

International
IR Rectifier

MBR2045CT
MBRB2045CT
MBR2045CT-1

SCHOTTKY RECTIFIER

20 Amp

Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform (Per Device)	20	A
I_{FRM} @ $T_C = 135^\circ\text{C}$ (Per Leg)	20	A
V_{RRM}	35/45	V
I_{FSM} @ $t_p = 5\ \mu\text{s}$ sine	1060	A
V_F @ 10 Apk, $T_J = 125^\circ\text{C}$	0.57	V
T_J range	-65 to 150	$^\circ\text{C}$

Description/ Features

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, free-wheeling diodes, and reverse battery protection.

- 150°C T_J operation
- Center tap TO-220 and D²Pak packages
- Low forward voltage drop
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability

Case Styles

MBR20..CT	MBRB20..CT	MBR20..CT-1
 Base Common Cathode 1 2 3 Anode Common Cathode Anode TO-220	 Base Common Cathode 1 2 3 Anode Common Cathode Anode D²PAK	 Base Common Cathode 1 2 3 Anode Common Cathode Anode TO-262

Voltage Ratings

Parameters	MBR2035CT MBRB2035CT MBR2035CT-1	MBR2045CT MBRB2045CT MBR2045CT-1
V_R Max. DC Reverse Voltage (V)	35	45
V_{RWM} Max. Working Peak Reverse Voltage (V)		

Absolute Maximum Ratings

Parameters	Values	Units	Conditions
$I_{F(AV)}$ Max. Average Forward (Per Leg) Current (Per Device)	10 20	A	@ $T_C = 135^\circ\text{C}$, (Rated V_R)
I_{FRM} Peak Repetitive Forward Current (Per Leg)	20	A	Rated V_R , square wave, 20kHz $T_C = 135^\circ\text{C}$
I_{FSM} Non Repetitive Peak Surge Current	1060 150	A	5 μs Sine or 3 μs Rect. pulse Following any rated load condition and with rated V_{RWM} applied Surge applied at rated load conditions halfwave, single phase, 60Hz
E_{AS} Non-Repetitive Avalanche Energy	8	mJ	(Per Leg) $T_J = 25^\circ\text{C}$, $I_{AS} = 2\text{Amps}$, $L = 4\text{mH}$
I_{AR} Repetitive Avalanche Current (Per Leg)	2	A	Current decaying linearly to zero in 1 μsec Frequency limited by T_J max. $V_A = 1.5 \times V_R$ typical

Electrical Specifications

Parameters	Values	Units	Conditions
V_{FM} Max. Forward Voltage Drop (1)	0.84 0.57 0.72	V	@ 20A @ 10A @ 20A $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$
I_{RM} Max. Instantaneous Reverse Current (1)	0.1 15	mA	$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$ Rated DC voltage
$V_{F(TO)}$ Threshold Voltage	0.354	V	$T_J = T_J$ max.
r_t Forward Slope Resistance	17.6	m Ω	
C_T Max. Junction Capacitance	600	pF	$V_R = 5V_{DC}$ (test signal range 100Khz to 1Mhz) 25°C
L_S Typical Series Inductance	8.0	nH	Measured from top of terminal to mounting plane
dv/dt Max. Voltage Rate of Change (Rated V_R)	10000	V/ μs	

(1) Pulse Width < 300 μs , Duty Cycle <2%

Thermal-Mechanical Specifications

Parameters	Values	Units	Conditions
T_J Max. Junction Temperature Range	-65 to 150	$^\circ\text{C}$	
T_{stg} Max. Storage Temperature Range	-65 to 175	$^\circ\text{C}$	
R_{thJC} Max. Thermal Resistance Junction to Case (Per Leg)	2.0	$^\circ\text{C/W}$	DC operation
R_{thCS} Typical Thermal Resistance Case to Heatsink	0.50	$^\circ\text{C/W}$	Mounting surface, smooth and greased Only for TO-220
wt Approximate Weight	2 (0.07)	g (oz.)	
T Mounting Torque	Min. 6 (5) Max. 12 (10)	Kg-cm (lbf-in)	Non-lubricated threads

