

International IOR Rectifier

8ETL06
8ETL06S
8ETL06-1
8ETL06FP

Ultra-low V_F Hyperfast Rectifier for Discontinuous Mode PFC

Features

- Benchmark Ultra-low Forward Voltage Drop
- Hyperfast Recovery Time
- Low Leakage Current
- 175°C Operating Junction Temperature
- Fully Isolated package ($V_{INS} = 2500 V_{RMS}$)
- UL E78996 approved 

$$V_F = 0.96V \text{ typ.}$$

$$I_{F(AV)} = 8A$$

$$V_R = 600V$$

Description

State of the art, ultra-low V_F , soft-switching Hyperfast Rectifiers optimized for Discontinuous (Critical) Mode (DCM) Power Factor Correction (PFC).

The minimised conduction loss, optimized stored charge and low recovery current minimize the switching losses and reduce over dissipation in the switching element and snubbers.

The device is also intended for use as a free wheeling diode in power supplies and other power switching applications.

Applications

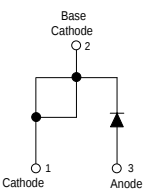
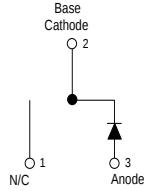
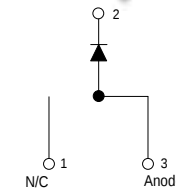
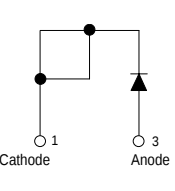
AC-DC SMPS 70W-400W

e.g. Laptop & Printer AC Adaptors, Desktop PC, TV & Monitor, Games units and DVD AC-DC power supplies.

Absolute Maximum Ratings

Parameters	Max	Units
V_{RRM} Peak Repetitive Reverse Voltage	600	V
$I_{F(AV)}$ Average Rectified Forward Current @ $T_C = 160^\circ C$ @ $T_C = 142^\circ C$ (FULLPACK)	8	A
I_{FSM} Non Repetitive Peak Surge Current @ $T_J = 25^\circ C$	175	
I_{FM} Peak Repetitive Forward Current	16	
T_J, T_{STG} Operating Junction and Storage Temperatures	- 65 to 175	$^\circ C$

Case Styles

8ETL06	8ETL06S	8ETL06-1	8ETL06FP
  TO-220AC	  D ² PAK	  TO-262	  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	600	-	-	V	$I_R = 100\mu\text{A}$
V_F Forward Voltage	-	0.96	1.05	V	$I_F = 8\text{A}, T_J = 25^\circ\text{C}$
	-	0.81	0.86	V	$I_F = 8\text{A}, T_J = 150^\circ\text{C}$
I_R Reverse Leakage Current	-	0.05	5	μA	$V_R = V_R \text{ Rated}$
	-	20	100	μA	$T_J = 150^\circ\text{C}, V_R = V_R \text{ Rated}$
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	-	60	100	ns	$I_F = 1\text{A}, di_F/dt = 100\text{A}/\mu\text{s}, V_R = 30\text{V}$
	-	150	250		$I_F = 8\text{A}, di_F/dt = 100\text{A}/\mu\text{s}, V_R = 30\text{V}$
	-	170	-		$T_J = 25^\circ\text{C}$
	-	250	-		$T_J = 125^\circ\text{C}$
I_{RRM} Peak Recovery Current	-	15	-	A	$T_J = 25^\circ\text{C}$
	-	20	-		$T_J = 125^\circ\text{C}$
Q_{rr} Reverse Recovery Charge	-	1.3	-	μC	$T_J = 25^\circ\text{C}$
	-	2.6	-		$T_J = 125^\circ\text{C}$

$I_F = 8\text{A}$
 $di_F/dt = 200\text{A}/\mu\text{s}$
 $V_R = 390\text{V}$

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} Thermal Resistance, Junction to Case	-	1.4	2	$^\circ\text{C}/\text{W}$
		3.4	4.3	
R_{thJA} ① Thermal Resistance, Junction to Ambient	-	-	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

