



**MBR20..CT**  
**MBRB20..CT**  
**MBR20..CT-1**

**SCHOTTKY RECTIFIER**

**20 Amp**

$I_{F(AV)} = 20\text{Amp}$   
 $V_R = 35 - 45\text{V}$

**Major Ratings and Characteristics**

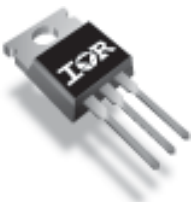
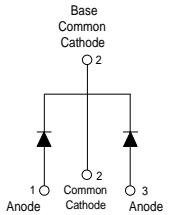

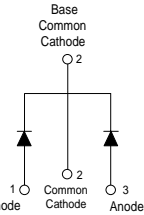

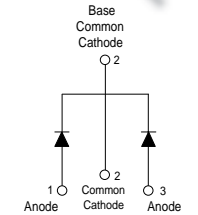
Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform (Per Device)	20	A
$I_{FRM}$ @ $T_C = 135^\circ\text{C}$ (Per Leg)	20	A
$V_{RRM}$	35-45	V
$I_{FSM}$ @ $t_p = 5 \mu\text{s}$ sine	1060	A
$V_F$ @ 10Apk, $T_J = 125^\circ\text{C}$	0.57	V
$T_J$ range	-65 to 150	$^\circ\text{C}$

**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 D<sup>2</sup>Pak 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
 <p>Base Common Cathode</p> <p>2</p>  <p>1 Anode    2 Common Cathode    3 Anode</p> <p><b>TO-220</b></p>	 <p>Base Common Cathode</p> <p>2</p>  <p>1 Anode    2 Common Cathode    3 Anode</p> <p><b>D<sup>2</sup>PAK</b></p>	 <p>Base Common Cathode</p> <p>2</p>  <p>1 Anode    2 Common Cathode    3 Anode</p> <p><b>TO-262</b></p>

Voltage Ratings

Parameters	MBR2035CT MBRB2035CT MBR2035CT-1	MBR2045CT MBRB2045CT MBR2045CT-1
V <sub>R</sub> Max. DC Reverse Voltage (V)	35	45
V <sub>RWM</sub> Max. Working Peak Reverse Voltage (V)		

Absolute Maximum Ratings

Parameters	Values	Units	Conditions
I <sub>F(AV)</sub> Max. Average Forward (Per Leg) Current (Per Device)	10	A	@ T <sub>C</sub> = 135°C, (Rated V <sub>R</sub> )
	20		
I <sub>FRM</sub> Peak Repetitive Forward Current (Per Leg)	20	A	Rated V <sub>R</sub> , square wave, 20kHz T <sub>C</sub> = 135°C
I <sub>FSM</sub> Non Repetitive Peak Surge Current	1060	A	5µs Sine or 3µs Rect. pulse Following any rated load condition and with rated V <sub>RRM</sub> applied Surge applied at rated load conditions halfwave, single phase, 60Hz
	150		
E <sub>AS</sub> Non-Repetitive Avalanche Energy	8	mJ	(Per Leg) T <sub>J</sub> = 25°C, I <sub>AS</sub> = 2 Amps, L = 4 mH
I <sub>AR</sub> Repetitive Avalanche Current (Per Leg)	2	A	Current decaying linearly to zero in 1 µsec Frequency limited by T <sub>J</sub> max. V <sub>A</sub> = 1.5 x V <sub>R</sub> typical

Electrical Specifications

Parameters	Values	Units	Conditions	
V <sub>FM</sub> Max. Forward Voltage Drop (1)	0.84	V	@ 20A	T <sub>J</sub> = 25°C
	0.57	V	@ 10A	T <sub>J</sub> = 125°C
	0.72	V	@ 20A	
I <sub>RM</sub> Max. Instantaneous Reverse Current (1)	0.1	mA	T <sub>J</sub> = 25°C	Rated DC voltage
	15	mA	T <sub>J</sub> = 125°C	
V <sub>F(TO)</sub> Threshold Voltage	0.354	V	T <sub>J</sub> = T <sub>J</sub> max.	
r <sub>t</sub> Forward Slope Resistance	17.6	mΩ		
C <sub>T</sub> Max. Junction Capacitance	600	pF	V <sub>R</sub> = 5V <sub>DC</sub> (test signal range 100Khz to 1Mhz) 25°C	
L <sub>S</sub> Typical Series Inductance	8.0	nH	Measured from top of terminal to mounting plane	
dv/dt Max. Voltage Rate of Change (Rated V <sub>R</sub> )	10000	V/µs		

