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SIDACTor® Protection Thyristors

Broadband Optimized™ Protection

TwinChip™ Series - DO-15



Agency Approvals

Agency	Agency File Number
	E133083

Pinout Designation

NOT APPLICABLE

Schematic Symbol



Description

TwinChip™ Series DO-15 are very low capacitance SIDACTor® thyristors are designed to protect broadband CPE equipment, such as VoIP and xDSL modems from damaging overvoltage transients. The series provides a through-hole solution that enables equipment to comply with global regulatory standards while limiting the impact to broadband signals.

Features & Benefits

- Differential protection
- Low insertion loss
- Low capacitance
- GDT compatible axial footprint
- Low voltage overshoot
- Does not degrade surge capability after multiple
- surge events within limit.
- Fails short circuit when surged in excess of ratings
- 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

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

Electrical Characteristics

Part Number	Marking	$V_{DRM} @ I_{DRM}=5\mu A$	$V_S @ 100V/\mu s$	I_H	I_S	I_T	$V_T @ I_T = 2.2 \text{ Amps}$	@ 1MHz @ 2V bias	
		V min	V max	mA min	mA max	A max	V max	pF min	pF max
P2602GBLRP	P262B	220	300	150	800	2.2	8	15	25
P3002GBLRP	P30B	280	360	150	800	2.2	8	10	20
P3502GBLRP	P352B	320	400	150	800	2.2	8	10	20
P4502GBLRP*	P452B	400	530	150	800	2.2	8	25	45

Notes:
 - Absolute maximum ratings measured at $T_A = 25^\circ C$ (unless otherwise noted).
 - Components are bi-directional.

Additional Information



Datasheet



Resources



Samples

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Surge Ratings

Series	I_{PP}			I_{TSM}
	10/160 ¹ 10/160 ²	10/1000 ¹ 10/1000 ²	5/310 ¹ 10/700 ²	50 / 60 Hz
	A min	A min	A typ	A min
B	100	80	150	25

Notes:

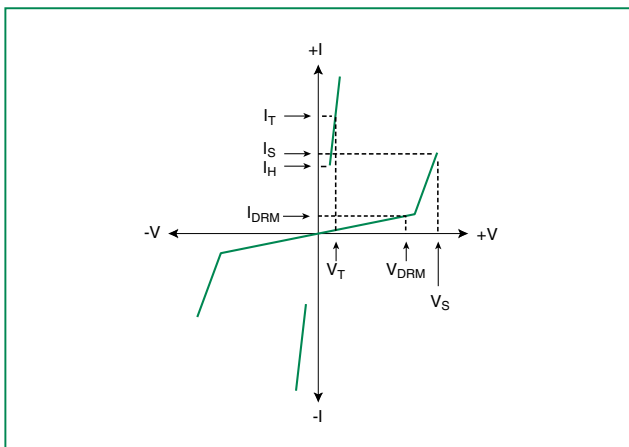
- 1 Current waveform in μs
 2 Voltage waveform in μs

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

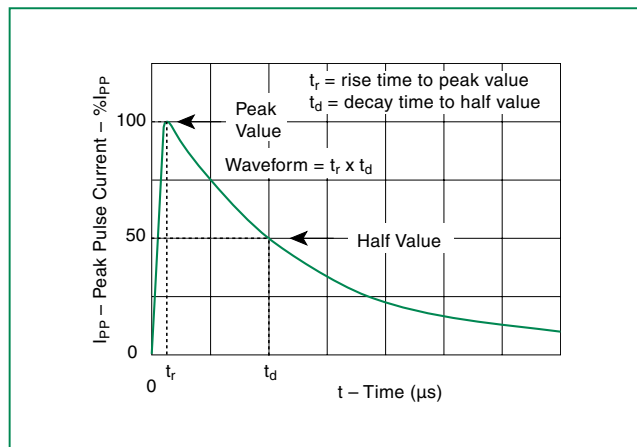
Thermal Considerations

Package	Symbol	Parameter	Value	Unit
 DO-15	T_J	Operating Junction Temperature Range	-40 to +150	$^{\circ}C$
	T_S	Storage Temperature Range	-65 to +150	$^{\circ}C$
	$R_{\theta JA}$	Thermal Resistance: Junction to Ambient	120	$^{\circ}C/W$

