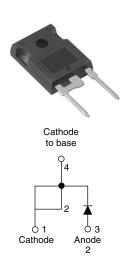


Vishay High Power Products

HEXFRED® Ultrafast Soft Recovery Diode, 25 A



TO-247AC modified

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				
dl _{(rec)M} /dt (typical)	250 A/μs				
I _{RRM}	10 A				

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

Pb-free Available



BENEFITS

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

DESCRIPTION

HFA25PB60 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 HFA25PB60 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 th 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 HFA25PB60 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	I _F	T _C = 100 °C	25		
Single pulse forward current	I _{FSM}		225	Α	
Maximum repetitive forward current	I _{FRM}		100		
Maximum power dissipation	P_{D}	T _C = 25 °C	151	W	
Maximum power dissipation		T _C = 100 °C	60	VV	
Operating junction and storage temperature range	T _J , T _{Stg}		- 55 to + 150	°C	

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

HFA25PB60PbF

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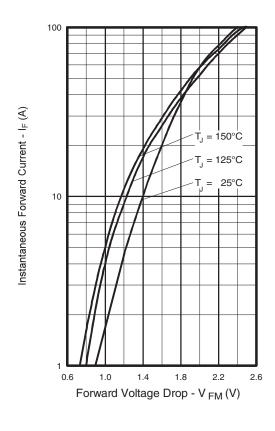
ELECTRICAL SPECIFICATIONS (T _J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	V _{BR}	Ι _R = 100 μΑ		600	-	-	
Maximum forward voltage V _{FM}		I _F = 25 A		-	1.3	1.7	V
	I _F = 50 A	See fig. 1 -	-	1.5	2.0		
	I _F = 25 A, T _J = 125 °C		-	1.3	1.7		
Maximum reverse		$V_R = V_R$ rated	See fig. 2	-	1.5	20	
leakage current	$T_{J} = 125 ^{\circ}\text{C}, V_{R} = 0.8 \text{x} \text{V}_{R} \text{rated}$ See fig. 2	See lig. 2	-	600	2000	μΑ	
Junction capacitance	C _T	V _R = 200 V	See fig. 3	=	55	100	pF
Series inductance	L _S	Measured lead to lead 5 mm from package body		-	12	-	nH

DYNAMIC RECOVERY CHARACTERISTICS (T _J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
	t _{rr}	$I_F = 1.0 \text{ A}, dI_F/dt = 200 \text{ A/}\mu\text{s}, V_R = 30 \text{ V}$		-	23	-	
Reverse recovery time See fig. 5, 10	t _{rr1}	T _J = 25 °C	I _F = 25 A dI _F /dt = 200 A/μs V _R = 200 V	-	50	75	ns
t _{rr2}	t _{rr2}	T _J = 125 °C		-	105	160	
Coo fig. 6, 10	I _{RRM1}	T _J = 25 °C		-	4.5	10	А
	I _{RRM2}	T _J = 125 °C		-	8.0	15	
Reverse recovery charge	Q _{rr1}	T _J = 25 °C		-	112	375	nC
See fig. 7, 10	Q _{rr2}	T _J = 125 °C		-	420	1200	110
Peak rate of fall of recovery current during t _b See fig. 8, 10	dI _{(rec)M} /dt1	T _J = 25 °C		-	250	-	- A/μs
	dI _{(rec)M} /dt2	T _J = 125 °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	°C
Thermal resistance, junction to case	R _{thJC}		-	-	0.83	
Thermal resistance, junction to ambient	R _{thJA}	Typical socket mount	-	-	40	K/W
Thermal resistance, case to heatsink	R _{thCS}	Mounting surface, flat, smooth and greased	-	0.25	-	
Weight			-	6.0	-	g
vveigni			-	0.21	-	OZ.
Mounting torque			6.0 (5.0)	-	12 (10)	kgf ⋅cm (lbf ⋅in)
Marking device		Case style TO-247AC modified (JEDEC)	HFA25PB60			



