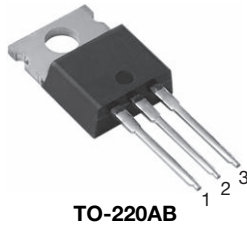
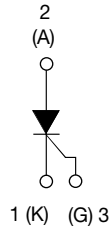




Thyristor High Voltage, Phase Control SCR, 25 A



TO-220AB



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 start) and AC switch in motor control, UPS, welding, and battery charge.

DESCRIPTION

The VS-25TTS... 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

Package	TO-220AB
Diode variation	Single SCR
$I_{T(AV)}$	16 A
V_{DRM}/V_{RRM}	800 V, 1200 V
V_{TM}	1.25 V
I_{GT}	45 mA
T_J	- 40 °C to 125 °C

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	18	22	A

MAJOR RATINGS AND CHARACTERISTICS

PARAMETER	TEST CONDITIONS	VALUES	UNITS
$I_{T(AV)}$	Sinusoidal waveform	16	A
I_{RMS}		25	
V_{RRM}/V_{DRM}		800/1200	V
I_{TSM}		320	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-25TTS08PbF, VS-25TTS08-M3	800	800	10
VS-25TTS12PbF, VS-25TTS12-M3	1200	1200	

**ABSOLUTE MAXIMUM RATINGS**

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES		UNITS
				TYP.	MAX.	
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		270		
		10 ms sine pulse, no voltage reapplied		320		
Maximum I ² t for fusing	I ² t	10 ms sine pulse, rated V _{RRM} applied		365		A ² s
		10 ms sine pulse, no voltage reapplied		515		
Maximum I ² √t for fusing	I ² √t	t = 0.1 to 10 ms, no voltage reapplied		5152		A ² √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	Anode supply = 6 V, resistive load, initial I _T = 1 A, T _J = 25 °C		-	150	
Maximum latching current	I _L	Anode supply = 6 V, resistive load, T _J = 25 °C		200		
Maximum rate of rise of off-state voltage	dV/dt	T _J = T _J max., linear to 80 °C, V _{DRM} = R _g - k = Open		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, $T_J = -10\text{ }^{\circ}\text{C}$	60	mA
		Anode supply = 6 V, resistive load, $T_J = 25\text{ }^{\circ}\text{C}$	45	
		Anode supply = 6 V, resistive load, $T_J = 125\text{ }^{\circ}\text{C}$	20	
Maximum required DC gate voltage to trigger	V_{GT}	Anode supply = 6 V, resistive load, $T_J = -10\text{ }^{\circ}\text{C}$	2.5	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}	$T_J = 125\text{ }^{\circ}\text{C}$, $V_{DRM} = \text{Rated value}$	0.25	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}	$T_J = 25\text{ }^{\circ}\text{C}$	0.9	μs
Typical reverse recovery time	t_{rr}	$T_J = 125\text{ }^{\circ}\text{C}$	4	
Typical turn-off time	t_q		110	



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	1.1	°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			6 (5)	kgf · cm (lbf · in)
			12 (10)	
Marking device		Case style TO-220AB	25TTS08	
			25TTS12	

