

Vishay High Power Products

Surface Mountable Phase Control SCR, 16 A



PRODUCT SUMMARY		
V _T at 10 A	< 1.4 V	
I _{TSM}	200 A	
V_{RRM}	800/1200 V	

DESCRIPTION/FEATURES

The 16TTS..S High Voltage Series of silicon controlled rectifiers are specifically designed for medium power switching and phase control applications. The glass passivation technology used has reliable operation up to 125 °C junction temperature.

Typical applications are in input rectification (soft start) and these products are designed to be used with Vishay HPP input diodes, switches and output rectifiers which are available in identical package outlines.

This product has been designed and qualified for industrial level.

OUTPUT CURRENT IN TYPICAL APPLICATIONS				
APPLICATIONS	SINGLE-PHASE BRIDGE UNITS			
NEMA FR-4 or G10 glass fabric-based epoxy with 4 oz. (140 μm) copper	2.5	3.5		
Aluminum IMS, R _{thCA} = 15 °C/W	6.3	9.5	А	
Aluminum IMS with heatsink, R _{thCA} = 5 °C/W	14.0	18.5		

Note

• $T_A = 55$ °C, $T_J = 125$ °C, footprint 300 mm²

MAJOR RATINGS AND CHARACTERISTICS				
PARAMETER	TEST CONDITIONS	VALUES	UNITS	
I _{T(AV)}	Sinusoidal waveform	10	Λ	
I _{RMS}		16	A	
V_{RRM}/V_{DRM}		800/1200	V	
I _{TSM}		200	A	
V _T	10 A, T _J = 25 °C	1.4	V	
dV/dt		500	V/µs	
dl/dt		150	A/μs	
T _J		- 40 to 125	°C	

VOLTAGE RATINGS					
PART NUMBER	V _{RRM} , MAXIMUM PEAK REVERSE VOLTAGE V	V _{DRM} , MAXIMUM PEAK DIRECT VOLTAGE V	I _{RRM} /I _{DRM} AT 125 °C mA		
16TTS08S	800	10			
16TTS12S	1200	1200	10		

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ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
PARAMETER	STIVIBUL	TEST CONDITIONS	TYP. MAX.	UNITS
Maximum average on-state current	I _{T(AV)}	T _C = 98 °C, 180° conduction, half sine wave	10	
Maximum RMS on-state current	I _{RMS}		16	A
Maximum peak, one-cycle,		10 ms sine pulse, rated V _{RRM} applied	170	A
non-repetitive surge current	I _{TSM}	10 ms sine pulse, no voltage reapplied	200	
Maximum 124 for fusing	l ² t	10 ms sine pulse, rated V _{RRM} applied	144	A ² s
Maximum I ² t for fusing	1-1	10 ms sine pulse, no voltage reapplied	200	A-S
Maximum I $^2\sqrt{t}$ for fusing	l²√t	t = 0.1 to 10 ms, no voltage reapplied	2000	A²√s
Maximum on-state voltage drop	V_{TM}	10 A, T _J = 25 °C	1.4	V
On-state slope resistance	r _t	r _t T 105 °C		mΩ
Threshold voltage	V _{T(TO)}	T _J = 125 °C	1.1	V
Marine we was and disease leading at		T _J = 25 °C	0.5	
Maximum reverse and direct leakage current	I _{RM} /I _{DM}	$T_{J} = 125 ^{\circ}\text{C}$ $V_{R} = \text{Rated } V_{RRM}/V_{DRM}$	10	
Holding current	I _H	Anode supply = 6 V, resistive load, initial I _T = 1 A	- 100	mA
Maximum latching current	ΙL	Anode supply = 6 V, resistive load	200	
Maximum rate of rise of off-state voltage	dV/dt		500	V/µs
Maximum rate of rise of turned-on current	dl/dt		150	A/μs

TRIGGERING				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum peak gate power	P_{GM}		8.0	w
Maximum average gate power	P _{G(AV)}		2.0	7 **
Maximum peak positive gate current	+ I _{GM}		1.5	Α
Maximum peak negative gate voltage	- V _{GM}		10	V
	I _{GT}	Anode supply = 6 V, resistive load, T _J = - 10 °C	90	mA V
Maximum required DC gate current to trigger		Anode supply = 6 V, resistive load, T _J = 25 °C	60	
		Anode supply = 6 V, resistive load, T _J = 125 °C	35	
Maximum required DC gate voltage to trigger	V _{GT}	Anode supply = 6 V, resistive load, T _J = - 10 °C	3.0	
		Anode supply = 6 V, resistive load, T _J = 25 °C	2.0	
		Anode supply = 6 V, resistive load, T _J = 125 °C	1.0]
Maximum DC gate voltage not to trigger	V_{GD}	$T_{J} = 125 ^{\circ}\text{C}, V_{\text{DRM}} = \text{Rated value} $		
Maximum DC gate current not to trigger	I _{GD}			mA

