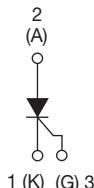


Thyristor High Voltage, Phase Control SCR, 10 A



TO-220AB



PRODUCT SUMMARY	
Package	TO-220AB
Diode variation	Single SCR
$I_{T(AV)}$	6.5 A
V_{DRM}/V_{RRM}	800 V
V_{TM}	1.15 V
I_{GT}	15 mA
T_J	- 40 °C to 125 °C

FEATURES

- Designed and qualified according to JEDEC-JESD47
- 125 °C max. operating junction temperature
- Material categorization:
For definitions of compliance please see www.vishay.com/doc?99912


RoHS

COMPLIANT

HALOGEN FREE
Available

APPLICATIONS

- Typical usage is in input rectification crowbar (soft star) and AC switch in motor control, UPS, welding, and battery charge

DESCRIPTION

The VS-10TTS08... 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.

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	6.5	A
$I_{T(RMS)}$		10	
V_{RRM}/V_{DRM}		800	V
I_{TSM}		110	A
V_T	6.5 A, $T_J = 25$ °C	1.15	V
dV/dt		150	V/μs
dl/dt		100	A/μs
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
VS-10TTS08PbF, VS-10TTS08-M3	800	800	1.0

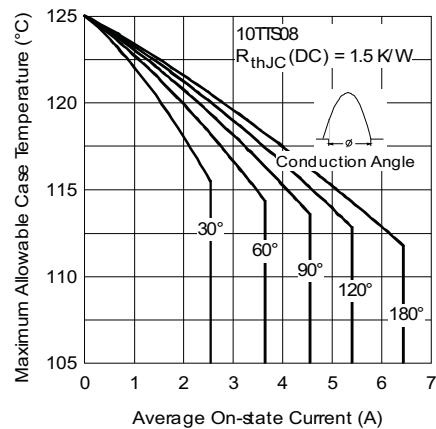
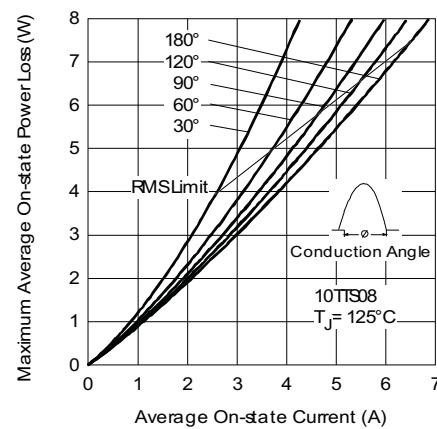
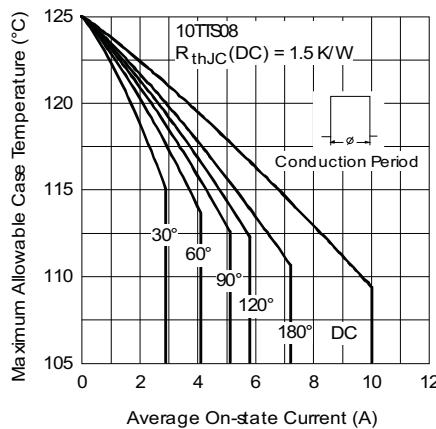
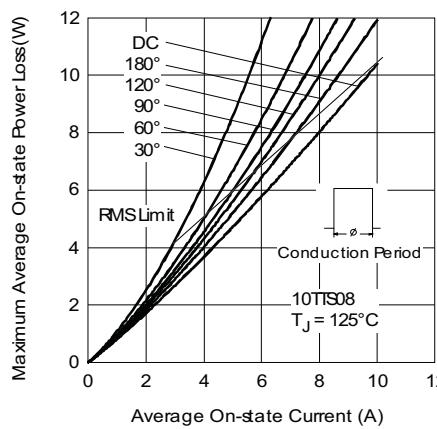
ABSOLUTE MAXIMUM RATINGS						
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum average on-state current	$I_{T(AV)}$	$T_C = 112^\circ C$, 180° conduction half sine wave		6.5	A	
Maximum RMS on-state current	$I_{T(RMS)}$			10		
Maximum peak, one-cycle, non-repetitive surge current	I_{TSM}	10 ms sine pulse, rated V_{RRM} applied, $T_J = 125^\circ C$		95		
		10 ms sine pulse, no voltage reapplied, $T_J = 125^\circ C$		110		
Maximum I^2t for fusing	I^2t	10 ms sine pulse, rated V_{RRM} applied, $T_J = 125^\circ C$		45	A^2s	
		10 ms sine pulse, no voltage reapplied, $T_J = 125^\circ C$		64		
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1$ ms to 10 ms, no voltage reapplied, $T_J = 125^\circ C$		640	$A^2\sqrt{s}$	
Maximum on-state voltage drop	V_{TM}	6.5 A, $T_J = 25^\circ C$		1.15	V	
