Bulletin PD-20740 rev. B 02/06

International Rectifier

80EBU02

Ultrafast Soft Recovery Diode

Features
- Ultrafast Recovery
- 175°C Operating Junction Temperature
- Screw Mounting Only
- Lead-Free Plating

t_{rr} = 35ns
$I_{F(AV)}$ = 80Amp
V_R = 200V

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

Description/ Applications

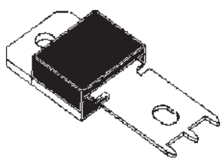
These diodes are optimized to reduce losses and EMI/ RFI in high frequency power conditioning systems.
The softness of the recovery eliminates the need for a snubber in most applications. These devices are ideally suited for HF welding, power converters and other applications where switching losses are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

Absolute Maximum Ratings

	Parameters	Max	Units
V_R	Cathode to Anode Voltage	200	V
$I_{F(AV)}$	Continuous Forward Current, T_C = 112°C	80	A
I_{FSM}	Single Pulse Forward Current, T_C = 25°C	800	
I_{FRM} ①	Maximum Repetitive Forward Current	160	
T_J, T_{STG}	Operating Junction and Storage Temperatures	- 55 to 175	°C

① Square Wave, 20kHz

Case Styles



Pow*IR*tab

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 = 50μA
V_F	Forward Voltage	-	0.98	1.13	V	I_F = 80A
		-	0.79	0.92	V	I_F = 80A, 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	-	89	-	pF	V_R = 200V
L_S	Series Inductance	-	3.5	-	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	
		-	32	-		T_J = 25°C	I_F = 80A V_R = 160V di_F/dt = 200A/μs
		-	52	-		T_J = 125°C	
I_{RRM}	Peak Recovery Current	-	4.4	-	A	T_J = 25°C	
		-	8.8	-		T_J = 125°C	
Q_{rr}	Reverse Recovery Charge	-	70	-	nC	T_J = 25°C	
			-	240	-	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			5.02	g
			0.18		(oz)
T	Mounting Torque	1.2		2.4	N * m
		10		20	lbf.in

