

International IR Rectifier

60EPU02PbF
60APU02PbF

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.


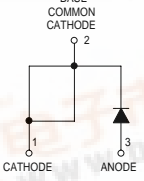

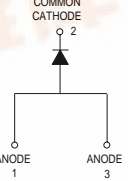
$t_{rr} = 35ns$
$I_{F(AV)} = 60Amp$
$V_R = 200V$

Absolute Maximum Ratings

Parameters	Max	Units
V_R Cathode to Anode Voltage	200	V
$I_{F(AV)}$ Continuous Forward Current, $T_C = 127^\circ C$	60	A
I_{FSM} Single Pulse Forward Current, $T_C = 25^\circ C$	800	
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>60EPU02PbF</p>   <p>TO-247AC (Modified)</p>	<p>60APU02PbF</p>   <p>TO-247AC</p>
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Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

Parameters	Min	Typ	Max	Units	Test Conditions
V _{BR} , V _r Breakdown Voltage, Blocking Voltage	200	-	-	V	I _R = 100μA
V _F Forward Voltage	-	0.98	1.08	V	I _F = 60A
	-	0.81	0.88	V	I _F = 60A, T _J = 175°C
I _R Reverse Leakage Current	-	-	50	μA	V _R = V _R Rated
	-	-	2	mA	T _J = 150°C, V _R = V _R Rated
C _T Junction Capacitance	-	87	-	pF	V _R = 200V
L _S Series Inductance	-	8.0	-	nH	Measured lead to lead 5mm from package body

Dynamic Recovery Characteristics @ T_J = 25°C (unless otherwise specified)

Parameters	Min	Typ	Max	Units	Test Conditions	
t _{rr} Reverse Recovery Time	-	-	35	ns	I _F = 1.0A, di _F /dt = 200A/μs, V _R = 30V	
	-	28	-		T _J = 25°C	I _F = 60A V _R = 160V di _F /dt = 200A/μs
	-	50	-		T _J = 125°C	
I _{RRM} Peak Recovery Current	-	4	-	A	T _J = 25°C	
	-	8	-		T _J = 125°C	
Q _{rr} Reverse Recovery Charge	-	59	-	nC	T _J = 25°C	
	-	220	-		T _J = 125°C	

Thermal - Mechanical Characteristics

Parameters	Min	Typ	Max	Units
R _{thJC} Thermal Resistance, Junction to Case			0.70	K/W
R _{thCS} ② Thermal Resistance, Case to Heatsink		0.2		
Wt Weight		5.5		g
		0.2		(oz)
T Mounting Torque			1.2	N*m
Marking Device	60EPU02, 60APU02			

