

HFA04SD60S

Ultrafast, Soft Recovery Diode

Features

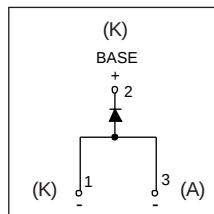
- Ultrafast Recovery
- Ultrasoft Recovery
- Very Low I_{RRM}
- Very Low Q_{rr}
- Guaranteed Avalanche
- Specified at Operating Conditions

Benefits

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

Description

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 freewheeling, flyback, power converters, motor drives, and other applications where high speed and reduced switching losses are design requirements.

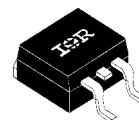


$$V_R = 600 \text{ V}$$

$$V_F = 1.5 \text{ V}$$

$$I_F = 4 \text{ A}$$

$$t_{rr} = 38 \text{ ns}$$



D-Pak

Absolute Maximum Ratings

	Parameter	Max.	Units
V_R	Cathode-to-Anode Voltage	600	V
$I_F @ T_C = 25^\circ\text{C}$	Continuous Forward Current	11	A
$I_F @ T_C = 116^\circ\text{C}$	Continuous Forward Current	4.0	
I_{FSM}	Single Pulse Forward Current	25	
I_{FRM}	Maximum Repetitive Forward Current	16	
$P_D @ T_C = 25^\circ\text{C}$	Maximum Power Dissipation	25	W
$P_D @ T_C = 116^\circ\text{C}$	Maximum Power Dissipation	6.8	
T_J	Operating Junction and	-55 to +150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range		

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 See Fig. 1	—	1.5	1.7	V	$I_F = 4.0\text{A}$
		—	1.8	2.1		$I_F = 8.0\text{A}$
		—	1.5	1.7		$I_F = 4.0\text{A}, T_J = 125^\circ\text{C}$
I_{RM}	Max Reverse Leakage Current See Fig. 2	—	10	70	μA	$V_R = V_R \text{ Rated}$
		—	44	300		$T_J = 125^\circ\text{C}, V_R = 0.8 \times V_R \text{ Rated}$
C_T	Junction Capacitance See Fig. 3	—	8.0	9.0	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	—	38	—	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 & 10	—	49	56		$T_J = 25^\circ\text{C}$
t_{rr2}		—	65	72		$T_J = 150^\circ\text{C}$
I_{RRM1}	Peak Recovery Current	—	2.5	2.8	A	$T_J = 25^\circ\text{C}$
I_{RRM2}	See Fig. 6	—	3.6	4.2		$T_J = 150^\circ\text{C}$
Q_{rr1}	Reverse Recovery Charge	—	74	95	nC	$T_J = 25^\circ\text{C}$
Q_{rr2}	See Fig. 7	—	153	180		$T_J = 150^\circ\text{C}$
$di_{(rec)}/dt1$	Peak Rate of Fall of Recovery Current	—	99	—	A/ μs	$T_J = 25^\circ\text{C}$
$di_{(rec)}/dt2$	During t_b See Fig. 8	—	130	—		$T_J = 150^\circ\text{C}$

Thermal - Mechanical Characteristics

	Parameter	Min.	Typ.	Max.	Units
T_J	Max. Junction Temperature Range	—	—	-55 to 150	$^\circ\text{C}$
T_{Stg}	Max. Storage Temperature Range	—	—	-55 to 150	
T_s	Soldering Temperature, 10sec	—	—	240	
R_{thJC}	Thermal Resistance, Junction to Case	—	—	5.0	$^\circ\text{K/W}$
$R_{thJA} \text{ ①}$	Thermal Resistance, Junction to Ambient	—	—	80	
Wt	Weight	—	1.0	—	g
		—	0.03	—	(oz)

① When mounted on 1" square(650mm²) PCB of FR-4 or G-10 material 4 oz (140 μm) copper 40 $^\circ\text{C/W}$.
For recommended footprint and soldering techniques refer to application note # AN-994

