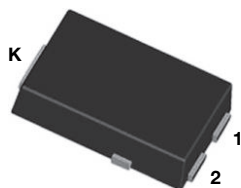


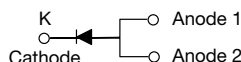
# Low Noise High Current Density Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low  $V_F = 0.30\text{ V}$  at  $I_F = 5\text{ A}$

## eSMP® Series



**SMPC (TO-277A)**



AUTOMOTIVE  
GRADE



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

## FEATURES

- Very low profile - typical height of 1.1 mm
- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- Low reverse spike voltage
- Very low junction capacitance
- 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/doc?99912](http://www.vishay.com/doc?99912)

## TYPICAL APPLICATIONS

For use in low voltage high frequency inverters, freewheeling, DC/DC converters, 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

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

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

M3 and HM3 suffix meets JESD 201 class 2 whisker test

## LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	20 A
$V_{RRM}$	60 V
$I_{FSM}$	340 A
$V_F$ at $I_F = 20\text{ A}$ ( $T_J = 125\text{ °C}$ )	0.48 V
$T_J$ max.	150 °C
Package	SMPC (TO-277A)
Circuit configuration	Single

MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)			
PARAMETER	SYMBOL	V20PL64	UNIT
Device marking code		20L64	
Maximum repetitive peak reverse voltage	$V_{RRM}$	60	V
Maximum average forward rectified current (fig. 1)	$I_{F(AV)}^{(1)}$	20	A
	$I_{F(AV)}^{(2)}$	5.2	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	$I_{FSM}$	340	A
Operating junction temperature range	$T_J^{(3)}$	-40 to +150	°C
Storage temperature range	$T_{STG}$	-55 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

(3) The heat generated must be less than the thermal conductivity from junction-to-ambient:  $dP_D/dT_J < 1/R_{\theta JA}$



ELECTRICAL CHARACTERISTICS ( $T_J = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)					
PARAMETER	TEST CONDITIONS	SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	$I_F = 5.0\text{ A}$	$V_F^{(1)}$	0.40	-	V
	$I_F = 10\text{ A}$		0.45	-	
	$I_F = 20\text{ A}$		0.53	0.60	
	$I_F = 5.0\text{ A}$		0.30	-	
	$I_F = 10\text{ A}$		0.37	-	
	$I_F = 20\text{ A}$		0.48	0.57	
Reverse current	$V_R = 60\text{ V}$	$I_R^{(2)}$	-	0.25	mA
			14.5	35	
Typical junction capacitance	4.0 V, 1 MHz	$C_J$	720	-	pF

**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	V20PL64	UNIT
Typical thermal resistance	$R_{\theta JA}^{(1)(2)}$	75	$^{\circ}\text{C/W}$
	$R_{\theta JM}^{(3)}$	4	

**Notes**(1) The heat generated must be less than the thermal conductivity from junction to ambient:  $dP_D/dT_J < 1/R_{\theta JA}$ (2) Free air mounted on recommended copper pad area; thermal resistance  $R_{\theta JA}$  - junction to ambient(3) Mounted on 30 mm x 30 mm aluminum PCB; thermal resistance  $R_{\theta JM}$  - junction to mount**ORDERING INFORMATION TABLE**

Device code

V	20	P	L	6	4	H	M3
1	2	3	4	5	6	7	8

- 1** - Vishay TMBS product
- 2** - Current rating (20 = 20 A)
- 3** - Package type (P = SMPC (TO-277A))
- 4** - Process type option (L = low  $V_F$ )
- 5** - Voltage rating (6 = 60 V)
- 6** - TMBS generation option (4 = gen 4)
- 7** - Quality grade (H = AEC-Q101 qualified, - = industry grade)
- 8** - Material / Environment category  
(M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free)

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
V20PL64-M3/H	0.10	H	1500	7" diameter plastic tape and reel
V20PL64-M3/I	0.10	I	6500	13" diameter plastic tape and reel
V20PL64HM3/H <sup>(1)</sup>	0.10	H	1500	7" diameter plastic tape and reel
V20PL64HM3/I <sup>(1)</sup>	0.10	I	6500	13" diameter plastic tape and reel