② Mounting Surface, Flat, Smooth and Greased

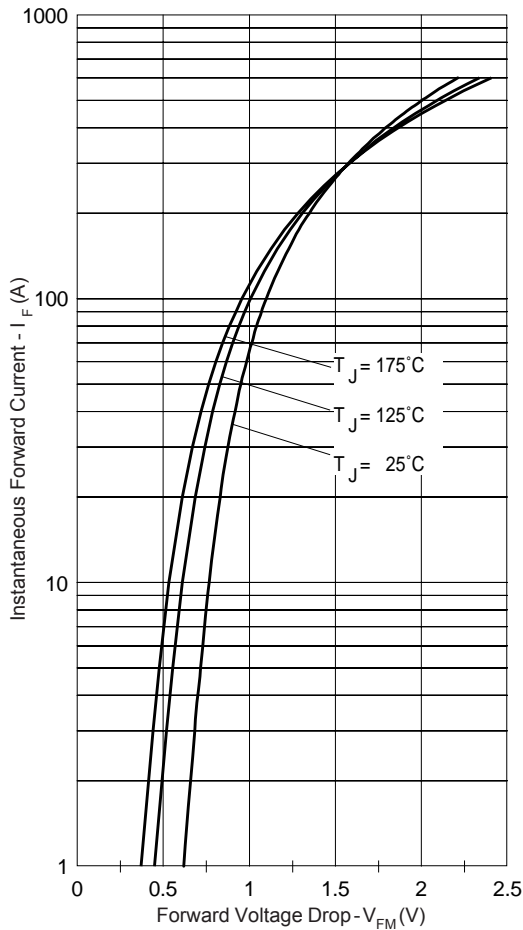


Fig. 1 - Typical Forward Voltage Drop Characteristics

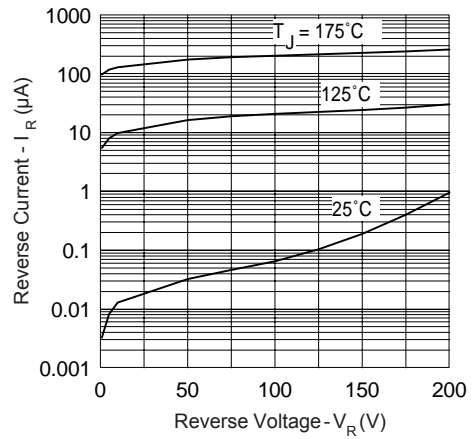


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

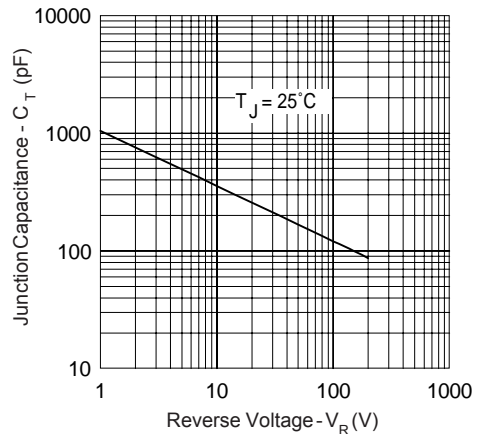


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

