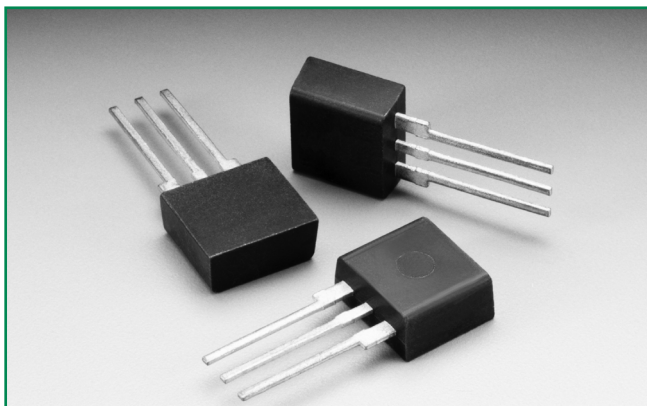


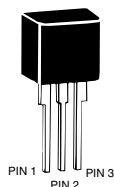
SIDACtor® Primary Protection Balanced Series - Modified TO-220



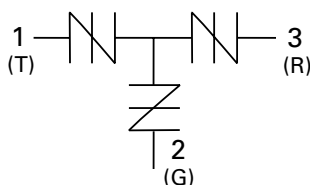
Agency Approvals

Agency	Agency File Number
	E133083

Pinout Designation



Schematic Symbol



Description

The SIDACtor® Primary Protection Balanced Series Modified TO-220 thyristors are components designed for use in primary protection applications.

The series provides a single port overvoltage solution that enables applications to comply with the balance requirements of GR-974 and GTS-8700. Please contact Littelfuse to discuss your particular application and regulatory requirements.

Features and Benefits

- High holding current options available
- Balanced overvoltage protection
- Failsafe option available
- 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 ratings
- Single-port protection
- Modified TO-220 Package
- Lead forms available
- RoHS Compliant
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin(Sn) IPC/JEDEC J-STD-609A.01

Applicable Global Standards

- GR-974
- GTS-8700
- UL 497
- ITU K.28

Electrical Characteristics

Part Number	Marking	V_{DRM} @ $I_{\text{DRM}}=5\mu\text{A}$	V_{S} @ 100V/ μs	I_{H}^*	I_{S}	I_{T}	$V_{\text{T}}@I_{\text{T}}=2.2\text{ Amps}$	Capacitance			
		V min	V max	mA min	mA max	A max	V max	Pin 1-2 / 3-2 Tip-Ground, Ring-Ground		Pin 1-3 Tip-Ring	
								pF min	pF max	pF min	pF max
		Pins 1-2, 3-2, 1-3									
P1553ACLxx	P1553AC	130	180	150	800	2.2	8	65	95	40	60
P1803ACLxx	P1803AC	150	210	150	800	2.2	8	55	85	35	55
P2103ACLxx	P2103AC	170	250	150	800	2.2	8	55	85	30	55
P2353ACLxx	P2353AC	200	270	150	800	2.2	8	50	75	30	50
P2703ACLxx	P2703AC	230	300	150	800	2.2	8	50	75	30	50
P3203ACLxx	P3203AC	270	350	150	800	2.2	8	45	70	25	45
P3403ACLxx	P3403AC	300	400	150	800	2.2	8	45	65	25	45
P5103ACLxx	P5103AC	420	600	150	800	2.2	8	40	60	20	40

Notes:

* Higher holding current available by special order. Contact Littelfuse for additional information.

- Absolute maximum ratings measured at $T_A = 25^\circ C$ (unless otherwise noted).

- Components are bi-directional.

- Off-state capacitance (C_o) is measured at 1 MHz with a 2 V bias.

- **xx** Part Number Suffix: **'RP'** (Reel pack), **Blank** (Bulk pack), **'60'** (Type 60 lead form bulk pack), **'FS1'** (Failsafe option bulk pack). Refer to Part Numbering section for additional details.

