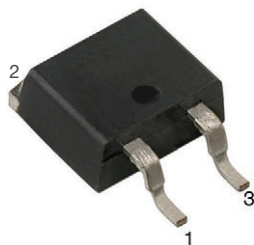
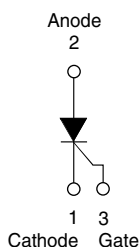


Thyristor Surface-Mount, Phase Control SCR, 16 A


D²PAK 2L (TO-263AB 2L)


FEATURES

- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C
- Designed and qualified according JEDEC®-JESD 47
- Meets JESD 201 class 2 whisker test
- 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



RoHS
COMPLIANT
HALOGEN
FREE

LINKS TO ADDITIONAL RESOURCES



3D Models

PRIMARY CHARACTERISTICS

$I_{T(AV)}$	16 A
V_{DRM}/V_{RRM}	1600 V
V_{TM}	1.25 V
I_{GT}	45 mA
T_J	-40 °C to +125 °C
Package	D²PAK 2L (TO-263AB 2L)
Circuit configuration	Single SCR

APPLICATIONS

- On-board and off-board EV / HEV battery chargers
- Renewable energy inverters

DESCRIPTION

The VS-25TTS16S2L-M3 high voltage series of silicon controlled rectifiers is specifically designed for medium power switching and phase control applications.

MECHANICAL DATA

Case: D²PAK 2L (TO-263AB 2L)

Molding compound meets UL 94 V-0 flammability rating

Terminals: matte tin plated leads, solderable per J-STD-002

OUTPUT CURRENT IN TYPICAL APPLICATIONS

APPLICATIONS	SINGLE-PHASE BRIDGE	THREE-PHASE BRIDGE	UNITS
NEMA FR-4 or G10 glass fabric-based epoxy with 4 oz. (140 µm) copper	3.5	5.5	A
Aluminum IMS, $R_{thCA} = 15$ °C/W	8.5	13.5	
Aluminum IMS with heatsink, $R_{thCA} = 5$ °C/W	16.5	25.0	

Note

- $T_A = 55$ °C, $T_J = 125$ °C, footprint 300 mm²

MAJOR RATINGS AND CHARACTERISTICS

PARAMETER	TEST CONDITIONS	VALUES	UNITS
$I_{T(AV)}$	Sinusoidal waveform	16	A
I_{RMS}		25	
V_{RRM}/V_{DRM}		1600	V
I_{TSM}		350	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-25TTS16SL-M3	1600	1600	10



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		300		
		10 ms sine pulse, no voltage reapplied		350		
Maximum I ² t for fusing	I ² t	10 ms sine pulse, rated V _{RRM} applied		450		A ² s
		10 ms sine pulse, no voltage reapplied		630		
Maximum I ² √t for fusing	I ² √t	t = 0.1 ms to 10 ms, no voltage reapplied		6300		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 %, 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 °C	60	mA	
		Anode supply = 6 V, resistive load, T _J = 25 °C	45		
		Anode supply = 6 V, resistive load, T _J = 125 °C	20		
Maximum required DC gate voltage to trigger	V _{GT}	Anode supply = 6 V, resistive load, T _J = - 10 °C	2.5	V	
		Anode supply = 6 V, resistive load, T _J = 25 °C	2.0		
		Anode supply = 6 V, resistive load, T _J = 125 °C	1.0		
Maximum DC gate voltage not to trigger	V _{GD}	T _J = 125 °C, V _{DRM} = 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
Soldering temperature	T_S	For 10 s (1.6 mm from case)	260	
Maximum thermal resistance, junction to case	R_{thJC}	DC operation	1.1	°C/W
Typical thermal resistance, junction to ambient (PCB mount)	$R_{thJA}^{(1)}$		40	
Approximate weight			2	g
			0.07	oz.
Marking device		Case style D ² PAK 2L (TO-263AB 2L)	25TTS16S	

Note

(1) When mounted on 1" square (650 mm²) PCB of FR-4 or G-10 material 4 oz. (140 μm) copper 40 °C/W

