

**HF RoHS 5kA Series - TO-218**



**Description**

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

Packaged in a robust TO-218 package, the 5kA Series is ideal for use in CATV amplifiers, Telecom Base Station equipment and Cell Towers.

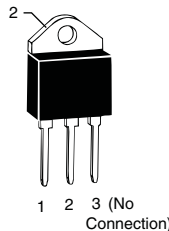
**Features and Benefits**

- Low voltage overshoot
- Low on-state voltage
- Does not degrade with use
- Fails short circuit when surged in excess of rating
- Rugged TO-218 package
- 5000A 8x20  $\mu$ s surge rating

**Agency Approvals**

Agency	Agency File Number
	E133083

**Pinout Designation**



**Applicable Global Standards**

- TIA-968-A
- TIA-968-B
- ITU K.20/21 Enhanced Level
- ITU K.20/21 Basic Level
- GR 1089 Intra-building
- IEC 61000-4-5
- YD/T 1082
- YD/T 993
- YD/T 950

**Schematic Symbol**



**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	140	220	50	800	2.2/25	4	400	650
P2300MEL	P2300ME	180	260	50	800	2.2/25	4	350	600

Notes:  
 - Absolute maximum ratings measured at  $T_a = 25^\circ C$  (unless otherwise noted).  
 - Devices are bi-directional (unless otherwise noted).  
 -  $I_s$  is a free air rating and heat sink is at 25A

**Surge Ratings**

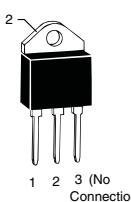
Series	$I_{PP}$		$I_{TSM}$ 50 / 60 Hz	di/dt
	8x20 <sup>1</sup>	1.2x50 <sup>2</sup>		
E	A min	A min	A min	A/μs max
E	5000	400	400	630

Notes:

- 1 Current waveform in μs
- 2 Voltage waveform in μs

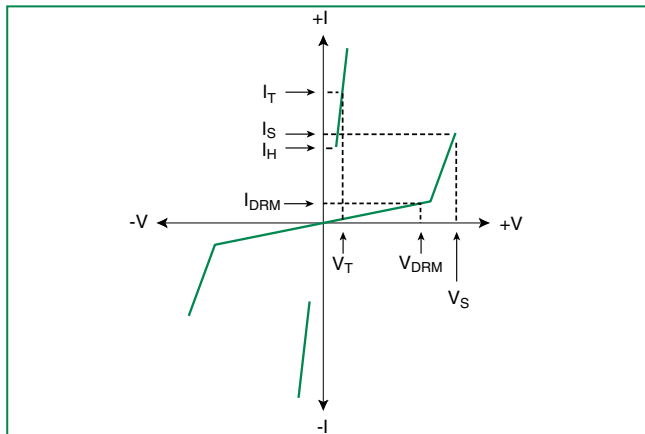
- Peak pulse current rating ( $I_{pp}$ ) is repetitive and guaranteed for the life of the product.
- $I_{pp}$  ratings applicable over temperature range of -40°C to +85°C
- The device must initially be in thermal equilibrium with -40°C ≤  $T_J$  ≤ +150°C

**Thermal Conditions**

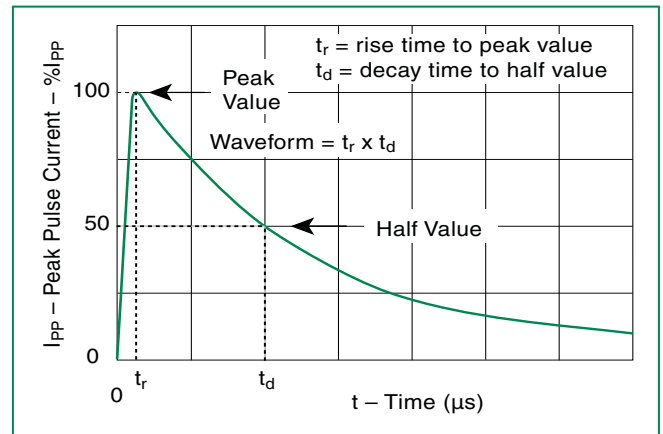
Package	Symbol	Parameter	Value	Unit
TO-218 	$T_{J\theta}$	Operating Junction Temperature Range	-40 to +150	°C
	$T_S$	Storage Temperature Range	-65 to +150	°C
	$T_C$	Maximum Case Temperature	100	°C
	$R_{\theta JC}^*$	Thermal Resistance: Junction to Case	1.7	°C/W
	$R_{\theta JA}$	Thermal Resistance: Junction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