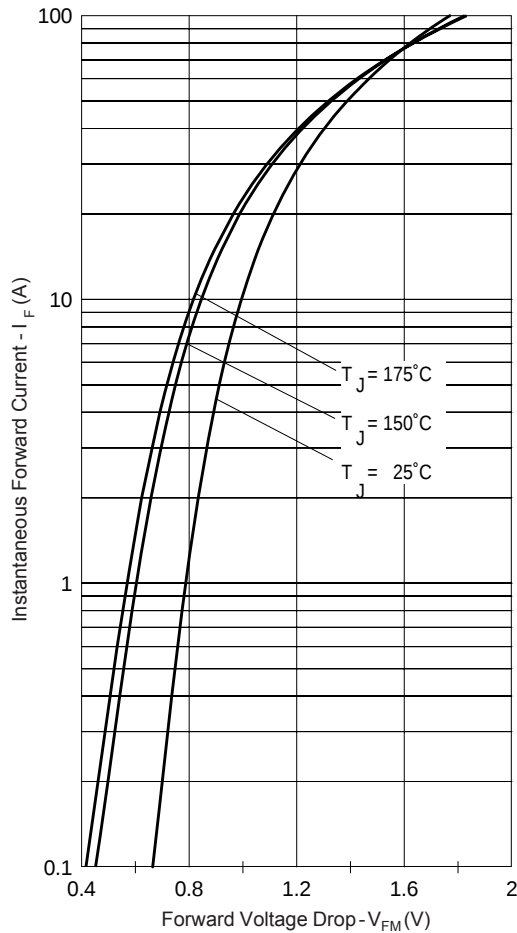


Fig. 1 - Typical Forward Voltage Drop Characteristics

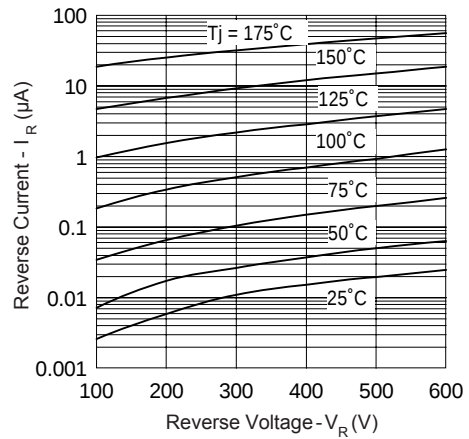


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

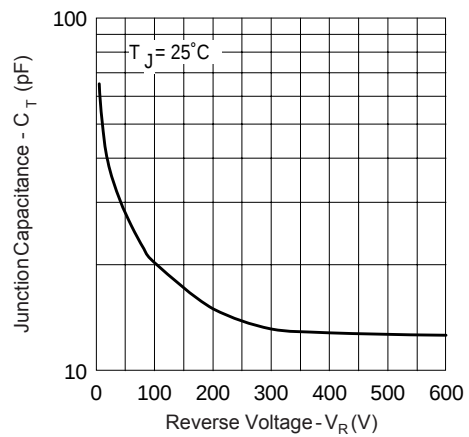


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

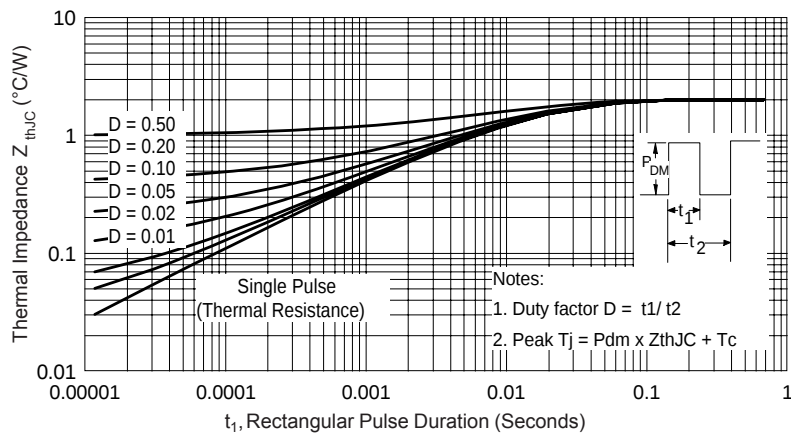


