

### 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



#### 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

#### Schematic Symbol



#### 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	$V_{DRM}$ @ $I_{DRM} = 5\mu A$	$V_S$ @ $100V/\mu s$	$I_H$	$I_S$	$I_T$	$V_T$ @ $I_T = 2.2 A$	Capacitance @ 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  $T_c = 25^\circ C$  (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**

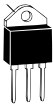
Series	I <sub>PP</sub>			I <sub>TSM</sub> / 60 Hz	di/dt
	1.2/50 <sup>1</sup> 8/20 <sup>2</sup>	10/350 <sup>1</sup> 1.2/50 <sup>2</sup>	10/1000 <sup>1</sup> 10/1000 <sup>2</sup>		
	A min	A min	A min		
E	5000 <sup>3</sup>	1500	1100	400	630

**Notes:**

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

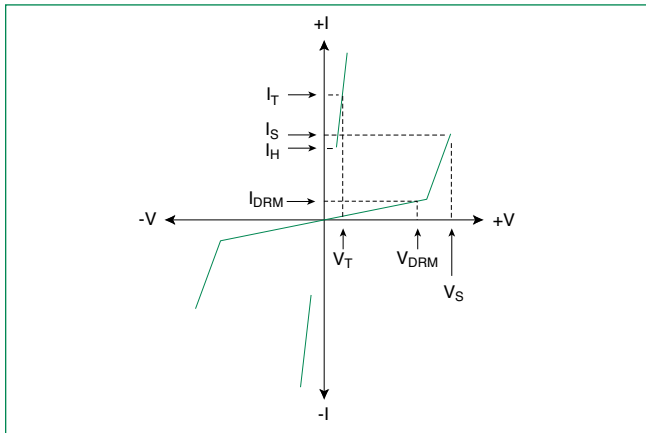
- Peak pulse current rating (I<sub>pp</sub>) is repetitive and guaranteed for the life of the product.  
- The component must initially be in thermal equilibrium with -40°C ≤ T<sub>j</sub> ≤ +150°C

**Thermal Conditions**

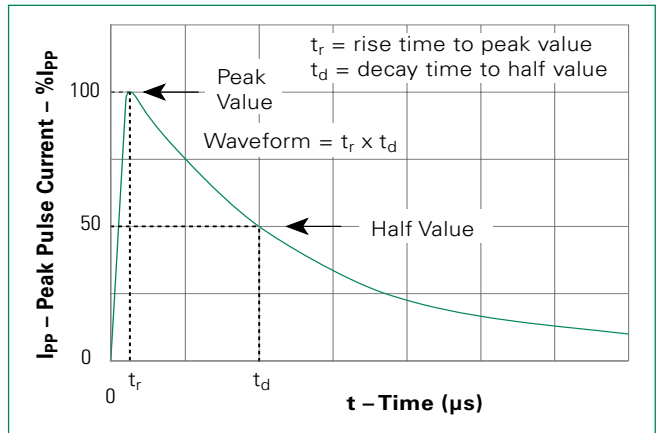
Package	Symbol	Parameter	Value	Unit
 TO-218	T <sub>JO</sub>	Operating Junction Temperature Range	-40 to +150	°C
	T <sub>S</sub>	Storage Temperature Range	-65 to +150	°C
	T <sub>C</sub>	Maximum Case Temperature	100	°C
	R <sub>θJC</sub> *	Thermal Resistance: Junction to Case	1.7	°C/W
	R <sub>θJA</sub>	Thermal Resistance: Junction to Ambient	56	°C/W

\*R<sub>θJC</sub> 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.

