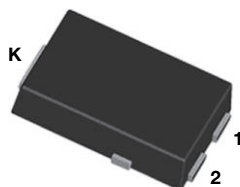


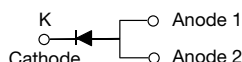
# High Current Density Surface Mount TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low  $V_F = 0.29\text{ V}$  at  $I_F = 5\text{ A}$

## eSMP® Series



## SMPC (TO-277A)



## 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 low voltage high frequency DC/DC converters, freewheeling, 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

**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	SMPC (TO-277A)
Circuit configuration	Single

## LINKS TO ADDITIONAL RESOURCES



3D Models

## 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



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>	0.40	-	V
	I <sub>F</sub> = 10 A			0.45	-	
	I <sub>F</sub> = 20 A			0.51	0.59	
	I <sub>F</sub> = 5.0 A	T <sub>A</sub> = 125 °C		0.29	-	
	I <sub>F</sub> = 10 A			0.36	-	
	I <sub>F</sub> = 20 A			0.46	0.54	
Reverse current	V <sub>R</sub> = 40 V	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	0.02	-	mA
		T <sub>A</sub> = 125 °C		15	-	
	V <sub>R</sub> = 50 V	T <sub>A</sub> = 25 °C		-	3	mA
		T <sub>A</sub> = 125 °C		20	60	

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

THERMAL CHARACTERISTICS ( $T_A = 25\text{ }^{\circ}\text{C}$ 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

ORDERING INFORMATION (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

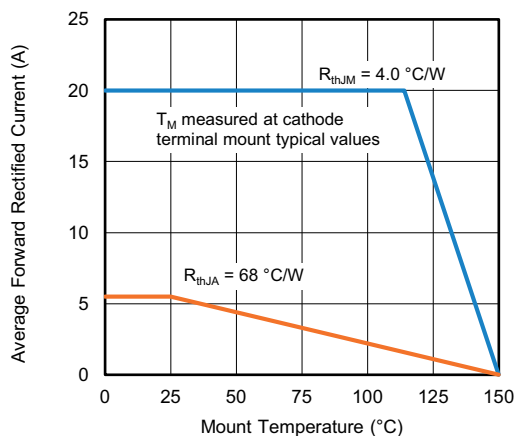
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

