



# TB0640H - TB3500H

## 100A BI-DIRECTIONAL SURFACE MOUNT THYRISTOR SURGE PROTECTIVE DEVICE

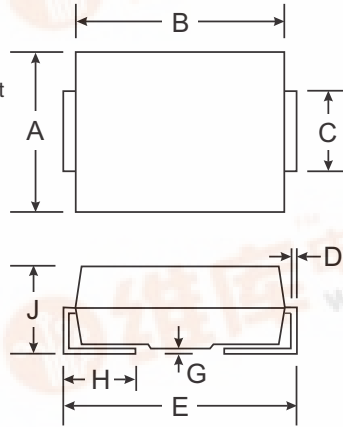
NEW PRODUCT

### Features

- 100A Peak Pulse Current @ 10/1000 $\mu$ s
- 400A Peak Pulse Current @ 8/20 $\mu$ s
- 58 - 320V Stand-Off Voltages
- Oxide-Glass Passivated Junction
- Bi-Directional 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)**

### Mechanical Data

- Case: SMB
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Lead Free Plating (Matte Tin Finish). Solderable per MIL-STD-202, Method 208
- Polarity: None; Bi-Directional Devices Have No Polarity Indicator
- Marking: Date Code & Marking Code (See Page 4)
- Ordering Information: See Page 4
- Weight: 0.093 grams (approximate)



| 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                    | 0.10 | 0.20 |
| H                    | 0.76 | 1.52 |
| J                    | 2.00 | 2.62 |
| All Dimensions in mm |      |      |

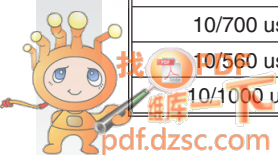
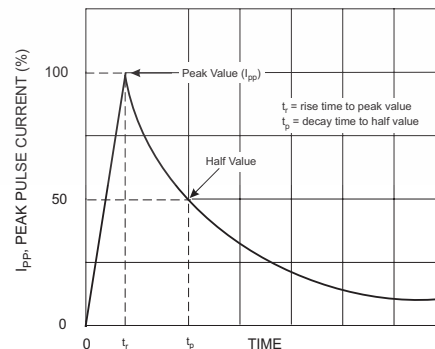
### Maximum Ratings @ T<sub>A</sub> = 25°C unless otherwise specified

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

| Characteristic   | Symbol               | Value       | Unit |
|--|----------------------|-------------|------|
| Non-Repetitive Peak Impulse Current @ 10/1000us                | I <sub>pp</sub>      | 100         | A    |
| Non-Repetitive Peak On-State Current @ 8.3ms (one-half cycle)  | I <sub>TSM</sub>     | 50          | A    |
| Junction Temperature Range                                     | T <sub>j</sub>       | -40 to +150 | °C   |
| Storage Temperature Range                                      | T <sub>STG</sub>     | -55 to +150 | °C   |
| Thermal Resistance, Junction to Lead                           | R <sub>θJL</sub>     | 20          | °C/W |
| Thermal Resistance, Junction to Ambient                        | R <sub>θJA</sub>     | 100         | °C/W |
| Typical Positive Temperature Coefficient for Breakdown Voltage | ΔVBR/ΔT <sub>j</sub> | 0.1         | %/°C |

### Maximum Rated Surge Waveform

| Waveform   | Standard         | I <sub>pp</sub> (A) |
|------------|------------------|---------------------|
| 2/10 us    | GR-1089-CORE     | 500                 |
| 8/20 us    | IEC 61000-4-5    | 400                 |
| 10/160 us  | FCC Part 68      | 250                 |
| 10/700 us  | ITU-T, K.20/K.21 | 200                 |
| 10/560 us  | FCC Part 68      | 160                 |
| 10/1000 us | GR-1089-CORE     | 100                 |

