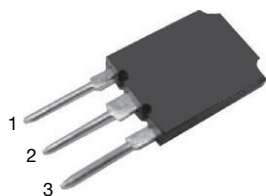
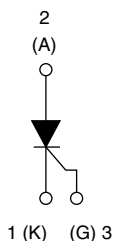




Thyristor High Voltage, Phase Control SCR, 70 A



Super TO-247



LINKS TO ADDITIONAL RESOURCES



3D Models

PRIMARY CHARACTERISTICS

$I_{T(AV)}$	70 A
V_{DRM}/V_{RRM}	1200 V, 1600 V
V_{TM}	1.40 V
I_{GT}	100 mA
T_J	-40 °C to 150 °C
Circuit configuration	Single SCR
Package	Super TO-247

FEATURES

- High surge capability
- High voltage input rectification
- 150 °C maximum operating junction temperature
- Designed and qualified according to JEDEC®-JESD 47
- Halogen-free
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- AC switches
- High voltage input rectification (soft start)
- High current crow-bar
- Other phase-control circuits
- Designed to be used with Vishay input diodes, switches, and output rectifiers which are available in identical package outlines

DESCRIPTION

The VS-70TPS...M3 high voltage series of silicon controlled rectifiers are specifically designed for high and medium power switching, and phase control applications.

MECHANICAL DATA

Case: Super TO-247

Molding compound meets UL 94 V-0 flammability rating

Terminal: matte tin plated leads, solderable per J-STD-002

MAJOR RATINGS AND CHARACTERISTICS

PARAMETER	TEST CONDITIONS	VALUES	UNITS
$I_{T(AV)}$	Sinusoidal waveform	70	A
I_{RMS}	Lead current limitation	75	
V_{RRM}/V_{DRM}	Range	1200 to 1600	V
I_{TSM}		930	A
V_{TM}	100 A, $T_J = 25$ °C	1.40	V
dV/dt		500	V/ μ s
dI/dt		150	A/ μ s
T_J		-40 to +150	°C

VOLTAGE RATINGS

PART NUMBER	V_{RRM}/V_{DRM} , MAXIMUM REPETITIVE PEAK AND OFF-STATE VOLTAGE V	V_{RSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I_{RRM}/I_{DRM} AT 150 °C mA
VS-70TPS12-M3	1200	1300	42
VS-70TPS16-M3	1600	1700	42



ABSOLUTE MAXIMUM RATINGS						
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum average on-state current	I _{T(AV)}	T _C = 109 °C, 180° conduction half sine wave		70	A	
Maximum continuous RMS on-state current as AC switch	I _{T(RMS)}	Lead current limitation		75		
Maximum peak, one-cycle non-repetitive surge current	I _{TSM}	10 ms sine pulse, rated V _{RRM} applied	Initial T _J = T _J maximum	780		A ² s
		10 ms sine pulse, no voltage reapplied		930		
Maximum I ² t for fusing	I ² t	10 ms sine pulse, rated V _{RRM} applied		3060	A ² s	
		10 ms sine pulse, no voltage reapplied		4325		
Maximum I ² √t for fusing	I ² √t	t = 0.1 ms to 10 ms, no voltage reapplied		43250	A ² √s	
Low level value of threshold voltage	V _{T(TO)1}	T _J = 150 °C		0.95	V	
High level value of threshold voltage	V _{T(TO)2}			1.05		
Low level value of on-state slope resistance	r _{t1}			4.15	mΩ	
High level value of on-state slope resistance	r _{t2}			3.65		
Maximum peak on-state voltage	V _{TM}	100 A, T _J = 25 °C		1.4	V	
Maximum rate of rise of turned-on current	dI/dt	T _J = 25 °C		150	A/μs	
Maximum holding current	I _H	Anode supply = 6 V, resistive load, initial I _T = 1 A, T _J = 25 °C		250	mA	
Maximum latching current	I _L	Anode supply = 6 V, resistive load, T _J = 25 °C		400		
Maximum reverse and direct leakage current	I _{RRM} /I _{DRM}	T _J = 25 °C	V _R = rated V _{RRM} /V _{DRM} (T _J = T _J max., linear to 80 % V _{DRM} = R _g -k = Open)	1.0		V/μs
		T _J = 150 °C		42		
Maximum rate of rise of off-state voltage	dV/dt	T _J = 150 °C			500	

