

HFA04SD60SPbF

Ultrafast, Soft Recovery Diode

Features

- Ultrafast Recovery Time
- Ultrasoft Recovery
- Very Low I_{RRM}
- Very Low Q_{rr}
- Guaranteed Avalanche
- Specified at Operating Temperature
- Lead-Free

Benefits

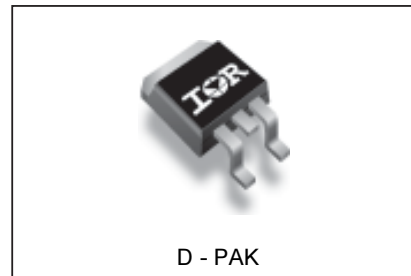
- Reduced RFI and EMI
- Reduced Power Loss in Diode and Switching Transistor
- Higher Frequency Operation
- Reduced Snubbing
- Reduced Parts Count

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

$t_{rr} = 38ns$ $I_{F(AV)} = 4Amp$ $V_R = 600V$

Package Outline



Absolute Maximum Ratings

	Parameters	Max	Units
V_{RRM}	Cathode-to-Anode Voltage	600	V
$I_{F(AV)}$	Continuous Forward Current $T_C = 100^\circ C$	4	A
I_{FSM}	Single Pulse Forward Current	25	
I_{FRM}	Peak Repetitive Forward Current $T_C = 116^\circ C$	16	
P_D	Maximum Power Dissipation $T_C = 100^\circ C$	10	W
T_J, T_{STG}	Operating Junction and Storage Temperatures	- 55 to 150	$^\circ C$

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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	600	-	-	V	I _R = 100μA
V _F Forward Voltage See Fig. 1	-	1.5	1.8	V	I _F = 4A
	-	1.8	2.2	V	I _F = 8A
	-	1.4	1.7	V	I _F = 4A, T _J = 125°C
I _R Max. Reverse Leakage Current	-	0.17	3.0	μA	V _R = V _R Rated
	-	44	300	μA	T _J = 125°C, V _R = 0.8 x V _R Rated
C _T Junction Capacitance	-	4	8	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	-	17	-	ns	I _F = 1.0A, di _F /dt = 200A/μA, V _R = 30V
	-	28	42		T _J = 25°C
	-	38	57		T _J = 125°C
I _{RRM} Peak Recovery Current	-	2.9	5.2	A	T _J = 25°C
	-	3.7	6.7		T _J = 125°C
Q _{rr} Reverse Recovery Charge	-	40	60	nC	T _J = 25°C
	-	70	105		T _J = 125°C
di _(rec) /dt Rate of Fall of recovery Current	-	280	-	A/μs	T _J = 25°C
	-	235	-		T _J = 125°C

Thermal - Mechanical Characteristics

Parameters	Min	Typ	Max	Units
T _J Max. Junction Temperature Range	-	-	-55 to 150	°C
T _{Stg} Max. Storage Temperature Range	-	-	-55 to 150	
T _S Soldering Temperature, 10 sec	-	-	240	
R _{thJC} Thermal Resistance, Junction to Case	-	-	5.0	°C/ W
R _{thJA} ^① Thermal Resistance, Junction to Ambient	-	-	80	
Wt Weight	-	2.0	-	g
	-	0.07	-	(oz)
T Mounting Torque	6.0	-	12	Kg*cm
	5.0	-	10	lbf*in

