

50A BIDIRECTIONAL SURFACE MOUNT THYRISTOR SURGE PROTECTION DEVICE

Features

- 50A Peak Pulse Current @ 10/1000µs
- 250A 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



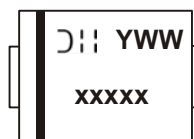
Bottom View

Ordering Information (Note 3)

| Part Number | Case | Packaging |
|--------------|------|------------------|
| TB0640M-13-F | SMB | 3000/Tape & Reel |
| TB0720M-13-F | SMB | 3000/Tape & Reel |
| TB0900M-13-F | SMB | 3000/Tape & Reel |
| TB1100M-13-F | SMB | 3000/Tape & Reel |
| TB1300M-13-F | SMB | 3000/Tape & Reel |
| TB1500M-13-F | SMB | 3000/Tape & Reel |
| TB1800M-13-F | SMB | 3000/Tape & Reel |
| TB2300M-13-F | SMB | 3000/Tape & Reel |
| TB2600M-13-F | SMB | 3000/Tape & Reel |
| TB3100M-13-F | SMB | 3000/Tape & Reel |
| TB3500M-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 Electrical Characteristics table on page 3)
 DII = Manufacturers' code marking
 YWW = Date code marking
 Y = Last digit of year (ex: 2 for 2002)
 WW = Week code (01 to 53)

Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

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

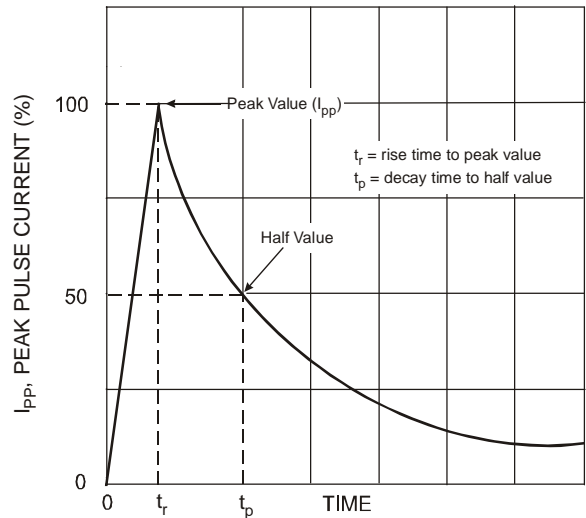
| Characteristic | Symbol | Value | Unit |
|--|-------------------------|-------|---------------------|
| Non-Repetitive Peak Impulse Current @10/1000us | I_{pp} | 50 | A |
| Non-Repetitive Peak On-State Current @8.3ms (one-half cycle) | I_{TSM} | 30 | A |
| Typical Positive Temperature Coefficient for Breakdown Voltage | $\Delta VBR/\Delta T_j$ | 0.1 | %/ $^\circ\text{C}$ |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|-----------------|-------------|---------------------------|
| Thermal Resistance, Junction to Lead | $R_{\theta JL}$ | 20 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 100 | $^\circ\text{C}/\text{W}$ |
| Junction Temperature Range | T_J | -40 to +150 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{STG} | -55 to +150 | $^\circ\text{C}$ |

Maximum Rated Surge Waveform

| Waveform | Standard | I_{pp} (A) |
|------------|------------------|--------------|
| 2/10 us | GR-1089-CORE | 300 |
| 8/20 us | IEC 61000-4-5 | 250 |
| 10/160 us | FCC Part 68 | 150 |
| 10/700 us | ITU-T, K.20/K.21 | 100 |
| 10/560 us | FCC Part 68 | 75 |
| 10/1000 us | GR-1089-CORE | 50 |

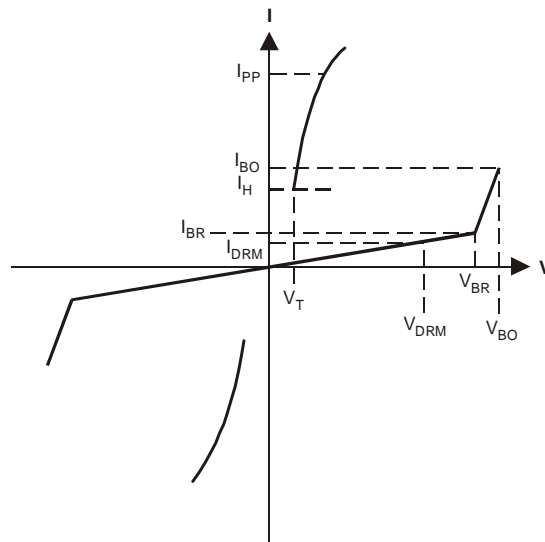


Electrical Characteristics @T_A = 25°C unless otherwise specified

| 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} (µA) | V _{BO} (V) | V _T (V) | Min (mA) | Max (mA) | Min (mA) | Max (mA) | C _O (pF) | |
| TB0640M | 58 | 5 | 77 | 3.5 | 50 | 800 | 150 | 800 | 140 | T064M |
| TB0720M | 65 | 5 | 88 | 3.5 | 50 | 800 | 150 | 800 | 140 | T072M |
| TB0900M | 75 | 5 | 98 | 3.5 | 50 | 800 | 150 | 800 | 140 | T090M |
| TB1100M | 90 | 5 | 130 | 3.5 | 50 | 800 | 150 | 800 | 90 | T110M |
| TB1300M | 120 | 5 | 160 | 3.5 | 50 | 800 | 150 | 800 | 90 | T130M |
| TB1500M | 140 | 5 | 180 | 3.5 | 50 | 800 | 150 | 800 | 90 | T150M |
| TB1800M | 160 | 5 | 220 | 3.5 | 50 | 800 | 150 | 800 | 90 | T180M |
| TB2300M | 190 | 5 | 265 | 3.5 | 50 | 800 | 150 | 800 | 60 | T230M |
| TB2600M | 220 | 5 | 300 | 3.5 | 50 | 800 | 150 | 800 | 60 | T260M |
| TB3100M | 275 | 5 | 350 | 3.5 | 50 | 800 | 150 | 800 | 60 | T310M |
| TB3500M | 320 | 5 | 400 | 3.5 | 50 | 800 | 150 | 800 | 60 | T350M |

| 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 4 |
| V _T | On state voltage |
| I _{PP} | Peak pulse current |
| C _O | Off-state capacitance Note 5 |

