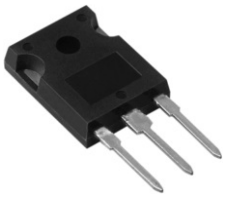
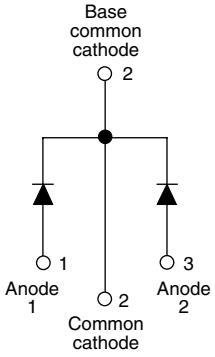
Schottky Rectifier, 2 x 20 A



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

Pb-free Available

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 °C (per leg)	40	
V_{RRM}		45	V
I_{FSM}	t_p = 5 µs sine	1020	A
V_F	20 Apk, T_J = 125 °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	$I_{F(AV)}$	T_C = 125 °C, 50 % duty cycle, rectangular waveform		20	A
Maximum average forward current — per device				40	
Peak repetitive forward current per leg	I_{FRM}	Rated V_R, square wave, 20 kHz, T_C = 125 °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	Following any rated load condition and with rated V_{RRM} applied	1020	
		10 ms sine or 6 ms rect. pulse		265	
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	0.59	V
		40 A		0.78	
		20 A	T_J = 125 °C	0.56	
		40 A		0.72	
Maximum instantaneous reverse current	I_{RM} (1)	T_J = 25 °C	Rated DC voltage	1.75	mA
		T_J = 100 °C		50	
		T_J = 125 °C		85	
Threshold voltage	$V_{F(TO)}$	T_J = T_J maximum		0.29	V
Forward slope resistance	r_t			10.3	mΩ
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		7.5	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		- 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	

