Bulletin PD-20738 rev. B 12/03

International
IOR Rectifier

MUR1020CT
MURB1020CT
MURB1020CT-1

Ultrafast Rectifier

Features

- Ultrafast Recovery Time
- Low Forward Voltage Drop
- Low Leakage Current
- 175°C Operating Junction Temperature

t_{rr} = 25ns
$I_{F(AV)}$ = 10Amp
V_R = 200V

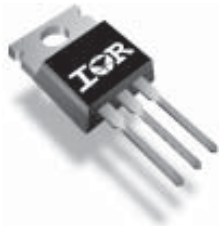
Description/ Applications

International Rectifier's MUR.. series are the state of the art Ultra fast recovery rectifiers specifically designed with optimized performance of forward voltage drop and ultra fast recovery time.
The planar structure and the platinum doped life time control, guarantee the best overall performance, ruggedness and reliability characteristics.
These devices are intended for use in the output rectification stage of SMPS, UPS, DC-DC converters as well as free-wheeling diode in low voltage inverters and chopper motor drives.
Their extremely optimized stored charge and low recovery current minimize the switching losses and reduce over dissipation in the switching element and snubbers.

Absolute Maximum Ratings

	Parameters		Max	Units
V_{RRM}	Peak Repetitive Peak Reverse Voltage		200	V
$I_{F(AV)}$	Average Rectified Forward Current	Per Leg	5	A
	Total Device, (Rated V_R), T_C = 149°C	Total Device	10	
I_{FSM}	Non Repetitive Peak Surge Current	Per Leg	50	
I_{FM}	Peak Repetitive Forward Current	Per Leg	10	
	(Rated V_R, Square wave, 20 KHz), T_C = 149°C			
T_J, T_{STG}	Operating Junction and Storage Temperatures		- 65 to 175	°C

Case Styles

MUR1020CT	MURB1020CT	MURB1020CT-1
		
TO-220AB	D^2PAK	TO-262

Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameters	Min	Typ	Max	Units	Test Conditions
V_{BR}, V_r	Breakdown Voltage, Blocking Voltage	200	-	-	V	I_R = 100µA
V_F	Forward Voltage	-	0.87	0.99	V	I_F = 5A, T_J = 125°C
		-	1.02	1.20	V	I_F = 10A, T_J = 125°C
		-	1.12	1.25	V	I_F = 10A, T_J = 25°C
I_R	Reverse Leakage Current	-	-	10	µA	V_R = V_R Rated
		-	-	250	µA	T_J = 150°C, V_R = V_R Rated
C_T	Junction Capacitance	-	8	-	pF	V_R = 200V
L_S	Series Inductance	-	8.0	-	nH	Measured lead to lead 5mm from package body

Dynamic Recovery Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameters	Min	Typ	Max	Units	Test Conditions	
t_{rr}	Reverse Recovery Time	-	-	35	ns	I_F = 1.0A, di_F/dt = 50A/µs, V_R = 30V	
		-	-	25		I_F = 0.5A, I_R = 1.0A, I_{REC} = 0.25A	
		-	24	-		T_J = 25°C	I_F = 5A V_R = 160V di_F/dt = 200A/µs
			35			T_J = 125°C	
I_{RRM}	Peak Recovery Current	-	3.3	-	A	T_J = 25°C	
		-	5.0	-		T_J = 125°C	
Q_{rr}	Reverse Recovery Charge	-	33	-	nC	T_J = 25°C	
		-	76	-		T_J = 125°C	

Thermal - Mechanical Characteristics

	Parameters		Min	Typ	Max	Units
T_J	Max. Junction Temperature Range		-	-	- 65 to 175	°C
T_{Stg}	Max. Storage Temperature Range		-	-	- 65 to 175	
R_{thJC}	Thermal Resistance, Junction to Case	Per Leg	-	-	5	°C/W
R_{thJA}	Thermal Resistance, Junction to Ambient	Per Leg	-	-	50	
R_{thCS} ①	Thermal Resistance, Case to Heatsink		-	0.5	-	
Wt	Weight		-	2.0	-	g
			-	0.07	-	(oz)
	Mounting Torque		6.0	-	12	Kg-cm
			5.0	-	10	lbf.in

