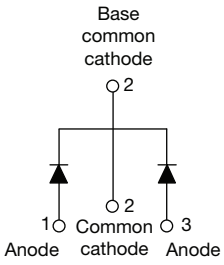
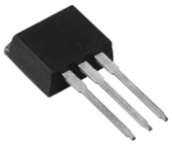
Schottky Rectifier, 2 x 20 A

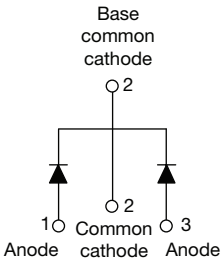
VS-MBRB4045CTPbF



D²PAK

VS-MBR4045CT-1PbF





TO-262

FEATURES

- 150 °C T_J operation
- Low forward voltage drop
- High frequency operation
- Center tap TO-220, D²PAK and TO-262 packages
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Halogen-free according to IEC 61249-2-21 definition
- Compliant to RoHS directive 2002/95/EC
- AEC-Q101 qualified

Pb e3 RoHS COMPLIANT HALOGEN FREE

DESCRIPTION

The 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
I_{RM}	95 mA at 125 °C

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

VOLTAGE RATINGS			
PARAMETER	**SYMBOL**	**VS-MBRB4045CTPbF VS-MBR4045CT-1PbF**	**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 peak 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; Following any rated load condition and with rated V_{RRM} applied	210	
Non-repetitive avalanche energy per leg		E_{AS}	T_J = 25 °C, I_{AS} = 3 A, L = 4.4 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

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 instantaneous 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 D^2PAK	MBRB4045CT	
		Case style TO-262	MBR4045CT-1	

