

**TOSHIBA**

# Discrete Device Package Lineups

Selection  
Guide 2019





## Contents

### 1. Small Signal Devices 4-17

- Package Lineups
- Dimensional Outline

### 2. Logic ICs 18-24

- Package Lineups
- Dimensional Outline

### 3. Power MOSFETs 26-33

- Package Lineups
- Dimensional Outline

### 4. Power Discrete Devices 34-39

- Package Lineups
- Dimensional Outline

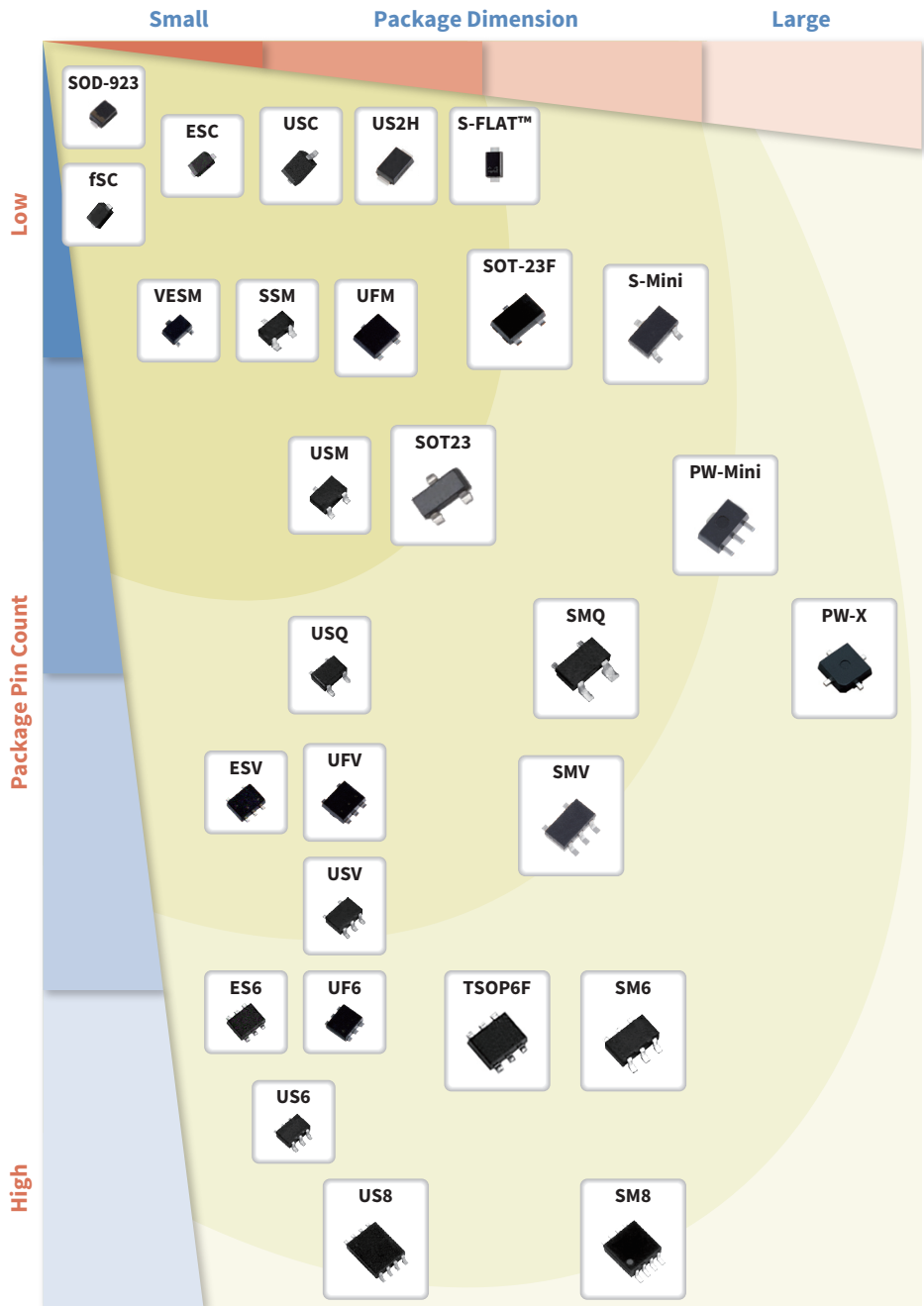
### 5. Photocouplers , Photorelays 40-51

- Package Lineups
- Dimensional Outline

# 1. Small Signal Devices

## Package Lineups

Surface Mount Type (Lead Type)

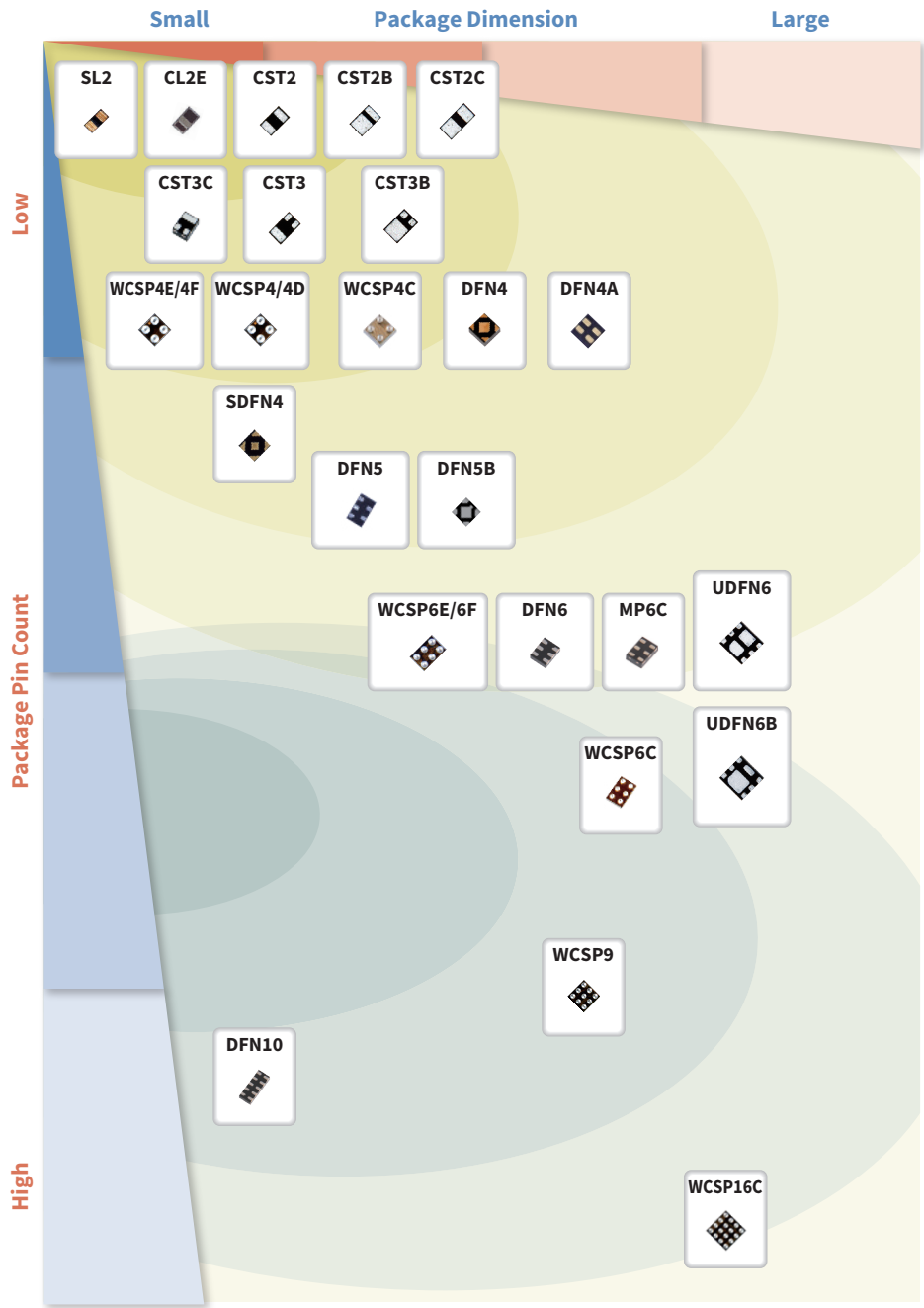


Surface Mount Type (Lead Type)

| Package          | Pin Count | Dimension<br>W x L (mm) | Products |        |                |            |             |                                         | Page |
|------------------|-----------|-------------------------|----------|--------|----------------|------------|-------------|-----------------------------------------|------|
|                  |           |                         | MOSFETs  | Diodes | LDO Regulators | Linear ICs | Transistors | RF Devices<br>(Radio-Frequency Devices) |      |
| fSC (SOD-923)    | 2         | 1.0 x 0.6               |          |        |                |            |             | ✓                                       | 8    |
| SOD-923          | 2         | 1.0 x 0.6               |          | ✓      |                |            |             |                                         | 8    |
| ESC (SOD-523)    | 2         | 1.6 x 0.8               |          | ✓      |                |            |             | ✓                                       | 8    |
| USC (SOD-323)    | 2         | 2.5 x 1.25              |          | ✓      |                |            |             | ✓                                       | 8    |
| US2H (SOD-323HE) | 2         | 2.5 x 1.4               |          | ✓      |                |            |             |                                         | 8    |
| S-FLAT           | 2         | 1.6 x 3.5               |          |        |                |            |             | ✓                                       | 8    |
| VESM (SOT-723)   | 3         | 1.2 x 1.2               | ✓        | ✓      |                |            | ✓           | ✓                                       | 9    |
| SSM (SOT-416)    | 3         | 1.6 x 1.6               | ✓        | ✓      |                |            | ✓           | ✓                                       | 9    |
| UFM (SOT-323F)   | 3         | 2.0 x 2.1               | ✓        |        |                |            | ✓           | ✓                                       | 9    |
| USM (SOT-323)    | 3         | 2.0 x 2.1               | ✓        | ✓      |                |            | ✓           | ✓                                       | 9    |
| SOT23            | 3         | 2.9 x 2.4               | ✓        | ✓      |                |            | ✓           |                                         | 9    |
| SOT-23F          | 3         | 2.9 x 2.4               | ✓        |        |                | ✓          |             | ✓                                       | 9    |
| S-Mini (SOT-346) | 3         | 2.9 x 2.5               | ✓        | ✓      |                |            | ✓           | ✓                                       | 10   |
| PW-Mini          | 3         | 4.6 x 4.2               |          |        |                |            |             | ✓                                       | 10   |
| USQ (SOT-343)    | 4         | 2.0 x 2.1               |          | ✓      |                |            |             | ✓                                       | 10   |
| SMQ (SOT-24)     | 4         | 2.9 x 2.9               |          | ✓      |                |            |             | ✓                                       | 10   |
| PW-X             | 4         | 6.1 x 6.3               |          |        |                |            |             | ✓                                       | 10   |
| ESV (SOT-553)    | 5         | 1.6 x 1.6               | ✓        | ✓      | ✓              |            | ✓           |                                         | 10   |
| UFV (SOT-353F)   | 5         | 2.0 x 2.1               | ✓        | ✓      | ✓              | ✓          |             |                                         | 11   |
| USV (SOT-353)    | 5         | 2.0 x 2.1               | ✓        | ✓      |                | ✓          | ✓           |                                         | 11   |
| SMV (SOT-25)     | 5         | 2.9 x 2.8               |          | ✓      | ✓              | ✓          | ✓           |                                         | 11   |
| ES6 (SOT-563)    | 6         | 1.6 x 1.6               | ✓        | ✓      |                |            | ✓           |                                         | 11   |
| UF6 (SOT-363F)   | 6         | 2.0 x 2.1               | ✓        |        |                |            |             |                                         | 11   |
| US6 (SOT-363)    | 6         | 2.0 x 2.1               | ✓        | ✓      |                |            | ✓           |                                         | 11   |
| SM6 (SOT-26)     | 6         | 2.9 x 2.8               |          | ✓      |                |            | ✓           |                                         | 12   |
| TSOP6F (SOT-26F) | 6         | 2.9 x 2.8               | ✓        |        |                |            |             |                                         | 12   |
| US8 (SOT-765)    | 8         | 2.0 x 3.1               |          |        |                | ✓          |             |                                         | 12   |
| SM8 (SOT-505)    | 8         | 2.9 x 4.0               |          |        |                | ✓          |             |                                         | 12   |

Note  
Linear ICs : Load Switch ICs , Power Multiplexer ICs , Operational Amplifier ICs , Comparator ICs , Magnetic Sensors

Surface Mount Type (Leadless Type)



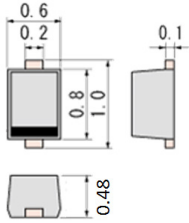
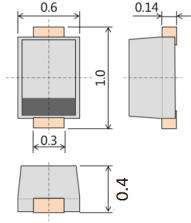
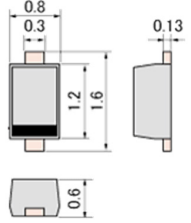
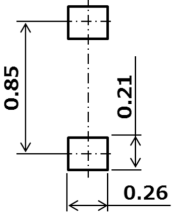
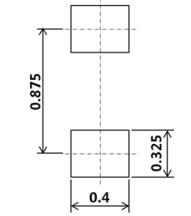
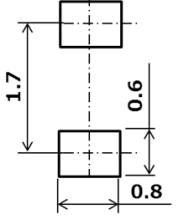
Surface Mount Type (Leadless Type)

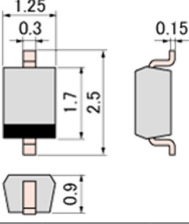
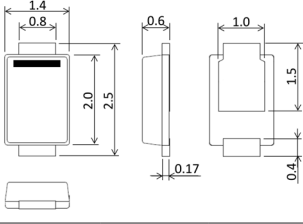
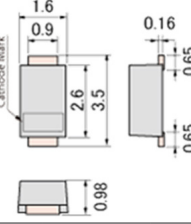
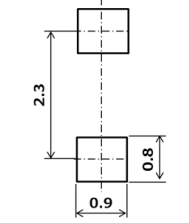
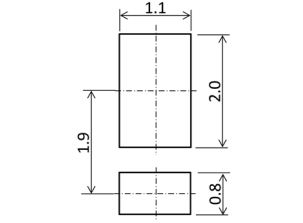
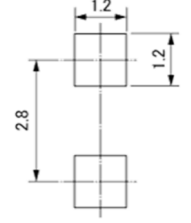
| Package           | Pin Count | Dimension<br>W x L (mm) | Products |        |                |            |             |                                         | Page |
|-------------------|-----------|-------------------------|----------|--------|----------------|------------|-------------|-----------------------------------------|------|
|                   |           |                         | MOSFETs  | Diodes | LDO Regulators | Linear ICs | Transistors | RF Devices<br>(Radio-Frequency Devices) |      |
| SL2 (SOD-962)     | 2         | 0.62 x 0.32             |          | ✓      |                |            |             | ✓                                       | 13   |
| CL2E              | 2         | 1.0 x 0.6               |          | ✓      |                |            |             |                                         | 13   |
| CST2 (SOD-882)    | 2         | 1.0 x 0.6               |          | ✓      |                |            |             | ✓                                       | 13   |
| CST2B             | 2         | 1.2 x 0.8               |          | ✓      |                |            |             |                                         | 13   |
| CST2C (SOD-963)   | 2         | 1.6 x 0.8               |          | ✓      |                |            |             |                                         | 13   |
| CST3C             | 3         | 0.8 x 0.6               | ✓        |        |                |            |             |                                         | 13   |
| CST3 (SOT-883)    | 3         | 1.0 x 0.6               | ✓        | ✓      |                |            | ✓           |                                         | 14   |
| CST3B             | 3         | 1.2 x 0.8               | ✓        |        |                |            |             |                                         | 14   |
| WCSP4E            | 4         | 0.645 x 0.645           |          |        | ✓              |            |             |                                         | 14   |
| WCSP4F            | 4         | 0.645 x 0.645           |          |        | ✓              |            |             |                                         | 14   |
| WCSP4             | 4         | 0.79 x 0.79             |          |        | ✓              |            |             |                                         | 14   |
| WCSP4D            | 4         | 0.79 x 0.79             |          |        |                | ✓          |             |                                         | 14   |
| SDFN4             | 4         | 0.8 x 0.8               |          |        | ✓              |            |             |                                         | 15   |
| WCSP4C            | 4         | 0.9 x 0.9               |          |        |                | ✓          |             |                                         | 15   |
| DFN4              | 4         | 1.0 x 1.0               |          |        | ✓              |            |             |                                         | 15   |
| DFN4A             | 4         | 1.2 x 1.2               |          |        |                | ✓          |             |                                         | 15   |
| DFN5B             | 5         | 1.2 x 1.2               |          |        | ✓              |            |             |                                         | 15   |
| DFN5              | 5         | 1.3 x 0.8               |          | ✓      |                |            |             |                                         | 15   |
| WCSP6E            | 6         | 1.2 x 0.8               |          |        |                | ✓          |             |                                         | 16   |
| WCSP6F            | 6         | 1.2 x 0.8               |          |        | ✓              |            |             |                                         | 16   |
| DFN6              | 6         | 1.25 x 1.0              |          | ✓      |                |            |             |                                         | 16   |
| MP6C              | 6         | 1.45 x 1.0              |          |        |                | ✓          |             |                                         | 16   |
| WCSP6C            | 6         | 1.5 x 1.0               | ✓        |        |                | ✓          |             |                                         | 16   |
| UDFN6 (SOT-1118)  | 6         | 2.0 x 2.0               | ✓        |        |                |            |             |                                         | 16   |
| UDFN6B (SOT-1220) | 6         | 2.0 x 2.0               | ✓        |        |                |            |             |                                         | 17   |
| WCSP9             | 9         | 1.5 x 1.5               |          |        |                | ✓          |             |                                         | 17   |
| DFN10             | 10        | 2.5 x 1.0               |          | ✓      |                |            |             |                                         | 17   |
| WCSP16C           | 16        | 1.9 x 1.9               |          |        |                | ✓          |             |                                         | 17   |

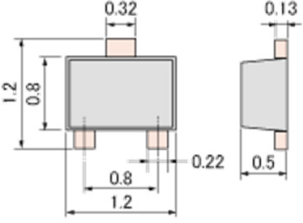
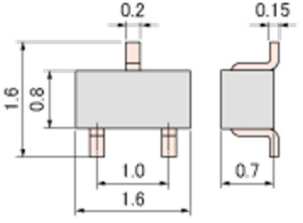
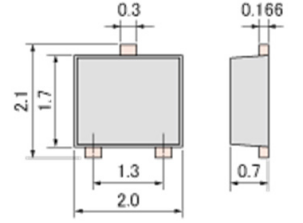
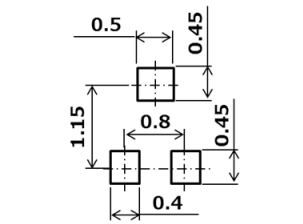
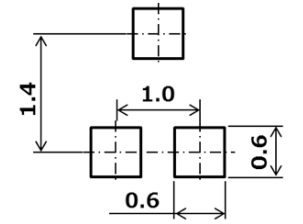
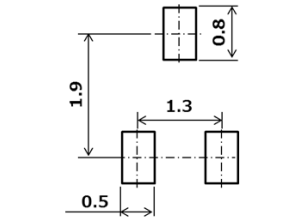
Note  
Linear ICs : Load Switch ICs , Power Multiplexer ICs , Operational Amplifier ICs , Comparator ICs , Magnetic Sensors

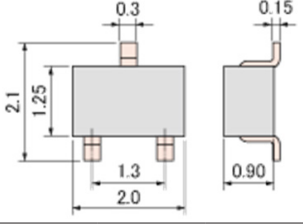
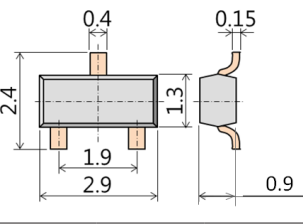
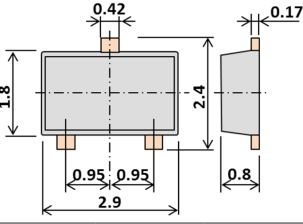
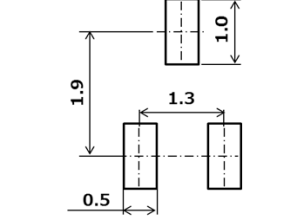
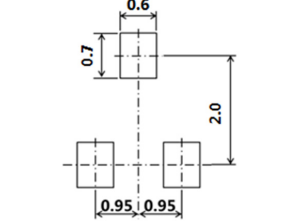
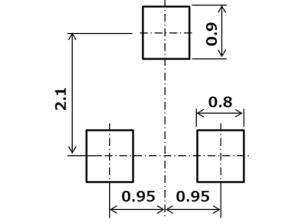
■ Dimensional Outline

