

# International IOR Rectifier

8ETX06  
8ETX06S  
8ETX06-1  
8ETX06FP

## Hyperfast Rectifier

### Features

- Hyperfast Recovery Time
- Low Forward Voltage Drop
- Low Leakage Current
- 175°C Operating Junction Temperature
- UL E78996 approved 

$$t_{rr} = 15\text{ns typ.}$$

$$I_{F(AV)} = 8\text{Amp}$$

$$V_R = 600\text{V}$$

### Description/ Applications

State of the art Hyperfast recovery rectifiers designed with optimized performance of forward voltage drop, Hyperfast recover time, and soft recovery.

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

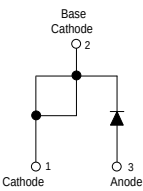
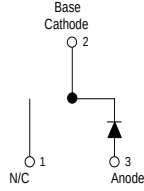
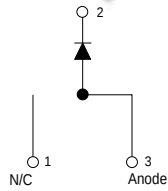
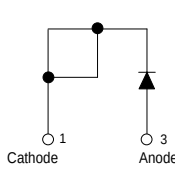
These devices are intended for use in PFC Boost stage in the AC-DC section of SMPS, inverters or as freewheeling diodes.

The IR 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                                                                           | 600         | V                |
| $I_{F(AV)}$ Average Rectified Forward Current @ $T_C = 143^\circ\text{C}$<br>@ $T_C = 106^\circ\text{C}$ (FULLPACK) | 8           | A                |
| $I_{FSM}$ Non Repetitive Peak Surge Current @ $T_J = 25^\circ\text{C}$                                              | 110         |                  |
| $I_{FM}$ Peak Repetitive Forward Current                                                                            | 18          |                  |
| $T_J, T_{STG}$ Operating Junction and Storage Temperatures                                                          | - 65 to 175 | $^\circ\text{C}$ |

### Case Styles

| 8ETX06                                                                                              | 8ETX06S                                                                                                     | 8ETX06-1                                                                                           | 8ETX06FP                                                                                                     |
|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|                  |                          |                 |                         |
|  <p>TO-220AC</p> |  <p>D<sup>2</sup>PAK</p> |  <p>TO-262</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 | 600 | -   | -   | V             | $I_R = 100\mu\text{A}$                      |
| $V_F$ Forward Voltage                             | -   | 2.3 | 3.0 | V             | $I_F = 8\text{A}, T_J = 25^\circ\text{C}$   |
|                                                   | -   | 1.4 | 1.7 | V             | $I_F = 8\text{A}, T_J = 150^\circ\text{C}$  |
| $I_R$ Reverse Leakage Current                     | -   | 0.3 | 50  | $\mu\text{A}$ | $V_R = V_R$ Rated                           |
|                                                   | -   | 35  | 500 | $\mu\text{A}$ | $T_J = 150^\circ\text{C}, V_R = V_R$ Rated  |
| $C_T$ Junction Capacitance                        | -   | 17  | -   | pF            | $V_R = 600\text{V}$                         |
| $L_S$ Series Inductance                           | -   | 8.0 | -   | 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   | -   | 15  | 19  | ns    | $I_F = 1\text{A}, di_F/dt = 100\text{A}/\mu\text{s}, V_R = 30\text{V}$          |
|                                  | -   | 16  | 24  |       | $I_F = 8\text{A}, di_F/dt = 100\text{A}/\mu\text{s}, V_R = 30\text{V}$          |
|                                  | -   | 17  | -   |       | $T_J = 25^\circ\text{C}$                                                        |
|                                  | -   | 40  | -   |       | $T_J = 125^\circ\text{C}$                                                       |
| $I_{RRM}$ Peak Recovery Current  | -   | 2.3 | -   | A     | $T_J = 25^\circ\text{C}$                                                        |
|                                  | -   | 4.5 | -   |       | $T_J = 125^\circ\text{C}$                                                       |
| $Q_{rr}$ Reverse Recovery Charge | -   | 20  | -   | nC    | $T_J = 25^\circ\text{C}$                                                        |
|                                  | -   | 100 | -   |       | $T_J = 125^\circ\text{C}$                                                       |
| $t_{rr}$ Reverse Recovery Time   | -   | 31  | -   | ns    | $I_F = 8\text{A}$<br>$di_F/dt = 200\text{A}/\mu\text{s}$<br>$V_R = 390\text{V}$ |
| $I_{RRM}$ Peak Recovery Current  | -   | 12  | -   | A     |                                                                                 |
| $Q_{rr}$ Reverse Recovery Charge | -   | 195 | -   | nC    |                                                                                 |