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

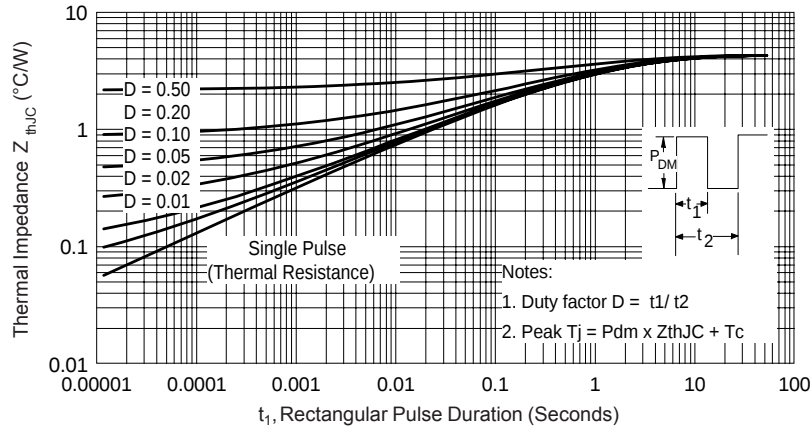
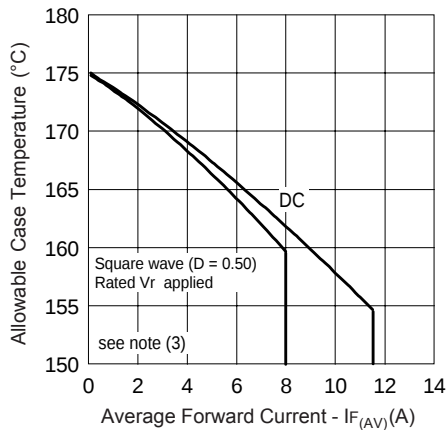
Fig. 5 - Max. Thermal Impedance Z_{thJC} Characteristics (FULLPACK)

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

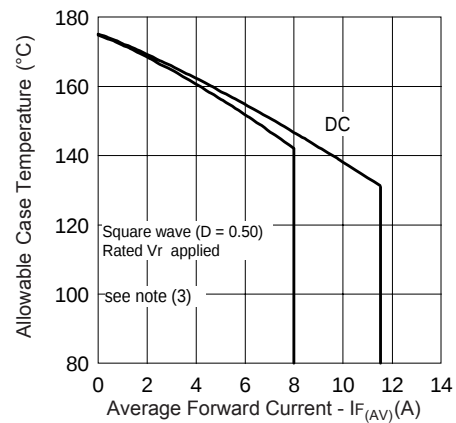


Fig. 7 - Max. Allowable Case Temperature Vs. Average Forward Current (FULLPACK)