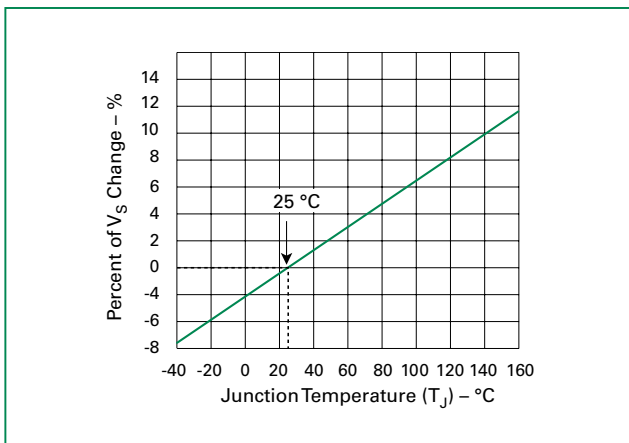
V-I Characteristics



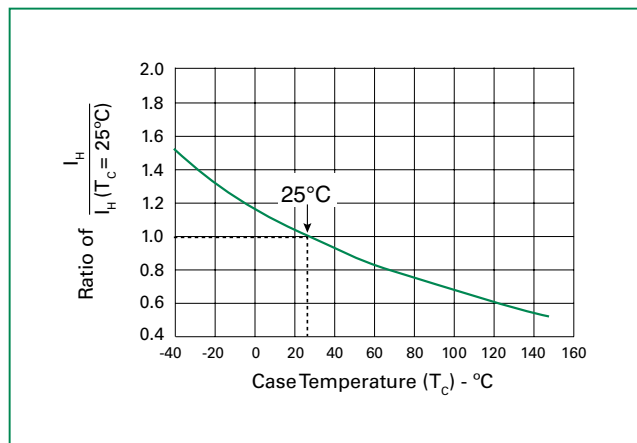
$t_r \times t_d$ Pulse Waveform



Normalized V_S Change vs. Junction Temperature



Normalized DC Holding Current vs. Case Temperature

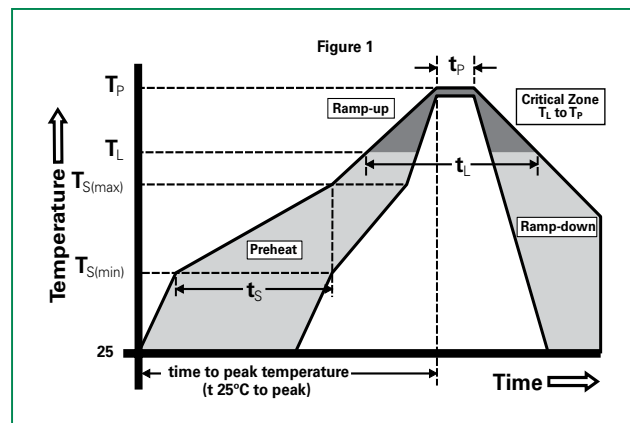


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Soldering Parameters

Reflow Condition		Pb-Free assembly (see Figure 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/second max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	- Temperature (T_L) (Liquidus)	217°C
	- Temperature (t_L)	60-150 seconds
Peak Temperature (T_p)		260(+0/-5)°C
Time within 5°C of actual peak Temperature (t_p)		30 seconds max
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_p)		8 minutes 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

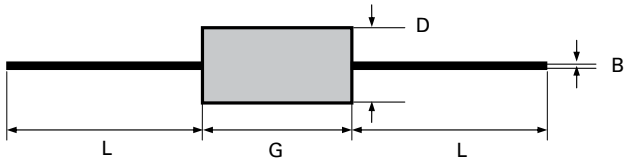
Environmental Specifications

High Temp Voltage Blocking	80% Rated V_{DRM} (V_{AC} 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

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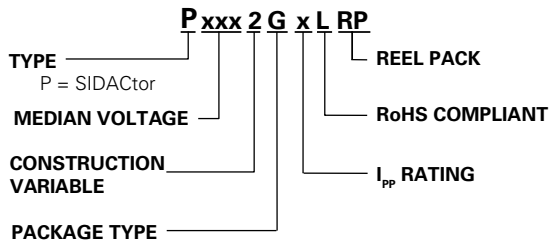
Broadband Optimized™ Protection

Dimensions — DO-15

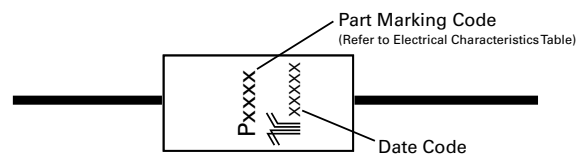


Dimension	Inches		Millimeters	
	min	max	min	max
B	0.028	0.034	0.711	0.864
D	0.12	0.14	3.048	3.556
G	0.235	0.27	5.969	6.858
L	1		25.4	

Part Numbering



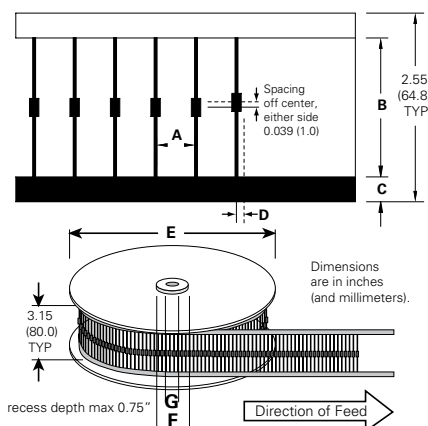
Part Marking



Packing Options

Package Type	Description	Quantity	Added Suffix	Industry Standard
G	DO-15 Axial Tape & Reel	5000	RP	EIA-RS-296-D

Tape and Reel Specification — DO-15



Symbols	Description	inch	mm
A	Component Spacing (lead to lead)	0.200 ± 0.020"	5.08 ± 0.508
B	Inner Tape Pitch	2.062 ± 0.059"	52.37 ± 1.498
C	Tape Width	0.250"	6.35
D	Max. Off Alignment	0.048"	1.219
E	Reel Dimension	13"	330.2
F	Max. Hub Recess	3"	76.19
G	Max. Abor Hole	0.68"	17.27