Surge Ratings

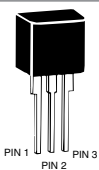
Series	I _{PP}									I _{TSM} 50/60 Hz	di/dt
	0.2/310 ¹ 0.5/700 ²	2/10 ¹ 2/10 ²	8/20 ¹ 1.2/50 ²	10/160 ¹ 10/160 ²	10/560 ¹ 10/560 ²	5/320 ¹ 9/720 ²	10/360 ¹ 10/360 ²	10/1000 ¹ 10/1000 ²	5/310 ¹ 10/700 ²		
	A min	A min	A min	A min	A min	A min	A min	A min	A min		
C	50	500	400	200	150	200	175	100	200	50	500

Notes:

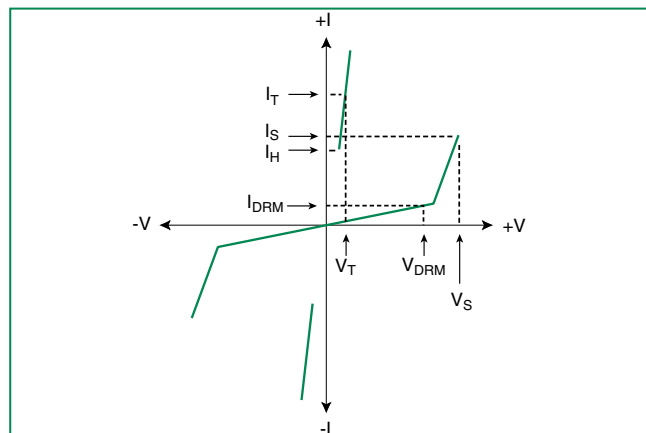
1 Current waveform in μs
2 Voltage waveform in μs

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

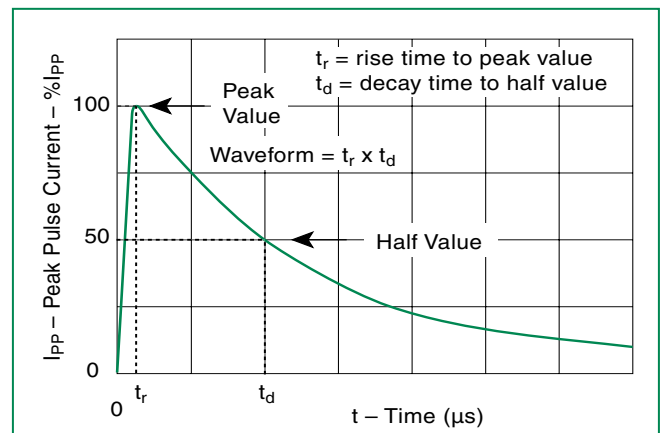
Thermal Considerations

Package	Symbol	Parameter	Value	Unit
Modified TO-220 	T_J	Operating Junction Temperature Range	-40 to +150	°C
	T_S	Storage Temperature Range	-65 to +150	°C
	$R_{\theta JA}$	Thermal Resistance: Junction to Ambient	50	°C/W

