



MBR4045CT
MBRB4045CT
MBR4045CT-1

SCHOTTKY RECTIFIER

40 Amp

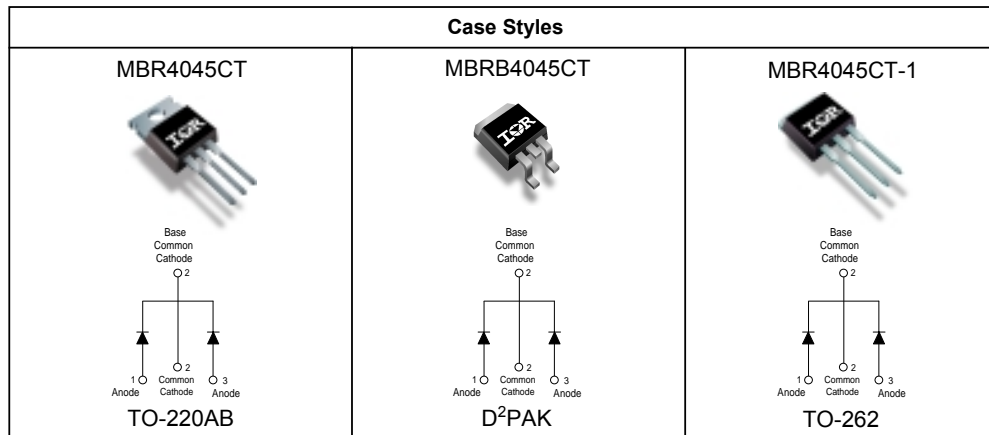
Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform (Per Device)	40	A
I_{FRM} @ $T_C = 118^\circ\text{C}$ (PerLeg)	40	A
V_{RRM}	45	V
I_{FSM} @ $t_p = 5 \mu\text{s}$ sine	900	A
V_F @ 20 Apk, $T_J = 125^\circ\text{C}$	0.58	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, D²Pak and TO-262 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



Voltage Ratings

Parameters	MBR4045CT MBRB4045CT MBR4045CT-1
V _R Max. DC Reverse Voltage (V)	45
V _{RWM} Max. Working Peak Reverse Voltage (V)	

Absolute Maximum Ratings

Parameters	Values	Units	Conditions
I _{F(AV)} Max. Average Forward Current (Per Leg)	20	A	@ T _C = 118 °C, (Rated V _R)
	40		
I _{FRM} Peak Repetitive Forward Current (Per Leg)	40	A	Rated V _R , square wave, 20kHz T _C = 118 °C
I _{FSM} Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg)	900	A	5µs Sine or 3µs Rect. pulse 10ms Sine or 6ms Rect. pulse Following any rated load condition and with rated V _{RRM} applied
	210		
E _{AS} Non-Repetitive Avalanche Energy (Per Leg)	20	A	T _J = 25 °C, I _{AS} = 3Amps, L = 4.40mH
I _{AR} Repetitive Avalanche Current (Per Leg)	3	A	Current decaying linearly to zero in 1 µsec Frequency limited by T _J max. V _A = 1.5 x V _R typical

Electrical Specifications

Parameters	Values	Units	Conditions
V _{FM} Max. Forward Voltage Drop (1)	0.60	V	@ 20A T _J = 25 °C
	0.78	V	@ 40A
	0.58	V	@ 20A T _J = 125 °C
	0.75	V	@ 40A
I _{RM} Max. Instantaneous Reverse Current (1)	1	mA	T _J = 25 °C Rated DC voltage
	50	mA	T _J = 100 °C
	95	mA	T _J = 125 °C
C _T Max. Junction Capacitance	900	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)	10,000	V/ µs	

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

Thermal-Mechanical Specifications

Parameters	Values	Units	Conditions
T _J Max. Junction Temperature Range	-65 to 150	°C	
T _{stg} Max. Storage Temperature Range	-65 to 175	°C	
R _{thJC} Max. Thermal Resistance Junction to Case (Per Leg)	1.5	°C/W	DC operation
R _{thCS} Typical Thermal Resistance Case to Heatsink	0.50	°C/W	Mounting surface, smooth and greased Only for TO-220
R _{thJA} Max. Thermal Resistance Junction to Ambient	50	°C/W	DC operation For D ² Pak and TO-262
wt Approximate Weight	2(0.07)	g (oz.)	
T Mounting Torque	Min. 6(5)	Kg-cm (lbf-in)	Non-lubricated threads
	Max. 12(10)		