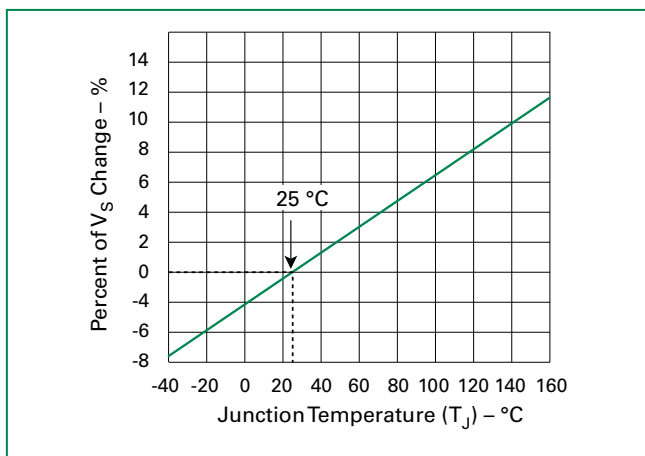
**V-I Characteristics**



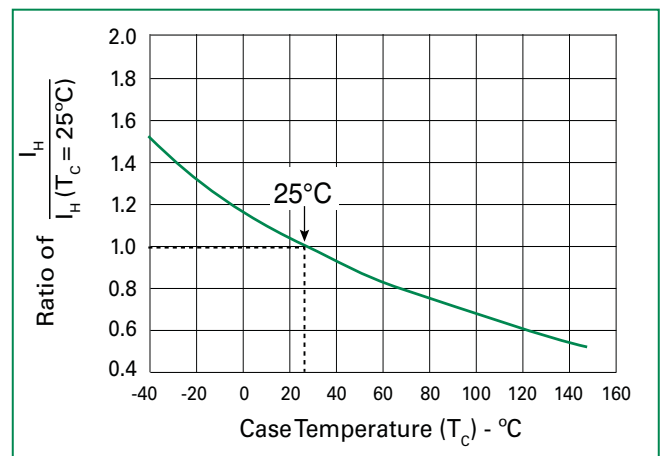
**$t_r \times t_d$  Pulse Waveform**



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

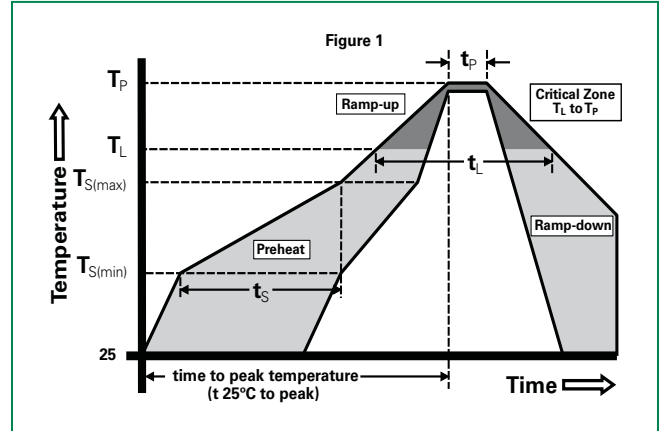


**Normalized DC Holding Current vs. Case Temperature**



**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) ( $t_p$ )	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



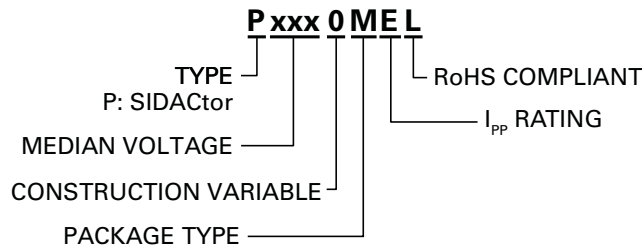
**Physical Specifications**

<b>Lead Material</b>	Copper Alloy
<b>Terminal Finish</b>	100% Matte-Tin Plated
<b>Body Material</b>	UL recognized epoxy meeting flammability classification 94V-0

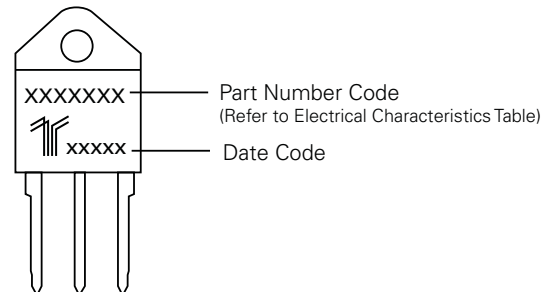
**Environmental Specifications**

<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

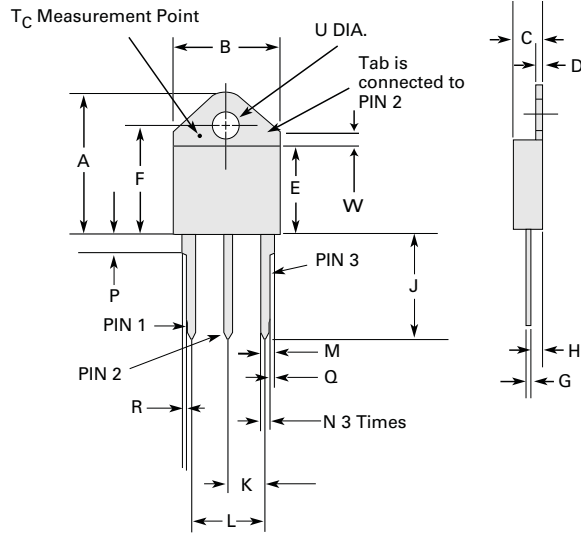
**Part Numbering**



**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	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

- 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**

