

International IR Rectifier

15ETH06
15ETH06S
15ETH06-1

Hyperfast Rectifier

Features

- Hyperfast Recovery Time
- Low Forward Voltage Drop
- Low Leakage Current
- 175°C Operating Junction Temperature
- Single Die Center Tap Module

$$t_{rr} = 22\text{ns typ.}$$

$$I_{F(AV)} = 15\text{Amp}$$

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

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.

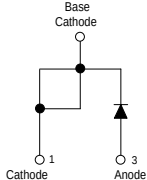
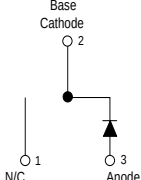
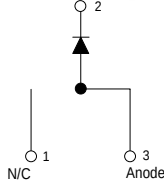
These devices are intended for use in PFC Boost stage in the AC-DC section of SMPS, inverters or as freewheeling diodes.

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 Peak Reverse Voltage	600	V
$I_{F(AV)}$ Average Rectified Forward Current @ $T_C = 140^\circ\text{C}$	15	A
I_{FSM} Non Repetitive Peak Surge Current @ $T_J = 25^\circ\text{C}$	120	
I_{FM} Peak Repetitive Forward Current	30	
T_J, T_{STG} Operating Junction and Storage Temperatures	- 65 to 175	$^\circ\text{C}$

Case Styles

15ETH06	15ETH06S	15ETH06-1
  TO-220AC	  D ² PAK	  TO-262

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	-	1.8	2.2	V	$I_F = 15\text{A}, T_J = 25^\circ\text{C}$
	-	1.3	1.6	V	$I_F = 15\text{A}, T_J = 150^\circ\text{C}$
I_R Reverse Leakage Current	-	0.2	50	μA	$V_R = V_R \text{ Rated}$
	-	30	500	μA	$T_J = 150^\circ\text{C}, V_R = V_R \text{ Rated}$
C_T Junction Capacitance	-	20	-	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	-	22	30	ns	$I_F = 1\text{A}, di_F/dt = 100\text{A}/\mu\text{s}, V_R = 30\text{V}$
	-	28	35		$I_F = 15\text{A}, di_F/dt = 100\text{A}/\mu\text{s}, V_R = 30\text{V}$
	-	29	-		$T_J = 25^\circ\text{C}$
	-	75	-		$T_J = 125^\circ\text{C}$
I_{RRM} Peak Recovery Current	-	3.5	-	A	$T_J = 25^\circ\text{C}$
	-	7	-		$T_J = 125^\circ\text{C}$
Q_{rr} Reverse Recovery Charge	-	57	-	nC	$T_J = 25^\circ\text{C}$
	-	300	-		$T_J = 125^\circ\text{C}$
t_{rr} Reverse Recovery Time	-	51	-	ns	$T_J = 125^\circ\text{C}$ $I_F = 15\text{A}$ $di_F/dt = 800\text{A}/\mu\text{s}$ $V_R = 390\text{V}$
I_{RRM} Peak Recovery Current	-	20	-	A	
Q_{rr} Reverse Recovery Charge	-	580	-	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	-	1.0	1.3	$^\circ\text{C}/\text{W}$
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

