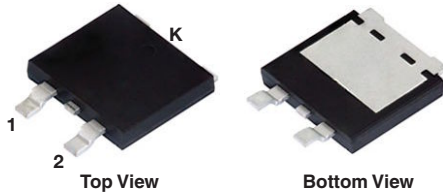
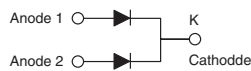


# Dual High Voltage TMBS® (Trench MOS Barrier Schottky) Rectifier

## eSMP® Series


**SMPD (TO-263AC)**

 AUTOMOTIVE  
GRADE  
Available

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

## FEATURES

- Very low profile - typical height of 1.7 mm
- 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
- 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.

## MECHANICAL DATA

**Case:** SMPD (TO-263AC)

Molding compound meets UL 94 V-0 flammability rating  
Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade

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

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	2 x 10.0 A
$V_{RRM}$	170 V
$I_{FSM}$	150 A
$V_F$ at $I_F = 10.0$ A ( $T_A = 125$ °C)	0.68 V
$T_J$ max.	175 °C
Package	SMPD (TO-263AC)
Circuit configurations	Common cathode

MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)			
PARAMETER	SYMBOL	V20D170C	UNIT
Device marking code		V20D170C	
Maximum repetitive peak reverse voltage	$V_{RRM}$	170	V
Maximum average forward rectified current (fig. 1)	per device	20	A
	per diode	10	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	$I_{FSM}$	150	A
Operating junction temperature range	$T_J$ <sup>(1)</sup>	-40 to +175	°C
Storage temperature range	$T_{STG}$	-55 to +175	°C

### Note

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



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>	0.75	-	V
	I <sub>F</sub> = 10 A			0.83	0.9	
	I <sub>F</sub> = 5 A	T <sub>A</sub> = 125 °C		0.6	-	
	I <sub>F</sub> = 10 A			0.68	0.76	
Reverse current at rated V <sub>R</sub> per diode	V <sub>R</sub> = 140 V	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	0.001	-	mA
		T <sub>A</sub> = 125 °C		0.8	-	mA
	V <sub>R</sub> = 170 V	T <sub>A</sub> = 25 °C		-	0.15	mA
		T <sub>A</sub> = 125 °C		1.5	5	mA
Typical junction capacitance	4.0 V, 1 MHz		C <sub>J</sub>	520	-	pF

**Notes**

- (1) Pulse test: 300 μs 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	V20D170C	UNIT
Typical thermal resistance per device	R <sub>θJC</sub> <sup>(1)</sup>	1.5	°C/W
	R <sub>θJA</sub> <sup>(2)(3)</sup>	58	

**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> - junction-to-mount
- (3) Free air, without heatsink

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
V20D170C-M3/I	0.55	I	2000/reel	13" diameter plastic tape and reel
V20D170CHM3/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<sub>A</sub> = 25 °C unless otherwise noted)**

