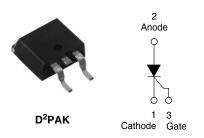


Vishay High Power Products

# Surface Mountable Phase Control SCR, 16 A



PRODUCT SUMMARY						
$V_{T}$ at 10 A	< 1.4 V					
I <sub>TSM</sub>	200 A					
V <sub>RRM</sub>	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	THREE-PHASE BRIDGE	UNITS					
NEMA FR-4 or G10 glass fabric-based epoxy with 4 oz. (140 $\mu m)$ copper	2.5	3.5						
Aluminum IMS, R <sub>thCA</sub> = 15 °C/W	6.3	9.5	A					
Aluminum IMS with heatsink, $R_{thCA} = 5 \ ^{\circ}C/W$	14.0	18.5						

Note

•  $T_A = 55 \ ^{\circ}C$ ,  $T_J = 125 \ ^{\circ}C$ , footprint 300 mm<sup>2</sup>

### MAJOR RATINGS AND CHARACTERISTICS

MAUON NATINGS AND CHANACTERISTICS								
PARAMETER	TEST CONDITIONS	VALUES	UNITS					
I <sub>T(AV)</sub>	Sinusoidal waveform	10	٨					
I <sub>RMS</sub>		16	A					
V <sub>RRM</sub> /V <sub>DRM</sub>		800/1200	V					
I <sub>TSM</sub>		200	А					
V <sub>T</sub>	10 A, T <sub>J</sub> = 25 °C	1.4	V					
dV/dt		500	V/µs					
dl/dt		150	A/µs					
TJ		- 40 to 125	°C					

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

### Vishay High Power Products Surface Mountable Phase Control SCR, 16 A

ABSOLUTE MAXIMUM RATIN	GS					
PARAMETER	SYMBOL		TEST CONDITIONS	VALUES		UNITS
FANAMETEN	STWBOL		TEST CONDITIONS			UNITS
Maximum average on-state current	I <sub>T(AV)</sub>	T <sub>C</sub> = 98 °C, 1	180° conduction, half sine wave	1	0	
Maximum RMS on-state current	I <sub>RMS</sub>			1	6	^
Maximum peak, one-cycle,	l	10 ms sine p	ulse, rated V <sub>RRM</sub> applied	170		- A
non-repetitive surge current	I <sub>TSM</sub>	10 ms sine p	ulse, no voltage reapplied	200		
Maximum 12t for fusing	l <sup>2</sup> t	10 ms sine pulse, rated $V_{RRM}$ applied			144	
Maximum I <sup>2</sup> t for fusing	1-1	10 ms sine pulse, no voltage reapplied			0	A <sup>2</sup> s
Maximum I <sup>2</sup> $\sqrt{t}$ for fusing	l²√t	t = 0.1 to 10 ms, no voltage reapplied			00	A²√s
Maximum on-state voltage drop	$V_{TM}$	10 A, T <sub>J</sub> = 25 °C		1.	4	V
On-state slope resistance	r <sub>t</sub>	T <sub>.1</sub> = 125 °C		24	.0	mΩ
Threshold voltage	V <sub>T(TO)</sub>	1j=125 C		1.	1	V
Maximum reverse and direct leakage current	1 4	T <sub>J</sub> = 25 °C	$\mathcal{N} = Poted \mathcal{N} = \mathcal{N}$	0.	5	
Maximum reverse and direct leakage current	I <sub>RM</sub> /I <sub>DM</sub>	T <sub>J</sub> = 125 °C	V <sub>R</sub> = Rated V <sub>RRM</sub> /V <sub>DRM</sub>	10	0	mA
Holding current	Ι <sub>Η</sub>	Anode supply = 6 V, resistive load, initial $I_T = 1 A$ -		-	100	ША
Maximum latching current	١ <sub>L</sub>	Anode supply = 6 V, resistive load 200		00		
Maximum rate of rise of off-state voltage	dV/dt	500		00	V/µs	
Maximum rate of rise of turned-on current	dl/dt			15	60	A/µs

TRIGGERING					
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS	
Maximum peak gate power	P <sub>GM</sub>		8.0	w	
Maximum average gate power	P <sub>G(AV)</sub>		2.0	vv	
Maximum peak positive gate current	+ I <sub>GM</sub>		1.5	А	
Maximum peak negative gate voltage	- V <sub>GM</sub>		10	V	
Maximum required DC gate current to trigger	I <sub>GT</sub>	Anode supply = 6 V, resistive load, $T_J$ = - 10 °C	90	mA	
		Anode supply = 6 V, resistive load, $T_J = 25 \ ^{\circ}C$	60		
		Anode supply = 6 V, resistive load, $T_J$ = 125 °C	35		
	V <sub>GT</sub>	Anode supply = 6 V, resistive load, $T_J$ = - 10 °C	3.0		
Maximum required DC gate voltage to trigger		Anode supply = 6 V, resistive load, $T_J = 25 \degree C$ 2.4		v	
voltage to trigger		Anode supply = 6 V, resistive load, $T_J$ = 125 °C	1.0	v	
Maximum DC gate voltage not to trigger	$V_{GD}$	T = 125 % $V = -$ Poted value	0.25	1	
Maximum DC gate current not to trigger	I <sub>GD</sub>	$T_{\rm J}$ = 125 °C, V <sub>DRM</sub> = Rated value		mA	