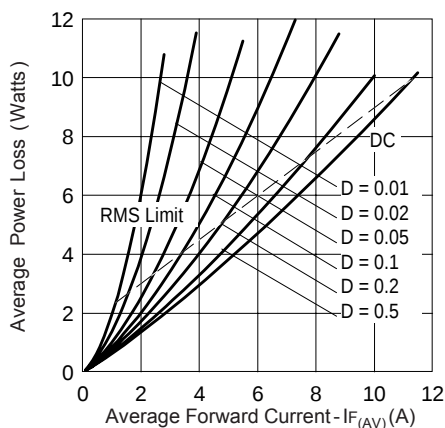


Fig. 8 - Forward Power Loss Characteristics

(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

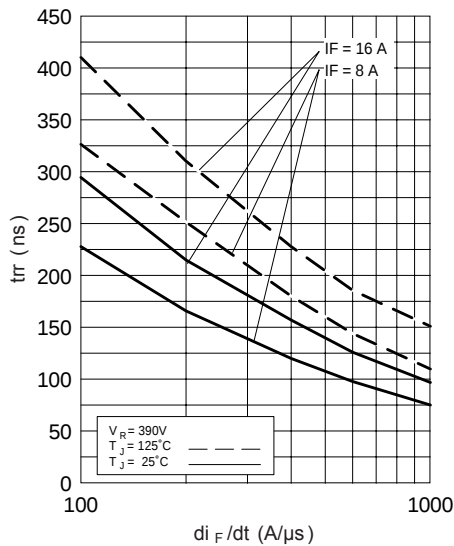


