



20CTH03PbF
20CTH03FPPbF

Hyperfast Rectifier

Features

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

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.

$$t_{rr} = 35\text{ns max.}$$

$$I_{F(AV)} = 20\text{Amp}$$

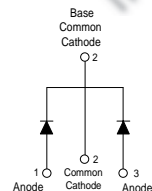
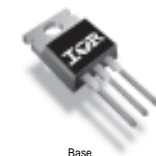
$$V_R = 300\text{V}$$

Absolute Maximum Ratings

Parameters	Max	Units
V_{RRM} Peak Repetitive Reverse Voltage	300	V
$I_{F(AV)}$ Average Rectified Forward Current @ $T_C = 160^\circ\text{C}$ Per Diode @ $T_C = 135^\circ\text{C}$ (FULLPACK) Per Device	10	A
	20	
	120	
I_{FSM} Non Repetitive Peak Surge Current @ $T_J = 25^\circ\text{C}$	120	
T_J, T_{STG} Operating Junction and Storage Temperatures	- 65 to 175	$^\circ\text{C}$

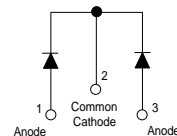
Case Styles

20CTH03PbF



TO-220AB

20CTH03FPPbF



TO-220 FULLPACK

Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

Parameters	Min	Typ	Max	Units	Test Conditions
V_{BR}, V_r Breakdown Voltage, Blocking Voltage	300	-	-	V	$I_R = 100\mu\text{A}$
V_F Forward Voltage	-	1.05	1.25	V	$I_F = 10\text{A}, T_J = 25^\circ\text{C}$
	-	0.85	0.95	V	$I_F = 10\text{A}, T_J = 125^\circ\text{C}$
I_R Reverse Leakage Current	-	-	20	μA	$V_R = V_R$ Rated
	-	6	200	μA	$T_J = 125^\circ\text{C}, V_R = V_R$ Rated
C_T Junction Capacitance	-	30	-	pF	$V_R = 300\text{V}$
L_S Series Inductance	-	8	-	nH	Measured lead to lead 5mm from package body

Dynamic Recovery Characteristics @ $T_C = 25^\circ\text{C}$ (unless otherwise specified)

Parameters	Min	Typ	Max	Units	Test Conditions
t_{rr} Reverse Recovery Time	-	-	35	ns	$I_F = 1\text{A}, di_F/dt = 50\text{A}/\mu\text{s}, V_R = 30\text{V}$
	-	-	30		$I_F = 1\text{A}, di_F/dt = 100\text{A}/\mu\text{s}, V_R = 30\text{V}$
	-	31	-		$T_J = 25^\circ\text{C}$
	-	42	-		$T_J = 125^\circ\text{C}$
I_{RRM} Peak Recovery Current	-	2.4	-	A	$T_J = 25^\circ\text{C}$
	-	5.6	-		$T_J = 125^\circ\text{C}$
Q_{rr} Reverse Recovery Charge	-	36	-	nC	$T_J = 25^\circ\text{C}$
	-	120	-		$T_J = 125^\circ\text{C}$

$I_F = 10\text{A}$
 $di_F/dt = 200\text{A}/\mu\text{s}$
 $V_R = 200\text{V}$

Thermal - Mechanical Characteristics

Parameters	Min	Typ	Max	Units
T_J Max. Junction Temperature Range	-	-	175	$^\circ\text{C}$
T_{Stg} Max. Storage Temperature Range	- 65	-	175	
R_{thJC} ① Thermal Resistance, Per Diode Junction to Case Fullpack (Per Diode)	-	-	1.5	$^\circ\text{C}/\text{W}$
	-	-	3.9	
Device Marking	20CTH03			Case Style TO-220
	20CTH03FP			Case Style Fullpack

