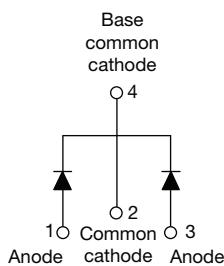
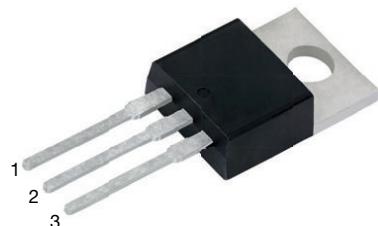


HEXFRED®, Ultrafast Soft Recovery Diode, 2 x 4 A



FEATURES

- Ultrafast and ultrasoft recovery
- Very low I_{RRM} and Q_{rr}
- Designed and qualified according to JEDEC®-JESD47
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

BENEFITS

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

DESCRIPTION

VS-HFA08TA60C... 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 VS-HFA08TA60C... 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 VS-HFA08TA60C... 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.

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	2 x 4 A
V_R	600 V
V_F at I_F	1.4 V
t_{rr} typ.	17 ns
Package	TO-220AB 3L
T_J max.	150 °C
Circuit configuration	Common cathode

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 ($T_J = 25^\circ\text{C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	V_{BR}	$I_R = 100 \mu\text{A}$		600	-	-	V
Maximum forward voltage	V_{FM}	$I_F = 4.0 \text{ A}$	See fig. 1	-	1.5	1.8	
		$I_F = 8.0 \text{ A}$		-	1.8	2.2	
		$I_F = 4.0 \text{ A}, T_J = 125^\circ\text{C}$		-	1.4	1.7	
Maximum reverse leakage current	I_{RM}	$V_R = V_R \text{ rated}$	See fig. 2	-	0.17	3.0	μA
		$T_J = 125^\circ\text{C}, V_R = 0.8 \times V_R \text{ rated}$		-	44	300	
Junction capacitance	C_T	$V_R = 200 \text{ V}$	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 ($T_J = 25^\circ\text{C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Reverse recovery time See fig. 5, 6 and 16	t_{rr}	$I_F = 1.0 \text{ A}, dI_F/dt = 200 \text{ A}/\mu\text{s}, V_R = 30 \text{ V}$		-	17	-	ns
	t_{rr1}	$T_J = 25^\circ\text{C}$		-	28	42	
	t_{rr2}	$T_J = 125^\circ\text{C}$		-	38	57	
Peak recovery current See fig. 7 and 8	I_{RRM1}	$T_J = 25^\circ\text{C}$		-	2.9	5.2	A
	I_{RRM2}	$T_J = 125^\circ\text{C}$		-	3.7	6.7	
	Q_{rr1}	$T_J = 25^\circ\text{C}$		-	40	60	
Reverse recovery charge See fig. 9 and 10	Q_{rr2}	$T_J = 125^\circ\text{C}$		-	70	105	nC
	$dI_{(rec)M}/dt1$	$T_J = 25^\circ\text{C}$		-	280	-	
	$dI_{(rec)M}/dt2$	$T_J = 125^\circ\text{C}$		-	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	
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 3L TO-220AB		HFA08TA60C			