① Typical Socket Mount

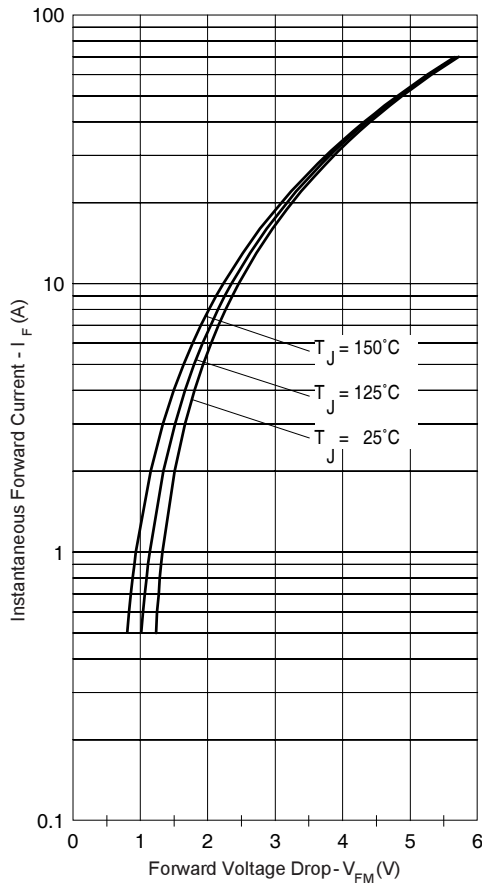


Fig. 1 - Typical Forward Voltage Drop Characteristics

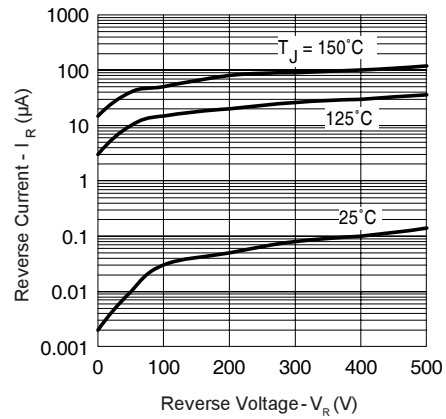


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

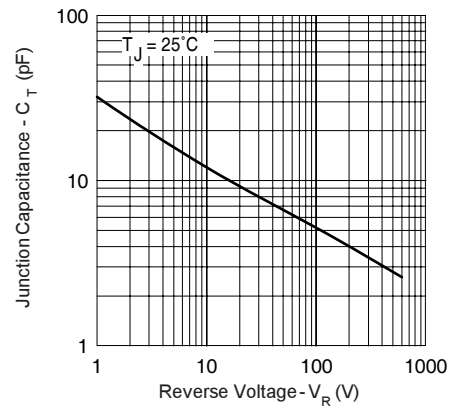


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

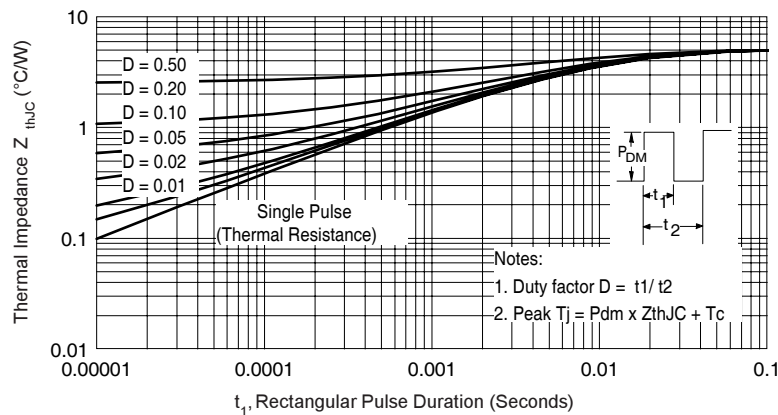


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

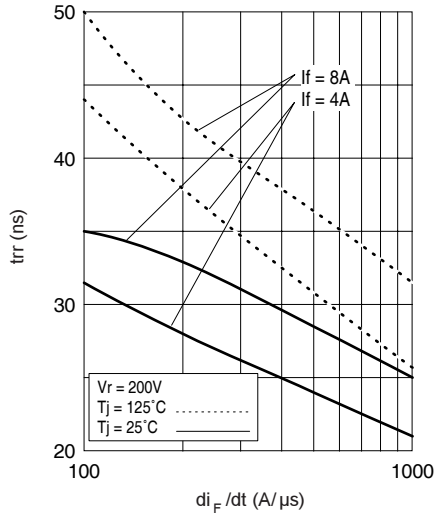


