



60EPU06PbF  
60APU06PbF

Ultrafast Soft Recovery Diode

**Features**

- Ultrafast Recovery
- 175°C Operating Junction Temperature
- Lead-Free ("PbF" suffix)

**Benefits**

- Reduced RFI and EMI
- Higher Frequency Operation
- Reduced Snubbing
- Reduced Parts Count

**Description/ Applications**


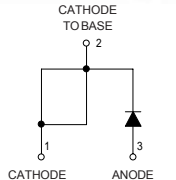

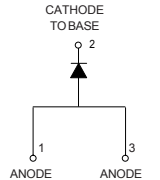
These diodes are optimized to reduce losses and EMI/ RFI in high frequency power conditioning systems. The softness of the recovery eliminates the need for a snubber in most applications. These devices are ideally suited for HF welding, power converters and other applications where switching losses are not significant portion of the total losses.

$t_{rr} = 34ns$ (typ)
$I_{F(AV)} = 60Amp$
$V_R = 600V$

**Absolute Maximum Ratings**

Parameters	Max	Units
$V_R$ Cathode to Anode Voltage	600	V
$I_{F(AV)}$ Continuous Forward Current, $T_C = 116^\circ C$	60	A
$I_{FSM}$ Single Pulse Forward Current, $T_C = 25^\circ C$	600	
$I_{FRM}$ ① Maximum Repetitive Forward Current	120	
$T_J, T_{STG}$ Operating Junction and Storage Temperatures	- 55 to 175	$^\circ C$

① Square Wave, 20kHz

Case Styles	
<p>60EPU06PbF</p>   <p>TO-247AC (Modified)</p>	<p>60APU06PbF</p>   <p>TO-247AC</p>

**Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)**

Parameters	Min	Typ	Max	Units	Test Conditions
V <sub>BR</sub> , V <sub>r</sub> Breakdown Voltage, Blocking Voltage	600	-	-	V	I <sub>R</sub> = 100μA
V <sub>F</sub> Forward Voltage	-	1.35	1.68	V	I <sub>F</sub> = 60A
	-	1.20	1.42	V	I <sub>F</sub> = 60A, T <sub>J</sub> = 125°C
	-	1.11	1.30	V	I <sub>F</sub> = 60A, T <sub>J</sub> = 175°C
I <sub>R</sub> Reverse Leakage Current	-	-	50	μA	V <sub>R</sub> = V <sub>R</sub> Rated
	-	-	500	μA	T <sub>J</sub> = 150°C, V <sub>R</sub> = V <sub>R</sub> Rated
C <sub>T</sub> Junction Capacitance	-	39	-	pF	V <sub>R</sub> = 600V

**Dynamic Recovery Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)**

Parameters	Min	Typ	Max	Units	Test Conditions	
t <sub>rr</sub> Reverse Recovery Time	-	34	45	ns	I <sub>F</sub> = 1A, di <sub>F</sub> /dt = 200A/μs, V <sub>R</sub> = 30V  I <sub>F</sub> = 60A V <sub>R</sub> = 200V di <sub>F</sub> /dt = 200A/μs	
	-	81	-			T <sub>J</sub> = 25°C
	-	164	-			T <sub>J</sub> = 125°C
I <sub>R</sub> Peak Recovery Current	-	7.4	-	A	T <sub>J</sub> = 25°C T <sub>J</sub> = 125°C	
	-	17.0	-			
Q <sub>rr</sub> Reverse Recovery Charge	-	300	-	nC	T <sub>J</sub> = 25°C T <sub>J</sub> = 125°C	
	-	1394	-			

**Thermal - Mechanical Characteristics**

Parameters	Min	Typ	Max	Units
R <sub>thJC</sub> Thermal Resistance, Junction to Case			0.63	K/W
R <sub>thCS</sub> ② Thermal Resistance, Case to Heatsink		0.2		
Wt Weight		5.5		g
		0.2		(oz)
T Mounting Torque	1.2		2.4	N * m
	10		20	lbf.in
Marking Device	60EPU06, 60APU06			

