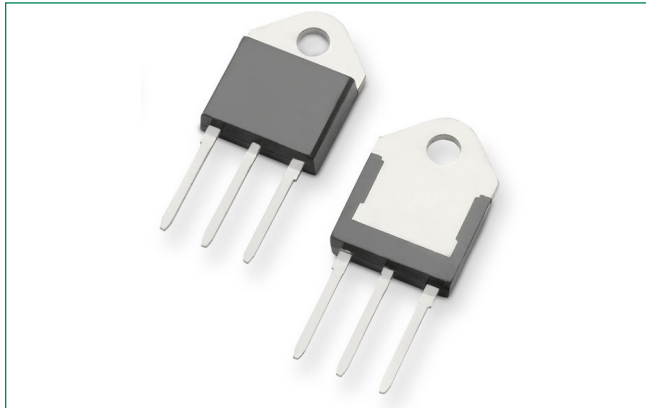


## Pxxx0ME 5kA SIDACtor Series® in TO-218



### Description

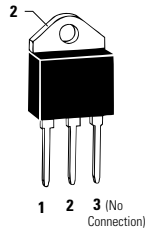
The 5kA series SIDACtor® components are designed to protect equipment located in high exposure environments from severe overvoltage transients.

Setup in a robust TO-218 package, the 5kA series are ideal for use in data interface and AC power line for CATV amplifiers, Telecom Base Station equipment and Cell Towers.

### Agency Approvals

| Agency | Agency File Number |
|--------|--------------------|
|        | E133083            |

### Pinout Designation



### Schematic Symbol



### Features and Benefits

- Low voltage overshoot
- Low on-state voltage
- Does not degrade surge capability after multiple surge events within limit.
- Fails short circuit when surged in excess of rating
- Rugged TO-218 package
- 5000A 8/20  $\mu$ s surge rating
- Pb-free E3 means 2<sup>nd</sup> level interconnect is Pb-free and the terminal finish material is tin(Sn) (IPC/JEDEC J-STD-609A.01)
- RoHS compliant, lead-free and halogen-free
- UL Recognized as an Isolated Loop Circuit Protector to UL 497B

### Applicable Global Standards

- TIA-968-A
- TIA-968-B
- ITU K.20/21/45 Enhanced Level
- ITU K.20/21/45 Basic Level
- GR 1089 Intra-building
- IEC 61000-4-5 2<sup>nd</sup> Edition
- YD/T 1082
- YD/T 993
- YD/T 950
- GR 1089 Inter-building

### Electrical Characteristics

| Part Number | Marking | $V_{DRM}$<br>@ $I_{DRM}=5\mu A$ | $V_S$<br>@ $100V/\mu s$ | $I_H$  | $I_S$  | $I_T$  | $V_T$<br>@ $I_T=2.2 A$ | Capacitance<br>@ 1MHz, 2V bias |        |
|-------------|---------|---------------------------------|-------------------------|--------|--------|--------|------------------------|--------------------------------|--------|
|             |         | V min                           | V max                   | mA min | mA max | A max  | V max                  | pF min                         | pF max |
| P1500MEL    | P1500ME | 140                             | 180                     | 50     | 800    | 2.2/25 | 4                      | 400                            | 650    |
| P1900MEL    | P1900ME | 155                             | 220                     | 50     | 800    | 2.2/25 | 4                      | 400                            | 650    |
| P2300MEL    | P2300ME | 180                             | 260                     | 50     | 800    | 2.2/25 | 4                      | 350                            | 600    |
| P2600MEL    | P2600ME | 220                             | 300                     | 50     | 800    | 2.2/25 | 4                      | 300                            | 600    |
| P3100MEL    | P3100ME | 275                             | 350                     | 50     | 800    | 2.2/25 | 4                      | 300                            | 550    |
| P3500MEL    | P3500ME | 320                             | 400                     | 50     | 800    | 2.2/25 | 4                      | 300                            | 500    |
| P3800MEL    | P3800ME | 350                             | 430                     | 50     | 800    | 2.2/25 | 4                      | 300                            | 500    |
| P4800MEL    | P4800ME | 450                             | 600                     | 20     | 800    | 2.2/25 | 4                      | 300                            | 500    |