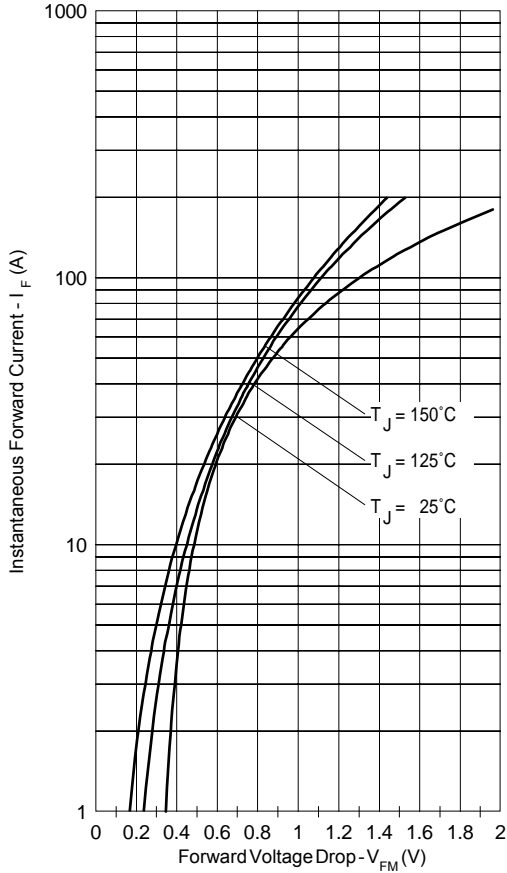


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

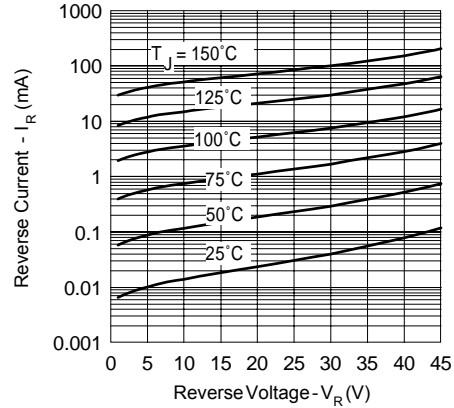


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

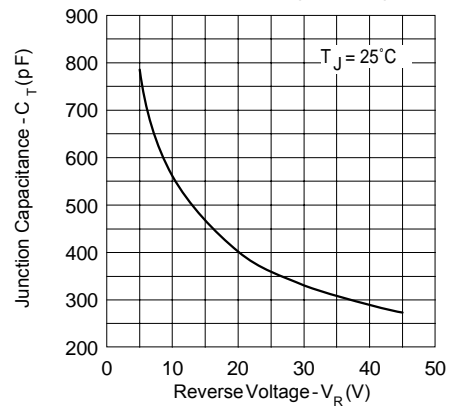


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

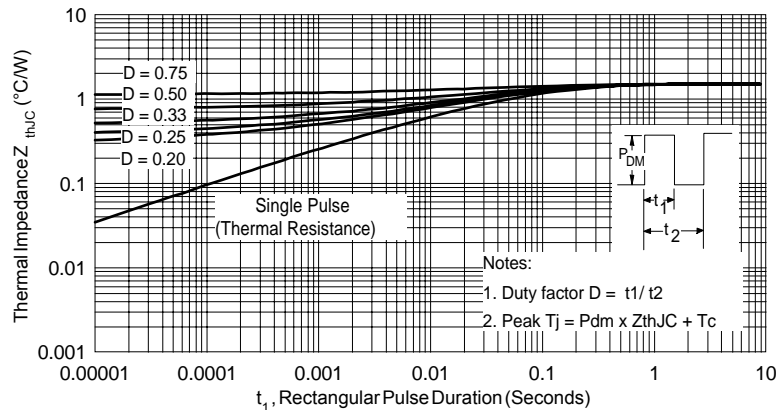