TRIGGERING					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum peak gate power	P _{GM}	T = 30 μs		10	W
Maximum average gate power	P _{G(AV)}			2.5	
Maximum peak gate current	I _{GM}			2.5	A
Maximum peak negative gate voltage	-V _{GM}			10	V
Maximum required DC gate voltage to trigger	V _{GT}	T _J = - 40 °C	Anode supply = 6 V resistive load	1.8	
		T _J = 25 °C		1.5	
		T _J = 150 °C		1.0	
Maximum required DC gate current to trigger	I _{GT}	T _J = - 40 °C	Anode supply = 6 V resistive load	150	mA
		T _J = 25 °C		100	
		T _J = 150 °C		65	
Maximum DC gate voltage not to trigger	V _{GD}	T _J = 150 °C, V _{DRM} = rated value		0.14	V
Maximum DC gate current not to trigger	I _{GD}			3.0	mA

SWITCHING					
PARAMETER	SYMBOL	TEST CONDITIONS		TYP.	MAX.
Turn-on time	t_{gt}	$I_R = 70\text{ A}$, $V_D = 50\text{ }^{\circ}\text{C}$, $I_{gt} = 300\text{ mA}$, $T_J = 25\text{ }^{\circ}\text{C}$		2	-
Turn-off time	t_q	$I_R = 70\text{ A}$, $V_D = 80\text{ }^{\circ}\text{C}$, $dV/dt = 20\text{ V}/\mu\text{s}$, $t_p = 200\text{ }^{\circ}\text{C}$, $I_{gt} = 100\text{ mA}$, $di/dt = 10\text{ A}/\mu\text{s}$, $V_R = 100\text{ V}$, $T_J = 150\text{ }^{\circ}\text{C}$		170	-



THERMAL AND MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction temperature range	T_J		-40 to +150	°C
Maximum storage temperature range	T_{Stg}		-40 to +150	
Maximum thermal resistance, junction to case	R_{thJC}	DC operation	0.27	°C/W
Maximum thermal resistance, junction to ambient	R_{thJA}		40	
Typical thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth and greased	0.2	
Approximate weight			6	g
Mounting torque	minimum		6 (5)	kgf · cm (lbf · in)
	maximum		12 (10)	
Marking device		Case style Super TO-247	70TPS12	
			70TPS16	

ΔR_{thJ-hs} CONDUCTION PER JUNCTION											
DEVICE	SINE HALF WAVE CONDUCTION					RECTANGULAR WAVE CONDUCTION					UNITS
	180°	120°	90°	60°	30°	180°	120°	90°	60°	30°	
VS-70TPS...-M3	0.078	0.092	0.117	0.172	0.302	0.053	0.092	0.125	0.180	0.306	°C/W

Note

- The table above shows the increment of thermal resistance R_{thJ-hs} when devices operate at different conduction angles than DC

