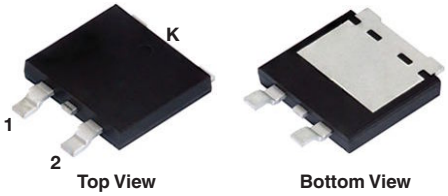
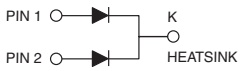
Dual Low-Voltage Trench MOS Barrier Schottky Rectifier

Ultra Low V_F = 0.29 V at I_F = 5.0 A

TMBS® eSMP® Series
SMPD (TO-263AC)



V40D45C



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
- AEC-Q101 qualified available:
  - Automotive ordering code: base P/NHM3
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE Available

RoHS COMPLIANT

HALOGEN FREE

TYPICAL APPLICATIONS

For use in high frequency DC/DC converters, switching power supplies, freewheeling diodes, OR-ing diode, and reverse battery protection in commercial, industrial, and automotive application.

MECHANICAL DATA

Case: SMPD (TO-263AC)
Molding compound meets UL 94 V-0 flammability rating
Base P/N-M3 - halogen-free, RoHS-compliant
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 meet JESD 201 class 2 whisker test

Polarity: as marked

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	2 x 20 A
V_{RRM}	45 V
I_{FSM}	250 A
V_F at I_F = 20 A (T_A = 125 °C)	0.40 V
T_J max.	150 °C
Package	SMPD (TO-263AC)
Diode variation	Common cathode

MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)

PARAMETER		SYMBOL	V40D45C	UNIT
Device marking code			V40D45C	
Maximum repetitive peak reverse voltage		V_{RRM}	45	V
Maximum average forward rectified current (fig. 1)	per device	$I_{F(AV)}$ (1)	40	A
	per diode		20	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load		I_{FSM}	250	A
Operating junction temperature range		T_J (2)	-40 to +150	°C
Storage temperature range		T_{STG}	-55 to +150	

Notes

(1) Mounted on infinite heatsink

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

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ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)						
PARAMETER	**TEST CONDITIONS**		**SYMBOL**	**TYP.**	**MAX.**	**UNIT**
Instantaneous forward voltage per diode	I_F = 5 A	T_A = 25 °C	V_F (1)	0.41	-	V
	I_F = 10 A			0.44	-	
	I_F = 20 A			0.49	0.57	
	I_F = 5 A	T_A = 125 °C		0.29	-	
	I_F = 10 A			0.33	-	
	I_F = 20 A			0.4	0.48	
Reverse current per diode	V_R = 45 V	T_A = 25 °C	I_R (2)	-	2.5	mA
		T_A = 125 °C		19	60	
Typical junction capacitance	4.0 V, 1 MHz		C_J	4500	-	pF

Notes0.

(1) Pulse test: 300 µs pulse width, 1 % duty cycle

(2) Pulse test: Pulse width ≤ 5 ms

THERMAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)			
PARAMETER	**SYMBOL**	**V40D45C**	**UNIT**
Typical thermal resistance per device	$R_{\theta JC}$ (1)	0.8	°C/W
	$R_{\theta JA}$ (2)(3)	45	

Notes

(1) Mounted on infinite heatsink

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

(3) Free air, without heatsink

ORDERING INFORMATION (Example)				
PREFERRED P/N	**UNIT WEIGHT (g)**	**PREFERRED PACKAGE CODE**	**BASE QUANTITY**	**DELIVERY MODE**
V40D45C-M3/I	0.55	I	2000/reel	13" diameter plastic tape and reel
V40D45CHM3/I (1)	0.55	I	2000/reel	13" diameter plastic tape and reel

Note

(1) AEC-Q101 qualified

RATINGS AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)

