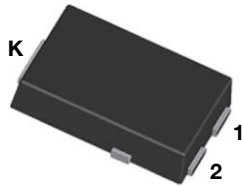
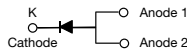


# High Current Density Surface Mount Trench MOS Barrier Schottky Rectifier

 Ultra Low  $V_F = 0.29\text{ V}$  at  $I_F = 5\text{ A}$ 
**TMBS® eSMP® Series**

**TO-277A (SMPC)**

**RoHS  
COMPLIANT  
HALOGEN  
FREE**
**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)

**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

**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	
$I_{F(AV)}$	20 A
$V_{RRM}$	50 V
$I_{FSM}$	240 A
$V_F$ at $I_F = 20\text{ A}$ ( $T_A = 125\text{ °C}$ )	0.46 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	V20PL50	UNIT
Device marking code		20L5	
Maximum repetitive peak reverse voltage	$V_{RRM}$	50	V
Maximum average forward rectified current (fig. 1)	$I_F^{(1)}$	20	A
	$I_F^{(2)}$	5.5	
Maximum DC reverse voltage	$V_{DC}$	40	V
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	$I_{FSM}$	240	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

<b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	$I_F = 5.0\text{ A}$	$T_A = 25\text{ }^\circ\text{C}$	$V_F^{(1)}$	0.40	-	V
	$I_F = 10\text{ A}$			0.45	-	
	$I_F = 20\text{ A}$			0.51	0.59	
	$I_F = 5.0\text{ A}$	$T_A = 125\text{ }^\circ\text{C}$		0.29	-	
	$I_F = 10\text{ A}$			0.36	-	
	$I_F = 20\text{ A}$			0.46	0.54	
Reverse current	$V_R = 40\text{ V}$	$T_A = 25\text{ }^\circ\text{C}$	$I_R^{(2)}$	0.02	-	mA
		$T_A = 125\text{ }^\circ\text{C}$		15	-	
	$V_R = 50\text{ V}$	$T_A = 25\text{ }^\circ\text{C}$		-	3	mA
		$T_A = 125\text{ }^\circ\text{C}$		20	60	

**Notes**

- (1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle  
 (2) Pulse test: pulse width  $\leq 5\text{ ms}$

<b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	V20PL50	UNIT
Typical thermal resistance	$R_{\theta JA}^{(1)(2)}$	68	$^\circ\text{C/W}$
	$R_{\theta JM}^{(3)}$	4	

**Notes**

- (1) Free air, mounted on recommended copper pad area; thermal resistance  $R_{\theta JA}$  - junction to ambient  
 (2) The heat generated must be less than the thermal conductivity from junction-to-ambient:  $dP_D/dT_J < 1/R_{\theta JA}$   
 (3) Mounted on 30 mm x 30 mm 2 oz. pad PCB; thermal resistance  $R_{\theta JM}$  - junction to mount measured at cathode side

<b>ORDERING INFORMATION</b> (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
V20PL50-M3/86A	0.10	86A	1500	7" diameter plastic tape and reel
V20PL50-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)

