

International IR Rectifier

15ETL06
15ETL06S
15ETL06-1
15ETL06FP

Bulletin PD-20695 rev. B 02/04

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 

$V_F = 0.99V$ typ.
 $I_{F(AV)} = 15Amp$
 $V_R = 600V$

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

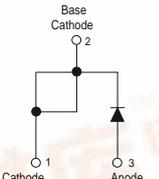
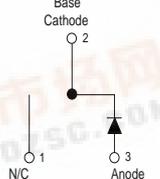
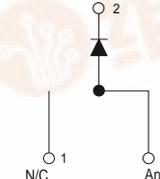
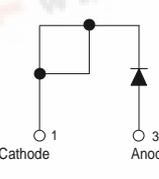
AC-DC SMPS 70W-400W

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 @ $T_C = 154^\circ C$ @ $T_C = 120^\circ C$ (FULLPACK)	15	A
I_{FSM} Non Repetitive Peak Surge Current @ $T_J = 25^\circ C$	250	
I_{FM} Peak Repetitive Forward Current	30	
T_J, T_{STG} Operating Junction and Storage Temperatures	- 65 to 175	$^\circ C$

Case Styles

15ETL06	15ETL06S	15ETL06-1	15ETL06FP
			
			
TO-220AC	D ² PAK	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	600	-	-	V	I _R = 100μA
V _F	-	0.99	1.05	V	I _F = 15A, T _J = 25°C
	-	0.85	0.92	V	I _F = 15A, T _J = 150°C
I _R	-	0.1	10	μA	V _R = V _R Rated
	-	15	120	μA	T _J = 150°C, V _R = V _R Rated
C _T	-	20	-	pF	V _R = 600V
L _S	-	8.0	-	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}	-	60	120	ns	I _F = 1A, di _F /dt = 100A/μs, V _R = 30V
	-	190	270		I _F = 15A, di _F /dt = 100A/μs, V _R = 30V
	-	220	-		T _J = 25°C
	-	320	-		T _J = 125°C
I _{RRM}	-	19	-	A	T _J = 25°C
	-	26	-		T _J = 125°C
Q _{rr}	-	2.2	-	μC	T _J = 25°C
	-	4.3	-		T _J = 125°C

I_F = 15A
di_F/dt = 200A/μs
V_R = 390V

Thermal - Mechanical Characteristics

Parameters	Min	Typ	Max	Units
T _J	-	-	175	°C
T _{Stg}	- 65	-	175	
R _{thJC}	-	1.0	1.3	°C/W
	-	3.0	3.5	
R _{thJA} ^①	-	-	70	
R _{thCS} ^②	-	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

