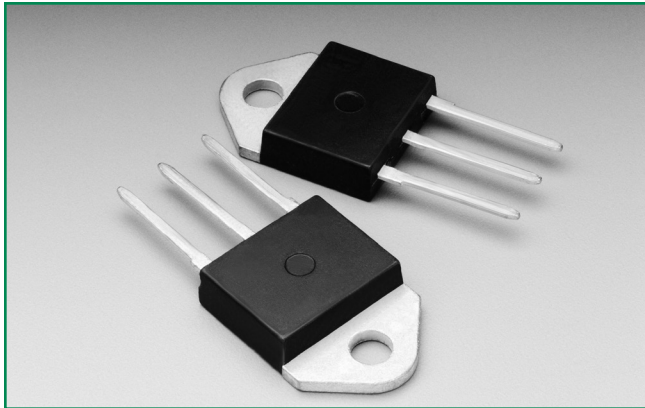


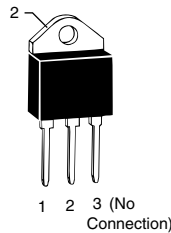
## Pxxx0ME 5kA SIDACtor Series® in TO-218



### Agency Approvals

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

### Pinout Designation



### Schematic Symbol



### Description

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

Packaged 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.

### 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

### 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 Inter-building
- GR 1089 Intra-building
- IEC 61000-4-5 2<sup>nd</sup> Edition
- YD/T 1082
- YD/T 993
- YD/T 950

### 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    |
| 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:**

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

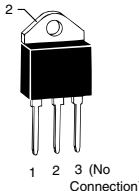
## Surge Ratings

| 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:

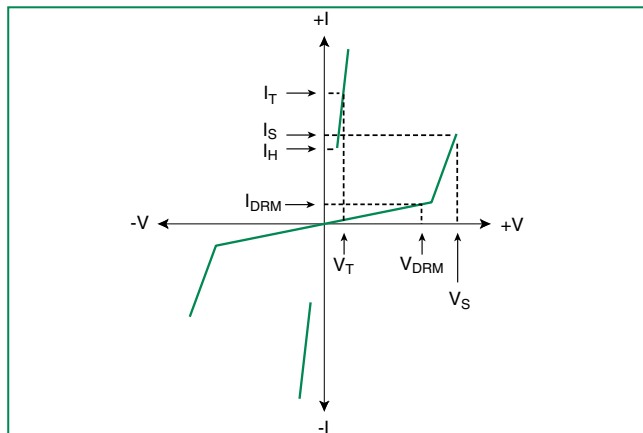
- 1 Voltage waveform in μs
  - 2 Current waveform in μs
  3. For surge rating of P3800MEL, it is minimum 4kA and typical 5kA @8/20μs.
- Peak pulse current rating ( $I_{PP}$ ) is repetitive and guaranteed for the life of the product.
  - $I_{PP}$  ratings applicable over temperature range of -40°C to +85°C
  - The component must initially be in thermal equilibrium with -40°C ≤  $T_J$  ≤ +150°C

## Thermal Conditions

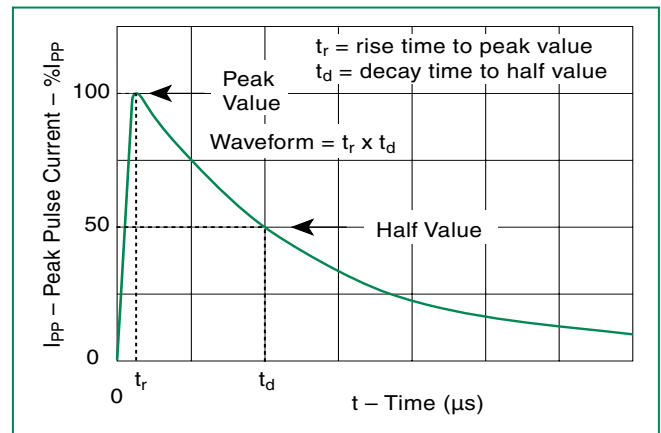
| Package                                                                                     | Symbol            | Parameter                               | Value       | Unit |
|---------------------------------------------------------------------------------------------|-------------------|-----------------------------------------|-------------|------|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