② Mounting Surface, Flat, Smooth and Greased

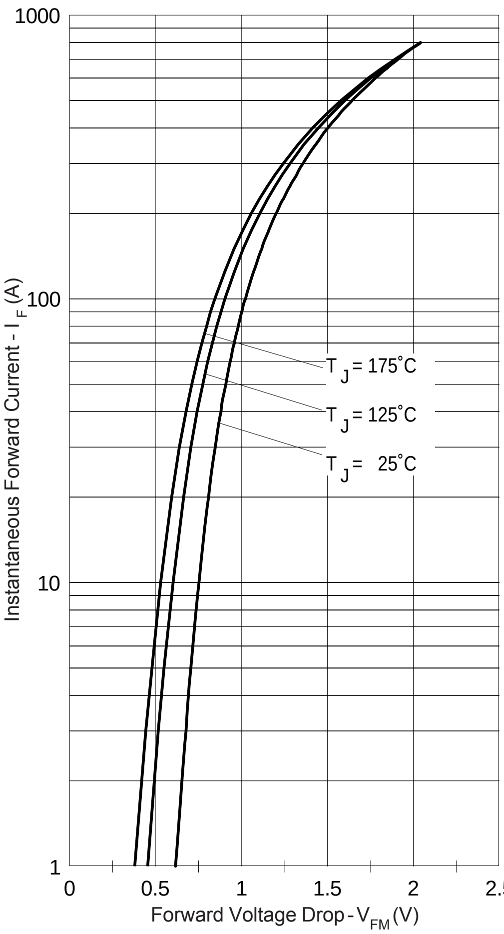


Fig. 1 - Typical Forward Voltage Drop Characteristics

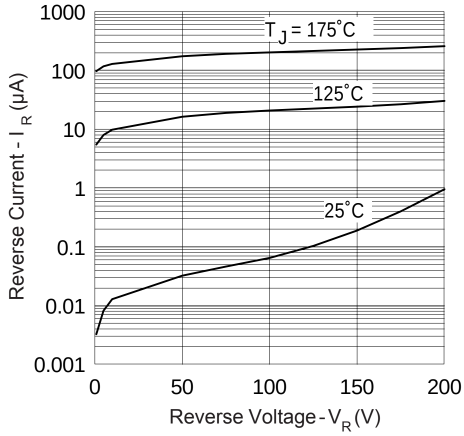


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

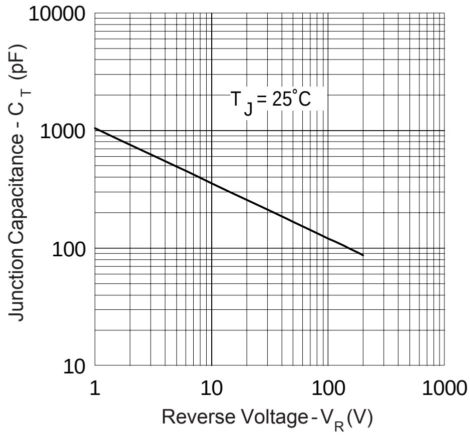


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

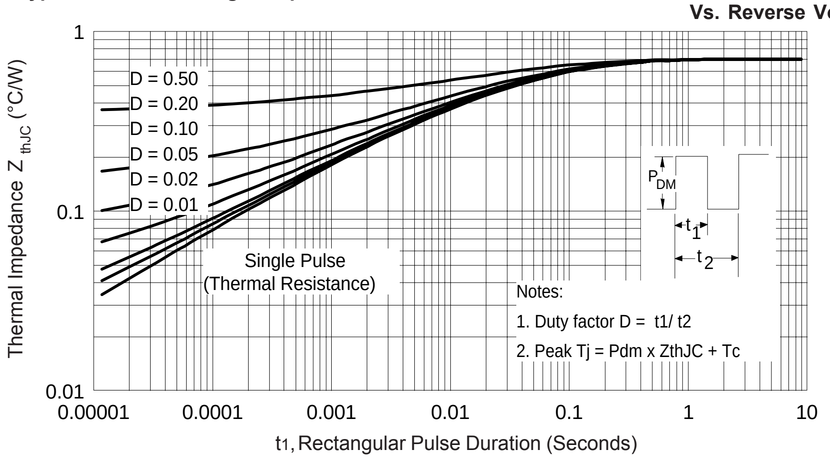


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

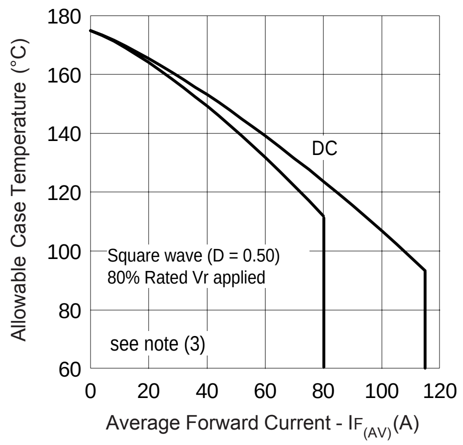


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

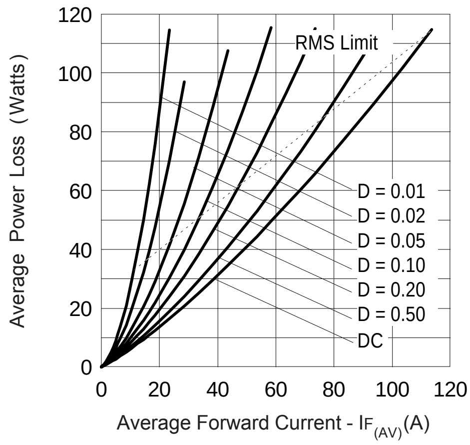


Fig. 6 - Forward Power Loss Characteristics

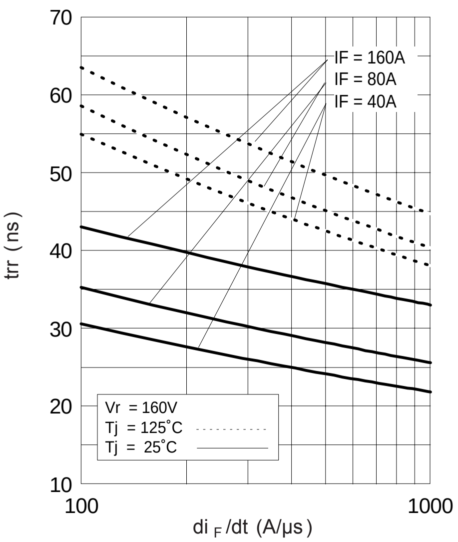


Fig. 7 - Typical Reverse Recovery time vs. di $_F$ /dt

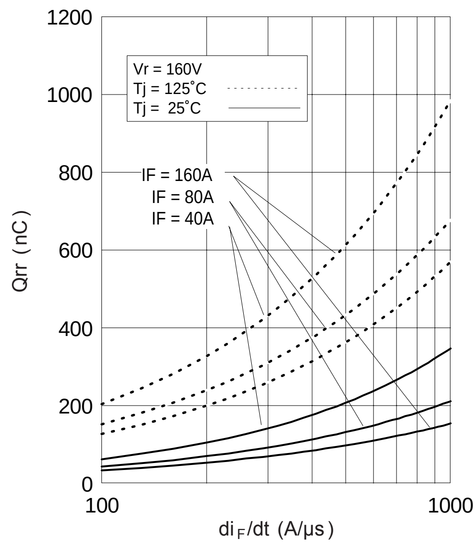


Fig. 8 - Typical Stored Charge vs. di $_F$ /dt

(3) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
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} = 80% rated V_R

