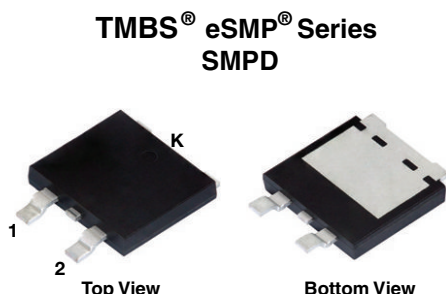
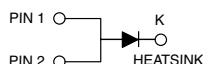


Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

Ultra Low $V_F = 0.26\text{ V}$ at $I_F = 5\text{ A}$



V40DL45BP



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

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

PRIMARY CHARACTERISTICS

$I_{F(DC)}$	40 A
V_{RRM}	45 V
I_{FSM}	240 A
V_F at $I_F = 40\text{ A}$ ($T_A = 125\text{ °C}$)	0.53 V
T_{OP} max. (AC model)	150 °C
T_J max. (DC forward current)	200 °C
Package	SMPD
Diode variations	Single die

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

PARAMETER	SYMBOL	V40DL45BP	UNIT
Maximum repetitive peak reverse voltage	V_{RRM}	45	V
Maximum DC forward current (fig. 1)	$I_{F(DC)}$ ⁽¹⁾	40	A
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I_{FSM}	240	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	$I_F = 5\text{ A}$	$V_F^{(1)}$	0.38	-	V
	$I_F = 20\text{ A}$		0.47	-	
	$I_F = 40\text{ A}$		0.58	0.66	
	$I_F = 5\text{ A}$		0.26	-	
	$I_F = 20\text{ A}$		0.38	-	
	$I_F = 40\text{ A}$		0.53	0.61	
Reverse current	$V_R = 45\text{ V}$	$I_R^{(2)}$	-	5	mA
			36	125	

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	V40DL45BP	UNIT
Typical thermal resistance	$R_{\theta JC}$	0.9	$^{\circ}\text{C/W}$
	$R_{\theta JA}^{(1)(2)}$	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	V40DL45BP-M3/I	0.55	I	2000/reel	13" diameter plastic tape and reel

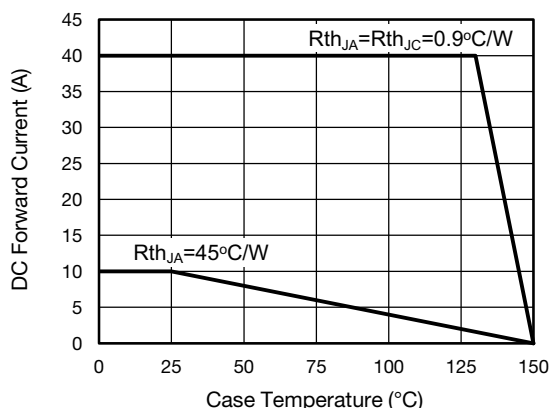
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)


