

# 14DE

## High breaking capacity semiconductor fuse

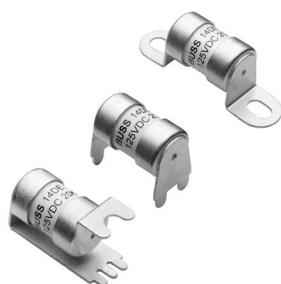


Photo is representative

### Product features

- 14 mm fuse
- Current rating: 40 A to 125 A
- 20 kA breaking capacity
- 125 Vdc rating
- High breaking capacity for high energy applications
- Bolt-down terminal and horizontal and vertical PCB terminal options available
- Designed to UL248-1, UL248-13, and JASO-D622

### Applications

- AI servers
- Data centers
- Cloud computing
- Power distribution boards (PDB)
- High power density boards
- Energy storage systems
- Electric and hybrid vehicles (EVs and HEVs)
- Renewable energy storage systems
- Photovoltaic (PV) systems

### Agency information

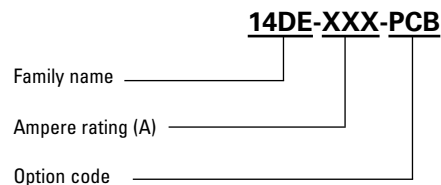
cURus recognition file number: E56412



### Environmental compliance



### Part numbering system



### Option code

- PCB: Vertical PCB mount
- 2P: 2 pin terminal, horizontal PCB mount
- SCT: Bolt-down, stud mounting

## Electrical characteristics

| Part number                 | Rated voltage (Vdc) | Rated current (A) | Breaking capacity <sup>1</sup> | Cold resistance <sup>2</sup> (mΩ) | Typical power loss @ 1.0 I <sub>n</sub> (W) | Typical I <sup>2</sup> t                            |                                                                |
|-----------------------------|---------------------|-------------------|--------------------------------|-----------------------------------|---------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------|
|                             |                     |                   |                                |                                   |                                             | Typical melting I <sup>2</sup> t (A <sup>2</sup> S) | Typical clearing I <sup>2</sup> t @ 125 Vdc (A <sup>2</sup> S) |
| 14DE-40-SCT<br>14DE-40-2P   | 125                 | 40                | 20 kA @ 125 Vdc                | 1.35 ± 30%                        | 3.2                                         | 705                                                 | 1250                                                           |
| 14DE-40-PCB                 | 125                 | 40                | 20 kA @ 125 Vdc                | 1.41 ± 30%                        | 3.2                                         | 705                                                 | 1250                                                           |
| 14DE-50-SCT<br>14DE-50-2P   | 125                 | 50                | 20 kA @ 125 Vdc                | 1.06 ± 30%                        | 4.1                                         | 1180                                                | 2160                                                           |
| 14DE-50-PCB                 | 125                 | 50                | 20 kA @ 125 Vdc                | 1.10 ± 30%                        | 4.1                                         | 1180                                                | 2160                                                           |
| 14DE-60-SCT<br>14DE-60-2P   | 125                 | 60                | 20 kA @ 125 Vdc                | 0.93 ± 30%                        | 5.3                                         | 1380                                                | 2430                                                           |
| 14DE-60-PCB                 | 125                 | 60                | 20 kA @ 125 Vdc                | 0.99 ± 30%                        | 5.3                                         | 1380                                                | 2430                                                           |
| 14DE-80-SCT<br>14DE-80-2P   | 125                 | 80                | 20 kA @ 125 Vdc                | 0.68 ± 30%                        | 6.7                                         | 2810                                                | 4930                                                           |
| 14DE-80-PCB                 | 125                 | 80                | 20 kA @ 125 Vdc                | 0.73 ± 30%                        | 6.7                                         | 2810                                                | 4930                                                           |
| 14DE-90-SCT<br>14DE-90-2P   | 125                 | 90                | 20 kA @ 125 Vdc                | 0.58 ± 30%                        | 7.2                                         | 3730                                                | 6520                                                           |
| 14DE-90-PCB                 | 125                 | 90                | 20 kA @ 125 Vdc                | 0.64 ± 30%                        | 7.2                                         | 3730                                                | 6520                                                           |
| 14DE-100-SCT<br>14DE-100-2P | 125                 | 100               | 20 kA @ 125 Vdc                | 0.48 ± 30%                        | 7.5                                         | 5500                                                | 9625                                                           |
| 14DE-100-PCB                | 125                 | 100               | 20 kA @ 125 Vdc                | 0.54 ± 30%                        | 7.5                                         | 5500                                                | 9625                                                           |
| 14DE-125-SCT<br>14DE-125-2P | 125                 | 125               | 20 kA @ 125 Vdc                | 0.37 ± 30%                        | 9.6                                         | 11200                                               | 19500                                                          |
| 14DE-125-PCB                | 125                 | 125               | 20 kA @ 125 Vdc                | 0.43 ± 30%                        | 9.6                                         | 11200                                               | 19500                                                          |

