# International

## HEXFRED<sup>™</sup>

#### Features

- Ultrafast Recovery
- Ultrasoft Recovery
- Very Low I<sub>RRM</sub>
- Very Low Q<sub>rr</sub>
- · 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

International Rectifier's HFA30TA60C is a state of the art center tap 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 15 amps per Leg continuous current, the HFA30TA60C 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 tb 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 HFA30TA60C 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 (per Leg)

	Parameter	Max.	Units
V <sub>R</sub>	Cathode-to-Anode Voltage	600	V
I <sub>F</sub> @ T <sub>C</sub> = 25°C	Continuous Forward Current		
I <sub>F</sub> @ T <sub>C</sub> = 100°C	Continuous Forward Current	15	
I <sub>FSM</sub>	Single Pulse Forward Current	150	A
IFRM	Maximum Repetitive Forward Current	60	
I <sub>AR</sub> ①	Maximum Repetitive Avalanche Current	15	
P <sub>D</sub> @ T <sub>C</sub> = 25°C	Maximum Power Dissipation	74	10/
P <sub>D</sub> @ T <sub>C</sub> = 100°C	Maximum Power Dissipation	29	V
TJ	Operating Junction and	55 to 1450	
T <sub>STG</sub>	Storage Temperature Range	-55 t0 +150	

\* 125°C

## PD -2.335

## HFA30TA60C

Ultrafast, Soft Recovery Diode





## Electrical Characteristics (per Leg) @ T<sub>J</sub> = 25°C (unless otherwise specified)

	Parameter	Min.	Тур.	Max.	Units	Test Conditions	
V <sub>BR</sub>	Cathode Anode Breakdown Voltage	600			V	Ι <sub>R</sub> = 100μΑ	
V <sub>FM</sub>	Max Forward Voltage		1.3	1.7		I <sub>F</sub> = 15A	
			1.5	2.0	V	I <sub>F</sub> = 30A See Fig. 1	
			1.2	1.6		I <sub>F</sub> = 15A, T <sub>J</sub> = 125°C	
I <sub>RM</sub>	Max Reverse Leakage Current		1.0	10	μΑ	V <sub>R</sub> = V <sub>R</sub> Rated See Fig. 2	
			400	1000		T <sub>J</sub> = 125°C, V <sub>R</sub> = 0.8 x V <sub>R</sub> Rated	
CT	Junction Capacitance		25	50	pF	V <sub>R</sub> = 200V See Fig. 3	
L <sub>S</sub>	Series Inductance		8.0		• nH	Measured lead to lead 5mm from	
						package body	

### Dynamic Recovery Characteristics (per Leg)@ T<sub>J</sub> = 25°C (unless otherwise specified)

	Parameter	Min.	Тур.	Max.	Units	Test Conditions	
t <sub>rr</sub>	Reverse Recovery Time		19			$I_F = 1.0A, di_f/dt = 200A/\mu s, V_R = 30V$	
t <sub>rr1</sub>	See Fig. 5, 10		42	60	ns	T <sub>J</sub> = 25°C	
t <sub>rr2</sub>	-		70	90		T <sub>J</sub> = 125°C	I <sub>F</sub> = 15A
I <sub>RRM1</sub>	Peak Recovery Current		4.0	6.0	^	T <sub>J</sub> = 25°C	
I <sub>RRM2</sub>	See Fig. 6		6.5	10		T <sub>J</sub> = 125°C	V <sub>R</sub> = 200V
Q <sub>rr1</sub>	Reverse Recovery Charge		80	180	nC	T <sub>J</sub> = 25°C	
Q <sub>rr2</sub>	See Fig. 7		220	450		T <sub>J</sub> = 125°C	di <sub>f</sub> /dt = 200A/µs
di <sub>(rec)M</sub> /dt1	Peak Rate of Fall of Recovery Current		188		A/116	T <sub>J</sub> = 25°C	
di <sub>(rec)M</sub> /dt2	During t <sub>b</sub> See Fig. 8		160		/ ~ µs	T <sub>J</sub> = 125°C	

#### Thermal - Mechanical Characteristics (per Leg)

	Parameter	Min.	Тур.	Max.	Units	
T <sub>lead</sub> ②	Lead Temperature			300	°C	
R <sub>θJC</sub>	Junction-to-Case, Single Leg Conducting			1.7		
	Junction-to-Case, Both Legs Conducting			0.85	KAN	
R <sub>0JA</sub> 3	Thermal Resistance, Junction to Ambient			80	10.00	
R <sub>0CS</sub> @	Thermal Resistance, Case to Heat Sink		0.50			
VVt	Weight		2.0		g	
			0.07		(oz)	
	Mounting Torque	6.0		12	Kg-cm	
		5.0		10	lbf•in	

 $\odot$   $\,$  L=100  $\mu H,$  duty cycle limited by max  $T_{\rm J}$ 

 $@ \quad 0.063 \mbox{ in. from Case (1.6mm) for 10 sec}$ 

③ Typical Socket Mount

Mounting Surface, Flat, Smooth and Greased



Fig. 4 - Maximum Thermal Impedance  $Z_{thjc}$  Characteristics, (per Leg)



Fig. 5 - Typical Reverse Recovery Time vs. di<sub>f</sub>/dt, (per Leg)





International **Tor** Rectifier



Fig. 6 - Typical Recovery Current vs. di<sub>f</sub>/dt, (per Leg)



(per Leg)









Fig. 11 - Avalanche Test Circuit and Waveforms

International **TOR** Rectifier



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 Data and specifications subject to change without notice.