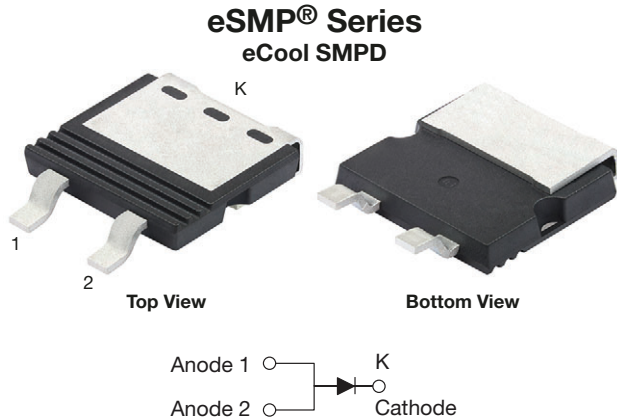


High-Voltage TMBS[®] (Trench MOS Barrier Schottky) Rectifier

 Ultra Low $V_F = 0.34\text{ V}$ at $I_F = 5.0\text{ A}$


FEATURES

- Top side cool
- Trench MOS Schottky technology
- Ideal for automated placement
- 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/doc?99912

 AUTOMOTIVE
GRADE
Available

RoHS
COMPLIANT
HALOGEN
FREE

TYPICAL APPLICATIONS

For use in high frequency DC/DC converters, switching power supplies, freewheeling diodes, OR-ing diode, and reverse battery protection in commercial, industrial, and automotive application.

LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	20 A
V_{RRM}	45 V
I_{FSM}	280 A
V_F at $I_F = 20\text{ A}$ ($T_J = 125\text{ °C}$)	0.47 V
T_J max.	175 °C
Package	eCool SMPD
Circuit configuration	Single

MECHANICAL DATA

Case: eCool SMPD

Molding compound meets UL 94 V-0 flammability rating
 Base P/N-M3 - halogen-free, RoHS-compliant
 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 meet JESD 201 class 2 whisker test

Polarity: as marked

MAXIMUM RATINGS ($T_A = 25\text{ °C}$ unless otherwise noted)			
PARAMETER	SYMBOL	V20CM45	UNIT
Device marking code		V20CM45	
Maximum repetitive peak reverse voltage	V_{RRM}	45	V
Maximum average forward rectified current (fig. 1)	$I_{F(AV)}^{(1)}$	20	A
	$I_{F(AV)}^{(2)}$	12.5	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	I_{FSM}	280	A
Operating junction temperature range	$T_J^{(3)}$	-40 to +175	°C
Storage temperature range	T_{STG}	-55 to +175	

Notes

- (1) Mounted on infinite heatsink
- (2) Free air, mounted on FR4 PCB, 2 oz., standard footprint with top side aluminum cooling
- (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 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I _F = 5 A	T _J = 25 °C	V _F ⁽¹⁾	0.46	-	V
	I _F = 10 A			0.50	-	
	I _F = 20 A			0.56	0.61	
	I _F = 5 A	T _J = 125 °C		0.34	-	
	I _F = 10 A			0.39	-	
	I _F = 20 A			0.47	0.51	
Reverse current at rated V _R	V _R = 45 V	T _J = 25 °C	I _R ⁽²⁾	-	0.16	mA
		T _J = 125 °C		4.5	12	
Typical junction capacitance	4.0 V, 1 MHz		C _J	2800	-	pF

Notes

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
- (2) Pulse test: Pulse width ≤ 5 ms

THERMAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Typical thermal resistance	R _{θJA} ⁽¹⁾⁽²⁾	26.5	34	°C/W
	R _{θJC} ⁽³⁾	1.2	1.5	

Notes

- (1) The heat generated must be less than the thermal conductivity from junction-to-ambient: dP_D/dT_J < 1/R_{θJA} - junction-to-ambient
- (2) Thermal resistance junction-to-ambient to follow JEDEC® 51-2A, device mounted on FR4 PCB, 2 oz. standard footprint with top-side aluminum cooling heatsink size L 35 mm x W 20 mm x H 10 mm
- (3) Thermal resistance junction-to-top case to follow JEDEC® 51-14 transient dual interface test method (TDIM)

ORDERING INFORMATION TABLE

Device code

V	20	C	M	45	H	M3
①	②	③	④	⑤	⑥	⑦

- 1** - Vishay TMBS product
- 2** - Current rating (20 = 20 A)
- 3** - Package type (C = eCool SMPD package)
- 4** - Process type option (M = low I_R)
- 5** - Voltage rating (45 = 45 V)
- 6** - Quality grade (H = AEC-Q101 qualified, - = industry grade)
- 7** - Material / Environment category
(M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free)

