

# SiBar Thyristor Surge Protectors

## TVBxxxSA-L Series

**Table SB1 - Electrical Characteristics**

| Part Number | V <sub>DM</sub> Max. (V) | V <sub>BO</sub> Max. (V) | I <sub>H</sub> Min. (mA) | V <sub>T</sub> Max. (V) | C1 (Typ)<br>50V <sub>DC</sub> Bias | C2 (Typ)<br>2V <sub>DC</sub> Bias | Off-State<br>Current<br>V <sub>D2</sub> =V <sub>DM</sub><br>(μA) |
|-------------|--------------------------|--------------------------|--------------------------|-------------------------|------------------------------------|-----------------------------------|------------------------------------------------------------------|
| TVB058SA-L  | 58                       | 77                       | 150                      | 4                       | 43                                 | 80                                | 5                                                                |
| TVB170SA-L  | 170                      | 265                      | 150                      | 4                       | 18                                 | 35                                | 5                                                                |
| TVB180SA-L  | 180                      | 219                      | 150                      | 4                       | 30 (Max)                           | 60 (Max)                          | 5                                                                |
| TVB200SA-L  | 200                      | 320                      | 150                      | 4                       | 18                                 | 35                                | 5                                                                |
| TVB270SA-L  | 270                      | 365                      | 150                      | 4                       | 15                                 | 32                                | 5                                                                |
| TVB300SA-L  | 300                      | 400                      | 150                      | 4                       | 14                                 | 27                                | 5                                                                |

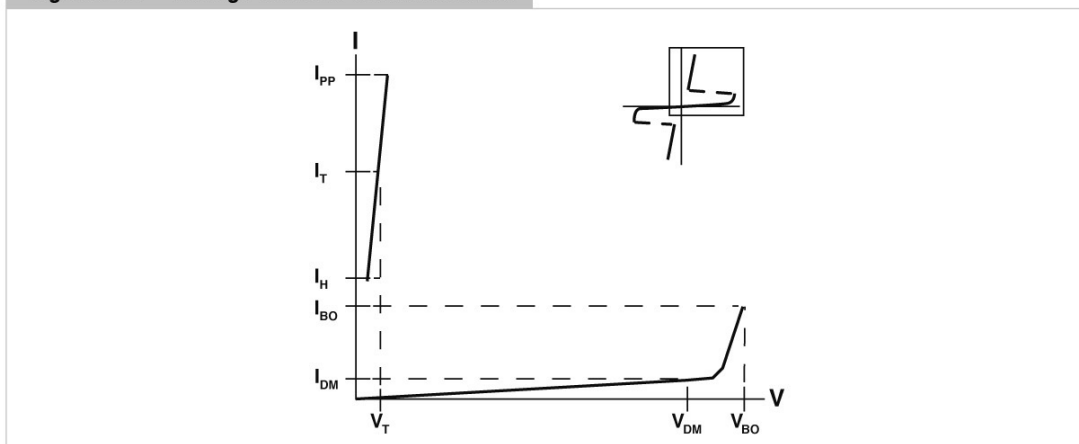
Notes: All electrical characteristics are measured at 25°C.  
V<sub>DM</sub> measured per UL497B pulse requirements: at max. off-state leakage current (IDM) = 5 μA.  
V<sub>BO</sub> measured at 100V/μs.  
C1 measured at 1 MHz with a 50 V<sub>DC</sub> bias.  
C2 measured at 1MHz with a 2V<sub>DC</sub> bias.

**Table SB2 – Surge Current Rating**

| Part Number | TIA-968                           |                                    |                                    | Telcordia GR-1089*                  |                                  | IEC61000-4-5                     | ITU K.20/21/45*                                        |                                 |                 |                 |
|-------------|-----------------------------------|------------------------------------|------------------------------------|-------------------------------------|----------------------------------|----------------------------------|--------------------------------------------------------|---------------------------------|-----------------|-----------------|
|             | Type A                            | Type B                             |                                    |                                     |                                  |                                  |                                                        |                                 |                 |                 |
|             | I <sub>pp</sub> (A)<br>5 x 320 μs | I <sub>pp</sub> (A)<br>10 x 560 μs | I <sub>pp</sub> (A)<br>10 x 160 μs | I <sub>pp</sub> (A)<br>10 x 1000 μs | I <sub>pp</sub> (A)<br>2 x 10 μs | I <sub>pp</sub> (A)<br>8 x 20 μs | I <sub>pp</sub> (A)<br>5 x 310 μs<br>(VOC: 10 x 700μs) | I <sub>TSM</sub><br>Min.<br>(A) | di/dt<br>(A/μs) | dV/dt<br>(V/μs) |
| TVBxxxSA-L  | 90                                | 70                                 | 100                                | 50                                  | 150                              | 150                              | 90                                                     | 22                              | 500             | 2000            |

