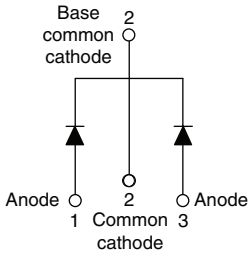
Schottky Rectifier, 2 x 20 A

TO-220AB



FEATURES

- 150 °C T_J operation
- Center tap TO-220, D^2PAK and TO-262 packages
- 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
- Lead (Pb)-free ("PbF" suffix)
- Designed and qualified for industrial level

Pb-free Available

RoHS* COMPLIANT

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.

PRODUCT SUMMARY	
$I_{F(AV)}$	2 x 20 A
V_R	45 V

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform (per device)	40	A
V_{RRM}		45	V
I_{FRM}	T_C = 118 °C (per leg)	40	A
I_{FSM}	t_p = 5 µs sine	900	
V_F	20 Apk, T_J = 125 °C	0.58	V
T_J	Range	- 65 to 150	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	MBR4045CTPbF	UNITS
Maximum DC reverse voltage	V_R	45	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 = 118 °C, rated V_R		20	A
	per device				40	
Peak repetitive forward current per leg		I_{FRM}	Rated V_R, square wave, 20 kHz, T_C = 118 °C		40	
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	900	
			10 ms sine or 6 ms rect. pulse		210	
Non-repetitive avalanche energy per leg		E_{AS}	T_J = 25 °C, I_{AS} = 3 A, L = 4.40 mH		20	mJ
Repetitive avalanche current per leg		I_{AR}	Current decaying linearly to zero in 1 µs Frequency limited by T_J maximum V_A = 1.5 x V_R typical		3	A

* Pb containing terminations are not RoHS compliant, exemptions may apply

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V_{FM} (1)	20 A	T_J = 25 °C	0.60	V
		40 A		0.78	
		20 A	T_J = 125 °C	0.58	
		40 A		0.75	
Maximum instantaneus reverse current	I_{RM} (1)	T_J = 25 °C	Rated DC voltage	1	mA
		T_J = 100 °C		50	
		T_J = 125 °C		95	
Maximum junction capacitance	C_T	V_R = 5 V_{DC}, (test signal range 100 kHz to 1 MHz) 25 °C		900	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	1.5	°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		Non-lubricated threads	6 (5)	kgf · cm (lbf · in)
Mounting torque maximum			12 (10)	
Marking device		Case style TO-220AB	MBR4045CT	

