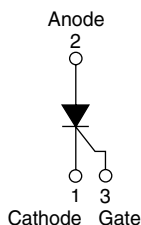


## Surface Mountable Phase Control SCR, 16 A



D<sup>2</sup>PAK



### DESCRIPTION/FEATURES

The 25TTS...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.

### PRODUCT SUMMARY

$V_T$ at 16 A	< 1.25 V
$I_{TSM}$	300 A
$V_{RRM}$	800 to 1600 V

### 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	3.5	5.5	A
Aluminum IMS, $R_{thCA} = 15$ °C/W	8.5	13.5	
Aluminum IMS with heatsink, $R_{thCA} = 5$ °C/W	16.5	25.0	

#### Note

- $T_A = 55$  °C,  $T_J = 125$  °C, footprint 300 mm<sup>2</sup>

### MAJOR RATINGS AND CHARACTERISTICS

PARAMETER	TEST CONDITIONS	VALUES	UNITS
$I_{T(AV)}$	Sinusoidal waveform	16	A
$I_{RMS}$		25	
$V_{RRM}/V_{DRM}$		800 to 1600	V
$I_{TSM}$		300	A
$V_T$	16 A, $T_J = 25$ °C	1.25	V
$dV/dt$		500	V/ $\mu$ s
$dI/dt$		150	A/ $\mu$ s
$T_J$		- 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
25TTS08S	800	800	10
25TTS12S	1200	1200	
25TTS16S	1600	1600	

# 25TTS...S High Voltage Series



Vishay High Power Products Surface Mountable Phase  
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ABSOLUTE MAXIMUM RATINGS						
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES		UNITS
				TYP.	MAX.	
Maximum average on-state current	$I_{T(AV)}$	$T_C = 93\text{ }^{\circ}\text{C}$ , 180° conduction half sine wave		16		A
Maximum RMS on-state current	$I_{RMS}$			25		
Maximum peak, one-cycle, non-repetitive surge current	$I_{TSM}$	10 ms sine pulse, rated $V_{RRM}$ applied		300		
		10 ms sine pulse, no voltage reapplied		350		
Maximum $I^2t$ for fusing	$I^2t$	10 ms sine pulse, rated $V_{RRM}$ applied		450		$A^2s$
		10 ms sine pulse, no voltage reapplied		630		
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1$ to 10 ms, no voltage reapplied		6300		$A^2\sqrt{s}$
Maximum on-state voltage drop	$V_{TM}$	16 A, $T_J = 25\text{ }^{\circ}\text{C}$		1.25		V
On-state slope resistance	$r_t$	$T_J = 125\text{ }^{\circ}\text{C}$		12.0		$m\Omega$
Threshold voltage	$V_{T(TO)}$			1.0		V
Maximum reverse and direct leakage current	$I_{RM}/I_{DM}$	$T_J = 25\text{ }^{\circ}\text{C}$	$V_R = \text{Rated } V_{RRM}/V_{DRM}$	0.5		mA
		$T_J = 125\text{ }^{\circ}\text{C}$		10		
Holding current	$I_H$	25TTS08, 25TTS12	Anode supply = 6 V, resistive load, initial $I_T = 1\text{ A}$	-	100	
		25TTS16		100	150	
Maximum latching current	$I_L$	Anode supply = 6 V, resistive load		200		
Maximum rate of rise of off-state voltage	$dV/dt$			500		V/ $\mu s$
Maximum rate of rise of turned-on current	$dI/dt$			150		A/ $\mu s$

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	
Maximum peak positive gate current	+ I <sub>GM</sub>		1.5	A
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 <sub>J</sub> = - 10 °C	60	mA
		Anode supply = 6 V, resistive load, T <sub>J</sub> = 25 °C	45	
		Anode supply = 6 V, resistive load, T <sub>J</sub> = 125 °C	20	
Maximum required DC gate voltage to trigger	V <sub>GT</sub>	Anode supply = 6 V, resistive load, T <sub>J</sub> = - 10 °C	2.5	V
		Anode supply = 6 V, resistive load, T <sub>J</sub> = 25 °C	2.0	
		Anode supply = 6 V, resistive load, T <sub>J</sub> = 125 °C	1.0	
Maximum DC gate voltage not to trigger	V <sub>GD</sub>	T <sub>J</sub> = 125 °C, V <sub>DRM</sub> = Rated value	0.25	mA
Maximum DC gate current not to trigger	I <sub>GD</sub>		2.0	

