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# SiBar™ Thyristor Surge Protectors
# TVAxxxRSA-L Series

Circuit Protection's SiBar thyristor surge protection devices are designed to help protect sensitive telecommunication equipment from the hazards caused by lightning, power contact, and power induction. These devices have a high electrical surge capability to help protect against transient faults and a high off-state impedance, rendering them virtually transparent during normal system operation.

SiBar thyristor surge protectors are designed to assist telecommunication and computer telephony equipment in meeting the applicable requirements and industry specifications.

## Benefits:

- Helps provide protection for sensitive telecom electronic equipment
- Lower capacitance
- Low leakage current
- Low power dissipation
- Fast, reliable operation
- No wear-out mechanisms
- Helps designers meet worldwide telecom standards
- Helps reduce warranty and service costs
- Easy installation
- Helps improve power efficiency of equipment

## Features:

- RoHS compliant
- Bidirectional crowbar transient voltage protection
- Broad voltage range 65V – 320V
- Low capacitance 12pF – 20pF @ 50V
- High off-state impedance
- Low on-state voltage
- High surge capability
- Short-circuit failure mode
- Surface-mount technology
- DO-214AC SMA package
- 10 x 1000 µs 50A surge rating
- Helps equipment comply with TIA-968, Telcordia GR-1089, IEC61000-4-5, ITU K.20/21/45

## Applications:

- Modems
- Fax machines
- Phones, answering machines
- PBX systems
- Set top boxes
- POS systems
- Analog and digital linecards (xDSL, T1/E1, ISDN...)
- Other customer premise and central office network equipment requiring




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# SiBar™ Thyristor Surge Protectors
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## Table SB1 - Electrical Characteristics

| Part Number | $V_{DM}$ Max. (V) | $V_{BO}$ Max. (V) | $I_H$ Min. (mA) | $V_T$ Max. (V) | C1 (Typ) @ 50$V_{DC}$ Bias (pF) | C2 (Typ) @ 2$V_{DC}$ Bias (pF) | Off-State Current @VDM (µA) |
|---|---|---|---|---|---|---|---|
| TVA065RSA-L | 65 | 88 | 150 | 4 | 20 | 40 | 5 |
| TVA090RSA-L | 90 | 130 | 150 | 4 | 20 | 40 | 5 |
| TVA120RSA-L | 120 | 160 | 150 | 4 | 16 | 30 | 5 |
| TVA130RSA-L | 130 | 173 | 150 | 4 | 14 | 30 | 5 |
| TVA170RSA-L | 170 | 220 | 150 | 4 | 14 | 25 | 5 |
| TVA190RSA-L | 190 | 260 | 150 | 4 | 14 | 25 | 5 |
| TVA220RSA-L | 220 | 295 | 150 | 4 | 12 | 25 | 5 |
| TVA270RSA-L | 275 | 350 | 150 | 4 | 12 | 25 | 5 |
| TVA300RSA-L | 320 | 400 | 150 | 4 | 12 | 25 | 5 |

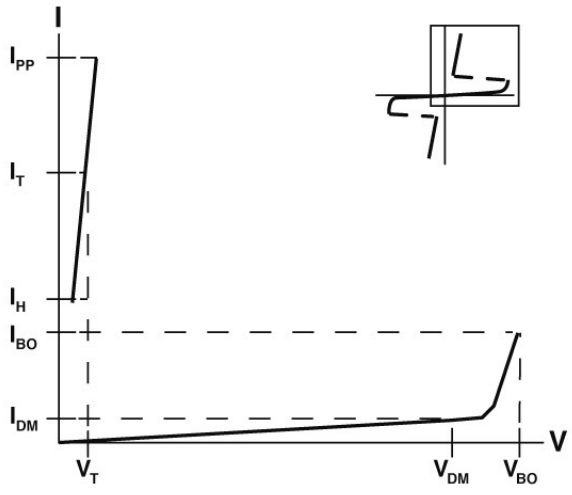
Notes: All electrical characteristics are measured at 25°C.
$V_{DM}$ measured per UL497B pulse requirements: at max. off-state leakage current (IDM) = 5 µA.
$V_{BO}$ measured at 100V/µs.