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

Thermal-Mechanical Specifications

Parameters	Values	Units	Conditions
T <sub>J</sub> Max. Junction Temperature Range	-65 to 150	°C	
T <sub>stg</sub> Max. Storage Temperature Range	-65 to 175	°C	
R <sub>thJC</sub> Max. Thermal Resistance Junction to Case (Per Leg)	2.0	°C/W	DC operation
R <sub>thCS</sub> Typical Thermal Resistance Case to Heatsink	0.50	°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)	Kg-cm (lbf-in)	Non-lubricated threads
	Max. 12 (10)		

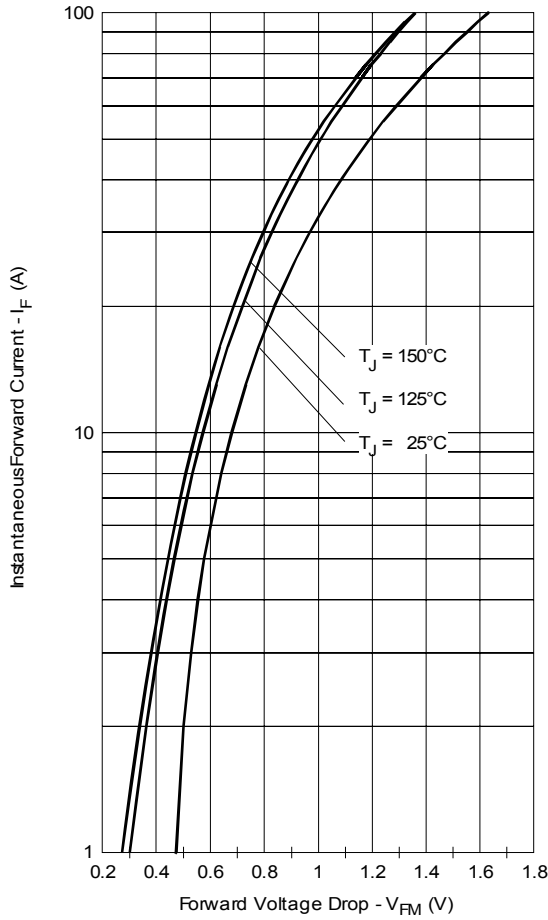


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

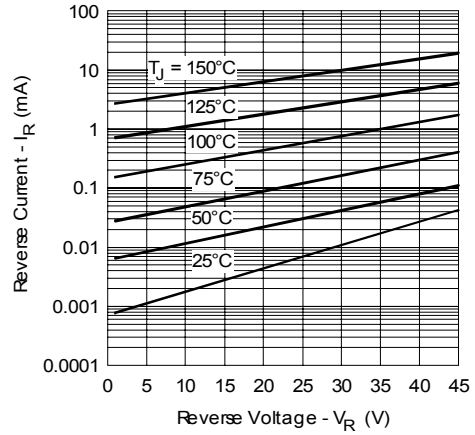


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

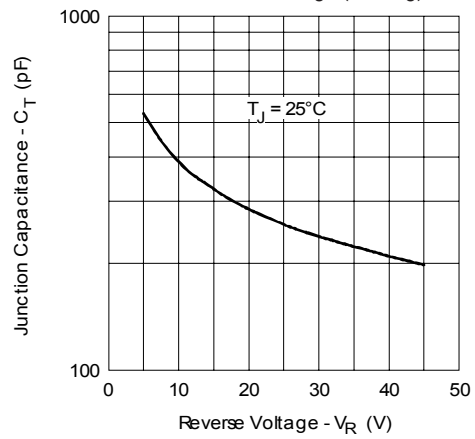


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

