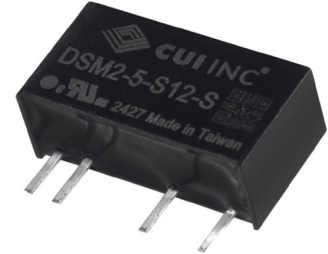


**SERIES: DSM2-S | DESCRIPTION: DC-DC CONVERTER**
**FEATURES**

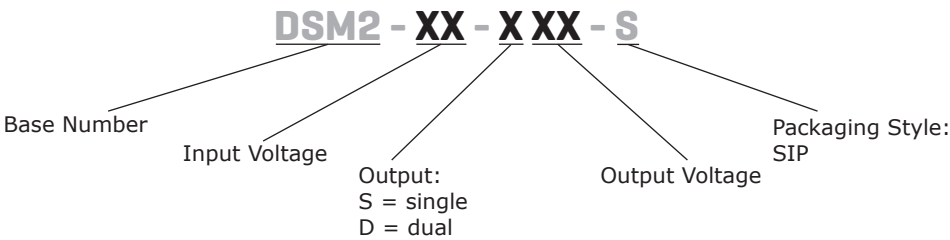
- 2 W isolated output
- industry standard SIP package
- single and dual unregulated output
- short circuit protection
- 4,000 Vdc isolation voltage
- certified to UL 62368-1
- -40 to 95 °C with derating


**MODEL**

| MODEL         | input<br>voltage | output<br>voltage | output<br>current | output<br>power | ripple<br>& noise <sup>1</sup> | efficiency     |            |
|---------------|------------------|-------------------|-------------------|-----------------|--------------------------------|----------------|------------|
|               | typ<br>(Vdc)     | range<br>(Vdc)    | (Vdc)             | max<br>(mA)     | max<br>(W)                     | max<br>(mVp-p) | typ<br>(%) |
| DSM2-5-S3-S   | 5                | 4.5~5.5           | 3.3               | 606             | 2                              | 150            | 75         |
| DSM2-5-S5-S   | 5                | 4.5~5.5           | 5                 | 400             | 2                              | 120            | 79         |
| DSM2-5-S9-S   | 5                | 4.5~5.5           | 9                 | 223             | 2                              | 120            | 83         |
| DSM2-5-S12-S  | 5                | 4.5~5.5           | 12                | 167             | 2                              | 120            | 83         |
| DSM2-5-S15-S  | 5                | 4.5~5.5           | 15                | 134             | 2                              | 120            | 82         |
| DSM2-5-D3-S   | 5                | 4.5~5.5           | ±3.3              | ±303            | 2                              | 150            | 78         |
| DSM2-5-D5-S   | 5                | 4.5~5.5           | ±5                | ±200            | 2                              | 120            | 81         |
| DSM2-5-D12-S  | 5                | 4.5~5.5           | ±12               | ±84             | 2                              | 120            | 84         |
| DSM2-5-D15-S  | 5                | 4.5~5.5           | ±15               | ±67             | 2                              | 120            | 83         |
| DSM2-12-S3-S  | 12               | 10.8~13.2         | 3.3               | 606             | 2                              | 150            | 78         |
| DSM2-12-S5-S  | 12               | 10.8~13.2         | 5                 | 400             | 2                              | 120            | 79         |
| DSM2-12-S9-S  | 12               | 10.8~13.2         | 9                 | 223             | 2                              | 120            | 85         |
| DSM2-12-S12-S | 12               | 10.8~13.2         | 12                | 167             | 2                              | 120            | 85         |
| DSM2-12-S15-S | 12               | 10.8~13.2         | 15                | 134             | 2                              | 120            | 82         |
| DSM2-12-D3-S  | 12               | 10.8~13.2         | ±3.3              | ±303            | 2                              | 150            | 82         |
| DSM2-12-D5-S  | 12               | 10.8~13.2         | ±5                | ±200            | 2                              | 120            | 81         |
| DSM2-12-D12-S | 12               | 10.8~13.2         | ±12               | ±84             | 2                              | 120            | 80         |
| DSM2-12-D15-S | 12               | 10.8~13.2         | ±15               | ±67             | 2                              | 120            | 82         |
| DSM2-24-S3-S  | 24               | 21.6~26.4         | 3.3               | 606             | 2                              | 150            | 80         |
| DSM2-24-S5-S  | 24               | 21.6~26.4         | 5                 | 400             | 2                              | 120            | 84         |
| DSM2-24-S9-S  | 24               | 21.6~26.4         | 9                 | 223             | 2                              | 120            | 86         |
| DSM2-24-S12-S | 24               | 21.6~26.4         | 12                | 167             | 2                              | 120            | 86         |
| DSM2-24-S15-S | 24               | 21.6~26.4         | 15                | 134             | 2                              | 120            | 85         |
| DSM2-24-D3-S  | 24               | 21.6~26.4         | ±3.3              | ±303            | 2                              | 150            | 82         |
| DSM2-24-D5-S  | 24               | 21.6~26.4         | ±5                | ±200            | 2                              | 120            | 83         |
| DSM2-24-D12-S | 24               | 21.6~26.4         | ±12               | ±84             | 2                              | 120            | 83         |
| DSM2-24-D15-S | 24               | 21.6~26.4         | ±15               | ±67             | 2                              | 120            | 84         |