② Mounting Surface, Flat, Smooth and Greased

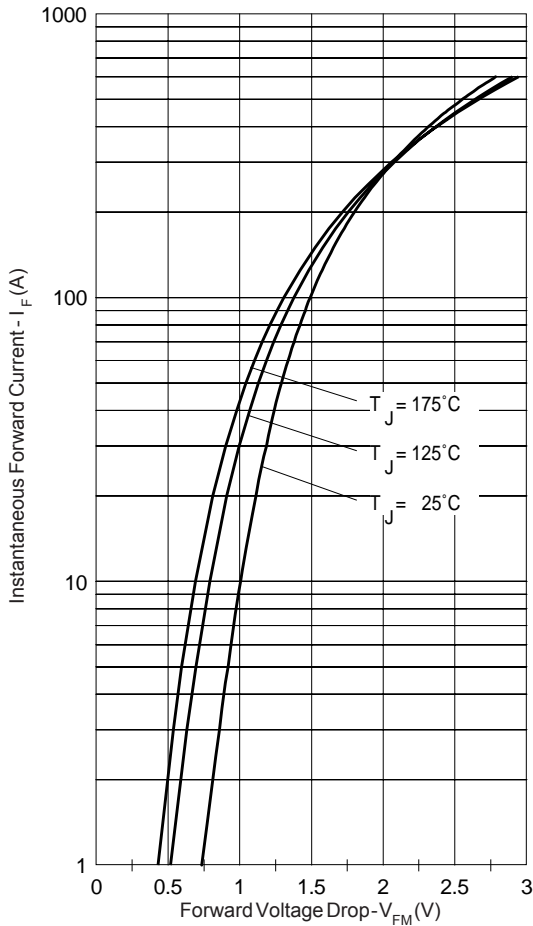


Fig. 1 - Typical Forward Voltage Drop Characteristics

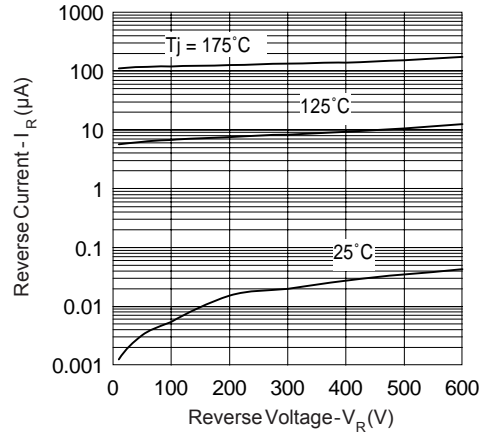


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

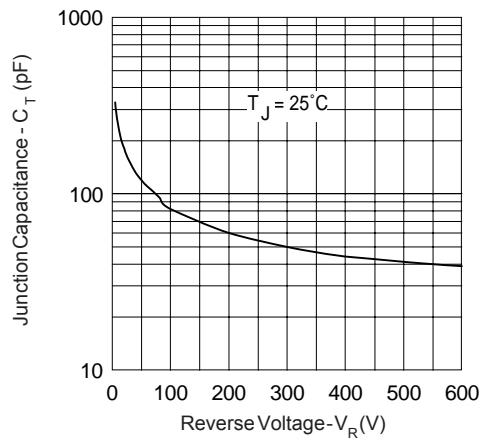


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

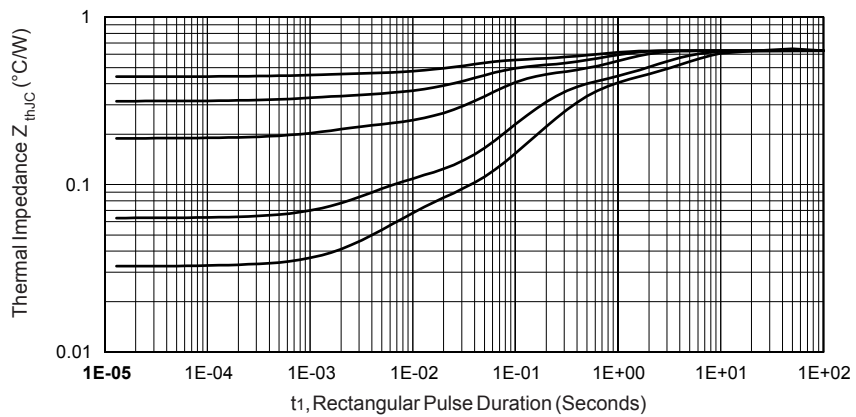


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics

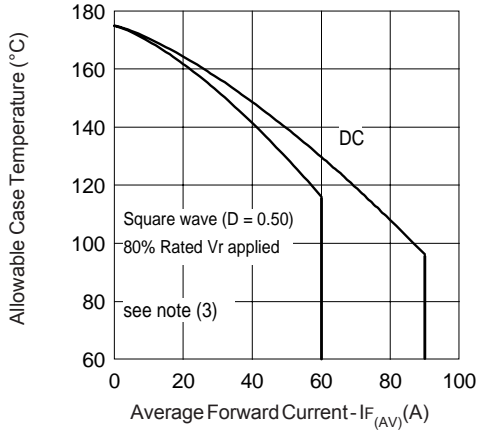


