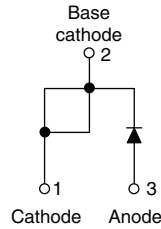


## Schottky Rectifier, 10 A


**TO-220AC**

**FEATURES**

- 150 °C  $T_J$  operation
- TO-220 package
- High frequency operation
- Low forward voltage drop
- 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 for industrial level

**DESCRIPTION**

This 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.

**PRODUCT SUMMARY**

$I_{F(AV)}$	10 A
$V_R$	35/45 V
$I_{RM}$	15 mA at 125 °C

**MAJOR RATINGS AND CHARACTERISTICS**

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	10	A
$I_{FRM}$	$T_C = 135\text{ °C}$	20	
$V_{RRM}$		35/45	V
$I_{FSM}$	$t_p = 5\ \mu\text{s}$ sine	1060	A
$V_F$	10 Apk, $T_J = 125\text{ °C}$	0.57	V
$T_J$	Range	- 65 to 150	°C

**VOLTAGE RATINGS**

PARAMETER	SYMBOL	MBR1035	MBR1045	UNITS
Maximum DC reverse voltage	$V_R$	35	45	V
Maximum working peak reverse voltage	$V_{RWM}$			

**ABSOLUTE MAXIMUM RATINGS**

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	$T_C = 135\text{ °C}$ , rated $V_R$	10	A
Peak repetitive forward current	$I_{FRM}$	Rated $V_R$ , square wave, 20 kHz, $T_C = 135\text{ °C}$	20	
Non-repetitive peak surge current	$I_{FSM}$	5 $\mu\text{s}$ sine or 3 $\mu\text{s}$ rect. pulse	1060	A
		Surge applied at rated load conditions halfwave, single phase, 60 Hz	150	
Non-repetitive avalanche energy	$E_{AS}$	$T_J = 25\text{ °C}$ , $I_{AS} = 2\text{ A}$ , $L = 4\text{ mH}$	8	mJ
Repetitive avalanche current	$I_{AR}$	Current decaying linearly to zero in 1 $\mu\text{s}$ Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical	2	A



ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	$V_{FM}^{(1)}$	20 A	$T_J = 25\text{ }^\circ\text{C}$	0.84	V
		10 A	$T_J = 125\text{ }^\circ\text{C}$	0.57	
		20 A		0.72	
Maximum instantaneous reverse current	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	Rated DC voltage	0.1	mA
		$T_J = 125\text{ }^\circ\text{C}$		15	
Threshold voltage	$V_{F(TO)}$	$T_J = T_J$ maximum		0.354	V
Forward slope resistance	$r_f$			17.6	m $\Omega$
Maximum junction capacitance	$C_T$	$V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$		600	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/ $\mu$ s

**Note**

(1) Pulse width < 300  $\mu$ s, duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum junction temperature range	$T_J$			- 65 to 150	$^\circ\text{C}$
Maximum storage temperature range	$T_{Stg}$			- 65 to 175	
Maximum thermal resistance, junction to case	$R_{thJC}$	DC operation		2.0	$^\circ\text{C}/\text{W}$
Typical thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, smooth and greased		0.50	
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		MBR1035	
				MBR1045	