## Table SB2 – Surge Current Rating

| | TIA-968 | | | Telcordia GR-1089* | | IEC61000-4-5 | ITU K.20/21/45* | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Type A | Type B | | | | | | | | |
| Part Number | $I_{pp}$(A) 5 x 320 µs | $I_{pp}$(A) 10 x 560 µs | $_{pp}$ (A) 10 x 160 µs | $I_{pp}$ (A) 10 x 1000 µs | $I_{pp}$ (A) 2 x 10 µs | $I_{pp}$ (A) 8 x 20 µs | $I_{PP}$ (A) 5 x 310 µs (VOC: 10 x 700µs) | $I_{TSM}$ Min. (A) | di/dt (A/µs) | dV/dt (V/µs) |
| TVAxxxRSA-L | 65 | 55 | 75 | 50 | 100 | 100 | 65 | 22 | 500 | 2000 |

Notes: *Lightning current wave forms for applicable industry specification.
$I_{TSM}$, 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-stage voltage (linear wave form, $V_D$ = rated $V_{BO}$, Ti = 25°C)

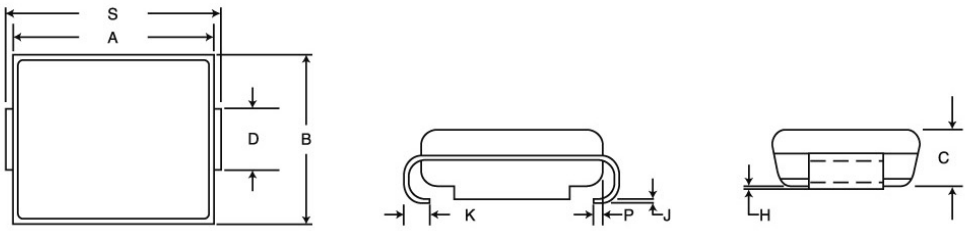
## Figure SB1 - Voltage-Current Characteristics




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

# SiBar™ Thyristor Surge Protectors
# TVAxxxRSA-L Series

## Figure SB2 - Dimension Figure




## Table SB3 – Dimensions in Millimeters

| | A | | B | | C | | D | |
|---|---|---|---|---|---|---|---|---|
| **Dimension** | **Min.** | **Max.** | **Min.** | **Max.** | **Min.** | **Max.** | **Min.** | **Max.** |
| TVAxxxRSA-L | 4.06 | 4.57 | 2.25 | 2.92 | 1.90 | 2.41 | 1.25 | 1.65 |
| | (0.160) | (0.180) | (0.089) | (0.115) | (0.075) | (0.095) | (0.049) | (0.065) |

| | H | | J | | K | | P | S | |
|---|---|---|---|---|---|---|---|---|---|
| **Dimension** | **Min.** | **Max.** | **Min.** | **Max.** | **Min.** | **Max.** | **Ref** | **Min** | **Max.** |
| TVAxxxRSA-L | 0.051 | 0.200 | 0.150 | 0.41 | 0.76 | 1.52 | 0.51 | 4.80 | 5.59 |
| | (0.002) | (0.008) | (0.006) | (0.016) | (0.030) | (0.060) | (0.020) | (0.189) | (0.220) |

Notes: *D dimension is measured within dimension P.
TVA series devices use industry standard SMA 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 |
| Max Junction temperature (°C) | 150 |
| Maximum Lead Temperature for Soldering Purpose; for 10s (°C) | 260 |

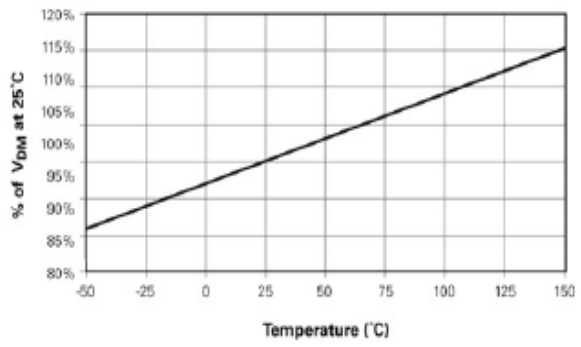
## Table SB5 – Reliability Tests

| 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 |

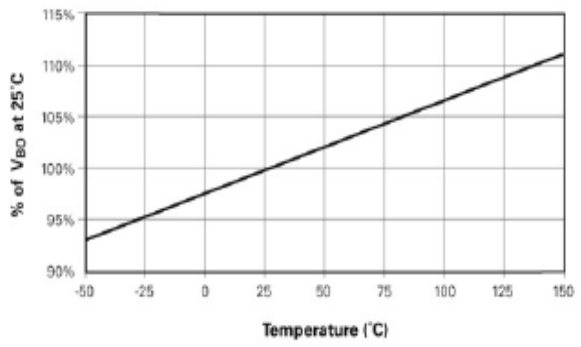
# SiBar™ Thyristor Surge Protectors
# TVAxxxRSA-L Series

