Bulletin PD-20619 rev. C 12/06

International
IOR Rectifier

70CRU02

Ultrafast Rectifier

Features

- Two Common-Cathode Diodes
- Ultrafast Reverse Recovery
- Ultrasoft Reverse Recovery Current Shape
- Low Forward Voltage Drop
- Low Leakage Current
- Optimized for Power Conversion: Welding and Industrial SMPS Applications
- Up to 175°C Operating Junction Temperature

t_{rr} = 28ns
$I_{F(AV)}$ = 70A
@T_C = 145°C
V_R = 200V

Description/ Applications

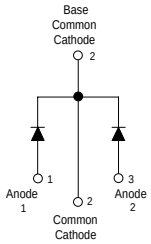
The 70CRU02 integrates two state-of-the-art International Rectifier's Ultrafast recovery rectifiers in the common-cathode configuration. The planar structure of the diodes, and the platinum doping life-time control, provide a Ultrasoft recovery current shape, together with the best overall performance, ruggedness and reliability characteristics.
These devices are thus intended for high frequency applications in which the switching energy is designed not to be predominant portion of the total energy, such as in the output rectification stage of Welding machines, SMPS, DC-DC converters. Their extremely optimized stored charge and low recovery current reduce both over-dissipation in the switching elements (and snubbers) and EMI/RFI.

Absolute Maximum Ratings

	Parameters			Max	Units
V_R	Cathode to Anode Voltage			200	V
$I_{F(AV)}$	Continuous Forward Current	T_C = 145°C	Per Diode	35	A
I_{FSM}	Single Pulse Forward Current	T_C = 25°C	Per Diode	300	
P_D	Maximum Power Dissipation	T_C = 100°C	Per Module	67	W
T_J, T_{STG}	Operating Junction and Storage Temperatures			- 55 to 175	°C

Case Styles

TO-218



Electrical Characteristics per Diode @ 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 = 60µA
V_F	Forward Voltage	-	0.95	1.09	V	I_F = 35A
		-	0.9	1.0	V	I_F = 35A, T_J = 125°C
		-	0.85	0.9	V	I_F = 35A, T_J = 175°C
I_R	Reverse Leakage Current	-	-	60	µA	V_R = V_R Rated
		-	-	2	mA	T_J = 150°C, V_R = V_R Rated
C_T	Junction Capacitance	-	50	-	pF	V_R = 200V
L_S	Series Inductance	-	10	-	nH	Measured from A-lead to K-lead 5mm from package body

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

	Parameters	Min	Typ	Max	Units	Test Conditions	
t_{rr}	Reverse Recovery Time	-	-	28	ns	T_J = 25°C	I_F = 1A V_R = 30V di_F/dt = 200A/µs
		-	34	-		T_J = 125°C	
		-	26	-		T_J = 25°C	I_F = 35A V_{RR} = 100V di/dt = 200A/µs
		-	49	-		T_J = 125°C	
I_{RRM}	Peak Recovery Current	-	3.7	-	A	T_J = 25°C	
		-	8.2	-		T_J = 125°C	
Q_{rr}	Reverse Recovery Charge	-	48.7	-	nC	T_J = 25°C	
		-	202	-		T_J = 125°C	

Thermal - Mechanical Characteristics

	Parameters		Min	Typ	Max	Units
R_{thJC}	Thermal Resistance, Junction to Case	Per Diode	-	0.8	0.9	K/W
R_{thJC}	Thermal Resistance, Junction to Case	Both Leg	-	-	0.45	
R_{thCS} (1)	Thermal Resistance, Case to Heatsink		-	0.2	-	
Wt	Weight		-	5.5	-	g
			-	0.2	-	(oz)
T	Mounting Torque		1.2	-	2.4	N * m
			10	-	20	lbf.in
	Marking Device		70CRU02			

(1) Mounting Surface, Flat, Smooth and Greased

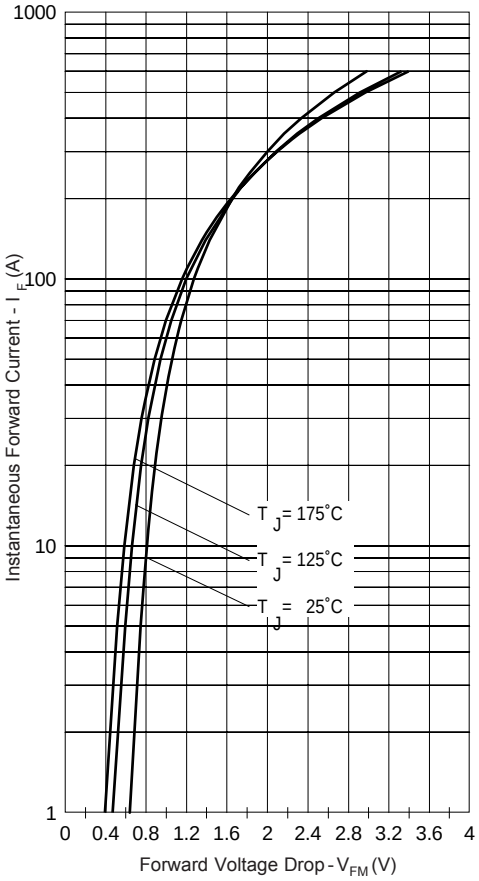


Fig. 1 - Typical Forward Voltage Drop Characteristics (Per Diode)