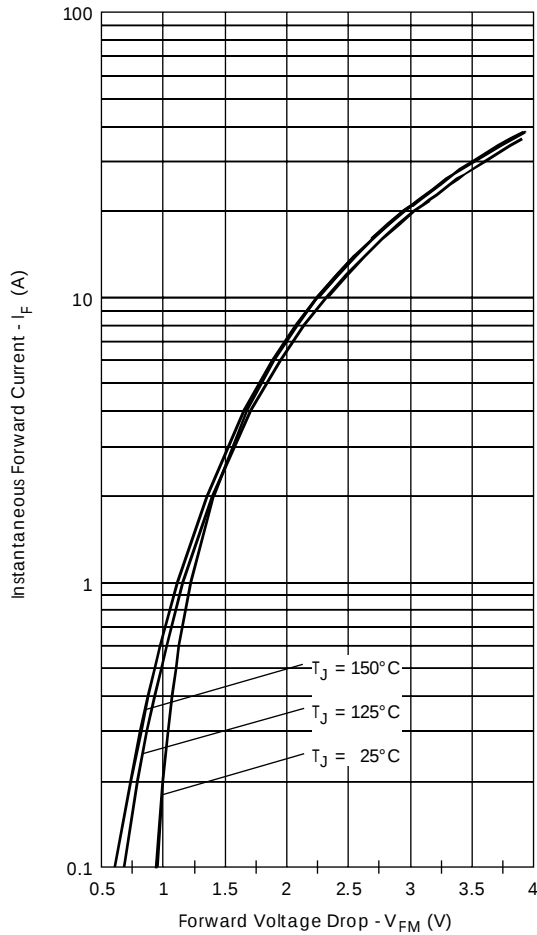


Fig. 1 - Maximum Forward Voltage Drop Characteristics

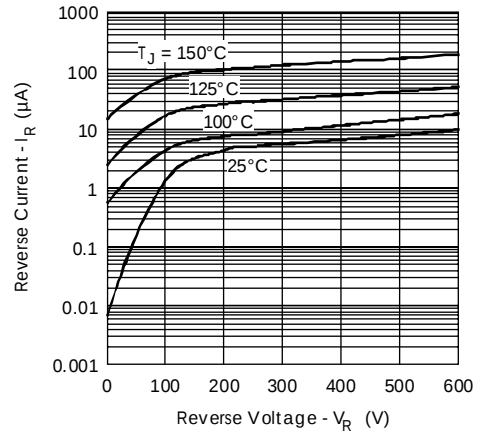


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

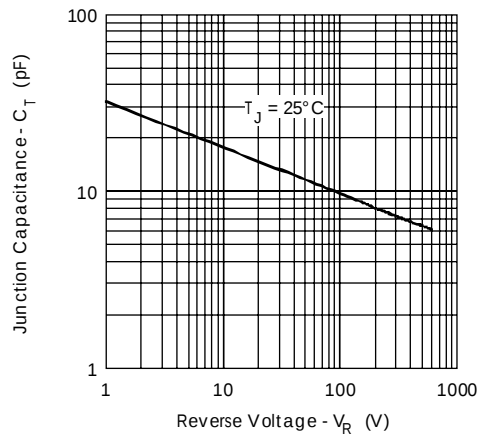