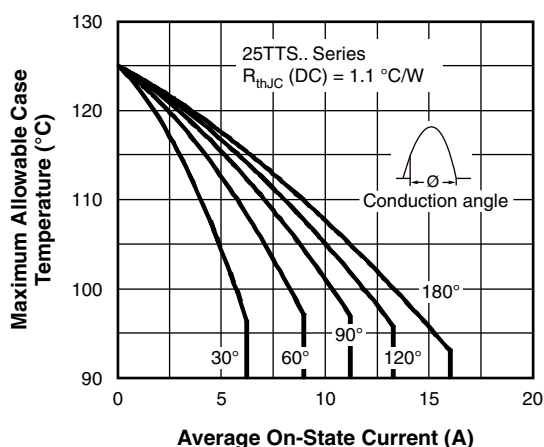


Fig. 1 - Current Rating Characteristics

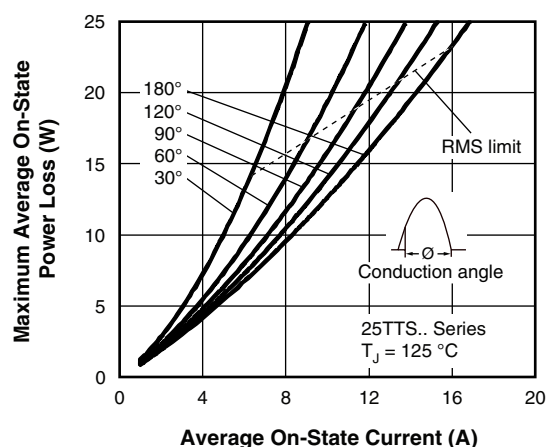


Fig. 3 - On-State Power Loss Characteristics

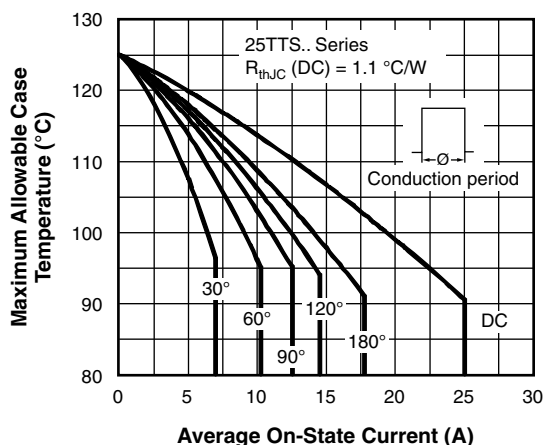


Fig. 2 - Current Rating Characteristics

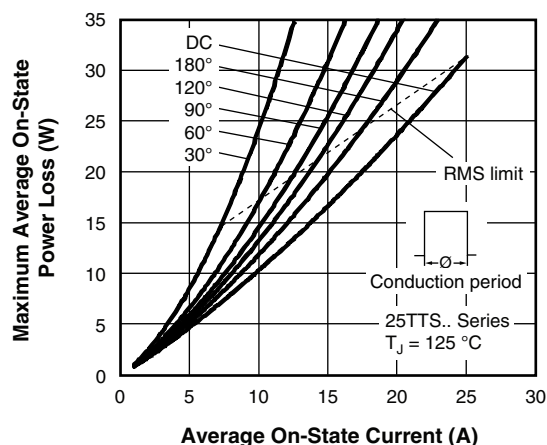


Fig. 4 - On-State Power Loss Characteristics

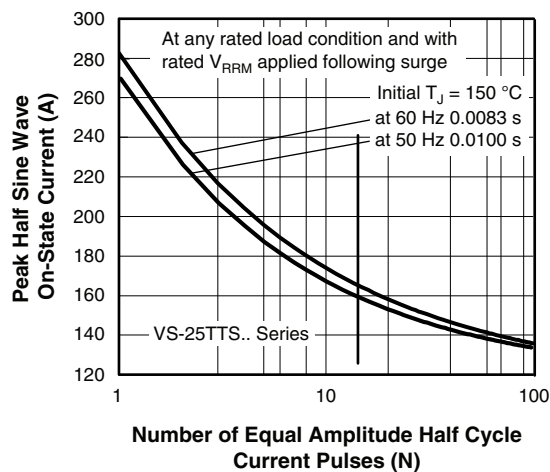


Fig. 5 - Maximum Non-Repetitive Surge Current

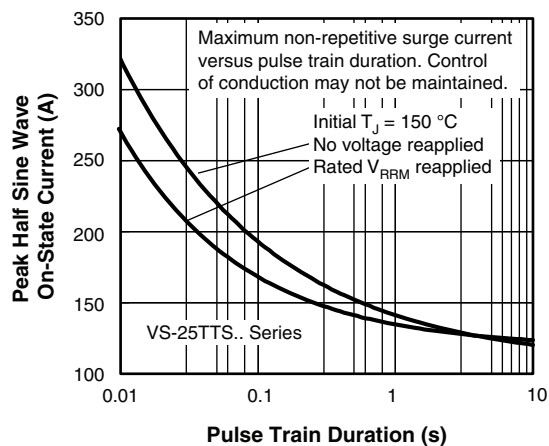


Fig. 6 - Maximum Non-Repetitive Surge Current

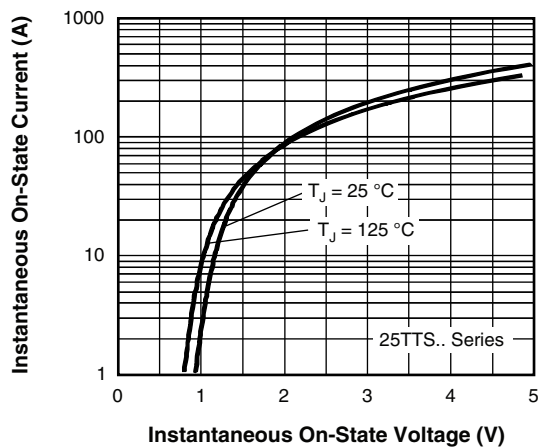


Fig. 7 - On-State Voltage Drop Characteristics

