AUTOMOTIVI GRADE

ROHS

HALOGEN FREE



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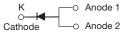
## Vishay General Semiconductor

# High Current Density Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier

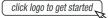
Ultra Low  $V_F = 0.50 \text{ V}$  at  $I_F = 6 \text{ A}$ 



#### **SMPC (TO-277A)**



#### **DESIGN SUPPORT TOOLS**





PRIMARY CHARACTERISTICS			
I <sub>F(AV)</sub>	12 A		
V <sub>RRM</sub>	100 V		
I <sub>FSM</sub>	200 A		
V <sub>F</sub> at I <sub>F</sub> = 15 A (125 °C)	0.61 V		
T <sub>J</sub> max.	175 °C		
Package	SMPC (TO-277A)		
Circuit configuration	Single		

#### **FEATURES**

- Very low profile typical height of 1.1 mm
- Ideal for automated placement
- Trench MOS Schottky technology
- 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 <a href="https://www.vishav.com/doc?99912"><u>www.vishav.com/doc?99912</u></a>

#### **TYPICAL APPLICATIONS**

For use in low voltage high frequency inverters, freewheeling, DC/DC converters, and polarity protection applications.

#### **MECHANICAL DATA**

Case: SMPC (TO-277A)

Molding compound meets UL 94 V-0 flammability rating Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade

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

<b>MAXIMUM RATINGS</b> (T <sub>A</sub> = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL	V12PM10	UNIT	
Device marking code		12M10		
Maximum repetitive peak reverse voltage	V <sub>RRM</sub>	100	V	
Maximum DC forward current	I <sub>F(AV)</sub> <sup>(1)</sup>	12	А	
	I <sub>F(AV)</sub> (2)	4.2		
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I <sub>FSM</sub>	200	А	
Operating junction temperature range	T <sub>J</sub> <sup>(3)</sup>	-40 to +175	°C	
Storage temperature range	T <sub>STG</sub>	-55 to +175	°C	

#### Notes

- (1) Mounted on 30 mm x 30 mm pad areas aluminum PCB
- (2) Free air, mounted on recommended pad area
- $^{(3)}$  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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<b>ELECTRICAL CHARACTERISTICS</b> (T <sub>A</sub> = 25 °C unless otherwise noted)							
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT	
Instantaneous forward voltage	I <sub>F</sub> = 6 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.57	-	V	
	I <sub>F</sub> = 12 A			0.69	0.75		
	I <sub>F</sub> = 6 A	- T <sub>A</sub> = 125 °C		0.50	-		
	I <sub>F</sub> = 12 A			0.61	0.66		
Reverse current	$V_R = 70 \text{ V}$ $T_A = 25 \text{ °C}$ $T_A = 125 \text{ °C}$	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	0.02	-		
		T <sub>A</sub> = 125 °C		2.5	-	mA	
	I V <sub>R</sub> = 100 V	T <sub>A</sub> = 25 °C		A = 25 °C	-	0.20	IIIA
		T <sub>A</sub> = 125 °C		5	16		
Typical junction capacitance	4.0 V, 1 MHz		CJ	1200	-	pF	

#### **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 specified)			
PARAMETER	SYMBOL V12PM10		UNIT
Typical thormal registance	R <sub>θJA</sub> <sup>(1)(2)</sup> 75		°C/W
Typical thermal resistance	R <sub>0JM</sub> (3)	4	C/VV

#### 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, mounted on recommended PCB, 2 oz. pad area; thermal resistance  $R_{\theta JA}$  junction to ambient
- $^{(3)}$  Units mounted on 30 mm x 30 mm aluminum PCB, thermal resistance  $R_{\theta JM}$  junction to mount

ORDERING INFORMATION (Example)					
PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE	
V12PM10-M3/H	0.10	Н	1500	7" diameter plastic tape and reel	
V12PM10-M3/I	0.10	1	6500	13" diameter plastic tape and reel	
V12PM10HM3/H <sup>(1)</sup>	0.10	Н	1500	7" diameter plastic tape and reel	
V12PM10HM3/I (1)	0.10	1	6500	13" diameter plastic tape and reel	

#### Note

(1) AEC-Q101 qualified



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### RATINGS AND CHARACTERISTICS CURVES (T<sub>A</sub> = 25 °C unless otherwise specified)

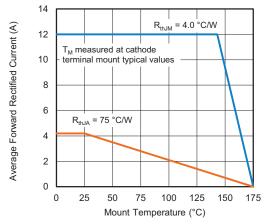


Fig. 1 - Maximum Forward Current Derating Curve

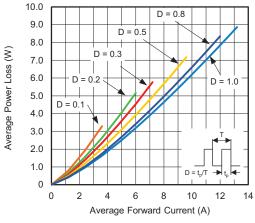


Fig. 2 - Forward Power Loss Characteristics

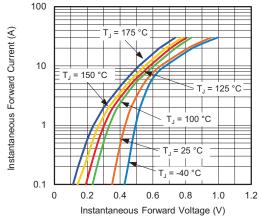


Fig. 3 - Typical Instantaneous Forward Characteristics

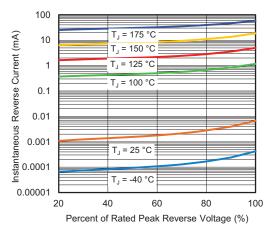


Fig. 4 - Typical Reverse Characteristics

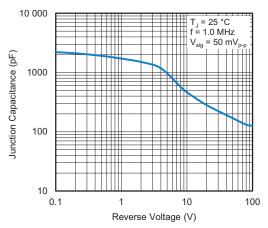


Fig. 5 - Typical Junction Capacitance

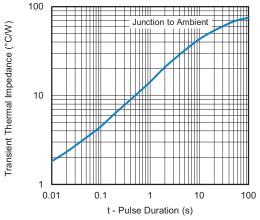
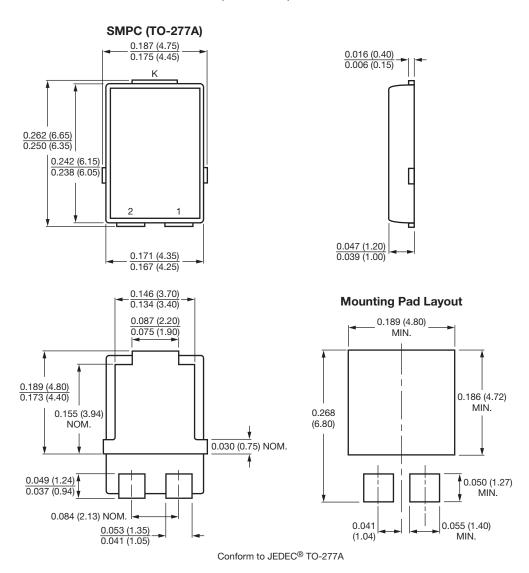


Fig. 6 - Typical Transient Thermal Impedance

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





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