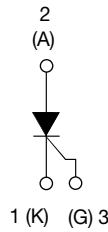


Thyristor High Voltage, Phase Control SCR, 40 A



FEATURES

- Designed and qualified according to JEDEC®-JESD 47
- 140 °C max. operating junction temperature
- Material categorization:
for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

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

DESCRIPTION

The VS-40TTS12... 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 140 °C junction temperature.

PRIMARY CHARACTERISTICS	
$I_{T(AV)}$	25 A
V_{DRM}/V_{RRM}	1200 V
V_{TM}	1.6 V
I_{GT}	35 mA
T_J	-40 °C to 140 °C
Package	TO-220AB 3L
Circuit configuration	Single SCR

MAJOR RATINGS AND CHARACTERISTICS			
PARAMETER	TEST CONDITIONS	VALUES	UNITS
$I_{T(AV)}$	Sinusoidal waveform	25	A
I_{RMS}		40	
V_{RRM}/V_{DRM}		1200	V
I_{TSM}		350	A
V_T	$T_J = 25\text{ °C}$	1.6	V
dV/dt		500	V/ μ s
dI/dt		150	A/ μ s
T_J		-40 to +140	°C

VOLTAGE RATINGS			
PART NUMBER	V_{RRM} , MAXIMUM PEAK REVERSE VOLTAGE V	V_{DRM} , MAXIMUM PEAK DIRECT VOLTAGE V	T_J °C
VS-40TTS12-M3	1200	1200	-25 to +140



ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average on-state current	$I_{T(AV)}$	$T_C = 93\text{ }^\circ\text{C}$, 180° conduction half sine wave	25	A
Maximum RMS on-state current	I_{RMS}		40	
Maximum peak, one-cycle non-repetitive surge current	I_{TSM}	10 ms sine pulse, rated V_{RRM} applied	300	
		10 ms sine pulse, no voltage reapplied	350	
Maximum I^2t for fusing	I^2t	10 ms sine pulse, rated V_{RRM} applied	450	A^2s
		10 ms sine pulse, no voltage reapplied	630	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1$ to 10 ms, no voltage reapplied	6300	$A^2\sqrt{s}$
Maximum on-state voltage	V_{TM}	80 A, $T_J = 25\text{ }^\circ\text{C}$	1.6	V
Low level value of on-state slope resistance	r_t	$T_J = 140\text{ }^\circ\text{C}$	11.4	$m\Omega$
Low level value of threshold voltage	$V_{T(TO)}$		0.96	V
Maximum reverse and direct leakage current	I_{RRM}/I_{DRM}	$T_J = 25\text{ }^\circ\text{C}$	0.5	mA
		$T_J = 140\text{ }^\circ\text{C}$	12	
Holding current	I_H	Anode supply = 6 V, resistive load, initial $I_T = 1$ A, $T_J = 25\text{ }^\circ\text{C}$	100	
Maximum latching current	I_L	Anode supply = 6 V, resistive load, $T_J = 25\text{ }^\circ\text{C}$	200	
Maximum rate of rise of off-state voltage	dV/dt	$T_J = T_J \text{ max.}$, linear to 80 %, $V_{DRM} = R_g - k = \text{Open}$	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, $T_J = 25\text{ }^\circ\text{C}$	35	mA
Maximum required DC gate voltage to trigger	V_{GT}	Anode supply = 6 V, resistive load, $T_J = 25\text{ }^\circ\text{C}$	1.3	V
Maximum DC gate voltage not to trigger	V_{GD}	$T_J = 140\text{ }^\circ\text{C}$, $V_{DRM} = \text{Rated value}$	0.2	
Maximum DC gate current not to trigger	I_{GD}		1.5	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}	$T_J = 140\text{ }^\circ\text{C}$	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 140	$^\circ\text{C}$
Maximum thermal resistance, junction to case	R_{thJC}	DC operation	0.8	$^\circ\text{C/W}$
Maximum thermal resistance, junction to ambient	R_{thJA}		60	
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 3L	40TTS12	

