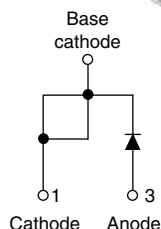


HEXFRED® Ultrafast Soft Recovery Diode, 25 A



TO-220AC

FEATURES

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



RoHS*
COMPLIANT

BENEFITS

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

DESCRIPTION

HFA25TB60 is a state of the art 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 25 A continuous current, the HFA25TB60 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 HFA25TB60 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 25 A at 25 °C	1.7 V
$I_{F(AV)}$	25 A
t_{rr} (typical)	23 ns
T_J (maximum)	150 °C
Q_{rr} (typical)	112 nC
$di_{(rec)M}/dt$ (typical)	250 A/μs
I_{RRM}	10 A

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Cathode to anode voltage	V_R		600	V
Maximum continuous forward current	I_F	$T_C = 100\text{ °C}$	25	A
Single pulse forward current	I_{FSM}		225	
Maximum repetitive forward current	I_{FRM}		100	
Maximum power dissipation	P_D	$T_C = 25\text{ °C}$	125	W
		$T_C = 100\text{ °C}$	50	
Operating junction and storage temperature range	T_J, T_{Stg}		- 55 to + 150	°C

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

ELECTRICAL SPECIFICATIONS ($T_J = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	V_{BR}	$I_R = 100\text{ }\mu\text{A}$	600	-	-	V
Maximum forward voltage	V_{FM}	$I_F = 25\text{ A}$	-	1.3	1.7	
		$I_F = 50\text{ A}$	-	1.5	2.0	
		$I_F = 25\text{ A}, T_J = 125\text{ }^{\circ}\text{C}$	-	1.3	1.7	
Maximum reverse leakage current	I_{RM}	$V_R = V_R\text{ rated}$	-	1.5	20	μA
		$T_J = 125\text{ }^{\circ}\text{C}, V_R = 0.8 \times V_R\text{ rated}$	-	600	2000	
Junction capacitance	C_T	$V_R = 200\text{ V}$	-	55	100	pF
Series inductance	L_S	Measured lead to lead 5 mm from package body	-	8.0	-	nH

DYNAMIC RECOVERY CHARACTERISTICS ($T_J = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse recovery time See fig. 5, 6 and 16	t_{rr}	$I_F = 1.0\text{ A}, dI_F/dt = 200\text{ A}/\mu\text{s}, V_R = 30\text{ V}$	-	23	-	ns
	t_{rr1}	$T_J = 25\text{ }^{\circ}\text{C}$	-	50	75	
	t_{rr2}	$T_J = 125\text{ }^{\circ}\text{C}$	-	105	160	
Peak recovery current See fig. 7 and 8	I_{RRM1}	$T_J = 25\text{ }^{\circ}\text{C}$	-	4.5	10	A
	I_{RRM2}	$T_J = 125\text{ }^{\circ}\text{C}$	-	8.0	15	
Reverse recovery charge See fig. 9 and 10	Q_{rr1}	$T_J = 25\text{ }^{\circ}\text{C}$	-	112	375	nC
	Q_{rr2}	$T_J = 125\text{ }^{\circ}\text{C}$	-	420	1200	
Peak rate of fall of recover current during t_b See fig. 11 and 12	$dI_{(rec)M}/dt1$	$T_J = 25\text{ }^{\circ}\text{C}$	-	250	-	A/ μs
	$dI_{(rec)M}/dt2$	$T_J = 125\text{ }^{\circ}\text{C}$	-	160	-	

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	$^{\circ}\text{C}$
Thermal resistance, junction to case	R_{thJC}		-	-	1.0	K/W
Thermal resistance, junction to ambient	R_{thJA}	Typical socket mount	-	-	80	
Thermal resistance, case to heatsink	R_{thCS}	Mounting surface, flat, smooth and greased	-	0.5	-	
Weight			-	2.0	-	g
			-	0.07	-	oz.
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style TO-220AC	HFA25TB60			

