Bulletin PD-20768 rev. C 09/04

International
IOR Rectifier

30CTH02
30CTH02S
30CTH02-1
30CTH02FP

Hyperfast Rectifier

Features

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

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

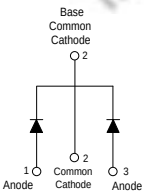
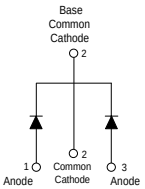
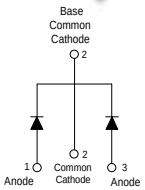
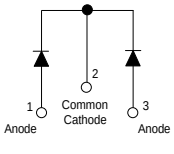
Description/ Applications

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°C	Per Diode	15	A
	@ T_C = 125°C (FULLPACK)	Per Diode		
		Per Device	30	
I_{FSM}	Non Repetitive Peak Surge Current @ T_J = 25°C		200	
T_J, T_{STG}	Operating Junction and Storage Temperatures		- 65 to 175	°C

Case Styles

30CTH02	30CTH02S	30CTH02-1	30CTH02FP
			
			
TO-220AB	D^2PAK	TO-262	TO-220 FULLPACK

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	-	0.92	1.05	V	I_F = 15A, T_J = 25°C
		-	0.78	0.85	V	I_F = 15A, T_J = 125°C
I_R	Reverse Leakage Current	-	-	10	µA	V_R = V_R Rated
		-	5	300	µA	T_J = 125°C, V_R = V_R Rated
C_T	Junction Capacitance	-	57	-	pF	V_R = 200V
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	-	-	35	ns	I_F = 1A, di_F/dt = 50A/µs, V_R = 30V	
		-	-	30		I_F = 1A, di_F/dt = 100A/µs, V_R = 30V	
		-	26	-		T_J = 25°C	I_F = 15A di_F/dt = 200A/µs V_R = 160V
		-	40	-		T_J = 125°C	
I_{RRM}	Peak Recovery Current	-	2.8	-	A	T_J = 25°C	
		-	6.0	-		T_J = 125°C	
Q_{rr}	Reverse Recovery Charge	-	37	-	nC	T_J = 25°C	
		-	120	-		T_J = 125°C	

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} ①	Thermal Resistance,	Per Diode	-	-	1.1	°C/W
	Junction to Case	Fullpack (Per Diode)	-	-	3.5	
	Device Marking		30CTH02			Case Style TO-220
			30CTH02S			Case Style D^2Pak
			30CTH02-1			Case Style TO-262
			30CTH02FP			Case Style Fullpack

