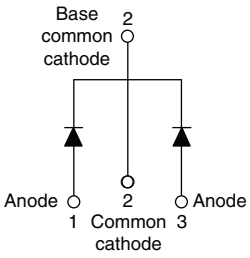
High Performance Schottky Rectifier, 2 x 10 A

TO-220AB 3L



FEATURES

- 150 °C T_J operation
- Low forward voltage drop
- High frequency operation
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- Designed and qualified according to JEDEC®-JESD 47
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT
HALOGEN FREE

DESCRIPTION

This center tap Schottky rectifier has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature. Typical applications are in switching power supplies, converters, freewheeling diodes, and reverse battery protection.

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	2 x 10 A
V_R	80 V, 90 V, 100 V
V_F at I_F	0.70 V
I_{RM} max.	6 mA at 125 °C
T_J max.	150 °C
E_{AS}	24 mJ
Package	TO-220AB 3L
Circuit configuration	Common cathode

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform (per device)	20	A
I_{FRM}	T_C = 133 °C per leg	20	A
V_{RRM}		80/100	V
I_{FSM}	t_p = 5 µs sine	850	A
V_F	10 A_{pk}, T_J = 125 °C	0.70	V
T_J	Range	-65 to +150	°C

VOLTAGE RATINGS					
PARAMETER	SYMBOL	MBR2080CT-M3	MBR2090CT-M3	MBR20100CT-M3	UNITS
Maximum DC reverse voltage	V_R	80	90	100	V
Maximum working peak reverse voltage	V_{RWM}				

ABSOLUTE MAXIMUM RATINGS						
PARAMETER		SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current	per leg	$I_{F(AV)}$	T_C = 133 °C, rated V_R		10	A
	per device				20	
Peak repetitive forward current per leg		I_{FRM}	Rated V_R, square wave, 20 kHz, T_C = 133 °C		20	
Non-repetitive peak surge current		I_{FSM}	5 µs sine or 3 µs rect. pulse	Following any rated load condition and with rated V_{RRM} applied	850	
			Surge applied at rated load conditions halfwave, single phase, 60 Hz		150	
Peak repetitive reverse surge current		I_{RRM}	2.0 µs, 1.0 kHz		0.5	
Non-repetitive avalanche energy per leg		E_{AS}	T_J = 25 °C, I_{AS} = 2 A, L = 12 mH		24	mJ

ELECTRICAL SPECIFICATIONS					
PARAMETER	**SYMBOL**	**TEST CONDITIONS**		**VALUES**	**UNITS**
Maximum forward voltage drop	V_{FM} (1)	10 A	T_J = 25 °C	0.80	V
		20 A		0.95	
		10 A	T_J = 125 °C	0.70	
		20 A		0.85	
Maximum instantaneous reverse current	I_{RM} (1)	T_J = 25 °C	Rated DC voltage	0.10	mA
		T_J = 125 °C		6	
Threshold voltage	$V_{F(TO)}$	$T_J = T_J$ maximum		0.433	V
Forward slope resistance	r_t			15.8	mΩ
Maximum junction capacitance	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz) 25 °C		400	pF
Typical series inductance	L_S	Measured from top of terminal to mounting plane		8.0	nH
Maximum voltage rate of change	dV/dt	Rated V_R		10 000	V/µs

Note

(1) Pulse width < 300 µs, duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS					
PARAMETER		**SYMBOL**	**TEST CONDITIONS**	**VALUES**	**UNITS**
Maximum junction temperature range		T_J		-65 to +150	°C
Maximum storage temperature range		T_{Stg}		-65 to +175	
Maximum thermal resistance, junction to case per leg		R_{thJC}	DC operation	2.0	°C/W
Typical thermal resistance, case to heatsink		R_{thCS}	Mounting surface, smooth and greased (Only for TO-220)	0.50	
Maximum thermal resistance, junction to ambient		R_{thJA}	DC operation (For D^2PAK and TO-262)	50	
Approximate weight				2	g
				0.07	oz.
Mounting torque	minimum			6 (5)	kg· cm (lbf · in)
	maximum			12 (10)	
Marking device			Case style TO-220AB 3L	MBR2080CT MBR2090CT MBR20100CT	

