



30CTH02
30CTH02S
30CTH02-1
30CTH02FP

Hyperfast Rectifier

Features

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

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

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.


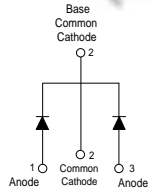

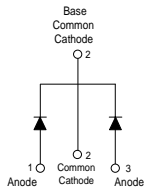

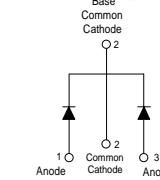

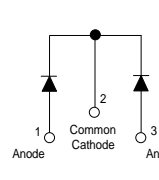
The planar structure and the platinum doped life time control, guarantee the best overall performance, ruggedness and reliability characteristics.

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 @ $T_C = 159^\circ\text{C}$ Per Diode @ $T_C = 125^\circ\text{C}$ (FULLPACK) Per Diode | 15 | A |
| | Per Device | |
| I_{FSM} Non Repetitive Peak Surge Current @ $T_J = 25^\circ\text{C}$ | 200 | |
| T_J, T_{STG} Operating Junction and Storage Temperatures | - 65 to 175 | $^\circ\text{C}$ |

| Case Styles | | | |
|---|--|--|---|
| <p>30CTH02</p>  <p>Base Common Cathode</p>  <p>1 Anode 2 Common Cathode 3 Anode</p> <p>TO-220AB</p> | <p>30CTH02S</p>  <p>Base Common Cathode</p>  <p>1 Anode 2 Common Cathode 3 Anode</p> <p>D²PAK</p> | <p>30CTH02-1</p>  <p>Base Common Cathode</p>  <p>1 Anode 2 Common Cathode 3 Anode</p> <p>TO-262</p> | <p>30CTH02FP</p>   <p>1 Anode 2 Common Cathode 3 Anode</p> <p>TO-220 FULLPACK</p> |

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 | - | A | $T_J = 25^\circ\text{C}$ |
| | - | 40 | - | | $T_J = 125^\circ\text{C}$ |
| I_{RRM} Peak Recovery Current | - | 2.8 | - | A | $I_F = 15\text{A}$ $di_F/dt = 200\text{A}/\mu\text{s}$ $V_R = 160\text{V}$ |
| | - | 6.0 | - | | |
| 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 Junction to Case Fullpack (Per Diode) | - | - | 1.1 | $^\circ\text{C}/\text{W}$ |
| | - | - | 3.5 | |
| Device Marking | 30CTH02 | | | Case Style TO-220 |
| | 30CTH02S | | | Case Style D ² Pak |
| | 30CTH02-1 | | | Case Style TO-262 |
| | 30CTH02FP | | | Case Style Fullpack |

