

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

Ultra Low $V_F = 0.51\text{ V}$ at $I_F = 2.5\text{ A}$



DESIGN SUPPORT TOOLS AVAILABLE



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	2 x 5A
V_{RRM}	120 V
I_{FSM}	100 A
V_F at $I_F = 5\text{ A}$ ($T_A = 125\text{ }^\circ\text{C}$)	0.59 V
T_J max.	150 $^\circ\text{C}$
Package	FlatPAK 5 x 6
Circuit configuration	Common cathode

FEATURES

- 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 $^\circ\text{C}$
- AEC-Q101 qualified available
- Automotive ordering code: base P/NHM3
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

TYPICAL APPLICATIONS

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

MECHANICAL DATA

Case: FlatPAK 5 x 6

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 meets JESD 201 class 2 whisker test

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

PARAMETER	SYMBOL	V10K120C	UNIT
Device marking code		V1012C	
Maximum repetitive peak reverse voltage	V_{RRM}	120	V
Maximum DC forward current per device	$I_{F(AV)}^{(1)}$	10	A
	$I_{F(AV)}^{(2)}$	3.6	A
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode	I_{FSM}	100	A
Operating junction temperature range	$T_J^{(3)}$	-40 to +150	$^\circ\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^\circ\text{C}$

Notes

(1) With infinite heatsink

(2) Free air, mounted on recommended 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** ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)

PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage per diode	I _F = 2.5 A	T _A = 25 °C	V _F ⁽¹⁾	0.57	-	V
	I _F = 5 A			0.73	0.81	
	I _F = 2.5 A	T _A = 125 °C		0.51	-	
	I _F = 5 A			0.59	0.67	
Reverse current per diode	V _R = 90 V	T _A = 25 °C	I _R ⁽²⁾	0.01	-	mA
		T _A = 125 °C		3	-	
	V _R = 120 V	T _A = 25 °C		-	0.4	
		T _A = 125 °C		6	15	
Typical junction capacitance per diode	4.0 V, 1 MHz		C _J	600	-	pF

Notes(1) Pulse test: 300 μs 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	TYP.	MAX.	UNIT
Thermal resistance per device	$R_{\theta JA}^{(1)(2)}$	75	-	$^{\circ}\text{C/W}$
	$R_{\theta JM}^{(3)}$	2.5	3.5	

Notes(1) The heat generated must be less than 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 infinite heat sink; thermal resistance $R_{\theta JM}$ - junction-to-mount**ORDERING INFORMATION** (Example)

PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
V10K120C-M3/H	0.10	H	1500	7" diameter plastic tape and reel
V10K120C-M3/I	0.10	I	6000	13" diameter plastic tape and reel
V10K120CHM3/H ⁽¹⁾	0.10	H	1500	7" diameter plastic tape and reel
V10K120CHM3/I ⁽¹⁾	0.10	I	6000	13" diameter plastic tape and reel

Note

(1) AEC-Q101 qualified

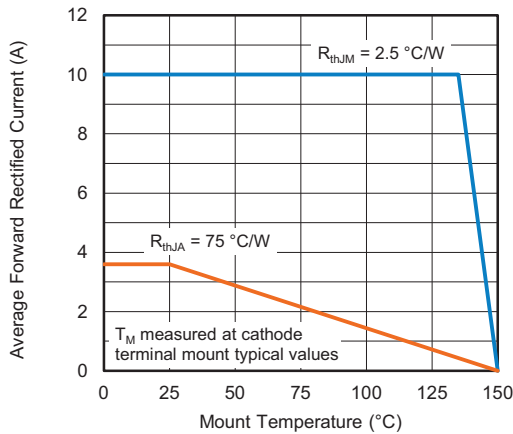
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

