

International
IR Rectifier

HEXFRED™

HFA25TB60S

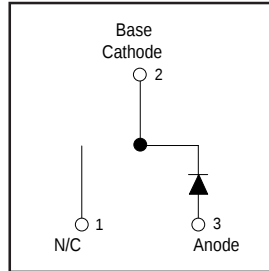
Ultrafast, Soft Recovery Diode

Features

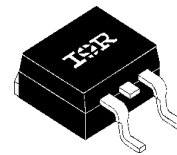
- Ultrafast Recovery
- Ultrasoft Recovery
- Very Low I_{RRM}
- Very Low Q_{rr}
- Specified at Operating Conditions

Benefits

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



$V_R = 600V$
 $V_F(\text{typ.})^* = 1.3V$
 $I_{F(AV)} = 25A$
 $Q_{rr}(\text{typ.}) = 112nC$
 $I_{RRM} = 10A$
 $t_{rr}(\text{typ.}) = 23ns$
 $di_{(rec)M}/dt(\text{typ.}) = 250A/\mu s$



D² Pak

Description

International Rectifier's HFA25TB60S 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 25 amps continuous current, the HFA25TB60S 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 HFA25TB60S 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.

Absolute Maximum Ratings

	Parameter	Max.	Units
V_R	Cathode-to-Anode Voltage	600	V
$I_F @ T_C = 100^\circ C$	Continuous Forward Current	25	A
I_{FSM}	Single Pulse Forward Current	225	
I_{FRM}	Maximum Repetitive Forward Current	100	
$P_D @ T_C = 25^\circ C$	Maximum Power Dissipation	125	W
$P_D @ T_C = 100^\circ C$	Maximum Power Dissipation	50	
T_J	Operating Junction and	-55 to +150	$^\circ C$
T_{STG}	Storage Temperature Range		

* $125^\circ C$

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	—	1.3	1.7	V	$I_F = 25\text{A}$
		—	1.5	2.0		$I_F = 50\text{A}$
		—	1.3	1.7		$I_F = 25\text{A}, T_J = 125^\circ\text{C}$
I_{RM}	Max Reverse Leakage Current	—	1.5	20	μA	$V_R = V_R \text{ Rated}$
		—	600	2000		$T_J = 125^\circ\text{C}, V_R = 0.8 \times V_R \text{ Rated}$
C_T	Junction Capacitance	—	55	100	pF	$V_R = 200\text{V}$
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	—	23	—	ns	$I_F = 1.0\text{A}, di/dt = 200\text{A}/\mu\text{s}, V_R = 30\text{V}$
t_{rr1}	See Fig. 5	—	50	75		$T_J = 25^\circ\text{C}$
t_{rr2}		—	105	160		$T_J = 125^\circ\text{C}$
I_{RRM1}	Peak Recovery Current	—	4.5	10	A	$T_J = 25^\circ\text{C}$
I_{RRM2}	See Fig. 6	—	8.0	15		$T_J = 125^\circ\text{C}$
Q_{rr1}	Reverse Recovery Charge	—	112	375	nC	$T_J = 25^\circ\text{C}$
Q_{rr2}	See Fig. 7	—	420	1200		$T_J = 125^\circ\text{C}$
$di_{(rec)M}/dt1$	Peak Rate of Fall of Recovery Current	—	250	—	A/ μs	$T_J = 25^\circ\text{C}$
$di_{(rec)M}/dt2$	During t_b See Fig. 8	—	160	—		$T_J = 125^\circ\text{C}$

Thermal - Mechanical Characteristics

	Parameter	Min.	Typ.	Max.	Units
T_{lead} ①	Lead Temperature	—	—	300	$^\circ\text{C}$
R_{thJC}	Thermal Resistance, Junction to Case	—	—	1.0	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

