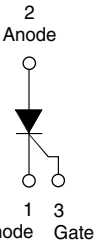
Surface Mountable Phase Control SCR, 16 A

D²PAK



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.

PRODUCT SUMMARY	
V_T at 10 A	< 1.4 V
I_{TSM}	200 A
V_{RRM}	800/1200 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	2.5	3.5	A
Aluminum IMS, R_{thCA} = 15 °C/W	6.3	9.5	
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	A
I_{RMS}		16	
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
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**
16TTS08S	800	800	10
16TTS12S	1200	1200	

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES TYP.	VALUES MAX.	UNITS
Maximum average on-state current	$I_{T(AV)}$	T_C = 98 °C, 180° conduction, half sine wave	10		A
Maximum RMS on-state current	I_{RMS}		16		
Maximum peak, one-cycle, non-repetitive surge current	I_{TSM}	10 ms sine pulse, rated V_{RRM} applied	170		
		10 ms sine pulse, no voltage reapplied	200		
Maximum I^2t for fusing	I^2t	10 ms sine pulse, rated V_{RRM} applied	144		A^2s
		10 ms sine pulse, no voltage reapplied	200		
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reapplied	2000		$A^2\sqrt{s}$
Maximum on-state voltage drop	V_{TM}	10 A, T_J = 25 °C	1.4		V
On-state slope resistance	r_t	T_J = 125 °C	24.0		mΩ
Threshold voltage	$V_{T(TO)}$		1.1		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, V_R = Rated V_{RRM}/V_{DRM}	10		
Holding current	I_H	Anode supply = 6 V, resistive load, initial I_T = 1 A	-	100	
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	90	mA
		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	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	

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	
Approximate weight			2	g
			0.07	oz.
Marking device		Case style D^2PAK (SMD-220)	16TTS08S	
			16TTS12S	

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.