HEXFRED® Vishay High Power Products Ultrafast Soft Recovery Diode, 25 A



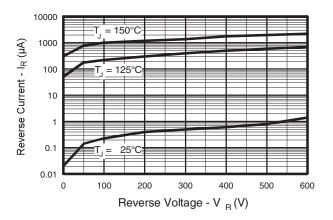


Fig. 2 - Typical Reverse Current vs. Reverse Voltage

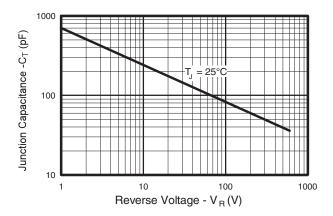


Fig. 1 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current

Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

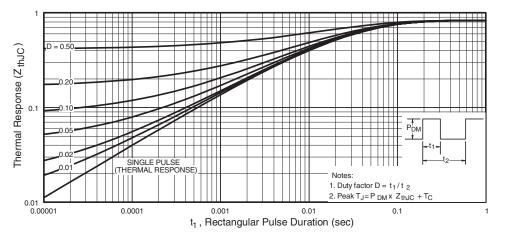


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

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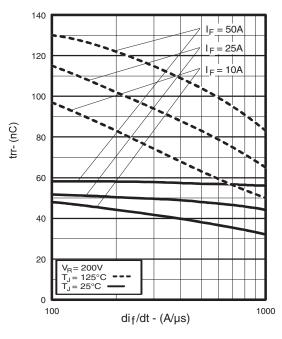


Fig. 5 - Typical Reverse Recovery Time vs. dI_F/dt

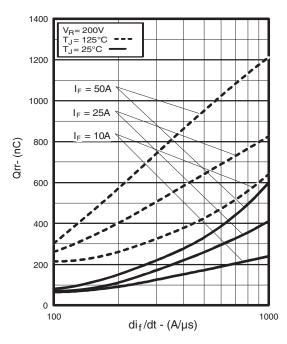


Fig. 7 - Typical Stored Charge vs. dl_F/dt

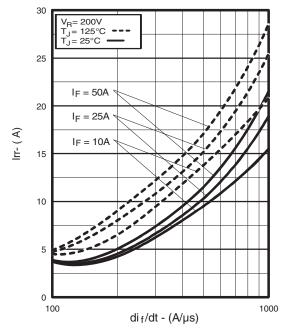


Fig. 6 - Typical Recovery Current vs. dl_F/dt

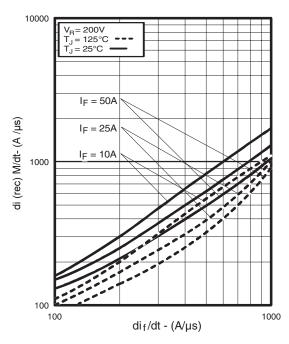


Fig. 8 - Typical dI_{(rec)M}/dt vs. dI_F/dt



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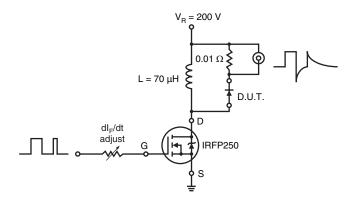
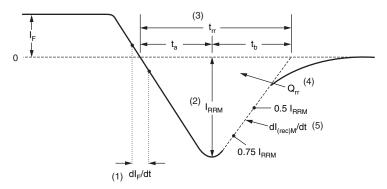


Fig. 9 - Reverse Recovery Parameter Test Circuit



- (1) dl_F/dt rate of change of current through zero crossing
- (2) I_{RRM} peak reverse recovery current
- (3) $\rm t_{rr}$ reverse recovery time measured from zero crossing point of negative going $\rm I_{r}$ to point where a line passing through 0.75 $\rm I_{RRM}$ and 0.50 $\rm I_{RRM}$ extrapolated to zero current.
- (4) $\mathbf{Q}_{\rm rr}$ area under curve defined by $\mathbf{t}_{\rm rr}$ and $\mathbf{I}_{\rm RRM}$

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

(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

HFA25PB60PbF

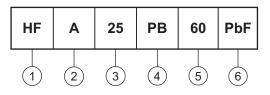
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ORDERING INFORMATION TABLE

Device code



1 - HEXFRED® family

Process designator: A = Electron irradiated

B = Platinum diffused

3 - Current rating (25 = 25 A)

- Package outline (PB = TO-247, 2 pins)

5 - Voltage rating (60 = 600 V)

- • None = Standard production

• PbF = Lead (Pb)-free

LINKS TO RELATED DOCUMENTS				
Dimensions http://www.vishay.com/doc?95253				
Part marking information	http://www.vishay.com/doc?95255			



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