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Thyristor High Voltage, Phase Control SCR, 40 A



PRIMARY CHARACTERISTICS				
I _{T(AV)}	35 A			
V _{DRM} /V _{RRM}	1200 V			
V _{TM}	1.45 V			
I _{GT}	150 mA			
TJ	-40 °C to +125 °C			
Package	TO-247AD 3L			
Circuit configuration	Single SCR			

FEATURES

- Low I_{GT} parts available
- Designed and qualified according to JEDEC[®] - JESD 47

- RoHS COMPLIANT HALOGEN FREE
- Flexible solution for reliable AC power rectification
- · Easy control peak current at charger power up to reduce passive / electromechanical components
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

APPLICATIONS

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

DESCRIPTION

The VS-40TPS12.. high voltage series of silicon controlled rectifiers are specifically designed for medium power switching and phase control applications.

AEC-Q101 qualified P/N available (VS-40TPS12LHM3, VS-40TPS12ALHM3).

MAJOR RATINGS AND CHARACTERISTICS						
PARAMETER	TEST CONDITIONS	VALUES	UNITS			
I _{T(AV)}	Sinusoidal waveform	35	Α			
I _{RMS}		55	A			
V _{RRM} /V _{DRM}		1200	V			
I _{TSM}		600	A			
V _T	40 A, T _J = 25 °C	1.45	V			
dv/dt		1000	V/µs			
di/dt		100	A/µs			
TJ		-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-40TPS12AL-M3	1200	1300	10				
VS-40TPS12L-M3	1200	1300	10				



VS-40TPS12L-M3, VS-40TPS12AL-M3

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ABSOLUTE MAXIMUM RATINGS	i				
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average on-state current	I _{T(AV)}	T _C = 79 °C, 180° conduction half sine way	e	35	
Maximum continuous RMS on-state current as AC switch	I _{T(RMS)}			55	A
Maximum peak, one-cycle	— ———————————————————————————————————	10 ms sine pulse, rated V _{RRM} applied		500	
non-repetitive surge current	ITSM	10 ms sine pulse, no voltage reapplied		600	
Maximum I ² t for fusing	l ² t	10 ms sine pulse, rated V _{RRM} applied	Initial $T_{,1} = T_{,1} max.$	1250	A ² s
Maximum r-t for fusing	1-1	10 ms sine pulse, no voltage reapplied	ij – ijiliax.	1760	A-S
Maximum I²√t for fusing	l²√t	t = 0.1 ms to 10 ms, no voltage reapplied	17 600	A²√s	
Low level value of threshold voltage	V _{T(TO)1}			1.02	V
High level value of threshold voltage	V _{T(TO)2}	T 105 %C		1.23	v
Low level value of on-state slope resistance	r _{t1}	T _J = 125 °C		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 °C		1.85	V
Maximum rate of rise of turned-on current	di/dt	T _J = 25 °C		100	A∕µs
Maximum holding current	Ι _Η	Anode supply = 6 V, resistive load, initial T,	_J = 1 A, I _T = 25 °C	300	
Maximum latching current	١L	Anode supply = 6 V, resistive load, $T_J = 25$	5 °C	350	A
Maximum reverse and direct lackage aureant		$T_J = 25 \text{ °C}$			mA
Maximum reverse and direct leakage current	I _{RRM/} I _{DRM}	$T_J = 125 \text{ °C}$ $V_R = \text{rated } V_{RRM} / V_{DRM}$		10	
Maximum rate of rise of off-state voltage 40TPS12A	dv/dt			500	1//110
Maximum rate of rise of off-state voltage 40TPS12	αν/αι	$T_J = T_J$ maximum, linear to 80 % V_{DRM} , R_{g}	1000	V∕µs	

TRIGGERING					
PARAMETER	SYMBOL	TEST CO	ONDITIONS	VALUES	UNITS
Maximum peak gate power	P _{GM}			10	W
Maximum average gate power	P _{G(AV)}			2.5	vv
Maximum peak gate current	I _{GM}			2.5	А
Maximum peak negative gate voltage	-V _{GM}			10	V
		T _J = -40 °C		2.0	
Maximum required DC gate voltage to trigger	V_{GT}	T _J = 25 °C	 Anode supply = 6 V resistive load 	1.7	V
		T _J = 125 °C		1.3	
Maximum maximal DO anto anotato triang		T _J = -40 °C		200	mA
		T _J = 25 °C	Anode supply = 6 V resistive load	150	
Maximum required DC gate current to trigger	I _{GT}	T _J = 125 °C	Tesistive load	80	
		$T_J = 25$ °C, for 40TPS12A		40	
Maximum DC gate voltage not to trigger for 40TPS12	V _{GD}	- T _J = 125 °C, V _{DRM} = rated value		0.25	V
Maximum DC gate current not to trigger for 40TPS12	I _{GD}			6	mA
Maximum DC gate voltage not to trigger for 40TPS12A	V _{GD}	- T _J = 125 °C, V _{DRM} = rated value		0.15	V
Maximum DC gate current not to trigger for 40TPS12A	I _{GD}			1	mA