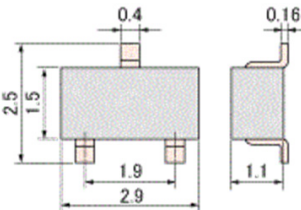
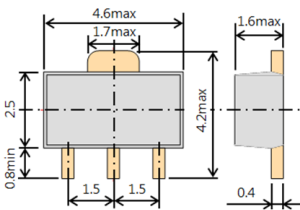
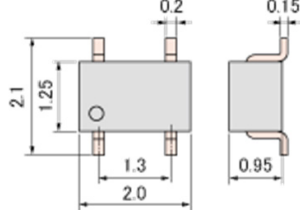
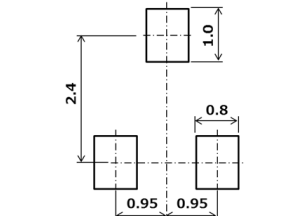
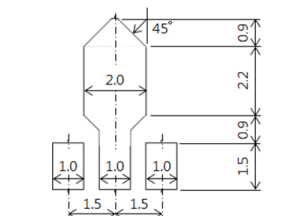
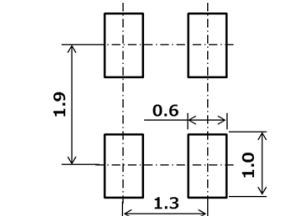
Surface Mount Type (Lead Type)

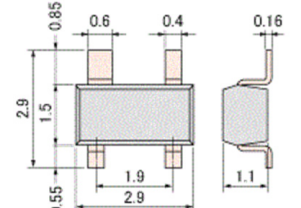
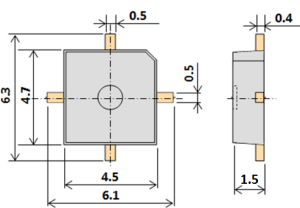
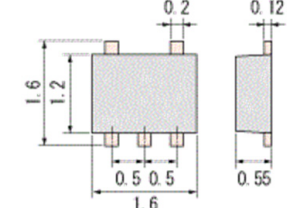
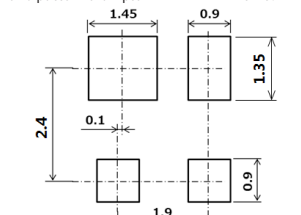
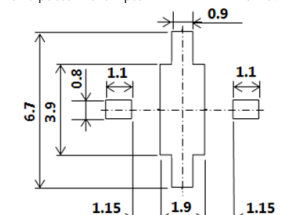
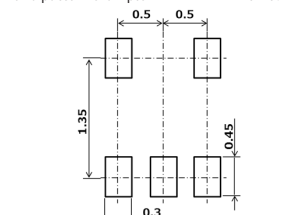
| fSC (SOD-923) (1.0x0.6)                                                           |        |               | SOD-923 (1.0x0.6)                                                                 |         |               | ESC (SOD-523) (1.6x0.8)                                                           |        |              |
|-----------------------------------------------------------------------------------|--------|---------------|-----------------------------------------------------------------------------------|---------|---------------|-----------------------------------------------------------------------------------|--------|--------------|
| Package dimension<br>unit : mm                                                    |        |               | Package dimension<br>unit : mm                                                    |         |               | Package dimension<br>unit : mm                                                    |        |              |
|  |        |               |  |         |               |  |        |              |
| Land pattern example<br>unit : mm                                                 |        |               | Land pattern example<br>unit : mm                                                 |         |               | Land pattern example<br>unit : mm                                                 |        |              |
|  |        |               |  |         |               |  |        |              |
| Pin count                                                                         | Weight | MOQ           | Pin count                                                                         | Weight  | MOQ           | Pin count                                                                         | Weight | MOQ          |
| 2                                                                                 | 0.6 mg | 10,000 p/reel | 2                                                                                 | 0.55 mg | 10,000 p/reel | 2                                                                                 | 1.4 mg | 8,000 p/reel |
| Reel dimension                                                                    |        | Tape width    | Reel dimension                                                                    |         | Tape width    | Reel dimension                                                                    |        | Tape width   |
| Diameter                                                                          | Width  |               | Diameter                                                                          | Width   |               | Diameter                                                                          | Width  |              |
| 180 mmΦ                                                                           | 9 mm   | 8 mm          | 180 mmΦ                                                                           | 9 mm    | 8 mm          | 180 mmΦ                                                                           | 9 mm   | 8 mm         |

| USC (SOD-323) (2.5x1.25)                                                            |        |              | US2H (SOD-323HE) (2.5x1.4)                                                          |        |              | S-FLAT™ (1.6x3.5)                                                                   |        |              |
|-------------------------------------------------------------------------------------|--------|--------------|-------------------------------------------------------------------------------------|--------|--------------|-------------------------------------------------------------------------------------|--------|--------------|
| Package dimension<br>unit : mm                                                      |        |              | Package dimension<br>unit : mm                                                      |        |              | Package dimension<br>unit : mm                                                      |        |              |
|   |        |              |   |        |              |   |        |              |
| Land pattern example<br>unit : mm                                                   |        |              | Land pattern example<br>unit : mm                                                   |        |              | Land pattern example<br>unit : mm                                                   |        |              |
|  |        |              |  |        |              |  |        |              |
| Pin count                                                                           | Weight | MOQ          | Pin count                                                                           | Weight | MOQ          | Pin count                                                                           | Weight | MOQ          |
| 2                                                                                   | 4.5 mg | 3,000 p/reel | 2                                                                                   | 5.4 mg | 3,000 p/reel | 2                                                                                   | 13 mg  | 3,000 p/reel |
| Reel dimension                                                                      |        | Tape width   | Reel dimension                                                                      |        | Tape width   | Reel dimension                                                                      |        | Tape width   |
| Diameter                                                                            | Width  |              | Diameter                                                                            | Width  |              | Diameter                                                                            | Width  |              |
| 180 mmΦ                                                                             | 9 mm   | 8 mm         | 180 mmΦ                                                                             | 9 mm   | 8 mm         | 180 mmΦ                                                                             | 9 mm   | 8 mm         |

| VESM (SOT-723) (1.2x1.2)                                                          |        |              | SSM (SOT-416) (1.6x1.6)                                                           |        |              | UFM (SOT-323F) (2.0x2.1)                                                           |        |              |
|-----------------------------------------------------------------------------------|--------|--------------|-----------------------------------------------------------------------------------|--------|--------------|------------------------------------------------------------------------------------|--------|--------------|
| Package dimension                                                                 |        | unit : mm    | Package dimension                                                                 |        | unit : mm    | Package dimension                                                                  |        | unit : mm    |
|  |        |              |  |        |              |  |        |              |
| Land pattern example                                                              |        | unit : mm    | Land pattern example                                                              |        | unit : mm    | Land pattern example                                                               |        | unit : mm    |
|  |        |              |  |        |              |  |        |              |
| Pin count                                                                         | Weight | MOQ          | Pin count                                                                         | Weight | MOQ          | Pin count                                                                          | Weight | MOQ          |
| 3                                                                                 | 1.5 mg | 8,000 p/reel | 3                                                                                 | 2.4 mg | 3,000 p/reel | 3                                                                                  | 6.6 mg | 3,000 p/reel |
| Reel dimension                                                                    |        | Tape width   | Reel dimension                                                                    |        | Tape width   | Reel dimension                                                                     |        | Tape width   |
| Diameter                                                                          | Width  |              | Diameter                                                                          | Width  |              | Diameter                                                                           | Width  |              |
| 180 mmΦ                                                                           | 9 mm   | 8 mm         | 180 mmΦ                                                                           | 9 mm   | 8 mm         | 180 mmΦ                                                                            | 9 mm   | 8 mm         |

| USM (SOT-323) (2.0x2.1)                                                             |        |              | SOT23 (SOT-23) (2.9x2.4)                                                            |        |              | SOT-23F (2.9x2.4)                                                                    |        |              |
|-------------------------------------------------------------------------------------|--------|--------------|-------------------------------------------------------------------------------------|--------|--------------|--------------------------------------------------------------------------------------|--------|--------------|
| Package dimension                                                                   |        | unit : mm    | Package dimension                                                                   |        | unit : mm    | Package dimension                                                                    |        | unit : mm    |
|   |        |              |   |        |              |   |        |              |
| Land pattern example                                                                |        | unit : mm    | Land pattern example                                                                |        | unit : mm    | Land pattern example                                                                 |        | unit : mm    |
|  |        |              |  |        |              |  |        |              |
| Pin count                                                                           | Weight | MOQ          | Pin count                                                                           | Weight | MOQ          | Pin count                                                                            | Weight | MOQ          |
| 3                                                                                   | 6 mg   | 3,000 p/reel | 3                                                                                   | 9 mg   | 3,000 p/reel | 3                                                                                    | 11 mg  | 3,000 p/reel |
| Reel dimension                                                                      |        | Tape width   | Reel dimension                                                                      |        | Tape width   | Reel dimension                                                                       |        | Tape width   |
| Diameter                                                                            | Width  |              | Diameter                                                                            | Width  |              | Diameter                                                                             | Width  |              |
| 180 mmΦ                                                                             | 9 mm   | 8 mm         | 180 mmΦ                                                                             | 9 mm   | 8 mm         | 180 mmΦ                                                                              | 9 mm   | 8 mm         |

| S-Mini (SOT-346) (2.9x2.5)                                                       |        |              | PW-Mini (4.6x4.2)                                                                 |        |              | USQ (SOT-343) (2.0x2.1)                                                            |        |              |
|----------------------------------------------------------------------------------|--------|--------------|-----------------------------------------------------------------------------------|--------|--------------|------------------------------------------------------------------------------------|--------|--------------|
| Package dimension                                                                |        | unit : mm    | Package dimension                                                                 |        | unit : mm    | Package dimension                                                                  |        | unit : mm    |
|  |        |              |  |        |              |  |        |              |
| Land pattern example                                                             |        | unit : mm    | Land pattern example                                                              |        | unit : mm    | Land pattern example                                                               |        | unit : mm    |
|  |        |              |  |        |              |  |        |              |
| Pin count                                                                        | Weight | MOQ          | Pin count                                                                         | Weight | MOQ          | Pin count                                                                          | Weight | MOQ          |
| 3                                                                                | 12 mg  | 3,000 p/reel | 3                                                                                 | 50 mg  | 1,000 p/reel | 4                                                                                  | 6 mg   | 3,000 p/reel |
| Reel dimension                                                                   |        | Tape width   | Reel dimension                                                                    |        | Tape width   | Reel dimension                                                                     |        | Tape width   |
| Diameter                                                                         | Width  |              | Diameter                                                                          | Width  |              | Diameter                                                                           | Width  |              |
| 180 mmΦ                                                                          | 9 mm   | 8 mm         | 180 mmΦ                                                                           | 13 mm  | 12 mm        | 180 mmΦ                                                                            | 9 mm   | 8 mm         |

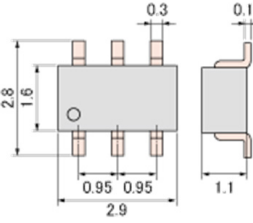
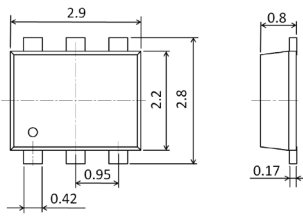
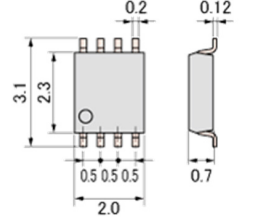
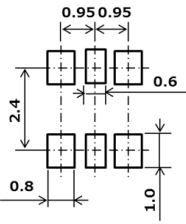
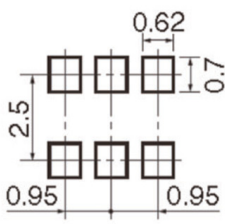
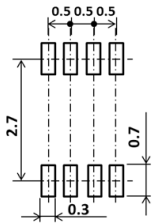
| SMQ (SOT-24) (2.9x2.9)                                                             |        |              | PW-X (6.1x6.3)                                                                      |        |              | ESV (SOT-553) (1.6x1.6)                                                              |        |            |
|------------------------------------------------------------------------------------|--------|--------------|-------------------------------------------------------------------------------------|--------|--------------|--------------------------------------------------------------------------------------|--------|------------|
| Package dimension                                                                  |        | unit : mm    | Package dimension                                                                   |        | unit : mm    | Package dimension                                                                    |        | unit : mm  |
|   |        |              |   |        |              |   |        |            |
| Land pattern example                                                               |        | unit : mm    | Land pattern example                                                                |        | unit : mm    | Land pattern example                                                                 |        | unit : mm  |
|  |        |              |  |        |              |  |        |            |
| Pin count                                                                          | Weight | MOQ          | Pin count                                                                           | Weight | MOQ          | Pin count                                                                            | Weight | MOQ        |
| 4                                                                                  | 13 mg  | 3,000 p/reel | 4                                                                                   | 80 mg  | 1,000 p/reel | 5                                                                                    | 3 mg   | - *        |
| Reel dimension                                                                     |        | Tape width   | Reel dimension                                                                      |        | Tape width   | Reel dimension                                                                       |        | Tape width |
| Diameter                                                                           | Width  |              | Diameter                                                                            | Width  |              | Diameter                                                                             | Width  |            |
| 180 mmΦ                                                                            | 9 mm   | 8 mm         | 180 mmΦ                                                                             | 13 mm  | 12 mm        | 180 mmΦ                                                                              | 9 mm   | 8 mm       |

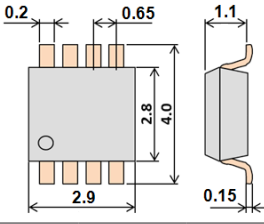
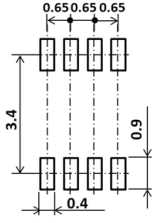
\* TPL3 8,000p/reel, TE85L 4,000p/reel

| UFV (SOT-353F) (2.0x2.1) |        |              | USV (SOT-353) (2.0x2.1) |        |              | SMV (SOT-25) (2.9x2.8) |        |              |
|--------------------------|--------|--------------|-------------------------|--------|--------------|------------------------|--------|--------------|
| Package dimension        |        | unit : mm    | Package dimension       |        | unit : mm    | Package dimension      |        | unit : mm    |
|                          |        |              |                         |        |              |                        |        |              |
| Land pattern example     |        | unit : mm    | Land pattern example    |        | unit : mm    | Land pattern example   |        | unit : mm    |
|                          |        |              |                         |        |              |                        |        |              |
| Pin count                | Weight | MOQ          | Pin count               | Weight | MOQ          | Pin count              | Weight | MOQ          |
| 5                        | 7 mg   | 3,000 p/reel | 5                       | 6 mg   | 3,000 p/reel | 5                      | 14 mg  | 3,000 p/reel |
| Reel dimension           |        | Tape width   | Reel dimension          |        | Tape width   | Reel dimension         |        | Tape width   |
| Diameter                 | Width  |              | Diameter                | Width  |              | Diameter               | Width  |              |
| 180 mmΦ                  | 9 mm   | 8 mm         | 180 mmΦ                 | 9 mm   | 8 mm         | 180 mmΦ                | 9 mm   | 8 mm         |

| ES6 (SOT-563) (1.6x1.6) |        |            | UF6 (SOT-363F) (2.0x2.1) |        |              | US6 (SOT-363) (2.0x2.1) |        |              |
|-------------------------|--------|------------|--------------------------|--------|--------------|-------------------------|--------|--------------|
| Package dimension       |        | unit : mm  | Package dimension        |        | unit : mm    | Package dimension       |        | unit : mm    |
|                         |        |            |                          |        |              |                         |        |              |
| Land pattern example    |        | unit : mm  | Land pattern example     |        | unit : mm    | Land pattern example    |        | unit : mm    |
|                         |        |            |                          |        |              |                         |        |              |
| Pin count               | Weight | MOQ        | Pin count                | Weight | MOQ          | Pin count               | Weight | MOQ          |
| 6                       | 3 mg   | - *        | 6                        | 7 mg   | 3,000 p/reel | 6                       | 6.8 mg | 3,000 p/reel |
| Reel dimension          |        | Tape width | Reel dimension           |        | Tape width   | Reel dimension          |        | Tape width   |
| Diameter                | Width  |            | Diameter                 | Width  |              | Diameter                | Width  |              |
| 180 mmΦ                 | 9 mm   | 8 mm       | 180 mmΦ                  | 9 mm   | 8 mm         | 180 mmΦ                 | 9 mm   | 8 mm         |

\* TPL3 8,000p/reel, TE85L 4,000p/reel

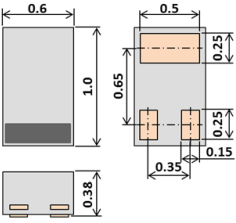
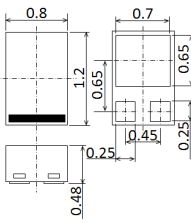
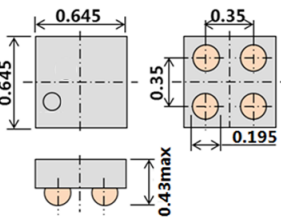
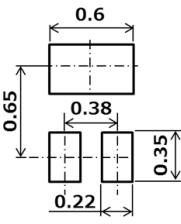
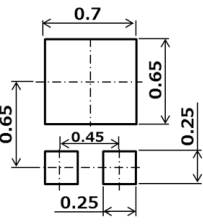
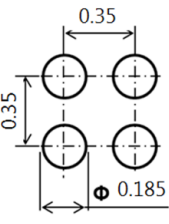
| SM6 (SOT-26) (2.9x2.8)                                                                                    |        |              | TSOP6F (SOT-26F) (2.9x2.8)                                                                                |        |              | US8 (SOT-765) (2.0x3.1)                                                                                   |        |              |
|-----------------------------------------------------------------------------------------------------------|--------|--------------|-----------------------------------------------------------------------------------------------------------|--------|--------------|-----------------------------------------------------------------------------------------------------------|--------|--------------|
| Package dimension<br>     |        |              | Package dimension<br>    |        |              | Package dimension<br>   |        |              |
| Land pattern example<br> |        |              | Land pattern example<br> |        |              | Land pattern example<br> |        |              |
| Pin count                                                                                                 | Weight | MOQ          | Pin count                                                                                                 | Weight | MOQ          | Pin count                                                                                                 | Weight | MOQ          |
| 6                                                                                                         | 15 mg  | 3,000 p/reel | 6                                                                                                         | 16 mg  | 3,000 p/reel | 8                                                                                                         | 8.8 mg | 3,000 p/reel |
| Reel dimension                                                                                            |        | Tape width   | Reel dimension                                                                                            |        | Tape width   | Reel dimension                                                                                            |        | Tape width   |
| Diameter                                                                                                  | Width  |              | Diameter                                                                                                  | Width  |              | Diameter                                                                                                  | Width  |              |
| 180 mmΦ                                                                                                   | 9 mm   | 8 mm         | 180 mmΦ                                                                                                   | 9 mm   | 8 mm         | 180 mmΦ                                                                                                   | 9 mm   | 8 mm         |

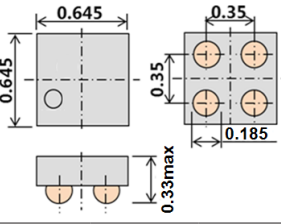
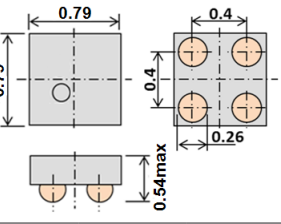
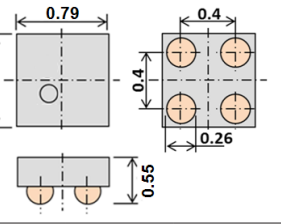
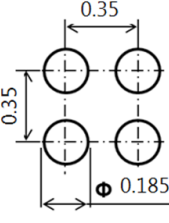
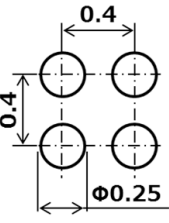
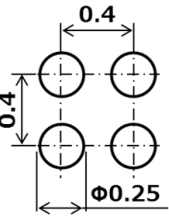
| SM8 (SOT-505) (2.9x4.0)                                                                                     |        |              |
|-------------------------------------------------------------------------------------------------------------|--------|--------------|
| Package dimension<br>      |        |              |
| Land pattern example<br> |        |              |
| Pin count                                                                                                   | Weight | MOQ          |
| 8                                                                                                           | 21 mg  | 3,000 p/reel |
| Reel dimension                                                                                              |        | Tape width   |
| Diameter                                                                                                    | Width  |              |
| 180 mmΦ                                                                                                     | 13 mm  | 12 mm        |