① Mounting Surface, Flat, Smooth and Greased

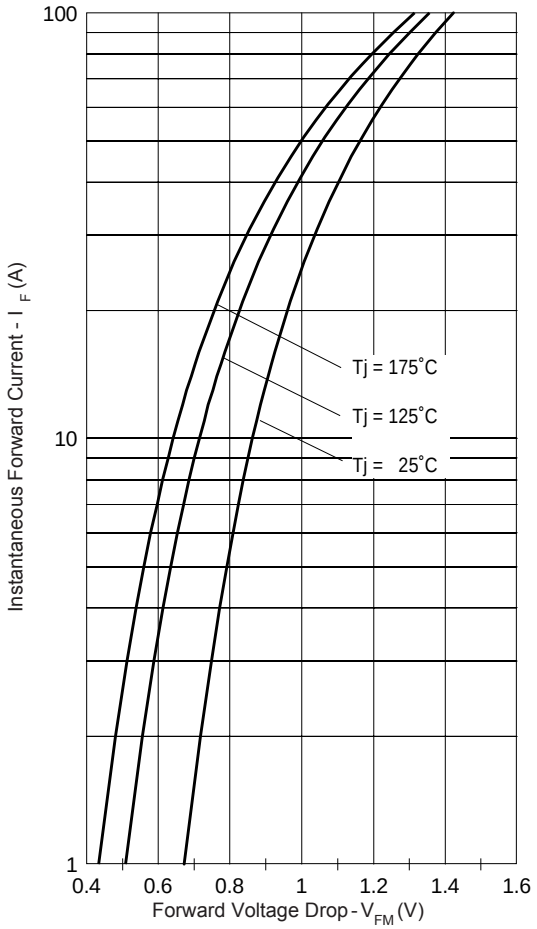


Fig. 1 - Typical Forward Voltage Drop Characteristics

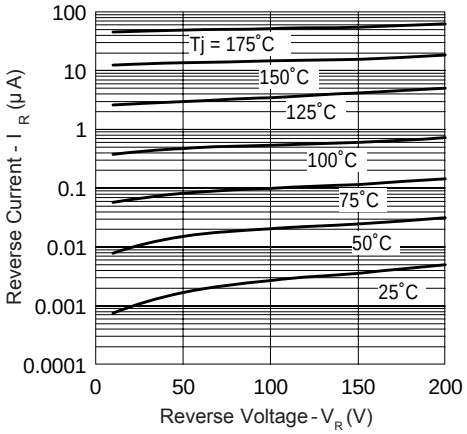


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

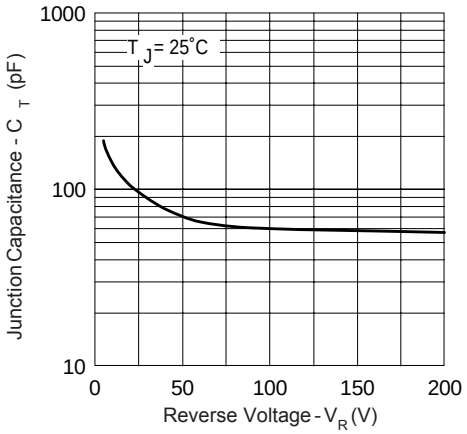


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

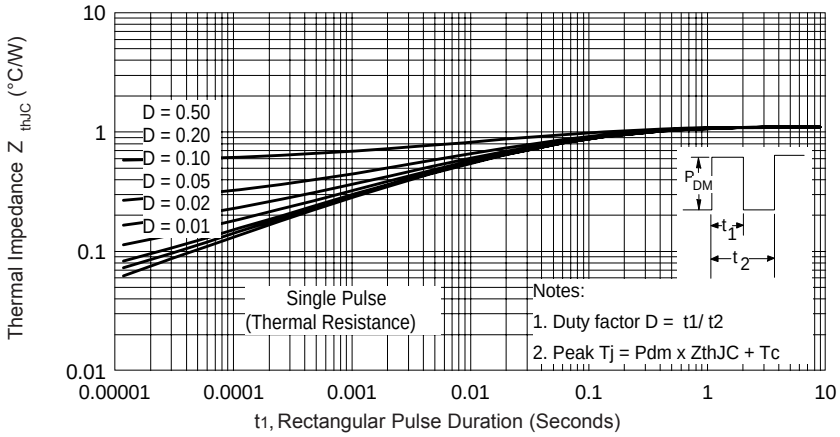


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

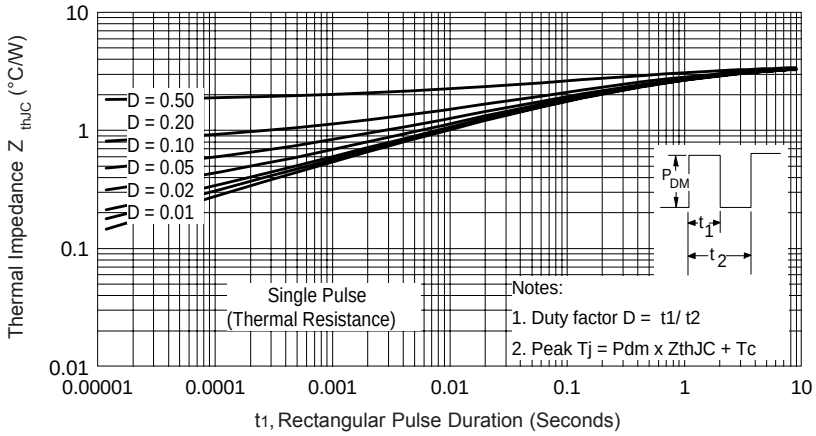


Fig. 5 - Max. Thermal Impedance Z_{thJC} Characteristics (FULLPACK)

