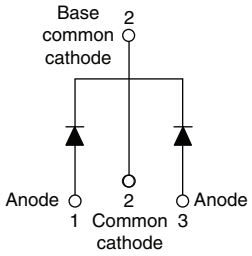
High Performance
Schottky Generation 5.0, 2 x 10 A

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

Pb-free
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}		100	V
V_F	10 Apk, T_J = 125 °C (typical, per leg)	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	Following any rated load condition and with rated V_{RRM} applied	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

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		TYP.	MAX.	UNITS
Forward voltage drop per leg	V_{FM} (1)	10 A	T_J = 25 °C	-	0.79	V
		20 A		-	0.88	
		10 A	T_J = 125 °C	-	0.68	
		20 A		-	0.80	
Reverse leakage current per leg	I_{RM} (1)	T_J = 25 °C	V_R = Rated V_R	-	100	µA
		T_J = 125 °C		-	4	mA
Junction capacitance per leg	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz) 25 °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	°C
Maximum thermal resistance, junction to case per leg		R_{thJC}	DC operation	2	°C/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)	kgf · cm (lbf · in)
	maximum			12 (10)	
Marking device			Case style TO-220AB	MBR20T100CT	

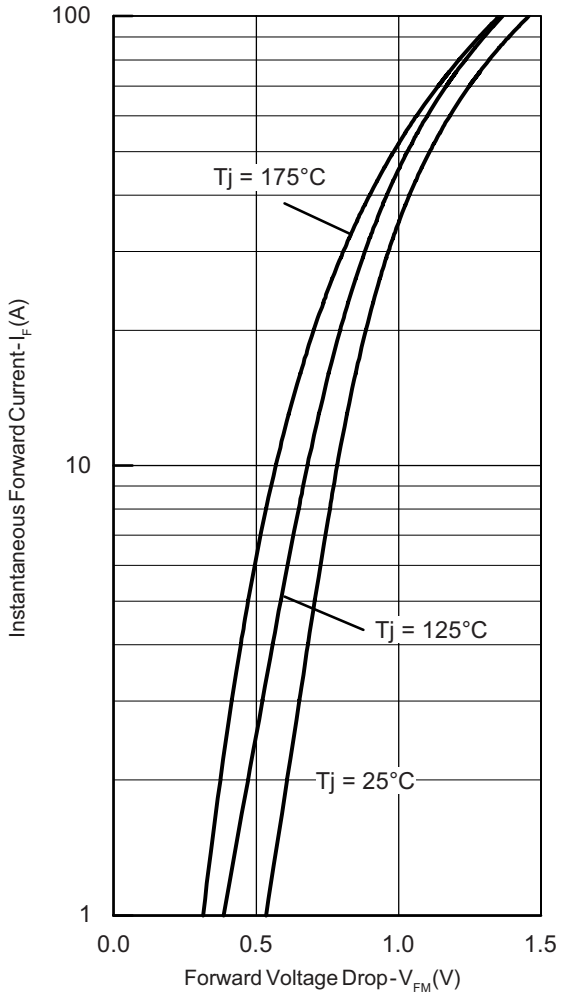


Fig. 1 - Maximum Forward Voltage Drop Characteristics

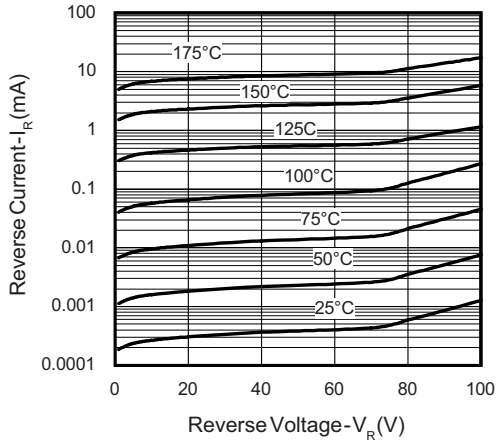


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

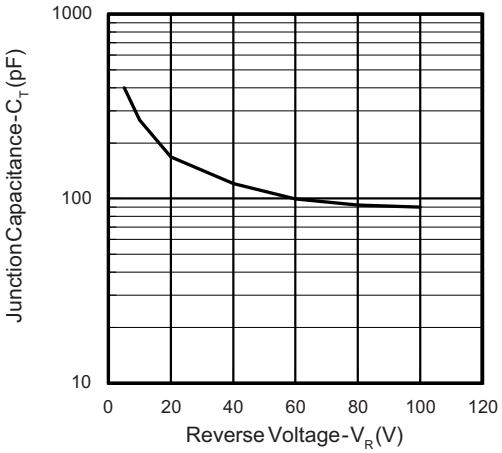


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

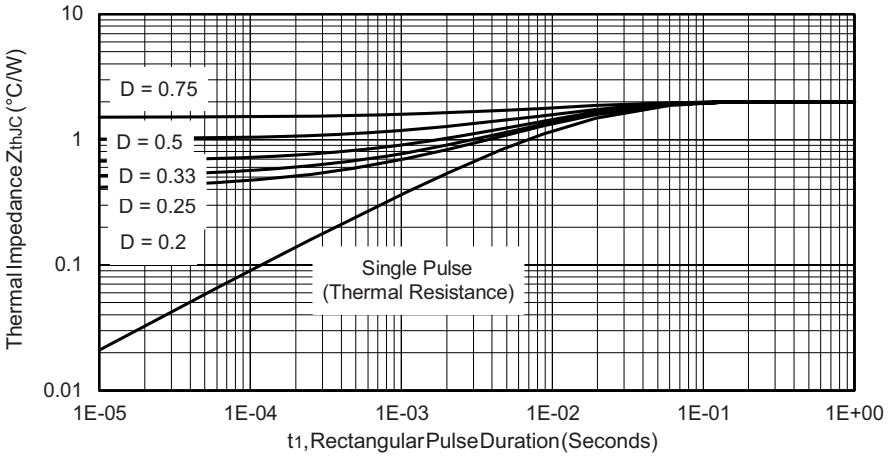


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

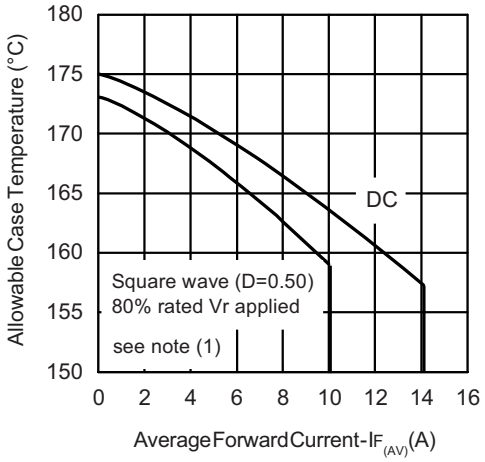


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

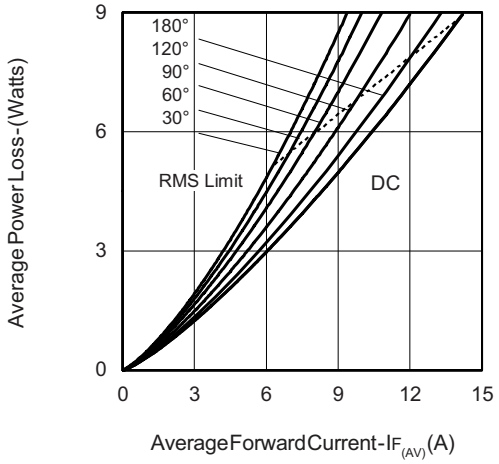


Fig. 6 - Forward Power Loss Characteristics

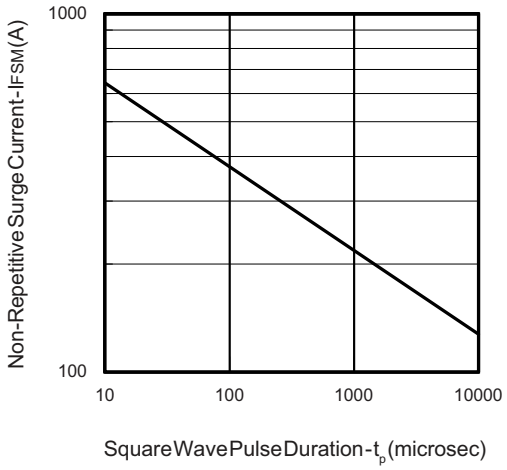


Fig. 7 - Maximum Non-Repetitive Surge Current

Note

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
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} = 80 % rated V_R

