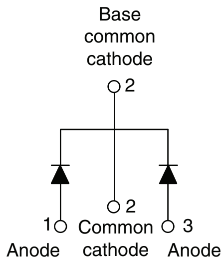
HEXFRED®
Ultrafast Soft Recovery Diode, 2 x 4 A



D²PAK

PRODUCT SUMMARY	
V_R	600 V
V_F at 4 A at 25 °C	1.8 V
$I_{F(AV)}$	2 x 4 A
t_{rr} (typical)	17 ns
T_J (maximum)	150 °C
Q_{rr}	40 nC
$dI_{(rec)M}/dt$	280 A/µs

FEATURES

- Ultrafast recovery
- Ultrasoft recovery
- Very low I_{RRM}
- Very low Q_{rr}
- Specified at operating conditions
- Designed and qualified for industrial level

BENEFITS

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

DESCRIPTION

HFA08TA60CS 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 4 A per leg continuous current, the HFA08TA60CS 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 HFA08TA60CS 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

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	4	A
	per device			8	
Single pulse forward current		I_{FSM}		25	
Maximum repetitive forward current		I_{FRM}		16	
Maximum power dissipation		P_D	T_C = 25 °C	25	W
			T_C = 100 °C	10	
Operating junction and storage temperature range		T_J, T_{Stg}		- 55 to + 150	°C

ELECTRICAL SPECIFICATIONS (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 = 4.0 A	See fig. 1	-	1.5	1.8	
		I_F = 8.0 A		-	1.8	2.2	
		I_F = 4.0 A, T_J = 125 °C		-	1.4	1.7	
Maximum reverse leakage current	I_{RM}	$V_R = V_R$ rated	See fig. 2	-	0.17	3.0	µA
		T_J = 125 °C, V_R = 0.8 x V_R rated		-	44	300	
Junction capacitance	C_T	V_R = 200 V	See fig. 3	-	4.0	8.0	pF
Series inductance	L_S	Measured lead to lead 5 mm from package body		-	8.0	-	nH

DYNAMIC RECOVERY CHARACTERISTICS (T_J = 25 °C unless otherwise specified)							
PARAMETER	**SYMBOL**	**TEST CONDITIONS**		**MIN.**	**TYP.**	**MAX.**	**UNITS**
Reverse recovery time See fig. 5, 6 and 16	t_{rr}	I_F = 1.0 A, dI_F/dt = 200 A/µs, V_R = 30 V		-	17	-	ns
	t_{rr1}	T_J = 25 °C	I_F = 4.0 A dI_F/dt = 200 A/µs V_R = 200 V	-	28	42	
	t_{rr2}	T_J = 125 °C		-	38	57	
Peak recovery current See fig. 7 and 8	I_{RRM1}	T_J = 25 °C		-	2.9	5.2	A
	I_{RRM2}	T_J = 125 °C		-	3.7	6.7	
Reverse recovery charge See fig. 9 and 10	Q_{rr1}	T_J = 25 °C		-	40	60	nC
	Q_{rr2}	T_J = 125 °C		-	70	105	
Peak rate of fall of recovery current during t_b See fig. 11 and 12	$dI_{(rec)M}/dt1$	T_J = 25 °C		-	280	-	A/µs
	$dI_{(rec)M}/dt2$	T_J = 125 °C		-	235	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Lead temperature	T_{lead}	0.063" from case (1.6 mm) for 10 s	-	-	300	°C
Thermal resistance, junction to case	R_{thJC}		-	-	5.0	K/W
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 D²PAK	HFA08TA60CS			

