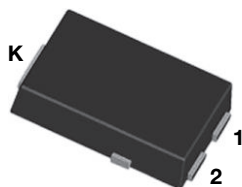


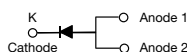
# SMD Photovoltaic Solar Cell Protection Schottky Rectifier

Ultra Low  $V_F = 0.34 \text{ V}$  at  $I_F = 5 \text{ A}$

TMBS® eSMP® Series



TO-277A (SMPC)



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



**RoHS**  
COMPLIANT  
HALOGEN  
FREE

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

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

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	10 A
$V_{RRM}$	45 V
$I_{FSM}$	180 A
$V_F$ at $I_F = 10 \text{ A}$	0.41 V
$T_{OP \text{ max.}}$	150 °C
Package	TO-277A (SMPC)
Diode variation	Single die

MAXIMUM RATINGS ( $T_A = 25 \text{ °C}$ unless otherwise noted)			
PARAMETER	SYMBOL	V10P45S	UNIT
Device marking code		1045S	
Maximum repetitive peak reverse voltage	$V_{RRM}$	45	V
Maximum DC forward current	$I_F^{(1)}$	10	A
	$I_F^{(2)}$	4.4	
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	$I_{FSM}$	180	A
Junction temperature in DC forward current without reverse bias, $t \leq 1 \text{ h}$	$T_J^{(3)}$	$\leq 200$	°C
Operating junction temperature range	$T_{OP}$	-40 to +150	°C
Storage temperature range	$T_{STG}$	-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

ELECTRICAL CHARACTERISTICS (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>	0.42	-	V
	I <sub>F</sub> = 10 A			0.48	0.57	
	I <sub>F</sub> = 5.0 A	T <sub>A</sub> = 125 °C		0.34	-	
	I <sub>F</sub> = 10 A			0.41	0.50	
Reverse current	V <sub>R</sub> = 45 V	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	21	800	μA
		T <sub>A</sub> = 125 °C		9	35	mA

**Notes**

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

(2) Pulse test: Pulse width  $\leq 40\text{ ms}$

<b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	V10P45S	UNIT
Typical thermal resistance	$R_{\theta JA}^{(1)}$	75	$^{\circ}\text{C/W}$
	$R_{\theta JM}^{(2)}$	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

<b>ORDERING INFORMATION</b> (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
V10P45S-M3/86A	0.10	86A	1500	7" diameter plastic tape and reel
V10P45S-M3/87A	0.10	87A	6500	13" diameter plastic tape and reel

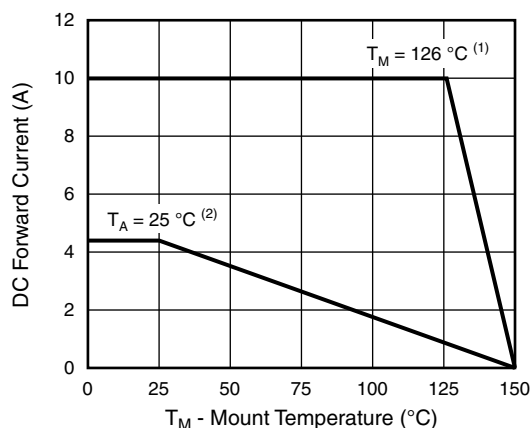
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Forward Current Derating Curve

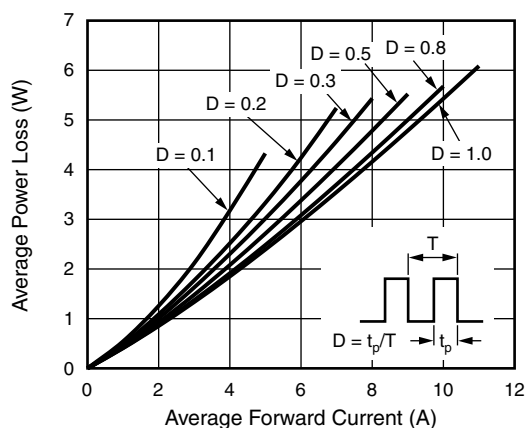


Fig. 2 - Forward Power Loss Characteristics

**Notes**

(1) Mounted on 30 mm x 30 mm aluminum PCB;  $T_M$  measured at the terminal of cathode band ( $R_{\theta JM} = 4\text{ }^{\circ}\text{C/W}$ )

(2) Free air, mounted on recommended copper pad area ( $R_{\theta JA} = 75\text{ }^{\circ}\text{C/W}$ )

