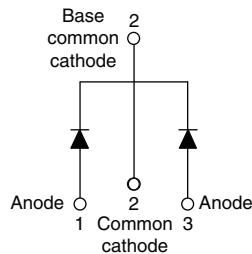


High Performance Schottky Generation 5.0, 2 x 10 A



TO-220AB



FEATURES

- 175 °C high performance Schottky diode
- Very low forward voltage drop
- Extremely low reverse leakage
- Optimized V_F vs. I_R trade off for high efficiency
- Increased ruggedness for reverse avalanche capability
- RBSOA available
- Negligible switching losses
- Submicron trench technology
- Full lead (Pb)-free and RoHS compliant devices
- Designed and qualified for industrial level


RoHS
COMPLIANT

APPLICATIONS

- High efficiency SMPS
- Automotive
- High frequency switching
- Output rectification
- Reverse battery protection
- Freewheeling
- Dc-to-dc systems
- Increased power density systems

PRODUCT SUMMARY

$I_{F(AV)}$	2 x 10 A
V_R	100 V
V_F at 10 A at 125 °C	0.68 V

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
V_{RRM}	10 Apk, $T_J = 125$ °C (typical, per leg)	100	V
V_F		0.62	
T_J	Range	- 55 to 175	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	MBR20T100CT	UNITS
Maximum DC reverse voltage	V_R	$T_J = 25$ °C	100	V

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current per leg	$I_{F(AV)}$	50 % duty cycle at $T_C = 159$ °C, rectangular waveform	10	A
per device			20	
Maximum peak one cycle non-repetitive surge current per leg	I_{FSM}	5 µs sine or 3 µs rect. pulse	850	A
		10 ms sine or 6 ms rect. pulse	200	
Non-repetitive avalanche energy per leg	E_{AS}	$T_J = 25$ °C, $I_{AS} = 3$ A, $L = 12$ mH	54	mJ
Repetitive avalanche current per leg	I_{AR}	Limited by frequency of operation and time pulse duration so that $T_J < T_{J\ max}$. I_{AS} at T_J max. as a function of time pulse See fig. 8	I_{AS} at T_J max.	A

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ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		TYP.	MAX.	UNITS	
Forward voltage drop per leg	$V_{FM}^{(1)}$	10 A	$T_J = 25 \text{ }^\circ\text{C}$	-	0.79	V	
		20 A		-	0.88		
		10 A	$T_J = 125 \text{ }^\circ\text{C}$	-	0.68		
		20 A		-	0.80		
Reverse leakage current per leg	$I_{RM}^{(1)}$	$T_J = 25 \text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	-	100	μA	
		$T_J = 125 \text{ }^\circ\text{C}$		-	4	mA	
Junction capacitance per leg	C_T	$V_R = 5 \text{ V}_{\text{DC}}$ (test signal range 100 kHz to 1 MHz) $25 \text{ }^\circ\text{C}$		400	-	pF	
Series inductance per leg	L_S	Measured lead to lead 5 mm from package body		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 and storage temperature range	T_J, T_{Stg}			- 55 to 175	$^\circ\text{C}$
Maximum thermal resistance, junction to case per leg	R_{thJC}	DC operation		2	$^\circ\text{C}/\text{W}$
Maximum thermal resistance, junction to case per device				1	
Typical thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth and greased		0.5	
Approximate weight				2	g
				0.07	oz.
Mounting torque	minimum			6 (5)	$\text{kgf} \cdot \text{cm}$ (lbf · in)
	maximum			12 (10)	
Marking device		Case style TO-220AB		MBR20T100CT	

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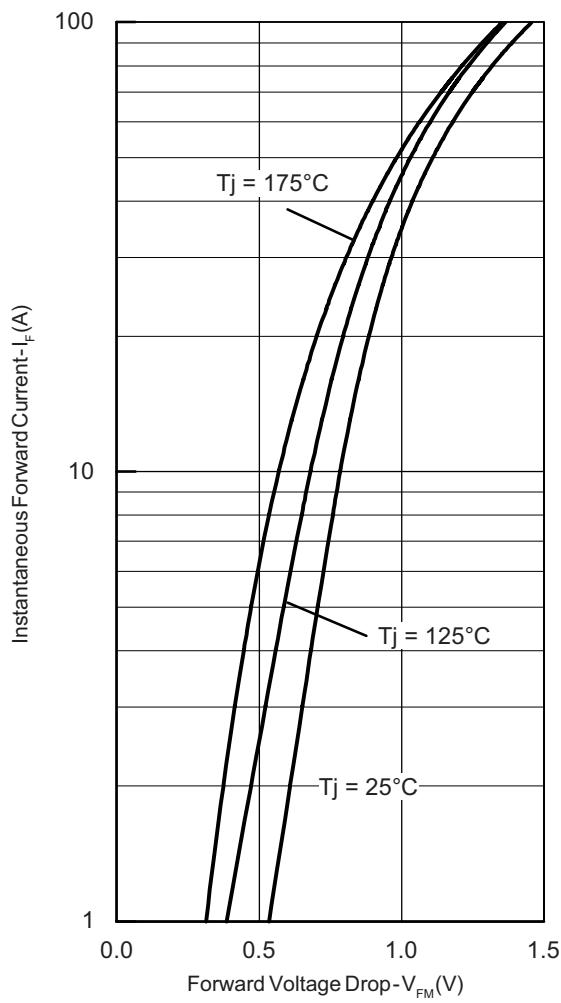