Notes: \*Lightning current wave forms for applicable industry specification.  
I<sub>TSM</sub>, peak on-state surge current is measured at 60 Hz, one cycle.  
di/dt: critical rate-of-rise of on-state current (pulsed power amplifier Vmax = 600V; C = 30μF).  
dV/dt: critical rate-of-rise of off-state voltage (linear wave form, V<sub>0</sub> = rated V<sub>BO</sub>, T<sub>i</sub> = 25°C

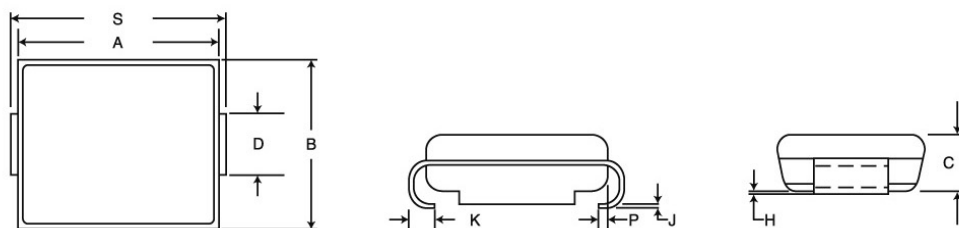
**Figure SB1 - Voltage-Current Characteristics**



The voltage current (V-I) is useful in depicting the electrical characteristics of the SiBar thyristor surge protectors in relation to each other.

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**Figure SB2 - Dimension Figure**



**Table SB3 – Dimensions in Millimeters**

| Dimension  | A       |         | B       |         | C       |         | D       |         |
|------------|---------|---------|---------|---------|---------|---------|---------|---------|
|            | Min.    | Max.    | Min.    | Max.    | Min.    | Max.    | Min.    | Max.    |
| TVBxxxSA-L | 4.06    | 4.57    | 3.30    | 3.94    | 1.90    | 2.41    | 1.95    | 2.20    |
|            | (0.160) | (0.180) | (0.130) | (0.155) | (0.075) | (0.095) | (0.077) | (0.087) |

| Dimension  | H       |         | J       |         | K       |         | P       | S       |         |
|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|            | Min.    | Max.    | Min.    | Max.    | Min.    | Max.    | Ref     | Min     | Max.    |
| TVBxxxSA-L | 0.051   | 0.200   | 0.150   | 0.31    | 0.76    | 1.27    | 0.51    | 5.21    | 5.59    |
|            | (0.002) | (0.008) | (0.006) | (0.012) | (0.030) | (0.050) | (0.202) | (0.205) | (0.220) |

Notes: \*D dimension is measured within dimension P.  
TVB series devices use industry standard SMB package type.  
All devices are bidirectional and may be oriented in either direction for installation

**Table SB4 – Physical Characteristics and Environmental Specifications**

|                                                              |                                   |
|--------------------------------------------------------------|-----------------------------------|
| Lead material                                                | Matte tin finish (-L devices)     |
| Encapsulating material                                       | Epoxy, meets UL94V-0 requirements |
| Solderability                                                | per MIL-STD-750, Method 2026      |
| Solder heat withstand                                        | per MIL-STD-750, Method 2031      |
| Solvent resistance                                           | per MIL-STD-750, Method 1022      |
| Mechanical shock                                             | per MIL-STD-750, Method 2016      |
| Vibration                                                    | per MIL-STD-750, Method 2056      |
| Storage temperature (°C)                                     | -55 to 150                        |
| Operating temperature (°C)                                   | -40 to 125                        |
| Junction temperature (°C)                                    | 175                               |
| Maximum Lead Temperature for Soldering Purpose; for 10s (°C) | 260                               |

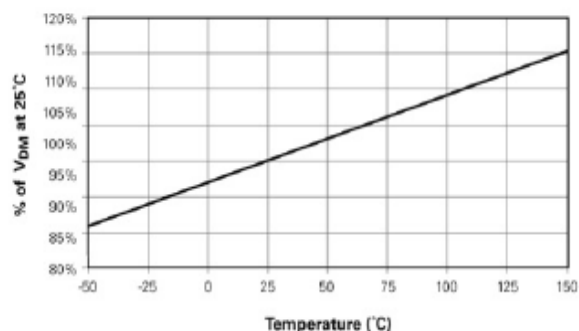
**Table SB5 – Reliability Tests**

| Test                                          | Conditions                       | Duration    |
|-----------------------------------------------|----------------------------------|-------------|
| High temperature, reverse bias                | +100°C, 50VDC bias               | 1000 hours  |
| High humidity, high temperature, reverse bias | 85% RH, +85°C, 50VDC bias        | 1000 hours  |
| High temperature storage life                 | +150°C                           | 1000 hours  |
| Temperature cycling                           | -65°C to +150°C, 15 minute dwell | 1000 cycles |
| Autoclave                                     | 100% RH, +121°C, 15 PSI          | 96 hours    |