① Mounting Surface, Flat, Smooth and Greased

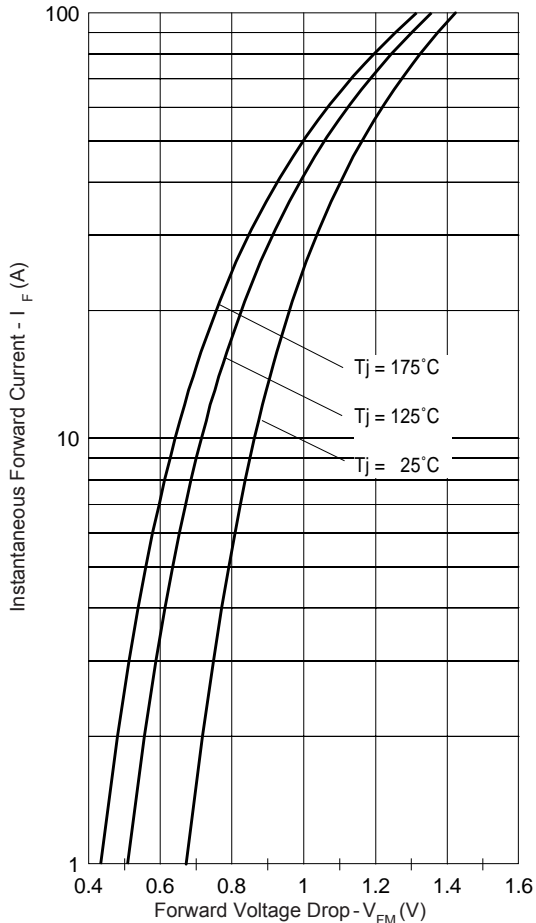


Fig. 1 - Typical Forward Voltage Drop Characteristics

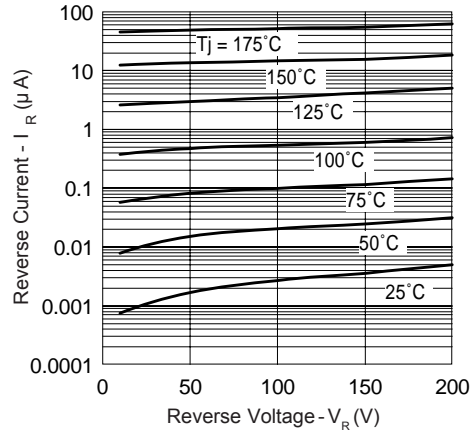


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

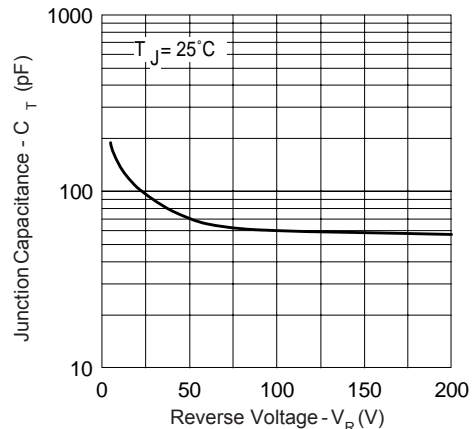


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

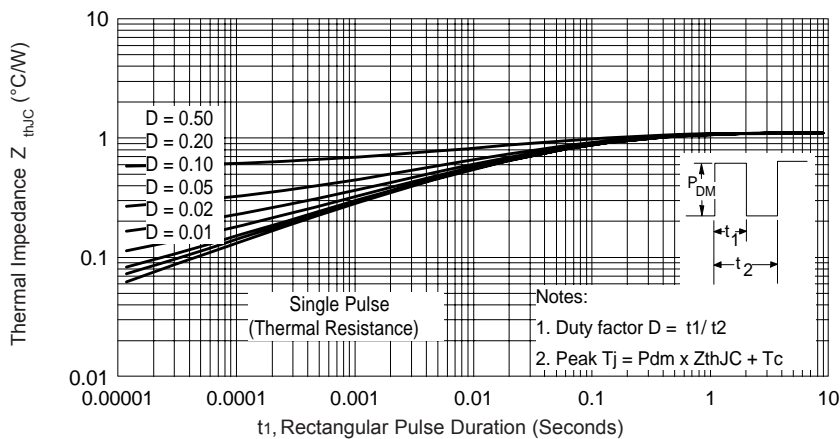


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

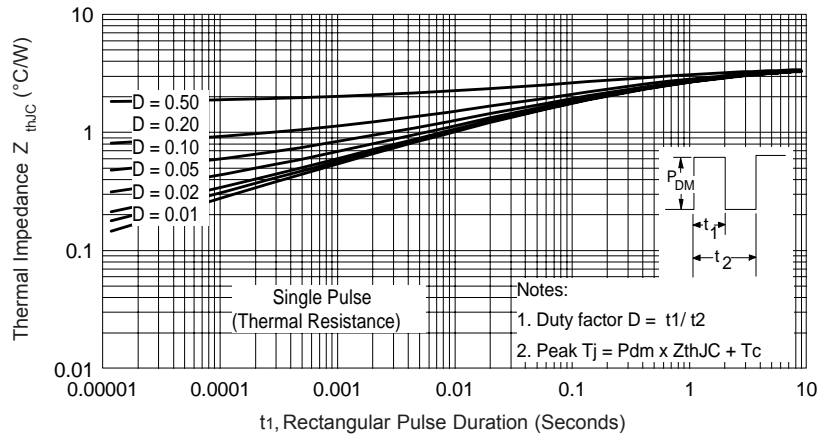


Fig. 5 - Max. Thermal Impedance Z_{thJC} Characteristics (FULLPACK)

