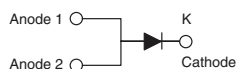
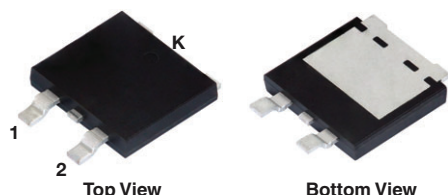


# TMBS® (Trench MOS Barrier Schottky) Rectifier for PV Solar Cell Bypass Protection

Ultra Low  $V_F = 0.31\text{ V}$  at  $I_F = 5\text{ A}$

## eSMP® Series SMPD (TO-263AC)



## LINKS TO ADDITIONAL RESOURCES


[3D Models](#)

## PRIMARY CHARACTERISTICS

$I_{F(AV)}$	20 A
$V_{RRM}$	45 V
$I_{FSM}$	160 A
$V_F$ at $I_F = 20\text{ A}$ ( $T_A = 125\text{ °C}$ )	0.50 V
$T_{OP}$ max. (AC model)	150 °C
$T_J$ max. (DC forward current)	200 °C
Package	SMPD (TO-263AC)
Circuit configuration	Single

## 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
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



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

## TYPICAL APPLICATIONS

For use in solar cell junction box as a bypass diode for protection, using DC forward current without reverse bias.

## 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

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 suffix meets JESD 201 class 2 whisker test

**Polarity:** as marked

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

PARAMETER	SYMBOL	V20DL45BP	UNIT
Maximum repetitive peak reverse voltage	$V_{RRM}$	45	V
Maximum DC forward current (fig. 1)	$I_{F(DC)}^{(1)}$	20	A
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	$I_{FSM}$	160	A
Operating junction temperature range (AC model)	$T_{OP}$	-40 to +150	°C
Junction temperature in DC forward current without reverse bias, $t \leq 1\text{ h}$	$T_J^{(2)}$	$\leq 200$	°C

## Note

(1) With heatsink

(2) Meets the requirements of IEC 61215 ed.2 bypass diode thermal test

<b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)					
PARAMETER	TEST CONDITIONS	SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	$I_F = 5\text{ A}$	$T_A = 25\text{ }^{\circ}\text{C}$	0.42	-	V
	$I_F = 10\text{ A}$		0.48	-	
	$I_F = 20\text{ A}$		0.55	0.64	
	$I_F = 5\text{ A}$	$T_A = 125\text{ }^{\circ}\text{C}$	0.31	-	
	$I_F = 10\text{ A}$		0.38	-	
	$I_F = 20\text{ A}$		0.50	0.58	
Reverse current	$V_R = 45\text{ V}$	$T_A = 25\text{ }^{\circ}\text{C}$	-	2.5	mA
		$T_A = 125\text{ }^{\circ}\text{C}$	20	50	

**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	V20DL45BP	UNIT
Typical thermal resistance	$R_{\theta JC}$	1.6	$^{\circ}\text{C/W}$
	$R_{\theta JA}^{(1)(2)}$	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)	V20DL45BP-M3/I	0.55	I	2000/reel	13" diameter plastic tape and reel

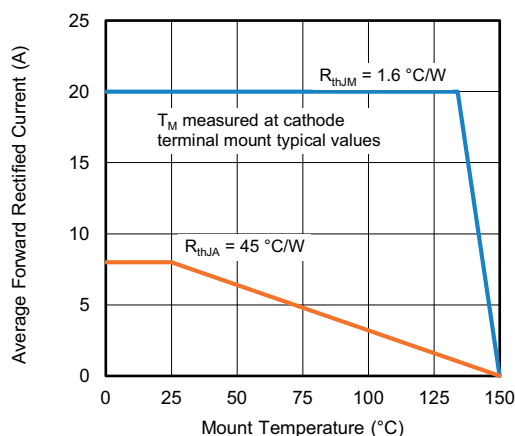
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Forward Current Derating Curve