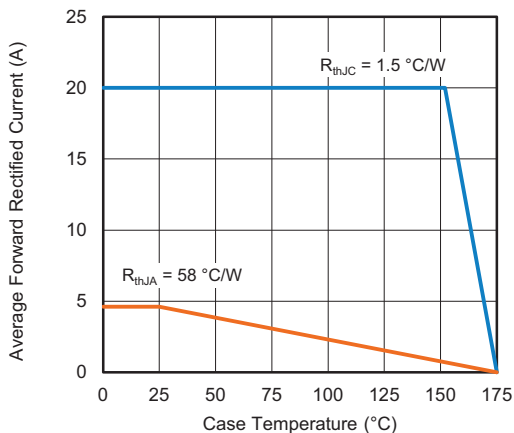


Fig. 1 - Forward Current Derating Curve

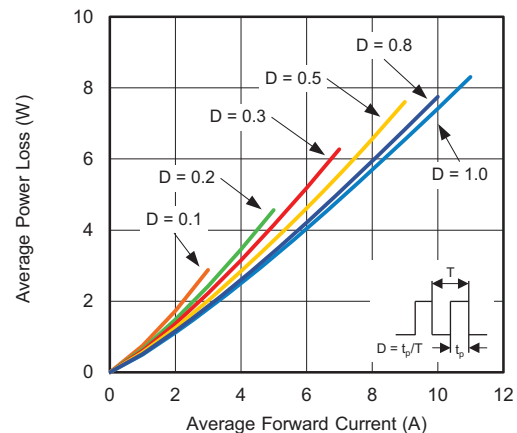


Fig. 2 - Forward Power Loss Characteristics

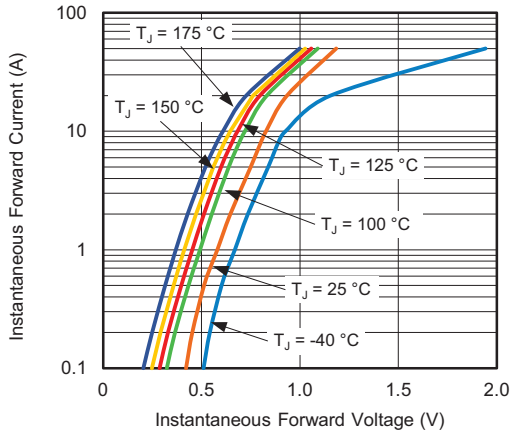


Fig. 3 - Typical Instantaneous Forward Characteristics

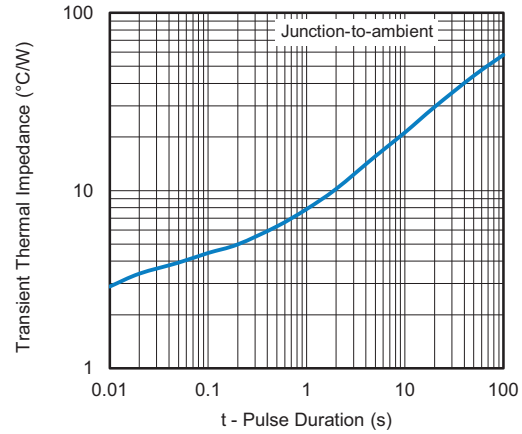


Fig. 6 - Typical Transient Thermal Impedance

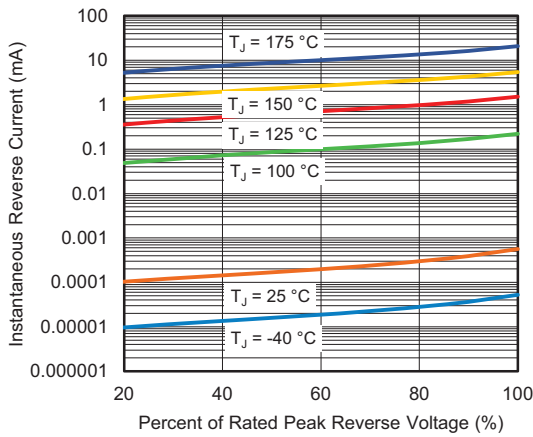


Fig. 4 - Typical Reverse Characteristics