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

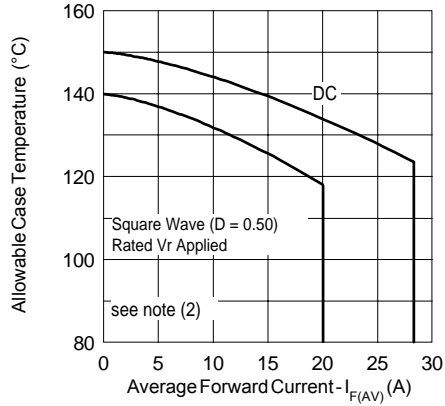


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

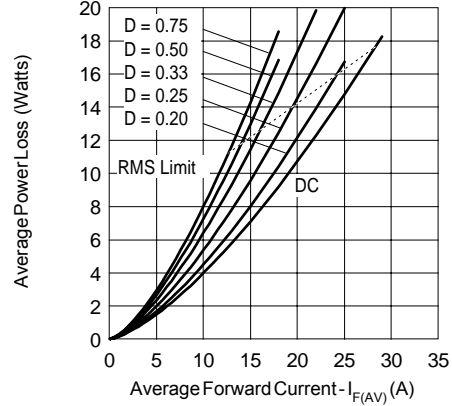


Fig. 6 - Forward Power Loss Characteristics

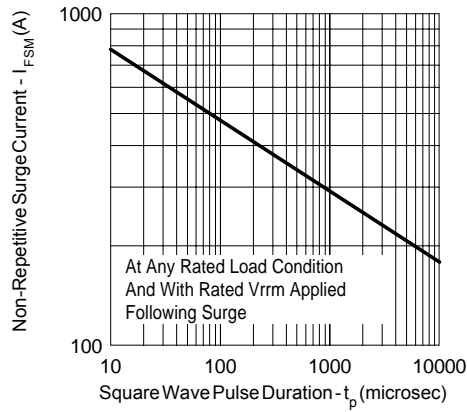
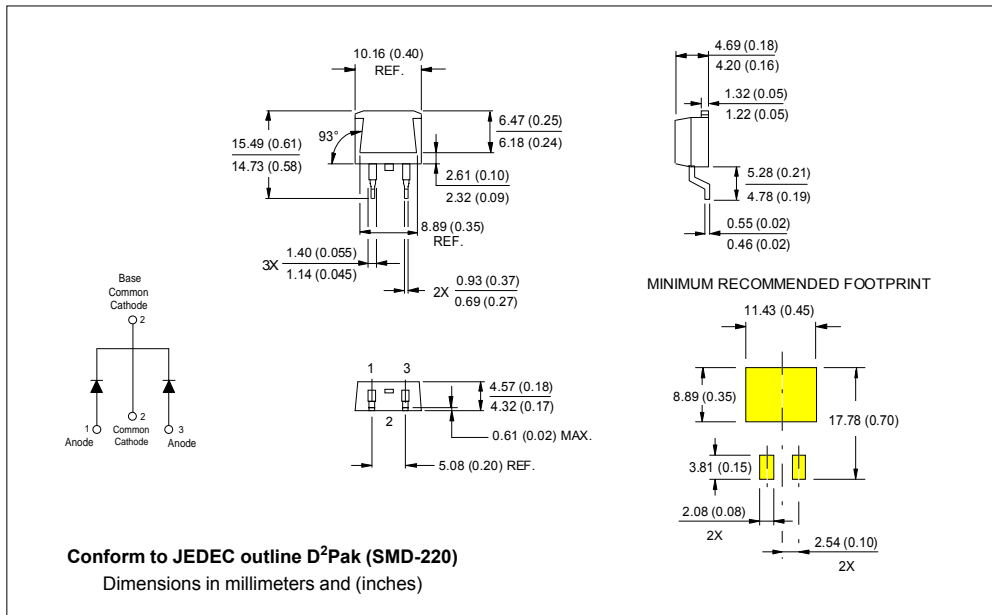
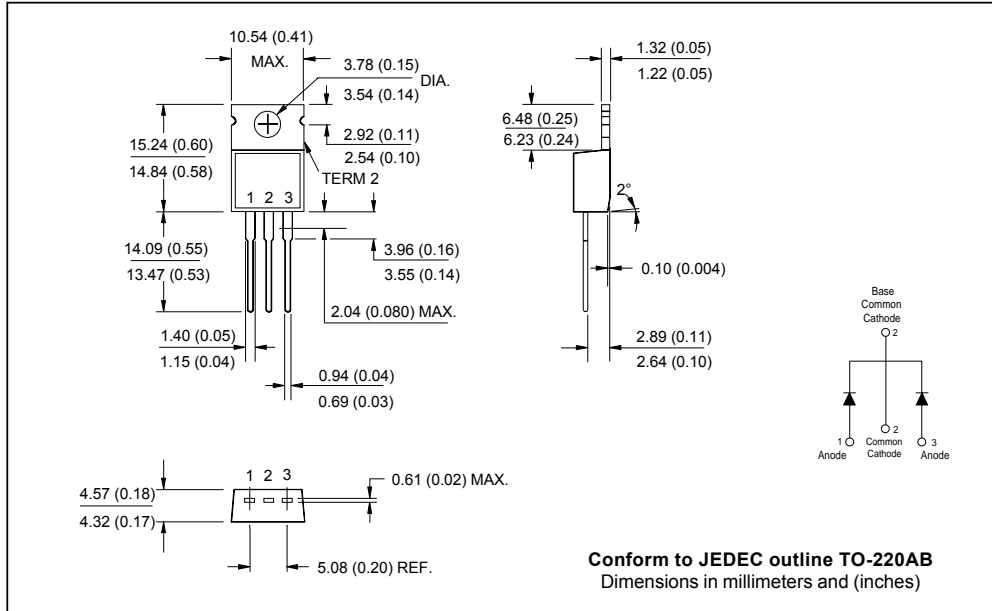


