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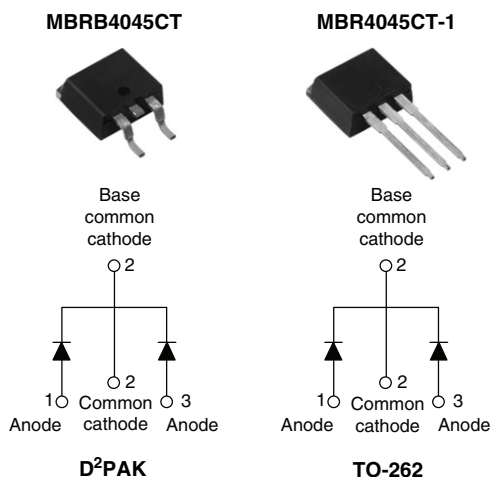
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## MBRB4045CT/MBR4045CT-1

Vishay High Power Products

### Schottky Rectifier, 2 x 20 A



#### FEATURES

- 150 °C  $T_J$  operation
- Low forward voltage drop
- High frequency operation
- Center tap TO-220, D<sup>2</sup>PAK 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
- Designed and qualified for Q101 level

#### 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
$I_{FSM}$	$t_p = 5$ $\mu$ s 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	MBRB4045CT MBR4045CT-1	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 per device	$I_{F(AV)}$	$T_C = 118$ °C, rated $V_R$	20	A
			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 $\mu$ s sine or 3 $\mu$ s rect. pulse	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, $L = 4.4$ mH	20	mJ
Repetitive avalanche current per leg	$I_{AR}$	Current decaying linearly to zero in 1 $\mu$ s Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical	3	A

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ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	$V_{FM}^{(1)}$	20 A	$T_J = 25\text{ }^\circ\text{C}$	0.60	V
		40 A		0.78	
		20 A	$T_J = 125\text{ }^\circ\text{C}$	0.58	
		40 A		0.75	
Maximum instantaneous reverse current	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	Rated DC voltage	1	mA
		$T_J = 100\text{ }^\circ\text{C}$		50	
		$T_J = 125\text{ }^\circ\text{C}$		95	
Maximum junction capacitance	$C_T$	$V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$		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/ $\mu$ 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 per leg	$R_{thJC}$	DC operation		1.5	$^\circ\text{C}/\text{W}$
Typical thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, smooth and greased (Only for TO-262)		0.50	
Maximum thermal resistance, junction to ambient	$R_{thJA}$	DC operation (For D <sup>2</sup> PAK and TO-262)		50	
Approximate weight				2	g
				0.07	oz.
Mounting torque	minimum maximum		Non-lubricated threads	6 (5)	kgf · cm (lbf · in)
				12 (10)	
Marking device		Case style D <sup>2</sup> PAK		MBRB4045CT	
		Case style TO-262		MBR4045CT-1	



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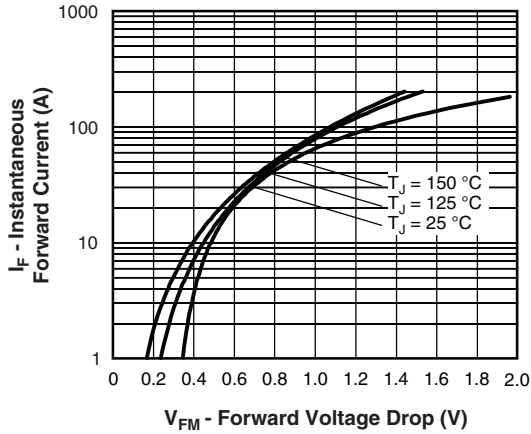