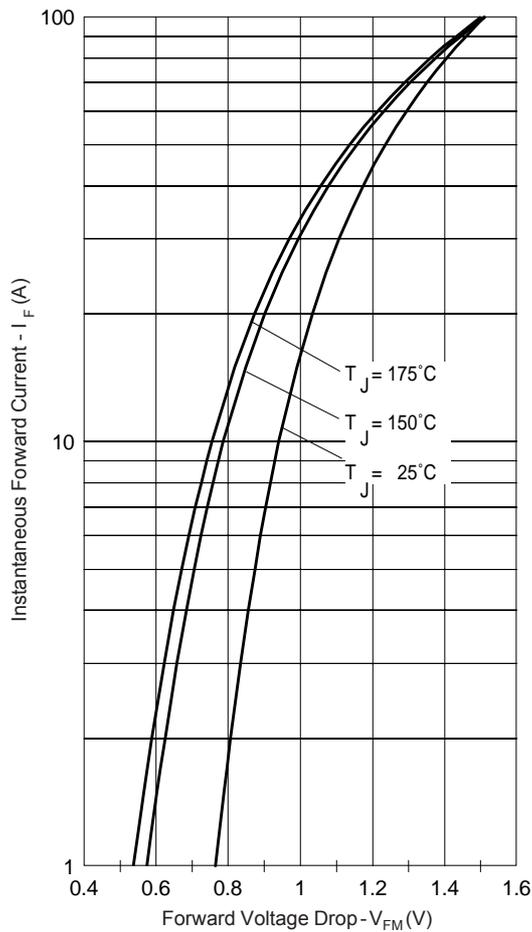


Fig. 1 - Typical Forward Voltage Drop Characteristics

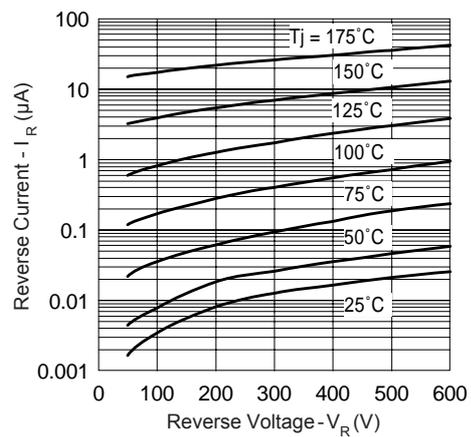


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

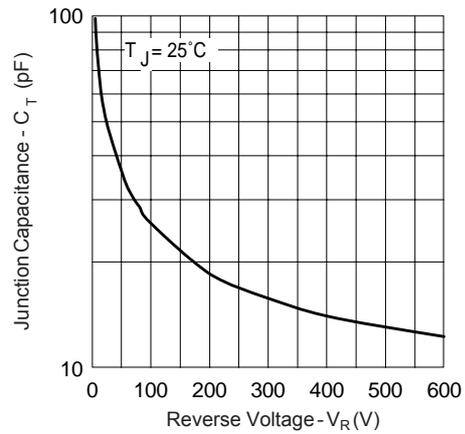


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

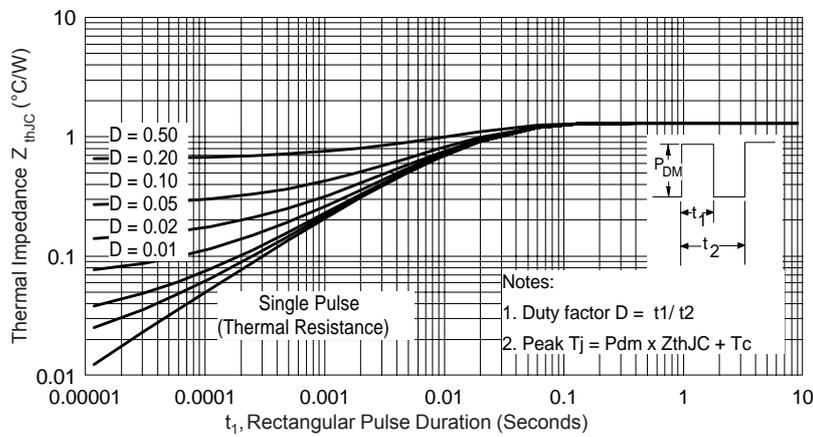


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

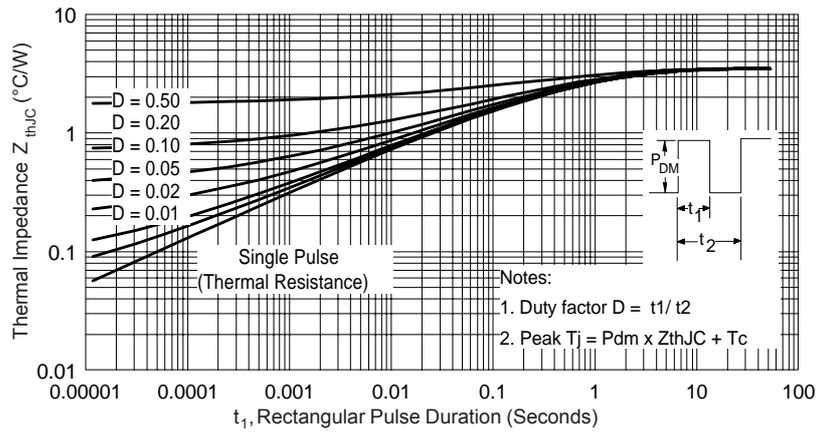


Fig. 5 - Max. Thermal Impedance Z_{thJC} Characteristics (FULLPACK)