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
V20CM45-M3/I	0.66	I	2000/reel	13" diameter plastic tape and reel
V20CM45HM3/I ⁽¹⁾	0.66	I	2000/reel	13" diameter plastic tape and reel

Note

- (1) AEC-Q101 qualified



RATINGS AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)

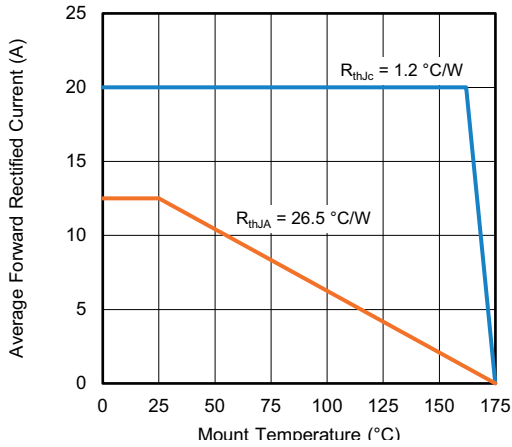


Fig. 1 - Maximum Forward Current Derating Curve

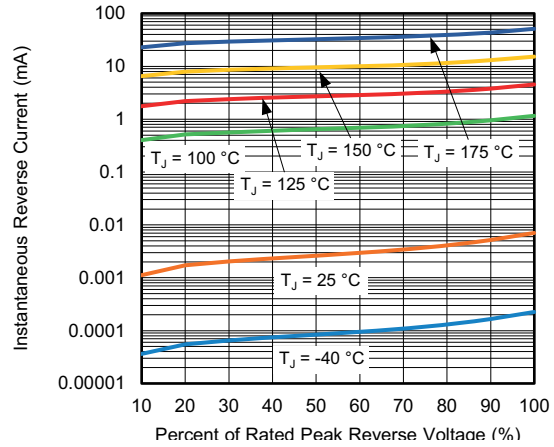


Fig. 4 - Typical Reverse Leakage Characteristics

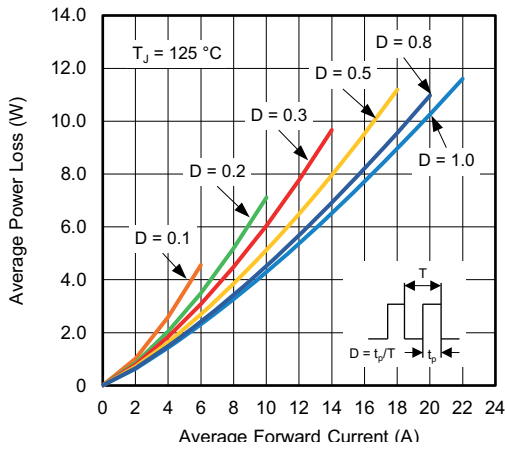


Fig. 2 - Average Power Loss Characteristics

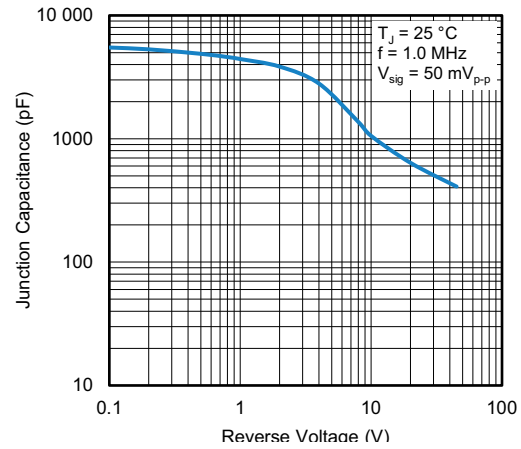


Fig. 5 - Typical Junction Capacitance

