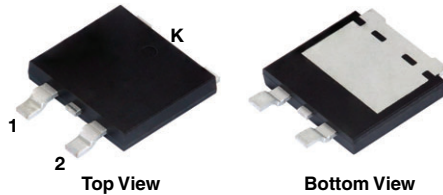


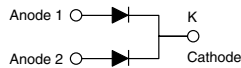
# Dual High-Voltage TMBS® (Trench MOS Barrier Schottky) Rectifier

 Ultra Low  $V_F = 0.46 \text{ V}$  at  $I_F = 5 \text{ A}$ 

## eSMP® Series SMPD (TO-263AC)



### V40DM120C



## LINKS TO ADDITIONAL RESOURCES


[3D Models](#)

### PRIMARY CHARACTERISTICS

$I_{F(AV)}$	2 x 20 A
$V_{RRM}$	120 V
$I_{FSM}$	250 A
$V_F$ at $I_F = 20 \text{ A}$ ( $T_A = 125 \text{ }^\circ\text{C}$ )	0.64 V
$T_J$ max.	175 $^\circ\text{C}$
Package	SMPD (TO-263AC)
Circuit configuration	Common cathode

## 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  $^\circ\text{C}$
- AEC-Q101 qualified available:
  - Automotive ordering code: base P/NHM3
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://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 meets JESD 201 class 2 whisker test

**Polarity:** as marked

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

PARAMETER	SYMBOL	V40DM120C	UNIT
Maximum repetitive peak reverse voltage	$V_{RRM}$	120	V
Maximum average forward rectified current (fig. 1)	$I_{F(AV)}$	per device	40
		per diode	20
Peak forward surge current 10 ms single half sine-wave superimposed on rated load per diode	$I_{FSM}$	250	A
Voltage rate of change (rated $V_R$ )	dV/dt	10 000	V/ $\mu\text{s}$
Operating junction and storage temperature range	$T_J, T_{STG}$	-40 to +175	$^\circ\text{C}$



ELECTRICAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage per diode	$I_F = 5\text{ A}$	$T_A = 25\text{ }^\circ\text{C}$	$V_F^{(1)}$	0.54	-	V
	$I_F = 10\text{ A}$			0.64	-	
	$I_F = 20\text{ A}$			0.79	0.89	
	$I_F = 5\text{ A}$	$T_A = 125\text{ }^\circ\text{C}$		0.46	-	
	$I_F = 10\text{ A}$			0.55	-	
	$I_F = 20\text{ A}$			0.64	0.72	
Reverse current per diode	$V_R = 90\text{ V}$	$T_A = 25\text{ }^\circ\text{C}$	$I_R^{(2)}$	9	-	$\mu\text{A}$
		$T_A = 125\text{ }^\circ\text{C}$		4.3	-	mA
	$V_R = 120\text{ V}$	$T_A = 25\text{ }^\circ\text{C}$		-	500	$\mu\text{A}$
		$T_A = 125\text{ }^\circ\text{C}$		7	32	mA

**Notes**

- (1) Pulse test: 300  $\mu\text{s}$  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	V40DM120C	UNIT
Typical thermal resistance	per diode	$R_{\theta JC}$	2.0	$^\circ\text{C/W}$
	per device		1.1	
	per device	$R_{\theta JA}^{(1)(2)}$	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)	V40DM120C-M3/I	0.55	I	2000/reel	13" diameter plastic tape and reel
SMPD (TO-263AC)	V40DM120CHM3/I <sup>(1)</sup>	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)

