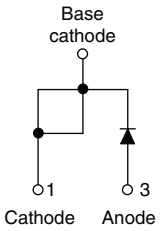
High Performance
Schottky Generation 5.0, 10 A

TO-220AC



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	
$I_{F(AV)}$	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)	0.62	
T_J	Range	- 55 to 175	°C

VOLTAGE RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	MBR10T100	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	$I_{F(AV)}$	50 % duty cycle at T_C = 159 °C, rectangular waveform		10	A
Maximum peak one cycle non-repetitive surge current	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	E_{AS}	T_J = 25 °C, I_{AS} = 3 A, L = 12 mH		54	mJ
Repetitive avalanche current	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		-	0.8	
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		R_{thJC}	DC operation	2	°C/W
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-220AC	MBR10T100	

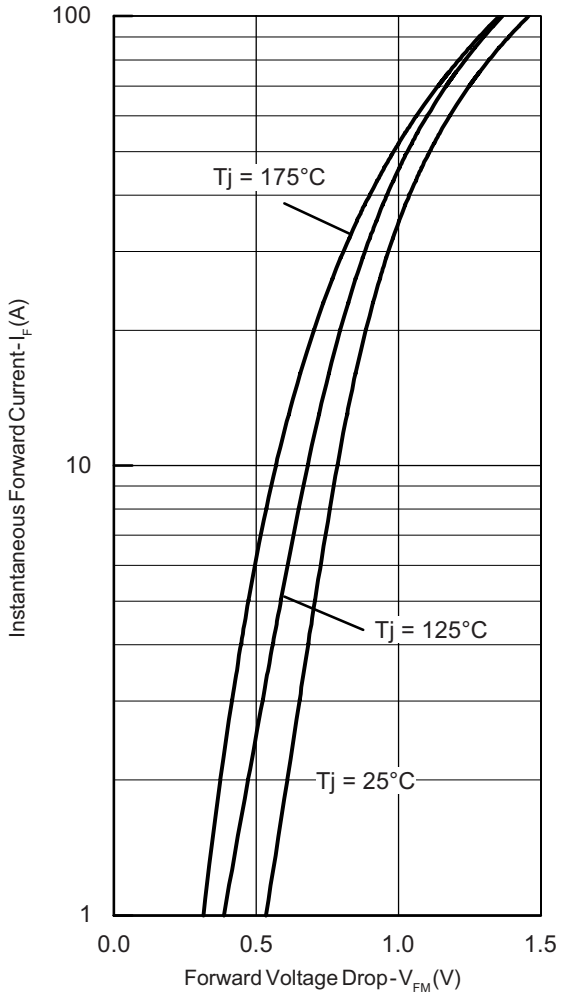


Fig. 1 - Maximum Forward Voltage Drop Characteristics

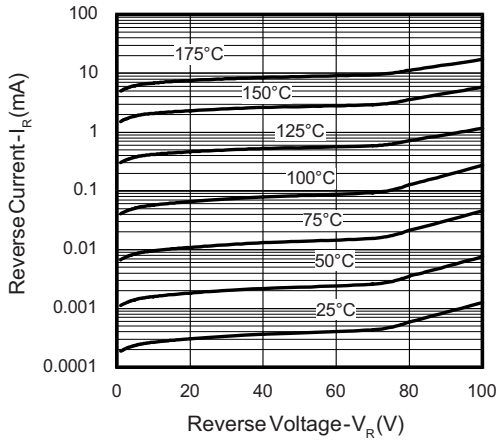


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

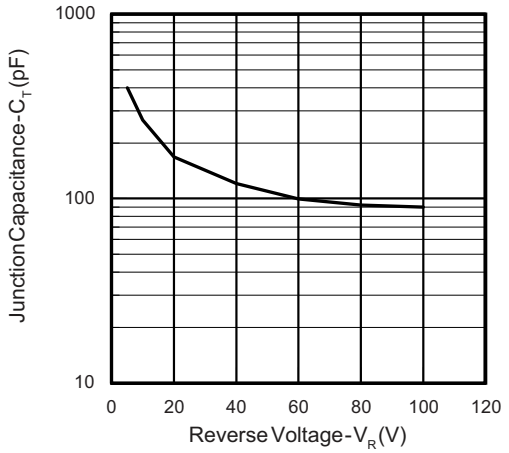


