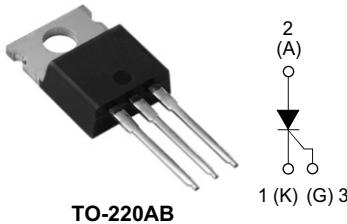


Phase Control SCR, 10 A


PRODUCT SUMMARY

V_T at 10 A	< 1.4 V
I_{TSM}	200 A
V_{RRM}	800/1200 V

DESCRIPTION/FEATURES

The 16TTS..PbF 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.

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

OUTPUT CURRENT IN TYPICAL APPLICATIONS

APPLICATIONS	SINGLE-PHASE BRIDGE	THREE-PHASE BRIDGE	UNITS
Capacitive input filter $T_A = 55$ °C, $T_J = 125$ °C, common heatsink of 1 °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 (1)	800/1200	V
I_{TSM}		200	A
V_T	10 A, $T_J = 25$ °C	1.4	V
dV/dt		500	V/μs
dl/dt		150	A/μs
T_J	Range	- 40 to 125	°C

Note

(1) For higher voltage up to 1600 V contact factory

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
16TTS08PbF	800	800	10
16TTS12PbF	1200	1200	

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

16TTS..PbF High Voltage Series

Vishay High Power Products Phase Control SCR, 10 A



ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES		UNITS
			TYP.	MAX.	
Maximum average on-state current	$I_{T(AV)}$	$T_C = 98^\circ\text{C}$, 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^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		$\text{A}^2\sqrt{\text{s}}$
Maximum on-state voltage drop	V_{TM}	10 A, $T_J = 25^\circ\text{C}$	1.4		V
On-state slope resistance	r_t	$T_J = 125^\circ\text{C}$	24.0		$\text{m}\Omega$
Threshold voltage	$V_{T(TO)}$		1.1		V
Maximum reverse and direct leakage current	I_{RM}/I_{DM}	$T_J = 25^\circ\text{C}$	0.5		
		$T_J = 125^\circ\text{C}$	10		
Holding current	I_H	Anode supply = 6 V, resistive load, initial $I_T = 1$ A 16TTS08PbF, 16TTS12PbF	-	100	mA
Maximum latching current	I_L	Anode supply = 6 V, resistive load	200		
Maximum rate of rise of off-state voltage	dV/dt		500		$\text{V}/\mu\text{s}$
Maximum rate of rise of turned-on current	di/dt		150		$\text{A}/\mu\text{s}$

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, $T_J = -65^\circ\text{C}$	90	mA
		Anode supply = 6 V, resistive load, $T_J = 25^\circ\text{C}$	60	
		Anode supply = 6 V, resistive load, $T_J = 125^\circ\text{C}$	35	
Maximum required DC gate voltage to trigger	V_{GT}	Anode supply = 6 V, resistive load, $T_J = -65^\circ\text{C}$	3.0	V
		Anode supply = 6 V, resistive load, $T_J = 25^\circ\text{C}$	2.0	
		Anode supply = 6 V, resistive load, $T_J = 125^\circ\text{C}$	1.0	
Maximum DC gate voltage not to trigger	V_{GD}	$T_J = 125^\circ\text{C}$, V_{DRM} = Rated value	0.2	mA
Maximum DC gate current not to trigger	I_{GD}		2.0	

SWITCHING

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



16TTS..PbF High Voltage Series

Phase Control SCR, 10 A Vishay High Power Products

THERMAL AND MECHANICAL SPECIFICATIONS

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	1.3	°C/W
Maximum thermal resistance, junction to ambient	R_{thJA}		62	
Typical thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth and greased	0.5	
Approximate weight			2	g
			0.07	oz.
Mounting torque	minimum		6 (5)	kgf · cm (lbf · in)
	maximum		12 (10)	
Marking device		Case style TO-220AB	16TTS08	
			16TTS12	