① Mounting Surface, Flat, Smooth and Greased

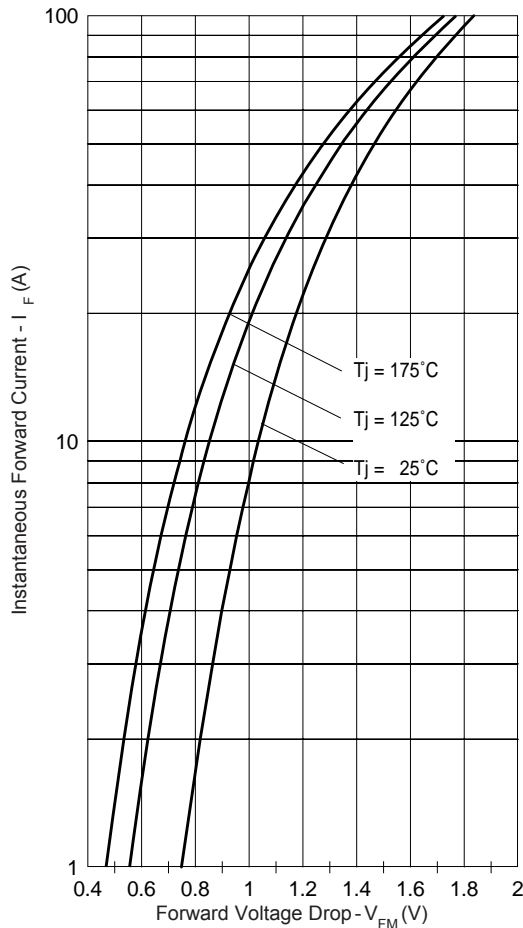


Fig. 1 - Typical Forward Voltage Drop Characteristics

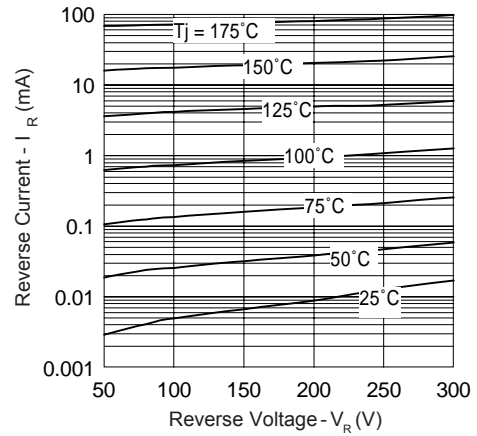


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

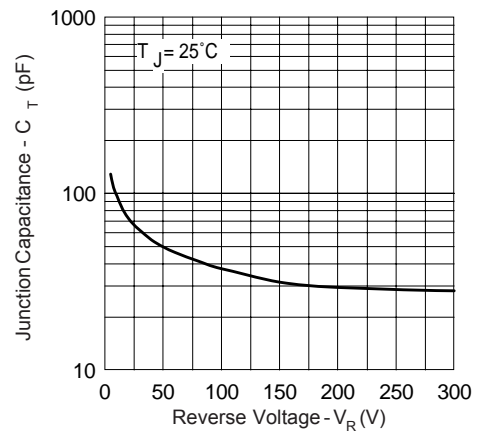


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

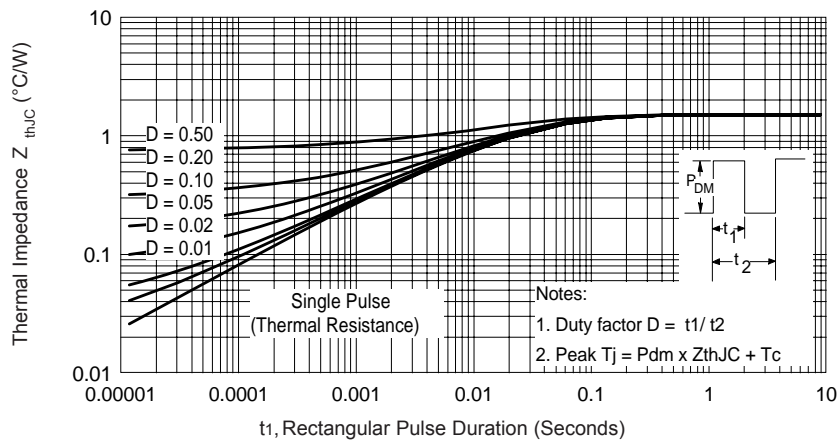


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

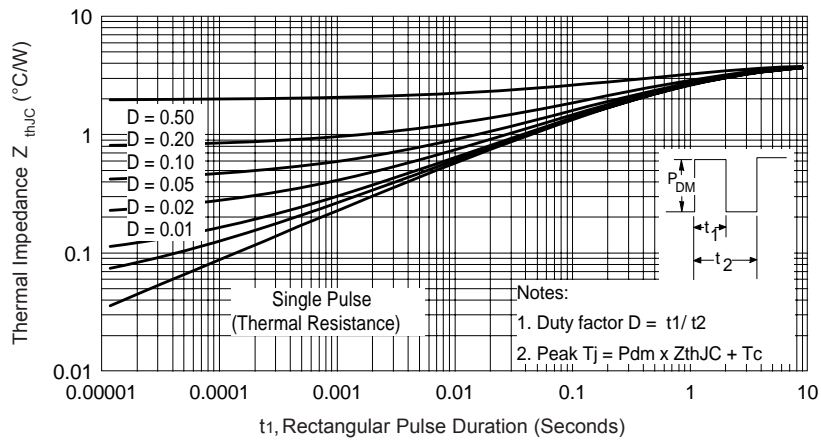
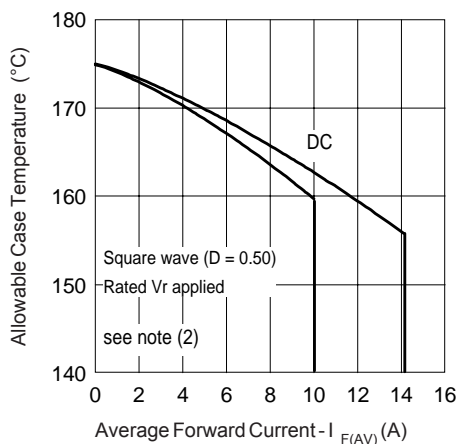
