



# MBRD650CT MBRD660CT

SCHOTTKY RECTIFIER

6 Amp

$I_{F(AV)} = 6.0\text{Amp}$   
 $V_R = 50\text{-}60\text{V}$

### Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	6	A
$V_{RRM}$	50 - 60	V
$I_{FSM}$ @ $t_p = 5 \mu\text{s}$ sine	490	A
$V_F$ @ $3\text{Apk}$ , $T_J = 125^\circ\text{C}$ (per leg)	0.65	V
$T_J$ range	-40 to 150	$^\circ\text{C}$

### Description/ Features

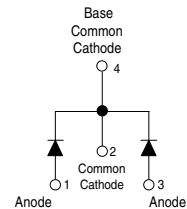
The MBRD650CT, MBRD660CT surface mount, center tap, Schottky rectifier series has been designed for applications requiring low forward drop and small foot prints on PC board. Typical applications are in disk drives, switching power supplies, converters, free-wheeling diodes, battery charging, and reverse battery protection.

- Popular D-PAK outline
- Center tap configuration
- Small foot print, surface mountable
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability

### Case Styles



D-PAK (TO-252AA)



**Voltage Ratings**

Part number	MBRD650CT	MBRD660CT
V <sub>R</sub> Max. DC Reverse Voltage (V)	50	60
V <sub>RWM</sub> Max. Working Peak Reverse Voltage (V)		

**Absolute Maximum Ratings**

Parameters	Value	Units	Conditions
I <sub>F(AV)</sub> Max. Average Forward (Per Leg) Current * See Fig. 5 (Per Device)	3.0 6	A	50% duty cycle @ T <sub>C</sub> = 128°C, rectangular wave form
I <sub>FSM</sub> Max. Peak One Cycle Non-Repetitive Surge Current * See Fig. 7	490 75	A	5µs Sine or 3µs Rect. pulse 10ms Sine or 6ms Rect. pulse
E <sub>AS</sub> Non-Repet. Aval. Energy (Per Leg)	6	mJ	T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 1 Amp, L = 12 mH
I <sub>AR</sub> Repetitive Avalanche Current (Per Leg)	0.6	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	Value	Units	Conditions
V <sub>FM</sub> Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.7	V	@ 3A
	0.9	V	@ 6A
	0.65	V	@ 3A
	0.85	V	@ 6A
I <sub>RM</sub> Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	0.1	mA	T <sub>J</sub> = 25 °C
	15	mA	T <sub>J</sub> = 125 °C
C <sub>T</sub> Typ. Junction Capacitance (Per Leg)	145	pF	V <sub>R</sub> = 5V <sub>DC</sub> (test signal range 100Khz to 1Mhz) 25°C
L <sub>S</sub> Typical Series Inductance (Per Leg)	5.0	nH	Measured lead to lead 5mm from package body
dv/dt Max. Voltage Rate of Change	10000	V/µs	(Rated V <sub>R</sub> )

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

**Thermal-Mechanical Specifications**

Parameters	Value	Units	Conditions
T <sub>J</sub> Max. Junction Temperature Range (*)	-40 to 150	°C	
T <sub>stg</sub> Max. Storage Temperature Range	-40 to 150	°C	
R <sub>thJC</sub> Max. Thermal Resistance (Per Leg) Junction to Case (Per Device)	6	°C/W	DC operation * See Fig. 4
	3		
R <sub>thJA</sub> Max. Thermal Resistance Junction to Ambient	80	°C/W	
wt Approximate Weight	0.3 (0.01)	g (oz.)	
Case Style	D-Pak		Similar to TO-252AA
Device Marking	MBRD660CT		

(\*)  $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$  thermal runaway condition for a diode on its own heatsink

