



**THE DATASHEET OF  
TB2300L-13-F**



**30A BIDIRECTIONAL SURFACE MOUNT THYRISTOR SURGE PROTECTIVE DEVICE**

**Features**

- 30A Peak Pulse Current @ 10/1000µs
- 150A Peak Pulse Current @ 8/20µs
- 58 - 320V Stand-Off Voltages
- Oxide-Glass Passivated Junction
- Bidirectional Protection In a Single Device
- High Off-State impedance and Low On-State Voltage
- Helps Equipment Meet GR-1089-CORE, IEC 61000-4-5, FCC Part 68, ITU-T K.20/K.21, and UL497B
- UL Listed Under Recognized Component Index, File Number 156346
- **Lead Free Finish/RoHS Compliant (Note 1)**
- **Green Molding Compound (No Halogen and Antimony) (Note 2)**

**Mechanical Data**

- Case: SMB
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Lead Free Plating (Matte Tin Finish). Solderable per MIL-STD-202, Method 208
- Polarity: None; Bidirectional Devices Have No Polarity Indicator
- Weight: 0.093 grams (approximate)



Top View



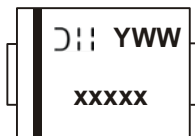
Bottom View

**Ordering Information** (Note 3)

Part Number	Case	Packaging
TB0640L-13-F	SMB	3000/Tape & Reel
TB0720L-13-F	SMB	3000/Tape & Reel
TB0900L-13-F	SMB	3000/Tape & Reel
TB1100L-13-F	SMB	3000/Tape & Reel
TB1300L-13-F	SMB	3000/Tape & Reel
TB1500L-13-F	SMB	3000/Tape & Reel
TB1800L-13-F	SMB	3000/Tape & Reel
TB2300L-13-F	SMB	3000/Tape & Reel
TB2600L-13-F	SMB	3000/Tape & Reel
TB3100L-13-F	SMB	3000/Tape & Reel
TB3500L-13-F	SMB	3000/Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied, see EU Directive 2002/95/EC Annex Notes.
  2. Product manufactured with Data Code 0924 (week 24, 2009) and newer are built with Green Molding Compound.
  3. For packaging details, go to our website at <http://www.diodes.com>.

**Marking Information**



xxxxx = Product type marking code (See Table on Page 2)  
 DIII = Manufacturers' code marking  
 YWW = Date code marking  
 Y = Last digit of year (ex: 2 for 2002)  
 WW = Week code (01 ~ 53)

**Maximum Ratings** @T<sub>A</sub> = 25°C unless otherwise specified

Single phase, half wave, 60Hz, resistive or inductive load.  
For capacitance load, derate current by 20%.

Characteristic	Symbol	Value	Unit
Non-Repetitive Peak Impulse Current @10/1000us	I <sub>pp</sub>	30	A
Non-Repetitive Peak On-State Current @8.3ms (one-half cycle)	I <sub>TSM</sub>	15	A
Typical Positive Temperature Coefficient for Breakdown Voltage	ΔVBR/ΔT <sub>J</sub>	0.1	%/°C

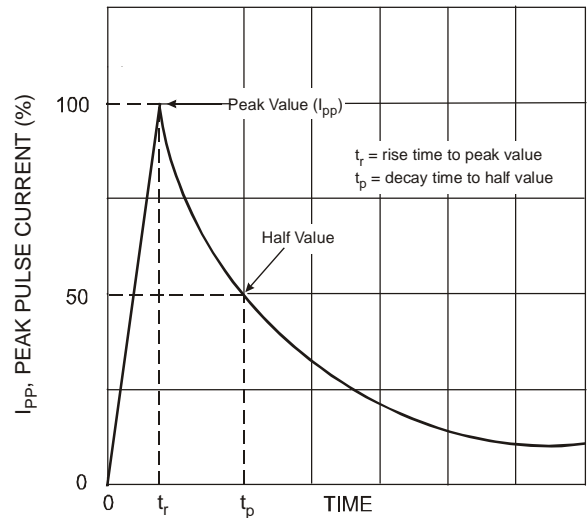
**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Lead	R <sub>θJL</sub>	30	°C/W
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	120	°C/W
Junction Temperature Range	T <sub>J</sub>	-40 to +150	°C
Storage Temperature Range	T <sub>STG</sub>	-55 to +150	°C