Surface Mount Type (Leadless Type)

| SL2 (SOD-962) (0.62x0.32)      |        |               | CL2E (1.0x0.6)                 |         |               | CST2 (SOD-882) (1.0x0.6)       |        |               |
|--------------------------------|--------|---------------|--------------------------------|---------|---------------|--------------------------------|--------|---------------|
| Package dimension unit : mm    |        |               | Package dimension unit : mm    |         |               | Package dimension unit : mm    |        |               |
|                                |        |               |                                |         |               |                                |        |               |
| Land pattern example unit : mm |        |               | Land pattern example unit : mm |         |               | Land pattern example unit : mm |        |               |
|                                |        |               |                                |         |               |                                |        |               |
| Pin count                      | Weight | MOQ           | Pin count                      | Weight  | MOQ           | Pin count                      | Weight | MOQ           |
| 2                              | 0.2 mg | 10,000 p/reel | 2                              | 0.39 mg | 10,000 p/reel | 2                              | 0.7 mg | 10,000 p/reel |
| Reel dimension                 |        | Tape width    | Reel dimension                 |         | Tape width    | Reel dimension                 |        | Tape width    |
| Diameter                       | Width  |               | Diameter                       | Width   |               | Diameter                       | Width  |               |
| 180 mmΦ                        | 9 mm   | 8 mm          | 180 mmΦ                        | 9 mm    | 8 mm          | 180 mmΦ                        | 9 mm   | 8 mm          |

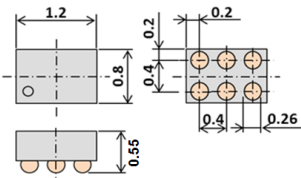
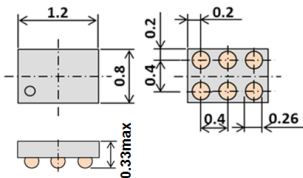
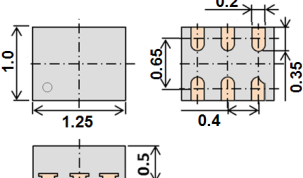
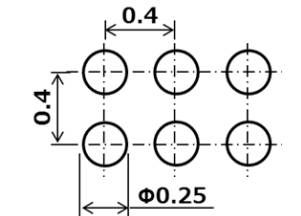
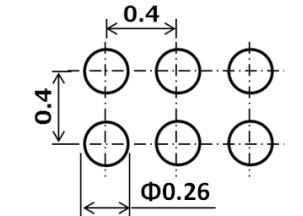
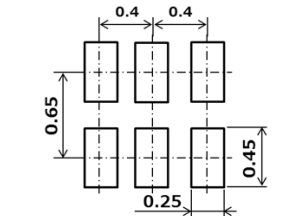
| CST2B (1.2x0.8)                |        |               | CST2C (SOD-963) (1.6x0.8)      |        |               | CST3C (0.8x0.6)                |         |               |
|--------------------------------|--------|---------------|--------------------------------|--------|---------------|--------------------------------|---------|---------------|
| Package dimension unit : mm    |        |               | Package dimension unit : mm    |        |               | Package dimension unit : mm    |         |               |
|                                |        |               |                                |        |               |                                |         |               |
| Land pattern example unit : mm |        |               | Land pattern example unit : mm |        |               | Land pattern example unit : mm |         |               |
|                                |        |               |                                |        |               |                                |         |               |
| Pin count                      | Weight | MOQ           | Pin count                      | Weight | MOQ           | Pin count                      | Weight  | MOQ           |
| 2                              | 0.7 mg | 10,000 p/reel | 2                              | 1.5 mg | 10,000 p/reel | 3                              | 0.63 mg | 10,000 p/reel |
| Reel dimension                 |        | Tape width    | Reel dimension                 |        | Tape width    | Reel dimension                 |         | Tape width    |
| Diameter                       | Width  |               | Diameter                       | Width  |               | Diameter                       | Width   |               |
| 180 mmΦ                        | 9 mm   | 8 mm          | 180 mmΦ                        | 9 mm   | 8 mm          | 180 mmΦ                        | 9 mm    | 8 mm          |

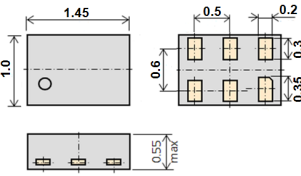
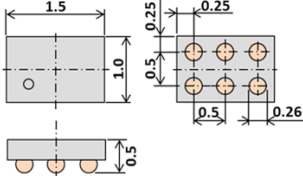
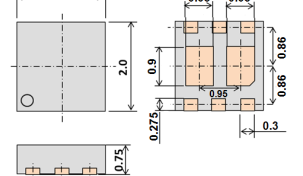
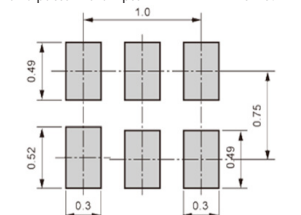
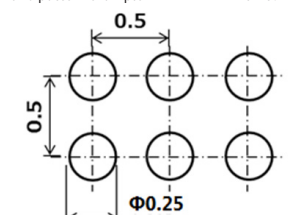
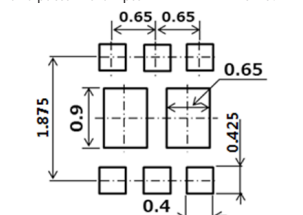
| CST3 (SOT-883) (1.0x0.6)                                                          |         |               | CST3B (1.2x0.8)                                                                   |        |               | WCSP4E (0.645x0.645)                                                               |         |              |
|-----------------------------------------------------------------------------------|---------|---------------|-----------------------------------------------------------------------------------|--------|---------------|------------------------------------------------------------------------------------|---------|--------------|
| Package dimension unit: mm                                                        |         |               | Package dimension unit: mm                                                        |        |               | Package dimension unit: mm                                                         |         |              |
|   |         |               |  |        |               |  |         |              |
| Land pattern example unit: mm                                                     |         |               | Land pattern example unit: mm                                                     |        |               | Land pattern example unit: mm                                                      |         |              |
|  |         |               |  |        |               |   |         |              |
| Pin count                                                                         | Weight  | MOQ           | Pin count                                                                         | Weight | MOQ           | Pin count                                                                          | Weight  | MOQ          |
| 3                                                                                 | 0.75 mg | 10,000 p/reel | 3                                                                                 | 1.5 mg | 10,000 p/reel | 4                                                                                  | 0.34 mg | 5,000 p/reel |
| Reel dimension                                                                    |         | Tape width    | Reel dimension                                                                    |        | Tape width    | Reel dimension                                                                     |         | Tape width   |
| Diameter                                                                          | Width   |               | Diameter                                                                          | Width  |               | Diameter                                                                           | Width   |              |
| 180 mmΦ                                                                           | 9 mm    | 8 mm          | 180 mmΦ                                                                           | 9 mm   | 8 mm          | 180 mmΦ                                                                            | 9 mm    | 8 mm         |

| WCSP4F (0.645x0.645)                                                                |         |              | WCSP4 (0.79x0.79)                                                                   |        |              | WCSP4D (0.79x0.79)                                                                  |         |              |
|-------------------------------------------------------------------------------------|---------|--------------|-------------------------------------------------------------------------------------|--------|--------------|-------------------------------------------------------------------------------------|---------|--------------|
| Package dimension unit: mm                                                          |         |              | Package dimension unit: mm                                                          |        |              | Package dimension unit: mm                                                          |         |              |
|    |         |              |   |        |              |  |         |              |
| Land pattern example unit: mm                                                       |         |              | Land pattern example unit: mm                                                       |        |              | Land pattern example unit: mm                                                       |         |              |
|  |         |              |  |        |              |  |         |              |
| Pin count                                                                           | Weight  | MOQ          | Pin count                                                                           | Weight | MOQ          | Pin count                                                                           | Weight  | MOQ          |
| 4                                                                                   | 0.26 mg | 5,000 p/reel | 4                                                                                   | 0.7 mg | 3,000 p/reel | 4                                                                                   | 0.79 mg | 5,000 p/reel |
| Reel dimension                                                                      |         | Tape width   | Reel dimension                                                                      |        | Tape width   | Reel dimension                                                                      |         | Tape width   |
| Diameter                                                                            | Width   |              | Diameter                                                                            | Width  |              | Diameter                                                                            | Width   |              |
| 180 mmΦ                                                                             | 9 mm    | 8 mm         | 180 mmΦ                                                                             | 9 mm   | 8 mm         | 180 mmΦ                                                                             | 9 mm    | 8 mm         |

| SDFN4 (0.8x0.8)                   |        |               | WCSP4C (0.9x0.9)                  |        |              | DFN4 (1.0x1.0)                    |        |               |
|-----------------------------------|--------|---------------|-----------------------------------|--------|--------------|-----------------------------------|--------|---------------|
| Package dimension unit: mm<br>    |        |               | Package dimension unit: mm<br>    |        |              | Package dimension unit: mm<br>    |        |               |
| Land pattern example unit: mm<br> |        |               | Land pattern example unit: mm<br> |        |              | Land pattern example unit: mm<br> |        |               |
| Pin count                         | Weight | MOQ           | Pin count                         | Weight | MOQ          | Pin count                         | Weight | MOQ           |
| 4                                 | 0.6 mg | 10,000 p/reel | 4                                 | 0.9 mg | 3,000 p/reel | 4                                 | 1.3 mg | 10,000 p/reel |
| Reel dimension                    |        | Tape width    | Reel dimension                    |        | Tape width   | Reel dimension                    |        | Tape width    |
| Diameter                          | Width  |               | Diameter                          | Width  |              | Diameter                          | Width  |               |
| 180 mmΦ                           | 9 mm   | 8 mm          | 180 mmΦ                           | 9 mm   | 8 mm         | 180 mmΦ                           | 9 mm   | 8 mm          |

| DFN4A (1.2x1.2)                   |         |              | DFN5B (1.2x1.2)                   |        |              | DFN5 (1.3x0.8)                    |        |              |
|-----------------------------------|---------|--------------|-----------------------------------|--------|--------------|-----------------------------------|--------|--------------|
| Package dimension unit: mm<br>    |         |              | Package dimension unit: mm<br>    |        |              | Package dimension unit: mm<br>    |        |              |
| Land pattern example unit: mm<br> |         |              | Land pattern example unit: mm<br> |        |              | Land pattern example unit: mm<br> |        |              |
| Pin count                         | Weight  | MOQ          | Pin count                         | Weight | MOQ          | Pin count                         | Weight | MOQ          |
| 4                                 | 1.45 mg | 5,000 p/reel | 5                                 | 1.4 mg | 5,000 p/reel | 5                                 | 1 mg   | 5,000 p/reel |
| Reel dimension                    |         | Tape width   | Reel dimension                    |        | Tape width   | Reel dimension                    |        | Tape width   |
| Diameter                          | Width   |              | Diameter                          | Width  |              | Diameter                          | Width  |              |
| 180 mmΦ                           | 9 mm    | 8 mm         | 180 mmΦ                           | 9 mm   | 8 mm         | 180 mmΦ                           | 9 mm   | 8 mm         |

| WCSP6E (1.2x0.8)                                                                 |        |              | WCSP6F (1.2x0.8)                                                                  |         |              | DFN6 (1.25x1.0)                                                                    |        |              |
|----------------------------------------------------------------------------------|--------|--------------|-----------------------------------------------------------------------------------|---------|--------------|------------------------------------------------------------------------------------|--------|--------------|
| Package dimension unit: mm                                                       |        |              | Package dimension unit: mm                                                        |         |              | Package dimension unit: mm                                                         |        |              |
|  |        |              |  |         |              |  |        |              |
| Land pattern example unit: mm                                                    |        |              | Land pattern example unit: mm                                                     |         |              | Land pattern example unit: mm                                                      |        |              |
|  |        |              |  |         |              |  |        |              |
| Pin count                                                                        | Weight | MOQ          | Pin count                                                                         | Weight  | MOQ          | Pin count                                                                          | Weight | MOQ          |
| 6                                                                                | 1 mg   | 5,000 p/reel | 6                                                                                 | 0.61 mg | 5,000 p/reel | 6                                                                                  | 0.7 mg | 3,000 p/reel |
| Reel dimension                                                                   |        | Tape width   | Reel dimension                                                                    |         | Tape width   | Reel dimension                                                                     |        | Tape width   |
| Diameter                                                                         | Width  |              | Diameter                                                                          | Width   |              | Diameter                                                                           | Width  |              |
| 180 mmΦ                                                                          | 9 mm   | 8 mm         | 180 mmΦ                                                                           | 9 mm    | 8 mm         | 180 mmΦ                                                                            | 9 mm   | 8 mm         |

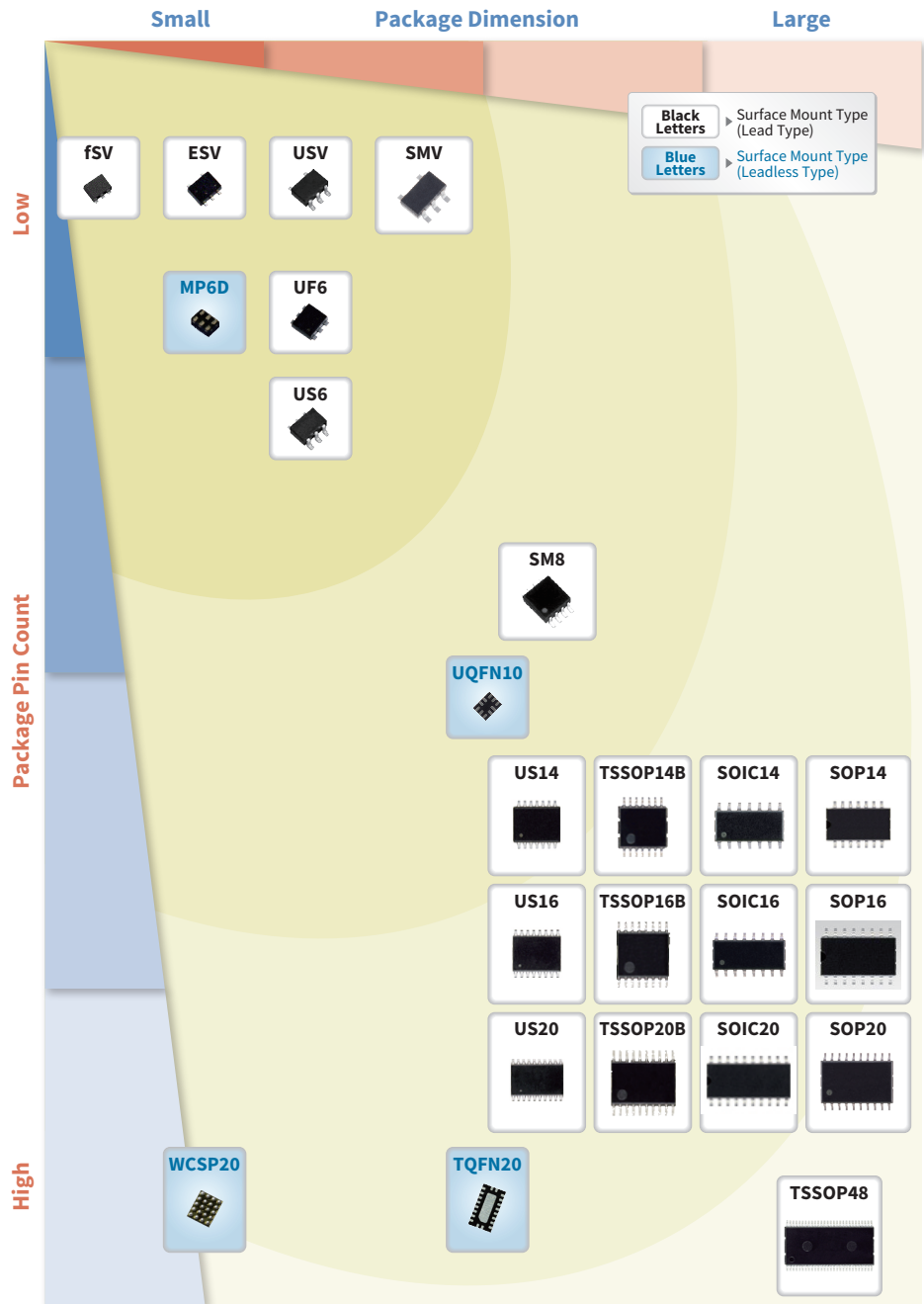
| MP6C (1.45x1.0)                                                                    |        |              | WCSP6C (1.5x1.0)                                                                    |        |              | UDFN6 (SOT-1118) (2.0x2.0)                                                           |        |              |
|------------------------------------------------------------------------------------|--------|--------------|-------------------------------------------------------------------------------------|--------|--------------|--------------------------------------------------------------------------------------|--------|--------------|
| Package dimension unit: mm                                                         |        |              | Package dimension unit: mm                                                          |        |              | Package dimension unit: mm                                                           |        |              |
|   |        |              |   |        |              |   |        |              |
| Land pattern example unit: mm                                                      |        |              | Land pattern example unit: mm                                                       |        |              | Land pattern example unit: mm                                                        |        |              |
|  |        |              |  |        |              |  |        |              |
| Pin count                                                                          | Weight | MOQ          | Pin count                                                                           | Weight | MOQ          | Pin count                                                                            | Weight | MOQ          |
| 6                                                                                  | 2.4 mg | 5,000 p/reel | 6                                                                                   | 1.4 mg | 3,000 p/reel | 6                                                                                    | 8.5 mg | 3,000 p/reel |
| Reel dimension                                                                     |        | Tape width   | Reel dimension                                                                      |        | Tape width   | Reel dimension                                                                       |        | Tape width   |
| Diameter                                                                           | Width  |              | Diameter                                                                            | Width  |              | Diameter                                                                             | Width  |              |
| 180 mmΦ                                                                            | 9 mm   | 8 mm         | 180 mmΦ                                                                             | 9 mm   | 8 mm         | 180 mmΦ                                                                              | 9 mm   | 8 mm         |

| UDFN6B (SOT-1220) (2.0x2.0)        |        |              | WCSP9 (1.5x1.5)                    |        |              | DFN10 (2.5x1.0)                    |        |              |
|------------------------------------|--------|--------------|------------------------------------|--------|--------------|------------------------------------|--------|--------------|
| Package dimension unit : mm<br>    |        |              | Package dimension unit : mm<br>    |        |              | Package dimension unit : mm<br>    |        |              |
| Land pattern example unit : mm<br> |        |              | Land pattern example unit : mm<br> |        |              | Land pattern example unit : mm<br> |        |              |
| Pin count                          | Weight | MOQ          | Pin count                          | Weight | MOQ          | Pin count                          | Weight | MOQ          |
| 6                                  | 8.5 mg | 3,000 p/reel | 9                                  | 3.5 mg | 5,000 p/reel | 10                                 | 3.2 mg | 3,000 p/reel |
| Reel dimension                     |        | Tape width   | Reel dimension                     |        | Tape width   | Reel dimension                     |        | Tape width   |
| Diameter                           | Width  |              | Diameter                           | Width  |              | Diameter                           | Width  |              |
| 180 mmΦ                            | 9 mm   | 8 mm         | 180 mmΦ                            | 9 mm   | 8 mm         | 180 mmΦ                            | 9 mm   | 8 mm         |

| WCSP16C (1.9x1.9)                  |        |              |
|------------------------------------|--------|--------------|
| Package dimension unit : mm<br>    |        |              |
| Land pattern example unit : mm<br> |        |              |
| Pin count                          | Weight | MOQ          |
| 16                                 | 3.9 mg | 5,000 p/reel |
| Reel dimension                     |        | Tape width   |
| Diameter                           | Width  |              |
| 180 mmΦ                            | 9 mm   | 8 mm         |

# 2. Logic ICs

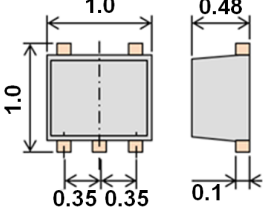
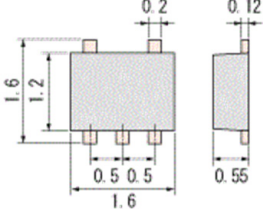
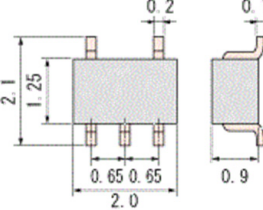
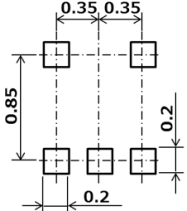
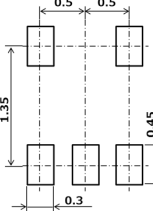
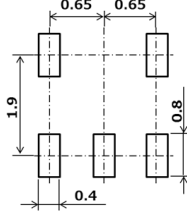
Package Lineups