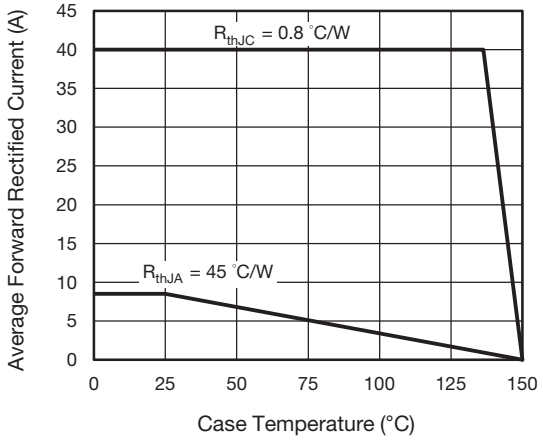

Fig. 1 - Maximum Forward Current Derating Curve

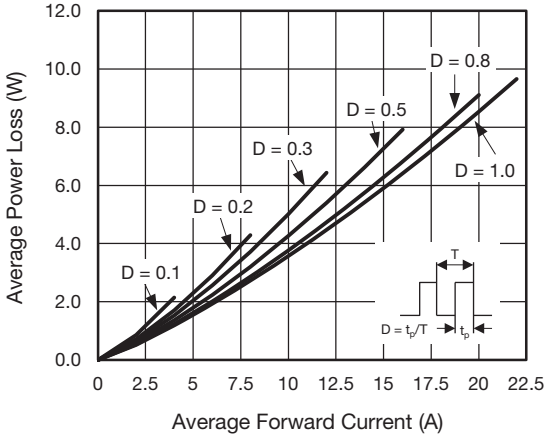

Fig. 2 - Average Power Loss Characteristics

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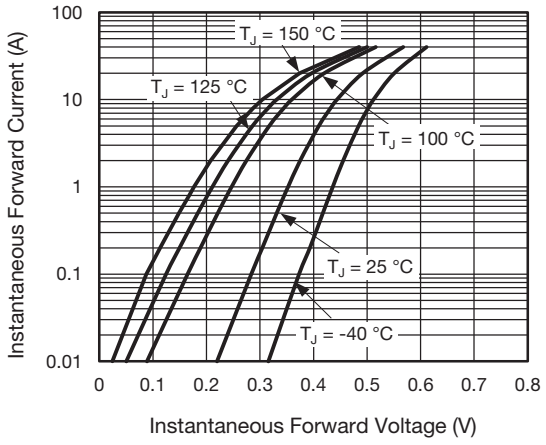