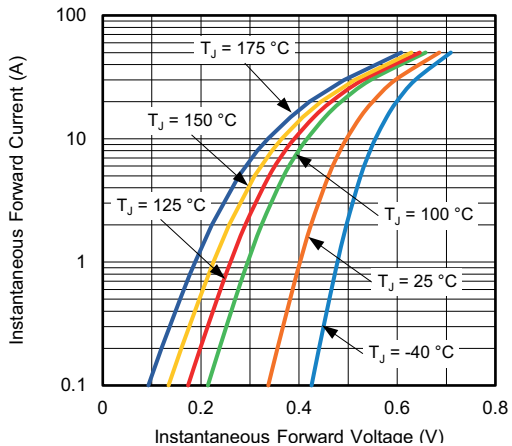


Fig. 3 - Typical Instantaneous Forward Characteristics

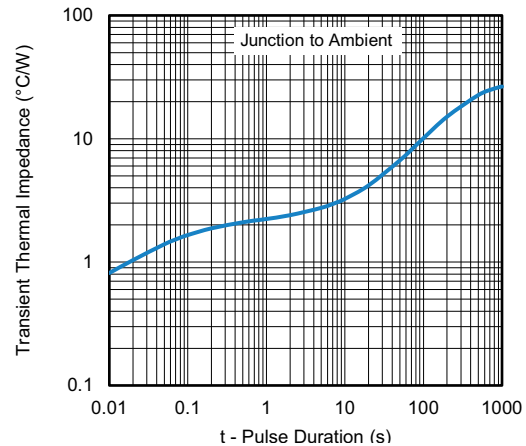
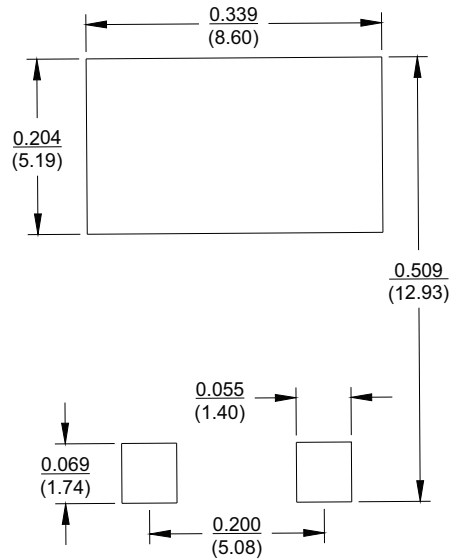
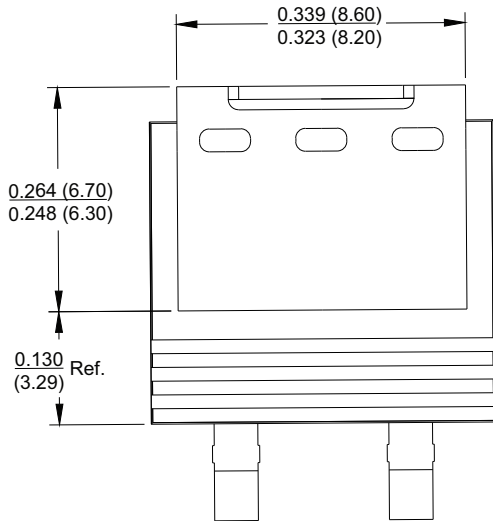
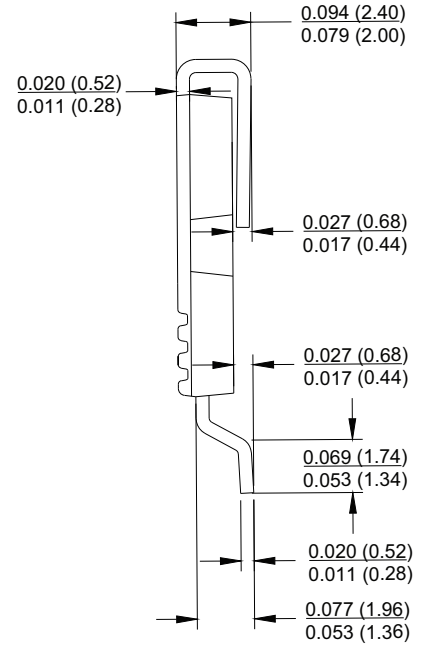
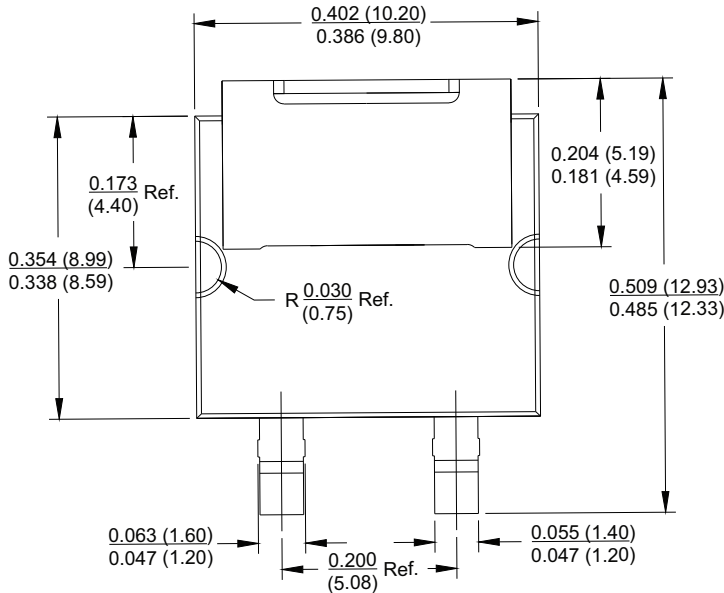


Fig. 6 - Typical Transient Thermal Impedance



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

eCool SMPD



Note

- The suggested mounting pad layout is provided for reference only, as actual pad layouts may vary depending on application



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