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

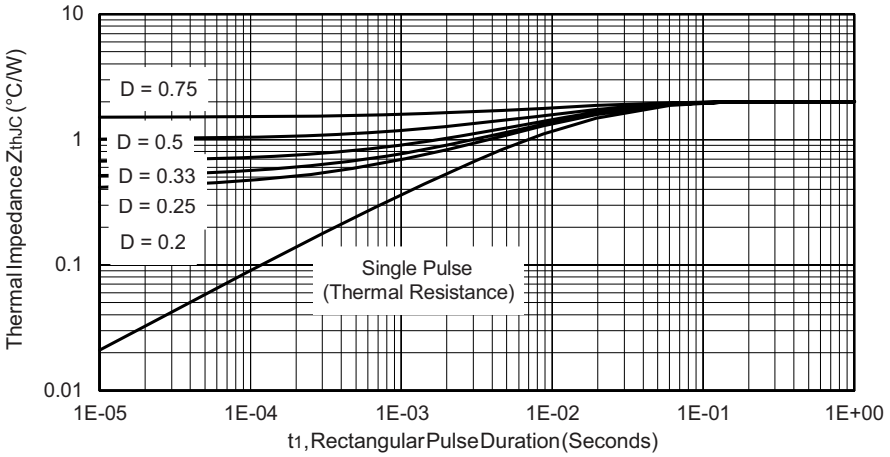


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

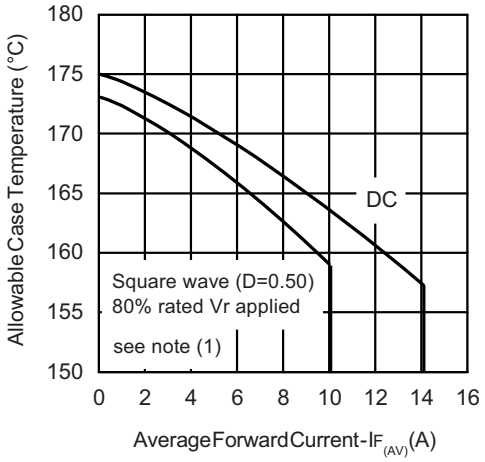


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

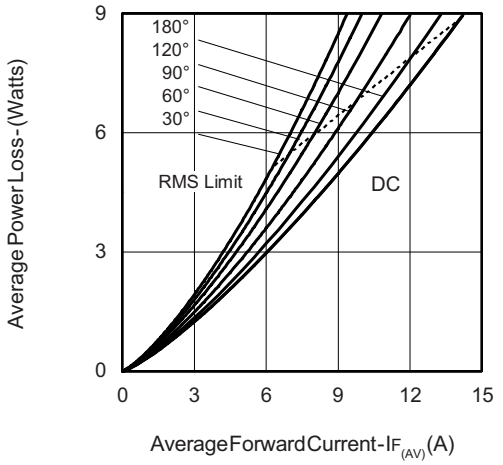


Fig. 6 - Forward Power Loss Characteristics

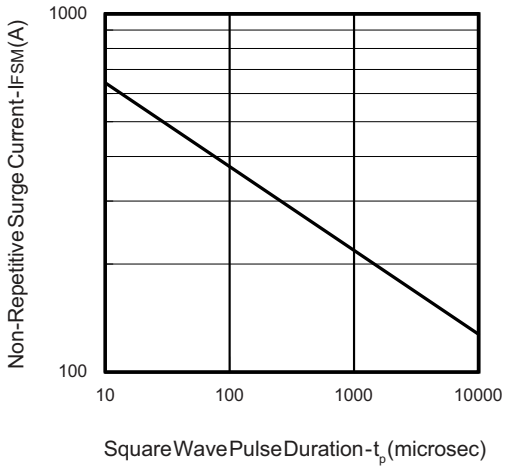


Fig. 7 - Maximum Non-Repetitive Surge Current

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

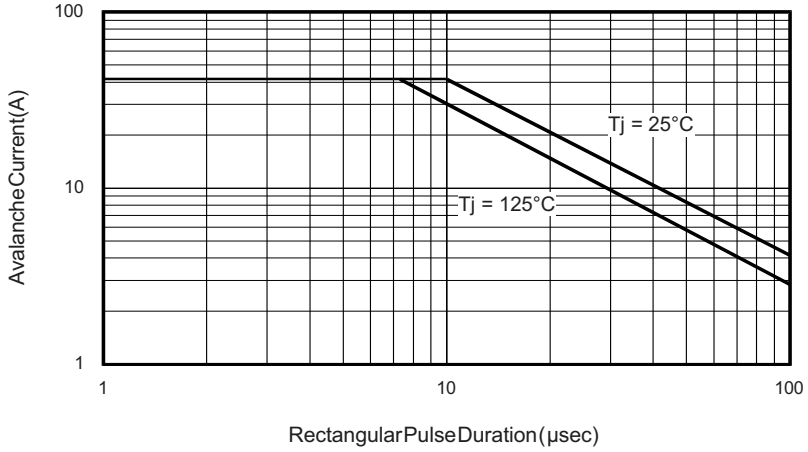


Fig. 8 - Reverse Bias Safe Operating Area (Avalanche Current vs. Rectangular Pulse Duration)

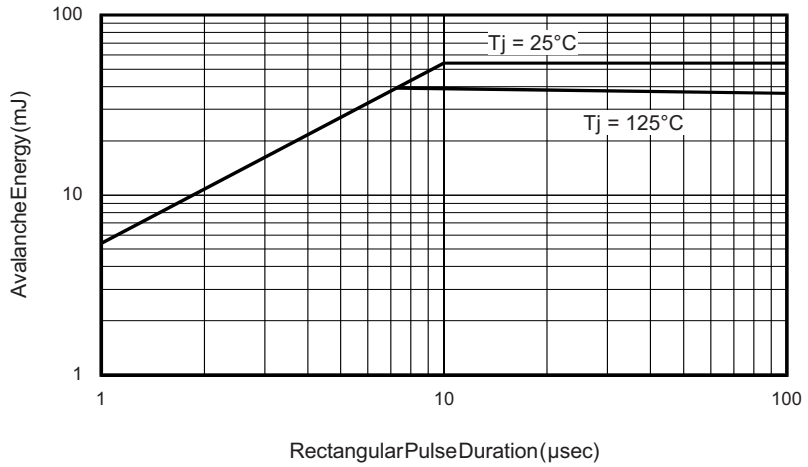
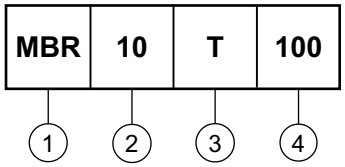


Fig. 9 - Reverse Bias Safe Operating Area (Avalanche Energy vs. Rectangular Pulse Duration)

ORDERING INFORMATION TABLE

Device code



1 - MBR series
2 - Current rating (10 = 10 A)
3 - T = Trench
4 - Voltage rating (100 = 100 V)

Tube standard pack quantity: 50 pieces

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95221
Part marking information	http://www.vishay.com/doc?95224

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