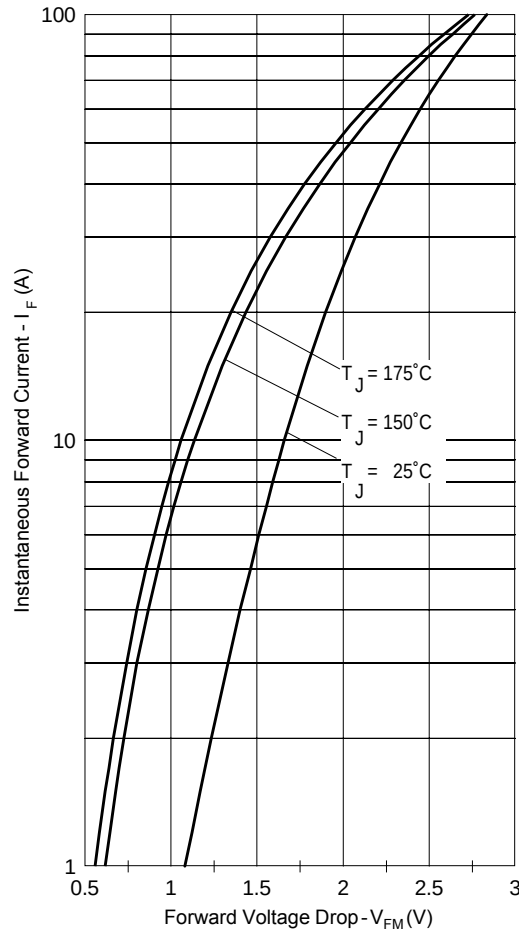


Fig. 1 - Typical Forward Voltage Drop Characteristics

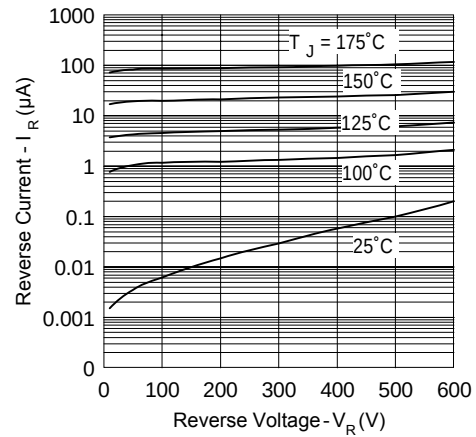


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

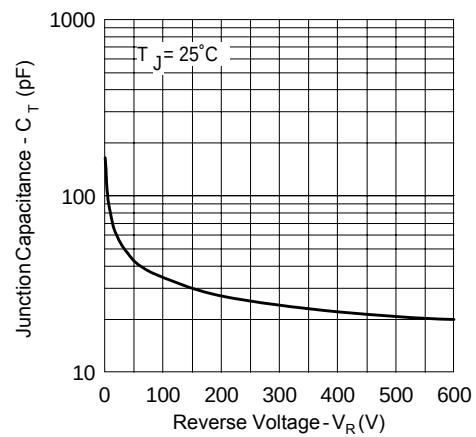


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

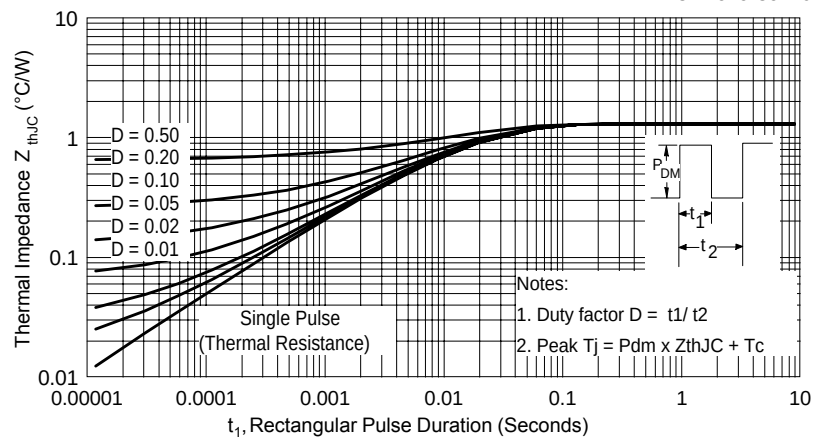


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

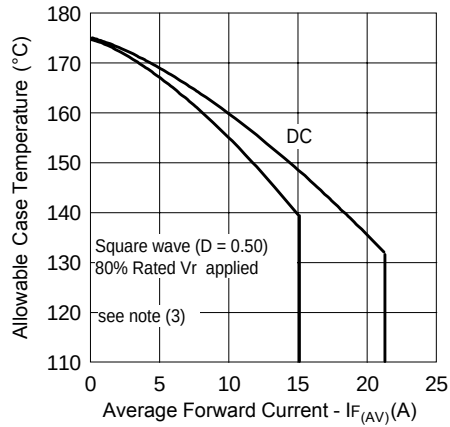