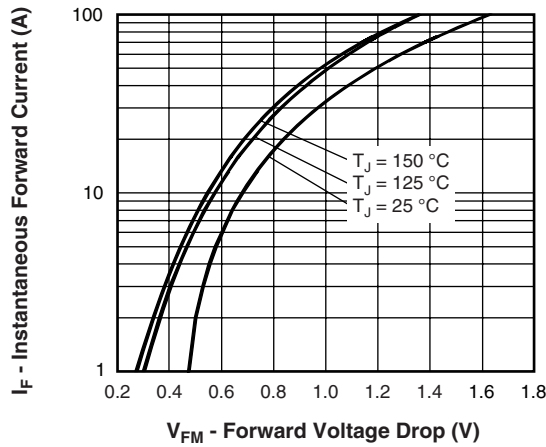


Fig. 1 - Maximum Forward Voltage Drop Characteristics

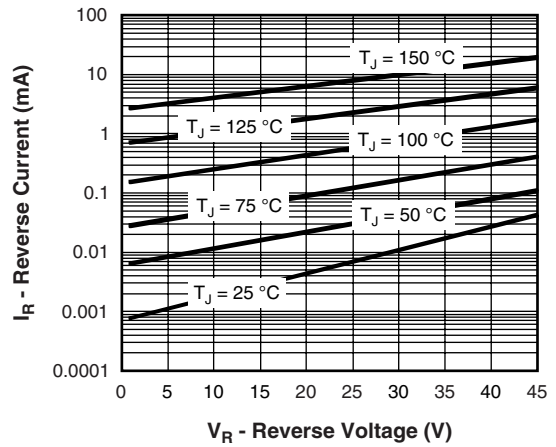


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

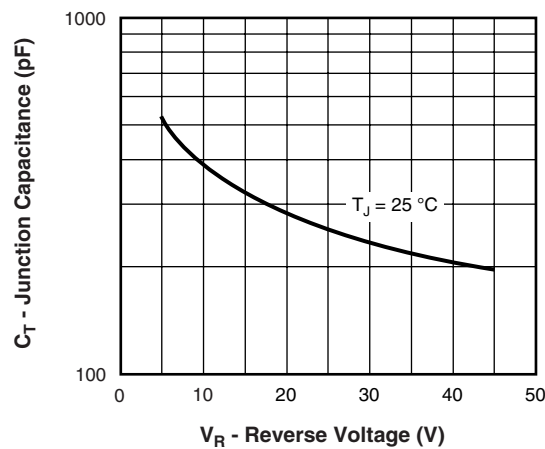


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

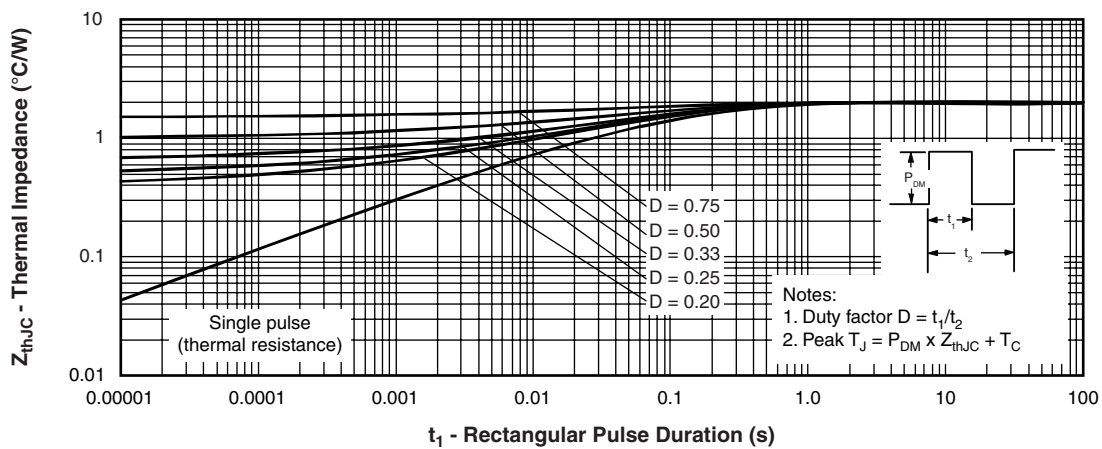


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

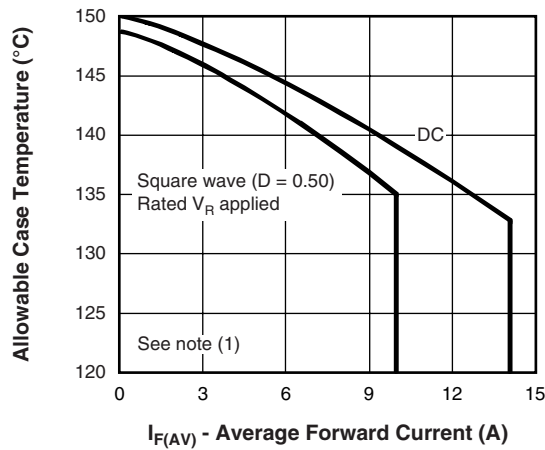


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

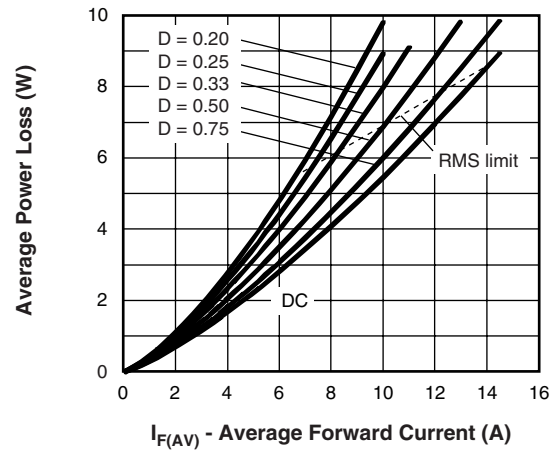


Fig. 6 - Forward Power Loss Characteristics

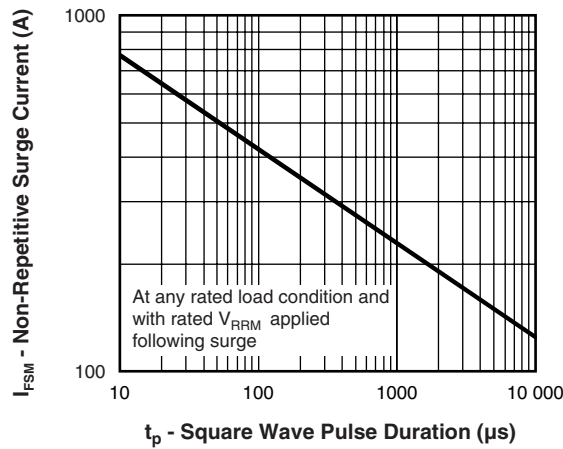


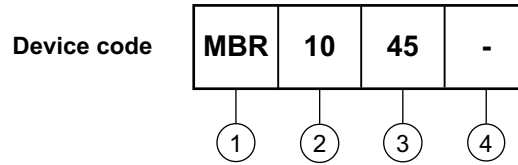
Fig. 7 - Maximum Non-Repetitive Surge Current

**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  $V_{R1}$  = Rated  $V_R$



### ORDERING INFORMATION TABLE



- 1** - Schottky MBR series
- 2** - Current rating (10 = 10 A)
- 3** - Voltage ratings 35 = 35 V  
45 = 45 V
- 4** -
  - None = Standard production
  - PbF = Lead (Pb)-free

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95221">http://www.vishay.com/doc?95221</a>
Part marking information	<a href="http://www.vishay.com/doc?95224">http://www.vishay.com/doc?95224</a>
SPIICE model	<a href="http://www.vishay.com/doc?95293">http://www.vishay.com/doc?95293</a>



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