

International
IR Rectifier

MBR4045CT
MBRB4045CT
MBR4045CT-1

SCHOTTKY RECTIFIER

40 Amp

$$I_{F(AV)} = 40\text{Amp}$$

$$V_R = 45\text{V}$$

Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform (Per Device)	40	A
I_{FRM} @ $T_C = 118^\circ\text{C}$ (Per Leg)	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

Case Styles

MBR4045CT	MBRB4045CT	MBR4045CT-1
 Base Common Cathode 2 1 2 3 Anode Common Cathode Anode TO-220AB	 Base Common Cathode 2 1 2 3 Anode Common Cathode Anode D²PAK	 Base Common Cathode 2 1 2 3 Anode Common Cathode Anode TO-262

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 (Per Leg) Current (Per Device)	20 40	A	@ $T_C = 118^\circ\text{C}$, (Rated V_R)
I_{FRM} Peak Repetitive Forward Current (Per Leg)	40	A	Rated V_R , square wave, 20kHz $T_C = 118^\circ\text{C}$
I_{FSM} Max. Peak One Cycle Non -Repetitive Surge Current (Per Leg)	900 210	A	5 μs Sine or 3 μs Rect. pulse 10ms Sine or 6ms Rect. pulse Following any rated load condition and with rated V_{RWM} applied
E_{AS} Non -Repetitive Avalanche Energy (Per Leg)	20	A	$T_J = 25^\circ\text{C}$, $I_{AS} = 3\text{Amps}$, $L = 4.40\text{mH}$
I_{AR} Repetitive Avalanche Current (Per Leg)	3	A	Current decaying linearly to zero in 1 μsec Frequency limited by T_J max. $V_A = 1.5 \times V_R$ typical

Electrical Specifications

Parameters	Values	Units	Conditions
V_{FM} Max. Forward Voltage Drop (1)	0.60 0.78 0.58 0.75	V	@ 20A @ 40A @ 20A @ 40A $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$
I_{RM} Max. Instantaneous Reverse Current (1)	1 50 95	mA	$T_J = 25^\circ\text{C}$ $T_J = 100^\circ\text{C}$ $T_J = 125^\circ\text{C}$ Rated DC voltage
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)	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)	1.5	$^\circ\text{C/W}$	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
R_{thJA} Max. Thermal Resistance Junction to Ambient	50	$^\circ\text{C/W}$	DC operation For D ² Pak and TO-262
wt Approximate Weight	2 (0.07)	g (oz.)	
T Mounting Torque	Min. 6 (5) Max. 12 (10)	Kg-cm (lbf-in)	Non-lubricated threads