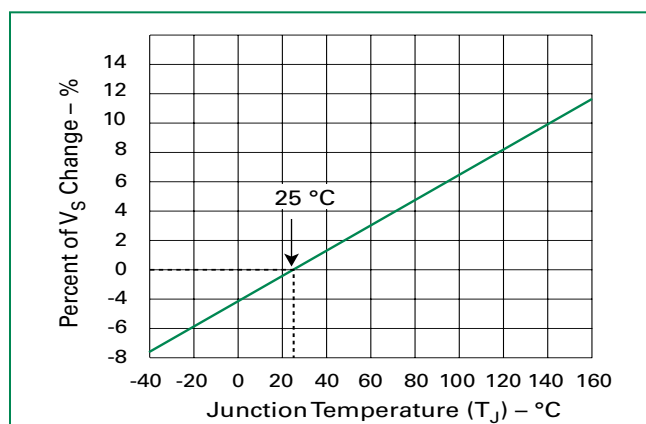
V-I Characteristics



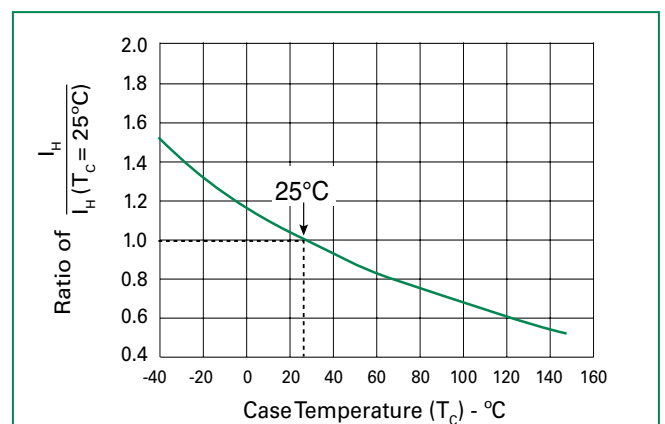
$t_r \times t_d$ Pulse Waveform



Normalized V_S Change vs. Junction Temperature

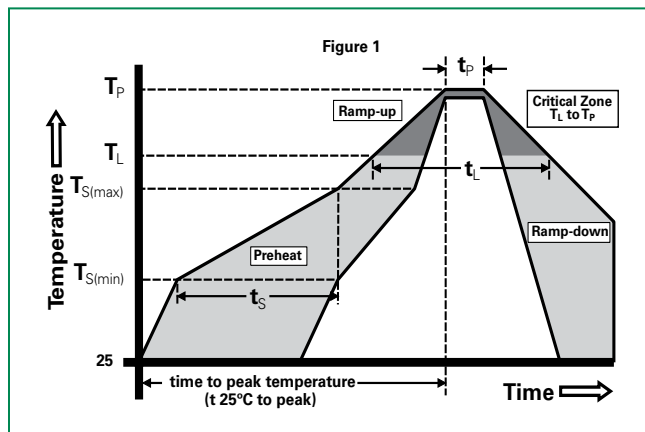


Normalized DC Holding Current vs. Case Temperature



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



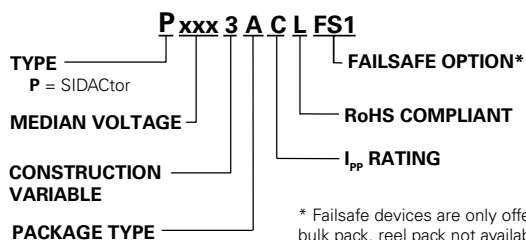
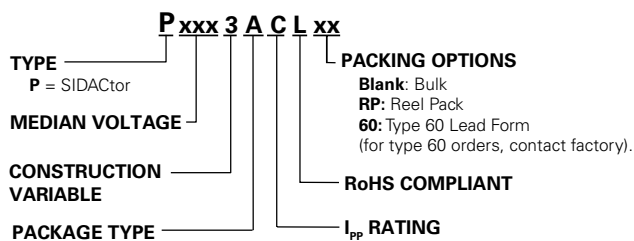
Physical Specifications

Lead Material	Copper Alloy
Terminal Finish	100% Matte-Tin Plated
Body Material	UL Recognized epoxy meeting flammability classification V-0