Fig. 3 - Typical Instantaneous Forward Characteristics

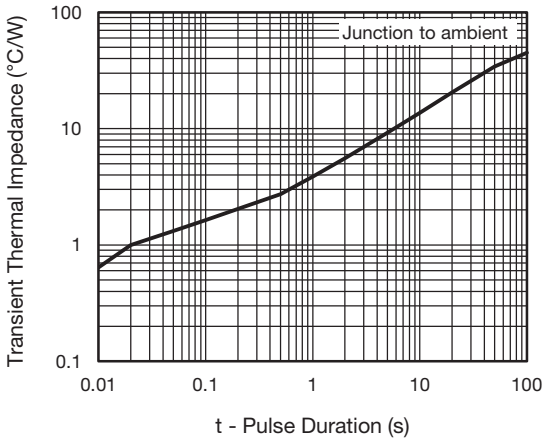

Fig. 6 - Typical Transient Thermal Impedance

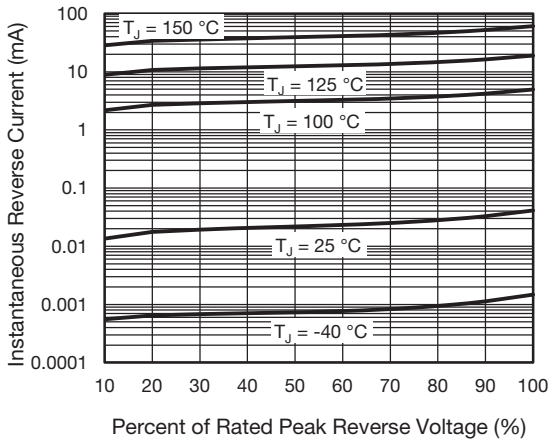

Fig. 4 - Typical Reverse Leakage Characteristics

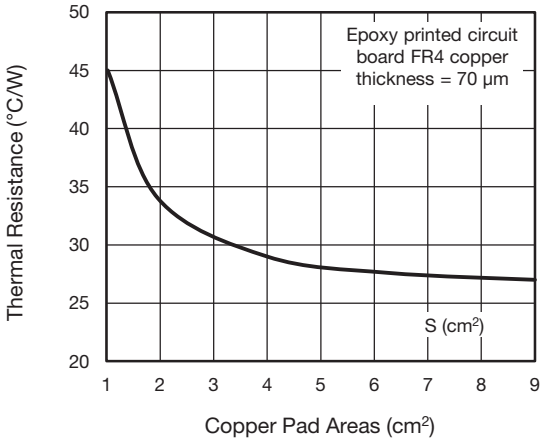

Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

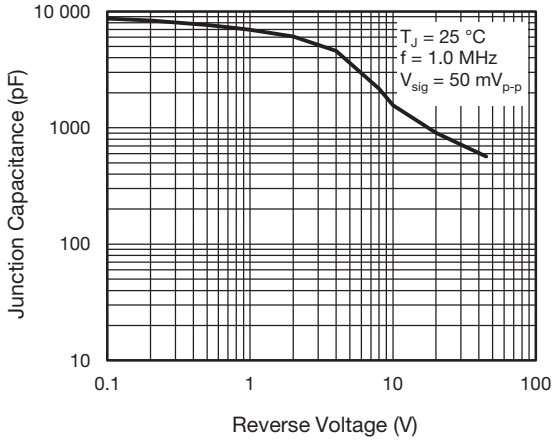

Fig. 5 - Typical Junction Capacitance

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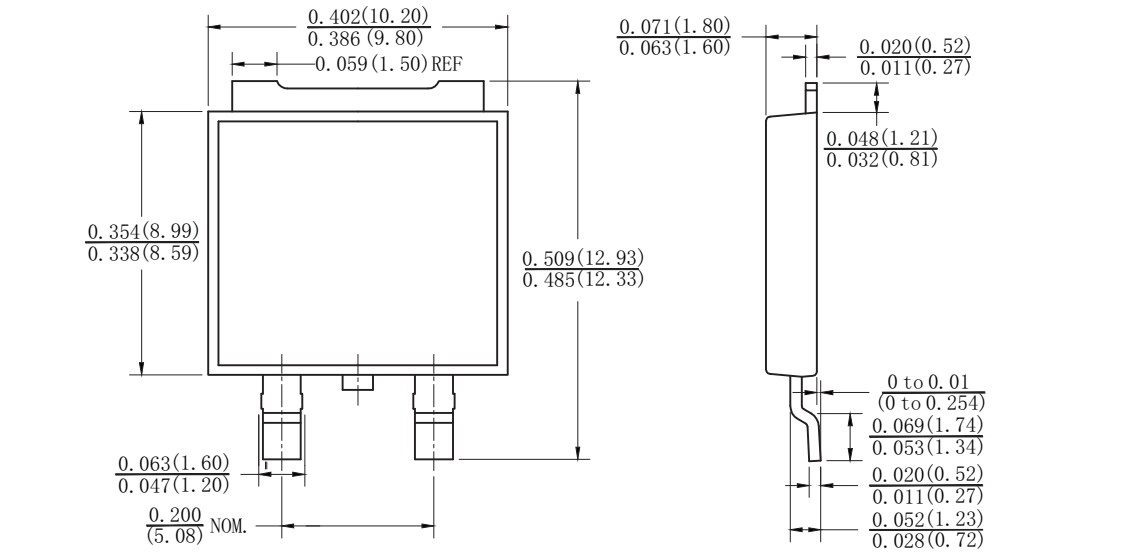
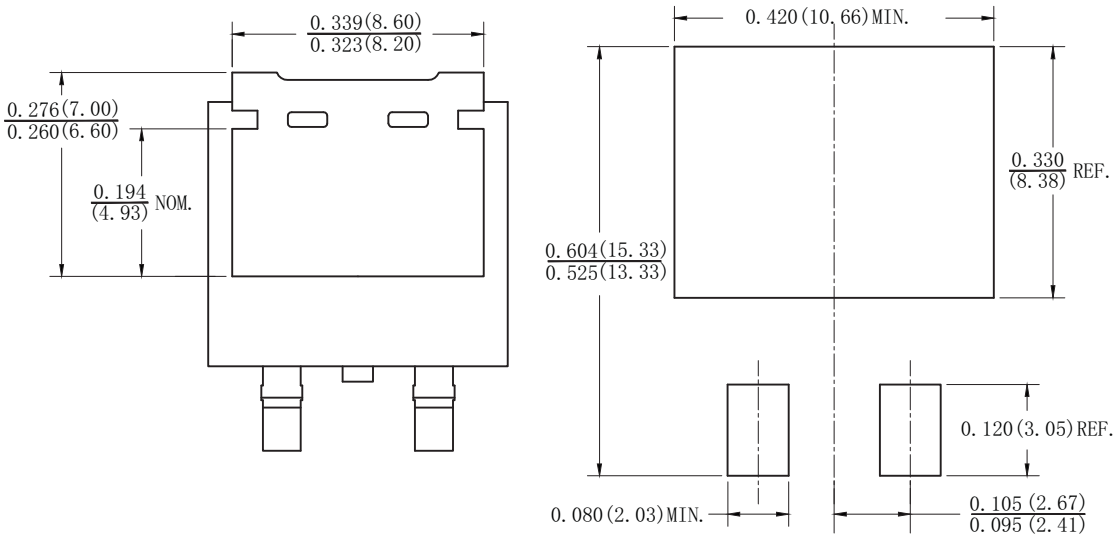
PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMPD (TO-263AC)



Mounting Pad Layout



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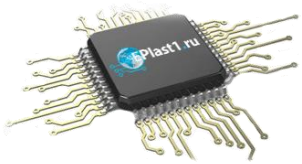

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