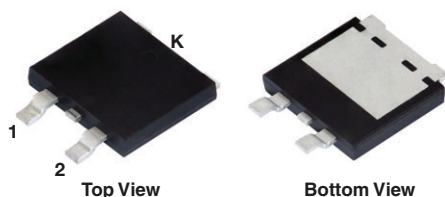


# Dual High-Voltage TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low  $V_F = 0.45\text{ V}$  at  $I_F = 5\text{ A}$

## eSMP® Series SMPD (TO-263AC)



## LINKS TO ADDITIONAL RESOURCES


[3D Models](#)


**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

## 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 [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

## 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.

## PRIMARY CHARACTERISTICS

$I_{F(AV)}$	2 x 20 A
$V_{RRM}$	120 V
$I_{FSM}$	250 A
$V_F$ at $I_F = 20\text{ A}$ ( $T_A = 125\text{ °C}$ )	0.64 V
$T_J$ max.	150 °C
Package	SMPD (TO-263AC)
Circuit configuration	Common cathode

## 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 meets JESD 201 class 2 whisker test

**Polarity:** as marked

## MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)

PARAMETER	SYMBOL	V40D120C	UNIT
Maximum repetitive peak reverse voltage	$V_{RRM}$	120	V
Maximum average forward rectified current (fig. 1)	$I_{F(AV)}$	40	A
		20	
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	$I_{FSM}$	250	A
Voltage rate of change (rated $V_R$ )	$dV/dt$	10 000	V/ $\mu$ s
Operating junction and storage temperature range	$T_J, T_{STG}$	-40 to +150	°C

ELECTRICAL CHARACTERISTICS (T <sub>A</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>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.51	-	V
	I <sub>F</sub> = 10 A			0.63	-	
	I <sub>F</sub> = 20 A			0.78	0.89	
	I <sub>F</sub> = 5 A	T <sub>A</sub> = 125 °C		0.45	-	
	I <sub>F</sub> = 10 A			0.55	-	
	I <sub>F</sub> = 20 A			0.64	0.71	
Reverse current at rated V <sub>R</sub> per diode	V <sub>R</sub> = 90 V	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	11	-	μA
		T <sub>A</sub> = 125 °C		9.4	-	mA
	V <sub>R</sub> = 120 V	T <sub>A</sub> = 25 °C		-	500	μA
		T <sub>A</sub> = 125 °C		23	70	mA

**Notes**

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

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

<b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)				
PARAMETER		SYMBOL	V40D120C	UNIT
Typical thermal resistance	per diode	$R_{\theta JC}$	1.9	$^{\circ}\text{C/W}$
	per device		1.0	
	per device	$R_{\theta JA}^{(1)(2)}$	45	

**Notes**

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

(2) Free air, without heatsink

<b>ORDERING INFORMATION</b> (Example)					
PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
SMPD (TO-263AC)	V40D120C-M3/I	0.55	I	2000/reel	13" diameter plastic tape and reel
SMPD (TO-263AC)	V40D120CHM3/I <sup>(1)</sup>	0.55	I	2000/reel	13" diameter plastic tape and reel

**Note**

(1) AEC-Q101 qualified

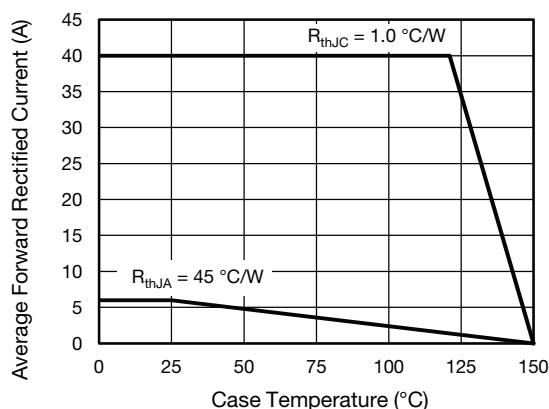
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Forward Current Derating Curve