16TTS..PbF High Voltage Series

Vishay High Power Products Phase Control SCR, 10 A

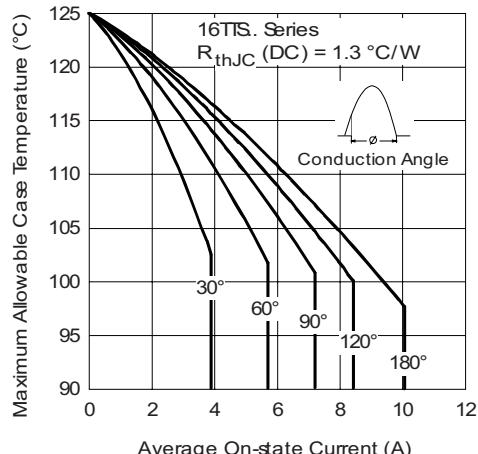


Fig. 1 - Current Rating Characteristics

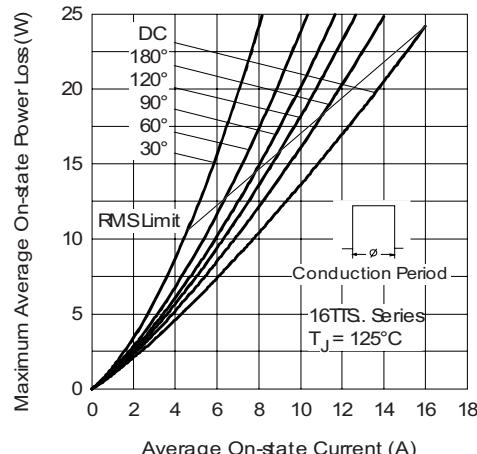


Fig. 4 - On-State Power Loss Characteristics

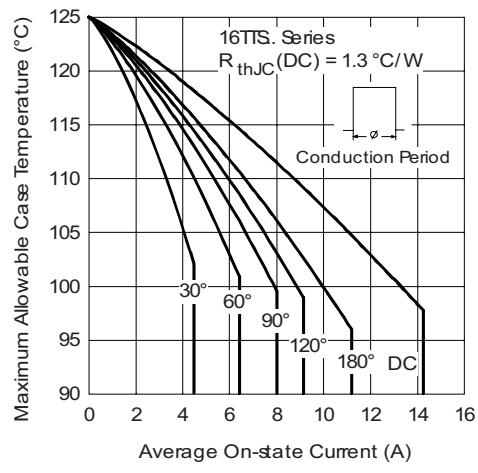


Fig. 2 - Current Rating Characteristics

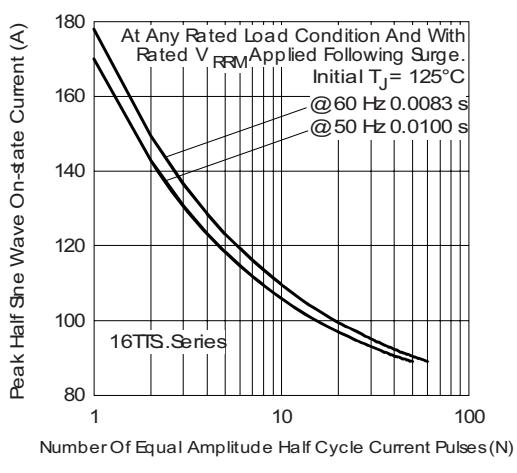


Fig. 5 - Maximum Non-Repetitive Surge Current

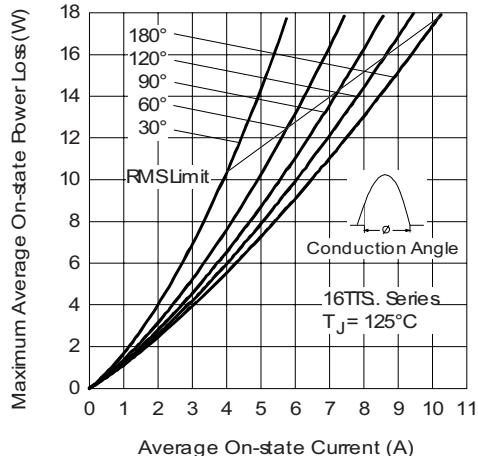


Fig. 3 - On-State Power Loss Characteristics

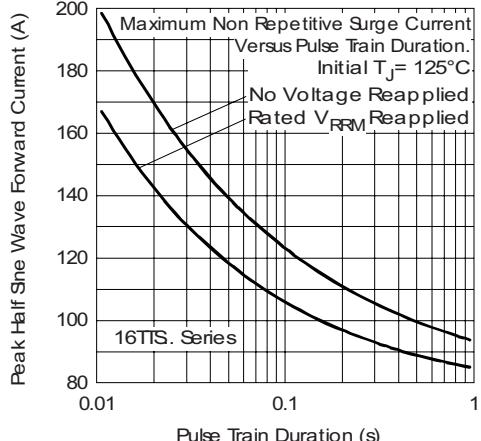


Fig. 6 - Maximum Non-Repetitive Surge Current

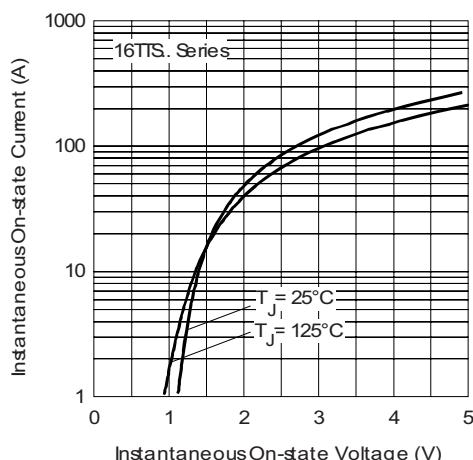


Fig. 7 - On-State Voltage Drop Characteristics

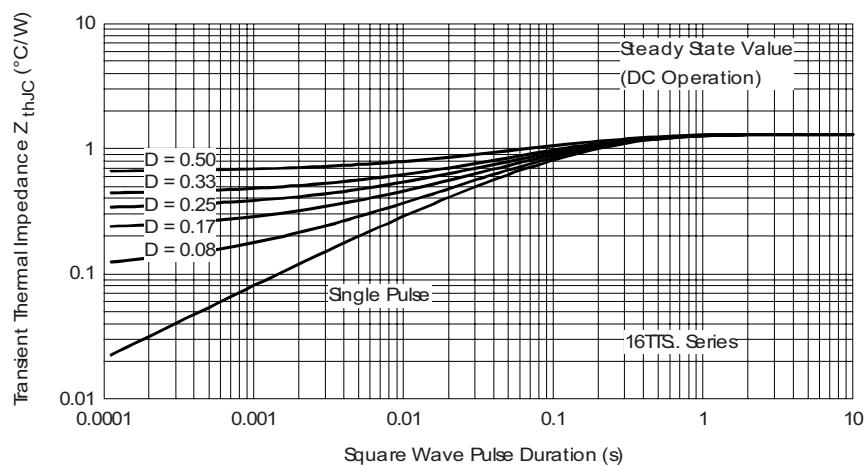


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

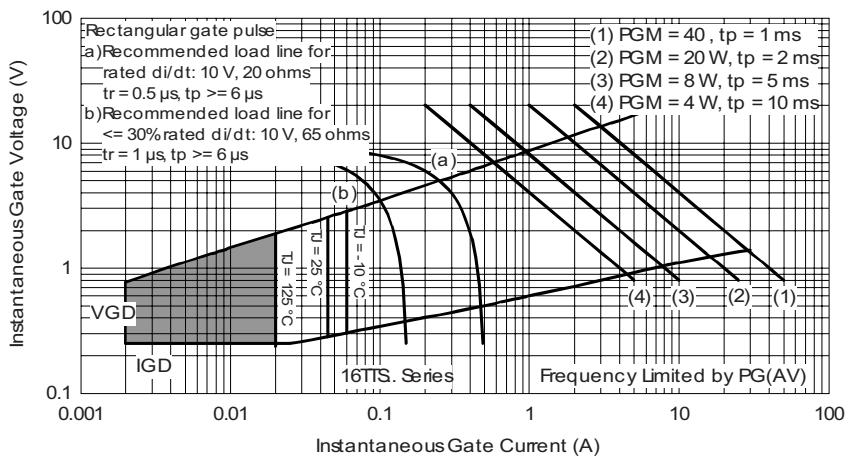