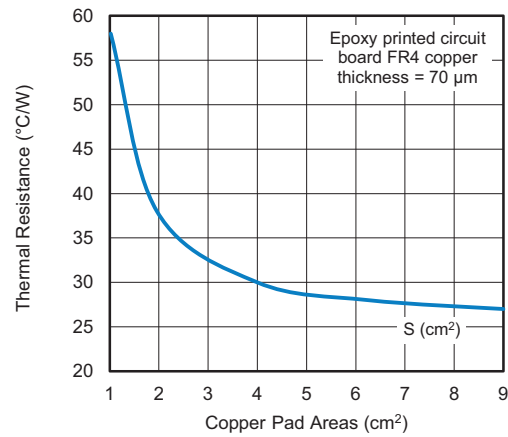


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

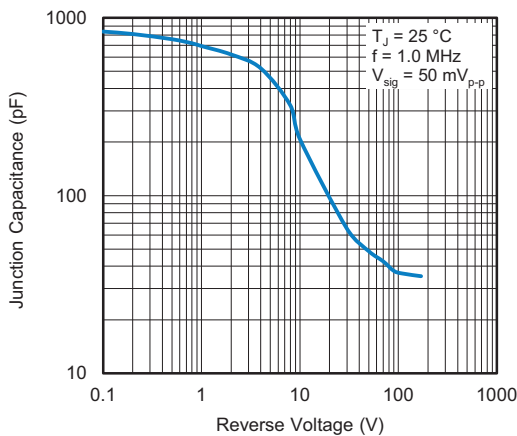
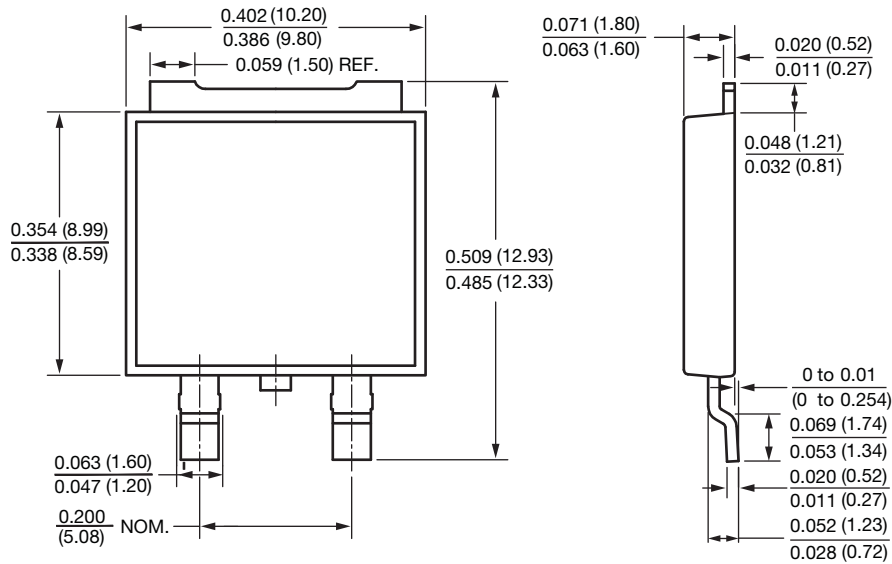


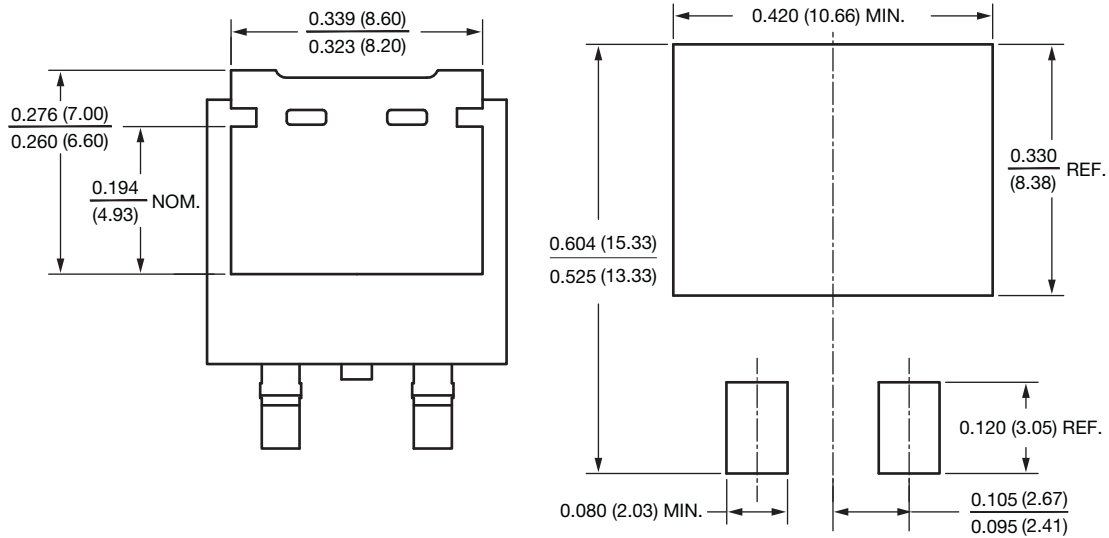
Fig. 5 - Typical Junction Capacitance

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

**SMPD (TO-263AC)**



**Mounting Pad Layout**





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