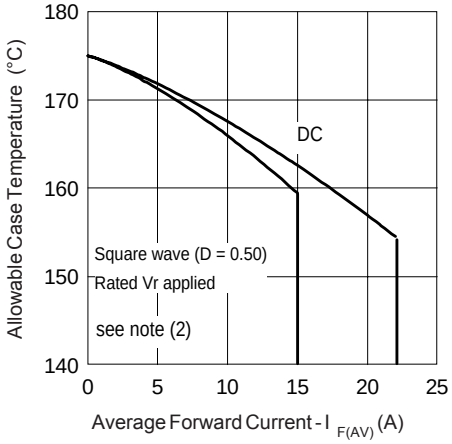


Fig. 6 - Max. Allowable Case Temperature Vs. Average Forward Current

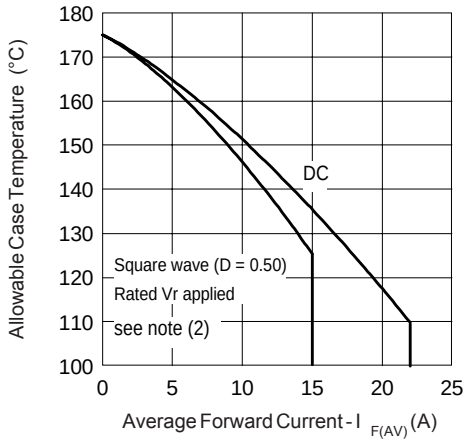


Fig. 7 - Max. Allowable Case Temperature Vs. Average Forward Current (FULLPACK)