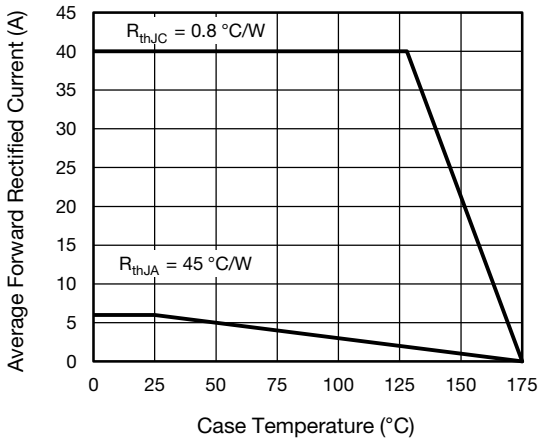


Fig. 1 - Forward Current Derating Curve

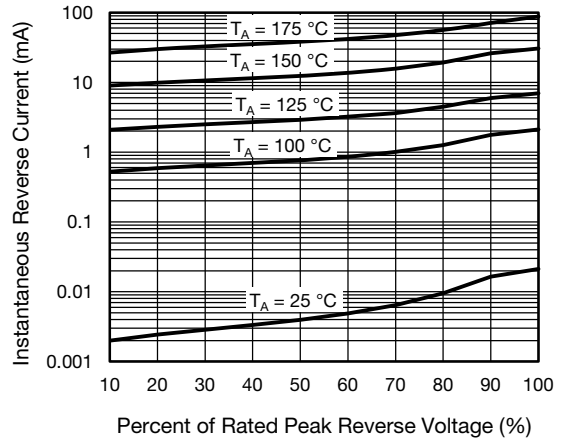


Fig. 4 - Typical Reverse Characteristics Per Diode

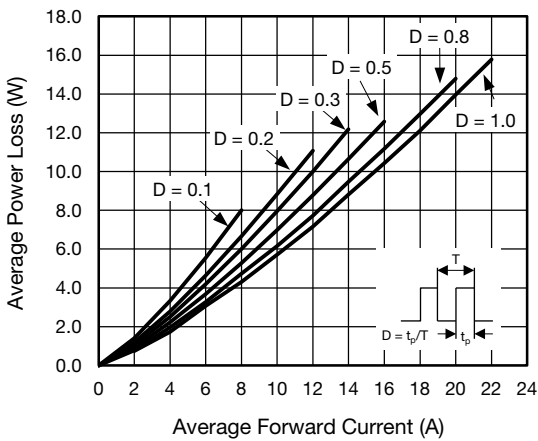


Fig. 2 - Forward Power Loss Characteristics Per Diode

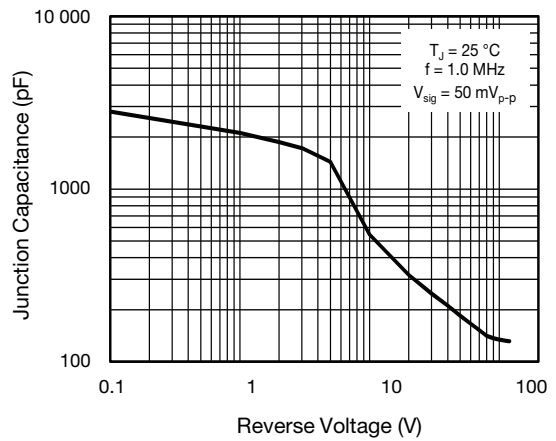


Fig. 5 - Typical Junction Capacitance Per Diode

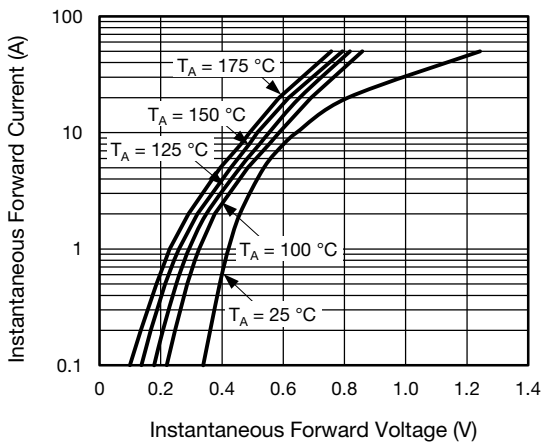


