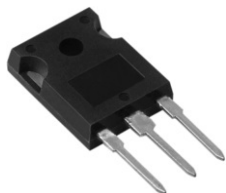
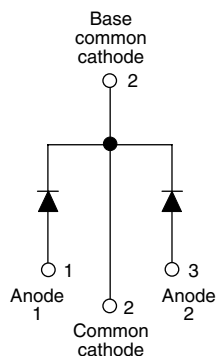


Schottky Rectifier, 2 x 20 A


TO-247AC


FEATURES

- 150 °C T_J operation
- Center tap TO-247 package
- Very 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


RoHS*
COMPLIANT

DESCRIPTION

The MBR4045WTPbF center tap Schottky rectifier has been optimized for very low forward voltage drop, with moderate leakage. 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}	85 mA at 125 °C

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform (per device)	40	A
I_{FRM}	$T_C = 125\text{ °C}$ (per leg)	40	
V_{RRM}		45	V
I_{FSM}	$t_p = 5\text{ }\mu\text{s}$ sine	1020	A
V_F	20 Apk, $T_J = 125\text{ °C}$	0.56	V
T_J	Range	- 55 to 150	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	MBR4045WTPbF	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	$I_{F(AV)}$	$T_C = 125\text{ °C}$, 50 % duty cycle, rectangular waveform	20 40	A
Peak repetitive forward current per leg	I_{FRM}	Rated V_R , square wave, 20 kHz, $T_C = 125\text{ °C}$	40	
Maximum peak one cycle non-repetitive surge current per leg See fig. 7	I_{FSM}	5 μs sine or 3 μs rect. pulse 10 ms sine or 6 ms rect. pulse	1020 265	
		Following any rated load condition and with rated V_{RRM} applied		
Non-repetitive avalanche energy per leg	E_{AS}	$T_J = 25\text{ °C}$, $I_{AS} = 3\text{ A}$, $L = 4.40\text{ mH}$	20	mJ
Repetitive avalanche current per leg	I_{AR}	Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ 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	$T_J = 25\text{ }^{\circ}\text{C}$	0.59	V	
		40 A		0.78		
		20 A	$T_J = 125\text{ }^{\circ}\text{C}$	0.56		
		40 A		0.72		
Maximum instantaneous reverse current	$I_{RM}^{(1)}$	$T_J = 25\text{ }^{\circ}\text{C}$	Rated DC voltage	1.75	mA	
		$T_J = 100\text{ }^{\circ}\text{C}$		50		
		$T_J = 125\text{ }^{\circ}\text{C}$		85		
Threshold voltage	$V_{F(TO)}$	$T_J = T_J \text{ maximum}$		0.29	V	
Forward slope resistance	r_t			10.3	mΩ	
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		7.5	nH	
Maximum voltage rate of change	dV/dt	Rated V_R		10 000	V/μs	

Note

⁽¹⁾ Pulse width < 300 μ s, duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction temperature range	T _J		- 55 to 150	°C
Maximum storage temperature range	T _{Stg}		- 55 to 175	
Maximum thermal resistance, junction to case per package	R _{thJC}	DC operation	1.4	°C/W
Typical thermal resistance, case to heatsink	R _{thCS}	Mounting surface, smooth and greased	0.7	
Approximate weight			6	g
			0.21	oz.
Mounting torque	minimum		6 (5)	kgf · cm (lbf · in)
	maximum		12 (10)	
Device marking		Case style TO-247AC (JEDEC)	MBR4045WT	