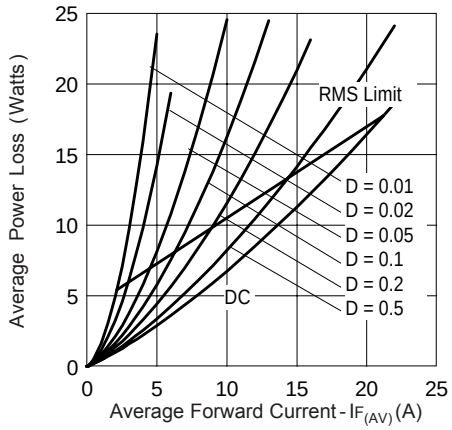


Fig. 8 - Forward Power Loss Characteristics

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

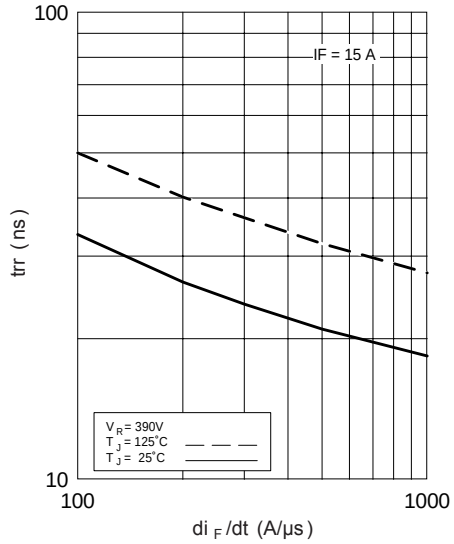


Fig. 9 - Typical Reverse Recovery vs. di_F/dt

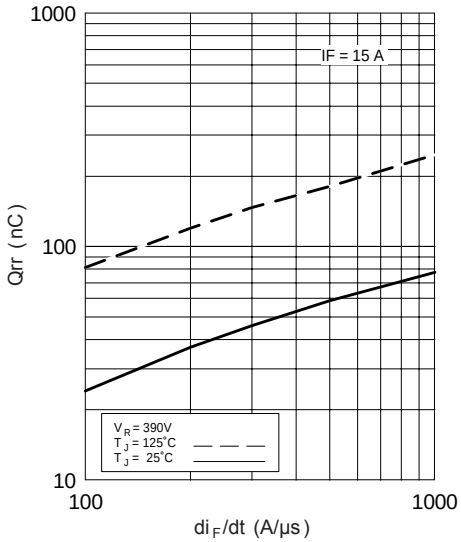


Fig. 10 - Typical Stored Charge vs. di_F/dt

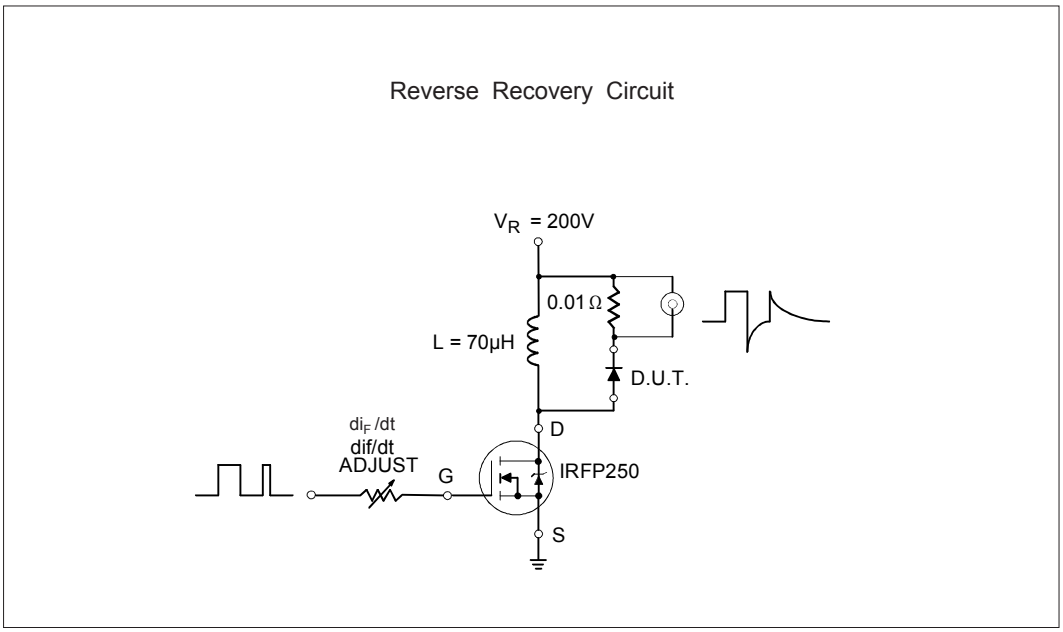
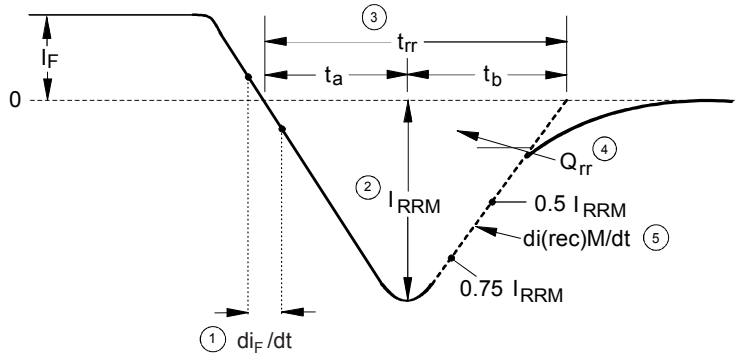


