

International
IOR Rectifier

HEXFRED™

HFA04TB60S

Ultrafast, Soft Recovery Diode

Features

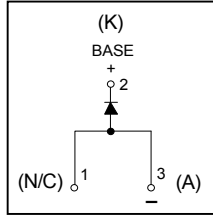
- Ultrafast Recovery
- Ultrasoft Recovery
- Very Low I_{RRM}
- Very Low Q_{rr}
- Specified at Operating Conditions

Benefits

- Reduced RFI and EMI
- Reduced Power Loss in Diode and Switching Transistor
- Higher Frequency Operation
- Reduced Snubbing
- Reduced Parts Count

Description

International Rectifier's HFA04TB60S is a state of the art ultra fast recovery diode. Employing the latest in epitaxial construction and advanced processing techniques it features a superb combination of characteristics which result in performance which is unsurpassed by any rectifier previously available. With basic ratings of 600 volts and 8 amps per Leg continuous current, the HFA04TB60S is especially well suited for use as the companion diode for IGBTs and MOSFETs. In addition to ultra fast recovery time, the HEXFRED product line features extremely low values of peak recovery current (I_{RRM}) and does not exhibit any tendency to "snap-off" during the t_b portion of recovery. The HEXFRED features combine to offer designers a rectifier with lower noise and significantly lower switching losses in both the diode and the switching transistor. These HEXFRED advantages can help to significantly reduce snubbing, component count and heatsink sizes. The HEXFRED HFA04TB60S is ideally suited for applications in power supplies and power conversion systems (such as inverters), motor drives, and many other similar applications where high speed, high efficiency is needed.



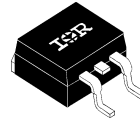
$$V_R = 600V$$

$$V_F = 1.8V$$

$$Q_{rr}^* = 40nC$$

$$di_{(rec)M}/dt^* = 280A/\mu s$$

* 125°C



D² Pak

Absolute Maximum Ratings

	Parameter	Max.	Units
V_R	Cathode-to-Anode Voltage	600	V
$I_F @ T_C = 100^\circ C$	Continuous Forward Current	4.0	A
I_{FSM}	Single Pulse Forward Current	25	
I_{FRM}	Maximum Repetitive Forward Current	16	
$P_D @ T_C = 25^\circ C$	Maximum Power Dissipation	25	W
$P_D @ T_C = 100^\circ C$	Maximum Power Dissipation	10	
T_J	Operating Junction and	-55 to +150	°C
T_{STG}	Storage Temperature Range		

HFA04TB60S

Bulletin PD-20614 rev. A 12/00

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Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
V_{BR}	Cathode Anode Breakdown Voltage	600	—	—	V	$I_R = 100\mu\text{A}$
V_{FM}	Max Forward Voltage		1.5	1.8	V	$I_F = 4.0\text{A}$
			1.8	2.2		$I_F = 8.0\text{A}$ See Fig. 1
			1.4	1.7		$I_F = 4.0\text{A}$, $T_J = 125^\circ\text{C}$
I_{RM}	Max Reverse Leakage Current		0.17	3.0	μA	$V_R = V_R$ Rated See Fig. 2
			44	300		$T_J = 125^\circ\text{C}$, $V_R = 0.8 \times V_R$ Rated
C_T	Junction Capacitance	—	4.0	8.0	pF	$V_R = 200\text{V}$ See Fig. 3
L_S	Series Inductance	—	8.0	—	nH	Measured lead to lead 5mm from package body

Dynamic Recovery Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
t_{rr}	Reverse Recovery Time	—	17	—	ns	$I_F = 1.0\text{A}$, $di_F/dt = 200\text{A}/\mu\text{s}$, $V_R = 30\text{V}$
t_{rr1}	See Fig. 5 & 6	—	28	42		$T_J = 25^\circ\text{C}$
t_{rr2}		—	38	57		$T_J = 125^\circ\text{C}$
I_{RRM1}	Peak Recovery Current	—	2.9	5.2	A	$T_J = 25^\circ\text{C}$
I_{RRM2}		—	3.7	6.7		$T_J = 125^\circ\text{C}$
Q_{rr1}	Reverse Recovery Charge	—	40	60	nC	$T_J = 25^\circ\text{C}$
Q_{rr2}	See Fig. 7	—	70	105		$T_J = 125^\circ\text{C}$
$di_{(rec)M}/dt1$	Peak Rate of Fall of Recovery Current	—	280	—	$\text{A}/\mu\text{s}$	$T_J = 25^\circ\text{C}$
$di_{(rec)M}/dt2$	During t_b See Fig. 8	—	235	—		$T_J = 125^\circ\text{C}$