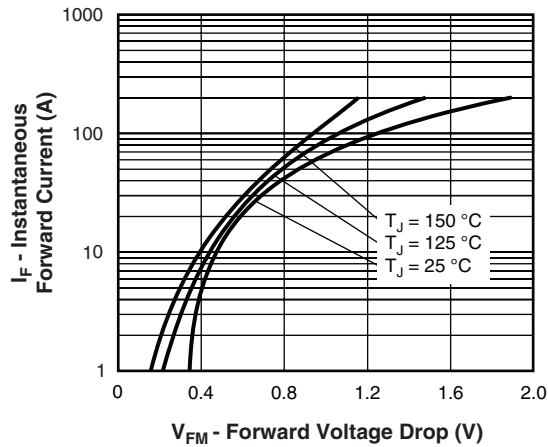


Fig. 1 - Maximum Forward Voltage Drop Characteristics

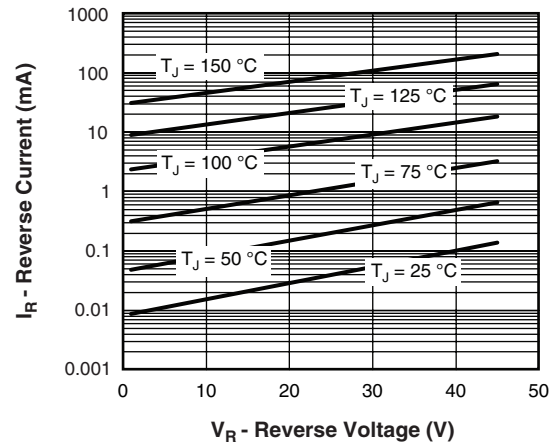


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

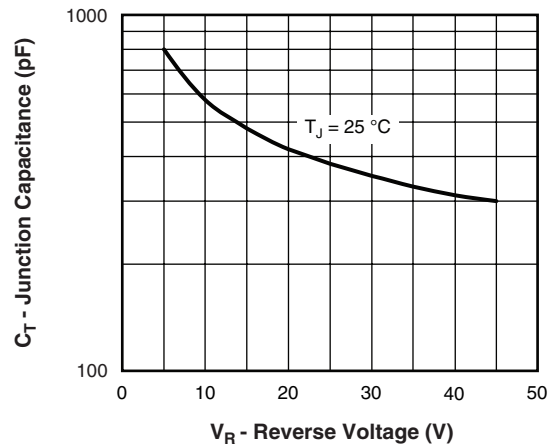
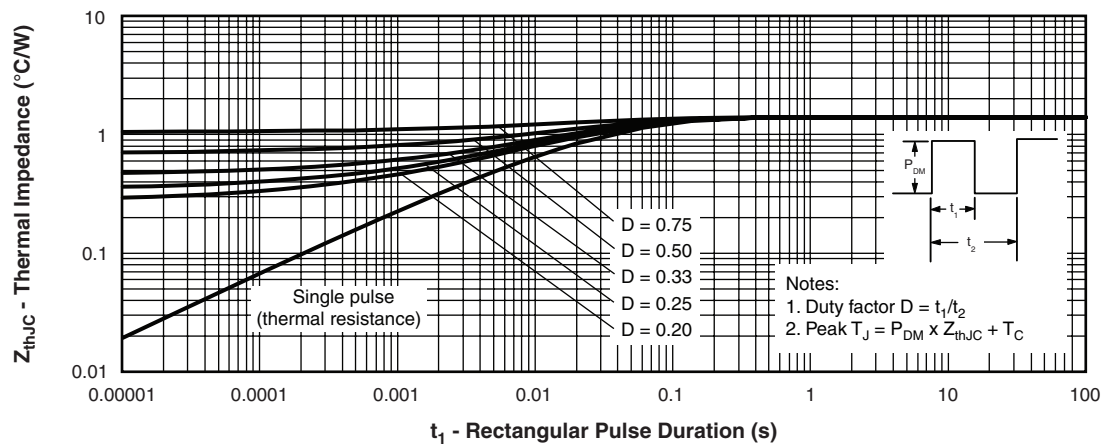