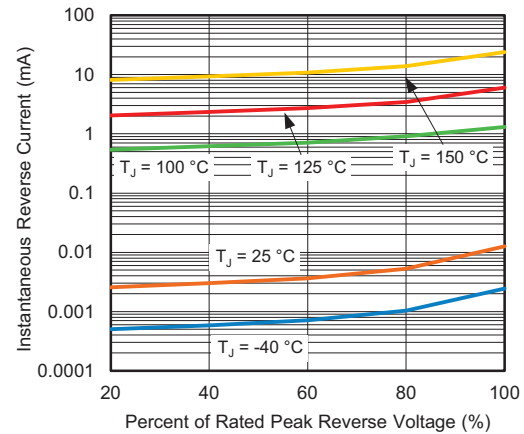


Fig. 4 - Typical Reverse Leakage Characteristics

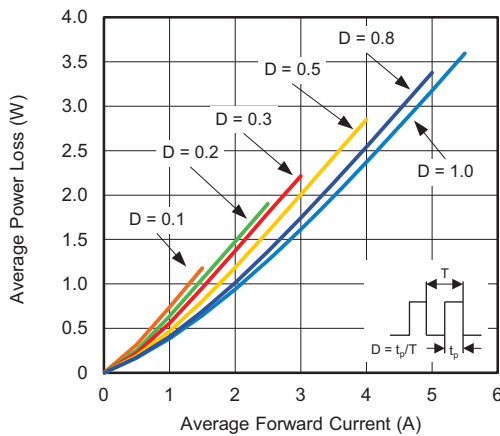


Fig. 2 - Forward Power Loss Characteristics

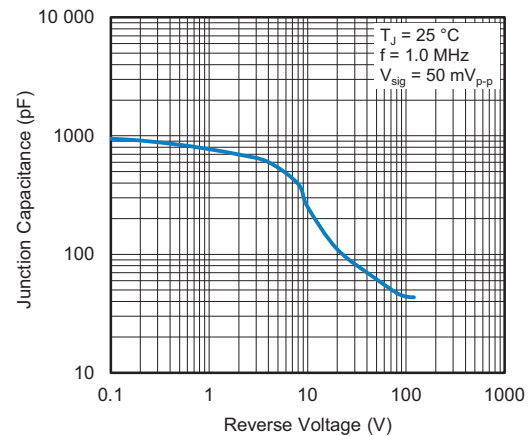


Fig. 5 - Typical Junction Capacitance

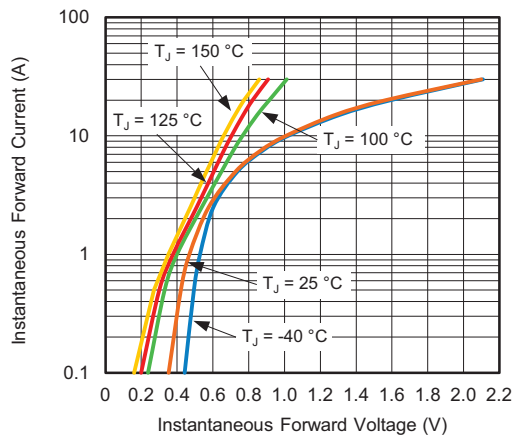


Fig. 3 - Typical Instantaneous Forward Characteristics

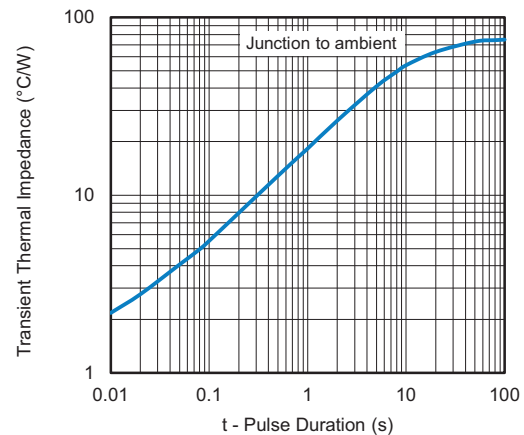
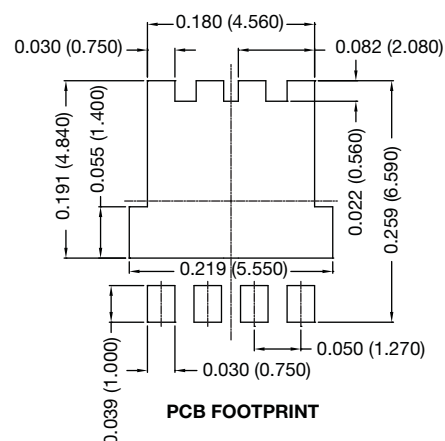


Fig. 6 - Typical Transient Thermal Impedance

**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)**FlatPAK 5 x 6****TOP VIEW****BOTTOM VIEW****PCB FOOTPRINT****SIDE VIEW**

DIM.	INCHES			MILLIMETERS		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.035	0.039	0.043	0.89	0.99	1.09
(a)	-	0.006	-	-	0.15	-
b	0.013	0.017	0.020	0.32	0.43	0.52
b1	0.013	0.017	0.020	0.32	0.43	0.52
c	0.008	-	0.014	0.20	-	0.35
D	0.197	0.203	0.209	5.00	5.15	5.30
D1	0.189	0.193	0.197	4.80	4.90	5.00
D2	0.154	0.161	0.169	3.90	4.10	4.30
(d1)	-	0.016	-	-	0.40	-
(d2)	-	0.005	-	-	0.125	-
E	0.238	0.244	0.250	6.05	6.20	6.35
E1	0.228	0.232	0.236	5.80	5.90	6.00
E2	0.157	0.165	0.173	4.00	4.20	4.40
(E3)	-	0.144	-	-	3.65	-
e	0.050 BSC			1.27 BSC		
(K)	0.039	-	-	1.00	-	-
L1	0.019	-	0.043	0.48	-	1.10
L2	0.012	-	0.031	0.30	-	0.80
M	0.128	0.138	0.148	3.25	3.50	3.75
Θ	0°	-	10°	0°	-	10°

Notes

- Dimensioning and tolerancing per ASME Y14.5-2009
- Dimensions D1 and E1 do not include mold flash or gate burrs
- Dimension (XX) means reference only



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