**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 |                           |
| $R_{thJC}$ Thermal Resistance, Junction to Case Per Leg<br>(Fullpack) Per Leg | -    | 1.4  | 2   | $^\circ\text{C}/\text{W}$ |
|                                                                               | -    | 3.4  | 4.3 |                           |
| $R_{thJA}$ ① Thermal Resistance, Junction to Ambient Per Leg                  | -    | -    | 70  |                           |
| $R_{thCS}$ ② Thermal Resistance, Case to Heatsink                             | -    | 0.5  | -   |                           |
| Weight                                                                        | -    | 2.0  | -   | g                         |
|                                                                               | -    | 0.07 | -   | (oz)                      |
| Mounting Torque                                                               | 6.0  | -    | 12  | Kg-cm                     |
|                                                                               | 5.0  | -    | 10  | lbf.in                    |

① Typical Socket Mount

② Mounting Surface, Flat, Smooth and Greased

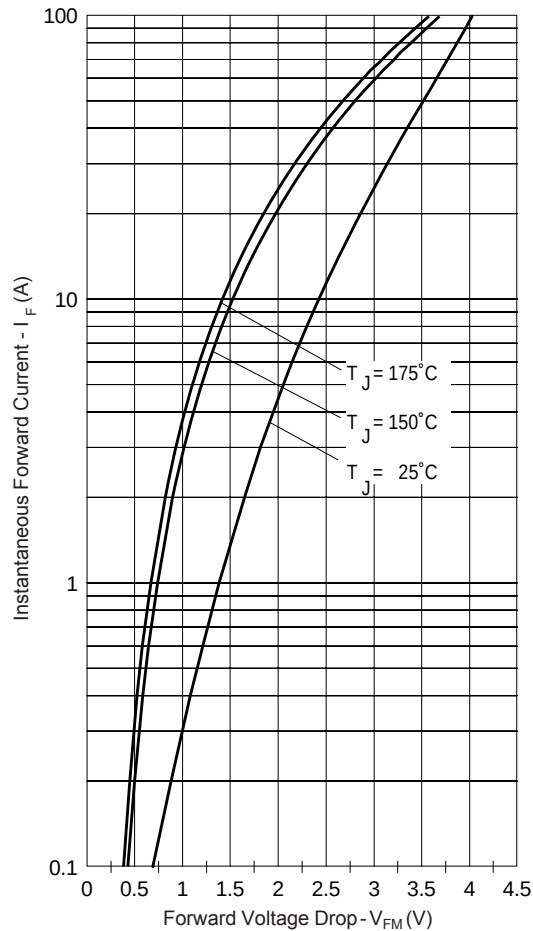


Fig. 1 - Typical Forward Voltage Drop Characteristics

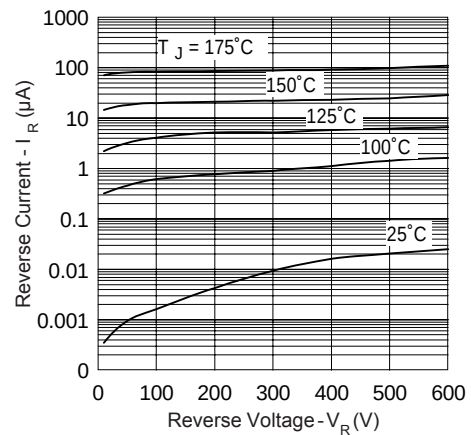


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

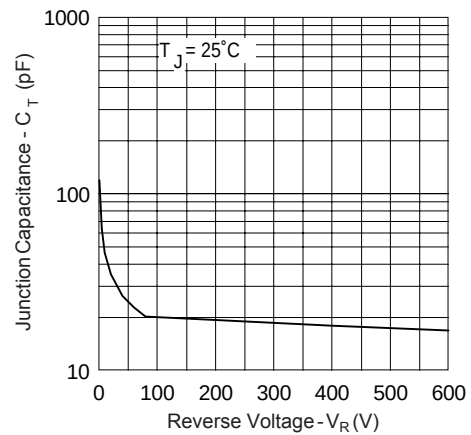


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

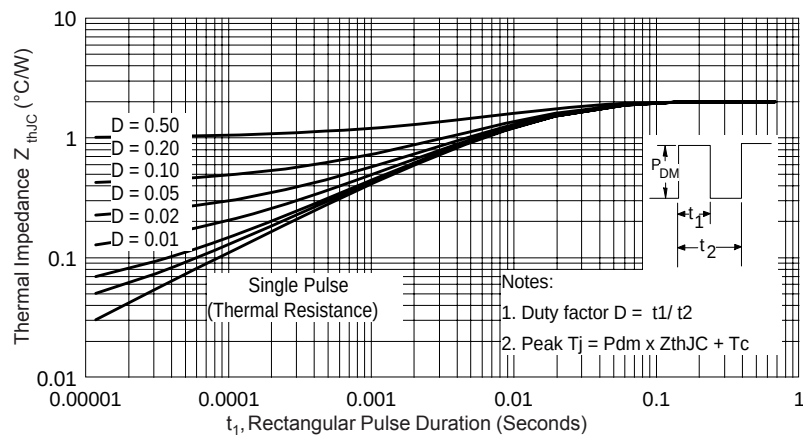


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics

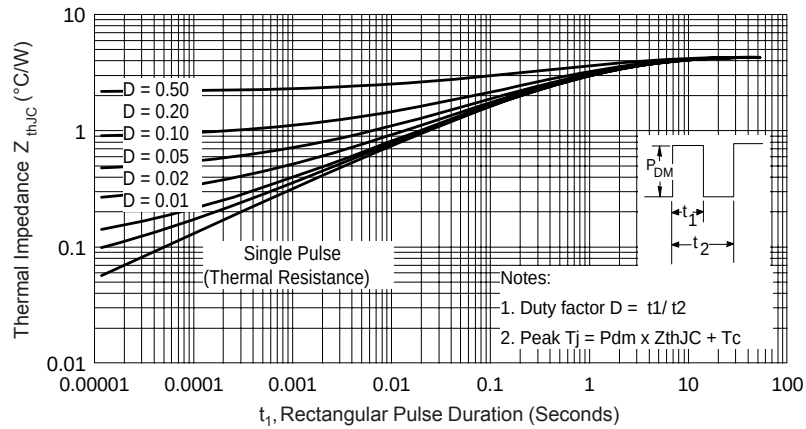
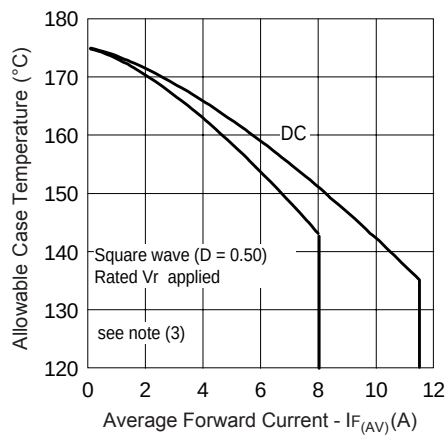
Fig. 5 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics (FULLPACK)

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

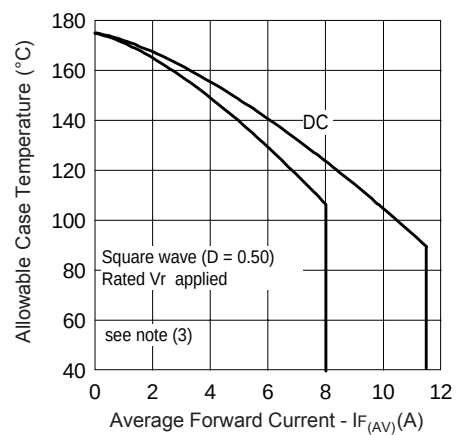


Fig. 7 - Max. Allowable Case Temperature Vs. Average Forward Current (FULLPACK)