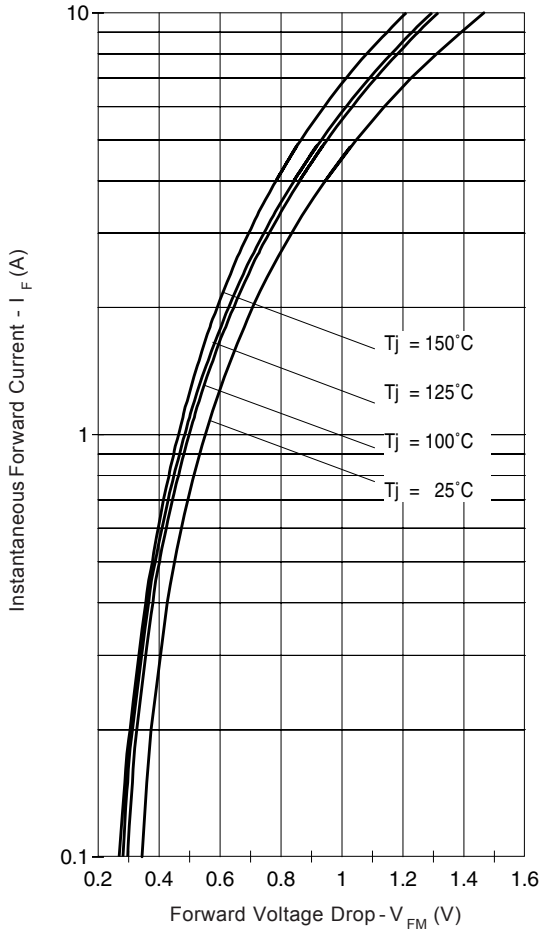


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

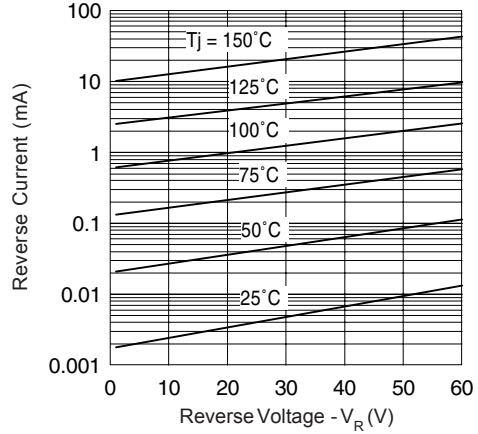


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

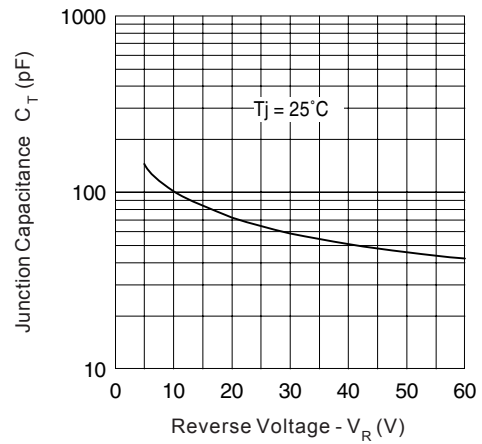


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

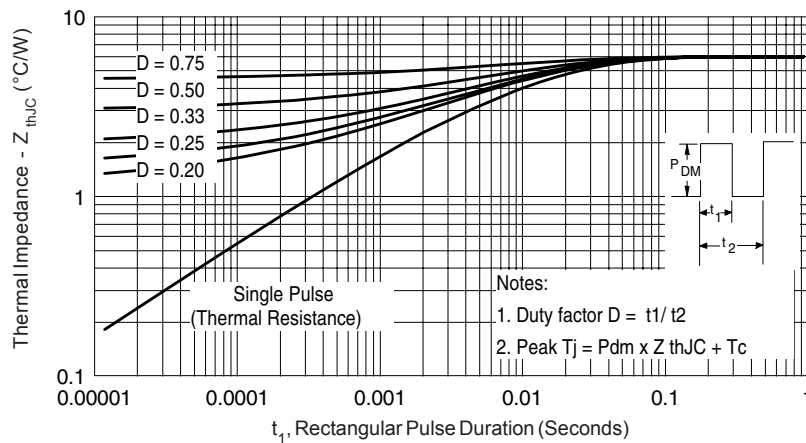


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

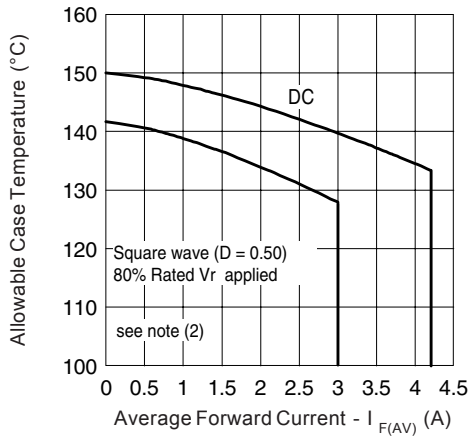


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

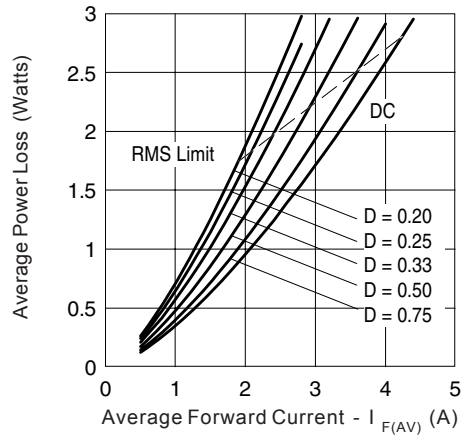


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

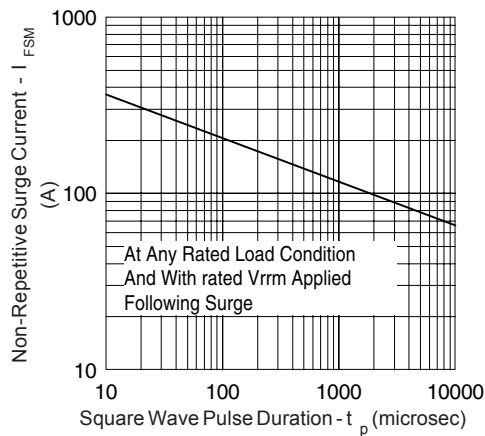


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

- (2) Formula used:  $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$ ;  
 $P_d = \text{Forward Power Loss} = I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$  (see Fig. 6);  
 $P_{d_{REV}} = \text{Inverse Power Loss} = V_{R1} \times I_R (1 - D)$ ;  $I_R @ V_{R1} = 80\% \text{ rated } V_R$

Outline Table

**NOTES:**

- 1.- DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994
- 2.- DIMENSION ARE SHOWN IN INCHES [MILLIMETERS]