**Maximum Rated Surge Waveform**

Waveform	Standard	I <sub>pp</sub> (A)
2/10 us	GR-1089-CORE	200
8/20 us	IEC 61000-4-5	150
10/160 us	FCC Part 68	100
10/700 us (Note 4)	ITU-T, K.20/K.21	60
10/560 us	FCC Part 68	50
10/1000 us	GR-1089-CORE	30

Notes: 4. Applied 2kV, 10/700 us waveform



**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

Part Number	Maximum Rated Repetitive Off-State Voltage	Maximum Off-State Leakage Current @ V <sub>DRM</sub>	Maximum Breakover Voltage	Maximum On-State Voltage @ I <sub>T</sub> = 1A	Breakover Current I <sub>BO</sub>		Holding Current I <sub>H</sub>		Typical Off-State Capacitance	Marking Code
	V <sub>DRM</sub> (V)	I <sub>DRM</sub> (uA)	V <sub>BO</sub> (V)	V <sub>T</sub> (V)	Min (mA)	Max (mA)	Min (mA)	Max (mA)	C <sub>O</sub> (pF)	
TB0640L	58	5	77	3.5	50	800	150	800	100	T064L
TB0720L	65	5	88	3.5	50	800	150	800	100	T072L
TB0900L	75	5	98	3.5	50	800	150	800	100	T090L
TB1100L	90	5	130	3.5	50	800	150	800	60	T110L
TB1300L	120	5	160	3.5	50	800	150	800	60	T130L
TB1500L	140	5	180	3.5	50	800	150	800	60	T150L
TB1800L	160	5	220	3.5	50	800	150	800	60	T180L
TB2300L	190	5	265	3.5	50	800	150	800	40	T230L
TB2600L	220	5	300	3.5	50	800	150	800	40	T260L
TB3100L	275	5	350	3.5	50	800	150	800	40	T310L
TB3500L	320	5	400	3.5	50	800	150	800	40	T350L

**Electrical Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Symbol	Parameter
$V_{\text{DRM}}$	Stand-off Voltage
$I_{\text{DRM}}$	Leakage current at stand-off voltage
$V_{\text{BR}}$	Breakdown voltage
$I_{\text{BR}}$	Breakdown current
$V_{\text{BO}}$	Breakover voltage
$I_{\text{BO}}$	Breakover current
$I_{\text{H}}$	Holding current (Note 5)
$V_{\text{T}}$	On state voltage
$I_{\text{PP}}$	Peak pulse current
$C_{\text{O}}$	Off-state capacitance (Note 6)

Notes: 5.  $I_{\text{H}} > (V_{\text{T}}/R_{\text{i}})$  If this criterion is not obeyed, the TSPD triggers but does not return correctly to high-resistance state. The surge recovery time does not exceed 30ms.  
6. Off-state capacitance measured at  $f = 1.0\text{MHz}$ ,  $1.0V_{\text{RMS}}$  signal,  $V_{\text{R}} = 2V_{\text{DC}}$  bias.