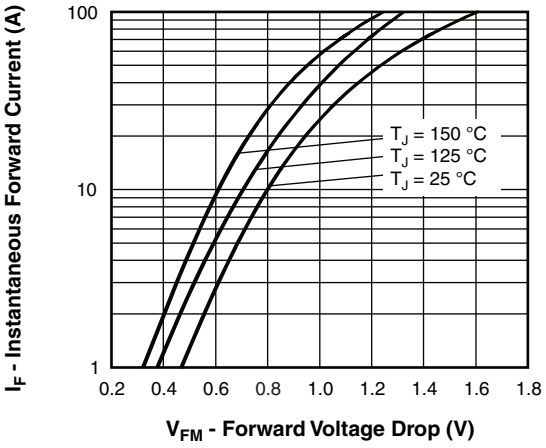


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

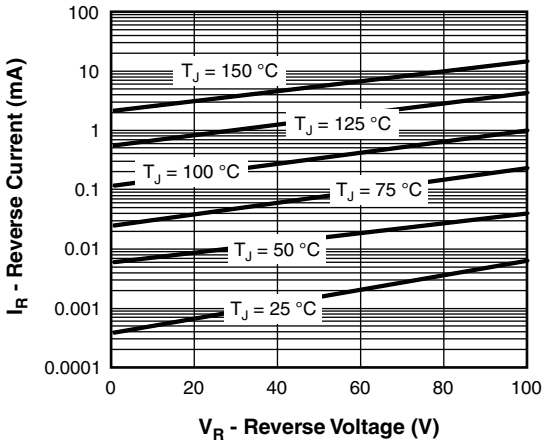


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

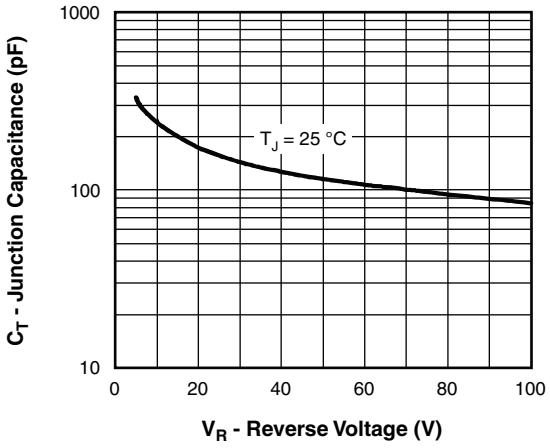


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

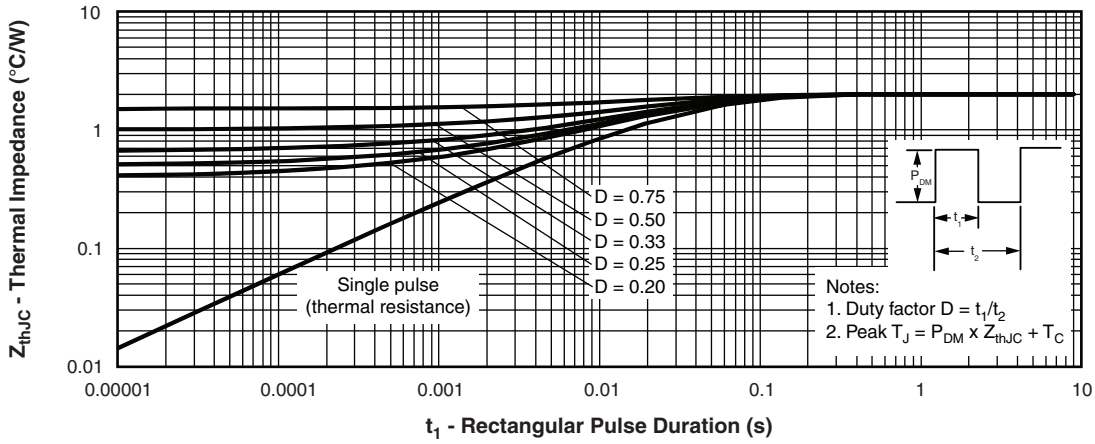


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

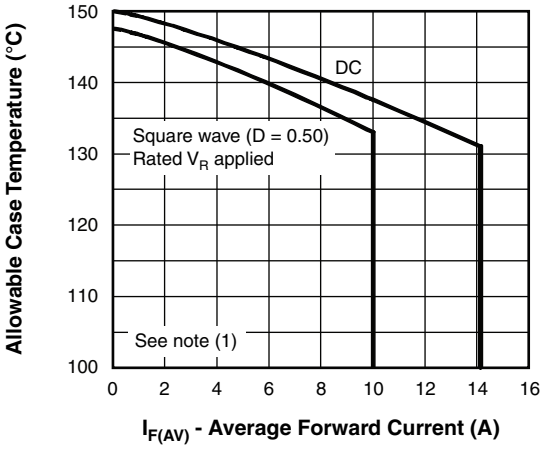


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