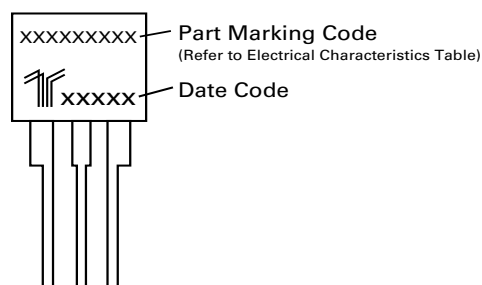
Environmental Specifications

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

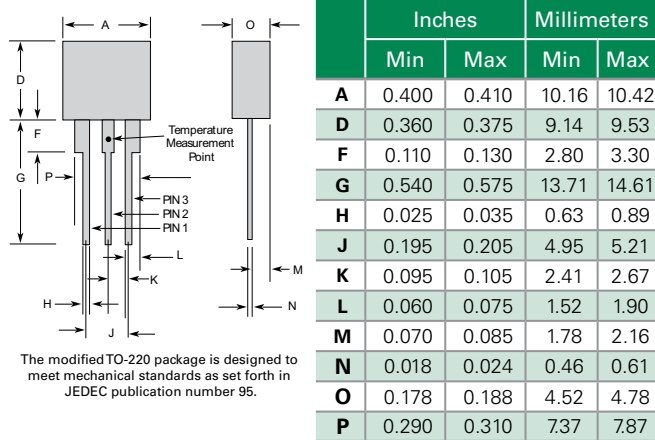
Part Numbering



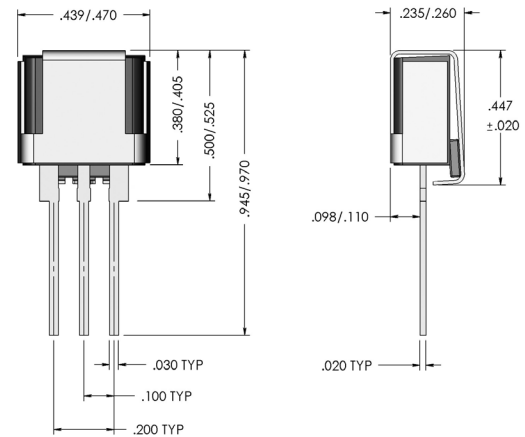
Part Marking



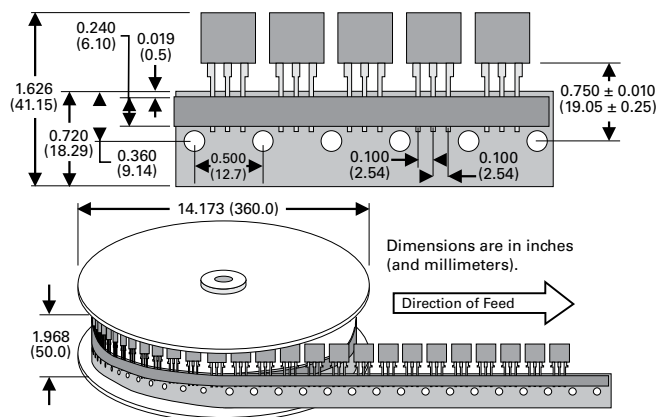
Dimensions - Modified TO-220



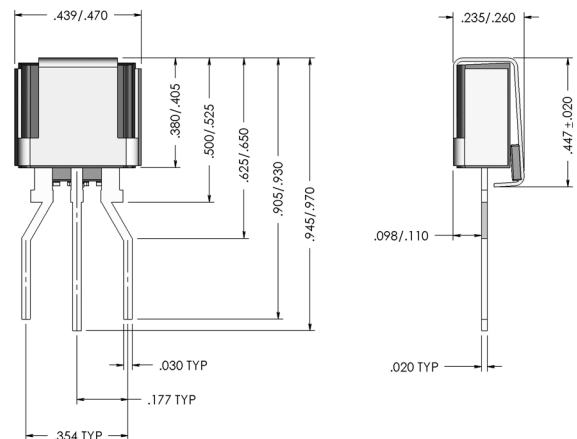
Dimensions - Modified TO-220 with Failsafe



Tape and Reel Specification - Modified TO-220



Dimensions - Modified TO-220 Type 60 with Failsafe



Packing Options

Package Type	Description	Quantity	Added Suffix	Industry Standard
A	Modified TO-220 Tape and Reel Pack	700	RP	EIA-468-B
	Modified TO-220 Bulk Pack	500	(no added suffix)	N/A
	Modified TO-220 Type 60 Lead Form Bulk Pack	500	60 (special order item, contact factory for details)	N/A

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