#### Notes:

1. Absolute maximum ratings measured at  $T_A=25^\circ C$  (unless otherwise noted).
2. Components are bi-directional (unless otherwise noted).
3.  $I_T$  is a free air rating and heat sink is at 25A

### Surge Ratings

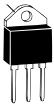
| Series | $I_{PP}$                                 |                                            |                                              | $I_{TSM}$<br>50 / 60 Hz | di/dt    |
|--------|------------------------------------------|--------------------------------------------|----------------------------------------------|-------------------------|----------|
|        | 1.2/50 <sup>1</sup><br>8/20 <sup>2</sup> | 10/350 <sup>1</sup><br>1.2/50 <sup>2</sup> | 10/1000 <sup>1</sup><br>10/1000 <sup>2</sup> |                         |          |
|        | A min                                    | A min                                      | A min                                        | A min                   | A/μs max |
| E      | 5000 <sup>3</sup>                        | 1500                                       | 1100                                         | 400                     | 630      |

#### Notes:

1. Voltage waveform in μs
2. Current waveform in μs
3. For surge rating of P3800MEL, it is minimum 4kA and typical 5kA @8/20μs.

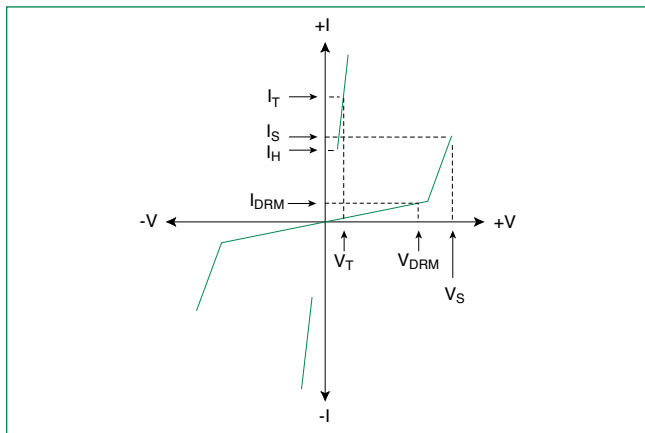
- Peak pulse current rating ( $I_{PP}$ ) is repetitive and guaranteed for the life of the product.
- The component must initially be in thermal equilibrium with  $-40^{\circ}\text{C} \leq T_J \leq +150^{\circ}\text{C}$

### Thermal Conditions

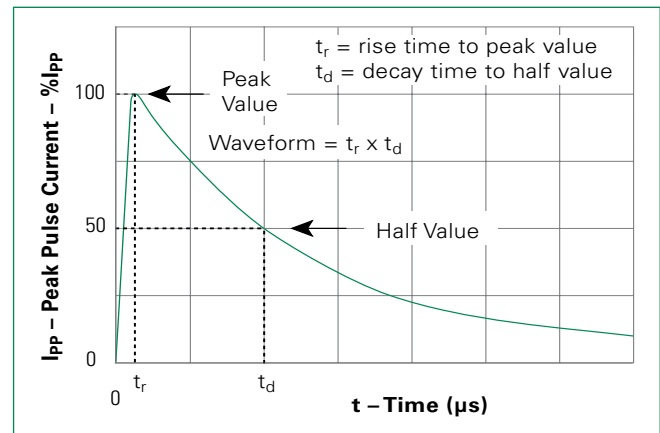
| Package                                                                                     | Symbol            | Parameter                               | Value       | Unit                 |
|---------------------------------------------------------------------------------------------|-------------------|-----------------------------------------|-------------|----------------------|
| <br>TO-218 | $T_{J0}$          | Operating Junction Temperature Range    | -40 to +150 | $^{\circ}\text{C}$   |
|                                                                                             | $T_S$             | Storage Temperature Range               | -65 to +150 | $^{\circ}\text{C}$   |
|                                                                                             | $T_C$             | Maximum Case Temperature                | 100         | $^{\circ}\text{C}$   |
|                                                                                             | $R_{\theta JC}^*$ | Thermal Resistance: Junction to Case    | 1.7         | $^{\circ}\text{C/W}$ |
|                                                                                             | $R_{\theta JA}$   | Thermal Resistance: Junction to Ambient | 56          | $^{\circ}\text{C/W}$ |

\* $R_{\theta JC}$  rating assumes the use of a heat sink and on state mode for extended time at 25 A, with average power dissipation of 29.125 W.