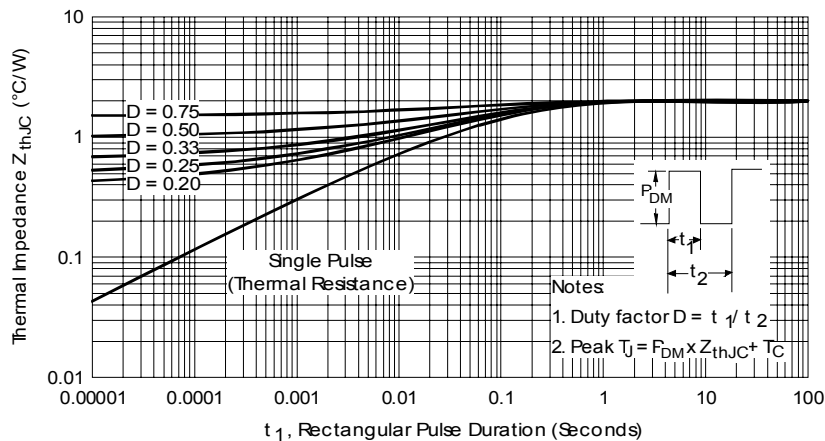


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

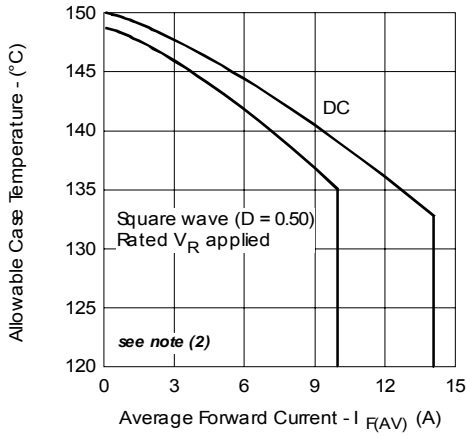


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

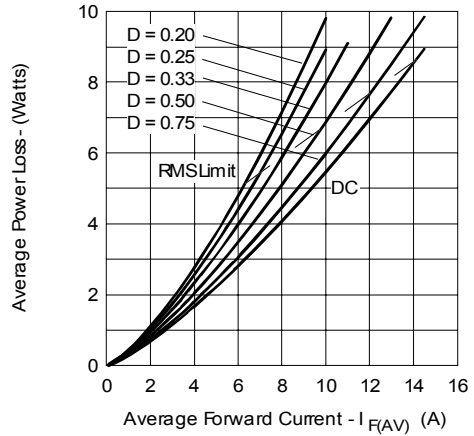


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

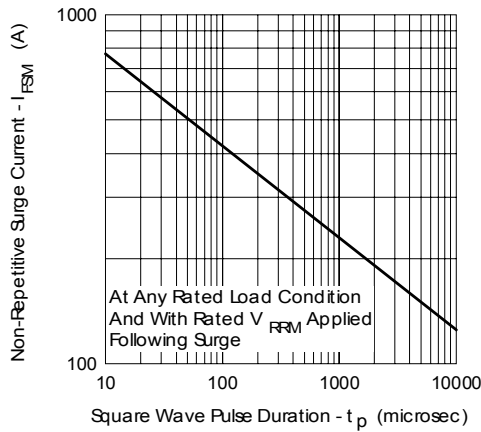
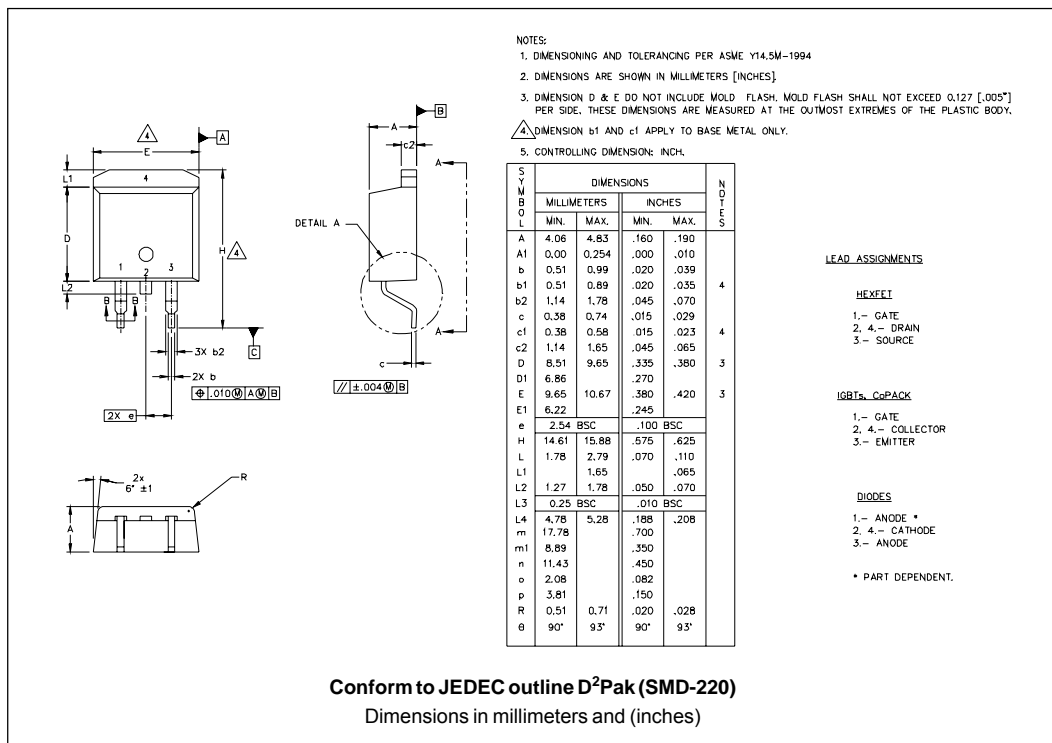
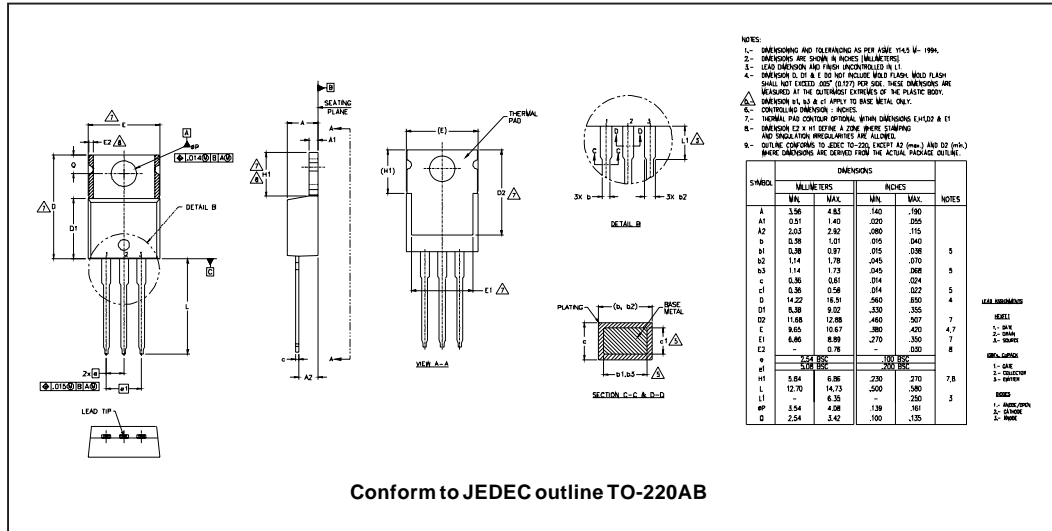