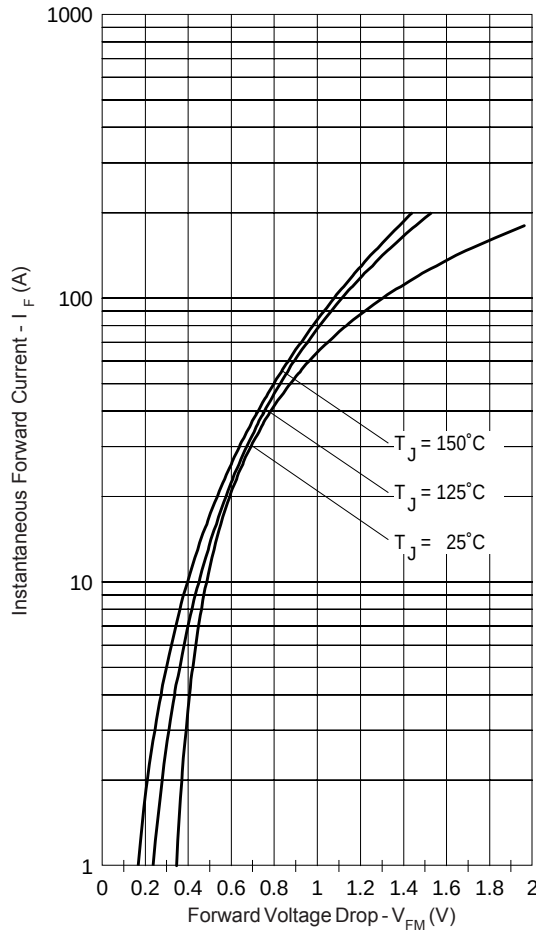


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

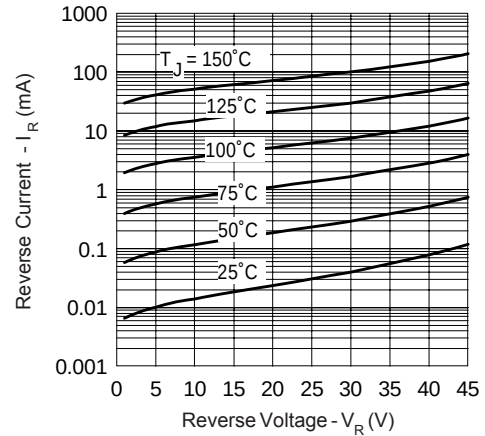


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

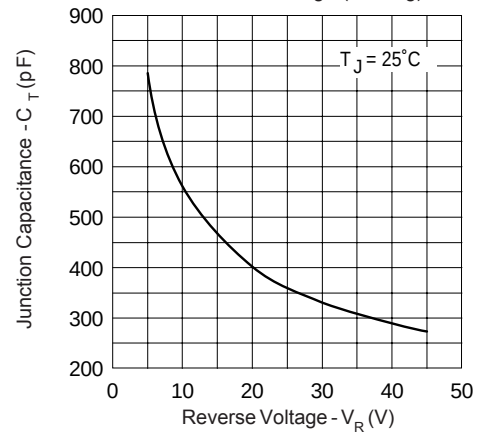


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

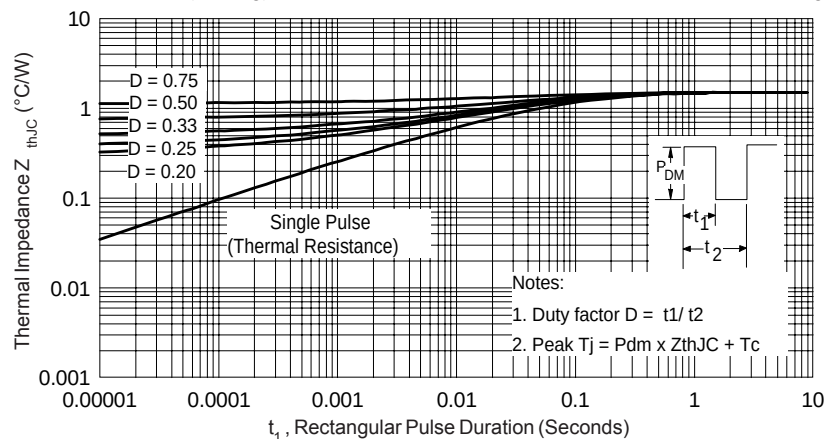


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