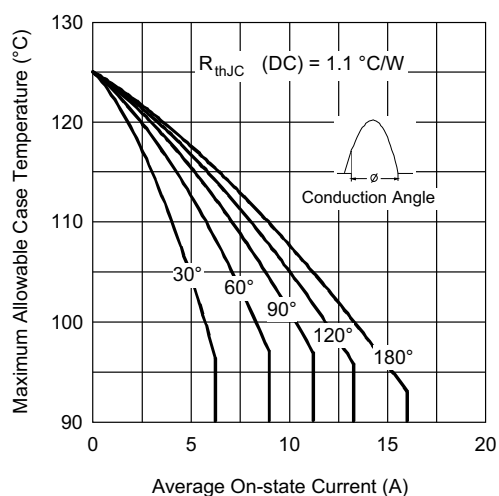


Fig. 1 - Current Rating Characteristics

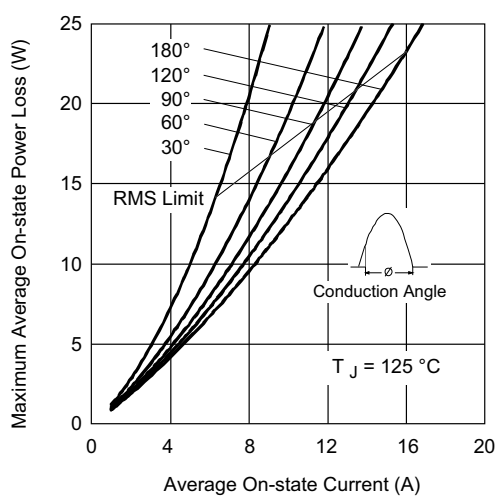


Fig. 3 - On-State Power Loss Characteristics

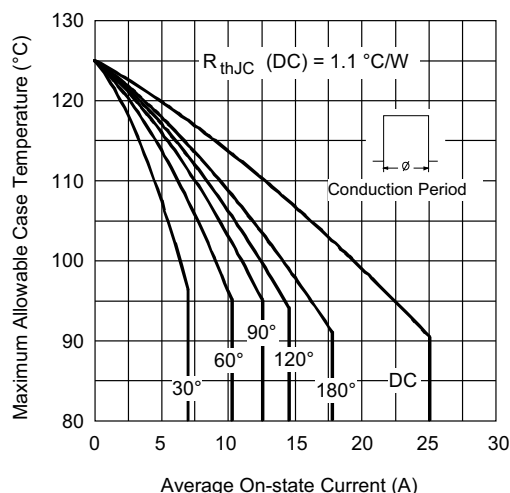


Fig. 2 - Current Rating Characteristics

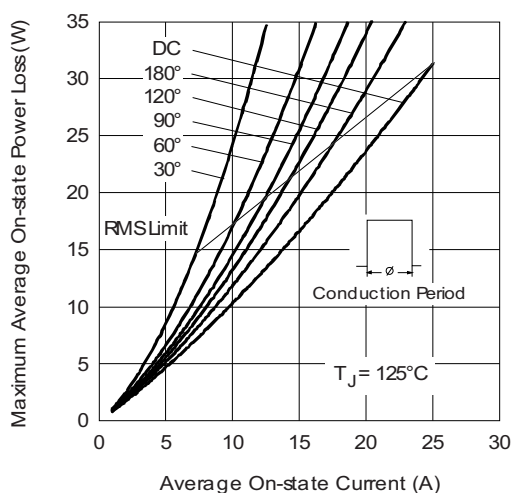


Fig. 4 - On-State Power Loss Characteristics

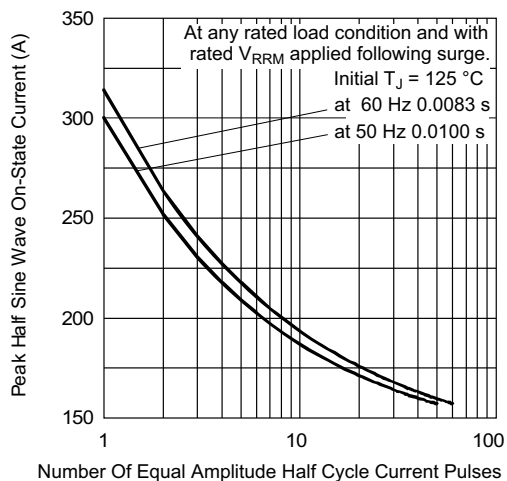


Fig. 5 - Maximum Non-Repetitive Surge Current

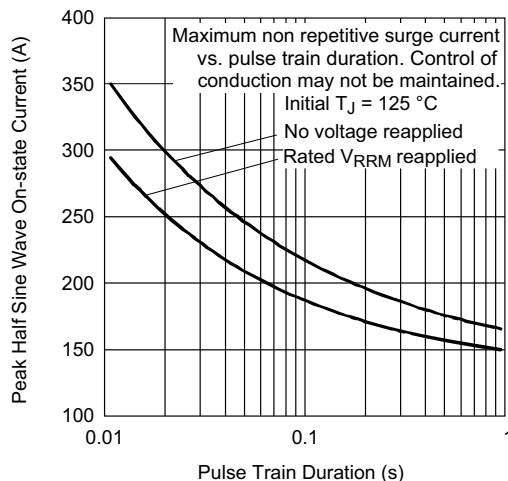


Fig. 6 - Maximum Non-Repetitive Surge Current

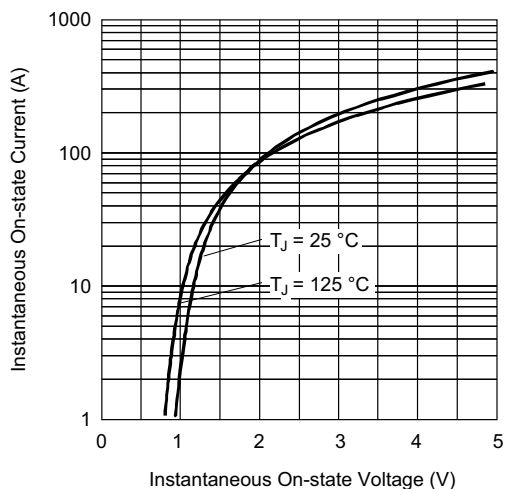
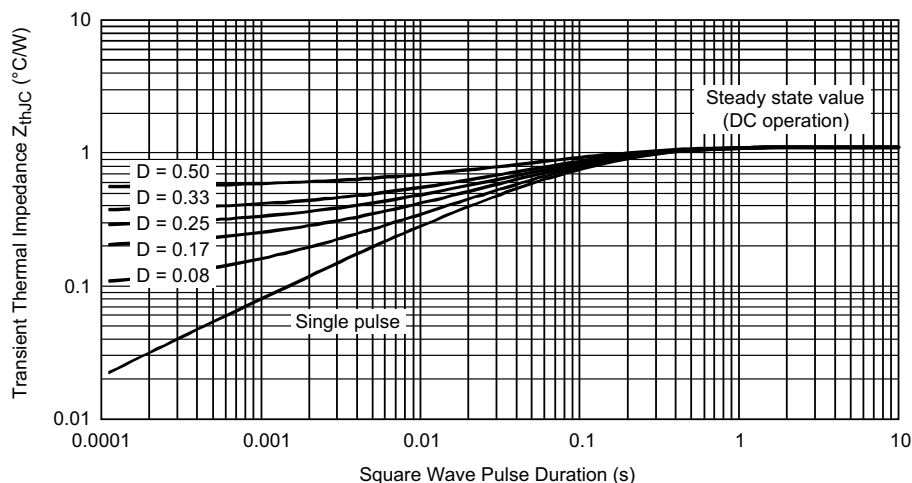


Fig. 7 - On-State Voltage Drop Characteristics


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

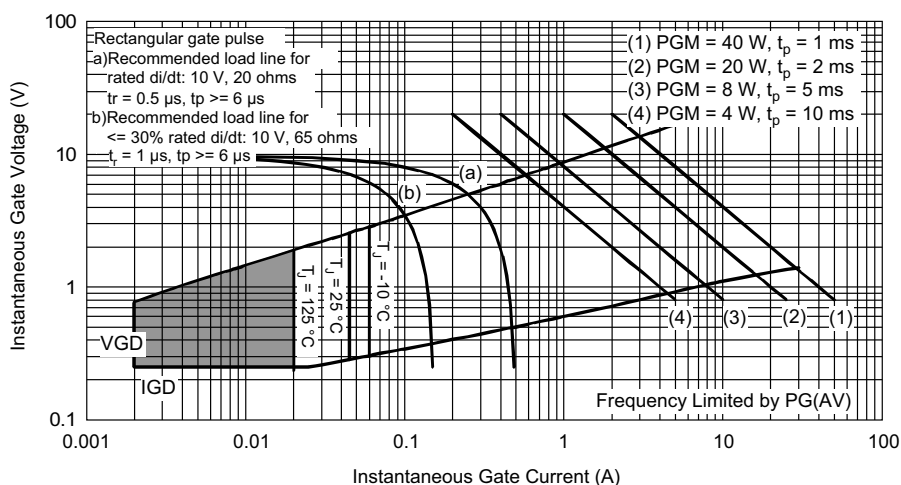


Fig. 9 - Gate Characteristics

ORDERING INFORMATION TABLE

Device code

VS-	25	T	T	S	16	S	2	L	-M3
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1 2 3 4 5 6 7 8 9 10

- 1** - Vishay Semiconductors product
- 2** - Current rating (25 = 25 A)
- 3** - Circuit configuration:
T = single thyristor
- 4** - Package:
T = D²PAK (TO-263AB)
- 5** - Type of silicon:
S = standard recovery rectifier
- 6** - Voltage rating: Voltage code x 100 = V_{RRM} — **16 = 1600 V**
- 7** - S = surface mountable
- 8** - 2 = true 2 pin D²PAK
- 9** - L = tape and reel (left oriented), for different orientation contact factory
- 10** - Environmental digit:
-M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

ORDERING INFORMATION (Example)

PREFERRED P/N	QUANTITY PER REEL	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-25TTS16S2L-M3	800	800	13" diameter reel

LINKS TO RELATED DOCUMENTS

Dimensions	www.vishay.com/doc?96683
Part marking information	www.vishay.com/doc?96693
Packaging information	www.vishay.com/doc?96317



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