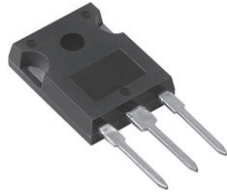
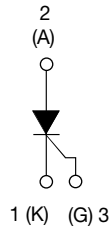




High Voltage Phase Control Thyristor, 40 A



TO-247AC



FEATURES

- Designed and qualified according to JEDEC-JESD47
- Low I_{GT} parts available
- Compliant to RoHS Directive 2002/95/EC
- 125 °C max. operating junction temperature
- Halogen-free according to IEC 61249-2-21 definition (-M3 only)



RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

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

DESCRIPTION

The VS-40TPS... 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-247AC
Diode variation	Single SCR
$I_{T(AV)}$	35 A
V_{DRM}/V_{RRM}	800 V, 1200 V
V_{TM}	1.45 V
I_{GT}	150 mA
T_J	- 40 °C to 125 °C

MAJOR RATINGS AND CHARACTERISTICS			
PARAMETER	TEST CONDITIONS	VALUES	UNITS
$I_{T(AV)}$	Sinusoidal waveform	35	A
I_{RMS}		55	
V_{RRM}/V_{DRM}		800/1200	V
I_{TSM}		500	A
V_T	40 A, $T_J = 25\text{ °C}$	1.45	V
dV/dt		1000	V/ μ s
dI/dt		100	A/ μ s
T_J		- 40 to 125	°C

VOLTAGE RATINGS			
PART NUMBER	V_{RRM}/V_{DRM} , MAXIMUM REPETITIVE PEAK AND OFF-STATE VOLTAGE V	V_{RSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I_{RRM}/I_{DRM} AT 125 °C mA
VS-40TPS08APbF, VS-40TPS08A-M3	800	900	10
VS-40TPS08PbF, VS-40TPS08-M3	1200	1300	
VS-40TPS12APbF, VS-40TPS12A-M3	800	900	
VS-40TPS12PbF, VS-40TPS12-M3	1200	1300	



ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average on-state current	$I_{T(AV)}$	$T_C = 79\text{ }^\circ\text{C}$, 180° conduction half sine wave		35	A
Maximum continuous RMS on-state current as AC switch	$I_{T(RMS)}$			55	
Maximum peak, one-cycle non-repetitive surge current	I_{TSM}	10 ms sine pulse, rated V_{RRM} applied	Initial $T_J = T_J$ maximum	500	
		10 ms sine pulse, no voltage reapplied		600	
Maximum I^2t for fusing	I^2t	10 ms sine pulse, rated V_{RRM} applied		1250	A ² s
		10 ms sine pulse, no voltage reapplied		1760	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied		12 500	A ² √s
Low level value of threshold voltage	$V_{T(TO)1}$	$T_J = 125\text{ }^\circ\text{C}$		1.02	V
High level value of threshold voltage	$V_{T(TO)2}$			1.23	
Low level value of on-state slope resistance	r_{t1}			9.74	mΩ
High level value of on-state slope resistance	r_{t2}			7.50	
Maximum peak on-state voltage	V_{TM}	110 A, $T_J = 25\text{ }^\circ\text{C}$		1.85	V
Maximum rate of rise of turned-on current	di/dt	$T_J = 25\text{ }^\circ\text{C}$		100	A/μs
Maximum holding current	I_H			150	mA
Maximum latching current	I_L			300	
Maximum reverse and direct leakage current	I_{RRM}/I_{DRM}	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_{RRM}/V_{DRM}$	0.5	
		$T_J = 125\text{ }^\circ\text{C}$		10	
Maximum rate of rise of off-state voltage 40TPS08	dV/dt	$T_J = T_J$ maximum, linear to 80 % V_{DRM} , R_g -k = Open		500	V/μs
Maximum rate of rise of off-state voltage 40TPS12				1000	