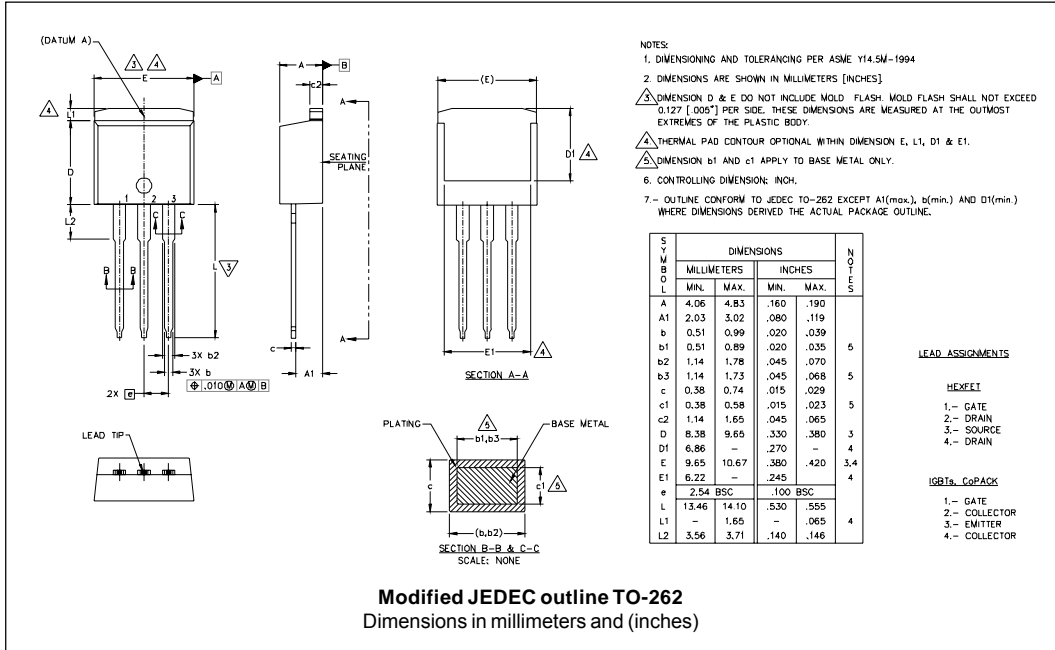
Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