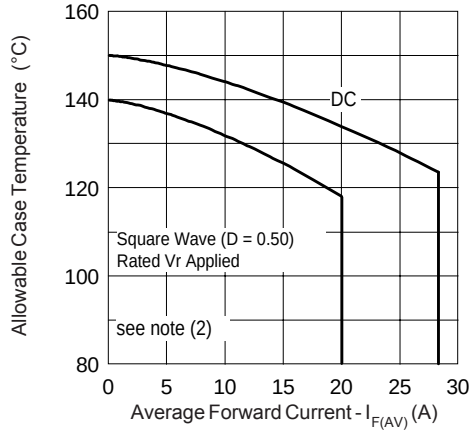


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

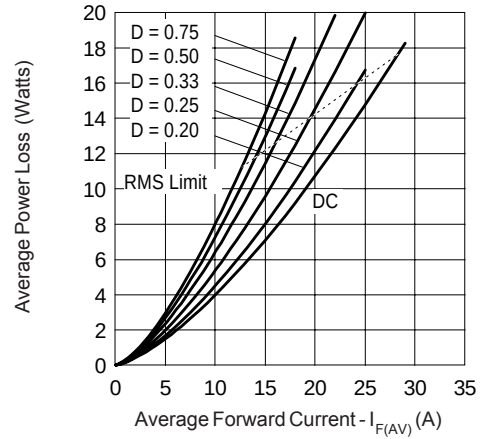


Fig. 6 - Forward Power Loss Characteristics

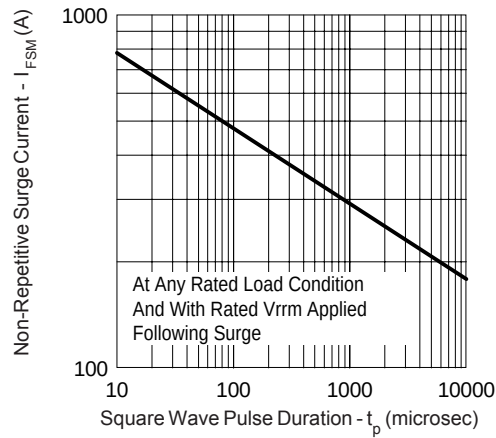


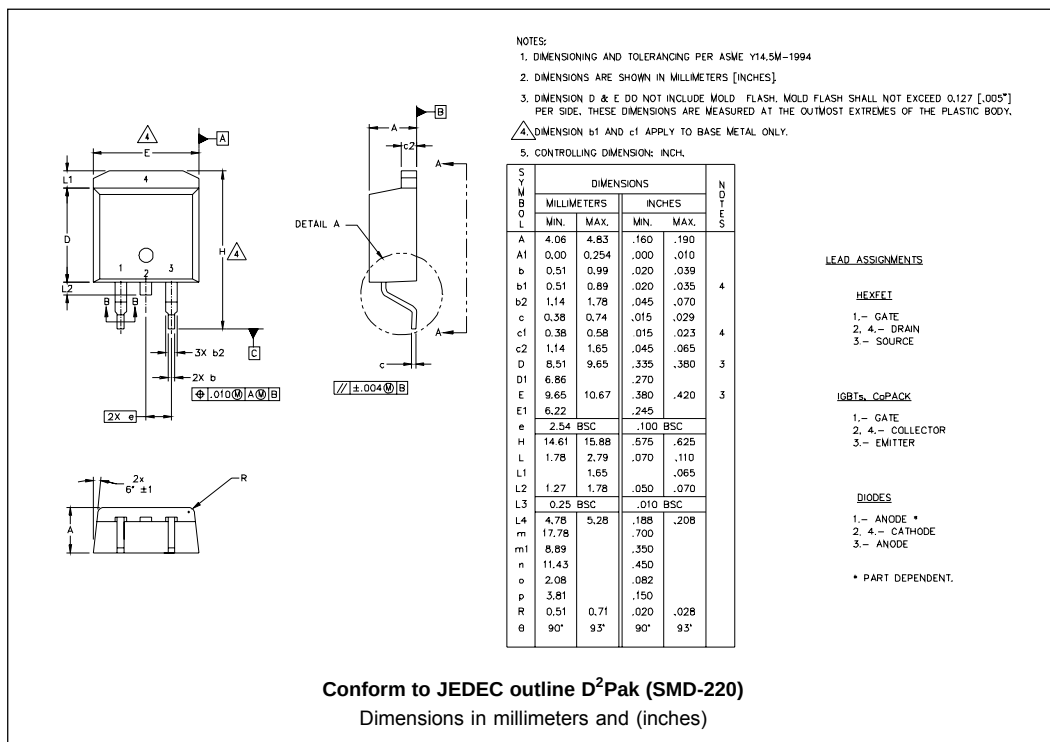
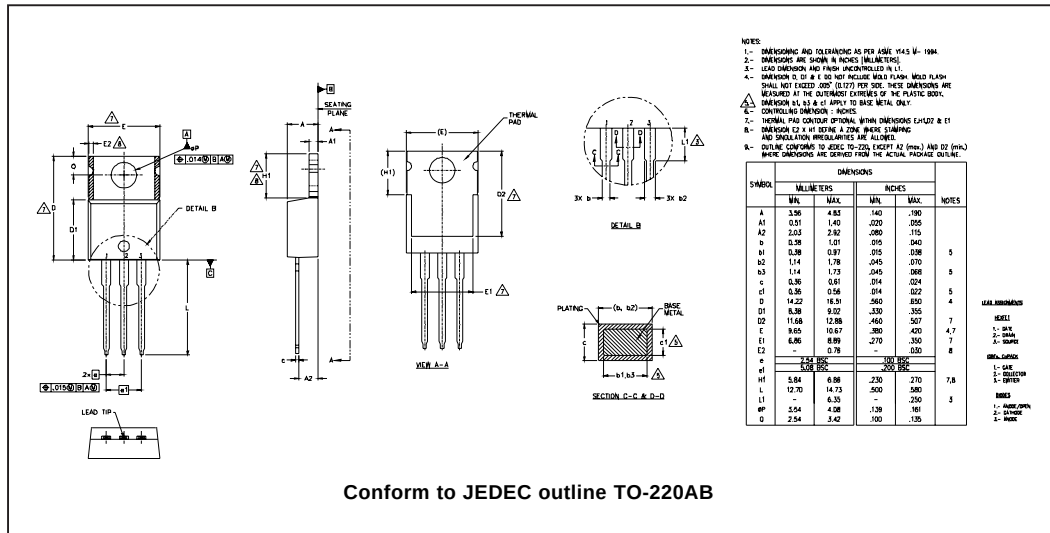
Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