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

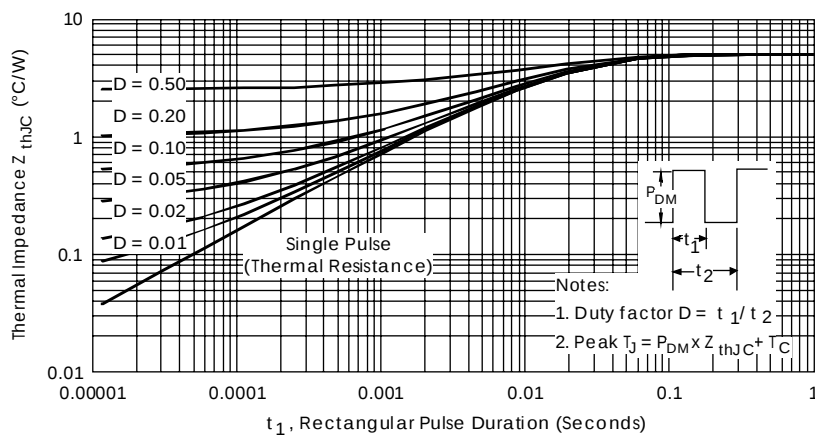
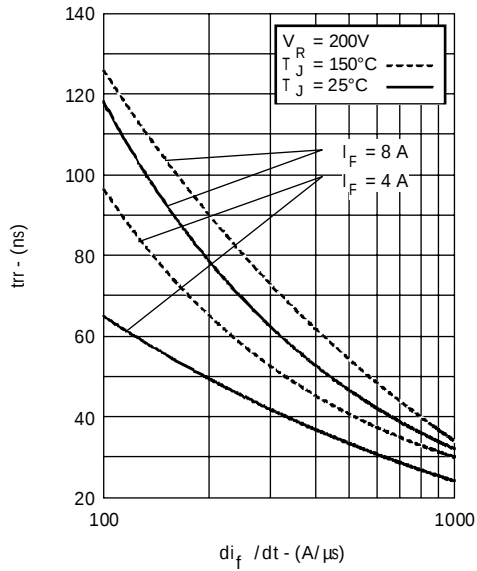
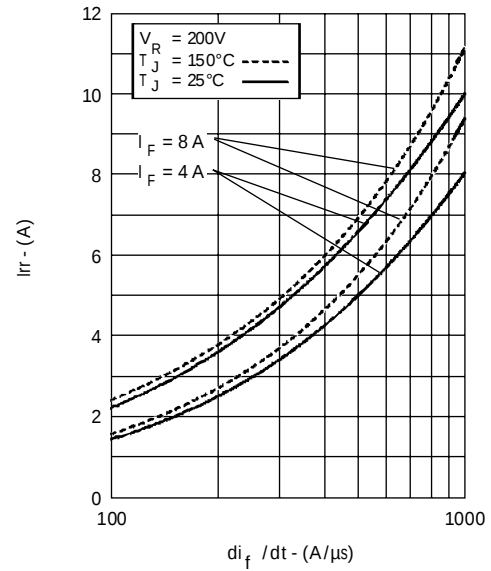
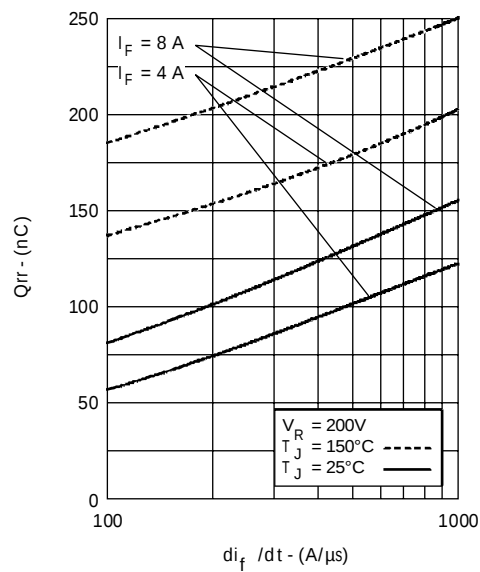
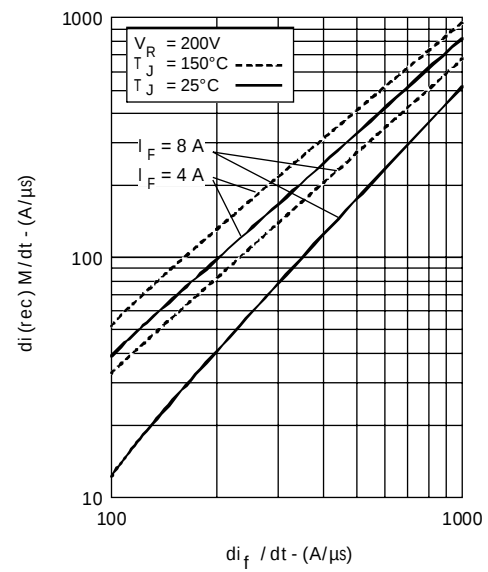


