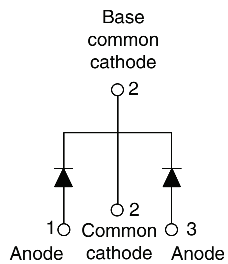
HEXFRED®
Ultrafast Soft Recovery Diode, 2 x 15 A



D^2PAK

FEATURES

- Ultrafast recovery
- Ultrasoft recovery
- Very low I_{RRM}
- Very low Q_{rr}
- Specified at operating conditions
- Lead (Pb)-free
- Designed and qualified for Q101 level

Pb Available
RoHS*
COMPLIANT

BENEFITS

- Reduced RFI and EMI
- Reduced power loss in diode and switching transistor
- Higher frequency operation
- Reduced snubbing
- Reduced parts count

DESCRIPTION

HFA30TA60CS is a state of the art center tap ultrafast 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 V and 15 A per leg continuous current, the HFA30TA60CS is especially well suited for use as the companion diode for IGBTs and MOSFETs. In addition to ultrafast 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 HFA30TA60CS 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.

PRODUCT SUMMARY	
V_R	600 V
V_F at 15 A at 25 °C	1.7 V
$I_{F(AV)}$	2 x 15 A
t_{rr} (typical)	19 ns
T_J (maximum)	150 °C
Q_{rr} (typical)	80 nC
$dI_{(rec)M}/dt$ (typical) at 125 °C	160 A/µs
I_{RRM} (typical)	4.0 A

ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	TEST CONDITIONS	VALUES	UNITS
Cathode to anode voltage		V_R		600	V
Maximum continuous forward current	per leg	I_F	T_C = 100 °C	15	A
	per device			30	
Single pulse forward current		I_{FSM}		150	
Maximum repetitive forward current		I_{FRM}		60	
Maximum power dissipation		P_D	T_C = 25 °C	74	°C
			T_C = 100 °C	29	
Operating junction and storage temperature range		T_J, T_{Stg}		- 55 to + 150	W

* Pb containing terminations are not RoHS compliant, exemptions may apply

ELECTRICAL SPECIFICATIONS PER LEG (T_J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	V_{BR}	I_R = 100 µA		600	-	-	V
Maximum forward voltage	V_{FM}	I_F = 15 A	See fig. 1	-	1.3	1.7	
		I_F = 30 A		-	1.5	2.0	
		I_F = 15 A, T_J = 125 °C		-	1.2	1.6	
Maximum reverse leakage current	I_{RM}	V_R = V_R rated	See fig. 2	-	1.0	10	µA
		T_J = 125 °C, V_R = 0.8 x V_R rated		-	400	1000	
Junction capacitance	C_T	V_R = 200 V	See fig. 3	-	25	50	pF
Series inductance	L_S	Measured lead to lead 5 mm from package body		-	8.0	-	nH

DYNAMIC RECOVERY CHARACTERISTICS PER LEG (T_J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Reverse recovery time See fig. 5, 10	t_{rr}	I_F = 1.0 A, dI_F/dt = 200 A/µs, V_R = 30 V		-	19	-	ns
	t_{rr1}	T_J = 25 °C	I_F = 15 A dI_F/dt = 200 A/µs V_R = 200 V	-	42	60	
	t_{rr2}	T_J = 125 °C		-	70	90	
Peak recovery current See fig. 6	I_{RRM1}	T_J = 25 °C		-	4.0	6.0	A
	I_{RRM2}	T_J = 125 °C		-	6.5	10	
Reverse recovery charge See fig. 7	Q_{rr1}	T_J = 25 °C		-	80	180	nC
	Q_{rr2}	T_J = 125 °C		-	220	450	
Peak rate of fall of recovery current during t_b See fig. 8	$dI_{(rec)M}/dt1$	T_J = 25 °C		-	188	-	A/µs
	$dI_{(rec)M}/dt2$	T_J = 125 °C		-	160	-	