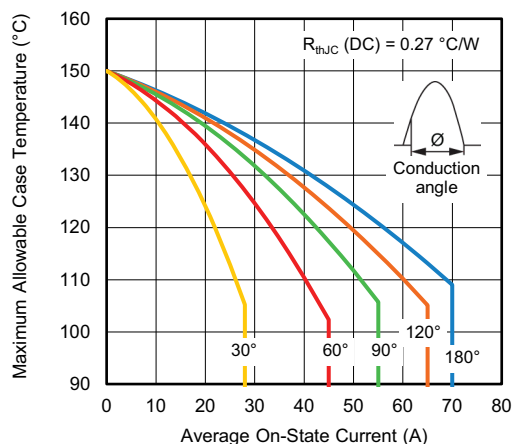


Fig. 1 - Current Rating Characteristics

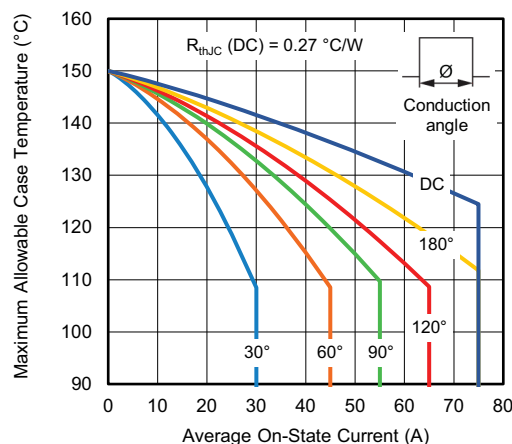


Fig. 2 - Current Rating Characteristics

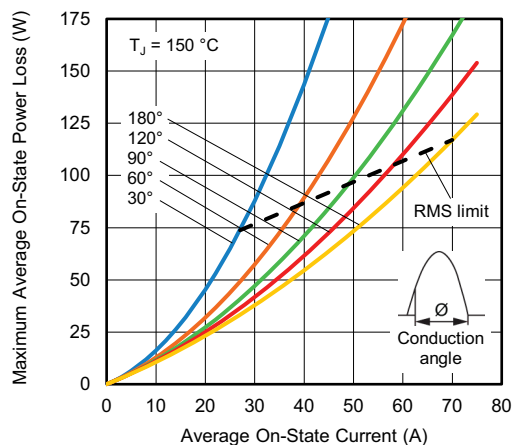


Fig. 3 - On-State Power Loss Characteristics

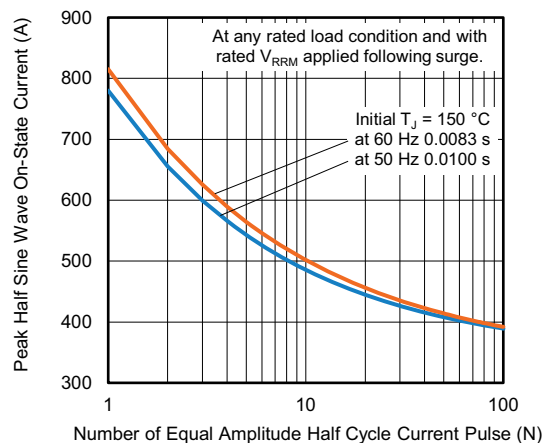


Fig. 5 - Maximum Non-Repetitive Surge Current

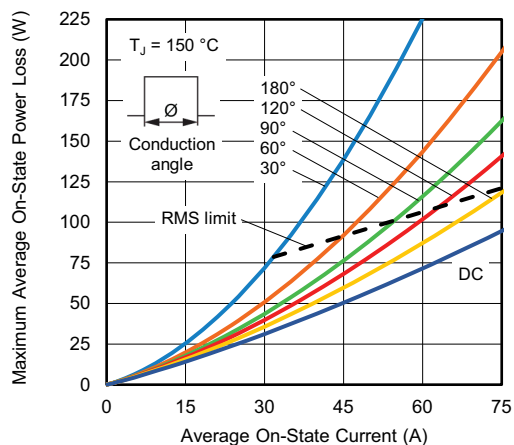


Fig. 4 - On-State Power Loss Characteristic

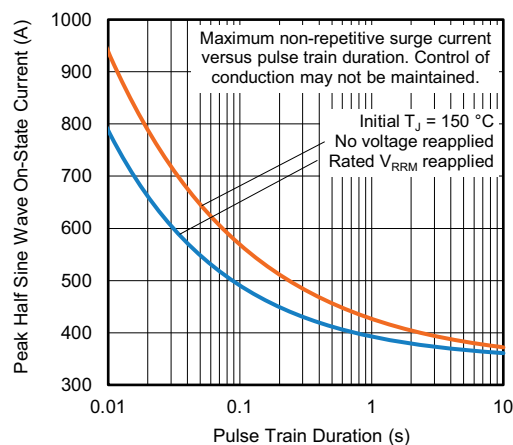


Fig. 6 - Maximum Non-Repetitive Surge Current

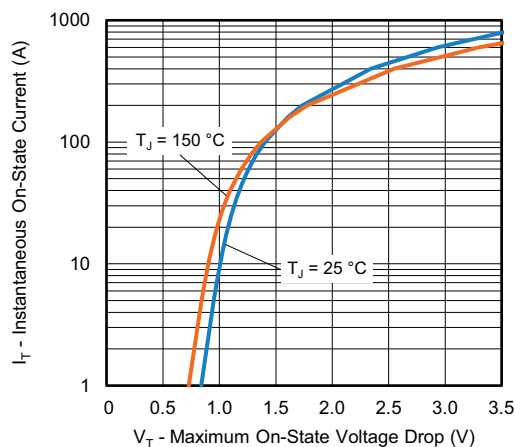