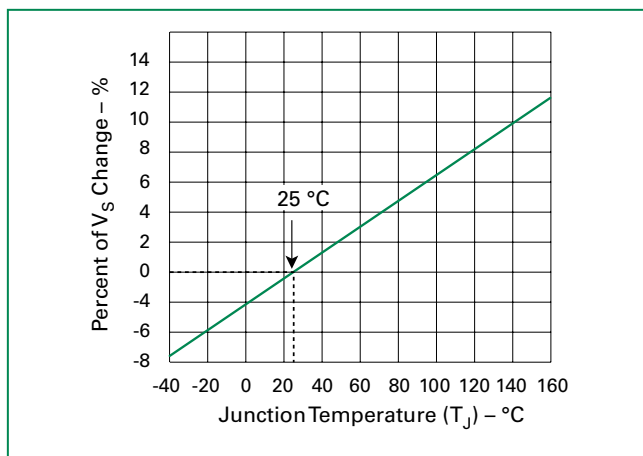
## V-I Characteristics



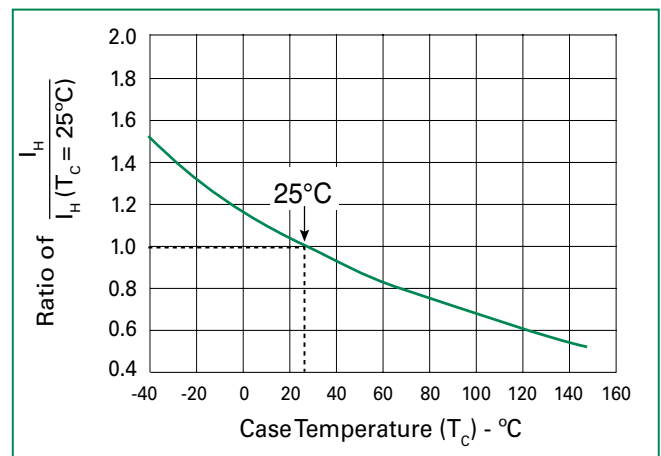
## $t_r \times t_d$ Pulse Waveform



## Normalized $V_S$ Change vs. Junction Temperature

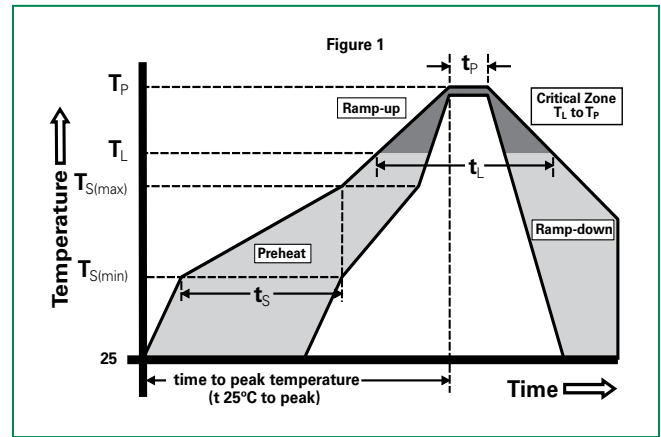


## Normalized DC Holding Current vs. Case Temperature



## Soldering Parameters

|                                                        |                                   |                               |
|--------------------------------------------------------|-----------------------------------|-------------------------------|
| Reflow Condition                                       |                                   | Pb-Free assembly (see Fig. 1) |
| Pre Heat                                               | -Temperature Min ( $T_{s(min)}$ ) | +150°C                        |
|                                                        | -Temperature Max ( $T_{s(max)}$ ) | +200°C                        |
|                                                        | -Time (Min to Max) ( $t_s$ )      | 60-180 secs.                  |
| Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak) |                                   | 3°C/sec. Max.                 |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                   |                                   | 3°C/sec. Max.                 |
| Reflow                                                 | -Temperature ( $T_L$ ) (Liquidus) | +217°C                        |
|                                                        | -Temperature ( $T_L$ )            | 60-150 secs.                  |
| Peak Temp ( $T_p$ )                                    |                                   | +260(+0/-5)°C                 |
| Time within 5°C of actual Peak Temp ( $t_p$ )          |                                   | 30 secs. Max.                 |
| Ramp-down Rate                                         |                                   | 6°C/sec. Max.                 |
| Time 25°C to Peak Temp ( $T_p$ )                       |                                   | 8 min. Max.                   |
| Do not exceed                                          |                                   | +260°C                        |



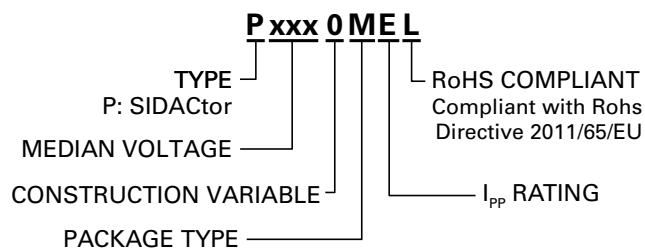
## Physical Specifications

|                        |                                                             |
|------------------------|-------------------------------------------------------------|
| <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 |

