International **TGR** Rectifier

FRED

Features

- Reduced RFI and EMI
- Reduced Snubbing
- Extensive Characterization of Recovery Parameters
- Hermetic
- Surface Mount

PD - 94228A

HFB60HF20C

Ultrafast, Soft Recovery Diode

VF	R = 200V
I _{F(} A	(V) = 60A
t _{rr}	= 35ns

Description

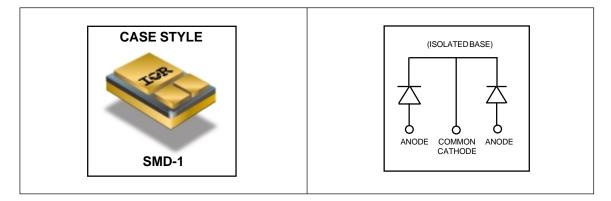
These Ultrafast, soft recovery diodes are optimized to reduce losses and EMI/RFI in high frequency power conditioning systems. An extensive characterization of the recovery behavior for different values of current, temperature and di/dt simplifies the calculations of losses in the operating conditions. The softness of the recovery eliminates the need for a snubber in most applications. These devices are ideally suited for power converters, motors drives and other applications where switching losses are significant portion of the total losses.

Absolute Maximum Ratings

	Parameter	Max.	Units
V _R	Cathode to Anode Voltage (Per Leg)	200	V
I _{F(AV)}	Continuous Forward Current, ① T _C = 50°C	60	Δ
I _{FSM}	Single Pulse Forward Current, $@ T_C = 25^{\circ}C$ (Per Leg)	300	
P _D @ T _C = 25°C	Maximum Power Dissipation	46	W
T _{J,} T _{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C

Note: 1 D.C. = 50% rect. wave

 $@\ 1/2$ sine wave, 60 Hz , P.W. = 8.33 ms



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

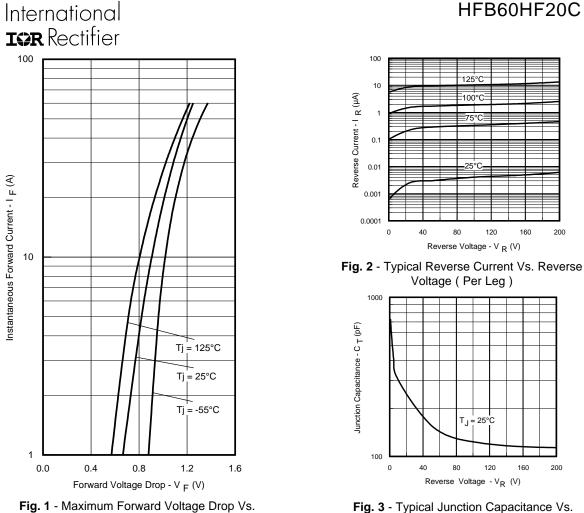
	Parameter	Min.	Тур.	Max.	Units	Test Conditions
V _{BR}	Cathode Anode Breakdown Voltage	200	_	_	V	I _R = 100μA
VF	Forward Voltage	_	—	1.19		$I_F = 30A, T_J = -55^{\circ}C$
	See Fig. 1	_	_	1.08	v	I _F = 30A, T _J = 25°C
		—	-	1.25		$I_F = 60A, T_J = 25^{\circ}C$
		—	_	1.22		$I_F = 60A, T_J = 125^{\circ}C$
I _R	Reverse Leakage Current	_	—	10	μA	$V_R = V_R$ Rated
	See Fig. 2		—	100	μA	$V_R = V_R$ Rated, $T_J = 125^{\circ}C$
CT	Junction Capacitance, See Fig. 3	_	_	140	pF	V _R = 200V
Ls	Series Inductance	—	5.9	—	nH	Measured from center of cathode pad
						to center of anode pad

Dynamic Recovery Characteristics (Per Leg) @ T_J = 25°C (unless otherwise specified)

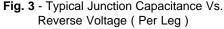
	Parameter	Min.	Тур.	Max.	Units	Test Conditions		
t _{rr}	Reverse Recovery Time	_		35	ns	$I_F = 1.0A, V_R = 30V, di_t/dt = 200A/\mu s$		
t _{rr1}	Reverse Recovery Time	_	35	_	ns	T _J = 25°C	See Fig.	
t _{rr2}		—	58			T _J = 125°C	5	$I_F = 60A$
I _{RRM1}	Peak Recovery Current		3.8	—	Α	T _J = 25°C	See Fig.	
I _{RRM2}		—	8.0	_		T _J = 125°C	6	V _R = 160V
Q _{rr1}	Reverse Recovery Charge	—	77	_	nC	T _J = 25°C	See Fig.	
Q _{rr2}		—	240	-		T _J = 125°C	7	di _f /dt = 200A/µs
di _{(rec)M} /dt1	Peak Rate of Fall of Recovery Current	—	470		A/µs	T _J = 25°C	See Fig.	
di _{(rec)M} /dt2	During t _b	_	640	—	-7.μ3	T _J = 125°C	8	