TRIGGERING					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum peak gate power	P_{GM}			10	W
Maximum average gate power	$P_{G(AV)}$			2.5	
Maximum peak gate current	I_{GM}			2.5	A
Maximum peak negative gate voltage	$-V_{GM}$			10	V
Maximum required DC gate voltage to trigger	V_{GT}	$T_J = -40\text{ }^\circ\text{C}$	Anode supply = 6 V resistive load	4.0	V
		$T_J = 25\text{ }^\circ\text{C}$		2.5	
		$T_J = 125\text{ }^\circ\text{C}$		1.7	
Maximum required DC gate current to trigger	I_{GT}	$T_J = -40\text{ }^\circ\text{C}$		270	mA
		$T_J = 25\text{ }^\circ\text{C}$		150	
		$T_J = 125\text{ }^\circ\text{C}$		80	
		$T_J = 25\text{ }^\circ\text{C}$, for 40TPS08APbF and 40TPS12APbF		40	
Maximum DC gate voltage not to trigger	V_{GD}	$T_J = 125\text{ }^\circ\text{C}$, $V_{DRM} = \text{Rated value}$		0.25	V
Maximum DC gate current not to trigger	I_{GD}			6	mA



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	0.6	°C/W
Maximum thermal resistance, junction to ambient	R_{thJA}		40	
Maximum thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth and greased	0.2	
Approximate weight			6	g
			0.21	oz.
Mounting torque	minimum		6 (5)	kgf · cm (lbf · in)
	maximum		12 (10)	
Marking device		Case style TO-247AC	40TPS08A	
			40TPS12A	
			40TPS08	
			40TPS12	