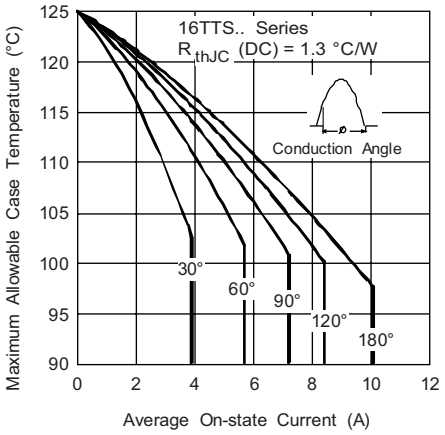


Fig. 1 - Current Rating Characteristics

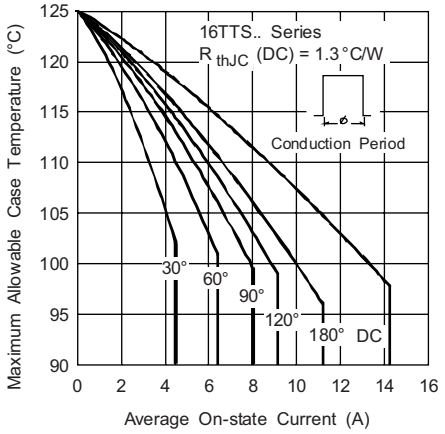


Fig. 2 - Current Rating Characteristics

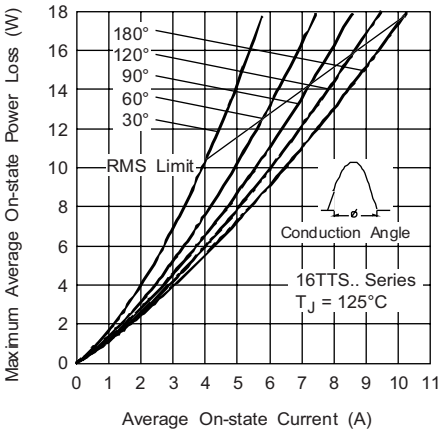


Fig. 3 - On-State Power Loss Characteristics

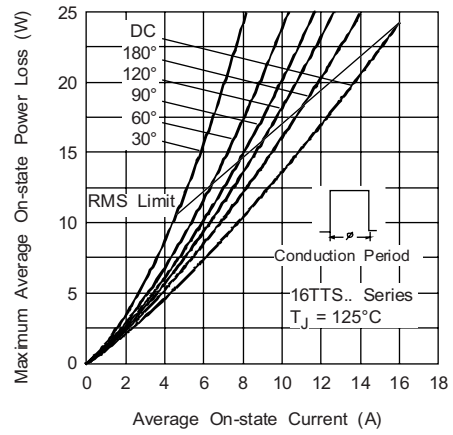


Fig. 4 - On-State Power Loss Characteristics

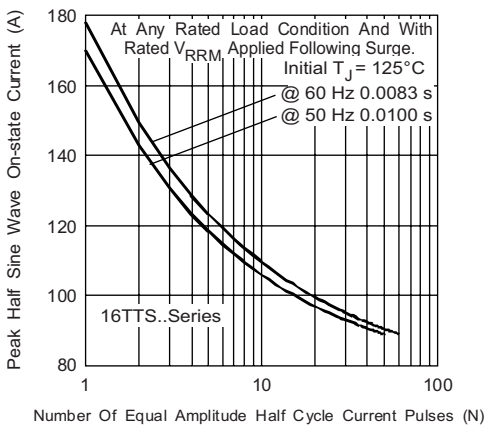


Fig. 5 - Maximum Non-Repetitive Surge Current

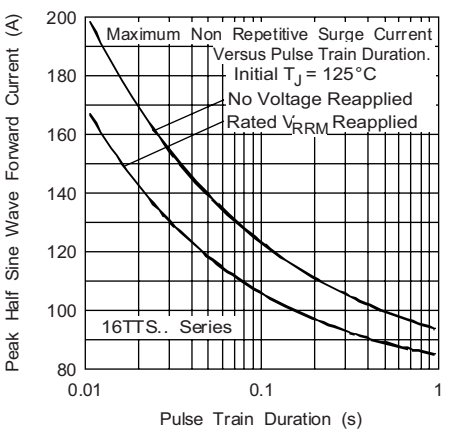


Fig. 6 - Maximum Non-Repetitive Surge Current

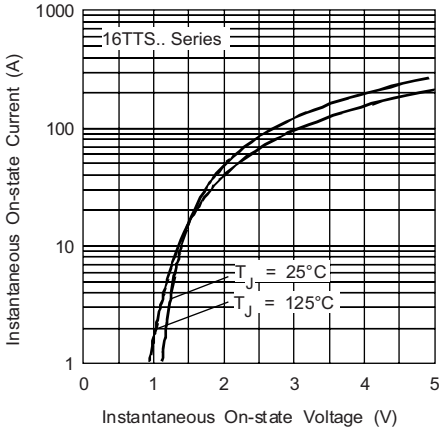


Fig. 7 - On-State Voltage Drop Characteristics

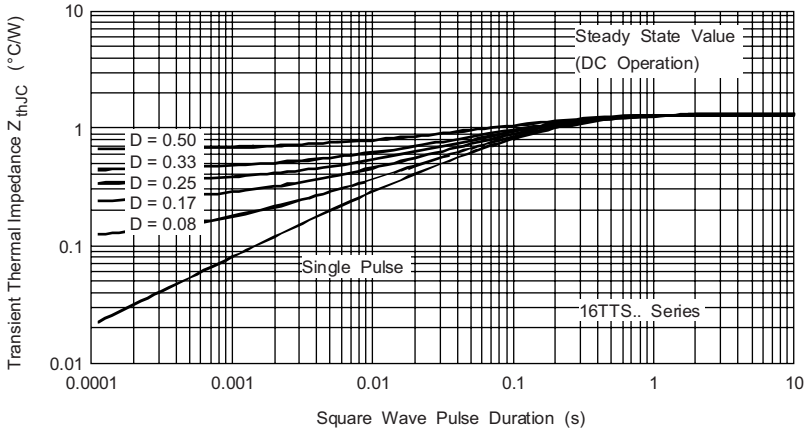


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

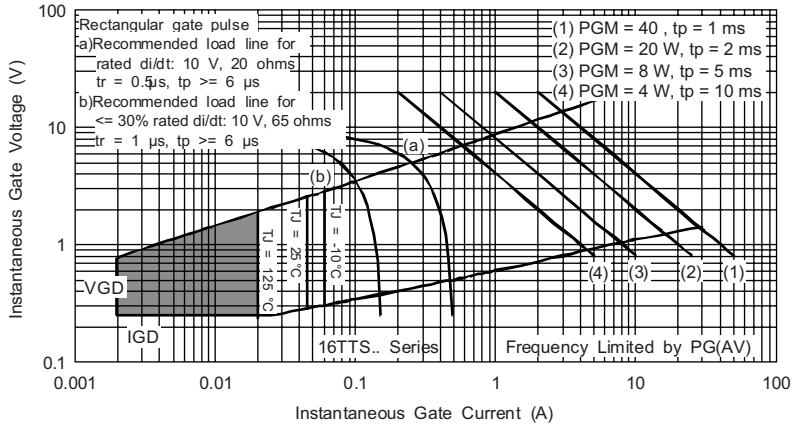


Fig. 9 - Gate Characteristics

ORDERING INFORMATION TABLE

Device code

16	T	T	S	12	S	TRL	-
1	2	3	4	5	6	7	8

- **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)
- **6** - S = TO-220 D^2PAK (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

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