Fig. 5 - Typical Reverse Recovery vs. di_F/dt

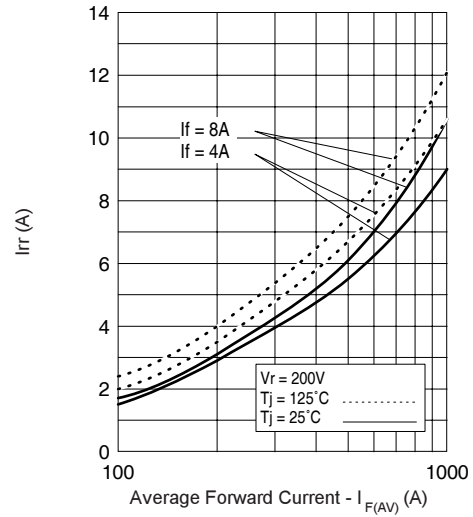


Fig. 6 - Typical Recovery Current vs. di_F/dt

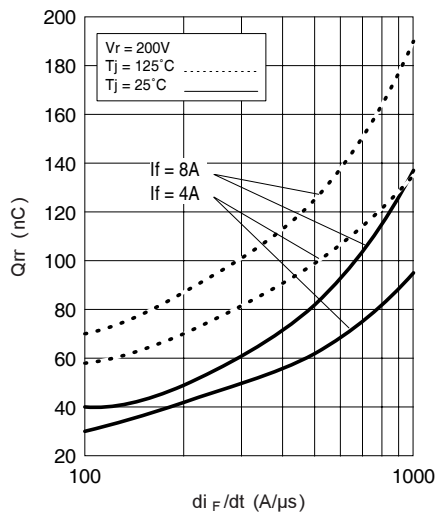


Fig. 7 - Typical Stored Charge vs. di_F/dt

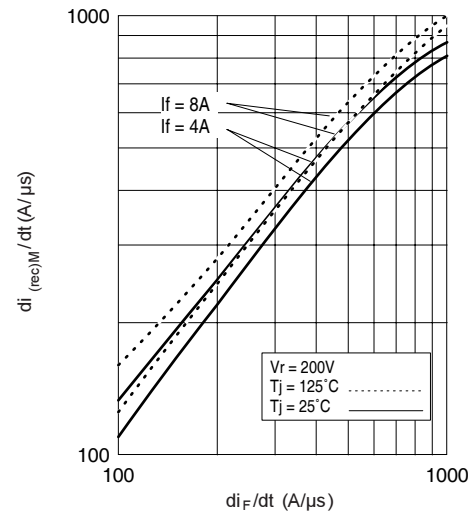


Fig. 8 - Typical $di_{(rec)M}/dt$ vs. di_F/dt

Reverse Recovery Circuit

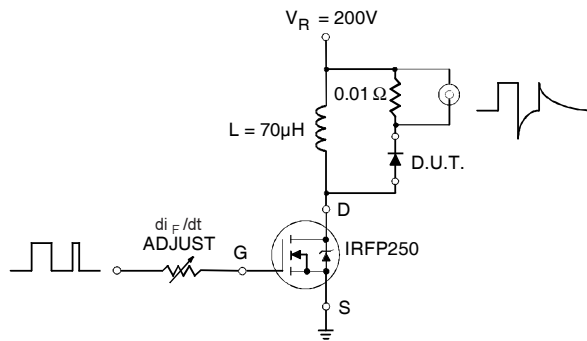
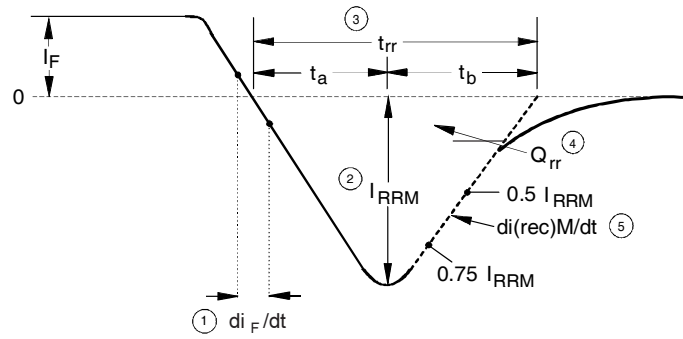