Fig. 11- Reverse Recovery Parameter Test Circuit



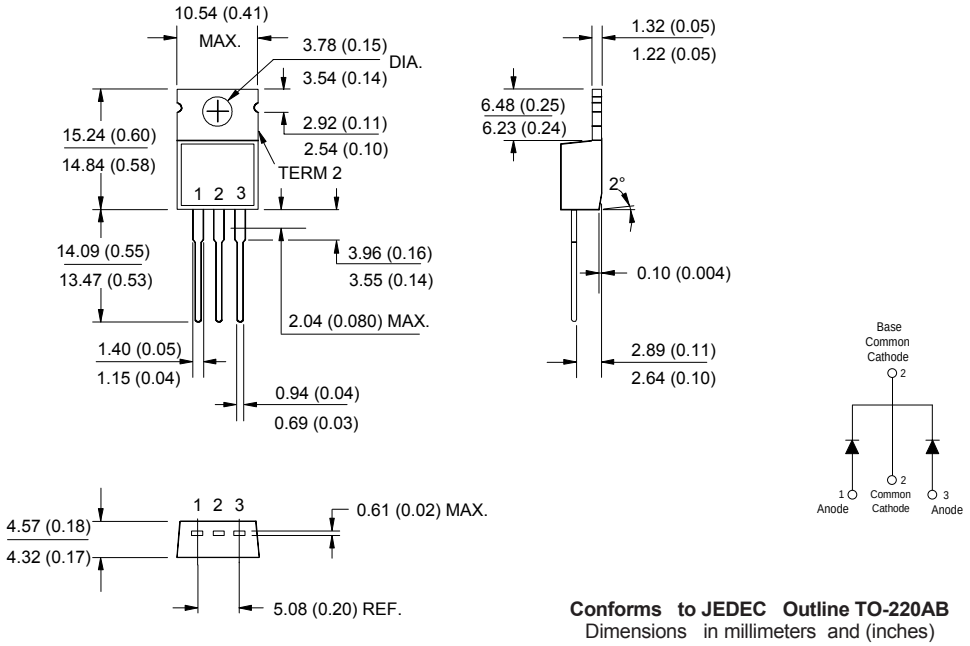
1. di_F/dt - Rate of change of current through zero crossing
2. I_{RRM} - Peak reverse recovery current
3. t_{rr} - Reverse recovery time measured from zero crossing point of negative going I_F to point where a line passing through 0.75 I_{RRM} and 0.50 I_{RRM} extrapolated to zero current
4. Q_{rr}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

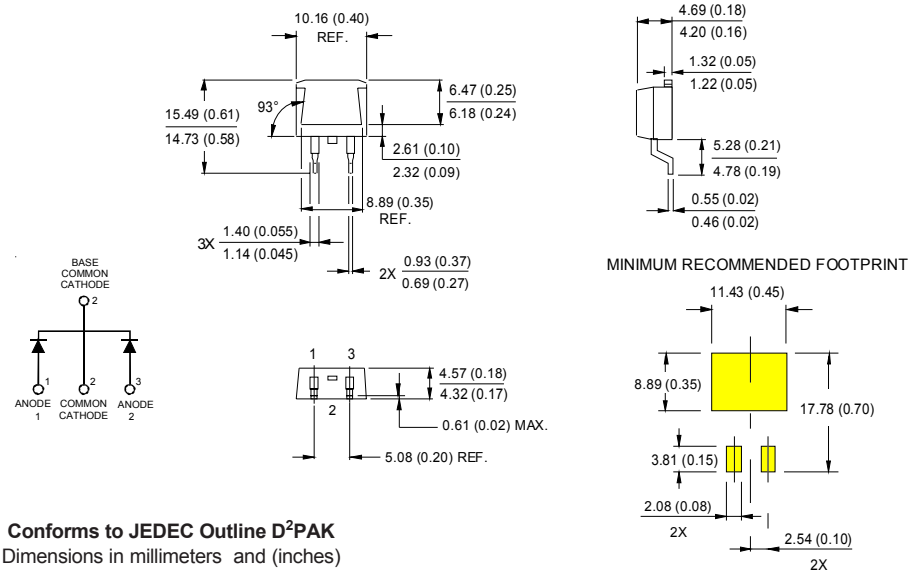
Fig. 13 - Reverse Recovery Waveform and Definitions