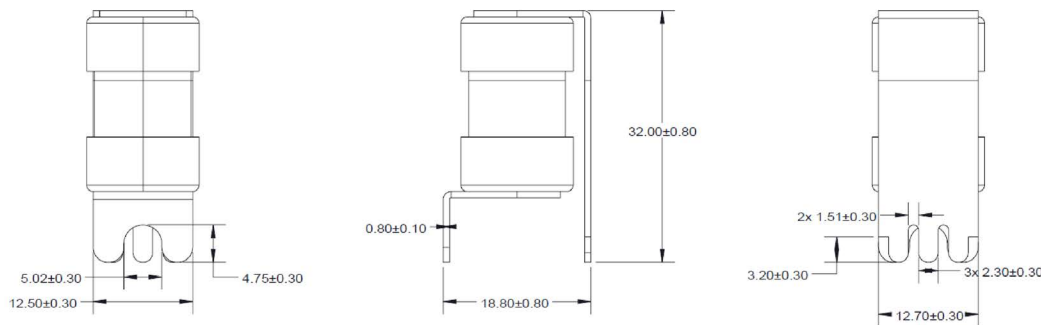
1. Tested at time constant < 2 ms; the minimum interrupting rating is 3.0 I<sub>n</sub> under 125 Vdc

2. Cold resistance is measured at < 10% rated current in ambient temperature of +25 °C

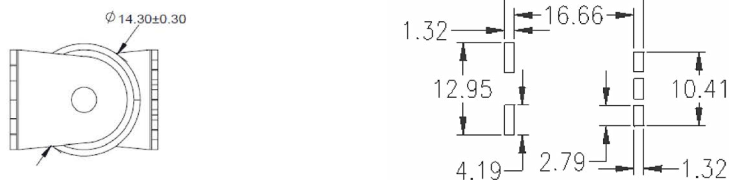
for 14DE-xx-SCT &- 2P, the resistance test point is on the end cap; for 14DE-xx-PCB, the resistance test point is on the end of terminal