THERMAL - MECHANICAL SPECIFICATIONS PER LEG						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Lead temperature	T_{lead}	0.063" from case (1.6 mm) for 10 s	-	-	300	°C
Junction to case, single leg conducting	R_{thJC}		-	-	1.7	K/W
Junction to case, both legs conducting			-	-	0.85	
Thermal resistance, junction to ambient	R_{thJA}	Typical socket mount	-	-	80	
Weight			-	2.0	-	g
			-	0.07	-	oz.
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style D^2PAK	HFA30TA60CS			

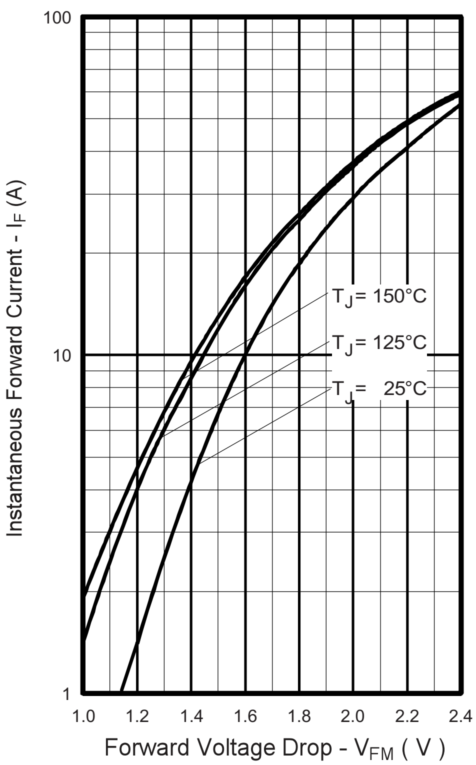


Fig. 1 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current (Per Leg)

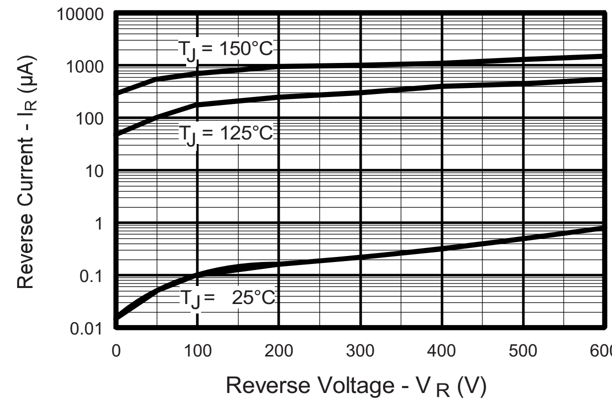


Fig. 2 - Typical Reverse Current vs. Reverse Voltage (Per Leg)