Reverse Recovery Circuit

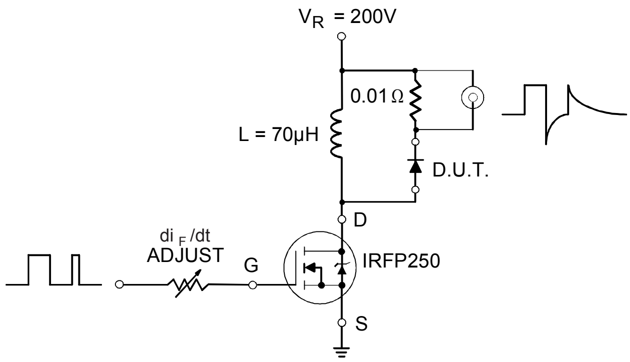
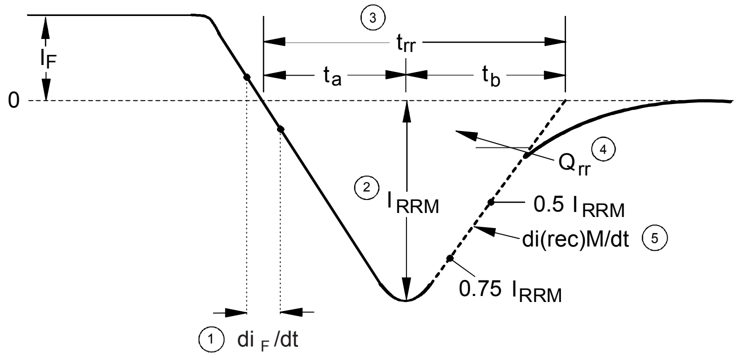


Fig. 9- Reverse Recovery Parameter Test Circuit



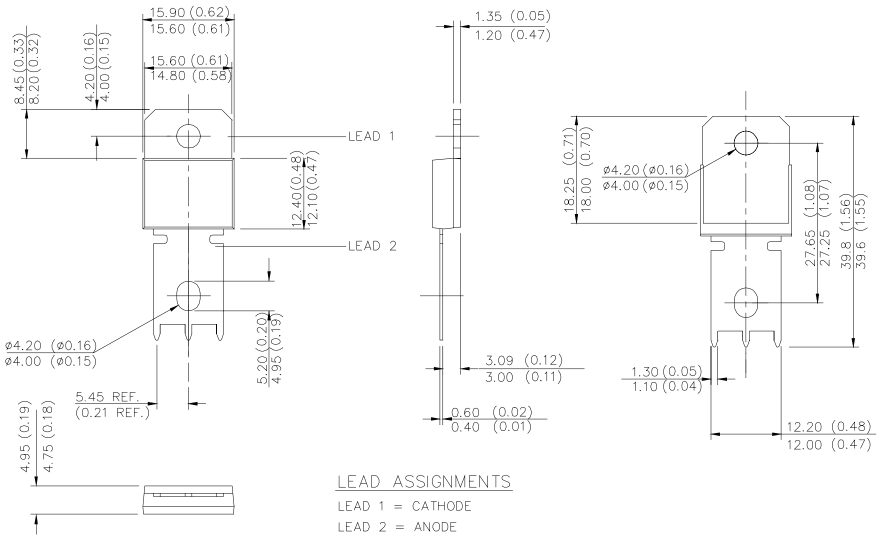
1. di_F/dt - Rate of change of current through zero crossing
2. I_{RRM} - Peak reverse recovery current
3. t_{rr} - Reverse recovery time measured from zero crossing point of negative going I_F to point where a line passing through 0.75 I_{RRM} and 0.50 I_{RRM} extrapolated to zero current
4. Q_{rr} - Area under curve defined by t_{rr} and I_{RRM}

$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

5. $di_{(rec)M}/dt$ - Peak rate of change of current during t_b portion of t_{rr}

Fig. 10 - Reverse Recovery Waveform and Definitions

Outline Table



Dimensions in millimeters and (inches)

Ordering Information Table

Device Code

80	E	B	U	02
1	2	3	4	5

1	-	Current Rating	(80 = 80A)
2	-	Single Diode	
3	-	Pow***IR***tab	(Ultrafast/ Hyperfast only)
4	-	Ultrafast Recovery	
5	-	Voltage Rating	(02 = 200V)

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
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IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7309
02/06

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