

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)
 ☺☺☺ = Manufacturers' code marking
 YWW = Date code marking
 Y = Last digit of year (ex: 2 for 2002)
 WW = Week code (01 ~ 53)

Maximum Ratings @T_A = 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 _{pp} | 30 | A |
| Non-Repetitive Peak On-State Current @8.3ms (one-half cycle) | I _{TSM} | 15 | A |
| Typical Positive Temperature Coefficient for Breakdown Voltage | ΔVBR/ΔT _J | 0.1 | %/°C |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|------------------|-------------|------|
| Thermal Resistance, Junction to Lead | R _{θJL} | 30 | °C/W |
| Thermal Resistance, Junction to Ambient | R _{θJA} | 120 | °C/W |
| Junction Temperature Range | T _J | -40 to +150 | °C |
| Storage Temperature Range | T _{STG} | -55 to +150 | °C |

Maximum Rated Surge Waveform

| Waveform | Standard | I _{pp} (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_A = 25°C unless otherwise specified

| Part Number | Maximum Rated Repetitive Off-State Voltage | Maximum Off-State Leakage Current @ V _{DRM} | Maximum Breakover Voltage | Maximum On-State Voltage @ I _T = 1A | Breakover Current I _{BO} | | Holding Current I _H | | Typical Off-State Capacitance | Marking Code |
|-------------|--|--|---------------------------|--|-----------------------------------|----------|--------------------------------|----------|-------------------------------|--------------|
| | V _{DRM} (V) | I _{DRM} (uA) | V _{BO} (V) | V _T (V) | Min (mA) | Max (mA) | Min (mA) | Max (mA) | C _O (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_{DRM} | Stand-off Voltage |
| I_{DRM} | Leakage current at stand-off voltage |
| V_{BR} | Breakdown voltage |
| I_{BR} | Breakdown current |
| V_{BO} | Breakover voltage |
| I_{BO} | Breakover current |
| I_{H} | Holding current (Note 5) |
| V_{T} | On state voltage |
| I_{PP} | Peak pulse current |
| C_{O} | Off-state capacitance (Note 6) |

Notes: 5. $I_{\text{H}} > (V_{\text{L}}/R_{\text{L}})$ 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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