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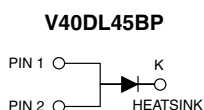
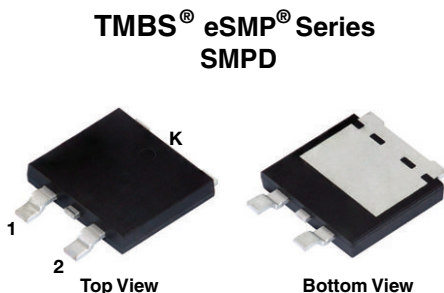
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**V40DL45BP**

Vishay General Semiconductor

## Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

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



### 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

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, $t = \leq 1\text{ h}$	$T_J^{(2)}$	$\leq 200$	°C

#### Note

(1) With heatsink

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



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ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I <sub>F</sub> = 5 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.38	-	V
	I <sub>F</sub> = 20 A			0.47	-	
	I <sub>F</sub> = 40 A			0.58	0.66	
	I <sub>F</sub> = 5 A	T <sub>A</sub> = 125 °C		0.26	-	
	I <sub>F</sub> = 20 A			0.38	-	
	I <sub>F</sub> = 40 A			0.53	0.61	
Reverse current	V <sub>R</sub> = 45 V	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	-	5	mA
		T <sub>A</sub> = 125 °C		36	125	

**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	V40DL45BP	UNIT
Typical thermal resistance	R <sub>θJC</sub>	0.9	°C/W
	R <sub>θJA</sub> <sup>(1)(2)</sup>	45	

**Notes**

- (1) 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>
- (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<sub>A</sub> = 25 °C unless otherwise noted)**

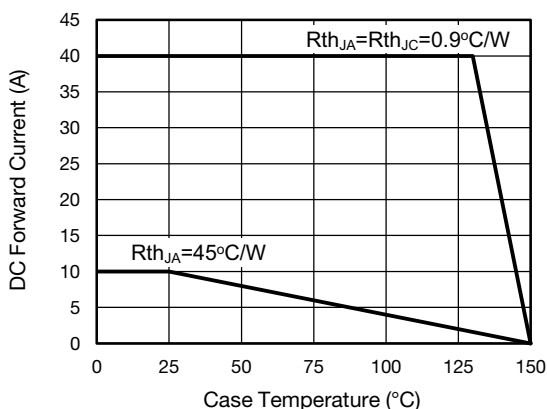


Fig. 1 - Forward Current Derating Curve

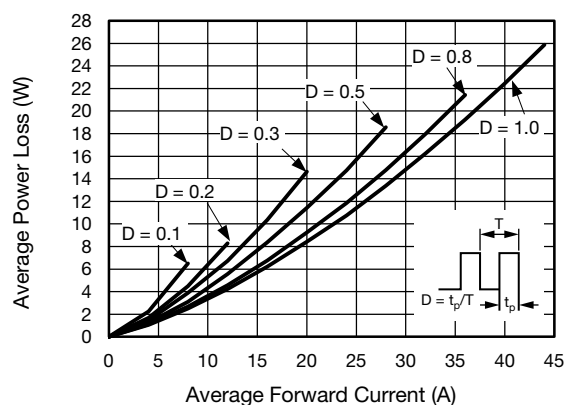


Fig. 2 - Forward Power Loss Characteristics



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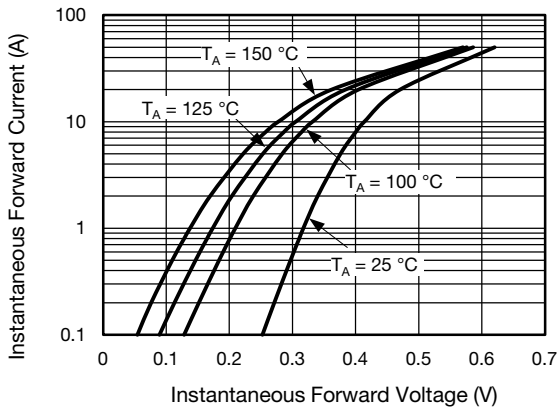