Outline Table

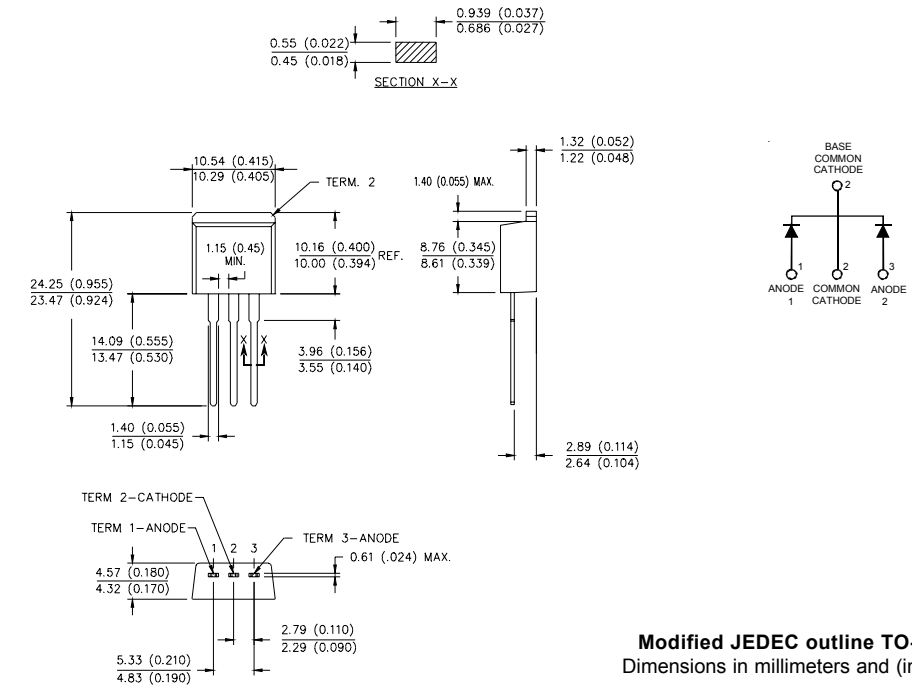


Conforms to JEDEC Outline TO-220AB
Dimensions in millimeters and (inches)