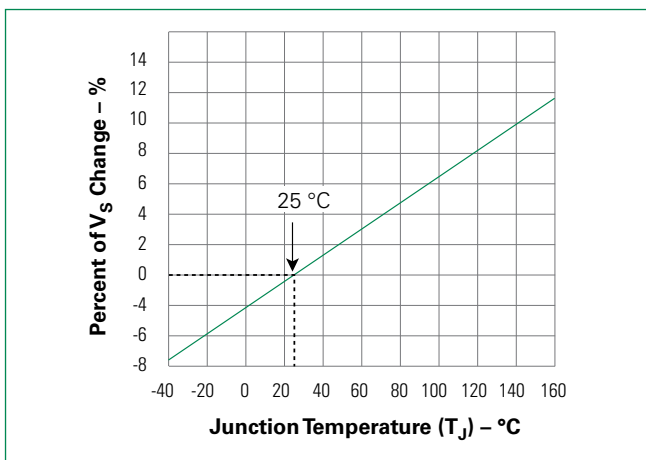
**V-I Characteristics**



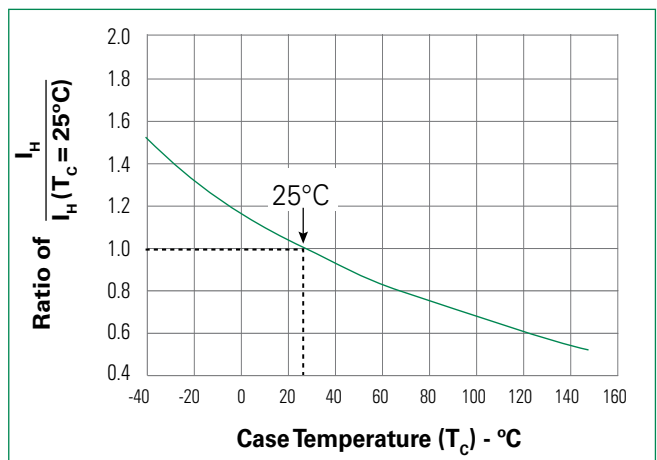
**t<sub>r</sub> x t<sub>d</sub> Pulse Waveform**



**Normalized V<sub>S</sub> 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

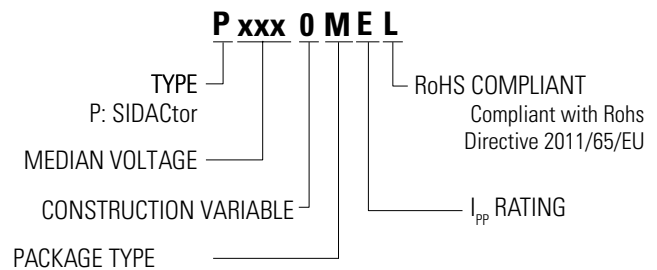
### Environmental Specifications

<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-A104
<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

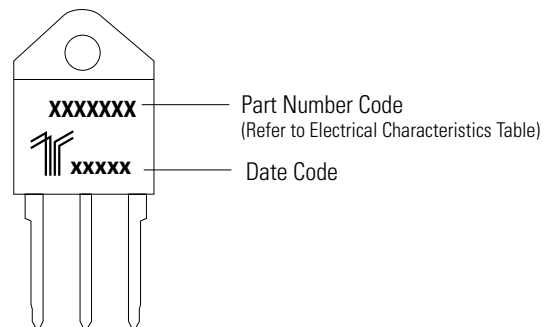
### Wave Solder (THD) Parameters and Lead-Free Requirements

Reflow Parameter	Lead-Free Requirement
Prehead (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**



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	1.73
<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

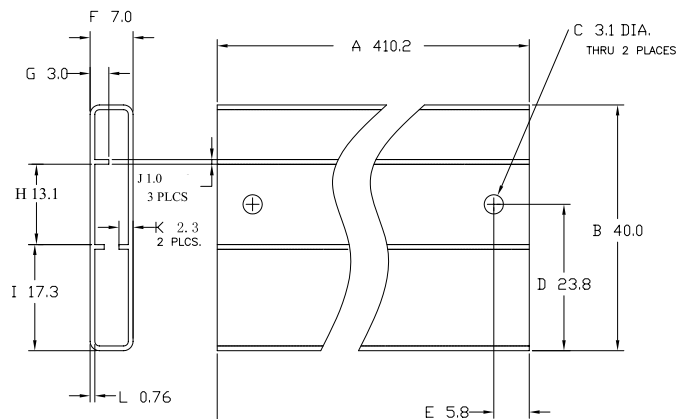
**Notes:**

- 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).

**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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