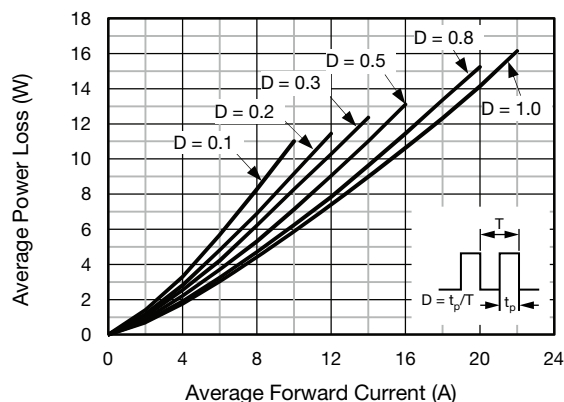


Fig. 2 - Forward Power Loss Characteristics Per Diode

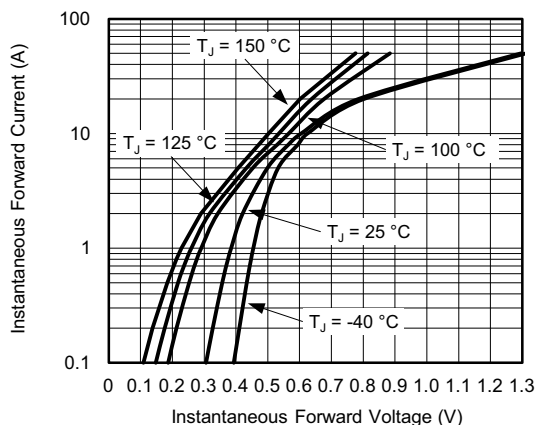


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

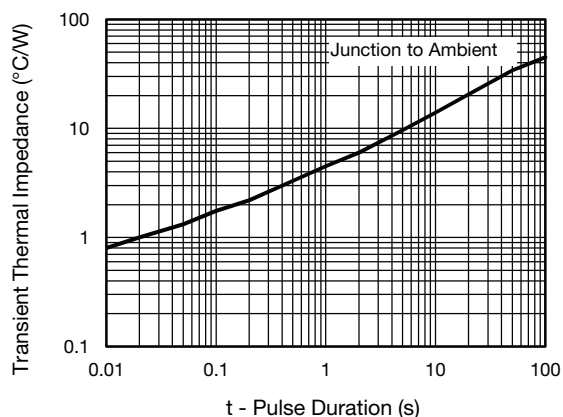


Fig. 6 - Typical Transient Thermal Impedance Per Device

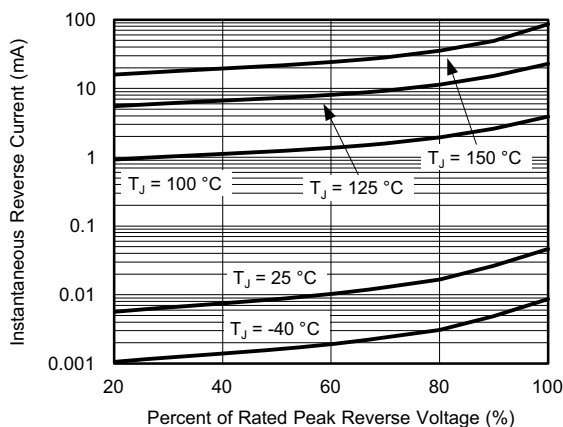


Fig. 4 - Typical Reverse Characteristics Per Diode