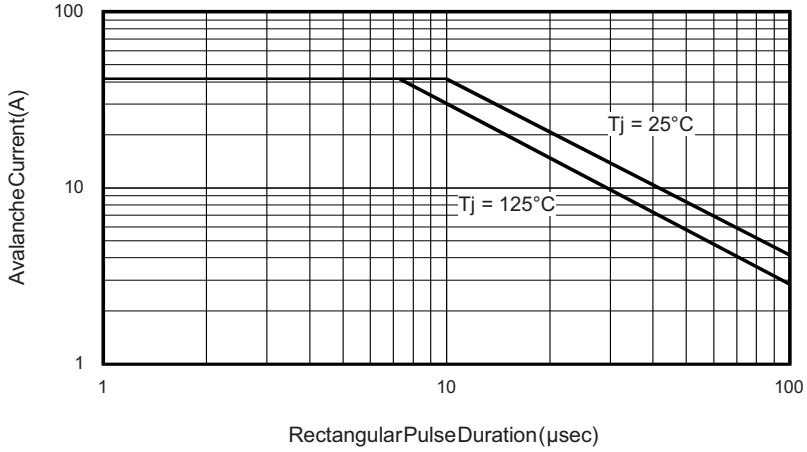


Fig. 8 - Reverse Bias Safe Operating Area (Avalanche Current vs. Rectangular Pulse Duration)

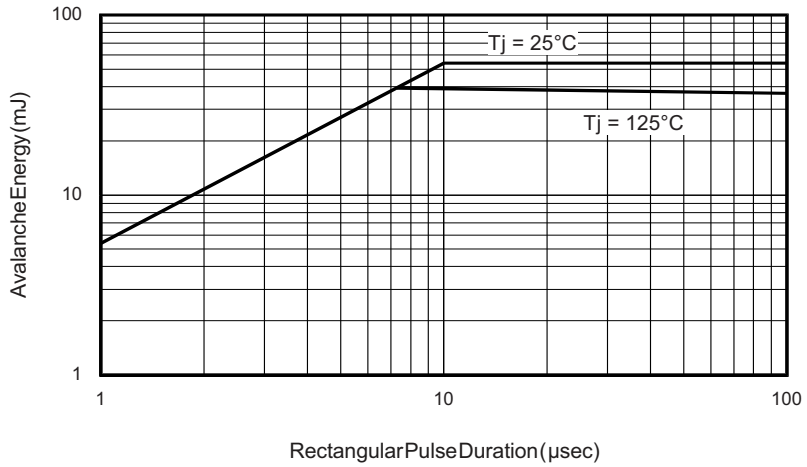
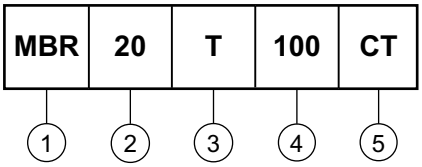


Fig. 9 - Reverse Bias Safe Operating Area (Avalanche Energy vs. Rectangular Pulse Duration)