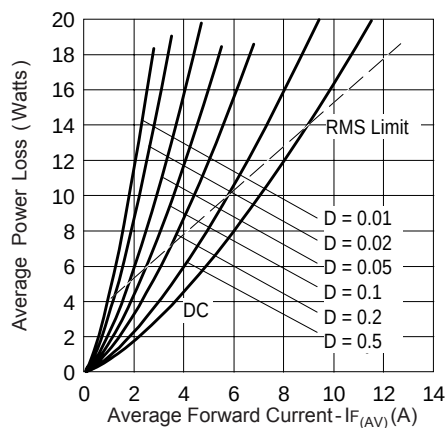


Fig. 8 - Forward Power Loss Characteristics

(3) 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  $V_R$

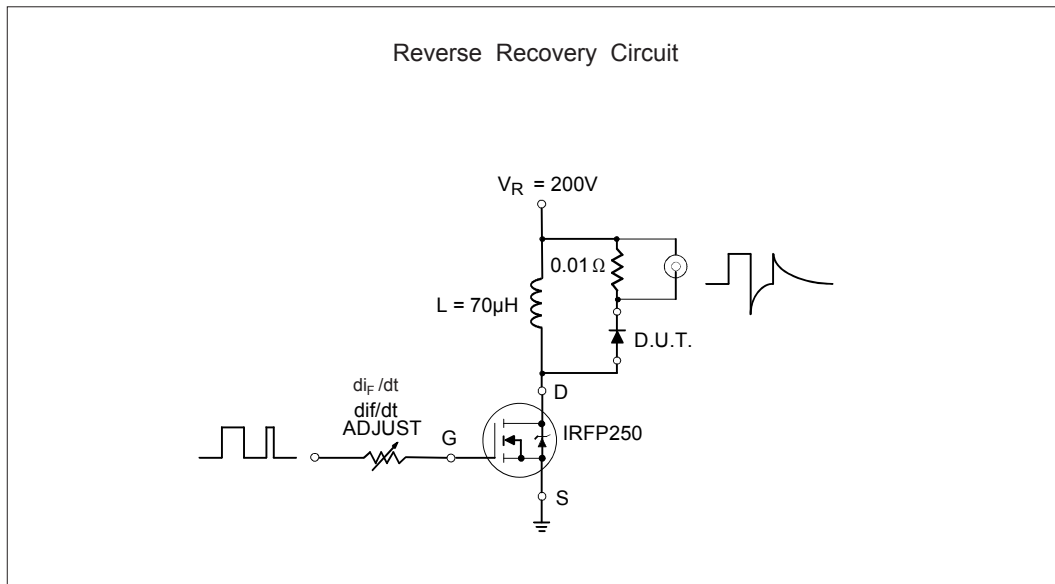
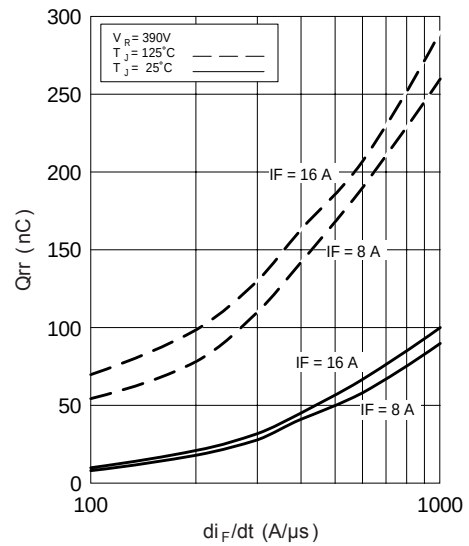
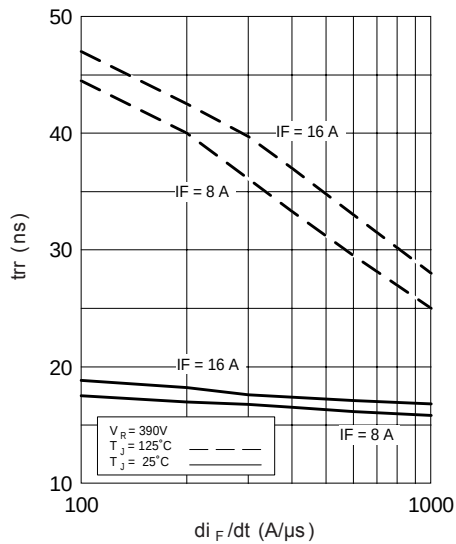