## Mechanical specifications - mm

### PCB: Vertical PCB mount

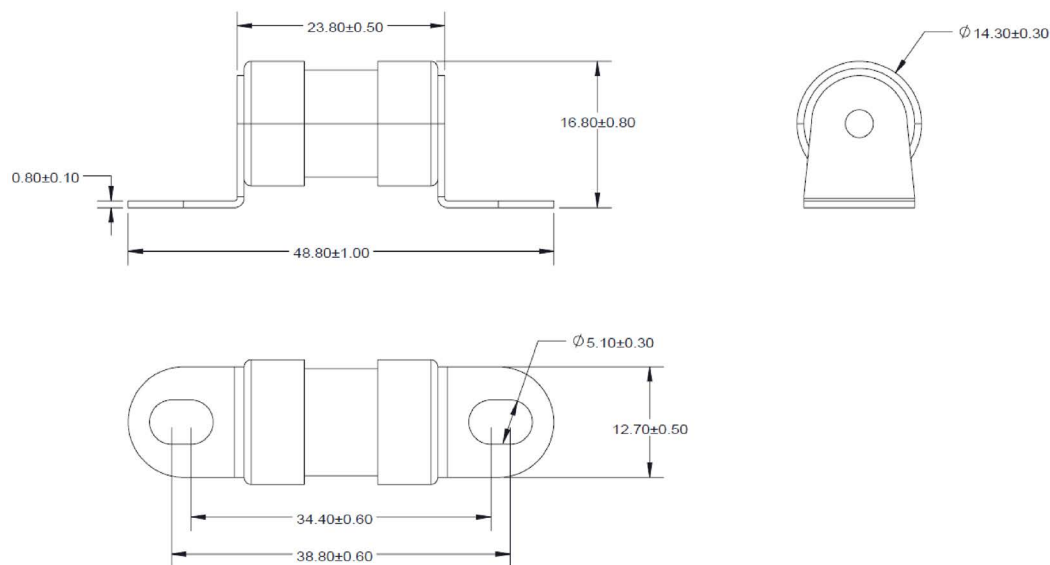


### Recommended PCB layout



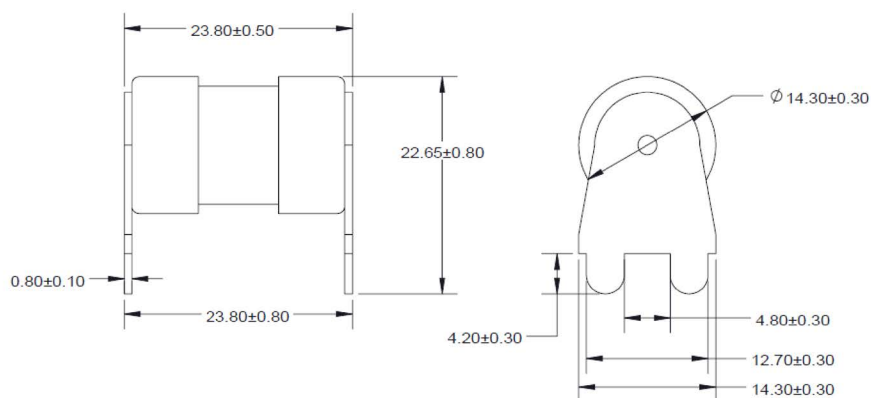
## Mechanical specifications - mm

### SCT: Bolt down, stud mounting



The recommended torque is  $4.5 \pm 1.0$  Nm for M5 Screw.

### 2P: 2 pin terminal, horizontal PCB mount



### Recommended PCB layout



Part marking



Illustration reference only

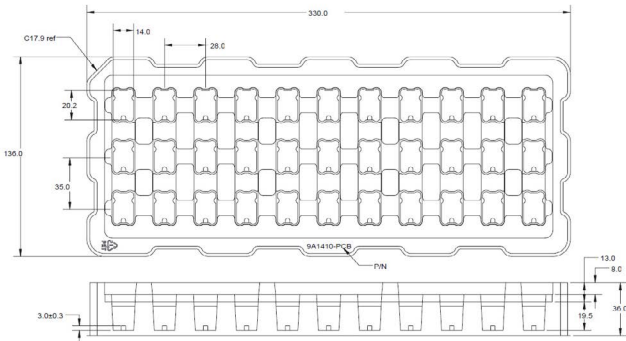
| Base part number | Marking on body                     |
|------------------|-------------------------------------|
| 14DE-40          | BUSS 14DE 40A<br>125VDC 20KA cULus  |
| 14DE-50          | BUSS 14DE 50A<br>125VDC 20KA cULus  |
| 14DE-60          | BUSS 14DE 60A<br>125VDC 20KA cULus  |
| 14DE-80          | BUSS 14DE 80A<br>125VDC 20KA cULus  |
| 14DE-90          | BUSS 14DE 90A<br>125VDC 20KA cULus  |
| 14DE-100         | BUSS 14DE 100A<br>125VDC 20KA cULus |
| 14DE-125         | BUSS 14DE 125A<br>125VDC 20KA cULus |