Fig. 5 - Max. Thermal Impedance Z_{thJC} Characteristics (FULLPACK)

Fig. 6 - Max. Allowable Case Temperature Vs. Average Forward Current

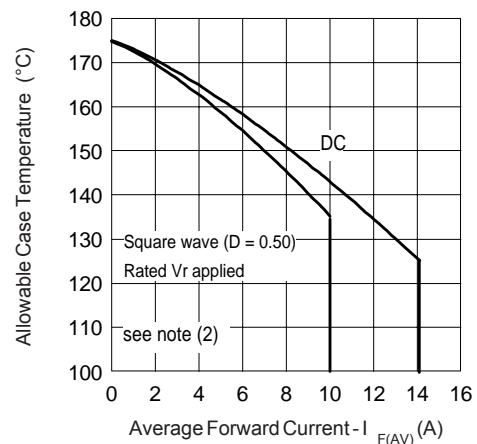


Fig. 7 - Max. Allowable Case Temperature Vs. Average Forward Current (FULLPACK)

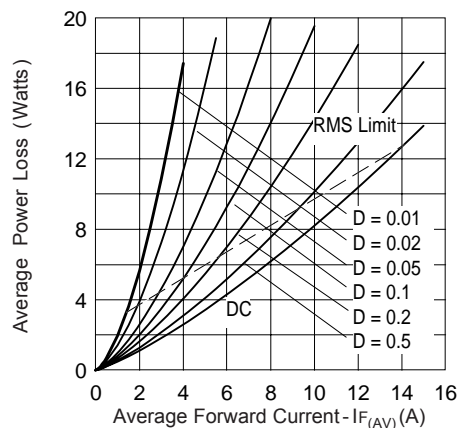


Fig. 8 - Forward Power Loss Characteristics

- (2) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$;
 P_d = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$
 (see Fig. 8);
 $P_{d_{REV}}$ = Inverse Power Loss = $V_{R1} \times I_R (1 - D)$;
 $I_R @ V_{R1}$ = rated V_R