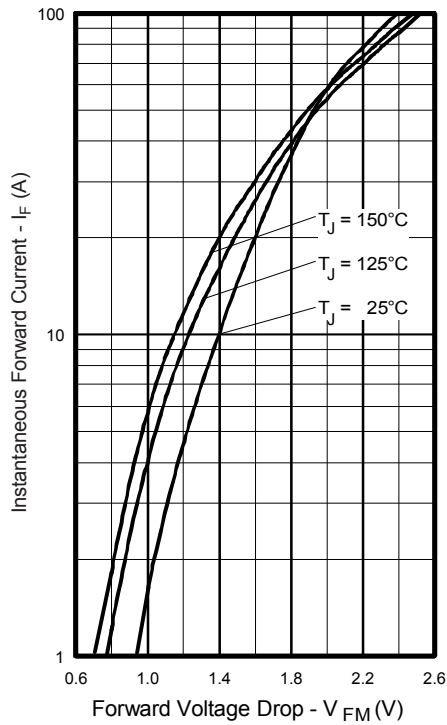


Fig. 1 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current

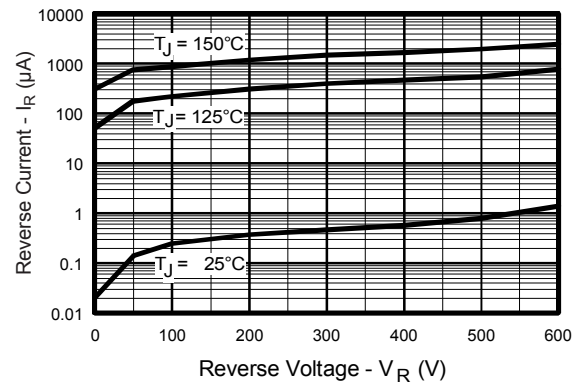


Fig. 2 - Typical Reverse Current vs. Reverse Voltage

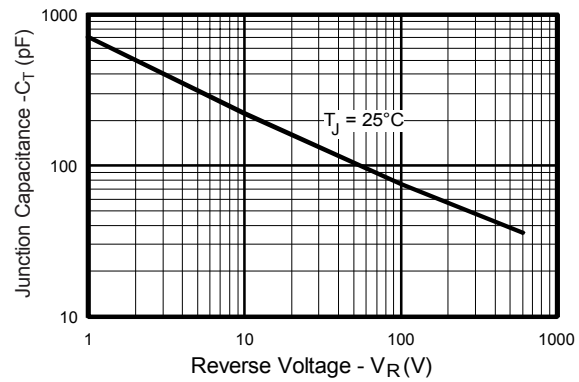