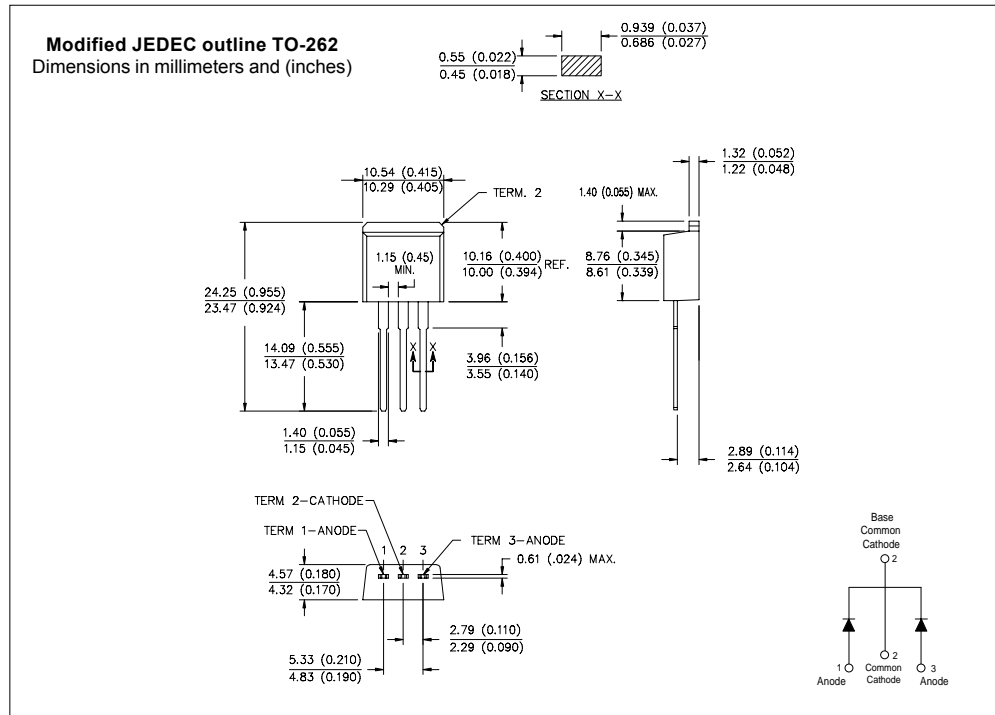
Fig. 7 - Max. Non-Repulsive Surge Current (Per Leg)