Notes: 1. At full load, nominal input, 20 MHz bandwidth oscilloscope.  
 2. The efficiency is test by nominal input and max. full load at 25 °C.  
 3. All specifications measured at Ta=25°C, nominal input voltage, rated output load, and after warm up unless otherwise specified.

PART NUMBER KEY



INPUT

| parameter           | conditions/description | min | typ | max | units |
|---------------------|------------------------|-----|-----|-----|-------|
| input voltage range |                        | -10 |     | +10 | %     |
| filter              | capacitance filter     |     |     |     |       |

OUTPUT

| parameter                              | conditions/description                    | min | typ  | max   | units |
|----------------------------------------|-------------------------------------------|-----|------|-------|-------|
| maximum capacitive load <sup>4,5</sup> | 3.3, 5 Vdc output models                  |     |      | 1,500 | µF    |
|                                        | ±3.3, ±5, 9 Vdc output models             |     |      | 680   | µF    |
|                                        | 12, 15 Vdc output models                  |     |      | 470   | µF    |
|                                        | ±12, ±15 Vdc output models                |     |      | 220   | µF    |
| voltage accuracy                       |                                           | -5  |      | +5    | %     |
| line regulation                        | measured from low to high line, full load |     | ±1.2 |       | %     |
| load regulation                        | measured from 10~100% load                |     |      |       |       |
|                                        | 3.3 Vdc output models                     |     |      | 20    | %     |
|                                        | 5 Vdc output models                       |     |      | 15    | %     |
|                                        | 9, 12, 15 Vdc output model                |     |      | 10    | %     |
| switching frequency                    | at Vin nominal, full load                 | 20  |      |       | kHz   |

Note: 4. The capacitive load is tested by minimum input and constant resistive load.  
5. For dual output models, maximum capacitance applies to individual outputs.

PROTECTIONS

| parameter                | conditions/description | min | typ | max | units |
|--------------------------|------------------------|-----|-----|-----|-------|
| short circuit protection | continuous             |     |     |     |       |

SAFETY AND COMPLIANCE

| parameter             | conditions/description                                    | min        | typ | max | units |
|-----------------------|-----------------------------------------------------------|------------|-----|-----|-------|
| isolation voltage     | input to output for 1 second                              | 4,000      |     |     | Vdc   |
| isolation capacitance |                                                           |            | 80  |     | pF    |
| insulation type       | functional                                                |            |     |     |       |
| safety approvals      | certified to 62368-1: UL                                  |            |     |     |       |
| EMC                   | EN 55032/55024 <sup>6</sup>                               |            |     |     |       |
| EMI                   | EN 55032, Class A/B                                       |            |     |     |       |
| ESD                   | IEC 61000-4-2, air ±8 kV; contact ±6 kV, perf. Criteria A |            |     |     |       |
| fast transient        | IEC 61000-4-4, ±0.5 kV, perf. Criteria A                  |            |     |     |       |
| surge                 | IEC 61000-4-5, ±0.5 kV, perf. Criteria A                  |            |     |     |       |
| conducted immunity    | IEC 61000-4-6, 3 Vrms, perf. Criteria A                   |            |     |     |       |
| vibration             | MIL-STD-202G                                              |            |     |     |       |
| MTBF                  | at 25°C                                                   | 18,300,000 |     |     | hours |
|                       | at 85°C                                                   | 8,070,000  |     |     | hours |
| RoHS                  | yes                                                       |            |     |     |       |

Note: 6. Refer to Figures 2 and 3 for recommended EMC circuit.

