

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

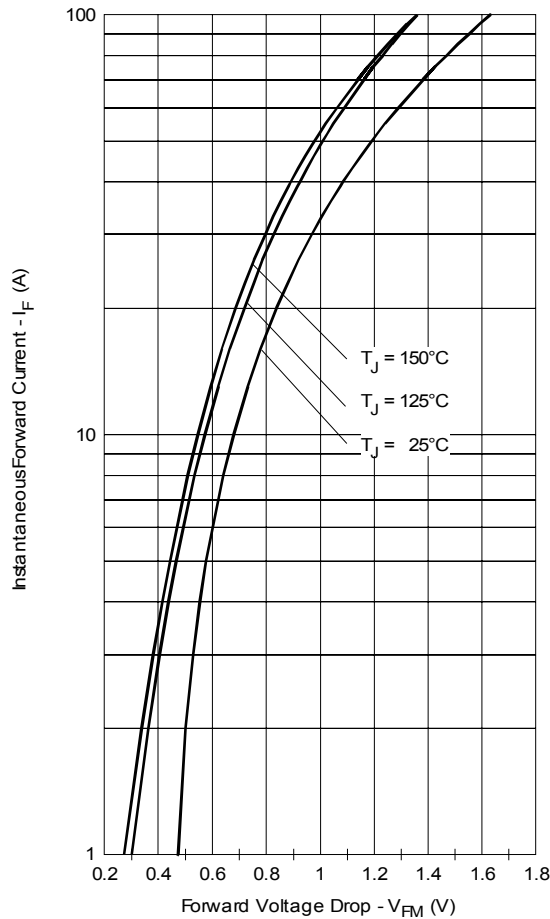


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

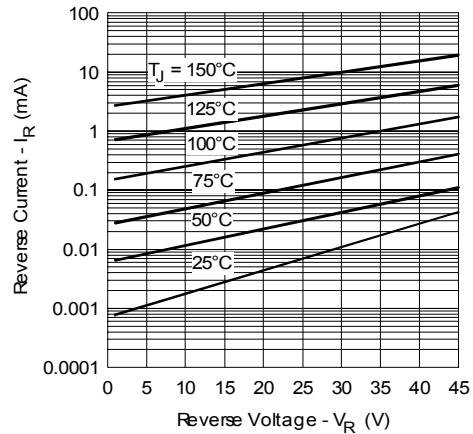


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

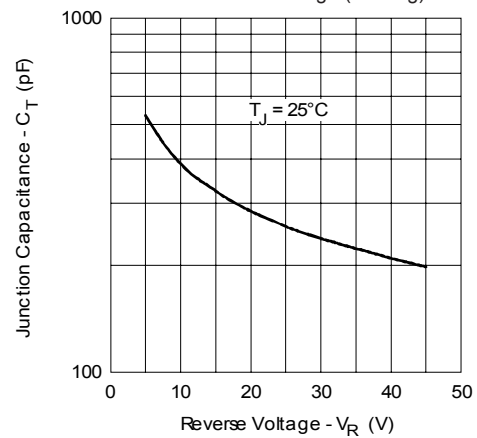


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

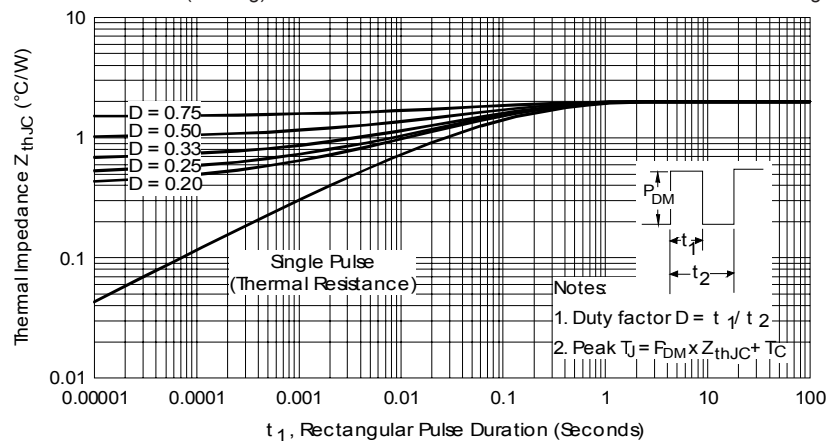


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

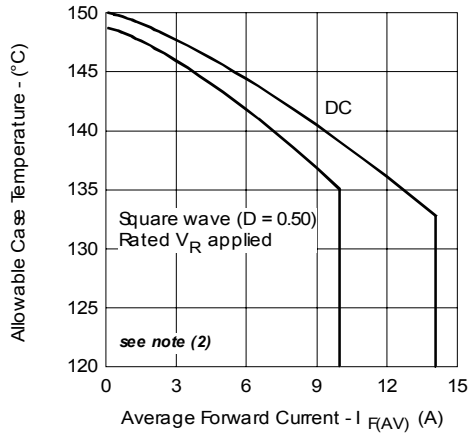