Packaging information

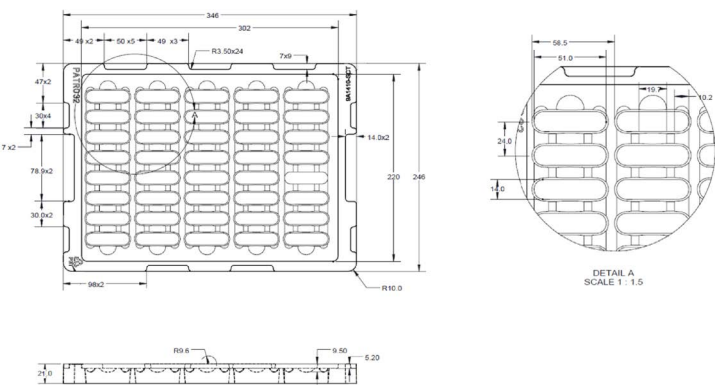
| Option code | Per carton (pcs) | Fuses per plastic tray (pcs) |
|-------------|------------------|------------------------------|
| -PCB        | 330              | 33                           |
| -SCT        | 400              | 40                           |
| -2P         | 500              | 50                           |

Tray dimensions - mm

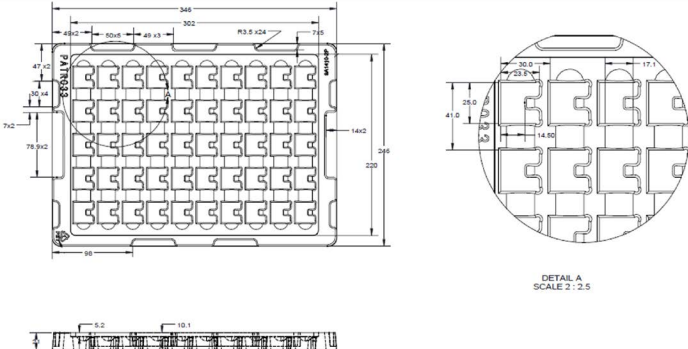
PCB



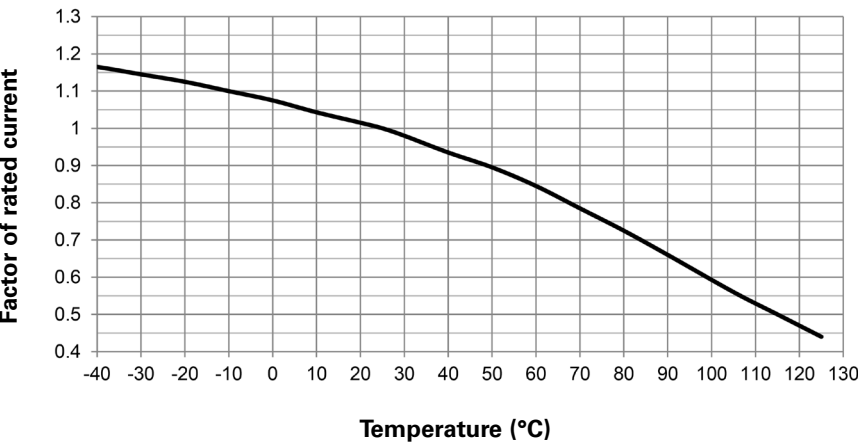
SCT



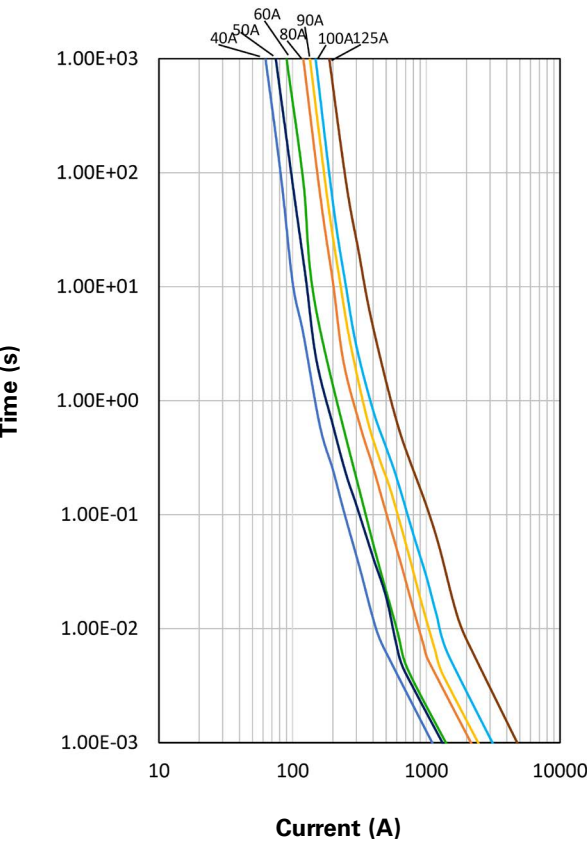
2P



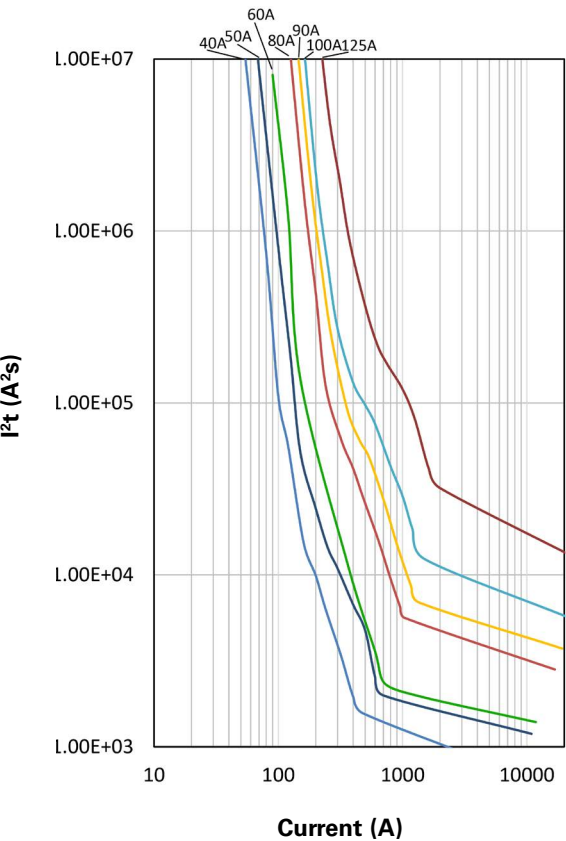
Temperature derating curve



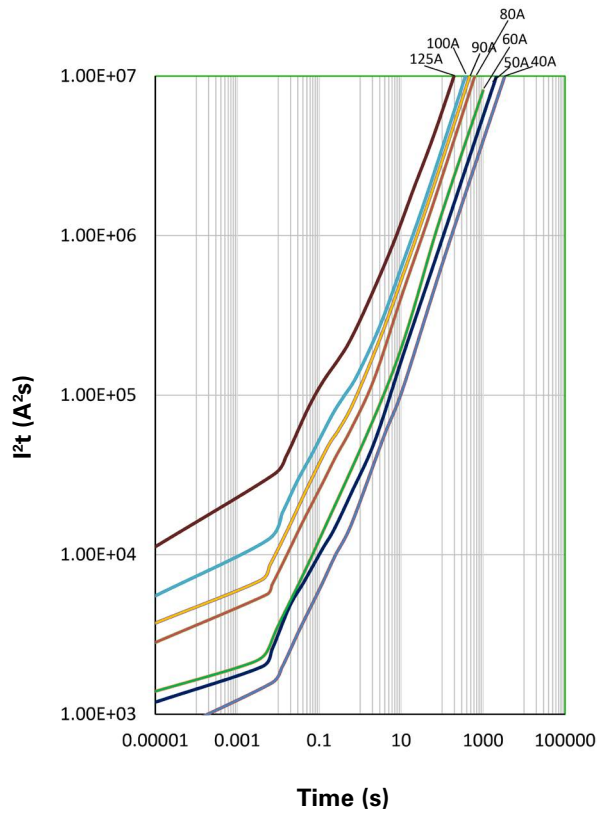
Time vs. current curve



I²t vs. current curve



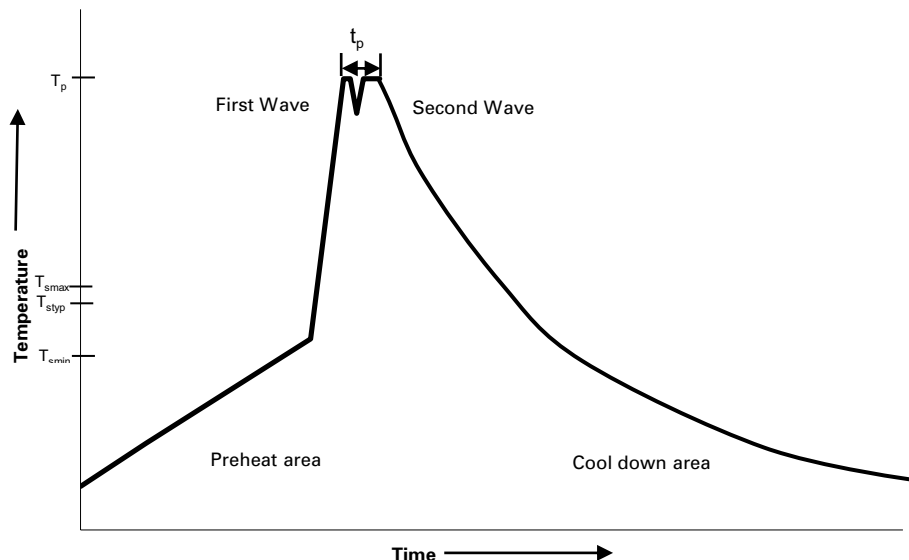
**I²t vs. time curve**



**General specifications**

|                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating temperature: -40 °C to +125 °C, with proper rerating factor applied                                                                                                                                                                                                                                                          |
| Thermal shock: JASO D622, -40 °C to +100 °C; 60 minutes each cycle, 48 cycles                                                                                                                                                                                                                                                          |
| Temperature/humidity cycling: JASO D622, 10 cycles: -40 °C to +120 °C, 95% to 99% RH                                                                                                                                                                                                                                                   |