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

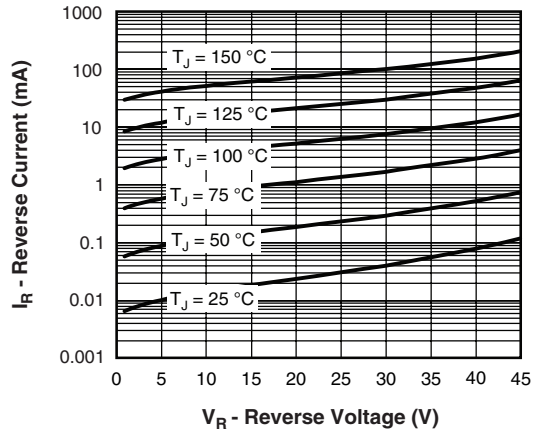


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

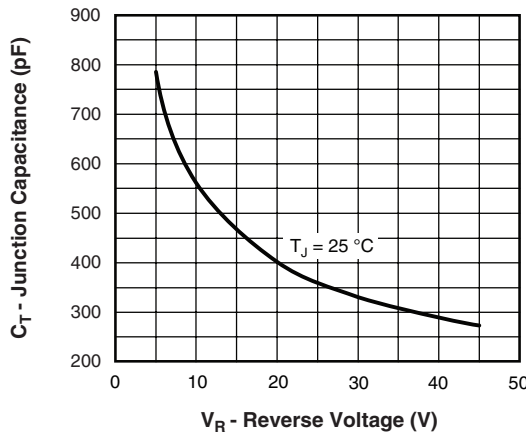


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

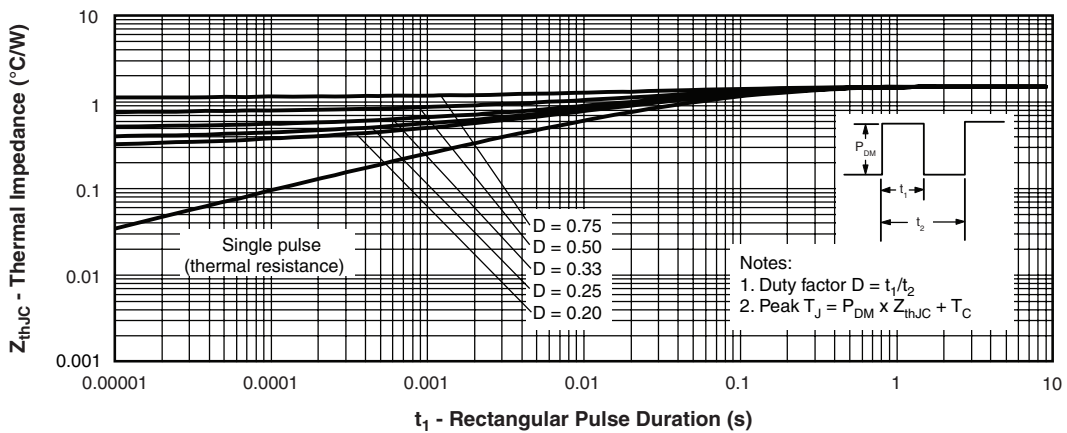


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

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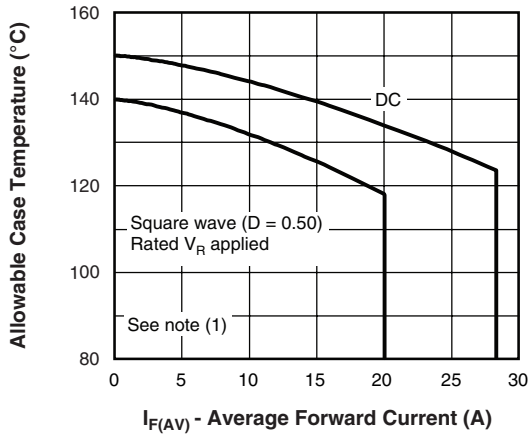


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

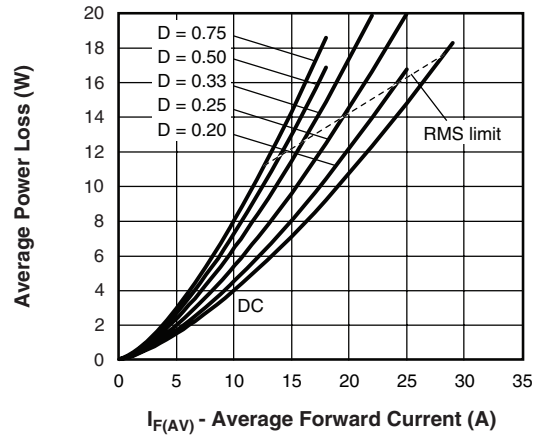


Fig. 6 - Forward Power Loss Characteristics

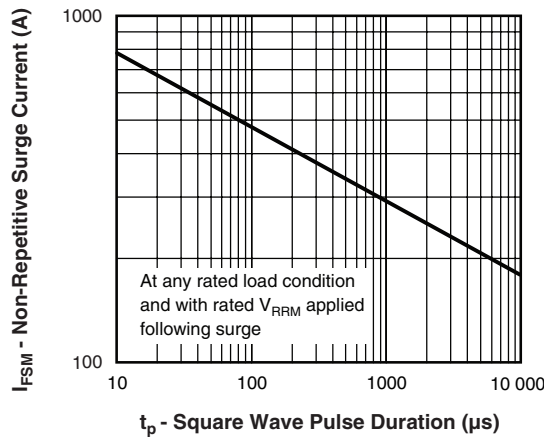


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

**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  $V_R$



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### ORDERING INFORMATION TABLE

Device code	<b>MBR</b>	<b>B</b>	<b>40</b>	<b>45</b>	<b>CT</b>	<b>-1</b>	<b>TRL</b>	<b>-</b>
	①	②	③	④	⑤	⑥	⑦	⑧

- 1** - Essential part number
- 2** -
  - B = D<sup>2</sup>PAK **6** None
  - None = TO-262 **6** = -1
- 3** - Current rating (40 = 40 A)
- 4** - Voltage rating (45 = 45 V)
- 5** - CT = Essential part number
- 6** -
  - None = D<sup>2</sup>PAK **2** = B
  - -1 = TO-262 **2** None
- 7** -
  - None = Tube (50 pieces)
  - TRL = Tape and reel (left oriented - for D<sup>2</sup>PAK only)
  - TRR = Tape and reel (right oriented - for D<sup>2</sup>PAK only)
- 8** -
  - None = Standard production
  - PbF = Lead (Pb)-free (for TO-262 and D<sup>2</sup>PAK tube)
  - P = Lead (Pb)-free (for D<sup>2</sup>PAK TRR and TRL)

#### LINKS TO RELATED DOCUMENTS

Dimensions	<a href="http://www.vishay.com/doc?95014">http://www.vishay.com/doc?95014</a>
Part marking information	<a href="http://www.vishay.com/doc?95008">http://www.vishay.com/doc?95008</a>
Packaging information	<a href="http://www.vishay.com/doc?95032">http://www.vishay.com/doc?95032</a>
SPICE model	<a href="http://www.vishay.com/doc?95296">http://www.vishay.com/doc?95296</a>



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