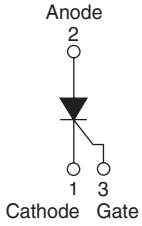
Surface Mountable Phase Control SCR, 16 A

D²PAK



FEATURES

- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Compliant to RoHS directive 2002/95/EC
- Halogen-free according to IEC 61249-2-21 definition
- Designed and qualified for industrial level

RoHS COMPLIANT
HALOGEN FREE

APPLICATIONS

- Input rectification (soft start)
- Vishay input diodes, switches and output rectifiers which are available in identical package outlines

DESCRIPTION

The VS-25TTS...SPbF 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.

PRODUCT SUMMARY	
V_T at 16 A	< 1.25 V
I_{TSM}	300 A
V_{RRM}	800 V 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 µm) 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 mm²

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/µs
dI/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
VS-25TTS08SPbF	800	800	10
VS-25TTS12SPbF	1200	1200	
VS-25TTS16SPbF	1600	1600	

For technical questions within your region, please contact one of the following:
DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES TYP.	VALUES MAX.	UNITS
Maximum average on-state current	$I_{T(AV)}$	T_C = 93 °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 ms to 10 ms, no voltage reapplied		6300		$A^2\sqrt{s}$
Maximum on-state voltage drop	V_{TM}	16 A, T_J = 25 °C		1.25		V
On-state slope resistance	r_t	T_J = 125 °C		12.0		mΩ
Threshold voltage	$V_{T(TO)}$			1.0		V
Maximum reverse and direct leakage current	I_{RM}/I_{DM}	T_J = 25 °C	V_R = Rated V_{RRM}/V_{DRM}	0.5		mA
		T_J = 125 °C		10		
Holding current	I_H	VS-25TTS08, VS-25TTS12	Anode supply = 6 V, resistive load, initial I_T = 1 A	-	100	
		VS-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/µs
Maximum rate of rise of turned-on current	dI/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	
Maximum peak positive gate current	+ I_{GM}		1.5	A
Maximum peak negative gate voltage	- V_{GM}		10	V
Maximum required DC gate current to trigger	I_{GT}	Anode supply = 6 V, resistive load, T_J = - 10 °C	60	mA
		Anode supply = 6 V, resistive load, T_J = 25 °C	45	
		Anode supply = 6 V, resistive load, T_J = 125 °C	20	
Maximum required DC gate voltage to trigger	V_{GT}	Anode supply = 6 V, resistive load, T_J = - 10 °C	2.5	V
		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 °C, V_{DRM} = Rated value	0.25	
Maximum DC gate current not to trigger	I_{GD}		2.0	mA

SWITCHING

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Typical turn-on time	t_{gt}	T_J = 25 °C	0.9	µs
Typical reverse recovery time	t_{rr}	T_J = 125 °C	4	
Typical turn-off time	t_q		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	1.1	°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^2PAK (SMD-220)	25TTS08S	
			25TTS12S	
			25TTS16S	

Note

(1) When mounted on 1" square (650 mm^2) 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