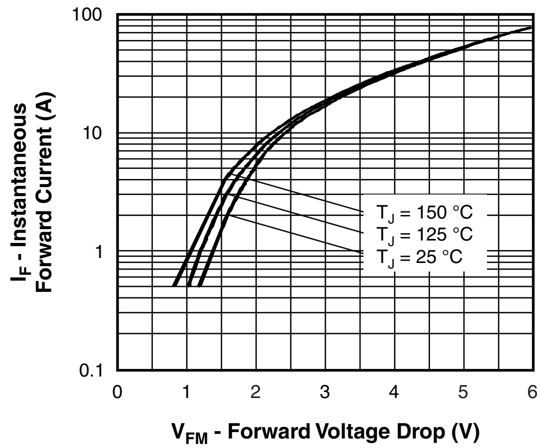


Fig. 1 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current

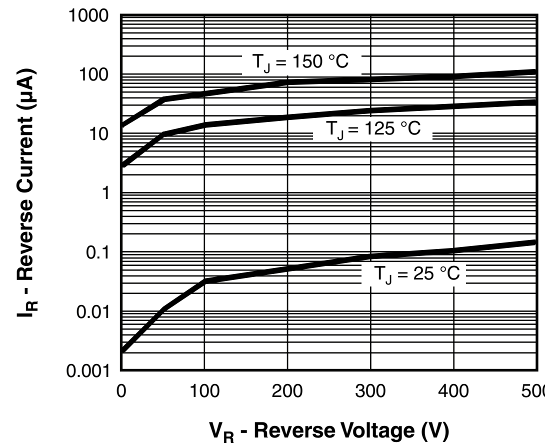


Fig. 2 - Typical Reverse Current vs. Reverse Voltage

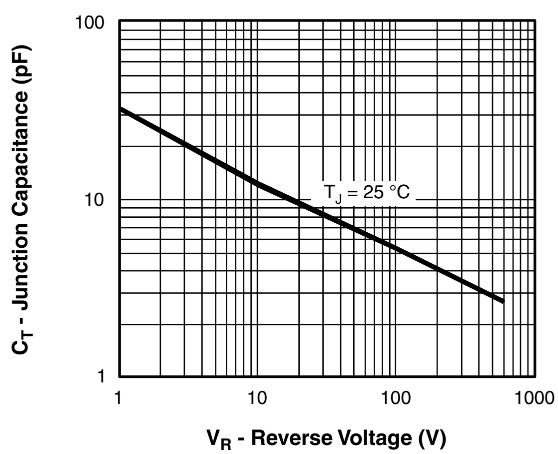


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

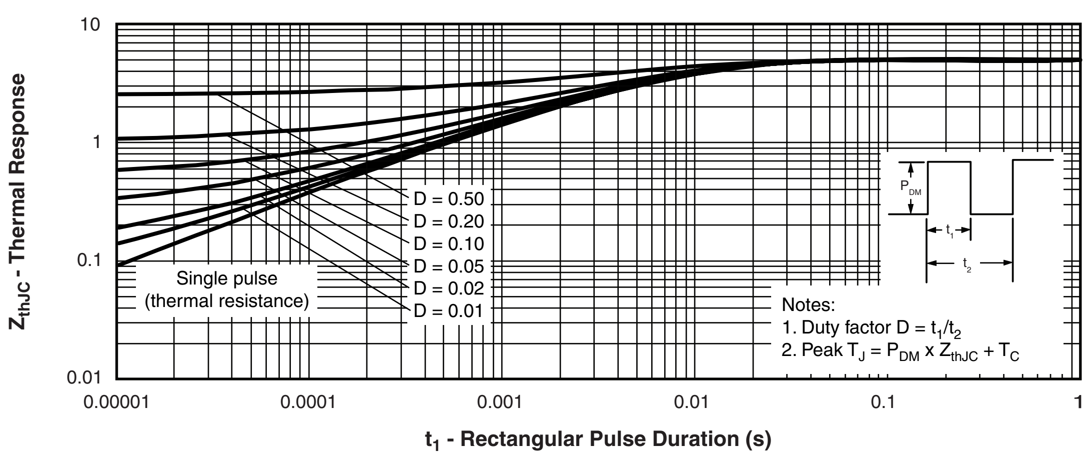


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

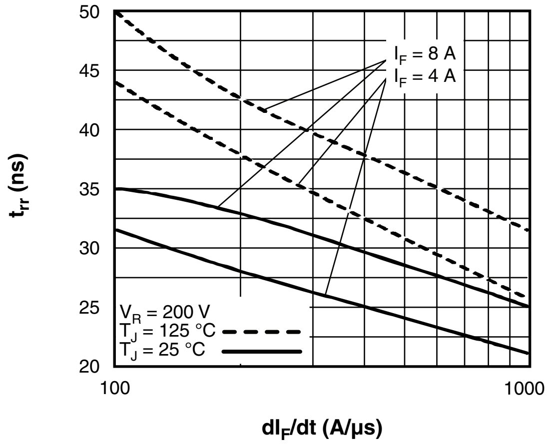


Fig. 5 - Typical Reverse Recovery Time vs. dI_F/dt