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

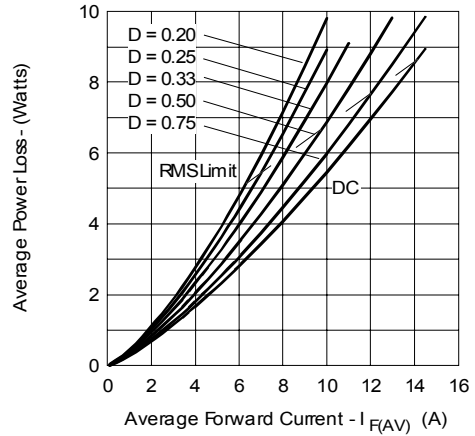


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

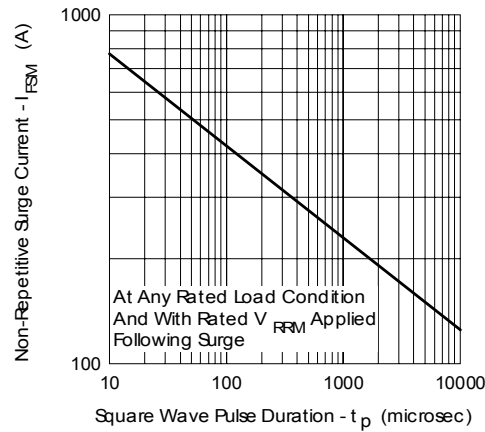


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

(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

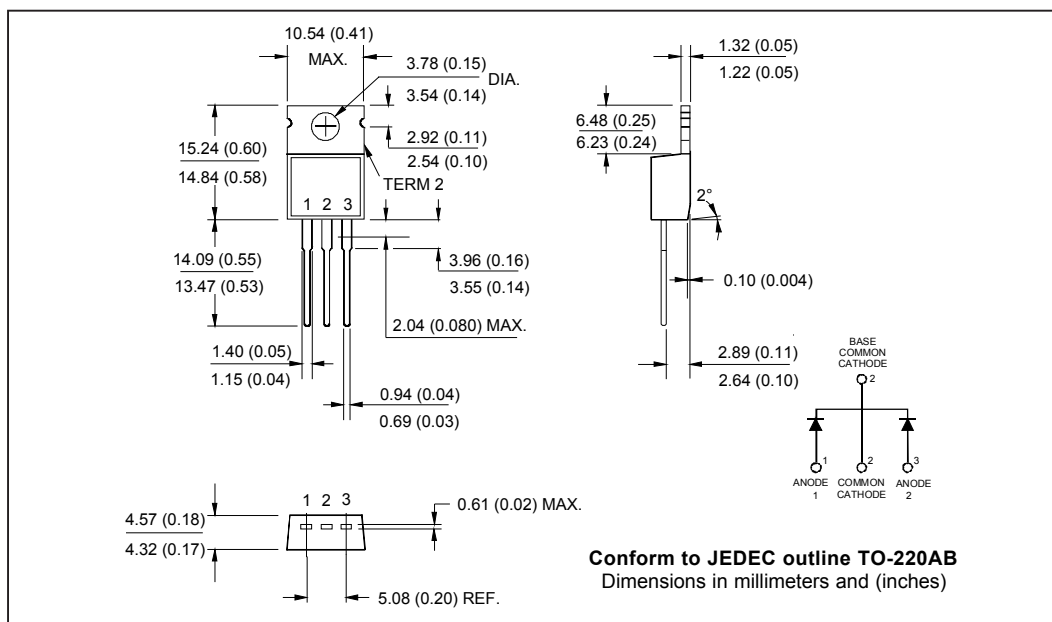
Ordering Information Table

Device Code					
1	2	3	4	5	6
MBR	B	20	45	CT	-1
1	2	3	4	5	6
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				