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THERMAL AND MECHANICAL SPECIFICATIONS							
PARAMETER	SYMBOL	SYMBOL TEST CONDITIONS		UNITS			
Maximum junction and storage temperature range	T _J , T _{Stg}		-40 to +125	°C			
Maximum thermal resistance, junction to case	n to case R _{thJC} DO an article		0.6				
Maximum thermal resistance, junction to ambient	R _{thJA}	DC operation	40	°C/W			
Maximum thermal resistance, case to heat sink	R _{thCS}	Mounting surface, smooth and greased	0.25				
Approximate weight			6	g			
Approximate weight			0.21	oz.			
Mounting torgueminimum	۱		6 (5)	kgf · cm			
maximum	ı		12 (10)	(lbf · in)			
Marking davias		Case style TO-247AD 3L	40TPS1	2AL			
Marking device		Case sigle 10-247 AD 3L	40TPS12L				

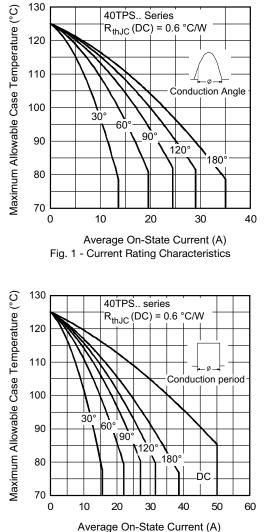


Fig. 2 - Current Rating Characteristics

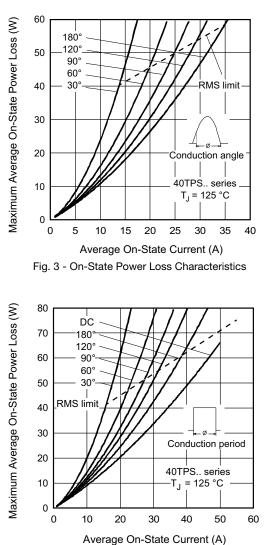
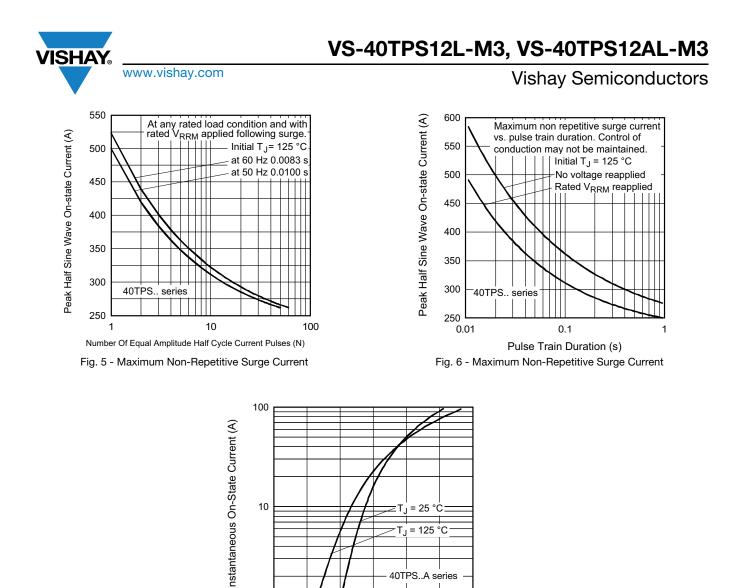
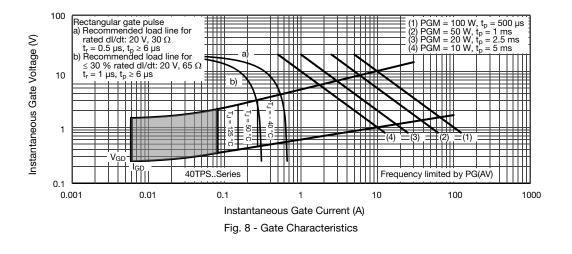