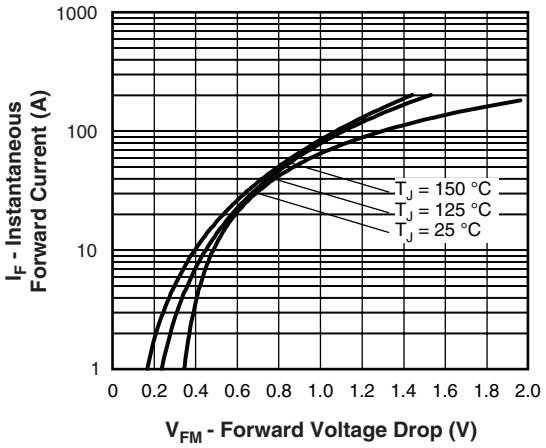


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

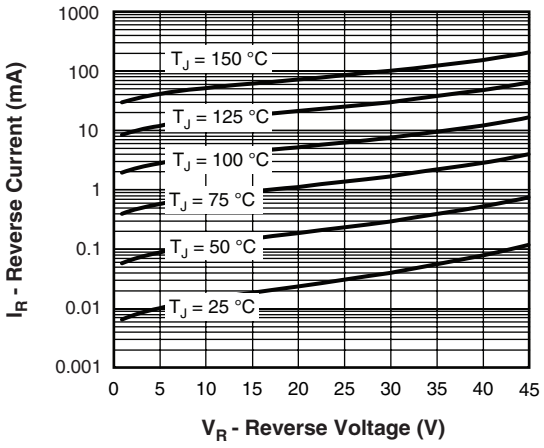


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

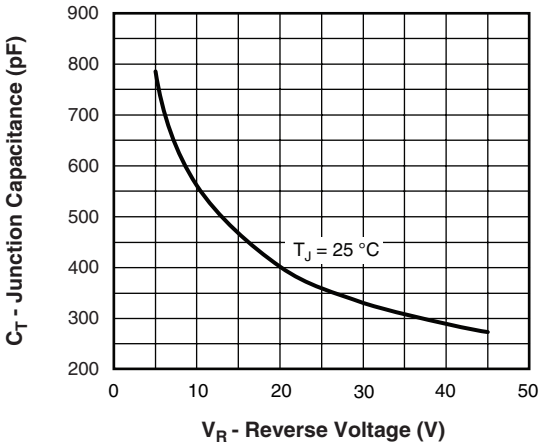


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

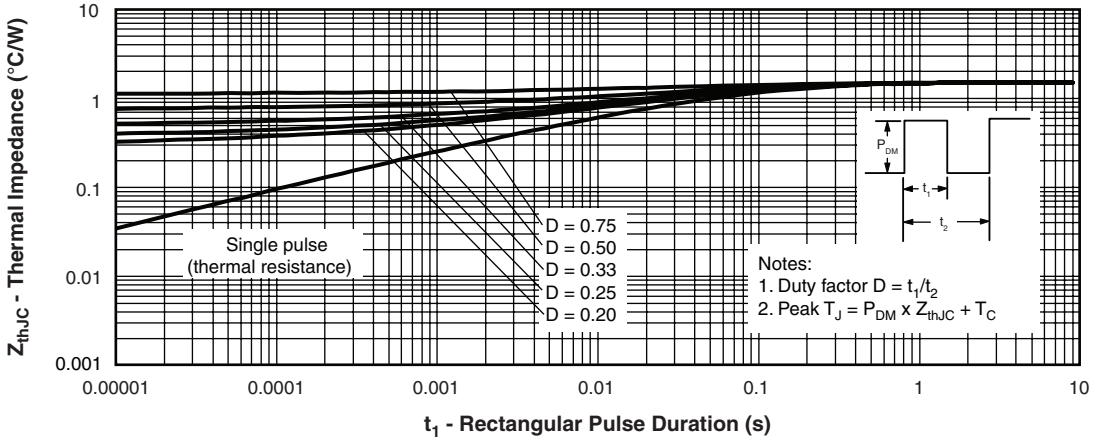


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

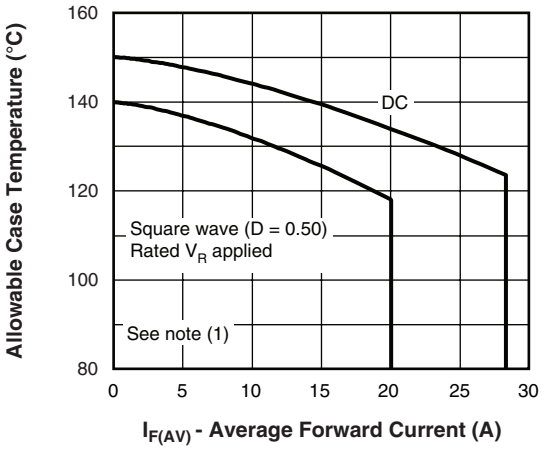


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

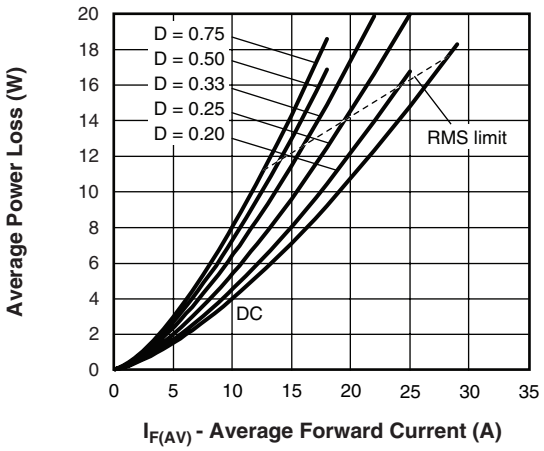


Fig. 6 - Forward Power Loss Characteristics

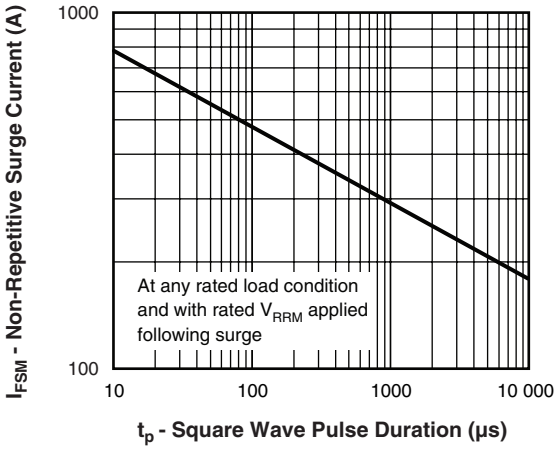


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

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

VS-	MBR	B	40	45	CT	-1	TRL	PbF
1	2	3	4	5	6	7	8	9

1 - HPP product suffix

2 - Essential part number

3 - • B = D^2PAK 7 None
• None = TO-262 7 = -1

4 - Current rating (40 = 40 A)

5 - Voltage rating (45 = 45 V)

6 - CT = Essential part number

7 - • None = D^2PAK 3 = B
• -1 = TO-262 3 None

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

9 - • 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	www.vishay.com/doc?95014
Part marking information	www.vishay.com/doc?95008
Packaging information	www.vishay.com/doc?95032
SPICE model	www.vishay.com/doc?95296

Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay’s terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.