SiBar Thyristor Surge Protectors
TVAxxxNSA-L Series

SiBar thyristor surge protection devices 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 assist designers to meet telecommunication and computer telephony equipment requirements and industry specifications.

Benefits:

- Helps provide protection for sensitive telecom electronic equipment
- Low leakage current
- Low power dissipation
- Fast, reliable operation
- No wear-out mechanisms
- Assists designers to 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
- Voltage range: 170V – 275V with improved Vdrm/Vbo range
- 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...)
- Other customer premise and central office network equipment requiring protection

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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) 50V_{DC} Bias	C2 (Typ) 2V_{DC} Bias	Off-State Current VD2=VDM (µA)
TVA170NSA-L	170	220	150	4	20	39	5
TVA220NSA-L	220	300	150	4	17	33	5
TVA275NSA-L	275	350	150	4	16	31	5

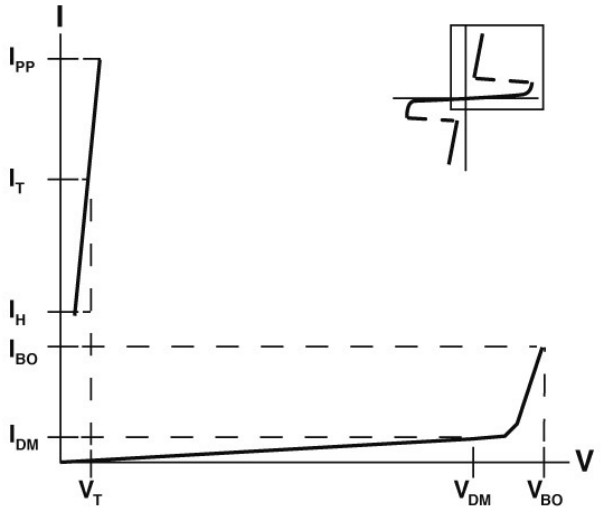
Notes: All electrical characteristics are measured at 25°C.
V_{DM} measured per UL497B pulse requirements: at max. off-state leakage current (IDM) = 5 µA.
V_{BO} measured at 100V/µs.
C1 measured at 1 MHz with a 50 V_{DC} bias.
C2 measured at 1MHz with a 2V_{DC} bias.

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)
TVAxxxNSA-L	90	70	100	50	150	150	90	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}, Tj = 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

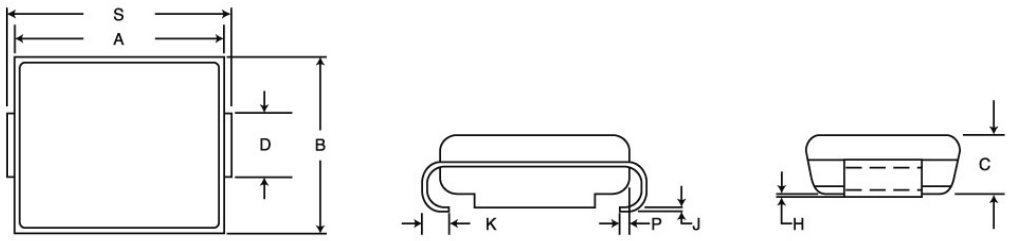

Table SB3 – Dimensions in Millimeters

	A		B		C		D	
Dimension	**Min.**	**Max.**	**Min.**	**Max.**	**Min.**	**Max.**	**Min.**	**Max.**
TVAxxxNSA-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.**
TVAxxxNSA-L	0.051	0.200	0.150	0.41	0.76	1.52	0.051	4.80	5.59
	(0.002)	(0.008)	(0.006)	(0.016)	(0.030)	(0.060)	(0.0020)	(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
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

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

Figure SB3 - Off-state Voltage vs. Temperature

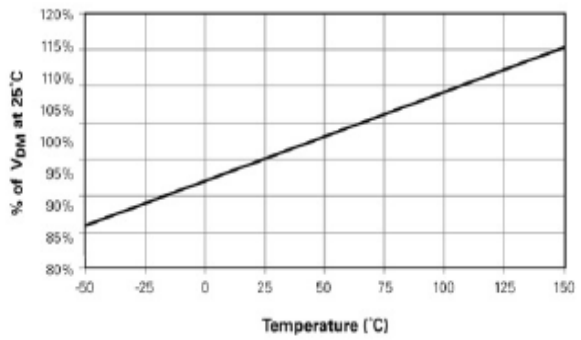

Figure SB4 - Breakover Voltage vs. Temperature

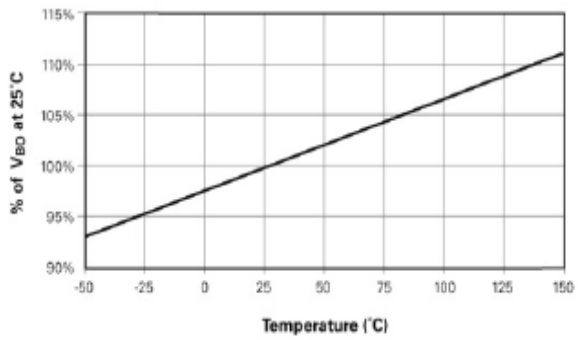

Figure SB5 - Hold Current vs. Temperature

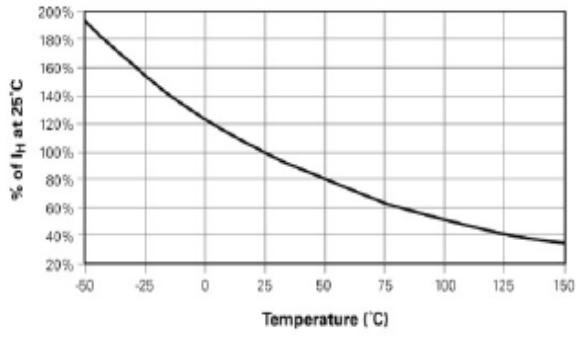

Figure SB6 - Off-state Current vs. Temperature

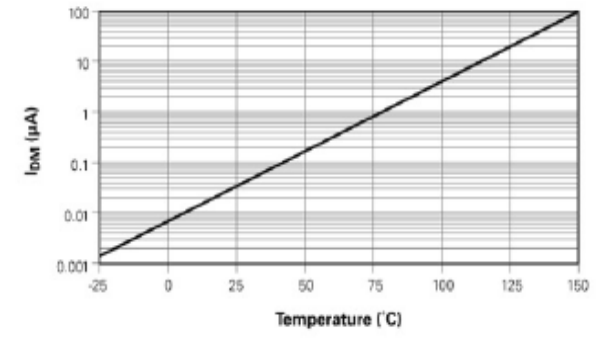

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Figure SB7 - Recommended Pad Layout

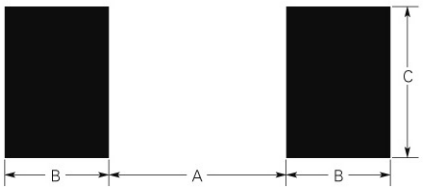

Table SB6 – Packaging and Marking Information

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*
TVA170NSA-L	5,000	20,000	17NA	2.0 (0.079)	2.0 (0.079)	2.0 (0.079)	**
TVA220NSA-L	5,000	20,000	22NA	2.0 (0.079)	2.0 (0.079)	2.0 (0.079)	**
TVA275NSA-L	5,000	20,000	27NA	2.0 (0.079)	2.0 (0.079)	2.0 (0.079)	**

* UL 497B, File # E179610

**UL Pending

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