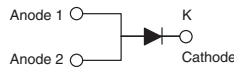
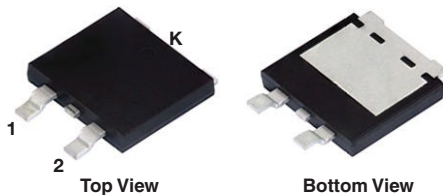


TMBS[®] (Trench MOS Barrier Schottky) Rectifier for PV Solar Cell Bypass Protection

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

eSMP[®] Series SMPD (TO-263AC)



DESIGN SUPPORT TOOLS AVAILABLE



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



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 1A 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⁾	≤ 200	°C

Note

⁽¹⁾ With heatsink

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

ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	$I_F = 5\text{ A}$	$T_A = 25\text{ }^\circ\text{C}$	$V_F^{(1)}$	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	$V_R = 45\text{ V}$	$T_A = 25\text{ }^\circ\text{C}$	$I_R^{(2)}$	-	2.5	mA
		$T_A = 125\text{ }^\circ\text{C}$		20	50	

Notes

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
 (2) Pulse test: Pulse width $\leq 5\text{ ms}$

THERMAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ 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

ORDERING INFORMATION (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

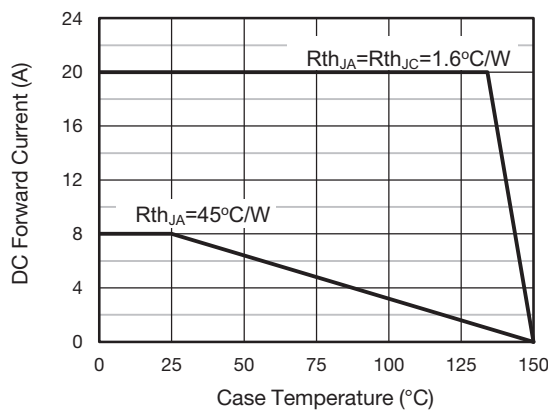
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)