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

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

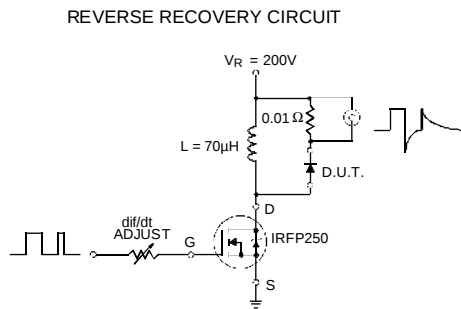


Fig.9- Reverse Recovery Parameter Test Circuit

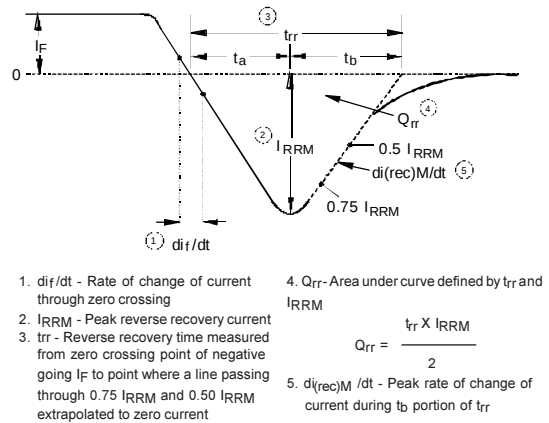


Fig.10- Reverse Recovery Waveform and Definitions

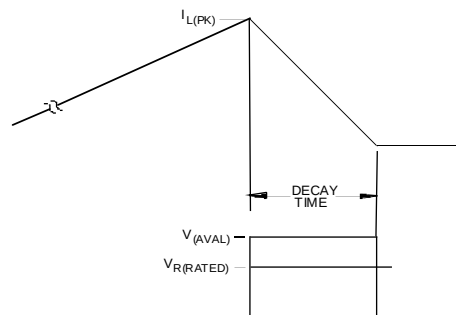
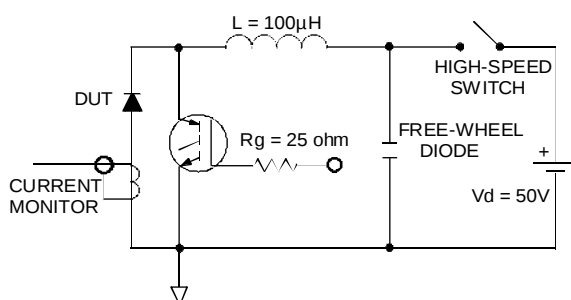
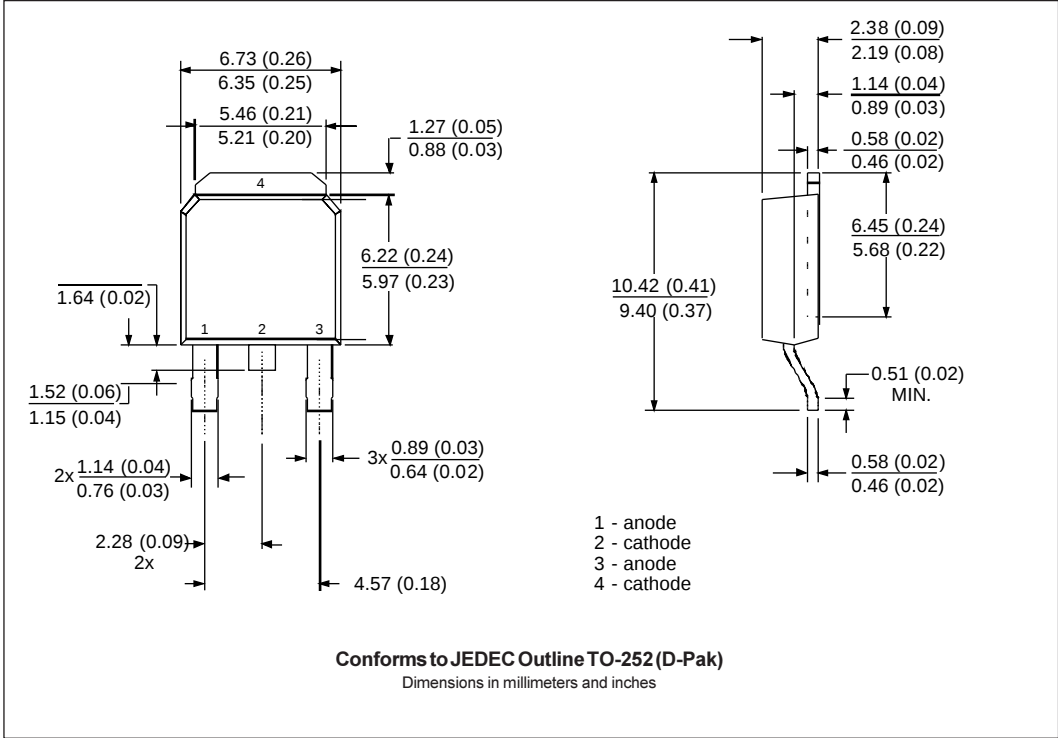
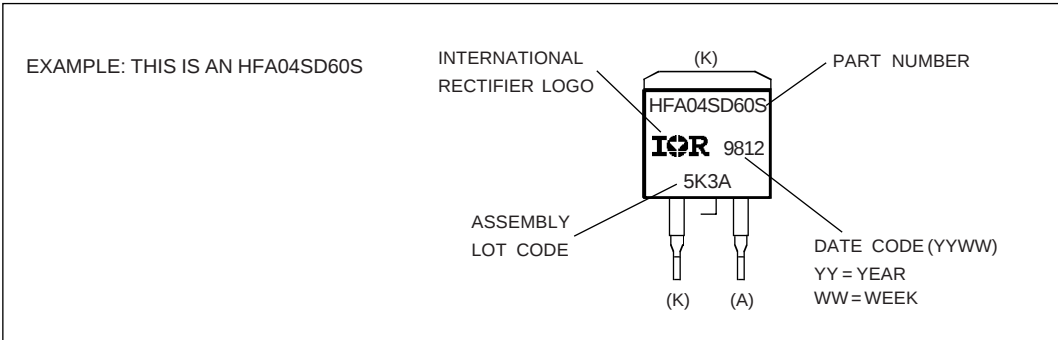


Fig.11 - Avalanche Test Circuit and Waveforms

Outline Table



Marking Information



Tape & Reel Information