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

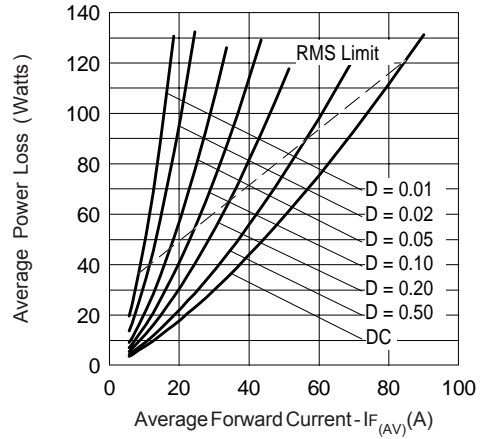


Fig. 6 - Forward Power Loss Characteristics

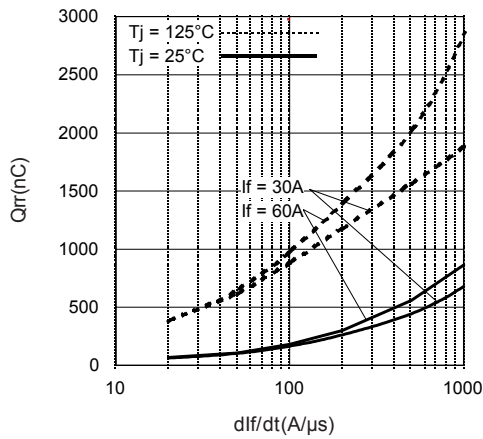


Fig. 7 - Typical Stored Charge vs. dif/dt

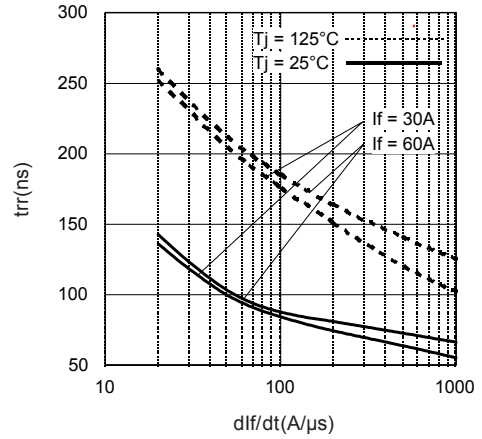


Fig. 87 - Typical Stored Charge vs. dif/dt

- (3) 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. 6);  
 $P_{d_{REV}} = \text{Inverse Power Loss} = V_{R1} \times I_R (1 - D)$ ;  $I_R @ V_{R1} = 80\% \text{ rated } V_R$