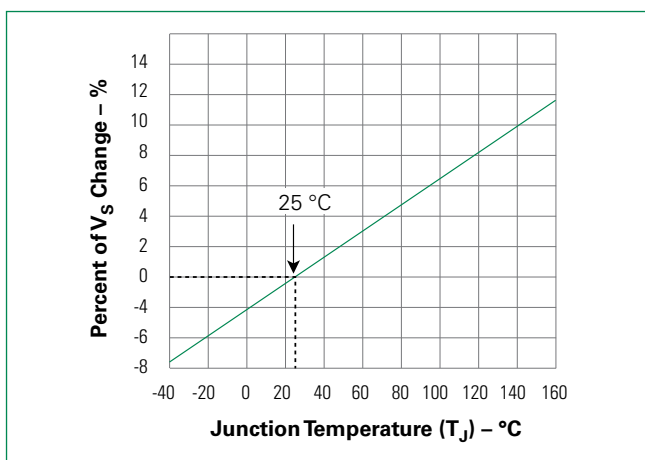
### V-I Characteristics



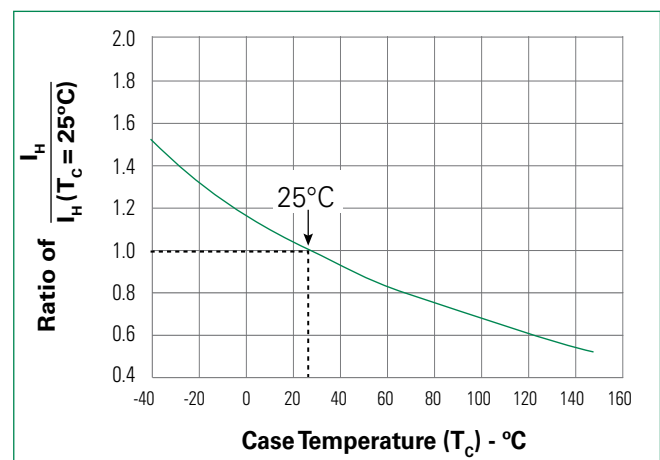
### $t_r \times t_d$ Pulse Waveform



### Normalized $V_S$ Change vs. Junction Temperature

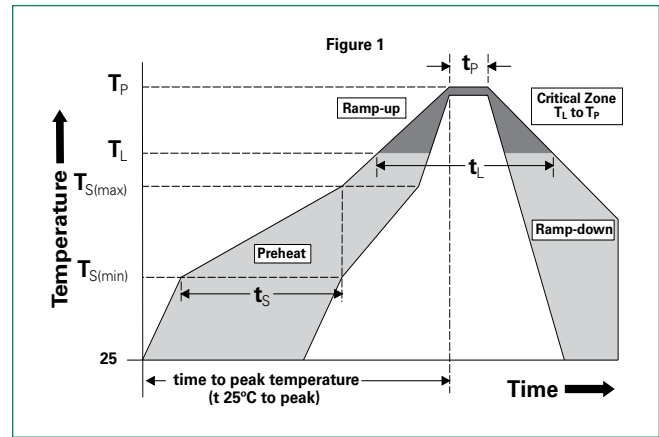


### Normalized DC Holding Current vs. Case Temperature



### Soldering Parameters

|                                                                        |                                    |                  |
|------------------------------------------------------------------------|------------------------------------|------------------|
| <b>Reflow Condition</b>                                                |                                    | Pb-Free assembly |
| <b>Pre Heat</b>                                                        | - Temperature Min ( $T_{s(min)}$ ) | +150°C           |
|                                                                        | - Temperature Max ( $T_{s(max)}$ ) | +200°C           |
|                                                                        | - Time (Min to Max) ( $t_s$ )      | 60-180 secs.     |
| <b>Average ramp up rate (Liquidus Temp (<math>T_L</math>) to peak)</b> |                                    | 3°C/sec. Max.    |
| <b><math>T_{s(max)}</math> to <math>T_L</math> - Ramp-up Rate</b>      |                                    | 3°C/sec. Max.    |
| <b>Reflow</b>                                                          | - Temperature ( $T_L$ ) (Liquidus) | +217°C           |
|                                                                        | - Temperature ( $t_L$ )            | 60-150 secs.     |
| <b>Peak Temp (<math>T_p</math>)</b>                                    |                                    | +260(+0/-5)°C    |
| <b>Time within 5°C of actual Peak Temp (<math>t_p</math>)</b>          |                                    | 30 secs. Max.    |
| <b>Ramp-down Rate</b>                                                  |                                    | 6°C/sec. Max.    |
| <b>Time 25°C to Peak Temp (<math>T_p</math>)</b>                       |                                    | 8 min. Max.      |
| <b>Do not exceed</b>                                                   |                                    | +260°C           |