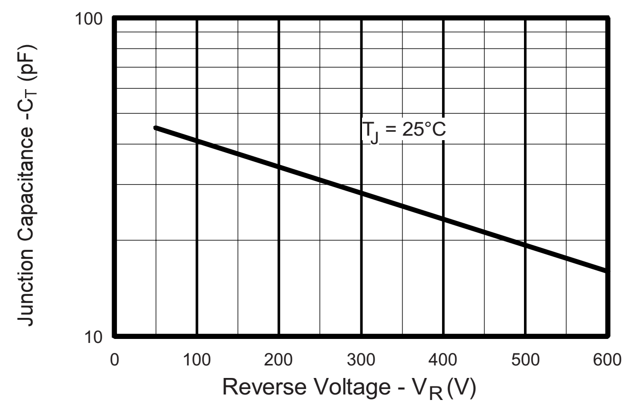


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

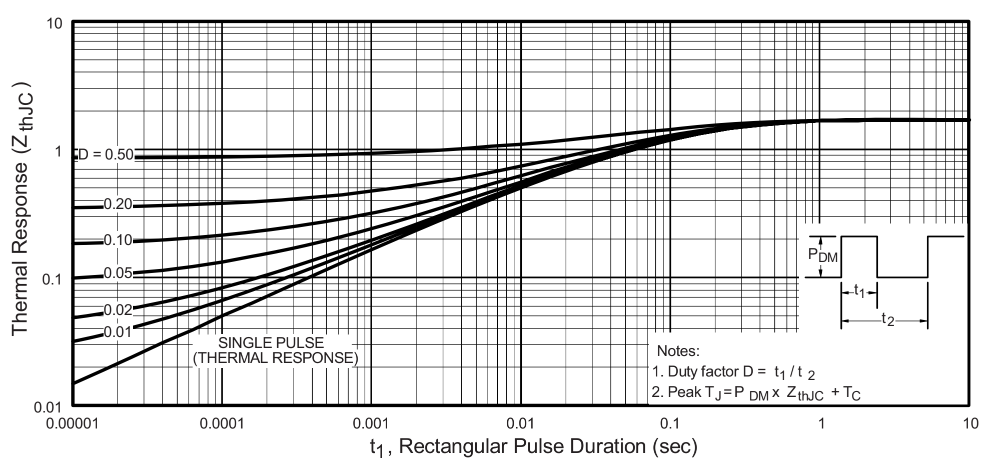


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

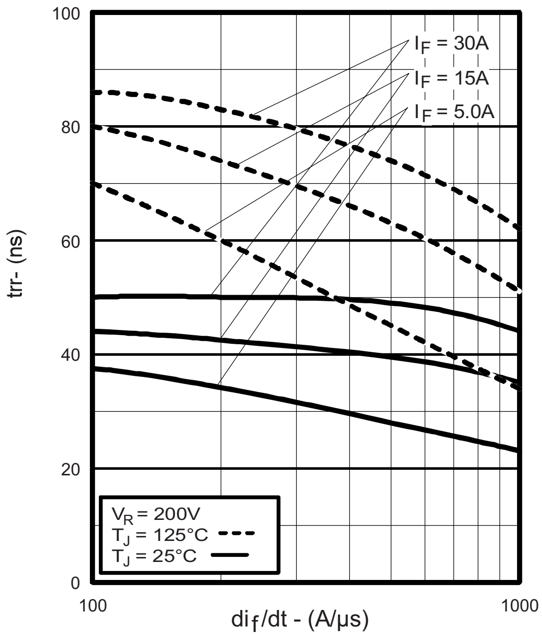


Fig. 5 - Typical Reverse Recovery Time vs. dI_F/dt (Per Leg)

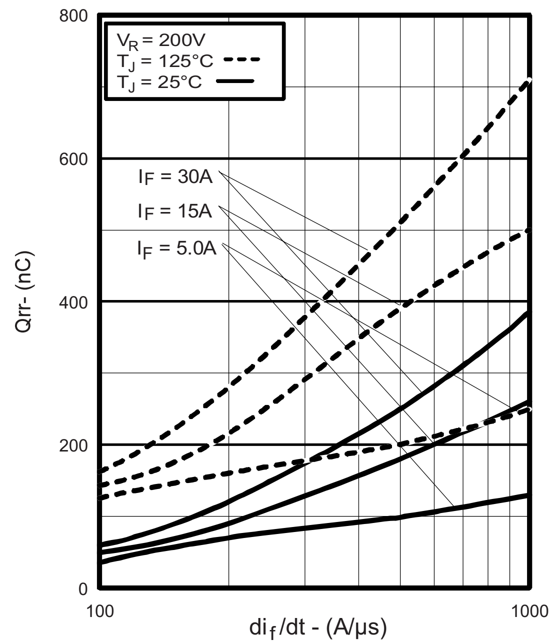


Fig. 7 - Typical Stored Charge vs. dI_F/dt (Per Leg)

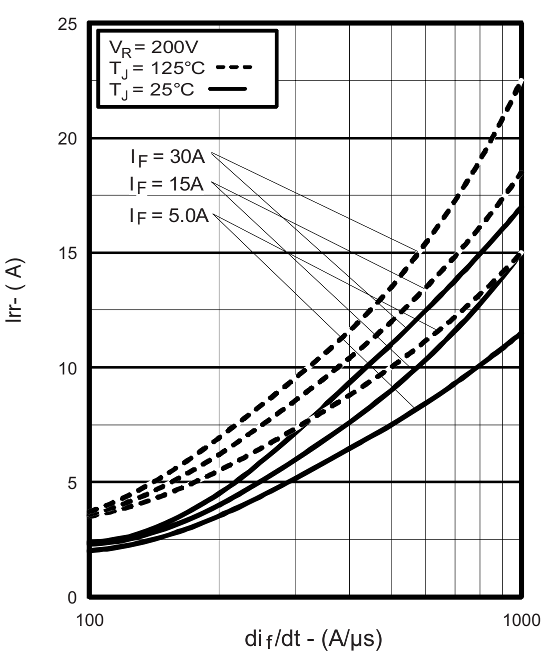


Fig. 6 - Typical Recovery Current vs. dI_F/dt (Per Leg)

