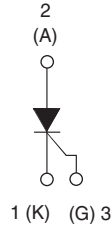


## Phase Control SCR TO-220AB FULL-PAK, 16 A



TO-220AB FULL-PAK



### DESCRIPTION/FEATURES

The 16TTS..FPPbF 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.



RoHS\*  
COMPLIANT

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.

Fully isolated package ( $V_{INS} = 2500 V_{RMS}$ ) is UL E78996 approved

This product has been designed and qualified for industrial level and lead (Pb)-free ("PbF" suffix).

### 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
Capacitive input filter $T_A = 55\text{ °C}$ , $T_J = 125\text{ °C}$ , common heatsink of $1\text{ °C/W}$	13.5	17	A

### MAJOR RATINGS AND CHARACTERISTICS

PARAMETER	TEST CONDITIONS	VALUES	UNITS
$I_{T(AV)}$	Sinusoidal waveform	10	A
$I_{RMS}$		16	
$V_{DRM}/V_{RRM}$	Range, for higher voltage up to 1600 V contact factory	800/1200	V
$I_{TSM}$		200	A
$V_T$	10 A, $T_J = 25\text{ °C}$	1.4	V
dV/dt		500	V/ $\mu$ s
dI/dt		150	A/ $\mu$ s
$T_J$	Range	- 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
16TTS08FPPbF	800	800	10
16TTS12FPPbF	1200	1200	

\* Pb containing terminations are not RoHS compliant, exemptions may apply

# 16TTS..FPPbF High Voltage Series



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ABSOLUTE MAXIMUM RATINGS						
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES		UNITS	
			TYP.	MAX.		
Maximum average on-state current	$I_{T(AV)}$	$T_c = 95\text{ }^\circ\text{C}$ , 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 <sup>2</sup> s	
		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 <sup>2</sup> √s	
Maximum on-state voltage drop	$V_{TM}$	10 A, $T_J = 25\text{ }^\circ\text{C}$	1.4		V	
On-state slope resistance	$r_t$	$T_J = 125\text{ }^\circ\text{C}$	24.0		mΩ	
Threshold voltage	$V_{T(TO)}$		1.1		V	
Maximum reverse and direct leakage current	$I_{RM}/I_{DM}$	$V_R = \text{Rated } V_{RRM}/V_{DRM}$	$T_J = 25\text{ }^\circ\text{C}$	0.5		mA
			$T_J = 125\text{ }^\circ\text{C}$	10		
Holding current	$I_H$	Anode supply = 6 V, resistive load, initial $I_T = 1\text{ A}$ 16TTS08FP, 16TTS12FP	-	100		
Maximum latching current	$I_L$	Anode supply = 6 V, resistive load	200		mA	
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, $T_J = -10\text{ }^\circ\text{C}$	90		mA
		Anode supply = 6 V, resistive load, $T_J = 25\text{ }^\circ\text{C}$	60		
		Anode supply = 6 V, resistive load, $T_J = 125\text{ }^\circ\text{C}$	35		
Maximum required DC gate voltage to trigger	$V_{GT}$	Anode supply = 6 V, resistive load, $T_J = -10\text{ }^\circ\text{C}$	3.0		V
		Anode supply = 6 V, resistive load, $T_J = 25\text{ }^\circ\text{C}$	2.0		
		Anode supply = 6 V, resistive load, $T_J = 125\text{ }^\circ\text{C}$	1.0		
Maximum DC gate voltage not to trigger	$V_{GD}$	$T_J = 125\text{ }^\circ\text{C}$ , $V_{DRM} = \text{Rated value}$	0.2		
Maximum DC gate current not to trigger	$I_{GD}$		2.0		mA

SWITCHING					
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES		UNITS
Typical turn-on time	$t_{gt}$	$T_J = 25\text{ }^\circ\text{C}$	0.9		μs
Typical reverse recovery time	$t_{rr}$	$T_J = 125\text{ }^\circ\text{C}$	4		
Typical turn-off time	$t_q$		110		



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<b>THERMAL AND MECHANICAL SPECIFICATIONS</b>				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	$T_J, T_{Stg}$		- 40 to 125	°C
Maximum thermal resistance, junction to case	$R_{thJC}$	DC operation	1.5	°C/W
Maximum thermal resistance, junction to ambient	$R_{thJA}$		62	
Typical thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, smooth and greased	1.5	
Approximate weight			2	g
			0.07	oz.
Mounting torque	minimum		6 (5)	kgf · cm
	maximum		12 (10)	(lbf · in)
Marking device		Case style TO-220AB FULL-PAK (94/V0)	16TTS08FP	
			16TTS12FP	