Fig. 9 - Gate Characteristics

16TTS..PbF High Voltage Series

Vishay High Power Products Phase Control SCR, 10 A



ORDERING INFORMATION TABLE

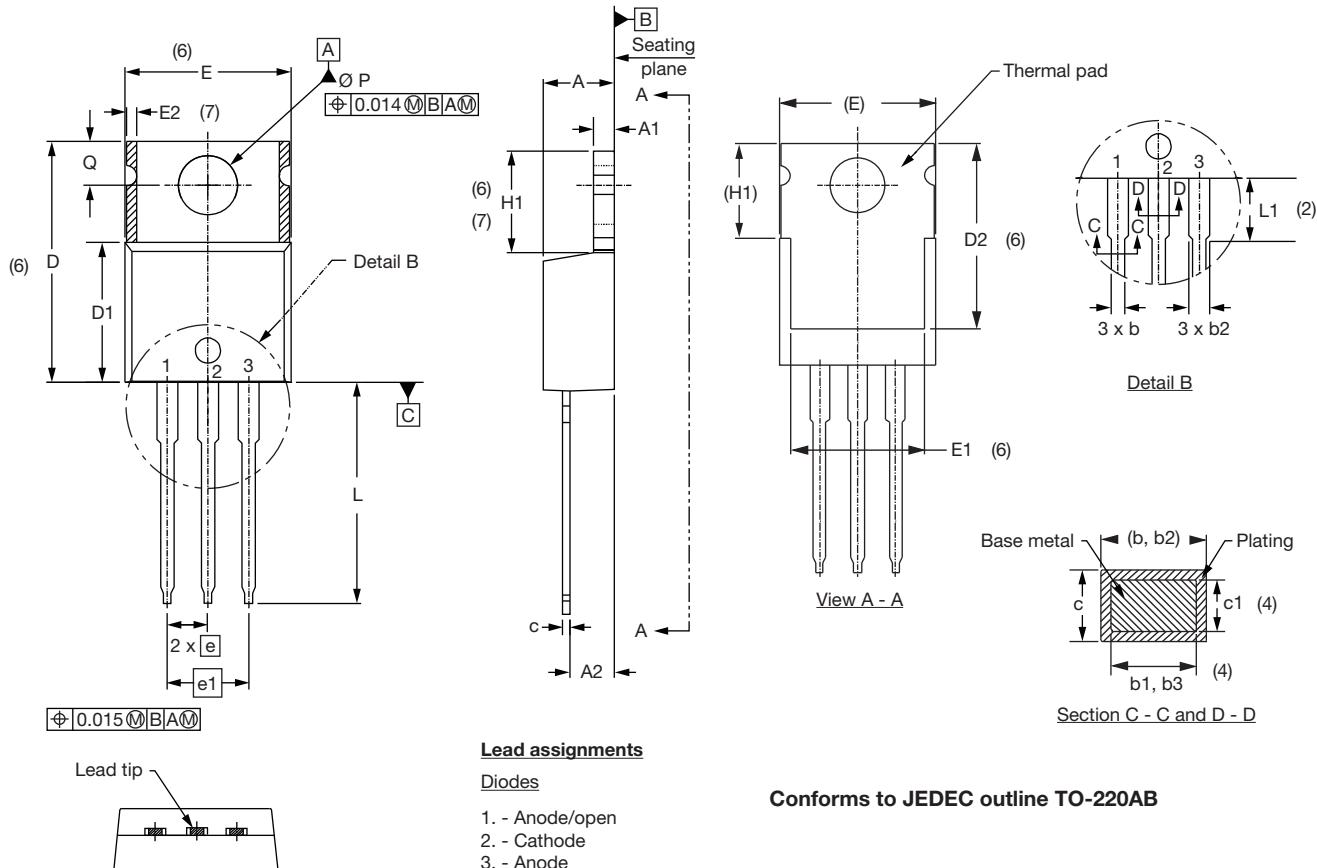
Device code	16	T	T	S	12	PbF
	1	2	3	4	5	6
[1]	-	Current rating				
[2]	-	Circuit configuration:				
		T = Single thyristor				
[3]	-	Package:				
		T = TO-220AB				
[4]	-	Type of silicon:				
		S = Converter grade				
[5]	-	Voltage code x 100 = V_{RRM}			08 = 800 V	
[6]	-	• None = Standard production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

Note: For higher voltage up to 1600 V contact factory

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95222
Part marking information	http://www.vishay.com/doc?95225

TO-220AB

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.25	4.65	0.167	0.183	
A1	1.14	1.40	0.045	0.055	
A2	2.56	2.92	0.101	0.115	
b	0.69	1.01	0.027	0.040	
b1	0.38	0.97	0.015	0.038	4
b2	1.20	1.73	0.047	0.068	
b3	1.14	1.73	0.045	0.068	4
c	0.36	0.61	0.014	0.024	
c1	0.36	0.56	0.014	0.022	4
D	14.85	15.25	0.585	0.600	3
D1	8.38	9.02	0.330	0.355	
D2	11.68	12.88	0.460	0.507	6

Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Lead dimension and finish uncontrolled in L1
- (3) Dimension D, D1 and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body
- (4) Dimension b1, b3 and c1 apply to base metal only
- (5) Controlling dimensions: inches
- (6) Thermal pad contour optional within dimensions E, H1, D2 and E1

(7) Dimensions E2 x H1 define a zone where stamping and singulation irregularities are allowed

(8) Outline conforms to JEDEC TO-220, except A2 (maximum) and D2 (minimum) where dimensions are derived from the actual package outline

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