

International IOR Rectifier

30CTH03PbF

Hyperfast Rectifier

Features

- Hyperfast Recovery Time
- Low Forward Voltage Drop
- Low Leakage Current
- 175°C Operating Junction Temperature
- Lead-Free ("PbF" suffix)

$t_{rr} = 36\text{ns max.}$
$I_{F(AV)} = 30\text{Amp}$
$V_R = 300\text{V}$

Description/ Applications

International Rectifier's 300V series are the state of the art Hyperfast recovery rectifiers designed with optimized performance of forward voltage drop and Hyperfast recovery time.

The planar structure and the platinum doped life time control guarantee the best overall performance, ruggedness and reliability characteristics.

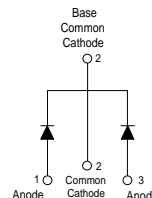
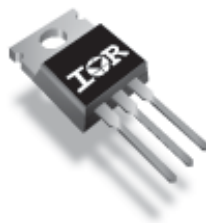
These devices are intended for use in the output rectification stage of SMPS, UPS, DC-DC converters as well as freewheeling diodes in low voltage inverters and chopper motor drives.

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 Reverse Voltage	300	V
$I_{F(AV)}$ Average Rectified Forward Current @ $T_c = 153^\circ\text{C}$ Per Diode	15	A
	Per Device	
I_{FSM} Non Repetitive Peak Surge Current @ $T_J = 25^\circ\text{C}$	150	
T_J, T_{STG} Operating Junction and Storage Temperatures	- 65 to 175	$^\circ\text{C}$

Case Styles



TO-220AB

30CTH03PbF

Bulletin PD-20892 rev. A 10/06

International
IRF Rectifier

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

Parameters	Min	Typ	Max	Units	Test Conditions
V _{BR} , V _F Breakdown Voltage, Blocking Voltage	300	-	-	V	I _R = 100μA
V _F Forward Voltage	-	1.0	1.25	V	I _F = 15A, T _J = 25°C
	-	0.85	0.95	V	I _F = 15A, T _J = 125°C
I _R Reverse Leakage Current	-	-	40	μA	V _R = V _R Rated
	-	8	200	μA	T _J = 125°C, V _R = V _R Rated
C _T Junction Capacitance	-	38	-	pF	V _R = 300V
L _S Series Inductance	-	8	-	nH	Measured lead to lead 5mm from package body

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

Parameters	Min	Typ	Max	Units	Test Conditions
t _{rr} Reverse Recovery Time	-	-	36	ns	I _F = 1A, di _F /dt = 50A/μs, V _R = 30V
	-	-	30		I _F = 1A, di _F /dt = 100A/μs, V _R = 30V
	-	33	-	A	T _J = 25°C
	-	48	-		T _J = 125°C
I _{RRM} Peak Recovery Current	-	2.8	-	A	T _J = 25°C
	-	6.5	-		T _J = 125°C
Q _{rr} Reverse Recovery Charge	-	46	-	nC	T _J = 25°C
	-	160	-		T _J = 125°C

I_F = 15A
di_F/dt = 200A/μs
V_R = 200V

Thermal - Mechanical Characteristics

Parameters	Min	Typ	Max	Units
T _J Max. Junction Temperature Range	-	-	175	°C
T _{Stg} Max. Storage Temperature Range	- 65	-	175	
R _{thJC} Thermal Resistance, Junction to Case	-	-	1.4	°C/W
Marking Device	30CTH03			