Thermal - Mechanical Characteristics

	Parameter	Min.	Typ.	Max.	Units
T_{lead} ①	Lead Temperature	—	—	300	$^\circ\text{C}$
R_{thJC}	Thermal Resistance, Junction to Case	—	—	5.0	K/W
R_{thJA} ②	Thermal Resistance, Junction to Ambient	—	—	80	
Wt	Weight	—	2.0	—	g
		—	0.07	—	(oz)

① 0.063 in. from Case (1.6mm) for 10 sec

② Typical Socket Mount

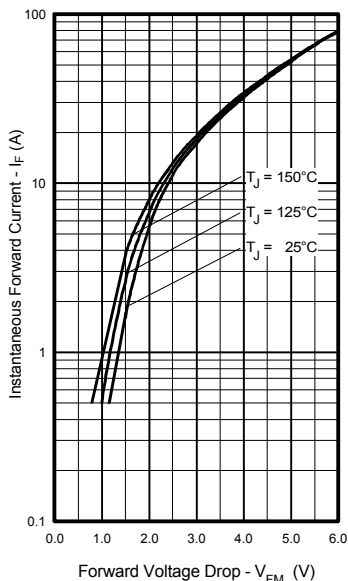


Fig. 1 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current,

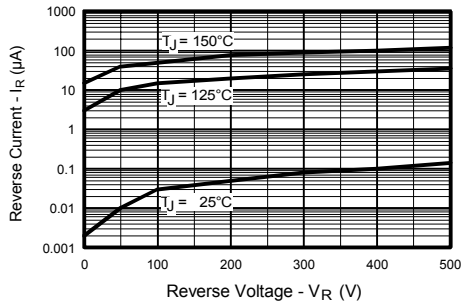


Fig. 2 - Typical Reverse Current vs. Reverse Voltage

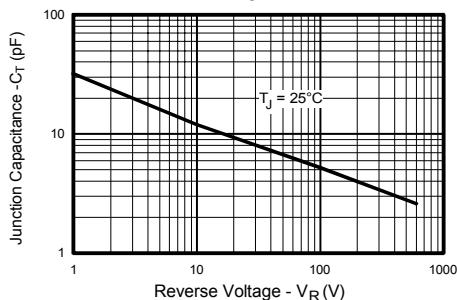


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

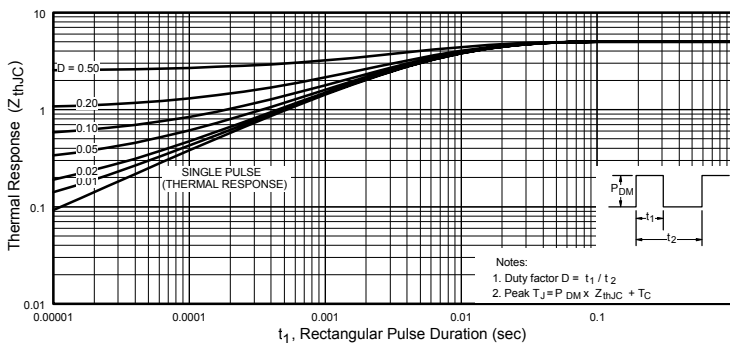


Fig. 4 - Maximum Thermal Impedance Z_{thjc} Characteristics

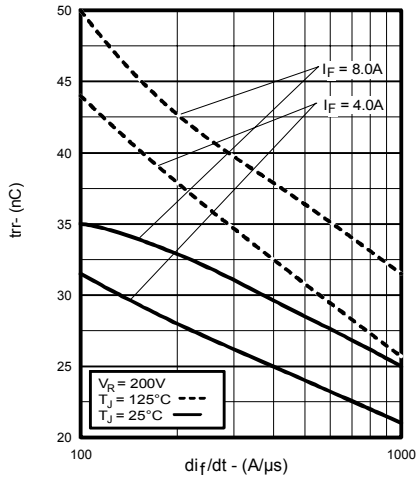