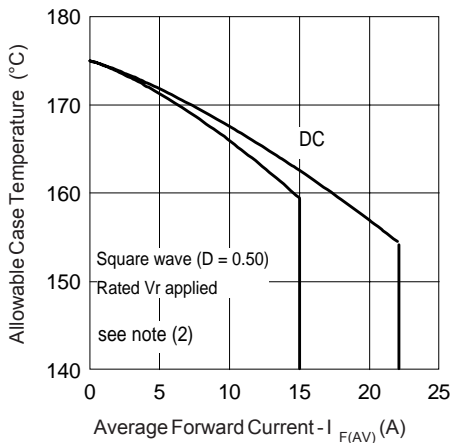


Fig. 6 - Max. Allowable Case Temperature Vs. Average Forward Current

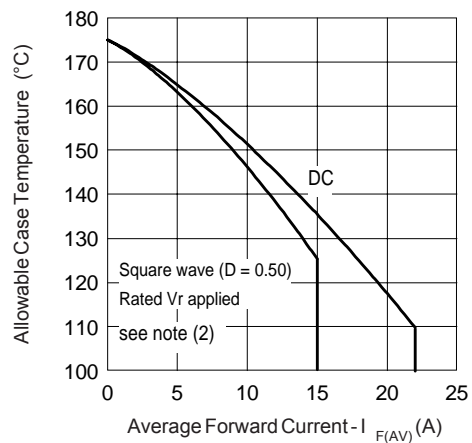


Fig. 7 - Max. Allowable Case Temperature Vs. Average Forward Current (FULLPACK)

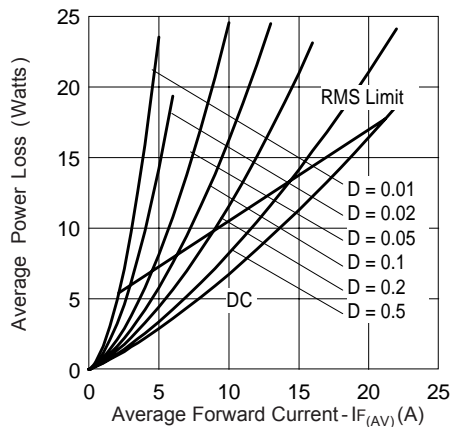


Fig. 8 - Forward Power Loss Characteristics

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

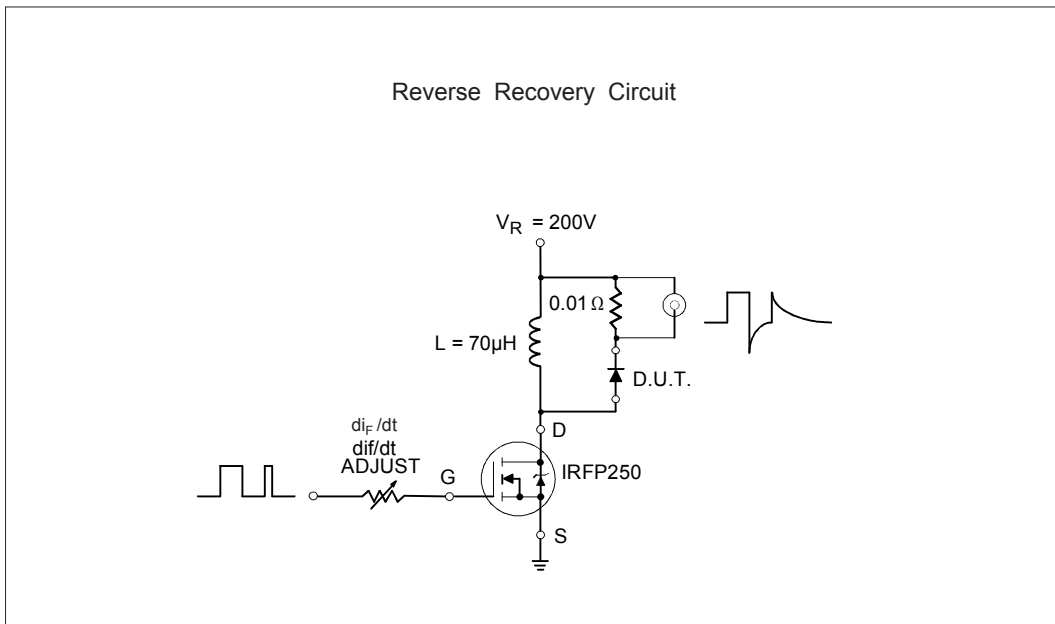
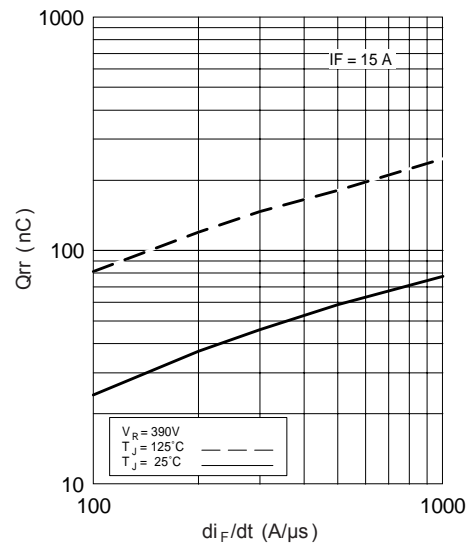
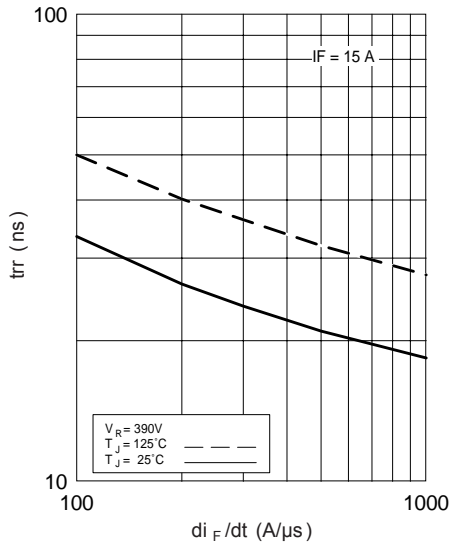