## ENVIRONMENTAL

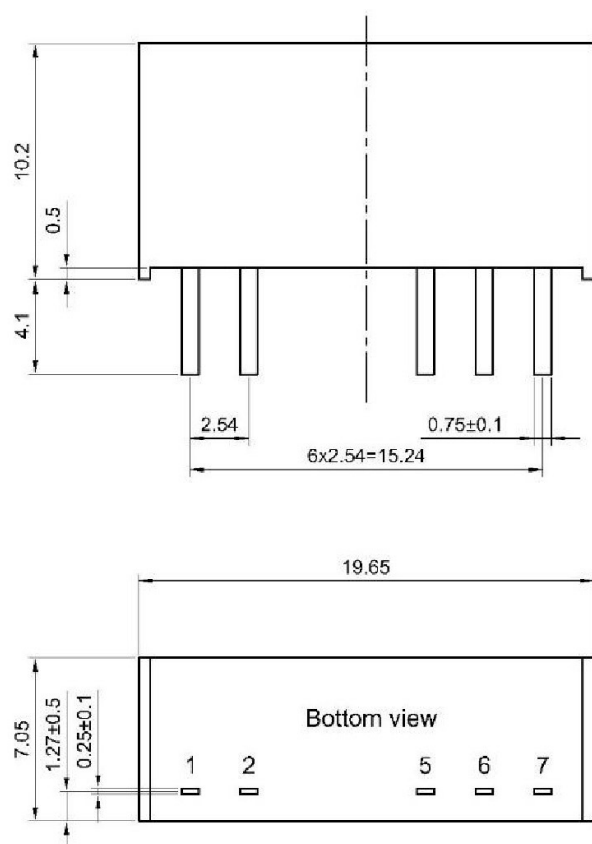
| parameter                | conditions/description | min | typ | max | units |
|--------------------------|------------------------|-----|-----|-----|-------|
| operating temperature    | see derating curve     | -40 |     | 95  | °C    |
| storage temperature      |                        | -55 |     | 125 | °C    |
| maximum case temperature |                        |     |     | 105 | °C    |
| operating humidity       | non-condensing         | 5   |     | 95  | %     |

## MECHANICAL

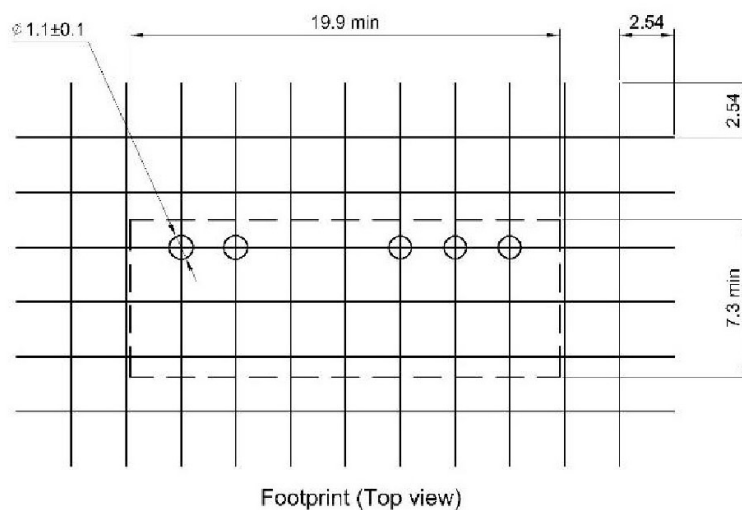
| parameter        | conditions/description | min | typ | max | units |
|------------------|------------------------|-----|-----|-----|-------|
| dimensions       | 19.65 x 7.05 x 10.20   |     |     |     | mm    |
| case material    | UL94V-0 black plastic  |     |     |     |       |
| potting material | epoxy (UL94V-0)        |     |     |     |       |
| weight           |                        |     | 2.8 |     | g     |