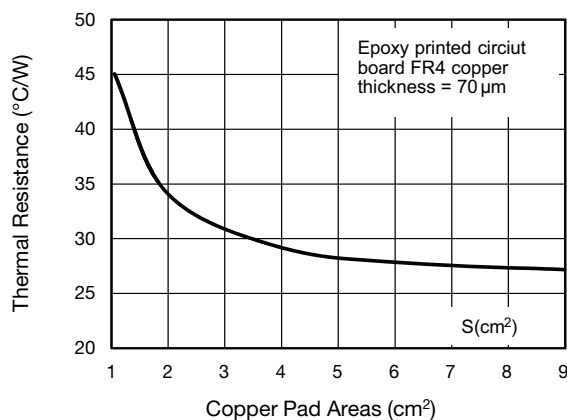


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

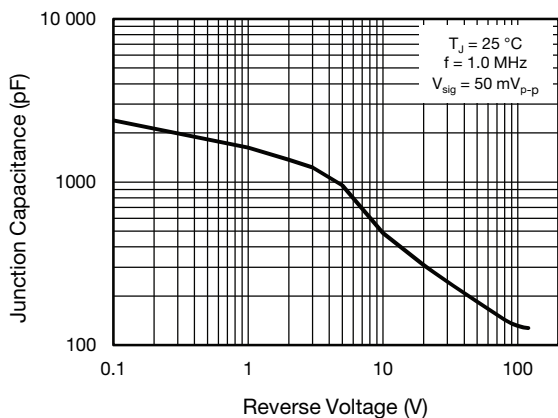
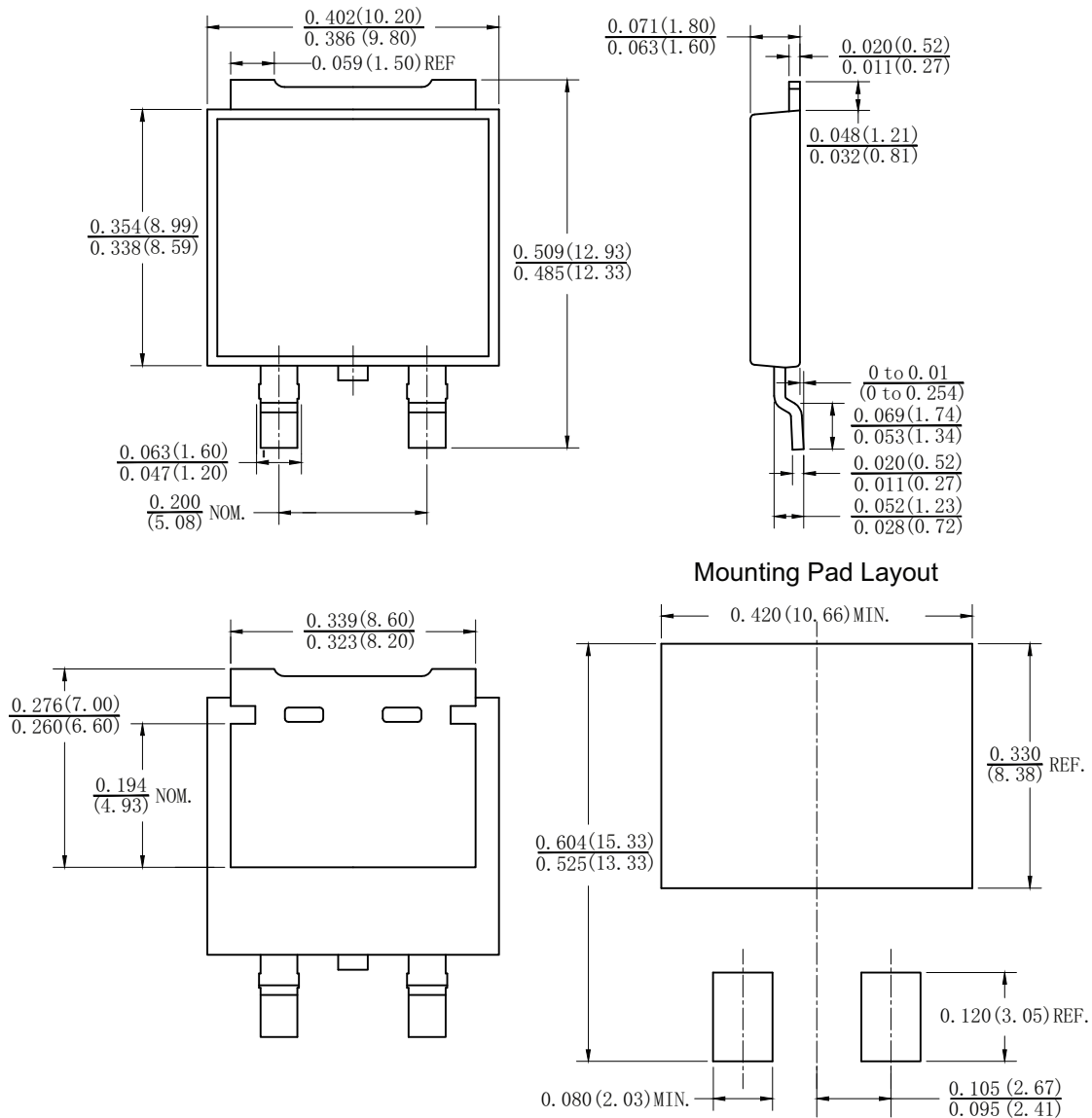


Fig. 5 - Typical Junction Capacitance Per Diode

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

**SMPD (TO-263AC)**




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