- 3.- LEAD DIMENSION UNCONTROLLED IN L5
- 4.- DIMENSION D1, E1, L5 & b3 ESTABLISH A MINIMUM MOUNTING SURFACE FOR THERMAL PAD.
- 5.- SECTION C-C DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN .005 AND 0.10 [0.15 AND 0.25] FROM THE LEAD TIP.
- 6.- DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .005 [0.15] PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY.
- 7.- DIMENSION b1 & c1 APPLIED TO BASE METAL ONLY.
- 8.- DATUM A & B TO BE DETERMINED AT DATUM PLANE H.
- 9.- OUTLINE CONFORMS TO JEDEC OUTLINE TO-252AA.

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
A	2.18	2.30	.086	.094	
A1	-	0.13	-	.005	
b	0.64	0.89	.025	.035	
b1	0.65	0.79	.025	.031	7
b2	0.76	1.14	.030	.045	
b3	4.95	5.46	.190	.210	4
c	0.46	0.61	.018	.024	
c1	0.41	0.56	.016	.022	7
c2	0.46	0.89	.018	.035	
D	5.97	6.22	.235	.245	6
D1	5.21	-	.205	-	4
E	6.55	6.73	.250	.265	6
E1	4.92	-	.170	-	4
φ	2.29 BSC	.090 BSC			
H	9.40	10.41	.370	.410	
L	1.40	1.78	.055	.070	
L1	2.74 BSC	-.08 REF			
L2	0.51 BSC	.020 BSC			
L3	0.89	1.27	.035	.050	4
L4	-	1.02	-	.040	
L5	1.14	1.52	.045	.060	3
α	0°	10°	0°	10°	
β1	0°	15°	0°	15°	
β2	25°	35°	25°	35°	