Fig. 11- Reverse Recovery Parameter Test Circuit

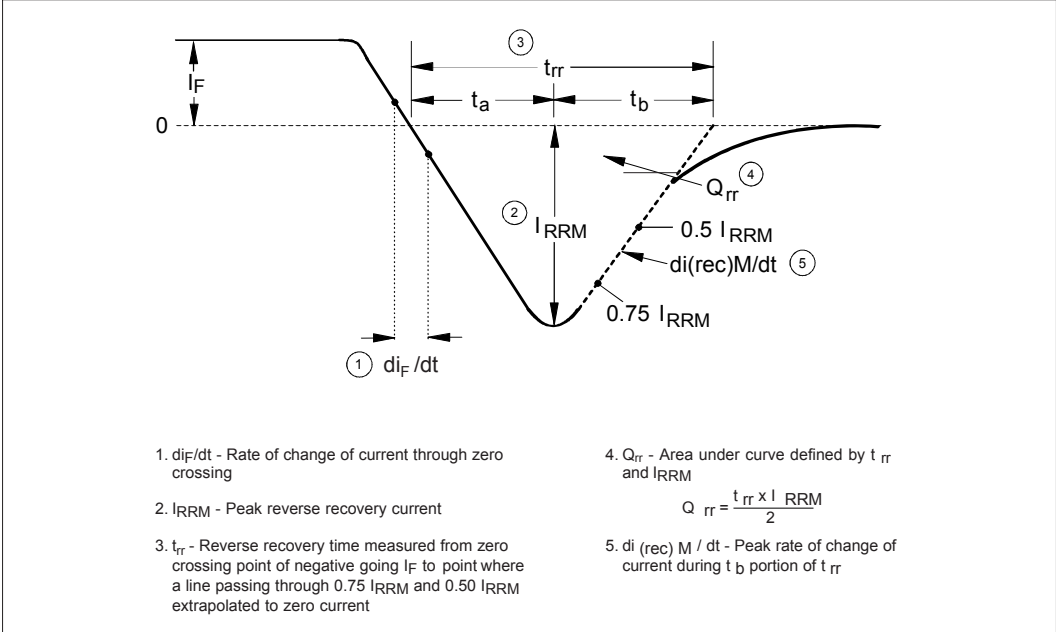
