COMPLIANT

HALOGEN FREE

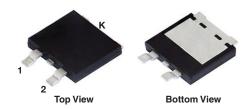


Vishay General Semiconductor

Dual Low-Voltage TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low $V_F = 0.4 \text{ V}$ at $I_F = 5.0 \text{ A}$

eSMP[®] Series SMPD (TO-263AC)





DESIGN SUPPORT TOOLS AVAILABLE



PRIMARY CHARACTERISTICS				
I _{F(AV)}	2 x 10 A			
V _{RRM}	45 V			
I _{FSM}	150 A			
V _F at I _F = 10 A (T _A = 125 °C)	0.46 V			
T _J max.	175 °C			
Package	SMPD (TO-263AC)			
Circuit configuration	Common cathode			

FEATURES

- Trench MOS Schottky technology
- Very low profile typical height of 1.7 mm
- · Ideal for automated placement
- · Low forward voltage drop, low power losses
- · High efficiency operation
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available:
 - Automotive ordering code: base P/NHM3
- Material categorization: for definitions of compliance please see <u>www.vishav.com/doc?99912</u>

TYPICAL APPLICATIONS

For use in high frequency DC/DC converters, switching power supplies, freewheeling diodes, OR-ing diode, and reverse battery protection in commercial, industrial, and automotive application.

MECHANICAL DATA

Case: SMPD (TO-263AC)

Molding compound meets UL 94 V-0 flammability rating

Base P/N-M3 - halogen-free, RoHS-compliant

Base P/NHM3 - halogen-free, RoHS-compliant, and

AEC-Q101 qualified

Terminals: matte tin plated leads, solderable per

J-STD-002 and JESD 22-B102

M3 and HM3 suffix meet JESD 201 class 2 whisker test

Polarity: as marked

MAXIMUM RATINGS (T _A = 25 °C unless otherwise noted)					
PARAMETER		SYMBOL	V20DM45C	UNIT	
Device marking code			V20DM45C		
Maximum repetitive peak reverse voltage		V _{RRM}	45	V	
Maximum average forward rectified current (fig. 1)	per device	I _{F(AV)} (1)	20	Α	
	per diode		10	Α	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load		I _{FSM}	150	А	
Operating junction temperature range		T _J ⁽²⁾	-40 to +175	°C	
Storage temperature range		T _{STG}	-55 to +175		

Notes

⁽¹⁾ Mounted on infinite heatsink

⁽²⁾ The heat generated must be less than the thermal conductivity from junction-to-ambient: $dP_D/dT_J < 1/R_{\theta,JA}$



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ELECTRICAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage per diode	I _F = 5 A	T _A = 25 °C	V _F ⁽¹⁾	0.50	-	. v
	I _F = 10 A			0.54	0.62	
	I _F = 5 A	T _A = 125 °C		0.40	-	
	I _F = 10 A			0.46	0.54	
Reverse current at rated V _R per diode	V _B = 45 V	T _A = 25 °C	I _R ⁽²⁾	-	0.2	- mA
	v _R = 45 v	T _A = 125 °C		3	8	
Typical junction capacitance	4.0 V, 1 MHz		C_{J}	1460	-	pF

Notes

(1) Pulse test: 300 µs pulse width, 1 % duty cycle

(2) Pulse test: Pulse width $\leq 5 \text{ ms}$

THERMAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL	V20DM45C	UNIT	
Typical thermal resistance per device	R ₀ JC (1)	1.8	°C/W	
	R _{0JA} (2)(3)	58	C/VV	

Notes

- (1) Mounted on infinite heatsink
- $^{(2)} \ \ The \ heat \ generated \ must \ be \ less \ than \ the \ thermal \ conductivity \ from \ junction-to-ambient: \ dP_D/dT_J < 1/R_{\theta JA} \ \ junction-to-ambient$
- (3) Free air, without heatsink

ORDERING INFORMATION (Example)					
PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE	
V20DM45C-M3/I	0.55	I	2000/reel	13" diameter plastic tape and reel	
V20DM45CHM3/I (1)	0.55	I	2000/reel	13" diameter plastic tape and reel	

Note

(1) AEC-Q101 qualified

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RATINGS AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)

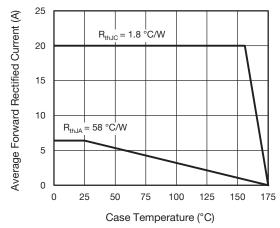
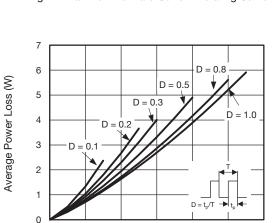


Fig. 1 - Maximum Forward Current Derating Curve



Average Forward Current (A)
Fig. 2 - Average Power Loss Characteristics

10

12

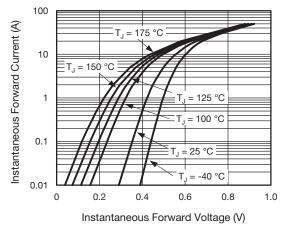


Fig. 3 - Typical Instantaneous Forward Characteristics

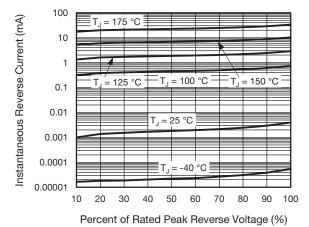


Fig. 4 - Typical Reverse Leakage Characteristics

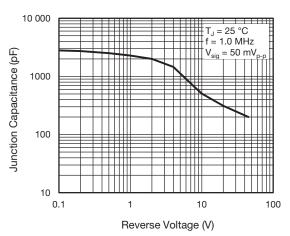


Fig. 5 - Typical Junction Capacitance

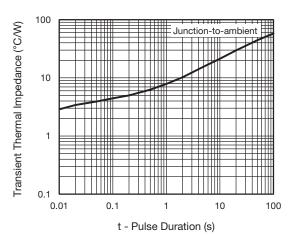


Fig. 6 - Typical Transient Thermal Impedance



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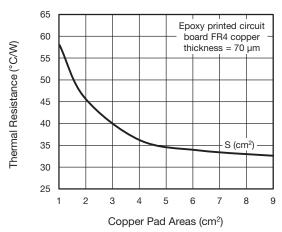
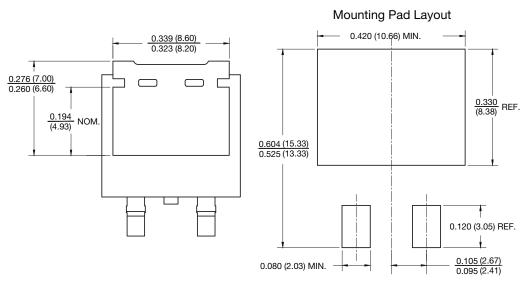


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMPD (TO-263AC) 0.402 (10.20) 0.071 (1.80) 0.063 (1.60) 0.386 (9.80) 0.020 (0.52) 0.011 (0.27) -0.059 (1.50) REF. 0.048 (1.21) 0.032 (0.81) 0.354 (8.99) 0.338 (8.59) 0.509 (12.93) 0.485 (12.33) 0 to 0.01 (0 to 0.254) 0.069 (1.74) 0.053 (1.34) 0.063 (1.60) 0.047 (1.20) 0.020 (0.52) 0.011 (0.27) 0.052 (1.23) 0.028 (0.72)



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