① Mounting Surface, Flat, Smooth and Greased

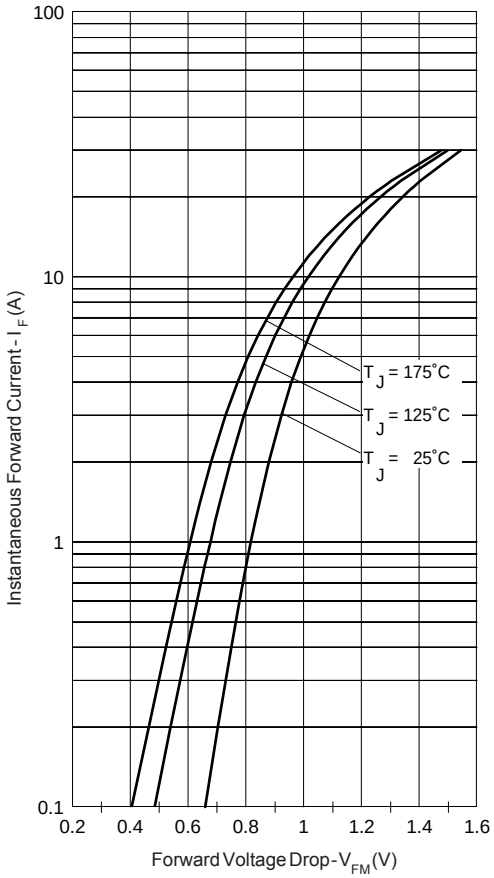


Fig. 1 - Typical Forward Voltage Drop Characteristics

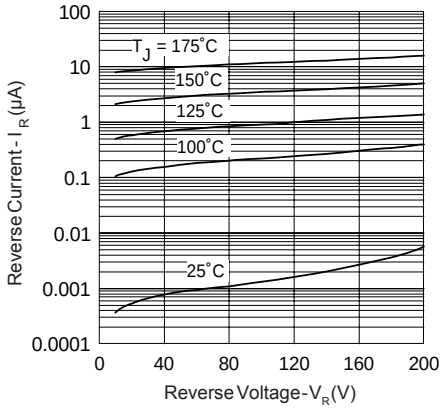


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

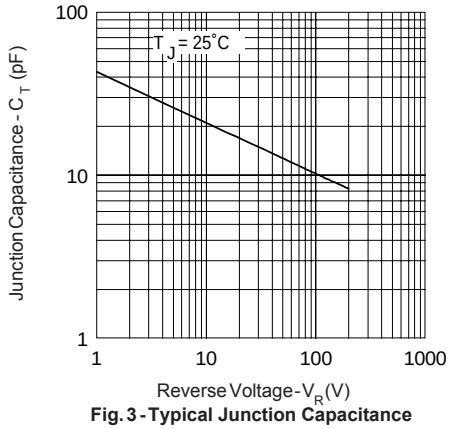


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

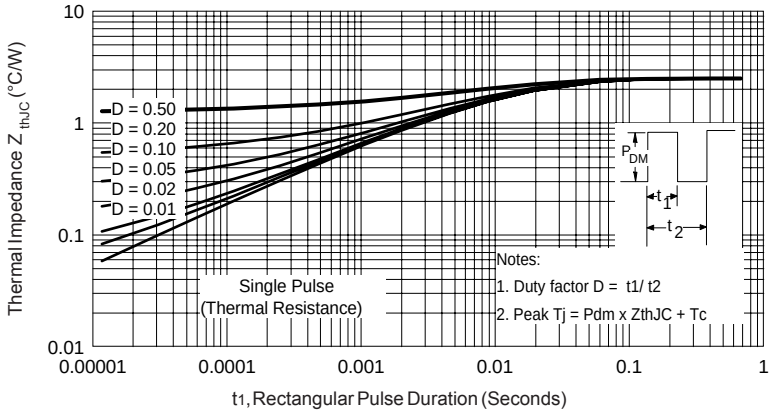


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

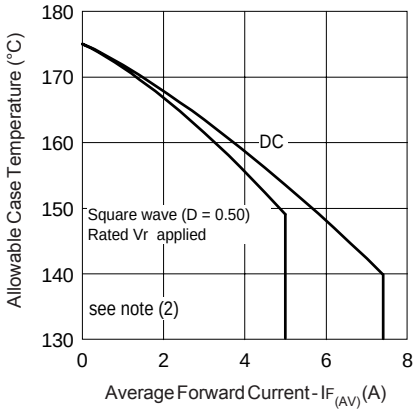