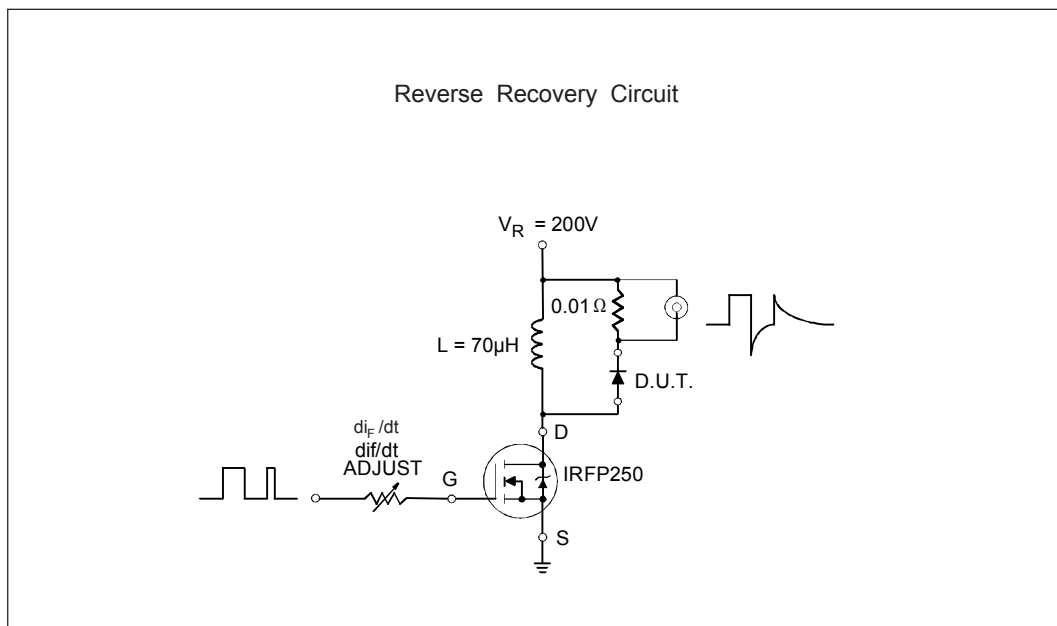
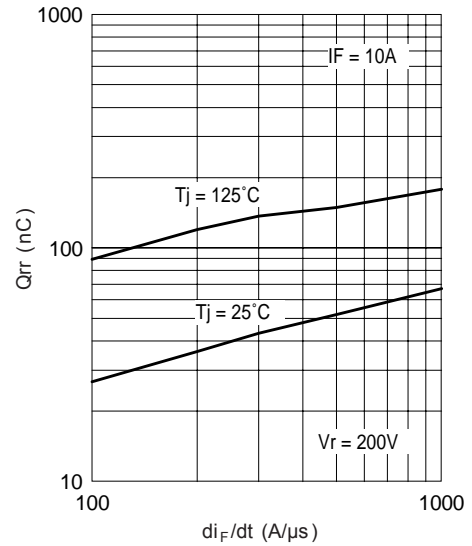
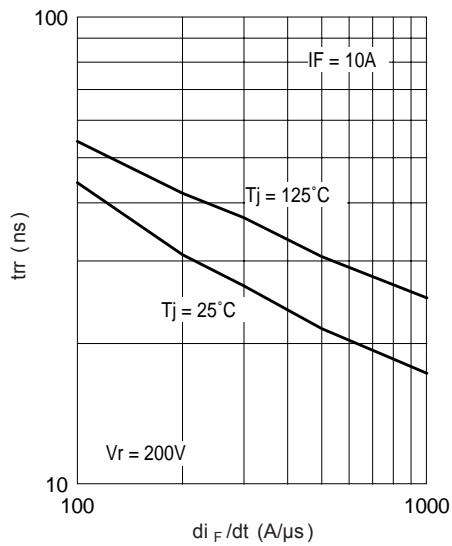


