

High Current Density Surface Mount Trench MOS Barrier 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
- AEC-Q101 qualified available
- Automotive ordering code; base P/NHM3
- Material categorization: for definitions of compliance please see www.vishay.com/doc299912

AUTOMOTIVE
GRADE
Available



RoHS
COMPLIANT
HALOGEN
FREE

TYPICAL APPLICATIONS

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

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

Base P/NHM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified

Base P/NHM3_X - halogen-free, RoHS-compliant, and AEC-Q101 qualified

("_X" denotes revision code e.g. A, B,.....)

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

M3 suffix meets JESD 201 class 2 whisker test, HM3 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_J max.	150 °C
Package	TO-277A (SMPC)
Diode variation	Single die

MAXIMUM RATINGS ($T_A = 25\text{ °C}$ unless otherwise noted)			
PARAMETER	SYMBOL	V10P45	UNIT
Device marking code		V1045	
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
Operating junction and storage temperature range	T_J, T_{STG}	-40 to +150	°C

Notes

(1) Mounted on 30 mm x 30 mm pad areas aluminum PCB

(2) Free air, mounted on recommended copper pad area

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

PARAMETER	TEST CONDITIONS	SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	$I_F = 5.0\text{ A}$	$V_F^{(1)}$	0.42	-	V
	$I_F = 10\text{ A}$		0.48	0.57	
	$I_F = 5.0\text{ A}$		0.34	-	
	$I_F = 10\text{ A}$		0.41	0.50	
Reverse current	$V_R = 45\text{ V}$	$I_R^{(2)}$	21	800	μA
			9	35	mA

Notes

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
 (2) Pulse test: pulse width $\leq 40\text{ ms}$

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

PARAMETER	SYMBOL	V10P45	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

ORDERING INFORMATION (Example)

PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
V10P45-M3/86A	0.10	86A	1500	7" diameter plastic tape and reel
V10P45-M3/87A	0.10	87A	6500	13" diameter plastic tape and reel
V10P45HM3/86A ⁽¹⁾	0.10	86A	1500	7" diameter plastic tape and reel
V10P45HM3/87A ⁽¹⁾	0.10	87A	6500	13" diameter plastic tape and reel
V10P45HM3_A/H ⁽¹⁾	0.10	H	1500	7" diameter plastic tape and reel
V10P45HM3_A/I ⁽¹⁾	0.10	I	6500	13" diameter plastic tape and reel

Note

- (1) AEC-Q101 qualified

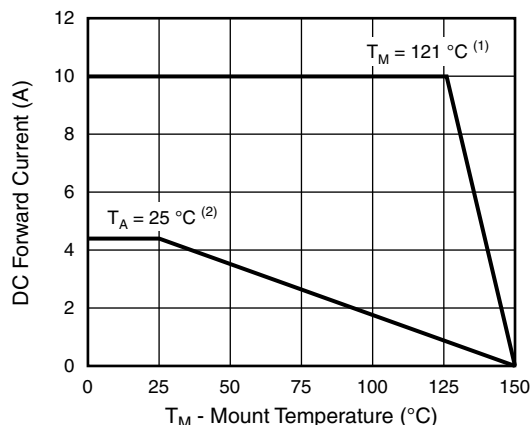
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)

Fig. 1 - Maximum Forward Current Derating Curve

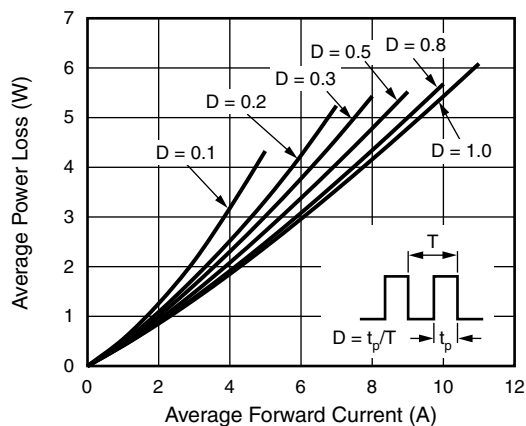


Fig. 2 - Forward Power Loss Characteristics

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 ($R_{\theta JA} = 75\text{ }^{\circ}\text{C/W}$)