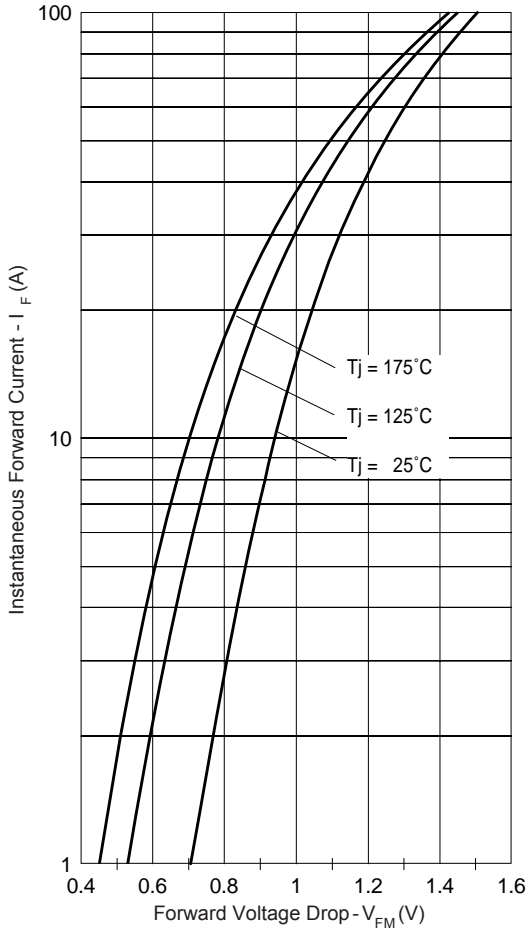


Fig. 1 - Typical Forward Voltage Drop Characteristics

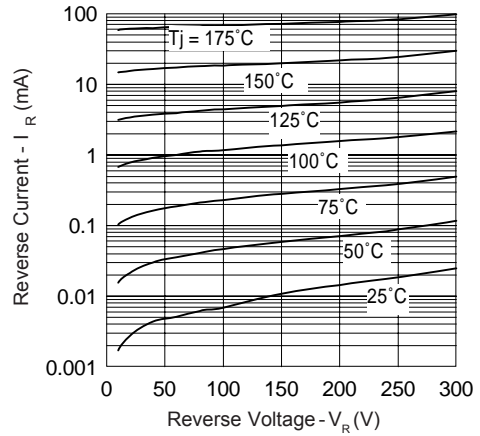


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

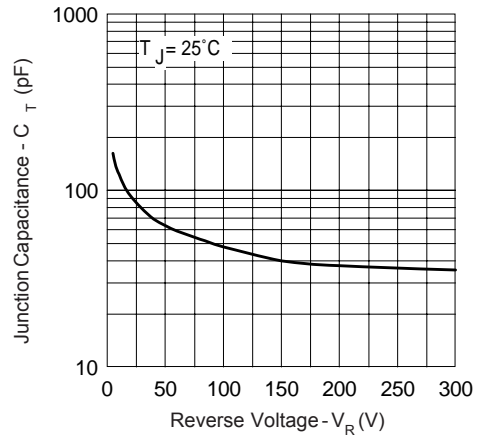


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

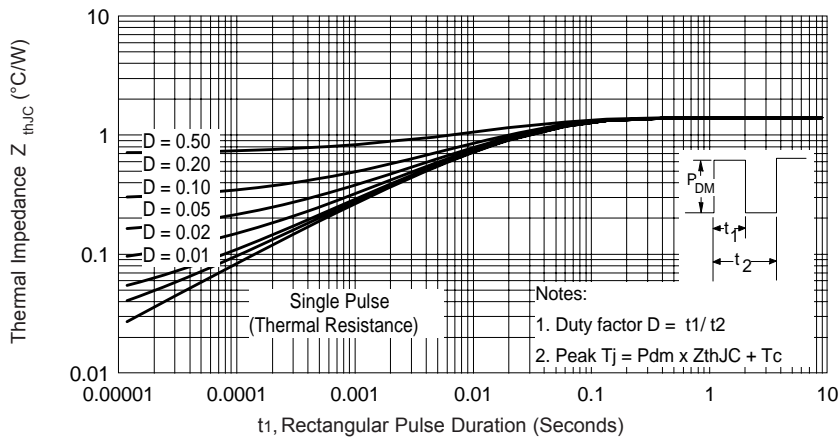


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

30CTH03PbF

Bulletin PD-20892 rev. A 10/06

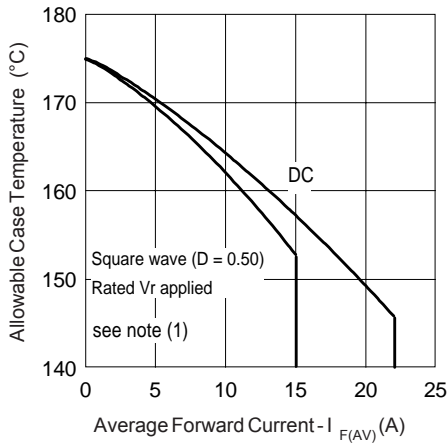


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

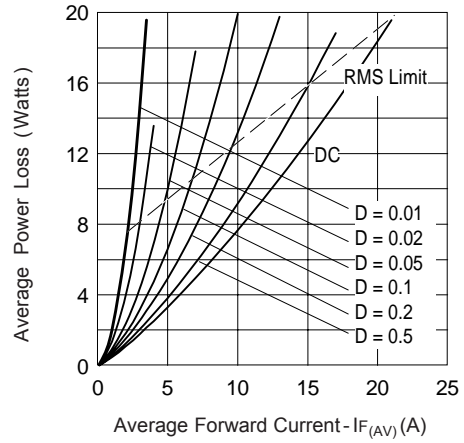


Fig. 6 - Forward Power Loss Characteristics

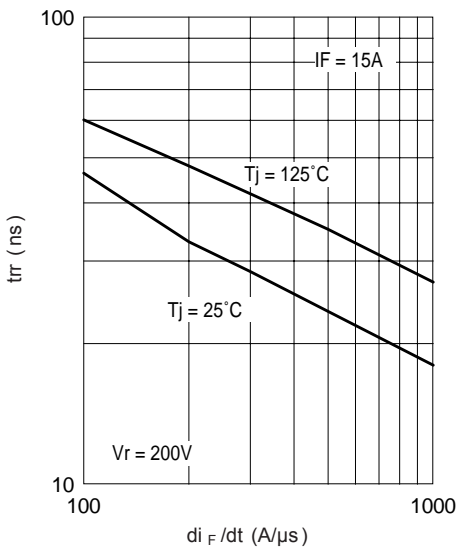


Fig. 7 - Typical Reverse Recovery vs. di_F/dt

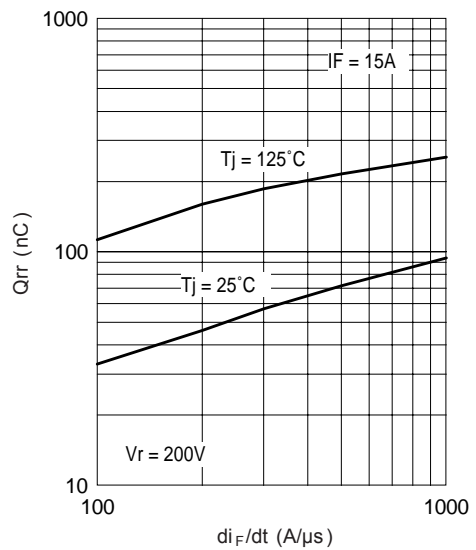


Fig. 8 - Typical Stored Charge vs. di_F/dt

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

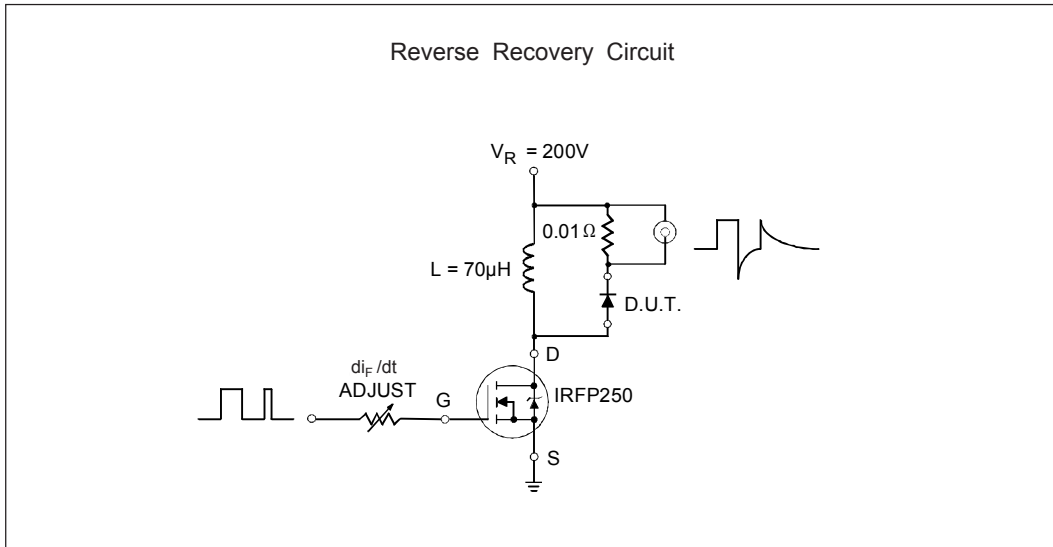


Fig. 9- Reverse Recovery Parameter Test Circuit

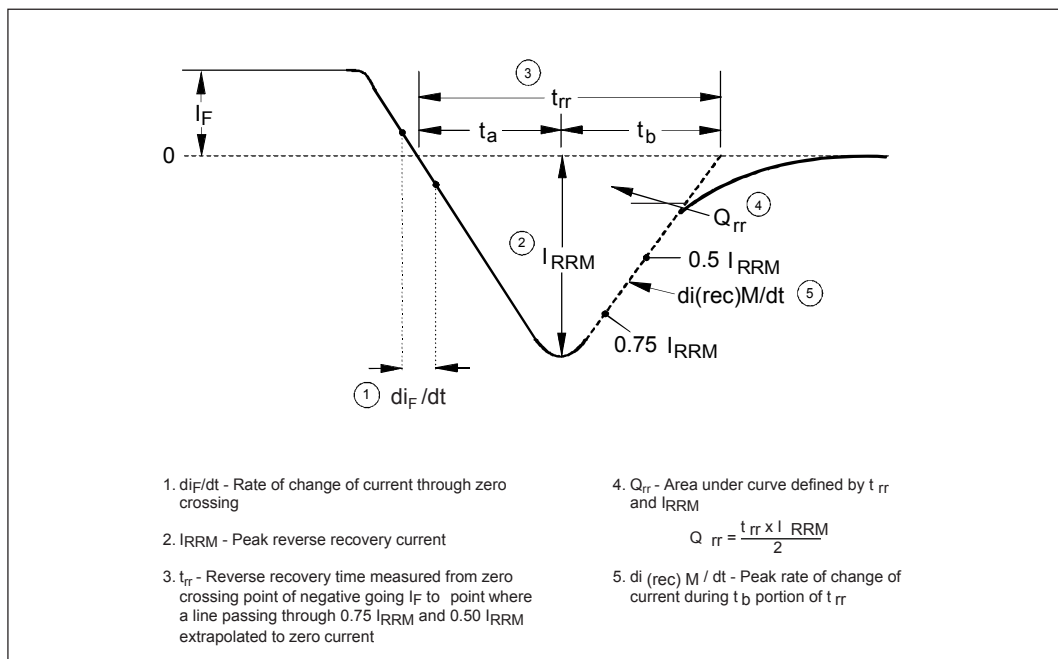


Fig. 10 - Reverse Recovery Waveform and Definitions

30CTH03PbF

Bulletin PD-20892 rev. A 10/06



Outline Table

NOTES:

- 1- DIMENSIONS AND TOLERANCING AS PER ASME Y14.5 M-1994.
- 2- DIMENSIONS ARE SHOWN IN INCHES (MILLIMETERS).
- 3- LEAD DIMENSION AND PITCH UNCONTROLLED IN L1.
- 4- DIMENSION D, D1 AS L1 DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.007" (0.177) PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
- 5- DIMENSION B1, B2 & C1 APPLY TO BASE METAL ONLY.
- 6- CONTROLLING DIMENSION - INCHES.
- 7- THE FINAL PWD CONTOUR OPTIONAL. DIMENSIONS L1, D2 & E1.
- 8- DIMENSION E2 IS NOT SEPARATE FROM STRIPPING AND SIMULATION INEQUALITIES ARE ALLOWED.
- 9- OUTLINE CONFORMS TO JEDEC TO-220 EXCEPT AS SHOWN AND D2 (b-2) WHERE DIMENSIONS ARE DERIVED FROM THE ACTUAL PRODUCE OUTLINE.

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	3.56	4.83	.140	.190	
A1	2.01	1.40	.020	.050	
A2	2.01	2.82	.080	.115	
b	0.38	1.01	.015	.040	5
b1	0.38	0.87	.015	.038	
b2	1.14	1.78	.045	.070	5
b3	1.14	1.73	.045	.068	
c	0.38	0.81	.014	.024	
c1	0.38	0.56	.014	.022	5
d	14.22	16.51	.460	.650	4
D1	8.33	9.02	.330	.358	7
D2	11.68	12.89	.460	.507	7
E	9.65	10.87	.380	.427	4, 7
E1	6.96	8.89	.270	.350	7
E2	-	0.76	-	.030	8
h	2.54	2.54	.100	.100	
h1	5.94	6.86	.230	.270	7, 8