Fig. 9- Reverse Recovery Parameter Test Circuit



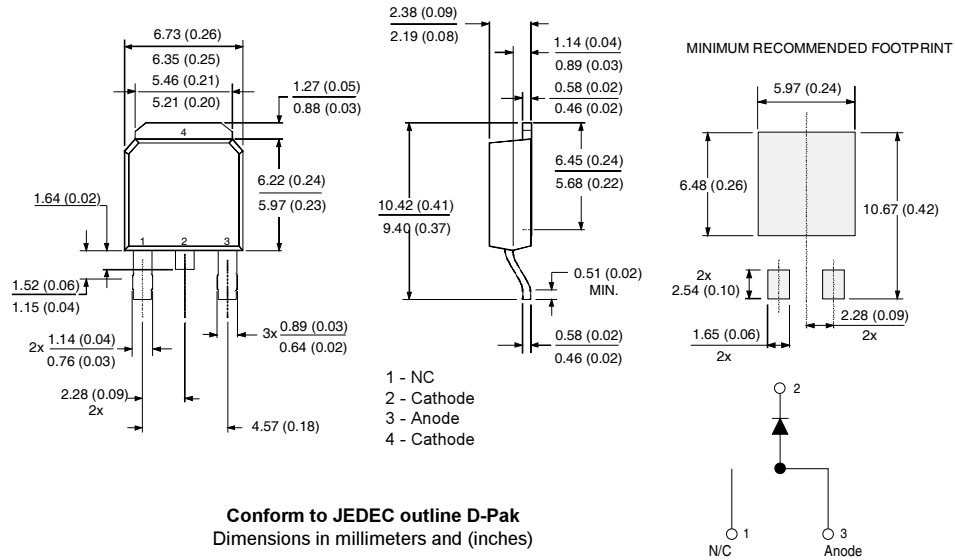
- | | |
|---|---|
| <p>1. di_F/dt - Rate of change of current through zero crossing</p> <p>2. I_{RRM} - Peak reverse recovery current</p> <p>3. t_{rr} - Reverse recovery time measured from zero crossing point of negative going I_F to point where a line passing through $0.75 I_{RRM}$ and $0.50 I_{RRM}$ extrapolated to zero current</p> | <p>4. Q_{rr} - Area under curve defined by t_{rr} and I_{RRM}</p> $Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$ <p>5. $di_{(rec)M}/dt$ - Peak rate of change of current during t_b portion of t_{rr}</p> |
|---|---|

Fig. 10 - Reverse Recovery Waveform and Definitions

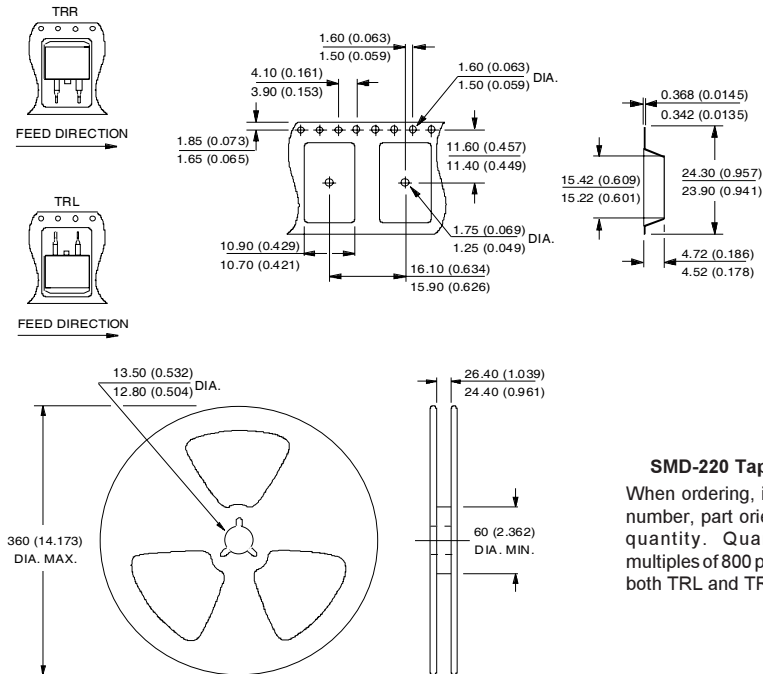
HFA04SD60SPbF



Outline Table



Tape & Reel Information

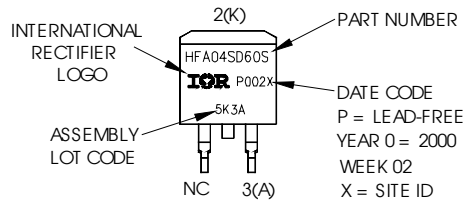


SMD-220 Tape & Reel

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.

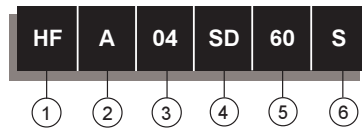
Marking Information

EXAMPLE: THIS IS A HFA04SD60S



Ordering Information Table

Device Code



- 1** - Hexfred Family
- 2** - Electron Irradiated
- 3** - Current Rating (04 = 4A)
- 4** - D-PAK
- 5** - Voltage Rating (60 = 600V)
- 6** - Suffix

S = D ² PAK/ Dpak TR = Tape & Reel TRL = Tape & Reel Left TRR = Tape & Reel Right

Note: "PbF" suffix at the end of the part number indicates Lead-Free.

Data and specifications subject to change without notice.
This product has been designed and qualified for Consumer Level.
Qualification Standards can be found on IR's Web site.



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