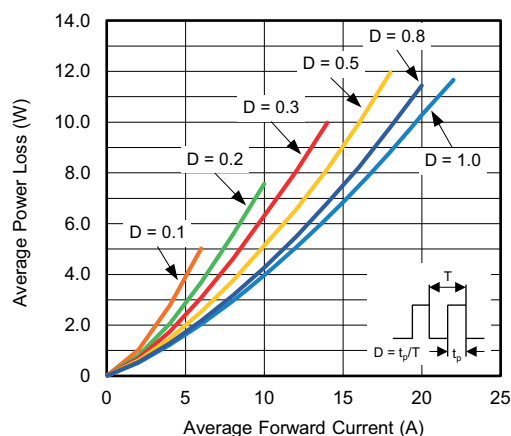


Fig. 2 - Forward Power Loss Characteristics

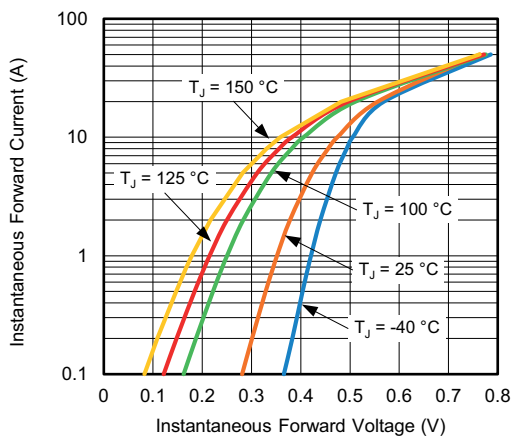


Fig. 3 - Typical Instantaneous Forward Characteristics

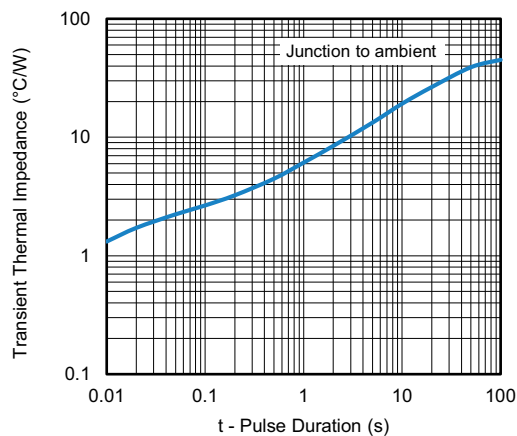


Fig. 6 - Typical Transient Thermal Impedance

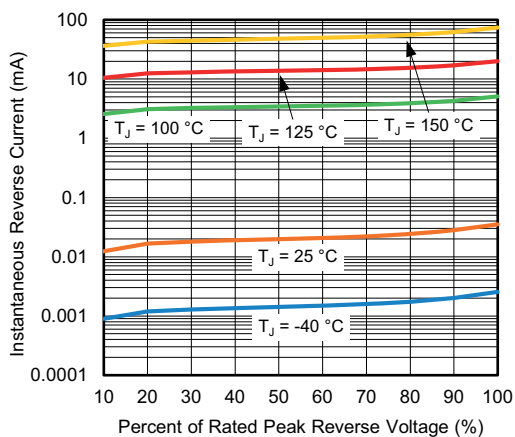


Fig. 4 - Typical Reverse Characteristics