Fig. 1 - Forward Current Derating Curve

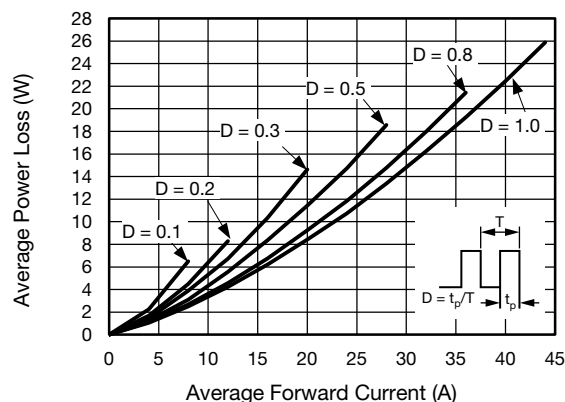


Fig. 2 - Forward Power Loss Characteristics

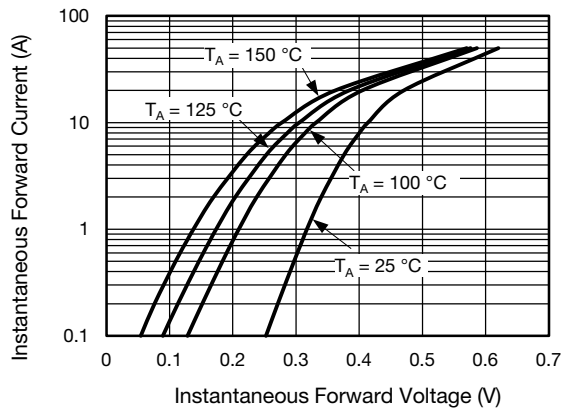


Fig. 3 - Typical Instantaneous Forward Characteristics

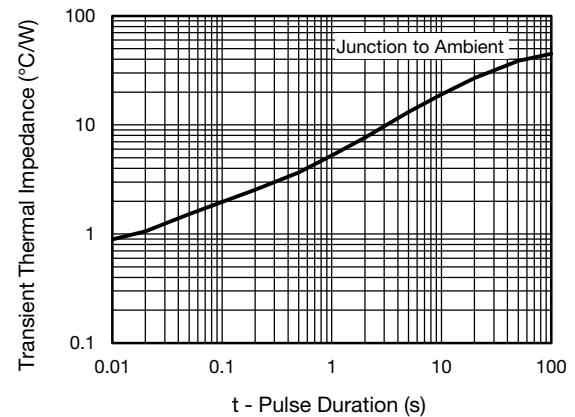


Fig. 6 - Typical Transient Thermal Impedance

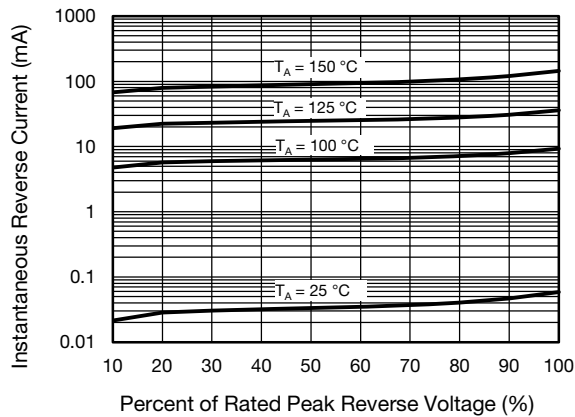