## MECHANICAL DRAWING

units: mm  
tolerance:  $\pm 0.25$  mm

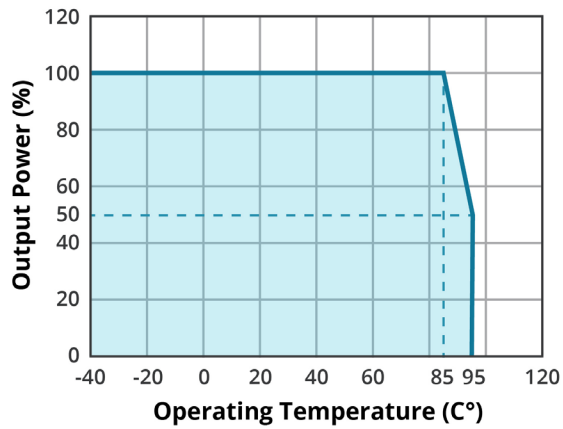


| PIN CONNECTIONS |        |       |
|-----------------|--------|-------|
| PIN             | Single | Dual  |
| 1               | +Vin   | +Vin  |
| 2               | -Vin   | -Vin  |
| 5               | -Vout  | -Vout |
| 6               | no pin | Com   |
| 7               | +Vout  | +Vout |

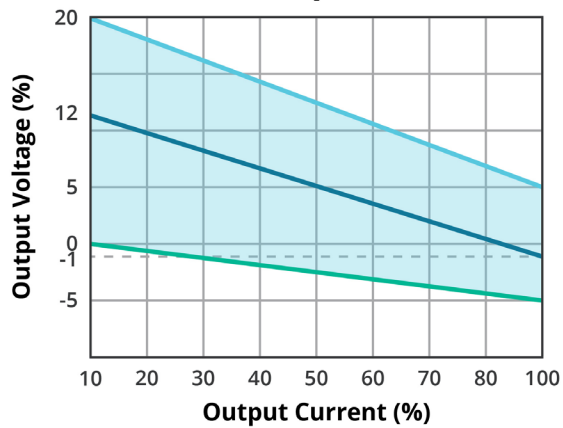


## DERATING CURVE

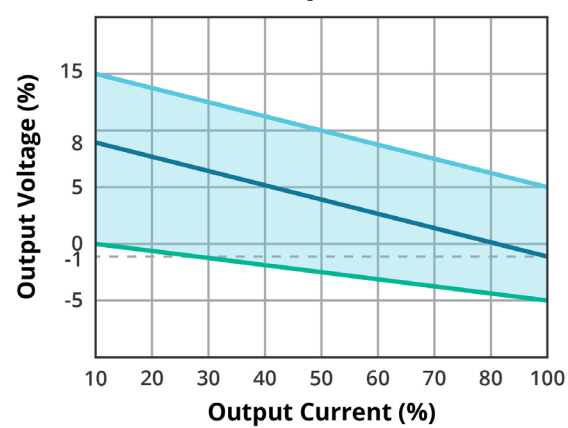
**TEMPERATURE DERATING CURVE**  
(natural convection)



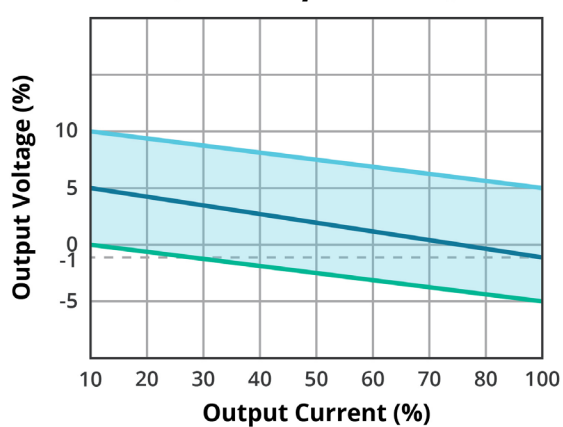
**OUTPUT REGULATION CURVE**  
(3.3 Vdc output models)