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

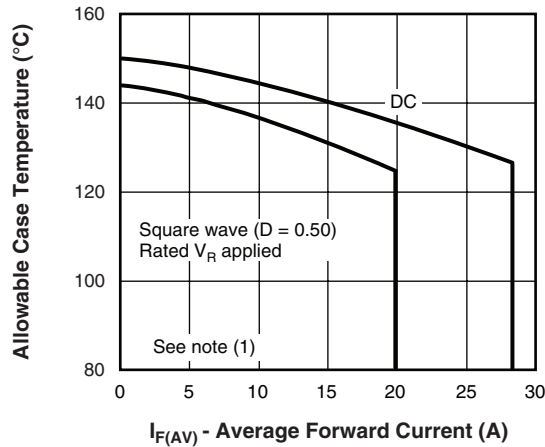


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

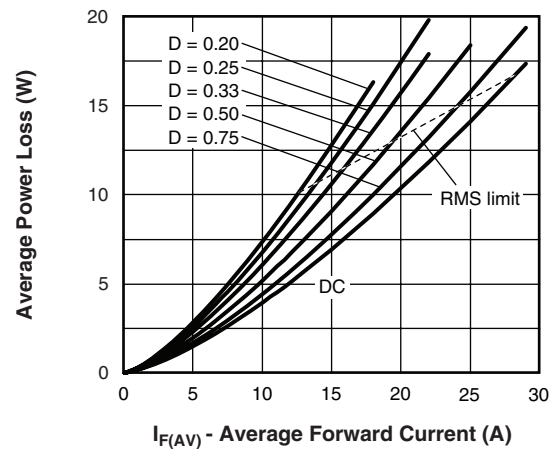


Fig. 6 - Forward Power Loss Characteristics

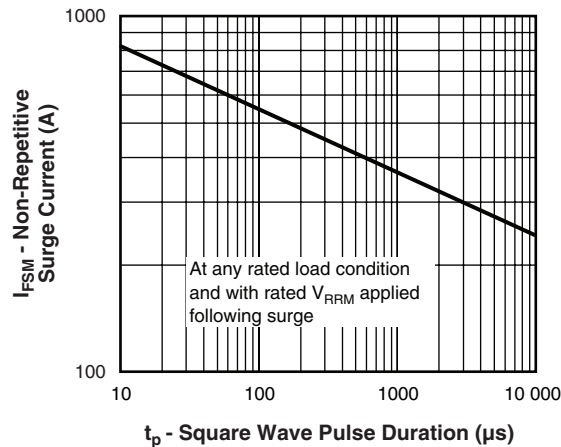


Fig. 7 - Maximum Non-Repetitive Surge Current

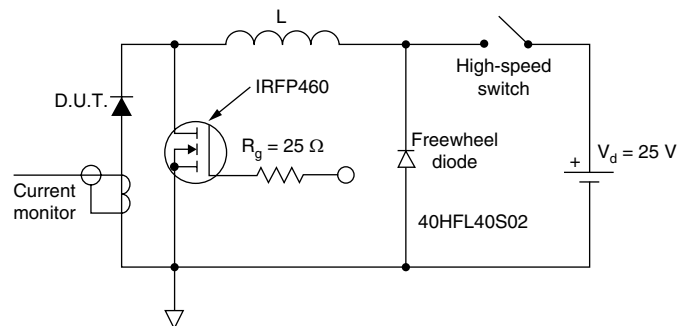


Fig. 8 - Unclamped Inductive Test Circuit

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$;
 P_d = Forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
 P_{dREV} = Inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at V_{R1} = Rated V_R

**ORDERING INFORMATION TABLE**

Device code	MBR	40	45	WT	PbF
	1	2	3	4	5

- | | | |
|----------|---|---|
| 1 | - | Schottky MBR series |
| 2 | - | Current rating (40 = 40 A) |
| 3 | - | Voltage rating (45 = 45 V) |
| 4 | - | Circuit configuration:
Center tap (dual) TO-247 |
| 5 | - | <ul style="list-style-type: none">• None = Standard production• PbF = Lead (Pb)-free |

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95223
Part marking information	http://www.vishay.com/doc?95226
SPICE model	http://www.vishay.com/doc?95297



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