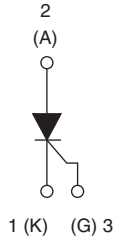


High Voltage Phase Control Thyristor, 70 A



Super TO-247



FEATURES

- High surge capability
- High voltage input rectification
- Compliant to RoHS Directive 2002/95/EC
- Designed and qualified according to JEDEC-JESD47


RoHS
COMPLIANT

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..PbF High Voltage Series of silicon controlled rectifiers are specifically designed for high and medium power switching, and phase control applications.

PRODUCT SUMMARY	
Package	Super TO-247
Diode variation	Single SCR
$I_{T(AV)}$	70 A
V_{DRM}/V_{RRM}	1200 V, 1600 V
V_{TM}	1.4 V
I_{GT}	100 mA
T_J	- 40 °C to 125 °C

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	1200/1600	V
I_{TSM}		1400	A
V_T	100 A, $T_J = 25\text{ °C}$	1.4	V
dV/dt		500	V/ μ s
dI/dt		150	A/ μ s
T_J		- 40 to 125	°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 125 °C mA
VS-70TPS12PbF	1200	1300	15
VS-70TPS16PbF	1600	1700	



ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average on-state current	$I_{T(AV)}$	$T_C = 82\text{ }^\circ\text{C}$, 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	1200	
		10 ms sine pulse, no voltage reapplied		1400	
Maximum I^2t for fusing	I^2t	10 ms sine pulse, rated V_{RRM} applied		7200	A^2s
		10 ms sine pulse, no voltage reapplied		10 200	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1\text{ ms to }10\text{ ms}$, no voltage reapplied		102 000	$A^2\sqrt{s}$
Low level value of threshold voltage	$V_{T(TO)1}$	$T_J = 125\text{ }^\circ\text{C}$		0.916	V
High level value of threshold voltage	$V_{T(TO)2}$			1.21	
Low level value of on-state slope resistance	$r_{\theta 1}$			4.138	$m\Omega$
High level value of on-state slope resistance	$r_{\theta 2}$			3.43	
Maximum peak on-state voltage	V_{TM}	100 A, $T_J = 25\text{ }^\circ\text{C}$		1.4	V
Maximum rate of rise of turned-on current	di/dt	$T_J = 25\text{ }^\circ\text{C}$		150	$A/\mu s$
Maximum holding current	I_H	$T_J = 25\text{ }^\circ\text{C}$		200	mA
Maximum latching current	I_L			400	
Maximum reverse and direct leakage current	I_{RRM}/I_{DRM}	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_{RRM}/V_{DRM}$	1.0	
		$T_J = 125\text{ }^\circ\text{C}$		15	
Maximum rate of rise of off-state voltage	dV/dt	$T_J = 125\text{ }^\circ\text{C}$		500	$V/\mu s$

TRIGGERING					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum peak gate power	P_{GM}	$T = 30\text{ }\mu s$		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}	$T_J = -40\text{ }^\circ\text{C}$	Anode supply = 6 V resistive load	1.8	
		$T_J = 25\text{ }^\circ\text{C}$		1.5	
		$T_J = 125\text{ }^\circ\text{C}$		1.1	
Maximum required DC gate current to trigger	I_{GT}	$T_J = -40\text{ }^\circ\text{C}$		150	mA
		$T_J = 25\text{ }^\circ\text{C}$	100		
		$T_J = 125\text{ }^\circ\text{C}$	80		
Maximum DC gate voltage not to trigger	V_{GD}	$T_J = 125\text{ }^\circ\text{C}$, $V_{DRM} = \text{Rated value}$		0.25	V
Maximum DC gate current not to trigger	I_{GD}			6	mA



THERMAL AND MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction temperature range	T_J		- 40 to 125	°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
			0.21	oz.
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..PbF	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