SWITCHING				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Typical turn-on time	t <sub>gt</sub>	T <sub>J</sub> = 25 °C	0.9	μs
Typical reverse recovery time	t <sub>rr</sub>	T <sub>J</sub> = 125 °C	4	
Typical turn-off time	t <sub>q</sub>		110	



## 25TTS...S High Voltage Series

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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	1.1	°C/W
Typical thermal resistance, junction to ambient (PCB mount)	$R_{thJA}^{(1)}$		40	
Approximate weight			2	g
			0.07	oz.
Marking device		Case style D <sup>2</sup> PAK (SMD-220)	25TTS08S	
			25TTS12S	
			25TTS16S	

### 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

# 25TTS...S High Voltage Series

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

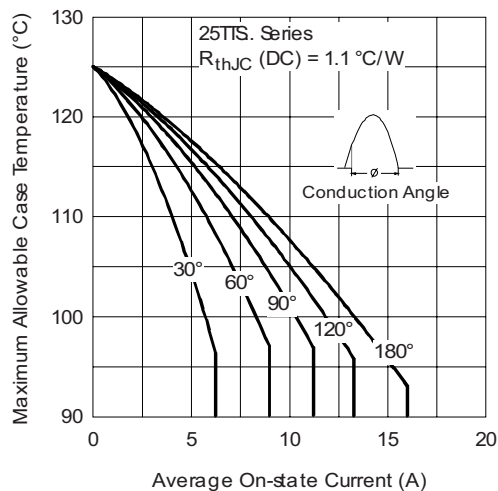


Fig. 1 - Current Rating Characteristics

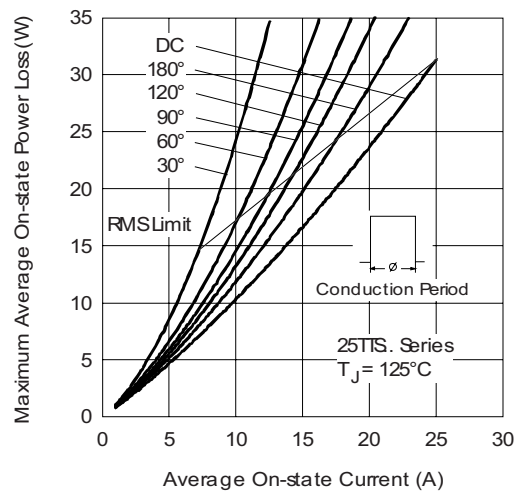


Fig. 4 - On-State Power Loss Characteristics

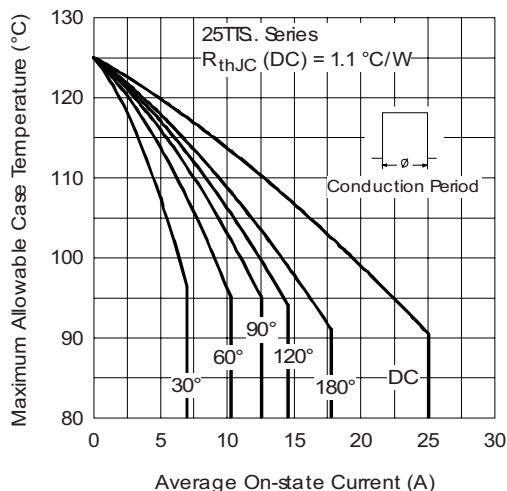


Fig. 2 - Current Rating Characteristics

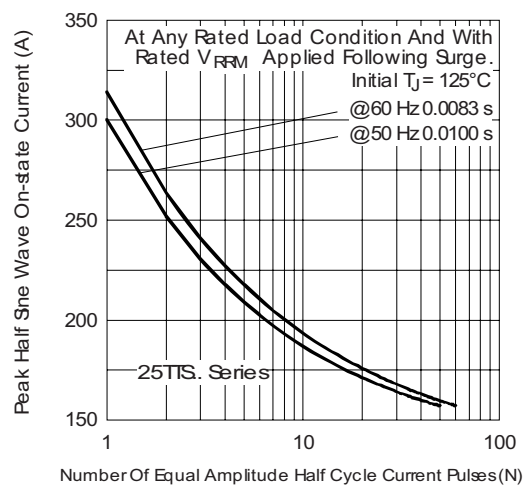


Fig. 5 - Maximum Non-Repetitive Surge Current

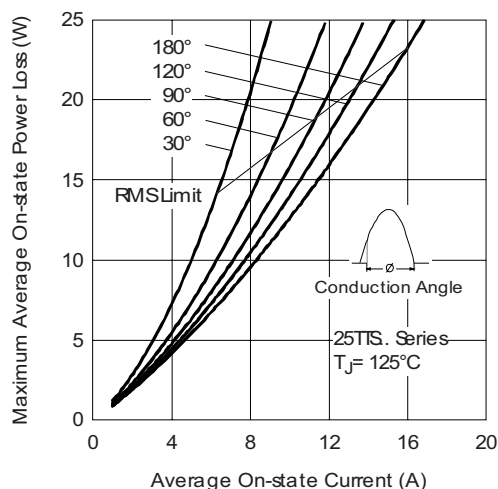


Fig. 3 - On-State Power Loss Characteristics

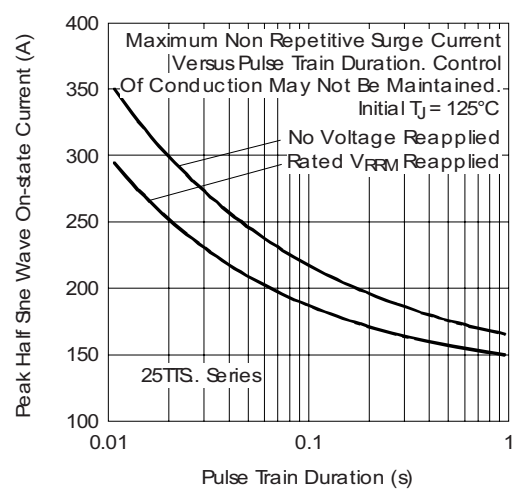


Fig. 6 - Maximum Non-Repetitive Surge Current



## 25TTS...S High Voltage Series

Surface Mountable Phase  
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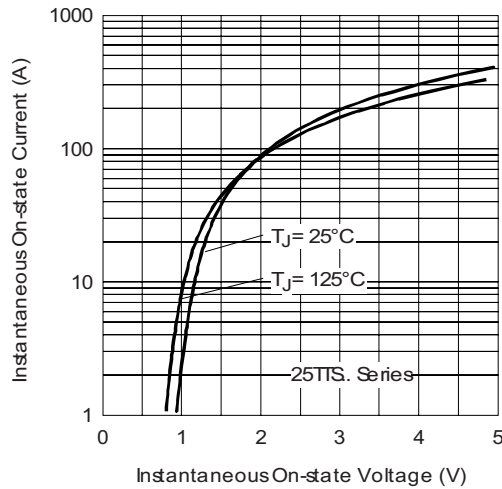