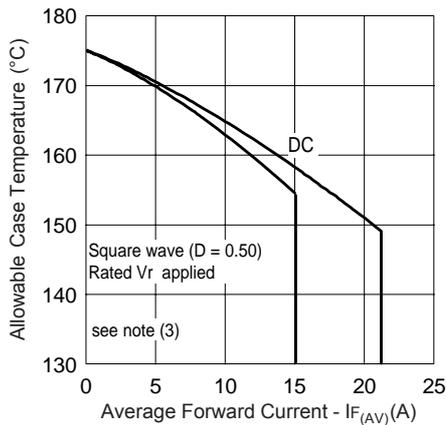


Fig. 6 - Max. Allowable Case Temperature Vs. Average Forward Current

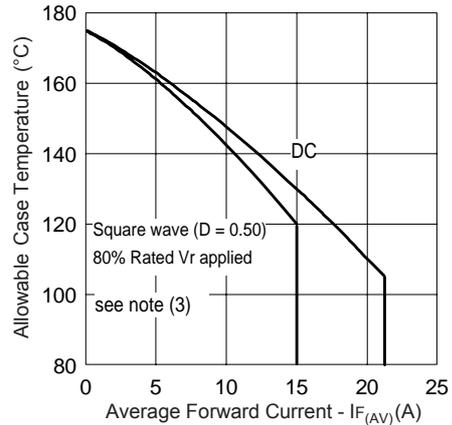


Fig. 7 - Max. Allowable Case Temperature Vs. Average Forward Current (FULLPACK)