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

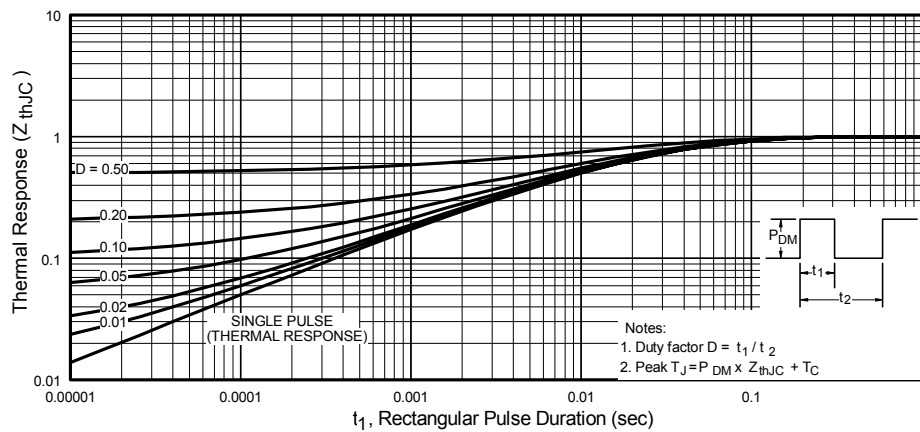
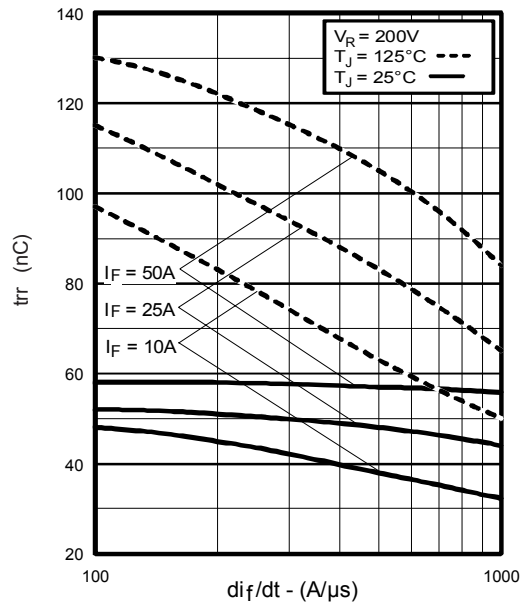
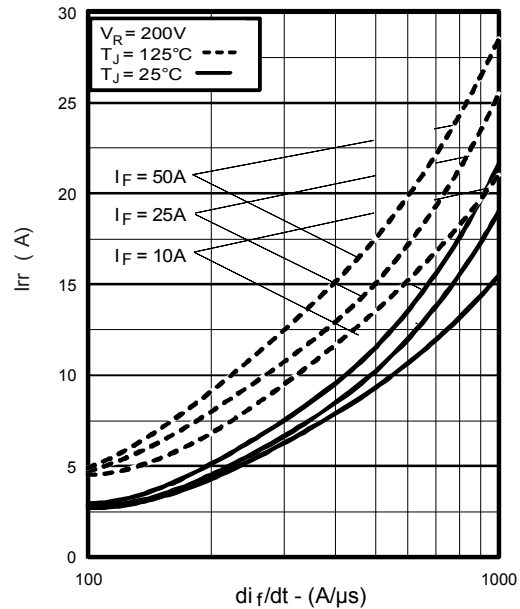
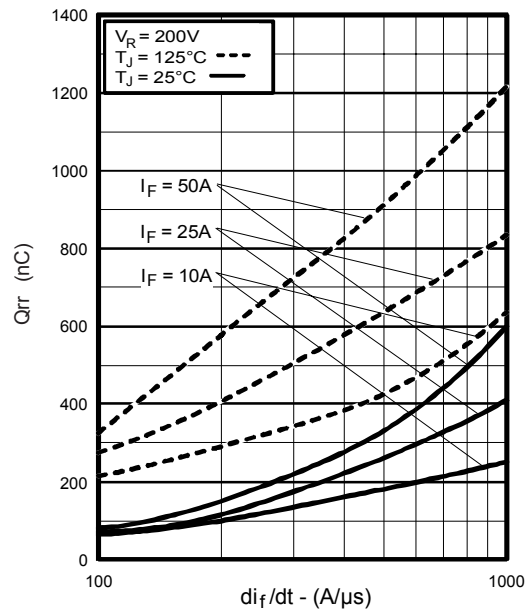
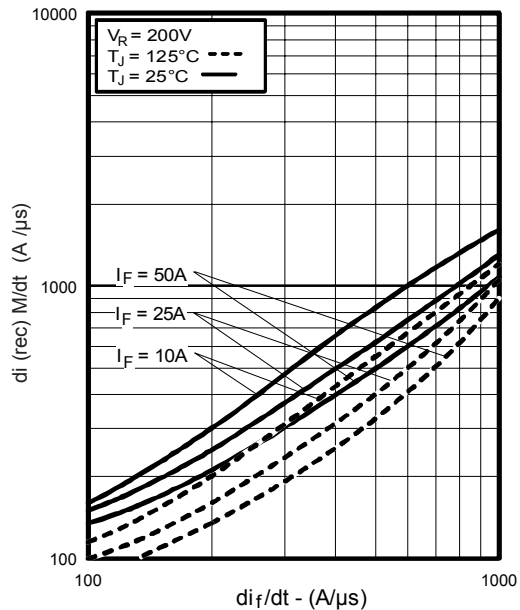


