

International **IR** Rectifier

30CTH02PbF 30CTH02FPPbF

Hyperfast Rectifier

Features

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

t_{rr} =30ns max.
 $I_{F(AV)}$ = 30Amp
 V_R = 200V

Description/ Applications

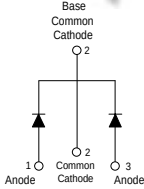
International Rectifier's 200V series are the state of the art Hyperfast recovery rectifiers specifically designed with optimized performance of forward voltage drop and hyperfast recovery time. The planar structure and the platinum doped life time control, guarantee the best overall performance, ruggedness and reliability characteristics. These devices are intended for use in the output rectification stage of SMPS, UPS, DC-DC converters as well as 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 Reverse Voltage	200	V
$I_{F(AV)}$ Average Rectified Forward Current @ $T_C = 159^{\circ}C$ Per Diode @ $T_C = 125^{\circ}C$ (FULLPACK) Per Diode Per Device	15	A
	30	
	200	
I_{FSM} Non Repetitive Peak Surge Current @ $T_J = 25^{\circ}C$	200	
T_J, T_{STG} Operating Junction and Storage Temperatures	- 65 to 175	$^{\circ}C$

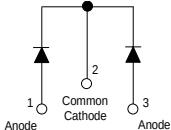
Case Styles

30CTH02PbF

TO-220AB

30CTH02FPPbF

TO-220 FULLPACK

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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	200	-	-	V	$I_R = 100\mu\text{A}$
V_F Forward Voltage	-	0.92	1.05	V	$I_F = 15\text{A}, T_J = 25^\circ\text{C}$
	-	0.78	0.85	V	$I_F = 15\text{A}, T_J = 125^\circ\text{C}$
I_R Reverse Leakage Current	-	-	10	μA	$V_R = V_R \text{ Rated}$
	-	5	300	μA	$T_J = 125^\circ\text{C}, V_R = V_R \text{ Rated}$
C_T Junction Capacitance	-	57	-	pF	$V_R = 200\text{V}$
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		$I_F = 1\text{A}, di_F/dt = 100\text{A}/\mu\text{s}, V_R = 30\text{V}$
	-	26	-		$T_J = 25^\circ\text{C}$
	-	40	-		$T_J = 125^\circ\text{C}$
I_{RRM} Peak Recovery Current	-	2.8	-	A	$T_J = 25^\circ\text{C}$
	-	6.0	-		$T_J = 125^\circ\text{C}$
Q_{rr} Reverse Recovery Charge	-	37	-	nC	$T_J = 25^\circ\text{C}$
	-	120	-		$T_J = 125^\circ\text{C}$

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	-	-	1.1	$^\circ\text{C}/\text{W}$
	Junction to Case Fullpack (Per Diode)	-	3.5	
Device Marking	30CTH02			Case Style TO-220
	30CTH02FP			Case Style Fullpack