Fig. 9 - Typical Reverse Recovery vs. di_F/dt

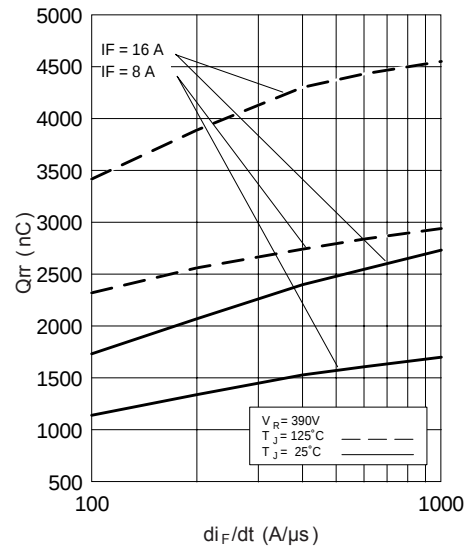


Fig. 10 - Typical Stored Charge vs. di_F/dt

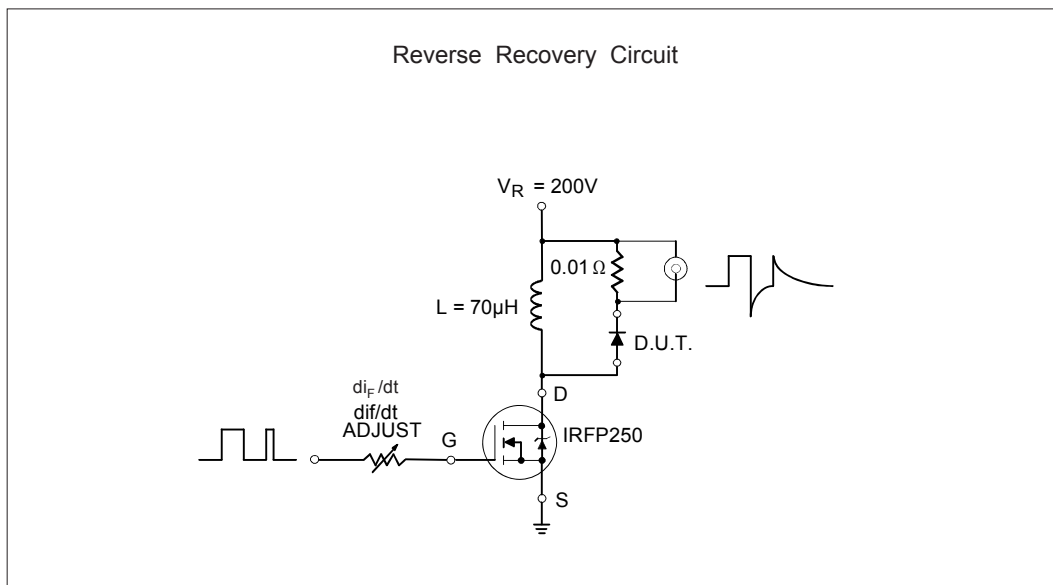