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

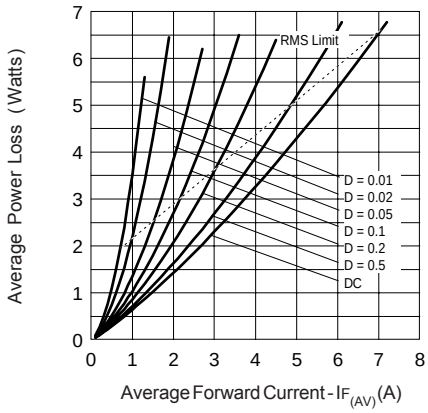


Fig. 6 - Forward Power Loss Characteristics

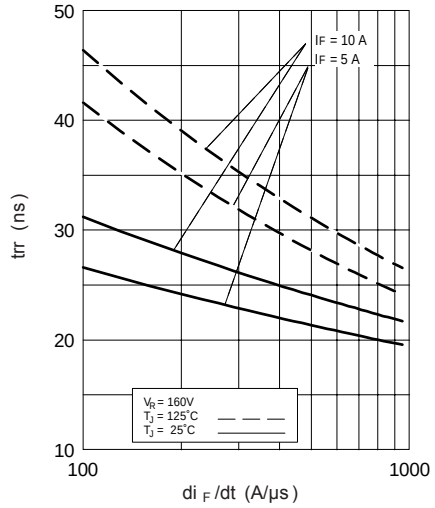


Fig. 7 - Typical Reverse Recovery vs. di_F/dt

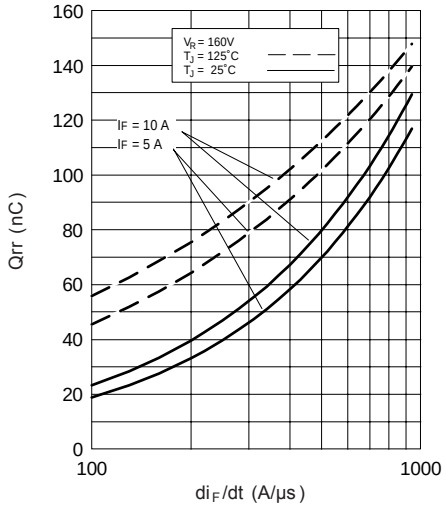


Fig. 8 - Typical Stored Charge vs. di_F/dt

(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

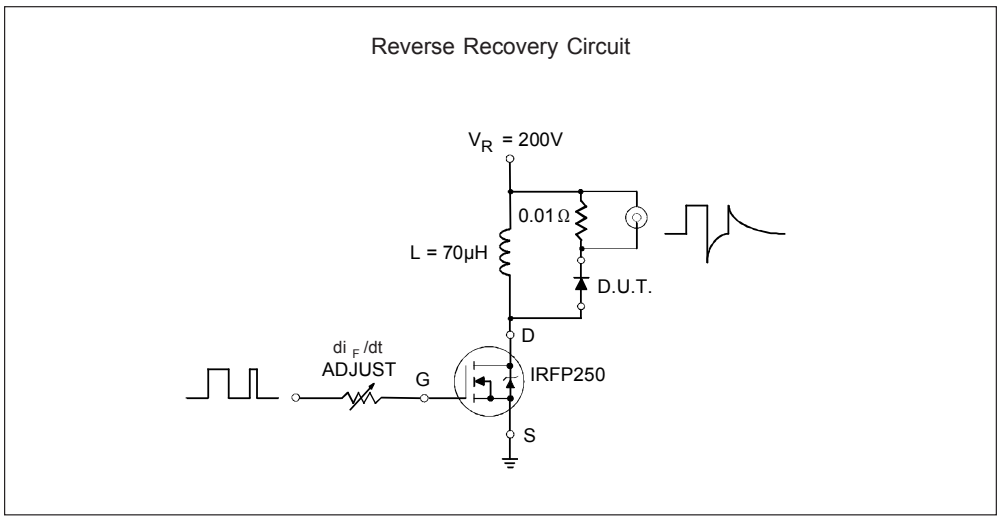
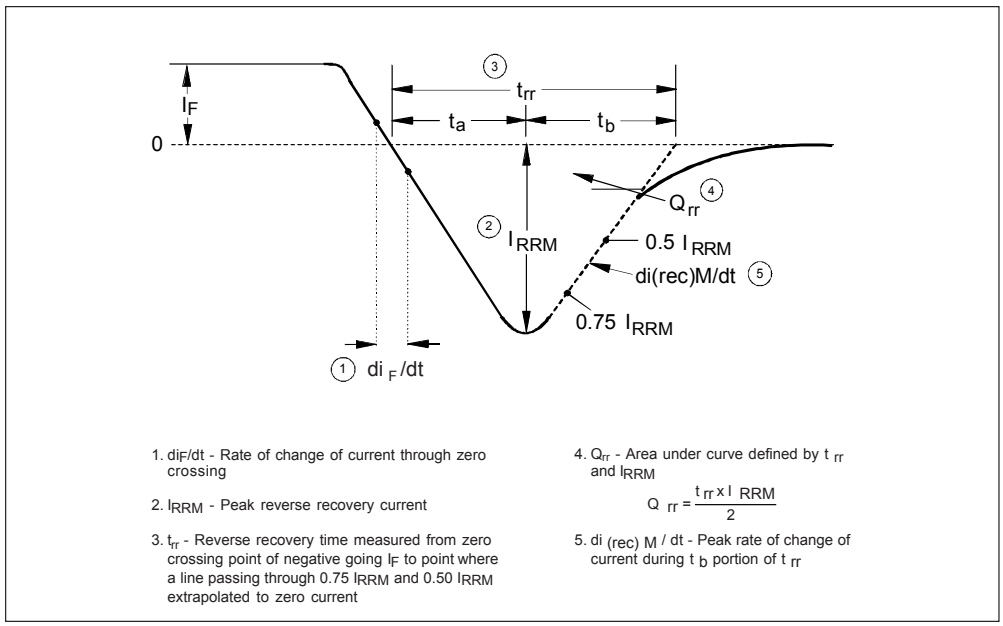