Thermal - Mechanical Characteristics

	Parameter	Тур.	Max.	Units
R _{thJC}	Junction-to-Case, Single Leg Conducting	_	2.73	°C/W
Wt	Weight	2.6	_	g



Instantaneous Forward Current (Per Leg)



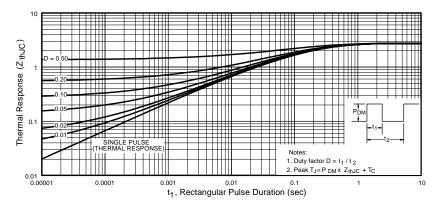


Fig. 4 - Maximum Thermal Impedance Z_{thjc} Characteristics (Per Leg)

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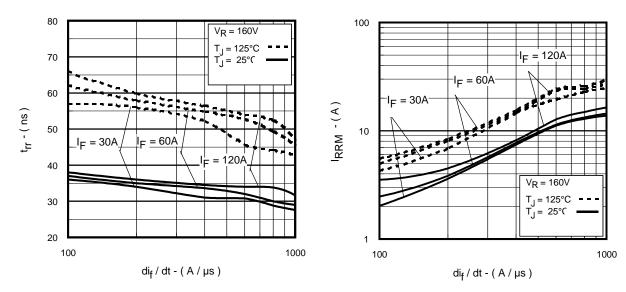


Fig. 5 - Typical Reverse Recovery Vs. di_f/dt,(Per Leg)

Fig. 6 -Typical Recovery Current Vs. dif/dt (Per Leg)

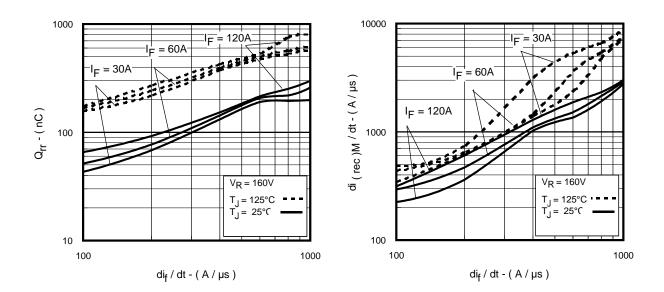


Fig. 7 - Typical Stored Charge Vs. dif/dt (Per Leg)

Fig. 8 - Typical di(rec)M/dt Vs. dif/dt (Per Leg)

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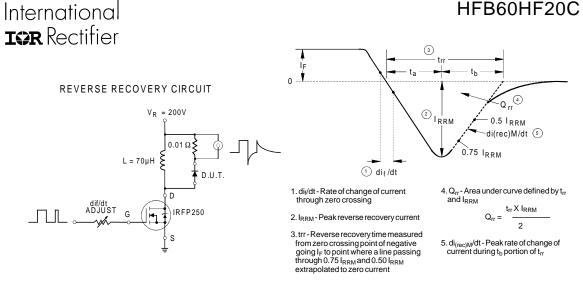
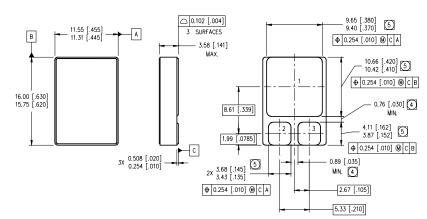


Fig. 9 - Reverse Recovery Parameter Test Circuit

Case Outline and Dimensions — SMD-1



NOTES:

- 1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
- 2. CONTROLLING DIMENSION: INCH.
- DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES]. 3.
- (4 DIMENSION INCLUDES METALLIZATION FLASH.
- $\overleftarrow{5}$ DIMENSION DOES NOT INCLUDE METALLIZATION FLASH.

PAD ASSIGNMENTS 1 = COMMON CATHODE 2 = ANODE 13 = ANODE 2

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Data and specifications subject to change without notice. 07/01

Fig. 10 - Reverse Recovery Waveform and Definitions

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