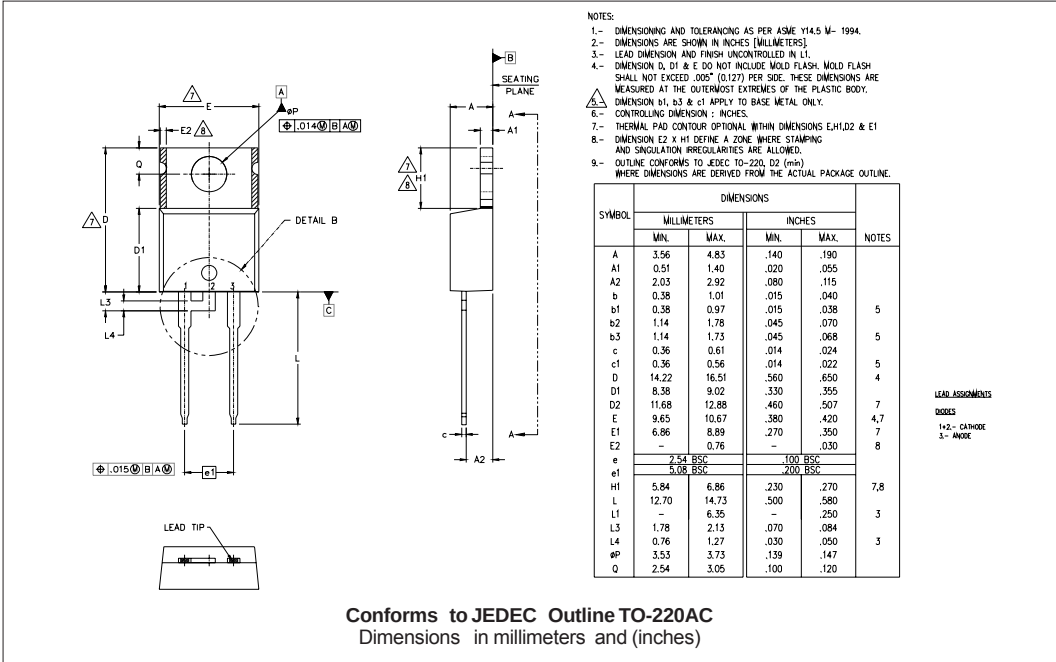
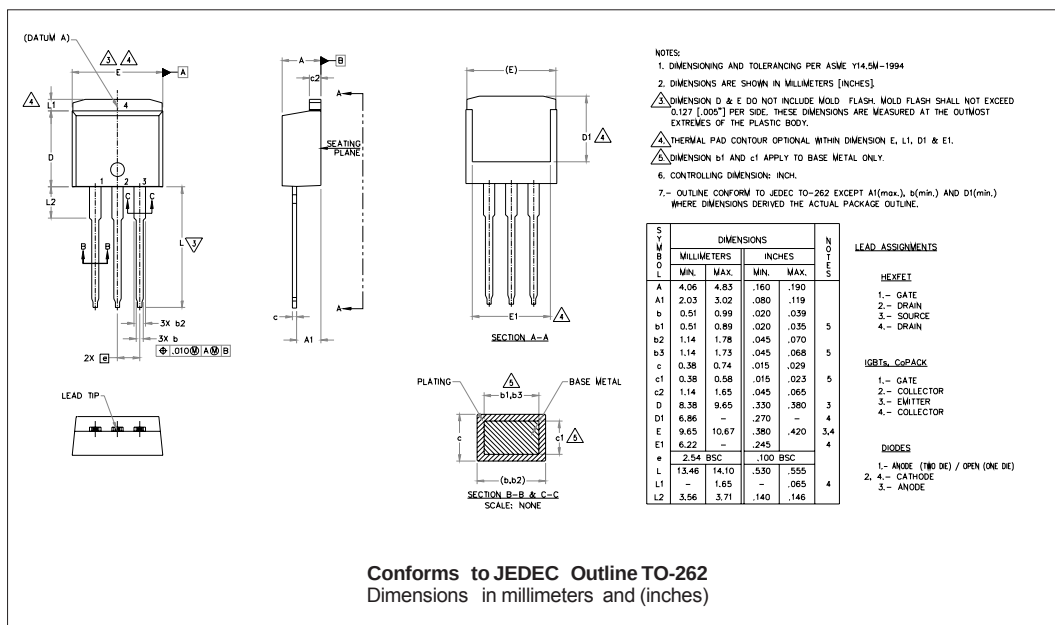
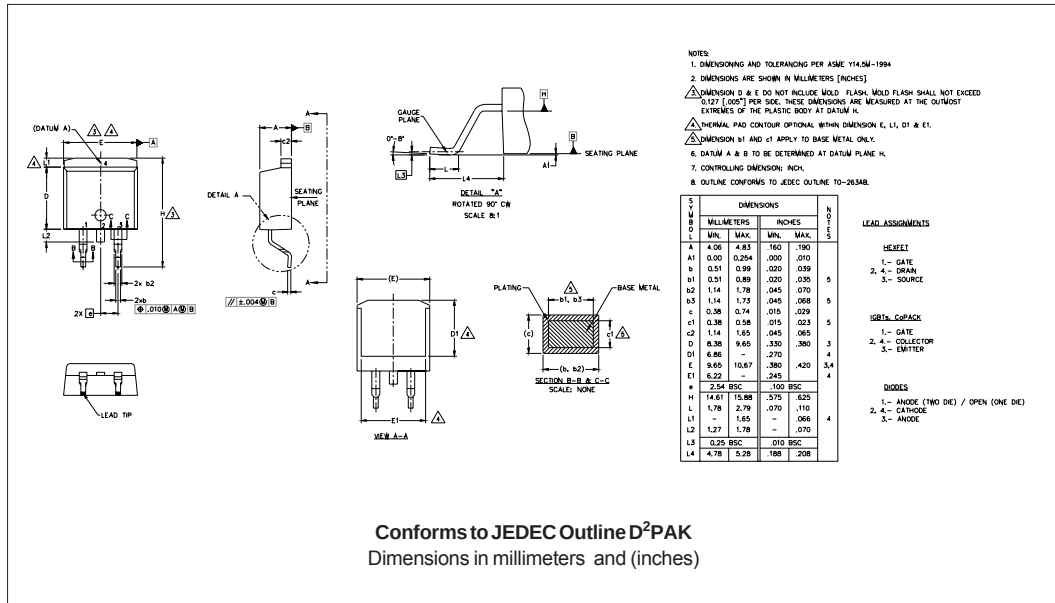