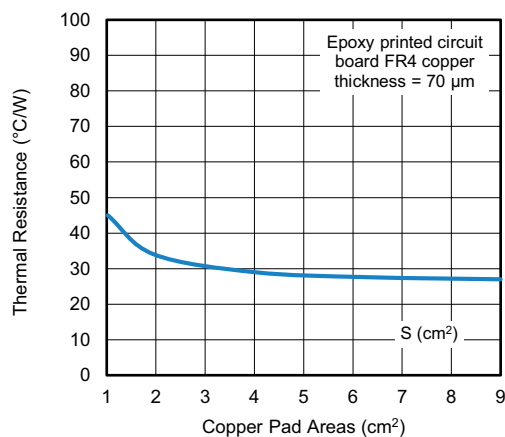


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

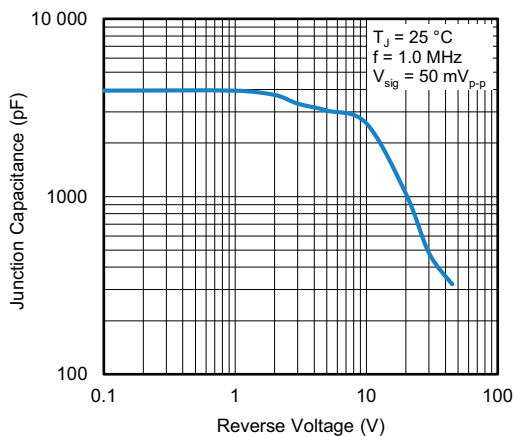
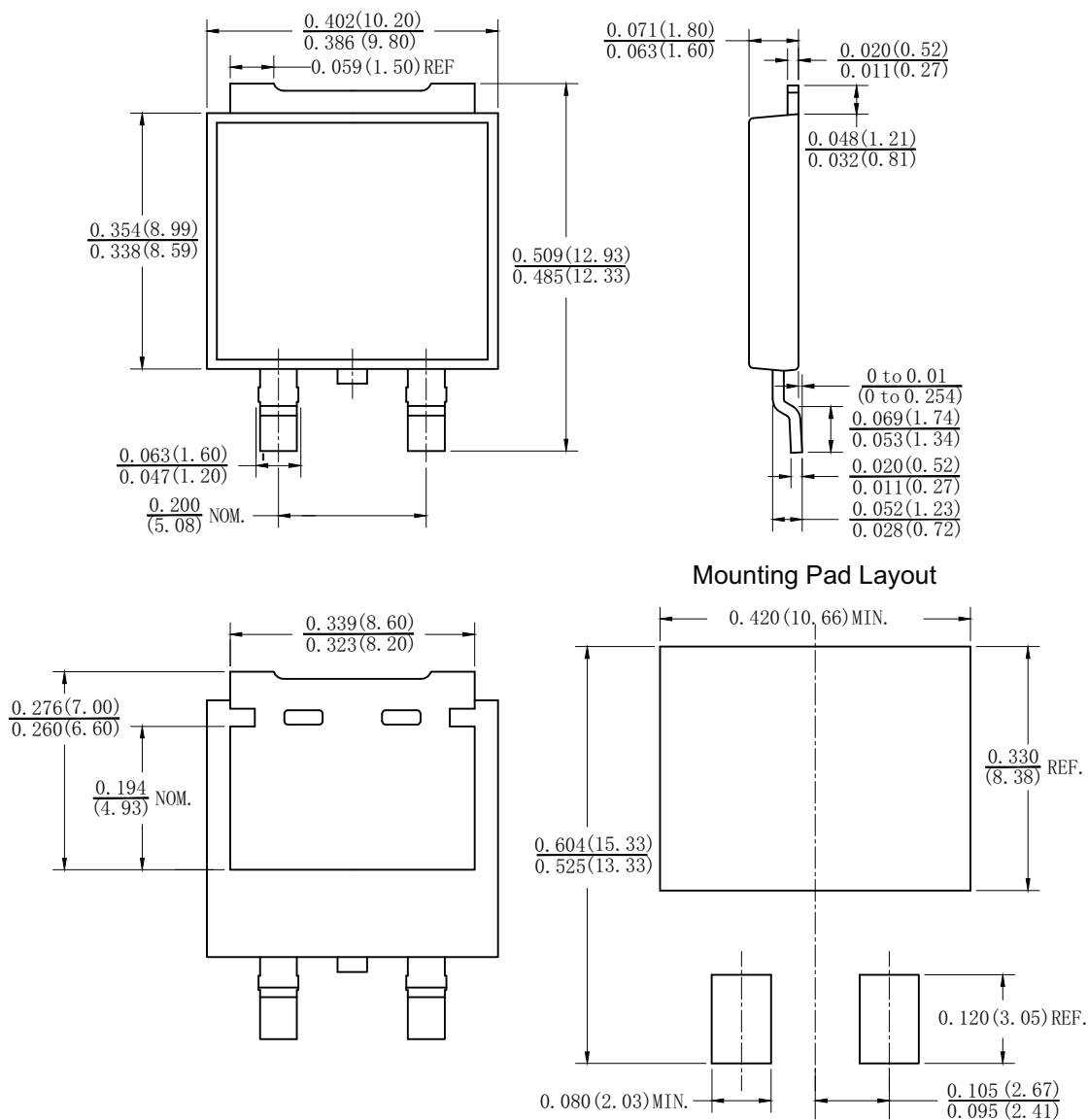


Fig. 5 - Typical Junction Capacitance

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

**SMPD (TO-263AC)**




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