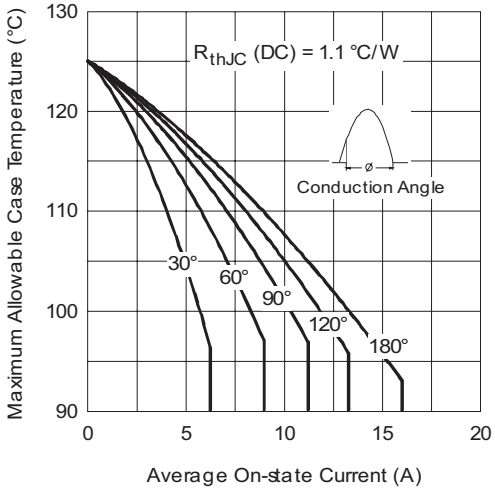

Fig. 1 - Current Rating Characteristics

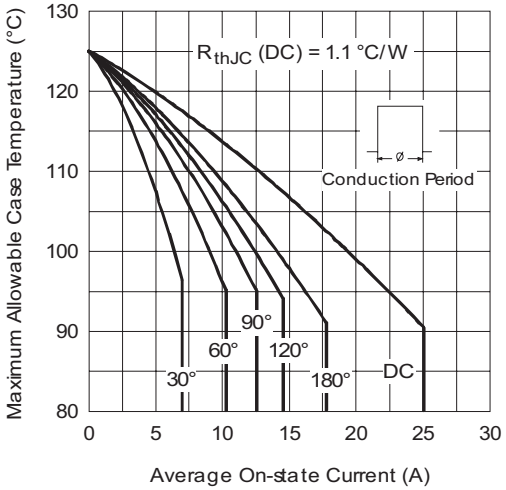

Fig. 2 - Current Rating Characteristics

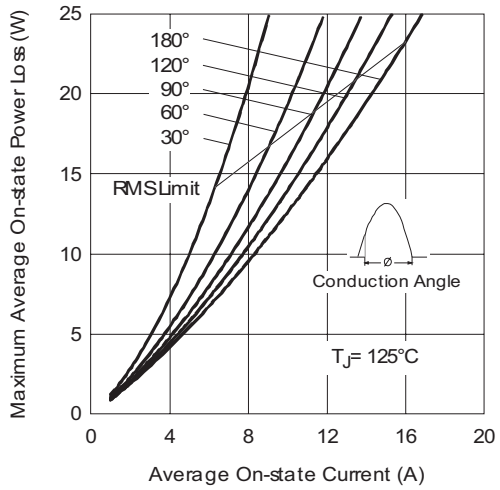

Fig. 3 - On-State Power Loss Characteristics

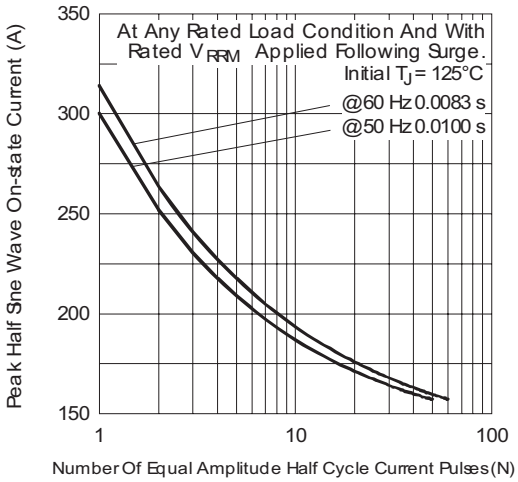

Fig. 5 - Maximum Non-Repetitive Surge Current

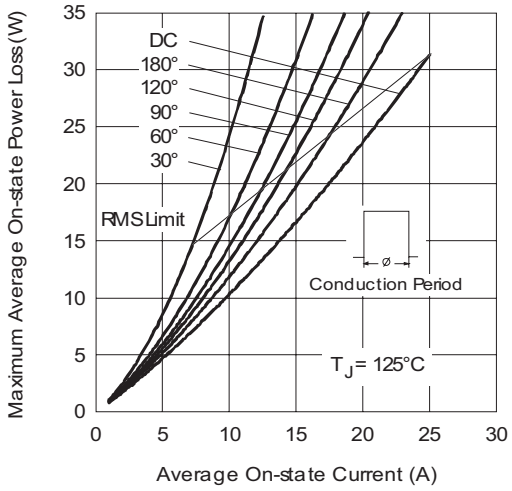

Fig. 4 - On-State Power Loss Characteristics

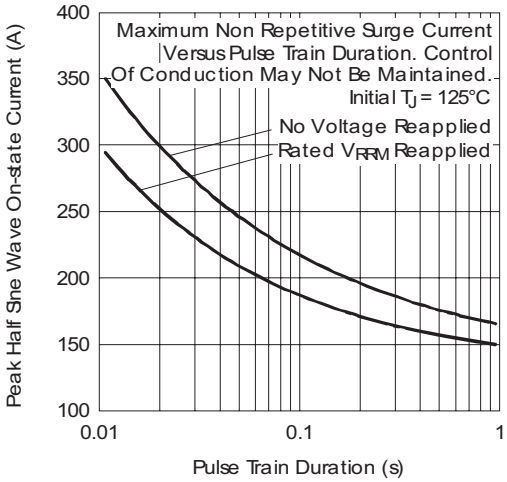

Fig. 6 - Maximum Non-Repetitive Surge Current

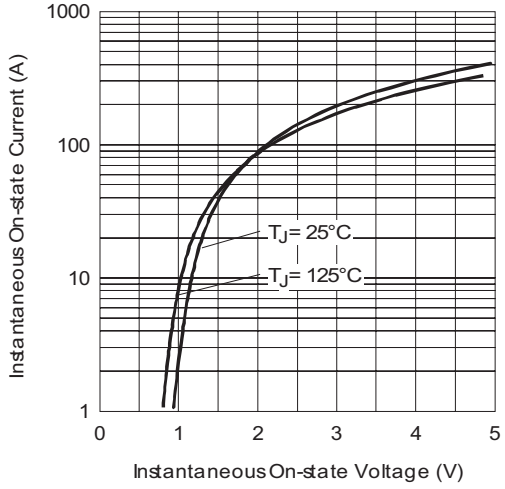

Fig. 7 - On-State Voltage Drop Characteristics

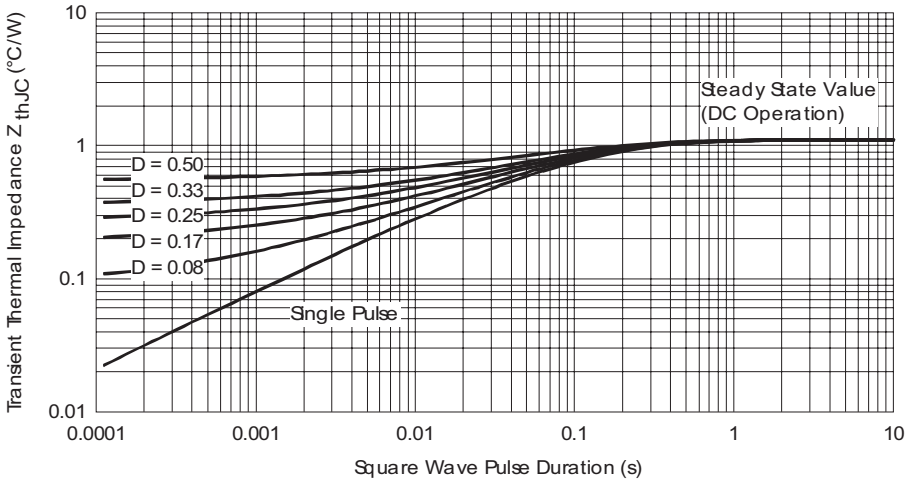

Fig. 8 - Gate Characteristics