(2) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$;

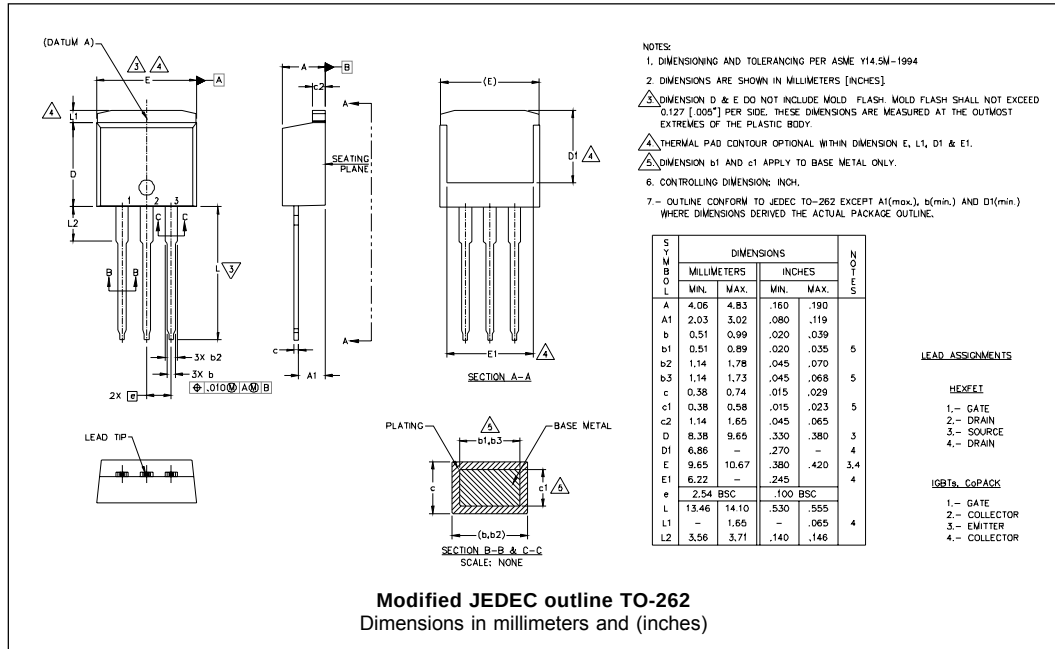
P_d = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)}/D)$ (see Fig. 6);

$P_{d_{REV}}$ = Inverse Power Loss = $V_{R1} \times I_R (1-D)$; $I_R @ V_{R1}$ = rated V_R