Fig. 3 - Typical Instantaneous Forward Characteristics

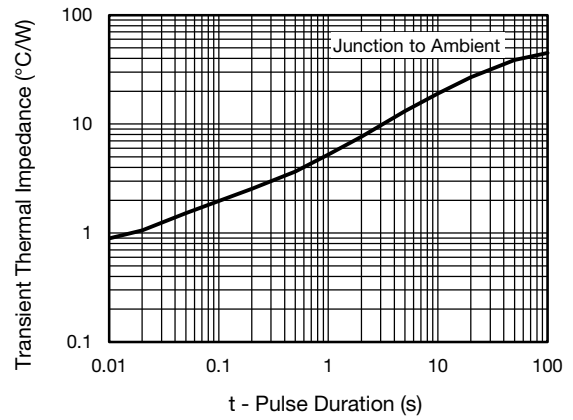


Fig. 6 - Typical Transient Thermal Impedance

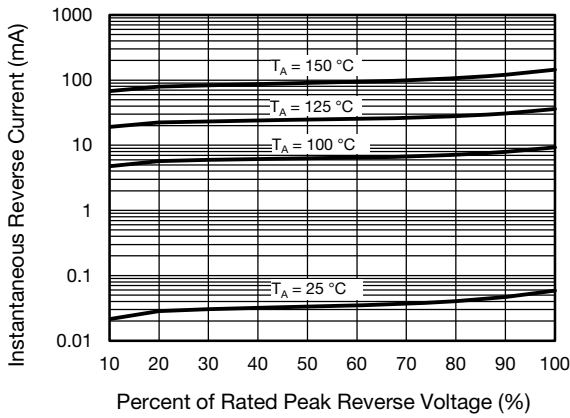


Fig. 4 - Typical Reverse Characteristics

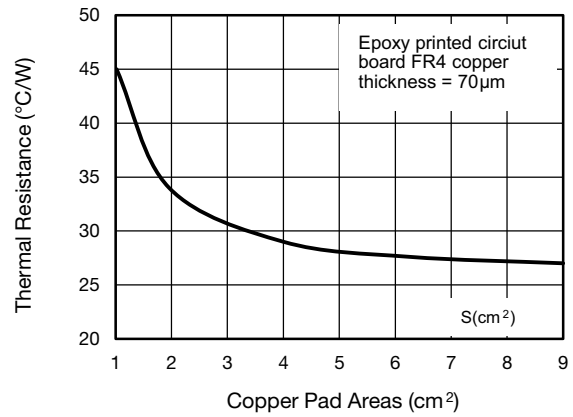


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

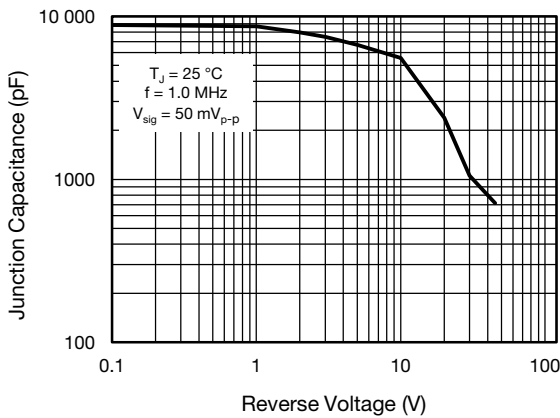


Fig. 5 - Typical Junction Capacitance

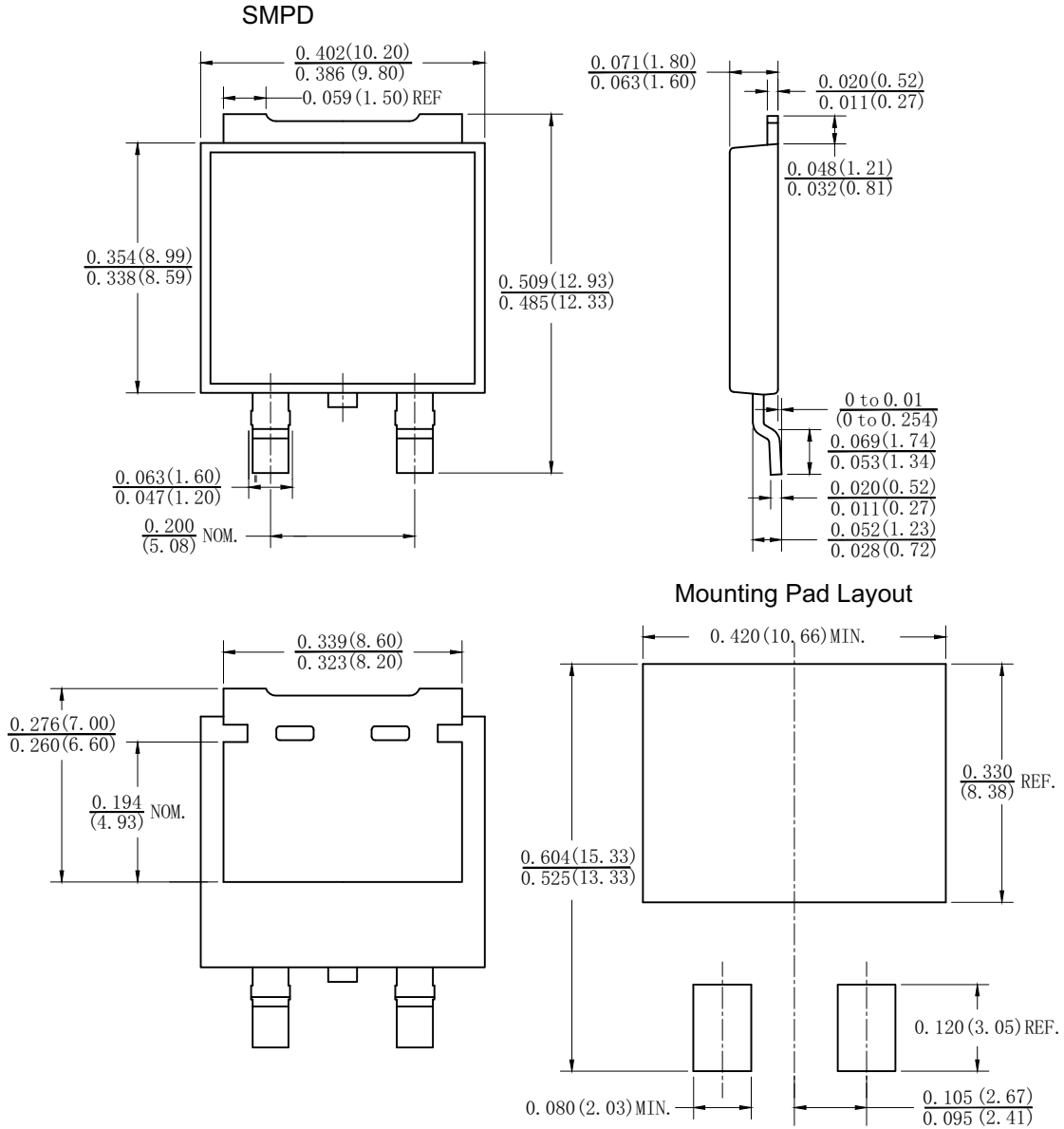


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**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)





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