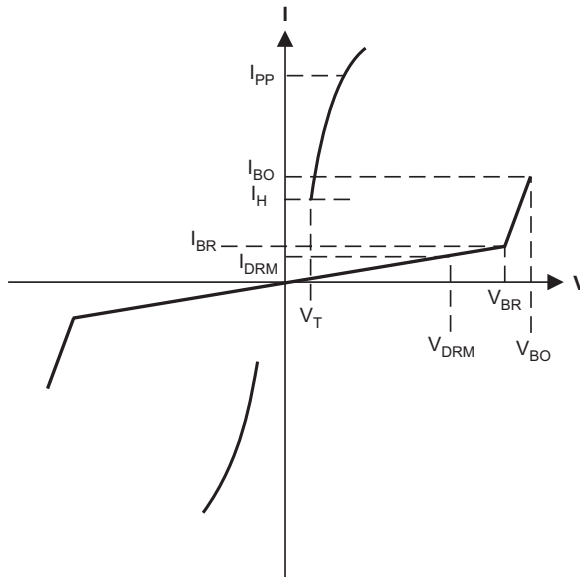


**Electrical Characteristics** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

| Part Number | Rated Repetitive Off-State Voltage | Off-State Leakage Current @ $V_{\text{DRM}}$ | Breakover Voltage   | On-State Voltage @ $I_T = 1\text{A}$ | Breakover Current $I_{\text{BO}}$ |          | Holding Current $I_{\text{H}}$ |          | Off-State Capacitance | Marking Code |
|-------------|------------------------------------|--|---------------------|--------------------------------------|-----------------------------------|----------|--------------------------------|----------|-----------------------|--------------|
|             | $V_{\text{DRM}}$ (V)               | $I_{\text{DRM}}$ ( $\mu\text{A}$ )           | $V_{\text{BO}}$ (V) | $V_{\text{T}}$ (V)                   | Min (mA)                          | Max (mA) | Min (mA)                       | Max (mA) | $C_{\text{O}}$ (pF)   |              |
| TB0640H     | 58                                 | 5  | 77                  | 3.5                                  | 50                                | 800      | 150                            | 800      | 200                   | T064H        |
| TB0720H     | 65                                 | 5  | 88                  | 3.5                                  | 50                                | 800      | 150                            | 800      | 200                   | T072H        |
| TB0900H     | 75                                 | 5  | 98                  | 3.5                                  | 50                                | 800      | 150                            | 800      | 200                   | T090H        |
| TB1100H     | 90                                 | 5  | 130                 | 3.5                                  | 50                                | 800      | 150                            | 800      | 120                   | T110H        |
| TB1300H     | 120                                | 5  | 160                 | 3.5                                  | 50                                | 800      | 150                            | 800      | 120                   | T130H        |
| TB1500H     | 140                                | 5  | 180                 | 3.5                                  | 50                                | 800      | 150                            | 800      | 120                   | T150H        |
| TB1800H     | 160                                | 5  | 220                 | 3.5                                  | 50                                | 800      | 150                            | 800      | 120                   | T180H        |
| TB2300H     | 190                                | 5  | 265                 | 3.5                                  | 50                                | 800      | 150                            | 800      | 80                    | T230H        |
| TB2600H     | 220                                | 5  | 300                 | 3.5                                  | 50                                | 800      | 150                            | 800      | 80                    | T260H        |
| TB3100H     | 275                                | 5  | 350                 | 3.5                                  | 50                                | 800      | 150                            | 800      | 80                    | T310H        |
| TB3500H     | 320                                | 5  | 400                 | 3.5                                  | 50                                | 800      | 150                            | 800      | 80                    | T350H        |

| 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: 2              |
| $V_{\text{T}}$   | On state voltage                     |
| $I_{\text{PP}}$  | Peak pulse current                   |
| $C_{\text{O}}$   | Off-state capacitance NOTE: 3        |

- Notes:
1. RoHS revision 13.2.2003. Glass and High Temperature Solder Exemptions Applied, see *EU Directive Annex Notes 5 and 7*.
  2.  $I_{\text{H}} > (V_{\text{L}}/R_{\text{L}})$  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.
  3. Off-state capacitance measured at  $f = 1.0\text{MHz}$ ,  $1.0V_{\text{RMS}}$  signal,  $V_{\text{R}} = 2V_{\text{DC}}$  bias.