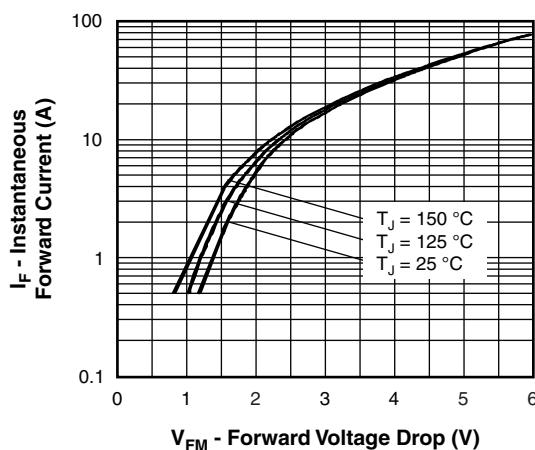


Fig. 1 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current

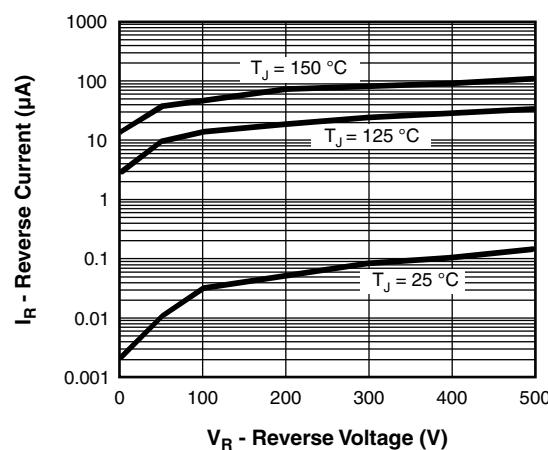


Fig. 2 - Typical Reverse Current vs. Reverse Voltage

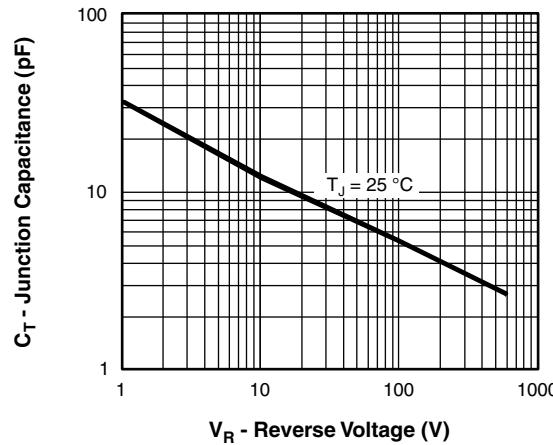


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

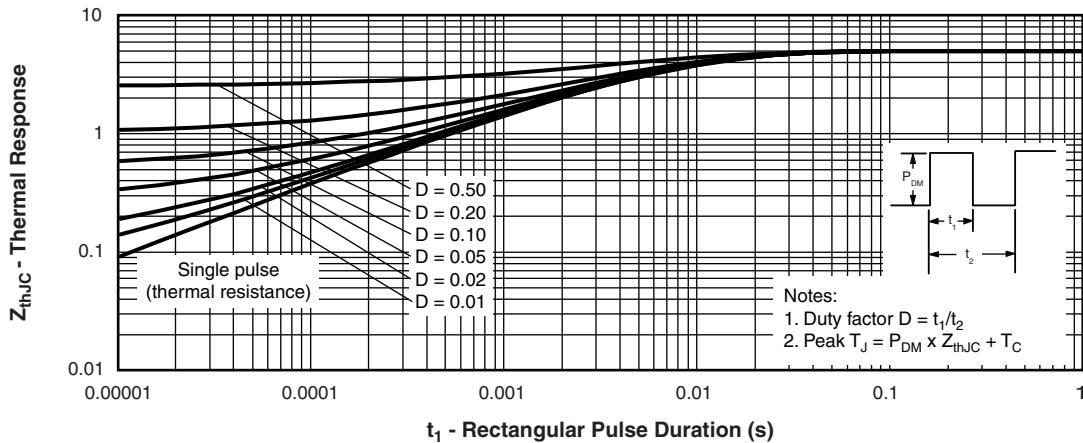


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

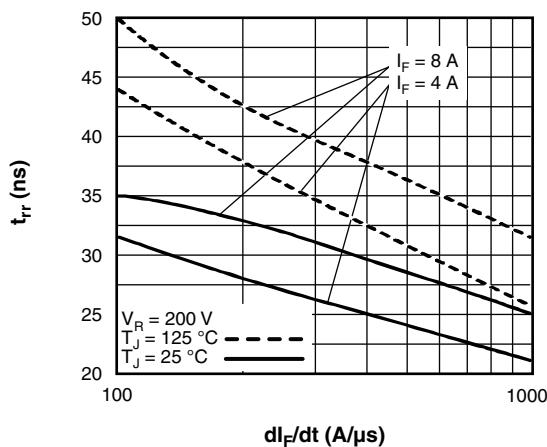


Fig. 5 - Typical Reverse Recovery Time vs. dI_F/dt

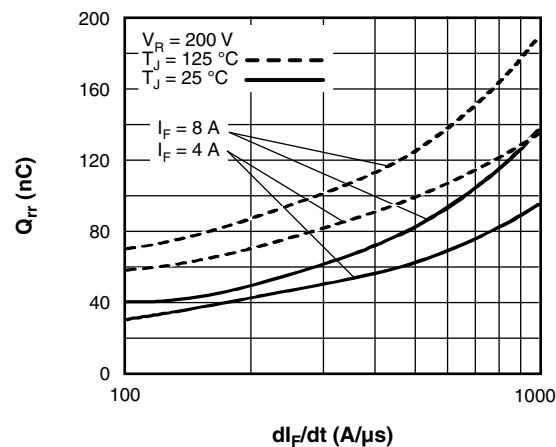


Fig. 7 - Typical Stored Charge vs. dI_F/dt

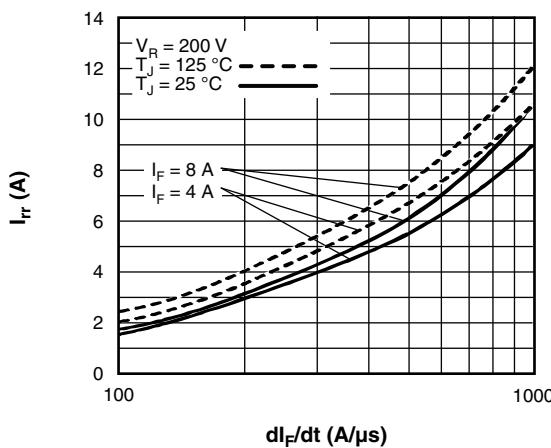


Fig. 6 - Typical Recovery Current vs. dI_F/dt

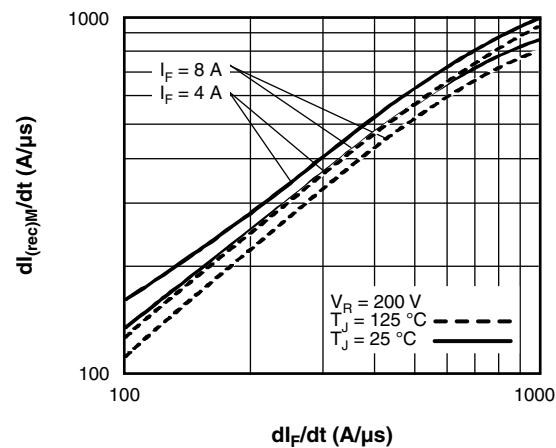
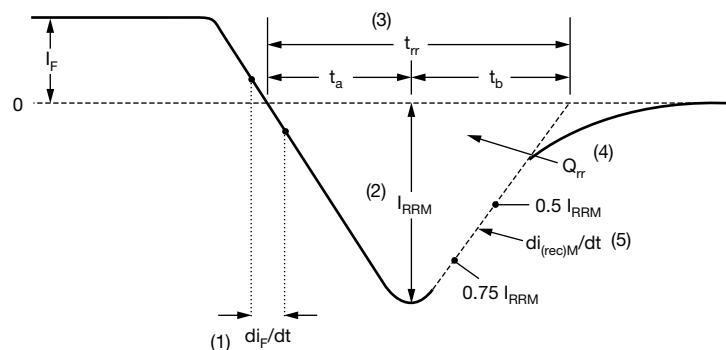


Fig. 8 - Typical $dI_{(rec)M}/dt$ vs. dI_F/dt



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

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

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

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

(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.

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

Fig. 9 - Reverse Recovery Waveform and Definitions

ORDERING INFORMATION TABLE

Device code	VS-	HF	A	08	TA	60	C	-M3
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

- 1** - Vishay Semiconductors product
- 2** - HEXFRED® family
- 3** - Electron irradiated
- 4** - Current rating (08 = 8 A)
- 5** - Package:
TA = 3L TO-220AB
- 6** - Voltage rating (60 = 600 V)
- 7** - Circuit configuration:
C = common cathode
- 7** - Environmental digit:
-M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free

ORDERING INFORMATION (Example)

