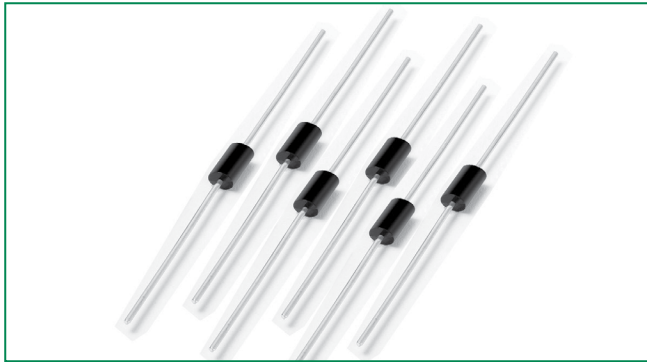


TwinChip™ Series - DO-15



**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

**Surge Ratings**


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

Notes:

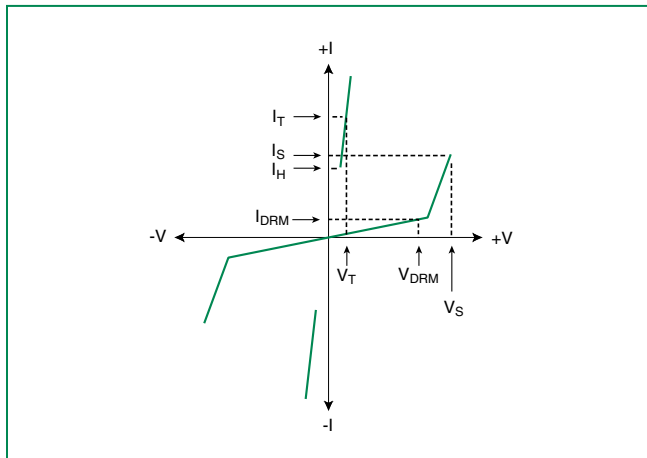
- 1 Current waveform in  $\mu s$
- 2 Voltage waveform in  $\mu s$

- 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°C to +85°C
- The component must initially be in thermal equilibrium with -40°C  $\leq T_J \leq$  +150°C

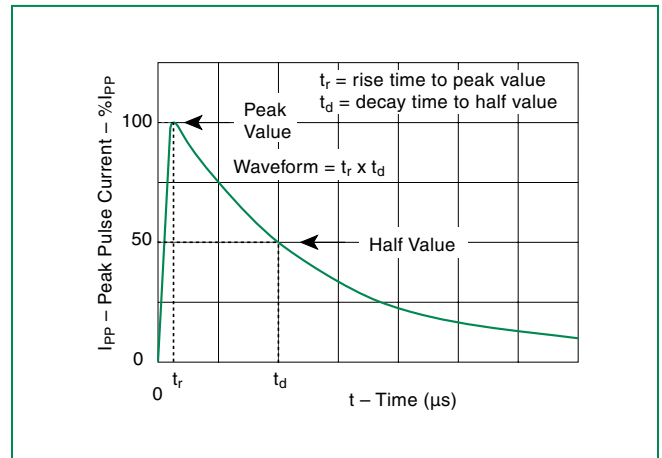
**Thermal Considerations**

Package	Symbol	Parameter	Value	Unit
 <b>DO-15</b>	$T_J$	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	120	°C/W