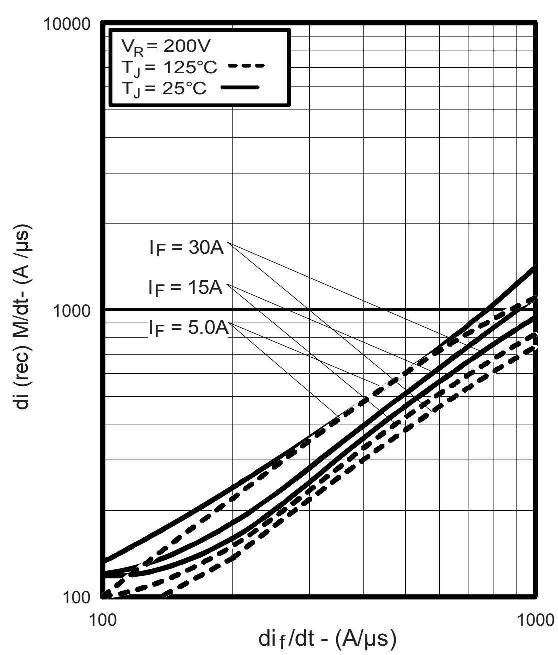


Fig. 8 - Typical $dI_{(rec)M}/dt$ vs. dI_F/dt (Per Leg)

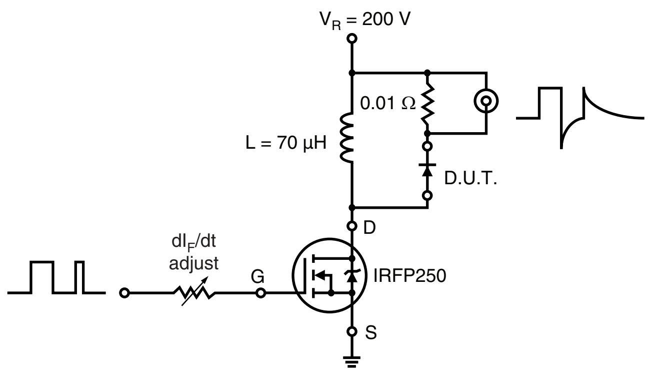
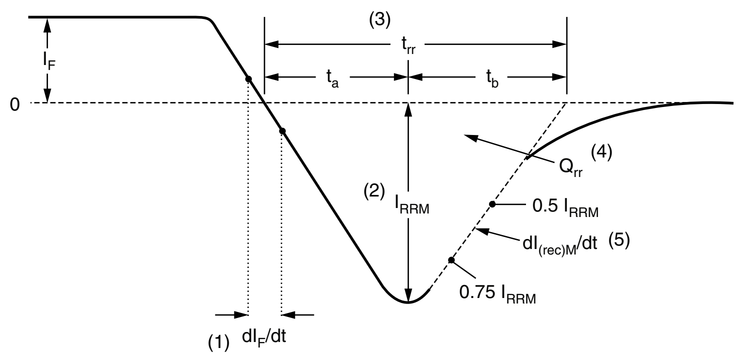


Fig. 9 - Reverse Recovery Parameter Test Circuit



(1) dI_F/dt - rate of change of current through zero crossing

(2) I_{RRM} - peak reverse recovery current

(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.

(4) Q_{rr} - area under curve defined by t_{rr} and I_{RRM}

$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

(5) $dI_{(rec)M}/dt$ - peak rate of change of current during t_b portion of t_{rr}

Fig. 10 - Reverse Recovery Waveform and Definitions

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95046
Part marking information	http://www.vishay.com/doc?95054
Packaging information	http://www.vishay.com/doc?95032

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