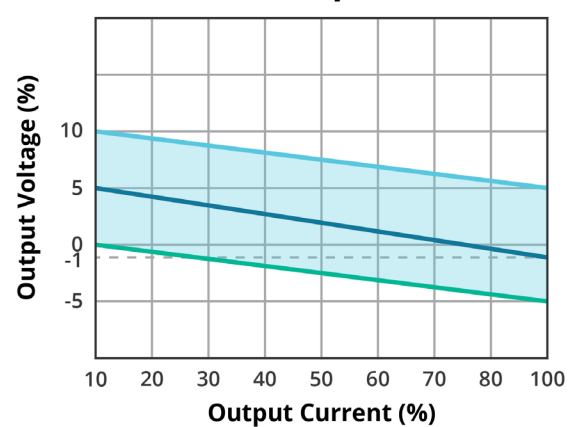
**OUTPUT REGULATION CURVE**  
(5 Vdc output models)



**OUTPUT REGULATION CURVE**  
(9 Vdc output models)

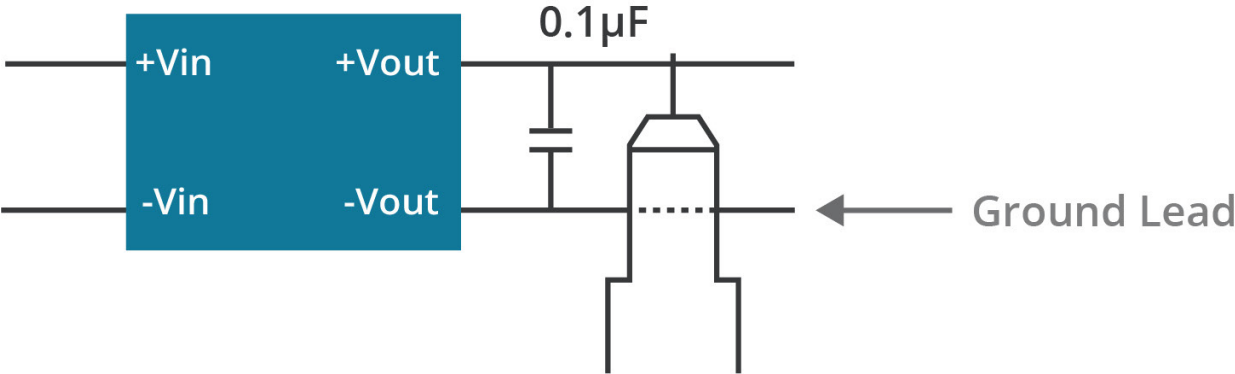


**OUTPUT REGULATION CURVE**  
(12, 15 Vdc output models)



**RIPPLE AND NOISE MEASURE METHOD**

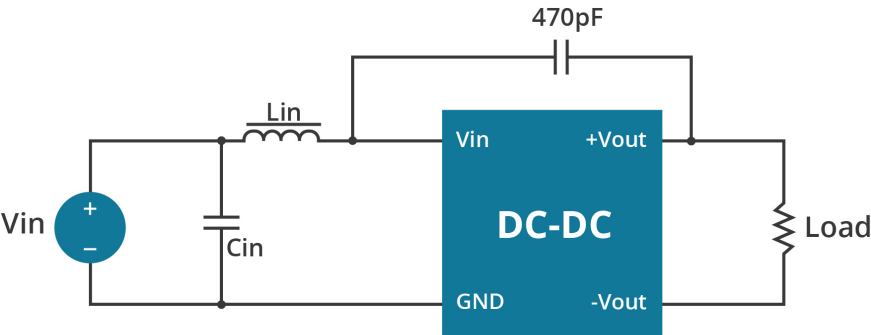
**Figure 1**



Note: Measured with 20MHz bandwidth and 0.1µF ceramic capacitor.