**Note**<sup>(1)</sup> AEC-Q101 qualified

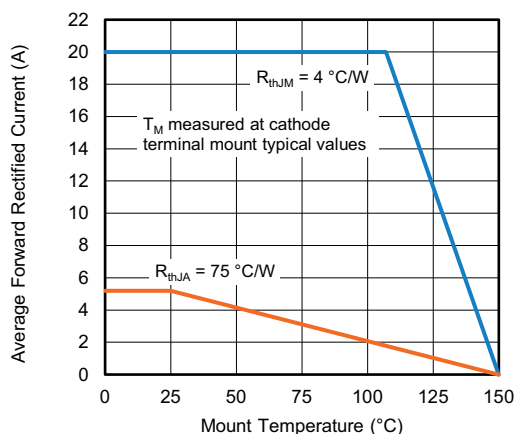
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Forward Current Derating Curve

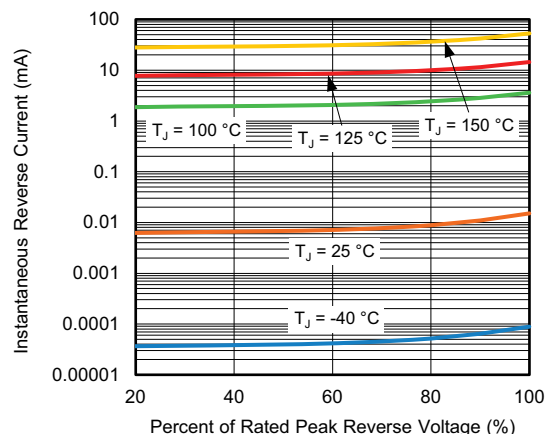


Fig. 4 - Typical Reverse Leakage Characteristics Per Diode

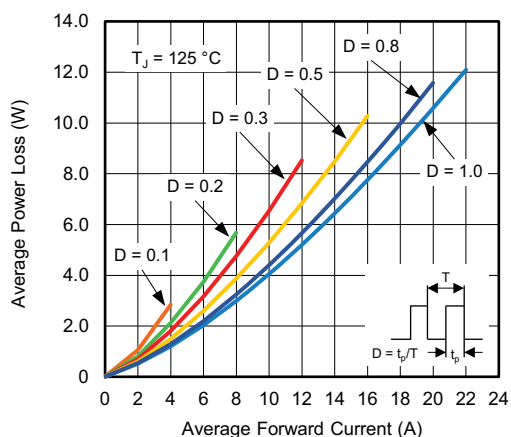


Fig. 2 - Forward Power Loss Characteristics

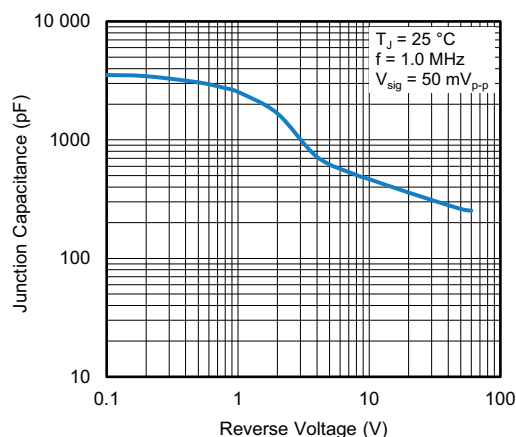