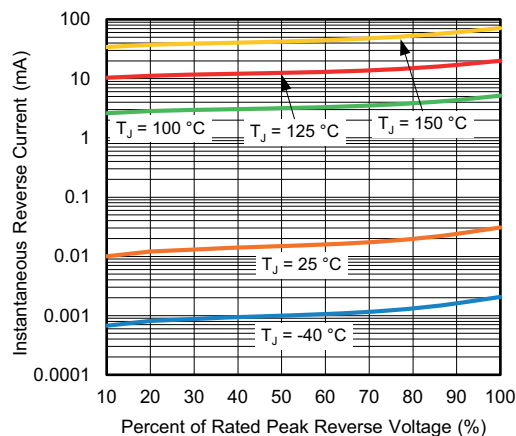


Fig. 4 - Typical Reverse Leakage Characteristics

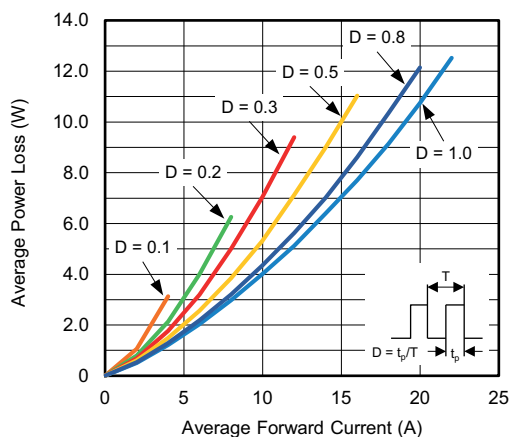


Fig. 2 - Forward Power Loss Characteristics

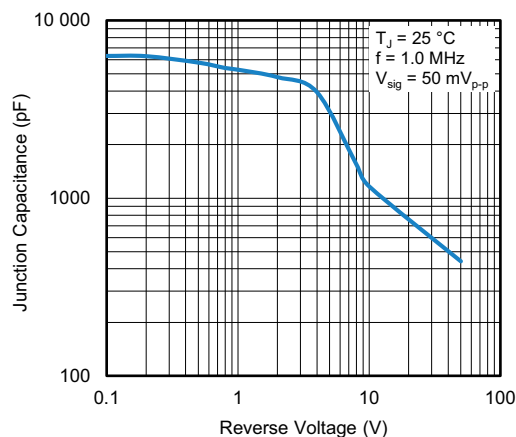


Fig. 5 - Typical Junction Capacitance

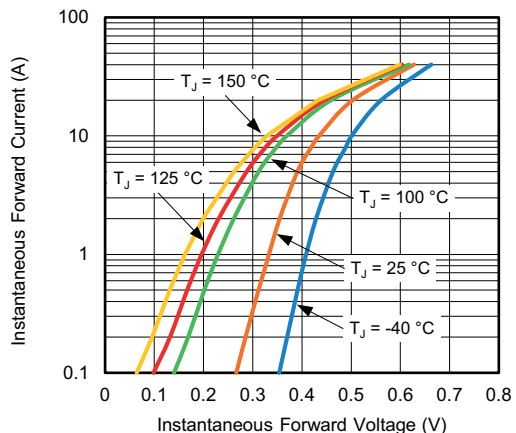


Fig. 3 - Typical Instantaneous Forward Characteristics

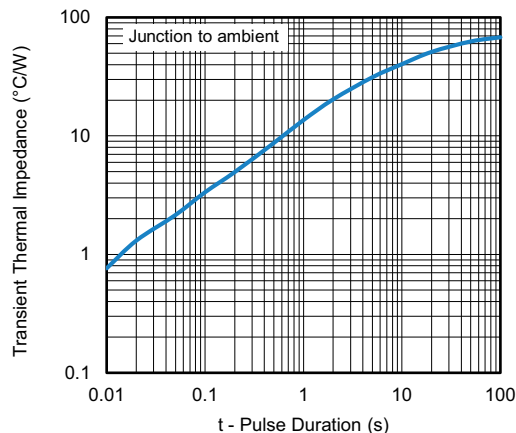
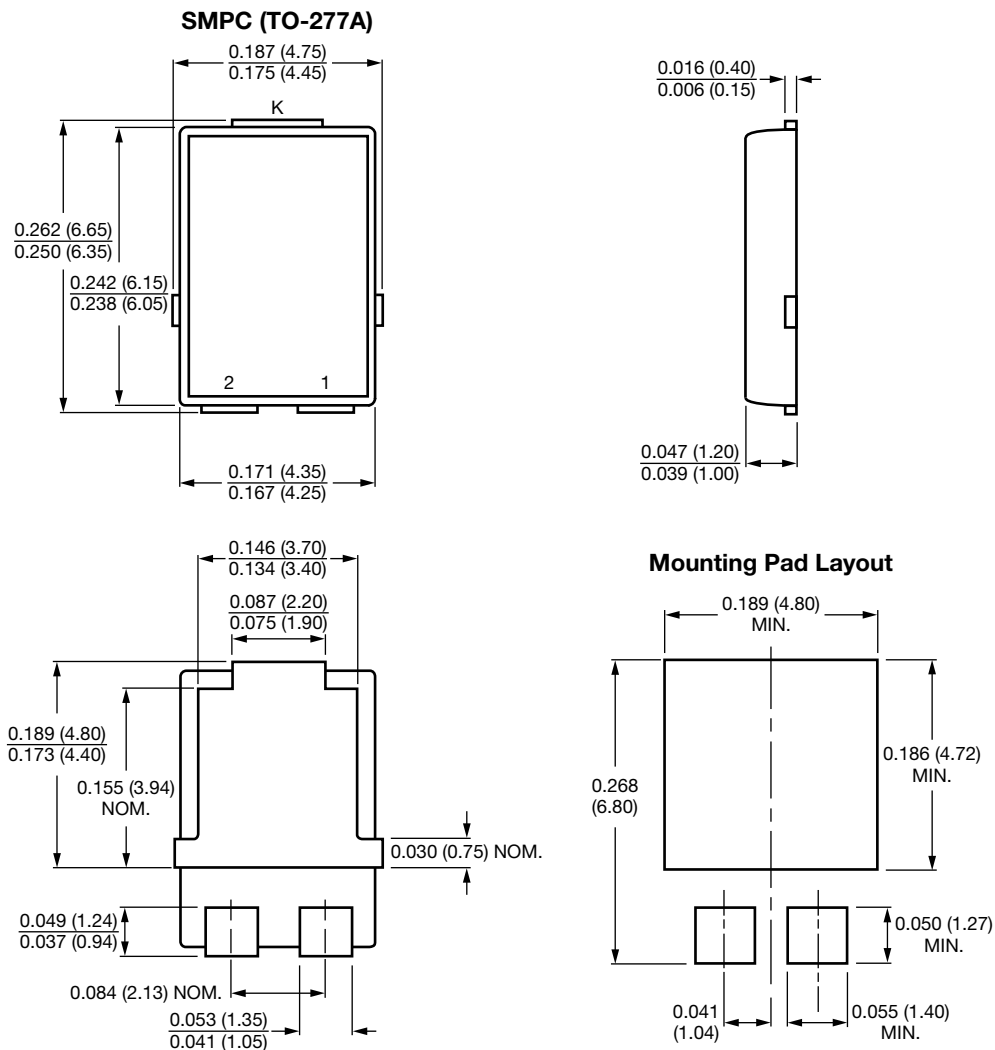


Fig. 6 - Typical Transient Thermal Impedance

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




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