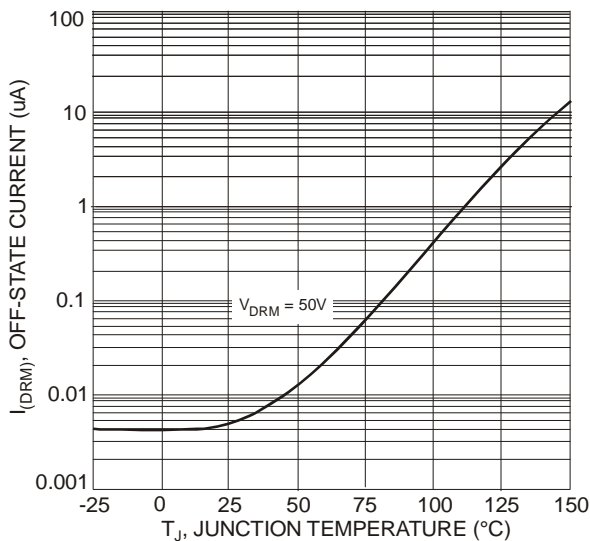
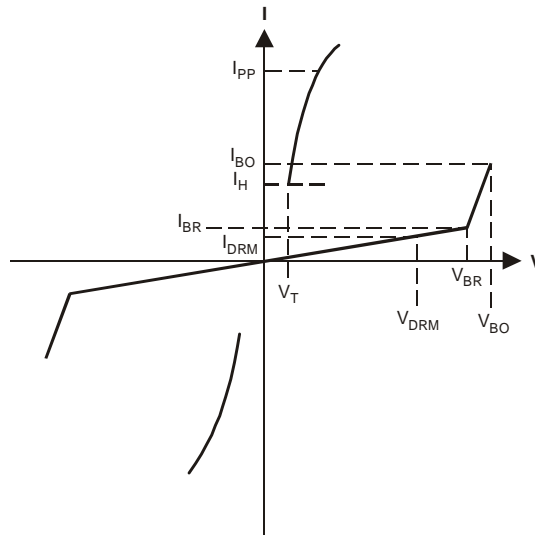