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

Fig. 5 - Typical Reverse Recovery vs. di_f/dt Fig. 6 - Typical Recovery Current vs. di_f/dt Fig. 7 - Typical Stored Charge vs. di_f/dt Fig. 8 - Typical $di_{(rec)}M/dt$ vs. di_f/dt

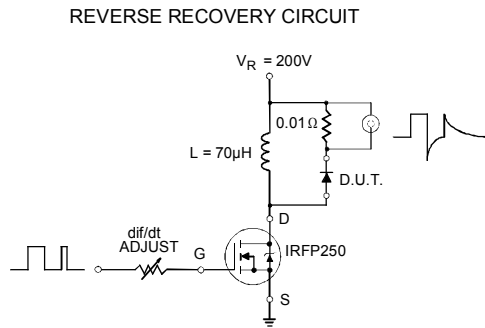


Fig. 9 - Reverse Recovery Parameter Test Circuit

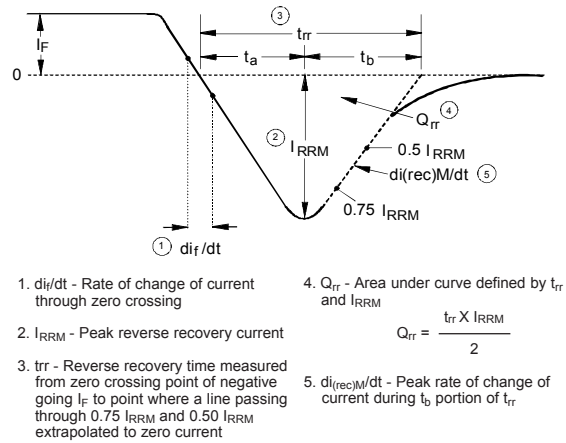
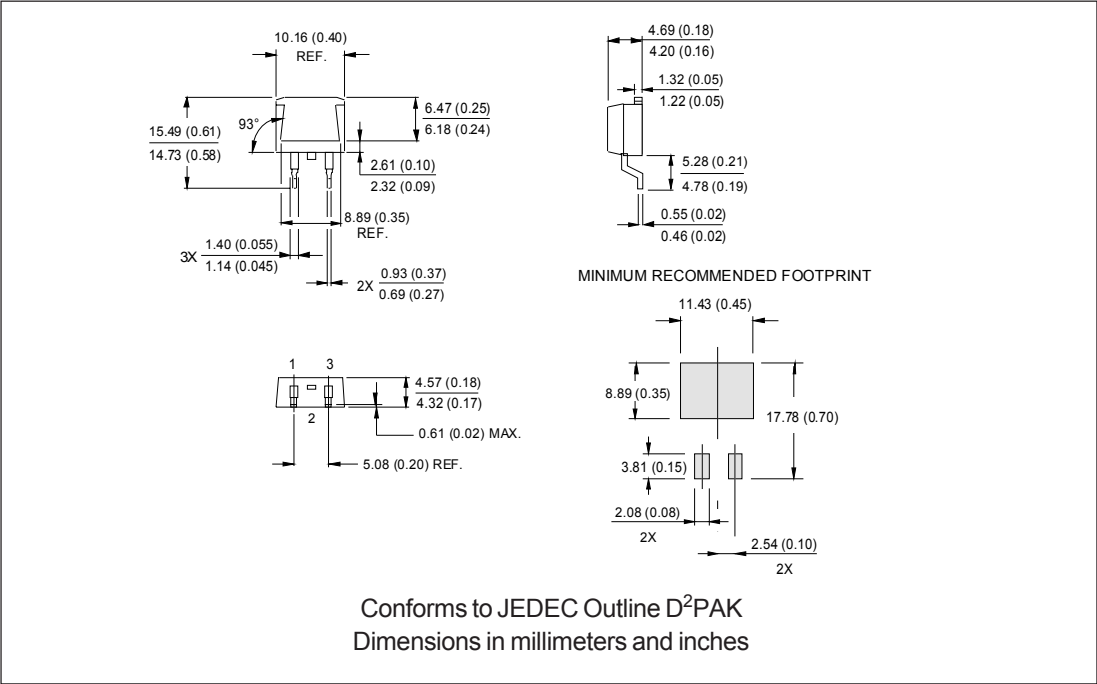