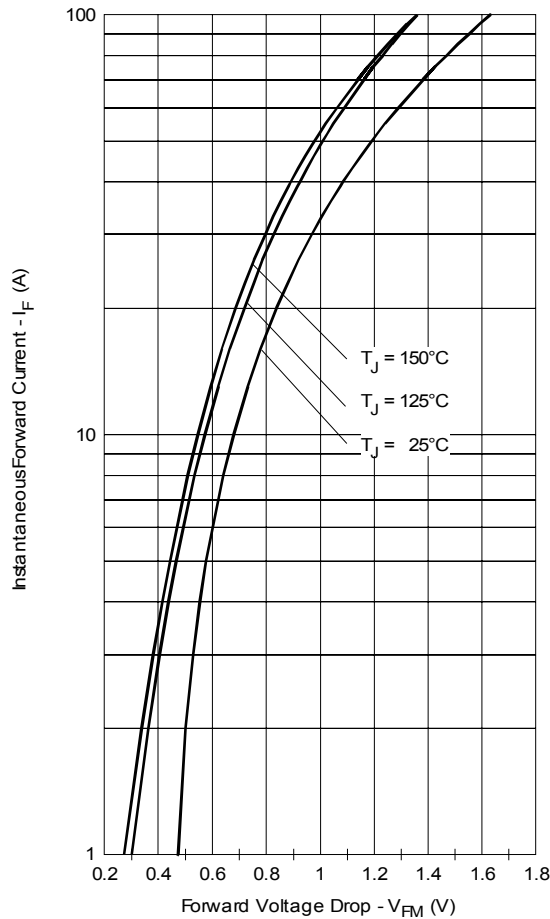


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

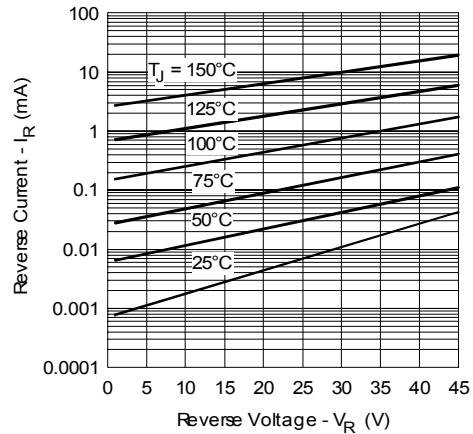


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

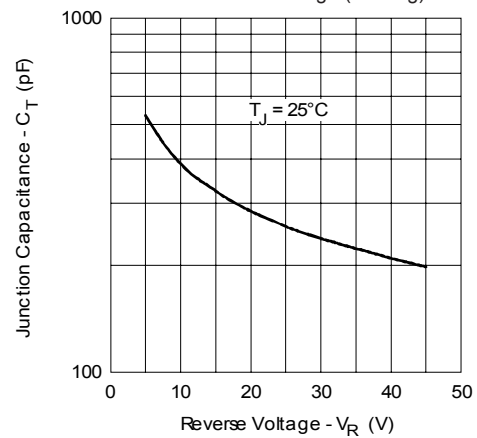


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

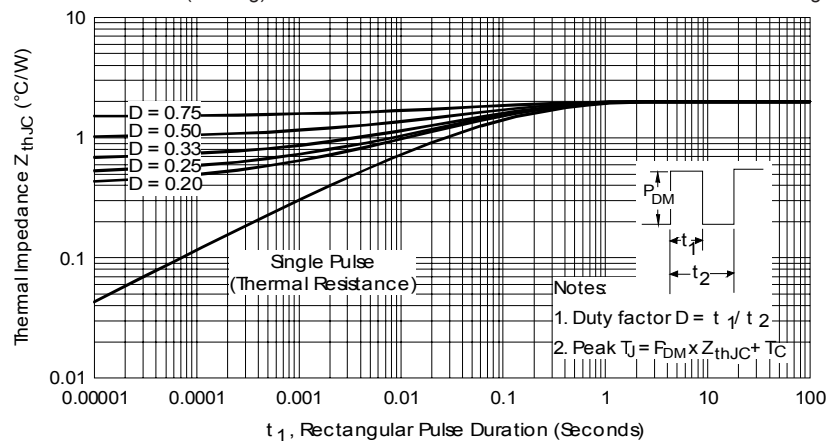


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

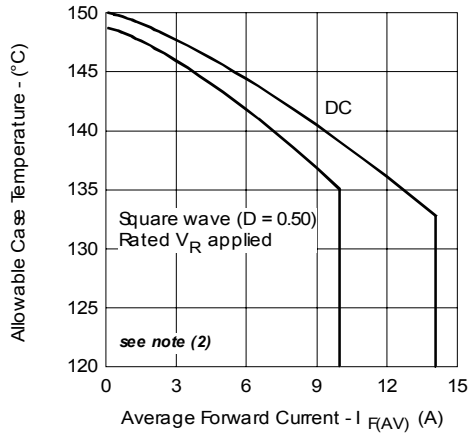


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