Fig. 9- Reverse Recovery Parameter Test Circuit



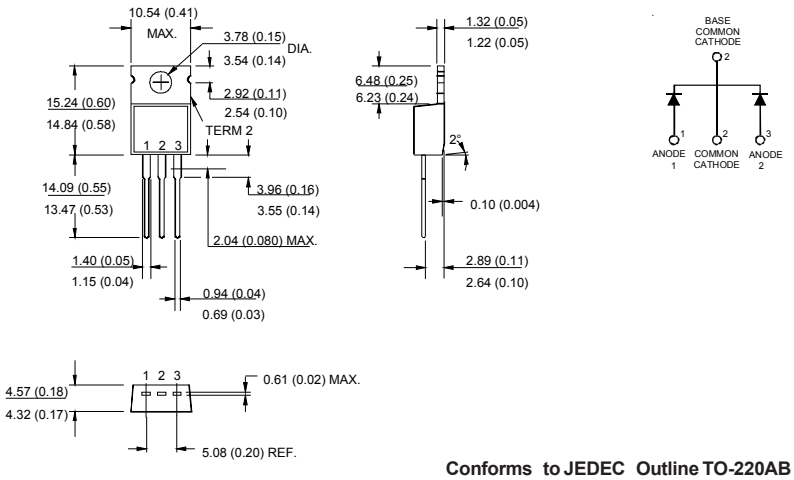
1. di_F/dt - Rate of change of current through zero crossing
2. I_{RRM} - Peak reverse recovery current
3. t_{rr} - Reverse recovery time measured from zero crossing point of negative going I_F to point where a line passing through 0.75 I_{RRM} and 0.50 I_{RRM} extrapolated to zero current
4. Q_{rr} - Area under curve defined by t_{rr} and I_{RRM}