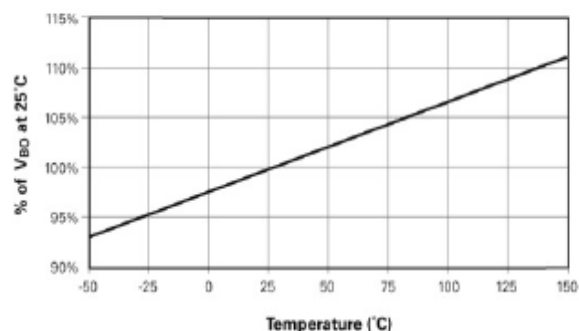
# SiBar Thyristor Surge Protectors TVBxxxSA-L Series

## Figures SB3-SB6 - Typical Electrical Characteristics vs. Temperature for SiBar Thyristor Surge Protectors

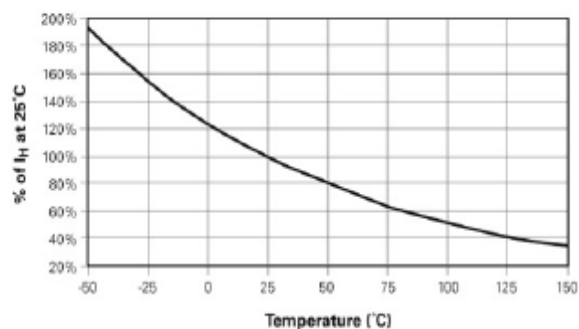
**Figure SB3 - Off-state Voltage vs. Temperature**



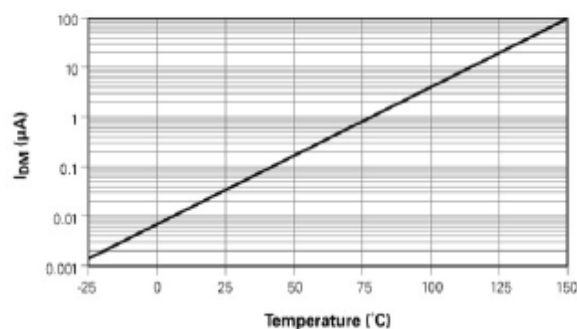
**Figure SB4 - Breakover Voltage vs. Temperature**



**Figure SB5 - Hold Current vs. Temperature**

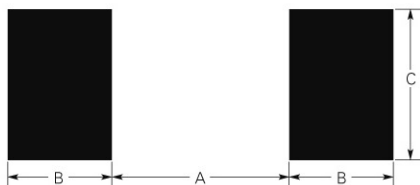


**Figure SB6 - Off-state Current vs. Temperature**



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**Figure SB7 - Recommended Pad Layout**



**Table SB6 – Packaging and Marking Information**

| Part Description         | Tape and Reel Quantity | Standard Package | Part Marking | Recommended Pad Layout (millimeters/inchs) |                    |                    | Agency Recognition* |
|--------------------------|------------------------|------------------|--------------|--------------------------------------------|--------------------|--------------------|---------------------|
|                          |                        |                  |              | Dimension A (Nom.)                         | Dimension B (Nom.) | Dimension C (Nom.) |                     |
| TVB058SA-L               | 2,500                  | 10,000           | 058A         | 2.261 (0.089)                              | 2.159 (0.085)      | 2.743 (0.108)      | --                  |
| TVB170SA-L               | 2,500                  | 10,000           | 170A         | 2.261 (0.089)                              | 2.159 (0.085)      | 2.743 (0.108)      | UL                  |
| TVB180SA-L               | 2,500                  | 10,000           | 180A         | 2.261 (0.089)                              | 2.159 (0.085)      | 2.743 (0.108)      | UL                  |
| TVB200SA-L               | 2,500                  | 10,000           | 200A         | 2.261 (0.089)                              | 2.159 (0.085)      | 2.743 (0.108)      | UL                  |
| TVB270SA-L               | 2,500                  | 10,000           | 270A         | 2.261 (0.089)                              | 2.159 (0.085)      | 2.743 (0.108)      | UL                  |
| TVB300SA-L               | 2,500                  | 10,000           | 300A         | 2.261 (0.089)                              | 2.159 (0.085)      | 2.743 (0.108)      | UL                  |
| * UL497B, File # E179610 |                        |                  |              |                                            |                    |                    |                     |