**EMI RECOMMENDED CIRCUIT FOR EN 55032 CLASS A/B**

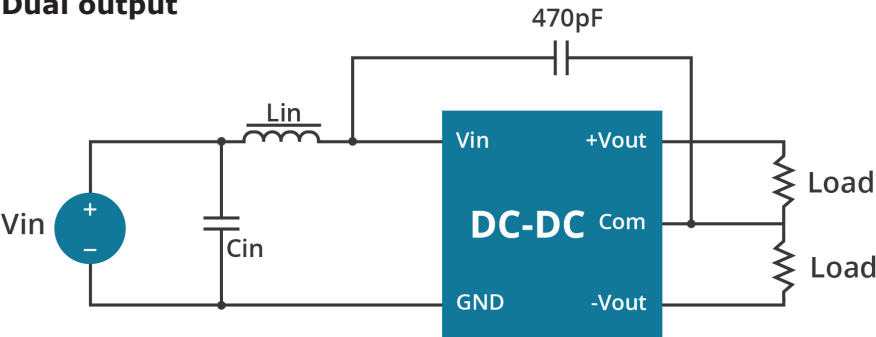
**Figure 2**  
**Single output**



**Table 1**  
**Single output**

| Recommended EMI Filter Values |         |       |         |       |
|-------------------------------|---------|-------|---------|-------|
| Vin                           | Class A |       | Class B |       |
|                               | Lin     | Cin   | Lin     | Cin   |
| 5                             | 1.0 µH  | 10 µF | 2.2 µH  | 10 µF |
| 12                            | 1.0 µH  | 10 µF | 2.2 µH  | 10 µF |
| 24                            | 2.2 µH  | 10 µF | 2.2 µH  | 22 µF |

**Figure 3**  
**Dual output**



**Table 2**  
**Dual output**

| Recommended EMI Filter Values |         |       |         |       |
|-------------------------------|---------|-------|---------|-------|
| Vin                           | Class A |       | Class B |       |
|                               | Lin     | Cin   | Lin     | Cin   |
| 5                             | 1.0 µH  | 10 µF | 2.2 µH  | 10 µF |
| 12                            | 1.0 µH  | 10 µF | 2.2 µH  | 10 µF |
| 24                            | 2.2 µH  | 10 µF | 2.2 µH  | 22 µF |

## REVISION HISTORY

| rev. | description     | date       |
|------|-----------------|------------|
| 1.0  | initial release | 10/04/2024 |

The revision history provided is for informational purposes only and is believed to be accurate.



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| <u><a href="#">DSM2-5-D12-S</a></u>  | <u><a href="#">DSM2-12-S5-S</a></u>  | <u><a href="#">DSM2-5-S5-S</a></u>   | <u><a href="#">DSM2-12-D15-S</a></u> | <u><a href="#">DSM2-5-D5-S</a></u>   | <u><a href="#">DSM2-24-S15-S</a></u> | <u><a href="#">DSM2-24-S3-S</a></u> |
| <u><a href="#">DSM2-12-S12-S</a></u> | <u><a href="#">DSM2-5-S15-S</a></u>  | <u><a href="#">DSM2-5-S3-S</a></u>   | <u><a href="#">DSM2-5-S12-S</a></u>  | <u><a href="#">DSM2-12-S9-S</a></u>  | <u><a href="#">DSM2-24-D15-S</a></u> | <u><a href="#">DSM2-5-D15-S</a></u> |
| <u><a href="#">DSM2-24-D5-S</a></u>  | <u><a href="#">DSM2-24-S12-S</a></u> | <u><a href="#">DSM2-12-D3-S</a></u>  | <u><a href="#">DSM2-24-D12-S</a></u> | <u><a href="#">DSM2-24-S5-S</a></u>  | <u><a href="#">DSM2-5-D3-S</a></u>   | <u><a href="#">DSM2-24-S9-S</a></u> |
| <u><a href="#">DSM2-12-S3-S</a></u>  | <u><a href="#">DSM2-12-D5-S</a></u>  | <u><a href="#">DSM2-12-S15-S</a></u> | <u><a href="#">DSM2-5-S9-S</a></u>   | <u><a href="#">DSM2-12-D12-S</a></u> | <u><a href="#">DSM2-24-D3-S</a></u>  |                                     |