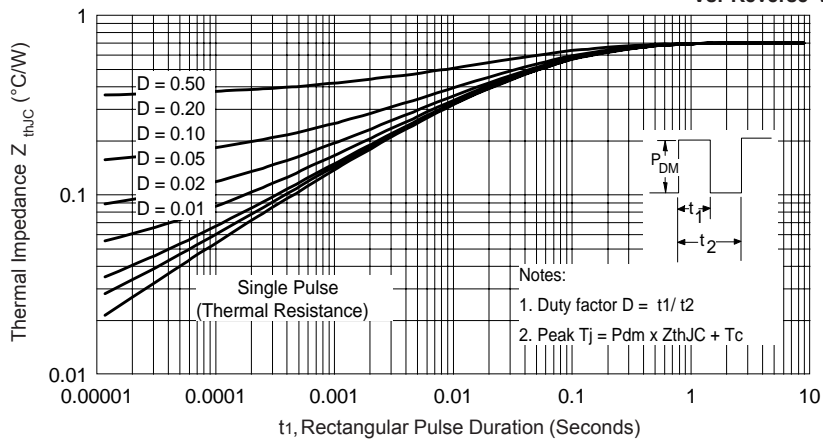


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

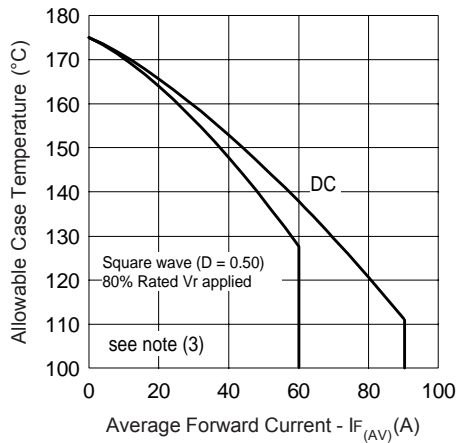


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

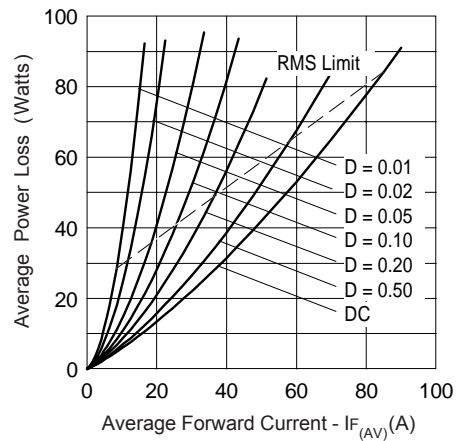


Fig. 6 - Forward Power Loss Characteristics

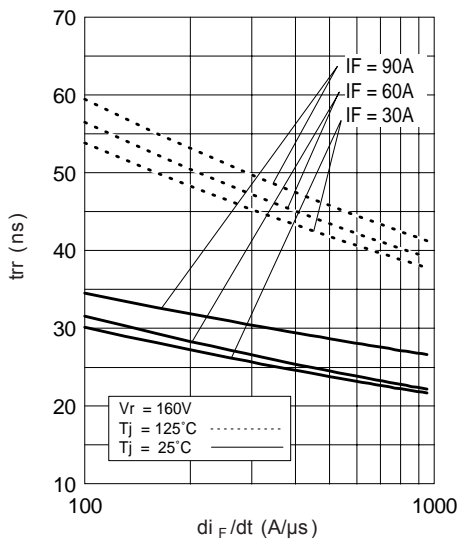