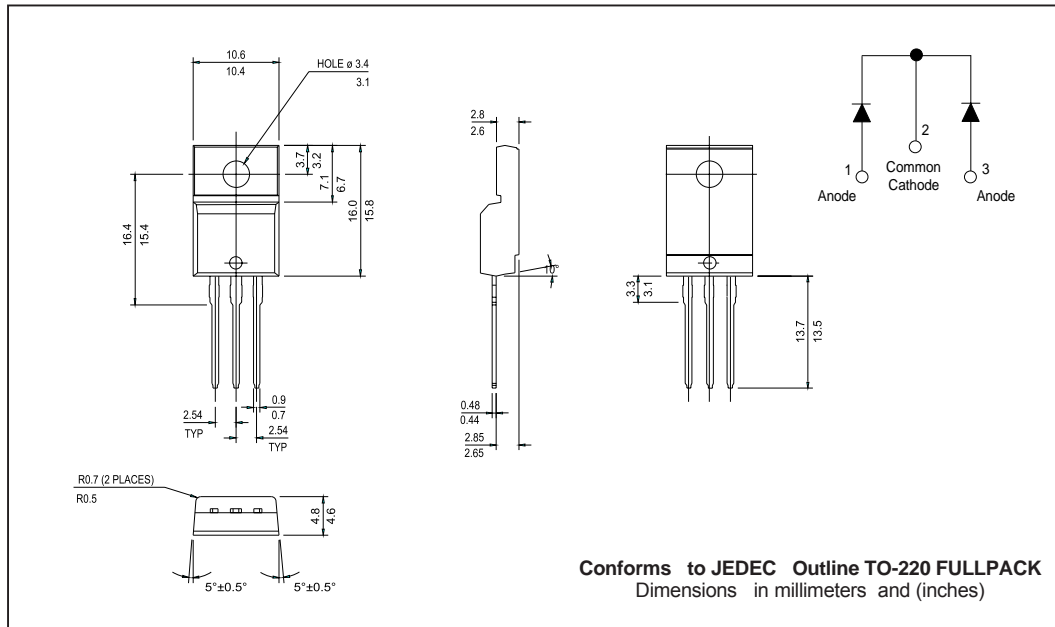


FIGURE 1 JEDEC TO-220AB

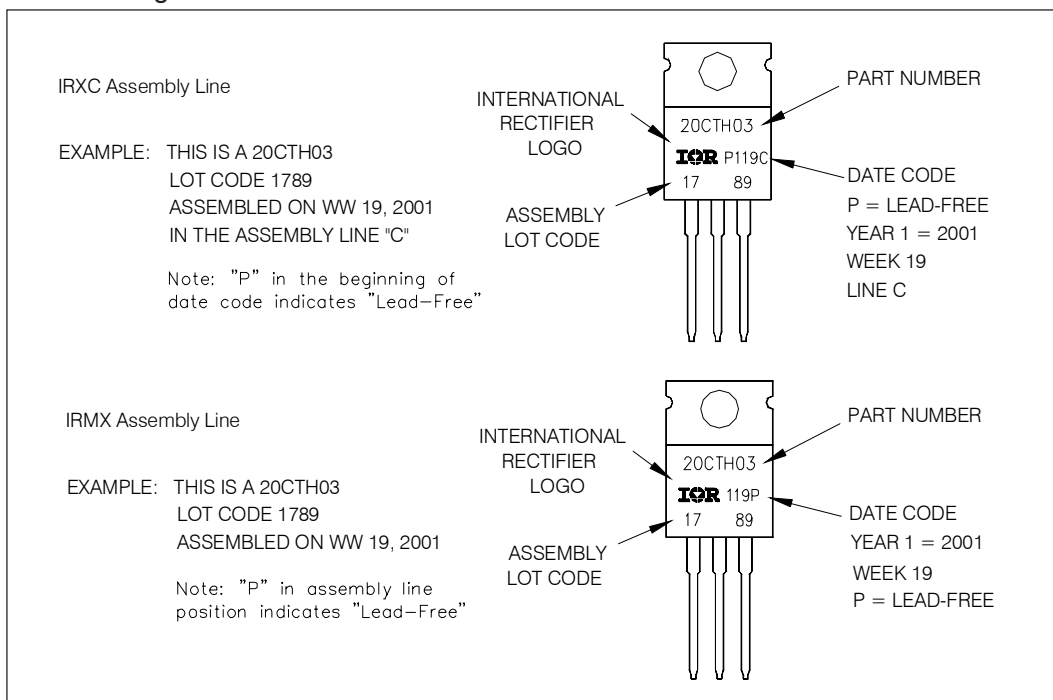
NOTES:

- 1.- DIMENSIONS AND TOLERANCING AS PER ANSI Y14.5 M-1994.
- 2.- DIMENSIONS ARE SHOWN IN INCHES (MILLIMETERS).
- 3.- LEAD DIMENSION AND FINISH UNCONTROLLED IN U.S.
- 4.- DIMENSION D, D1 & D2 DO NOT INCLUDE GOLD PLATING. GOLD PLATING SHALL NOT EXCEED 0.001 INCHES PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREMITY OF THE PLATING BODY.
- 5.- DIMENSION A11 & A12 TO BASE METAL ONLY.
- 6.- CONTROLLING DIMENSION: INCHES.
- 7.- THERMAL PAD OUTLINE DIMENSION WITHIN DIMENSIONS EXCEPT D1 & D2.
- 8.- DIMENSION D3 IS AT DEFINED ZONE BASED CLIPPING AND DIMENSION IMMEDIATELY AFTER ALLOWED.
- 9.- OUTLINE CONFORMING TO JEDEC TO-220, EXCEPT D1 (mm) AND D2 (mm). THESE DIMENSIONS ARE DERIVED FROM THE ACTUAL PACKAGE OUTLINE.

Outline Table

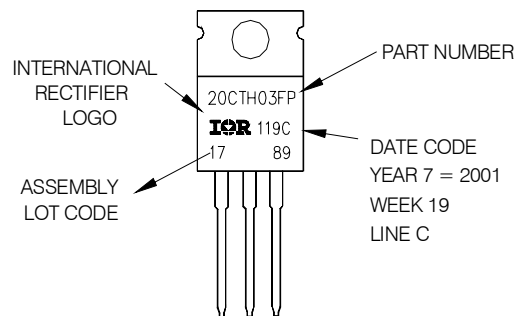


Part Marking Information



Marking Information

EXAMPLE: THIS IS A 20CTH03FP
 LOT CODE 1789
 ASSEMBLED ON WW 19, 2001
 IN THE ASSEMBLY LINE "C"



Ordering Information Table

Device Code

20	C	T	H	03	FP	PbF
①	②	③	④	⑤	⑥	⑦

- | | | |
|----------|---|---|
| 1 | - | Current Rating (20 = 20A) |
| 2 | - | C = Common Cathode |
| 3 | - | T = TO-220, D ² Pak |
| 4 | - | H = HyperFast Recovery |
| 5 | - | Voltage Rating (03 = 300V) |
| 6 | - | <ul style="list-style-type: none"> • none = TO-220AB • FP = TO-220 FULLPACK |
| 7 | - | <ul style="list-style-type: none"> • 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.

International
IR Rectifier

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
 TAC Fax: (310) 252-7309
 Visit us at www.irf.com for sales contact information. 10/06