HALOGEN

FREE

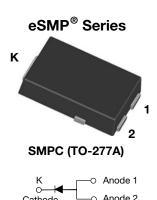


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## Vishay General Semiconductor

# SMD Photovoltaic Solar Cell Protection TMBS® (Trench MOS Barrier Schottky) Rectifiers

Ultra Low  $V_F = 0.31 \text{ V}$  at  $I_F = 5 \text{ A}$ 



#### **LINKS TO ADDITIONAL RESOURCES**



PRIMARY CHARACTERISTICS			
I <sub>F(AV)</sub>	15 A		
V <sub>RRM</sub>	45 V		
I <sub>FSM</sub>	210 A		
V <sub>F</sub> at I <sub>F</sub> = 15 A	0.42 V		
T <sub>J</sub> max.	150 °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
- Material categorization: for definitions of compliance please see <a href="https://www.vishay.com/doc?99912">www.vishay.com/doc?99912</a>

#### **TYPICAL APPLICATIONS**

For use in solar cell junction box as a bypass diode for protection, using DC forward current without reverse bias.

#### **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

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 suffix meets JESD 201 class 2 whisker test

<b>MAXIMUM RATINGS</b> (T <sub>A</sub> = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL	V15P45S	UNIT	
Device marking code		1545S		
Maximum repetitive peak reverse voltage	$V_{RRM}$	45	V	
Maximum DC forward current	I <sub>F</sub> <sup>(1)</sup>	15	Α	
	I <sub>F</sub> <sup>(2)</sup>	4.8		
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I <sub>FSM</sub>	210	А	
Junction temperature in DC forward current without reverse bias, $t \le 1 h$	T <sub>J</sub> <sup>(3)</sup>	≤ 200	°C	
Operating junction temperature range	T <sub>OP</sub>	-40 to +150	°C	
Storage temperature range	T <sub>STG</sub>	-40 to +175	°C	

#### **Notes**

- (1) Mounted on 30 mm x 30 mm aluminum PCB
- (2) Free air, mounted on recommended copper pad area
- (3) Meets the requirements of IEC 61215 ed. 2 bypass diode thermal test



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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> = 5.0 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.40	-	V
	I <sub>F</sub> = 7.5 A			0.45	-	
	I <sub>F</sub> = 15 A			0.49	0.58	
	I <sub>F</sub> = 5.0 A	T <sub>A</sub> = 125 °C		0.31	-	
	I <sub>F</sub> = 7.5 A			0.34	-	
	I <sub>F</sub> = 15 A			0.42	0.51	
Reverse current	V - 45 V	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	-	1500	μΑ
	$V_R = 45 \text{ V}$ $T_A = 125$	T <sub>A</sub> = 125 °C	IR (=)	15	50	mA

#### Notes

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

(2) Pulse test: Pulse width ≤ 40 ms

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)				
PARAMETER SYMBOL V15P45S				
Typical thermal registance	R <sub>eJA</sub> (1)	75	°C/W	
Typical thermal resistance	R <sub>0JM</sub> (2)	4		

#### Notes

 $^{(1)}\,$  Free air, mounted on recommended copper pad area; thermal resistance  $R_{\theta JA}$  - junction to ambient

 $^{(2)}$  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)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE	
V15P45S-M3/86A	0.10	86A	1500	7" diameter plastic tape and reel	
V15P45S-M3/87A	0.10	87A	6500	13" diameter plastic tape and reel	



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

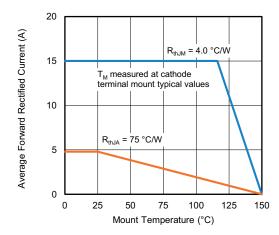


Fig. 1 - Forward Current Derating Curve

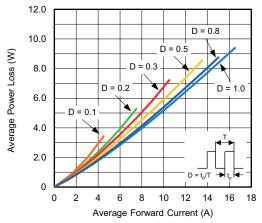


Fig. 2 - Forward Power Loss Characteristics Per Diode

#### **Notes**

- (1) Mounted on 30 mm x 30 mm aluminum PCB;  $T_M$  measured at the terminal of cathode band ( $R_{\theta JM} = 4$  °C/W)
- (2) Free air, mounted on recommended copper pad area ( $R_{\theta JA} = 75 \, ^{\circ}\text{C/W}$ )

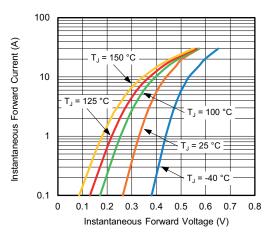


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

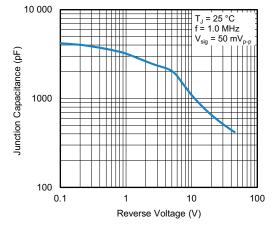


Fig. 5 - Typical Junction Capacitance

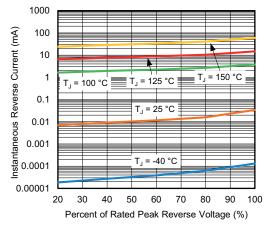


Fig. 4 - Typical Reverse Leakage Characteristics Per Diode

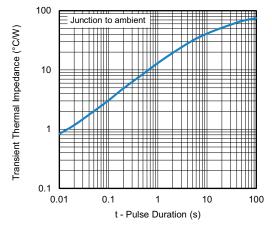
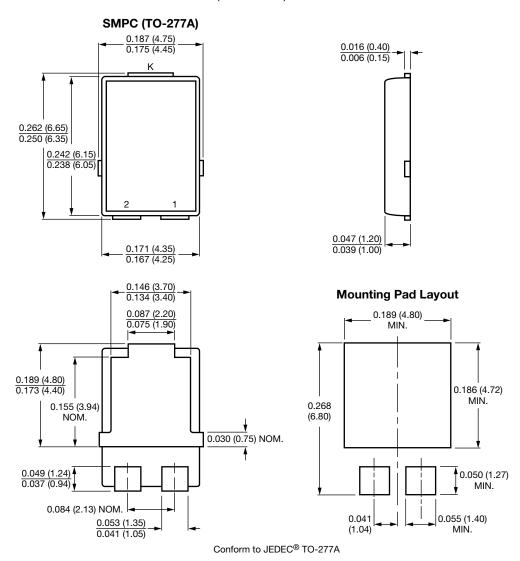


Fig. 6 - Typical Transient Thermal Impedance Per Diode



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





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