## Figures SB3-SB6 - Typical Electrical Charateristics vs. Temperature for Sibar Thyristor Surge Protectors

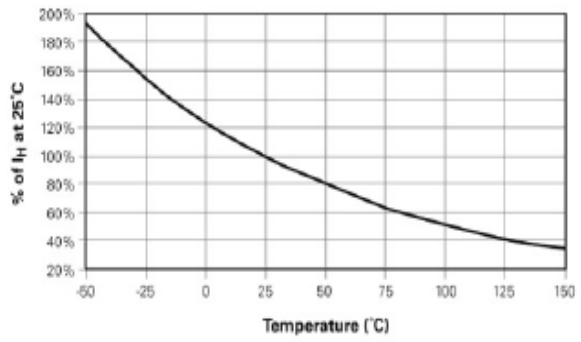
### Figure SB3 - Off-state Voltage vs. Temperature



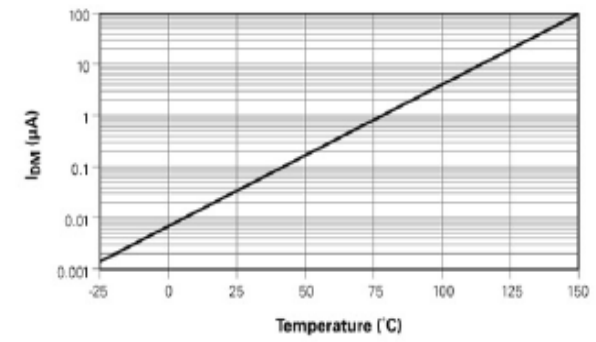

### Figure SB4 - Breakover Voltage vs. Temperature




### Figure SB5 - Hold Current vs. Temperature




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



# SiBar™ Thyristor Surge Protectors
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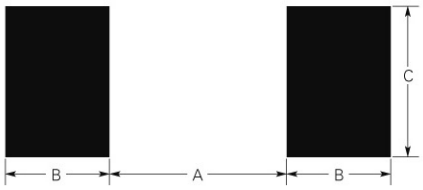
## Figure SB7 - Recommended Pad Layout




## Table SB6 – Packaging and Marking Information

| Part Description | Tape and Reel Quantity | Standard Package | Part Marking | Recommended Pad Layout (millimeters/inchs) Dimension A (Nom.) | Dimension B (Nom.) | Dimension C (Nom.) | Agency Recognition* |
|---|---|---|---|---|---|---|---|
| TVA065RSA-L | 5,000 | 20,000 | A065 | 2.00 (0.079) | 2.00 (0.079) | 2.00 (0.079) | UL |
| TVA090RSA-L | 5,000 | 20,000 | A090 | 2.00 (0.079) | 2.00 (0.079) | 2.00 (0.079) | UL |
| TVA120RSA-L | 5,000 | 20,000 | A120 | 2.00 (0.079) | 2.00 (0.079) | 2.00 (0.079) | UL |
| TVA130RSA-L | 5,000 | 20,000 | A130 | 2.00 (0.079) | 2.00 (0.079) | 2.00 (0.079) | UL |
| TVA170RSA-L | 5,000 | 20,000 | A170 | 2.00 (0.079) | 2.00 (0.079) | 2.00 (0.079) | UL |
| TVA190RSA-L | 5,000 | 20,000 | A190 | 2.00 (0.079) | 2.00 (0.079) | 2.00 (0.079) | UL |
| TVA220RSA-L | 5,000 | 20,000 | A220 | 2.00 (0.079) | 2.00 (0.079) | 2.00 (0.079) | UL |
| TVA270RSA-L | 5,000 | 20,000 | A270 | 2.00 (0.079) | 2.00 (0.079) | 2.00 (0.079) | UL |
| TVA300RSA-L | 5,000 | 20,000 | A300 | 2.00 (0.079) | 2.00 (0.079) | 2.00 (0.079) | ** |

* UL 497B, File # E179610

** UL Pending

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