① Mounting Surface, Flat, Smooth and Greased

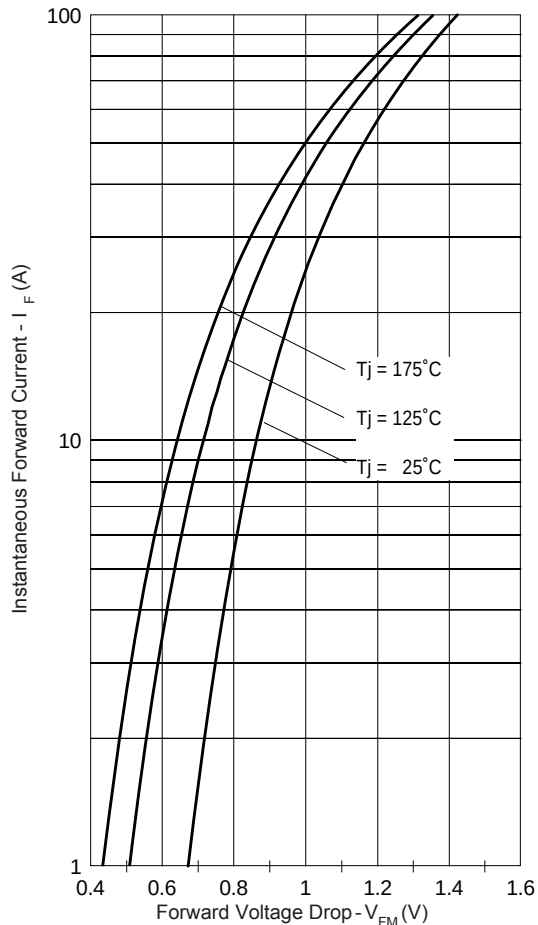


Fig. 1 - Typical Forward Voltage Drop Characteristics

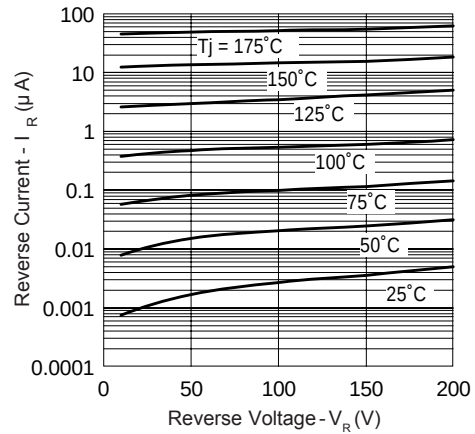


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

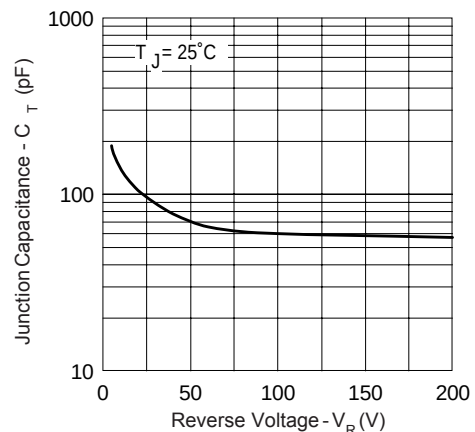


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

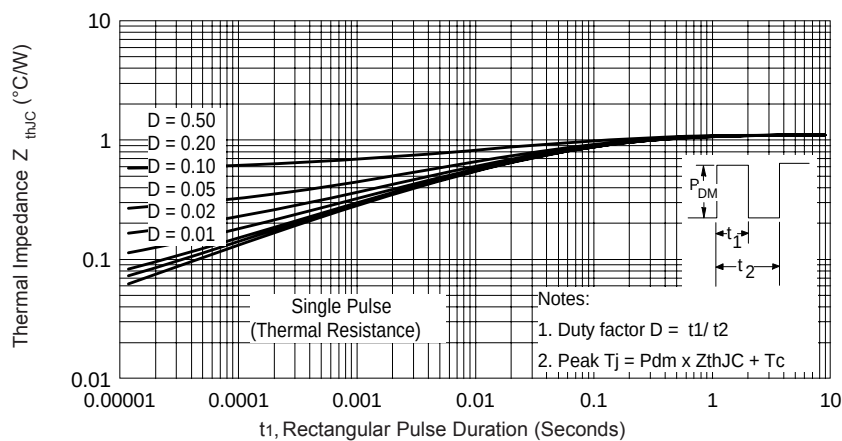


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

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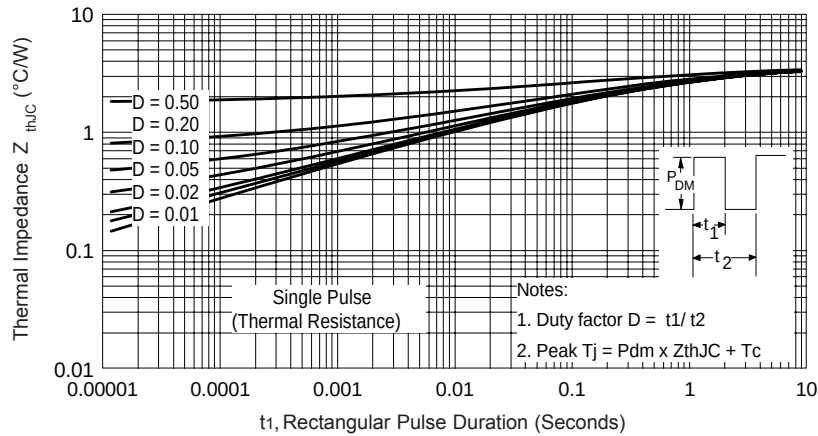