$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

5. $di_{(rec)M}/dt$ - Peak rate of change of current during t_b portion of t_{rr}

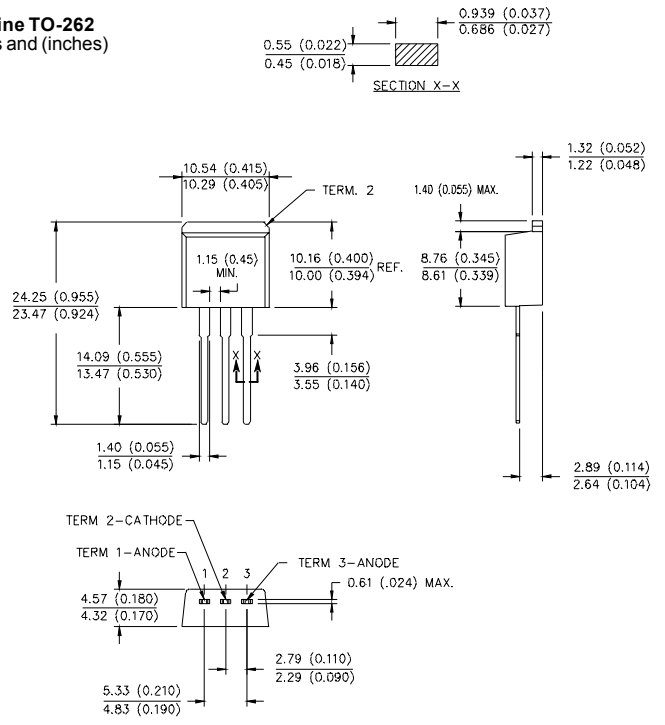
Fig. 10 - Reverse Recovery Waveform and Definitions

Outline Table

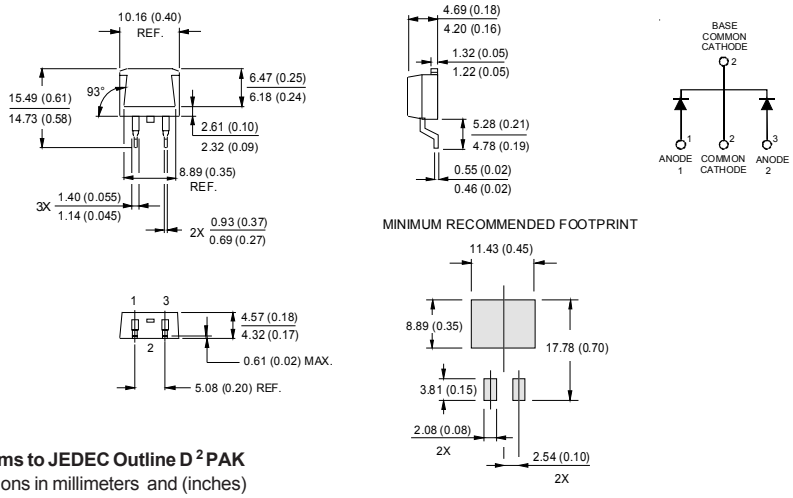


Conforms to JEDEC Outline TO-220AB
Dimensions in millimeters and (inches)

Modified JEDEC outline TO-262
Dimensions in millimeters and (inches)



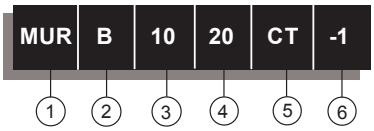
Outline Table



Conforms to JEDEC Outline D ^{2}PAK
Dimensions in millimeters and (inches)

Ordering Information Table

Device Code



1	-	Ultrafast MUR Series
2	-	B = D^{2}Pak / TO-262
		None = TO-220AB
3	-	Current Rating (10 = 10A)
4	-	Voltage Rating (20 = 200V)
5	-	CT = Center Tap (Dual) TO-220 / D^{2}PAK / TO-262
6	-	"-1" = TO-262 Option

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
IOR Rectifier

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12/03

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