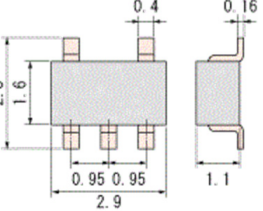
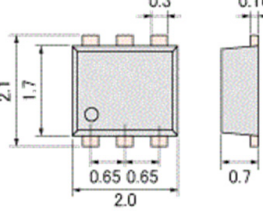
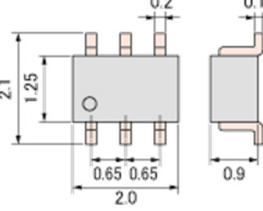
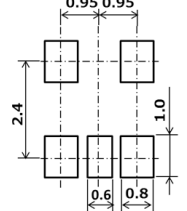
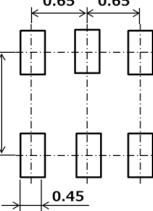
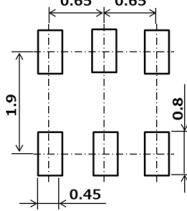
| Package                               |                | Pin Count | Dimension<br>W x L (mm) | Products       |                |              |                                                | Page |
|---------------------------------------|----------------|-----------|-------------------------|----------------|----------------|--------------|------------------------------------------------|------|
|                                       |                |           |                         | One-Gate Logic | CMOS Logic ICs | Bus Switches | Dual-Supply<br>Bidirectional Level<br>Shifters |      |
| Surface Mount Type<br>(Lead Type)     | fSV (SOT-953)  | 5         | 1.0 x 1.0               | ✓              |                |              |                                                | 20   |
|                                       | ESV (SOT-553)  | 5         | 1.6 x 1.6               | ✓              |                |              |                                                | 20   |
|                                       | USV (SOT-353)  | 5         | 2.0 x 2.1               | ✓              |                | ✓            |                                                | 20   |
|                                       | SMV (SOT-25)   | 5         | 2.9 x 2.8               | ✓              |                |              |                                                | 20   |
|                                       | UF6 (SOT-363F) | 6         | 2.0 x 2.1               |                |                | ✓            | ✓                                              | 20   |
|                                       | US6 (SOT-363)  | 6         | 2.0 x 2.1               | ✓              |                | ✓            |                                                | 20   |
|                                       | US8 (SOT-765)  | 8         | 2.0 x 3.1               | ✓              |                | ✓            |                                                | 21   |
|                                       | SM8 (SOT-505)  | 8         | 2.9 x 4.0               | ✓              |                |              |                                                | 21   |
|                                       | US14           | 14        | 4.0 x 4.0               |                | ✓              | ✓            |                                                | 21   |
|                                       | TSSOP14B       | 14        | 5.0 x 6.4               |                | ✓              |              |                                                | 21   |
|                                       | SOIC14         | 14        | 8.65 x 6.0              |                | ✓              |              |                                                | 21   |
|                                       | SOP14          | 14        | 10.3 x 7.8              |                | ✓              |              |                                                | 21   |
|                                       | US16           | 16        | 4.0 x 4.0               |                | ✓              | ✓            |                                                | 22   |
|                                       | TSSOP16B       | 16        | 5.0 x 6.4               |                | ✓              |              |                                                | 22   |
|                                       | SOIC16         | 16        | 9.9 x 6.0               |                | ✓              |              |                                                | 22   |
|                                       | SOP16          | 16        | 10.3 x 7.8              |                | ✓              |              |                                                | 22   |
|                                       | US20           | 20        | 5.0 x 4.0               |                | ✓              | ✓            |                                                | 22   |
|                                       | TSSOP20B       | 20        | 6.5 x 6.4               |                | ✓              |              |                                                | 22   |
|                                       | SOP20          | 20        | 12.8 x 7.8              |                | ✓              |              |                                                | 23   |
|                                       | SOIC20         | 20        | 12.8 x 10.3             |                | ✓              |              |                                                | 23   |
|                                       | TSSOP48        | 48        | 12.5 x 8.1              |                | ✓              |              |                                                | 23   |
| Surface Mount Type<br>(Leadless Type) | MP6D           | 6         | 1.45 x 1.0              |                |                | ✓            |                                                | 24   |
|                                       | UQFN10         | 10        | 1.8 X 1.4               |                |                | ✓            |                                                | 24   |
|                                       | TQFN20         | 20        | 4.5 x 2.5               |                |                | ✓            |                                                | 24   |
|                                       | WCSP20         | 20        | 1.6 x 2.0               |                |                | ✓            |                                                | 24   |

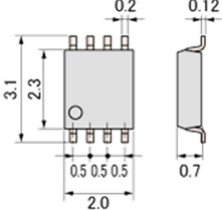
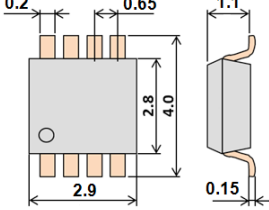
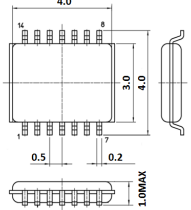
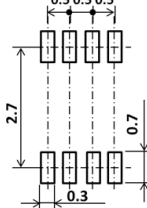
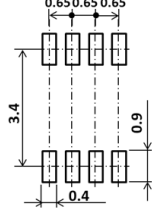
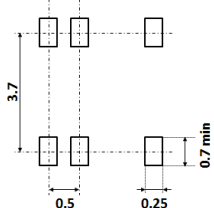
■ Dimensional Outline

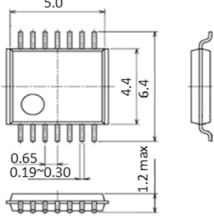
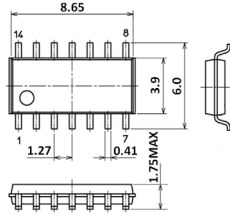
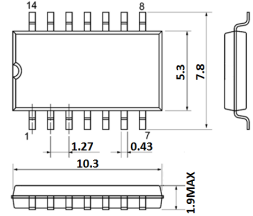
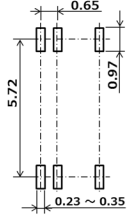
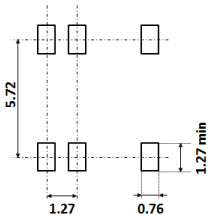
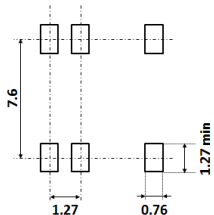
Surface Mount Type (Lead Type)

| fSV (SOT-953) (1.0x1.0)                                                           |        |               | ESV (SOT-553) (1.6x1.6)                                                           |        |            | USV (SOT-353) (2.0x2.1)                                                           |        |              |
|-----------------------------------------------------------------------------------|--------|---------------|-----------------------------------------------------------------------------------|--------|------------|-----------------------------------------------------------------------------------|--------|--------------|
| Package dimension<br>unit : mm                                                    |        |               | Package dimension<br>unit : mm                                                    |        |            | Package dimension<br>unit : mm                                                    |        |              |
|   |        |               |  |        |            |  |        |              |
| Land pattern example<br>unit : mm                                                 |        |               | Land pattern example<br>unit : mm                                                 |        |            | Land pattern example<br>unit : mm                                                 |        |              |
|  |        |               |  |        |            |  |        |              |
| Pin count                                                                         | Weight | MOQ           | Pin count                                                                         | Weight | MOQ        | Pin count                                                                         | Weight | MOQ          |
| 5                                                                                 | 1 mg   | 10,000 p/reel | 5                                                                                 | 3 mg   | - *        | 5                                                                                 | 6 mg   | 3,000 p/reel |
| Reel dimension                                                                    |        | Tape width    | Reel dimension                                                                    |        | Tape width | Reel dimension                                                                    |        | Tape width   |
| Diameter                                                                          | Width  |               | Diameter                                                                          | Width  |            | Diameter                                                                          | Width  |              |
| 180 mmΦ                                                                           | 9 mm   | 8 mm          | 180 mmΦ                                                                           | 9 mm   | 8 mm       | 180 mmΦ                                                                           | 9 mm   | 8 mm         |

\* TPL3 8,000p/reel, TE85L 4,000p/reel

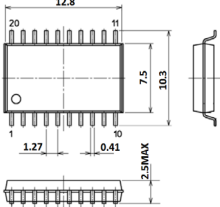
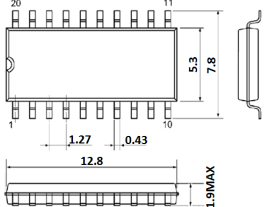
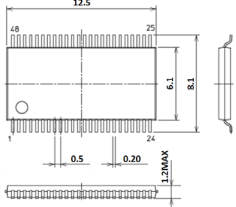
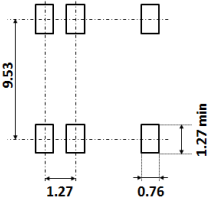
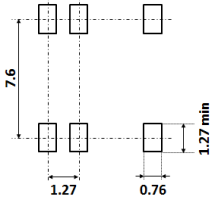
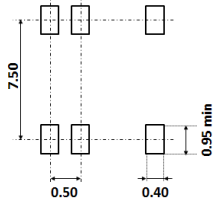
| SMV (SOT-25) (2.9x2.8)                                                              |        |              | UF6 (SOT-363F) (2.0x2.1)                                                            |        |              | US6 (SOT-363) (2.0x2.1)                                                             |        |              |
|-------------------------------------------------------------------------------------|--------|--------------|-------------------------------------------------------------------------------------|--------|--------------|-------------------------------------------------------------------------------------|--------|--------------|
| Package dimension<br>unit : mm                                                      |        |              | Package dimension<br>unit : mm                                                      |        |              | Package dimension<br>unit : mm                                                      |        |              |
|    |        |              |   |        |              |   |        |              |
| Land pattern example<br>unit : mm                                                   |        |              | Land pattern example<br>unit : mm                                                   |        |              | Land pattern example<br>unit : mm                                                   |        |              |
|  |        |              |  |        |              |  |        |              |
| Pin count                                                                           | Weight | MOQ          | Pin count                                                                           | Weight | MOQ          | Pin count                                                                           | Weight | MOQ          |
| 5                                                                                   | 14 mg  | 3,000 p/reel | 6                                                                                   | 7 mg   | 3,000 p/reel | 6                                                                                   | 6.8 mg | 3,000 p/reel |
| Reel dimension                                                                      |        | Tape width   | Reel dimension                                                                      |        | Tape width   | Reel dimension                                                                      |        | Tape width   |
| Diameter                                                                            | Width  |              | Diameter                                                                            | Width  |              | Diameter                                                                            | Width  |              |
| 180 mmΦ                                                                             | 9 mm   | 8 mm         | 180 mmΦ                                                                             | 9 mm   | 8 mm         | 180 mmΦ                                                                             | 9 mm   | 8 mm         |

| US8 (SOT-765) (2.0x3.1)                                                                                             |        |              | SM8 (SOT-505) (2.9x4.0)                                                                                             |        |              | US14 (4.0x4.0)                                                                                                       |        |              |
|---------------------------------------------------------------------------------------------------------------------|--------|--------------|---------------------------------------------------------------------------------------------------------------------|--------|--------------|----------------------------------------------------------------------------------------------------------------------|--------|--------------|
| Package dimension unit : mm<br>    |        |              | Package dimension unit : mm<br>    |        |              | Package dimension unit : mm<br>    |        |              |
| Land pattern example unit : mm<br> |        |              | Land pattern example unit : mm<br> |        |              | Land pattern example unit : mm<br> |        |              |
| Pin count                                                                                                           | Weight | MOQ          | Pin count                                                                                                           | Weight | MOQ          | Pin count                                                                                                            | Weight | MOQ          |
| 8                                                                                                                   | 8.8 mg | 3,000 p/reel | 8                                                                                                                   | 21 mg  | 3,000 p/reel | 14                                                                                                                   | 20 mg  | 2,500 p/reel |
| Reel dimension                                                                                                      |        | Tape width   | Reel dimension                                                                                                      |        | Tape width   | Reel dimension                                                                                                       |        | Tape width   |
| Diameter                                                                                                            | Width  |              | Diameter                                                                                                            | Width  |              | Diameter                                                                                                             | Width  |              |
| 180 mmΦ                                                                                                             | 9 mm   | 8 mm         | 180 mmΦ                                                                                                             | 13 mm  | 12 mm        | 254 mmΦ                                                                                                              | 13 mm  | 12 mm        |

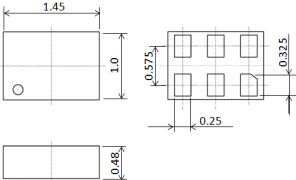
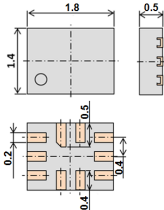
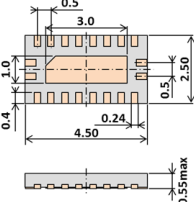
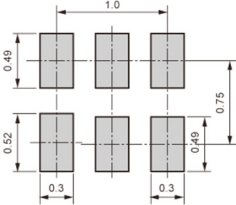
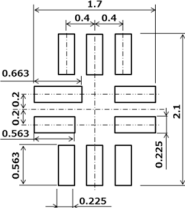
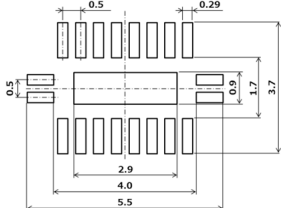
| TSSOP14B (5.0x6.4)                                                                                                    |         |              | SOIC14 (8.65x6.0)                                                                                                     |         |              | SOP14 (10.3x7.8)                                                                                                       |         |              |
|-----------------------------------------------------------------------------------------------------------------------|---------|--------------|-----------------------------------------------------------------------------------------------------------------------|---------|--------------|------------------------------------------------------------------------------------------------------------------------|---------|--------------|
| Package dimension unit : mm<br>     |         |              | Package dimension unit : mm<br>     |         |              | Package dimension unit : mm<br>     |         |              |
| Land pattern example unit : mm<br> |         |              | Land pattern example unit : mm<br> |         |              | Land pattern example unit : mm<br> |         |              |
| Pin count                                                                                                             | Weight  | MOQ          | Pin count                                                                                                             | Weight  | MOQ          | Pin count                                                                                                              | Weight  | MOQ          |
| 14                                                                                                                    | 54 mg   | 2,500 p/reel | 14                                                                                                                    | 130 mg  | 2,500 p/reel | 14                                                                                                                     | 180 mg  | 2,000 p/reel |
| Reel dimension                                                                                                        |         | Tape width   | Reel dimension                                                                                                        |         | Tape width   | Reel dimension                                                                                                         |         | Tape width   |
| Diameter                                                                                                              | Width   |              | Diameter                                                                                                              | Width   |              | Diameter                                                                                                               | Width   |              |
| 330 mmΦ                                                                                                               | 12.4 mm | 12 mm        | 330 mmΦ                                                                                                               | 17.4 mm | 16 mm        | 330 mmΦ                                                                                                                | 17.5 mm | 16 mm        |

| US16 (4.0x4.0)                     |        |              | TSSOP16B (5.0x6.4)                 |         |              | SOIC16 (9.9x6.0)                   |         |              |
|------------------------------------|--------|--------------|------------------------------------|---------|--------------|------------------------------------|---------|--------------|
| Package dimension unit : mm<br>    |        |              | Package dimension unit : mm<br>    |         |              | Package dimension unit : mm<br>    |         |              |
| Land pattern example unit : mm<br> |        |              | Land pattern example unit : mm<br> |         |              | Land pattern example unit : mm<br> |         |              |
| Pin count                          | Weight | MOQ          | Pin count                          | Weight  | MOQ          | Pin count                          | Weight  | MOQ          |
| 16                                 | 20 mg  | 2,500 p/reel | 16                                 | 55 mg   | 2,500 p/reel | 16                                 | 150 mg  | 2,500 p/reel |
| Reel dimension                     |        | Tape width   | Reel dimension                     |         | Tape width   | Reel dimension                     |         | Tape width   |
| Diameter                           | Width  |              | Diameter                           | Width   |              | Diameter                           | Width   |              |
| 254 mmΦ                            | 12 mm  | 12 mm        | 330 mmΦ                            | 12.4 mm | 12 mm        | 330 mmΦ                            | 17.4 mm | 16 mm        |

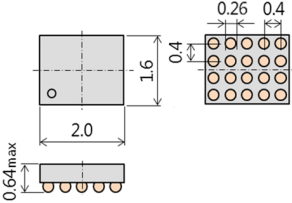
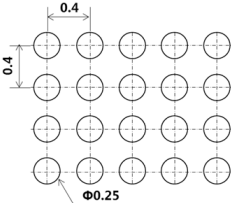
| SOP16 (10.3x7.8)                   |         |              | US20 (5.0x4.0)                     |        |              | TSSOP20B (6.5x6.4)                 |         |              |
|------------------------------------|---------|--------------|------------------------------------|--------|--------------|------------------------------------|---------|--------------|
| Package dimension unit : mm<br>    |         |              | Package dimension unit : mm<br>    |        |              | Package dimension unit : mm<br>    |         |              |
| Land pattern example unit : mm<br> |         |              | Land pattern example unit : mm<br> |        |              | Land pattern example unit : mm<br> |         |              |
| Pin count                          | Weight  | MOQ          | Pin count                          | Weight | MOQ          | Pin count                          | Weight  | MOQ          |
| 16                                 | 180 mg  | 2,000 p/reel | 20                                 | 30 mg  | 2,500 p/reel | 20                                 | 71 mg   | 2,000 p/reel |
| Reel dimension                     |         | Tape width   | Reel dimension                     |        | Tape width   | Reel dimension                     |         | Tape width   |
| Diameter                           | Width   |              | Diameter                           | Width  |              | Diameter                           | Width   |              |
| 330 mmΦ                            | 17.5 mm | 16 mm        | 254 mmΦ                            | 13 mm  | 12 mm        | 330 mmΦ                            | 17.5 mm | 16 mm        |

| SOIC20 (12.8x10.3)                                                                                                     |         |              | SOP20 (12.8x7.8)                                                                                                       |         |              | TSSOP48 (12.5x8.1)                                                                                                      |         |              |
|------------------------------------------------------------------------------------------------------------------------|---------|--------------|------------------------------------------------------------------------------------------------------------------------|---------|--------------|-------------------------------------------------------------------------------------------------------------------------|---------|--------------|
| Package dimension<br>unit : mm<br>    |         |              | Package dimension<br>unit : mm<br>    |         |              | Package dimension<br>unit : mm<br>    |         |              |
| Land pattern example<br>unit : mm<br> |         |              | Land pattern example<br>unit : mm<br> |         |              | Land pattern example<br>unit : mm<br> |         |              |
| Pin count                                                                                                              | Weight  | MOQ          | Pin count                                                                                                              | Weight  | MOQ          | Pin count                                                                                                               | Weight  | MOQ          |
| 20                                                                                                                     | 510 mg  | 2,000 p/reel | 20                                                                                                                     | 220 mg  | 2,000 p/reel | 48                                                                                                                      | 250 mg  | 1,000 p/reel |
| Reel dimension                                                                                                         |         | Tape width   | Reel dimension                                                                                                         |         | Tape width   | Reel dimension                                                                                                          |         | Tape width   |
| Diameter                                                                                                               | Width   |              | Diameter                                                                                                               | Width   |              | Diameter                                                                                                                | Width   |              |
| 330 mmΦ                                                                                                                | 25.4 mm | 24 mm        | 330 mmΦ                                                                                                                | 25.5 mm | 24 mm        | 330 mmΦ                                                                                                                 | 25.5 mm | 24 mm        |

Surface Mount Type (Leadless Type)

| MP6D (1.45x1.0)                                                                  |        |               | UQFN10 (1.8x1.4)                                                                  |        |              | TQFN20 (4.5x2.5)                                                                   |        |            |
|----------------------------------------------------------------------------------|--------|---------------|-----------------------------------------------------------------------------------|--------|--------------|------------------------------------------------------------------------------------|--------|------------|
| Package dimension<br>unit : mm                                                   |        |               | Package dimension<br>unit : mm                                                    |        |              | Package dimension<br>unit : mm                                                     |        |            |
|  |        |               |  |        |              |   |        |            |
| Land pattern example<br>unit : mm                                                |        |               | Land pattern example<br>unit : mm                                                 |        |              | Land pattern example<br>unit : mm                                                  |        |            |
|  |        |               |  |        |              |  |        |            |
| Pin count                                                                        | Weight | MOQ           | Pin count                                                                         | Weight | MOQ          | Pin count                                                                          | Weight | MOQ        |
| 6                                                                                | 2.4 mg | 10,000 p/reel | 10                                                                                | 3.5 mg | 3,000 p/reel | 20                                                                                 | 17 mg  | - *        |
| Reel dimension                                                                   |        | Tape width    | Reel dimension                                                                    |        | Tape width   | Reel dimension                                                                     |        | Tape width |
| Diameter                                                                         | Width  |               | Diameter                                                                          | Width  |              | Diameter                                                                           | Width  |            |
| 180 mmΦ                                                                          | 9 mm   | 8 mm          | 179 mmΦ                                                                           | 8.4 mm | 8 mm         | 179 mmΦ                                                                            | 13 mm  | 12 mm      |