Fig. 11 - Reverse Recovery Parameter Test Circuit

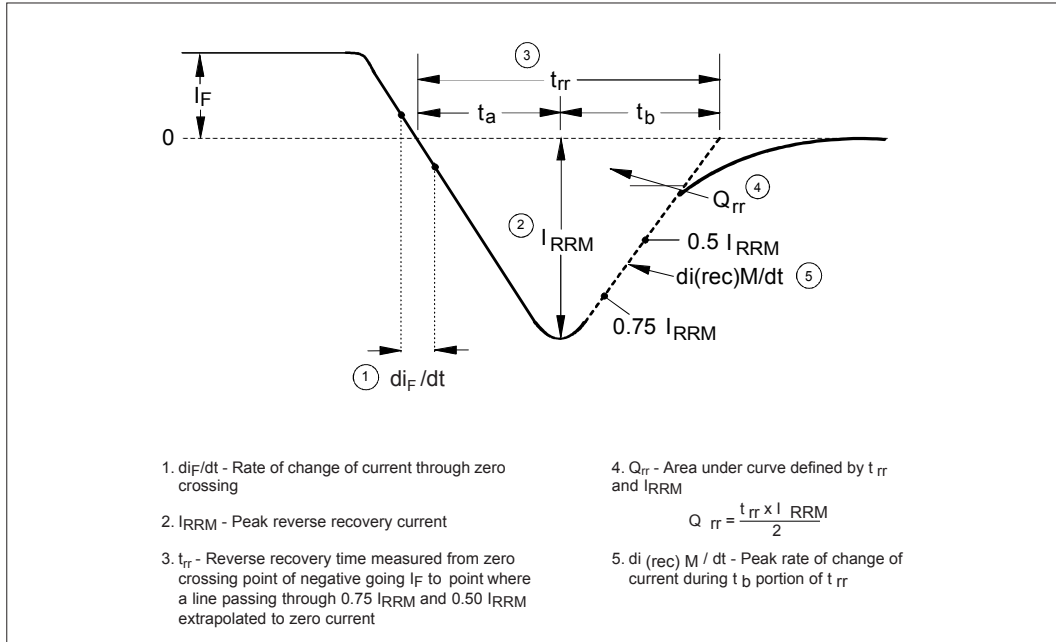