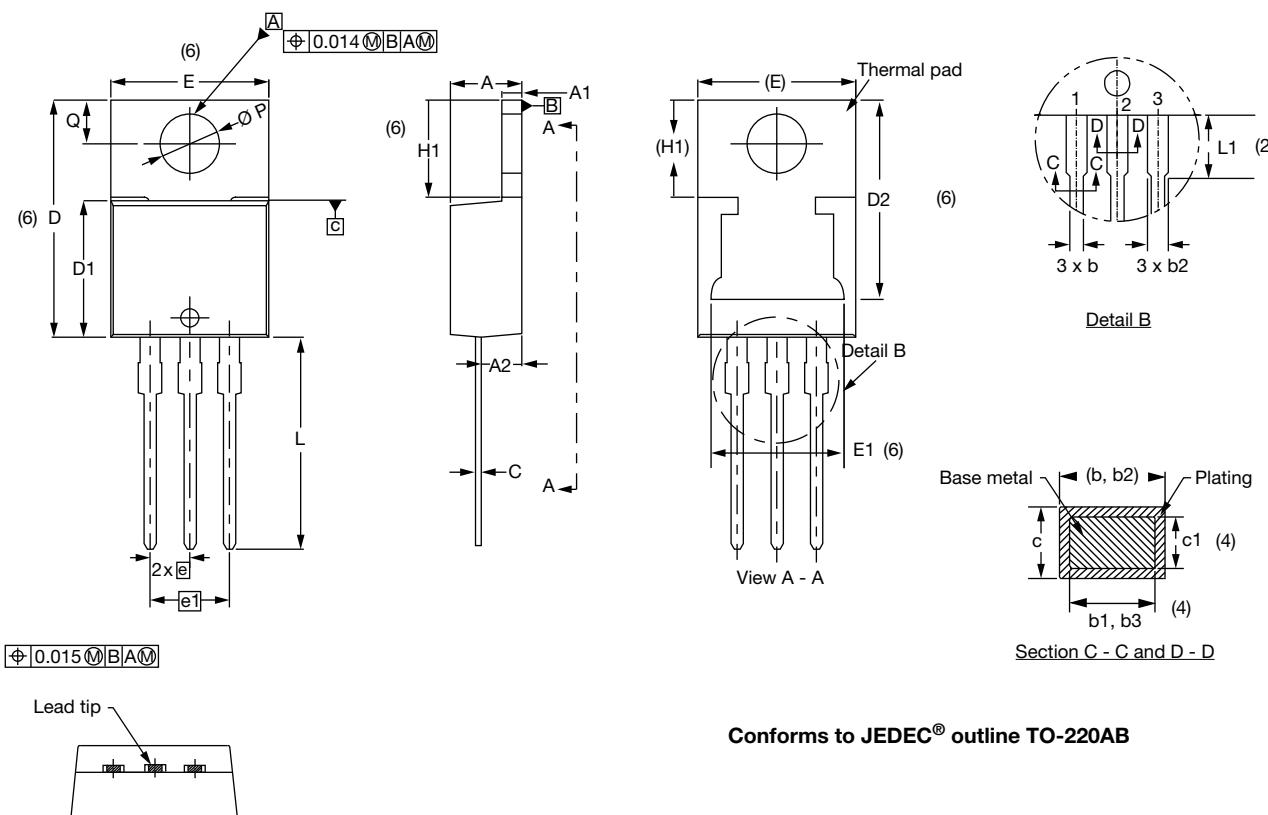
PREFERRED P/N	BASE QUANTITY	PACKAGING DESCRIPTION
VS-HFA08TA60C-M3	50	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS

Dimensions	www.vishay.com/doc?96154
Part marking information	www.vishay.com/doc?95028

TO-220AB 3L

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES		SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.				MIN.	MAX.	MIN.	MAX.	
A	4.25	4.65	0.167	0.183			D2	11.68	13.30	0.460	0.524	6, 7
A1	1.14	1.40	0.045	0.055			E	10.11	10.51	0.398	0.414	3, 6
A2	2.50	2.92	0.098	0.115			E1	6.86	8.89	0.270	0.350	6
b	0.69	1.01	0.027	0.040			e	2.41	2.67	0.095	0.105	
b1	0.38	0.97	0.015	0.038	4		e1	4.88	5.28	0.192	0.208	
b2	1.20	1.73	0.047	0.068			H1	6.09	6.48	0.240	0.255	6
b3	1.14	1.73	0.045	0.068	4		L	13.52	14.02	0.532	0.552	
c	0.36	0.61	0.014	0.024			L1	3.32	3.82	0.131	0.150	2
c1	0.36	0.56	0.014	0.022	4		Ø P	3.54	3.91	0.139	0.154	
D	14.85	15.35	0.585	0.604	3		Q	2.60	3.00	0.102	0.118	
D1	8.38	9.02	0.330	0.355								

Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Lead dimension and finish uncontrolled in L1
- (3) Dimension D, D1, and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body
- (4) Dimension b1, b3, and c1 apply to base metal only
- (5) Controlling dimensions: inches
- (6) Thermal pad contour optional within dimensions E, H1, D2, and E1
- (7) Outline conforms to JEDEC® TO-220, except D2

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