Fig. 1 - Maximum Forward Voltage Drop Characteristics

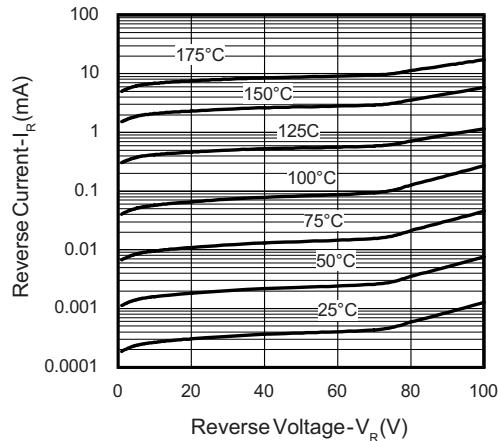


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

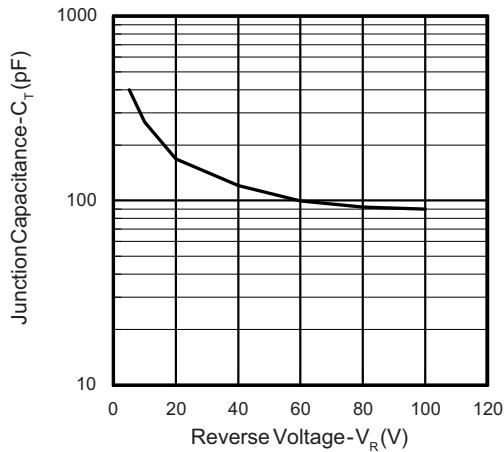


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

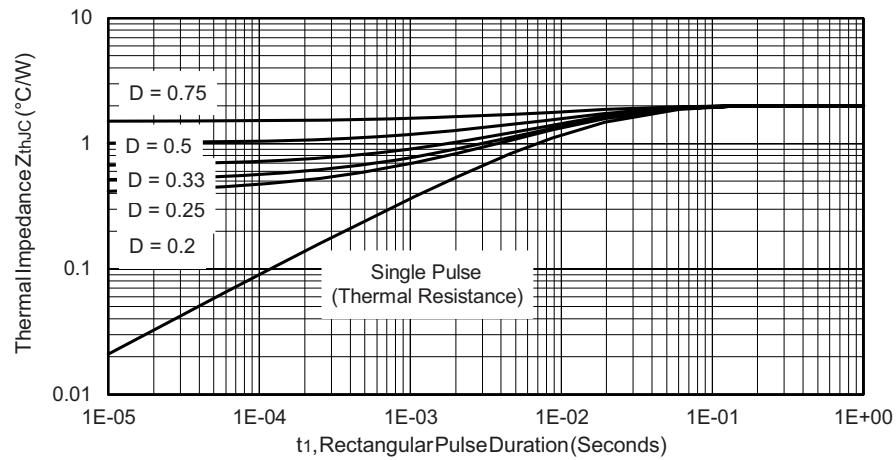


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

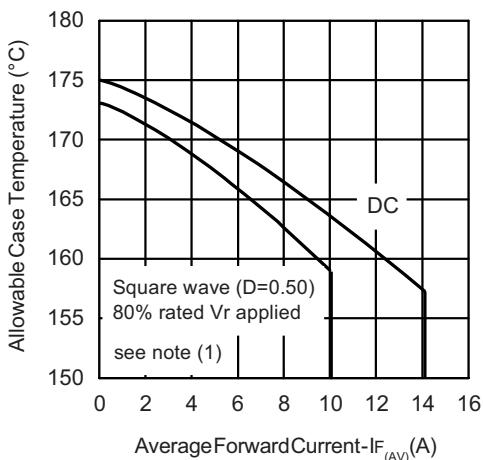


Fig. 5 - Maximum Allowable Case Temperature vs.
Average Forward Current

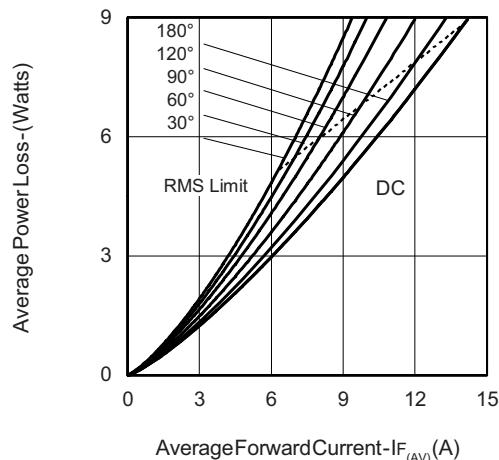


Fig. 6 - Forward Power Loss Characteristics

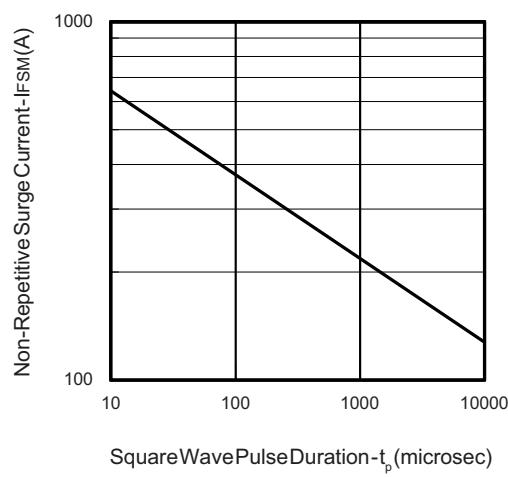