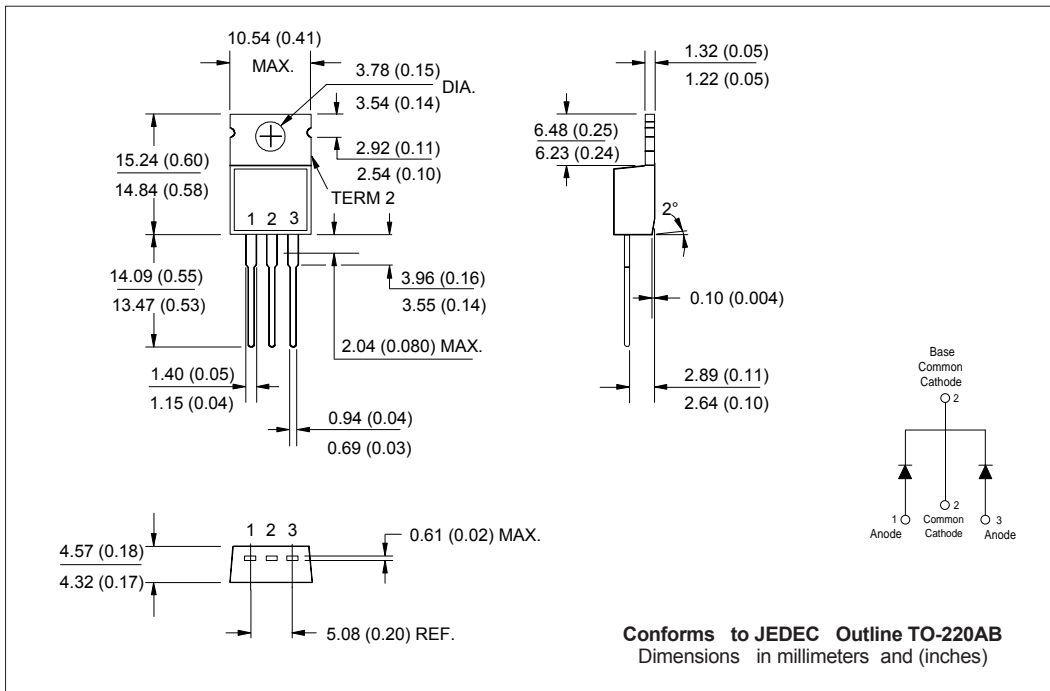
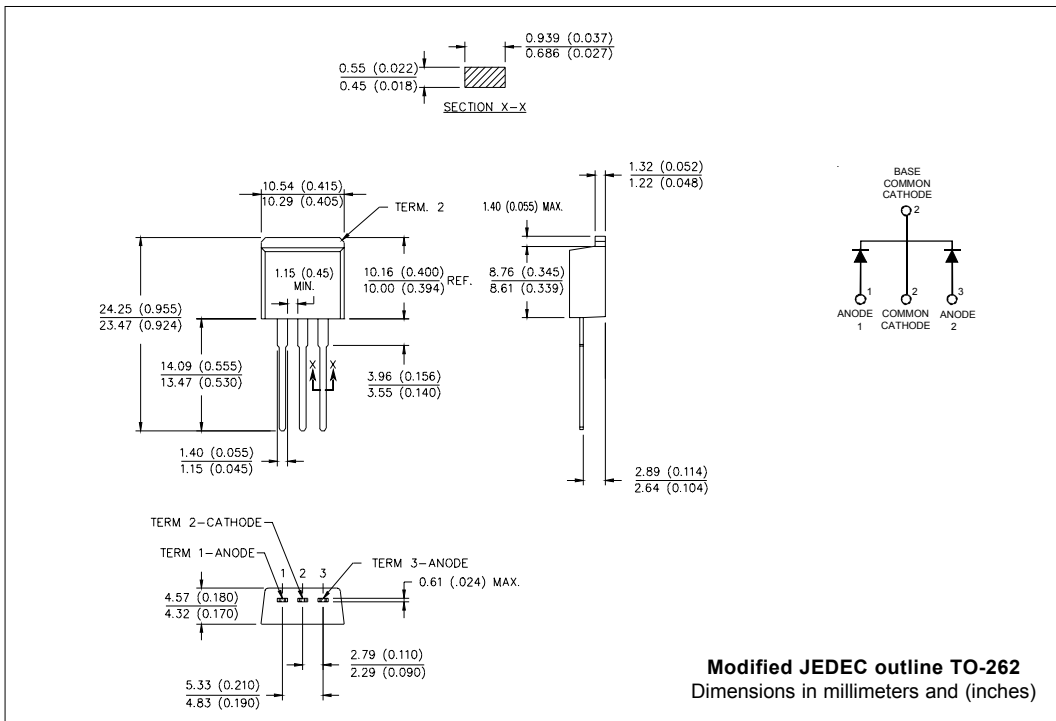
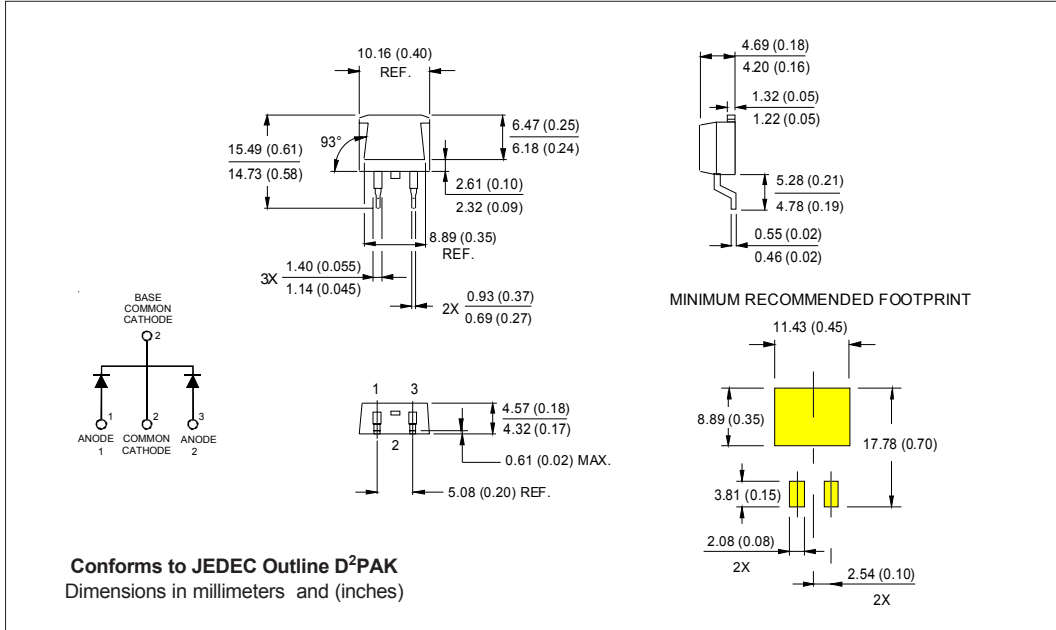