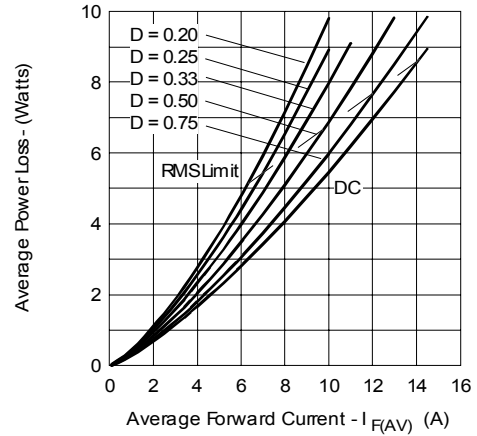


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

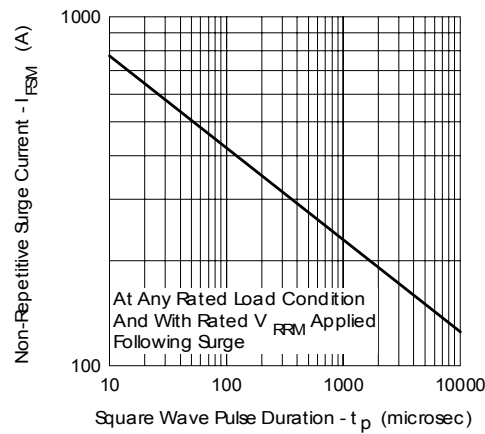


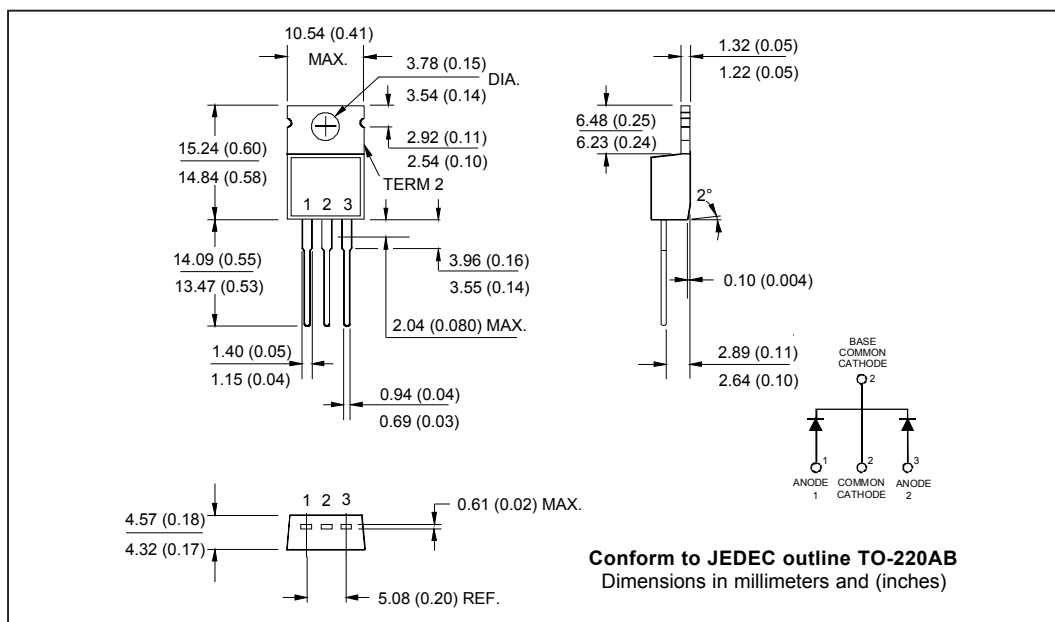
Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

- (2) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
 Pd = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$ (see Fig. 6);
 Pd_{REV} = Inverse Power Loss = $V_{R1} \times I_R (1 - D)$; $I_R @ V_{R1}$ = rated V_R