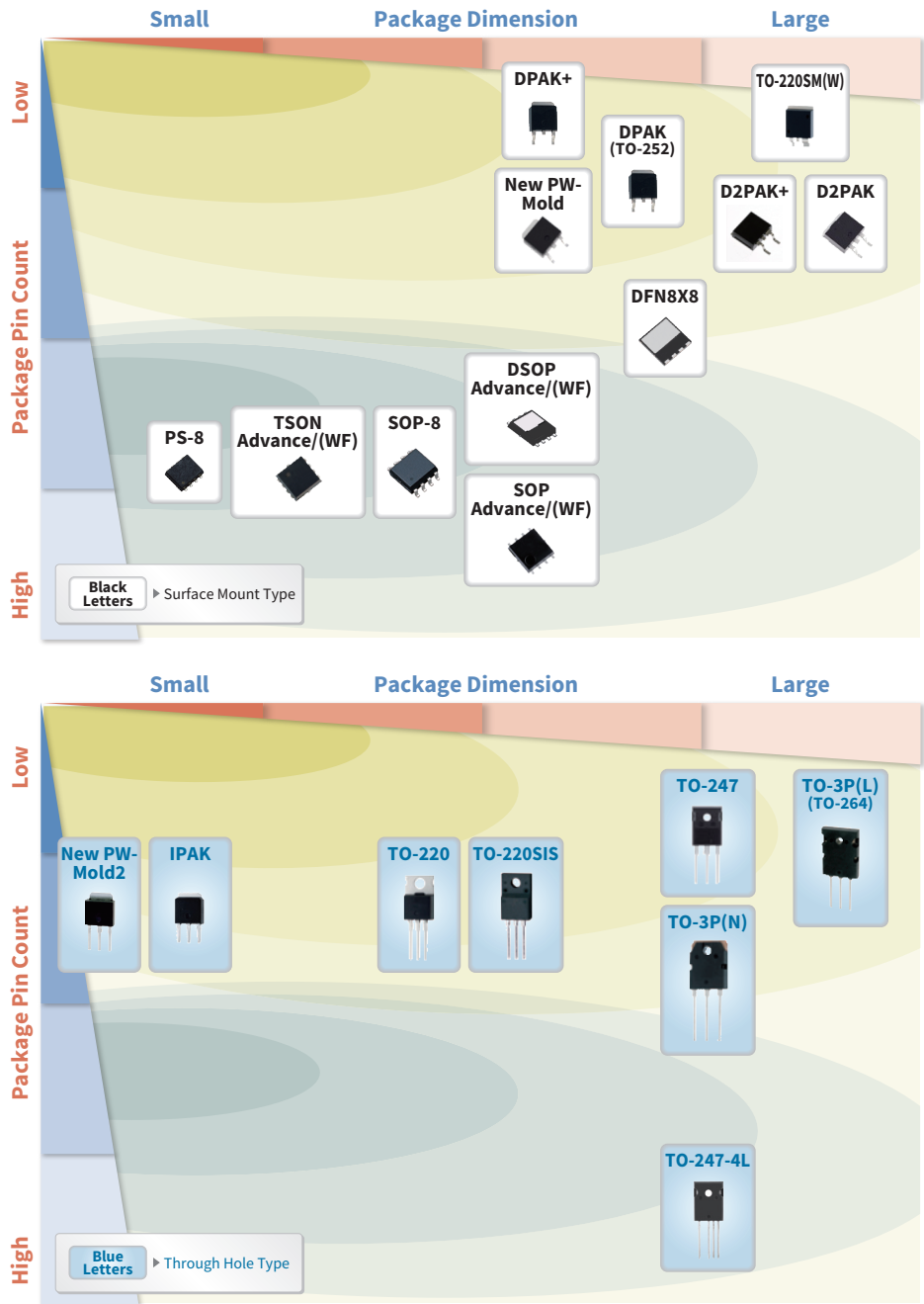
\* 3,000 or 5,000pcs/reel

| WCSP20 (1.6x2.0)                                                                    |        |              |
|-------------------------------------------------------------------------------------|--------|--------------|
| Package dimension<br>unit : mm                                                      |        |              |
|    |        |              |
| Land pattern example<br>unit : mm                                                   |        |              |
|  |        |              |
| Pin count                                                                           | Weight | MOQ          |
| 20                                                                                  | 5 mg   | 3,000 p/reel |
| Reel dimension                                                                      |        | Tape width   |
| Diameter                                                                            | Width  |              |
| 180 mmΦ                                                                             | 9 mm   | 8 mm         |



# 3. Power MOSFETs

## ■ Package Lineups



| Package            |                     | Pin Count          | Dimension<br>W x L (mm) | Page |
|--------------------|---------------------|--------------------|-------------------------|------|
| Surface Mount Type | DPAK+               | 3                  | 6.5 x 9.5               | 28   |
|                    | New PW-Mold         | 3                  | 6.5 x 9.5               | 28   |
|                    | DPAK                | 3                  | 6.6 x 10.0              | 28   |
|                    | TO-220SM(W)         | 3                  | 10.0 x 13.0             | 28   |
|                    | D2PAK+              | 3                  | 10.0 x 15.0             | 28   |
|                    | D2PAK               | 3                  | 10.35 x 15.3            | 29   |
|                    | DFN8x8              | 5                  | 8.0 x 8.0               | 29   |
|                    | PS-8                | 8                  | 2.9 x 2.8               | 29   |
|                    | TSOP Advance        | 8                  | 3.1 x 3.3               | 29   |
|                    | SOP-8               | 8                  | 4.9 x 6.0               | 29   |
|                    | DSOP Advance        | 8                  | 5.0 x 6.0               | 30   |
|                    | SOP Advance         | 8                  | 5.0 x 6.0               | 30   |
|                    | Wettable Flank Lead | TSOP Advance (WF)  | 3.1 x 3.6               | 31   |
|                    |                     | DSOP Advance (WF)L | 5.0 x 6.0               | 31   |
|                    |                     | DSOP Advance (WF)M | 5.0 x 6.0               | 31   |
|                    |                     | SOP Advance (WF)   | 5.0 x 6.0               | 31   |
| Through Hole Type  | New PW-Mold2        | 3                  | 6.5 x 5.5               | 32   |
|                    | IPAK                | 3                  | 6.65 x 6.1              | 32   |
|                    | TO-220              | 3                  | 10.16 x 8.59            | 32   |
|                    | TO-220SIS           | 3                  | 10.0 x 15.0             | 32   |
|                    | TO-3P(N)            | 3                  | 15.5 x 20.0             | 32   |
|                    | TO-247              | 3                  | 15.94 x 20.95           | 32   |
|                    | TO-3P(L)            | 3                  | 20.0 x 26.0             | 33   |
|                    | TO-247-4L           | 4                  | 15.94 x 20.95           | 33   |

# ■ Dimensional Outline

## Surface Mount Type

| DPAK+ (6.5x9.5)               |         |              | New PW-Mold (6.5x9.5)         |         |              | DPAK 2-7K1S (TO-252) (6.6x10.0) |         |              |
|-------------------------------|---------|--------------|-------------------------------|---------|--------------|---------------------------------|---------|--------------|
| Package dimension unit: mm    |         |              | Package dimension unit: mm    |         |              | Package dimension unit: mm      |         |              |
|                               |         |              |                               |         |              |                                 |         |              |
| Land pattern example unit: mm |         |              | Land pattern example unit: mm |         |              | Land pattern example unit: mm   |         |              |
|                               |         |              |                               |         |              |                                 |         |              |
| Pin count                     | Weight  | MOQ          | Pin count                     | Weight  | MOQ          | Pin count                       | Weight  | MOQ          |
| 3                             | 360 mg  | 2,000 p/reel | 3                             | 360 mg  | 2,000 p/reel | 3                               | 360 mg  | 2,000 p/reel |
| Reel dimension                |         | Tape width   | Reel dimension                |         | Tape width   | Reel dimension                  |         | Tape width   |
| Diameter                      | Width   |              | Diameter                      | Width   |              | Diameter                        | Width   |              |
| 330 mmΦ                       | 17.5 mm | 16 mm        | 330 mmΦ                       | 17.5 mm | 16 mm        | 332 mmΦ                         | 16.4 mm | 16 mm        |

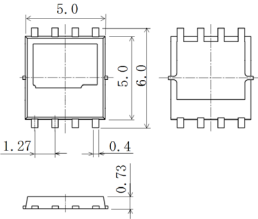
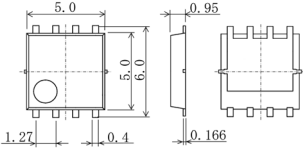
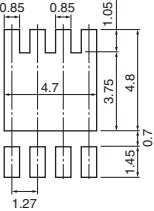
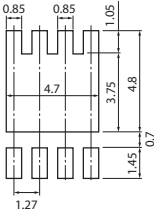
| DPAK 2-7N1S (TO-252)          |         |              | TO-220SM(W) (10.0x13.0)       |         |              | D2PAK+ (10.0x15.0)            |           |              |
|-------------------------------|---------|--------------|-------------------------------|---------|--------------|-------------------------------|-----------|--------------|
| Package dimension unit: mm    |         |              | Package dimension unit: mm    |         |              | Package dimension unit: mm    |           |              |
|                               |         |              |                               |         |              |                               |           |              |
| Land pattern example unit: mm |         |              | Land pattern example unit: mm |         |              | Land pattern example unit: mm |           |              |
|                               |         |              |                               |         |              |                               |           |              |
| Pin count                     | Weight  | MOQ          | Pin count                     | Weight  | MOQ          | Pin count                     | Weight    | MOQ          |
| 3                             | 389 mg  | 2,500 p/reel | 3                             | 1070 mg | 1,000 p/reel | 3                             | 992 mg mg | 1,000 p/reel |
| Reel dimension                |         | Tape width   | Reel dimension                |         | Tape width   | Reel dimension                |           | Tape width   |
| Diameter                      | Width   |              | Diameter                      | Width   |              | Diameter                      | Width     |              |
| 330 mmΦ                       | 17.2 mm | 16 mm        | 330 mmΦ                       | 25.5 mm | 24 mm        | 330 mmΦ                       | 25.5 mm   | 24 mm        |

| D2PAK (10.35x15.3)             |         |              | DFN8X8 (8.0x8.0)               |         |              | PS-8 (2.9x2.8)                 |        |              |
|--------------------------------|---------|--------------|--------------------------------|---------|--------------|--------------------------------|--------|--------------|
| Package dimension unit : mm    |         |              | Package dimension unit : mm    |         |              | Package dimension unit : mm    |        |              |
|                                |         |              |                                |         |              |                                |        |              |
| Land pattern example unit : mm |         |              | Land pattern example unit : mm |         |              | Land pattern example unit : mm |        |              |
|                                |         |              |                                |         |              |                                |        |              |
| Pin count                      | Weight  | MOQ          | Pin count                      | Weight  | MOQ          | Pin count                      | Weight | MOQ          |
| 3                              | 1590 mg | 1,000 p/reel | 5                              | 175 mg  | 2,500 p/reel | 8                              | 17 mg  | 3,000 p/reel |
| Reel dimension                 |         | Tape width   | Reel dimension                 |         | Tape width   | Reel dimension                 |        | Tape width   |
| Diameter                       | Width   |              | Diameter                       | Width   |              | Diameter                       | Width  |              |
| 330 mmΦ                        | 25.5 mm | 24 mm        | 332 mmΦ                        | 17.2 mm | 16.2 mm      | 180 mmΦ                        | 9 mm   | 8 mm         |

| TSOP Advance (3.1x3.3)         |         |            | SOP-8 2-5R1S (4.9x6.0)         |         |              | SOP-8 2-6J1S                   |         |              |
|--------------------------------|---------|------------|--------------------------------|---------|--------------|--------------------------------|---------|--------------|
| Package dimension unit : mm    |         |            | Package dimension unit : mm    |         |              | Package dimension unit : mm    |         |              |
|                                |         |            |                                |         |              |                                |         |              |
| Land pattern example unit : mm |         |            | Land pattern example unit : mm |         |              | Land pattern example unit : mm |         |              |
|                                |         |            |                                |         |              |                                |         |              |
| Pin count                      | Weight  | MOQ        | Pin count                      | Weight  | MOQ          | Pin count                      | Weight  | MOQ          |
| 8                              | 20 mg   | - *        | 8                              | 85 mg   | 2,500 p/reel | 8                              | 85 mg   | 3,000 p/reel |
| Reel dimension                 |         | Tape width | Reel dimension                 |         | Tape width   | Reel dimension                 |         | Tape width   |
| Diameter                       | Width   |            | Diameter                       | Width   |              | Diameter                       | Width   |              |
| 330 mmΦ                        | 13.5 mm | 12 mm      | 330 mmΦ                        | 13.5 mm | 12 mm        | 330 mmΦ                        | 13.5 mm | 12 mm        |

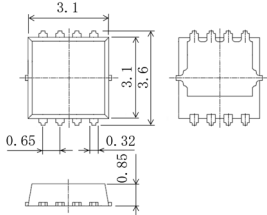
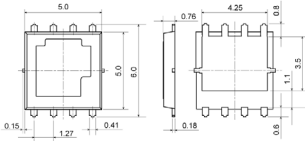
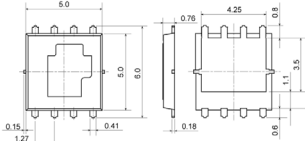
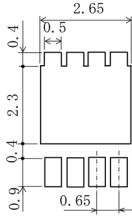
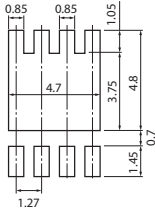
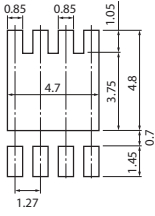
\* 3,000 or 5,000pcs/reel

Surface Mount Type

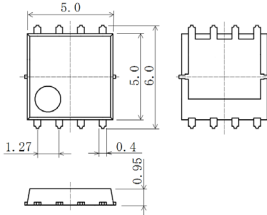
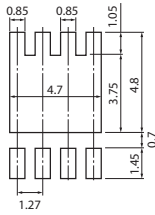
| DSOP Advance (5.0x6.0)                                                            |         |              | SOP Advance (5.0x6.0)                                                             |         |            |
|-----------------------------------------------------------------------------------|---------|--------------|-----------------------------------------------------------------------------------|---------|------------|
| Package dimension                                                                 |         | unit : mm    | Package dimension                                                                 |         | unit : mm  |
|   |         |              |  |         |            |
| Land pattern example                                                              |         | unit : mm    | Land pattern example                                                              |         | unit : mm  |
|  |         |              |  |         |            |
| Pin count                                                                         | Weight  | MOQ          | Pin count                                                                         | Weight  | MOQ        |
| 8                                                                                 | 98 mg   | 5,000 p/reel | 8                                                                                 | 69 mg   | - *        |
| Reel dimension                                                                    |         | Tape width   | Reel dimension                                                                    |         | Tape width |
| Diameter                                                                          | Width   |              | Diameter                                                                          | Width   |            |
| 330 mmΦ                                                                           | 13.5 mm | 12 mm        | 330 mmΦ                                                                           | 13.5 mm | 12 mm      |

\* 3,000 or 5,000pcs/reel

Surface Mount Type (Wettable Flank Lead Terminal)

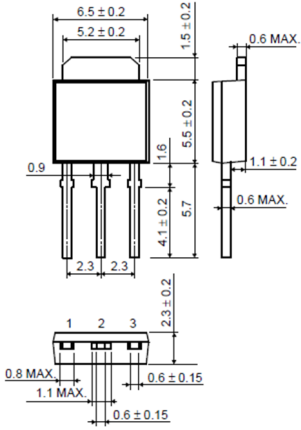
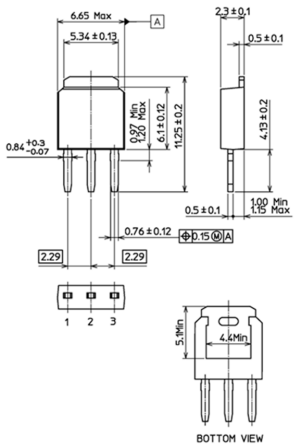
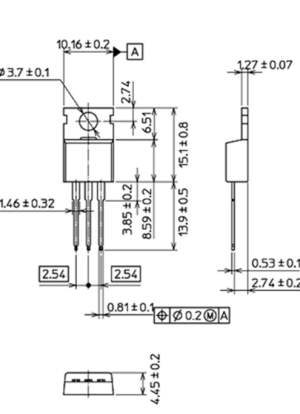
| TSON Advance (WF) (3.1x3.6)                                                       |         |            | DSOP Advance (WF)L (5.0x6.0)                                                      |         |              | DSOP Advance (WF)M (5.0x6.0)                                                       |         |              |
|-----------------------------------------------------------------------------------|---------|------------|-----------------------------------------------------------------------------------|---------|--------------|------------------------------------------------------------------------------------|---------|--------------|
| Package dimension                                                                 |         | unit : mm  | Package dimension                                                                 |         | unit : mm    | Package dimension                                                                  |         | unit : mm    |
|  |         |            |  |         |              |  |         |              |
| Land pattern example                                                              |         | unit : mm  | Land pattern example                                                              |         | unit : mm    | Land pattern example                                                               |         | unit : mm    |
|  |         |            |  |         |              |   |         |              |
| Pin count                                                                         | Weight  | MOQ        | Pin count                                                                         | Weight  | MOQ          | Pin count                                                                          | Weight  | MOQ          |
| 8                                                                                 | 20 mg   | - *        | 8                                                                                 | 98 mg   | 5,000 p/reel | 8                                                                                  | 98 mg   | 5,000 p/reel |
| Reel dimension                                                                    |         | Tape width | Reel dimension                                                                    |         | Tape width   | Reel dimension                                                                     |         | Tape width   |
| Diameter                                                                          | Width   |            | Diameter                                                                          | Width   |              | Diameter                                                                           | Width   |              |
| 330 mmΦ                                                                           | 13.5 mm | 12 mm      | 330 mmΦ                                                                           | 13.5 mm | 12 mm        | 330 mmΦ                                                                            | 13.5 mm | 12 mm        |

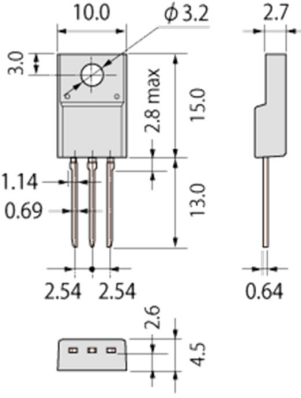
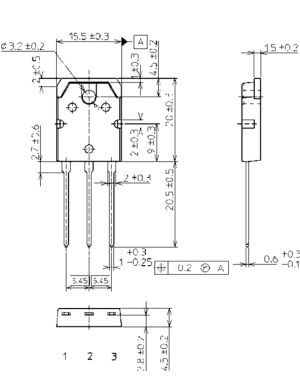
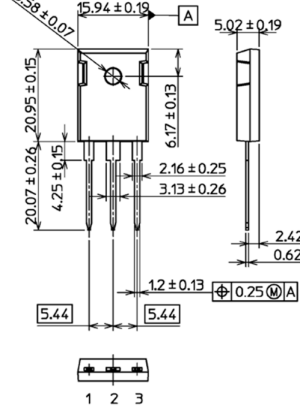
\* 3,000 or 5,000pcs/reel

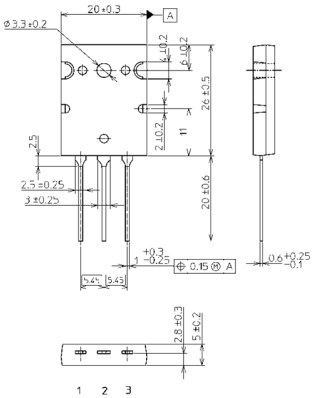
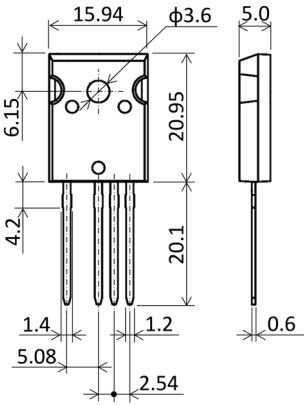
| SOP Advance (WF) (5.0x6.0)                                                          |         |            |
|-------------------------------------------------------------------------------------|---------|------------|
| Package dimension                                                                   |         | unit : mm  |
|   |         |            |
| Land pattern example                                                                |         | unit : mm  |
|  |         |            |
| Pin count                                                                           | Weight  | MOQ        |
| 8                                                                                   | 69 mg   | - *        |
| Reel dimension                                                                      |         | Tape width |
| Diameter                                                                            | Width   |            |
| 330 mmΦ                                                                             | 13.5 mm | 12 mm      |