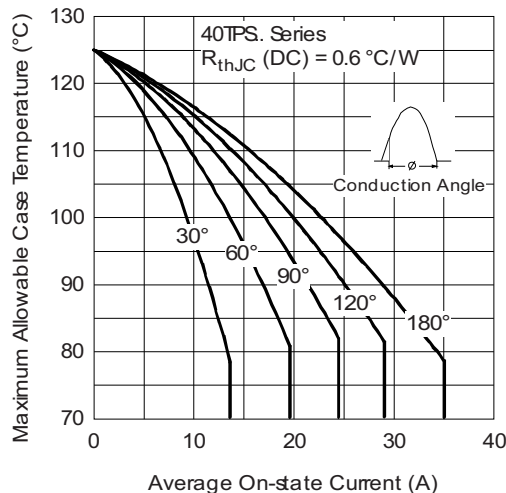


Fig. 1 - Current Rating Characteristics

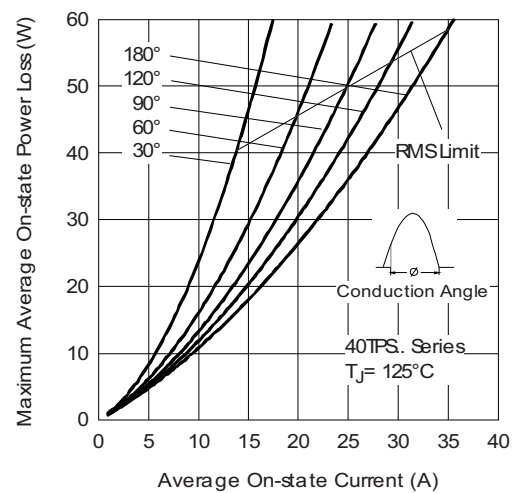


Fig. 3 - On-State Power Loss Characteristics

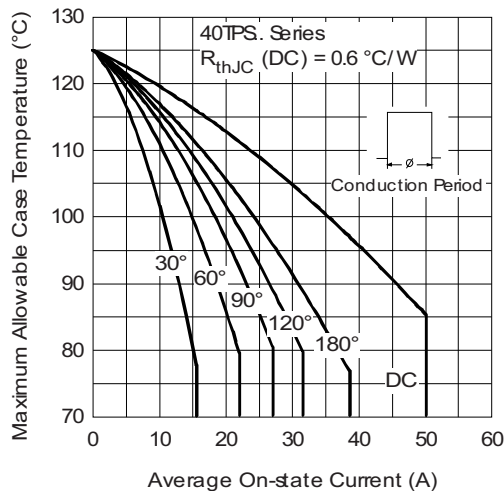


Fig. 2 - Current Rating Characteristics

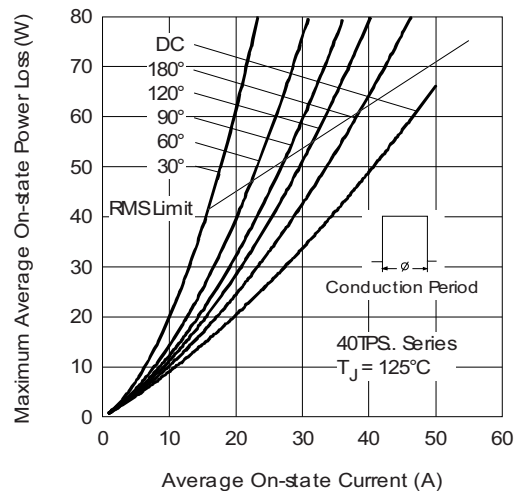


Fig. 4 - On-State Power Loss Characteristics

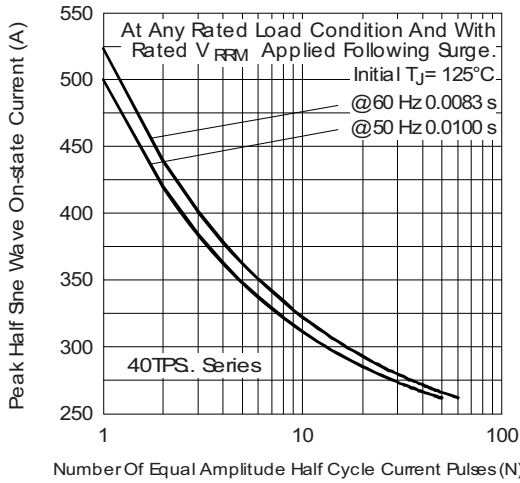


Fig. 5 - Maximum Non-Repetitive Surge Current

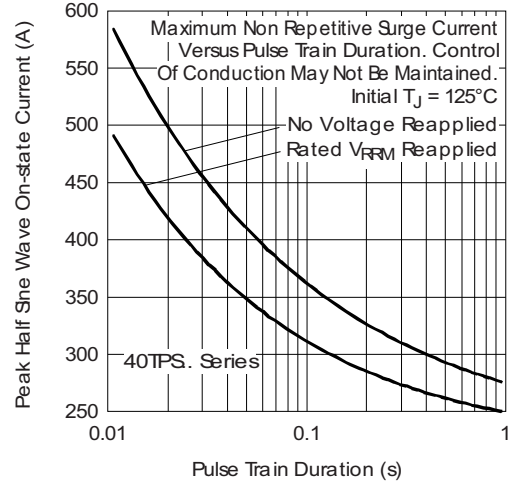


Fig. 6 - Maximum Non-Repetitive Surge Current

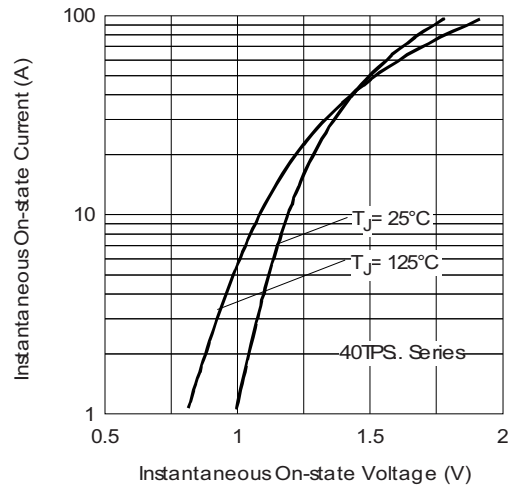


Fig. 7 - On-State Voltage Drop Characteristics

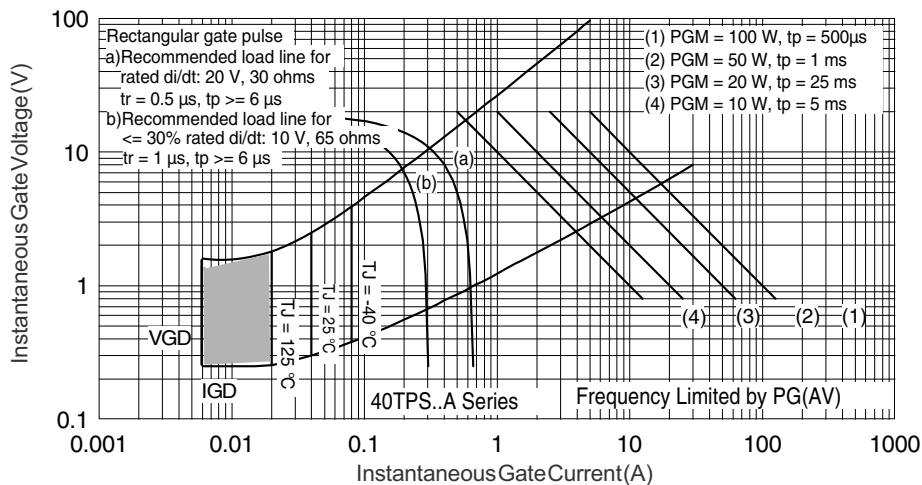


Fig. 8 - Gate Characteristics

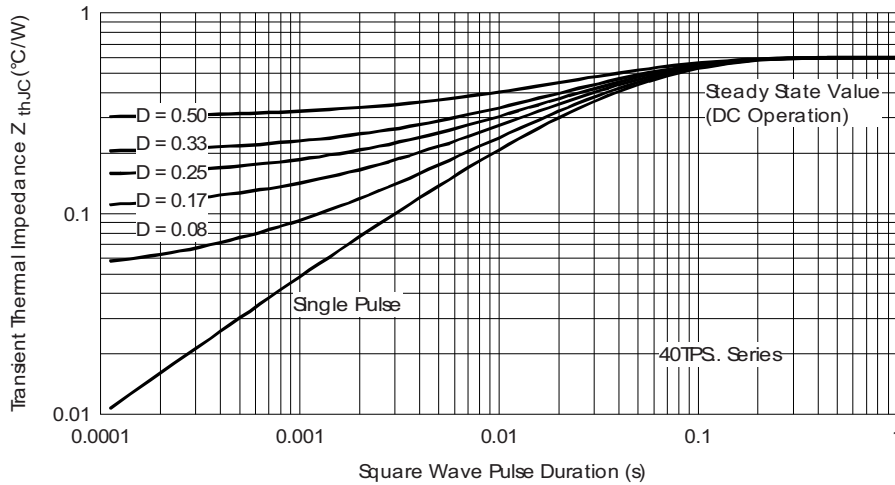


Fig. 9 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

Device code	VS-	40	T	P	S	12	A	PbF
	①	②	③	④	⑤	⑥	⑦	⑧

- 1** - Vishay Semiconductors product
- 2** - Current rating (40 = 40 A)
- 3** - Circuit configuration:
T = Thyristor
- 4** - Package:
P = TO-247
- 5** - Type of silicon:
S = Standard recovery rectifier
- 6** - Voltage ratings 08 = 800 V
12 = 1200 V
- 7** -
 - A = Low Igt selection 40 mA maximum
 - None = Standard Igt selection
- 8** - 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-40TPS08APbF	25	500	Antistatic plastic tubes
VS-40TPS08A-M3	25	500	Antistatic plastic tubes
VS-40TPS08PbF	25	500	Antistatic plastic tubes
VS-40TPS08-M3	25	500	Antistatic plastic tubes
VS-40TPS12APbF	25	500	Antistatic plastic tubes
VS-40TPS12A-M3	25	500	Antistatic plastic tubes
VS-40TPS12PbF	25	500	Antistatic plastic tubes
VS-40TPS12-M3	25	500	Antistatic plastic tubes

LINKS TO RELATED DOCUMENTS		
Dimensions		www.vishay.com/doc?95223
Part marking information	TO-247AC PbF	www.vishay.com/doc?95226
	TO-247AC-M3	www.vishay.com/doc?95007



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