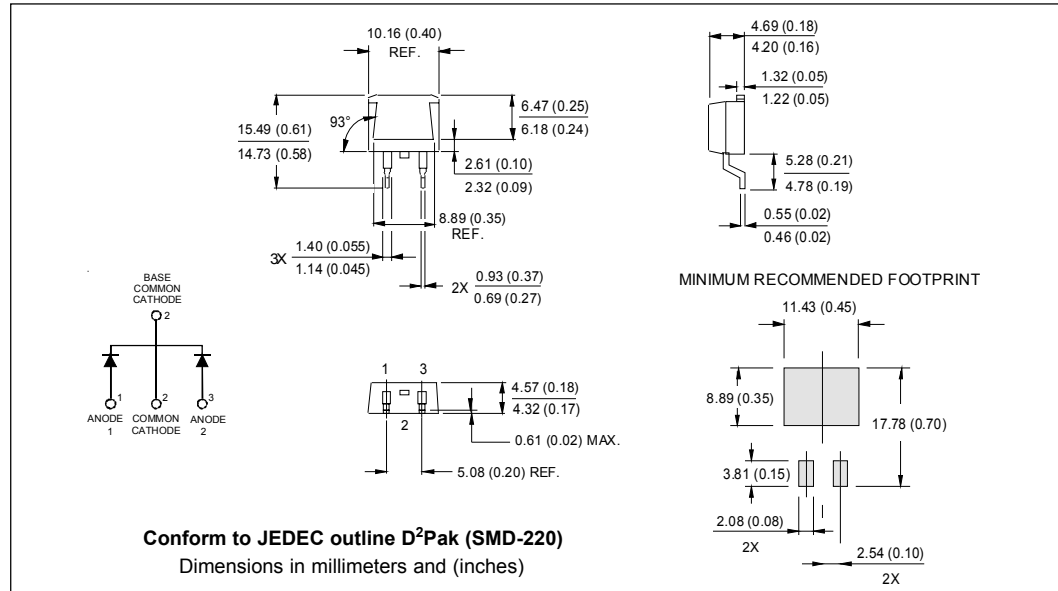
Ordering Information Table

Device Code					
1	2	3	4	5	6
MBR	B	20	45	CT	-1
1 - Essential Part Number 2 - B = Surface Mount None = TO-220 3 - Current Rating 4 - Voltage code: Code = V_{RRM} 5 - CT= Essential Part Number 6 - -1 = TO-262 None = TO-220					
				35 = 35V 45 = 45V	