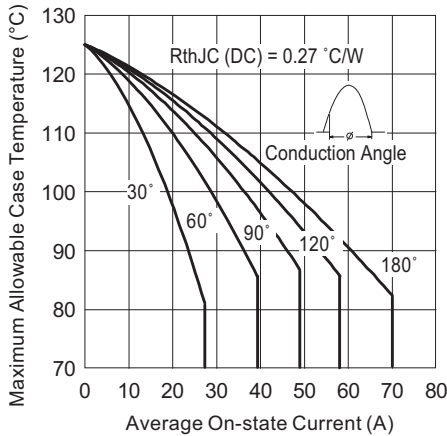


Fig. 1 - Current Rating Characteristics

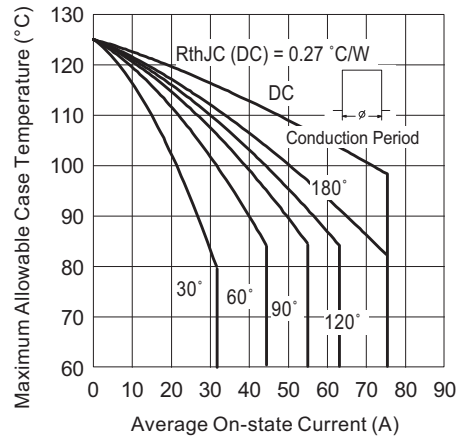


Fig. 2 - Current Rating Characteristics



VS-70TPS12PbF, VS-70TPS16PbF High Voltage Series

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Vishay Semiconductors

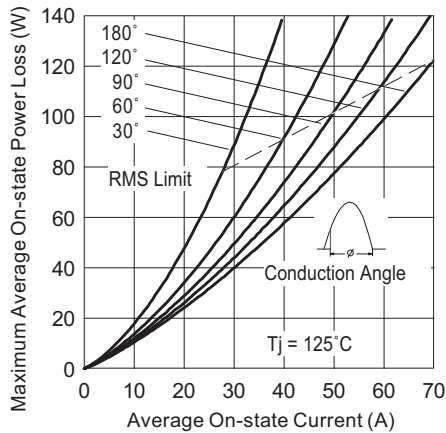


Fig. 3 - On-State Power Loss Characteristics

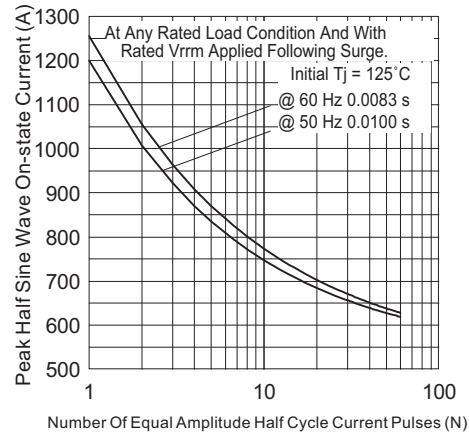