SWITCHING				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Typical turn-on time	t _{gt}	T _J = 25 °C	0.9	
Typical reverse recovery time	t _{rr}	T _{.1} = 125 °C	4	μs
Typical turn-off time	tq	1 1 1 1 2 5 6	110	



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THERMAL AND MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS	
Maximum junction and storage temperature range	T _J , T _{Stg}		- 40 to 125	°C	
Soldering temperature	T _S	For 10 s (1.6 mm from case)	240		
Maximum thermal resistance, junction to case	R _{thJC}	DC operation	1.3	°C/W	
Typical thermal resistance, junction to ambient	R _{thJA}	PCB mount (1)	40	C/VV	
Approximate weight			2	g	
Approximate weight			0.07	OZ.	
Marking device		Case style D ² PAK (SMD-220)	16TTS	16TTS08S	
			16TTS	16TTS12S	

Note

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 $^{^{(1)}}$ When mounted on 1" square (650 mm²) PCB of FR-4 or G-10 material 4 oz. (140 μm) copper 40 °C/W. For recommended footprint and soldering techniques refer to application note #AN-994.

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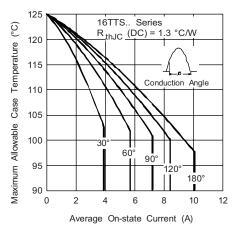


Fig. 1 - Current Rating Characteristics

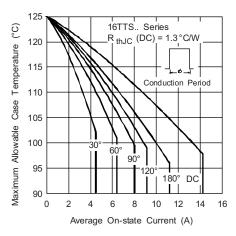


Fig. 2 - Current Rating Characteristics

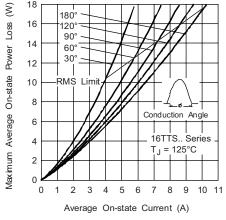


Fig. 3 - On-State Power Loss Characteristics

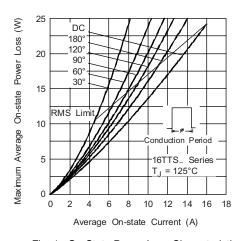


Fig. 4 - On-State Power Loss Characteristics

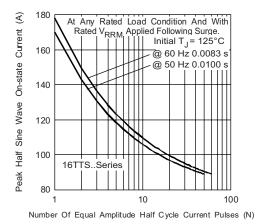


Fig. 5 - Maximum Non-Repetitive Surge Current

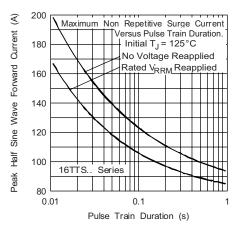


Fig. 6 - Maximum Non-Repetitive Surge Current



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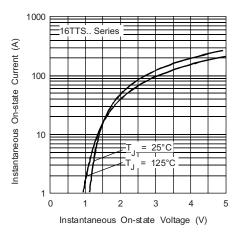


Fig. 7 - On-State Voltage Drop Characteristics

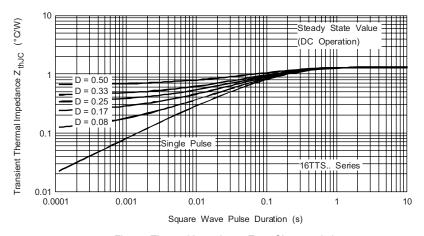


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

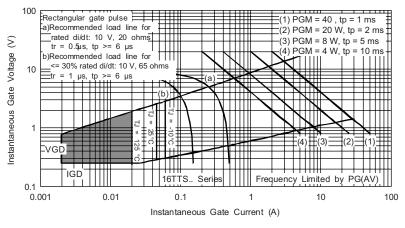


Fig. 9 - Gate Characteristics

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ORDERING INFORMATION TABLE

1 - Current rating

2 - Circuit configuration:

T = Single thyristor

3 - Package:

T = TO-220AC

4 - Type of silicon:

S = Standard recovery rectifier

5 - Voltage rating: Voltage code x 100 = V_{RRM} — 08 = 800 V 12 = 1200 V

- S = TO-220 D²PAK (SMD-220) version

7 - • None = Tube

• TRL = Tape and reel (left oriented)

• TRR = Tape and reel (right oriented)

8 - • None = Standard production

• PbF = Lead (Pb)-free

LINKS TO RELATED DOCUMENTS			
Dimensions http://www.vishay.com/doc?95046			
Part marking information	http://www.vishay.com/doc?95054		
Packaging information	http://www.vishay.com/doc?95032		



Vishay

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