Fig. 5 - Max. Thermal Impedance Z_{thJC} Characteristics (FULLPACK)

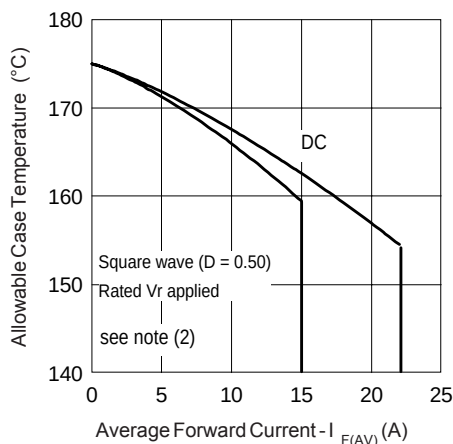


Fig. 6 - Max. Allowable Case Temperature Vs. Average Forward Current

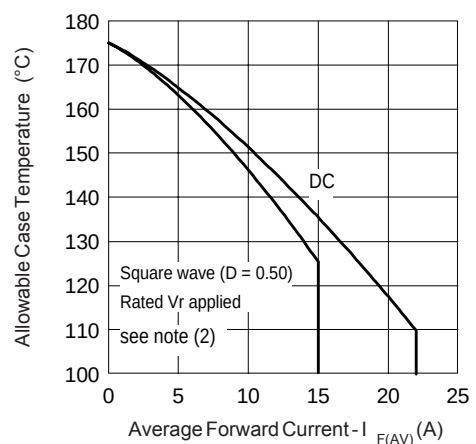


Fig. 7 - Max. Allowable Case Temperature Vs. Average Forward Current (FULLPACK)