\* 3,000 or 5,000pcs/reel

# Through Hole Type

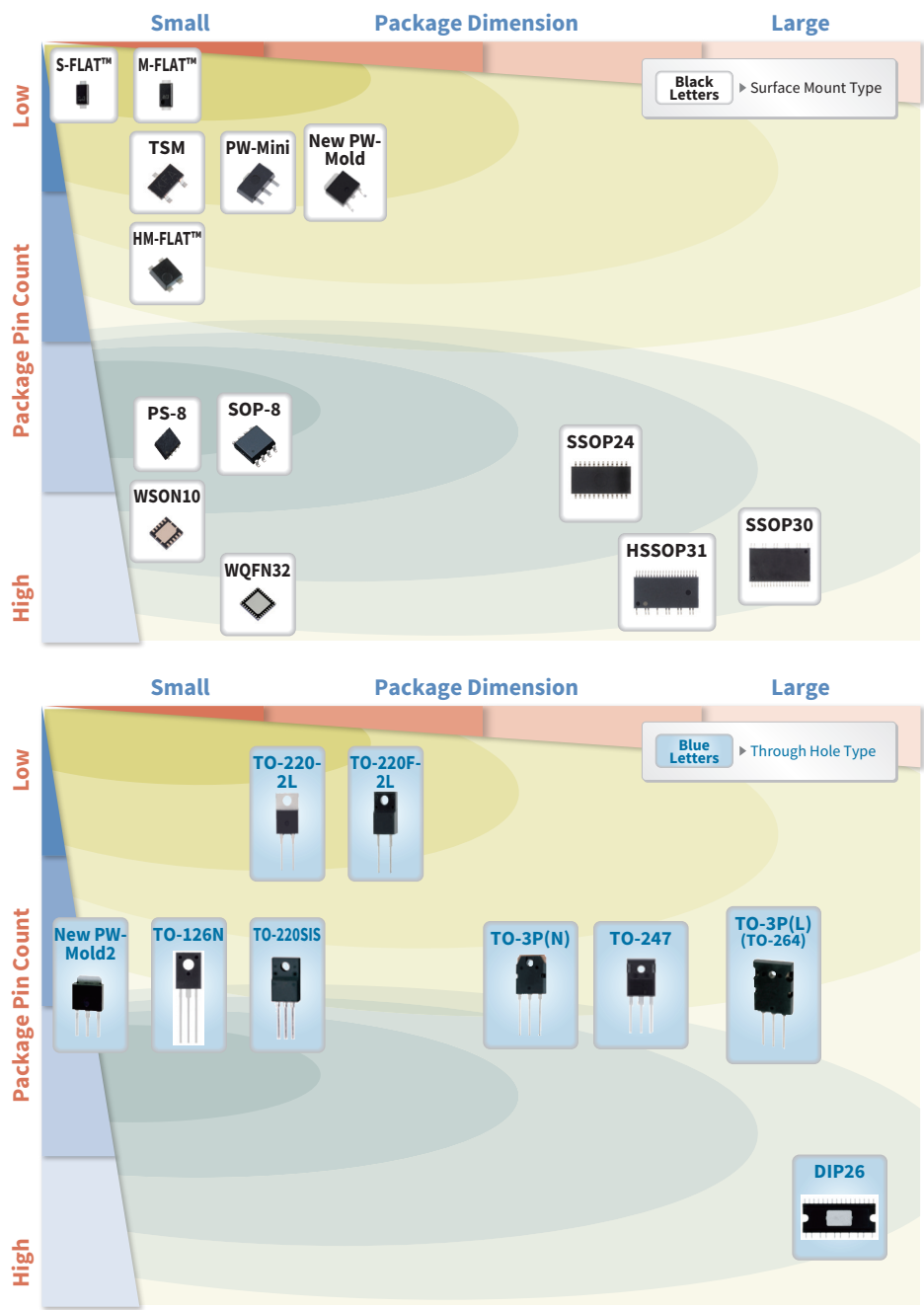
| New PW-Mold2 (6.5x5.5)                                                           |        |                   | IPAK (6.65x6.1)                                                                   |        |                    | TO-220 (10.16x15.1)                                                                |         |                    |
|----------------------------------------------------------------------------------|--------|-------------------|-----------------------------------------------------------------------------------|--------|--------------------|------------------------------------------------------------------------------------|---------|--------------------|
| Package dimension                                                                |        | unit : mm         | Package dimension                                                                 |        | unit : mm          | Package dimension                                                                  |         | unit : mm          |
|  |        |                   |  |        |                    |  |         |                    |
| Pin count                                                                        | Weight | Q'ty              | Pin count                                                                         | Weight | Q'ty               | Pin count                                                                          | Weight  | Q'ty               |
| 3                                                                                | 360 mg | 200 p/bag         | 3                                                                                 | 337 mg | 75 p/tube          | 3                                                                                  | 1930 mg | 50 p/tube          |
| Carton dimension                                                                 |        | Bag Q'ty / Carton | Tube dimension                                                                    |        | Tube Q'ty / Carton | Tube dimension                                                                     |         | Tube Q'ty / Carton |
| 178 x 80 x 90 mm                                                                 |        | 15 bag            | 20 x 4.4 x 508 mm                                                                 |        | 90 tube            | 33 x 7.0 x 534.5 mm                                                                |         | 20 tube            |

| TO-220SIS (SC-67) (10.0x15.0)                                                     |         |                    | TO-3P(N) (SC-65) (15.5x20.0)                                                       |         |                    | TO-247 (15.94x20.95)                                                                |         |                    |
|-----------------------------------------------------------------------------------|---------|--------------------|------------------------------------------------------------------------------------|---------|--------------------|-------------------------------------------------------------------------------------|---------|--------------------|
| Package dimension                                                                 |         | unit : mm          | Package dimension                                                                  |         | unit : mm          | Package dimension                                                                   |         | unit : mm          |
|  |         |                    |  |         |                    |  |         |                    |
| Pin count                                                                         | Weight  | Q'ty               | Pin count                                                                          | Weight  | Q'ty               | Pin count                                                                           | Weight  | Q'ty               |
| 3                                                                                 | 1700 mg | 50 p/tube          | 3                                                                                  | 4600 mg | 25 p/tube          | 3                                                                                   | 6150 mg | 30 p/tube          |
| Tube dimension                                                                    |         | Tube Q'ty / Carton | Tube dimension                                                                     |         | Tube Q'ty / Carton | Tube dimension                                                                      |         | Tube Q'ty / Carton |
| 32.4 x 7.11 x 528.5 mm                                                            |         | 30 tube            | 45 x 7.6 x 433 mm                                                                  |         | 40 tube            | 46 x 7.7 x 533.5 mm                                                                 |         | 8 tube             |

| TO-3P(L) (20.0x26.0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |                    | TO-247-4L (15.94x20.95)                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         |                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------------|
| Package dimension                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |         | unit : mm          | Package dimension                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         | unit : mm          |
|  <p>Technical drawing of TO-3P(L) package. Top view shows a rectangular body with dimensions 20.0 ± 0.3 mm by 26.0 ± 0.5 mm. It features three mounting holes with diameter <math>\phi 3.3 \pm 0.2</math> mm. Pin 1 is located 1.4 mm from the left edge and 5.08 mm from the bottom edge. Pin 2 is 1.2 mm from the bottom edge. Pin 3 is 2.54 mm from the bottom edge. The pin diameter is <math>\phi 0.15 \pm 0.01</math> mm. A detail view of the pin shows a length of 15.0 ± 0.2 mm and a diameter of <math>\phi 0.6 \pm 0.25</math> mm. The package is labeled with '1', '2', and '3' for the pins.</p> |         |                    |  <p>Technical drawing of TO-247-4L package. Top view shows a rectangular body with dimensions 15.94 mm by 20.95 mm. It features four mounting holes with diameter <math>\phi 3.6</math> mm. The pin diameter is <math>\phi 0.6 \pm 0.25</math> mm. A detail view of the pin shows a length of 15.0 mm and a diameter of <math>\phi 0.6</math> mm. The package is labeled with '1', '2', and '3' for the pins.</p> |         |                    |
| Pin count                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Weight  | Q'ty               | Pin count                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Weight  | Q'ty               |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 9750 mg | 100 p/tray         | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 6360 mg | 30 p/tube          |
| Tray dimension                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |         | Tray Q'ty / Carton | Tube dimension                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |         | Tube Q'ty / Carton |
| 184 x 24 x 290 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |         | 5 tray             | 45.5 x 7.6 x 533 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         | 15 tube            |

# 4. Power Discrete Devices

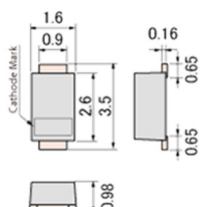
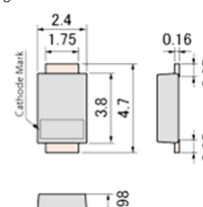
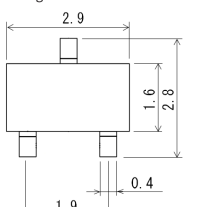
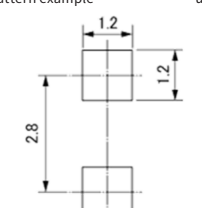
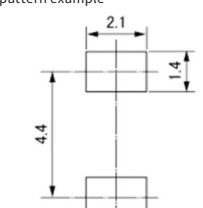
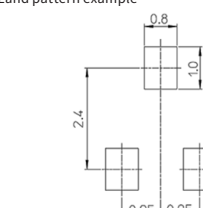
## ■ Package Lineups

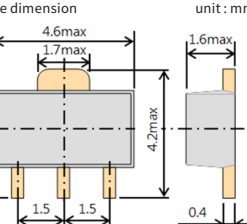
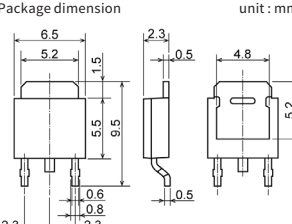
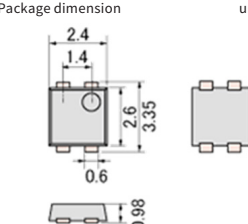
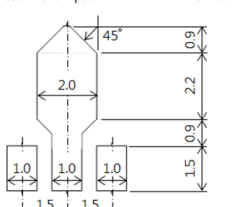
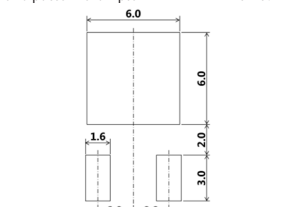
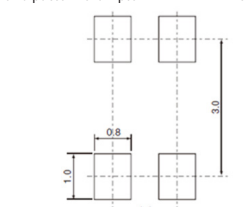


| Package            |              | Pin Count | Dimension<br>W x L (mm) | Products                            |        |       |                     | Page |
|--------------------|--------------|-----------|-------------------------|-------------------------------------|--------|-------|---------------------|------|
|                    |              |           |                         | IPDs<br>(Intelligent Power Devices) | Diodes | IGBTs | Bipolar Transistors |      |
| Surface Mount Type | S-FLAT       | 2         | 1.6 x 3.5               |                                     | ✓      |       |                     | 36   |
|                    | M-FLAT       | 2         | 2.4 x 4.7               |                                     | ✓      |       |                     | 36   |
|                    | TSM          | 3         | 2.9 x 2.8               |                                     |        |       | ✓                   | 36   |
|                    | PW-Mini      | 3         | 4.6 x 4.2               |                                     |        |       | ✓                   | 36   |
|                    | New PW-Mold  | 3         | 6.5 x 9.5               |                                     |        |       | ✓                   | 36   |
|                    | HM-FLAT      | 4         | 2.4 x 3.35              |                                     | ✓      |       |                     | 36   |
|                    | PS-8         | 8         | 2.9 x 2.8               | ✓                                   |        |       |                     | 37   |
|                    | SOP-8        | 8         | 4.9 x 6.0               | ✓                                   |        |       |                     | 37   |
|                    | WSOP10       | 10        | 3.0 x 3.0               | ✓                                   |        |       |                     | 37   |
|                    | SSOP24       | 24        | 13.0 x 8.0              | ✓                                   |        |       |                     | 37   |
|                    | SSOP30       | 30        | 20.0 x 14.2             | ✓                                   |        |       |                     | 37   |
|                    | HSSOP31      | 31        | 17.5 x 11.93            | ✓                                   |        |       |                     | 37   |
|                    | WQFN32       | 32        | 5.0 x 5.0               | ✓                                   |        |       |                     | 38   |
| Through Hole Type  | TO-220-2L    | 2         | 10.03 x 15.11           |                                     | ✓      |       |                     | 38   |
|                    | TO-220F-2L   | 2         | 10.0 x 15.0             |                                     | ✓      |       |                     | 38   |
|                    | New PW-Mold2 | 3         | 6.5 x 5.5               |                                     |        |       | ✓                   | 38   |
|                    | TO-126N      | 3         | 8.0 x 11.0              |                                     |        |       | ✓                   | 39   |
|                    | TO-220SIS    | 3         | 10.0 x 15.0             |                                     |        | ✓     | ✓                   | 39   |
|                    | TO-3P(N)     | 3         | 15.5 x 20.0             |                                     | ✓      | ✓     | ✓                   | 39   |
|                    | TO-247       | 3         | 15.94 x 20.95           |                                     | ✓      |       |                     | 39   |
|                    | TO-3P(L)     | 3         | 20.0 x 26.0             |                                     |        |       | ✓                   | 39   |
|                    | DIP26        | 26        | 32.0 x 16.6             | ✓                                   |        |       |                     | 39   |

# ■ Dimensional Outline

## Surface Mount Type

| S-FLAT™ (1.6x3.5)                                                                 |        |              | M-FLAT™ (2.4x4.7)                                                                 |        |              | TSM (2.9x2.8)                                                                     |        |              |
|-----------------------------------------------------------------------------------|--------|--------------|-----------------------------------------------------------------------------------|--------|--------------|-----------------------------------------------------------------------------------|--------|--------------|
| Package dimension unit : mm                                                       |        |              | Package dimension unit : mm                                                       |        |              | Package dimension unit : mm                                                       |        |              |
|  |        |              |  |        |              |  |        |              |
| Land pattern example unit : mm                                                    |        |              | Land pattern example unit : mm                                                    |        |              | Land pattern example unit : mm                                                    |        |              |
|  |        |              |  |        |              |  |        |              |
| Pin count                                                                         | Weight | MOQ          | Pin count                                                                         | Weight | MOQ          | Pin count                                                                         | Weight | MOQ          |
| 2                                                                                 | 13 mg  | 3,000 p/reel | 2                                                                                 | 23 mg  | 3,000 p/reel | 3                                                                                 | 10 mg  | 3,000 p/reel |
| Reel dimension                                                                    |        | Tape width   | Reel dimension                                                                    |        | Tape width   | Reel dimension                                                                    |        | Tape width   |
| Diameter                                                                          | Width  |              | Diameter                                                                          | Width  |              | Diameter                                                                          | Width  |              |
| 180 mmΦ                                                                           | 9 mm   | 8 mm         | 180 mmΦ                                                                           | 13 mm  | 12 mm        | 180 mmΦ                                                                           | 9 mm   | 6 mm         |

| PW-Mini (4.6x4.2)                                                                   |        |              | New PW-Mold (6.5x9.5)                                                               |         |              | HM-FLAT™ (2.4x3.35)                                                                 |        |              |
|-------------------------------------------------------------------------------------|--------|--------------|-------------------------------------------------------------------------------------|---------|--------------|-------------------------------------------------------------------------------------|--------|--------------|
| Package dimension unit : mm                                                         |        |              | Package dimension unit : mm                                                         |         |              | Package dimension unit : mm                                                         |        |              |
|   |        |              |   |         |              |   |        |              |
| Land pattern example unit : mm                                                      |        |              | Land pattern example unit : mm                                                      |         |              | Land pattern example unit : mm                                                      |        |              |
|  |        |              |  |         |              |  |        |              |
| Pin count                                                                           | Weight | MOQ          | Pin count                                                                           | Weight  | MOQ          | Pin count                                                                           | Weight | MOQ          |
| 3                                                                                   | 50 mg  | 1,000 p/reel | 3                                                                                   | 360 mg  | 2,000 p/reel | 4                                                                                   | 16 mg  | 3,000 p/reel |
| Reel dimension                                                                      |        | Tape width   | Reel dimension                                                                      |         | Tape width   | Reel dimension                                                                      |        | Tape width   |
| Diameter                                                                            | Width  |              | Diameter                                                                            | Width   |              | Diameter                                                                            | Width  |              |
| 180 mmΦ                                                                             | 13 mm  | 12 mm        | 330 mmΦ                                                                             | 17.5 mm | 16 mm        | 180 mmΦ                                                                             | 9 mm   | 16 mm        |

| PS-8 (2.9x2.8)                    |        |              | SOP-8 P-1.27A (5.0x6.0)           |         |              | WSO10 (3.0x3.0)                   |        |              |
|-----------------------------------|--------|--------------|-----------------------------------|---------|--------------|-----------------------------------|--------|--------------|
| Package dimension unit: mm<br>    |        |              | Package dimension unit: mm<br>    |         |              | Package dimension unit: mm<br>    |        |              |
| Land pattern example unit: mm<br> |        |              | Land pattern example unit: mm<br> |         |              | Land pattern example unit: mm<br> |        |              |
| Pin count                         | Weight | MOQ          | Pin count                         | Weight  | MOQ          | Pin count                         | Weight | MOQ          |
| 8                                 | 17 mg  | 3,000 p/reel | 8                                 | 85 mg   | 3,000 p/reel | 10                                | 20 mg  | 1,500 p/reel |
| Reel dimension                    |        | Tape width   | Reel dimension                    |         | Tape width   | Reel dimension                    |        | Tape width   |
| Diameter                          | Width  |              | Diameter                          | Width   |              | Diameter                          | Width  |              |
| 180 mmΦ                           | 9 mm   | 8 mm         | 330 mmΦ                           | 13.5 mm | 12 mm        | 330 mmΦ                           | 9 mm   | 8 mm         |

| SSOP24 (13.0x8.0)                 |         |              | SSOP30 (20.0x14.2)                |          |            | HSSOP31 (17.5x11.93)              |         |              |
|-----------------------------------|---------|--------------|-----------------------------------|----------|------------|-----------------------------------|---------|--------------|
| Package dimension unit: mm<br>    |         |              | Package dimension unit: mm<br>    |          |            | Package dimension unit: mm<br>    |         |              |
| Land pattern example unit: mm<br> |         |              | Land pattern example unit: mm<br> |          |            | Land pattern example unit: mm<br> |         |              |
| Pin count                         | Weight  | MOQ          | Pin count                         | Weight   | MOQ        | Pin count                         | Weight  | MOQ          |
| 24                                | 290 mg  | 2,000 p/reel | 30                                | 1,200 mg |            | 31                                | 700 mg  | 1,000 p/reel |
| Reel dimension                    |         | Tape width   | Reel dimension                    |          | Tape width | Reel dimension                    |         | Tape width   |
| Diameter                          | Width   |              | Diameter                          | Width    |            | Diameter                          | Width   |              |
| 330 mmΦ                           | 25.5 mm | 24 mm        |                                   |          |            | 330 mmΦ                           | 25.4 mm | 24 mm        |

## Surface Mount Type

**WQFN32 (5.0x5.0)**

Package dimension unit : mm

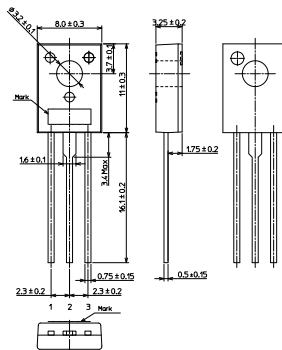
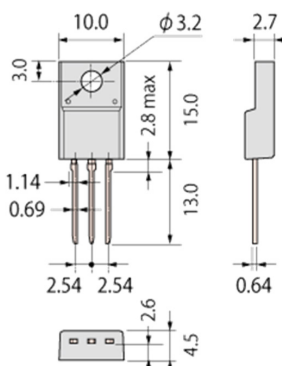
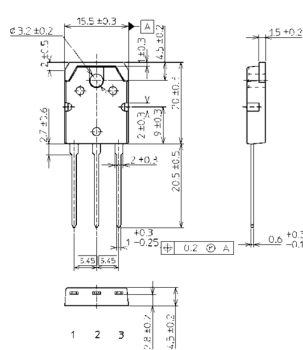
The technical drawing includes three views of the WQFN32 (5.0x5.0) package:

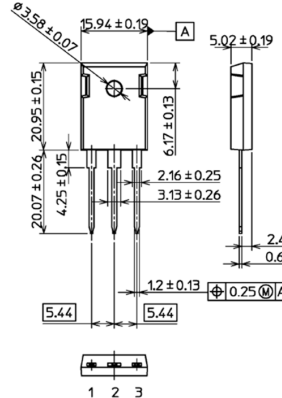
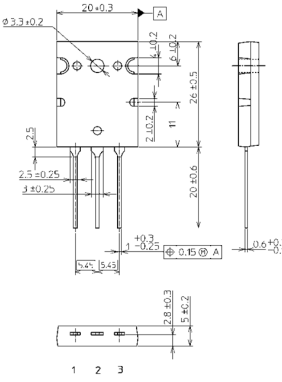
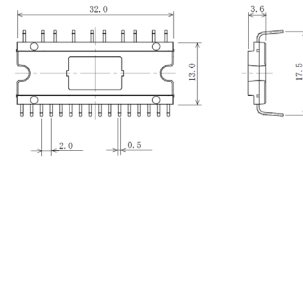
- Top View:** A square package with a side length of 5.0 mm. It features a central square area with a side length of 3.6 mm, surrounded by a border of 0.4 mm. The distance from the center to the edge of the package is 0.5 mm.
- Side View:** A cross-section showing the package height of 0.8 mm and the thickness of the package body, which is 0.25 mm.
- Land Pattern Example:** A detailed view of the package footprint. It shows a 4x4 grid of pads. The overall dimensions are 5.6 mm by 5.6 mm. The distance between the centers of adjacent pads is 0.5 mm. The distance from the center of a pad to the edge of the package is 0.2 mm. The distance from the center of a pad to the edge of the package is 0.25 mm. The diameter of the thermal via is 0.3 mm. The thickness of the thermal via is 0.2 mm. The distance between the centers of adjacent thermal vias is 0.5 mm.