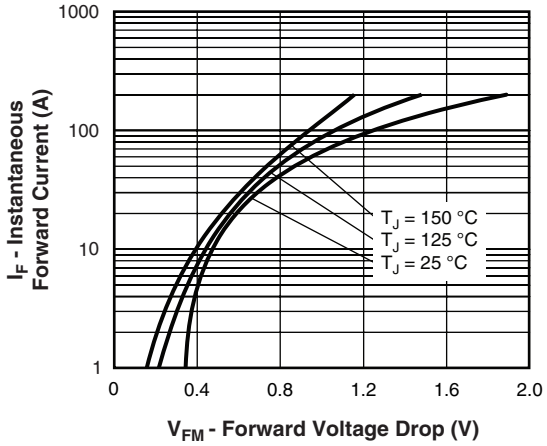


Fig. 1 - Maximum Forward Voltage Drop Characteristics

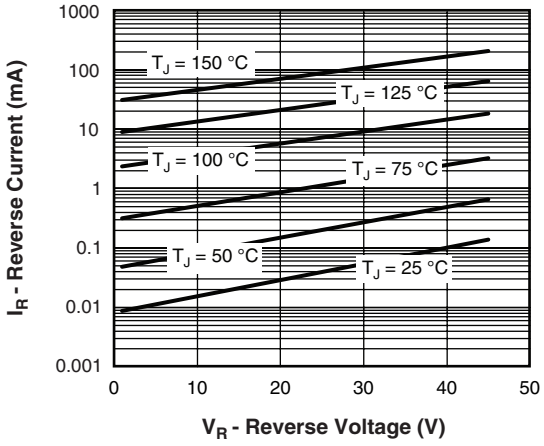


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

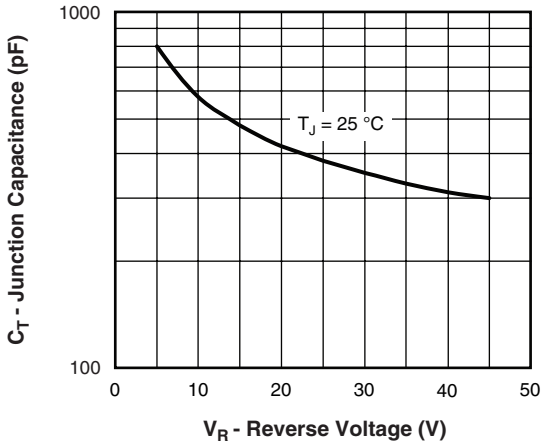


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

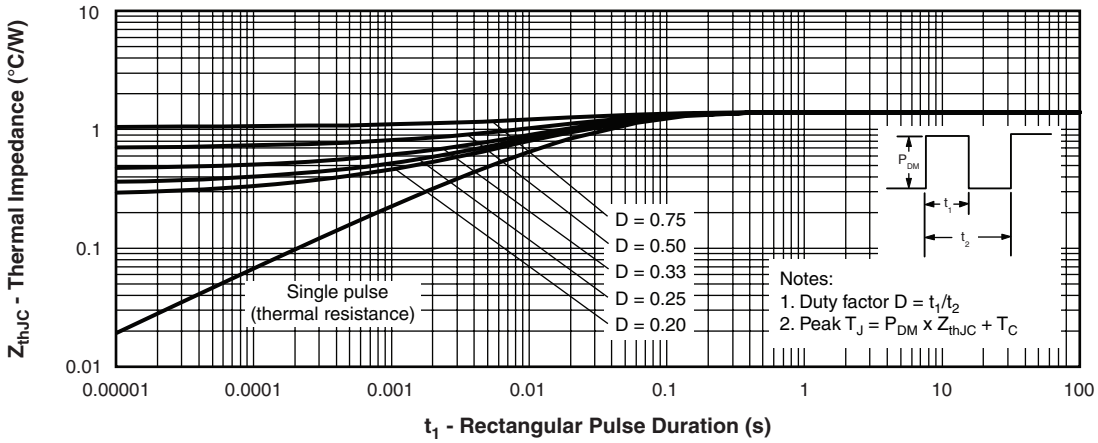


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

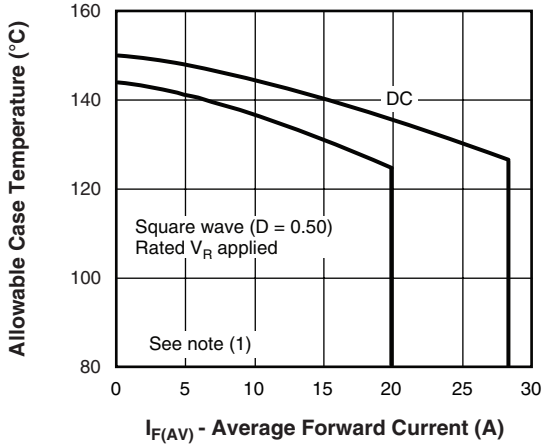


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

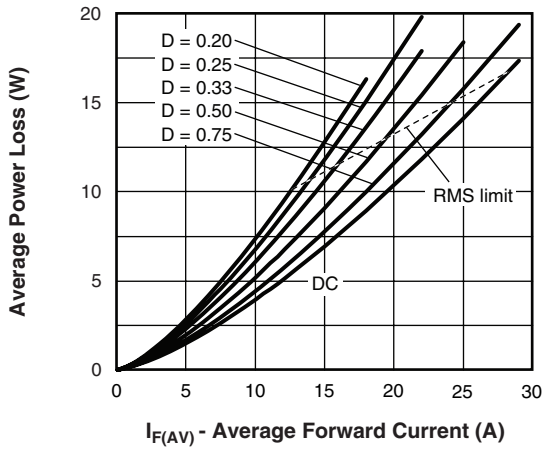


Fig. 6 - Forward Power Loss Characteristics

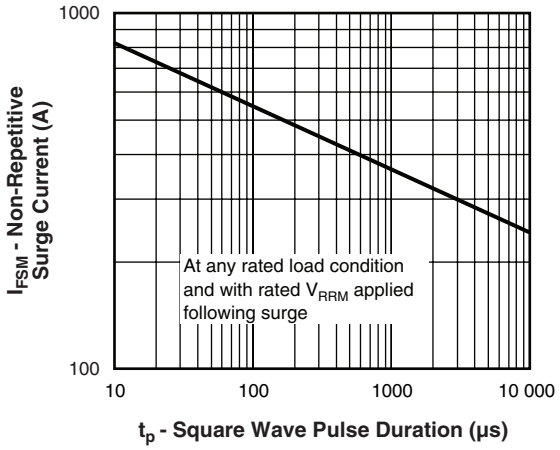


Fig. 7 - Maximum Non-Repetitive Surge Current

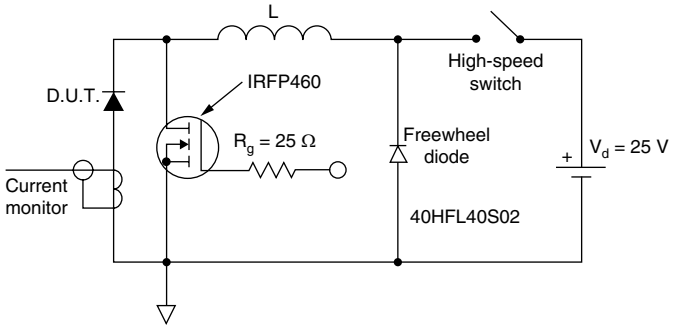


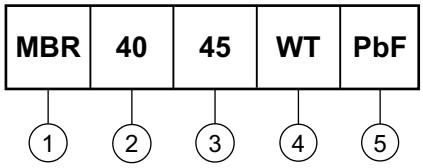
Fig. 8 - Unclamped Inductive Test Circuit

Note

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
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 - Circuit configuration:
Center tap (dual) TO-247
5 - • 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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