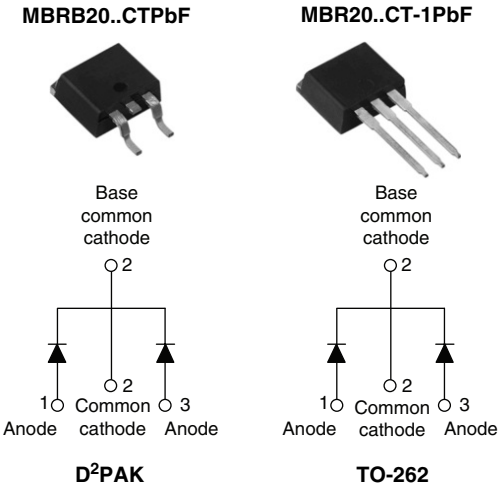
Schottky Rectifier, 2 x 10 A



D²PAK TO-262

FEATURES

- 150 °C T_J operation
- Center tap D²PAK 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 Q101 level

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 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 (per device)	20	A
I_{FRM}	T_C = 135 °C (per leg)	20	
V_{RRM}		35/45	V
I_{FSM}	t_p = 5 µs sine	1060	A
V_F	10 Apk, T_J = 125 °C	0.57	V
T_J	Range	- 65 to 150	°C

VOLTAGE RATINGS				
PARAMETER	SYMBOL	MBRB2035CTPbF MBR2035CT-1PbF	MBRB2045CTPbF MBR2045CT-1PbF	UNITS
Maximum DC reverse voltage	V_R	35	45	V
Maximum working peak reverse voltage	V_{RWM}			

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

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ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current per leg	$I_{F(AV)}$	T_C = 135 °C, rated V_R	10	A
Maximum average forward current per device	$I_{F(AV)}$	T_C = 135 °C, rated V_R	20	A
Peak repetitive forward current per leg	I_{FRM}	Rated V_R, square wave, 20 kHz, T_C = 135 °C	20	A
Non-repetitive peak surge current	I_{FSM}	5 µs sine or 3 µs rect. pulse; Following any rated load condition and with rated V_{RRM} applied	1060	A
Non-repetitive peak surge current	I_{FSM}	Surge applied at rated load conditions halfwave, single phase, 60 Hz	150	A
Non-repetitive avalanche energy per leg	E_{AS}	T_J = 25 °C, I_{AS} = 2 A, L = 4 mH	8	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	2	A

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V_{FM} (1)	20 A	T_J = 25 °C	0.84	V
Maximum forward voltage drop	V_{FM} (1)	10 A	T_J = 125 °C	0.57	V
Maximum forward voltage drop	V_{FM} (1)	20 A	T_J = 125 °C	0.72	V
Maximum instantaneous reverse current	I_{RM} (1)	T_J = 25 °C	Rated DC voltage	0.1	mA
Maximum instantaneous reverse current	I_{RM} (1)	T_J = 125 °C	Rated DC voltage	15	mA
Threshold voltage	$V_{F(TO)}$	T_J = T_J maximum		0.354	V
Forward slope resistance	r_t	T_J = T_J maximum		17.6	mΩ
Maximum junction capacitance	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz) 25 °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/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	°C
Maximum thermal resistance, junction to case per leg	R_{thJC}	DC operation	2.0	°C/W
Typical thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth and greased	0.50	°C/W
Approximate weight			2	g
Approximate weight			0.07	oz.
Mounting torque minimum		Non-lubricated threads	6 (5)	kgf · cm (lbf · in)
Mounting torque maximum		Non-lubricated threads	12 (10)	kgf · cm (lbf · in)
Marking device		Case style D^2PAK	MBRB2045CT	
Marking device		Case style TO-262	MBR2045CT-1	

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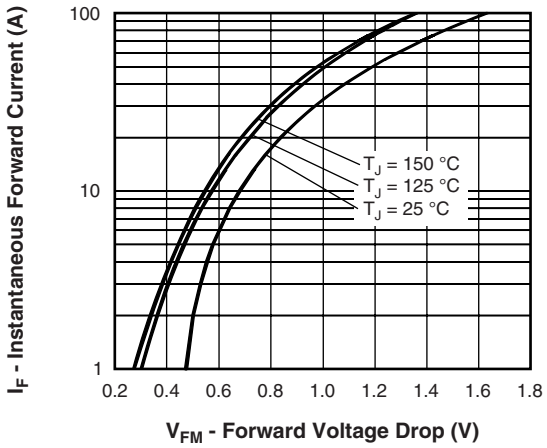

Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

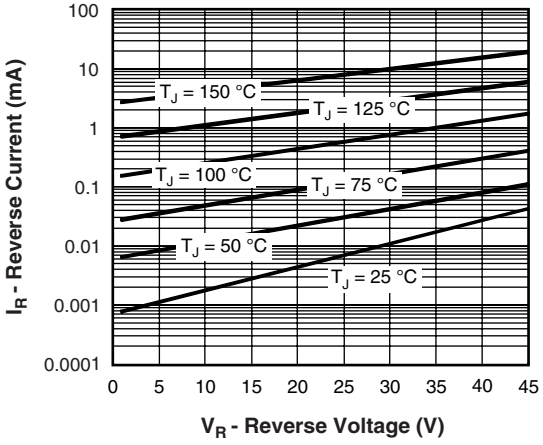

Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

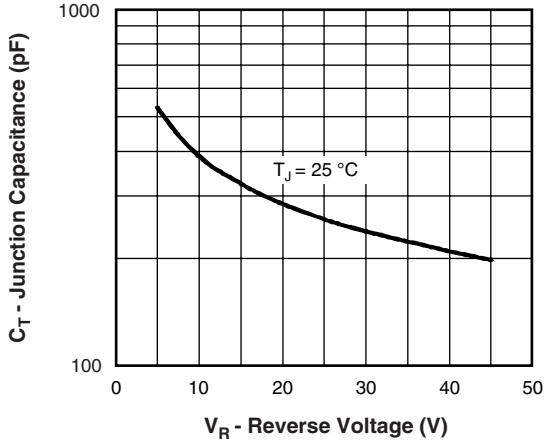

Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

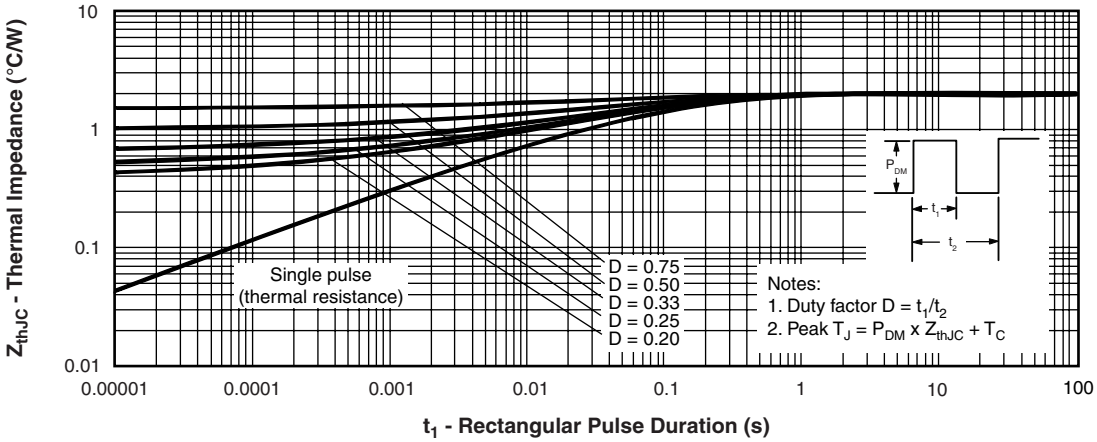

Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

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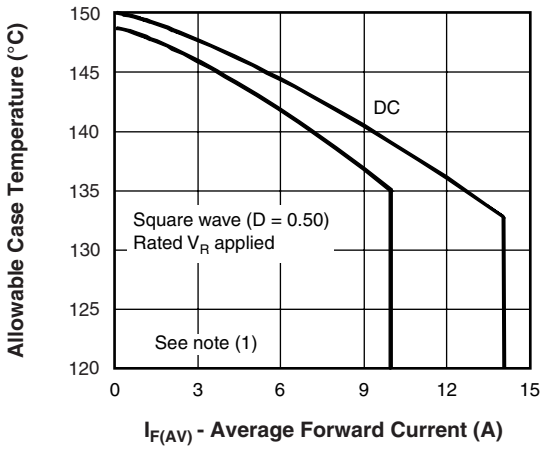

Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

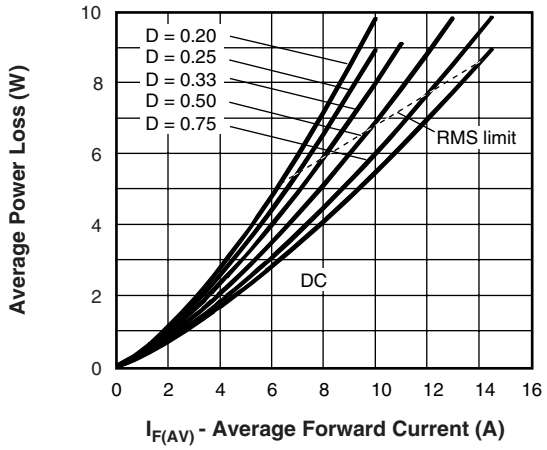

Fig. 6 - Forward Power Loss Characteristics (Per Leg)

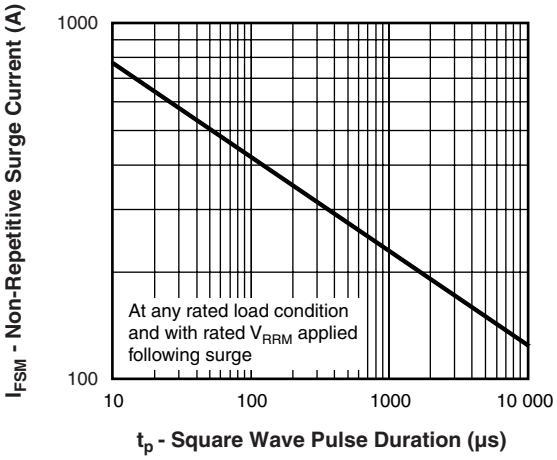

Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

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

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ORDERING INFORMATION TABLE

Device code

MBR	B	20	45	CT	-1	TRL	PbF
1	2	3	4	5	6	7	8

1 - Essential part number

2 - • B = D^2PAK 6 None
• None = TO-262 6 = -1

3 - Current rating (20 = 20 A)

4 - Voltage ratings — 35 = 35 V, 45 = 45 V

5 - CT = Essential part number

6 • None = D^2PAK 2 = B
• -1 = TO-262 2 None

7 - • None = Tube (50 pieces)
• TRL = Tape and reel (left oriented - for D^2PAK only)
• TRR = Tape and reel (right oriented - for D^2PAK only)

8 - • None = Standard production
• PbF = Lead (Pb)-free (for TO-262 and D^2PAK tube)
• P = Lead (Pb)-free (for D^2PAK TRR and TRL)

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95014
Part marking information	http://www.vishay.com/doc?95008
Packaging information	http://www.vishay.com/doc?95032

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