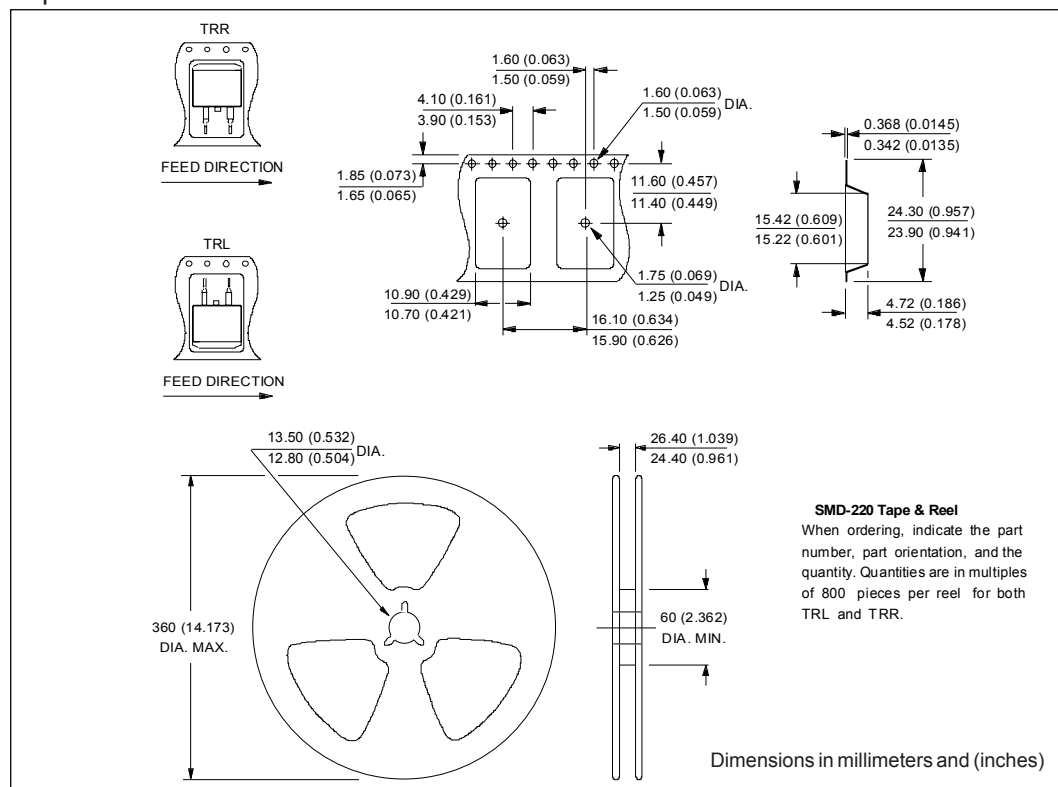
Outline Table



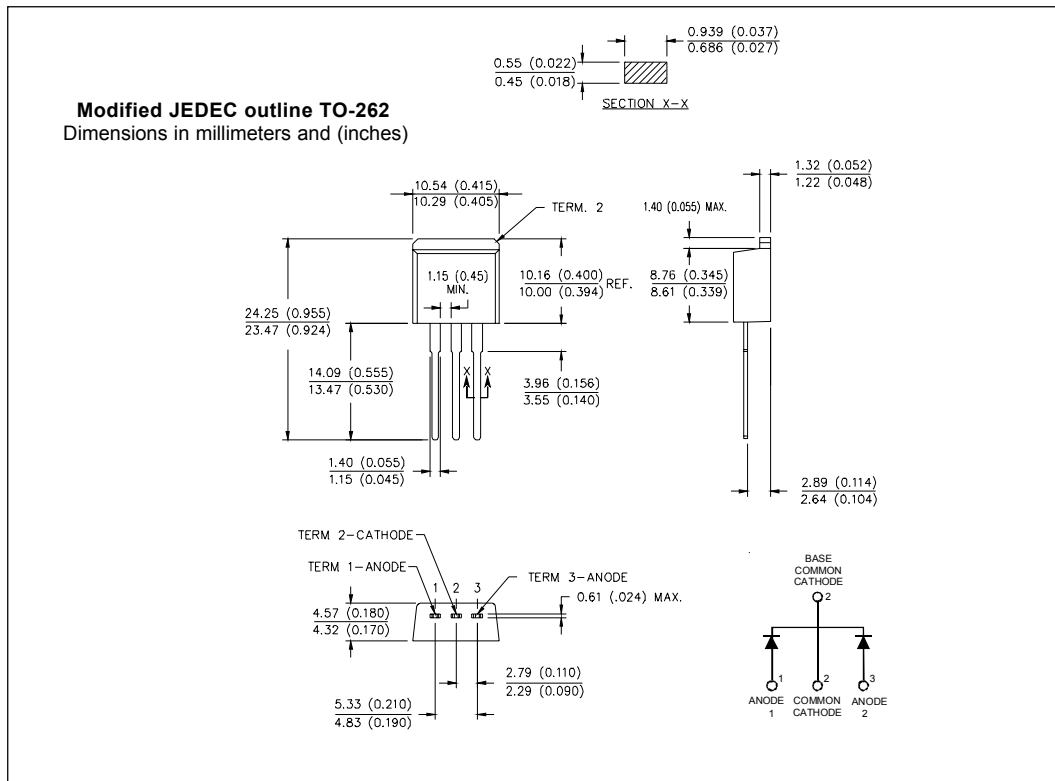
Outline Table



Tape & Reel Information



Outline Table



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MBR2045CT
*****
*   This model has been developed by           *
*   Wizard SPICE MODEL GENERATOR (1999)      *
*   (International Rectifier Corporation)      *
*   Contain Proprietary Information           *
*****
* SPICE Model Diode is composed by a         *
* simple diode plus paralalled VCG2T         *
*****
.SUBCKT MBR2045CT ANO CAT
D1 ANO 1 DMOD (0.03215)
*Define diode model
.MODEL DMOD D(IS=3.22473520069593E-04A,N=1.51153417806053,BV=52V,
+ IBV=0.64831328218128A,RS= 0.00042438,CJO=2.77992867902976E-08,
+ VJ=2.31227489200041,XTI=2, EG=0.682207095559952)
*****
*Implementation of VCG2T
VX 1 2 DC 0V
R1 2 CAT TRES 1E-6
.MODEL TRES RES(R=1,TC1=-29.9397914371146)
GP1 ANO CAT VALUE={-ABS(I(VX))*(EXP((((1.396526E-04/-29.93979)*((V(2,CAT)*1E6)/(I(VX)+1E-6)-
1)))+1)*4.399843E-02*ABS(V(ANO,CAT)))-1)}
*****
.ENDS MBR2045CT

Thermal Model Subcircuit
.SUBCKT MBR2045CT 5 1

CTHERM1    5    4    1.43E+00
CTHERM2    4    3    1.46E+01
CTHERM3    3    2    9.30E+01
CTHERM4    2    1    1.69E+03

RTERM1     5    4    5.79E-01
RTERM2     4    3    7.72E-01
RTERM1     3    2    4.45E-01
RTERM1     2    1    1.93E-01

.ENDS MBR2045CT

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Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level.
Qualification Standards can be found on IR's Web site.

International
IR Rectifier

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