Fig. 7 - Typical Reverse Recovery time vs. di_F/dt

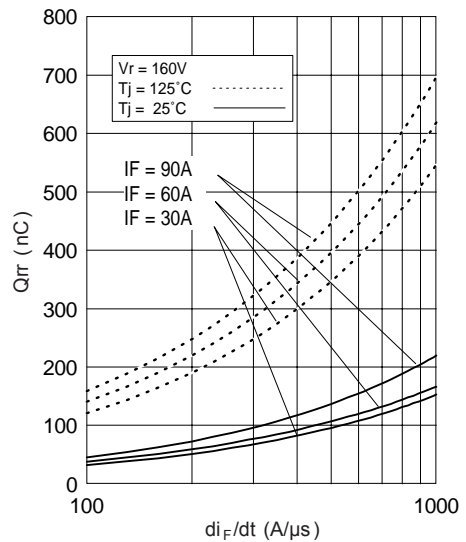


Fig. 8 - Typical Stored Charge vs. di_F/dt

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

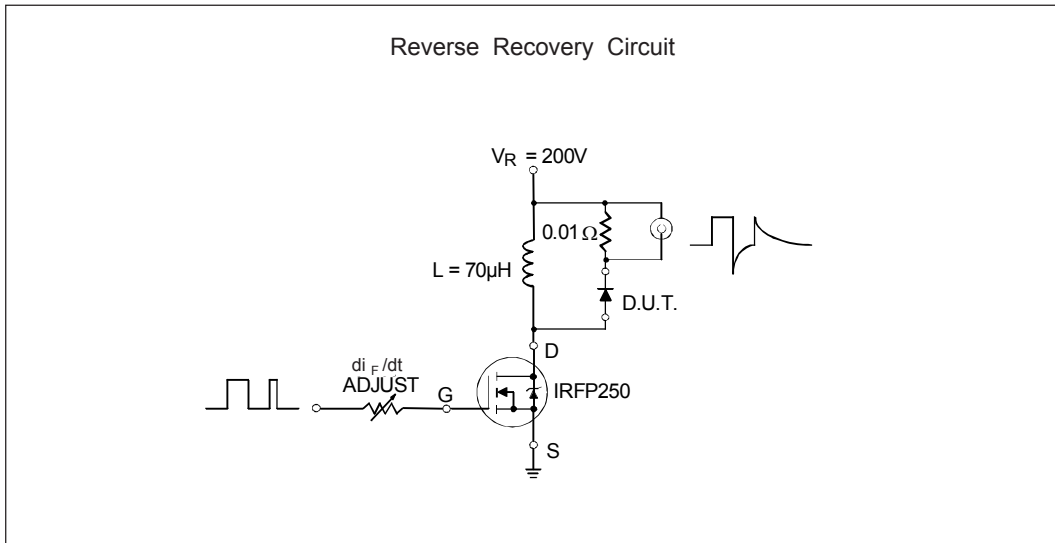


Fig. 9- Reverse Recovery Parameter Test Circuit

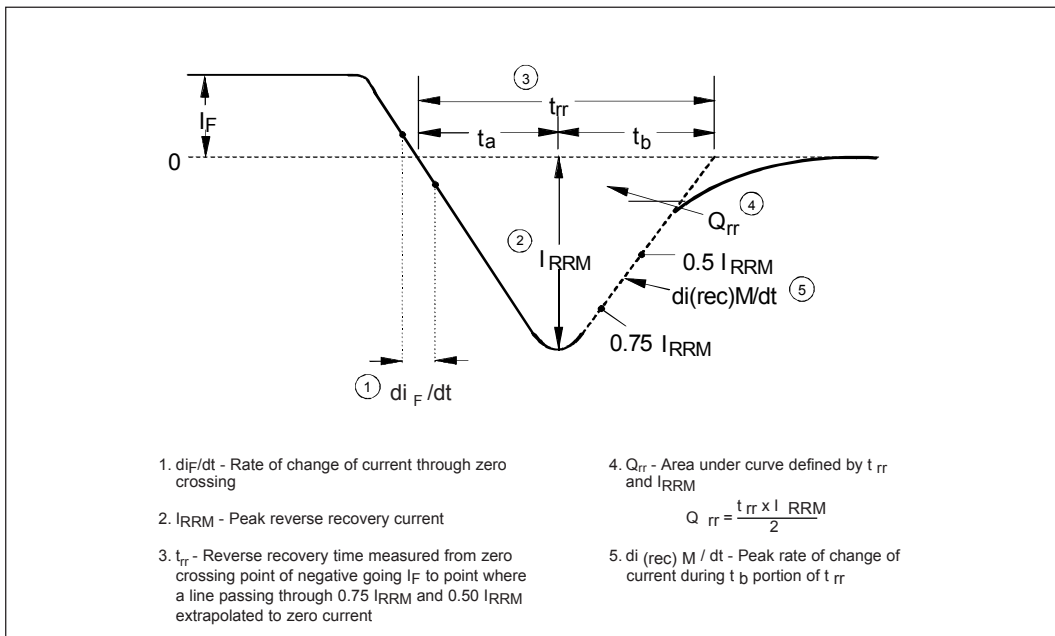
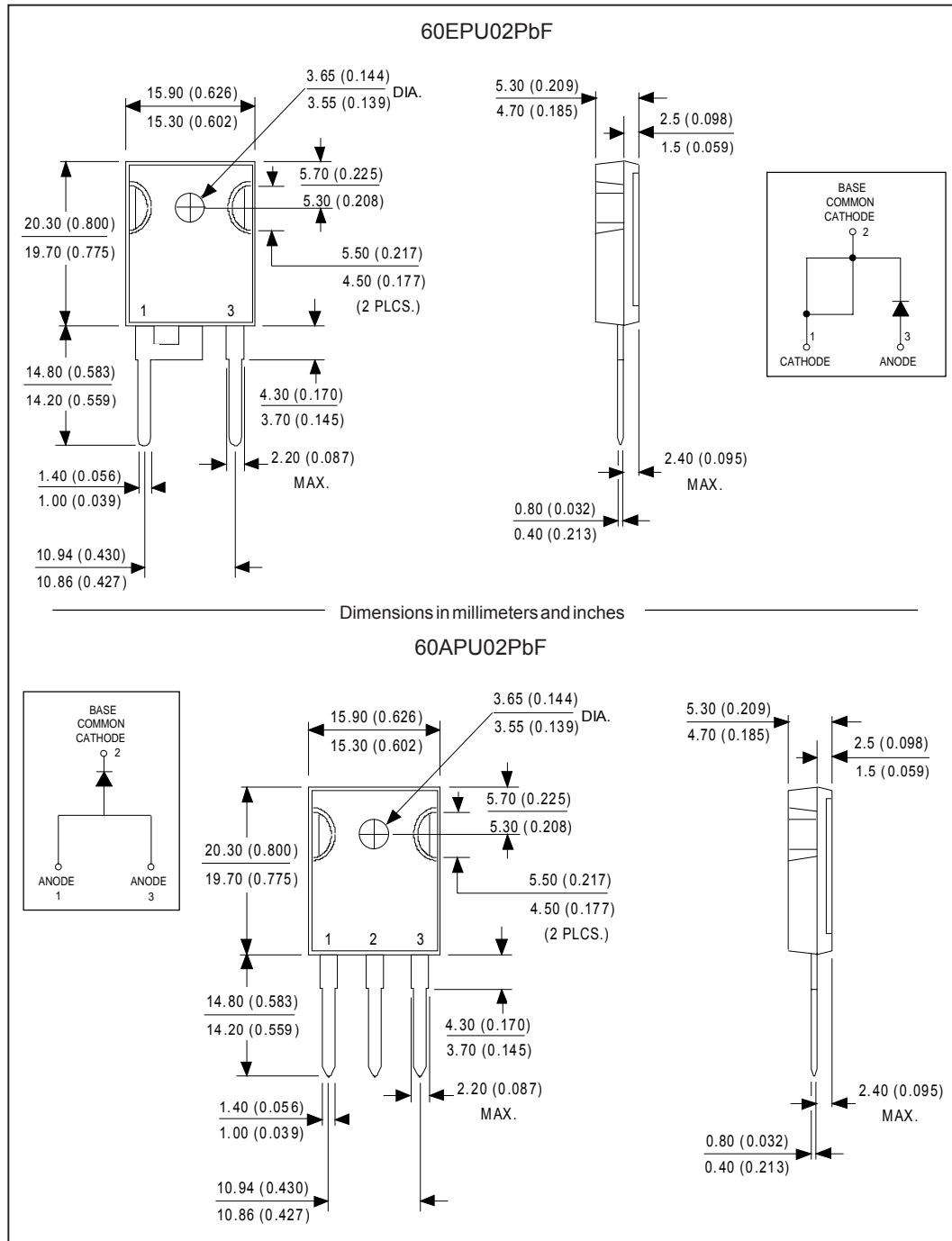