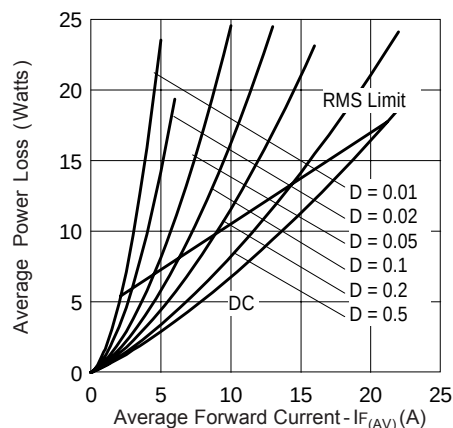


Fig. 8 - Forward Power Loss Characteristics

(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

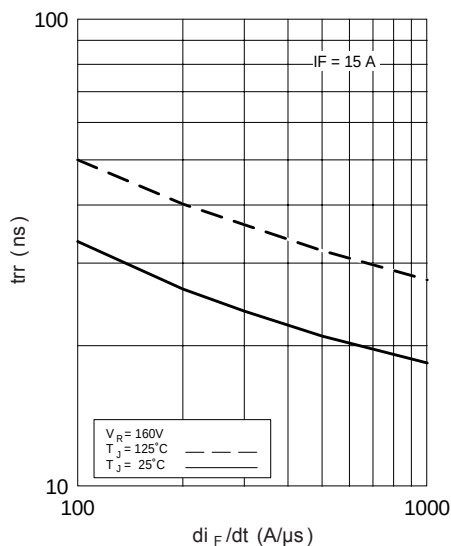


Fig.9 - Typical Reverse Recovery vs. di_F/dt

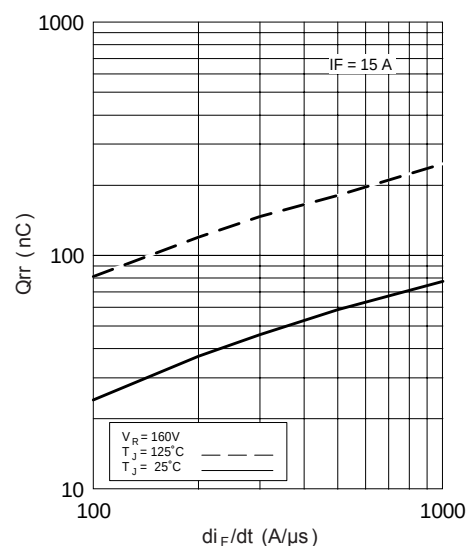