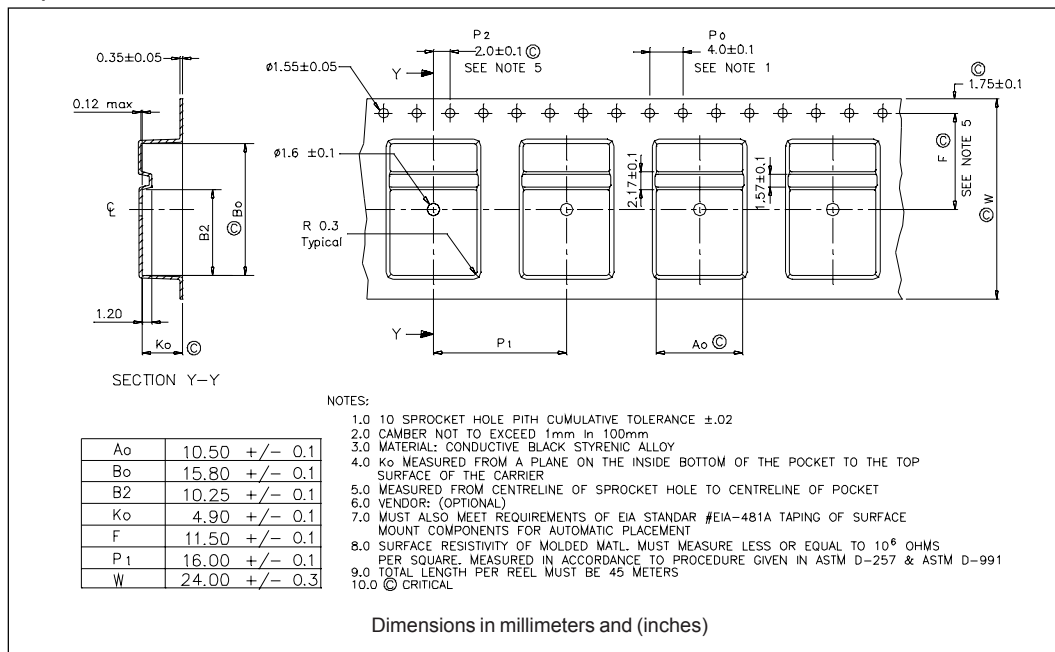
Outline Table



Outline Table



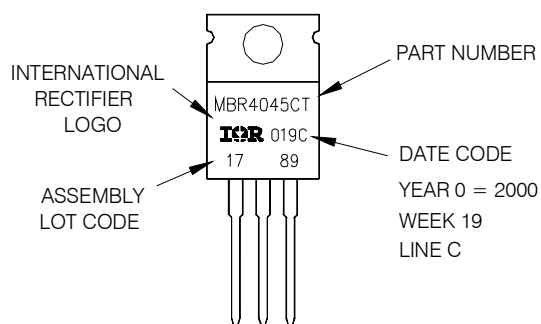
Tape & Reel Information



Part Marking Information

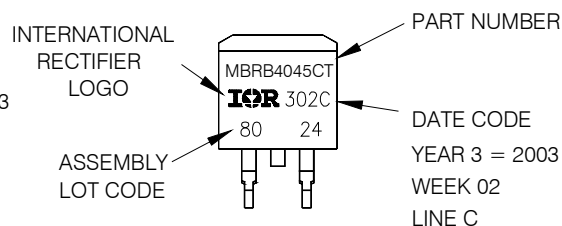
TO-220

EXAMPLE: THIS IS A MBR4045CT
LOT CODE 1789
ASSEMBLED ON WW 19, 2000
IN THE ASSEMBLY LINE "C"



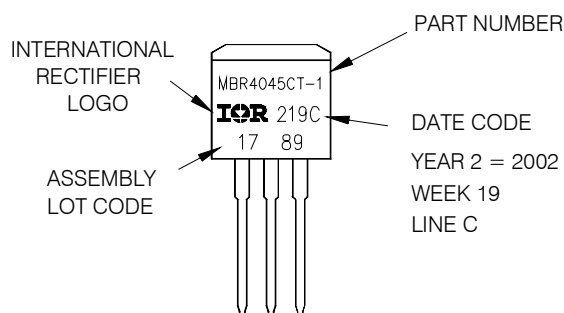
D²PAK

EXAMPLE: THIS IS A MBRB4045CT
LOT CODE 8024
ASSEMBLED ON WW 02, 2003
IN ASSEMBLY LINE "C"



TO-262

EXAMPLE: THIS IS A MBR4045CT-1
LOT CODE 1789
ASSEMBLED ON WW 19, 2002
IN ASSEMBLY LINE "C"



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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

R THERM1      5      4      4.55E-01
R THERM2      4      3      5.76E-01
R THERM1      3      2      3.12E-01
R THERM1      2      1      1.49E-01

.ENDS MBR4045CT

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Ordering Information Table

Device Code

MBR	B	40	45	CT	-1	TRL	-
1	2	3	4	5	6	7	8

- 1** - Essential Part Number
- 2** -
 - B = D²Pak **6** none
 - none = TO-220 **6** none
 - none = TO-262 **6** = -1
- 3** - Current Rating (40 = 40A)
- 4** - Voltage Ratings 35 = 35V
45 = 45V
- 5** - CT = Essential Part Number
- 6** -
 - none = TO-220 **2** none
 - none = D²Pak **2** = B
 - -1 = TO-262 **2** none
- 7** -
 - none = Tube (50 pieces)
 - TRL = Tape & Reel (Left Oriented - for D²Pak only)
 - TRR = Tape & Reel (Right Oriented - for D²Pak only)
- 8** -
 - none = Standard Production
 - PbF = Lead-Free (for TO-220TO-262 and D²Pak tube)
 - P = Lead-Free (for D²Pak TRR and TRL)

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.