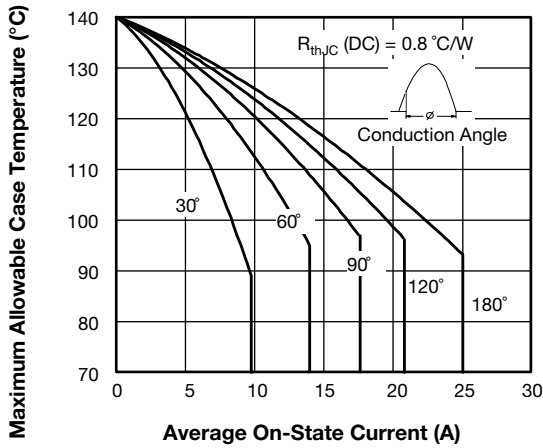


Fig. 1 - Current Rating Characteristics

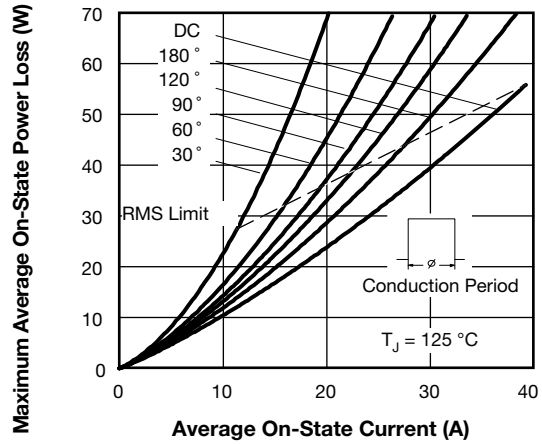


Fig. 4 - On-State Power Loss Characteristics

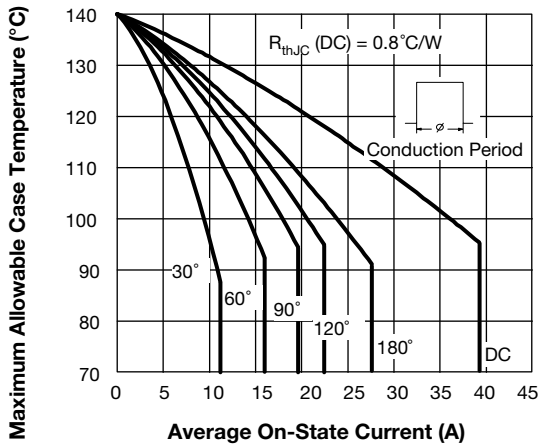


Fig. 2 - Current Rating Characteristics

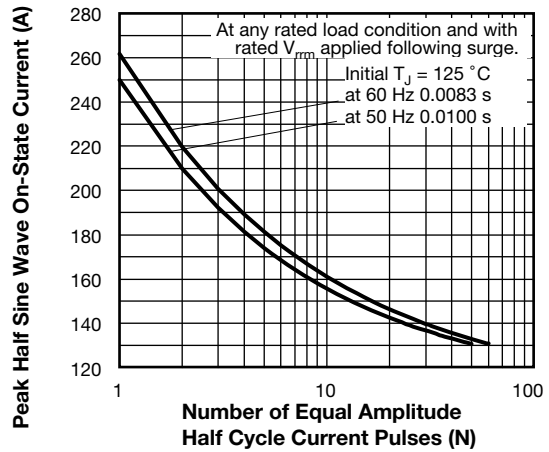


Fig. 5 - Maximum Non-Repetitive Surge Current

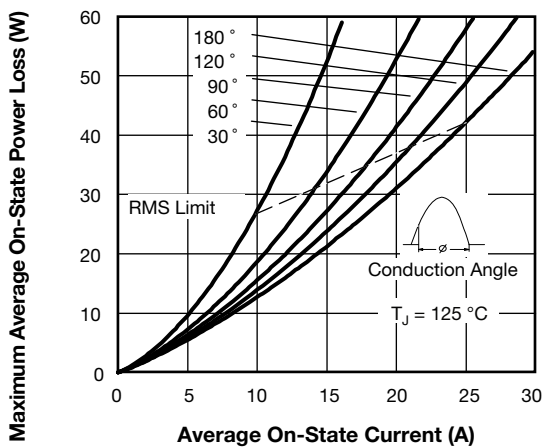


Fig. 3 - On-State Power Loss Characteristics

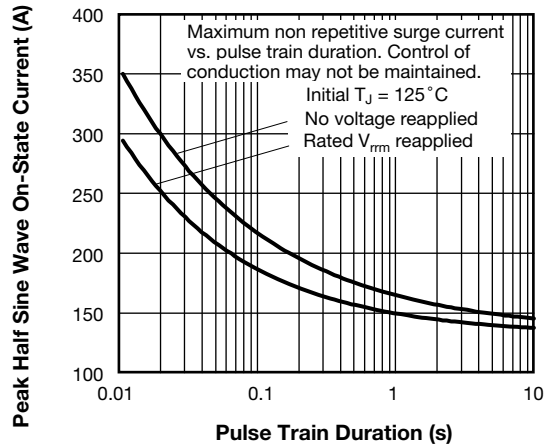


Fig. 6 - Maximum Non-Repetitive Surge Current

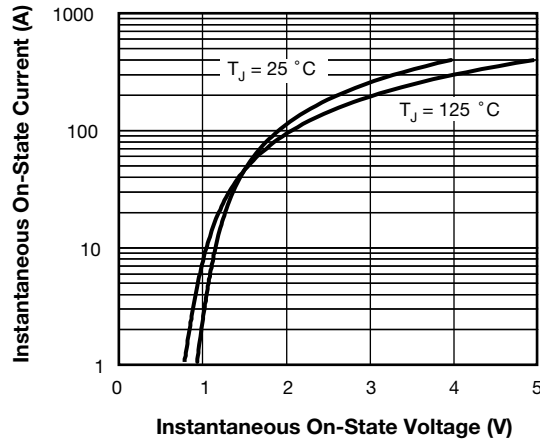


Fig. 7 - On-State Voltage Drop Characteristics

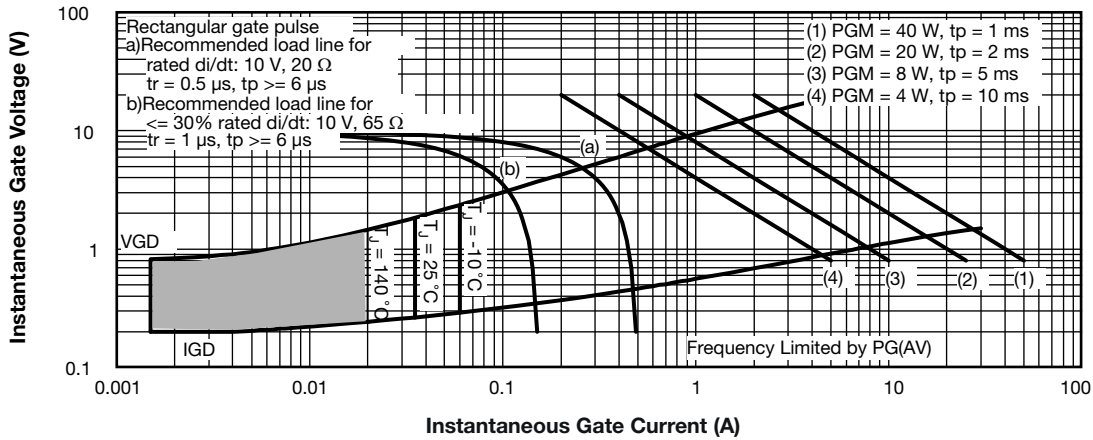


Fig. 8 - Gate Characteristics

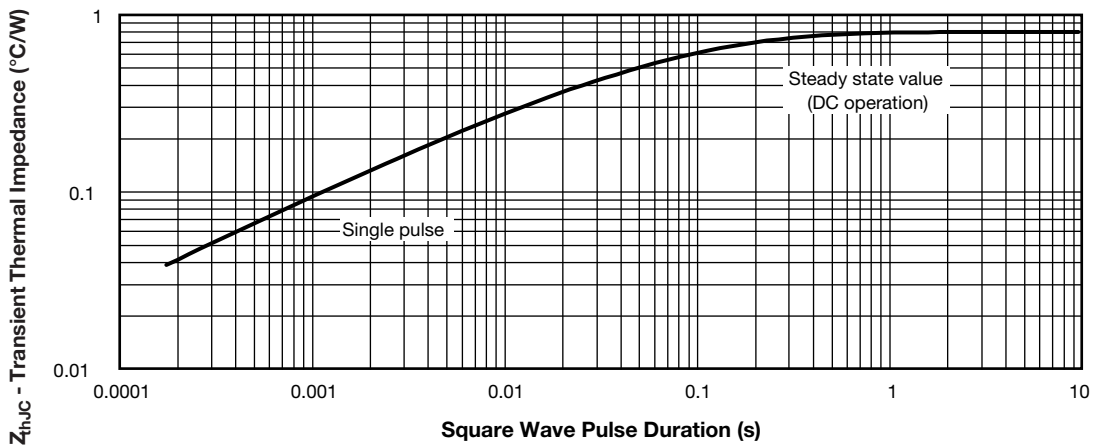
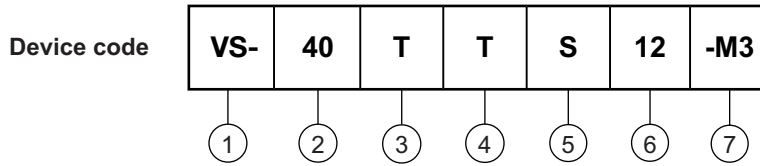


Fig. 1 - Thermal Impedance Z_{thJC} Characteristics



ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Current rating, RMS value
- 3** - Circuit configuration:
T = single thyristor
- 4** - Package:
T = TO-220
- 5** - Type of silicon:
S = standard recovery rectifier
- 6** - Voltage rating (12 = 1200 V)
- 7** - Environmental digit:
-M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

ORDERING INFORMATION (Example)		
PREFERRED P/N	BASE QUANTITY	PACKAGING DESCRIPTION
VS-40TTS12-M3	50	Antistatic plastic tubes

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?96154
Part marking information	www.vishay.com/doc?95028



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