Fig.10 - Typical Stored Charge vs. di_F/dt

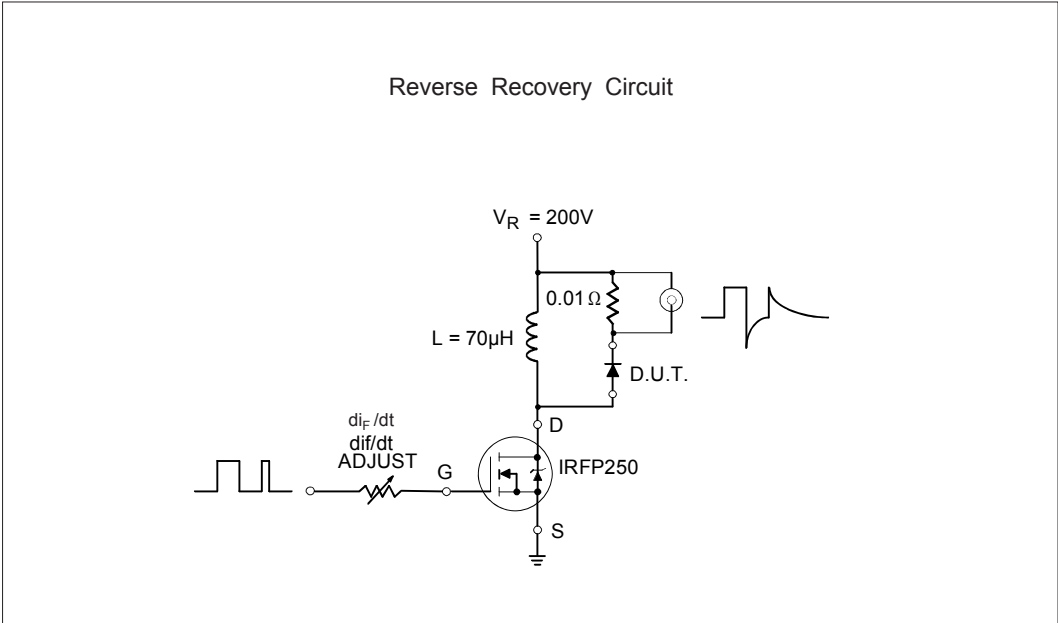


Fig. 11- Reverse Recovery Parameter Test Circuit

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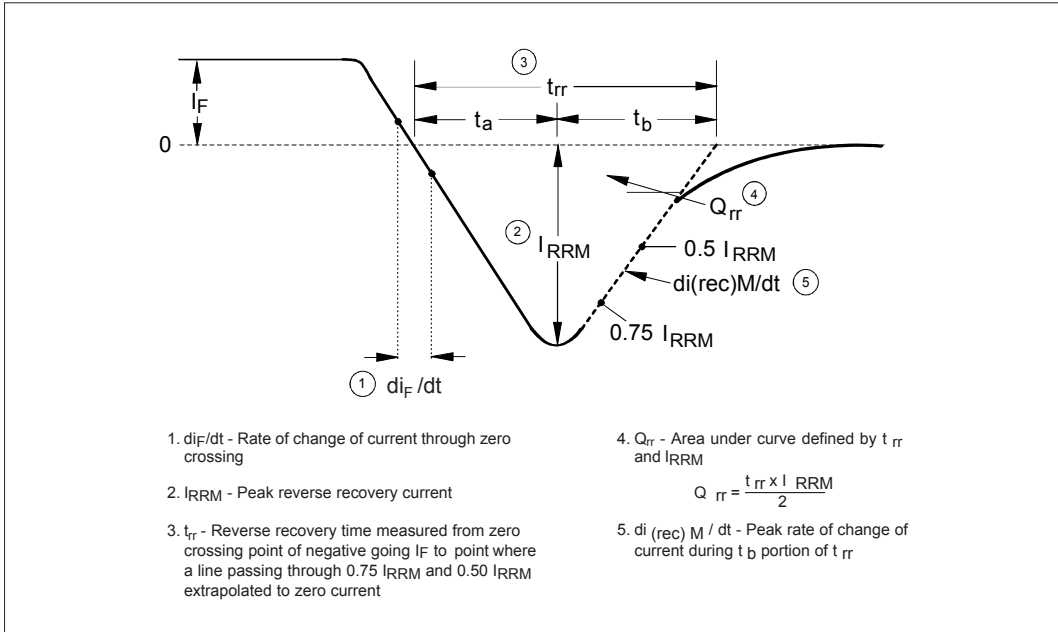
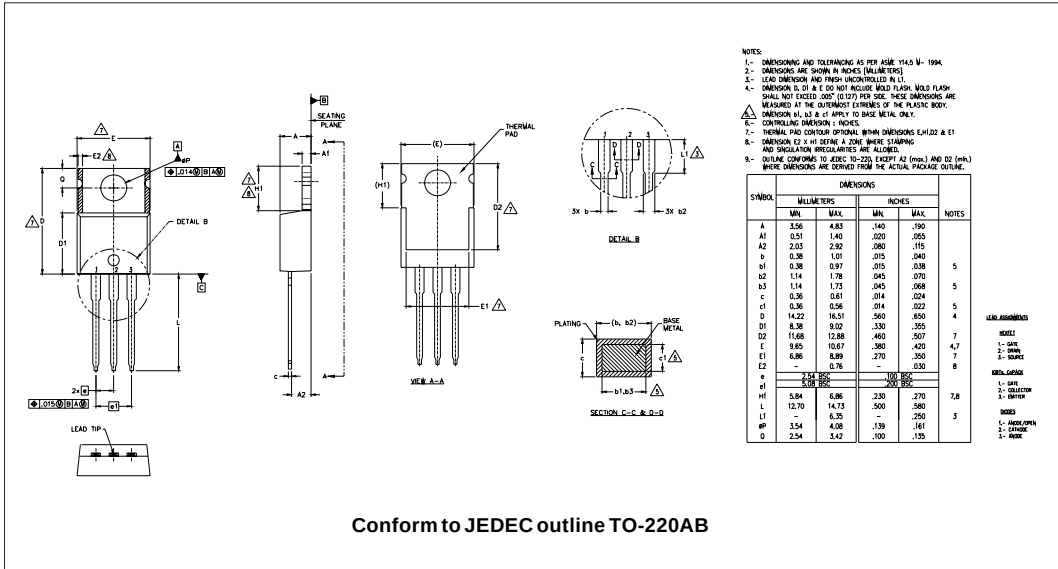
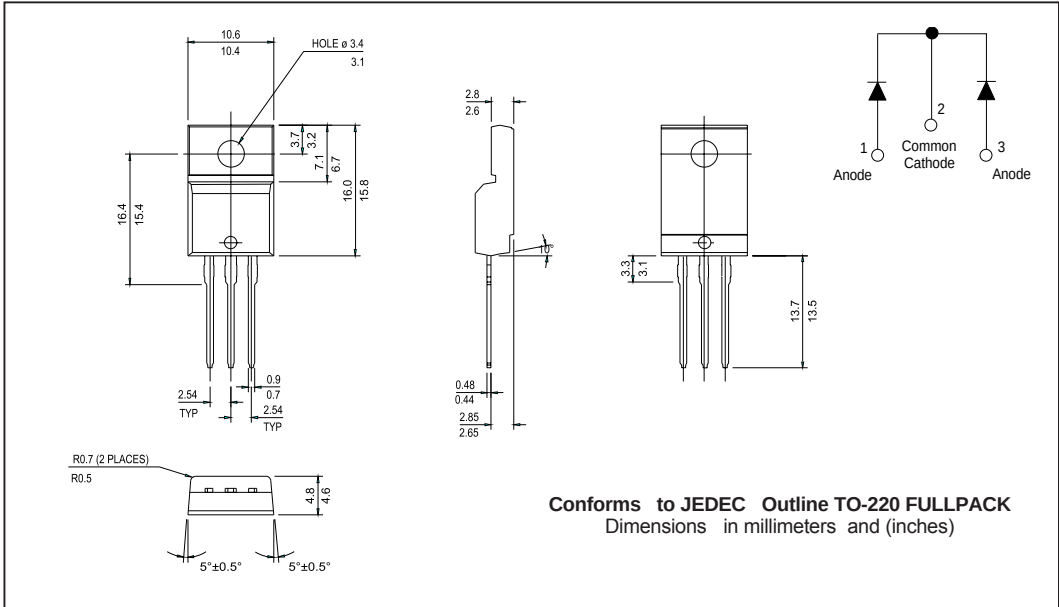