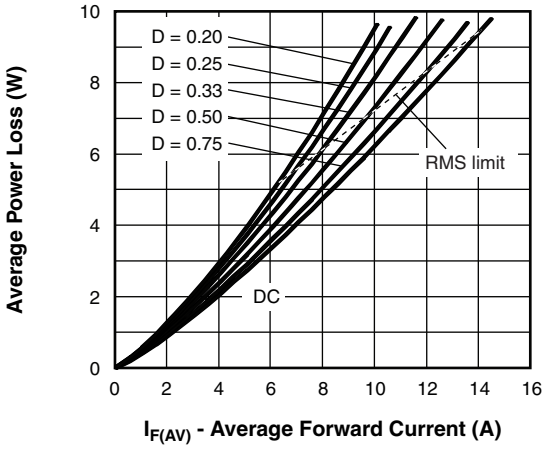


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

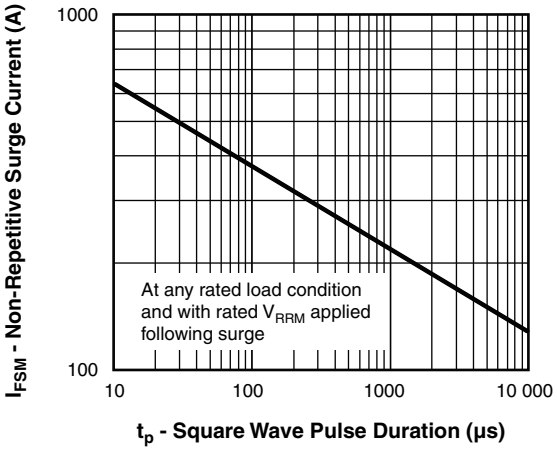


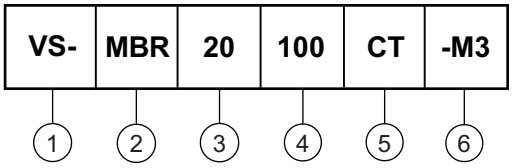
Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

Note

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = forward power loss = $I_{F(AV)} \times V_{FM}$ at ($I_{F(AV)}$/D) (see fig. 6);
Pd_{REV} = inverse power loss = $V_{R1} \times I_R$ (1 - D); I_R at V_{R1} = rated V_R