Fig. 12 - Reverse Recovery Waveform and Definitions

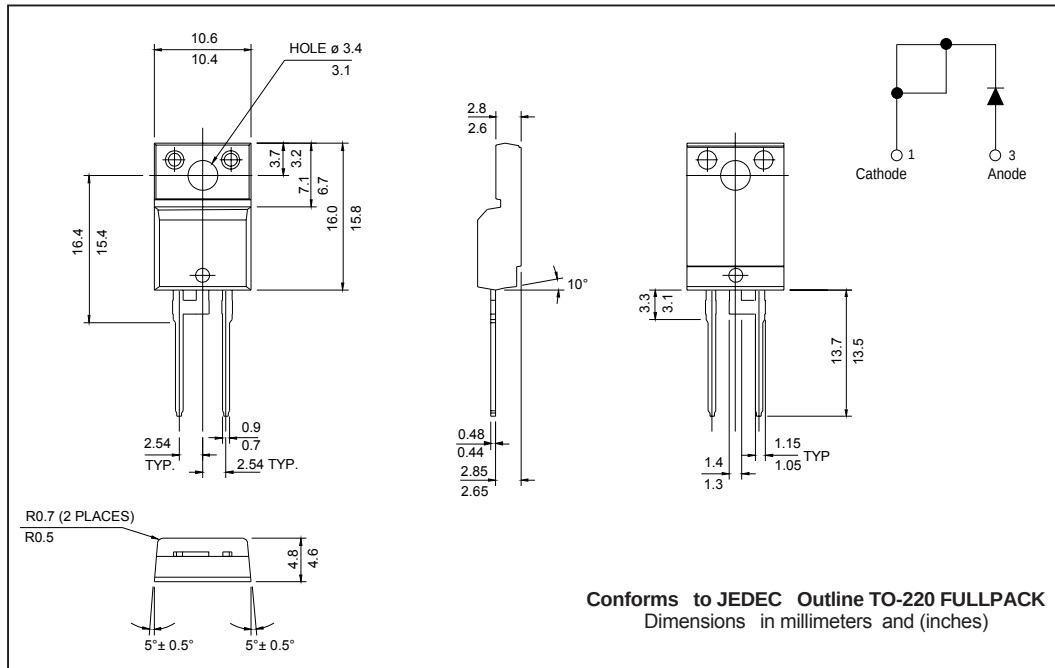
# Outline Table



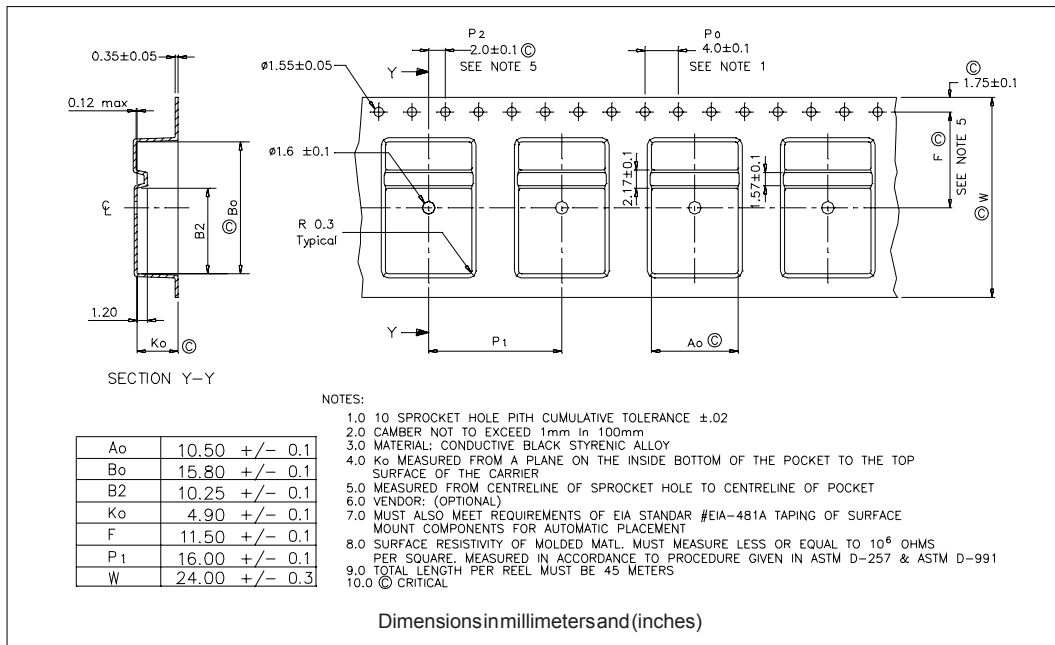
## Outline Table



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## Tape &amp; Reel Information