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Vishay High Power Products

Phase Control SCR  
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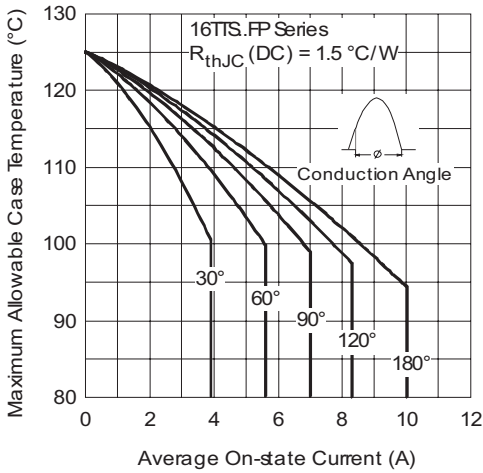


Fig. 1 - Current Rating Characteristics

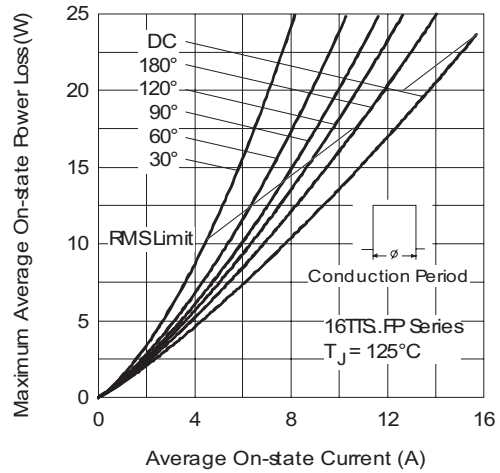


Fig. 4 - On-State Power Loss Characteristics

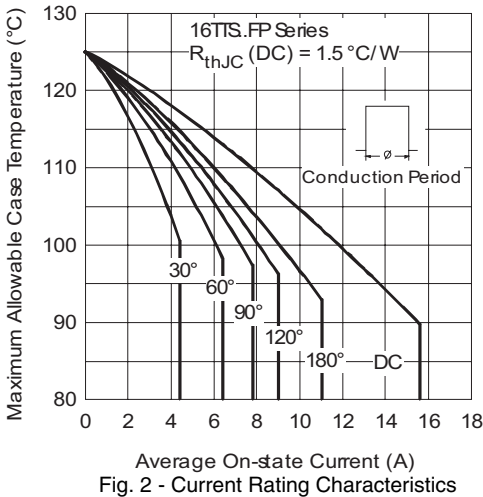


Fig. 2 - Current Rating Characteristics

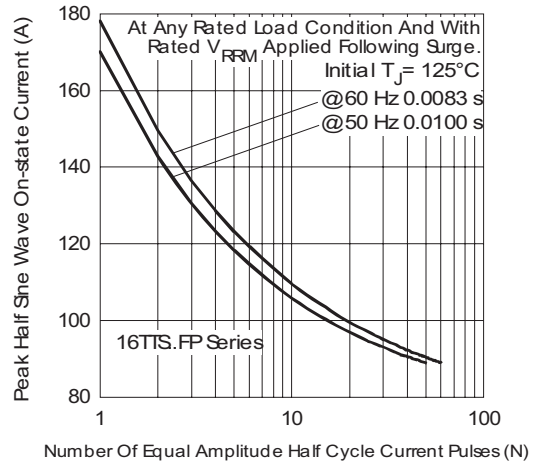


Fig. 5 - Maximum Non-Repetitive Surge Current

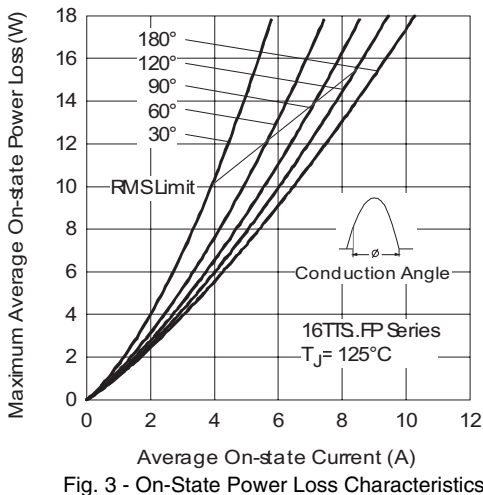


Fig. 3 - On-State Power Loss Characteristics

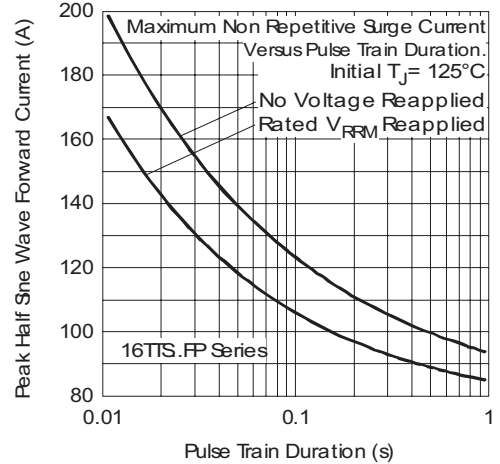


Fig. 6 - Maximum Non-Repetitive Surge Current



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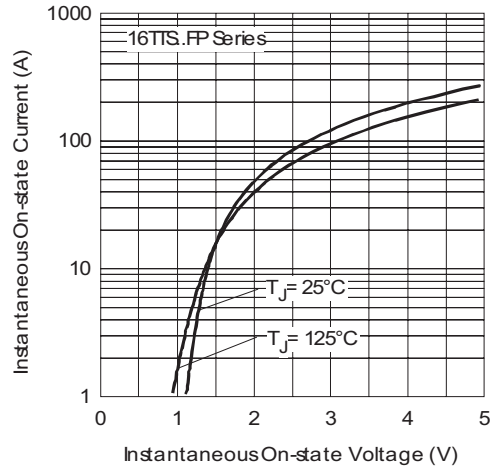


Fig. 7 - On-State Voltage Drop Characteristics

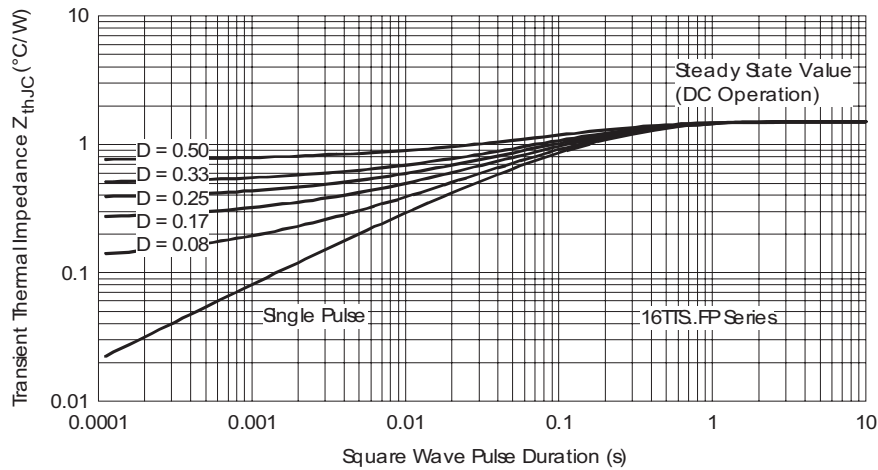