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

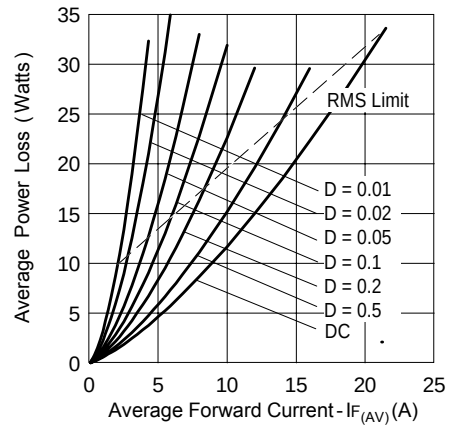


Fig. 6 - Forward Power Loss Characteristics

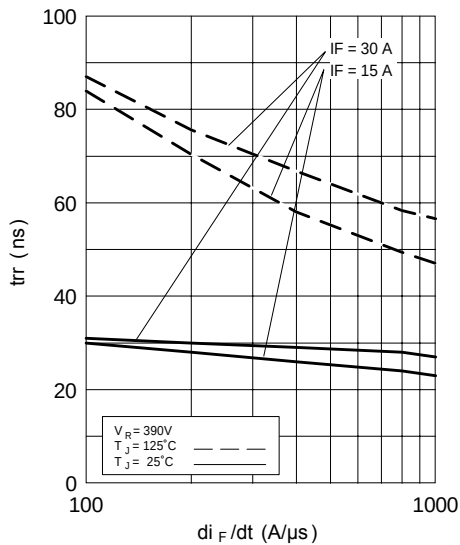


Fig. 7 - Typical Reverse Recovery vs. di_F/dt

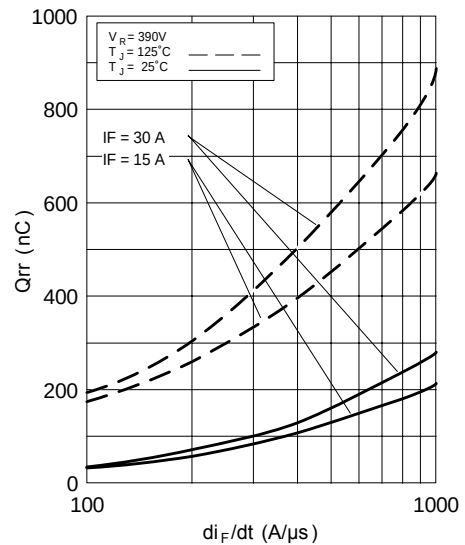


Fig. 8 - Typical Stored Charge vs. di_F/dt

(3) 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. 6);

Pd_{REV} = Inverse Power Loss = $V_{R1} \times I_R (1 - D)$; $I_R @ V_{R1}$ = rated V_R

