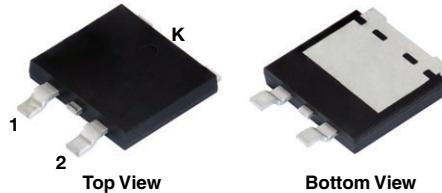


# Dual High-Voltage TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low  $V_F = 0.53$  V at  $I_F = 2.5$  A

## eSMP® Series SMPD (TO-263AC)



## V10D120C



## LINKS TO ADDITIONAL RESOURCES



AUTOMOTIVE GRADE  
Available



RoHS  
COMPLIANT  
HALOGEN  
FREE

## 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](http://www.vishay.com/doc?99912)

## 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

## PRIMARY CHARACTERISTICS

$I_F(AV)$	2 x 5.0 A
$V_{RRM}$	120 V
$I_{FSM}$	100 A
$V_F$ at $I_F = 5.0$ A ( $T_A = 125$ °C)	0.64 V
$T_J$ max.	150 °C
Package	SMPD (TO-263AC)
Circuit configuration	Common cathode

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

PARAMETER	SYMBOL	V10D120C	UNIT
Maximum repetitive peak reverse voltage	$V_{RRM}$	120	V
Maximum average forward rectified current (fig. 1)	$I_F(AV)$	10	A
per device per diode		5	
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	$I_{FSM}$	100	A
Voltage rate of change (rated $V_R$ )	$dV/dt$	10 000	V/μs
Operating junction and storage temperature range	$T_J, T_{STG}$	-40 to +150	°C

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT	
Instantaneous forward voltage per diode	$I_F = 2.5 \text{ A}$	$T_A = 25^\circ\text{C}$	$V_F$ <sup>(1)</sup>	0.61	-	V	
	$I_F = 5 \text{ A}$			0.79	0.94		
	$I_F = 2.5 \text{ A}$	$T_A = 125^\circ\text{C}$		0.53	-		
	$I_F = 5 \text{ A}$			0.64	0.72		
Reverse current at rated $V_R$ per diode	$V_R = 90 \text{ V}$	$T_A = 25^\circ\text{C}$	$I_R$ <sup>(2)</sup>	2.3	-	$\mu\text{A}$	
		$T_A = 125^\circ\text{C}$		2.3	-	$\text{mA}$	
	$V_R = 120 \text{ V}$	$T_A = 25^\circ\text{C}$		-	500	$\mu\text{A}$	
		$T_A = 125^\circ\text{C}$		5	15	$\text{mA}$	

**Notes**

(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle

(2) Pulse test: Pulse width  $\leq 5 \text{ ms}$

 **THERMAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

PARAMETER	SYMBOL	V10D120C	UNIT
Typical thermal resistance	per diode	$R_{\theta\text{JC}}$	3.5
	per device		2.5
	per device	$R_{\theta\text{JA}}$ <sup>(1)(2)</sup>	48

