COMPLIANT

HALOGEN FREE

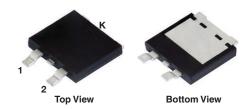


## Vishay General Semiconductor

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

Ultra Low  $V_F = 0.35 \text{ V}$  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>	100 V			
I <sub>FSM</sub>	340 A			
V <sub>F</sub> at I <sub>F</sub> = 20 A (T <sub>J</sub> = 125 °C)	0.56 V			
T <sub>J</sub> max.	150 °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.vishav.com/doc?99912"><u>www.vishav.com/doc?99912</u></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	V40D103C	UNIT	
Device marking code			V40D103C		
Maximum repetitive peak reverse voltage		$V_{RRM}$	100	V	
Maximum average forward rectified current (fig. 1)	per device	1 (1)	40		
	per diode	- I <sub>F(AV)</sub> <sup>(1)</sup>	20	A	
Peak forward surge current 8.3 ms single half superimposed on rated load	sine-wave	I <sub>FSM</sub>	340	А	
Operating junction temperature range		T <sub>J</sub> <sup>(2)</sup>	-40 to +150	°C	
Storage temperature range		T <sub>STG</sub>	-55 to +150	]	

#### 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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<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>	0.45	-	V
	I <sub>F</sub> = 10 A			0.51	-	
	I <sub>F</sub> = 20 A			0.62	0.70	
	I <sub>F</sub> = 5 A	T <sub>J</sub> = 125 °C		0.35	-	
	I <sub>F</sub> = 10 A			0.45	-	
	I <sub>F</sub> = 20 A			0.56	0.61	
Reverse current per diode	V <sub>R</sub> = 70 V	T <sub>J</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	0.008	-	mA
		T <sub>J</sub> = 125 °C		7.5	-	
	V 100 V	T <sub>J</sub> = 25 °C		-	1.2	
	V <sub>R</sub> = 100 V	T <sub>J</sub> = 125 °C		18	73	
Typical junction capacitance	4.0 V, 1 MHz		CJ	2750	-	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	V40D103C	UNIT
Typical thermal resistance per device	R <sub>0</sub> JC (1)	1.0	°C/W
Typical trieffial resistance per device	R <sub>0JA</sub> (2)(3)	50	C/VV

#### Notes

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

ORDERING INFORMATION (Example)					
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE	
V40D103C-M3/I	0.55	I	2000/reel	13" diameter plastic tape and reel	
V40D103CHM3/I (1)	0.55	I	2000/reel	13" diameter plastic tape and reel	

#### Note

(1) AEC-Q101 qualified

### **RATINGS AND CHARACTERISTICS CURVES** (T<sub>A</sub> = 25 °C unless otherwise noted)

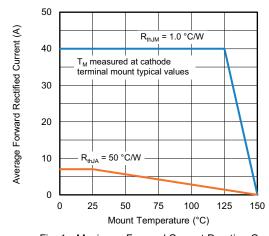


Fig. 1 - Maximum Forward Current Derating Curve

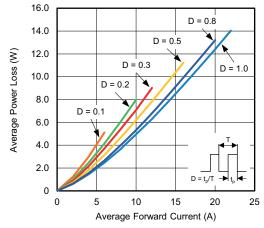


Fig. 2 - Average Power Loss Characteristics



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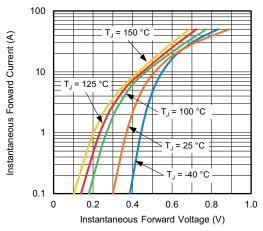


Fig. 3 - Typical Instantaneous Forward Characteristics

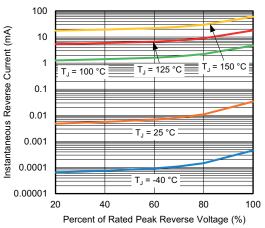


Fig. 4 - Typical Reverse Leakage Characteristics

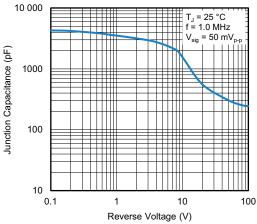


Fig. 5 - Typical Junction Capacitance

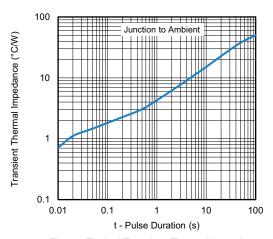


Fig. 6 - Typical Transient Thermal Impedance

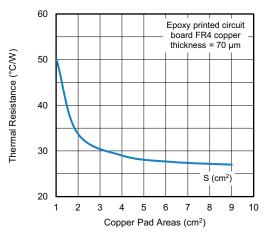
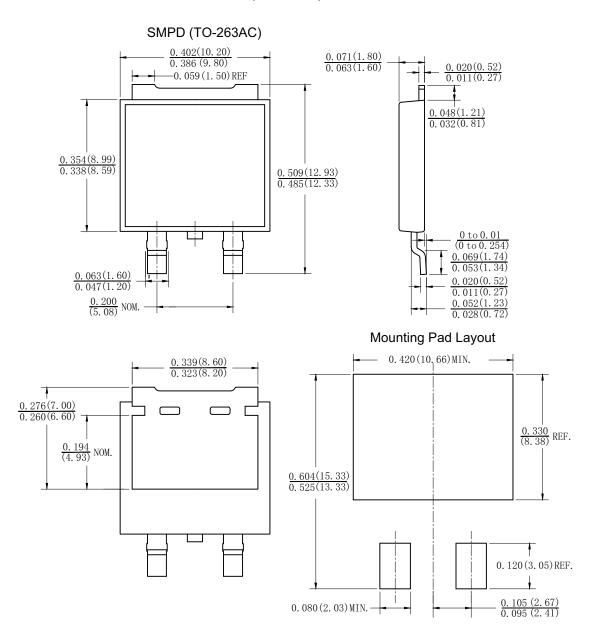


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas



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





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