(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  $V_R$

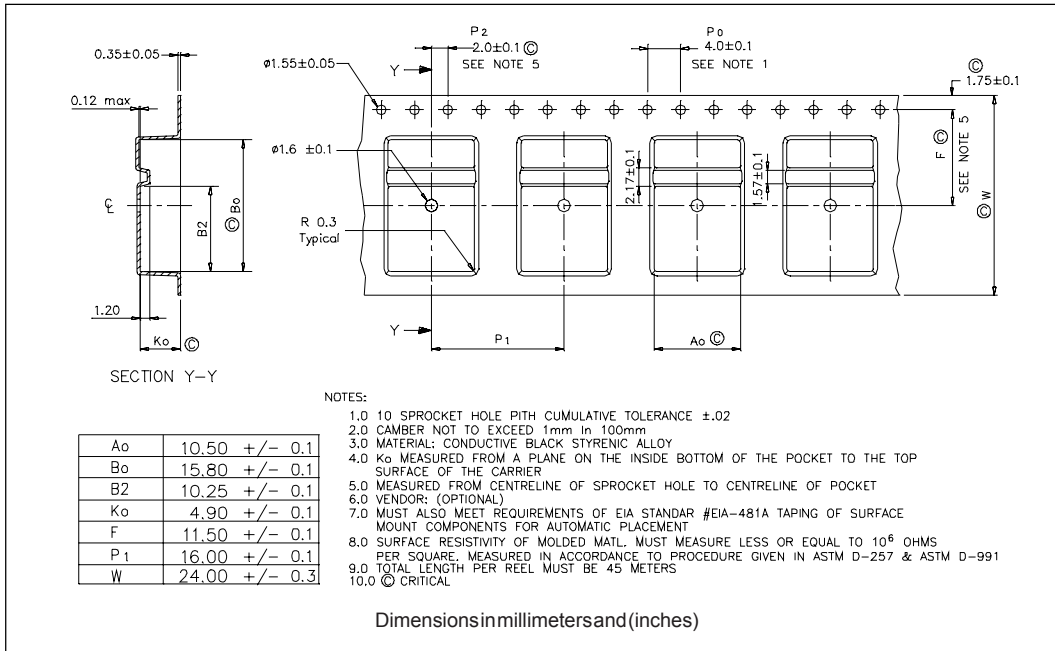
Outline Table



Outline Table



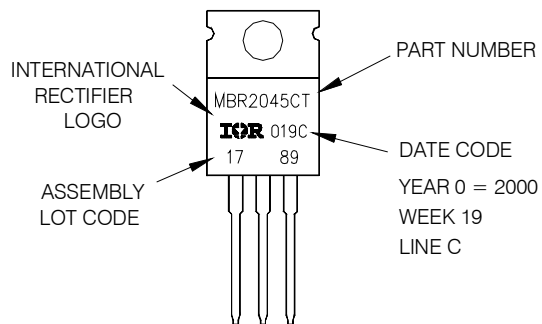
Tape & Reel Information



Part Marking Information

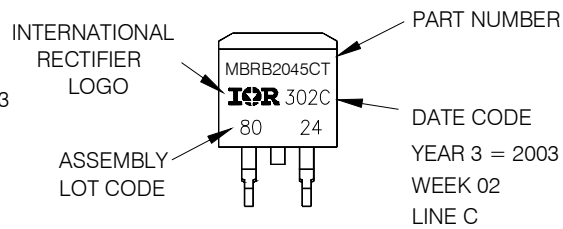
TO-220

EXAMPLE: THIS IS A MBR2045CT  
 LOT CODE 1789  
 ASSEMBLED ON WW 19, 2000  
 IN THE ASSEMBLY LINE "C"



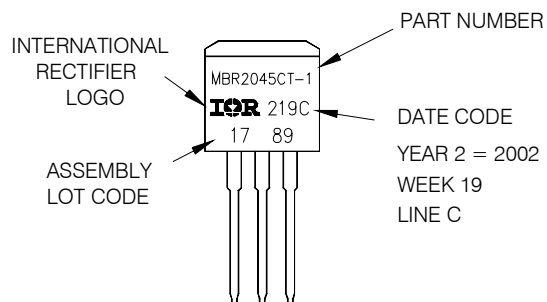
D<sup>2</sup>PAK

EXAMPLE: THIS IS A MBRB2045CT  
 LOT CODE 8024  
 ASSEMBLED ON WW 02, 2003  
 IN ASSEMBLY LINE "C"



TO-262

EXAMPLE: THIS IS A MBR2045CT-1  
 LOT CODE 1789  
 ASSEMBLED ON WW 19, 2002  
 IN ASSEMBLY LINE "C"



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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 ANOCAT
D1 ANO 1 DMOD (0.03215)
*Define diode model
.MODEL DMOD (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 ANOCAT 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

RTHERM1 5 4 5.79E-01
RTHERM2 4 3 7.72E-01
RTHERM1 3 2 4.45E-01
RTHERM1 2 1 1.93E-01

.ENDS MBR2045CT
    
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Ordering Information Table

Device Code																	
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MBR	B	20	45	CT	-1	TRL	-										
①	②	③	④	⑤	⑥	⑦	⑧										
<b>1</b>	- Essential Part Number																
<b>2</b>	- <ul style="list-style-type: none"> <li>• B = D<sup>2</sup>Pak     <b>6</b> none</li> <li>• none = TO-220     <b>6</b> none</li> <li>• none = TO-262     <b>6</b> = -1</li> </ul>																
<b>3</b>	- Current Rating (20 = 20A)																
<b>4</b>	- Voltage Ratings <span style="float: right; border: 1px solid black; padding: 2px;">35 = 35V 45 = 45V</span>																
<b>5</b>	- CT = Essential Part Number																
<b>6</b>	- <ul style="list-style-type: none"> <li>• none = TO-220     <b>2</b> none</li> <li>• none = D<sup>2</sup>Pak     <b>2</b> = B</li> <li>• -1 = TO-262     <b>2</b> none</li> </ul>																
<b>7</b>	- <ul style="list-style-type: none"> <li>• none = Tube (50 pieces)</li> <li>• TRL = Tape &amp; Reel (Left Oriented - for D<sup>2</sup>Pak only)</li> <li>• TRR = Tape &amp; Reel (Right Oriented - for D<sup>2</sup>Pak only)</li> </ul>																
<b>8</b>	- <ul style="list-style-type: none"> <li>• none = Standard Production</li> <li>• PbF = Lead-Free (for TO-220TO-262 and D<sup>2</sup>Pak tube)</li> <li>• P = Lead-Free (for D<sup>2</sup>Pak TRR and TRL)</li> </ul>																

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.