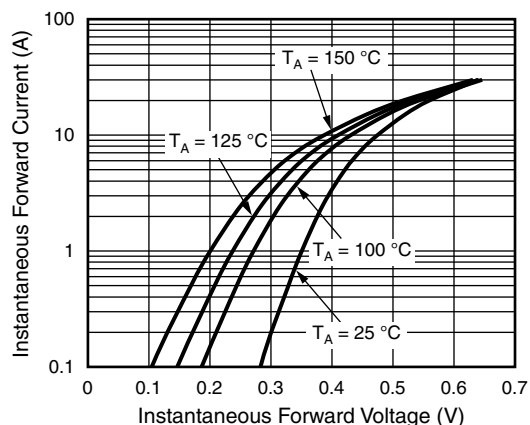


Fig. 3 - Typical Instantaneous Forward Characteristics

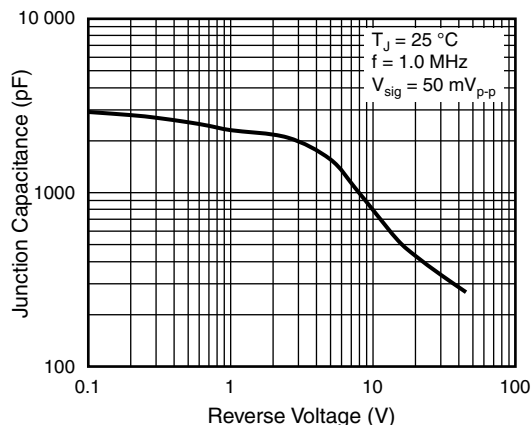


Fig. 5 - Typical Junction Capacitance

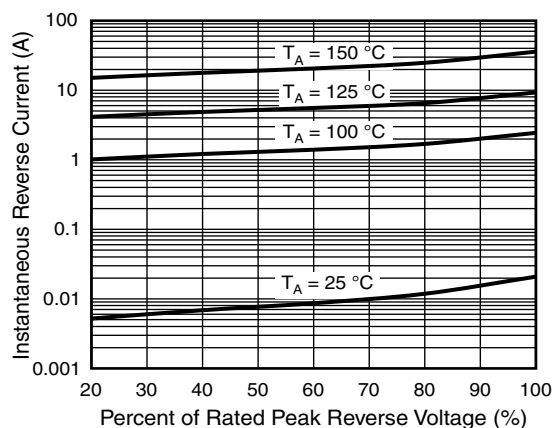


Fig. 4 - Typical Reverse Leakage Characteristics

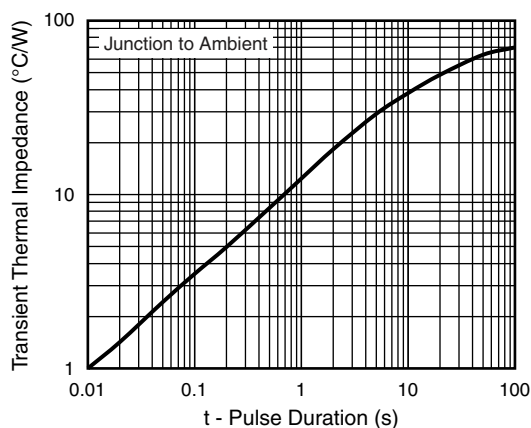
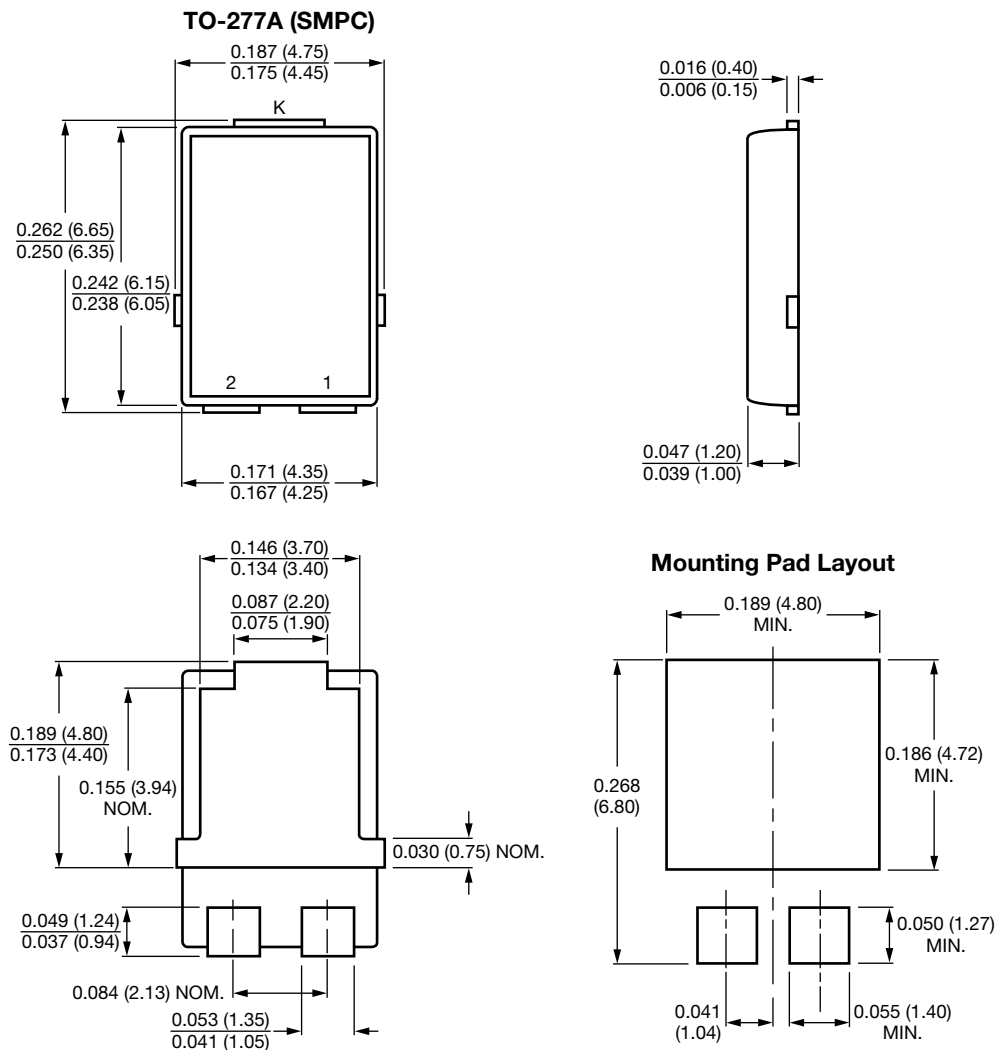


Fig. 6 - Typical Transient Thermal Impedance



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



Conform to JEDEC TO-277A



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