**LEAD ASSIGNMENTS**

- 1.- GATE
- 2.- DRAIN
- 3.- SOURCE
- 4.- DRAIN

**HEXFEET**

- 1.- GATE
- 2.- DRAIN
- 3.- SOURCE
- 4.- DRAIN

**IGBT & CoPAK**

- 1.- GATE
- 2.- COLLECTOR
- 3.- EMITTER
- 4.- COLLECTOR

**Modified JEDEC outline TO-252AA**  
Dimensions in millimeters and (inches)

Part Marking Information

EXAMPLE: THIS IS A MBRD660CT  
LOT CODE 8024  
ASSEMBLED ON WW 02, 2000

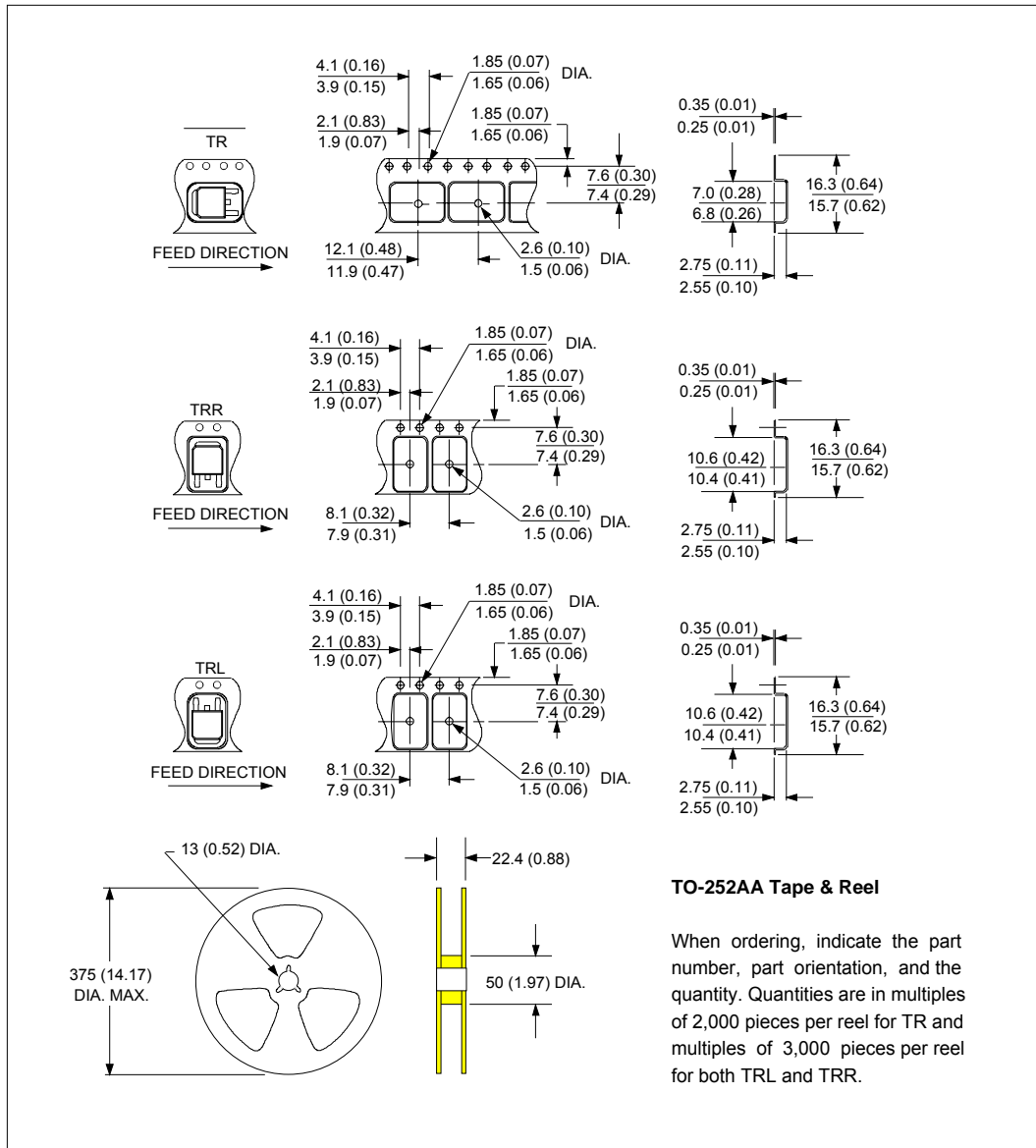
INTERNATIONAL  
RECTIFIER  
LOGO

ASSEMBLY  
LOT CODE

PART NUMBER  
MBRD660CT

DATE CODE  
YEAR 0 = 2000  
WEEK 02  
X = SITE ID

Tape & Reel Information



Ordering Information Table

Device Code						
<b>MBR</b>	<b>D</b>	<b>6</b>	<b>60</b>	<b>CT</b>	<b>TR</b>	<b>-</b>
①	②	③	④	⑤	⑥	⑦
<b>1</b>	-	Schottky MBR Series				
<b>2</b>	-	D = D-Pak (TO-252AA)				
<b>3</b>	-	Current Rating (6 = 6A)				
<b>4</b>	-	Voltage Ratings				
<b>5</b>	-	CT = Center Tap (Dual)				
<b>6</b>	-	<ul style="list-style-type: none"> <li>• none = Tube (50 pieces)</li> <li>• TR = Tape &amp; Reel</li> <li>• TRL = Tape &amp; Reel (Left Oriented)</li> <li>• TRR = Tape &amp; Reel (Right Oriented)</li> </ul>				
<b>7</b>	-	<ul style="list-style-type: none"> <li>• none = Standard Production</li> <li>• PbF = Lead-Free</li> </ul>				

50 = 50V  
 60 = 60V

Data and specifications subject to change without notice.  
 This product has been designed and qualified for AEC Q101 Level.  
 Qualification Standards can be found on IR's Web site.



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