Fig. 7 - On-State Voltage Drop Characteristics

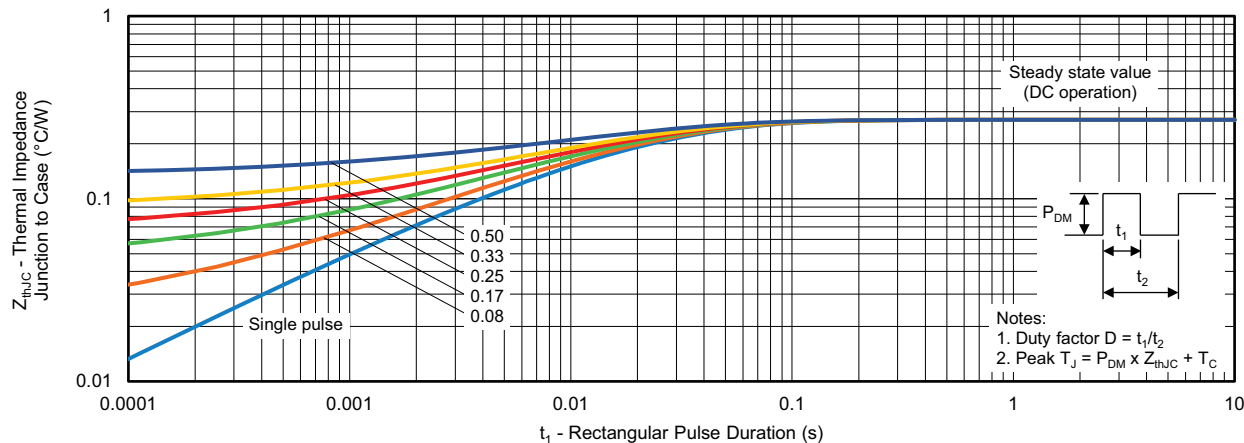


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

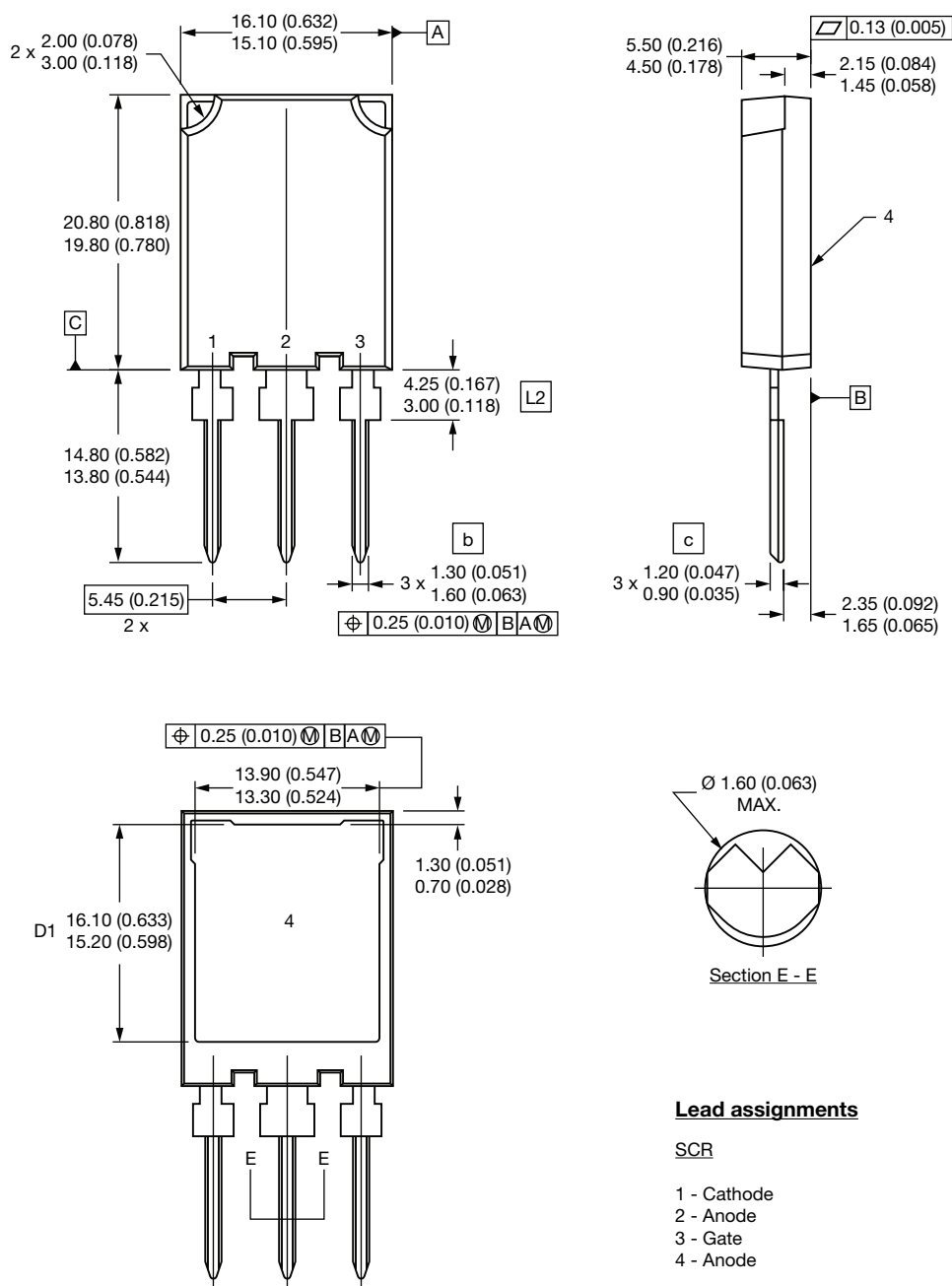
Device code	VS-	70	T	P	S	16	-M3
	①	②	③	④	⑤	⑥	⑦
①	- Vishay Semiconductors product						
②	- Current rating (70 = 70 A)						
③	- Circuit configuration: T = Thyristor						
④	- Package: P = Super TO-247						
⑤	- Type of silicon: S = Standard recovery rectifier						
⑥	- Voltage code x 100 = V_{RRM}					12 = 1200 V 16 = 1600 V	
⑦	- -M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free						

ORDERING INFORMATION (example)			
PREFERRED P/N	QUANTITY PER TUBE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-70TPS12-M3	25	500	Antistatic plastic tube
VS-70TPS16-M3	25	500	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?97136
Part marking information	www.vishay.com/doc?95683

Super TO-247

DIMENSIONS in millimeters (inches)



Notes

- (1) Dimension and tolerancing per ASME Y14.5M-1994
- (2) Controlling dimension: millimeter
- (3) Outline conforms to JEDEC® outline TO-274AA, except D1, b min., c min., L2 min.



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