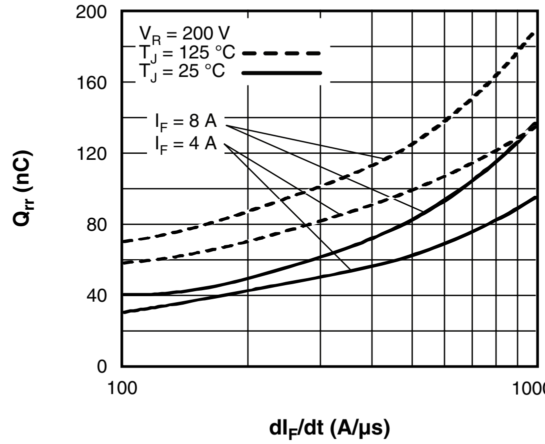


Fig. 7 - Typical Stored Charge vs. dI_F/dt

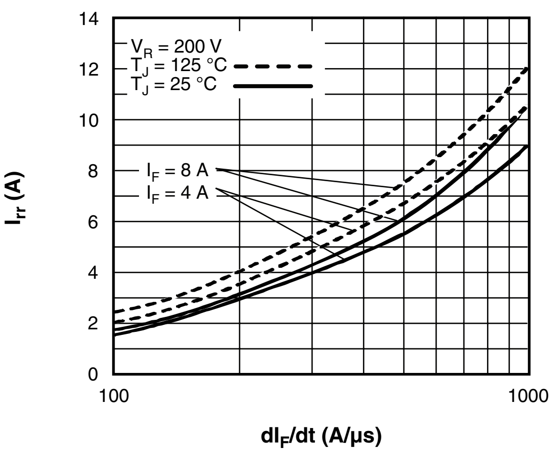


Fig. 6 - Typical Recovery Current vs. dI_F/dt

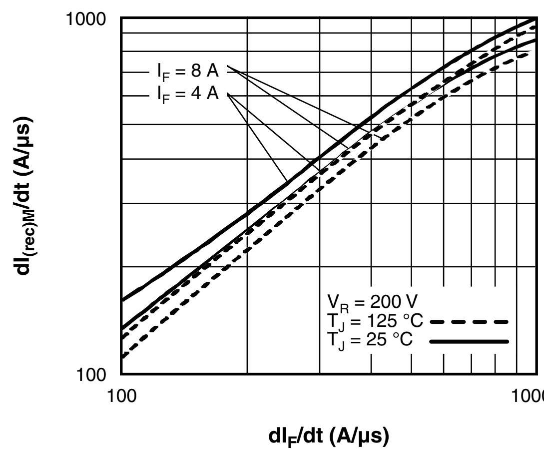


Fig. 8 - Typical $dI_{(rec)M}/dt$ vs. dI_F/dt

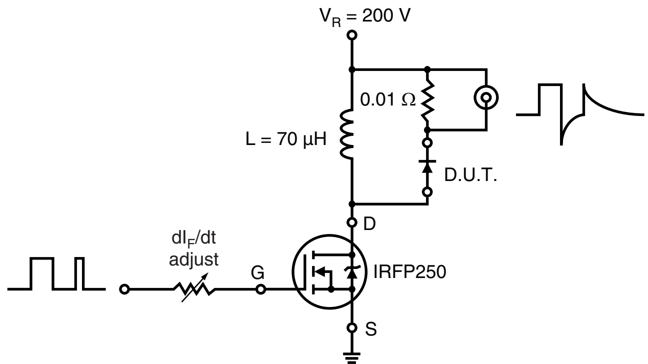
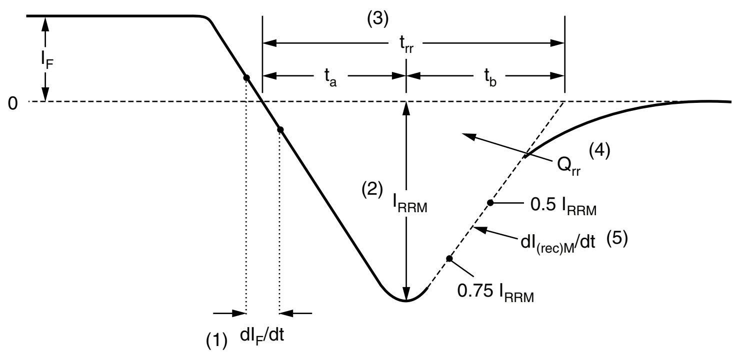


Fig. 9 - Reverse Recovery Parameter Test Circuit



(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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