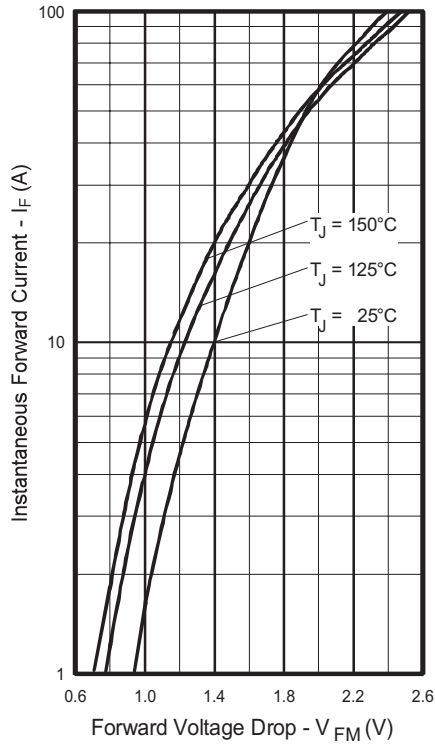


Fig. 1 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current

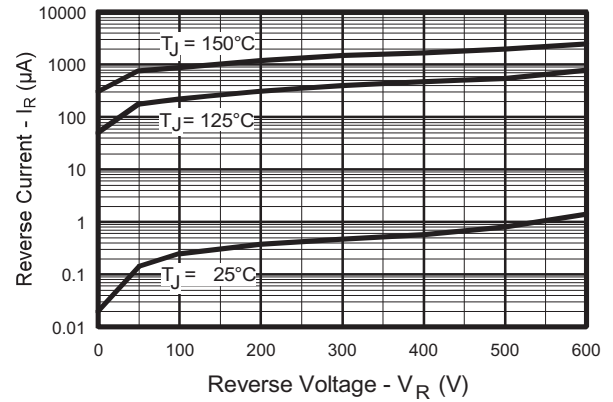


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

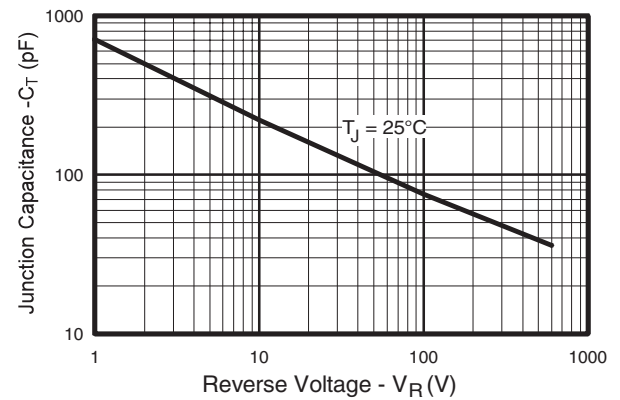


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

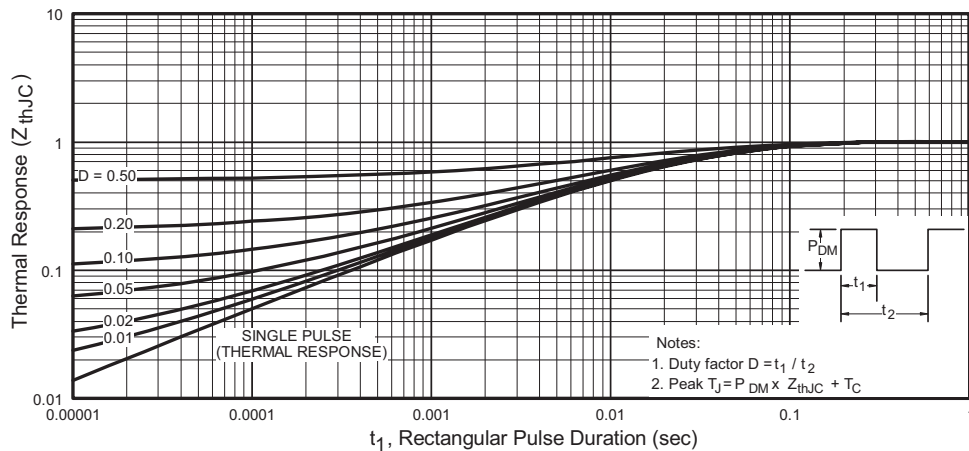


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

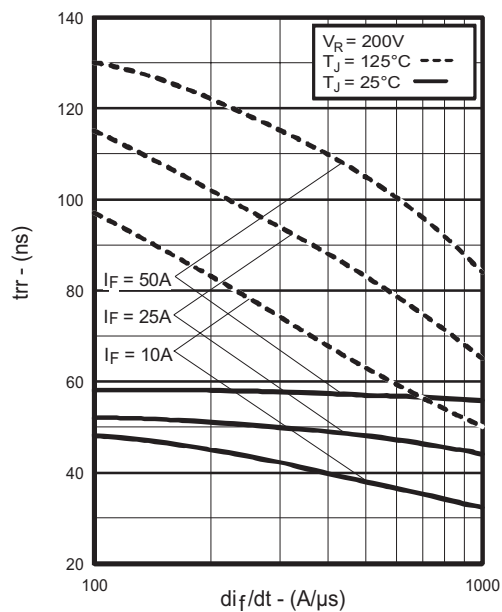


Fig. 5 - Typical Reverse Recovery Time vs. di_F/dt

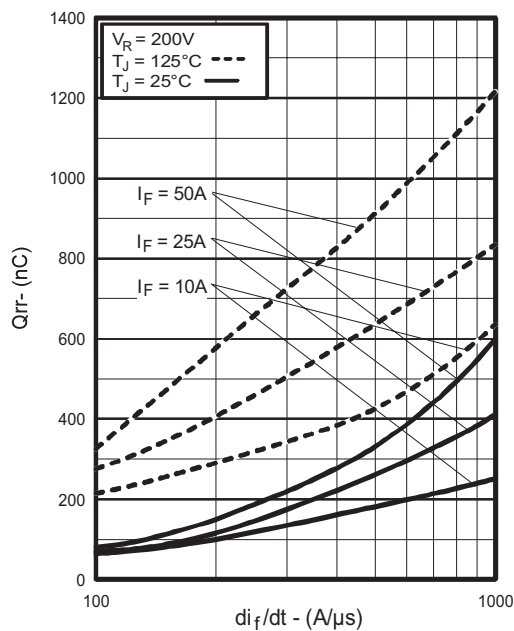


Fig. 7 - Typical Stored Charge vs. di_F/dt