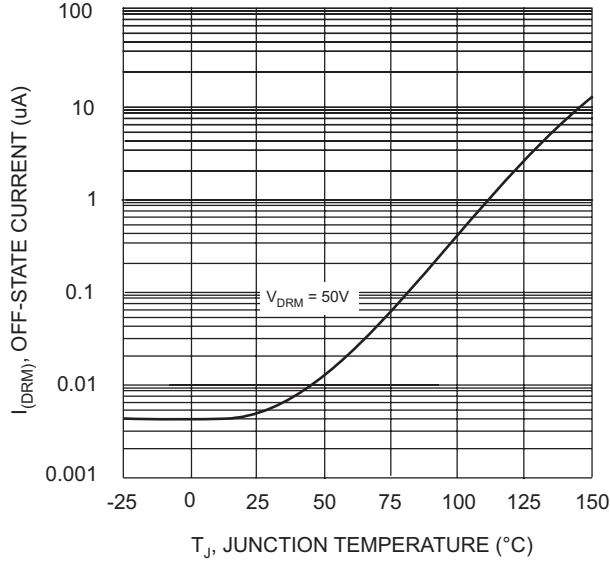


Fig. 1 Off-State Current vs. Junction Temperature

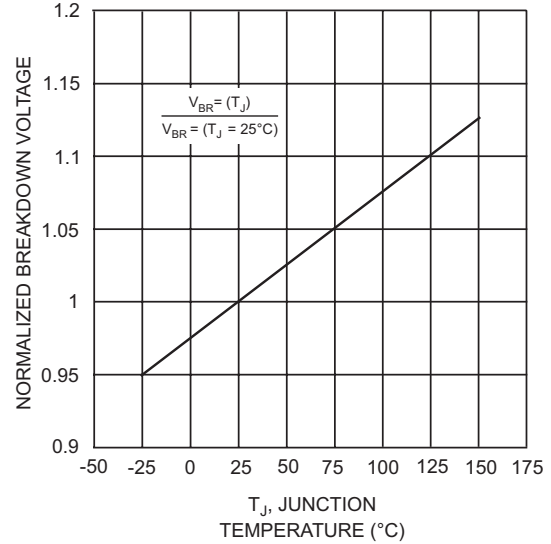


Fig. 2 Relative Variation of Breakdown Voltage vs. Junction Temperature

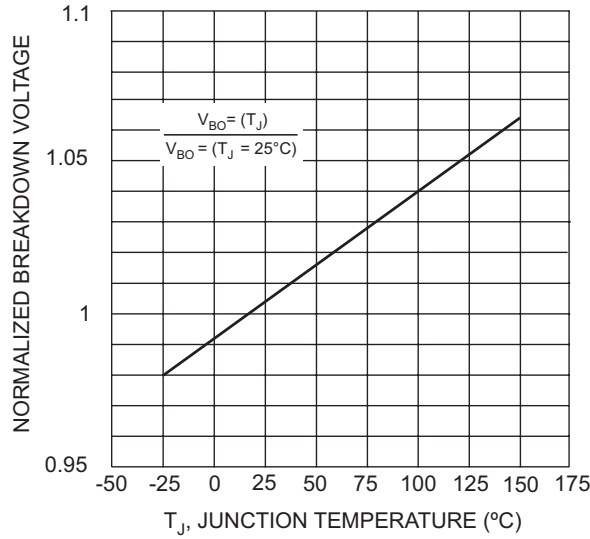


Fig. 3 Relative Variation of Breakover Voltage vs. Junction Temperature

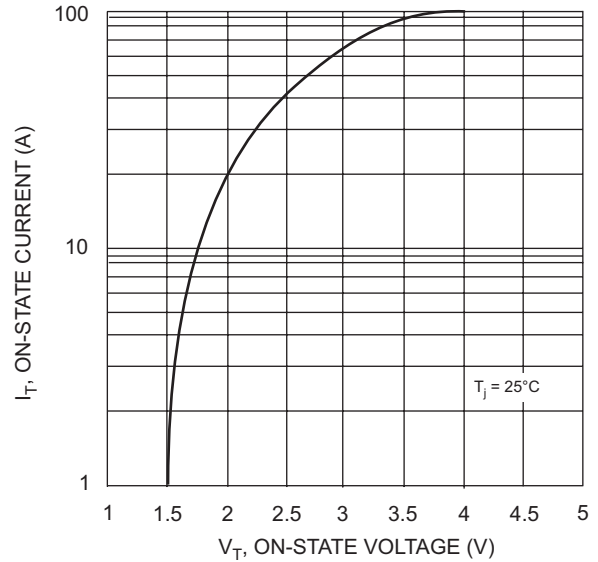


Fig. 4 On-State Current vs. On-State Voltage

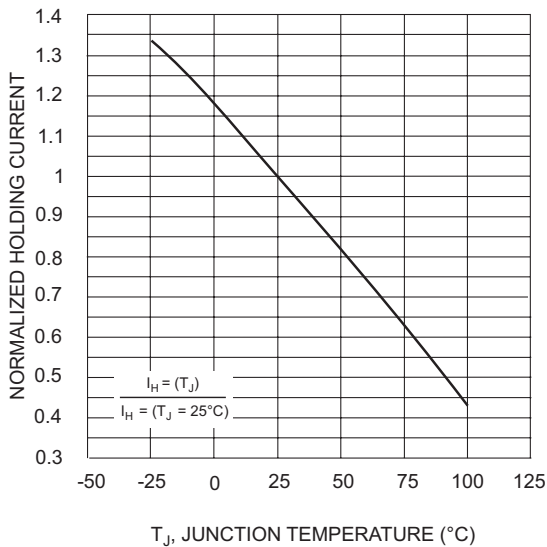


Fig. 5 Relative Variation of Holding Current vs. Junction Temperature

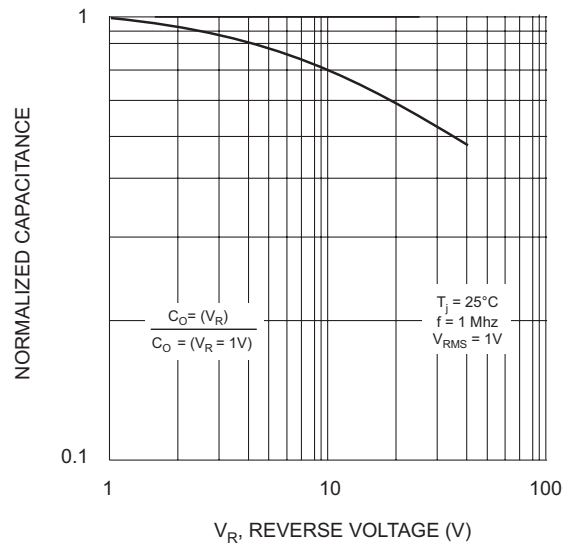


Fig. 6 Relative Variation of Normalized Capacitance vs. Reverse Voltage Bias

## Ordering Information (Note 4)

| Device       | Packaging | Shipping         |
|--------------|-----------|------------------|
| TB0640H-13-F | SMB       | 3000/Tape & Reel |
| TB0720H-13-F | SMB       | 3000/Tape & Reel |
| TB0900H-13-F | SMB       | 3000/Tape & Reel |
| TB1100H-13-F | SMB       | 3000/Tape & Reel |
| TB1300H-13-F | SMB       | 3000/Tape & Reel |
| TB1500H-13-F | SMB       | 3000/Tape & Reel |
| TB1800H-13-F | SMB       | 3000/Tape & Reel |
| TB2300H-13-F | SMB       | 3000/Tape & Reel |
| TB2600H-13-F | SMB       | 3000/Tape & Reel |
| TB3100H-13-F | SMB       | 3000/Tape & Reel |
| TB3500H-13-F | SMB       | 3000/Tape & Reel |

Notes: 4. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information



XXXXX = Product Type Marking Code (See Table on Page 2)  
 YWW = Date Code Marking  
 Y = Year ex: 2 = 2002  
 WW = Week Code 01 to 52

Date Code Key

| Year | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|------|------|------|------|------|------|------|------|------|
| Code | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    |

### IMPORTANT NOTICE

Diodes, Inc. and its subsidiaries reserve the right to make changes without further notice to any product herein to make corrections, modifications, enhancements, improvements, or other changes. Diodes, Inc. does not assume any liability arising out of the application or use of any product described herein; neither does it convey any license under its patent rights, nor the rights of others. The user of products in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on our website, harmless against all damages.

### LIFE SUPPORT

The products located on our website at [www.diodes.com](http://www.diodes.com) are not recommended for use in life support systems where a failure or malfunction of the component may directly threaten life or cause injury without the express written approval of Diodes Incorporated.