### Physical Specifications

|                        |                                                             |
|------------------------|-------------------------------------------------------------|
| <b>Lead Material</b>   | Copper Alloy                                                |
| <b>Terminal Finish</b> | 100% Matte-Tin Plated                                       |
| <b>Body Material</b>   | UL recognized epoxy meeting flammability classification V-0 |

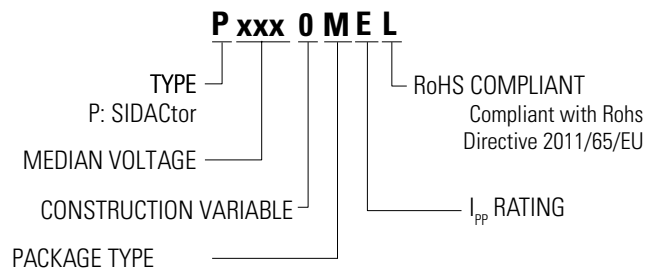
### Environmental Specifications

|                                         |                                                                                                                       |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>High Temp Voltage Blocking</b>       | 80% Rated $V_{DRM}$ ( $V_{AC}$ Peak) +125°C or +150°C, 504 or 1008 hrs. MIL-STD-750 (Method 1040) JEDEC, JESD22-A-101 |
| <b>Temp Cycling</b>                     | -65°C to +150°C, 15 min. dwell, 10 up to 100 cycles. MIL-STD-750 (Method 1051) EIA/JEDEC, JESD22-A-104                |
| <b>Biased Temp &amp; Humidity</b>       | 52 $V_{DC}$ (+85°C) 85%RH, 504 up to 1008 hrs. EIA/JEDEC, JESD22-A-101                                                |
| <b>High Temp Storage</b>                | +150°C 1008 hrs. MIL-STD-750 (Method 1031) JEDEC, JESD22-A-101                                                        |
| <b>Low Temp Storage</b>                 | -65°C, 1008 hrs.                                                                                                      |
| <b>Thermal Shock</b>                    | 0°C to +100°C, 5 min. dwell, 10 sec. transfer, 10 cycles. MIL-STD-750 (Method 1056) JEDEC, JESD22-A-106               |
| <b>Autoclave (Pressure Cooker Test)</b> | +121°C, 100%RH, 2atm, 24 up to 168 hrs. EIA/JEDEC, JESD22-A-102                                                       |
| <b>Resistance to Solder Heat</b>        | +260°C, 30 secs. MIL-STD-750 (Method 2031)                                                                            |
| <b>Moisture Sensitivity Level</b>       | 85%RH, +85°C, 168 hrs., 3 reflow cycles (+260°C Peak). JEDEC-J-STD-020, Level 1                                       |