ORDERING INFORMATION TABLE

Device code



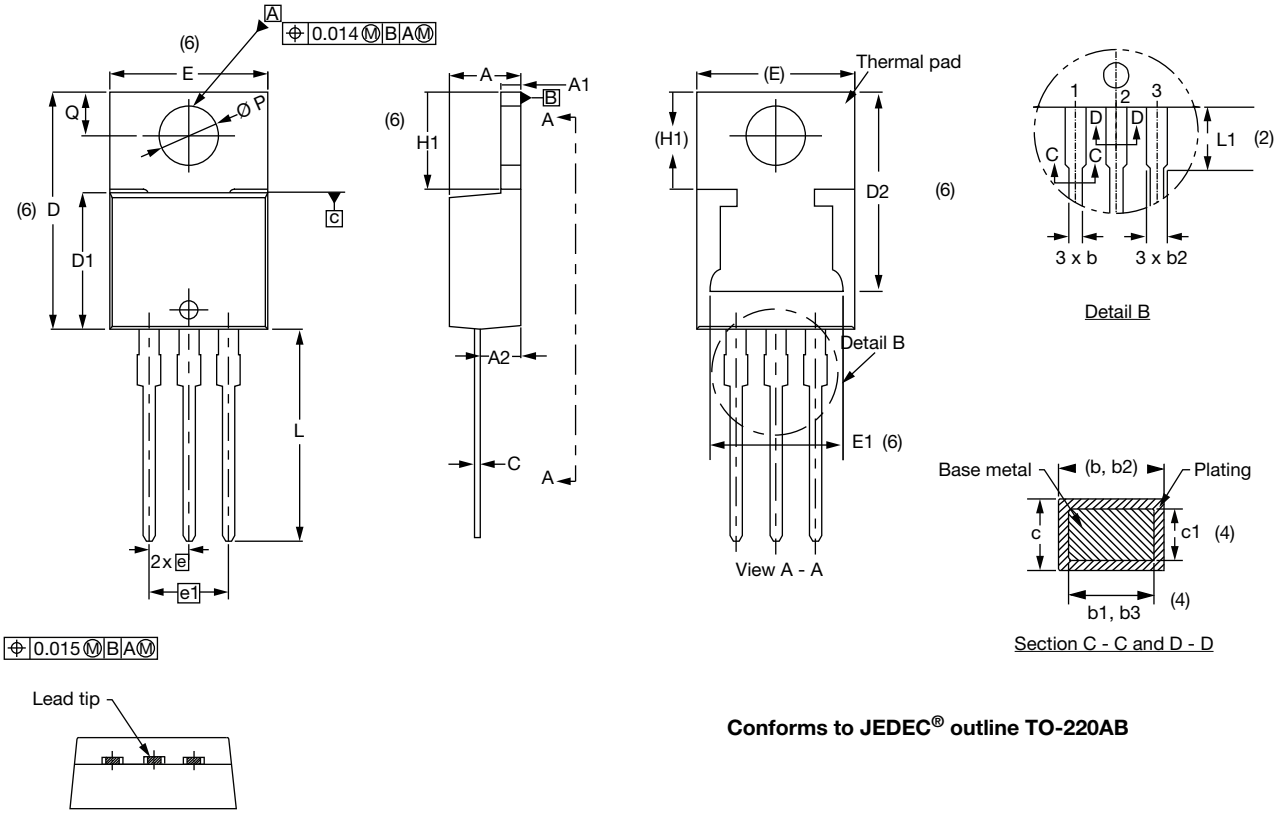
1 - Vishay Semiconductors product
2 - Schottky MBR series
3 - Current rating (20 = 20 A)
4 - Voltage ratings (080 = 80 V, 090 = 90 V, 100 = 100 V)
5 - CT = essential part number
6 - Environmental digit
-M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free

ORDERING INFORMATION (Example)		
PREFERRED P/N	**BASE QUANTITY**	**PACKAGING DESCRIPTION**
VS-MBR2080CT-M3	50	Antistatic plastic tubes
VS-MBR2090CT-M3	50	Antistatic plastic tubes
VS-MBR20100CT-M3	50	Antistatic plastic tubes

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?96154
Part marking information	www.vishay.com/doc?95028

TO-220AB 3L

DIMENSIONS in millimeters and inches



Conforms to JEDEC® outline TO-220AB

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.25	4.65	0.167	0.183	
A1	1.14	1.40	0.045	0.055	
A2	2.50	2.92	0.098	0.115	
b	0.69	1.01	0.027	0.040	
b1	0.38	0.97	0.015	0.038	4
b2	1.20	1.73	0.047	0.068	
b3	1.14	1.73	0.045	0.068	4
c	0.36	0.61	0.014	0.024	
c1	0.36	0.56	0.014	0.022	4
D	14.85	15.35	0.585	0.604	3
D1	8.38	9.02	0.330	0.355	

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
D2	11.68	13.30	0.460	0.524	6, 7
E	10.11	10.51	0.398	0.414	3, 6
E1	6.86	8.89	0.270	0.350	6
e	2.41	2.67	0.095	0.105	
e1	4.88	5.28	0.192	0.208	
H1	6.09	6.48	0.240	0.255	6
L	13.52	14.02	0.532	0.552	
L1	3.32	3.82	0.131	0.150	2
Ø P	3.54	3.91	0.139	0.154	
Q	2.60	3.00	0.102	0.118	

Notes

(1) Dimensioning and tolerancing as per ASME Y14.5M-1994
(2) Lead dimension and finish uncontrolled in L1
(3) Dimension D, D1, and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body
(4) Dimension b1, b3, and c1 apply to base metal only
(5) Controlling dimensions: inches
(6) Thermal pad contour optional within dimensions E, H1, D2, and E1
(7) Outline conforms to JEDEC® TO-220, except D2

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