ORDERING INFORMATION TABLE

Device code



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

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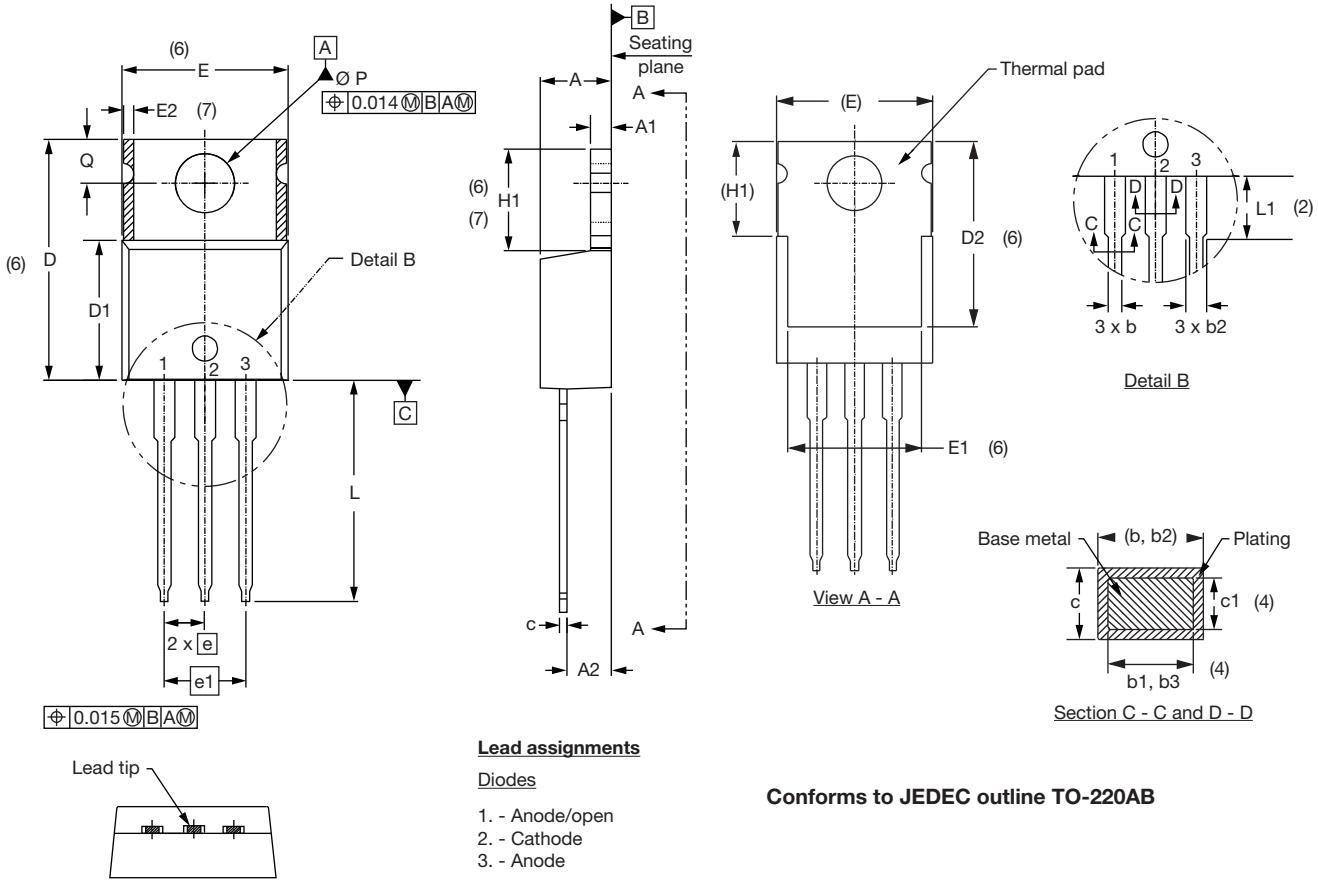
DIMENSIONS in millimeters and inches



Lead tip

Lead assignments

Diodes

1. - Anode/open
2. - Cathode
3. - Anode

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	2.56	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

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
E	10.11	10.51	0.398	0.414	3, 6
E1	6.86	8.89	0.270	0.350	6
E2	-	0.76	-	0.030	7
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, 7
L	13.52	14.02	0.532	0.552	
L1	3.32	3.82	0.131	0.150	2
Ø P	3.54	3.73	0.139	0.147	
Q	2.60	3.00	0.102	0.118	
θ	90° to 93°		90° to 93°		

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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