**Notes**

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

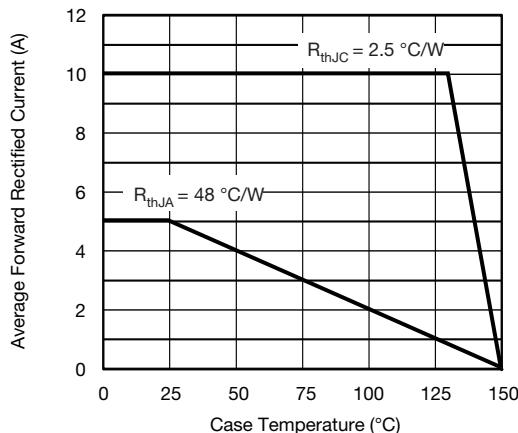
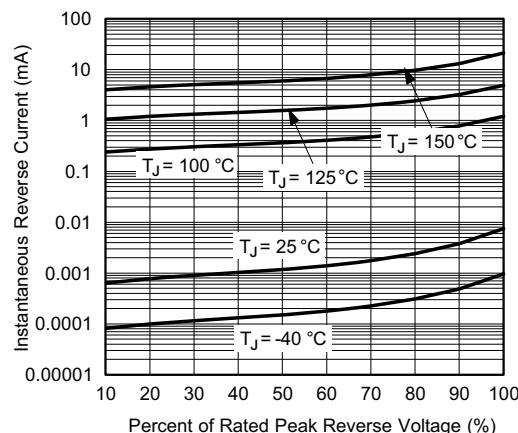
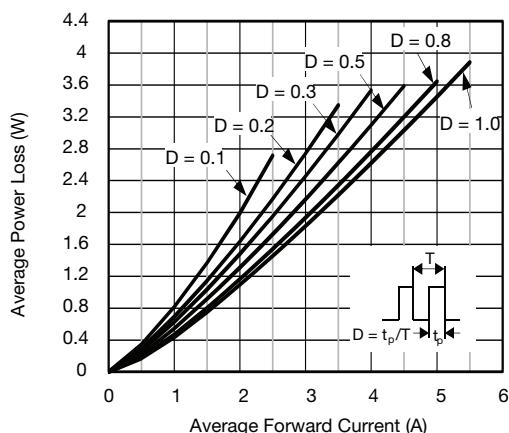
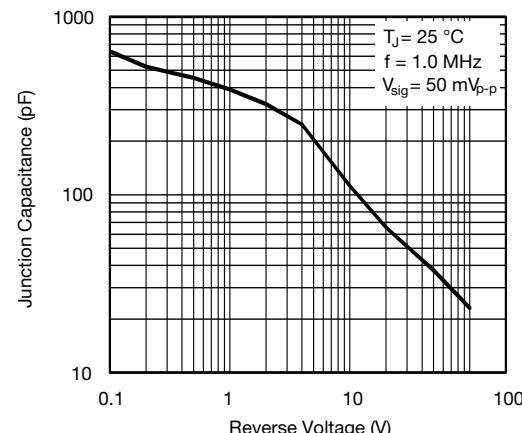
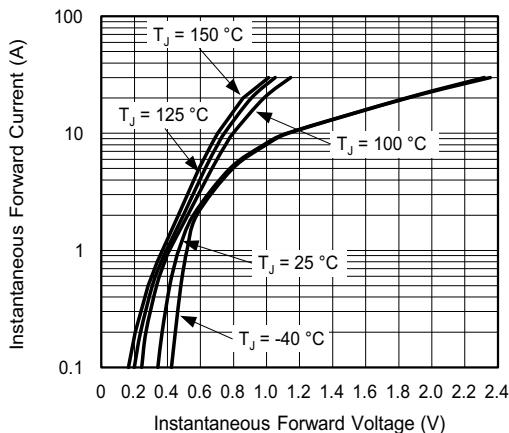
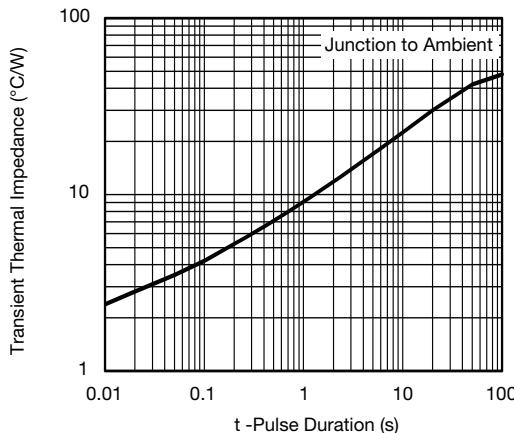
(2) Free air, without heatsink

**ORDERING INFORMATION** (Example)

PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
SMPD (TO-263AC)	V10D120C-M3/I	0.55	I	2000/reel	13" diameter plastic tape and reel
SMPD (TO-263AC)	V10D120CHM3/I <sup>(1)</sup>	0.55	I	2000/reel	13" diameter plastic tape and reel

**Note**

(1) AEC-Q101 qualified

**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25^\circ\text{C}$  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**

