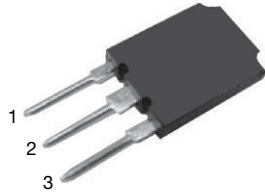
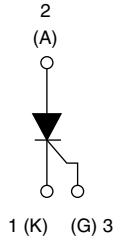


Thyristor High Voltage, Phase Control SCR, 70 A



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

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

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	
		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	
		T _J = 150 °C		42	
Maximum rate of rise of off-state voltage	dV/dt	T _J = 150 °C		500	V/μs

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}	$I_R = 70\text{ A}$, $V_D = 50\text{ \% } V_{DRM}$, $I_{gt} = 300\text{ mA}$, $T_J = 25\text{ }^{\circ}\text{C}$		2	-
Turn-off time	t_q	$I_R = 70\text{ A}$, $V_D = 80\text{ \% } V_{DRM}$, $dV/dt = 20\text{ V/}\mu\text{s}$, $t_p = 200\text{ }\mu\text{s}$, $I_{gt} = 100\text{ mA}$, $di/dt = 10\text{ A/}\mu\text{s}$, $V_R = 100\text{ V}$, $T_J = 150\text{ }^{\circ}\text{C}$		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

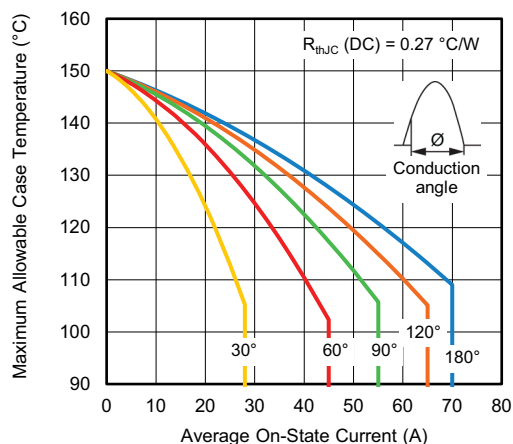


Fig. 1 - Current Rating Characteristics

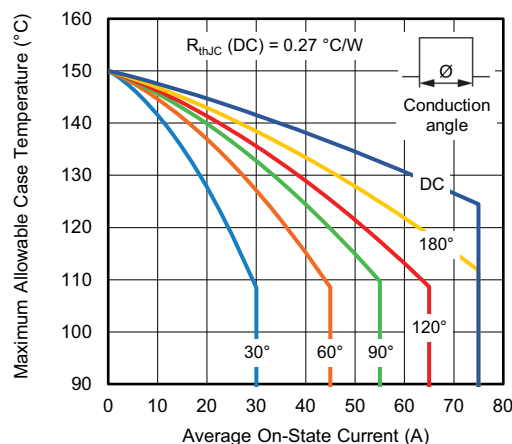


Fig. 2 - Current Rating Characteristics

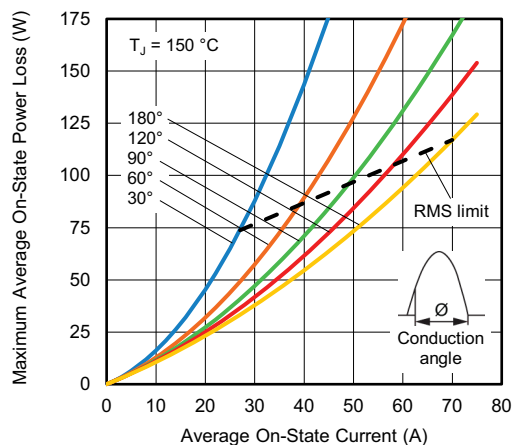


Fig. 3 - On-State Power Loss Characteristics

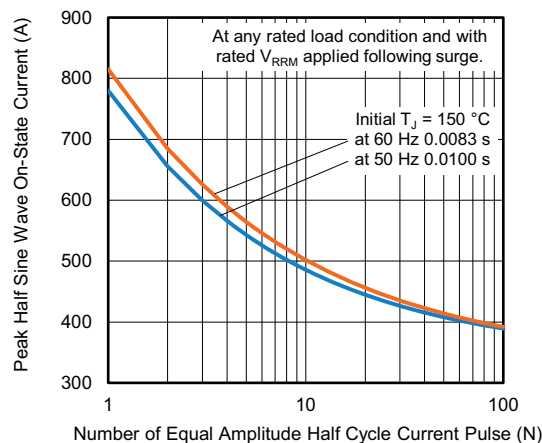


Fig. 5 - Maximum Non-Repetitive Surge Current

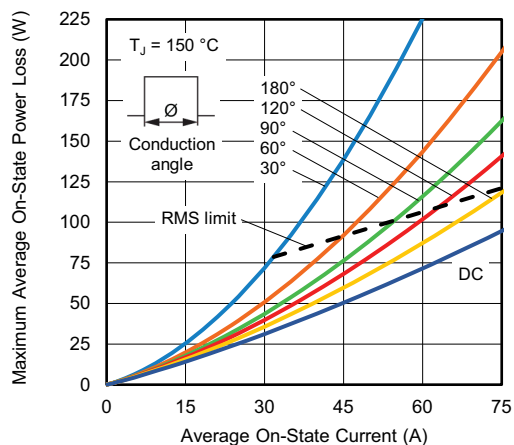


Fig. 4 - On-State Power Loss Characteristic

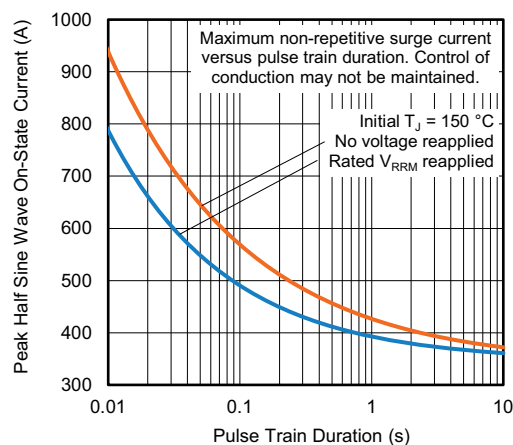