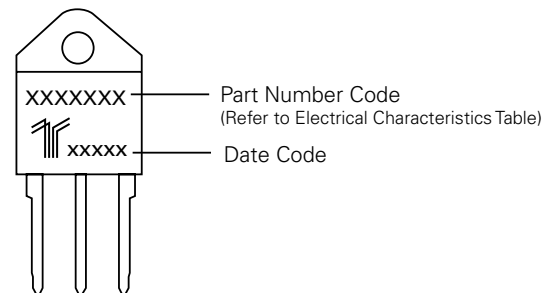
## Environmental Specifications

|                                         |                                                                                                                                |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>High Temp Voltage Blocking</b>       | 80% Rated $V_{DRM}$ ( $V_{AC \text{ Peak}}$ ) +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                                                |

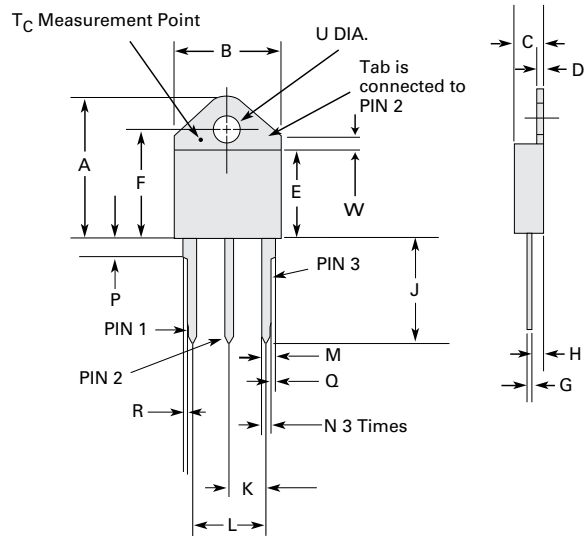
## Part Numbering



## Part Marking



## Dimensions — TO-218



**Notes:**

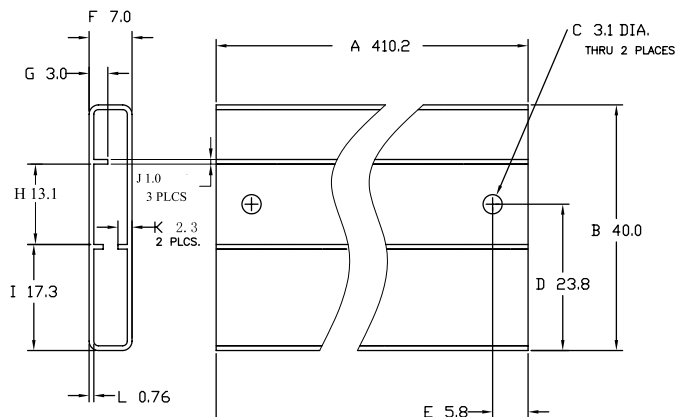
- Mold flash shall not exceed 0.13 mm per side.
- Maximum torque to be applied to mounting tab is 8 in-lbs. (0.904 Nm).
- Pin 3 has no connection.
- Tab is non-isolated (connects to middle pin).

| Dimensions | Inches |       | Millimeters |       |
|------------|--------|-------|-------------|-------|
|            | Min    | Max   | Min         | Max   |
| <b>A</b>   | 0.810  | 0.835 | 20.57       | 21.21 |
| <b>B</b>   | 0.610  | 0.630 | 15.49       | 16.00 |
| <b>C</b>   | 0.178  | 0.188 | 4.52        | 4.78  |
| <b>D</b>   | 0.055  | 0.070 | 1.40        | 1.78  |
| <b>E</b>   | 0.487  | 0.497 | 12.37       | 12.62 |
| <b>F</b>   | 0.635  | 0.655 | 16.13       | 16.64 |
| <b>G</b>   | 0.022  | 0.029 | 0.56        | 0.74  |
| <b>H</b>   | 0.075  | 0.095 | 1.91        | 2.41  |
| <b>J</b>   | 0.575  | 0.625 | 14.61       | 15.88 |
| <b>K</b>   | 0.211  | 0.219 | 5.36        | 5.56  |
| <b>L</b>   | 0.422  | 0.437 | 10.72       | 11.10 |
| <b>M</b>   | 0.058  | 0.068 | 1.47        | 6.73  |
| <b>N</b>   | 0.045  | 0.055 | 1.14        | 1.40  |
| <b>P</b>   | 0.095  | 0.115 | 2.41        | 2.92  |
| <b>R</b>   | 0.008  | 0.016 | 0.20        | 0.41  |
| <b>U</b>   | 0.161  | 0.165 | 4.1         | 4.2   |
| <b>W</b>   | 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



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