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

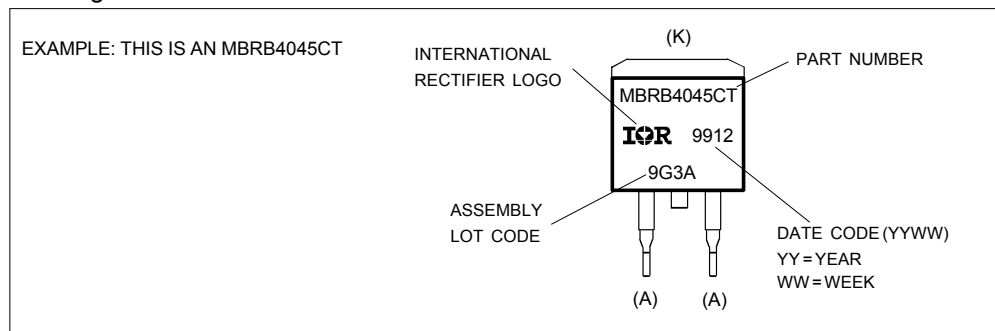
Outline Table



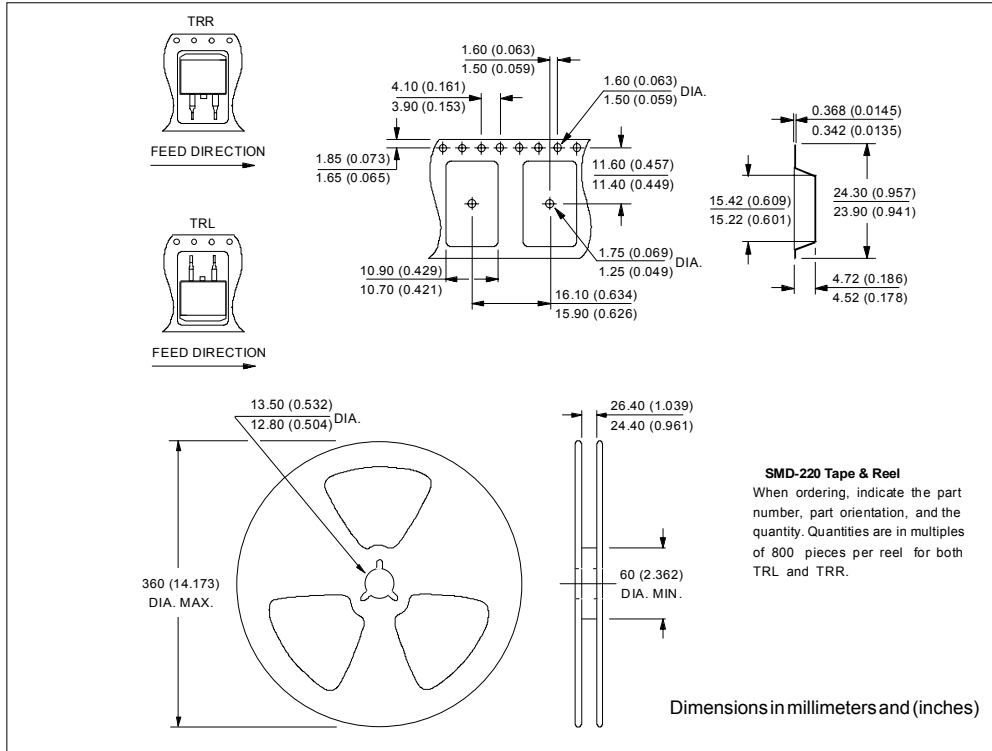
Outline Table



Marking Information



Tape & Reel Information



Ordering Information Table

Device Code					
MBR	B	40	45	CT	-1
①	②	③	④	⑤	⑥
1	-	Essential Part Number			
2	-	Package Style: none = TO-220 B = D ² Pak			
3	-	Current Rating: 40 = 40A			
4	-	Voltage code: Code = V _{RRM}			
5	-	Circuit configuration (Center Tap - Dual)			
6	-	-1 = TO-262 option			

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MBR4045CT
*****
*      This model has been developed by      *
*      Wizard SPICE MODEL GENERATOR (1999) *
*      (International Rectifier Corporation) *
*      Contains proprietary Information      *
*****
* SPICE Model Diode is composed by a      *
* simple diode plus paralalled VCG2T      *
*****
.SUBCKT MBR4045CT ANO CAT
D1 ANO 1 DMOD (0.07089)
*Define diode model
.MODEL DMOD D(IS=1.41031849705903E-04A,N=1.12223892649545,BV=49V,
+ IBV=0.267178064395486A,RS= 0.000581298,CJO=2.94926944579954E-08,
+ VJ=0.779269989906853,XTI=2, EG=0.730300626417364)
*****
*Implementation of VCG2T
VX 1 2 DC 0V
R1 2 CAT TRES 1E-6
.MODEL TRES RES(R=1,TC1=19.7716341798827)
GP1 ANO CAT VALUE={-ABS(I(VX))*(EXP((( -2.531689E-03/19.77164)*((V(2,CAT)*1E6)/
(I(VX)+1E-6)-1))+1)*6.454822E-02*ABS(V(ANO,CAT)))-1)}
*****
.ENDS MBR4045CT

Thermal Model Subcircuit
.SUBCKT MBR4045CT 5 1

CTHERM1    5    4    1.84E+00
CTHERM2    4    3    1.74E+01
CTHERM3    3    2    9.36E+01
CTHERM4    2    1    1.30E+03

RTHERM1    5    4    4.55E-01
RTHERM2    4    3    5.76E-01
RTHERM1    3    2    3.12E-01
RTHERM1    2    1    1.49E-01

.ENDS MBR4045CT
    
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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.