AUTOMOTIV

COMPLIANT

HALOGEN FREE



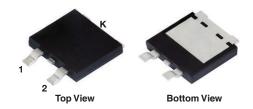
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## Vishay General Semiconductor

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

Ultra Low  $V_F = 0.40 \text{ V}$  at  $I_F = 5.0 \text{ A}$ 

## eSMP<sup>®</sup> Series SMPD (TO-263AC)





#### **LINKS TO ADDITIONAL RESOURCES**



PRIMARY CHARACTERISTICS				
I <sub>F(AV)</sub>	2 x 20 A			
V <sub>RRM</sub>	60 V			
I <sub>FSM</sub>	250 A			
$V_F$ at $I_F = 20$ A $(T_J = 125  ^{\circ}C)$	0.57 V			
T <sub>J</sub> 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 <a href="https://www.vishay.com/doc?99912">www.vishay.com/doc?99912</a>

#### **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

<b>MAXIMUM RATINGS</b> (T <sub>A</sub> = 25 °C unless otherwise noted)					
PARAMETER		SYMBOL	V40DM63C	UNIT	
Device marking code			V40DM63C		
Maximum repetitive peak reverse voltage		V <sub>RRM</sub>	60	V	
Maximum average forward rectified current (fig. 1)	per device	ı (1)	40	^	
	per diode	I <sub>F(AV)</sub> (1)	20	A	
Peak forward surge current 8.3 ms single half superimposed on rated load per diode	sine-wave	I <sub>FSM</sub>	250	А	
Operating junction temperature range		T <sub>J</sub> <sup>(2)</sup>	-40 to +175	°C	
Storage temperature range		T <sub>STG</sub>	-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<sub>D</sub>/dT<sub>J</sub> < 1/R<sub>θJA</sub>



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<b>ELECTRICAL CHARACTERISTICS</b> (T <sub>J</sub> = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage per diode	I <sub>F</sub> = 5 A	T <sub>J</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.50	-	V
	I <sub>F</sub> = 10 A			0.54	-	
	I <sub>F</sub> = 20 A			0.61	0.68	
	I <sub>F</sub> = 5 A	T <sub>J</sub> = 125 °C		0.40	-	
	I <sub>F</sub> = 10 A			0.47	-	
	I <sub>F</sub> = 20 A			0.57	0.62	
Reverse current at rated V <sub>R</sub> per diode	V <sub>R</sub> = 60 V	T <sub>J</sub> = 25 °C	I <sub>R</sub> (2)	-	0.04	- mA
	v <sub>R</sub> = 00 v	T <sub>J</sub> = 125 °C		2.5	8	
Typical junction capacitance per diode	4.0 V, 1 MHz		CJ	3100	-	pF

#### **Notes**

 $^{(1)}$  Pulse test: 300  $\mu$ s pulse width, 1 % duty cycle

(2) Pulse test: Pulse width ≤ 5 ms

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL V40DM63C			
Typical thermal resistance per device	R <sub>0</sub> JC <sup>(1)</sup>	1.0	°C/W	
	R <sub>0JA</sub> (2)(3)	50	]	

#### 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		
V40DM63C-M3/I	0.55	1	2000/reel	13" diameter plastic tape and reel		
V40DM63CHM3/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<sub>A</sub> = 25 °C unless otherwise noted)

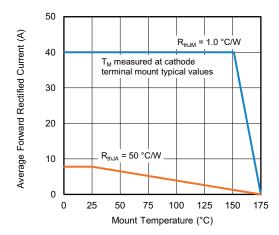


Fig. 1 - Maximum Forward Current Derating Curve

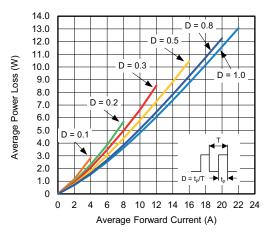


Fig. 2 - Average Power Loss Characteristics Per Diode

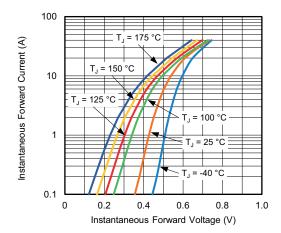


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

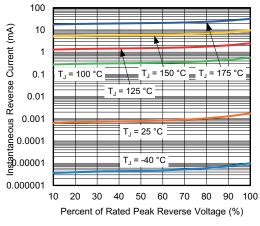


Fig. 4 - Typical Reverse Leakage Characteristics Per Diode

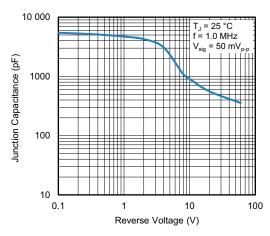


Fig. 5 - Typical Junction Capacitance Per Diode

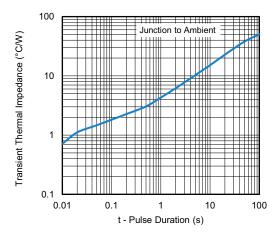


Fig. 6 - Typical Transient Thermal Impedance



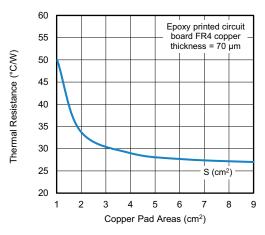
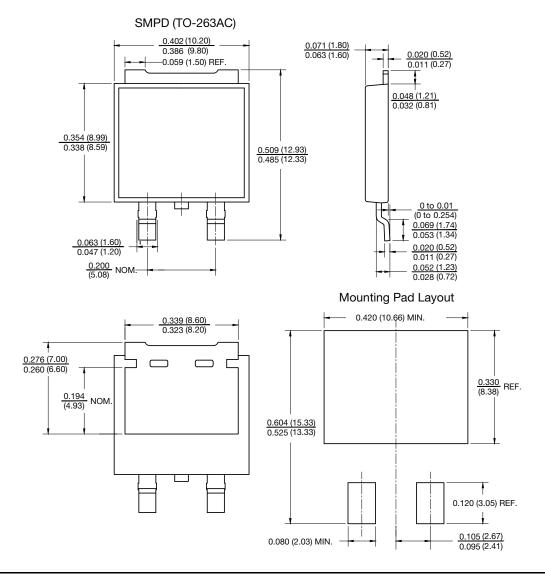


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

### **PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)





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