Fig. 11- Reverse Recovery Parameter Test Circuit

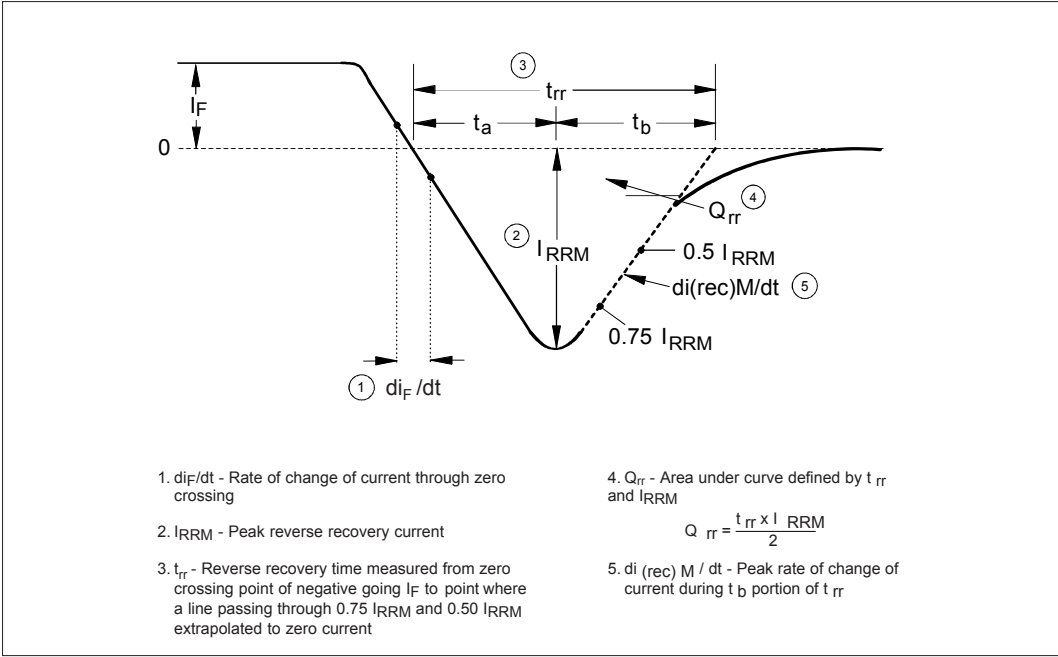
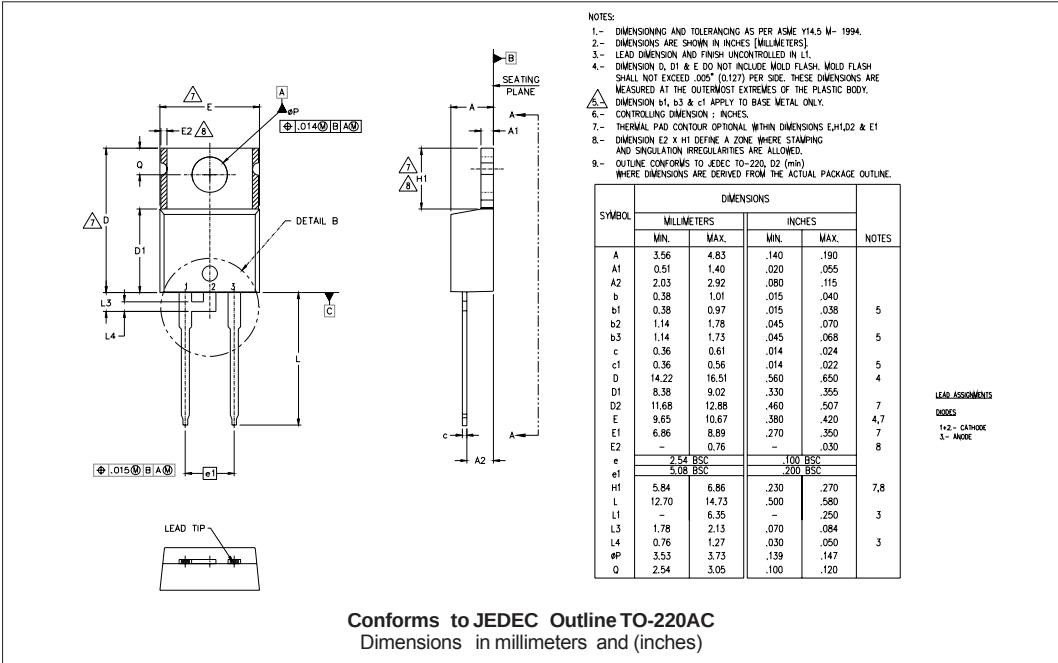
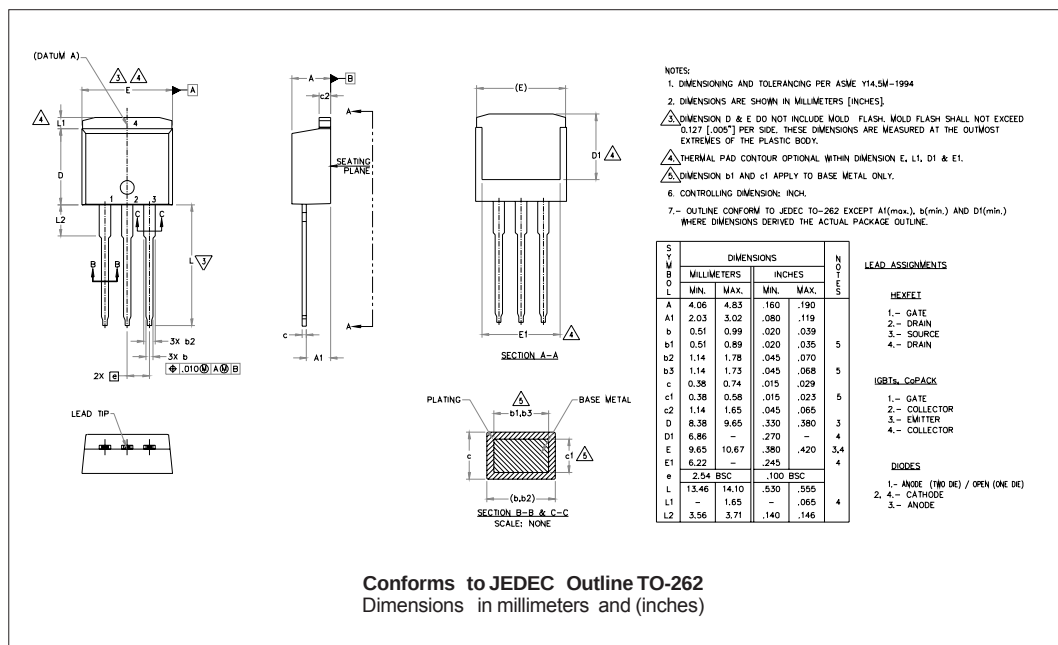
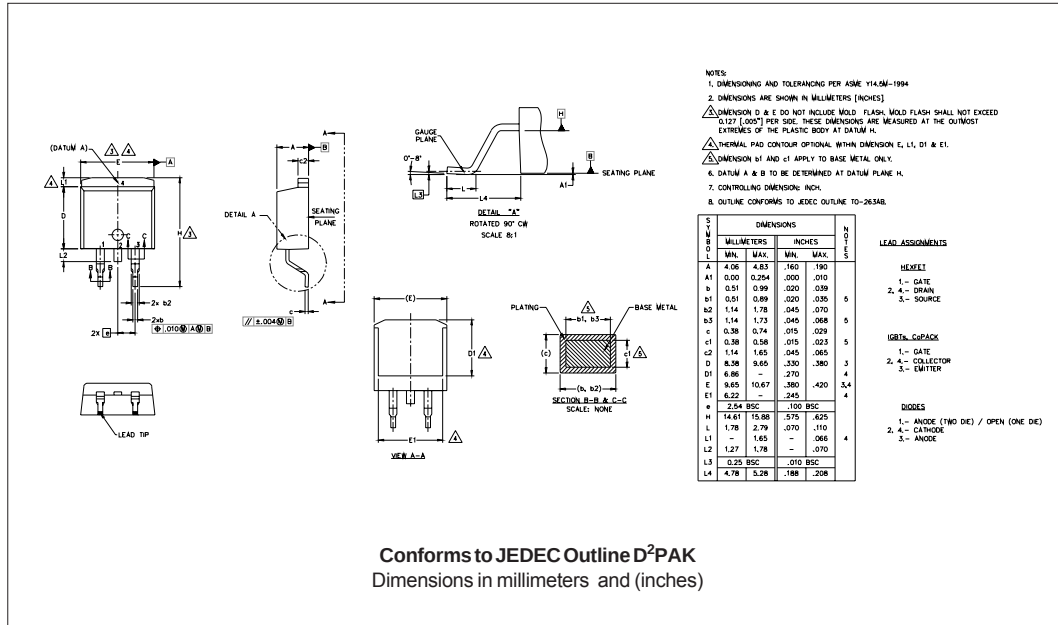