Fig. 7 - Maximum Non-Repetitive Surge Current

Note

(1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$;
 $P_d = \text{Forward power loss} = I_{F(AV)} \times V_{FM} \text{ at } (I_{F(AV)}/D)$ (see fig. 6);
 $P_{dREV} = \text{Inverse power loss} = V_{R1} \times I_R (1 - D)$; I_R at $V_{R1} = 80\%$ rated V_R

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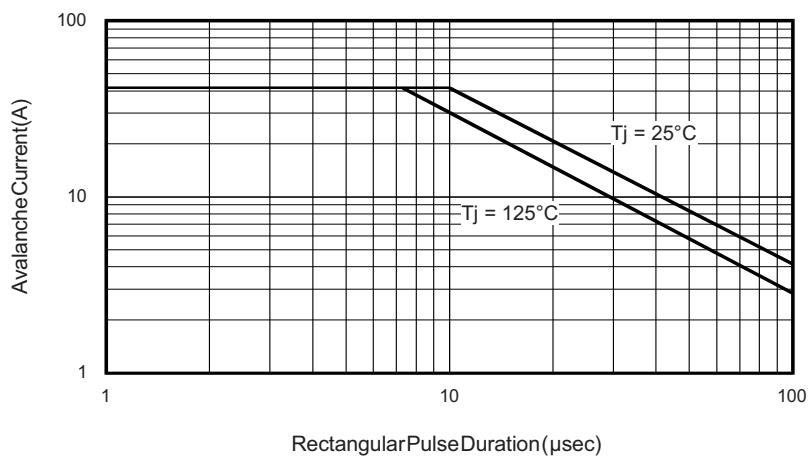


Fig. 8 - Reverse Bias Safe Operating Area (Avalanche Current vs. Rectangular Pulse Duration)

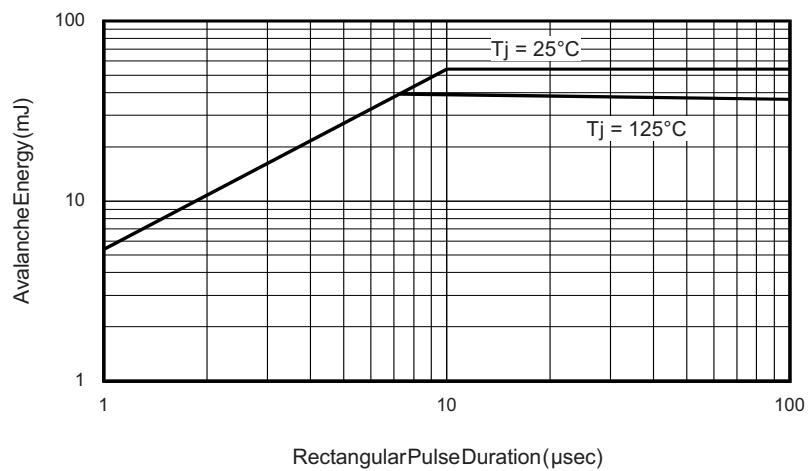


Fig. 9 - Reverse Bias Safe Operating Area (Avalanche Energy vs. Rectangular Pulse Duration)