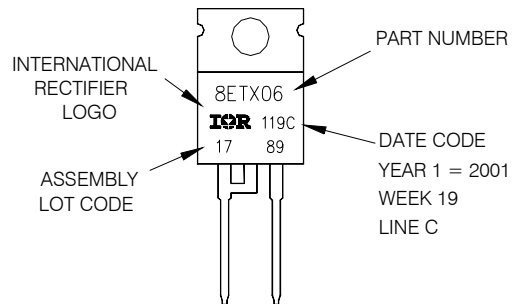




## Part Marking Information

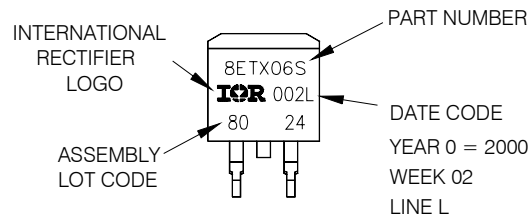
### TO-220AC

EXAMPLE: THIS IS A 8ETX06  
LOT CODE 1789  
ASSEMBLED ON WW 19, 2001  
IN THE ASSEMBLY LINE "C"



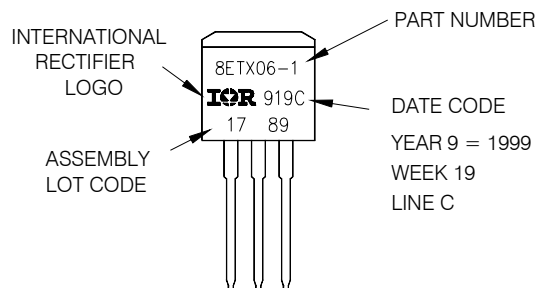
### D<sup>2</sup>PAK

EXAMPLE: THIS IS A 8ETX06S  
LOT CODE 8024  
ASSEMBLED ON WW 02, 2000  
IN THE ASSEMBLY LINE "L"



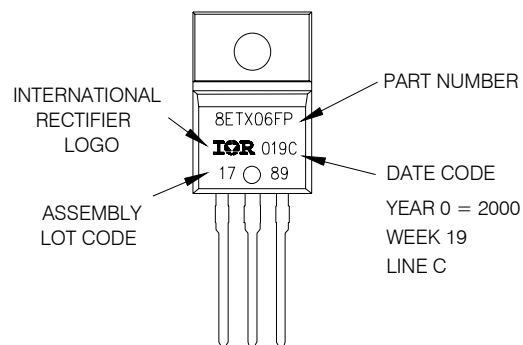
### TO-262

EXAMPLE: THIS IS A 8ETX06-1  
LOT CODE 1789  
ASSEMBLED ON WW 19, 1999  
IN THE ASSEMBLY LINE "C"



### FULLPACK

EXAMPLE: THIS IS A 8ETX06FP  
LOT CODE 1789  
ASSEMBLED ON WW 19, 2000  
IN THE ASSEMBLY LINE "C"



Ordering Information Table

| Device Code |   |                                                                  |   |    |    |     |   |
|-------------|---|------------------------------------------------------------------|---|----|----|-----|---|
| 8           | E | T                                                                | X | 06 | -1 | TRL | - |
| 1           | 2 | 3                                                                | 4 | 5  | 6  | 7   | 8 |
| 1           | - | Current Rating (8 = 8A)                                          |   |    |    |     |   |
| 2           | - | E = Single Diode                                                 |   |    |    |     |   |
| 3           | - | T = TO-220                                                       |   |    |    |     |   |
| 4           | - | X = HyperFast Recovery                                           |   |    |    |     |   |
| 5           | - | Voltage Rating (06 = 600V)                                       |   |    |    |     |   |
| 6           | - | None = TO-220                                                    |   |    |    |     |   |
|             |   | S = D <sup>2</sup> Pak                                           |   |    |    |     |   |
|             |   | -1 = TO-262 Option                                               |   |    |    |     |   |
|             |   | FP = TO-220 FULLPACK                                             |   |    |    |     |   |
| 7           | - | None = Tube (50 pieces)                                          |   |    |    |     |   |
|             |   | TRL = Tape & Reel (Left Oriented - for D <sup>2</sup> Pak only)  |   |    |    |     |   |
|             |   | TRR = Tape & Reel (Right Oriented - for D <sup>2</sup> Pak only) |   |    |    |     |   |
| 8           | - | • none = Standard Production                                     |   |    |    |     |   |
|             |   | • PbF = Lead-Free                                                |   |    |    |     |   |

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.