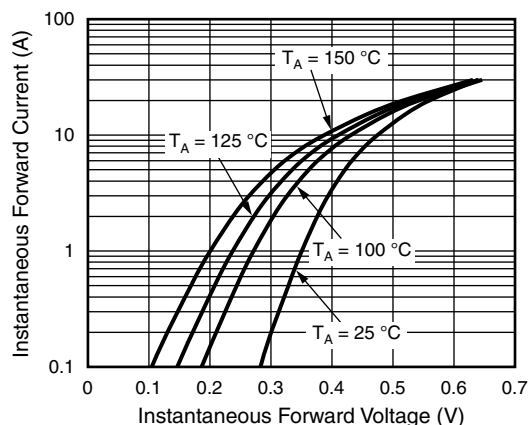


Fig. 3 - Typical Instantaneous Forward Characteristics

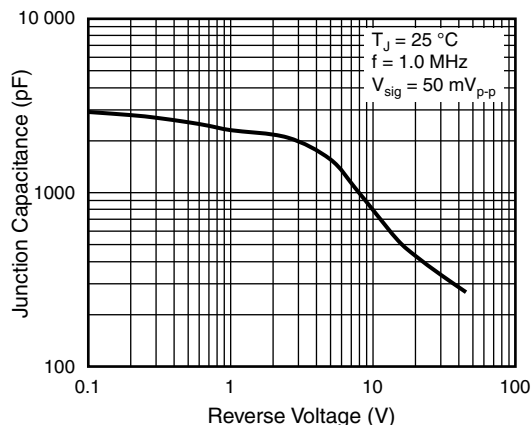


Fig. 5 - Typical Junction Capacitance

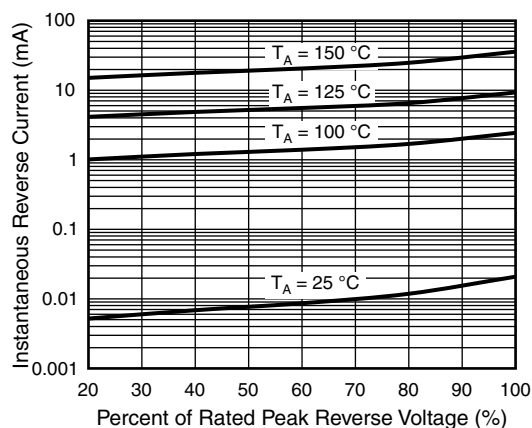


Fig. 4 - Typical Reverse Leakage Characteristics

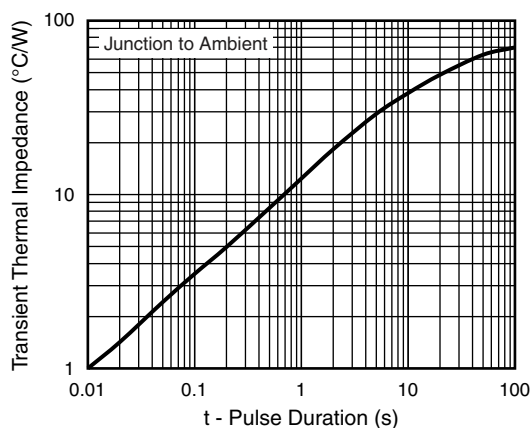
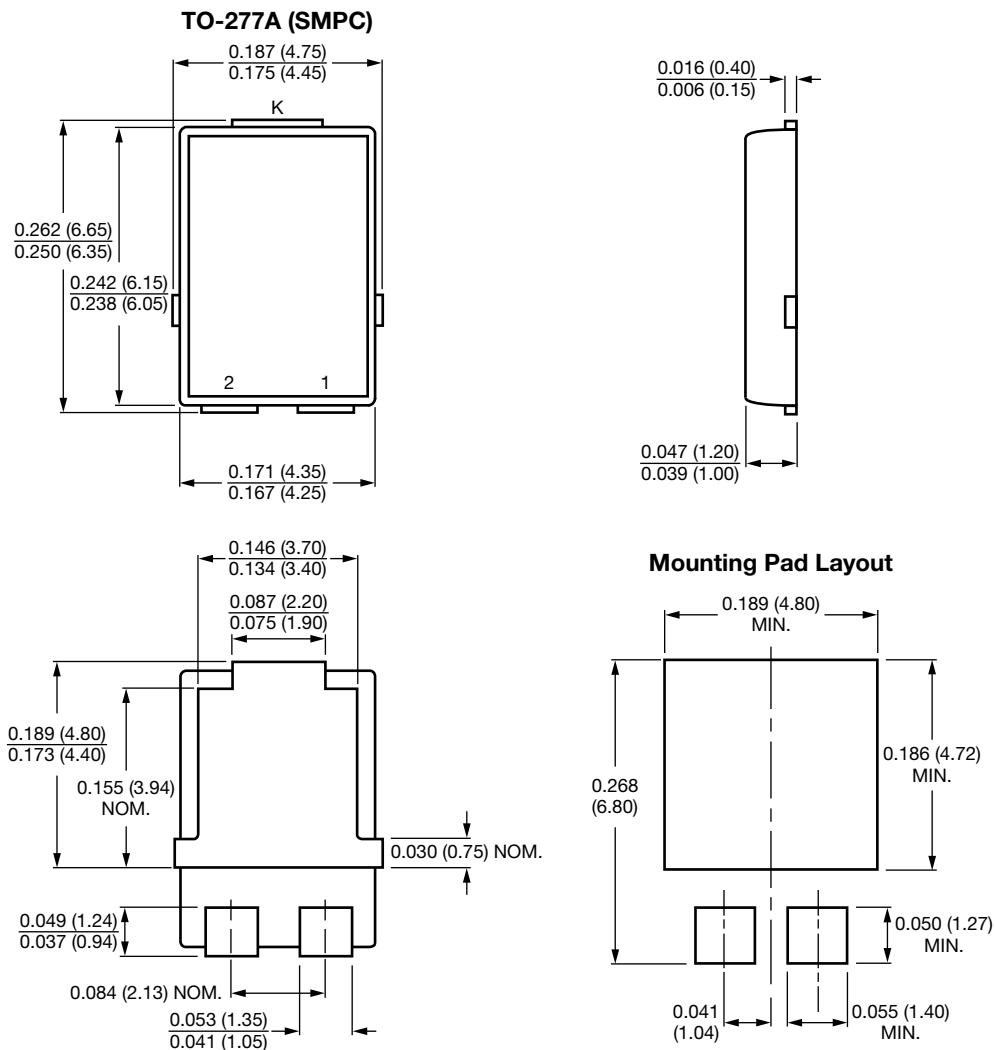


Fig. 6 - Typical Transient Thermal Impedance



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



Conform to JEDEC® TO-277A



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