- Notes:
4. I_H > (V_L/R_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.
 5. Off-state capacitance measured at f = 1.0MHz, 1.0V_{RMS} signal, V_R = 2V_{DC} bias.



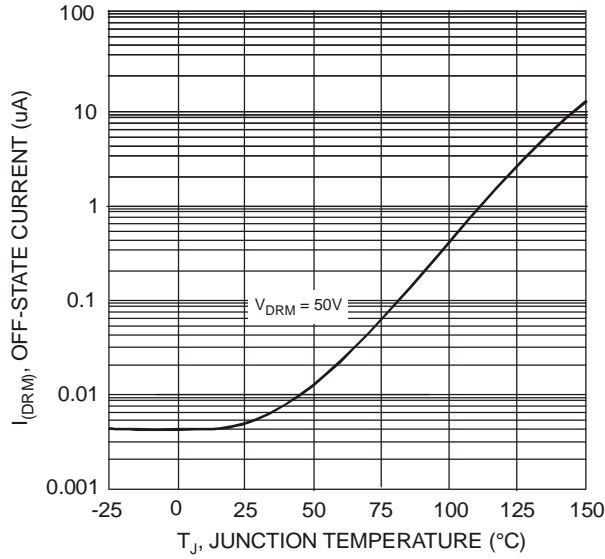


Fig. 1 Off-State Current vs. Junction Temperature

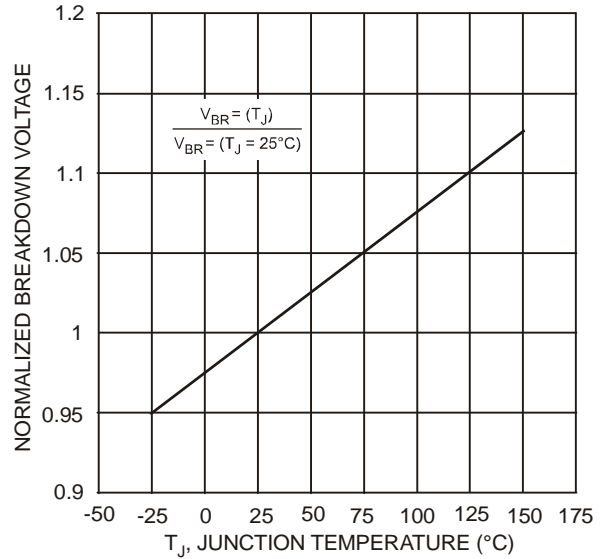


Fig. 2 Relative Variation of Breakdown Voltage vs. Junction Temperature

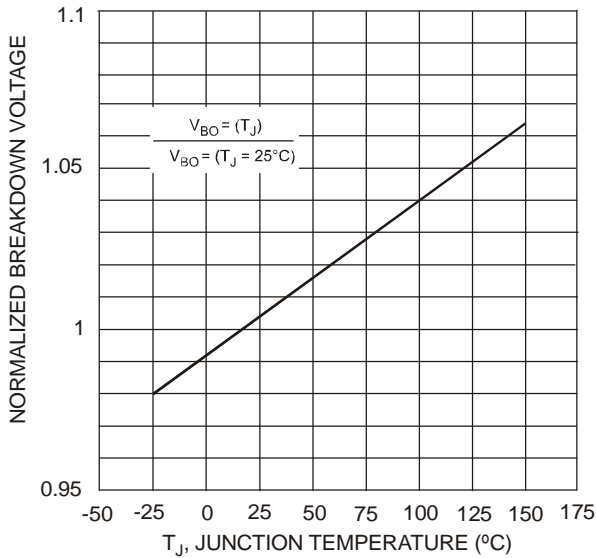


Fig. 3 Relative Variation of Breakover Voltage vs. Junction Temperature

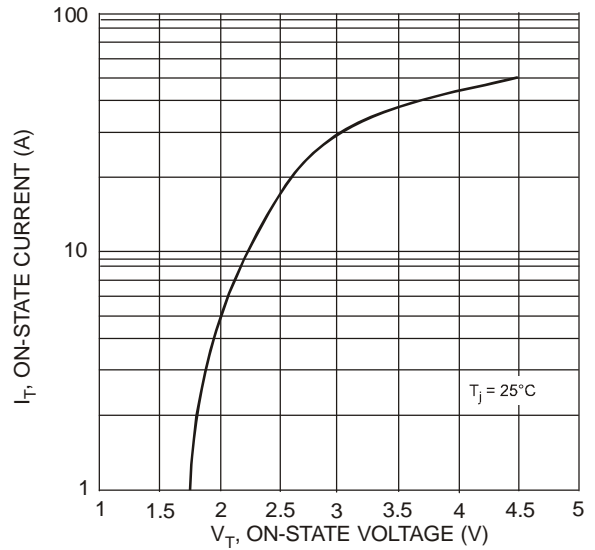


Fig. 4 On-State Current vs. On-State Voltage



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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