Fig. 13 - Reverse Recovery Waveform and Definitions

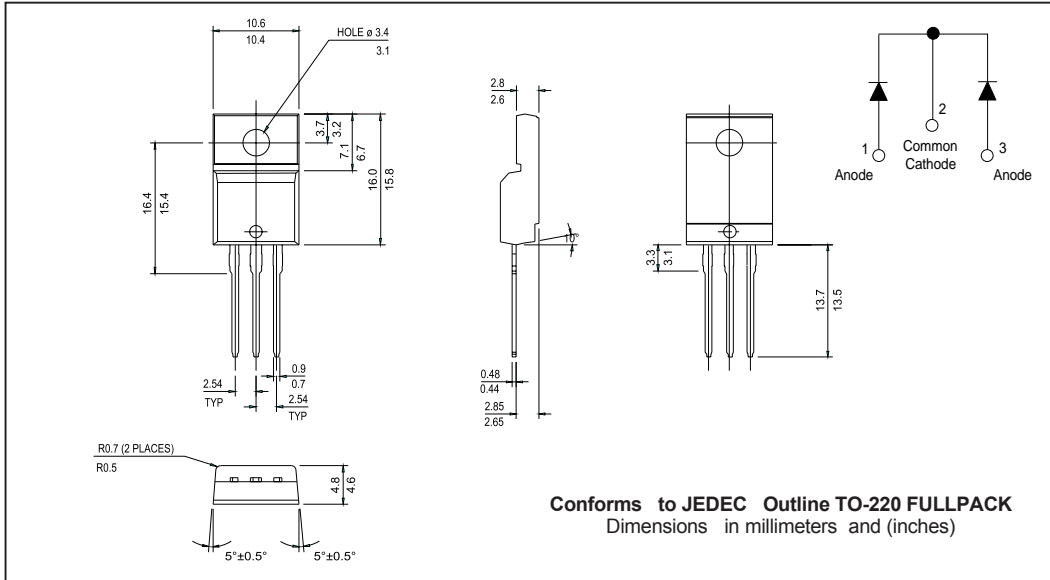
Outline Table



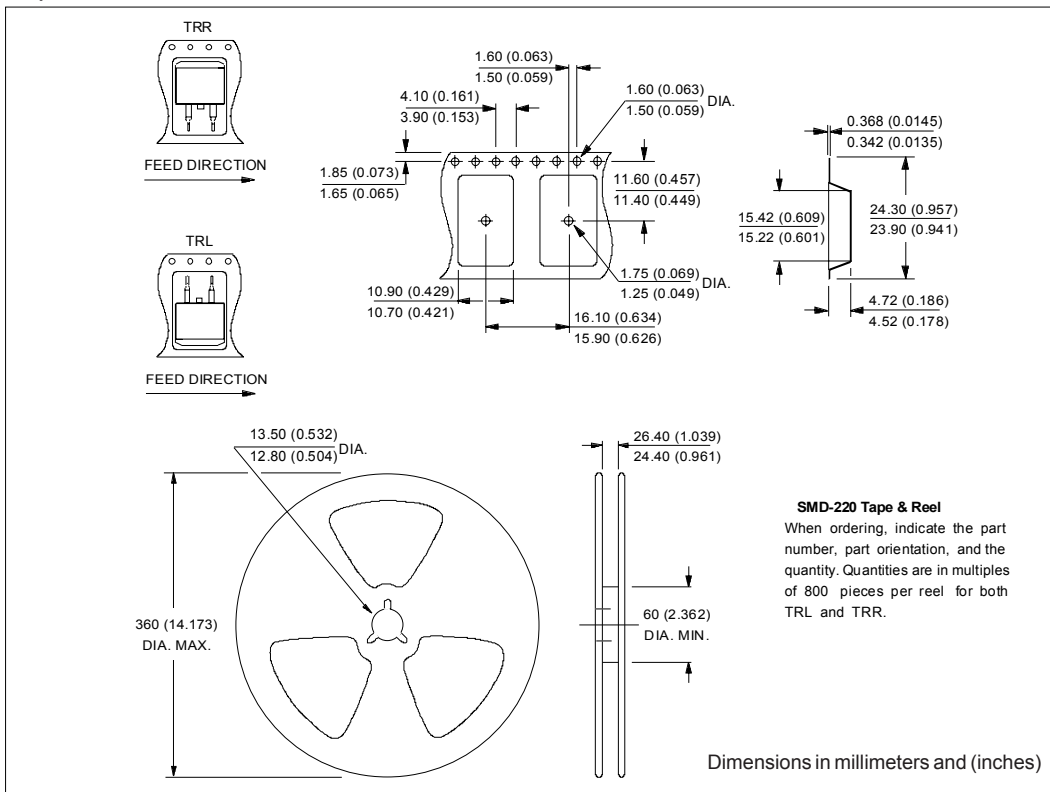
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