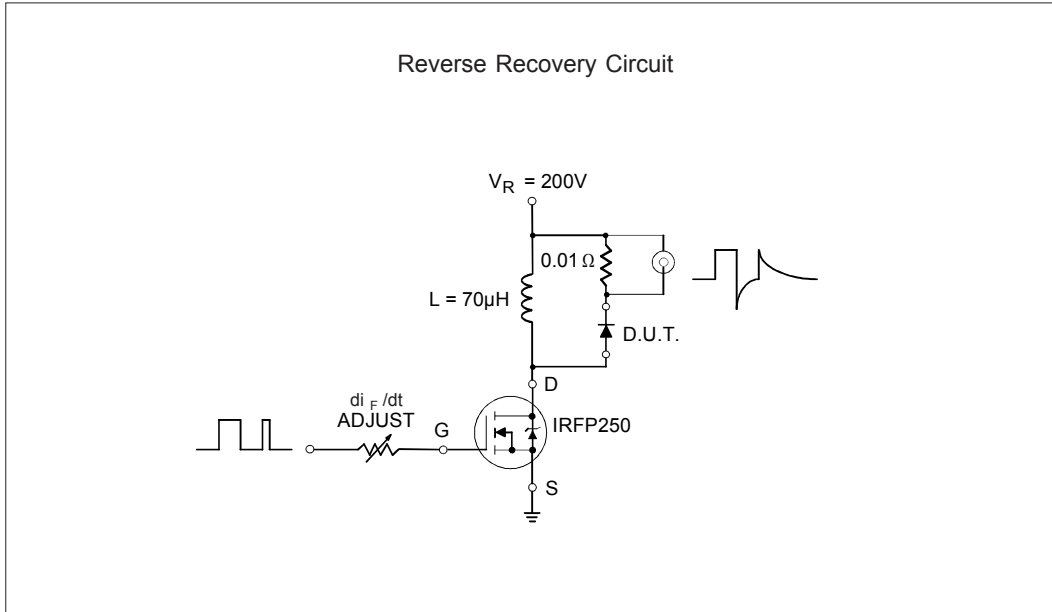


Fig. 9 - Reverse Recovery Parameter Test Circuit

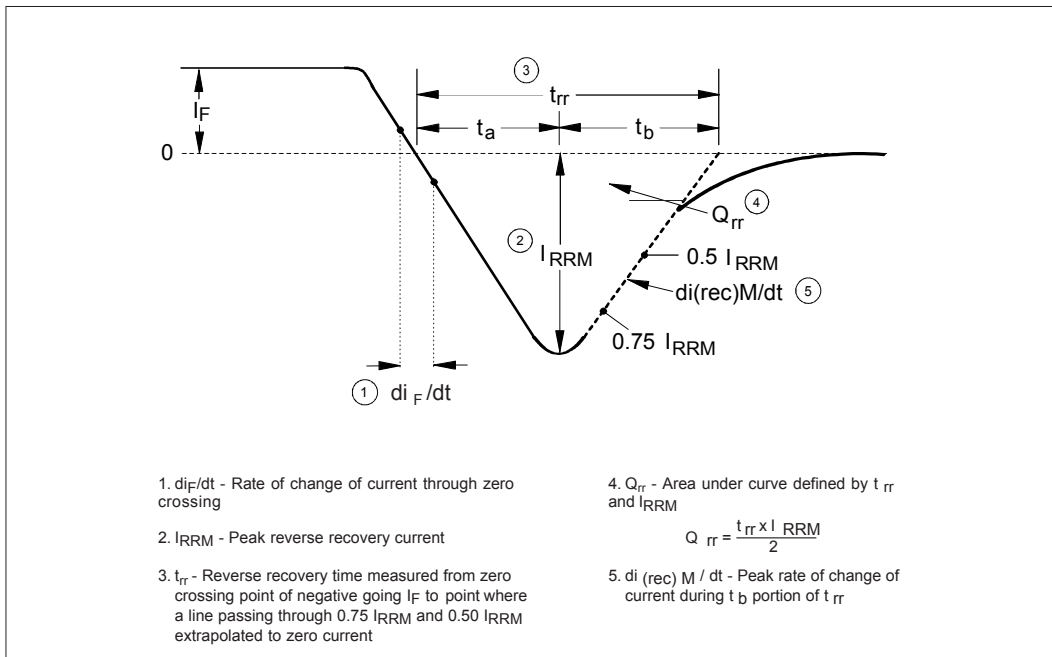
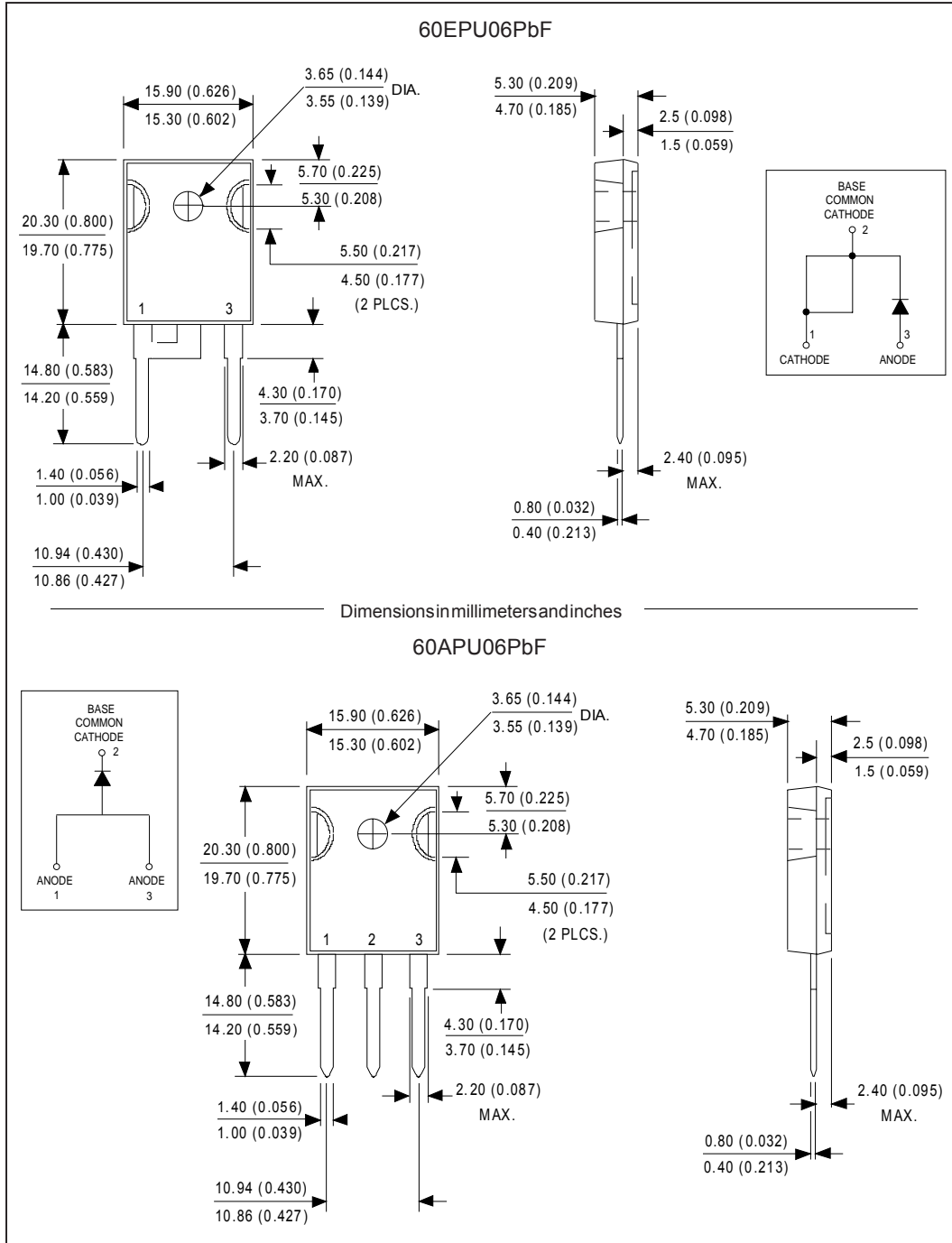
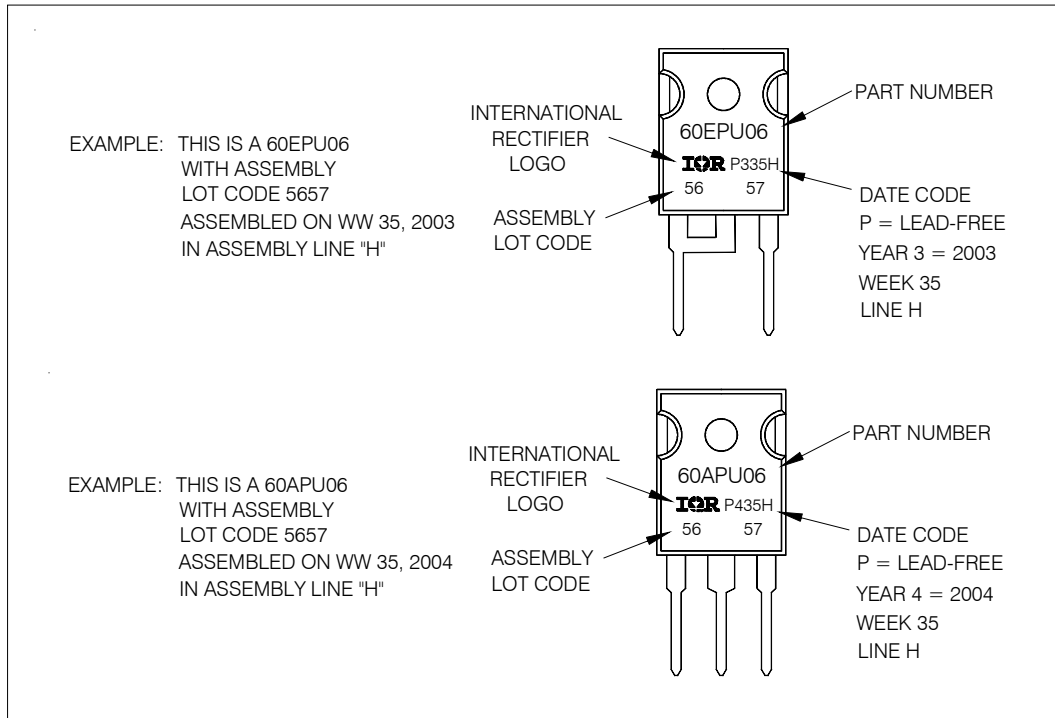


Fig. 10 - Reverse Recovery Waveform and Definitions

Outline Table



Marking Information



Ordering Information Table

Device Code					
60	E	P	U	06	PbF
①	②	③	④	⑤	⑥
<b>1</b>	- Current Rating (60 = 60A)				
<b>2</b>	- Circuit Configuration: E = Single Diode A = Single Diode, 3 pins				
<b>3</b>	- Package: P = TO-247AC (Modified)				
<b>4</b>	- Type of Silicon: U = UltraFast Recovery				
<b>5</b>	- Voltage Rating (06 = 600V)				
<b>6</b>	- • none = Standard Production • PbF = Lead-Free				

60EPU06PbF/ 60APU06PbF

Bulletin PD-21099 11/05

International  
**IOR** Rectifier

Data and specifications subject to change without notice.  
This product has been designed and qualified for Industrial Level and Lead-Free.  
Qualification Standards can be found on IR's Web site.

International  
**IOR** Rectifier

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