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ORDERING INFORMATION TABLE

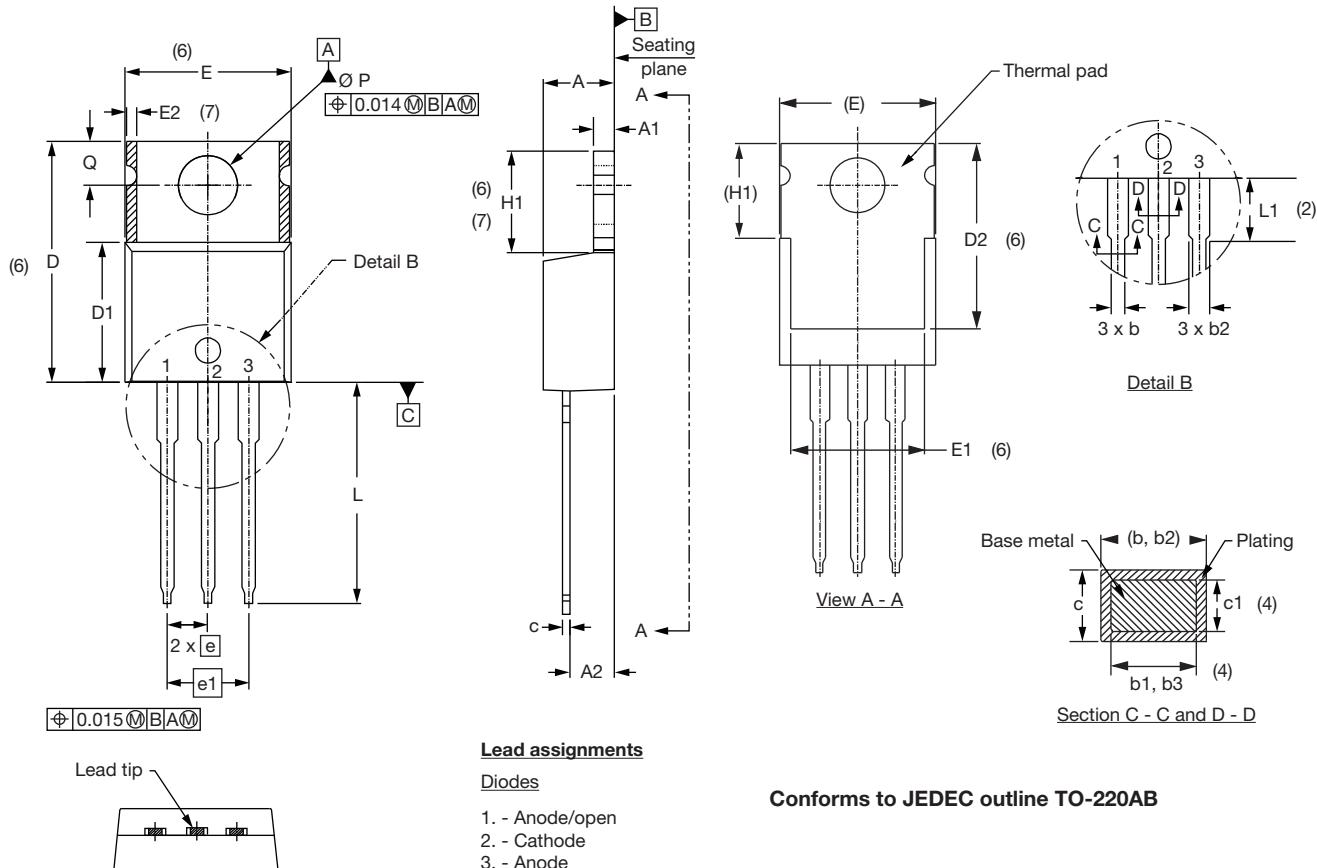
Device code	MBR	20	T	100	CT
	1	2	3	4	5
1					- MBR series
2					- Current rating (20 = 20 A)
3					- T = Trench
4					- Voltage rating (100 = 100 V)
5					- CT = Essential part number

Tube standard pack quantity: 50 pieces

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95222
Part marking information	http://www.vishay.com/doc?95225

TO-220AB

DIMENSIONS in millimeters and inches



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	2.56	2.92	0.101	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	15.25	0.585	0.600	3
D1	8.38	9.02	0.330	0.355	
D2	11.68	12.88	0.460	0.507	6

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) Dimensions E2 x H1 define a zone where stamping and singulation irregularities are allowed

(8) Outline conforms to JEDEC TO-220, except A2 (maximum) and D2 (minimum) where dimensions are derived from the actual package outline

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