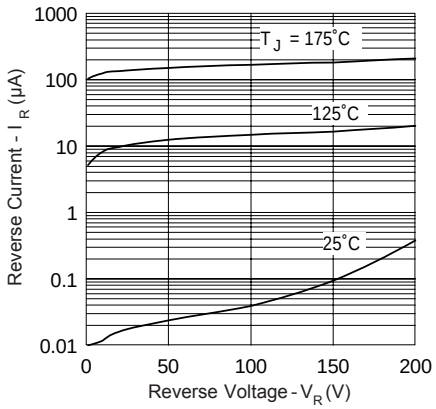


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

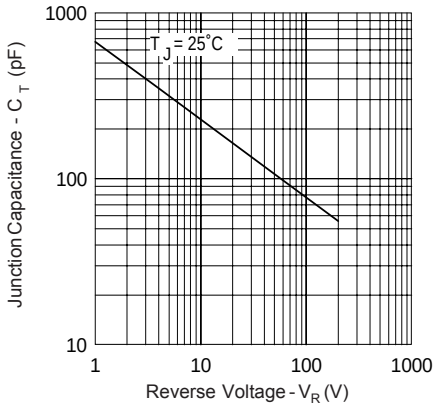


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

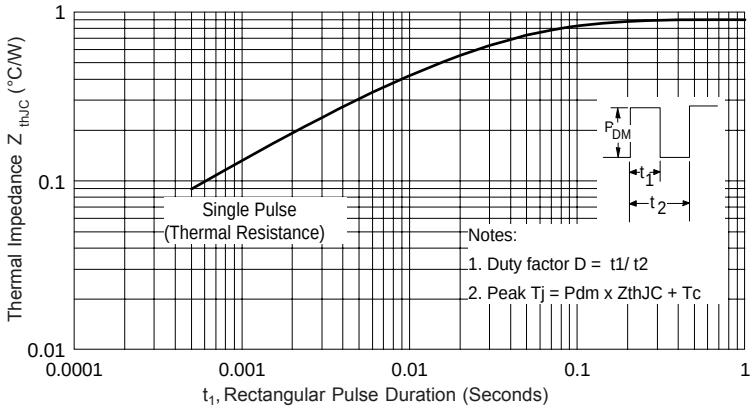


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Diode)