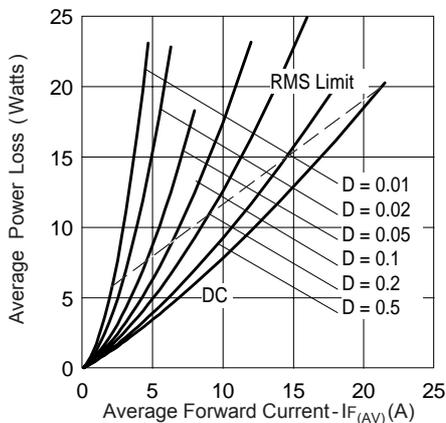


Fig. 8 - Forward Power Loss Characteristics

(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

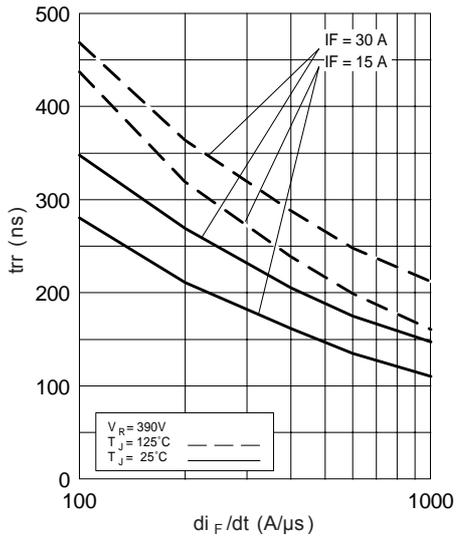


Fig. 9 - Typical Reverse Recovery vs. di_F/dt

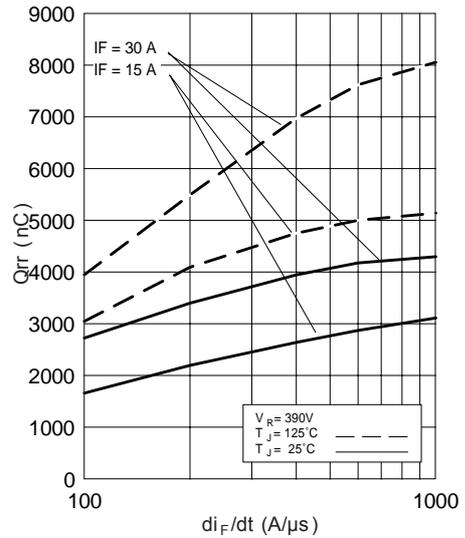