| Pin count      | Weight | MOQ        |
|----------------|--------|------------|
| 32             | 60 mg  |            |
| Reel dimension |        | Tape width |
| Diameter       | Width  |            |

### Through Hole Type

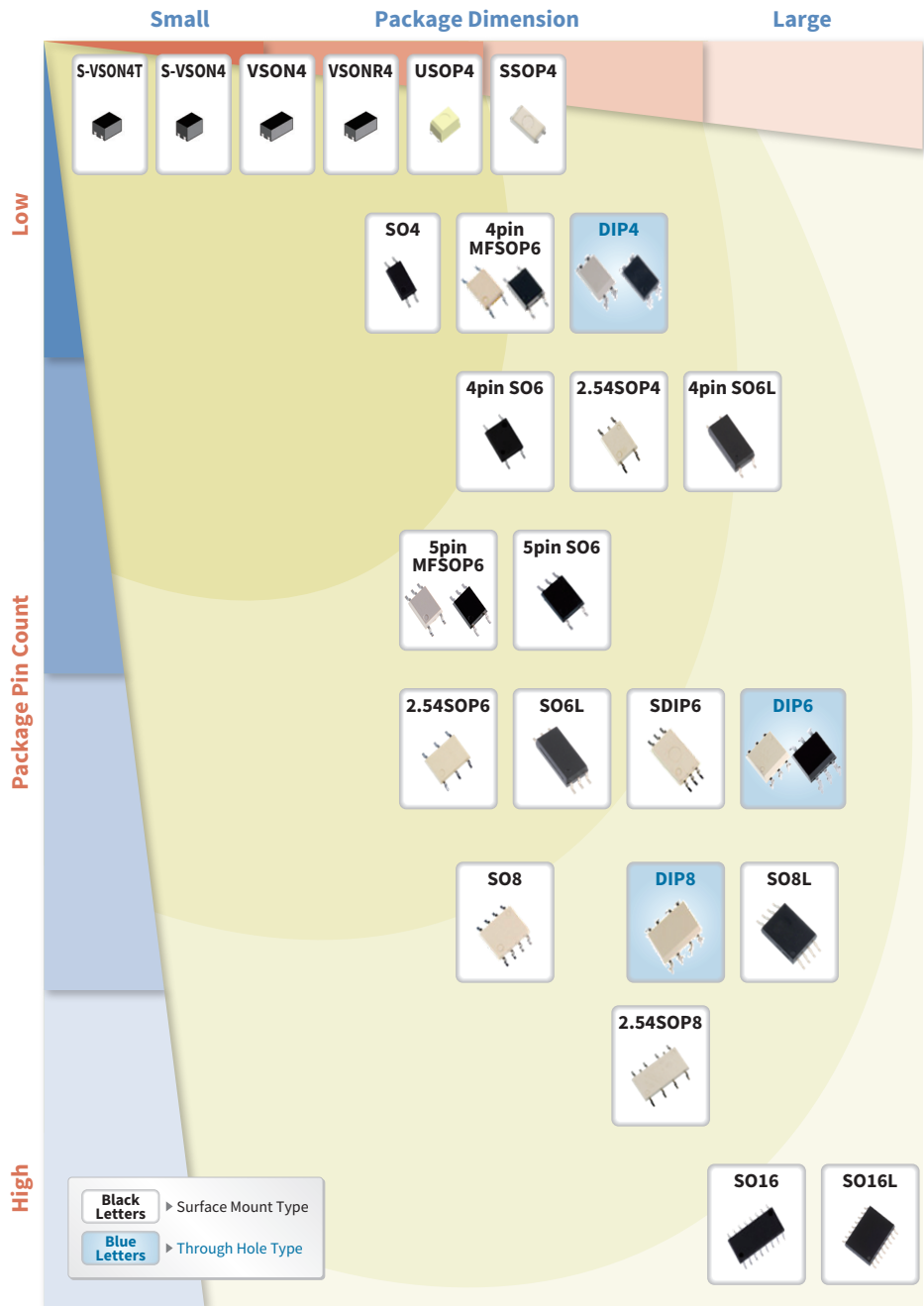
| TO-220-2L (10.03x15.11)                                                                                                                                                                            |                    |           | TO-220F-2L (10.0x15.0)                                                                                                             |                    |           | New PW-Sold2 (6.5x5.5)                                                                                                                                                                                     |        |                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------|
| Package dimension                                                                                                                                                                                  |                    | unit : mm | Package dimension                                                                                                                  |                    | unit : mm | Package dimension                                                                                                                                                                                          |        | unit : mm         |
| <p>Top view dimensions: 10.03±0.39, 6.27±0.43, 15.11±0.29, 28.0±0.26, 3.97±0.2, 1.44±0.32, 1.08, 0.77±0.15, Φ0.25(ΦA).</p> <p>Side view dimensions: 4.45±0.26, 1.29±0.12, 0.5±0.15, 2.56±0.36.</p> |                    |           | <p>Top view dimensions: 10.0, 3.0, 6.9, 15.0, 13.0, 1.95, 1.14, 0.69, 5.08, Φ3.2.</p> <p>Side view dimensions: 4.5, 2.7, 0.64.</p> |                    |           | <p>Top view dimensions: 6.5±0.2, 5.2±0.2, 1.5±0.2, 0.6 MAX., 0.9, 1.6, 5.5±0.2, 5.7, 4.1±0.2, 2.3, 2.3, 2.3±0.2, 0.8 MAX., 1.1 MAX., 0.6±0.15, 0.6 MAX.</p> <p>Side view dimensions: 1.1±0.2, 0.6 MAX.</p> |        |                   |
| Pin count                                                                                                                                                                                          | Weight             | Q'ty      | Pin count                                                                                                                          | Weight             | Q'ty      | Pin count                                                                                                                                                                                                  | Weight | Q'ty              |
| 2                                                                                                                                                                                                  | 1,900 mg           | 50 p/tube | 2                                                                                                                                  | 1,900 mg           | 50 p/tube | 3                                                                                                                                                                                                          | 360 mg | 200 p/bag         |
| Tube dimension                                                                                                                                                                                     | Tube Q'ty / Carton |           | Tube dimension                                                                                                                     | Tube Q'ty / Carton |           | Carton Dimension                                                                                                                                                                                           |        | Bag Q'ty / Carton |
| 32.8/33.0 x 7.0 x 533/534.5 mm                                                                                                                                                                     | 20 tube            |           | 33.0 x 7.0 x 532.5 mm                                                                                                              | 20 tube            |           | 178 x 80 x 90 mm                                                                                                                                                                                           |        | 15 bag            |

| TO-126N (8.0x11.0)                                                                |        |                    | TO-220SIS (SC-67) (10.0x15.0)                                                     |          |                    | TO-3P(N) (SC-65) (15.5x20.0)                                                       |          |                    |
|-----------------------------------------------------------------------------------|--------|--------------------|-----------------------------------------------------------------------------------|----------|--------------------|------------------------------------------------------------------------------------|----------|--------------------|
| Package dimension                                                                 |        | unit : mm          | Package dimension                                                                 |          | unit : mm          | Package dimension                                                                  |          | unit : mm          |
|  |        |                    |  |          |                    |  |          |                    |
| Pin count                                                                         | Weight | Q'ty               | Pin count                                                                         | Weight   | Q'ty               | Pin count                                                                          | Weight   | Q'ty               |
| 3                                                                                 | 840 mg | 250 p/bag          | 3                                                                                 | 1,700 mg | 50 p/tube          | 3                                                                                  | 4,600 mg | 25 p/tube          |
| Carton dimension                                                                  |        | Tube Q'ty / Carton | Tube dimension                                                                    |          | Tube Q'ty / Carton | Tube dimension                                                                     |          | Tube Q'ty / Carton |
| 245 x 175 x 100 mm                                                                |        | 8 bag              | 32.4 x 7.11 x 528.5 mm                                                            |          | 30 tube            | 45 x 7.6 x 433 mm                                                                  |          | 40 tube            |

| TO-247 (15.94x20.95)                                                               |          |                    | TO-3P(L) (20.5x26.0)                                                               |          |                    | DIP26 (32.0x16.6)                                                                    |          |                    |
|------------------------------------------------------------------------------------|----------|--------------------|------------------------------------------------------------------------------------|----------|--------------------|--------------------------------------------------------------------------------------|----------|--------------------|
| Package dimension                                                                  |          | unit : mm          | Package dimension                                                                  |          | unit : mm          | Package dimension                                                                    |          | unit : mm          |
|  |          |                    |  |          |                    |  |          |                    |
| Pin count                                                                          | Weight   | Q'ty               | Pin count                                                                          | Weight   | Q'ty               | Pin count                                                                            | Weight   | Q'ty               |
| 3                                                                                  | 6,150 mg | 30 p/tube          | 3                                                                                  | 9,750 mg | 100 p/tray         | 26                                                                                   | 3,800 mg | 20 p/tube          |
| Tube dimension                                                                     |          | Tube Q'ty / Carton | Tray dimension                                                                     |          | Tray Q'ty / Carton | Tube dimension                                                                       |          | Tube Q'ty / Carton |
| 46 x 7.7 x 533.5 mm                                                                |          | 8 tube             | 184 x 24 x 290 mm                                                                  |          | 5 tray             | 22 x 11 x 665 mm                                                                     |          | 25 tube            |

# 5. Photocouplers , Photorelays

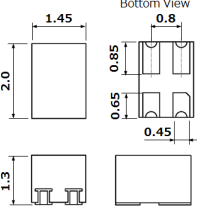
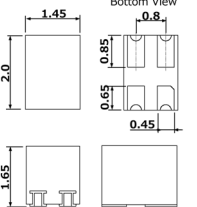
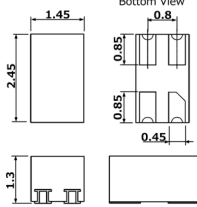
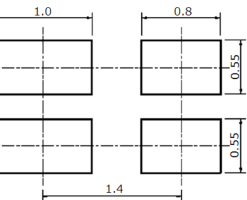
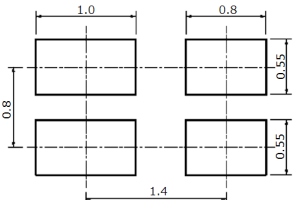
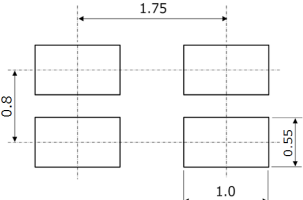
## ■ Package Lineups

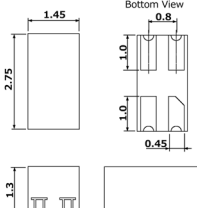
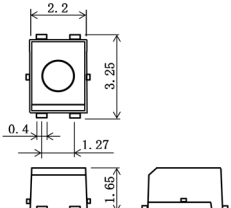
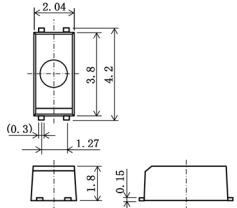
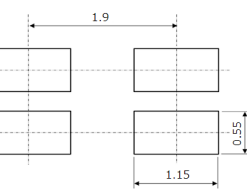
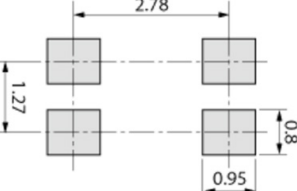
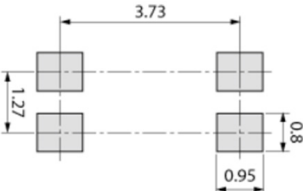


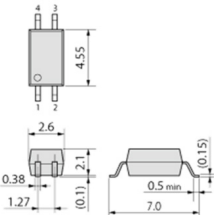
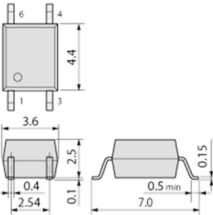
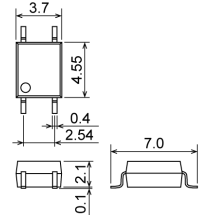
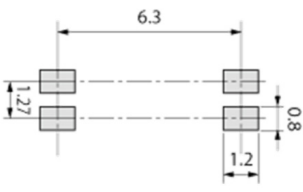
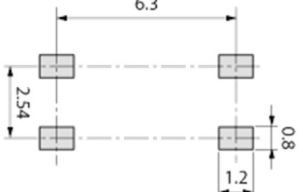
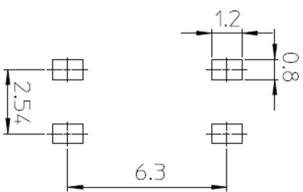
| Package            |              | Pin Count | Dimension<br>W x L (mm) | Products      |                   |              |                     |                  |             | Page |
|--------------------|--------------|-----------|-------------------------|---------------|-------------------|--------------|---------------------|------------------|-------------|------|
|                    |              |           |                         | Photocouplers |                   |              |                     |                  | Photorelays |      |
|                    |              |           |                         | IC Output     | Transistor Output | Triac Output | Photovoltaic Output | Thyristor Output |             |      |
| Surface Mount Type | S-VSON4T     | 4         | 1.45 x 2.0              |               |                   |              |                     |                  | ✓           | 42   |
|                    | S-VSON4      | 4         | 1.45 x 2.0              |               |                   |              |                     |                  | ✓           | 42   |
|                    | VSON4        | 4         | 1.45 x 2.45             |               |                   |              |                     |                  | ✓           | 42   |
|                    | VSONR4       | 4         | 1.45 x 2.75             |               |                   |              |                     |                  | ✓           | 42   |
|                    | USOP4        | 4         | 2.2 x 3.25              |               |                   |              |                     |                  | ✓           | 42   |
|                    | SSOP4        | 4         | 2.04 x 4.2              |               |                   |              | ✓                   |                  | ✓           | 42   |
|                    | SO4          | 4         | 2.6 x 7.0               |               | ✓                 |              |                     |                  |             | 43   |
|                    | 4pin MFSOP6  | 4         | 3.6 x 7.0               |               |                   | ✓            | ✓                   |                  |             | 43   |
|                    | 4pin SO6     | 4         | 3.7 x 7.0               | ✓             | ✓                 | ✓            | ✓                   |                  | ✓           | 43   |
|                    | 2.54 SOP4    | 4         | 3.9 x 7.0               |               |                   |              |                     |                  | ✓           | 43   |
|                    | 4pin SO6L    | 4         | 3.84 x 10.0             | ✓             | ✓                 |              |                     |                  |             | 43   |
|                    | 5pin MFSOP6  | 5         | 3.6 x 7.0               | ✓             |                   | ✓            |                     | ✓                |             | 43   |
|                    | 5pin SO6     | 5         | 3.7 x 7.0               | ✓             |                   |              |                     |                  |             | 44   |
|                    | 2.54 SOP6    | 6         | 6.3 x 7.0               |               |                   |              |                     |                  | ✓           | 44   |
|                    | SO6L         | 6         | 3.84 x 10               | ✓             |                   |              |                     |                  |             | 44   |
|                    | SDIP6        | 6         | 4.58 x 9.7              | ✓             |                   |              |                     |                  |             | 44   |
|                    | SO8          | 8         | 5.1 x 6.0               | ✓             |                   |              |                     |                  |             | 44   |
|                    | SO8L         | 8         | 5.85 x 10.0             | ✓             |                   |              |                     |                  |             | 44   |
|                    | 2.54 SOP8    | 8         | 9.4 x 7.0               |               |                   |              |                     |                  | ✓           | 45   |
|                    | SO16         | 16        | 10.3 x 7.0              |               | ✓                 |              |                     |                  |             | 45   |
|                    | SO16L        | 16        | 10.3 x 10.0             | ✓             |                   |              |                     |                  |             | 45   |
| Through Hole Type  | DIP4         | 4         | 4.58 x 7.62             |               | ✓                 | ✓            |                     |                  | ✓           | 46   |
|                    | DIP4(TLP785) | 4         | 4.6 x 7.62              |               | ✓                 |              |                     |                  |             | 46   |
|                    | DIP6         | 6         | 7.12 x 7.62             |               | ✓                 | ✓            | ✓                   | ✓                | ✓           | 46   |
|                    | DIP8         | 8         | 9.66 x 7.62             | ✓             | ✓                 | ✓            |                     | ✓                | ✓           | 46   |

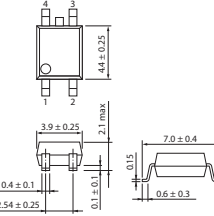
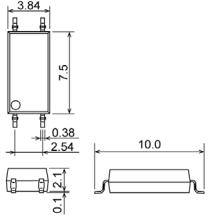
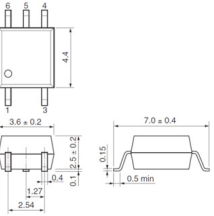
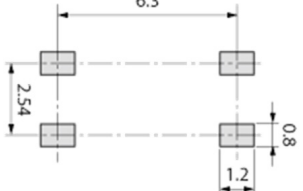
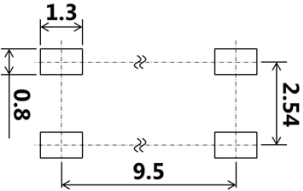
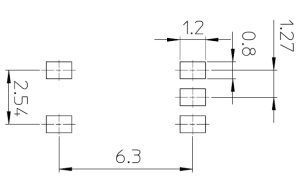
■ Dimensional Outline

Surface Mount Type

| S-VSON4T (1.45x2.0)                                                               |        |              | S-VSON4 (1.45x2.0)                                                                |        |              | VSON4 (1.45x2.45)                                                                  |        |              |
|-----------------------------------------------------------------------------------|--------|--------------|-----------------------------------------------------------------------------------|--------|--------------|------------------------------------------------------------------------------------|--------|--------------|
| Package dimension unit : mm                                                       |        |              | Package dimension unit : mm                                                       |        |              | Package dimension unit : mm                                                        |        |              |
|  |        |              |  |        |              |   |        |              |
| Land pattern example unit : mm                                                    |        |              | Land pattern example unit : mm                                                    |        |              | Land pattern example unit : mm                                                     |        |              |
|  |        |              |  |        |              |  |        |              |
| Pin count                                                                         | Weight | MOQ          | Pin count                                                                         | Weight | MOQ          | Pin count                                                                          | Weight | MOQ          |
| 4                                                                                 | 10 mg  | 2,500 p/reel | 4                                                                                 | 10 mg  | 2,500 p/reel | 4                                                                                  | 10 mg  | 3,000 p/reel |
| Reel dimension                                                                    |        | Tape width   | Reel dimension                                                                    |        | Tape width   | Reel dimension                                                                     |        | Tape width   |
| Diameter                                                                          | Width  |              | Diameter                                                                          | Width  |              | Diameter                                                                           | Width  |              |
| 180 mmΦ                                                                           | 9 mm   | 8 mm         | 180 mmΦ                                                                           | 9 mm   | 8 mm         | 180 mmΦ                                                                            | 9 mm   | 8 mm         |

| VSONR4 (1.45x2.75)                                                                  |        |              | USOP4 (2.2x3.25)                                                                    |        |              | SSOP4 (2.04x4.2)                                                                     |        |              |
|-------------------------------------------------------------------------------------|--------|--------------|-------------------------------------------------------------------------------------|--------|--------------|--------------------------------------------------------------------------------------|--------|--------------|
| Package dimension unit : mm                                                         |        |              | Package dimension unit : mm                                                         |        |              | Package dimension unit : mm                                                          |        |              |
|   |        |              |   |        |              |    |        |              |
| Land pattern example unit : mm                                                      |        |              | Land pattern example unit : mm                                                      |        |              | Land pattern example unit : mm                                                       |        |              |
|  |        |              |  |        |              |  |        |              |
| Pin count                                                                           | Weight | MOQ          | Pin count                                                                           | Weight | MOQ          | Pin count                                                                            | Weight | MOQ          |
| 4                                                                                   | 10 mg  | 3,000 p/reel | 4                                                                                   | 30 mg  | 1,500 p/reel | 4                                                                                    | 30 mg  | 1,500 p/reel |
| Reel dimension                                                                      |        | Tape width   | Reel dimension                                                                      |        | Tape width   | Reel dimension                                                                       |        | Tape width   |
| Diameter                                                                            | Width  |              | Diameter                                                                            | Width  |              | Diameter                                                                             | Width  |              |
| 180 mmΦ                                                                             | 9 mm   | 8 mm         | 180 mmΦ                                                                             | 13 mm  | 12 mm        | 180 mmΦ                                                                              | 13 mm  | 12 mm        |

| SO4 (2.6x7.0)                                                                     |         |              | 4pin MFSOP6 (3.6x7.0)                                                             |         |              | 4pin SO6 (3.7x7.0)                                                                 |         |              |
|-----------------------------------------------------------------------------------|---------|--------------|-----------------------------------------------------------------------------------|---------|--------------|------------------------------------------------------------------------------------|---------|--------------|
| Package dimension                                                                 |         | unit : mm    | Package dimension                                                                 |         | unit : mm    | Package dimension                                                                  |         | unit : mm    |
|  |         |              |  |         |              |  |         |              |
| Land pattern example                                                              |         | unit : mm    | Land pattern example                                                              |         | unit : mm    | Land pattern example                                                               |         | unit : mm    |
|  |         |              |  |         |              |  |         |              |
| Pin count                                                                         | Weight  | MOQ          | Pin count                                                                         | Weight  | MOQ          | Pin count                                                                          | Weight  | MOQ          |
| 4                                                                                 | 50 mg   | 2,500 p/reel | 4                                                                                 | 90 mg   | 3,000 p/reel | 4                                                                                  | 80 mg   | 3,000 p/reel |
| Reel dimension                                                                    |         | Tape width   | Reel dimension                                                                    |         | Tape width   | Reel dimension                                                                     |         | Tape width   |
| Diameter                                                                          | Width   |              | Diameter                                                                          | Width   |              | Diameter                                                                           | Width   |              |
| 330 mmΦ                                                                           | 13.5 mm | 12 mm        | 380 mmΦ                                                                           | 13.5 mm | 12 mm        | 380 mmΦ                                                                            | 13.5 mm | 12 mm        |