Fig. 12 - Reverse Recovery Waveform and Definitions

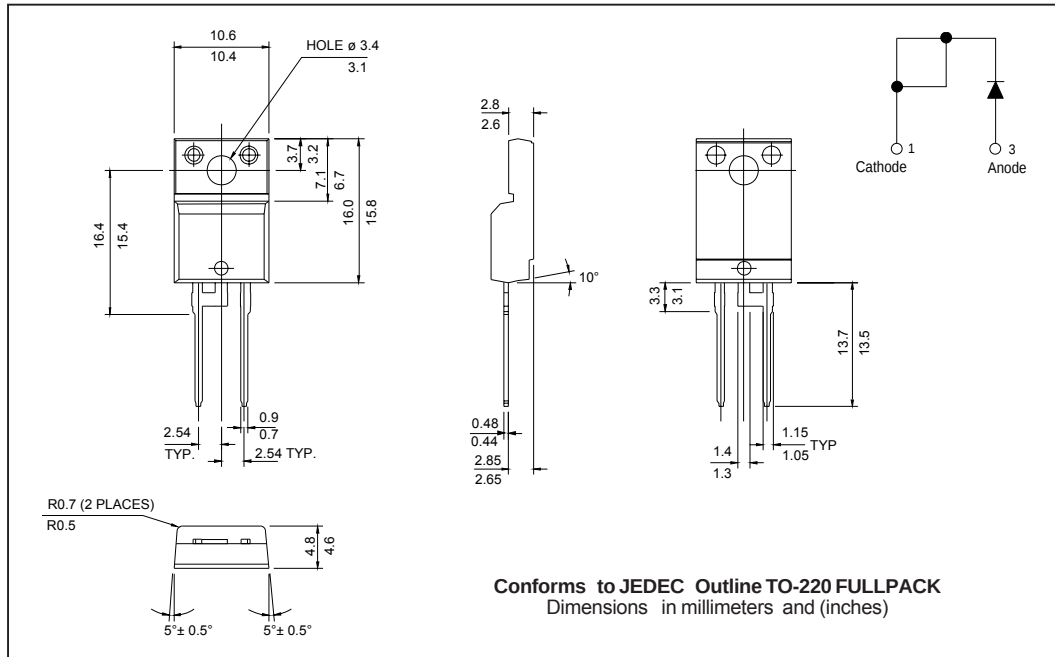
Outline Table



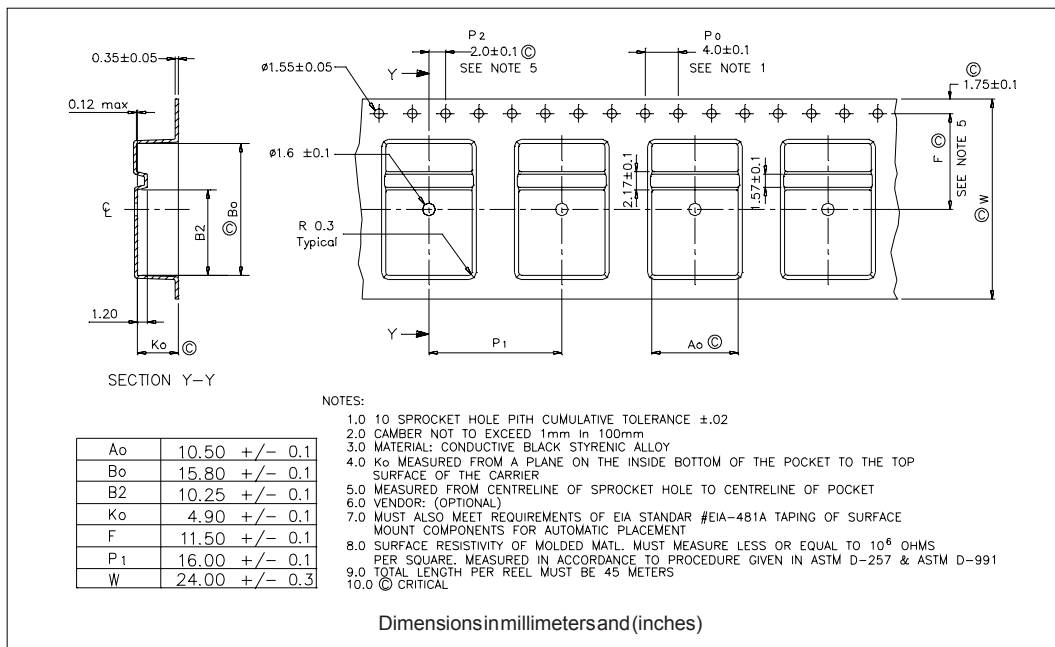
Outline Table



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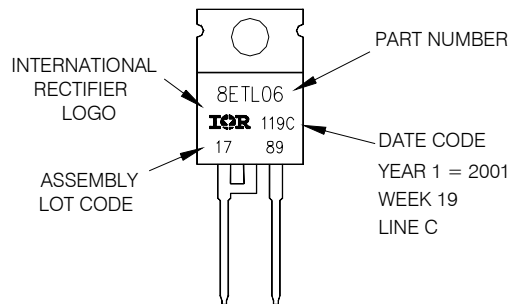
Tape & Reel Information



Part Marking Information

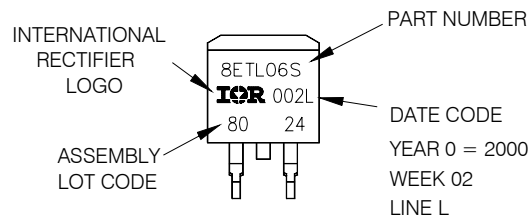
TO-220AC

EXAMPLE: THIS IS A 8ETL06
LOT CODE 1789
ASSEMBLED ON WW 19, 2001
IN THE ASSEMBLY LINE "C"



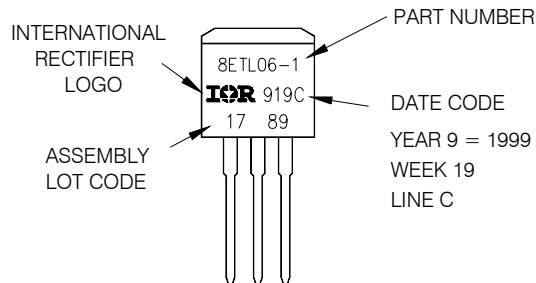
D²PAK

EXAMPLE: THIS IS A 8ETL06S
LOT CODE 8024
ASSEMBLED ON WW 02, 2000
IN THE ASSEMBLY LINE "L"



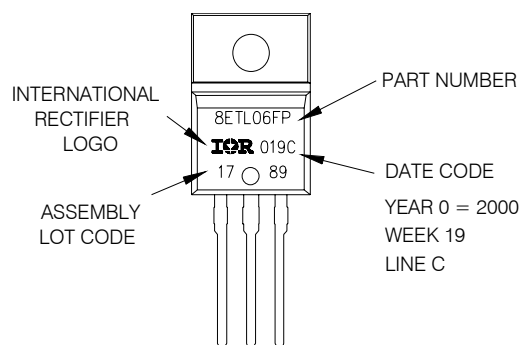
TO-262

EXAMPLE: THIS IS A 8ETL06-1
LOT CODE 1789
ASSEMBLED ON WW 19, 1999
IN THE ASSEMBLY LINE "C"



FULLPACK

EXAMPLE: THIS IS A 8ETL06FP
LOT CODE 1789
ASSEMBLED ON WW 19, 2000
IN THE ASSEMBLY LINE "C"



Ordering Information Table

Device Code							
8	E	T	L	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	-	L = Ultra Low V_F HyperFast Recovery					
5	-	Voltage Rating (06 = 600V)					
6	-	None = TO-220AC					
		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)					
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.

International
IR Rectifier

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