Fig. 1 - Forward Current Derating Curve

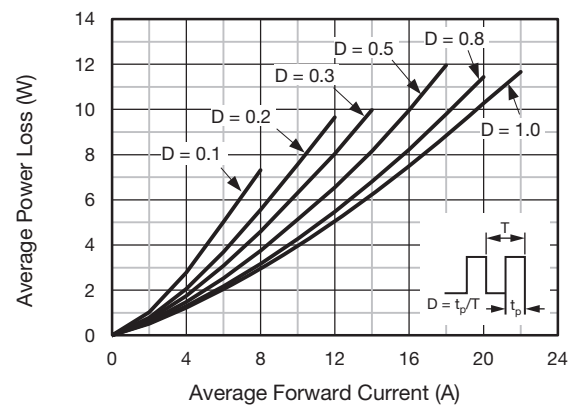


Fig. 2 - Forward Power Loss Characteristics

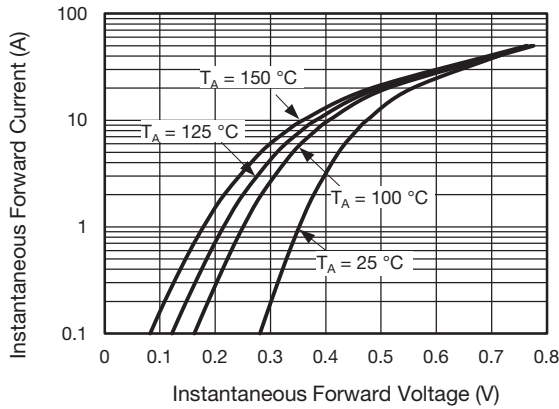


Fig. 3 - Typical Instantaneous Forward Characteristics

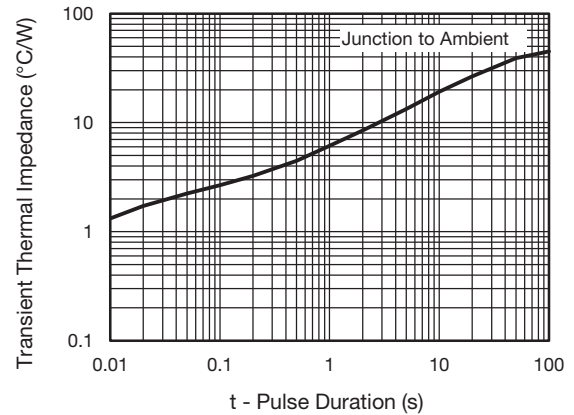


Fig. 6 - Typical Transient Thermal Impedance

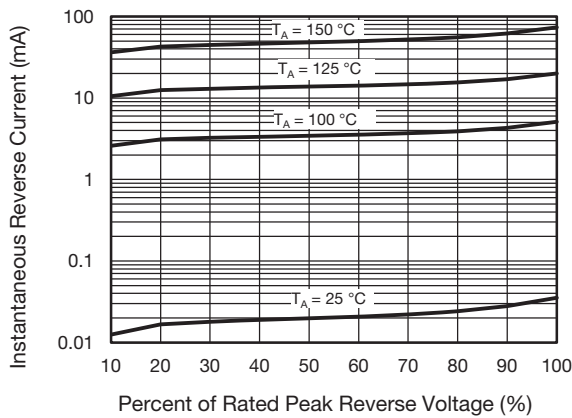


Fig. 4 - Typical Reverse Characteristics

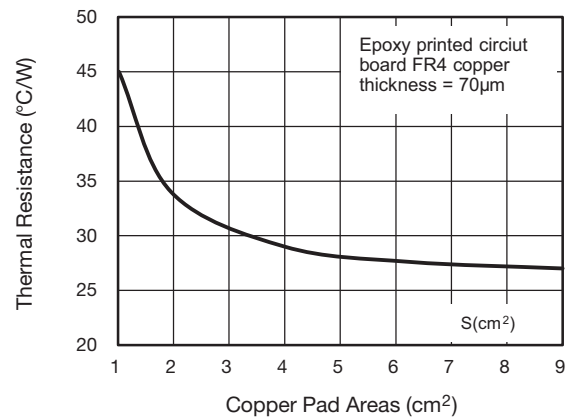


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

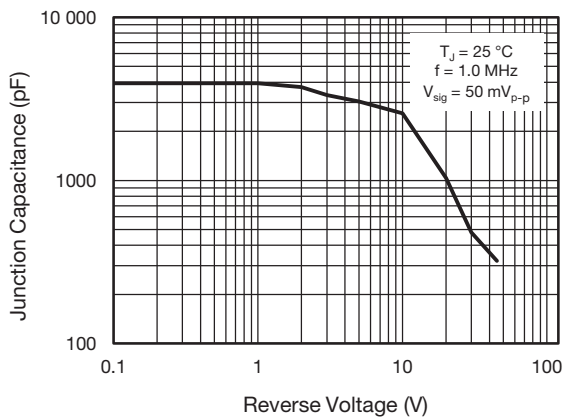
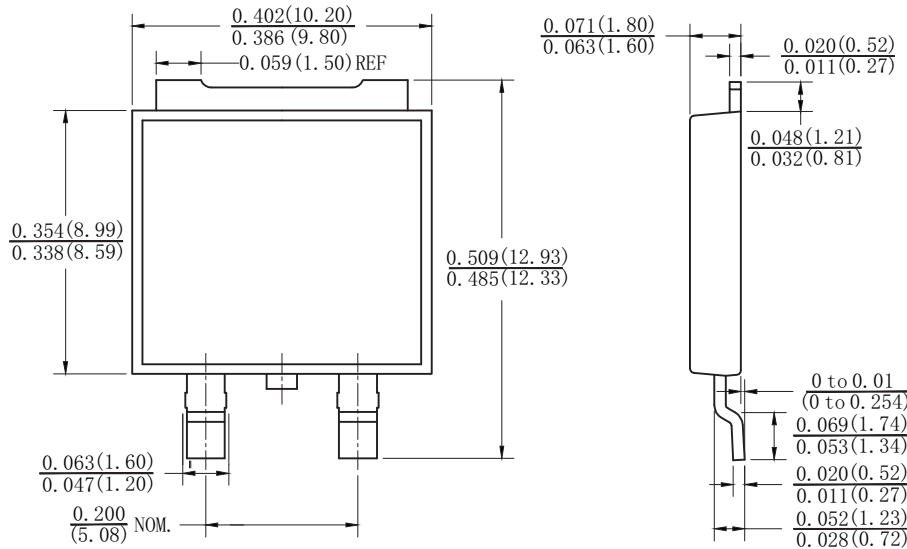


Fig. 5 - Typical Junction Capacitance

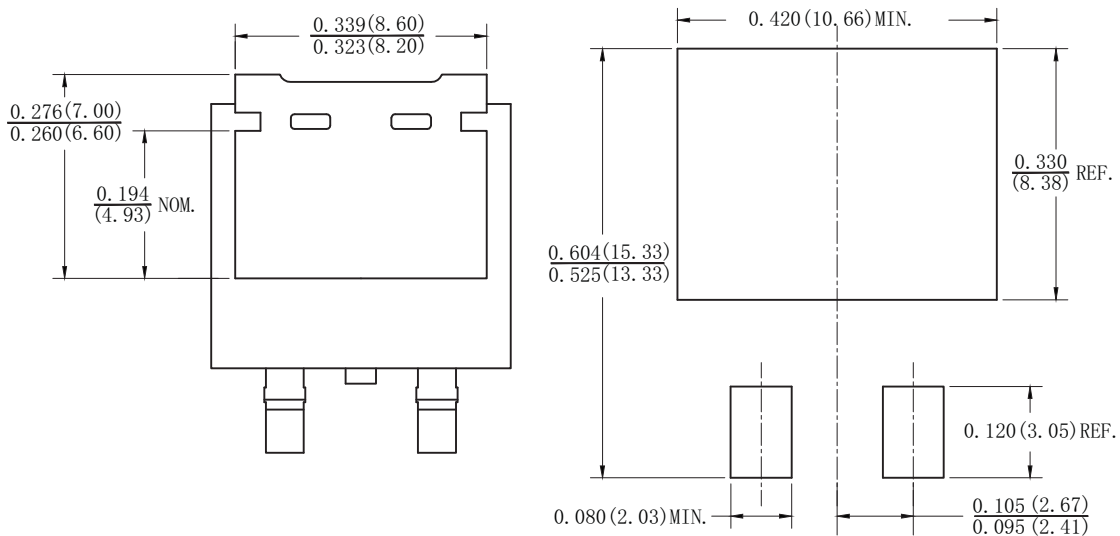


PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMPD (TO-263AC)



Mounting Pad Layout





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