Fig. 1 Off-State Current vs. Junction Temperature

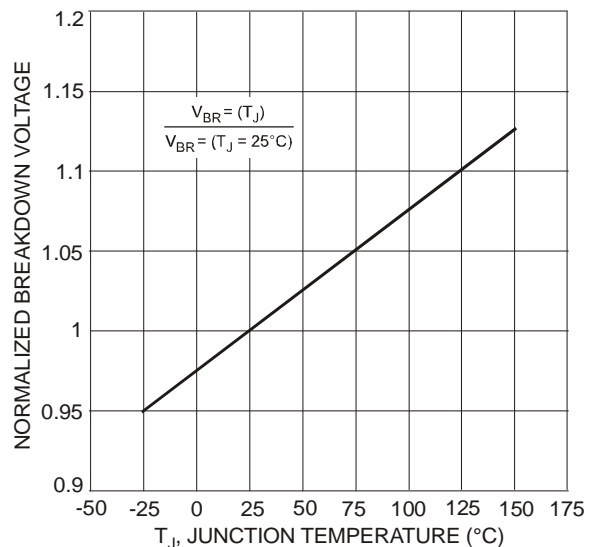


Fig. 2 Relative Variation of Breakdown Voltage vs. Junction Temperature

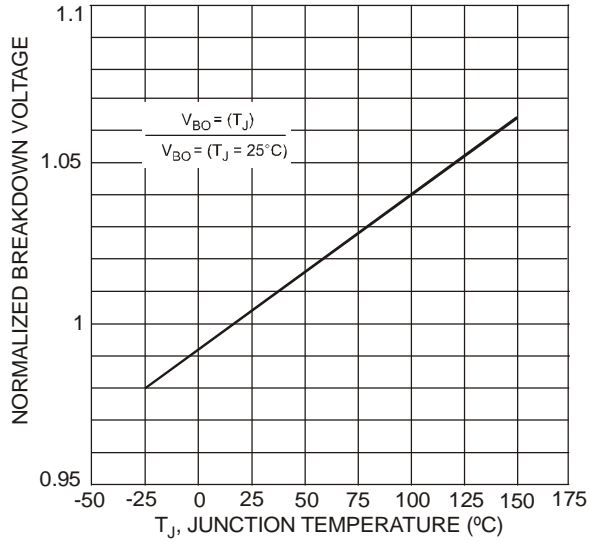


Fig. 3 Relative Variation of Breakover Voltage vs. Junction Temperature

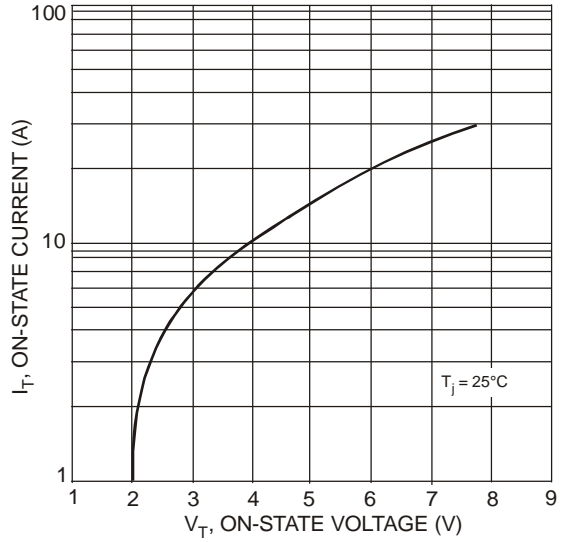


Fig. 4 On-State Current vs. On-State Voltage

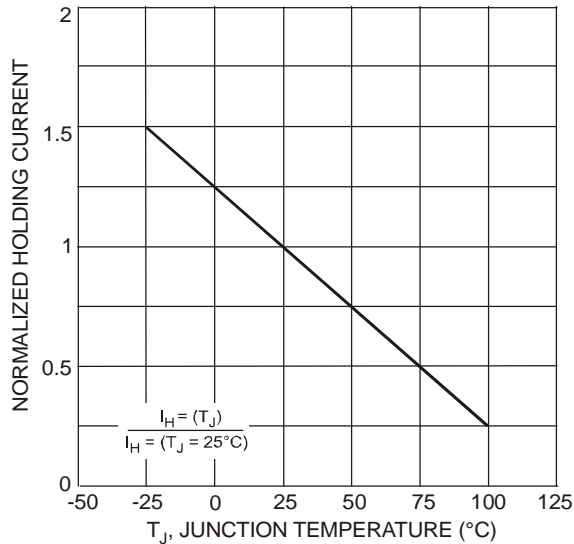


Fig. 5 Relative Variation of Holding Current vs. Junction Temperature

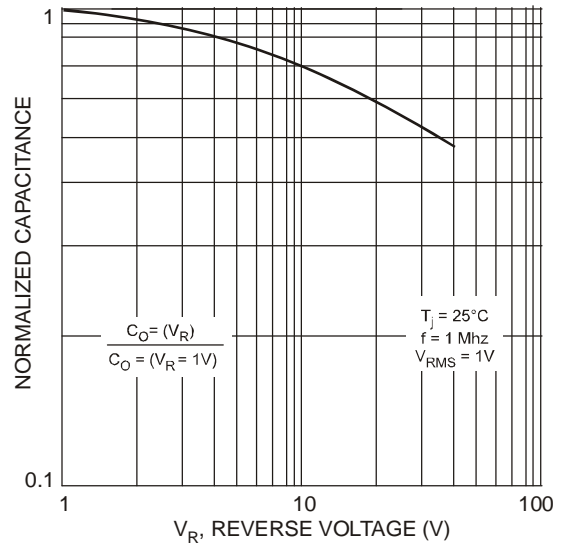
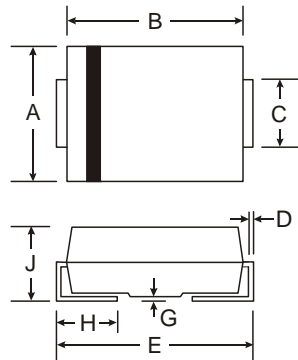


Fig. 6 Relative Variation of Junction Capacitance vs. Reverse Voltage Bias

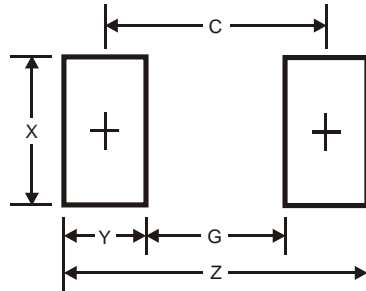
**Package Outline Dimensions**



SMB		
Dim	Min	Max
A	3.30	3.94
B	4.06	4.57
C	1.96	2.21
D	0.15	0.31
E	5.00	5.59
G	0.05	0.20
H	0.76	1.52
J	2.00	2.50

All Dimensions in mm

## Suggested Pad Layout



SMB Dimensions	Value (in mm)
Z	6.8
G	1.8
X	2.3
Y	2.5
C	4.3

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