Fig. 4 - On-State Power Loss Characteristics

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1 0.5 40TPS..A series

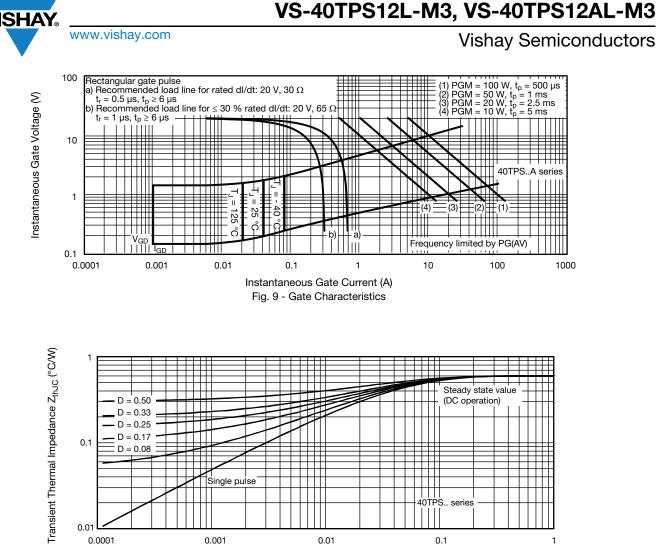
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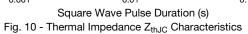
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Instantaneous On-State Voltage (V) Fig. 7 - On-State Voltage Drop Characteristics

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VS-40TPS12L-M3, VS-40TPS12AL-M3

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ORDERING INFORMATION TABLE

Device code	VS-	40	т	Р	s	12	A	L	-M3
		(2)	(3)	(4)	(5)	6	(7)	(8)	(9)
	<u>п</u> .	Visł	nav Sem	niconduc	ctors pro	U	\bigcirc	0	\bigcirc
	2 -		-	ng (40 =	-	uuuu			
	3 -			iguratior	-				
			thyristo						
	4 -	Pac	kage:						
		P =	TO-247						
	5 -	Тур	e of silic	con:					
	_	S =	standar	d recove	ery rectif	fier	г		
	6 -	Volt	age rati	ngs —				12 = 12	200 V
	7 -	• A	= Low I	gt selec	tion 40 ı	mA max	kimum		
		• N	one = s	tandard	Igt seled	ction			
	8 -	L =	long lea	ds					
	9 -	Env	rironmer	ntal digit	:				
		-M3	= halog	gen-free	, RoHS-	complia	int, and	termina	tions lea

ORDERING INFORMATION (Example)						
PREFERRED P/N	QUANTITY PER TUBE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION			
VS-40TPS12AL-M3	25	500	Antistatic plastic tubes			
VS-40TPS12L-M3	25	500	Antistatic plastic tubes			

LINKS TO RELATED DOCUMENTS				
Dimensions TO-247AD 3L www.vishay.com/doc?95626				
Part marking information	TO-247AD 3L	www.vishay.com/doc?95007		



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TO-247AD 3L

DIMENSIONS in millimeters and inches



View B

SYMBOL	MILLIN	IETERS	INCHES		NOTES
STIVIBOL	MIN.	MAX.	MIN.	MAX.	NOTES
А	4.65	5.31	0.183	0.209	
A1	2.21	2.59	0.087	0.102	
A2	1.50	2.49	0.059	0.098	
b	0.99	1.40	0.039	0.055	
b1	0.99	1.35	0.039	0.053	
b2	1.65	2.39	0.065	0.094	
b3	1.65	2.34	0.065	0.092	
b4	2.59	3.43	0.102	0.135	
b5	2.59	3.38	0.102	0.133	
с	0.38	0.89	0.015	0.035	
c1	0.38	0.84	0.015	0.033	
D	19.71	20.70	0.776	0.815	3
D1	13.08	-	0.515	-	4

(2, 52, 51) (4) Section C - C, D - D, E - E

SYMBOL	MILLIN	IETERS	INC	INCHES	
STNIBOL	MIN.	MAX.	MIN.	MAX.	NOTES
D2	0.51	1.30	0.020	0.051	
E	15.29	15.87	0.602	0.625	3
E1	13.46	-	0.53	-	
е	5.46	BSC	0.215	5 BSC	
ØК	0.2	0.254)10	
L	19.81	20.32	0.780	0.800	
L1	3.71	4.29	0.146	0.169	
ØР	3.56	3.66	0.14	0.144	
Ø P1	-	6.98	-	0.275	
Q	5.31	5.69	0.209	0.224	
R	4.52	5.49	0.178	0.216	
S	5.51 BSC		0.217	' BSC	

Notes

- ⁽¹⁾ Dimensioning and tolerancing per ASME Y14.5M-1994
- (2) Contour of slot optional
- ⁽³⁾ Dimension D and E do not include mold flash. These dimensions are measured at the outermost extremes of the plastic body
- ⁽⁴⁾ Thermal pad contour optional with dimensions D1 and E1
- ⁽⁵⁾ Lead finish uncontrolled in L1
- (6) Ø P to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154")
- ⁽⁷⁾ Outline conforms to JEDEC[®] outline TO-247 with exception of dimension A min., D, E min., Q min., S, and note 4

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