Fig. 5 - Typical Junction Capacitance

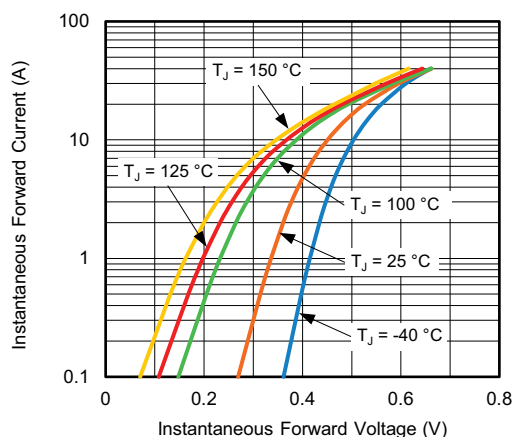


Fig. 3 - Typical Instantaneous Forward Characteristics

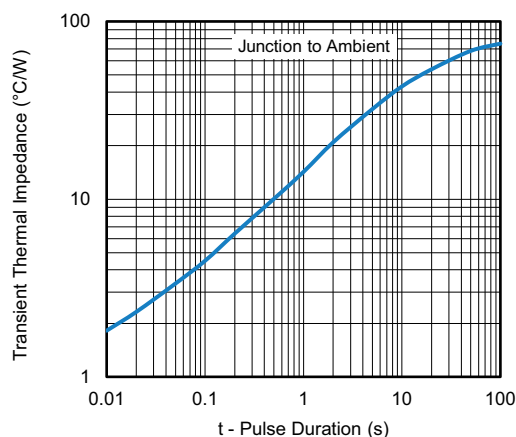
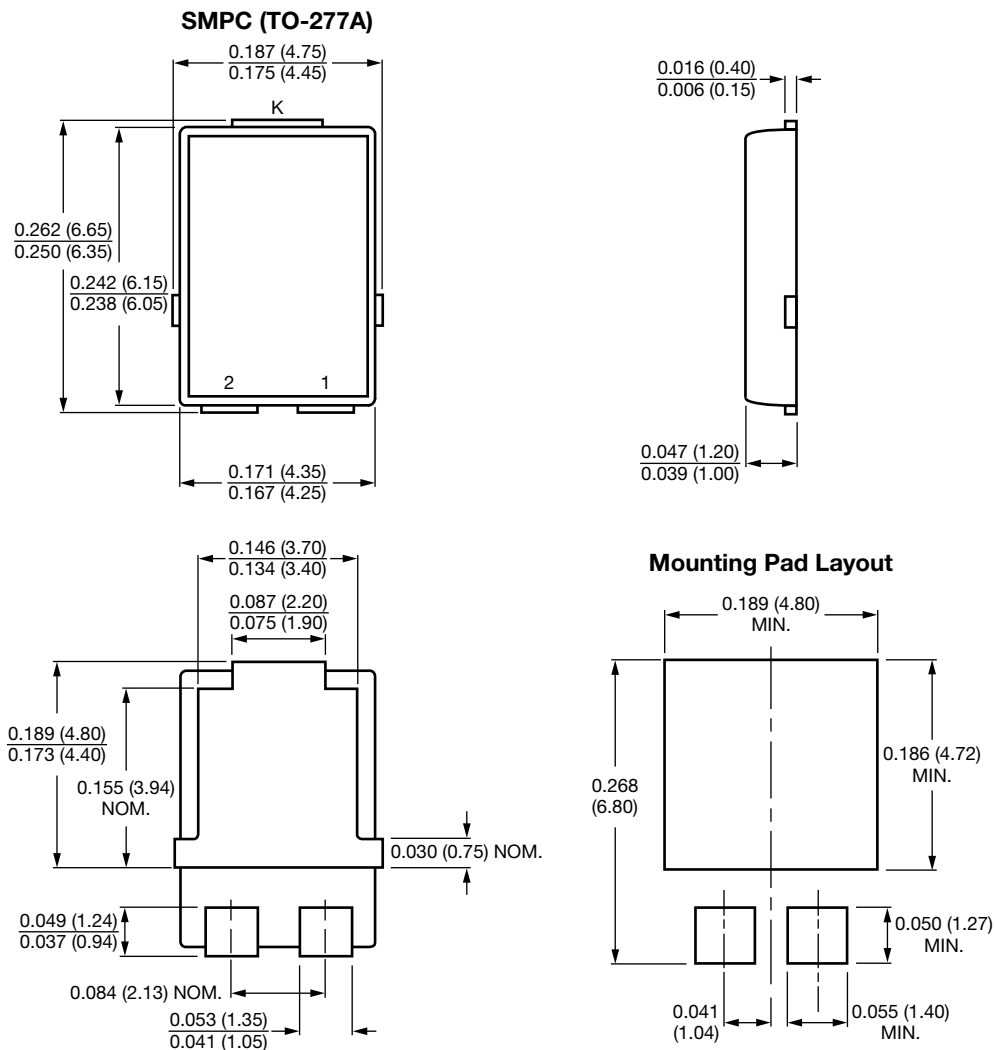


Fig. 6 - Typical Transient Thermal Impedance

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




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