

Dual Low-Voltage TMBS[®] (Trench MOS Barrier Schottky) Rectifier

 Ultra Low $V_F = 0.29\text{ V}$ at $I_F = 5.0\text{ A}$

eSMP[®] Series SMPD (TO-263AC)



DESIGN SUPPORT TOOLS AVAILABLE



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


**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.

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

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

MAXIMUM RATINGS ($T_A = 25\text{ °C}$ 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)	$I_{F(AV)}$ ⁽¹⁾	per device	40
		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: $dP_D/dT_J < 1/R_{\theta JA}$

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

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	V40D45C	UNIT
Typical thermal resistance per device	$R_{\theta JC}^{(1)}$	0.8	$^\circ\text{C/W}$
	$R_{\theta JA}^{(2)(3)}$	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

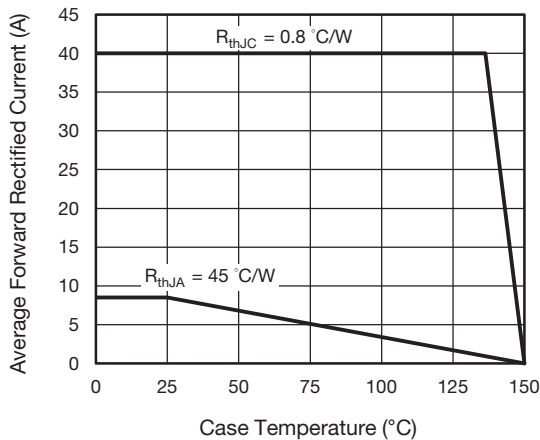
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