Outline Table

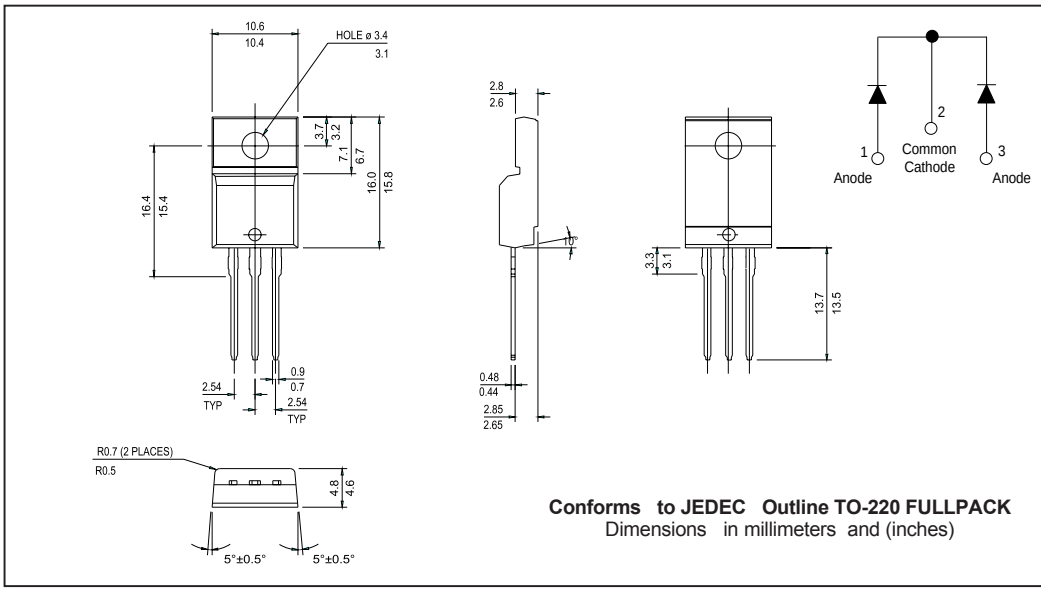


Conforms to JEDEC Outline D^2PAK
Dimensions in millimeters and (inches)



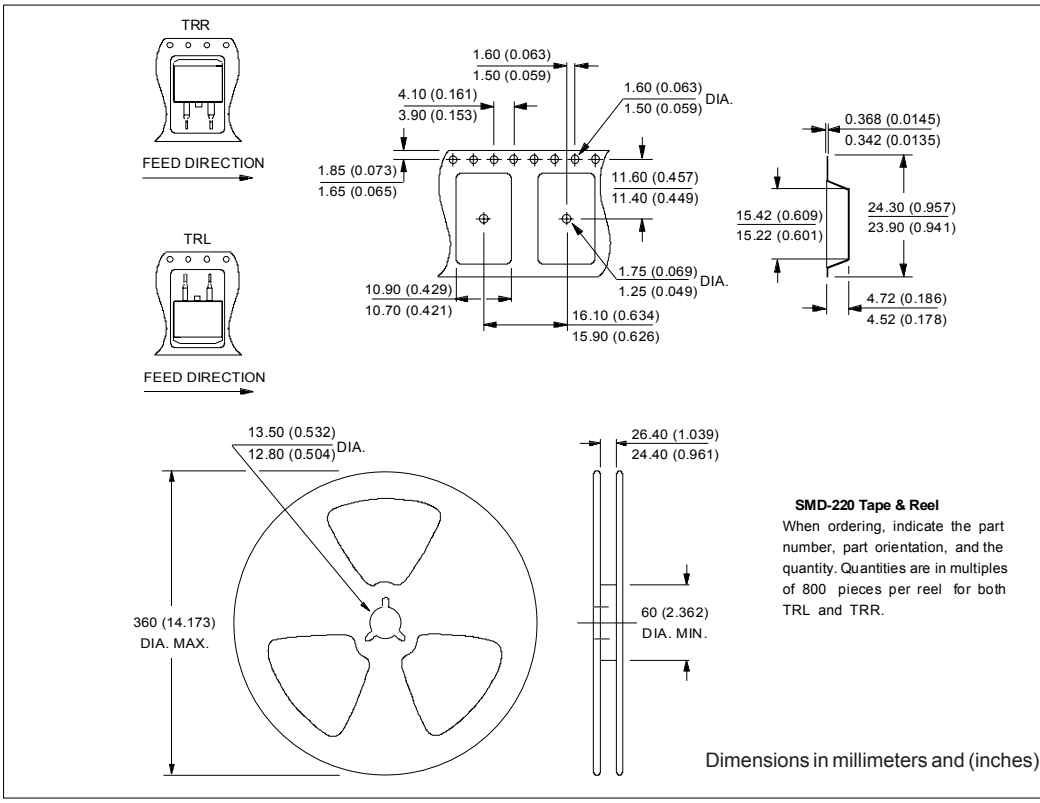
Modified JEDEC outline TO-262
Dimensions in millimeters and (inches)