On-state slope resistance	r_t	$T_J = 125^\circ C$		17.3	$m\Omega$	
Threshold voltage	$V_{T(TO)}$			0.85	V	
Maximum reverse and direct leakage current	I_{RM}/I_{DM}	$T_J = 25^\circ C$	$V_R = \text{Rated } V_{RRM}/V_{DRM}$	0.05	mA	
		$T_J = 125^\circ C$		1.0		
Typical holding current	I_H	Anode supply = 6 V, resistive load, initial $I_T = 1$ A, $T_J = 25^\circ C$		30		
Maximum latching current	I_L	Anode supply = 6 V, resistive load, $T_J = 25^\circ C$		50		
Maximum rate of rise of off-state voltage	dV/dt	$T_J = T_J \text{ max.}$, linear to 80 %, $V_{DRM} = R_g - k = \text{Open}$		150	V/ μ s	
Maximum rate of rise of turned-on current	dl/dt			100	A/ μ 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	
Maximum required DC gate current to trigger	I_{GT}	Anode supply = 6 V, resistive load, $T_J = -65^\circ C$		20	mA
		Anode supply = 6 V, resistive load, $T_J = 25^\circ C$		15	
		Anode supply = 6 V, resistive load, $T_J = 125^\circ C$		10	
Maximum required DC gate voltage to trigger	V_{GT}	Anode supply = 6 V, resistive load, $T_J = -65^\circ C$		1.2	V
		Anode supply = 6 V, resistive load, $T_J = 25^\circ C$		1	
		Anode supply = 6 V, resistive load, $T_J = 125^\circ C$		0.7	
Maximum DC gate voltage not to trigger	V_{GD}	$T_J = 125^\circ C$, $V_{DRM} = \text{Rated value}$		0.2	mA
Maximum DC gate current not to trigger	I_{GD}			0.1	

SWITCHING					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Typical turn-on time	t_{gt}	$T_J = 25^\circ C$		0.8	μ s
Typical reverse recovery time	t_{rr}			3	
Typical turn-off time	t_q	$T_J = 125^\circ C$		100	

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	1.5	°C/W
Maximum thermal resistance, junction to ambient	R_{thJA}		62	
Typical thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth and greased	0.5	
Approximate weight			2	g
Mounting torque	minimum maximum		0.07	oz.
Marking device		Case style TO-220AB	6 (5) 12 (10)	kgf · cm (lbf · in)
			10TTS08	