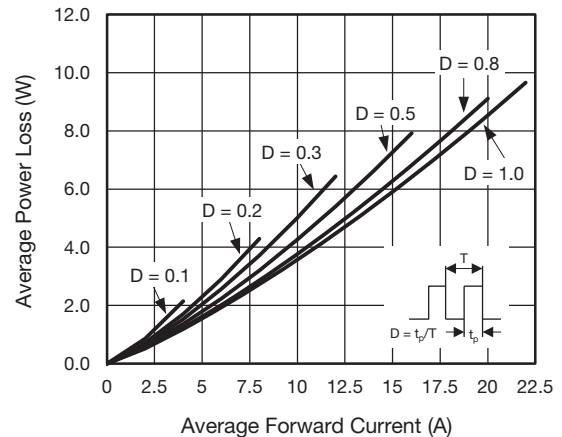


Fig. 2 - Average Power Loss Characteristics

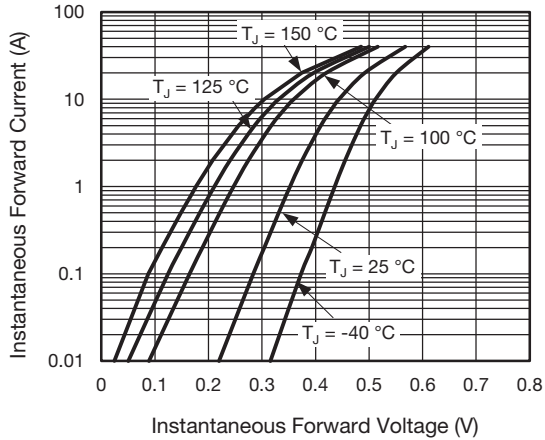


Fig. 3 - Typical Instantaneous Forward Characteristics

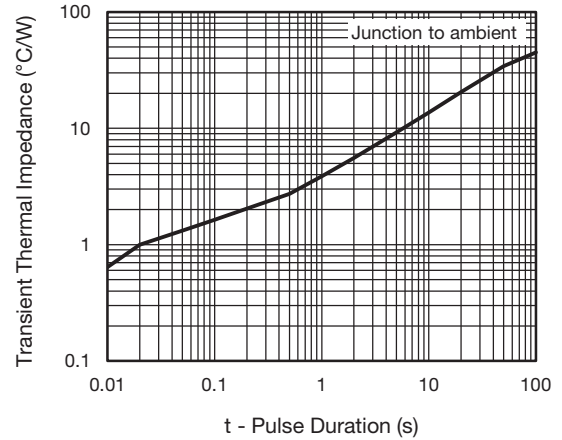


Fig. 6 - Typical Transient Thermal Impedance

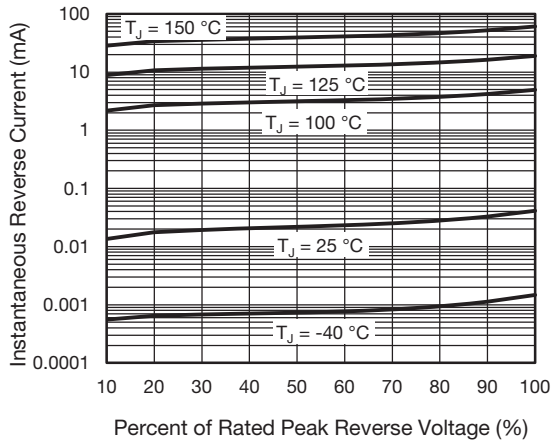


Fig. 4 - Typical Reverse Leakage Characteristics

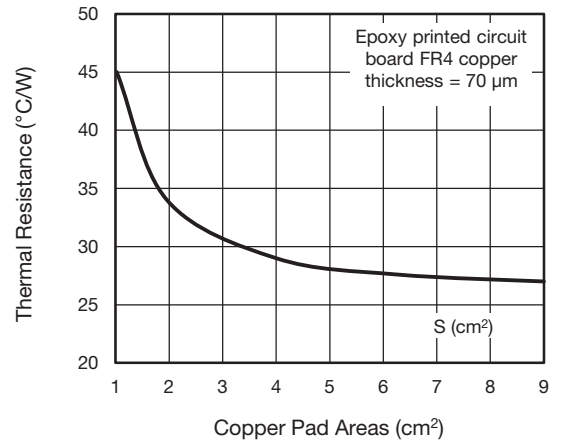


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

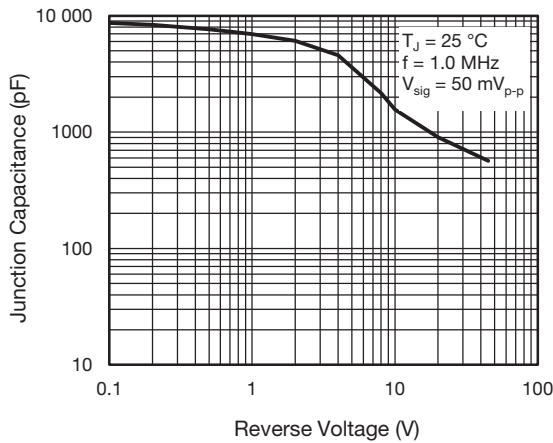
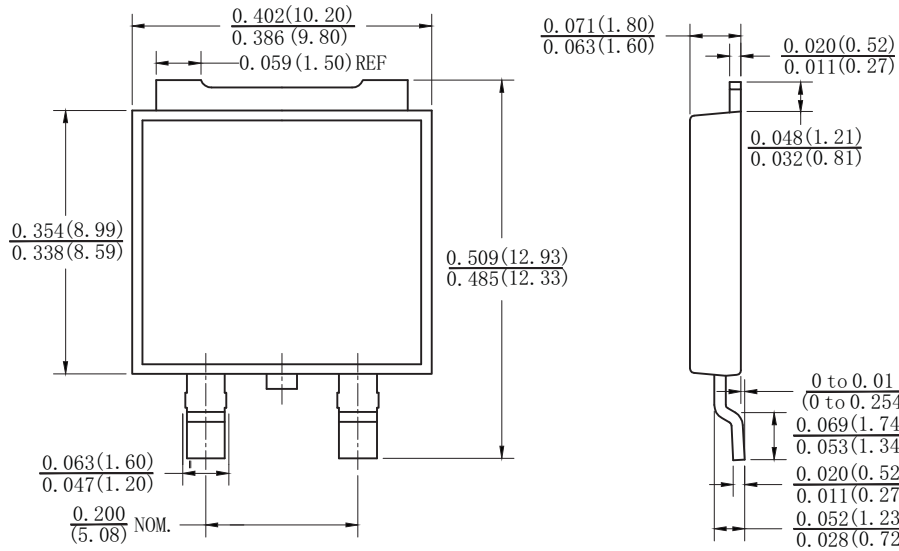


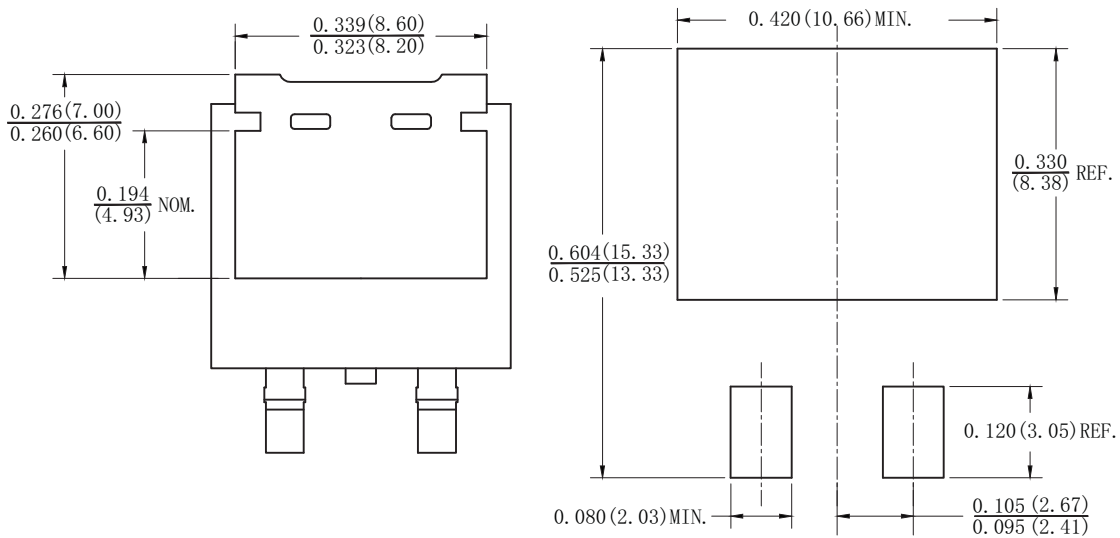
Fig. 5 - Typical Junction Capacitance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMPD (TO-263AC)



Mounting Pad Layout





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