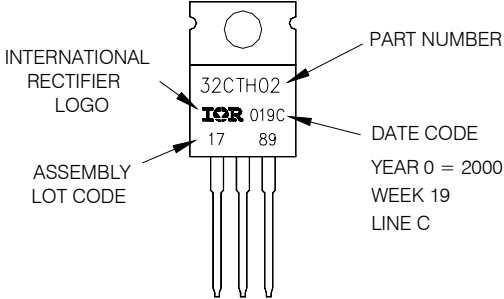
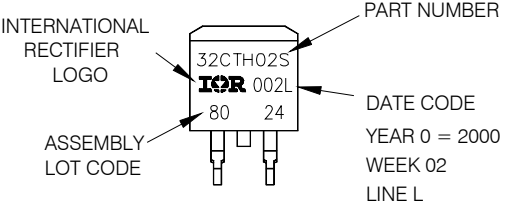
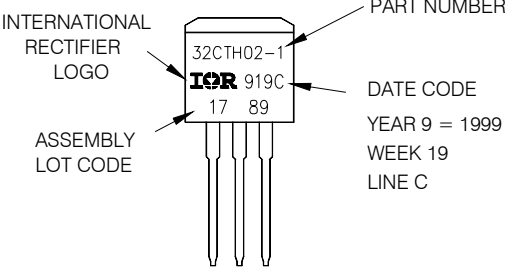
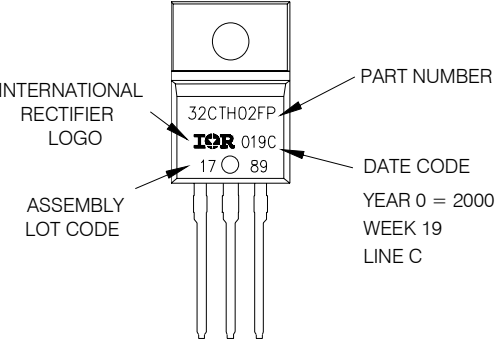
Outline Table