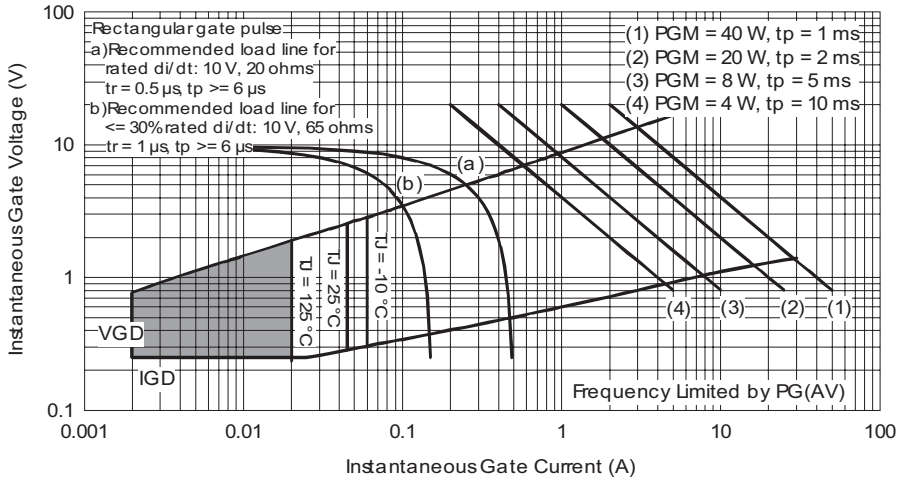

Fig. 9 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

Device code

VS-	25	T	T	S	12	S	TRL	PbF
1	2	3	4	5	6	7	8	9

1 - HPP product suffix

2 - Current rating (25 = 25 A)

3 - Circuit configuration:
T = Single thyristor

4 - Package:
T = TO-220AC

5 - Type of silicon:
S = Standard recovery rectifier

6 - Voltage rating: Voltage code x 100 = V_{RRM}
- 08 = 800 V
- 12 = 1200 V
- 16 = 1600 V

7 - S = TO-220 D^2PAK (SMD-220) version

8 - • None = Tube
• TRL = Tape and reel (left oriented)
• TRR = Tape and reel (right oriented)

9 - PbF = Lead (Pb)-free

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

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