Fig. 5 - Maximum Non-Repetitive Surge Current

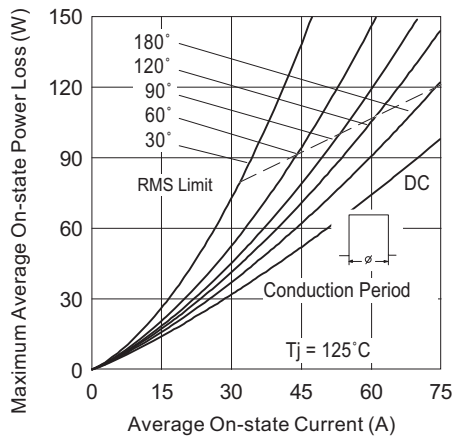


Fig. 4 - On-State Power Loss Characteristics

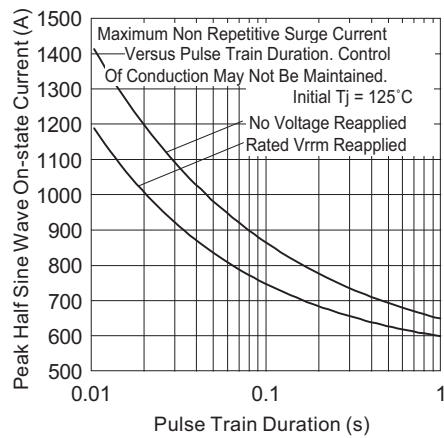


Fig. 6 - Maximum Non-Repetitive Surge Current

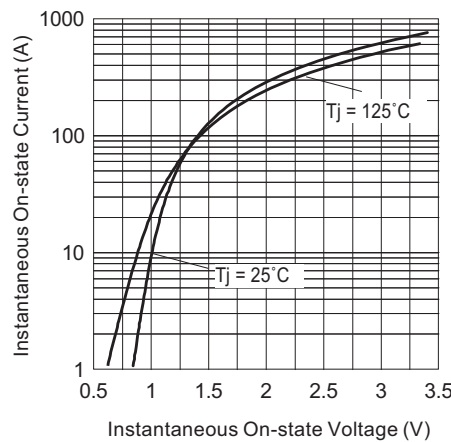


Fig. 7 - On-State Voltage Drop Characteristics

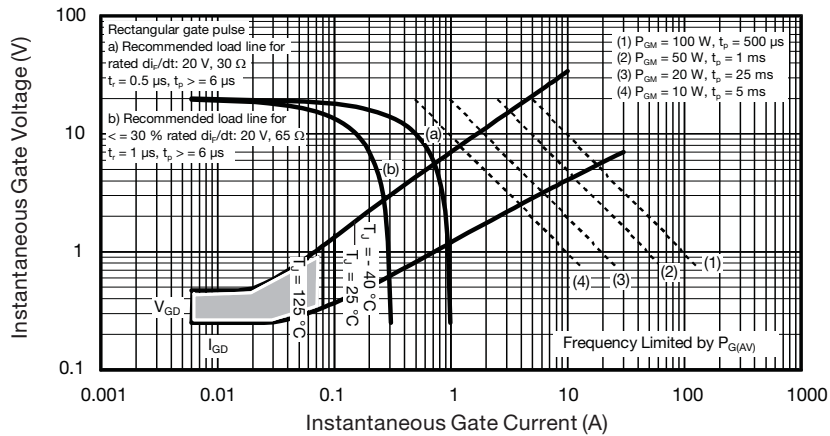


Fig. 8 - Gate Characteristics

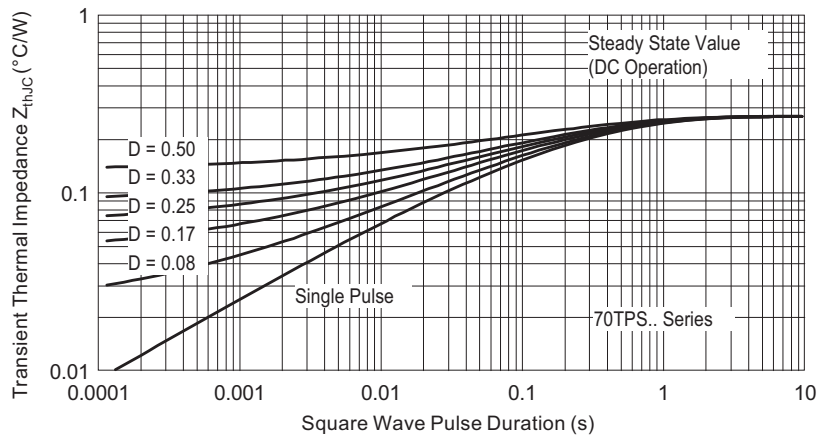
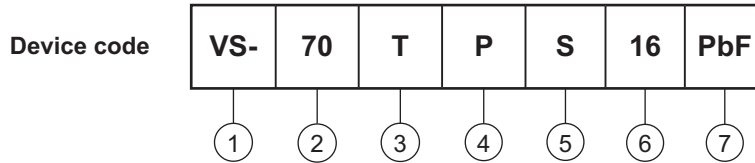