Tape & Reel Information



Part Marking Information

| | |
|--|--|
| <p>EXAMPLE: THIS IS A 32CTH02 LOT CODE 1789 ASSEMBLED ON WW 19, 2000 IN THE ASSEMBLY LINE "C"</p> |  <p>INTERNATIONAL RECTIFIER LOGO</p> <p>32CTH02</p> <p>IR 019C</p> <p>17 89</p> <p>ASSEMBLY LOT CODE</p> <p>PART NUMBER</p> <p>DATE CODE YEAR 0 = 2000 WEEK 19 LINE C</p> |
| <p>TO-220AB</p> | |
| <p>EXAMPLE: THIS IS A 32CTH02S LOT CODE 8024 ASSEMBLED ON WW 02, 2000 IN THE ASSEMBLY LINE "L"</p> |  <p>INTERNATIONAL RECTIFIER LOGO</p> <p>32CTH02S</p> <p>IR 002L</p> <p>80 24</p> <p>ASSEMBLY LOT CODE</p> <p>PART NUMBER</p> <p>DATE CODE YEAR 0 = 2000 WEEK 02 LINE L</p> |
| <p>D²PAK</p> | |
| <p>EXAMPLE: THIS IS A 32CTH02-1 LOT CODE 1789 ASSEMBLED ON WW 19, 1999 IN THE ASSEMBLY LINE "C"</p> |  <p>INTERNATIONAL RECTIFIER LOGO</p> <p>32CTH02-1</p> <p>IR 919C</p> <p>17 89</p> <p>ASSEMBLY LOT CODE</p> <p>PART NUMBER</p> <p>DATE CODE YEAR 9 = 1999 WEEK 19 LINE C</p> |
| <p>TO-262</p> | |
| <p>EXAMPLE: THIS IS A 32CTH02FP LOT CODE 1789 ASSEMBLED ON WW 19, 2000 IN THE ASSEMBLY LINE "C"</p> |  <p>INTERNATIONAL RECTIFIER LOGO</p> <p>32CTH02FP</p> <p>IR 019C</p> <p>17 89</p> <p>ASSEMBLY LOT CODE</p> <p>PART NUMBER</p> <p>DATE CODE YEAR 0 = 2000 WEEK 19 LINE C</p> |
| <p>FULLPACK</p> | |

Ordering Information Table

| Device Code | | | | | | | | | | | | | | | |
|-------------|---|-----------|----------|-----------|-----------|------------|-----------|------------|---|---|---|---|---|---|---|
| | <table border="1" style="margin: auto;"> <tr> <td style="padding: 5px;">30</td> <td style="padding: 5px;">C</td> <td style="padding: 5px;">T</td> <td style="padding: 5px;">H</td> <td style="padding: 5px;">02</td> <td style="padding: 5px;">-1</td> <td style="padding: 5px;">TRL</td> </tr> <tr> <td style="text-align: center;">①</td> <td style="text-align: center;">②</td> <td style="text-align: center;">③</td> <td style="text-align: center;">④</td> <td style="text-align: center;">⑤</td> <td style="text-align: center;">⑥</td> <td style="text-align: center;">⑦</td> </tr> </table> | 30 | C | T | H | 02 | -1 | TRL | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 30 | C | T | H | 02 | -1 | TRL | | | | | | | | | |
| ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | | | | | | | | | |
| 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 ² Pak -1 = TO-262 Option FP = TO-220 FULLPACK | | | | | | | | | | | | | | |
| 7 | - None = Tube (50 pieces) TRL = Tape & Reel (Left Oriented - for D ² Pak only) TRR = Tape & Reel (Right Oriented - for D ² Pak 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.