Fig. 10 - Reverse Recovery Waveform and Definitions

Outline Table



Marking Information

EXAMPLE: THIS IS A 60EPU02
 WITH ASSEMBLY
 LOT CODE 5657
 ASSEMBLED ON WW 35, 2000
 IN ASSEMBLY LINE "H"

PART NUMBER

DATE CODE
 P = LEAD-FREE
 YEAR 0 = 2000
 WEEK 35
 LINE H

EXAMPLE: THIS IS A 60APU02
 WITH ASSEMBLY
 LOT CODE 5657
 ASSEMBLED ON WW 35, 2000
 IN ASSEMBLY LINE "H"

PART NUMBER

DATE CODE
 P = LEAD-FREE
 YEAR 0 = 2000
 WEEK 35
 LINE H

Ordering Information Table

Device Code	60	E	P	U	02	PbF
	①	②	③	④	⑤	⑥
<p>1 - Current Rating (60 = 60A)</p> <p>2 - Circuit Configuration: E = Single Diode A = Single Diode, 3 pins</p> <p>3 - Package: P = TO-247AC (Modified)</p> <p>4 - Type of Silicon: U = UltraFast Recovery</p> <p>5 - Voltage Rating (02 = 200V)</p> <p>6 -</p> <ul style="list-style-type: none"> • none = Standard Production • PbF = Lead-Free 						

60EPU02PbF, 60APU02PbF

Bulletin PD-21079 08/05

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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.

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