Fig. 10 - Typical Stored Charge vs. di_F/dt

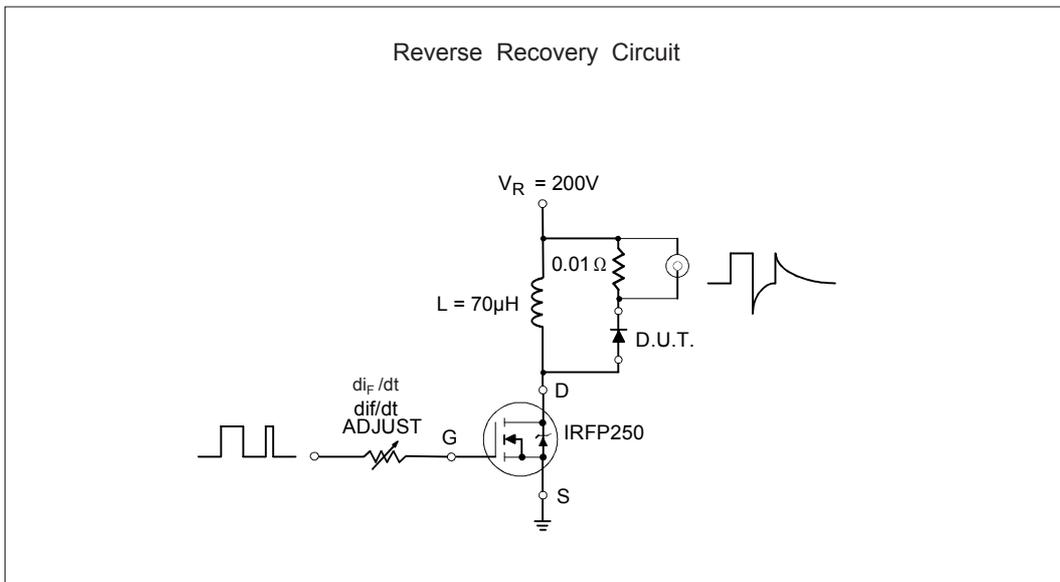


Fig. 11 - Reverse Recovery Parameter Test Circuit

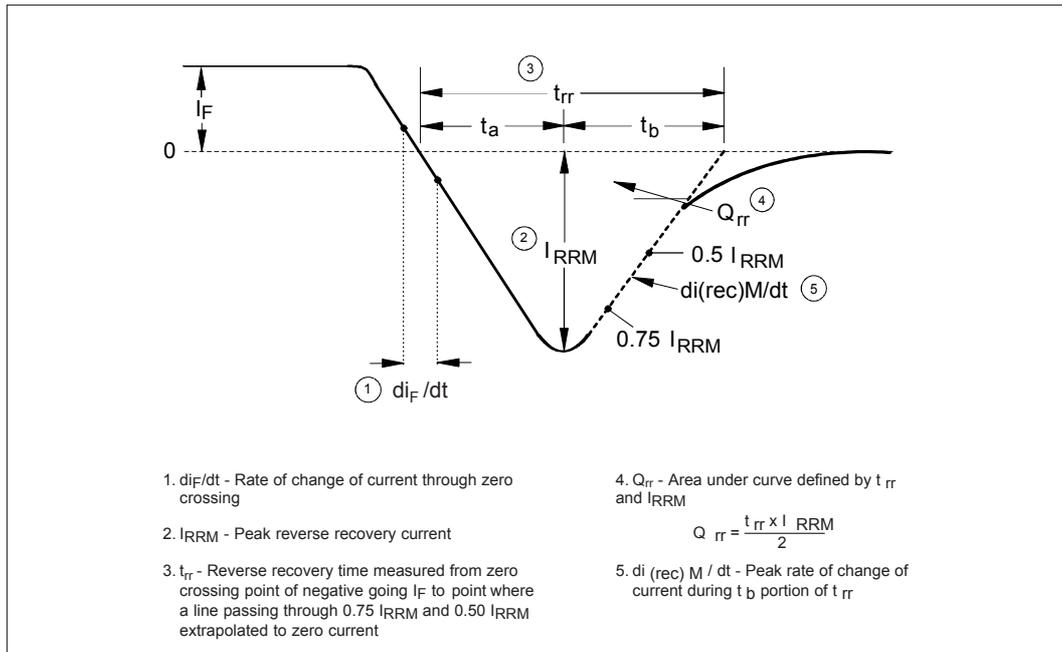
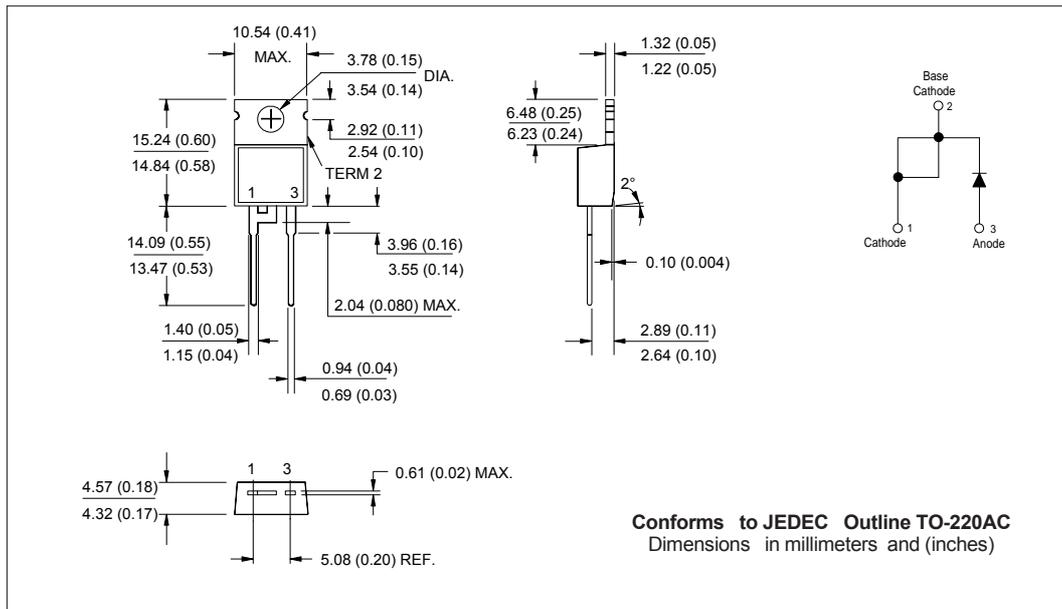
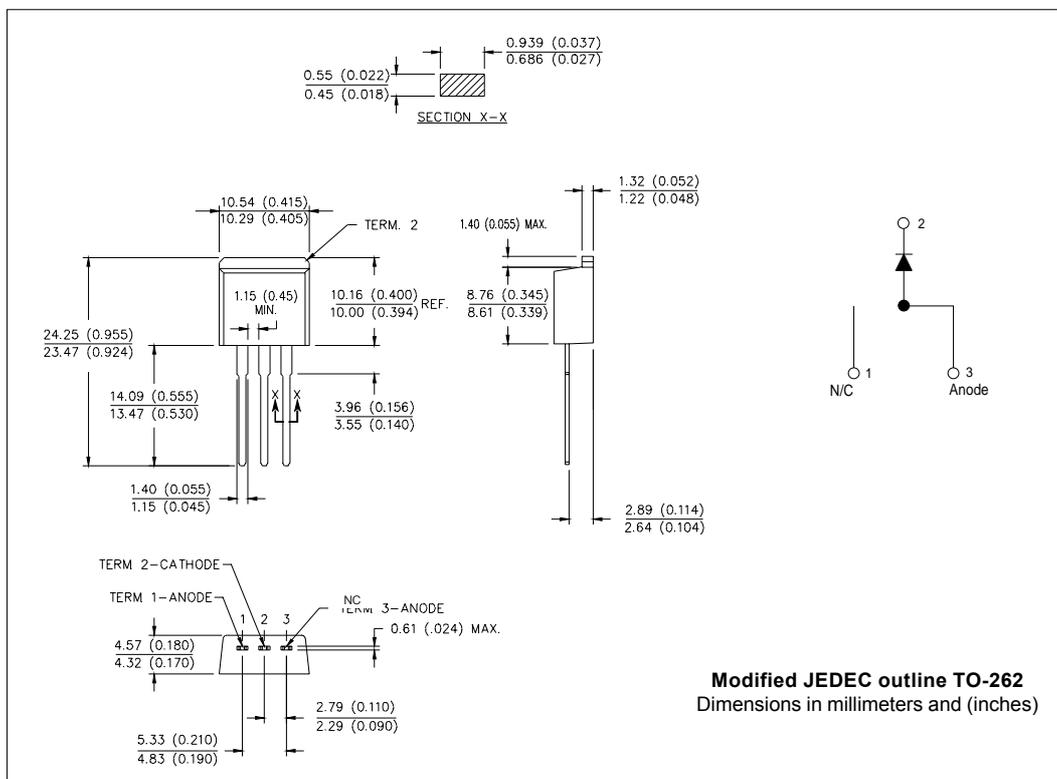
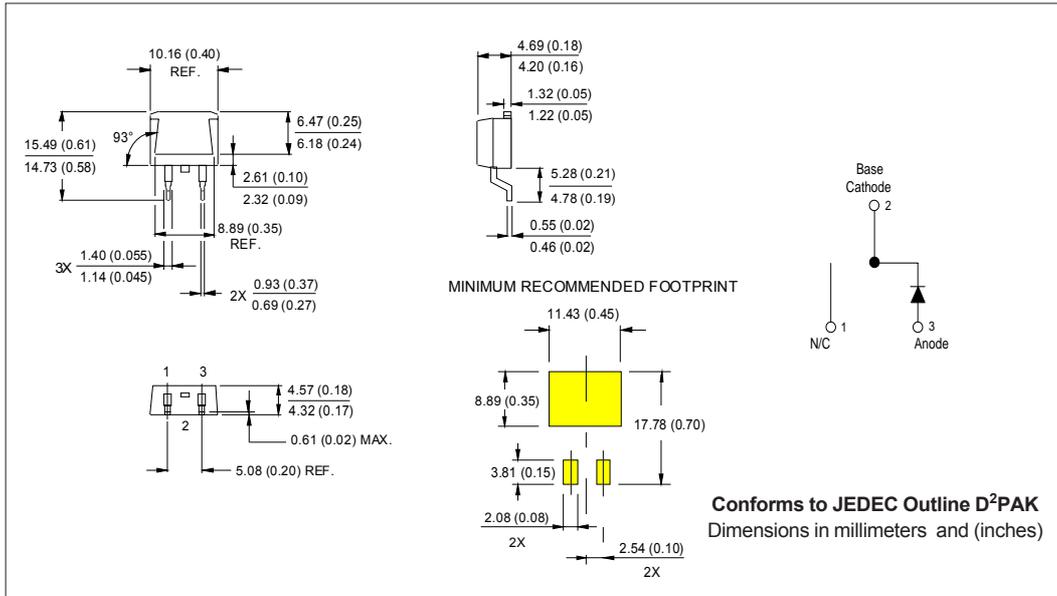