Fig. 8 - Thermal impedance  $Z_{thJC}$  Characteristics

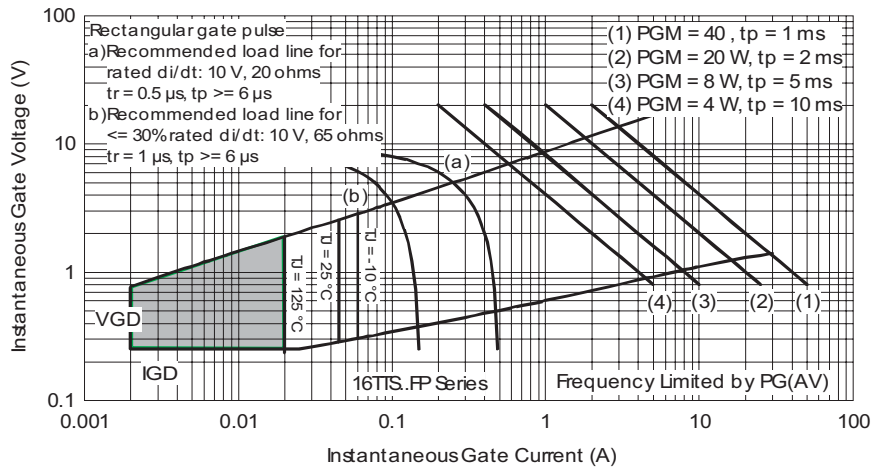


Fig. 9 - Gate Characteristics

# 16TTS..FPPbF High Voltage Series



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## ORDERING INFORMATION TABLE

Device code	16	T	T	S	12	FP	PbF
	①	②	③	④	⑤	⑥	⑦
①	-	Current rating, RMS value					
②	-	Circuit configuration: T = Single thyristor					
③	-	Package: T = TO-220AB					
④	-	Type of silicon: S = Converter grade					
⑤	-	Voltage code x 100 = $V_{RRM}$					08 = 800 V 12 = 1200 V
⑥	-	FULL-PAK					
⑦	-	• None = Standard production • PbF = Lead (Pb)-free					

Note: For higher voltage up to 1600 V contact factory

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95072">http://www.vishay.com/doc?95072</a>
Part marking information	<a href="http://www.vishay.com/doc?95069">http://www.vishay.com/doc?95069</a>



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