h2	5.94	6.86	.230	.270	7, 8
L	12.70	14.73	.500	.580	
L1	-	6.35	-	.250	3
LP	3.54	4.00	.139	.161	
D	2.54	3.42	.100	.135	

CONFORM TO JEDEC OUTLINE TO-220AB

Part Marking Information

IRXC Assembly Line

EXAMPLE: THIS IS A 30CTH03
LOT CODE 1789
ASSEMBLED ON WW 19, 2001
IN THE ASSEMBLY LINE "C"

Note: "P" in the beginning of date code indicates "Lead-Free"

INTERNATIONAL RECTIFIER LOGO

30CTH03

IR P119C

17 89

PART NUMBER

DATE CODE
P = LEAD-FREE
YEAR 1 = 2001
WEEK 19
LINE C

IRMX Assembly Line

EXAMPLE: THIS IS A 30CTH03
LOT CODE 1789
ASSEMBLED ON WW 19, 2001

Note: "P" in assembly line position indicates "Lead-Free"

INTERNATIONAL RECTIFIER LOGO

30CTH03

IR 119P

17 89

PART NUMBER

DATE CODE
YEAR 1 = 2001
WEEK 19
P = LEAD-FREE

Ordering Information Table

Device Code					
30	C	T	H	03	PbF
①	②	③	④	⑤	⑥
1	-	Current Rating (30 = 30A)			
2	-	C = Common Cathode			
3	-	Package T = TO-220			
4	-	H = HyperFast Recovery			
5	-	Voltage Rating (03 = 300V)			
6	-	• none = Standard Production • PbF = Lead-Free			
Tube Standard Pack Quantity : 50 pieces					

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