Fig. 1 - Current Rating Characteristics

Fig. 3 - On-State Power Loss Characteristics

Fig. 2 - Current Rating Characteristic

Fig. 4 - On-State Power Loss Characteristics

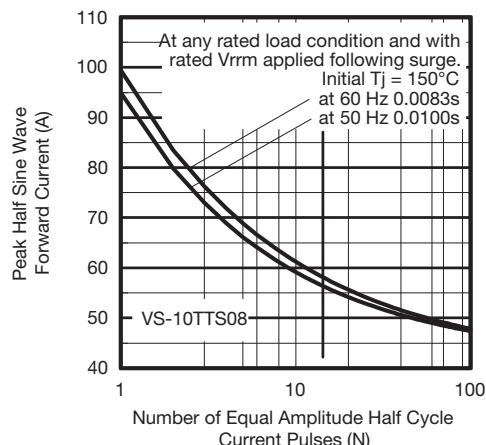


Fig. 5 - Maximum Non-Repetitive Surge Current

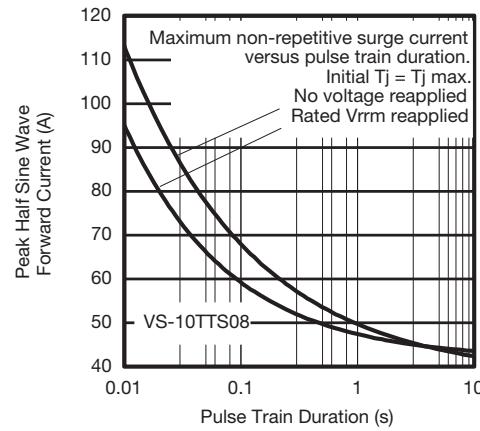


Fig. 6 - Maximum Non-Repetitive Surge Current

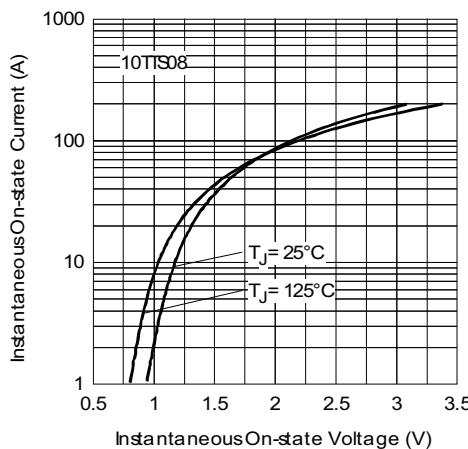


Fig. 7 - On-State Voltage Drop Characteristics

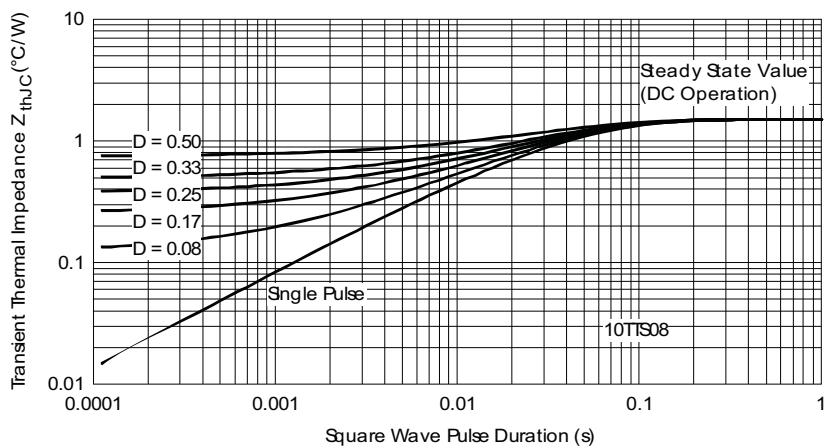


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

Device code	VS-	10	T	T	S	08	PbF
	1	2	3	4	5	6	7

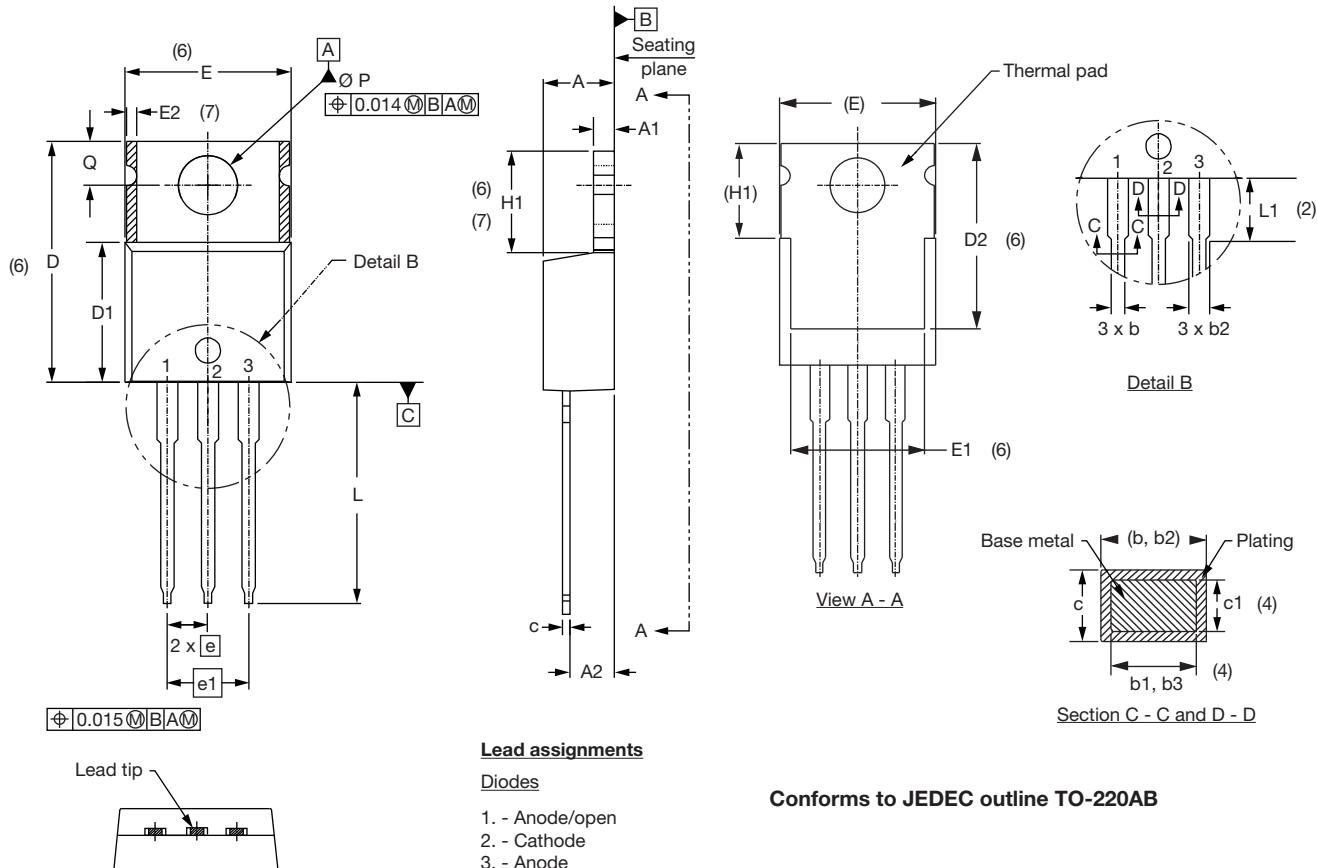
- 1** - Vishay Semiconductors product
- 2** - Current rating
- 3** - Circuit configuration:
T = Single thyristor
- 4** - Package:
T = TO-220AB
- 5** - Type of silicon:
S = Converter grade
- 6** - Voltage code x 100 = V_{RRM}
- 7** - Environmental digit:
PbF = Lead (Pb)-free and RoHS compliant
-M3 = Halogen-free, RoHS compliant, and terminations lead (Pb)-free

ORDERING INFORMATION (Example)			
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-10TTS08PbF	50	1000	Antistatic plastic tubes
VS-10TTS08-M3	50	1000	Antistatic plastic tubes

LINKS TO RELATED DOCUMENTS		
Dimensions		www.vishay.com/doc?95222
Part marking information	TO-220AB PbF	www.vishay.com/doc?95225
	TO-220AB -M3	www.vishay.com/doc?95028

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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