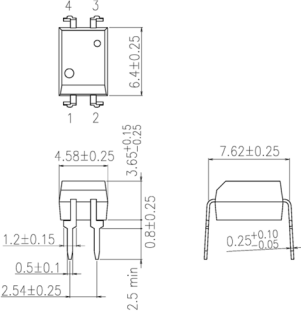
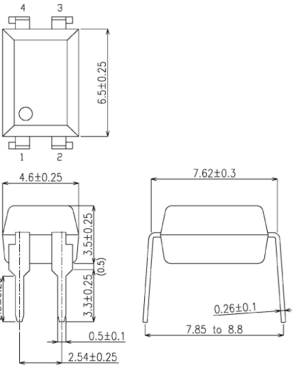
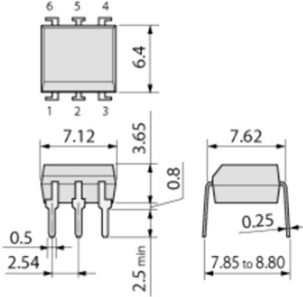
| 2.54SOP4 (3.9x7.0)                                                                  |         |              | 4pin SO6L (3.84x10.0)                                                               |         |              | 5pin MFSOP6 (3.6x7.0)                                                                |         |              |
|-------------------------------------------------------------------------------------|---------|--------------|-------------------------------------------------------------------------------------|---------|--------------|--------------------------------------------------------------------------------------|---------|--------------|
| Package dimension                                                                   |         | unit : mm    | Package dimension                                                                   |         | unit : mm    | Package dimension                                                                    |         | unit : mm    |
|   |         |              |   |         |              |   |         |              |
| Land pattern example                                                                |         | unit : mm    | Land pattern example                                                                |         | unit : mm    | Land pattern example                                                                 |         | unit : mm    |
|  |         |              |  |         |              |  |         |              |
| Pin count                                                                           | Weight  | MOQ          | Pin count                                                                           | Weight  | MOQ          | Pin count                                                                            | Weight  | MOQ          |
| 4                                                                                   | 100 mg  | 2,500 p/reel | 4                                                                                   | 128 mg  | 3,000 p/reel | 5                                                                                    | 90 mg   | 3,000 p/reel |
| Reel dimension                                                                      |         | Tape width   | Reel dimension                                                                      |         | Tape width   | Reel dimension                                                                       |         | Tape width   |
| Diameter                                                                            | Width   |              | Diameter                                                                            | Width   |              | Diameter                                                                             | Width   |              |
| 330 mmΦ                                                                             | 13.5 mm | 12 mm        | 330 mmΦ                                                                             | 17.4 mm | 16 mm        | 380 mmΦ                                                                              | 13.5 mm | 12 mm        |

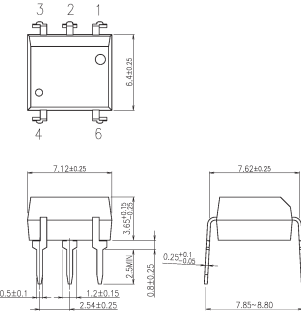
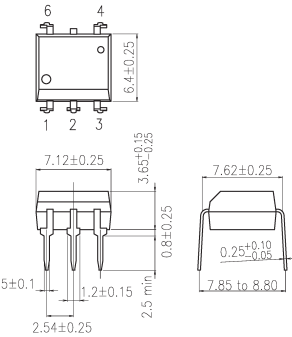
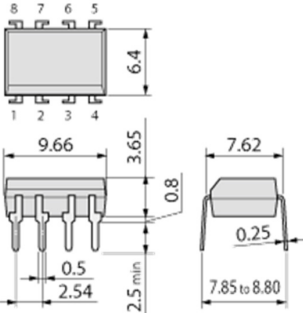
| 5pin SO6 (3.7x7.0)   |         |              | 2.54SOP6 (6.3x7.0)   |         |              | SO6L (3.84x10.0)     |         |              |
|----------------------|---------|--------------|----------------------|---------|--------------|----------------------|---------|--------------|
| Package dimension    |         | unit : mm    | Package dimension    |         | unit : mm    | Package dimension    |         | unit : mm    |
|                      |         |              |                      |         |              |                      |         |              |
| Land pattern example |         | unit : mm    | Land pattern example |         | unit : mm    | Land pattern example |         | unit : mm    |
|                      |         |              |                      |         |              |                      |         |              |
| Pin count            | Weight  | MOQ          | Pin count            | Weight  | MOQ          | Pin count            | Weight  | MOQ          |
| 5                    | 80 mg   | 3,000 p/reel | 6                    | 130 mg  | 2,500 p/reel | 6                    | 126 mg  | 1,500 p/reel |
| Reel dimension       |         | Tape width   | Reel dimension       |         | Tape width   | Reel dimension       |         | Tape width   |
| Diameter             | Width   |              | Diameter             | Width   |              | Diameter             | Width   |              |
| 380 mmΦ              | 13.5 mm | 12 mm        | 330 mmΦ              | 17.5 mm | 16 mm        | 330 mmΦ              | 17.4 mm | 16 mm        |

| SDIP6 (4.58x9.7)     |         |              | SO8 (5.1x6.0)        |         |              | SO8L (5.85x10.0)     |         |              |
|----------------------|---------|--------------|----------------------|---------|--------------|----------------------|---------|--------------|
| Package dimension    |         | unit : mm    | Package dimension    |         | unit : mm    | Package dimension    |         | unit : mm    |
|                      |         |              |                      |         |              |                      |         |              |
| Land pattern example |         | unit : mm    | Land pattern example |         | unit : mm    | Land pattern example |         | unit : mm    |
|                      |         |              |                      |         |              |                      |         |              |
| Pin count            | Weight  | MOQ          | Pin count            | Weight  | MOQ          | Pin count            | Weight  | MOQ          |
| 6                    | 260 mg  | 1,500 p/reel | 8                    | 110 mg  | 2,500 p/reel | 8                    | 205 mg  | 1,500 p/reel |
| Reel dimension       |         | Tape width   | Reel dimension       |         | Tape width   | Reel dimension       |         | Tape width   |
| Diameter             | Width   |              | Diameter             | Width   |              | Diameter             | Width   |              |
| 380 mmΦ              | 17.5 mm | 16 mm        | 330 mmΦ              | 13.5 mm | 12 mm        | 330 mmΦ              | 17.4 mm | 16 mm        |

| 2.54SOP8 (9.4x7.0)                 |         |              | SO16 (10.3x7.0)                    |         |              | SO16L (10.3x10.0)                  |         |              |
|------------------------------------|---------|--------------|------------------------------------|---------|--------------|------------------------------------|---------|--------------|
| Package dimension unit : mm<br>    |         |              | Package dimension unit : mm<br>    |         |              | Package dimension unit : mm<br>    |         |              |
| Land pattern example unit : mm<br> |         |              | Land pattern example unit : mm<br> |         |              | Land pattern example unit : mm<br> |         |              |
| Pin count                          | Weight  | MOQ          | Pin count                          | Weight  | MOQ          | Pin count                          | Weight  | MOQ          |
| 8                                  | 200 mg  | 2,500 p/reel | 16                                 | 190 mg  | 2,000 p/reel | 16                                 | 370 mg  | 1,500 p/reel |
| Reel dimension                     |         | Tape width   | Reel dimension                     |         | Tape width   | Reel dimension                     |         | Tape width   |
| Diameter                           | Width   |              | Diameter                           | Width   |              | Diameter                           | Width   |              |
| 330 mmΦ                            | 17.5 mm | 16 mm        | 330 mmΦ                            | 17.5 mm | 16 mm        | 330 mmΦ                            | 17.4 mm | 16 mm        |

Through Hole Type

| DIP4 (4.58x7.62)                                                                 |        |                    | DIP4(TLP785) (4.6x7.62)                                                           |        |                    | DIP6 (7.12x7.62)                                                                   |        |                    |
|----------------------------------------------------------------------------------|--------|--------------------|-----------------------------------------------------------------------------------|--------|--------------------|------------------------------------------------------------------------------------|--------|--------------------|
| Package dimension                                                                |        | unit : mm          | Package dimension                                                                 |        | unit : mm          | Package dimension                                                                  |        | unit : mm          |
|  |        |                    |  |        |                    |  |        |                    |
| Pin count                                                                        | Weight | Q'ty               | Pin count                                                                         | Weight | Q'ty               | Pin count                                                                          | Weight | Q'ty               |
| 4                                                                                | 260 mg | 100 p/tube         | 4                                                                                 | 260 mg | 100 p/tube         | 6                                                                                  | 400 mg | 50 p/tube          |
| Tube dimension                                                                   |        | Tube Q'ty / Carton | Tube dimension                                                                    |        | Tube Q'ty / Carton | Tube dimension                                                                     |        | Tube Q'ty / Carton |
| 11.3 x 10.3 x 525 mm                                                             |        | 4 tube             | 11.3 x 10.3 x 525 mm                                                              |        | 4 tube             | 11.3 x 10.3 x 525 mm                                                               |        | 20 tube            |

| 5pin DIP6 (7.12x7.62)                                                             |        |                    | 5pin DIP6 (cut) (7.12x7.62)                                                        |        |                    | DIP8 (9.66x7.62)                                                                    |        |                    |
|-----------------------------------------------------------------------------------|--------|--------------------|------------------------------------------------------------------------------------|--------|--------------------|-------------------------------------------------------------------------------------|--------|--------------------|
| Package dimension                                                                 |        | unit : mm          | Package dimension                                                                  |        | unit : mm          | Package dimension                                                                   |        | unit : mm          |
|  |        |                    |  |        |                    |  |        |                    |
| Pin count                                                                         | Weight | Q'ty               | Pin count                                                                          | Weight | Q'ty               | Pin count                                                                           | Weight | Q'ty               |
| 5                                                                                 | 400 mg | 50 p/tube          | 5                                                                                  | 400 mg | 50 p/tube          | 8                                                                                   | 540 mg | 50 p/tube          |
| Tube dimension                                                                    |        | Tube Q'ty / Carton | Tube dimension                                                                     |        | Tube Q'ty / Carton | Tube dimension                                                                      |        | Tube Q'ty / Carton |
| 11.3 x 10.3 x 525 mm                                                              |        | 20 tube            | 11.3 x 10.3 x 525 mm                                                               |        | 20 tube            | 11.3 x 10.3 x 525 mm                                                                |        | 60 tube            |

| DIP4(LF1) / (TP1)                     |  | DIP4(LF5) / (TP5)                     |  | DIP4(LF2)                                          |  |
|---------------------------------------|--|---------------------------------------|--|----------------------------------------------------|--|
| Package dimension<br>unit : mm<br>    |  | Package dimension<br>unit : mm<br>    |  | Package dimension<br>(DIP4 FType)<br>unit : mm<br> |  |
| Land pattern example<br>unit : mm<br> |  | Land pattern example<br>unit : mm<br> |  | Land pattern example<br>unit : mm<br>              |  |
| DIP4(LF4) / (TP4)                     |  | TLP785 DIP4(LF6) / (TP6)              |  | TLP785 DIP4(LF7) / (TP7)                           |  |
| Package dimension<br>unit : mm<br>    |  | Package dimension<br>unit : mm<br>    |  | Package dimension<br>unit : mm<br>                 |  |
| Land pattern example<br>unit : mm<br> |  | Land pattern example<br>unit : mm<br> |  | Land pattern example<br>unit : mm<br>              |  |

| DIP6(LF1) / (TP1)                      | DIP6(LF5) / (TP5)                      | DIP6(LF2)                                                     |
|----------------------------------------|----------------------------------------|---------------------------------------------------------------|
| <b>Package dimension</b> unit : mm<br> | <b>Package dimension</b> unit : mm<br> | <b>Package dimension</b> unit : mm<br><b>(DIP6 Ftype)</b><br> |

| Land pattern example | Land pattern example |
|----------------------|----------------------|
| <b>unit : mm</b><br> | <b>unit : mm</b><br> |

| DIP6(LF4) / (TP4)                      | 5pin DIP6 (LF1) / (TP1)                | 5pin DIP6 (LF5) / (TP5)                |
|----------------------------------------|----------------------------------------|----------------------------------------|
| <b>Package dimension</b> unit : mm<br> | <b>Package dimension</b> unit : mm<br> | <b>Package dimension</b> unit : mm<br> |

| Land pattern example | Land pattern example | Land pattern example |
|----------------------|----------------------|----------------------|
| <b>unit : mm</b><br> | <b>unit : mm</b><br> | <b>unit : mm</b><br> |

| 5pin DIP6 (LF2)                               | 5pin DIP6 (LF4) / (TP4)     | 5pin DIP6 (cut) (LF1) / (TP1) |
|-----------------------------------------------|-----------------------------|-------------------------------|
| <b>Package dimension</b><br>(5pin DIP6 Ftype) | <b>Package dimension</b>    | <b>Package dimension</b>      |
|                                               | <b>Land pattern example</b> | <b>Land pattern example</b>   |

| 5pin DIP6 (cut) (LF5) / (TP5) | 5pin DIP6 (cut) (LF2)                               | 5pin DIP6 (cut) (LF4) / (TP4) |
|-------------------------------|-----------------------------------------------------|-------------------------------|
| <b>Package dimension</b>      | <b>Package dimension</b><br>(5pin DIP6 (cut) Ftype) | <b>Package dimension</b>      |
| <b>Land pattern example</b>   |                                                     | <b>Land pattern example</b>   |



| DIP8(LF1) / (TP1)                                    | DIP8(LF5) / (TP5)                                    | DIP8(LF2)                                                            |
|------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------------|
| Package dimension                      unit : mm<br> | Package dimension                      unit : mm<br> | Package dimension                      unit : mm<br>(DIP8 Ftype)<br> |

|                                                         |                                                         |
|---------------------------------------------------------|---------------------------------------------------------|
| Land pattern example                      unit : mm<br> | Land pattern example                      unit : mm<br> |
|---------------------------------------------------------|---------------------------------------------------------|

| DIP8(LF4) / (TP4)                                       | SO8L(LF4)                                               |
|---------------------------------------------------------|---------------------------------------------------------|
| Package dimension                      unit : mm<br>    | Package dimension                      unit : mm<br>    |
| Land pattern example                      unit : mm<br> | Land pattern example                      unit : mm<br> |

## RESTRICTIONS ON PRODUCT USE

Toshiba Corporation and its subsidiaries and affiliates are collectively referred to as "TOSHIBA". Hardware, software and systems described in this document are collectively referred to as "Product".

- The drawings shown may not accurately represent the actual shape or dimensions.
- All linear dimensions are given in millimeters unless otherwise specified.
- TOSHIBA reserves the right to make changes to the information in this document and related Product without notice.
- This document and any information herein may not be reproduced without prior written permission from TOSHIBA. Even with TOSHIBA's written permission, reproduction is permissible only if reproduction is without alteration/omission.
- Though TOSHIBA works continually to improve Product's quality and reliability, Product can malfunction or fail. Customers are responsible for complying with safety standards and for providing adequate designs and safeguards for their hardware, software and systems which minimize risk and avoid situations in which a malfunction or failure of Product could cause loss of human life, bodily injury or damage to property, including data loss or corruption. Before customers use the Product, create designs including the Product, or incorporate the Product into their own applications, customers must also refer to and comply with (a) the latest versions of all relevant TOSHIBA information, including without limitation, this document, the specifications, the data sheets and application notes for Product and the precautions and conditions set forth in the "TOSHIBA Semiconductor Reliability Handbook" and (b) the instructions for the application with which the Product will be used with or for. Customers are solely responsible for all aspects of their own product design or applications, including but not limited to (a) determining the appropriateness of the use of this Product in such design or applications; (b) evaluating and determining the applicability of any information contained in this document, or in charts, diagrams, programs, algorithms, sample application circuits, or any other referenced documents; and (c) validating all operating parameters for such designs and applications. **TOSHIBA ASSUMES NO LIABILITY FOR CUSTOMERS' PRODUCT DESIGN OR APPLICATIONS.**
- **PRODUCT IS NEITHER INTENDED NOR WARRANTED FOR USE IN EQUIPMENTS OR SYSTEMS THAT REQUIRE EXTRAORDINARILY HIGH LEVELS OF QUALITY AND/OR RELIABILITY, AND/OR A MALFUNCTION OR FAILURE OF WHICH MAY CAUSE LOSS OF HUMAN LIFE, BODILY INJURY, SERIOUS PROPERTY DAMAGE AND/OR SERIOUS PUBLIC IMPACT ("UNINTENDED USE").** Except for specific applications as expressly stated in this document, Unintended Use includes, without limitation, equipment used in nuclear facilities, equipment used in the aerospace industry, lifesaving and/or life supporting medical equipment, equipment used for automobiles, trains, ships and other transportation, traffic signaling equipment, equipment used to control combustions or explosions, safety devices, elevators and escalators, and devices related to power plant. **IF YOU USE PRODUCT FOR UNINTENDED USE, TOSHIBA ASSUMES NO LIABILITY FOR PRODUCT.** For details, please contact your TOSHIBA sales representative or contact us via our website.
- Do not disassemble, analyze, reverse-engineer, alter, modify, translate or copy Product, whether in whole or in part.
- Product shall not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable laws or regulations.
- The information contained herein is presented only as guidance for Product use. No responsibility is assumed by TOSHIBA for any infringement of patents or any other intellectual property rights of third parties that may result from the use of Product. No license to any intellectual property right is granted by this document, whether express or implied, by estoppel or otherwise.
- **ABSENT A WRITTEN SIGNED AGREEMENT, EXCEPT AS PROVIDED IN THE RELEVANT TERMS AND CONDITIONS OF SALE FOR PRODUCT, AND TO THE MAXIMUM EXTENT ALLOWABLE BY LAW, TOSHIBA (1) ASSUMES NO LIABILITY WHATSOEVER, INCLUDING WITHOUT LIMITATION, INDIRECT, CONSEQUENTIAL, SPECIAL, OR INCIDENTAL DAMAGES OR LOSS, INCLUDING WITHOUT LIMITATION, LOSS OF PROFITS, LOSS OF OPPORTUNITIES, BUSINESS INTERRUPTION AND LOSS OF DATA, AND (2) DISCLAIMS ANY AND ALL EXPRESS OR IMPLIED WARRANTIES AND CONDITIONS RELATED TO SALE, USE OF PRODUCT, OR INFORMATION, INCLUDING WARRANTIES OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, ACCURACY OF INFORMATION, OR NONINFRINGEMENT.**
- Do not use or otherwise make available Product or related software or technology for any military purposes, including without limitation, for the design, development, use, stockpiling or manufacturing of nuclear, chemical, or biological weapons or missile technology products (mass destruction weapons). Product and related software and technology may be controlled under the applicable export laws and regulations including, without limitation, the Japanese Foreign Exchange and Foreign Trade Law and the U.S. Export Administration Regulations. Export and re-export of Product or related software or technology are strictly prohibited except in compliance with all applicable export laws and regulations.
- Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. Please use Product in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. **TOSHIBA ASSUMES NO LIABILITY FOR DAMAGES OR LOSSES OCCURRING AS A RESULT OF NONCOMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS.**

# TOSHIBA

Toshiba Electronic Devices & Storage Corporation

<https://toshiba.semicon-storage.com/>