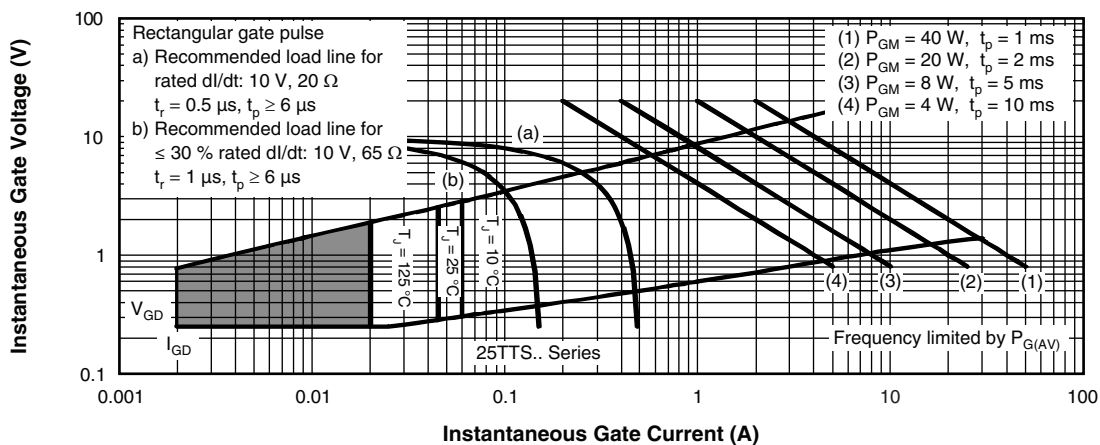


Fig. 8 - Gate Characteristics

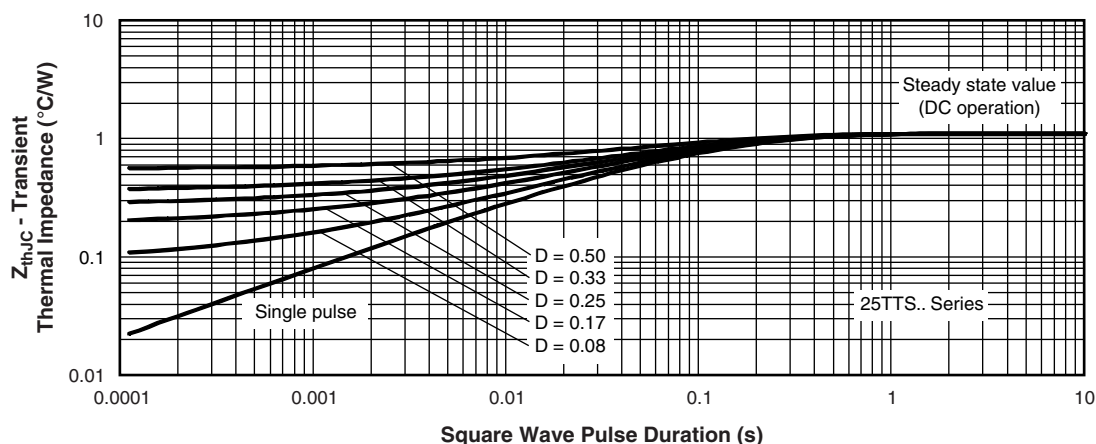


Fig. 9 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

Device code	VS-	25	T	T	S	12	PbF
	1	2	3	4	5	6	7

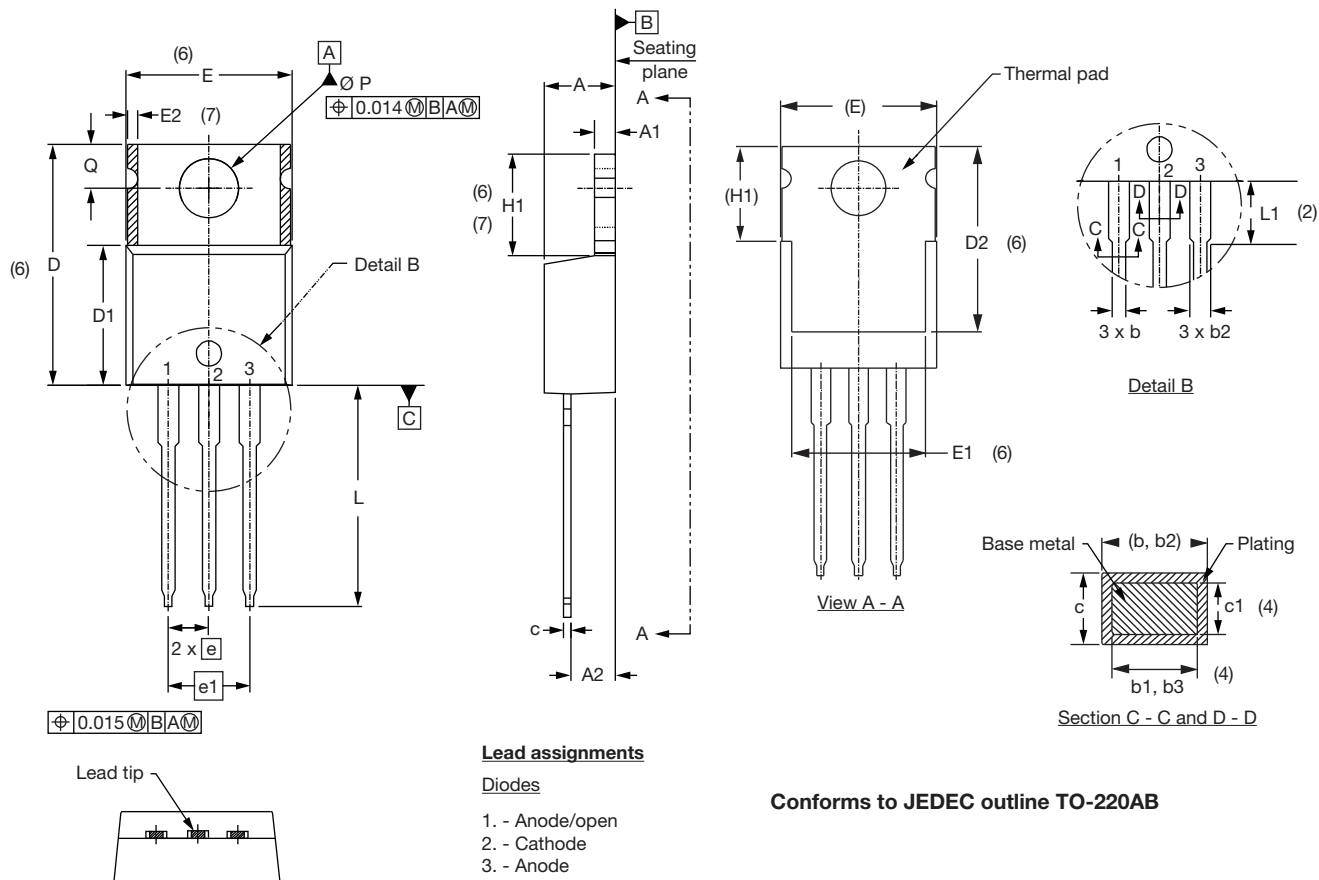
- 1 - Vishay Semiconductors product
- 2 - Current rating (25 = 25 A)
- 3 - Circuit configuration:
T = Single thyristor
- 4 - Package:
T = TO-220AB
- 5 - Type of silicon:
S = Standard recovery rectifier
- 6 - Voltage rating 08 = 800 V
12 = 1200 V
- 7 - Environmental digit:
PbF = Lead (Pb)-free and RoHS 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-25TTS08PbF	50	1000	Antistatic plastic tubes
VS-25TTS08-M3	50	1000	Antistatic plastic tubes
VS-25TTS12PbF	50	1000	Antistatic plastic tubes
VS-25TTS12-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

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
E	10.11	10.51	0.398	0.414	3, 6
E1	6.86	8.89	0.270	0.350	6
E2	-	0.76	-	0.030	7
e	2.41	2.67	0.095	0.105	
e1	4.88	5.28	0.192	0.208	
H1	6.09	6.48	0.240	0.255	6, 7
L	13.52	14.02	0.532	0.552	
L1	3.32	3.82	0.131	0.150	2
Ø P	3.54	3.73	0.139	0.147	
Q	2.60	3.00	0.102	0.118	
θ	90° to 93°		90° to 93°		

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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