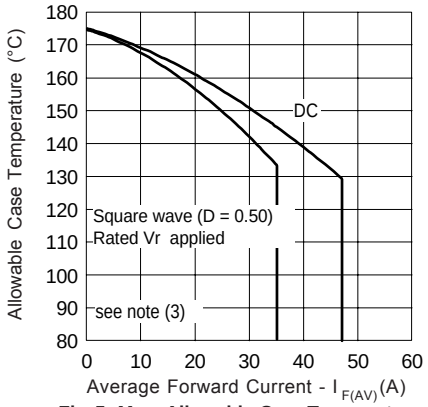


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

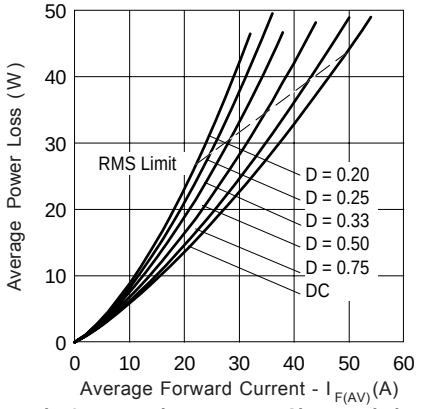


Fig. 6 - Forward Power Loss Characteristics

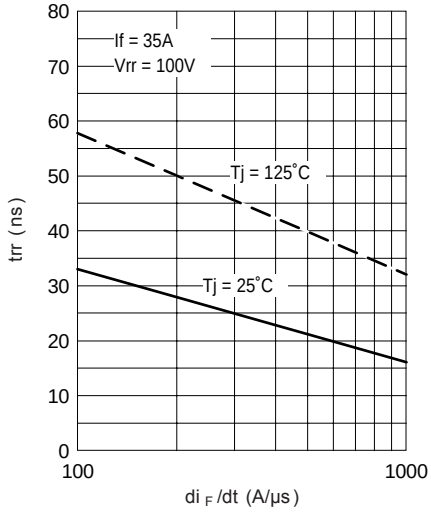


Fig. 7 - Typical Reverse Recovery vs. di_F/dt

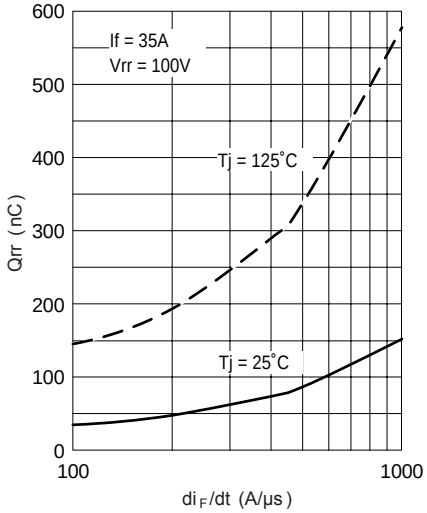


Fig. 8 - Typical Stored Charge vs. di_F/dt

(3) 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

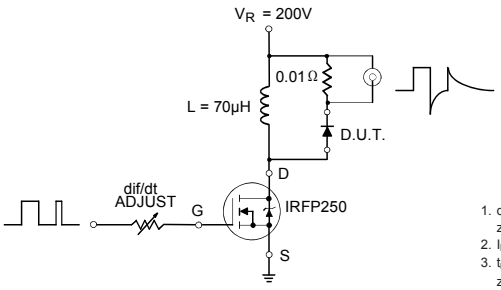
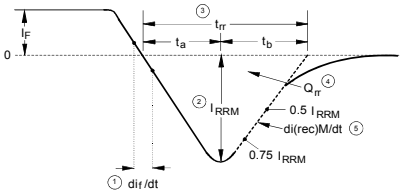


Fig. 9 - Reverse Recovery Parameter Test Circuit



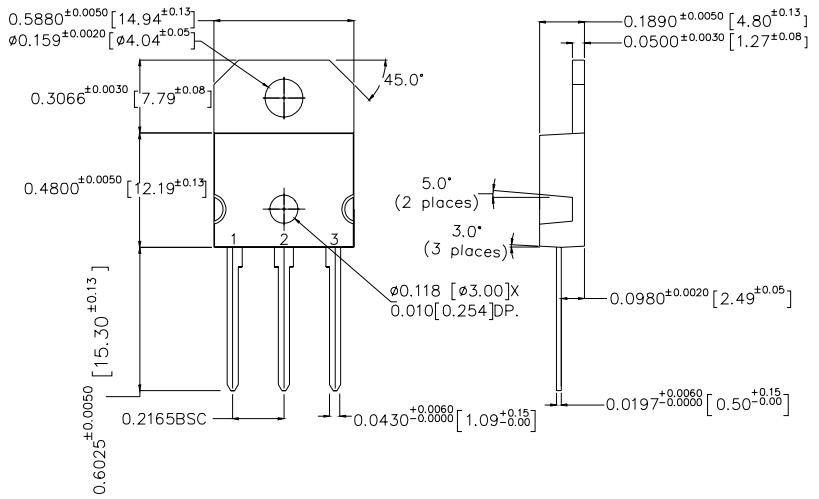
1. di_F/dt - Rate of change of current through zero crossing
2. I_{RRM} - Peak reverse recovery current
3. t_{rr} - Reverse recovery time measured from zero crossing point of negative going I_F to point where a line passing through 0.75 I_{RRM} and 0.50 I_{RRM} extrapolated to zero current
4. Q_{rr}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

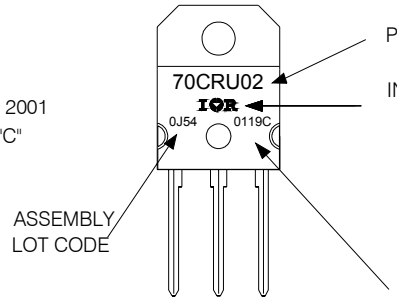
Outline Table



Dimensions in inches (and milimetres)

Marking Information

EXAMPLE: THIS IS A 70CRU02
LOT CODE 0J54
ASSEMBLED ON WW 19, 2001
IN THE ASSEMBLY LINE "C"



Ordering Information Table

Device Code

70	C	R	U	02	-
1	2	3	4	5	6

1	-	Current Rating	(70 = 70A)
2	-	Common Cathode	
3	-	TO-218	
4	-	Ultrafast Recovery	
5	-	Voltage Rating	(02 = 200V)
6	-	• none = Standard Production	
		• PbF = Lead-Free	

Tube Standard Pack Quantity : 30 pieces

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

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7309
12/06

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