Fig. 6 - Maximum Non-Repetitive Surge Current

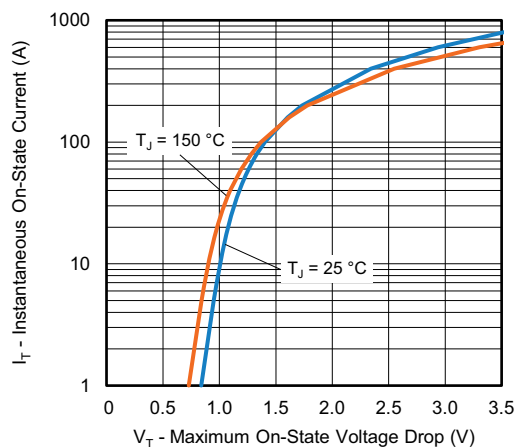


Fig. 7 - On-State Voltage Drop Characteristics

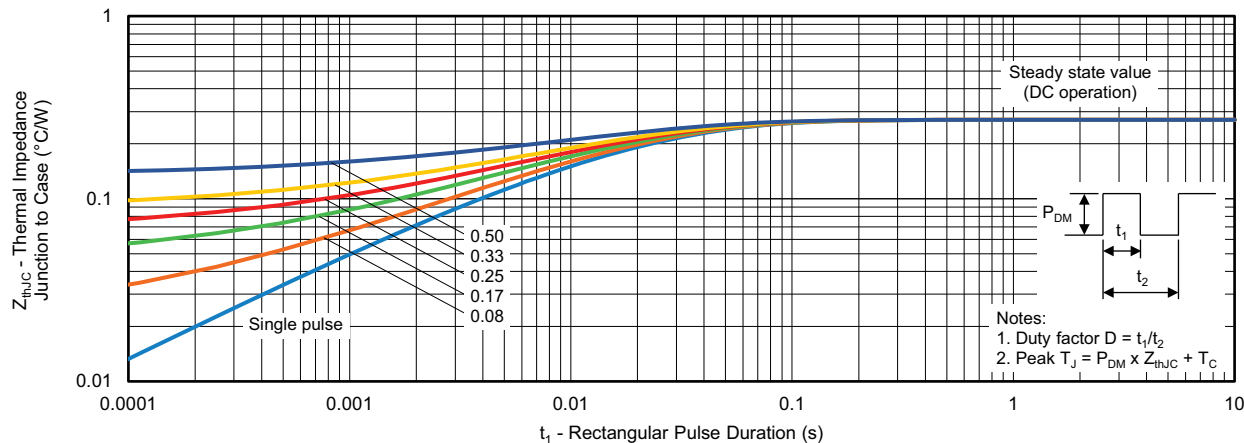


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

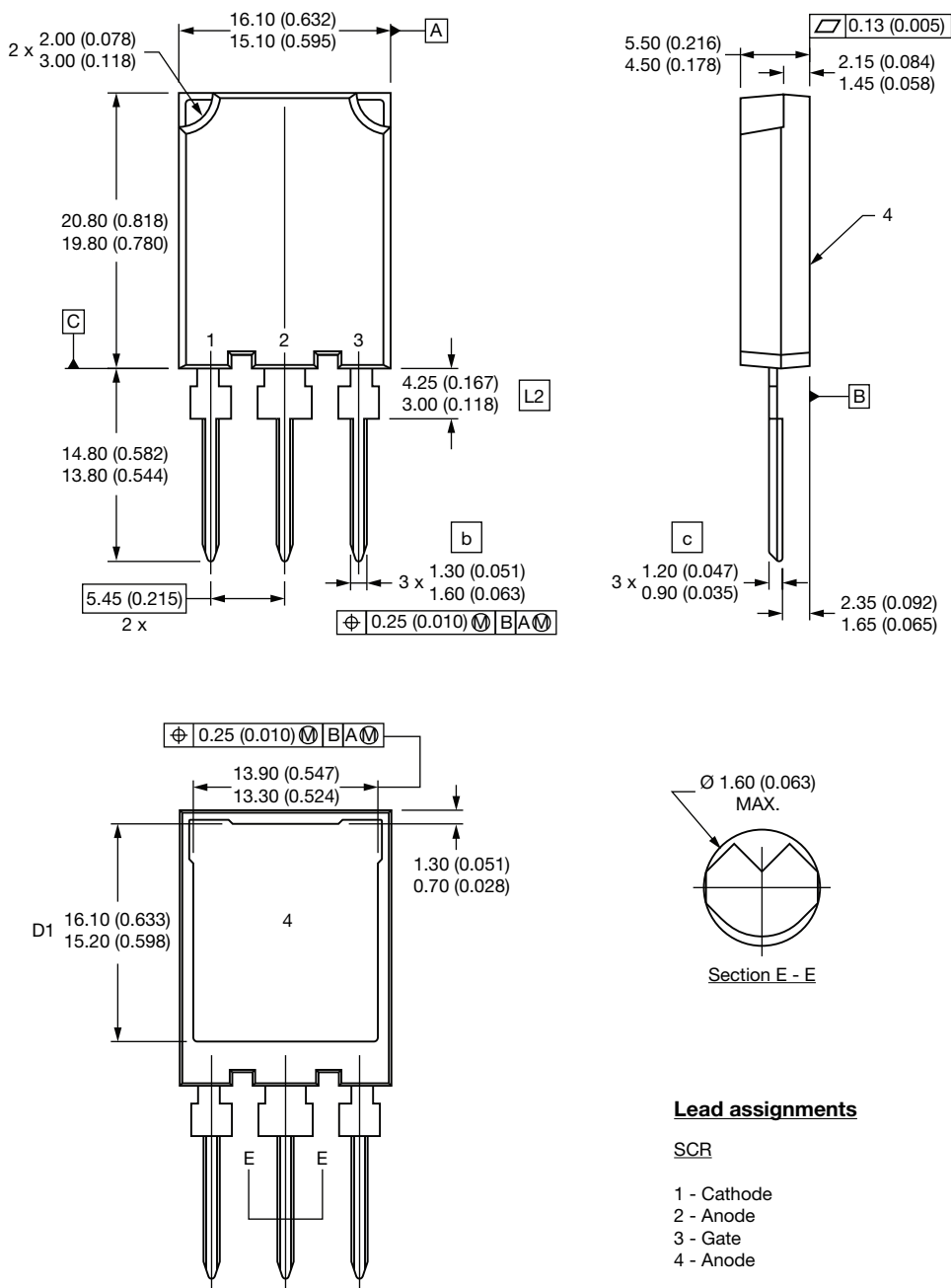
Device code	VS-	70	T	P	S	16	-M3
	1	2	3	4	5	6	7
1	Vishay Semiconductors product						
2	Current rating (70 = 70 A)						
3	Circuit configuration: T = Thyristor						
4	Package: P = Super TO-247						
5	Type of silicon: S = Standard recovery rectifier						
6	Voltage code x 100 = V_{RRM}					12 = 1200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



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.