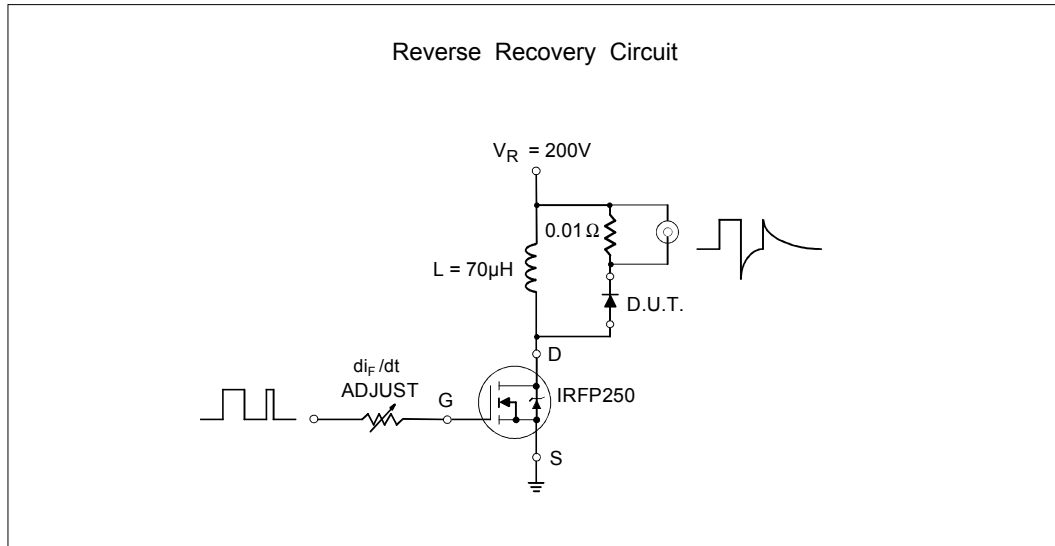


Fig. 9- Reverse Recovery Parameter Test Circuit

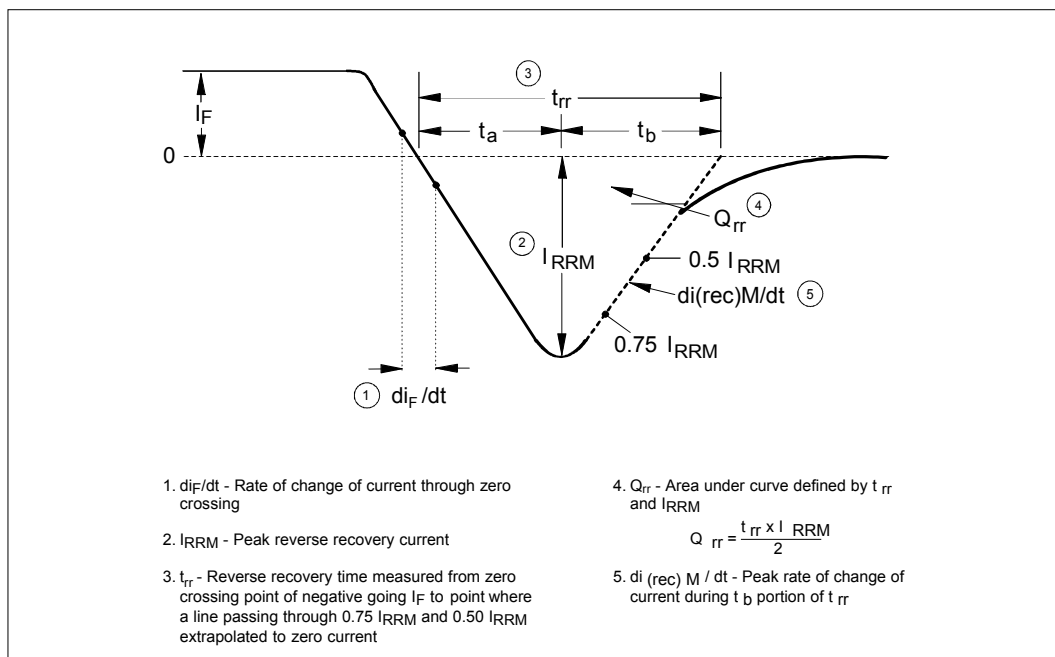
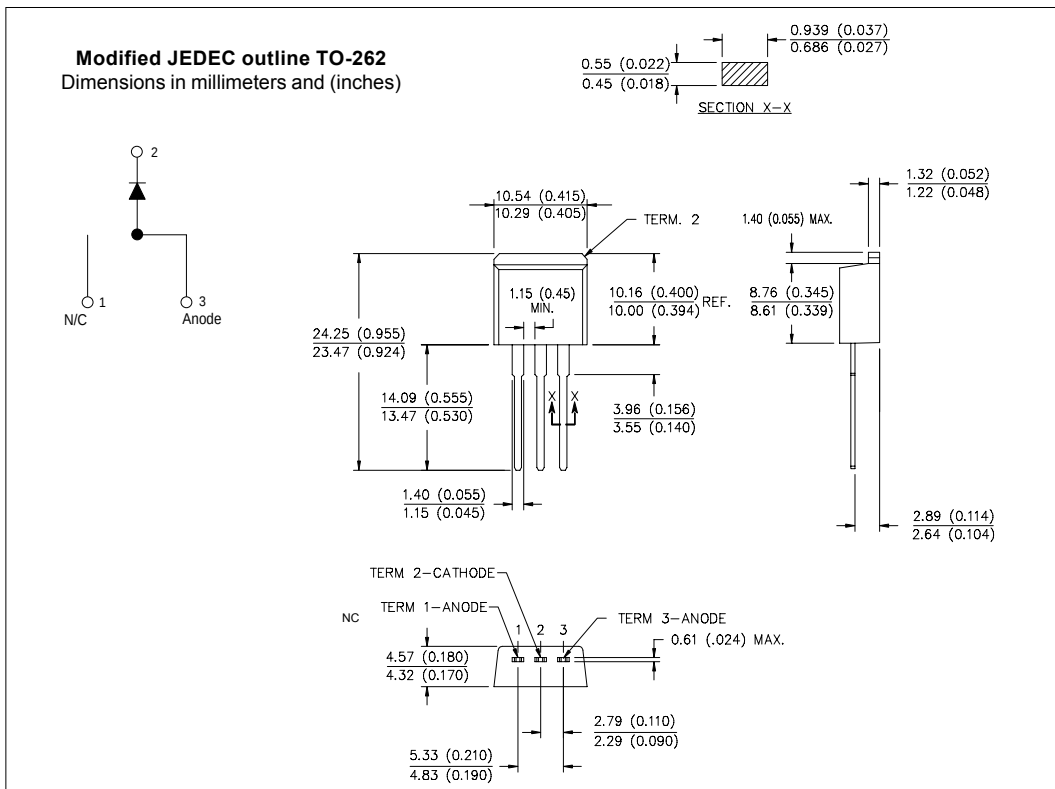
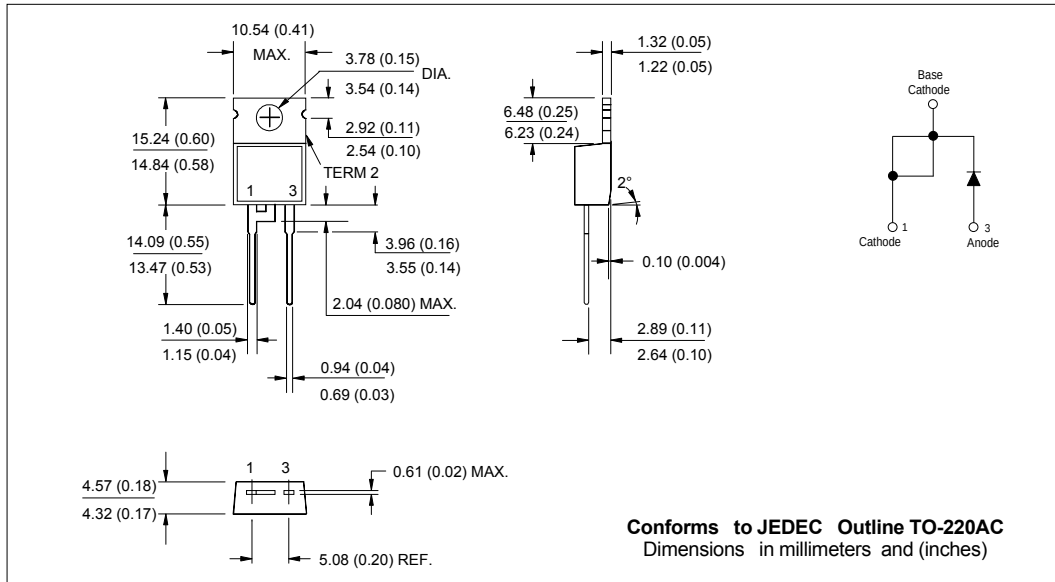
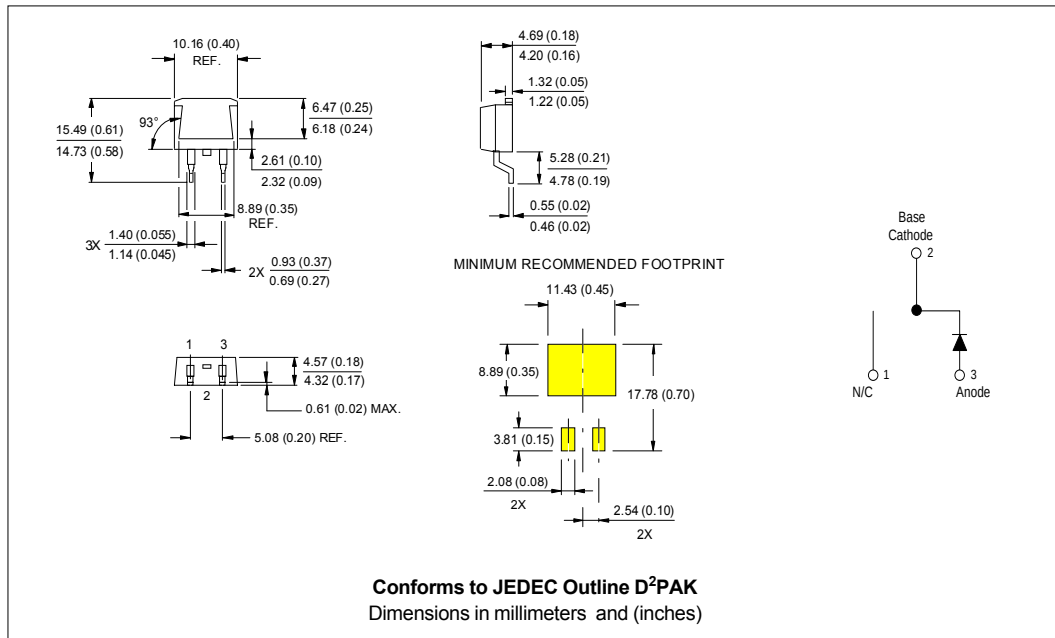


Fig. 10 - Reverse Recovery Waveform and Definitions

Outline Table



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Ordering Information Table

Device Code					
15	E	T	H	06	-1
①	②	③	④	⑤	⑥
1	-	Current Rating (15 = 15A)			
2	-	E = Single Diode			
3	-	T = TO-220, D ² Pak			
4	-	H = HyperFast Recovery			
5	-	Voltage Rating (06 = 600V)			
6	-	"-1" = TO-262 Option			
		S = D ² Pak			
		None = TO-220AC			

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.

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