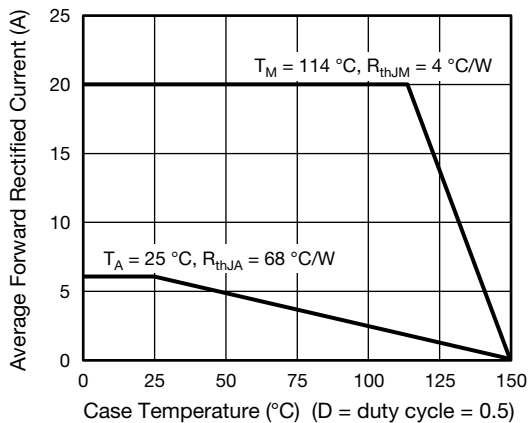


Fig. 1 - Maximum Forward Current Derating Curve

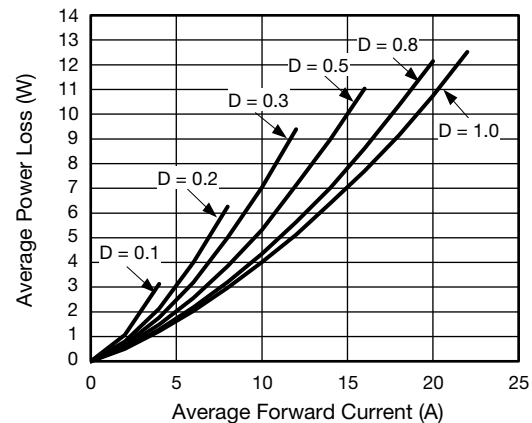


Fig. 2 - Forward Power Loss Characteristics

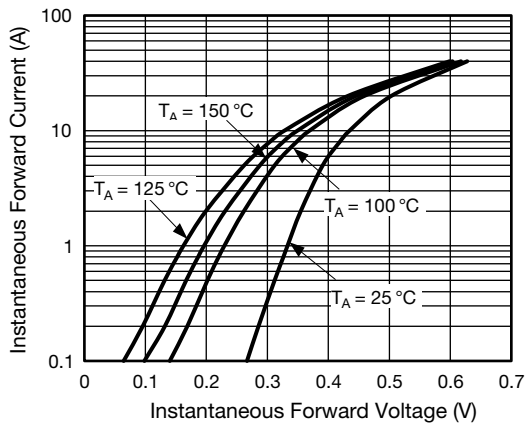


Fig. 3 - Typical Instantaneous Forward Characteristics

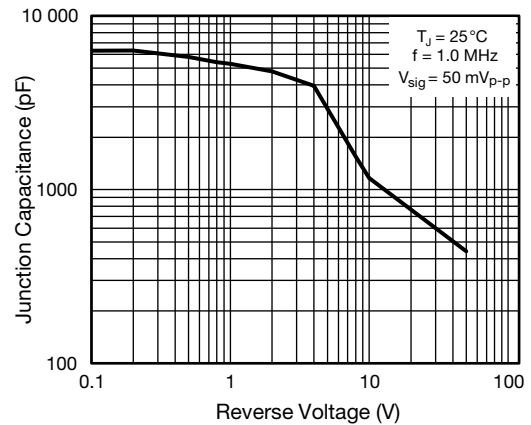


Fig. 5 - Typical Junction Capacitance

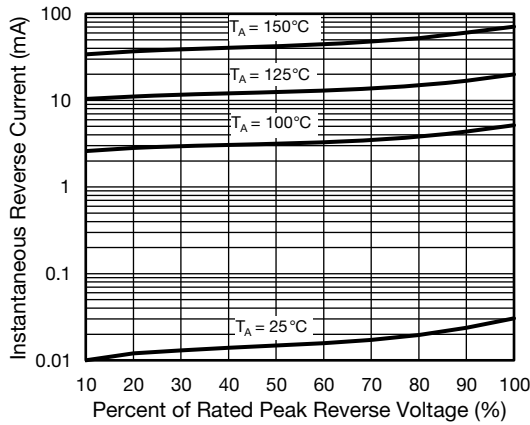


Fig. 4 - Typical Reverse Leakage Characteristics

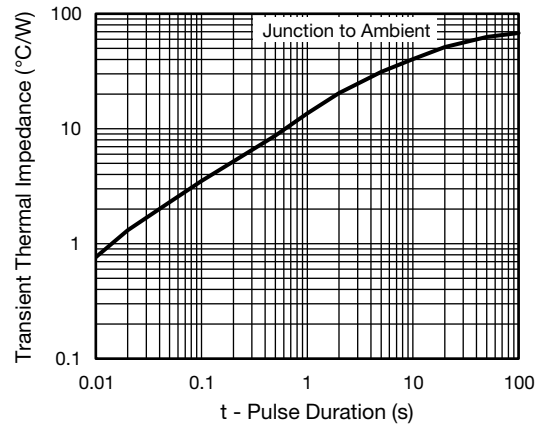
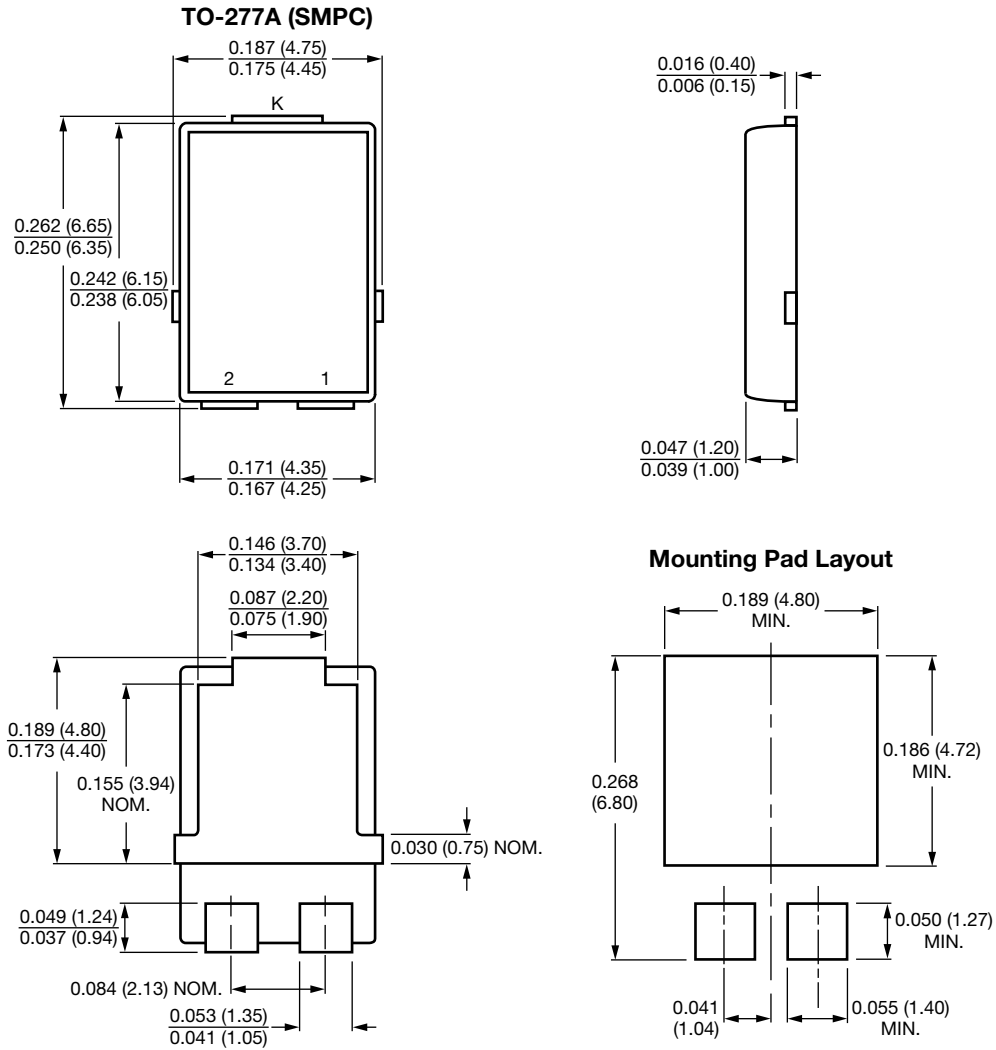


Fig. 6 - Typical Transient Thermal Impedance

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





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