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

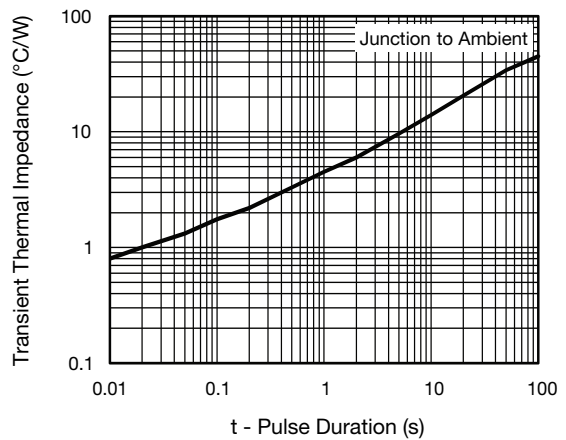


Fig. 6 - Typical Transient Thermal Impedance Per Device

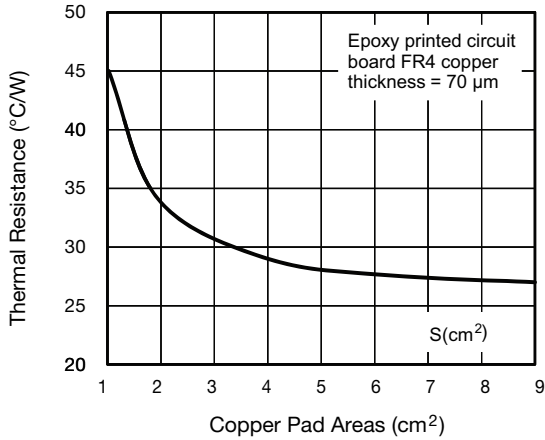
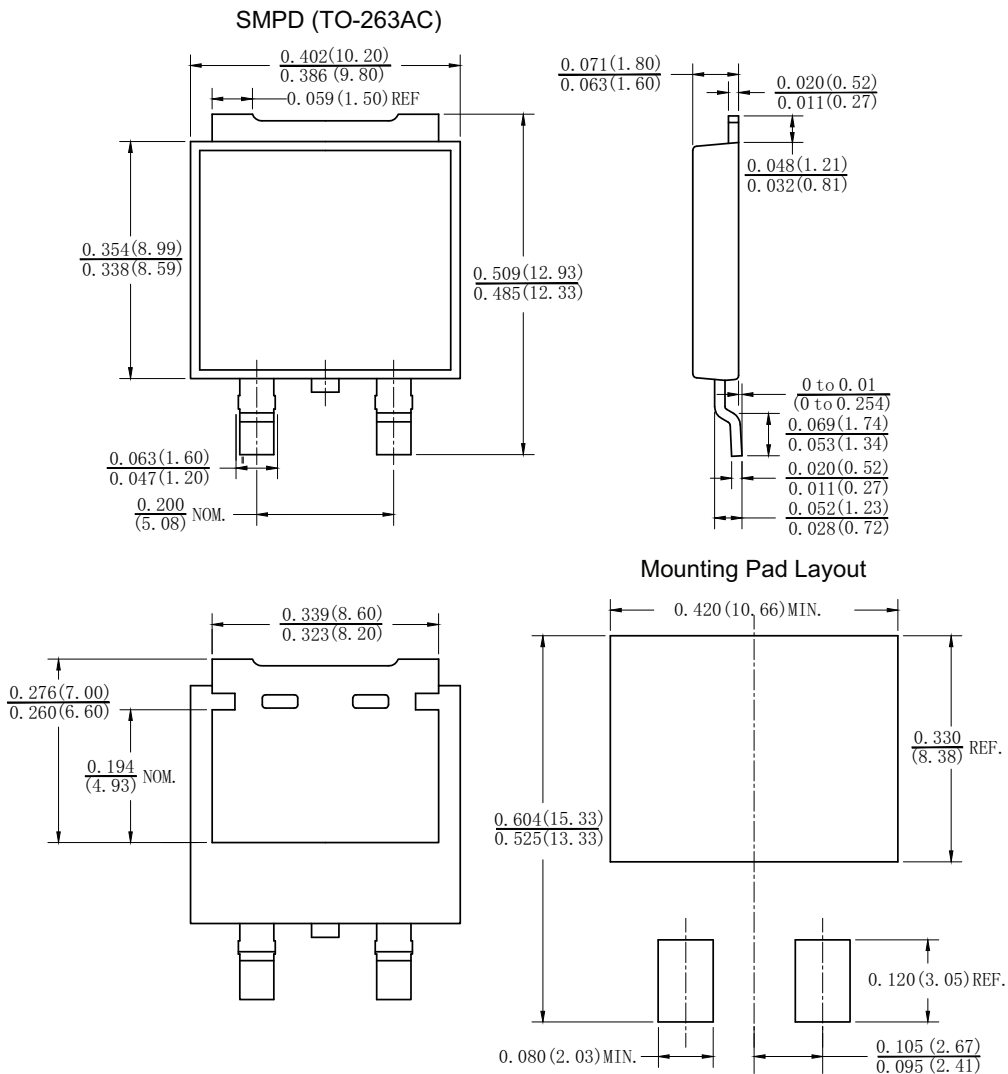


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

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





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