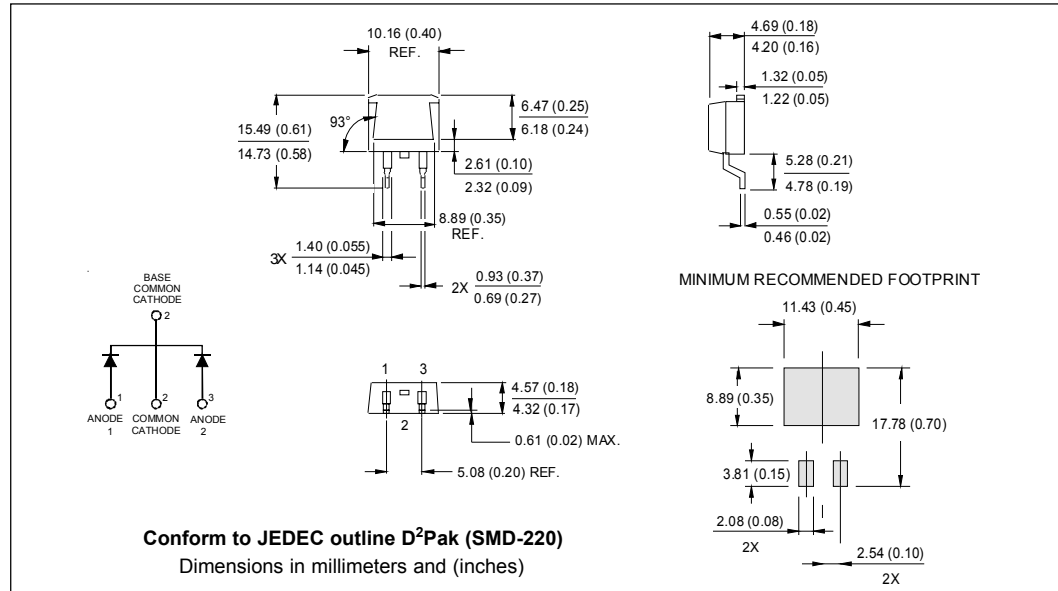
35 = 35V

45 = 45V

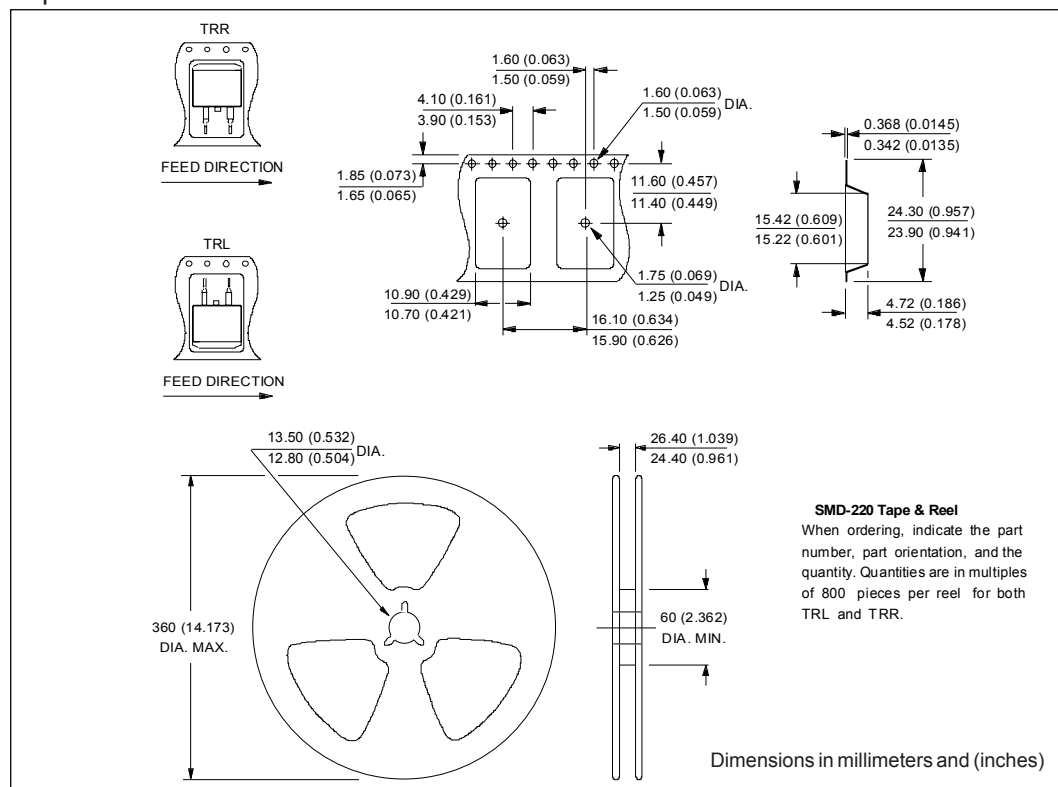
Outline Table



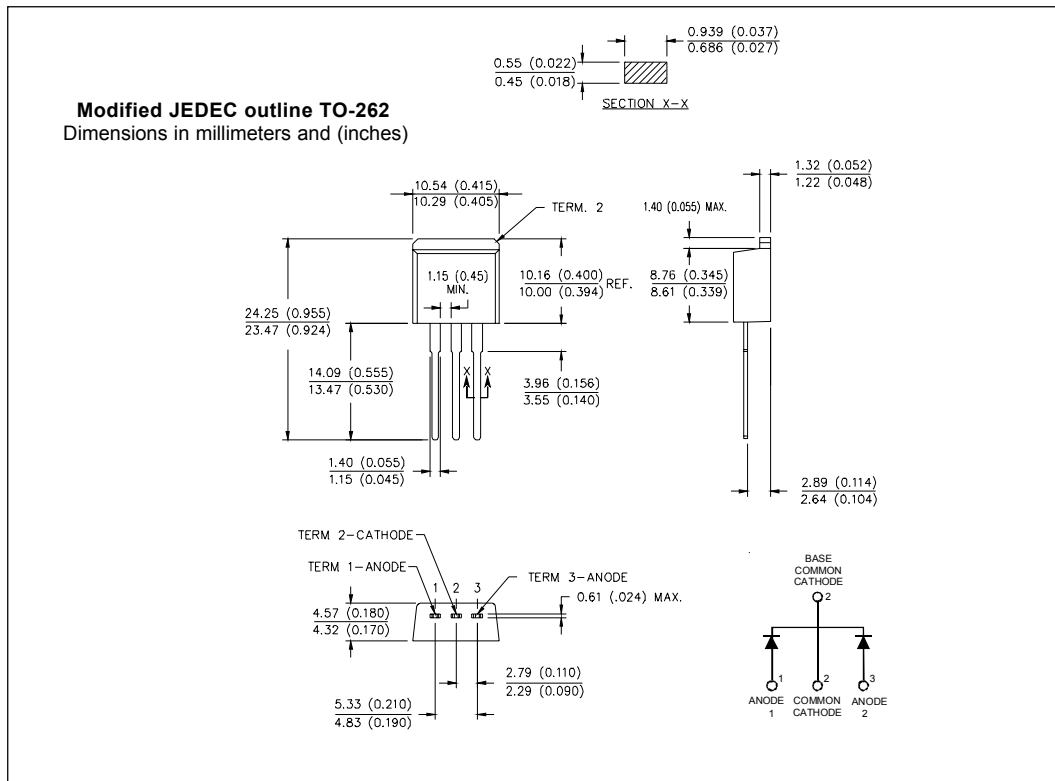
Outline Table



Tape & Reel Information



Outline Table



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

R THERM1	5	4	5.79E-01
R THERM2	4	3	7.72E-01
R THERM1	3	2	4.45E-01
R THERM1	2	1	1.93E-01

.ENDS MBR2045CT

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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