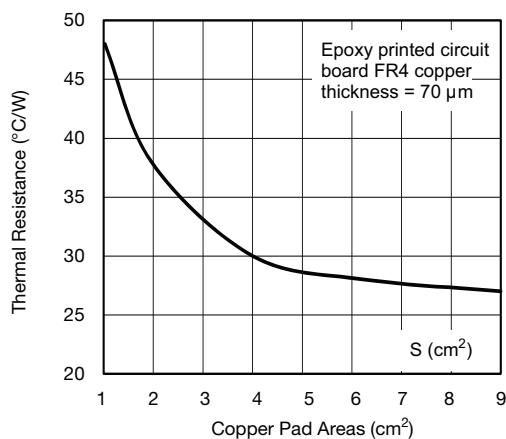
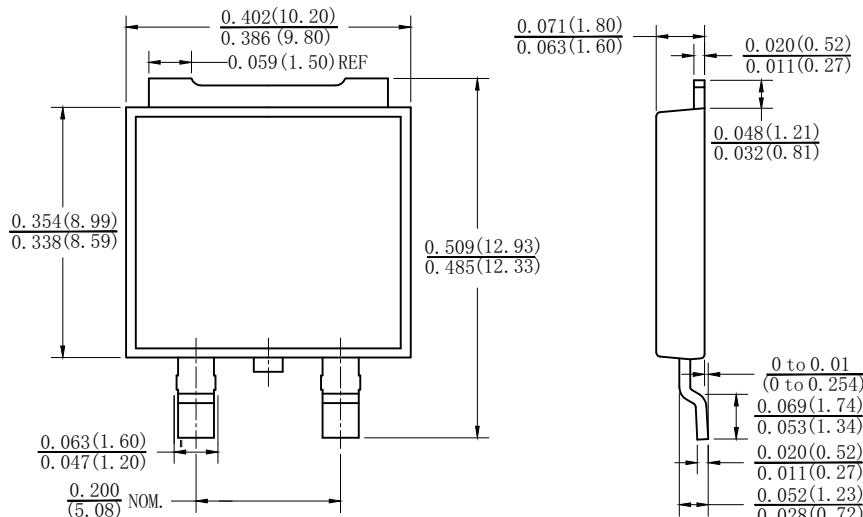


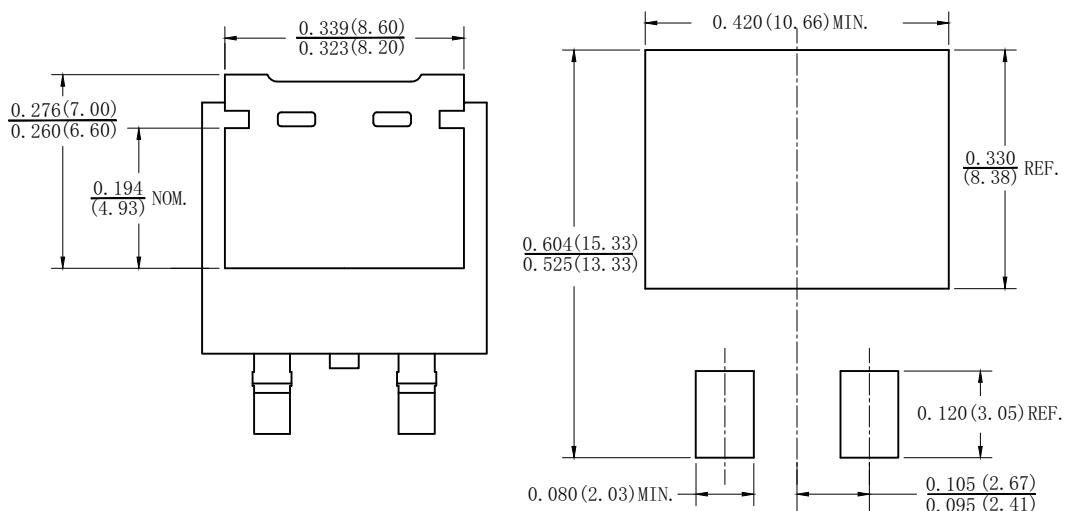
Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

#### SMPD (TO-263AC)



#### Mounting Pad Layout



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