Fig. 13 - Reverse Recovery Waveform and Definitions

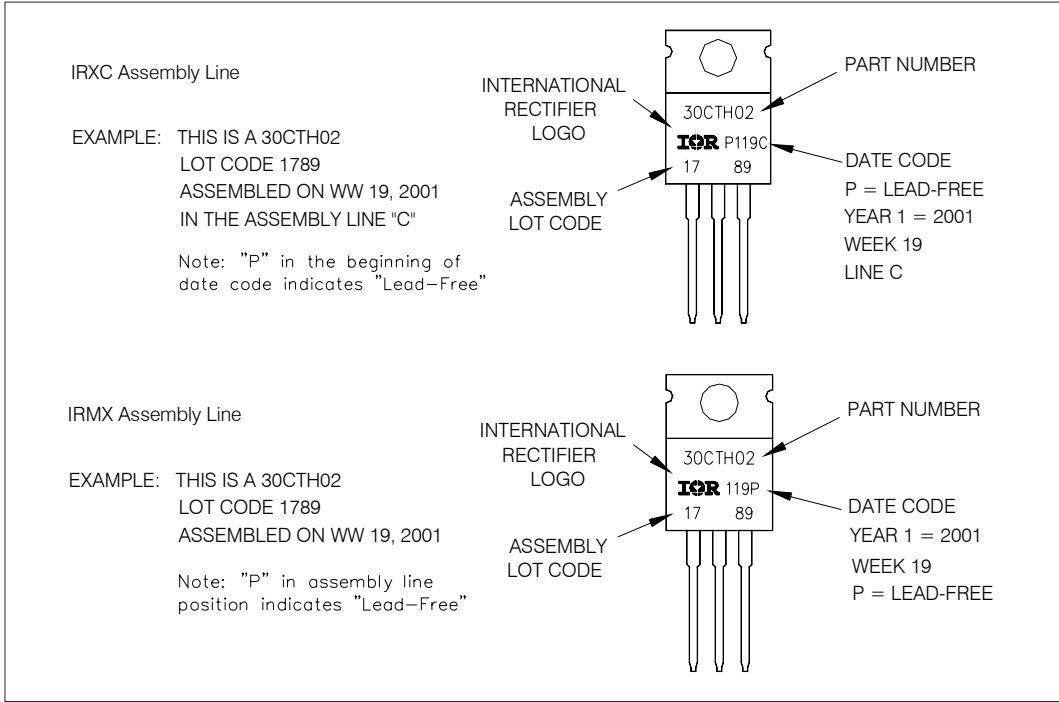
Outline Table



Outline Table



Part Marking Information



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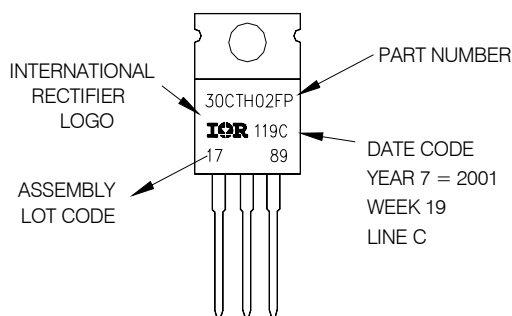
Marking Information

EXAMPLE: THIS IS A 30CTH02FP

LOT CODE 1789

ASSEMBLED ON WW 19, 2001

IN THE ASSEMBLY LINE "C"



Ordering Information Table

Device Code

30 C T H 02 FP PbF

① ② ③ ④ ⑤ ⑥ ⑦

- 1** - Current Rating (30 = 30A)
- 2** - C = Common Cathode
- 3** - T = TO-220, D²Pak
- 4** - H = HyperFast Recovery
- 5** - Voltage Rating (02 = 200V)
- 6** -
 - none = TO-220AB
 - FP = TO-220 FULLPACK
- 7** -
 - 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.

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Visit us at www.irf.com for sales contact information. 12/06