Fig. 12 - Reverse Recovery Waveform and Definitions

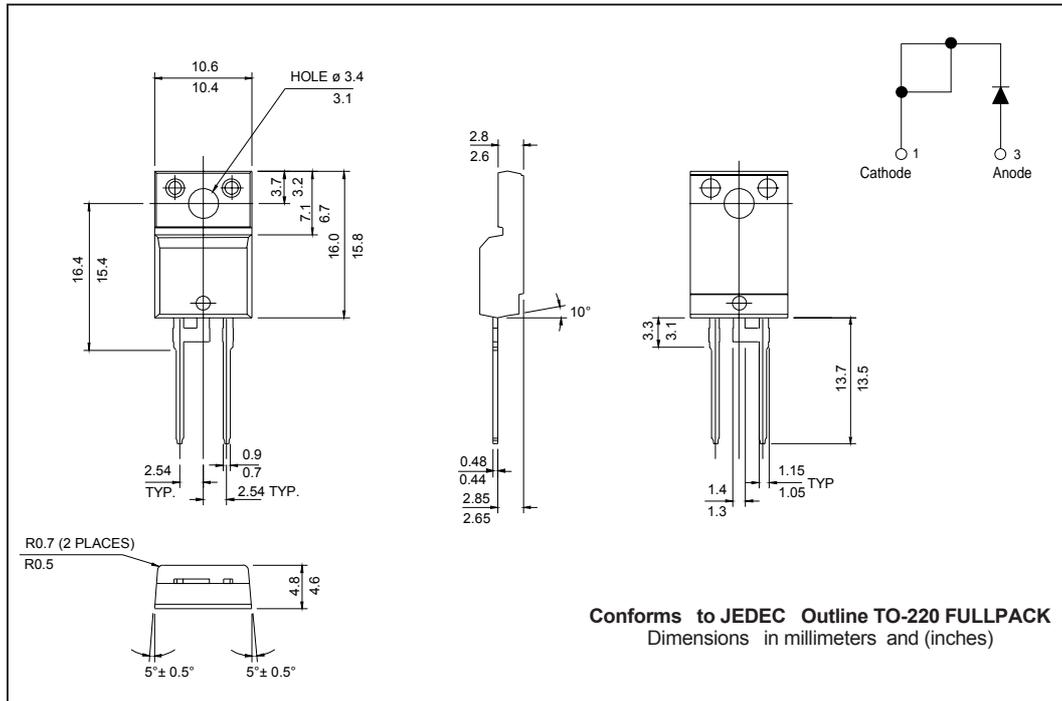
Outline Table



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Ordering Information Table

Device Code					
15	E	T	L	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	- L = Ultra-low V _F HyperFast Recovery				
5	- Voltage Rating (06 = 600V)				
6	- "-1" = TO-262 Option				
	S = D ² Pak				
	None = TO-220AC				
	FP = TO-220 FULLPACK				

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
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