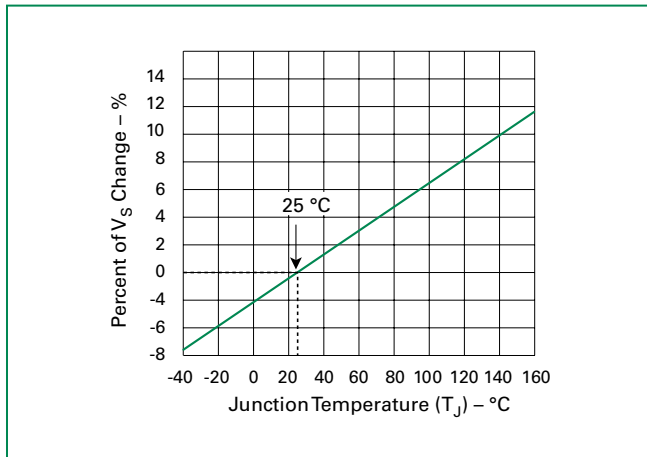
**V-I Characteristics**



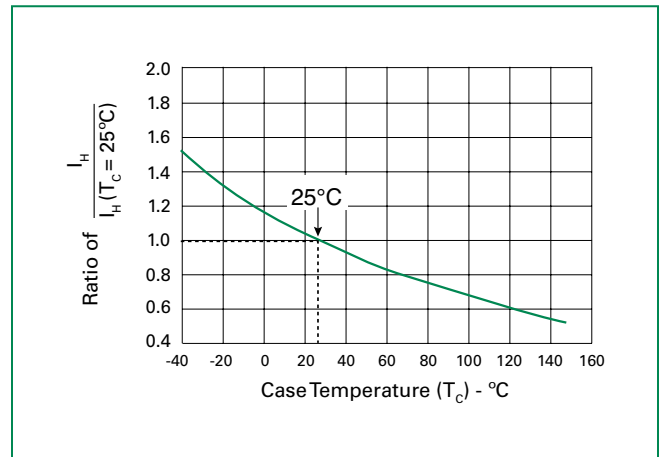
**$t_r \times t_d$  Pulse Waveform**



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

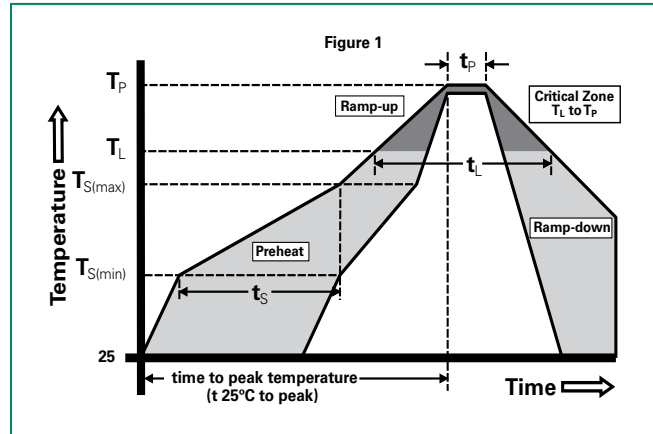


**Normalized DC Holding Current vs. Case Temperature**



**Soldering Parameters**

Reflow Condition		Pb-Free assembly (see 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



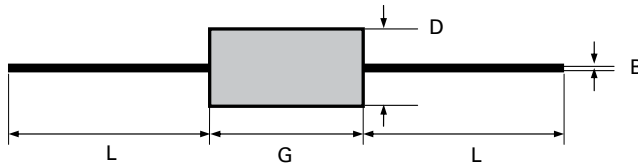
**Physical Specifications**

<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**

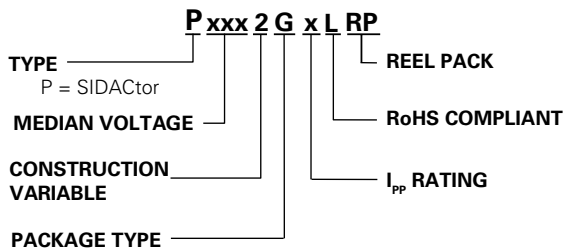
<b>High Temp Voltage Blocking</b>	80% Rated $V_{DRM}$ ( $V_{AC}$ Peak) +125°C or +150°C, 504 or 1008 hrs. MIL-STD-750 (Method 1040) JEDEC, JESD22-A-101
<b>Temp Cycling</b>	-65°C to +150°C, 15 min. dwell, 10 up to 100 cycles. MIL-STD-750 (Method 1051) EIA/ JEDEC, JESD22-A104
<b>Biased Temp &amp; Humidity</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

**Dimensions – DO-15**

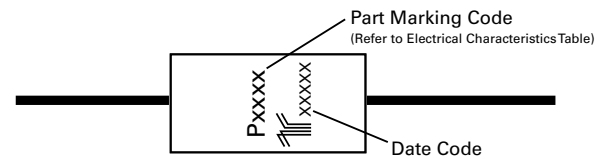


Dimension	Inches		Millimeters	
	min	max	min	max
<b>B</b>	0.028	0.034	0.711	0.864
<b>D</b>	0.12	0.14	3.048	3.556
<b>G</b>	0.235	0.27	5.969	6.858
<b>L</b>	1		25.4	

**Part Numbering**



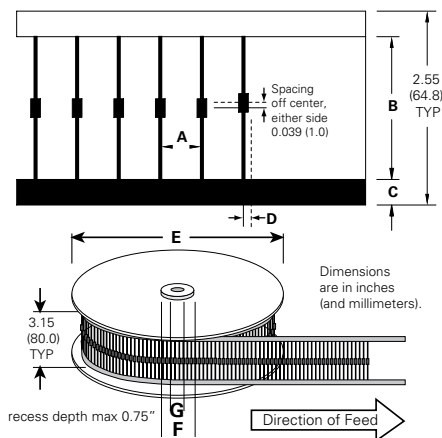
**Part Marking**



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

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