Fig. 9 - Thermal Impedance Z_{thJC} Characteristics



ORDERING INFORMATION TABLE



- 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}

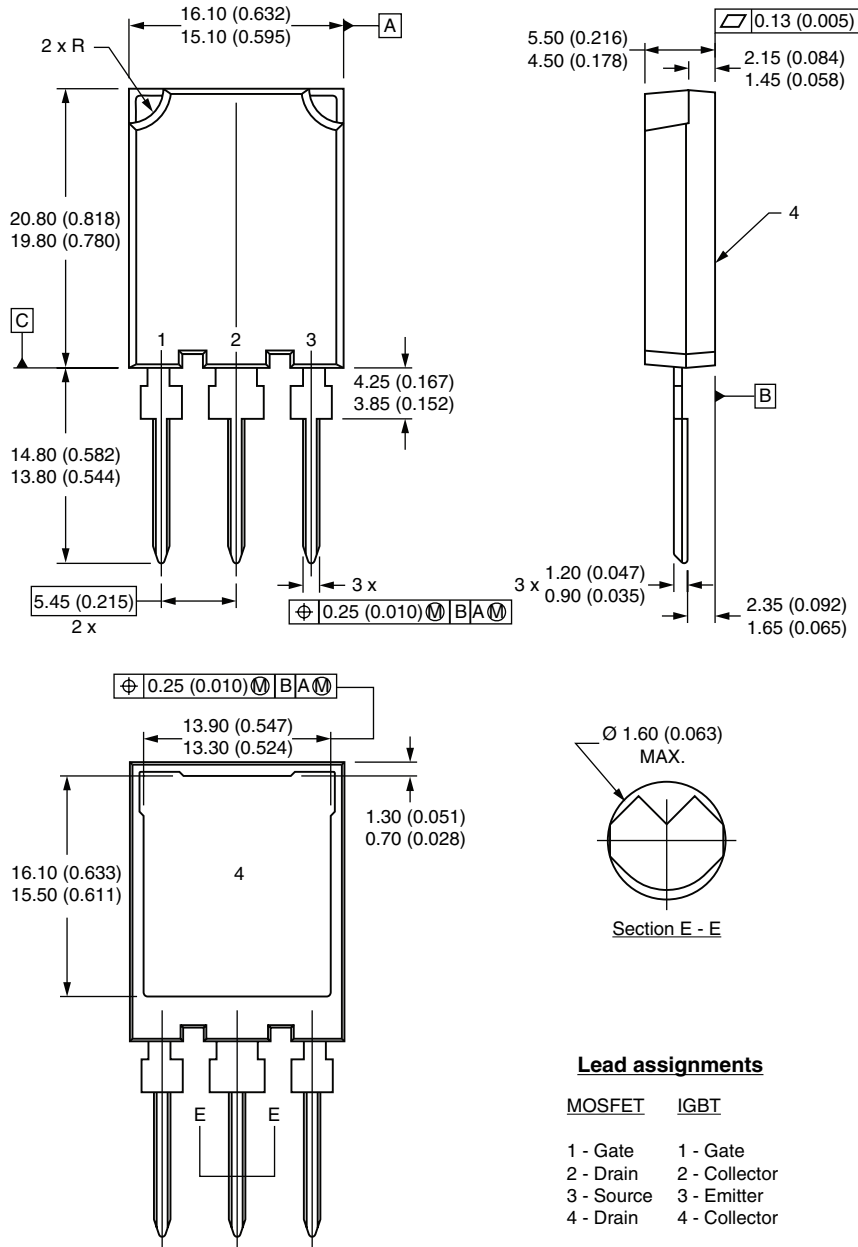
12 = 1200 V
16 = 1600 V
- 7** - PbF = Lead (Pb)-free

ORDERING INFORMATION (example)			
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-70TPS12PbF	25	500	Antistatic plastic tube
VS-70TPS16PbF	25	500	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95073
Part marking information	www.vishay.com/doc?95070

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



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