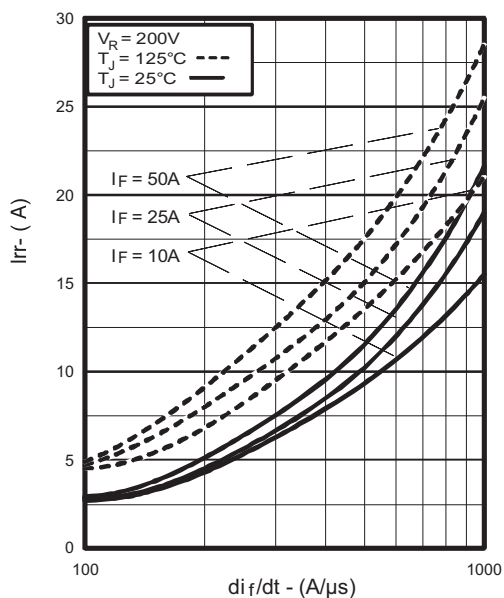


Fig. 6 - Typical Recovery Current vs. di_F/dt

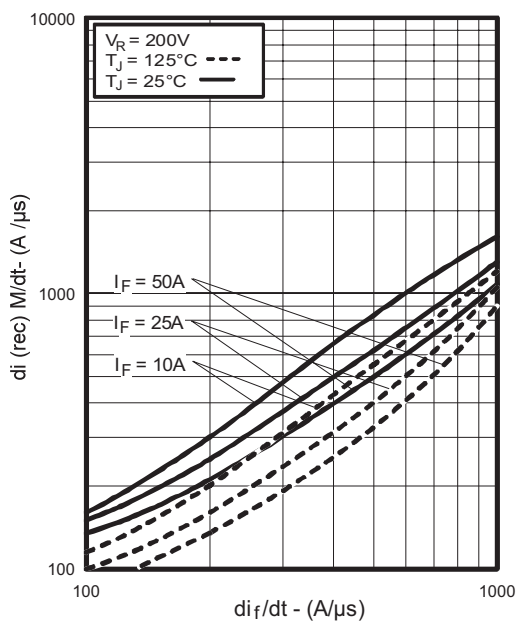


Fig. 8 - Typical $dI_{(rec)}M/dt$ vs. di_F/dt

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Vishay High Power Products

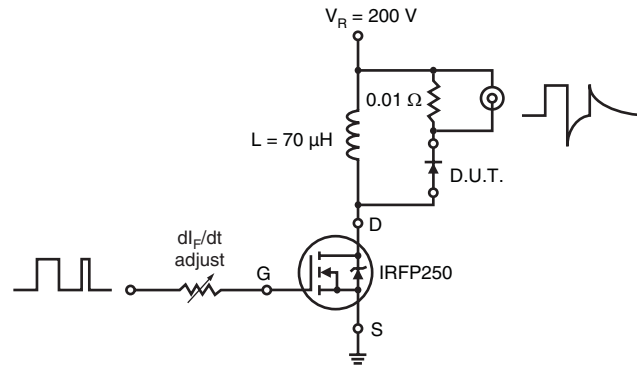


Fig. 9 - Reverse Recovery Parameter Test Circuit

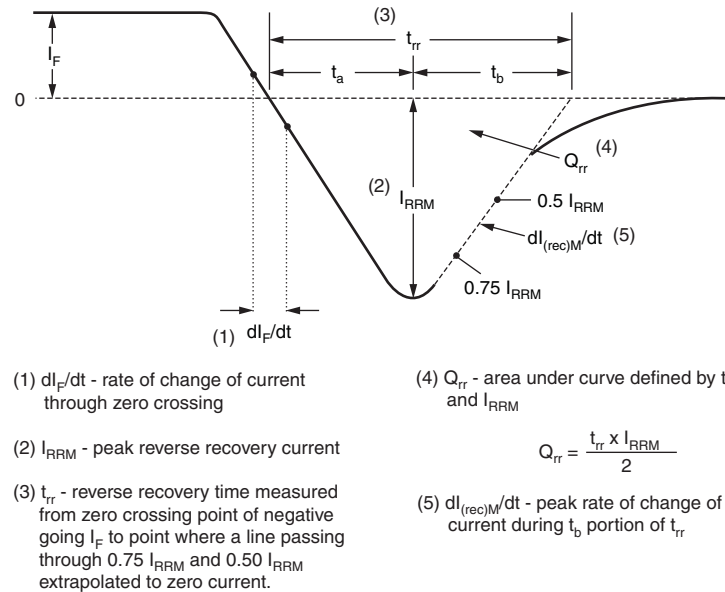


Fig. 10 - Reverse Recovery Waveform and Definitions

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95221
Part marking information	http://www.vishay.com/doc?95224



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