Fig. 4 - Typical Reverse Characteristics

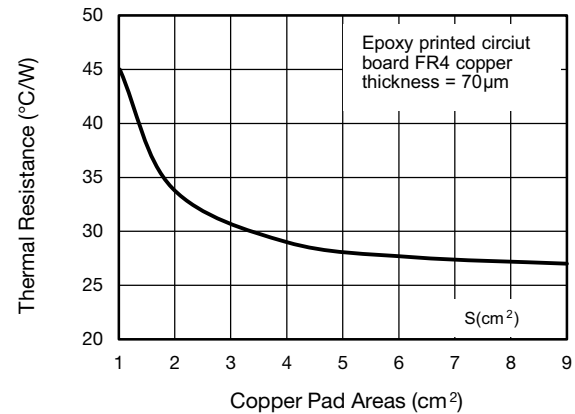


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

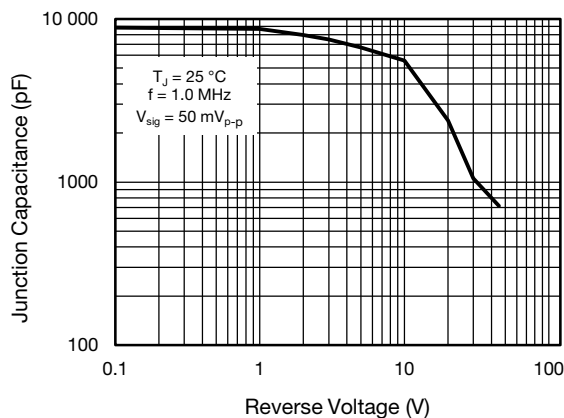
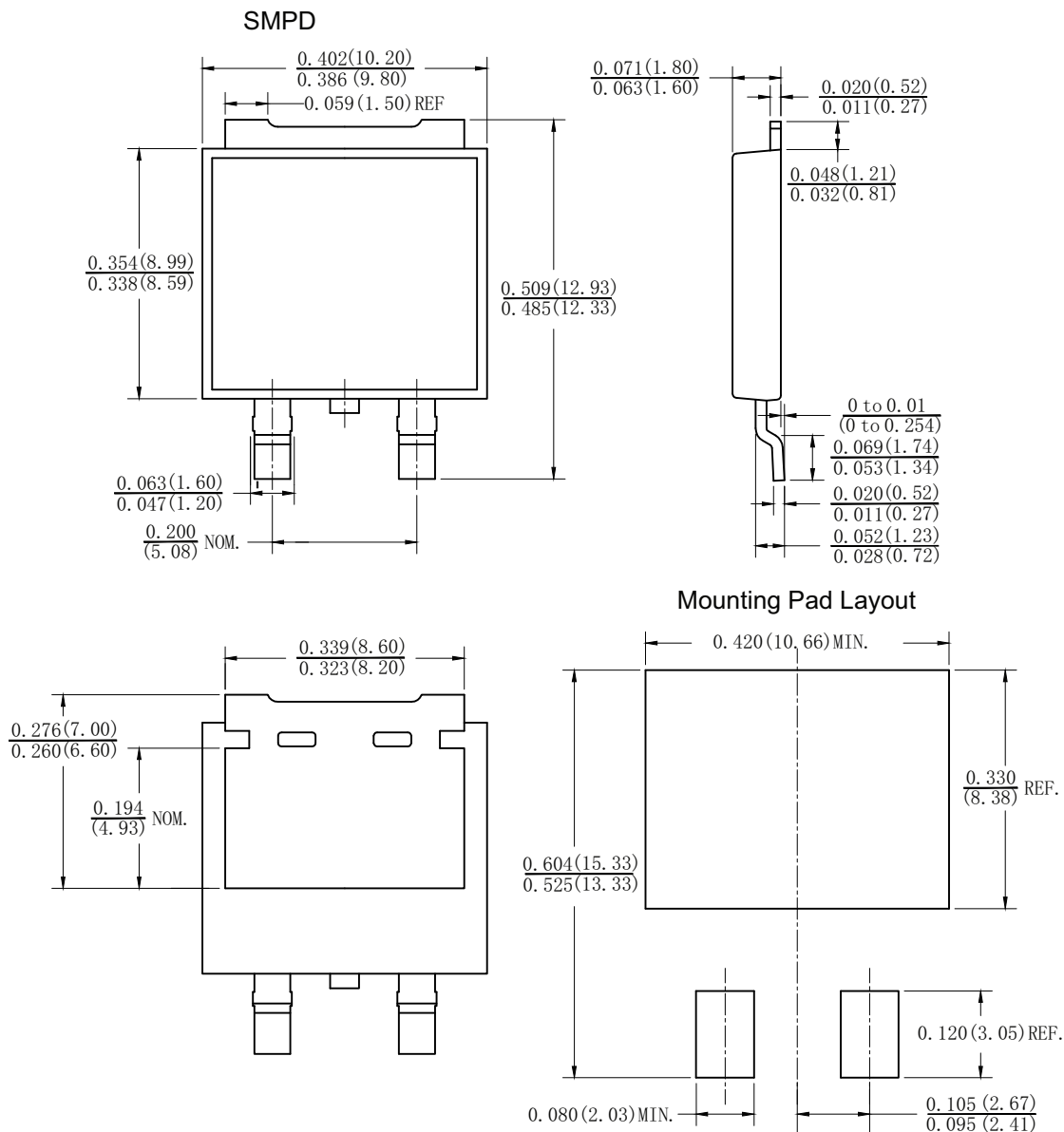


Fig. 5 - Typical Junction Capacitance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)




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