Fig. 7 - On-State Voltage Drop Characteristics

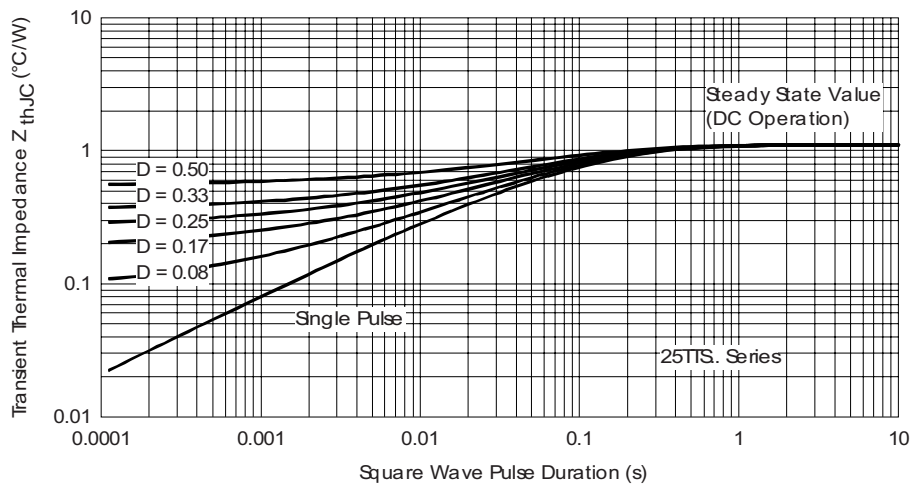


Fig. 8 - Gate Characteristics

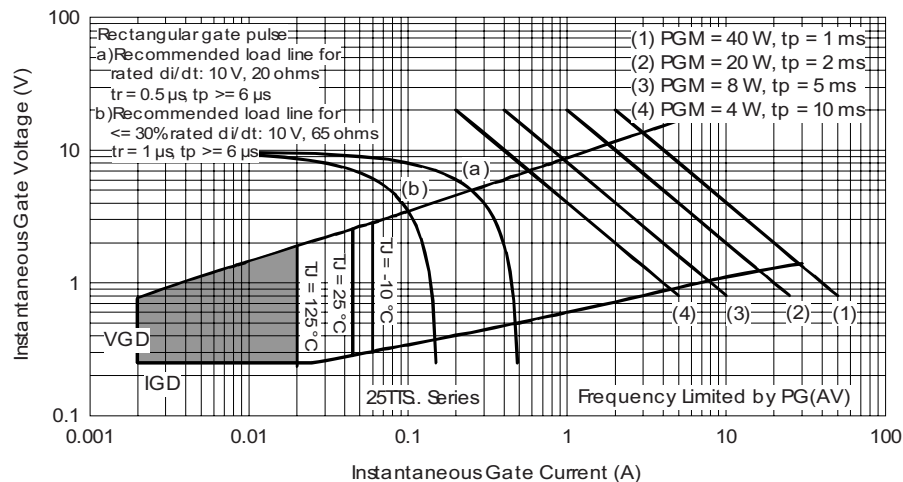


Fig. 9 - Thermal Impedance  $Z_{thJC}$  Characteristics

# 25TTS...S High Voltage Series

Vishay High Power Products Surface Mountable Phase  
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## ORDERING INFORMATION TABLE

Device code	25	T	T	S	16	S	TRL	-
	1	2	3	4	5	6	7	8
1	-	Current rating (25 = 25 A)						
2	-	Circuit configuration: T = Single thyristor						
3	-	Package: T = TO-220AC						
4	-	Type of silicon: Standard recovery rectifier						
5	-	Voltage code x 100 = $V_{RRM}$						
6	-	S = TO-220 D <sup>2</sup> PAK (SMD-220) version						
7	-	<ul style="list-style-type: none"><li>• None = Tube</li><li>• TRL = Tape and reel (left oriented)</li><li>• TRR = Tape and reel (right oriented)</li></ul>						
8	-	<ul style="list-style-type: none"><li>• None = Standard production</li><li>• PbF = Lead (Pb)-free</li></ul>						

08 = 800 V  
12 = 1200 V  
16 = 1600 V

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95046">http://www.vishay.com/doc?95046</a>
Part marking information	<a href="http://www.vishay.com/doc?95054">http://www.vishay.com/doc?95054</a>
Packaging information	<a href="http://www.vishay.com/doc?95032">http://www.vishay.com/doc?95032</a>



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