Fig. 5 - Typical Reverse Recovery vs. di/dt

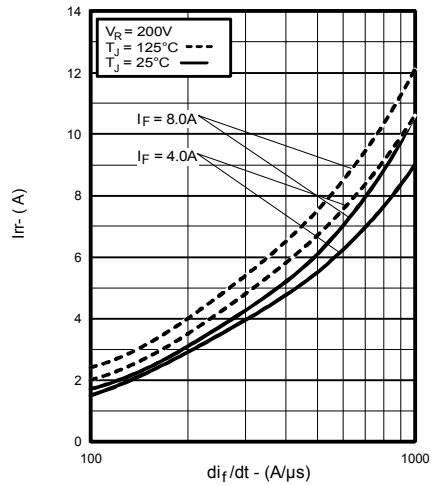


Fig. 6 - Typical Recovery Current vs. di/dt

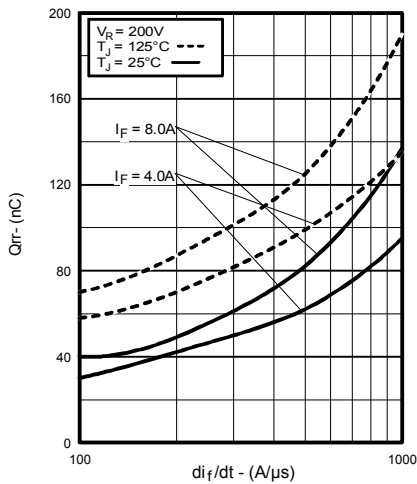


Fig. 7 - Typical Stored Charge vs. di/dt

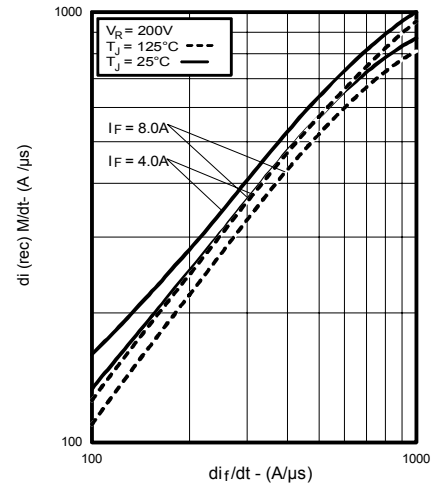


Fig. 8 - Typical $di_{(rec)}M/dt$ vs. di/dt

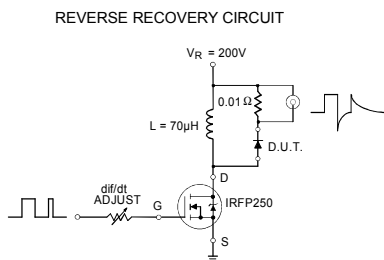


Fig. 9 - Reverse Recovery Parameter Test Circuit

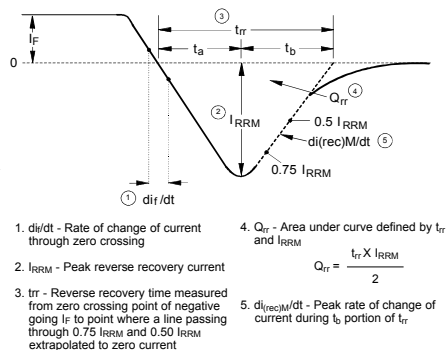


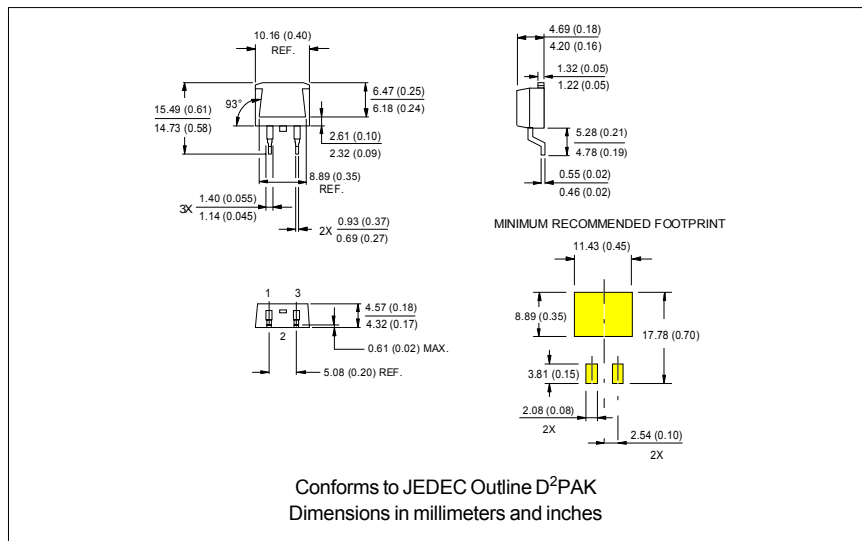
Fig. 10 - Reverse Recovery Waveform and Definitions

HFA04TB60S

Bulletin PD-20614 rev. A 12/00

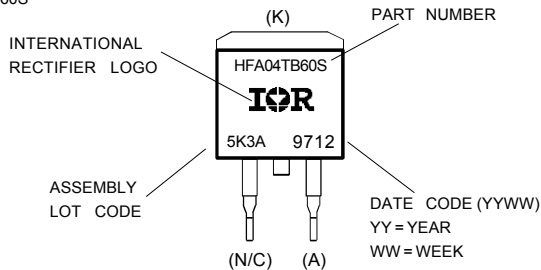
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Outline Table



Part Marking Information

EXAMPLE: THIS IS AN HFA04TB60S



Tape & Reel Information