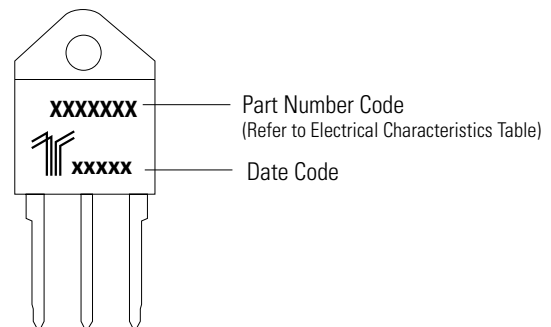
### Wave Solder (THD) Parameters and Lead-Free Requirements

| Reflow Parameter                 | Lead-Free Requirement |
|----------------------------------|-----------------------|
| Preheat (Depending on Flux Only) |                       |
| Temperature Min                  | 150°C                 |
| Temperature Max                  | 200°C                 |
| Time (Min to Max)                | 60 - 180 Seconds      |
| Solder Pot Temperature           | 245 - 265°C (Max)     |
| Solder Dwell Time                | 2 - 3.5 Seconds       |
| Cooling                          | -6°C/Seconds (Max)    |

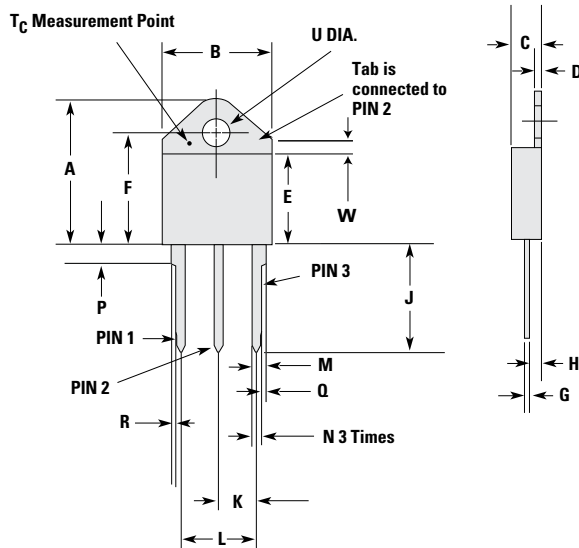
### Part Numbering



### Part Marking



### Dimensions — TO-218



**Notes:**

- Mold flash shall not exceed 0.13 mm per side.
- Maximum torque to be applied to mounting tab is 8 in-lbs. (0.904 Nm).
- Pin 3 has no connection.
- Tab is non-isolated (connects to middle pin).

| Dimensions | Inches |       | Millimeters |       |
|------------|--------|-------|-------------|-------|
|            | Min    | Max   | Min         | Max   |
| A          | 0.810  | 0.835 | 20.57       | 21.21 |
| B          | 0.610  | 0.630 | 15.49       | 16.00 |
| C          | 0.178  | 0.188 | 4.52        | 4.78  |
| D          | 0.055  | 0.070 | 1.40        | 1.78  |
| E          | 0.487  | 0.497 | 12.37       | 12.62 |
| F          | 0.635  | 0.655 | 16.13       | 16.64 |
| G          | 0.022  | 0.029 | 0.56        | 0.74  |
| H          | 0.075  | 0.095 | 1.91        | 2.41  |
| J          | 0.575  | 0.625 | 14.61       | 15.88 |
| K          | 0.211  | 0.219 | 5.36        | 5.56  |
| L          | 0.422  | 0.437 | 10.72       | 11.10 |
| M          | 0.058  | 0.068 | 1.47        | 1.73  |
| N          | 0.045  | 0.055 | 1.14        | 1.40  |
| P          | 0.095  | 0.115 | 2.41        | 2.92  |
| R          | 0.008  | 0.016 | 0.20        | 0.41  |
| U          | 0.161  | 0.165 | 4.1         | 4.2   |
| W          | 0.085  | 0.095 | 2.17        | 2.42  |

### Packing Options

| Package Type | Description           | Packing Options Quantity          | Added Suffix | Industry Standard |
|--------------|-----------------------|-----------------------------------|--------------|-------------------|
| M            | TO-218 (ME) Tube Pack | 250(25 per tube/10 tubes per box) | N/A          | N/A               |

### Tube Pack Specification — TO-218