Outline Table



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

Tape & Reel Information

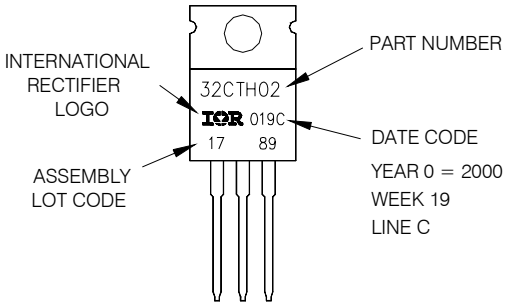


SMD-220 Tape & Reel
When ordering, indicate the part number, part orientation, and the quantity. Quantities are in multiples of 800 pieces per reel for both TRL and TRR.

Dimensions in millimeters and (inches)

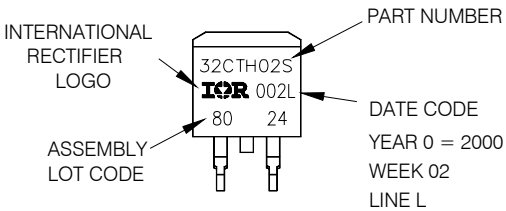
Part Marking Information

EXAMPLE: THIS IS A 32CTH02
LOT CODE 1789
ASSEMBLED ON WW 19, 2000
IN THE ASSEMBLY LINE "C"



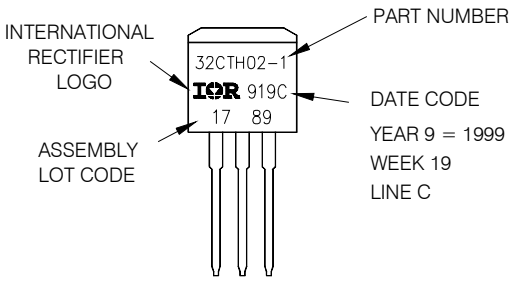
TO-220AB

EXAMPLE: THIS IS A 32CTH02S
LOT CODE 8024
ASSEMBLED ON WW 02, 2000
IN THE ASSEMBLY LINE "L"



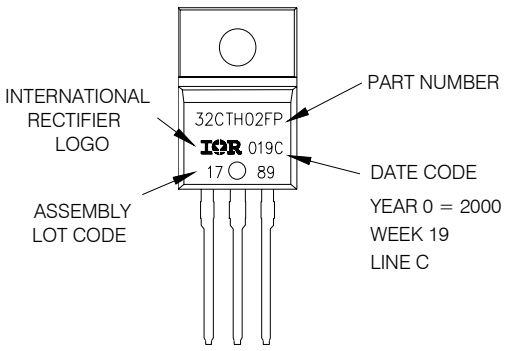
D^2PAK

EXAMPLE: THIS IS A 32CTH02-1
LOT CODE 1789
ASSEMBLED ON WW 19, 1999
IN THE ASSEMBLY LINE "C"



TO-262

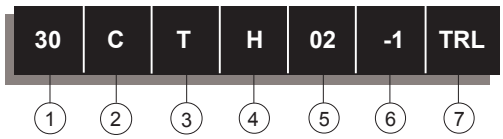
EXAMPLE: THIS IS A 32CTH02FP
LOT CODE 1789
ASSEMBLED ON WW 19, 2000
IN THE ASSEMBLY LINE "C"



FULLPACK

Ordering Information Table

Device Code



1	-	Current Rating (30 = 30A)
2	-	C = Common Cathode
3	-	T = TO-220
4	-	H = HyperFast Recovery
5	-	Voltage Rating (02 = 200V)
6	-	None = TO-220AB
		S = D^2Pak
		-1 = TO-262 Option
		FP = TO-220 FULLPACK
7		None = Tube (50 pieces)
		TRL = Tape & Reel (Left Oriented - for D^2Pak only)
		TRR = Tape & Reel (Right Oriented - for D^2Pak only)

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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