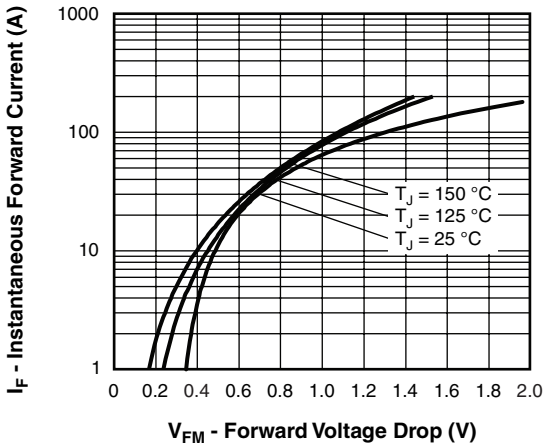


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

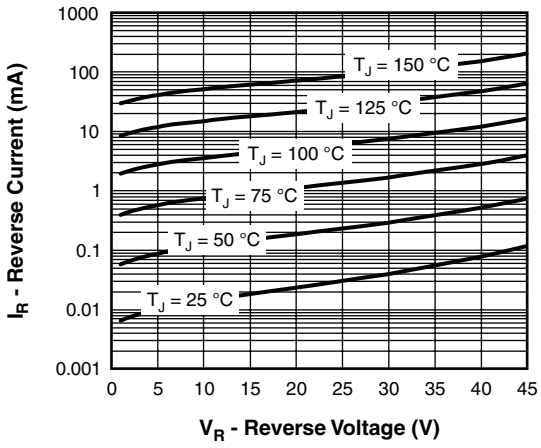


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

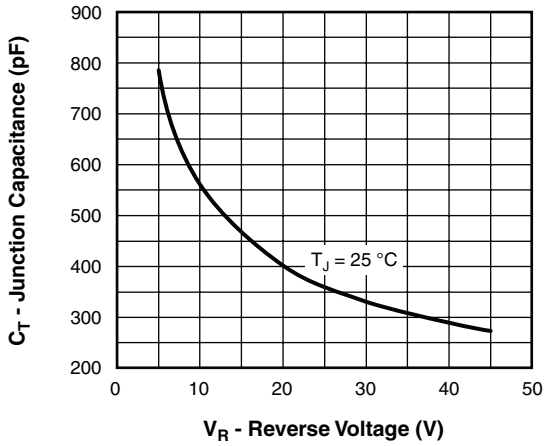


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

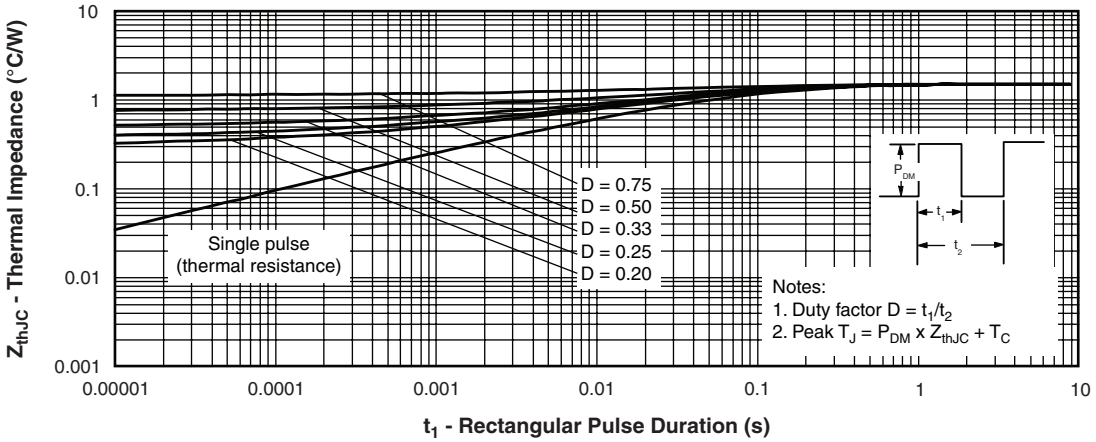


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

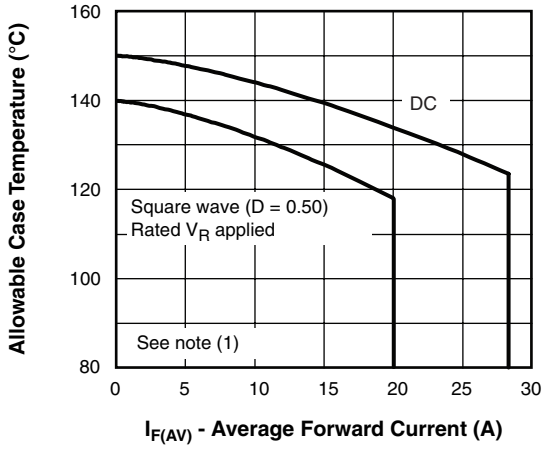


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

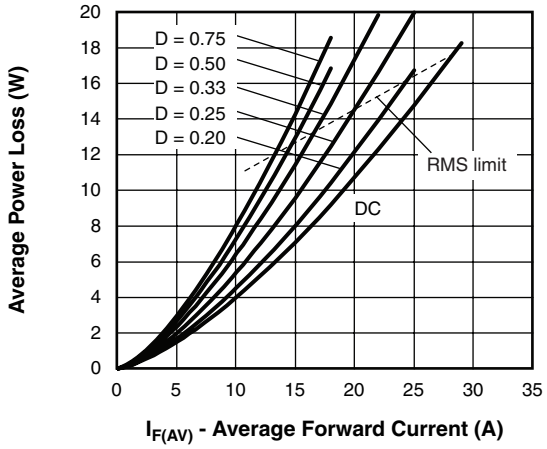


Fig. 6 - Forward Power Loss Characteristics

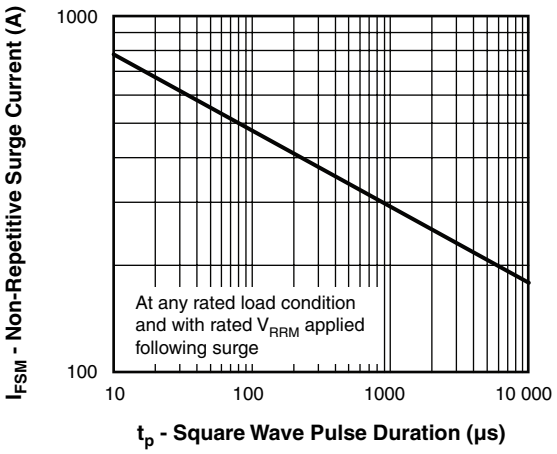


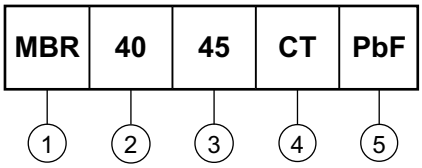
Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

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 - Schottky MBR series
2 - Current rating (40 = 40 A)
3 - Voltage rating (45 = 45 V)
4 - CT = Essential part number
5 - • None = Standard production
• PbF = Lead (Pb)-free

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95222
Part marking information	http://www.vishay.com/doc?95225
SPICE model	http://www.vishay.com/doc?95296

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