SWITCHING							
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS			
Typical turn-on time	t <sub>gt</sub>	$T_J = 25 \ ^{\circ}C$	0.9				
Typical reverse recovery time	t <sub>rr</sub>	T <sub>.1</sub> = 125 °C	4	μs			
Typical turn-off time	tq	1j=125 C	110				





#### Surface Mountable Phase Vishay High Power Products Control SCR, 16 A

THERMAL AND MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS		
Maximum junction and storage temperature range	T <sub>J</sub> , T <sub>Stg</sub>		- 40 to 125	°C		
Soldering temperature	T <sub>S</sub>	For 10 s (1.6 mm from case)	240			
Maximum thermal resistance, junction to case	R <sub>thJC</sub>	DC operation	1.3	°C/W		
Typical thermal resistance, junction to ambient	R <sub>thJA</sub>	PCB mount <sup>(1)</sup>	40	- 0/10		
Approvimeto weight			2	g		
Approximate weight			0.07	oz.		
Mandala and a characteria		Case style D <sup>2</sup> PAK (SMD-220)	16TTS	08S		
Marking device		Case sigle D-FAR (SMD-220)	16TTS	16TTS12S		

Note

<sup>(1)</sup> When mounted on 1" square (650 mm<sup>2</sup>) 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.

### Vishay High Power Products Surface Mountable Phase Control SCR, 16 A

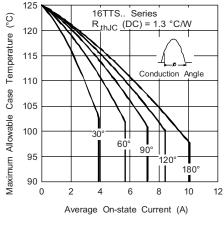


Fig. 1 - Current Rating Characteristics

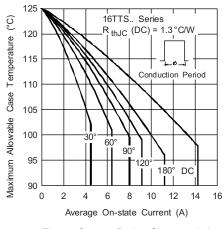


Fig. 2 - Current Rating Characteristics

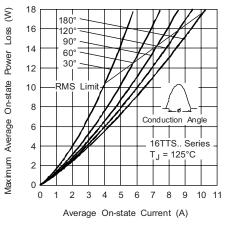


Fig. 3 - On-State Power Loss Characteristics

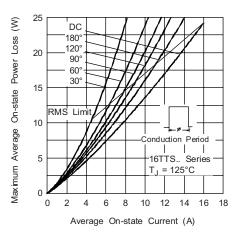


Fig. 4 - On-State Power Loss Characteristics

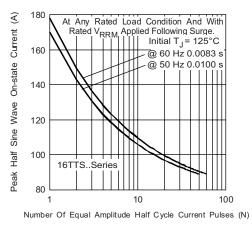


Fig. 5 - Maximum Non-Repetitive Surge Current

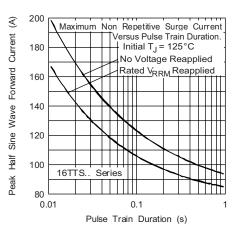


Fig. 6 - Maximum Non-Repetitive Surge Current



Surface Mountable Phase Vishay High Power Products Control SCR, 16 A

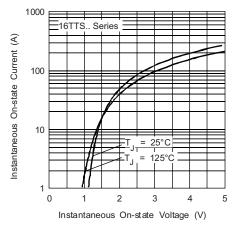
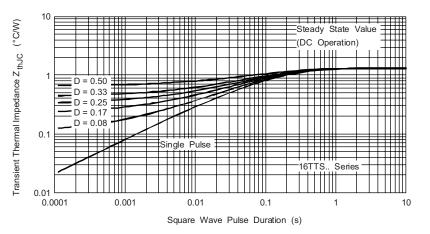
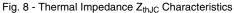


Fig. 7 - On-State Voltage Drop Characteristics





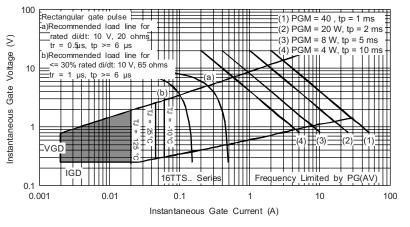


Fig. 9 - Gate Characteristics

Vishay High Power Products Surface Mountable Phase Control SCR, 16 A



### ORDERING INFORMATION TABLE

Device code	16	т	т	S	12	S	TRL	-	
		2	3	4	5	6	7	8	1
	1 - 2 -		rent rati	ng iguratior	n:				
	3	Pac	T = Single thyristor Package: T = TO-220AC						
	4	- Тур	e of silic	con:		ifier			
	5 - 6 -	- Volt	S = Standard recovery rectifier Voltage rating: Voltage code x 100 = $V_{RRM}$ 08 = 800 V S = TO-220 D <sup>2</sup> PAK (SMD-220) version 12 = 1200 V						
	7		<ul> <li>None = Tube</li> <li>TRL = Tape and reel (left oriented)</li> </ul>						
		• TF	RR = Tap	be and r	eel (righ	nt orient	,		
	8 -			andard id (Pb)-f	-	ion			

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				



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