

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

**Features**

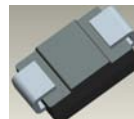
- 30A Peak Pulse Current @ 10/1000µs
- 150A Peak Pulse Current @ 8/20µs
- 58 - 320V Stand-Off Voltages
- Oxide-Glass Passivated Junction
- Bidirectional Protection In a Single Device
- High Off-State impedance and Low On-State Voltage
- Helps Equipment Meet GR-1089-CORE, IEC 61000-4-5, FCC Part 68, ITU-T 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<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.  $I_{\text{H}} > (V_{\text{T}}/R_{\text{f}})$  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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