| Vibration: JASO D622, 10 to 55 Hz, 3 directions, 2 hours each direction                                                                                                                                                                                                                                                                |
| Strength of terminals (bolt down terminal only [-SCT option] ): JASO D622, Mounting torque 4.5 +/- 1 Nm, 3 times                                                                                                                                                                                                                       |
| Solderability (PCB mounting only [-PCB and -2P option] ): MIL-STD-202 Method 208, Solder bath (+245 °C), dwell time 5.0 seconds ± 1.0 second                                                                                                                                                                                           |
| Storage condition and shelf life: The minimum shelf life is two years from date code manufactured provided product is maintained in its original packaging and stored in a controlled environment under the conditions of +20 °C to +40 °C temperature and 75% RH maximum. Solderability should be checked if this period is exceeded. |

### Wave solder profile PCB version only (-PCB and -2P option)



### Reference EN 61760-1:2006

| Profile feature                               | Standard SnPb solder                                  | Lead (Pb) free solder                                 |
|-----------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|
| Preheat                                       |                                                       |                                                       |
| • Temperature min. ( $T_{smin}$ )             | 100 °C                                                | 100 °C                                                |
| • Temperature typ. ( $T_{styp}$ )             | 120 °C                                                | 120 °C                                                |
| • Temperature max. ( $T_{smax}$ )             | 130 °C                                                | 130 °C                                                |
| • Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ ) | 70 seconds                                            | 70 seconds                                            |
| $\Delta$ preheat to maximum temperature       | 150 °C maximum                                        | 150 °C maximum                                        |
| Peak temperature ( $T_p$ )*                   | 235 °C to 260 °C                                      | 250 °C to 260 °C                                      |
| Time at peak temperature ( $t_p$ )            | 10 seconds maximum<br>5 seconds maximum each wave     | 10 seconds maximum<br>5 seconds maximum each wave     |
| Ramp-down rate                                | ~ 2 K/s minimum<br>~3.5 K/s typical<br>~5 K/s maximum | ~ 2 K/s minimum<br>~3.5 K/s typical<br>~5 K/s maximum |
| Time 25 °C to 25 °C                           | 4 minutes                                             | 4 minutes                                             |

### Manual solder

+350 °C maximum, 4 to 5 seconds maximum by soldering iron, generally manual, hand soldering is not recommended

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