Fig. 10 - Reverse Recovery Waveform and Definitions

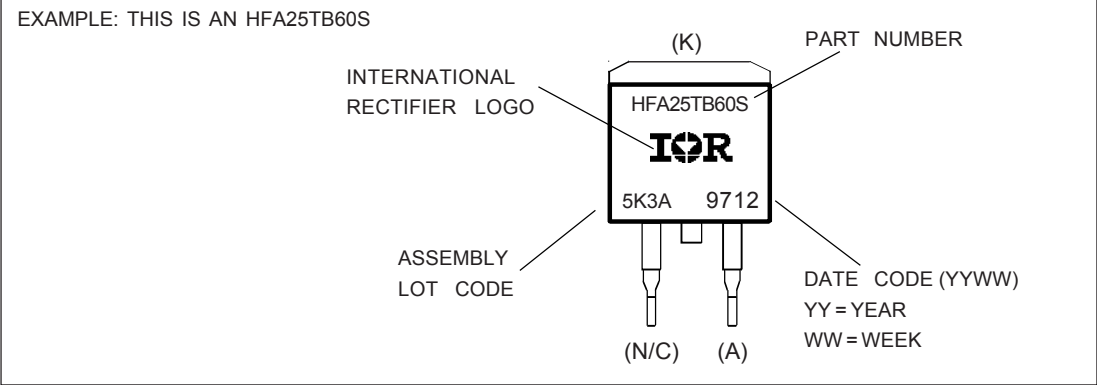
HFA25TB60S

Bulletin PD-20616 rev. B 11/03

Outline Table



Part Marking Information



The drawing illustrates the mechanical specifications for SMD-220 Tape & Reel, including top (TRR) and side (TRL) views, a detailed tape cross-section, and a reel layout.

TRR View: Shows the top of the tape with dimensions for the carrier width (4.10 (0.161) and 3.90 (0.153)), carrier thickness (1.60 (0.063) and 1.50 (0.059)), and carrier hole diameter (1.60 (0.063) DIA.). The carrier hole spacing is 11.60 (0.457) and 11.40 (0.449). The carrier hole diameter is 1.75 (0.069) DIA. The carrier hole spacing is 1.25 (0.049) DIA. The carrier hole diameter is 1.25 (0.049) DIA. The carrier hole diameter is 1.25 (0.049) DIA.

TRL View: Shows the side of the tape with dimensions for the carrier thickness (1.85 (0.073) and 1.65 (0.065)), carrier width (10.90 (0.429) and 10.70 (0.421)), carrier hole spacing (16.10 (0.634) and 15.90 (0.626)), and carrier hole diameter (1.75 (0.069) DIA.).

Tape Cross-Section: Shows the tape thickness (0.368 (0.0145) and 0.342 (0.0135)), carrier width (15.42 (0.609) and 15.22 (0.601)), carrier hole spacing (24.30 (0.957) and 23.90 (0.941)), and carrier hole diameter (4.72 (0.186) and 4.52 (0.178)).

Reel Layout: Shows a circular reel with a diameter of 360 (14.173) DIA. MAX. The reel has three segments. The segment width is 13.50 (0.532) and 12.80 (0.504) DIA. The segment thickness is 26.40 (1.039) and 24.40 (0.961). The segment width is 60 (2.362) DIA. MIN.

SMD-220 Tape & Reel
 When ordering, indicate the part number, part orientation, and the quantity. Quantities are in multiples of 800 pieces per reel for both TRL and TRR.

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