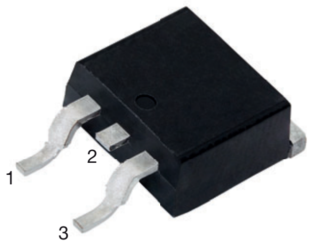
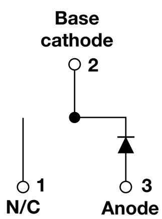
HEXFRED®
Ultrafast Soft Recovery Diode, 8 A



D^{2}PAK (TO-263AB)



FEATURES

- Ultrafast and ultrasoft recovery
- Very low I_{RRM} and Q_{rr}
- Specified at operating conditions
- 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-HFA08TB60S 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 8 A continuous current, the VS-HFA08TB60S 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 HFA08TB60S is ideally suited for applications in power supplies (PFC boost diode) and power conversion systems (such as inverters), motor drives, and many other similar applications where high speed, high efficiency is needed.

LINKS TO ADDITIONAL RESOURCES

3D Models

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	8 A
V_R	600 V
V_F at I_F	1.4 V
t_{rr} (typ.)	18 ns
T_J max.	150 °C
Package	D^{2}PAK (TO-263AB)
Circuit configuration	Single

MECHANICAL DATA

Case: D^{2}PAK (TO-263AB)

Molding compound meets UL 94 V-0 flammability rating

Terminals: matte tin plated leads, solderable per J-STD-002

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	8	A
Single pulse forward current	I_{FSM}		60	
Maximum repetitive forward current	I_{FRM}		24	
Maximum power dissipation	P_D	T_C = 25 °C	36	W
		T_C = 100 °C	14	
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 = 8.0 A	See fig. 1	-	1.4	1.7	
		I_F = 16 A		-	1.7	2.1	
		I_F = 8.0 A, T_J = 125 °C		-	1.4	1.7	
Maximum reverse leakage current	I_{RM}	V_R = V_R rated	See fig. 2	-	0.3	5.0	μA
		T_J = 125 °C, V_R = 0.8 x V_R rated		-	100	500	
Junction capacitance	C_T	V_R = 200 V	See fig. 3	-	10	25	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	t_{rr}	I_F = 1.0 A, dI_F/dt = 200 A/μs, V_R = 30 V		-	18	-	ns
	t_{rr1}	T_J = 25 °C	I_F = 8.0 A dI_F/dt = 200 A/μs V_R = 200 V	-	37	55	
	t_{rr2}	T_J = 125 °C		-	55	90	
Peak recovery current	I_{RRM1}	T_J = 25 °C		-	3.5	5.0	A
	I_{RRM2}	T_J = 125 °C		-	4.5	8.0	
Reverse recovery charge See fig. 7	Q_{rr1}	T_J = 25 °C		-	65	138	nC
	Q_{rr2}	T_J = 125 °C		-	124	360	
Peak rate of fall of recovery current during t_b See fig. 8	$dI_{(rec)M}/dt1$	T_J = 25 °C		-	240	-	A/μs
	$dI_{(rec)M}/dt2$	T_J = 125 °C		-	210	-	

THERMAL AND 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}		-	-	3.5	K/W
Thermal resistance, junction to ambient	R_{thJA}	Typical socket mount	-	-	80	
Weight			-	2.0	-	g
Marking device		Case style D^2PAK (TO-263AB)	HFA08TB60S			

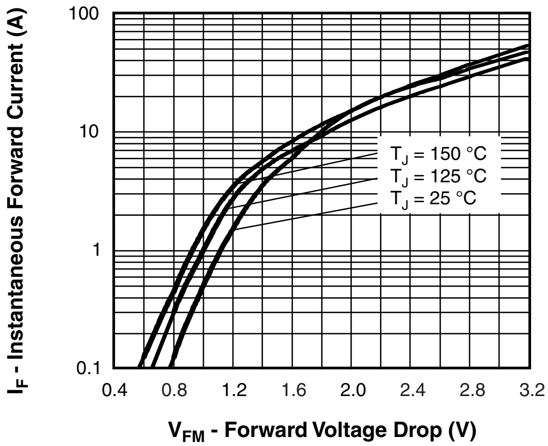


Fig. 1 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current

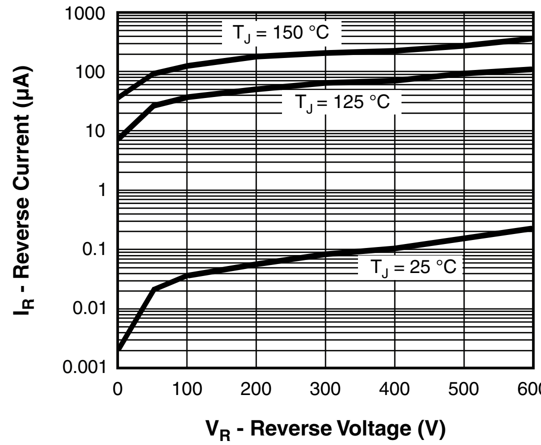


Fig. 2 - Typical Reverse Current vs. Reverse Voltage

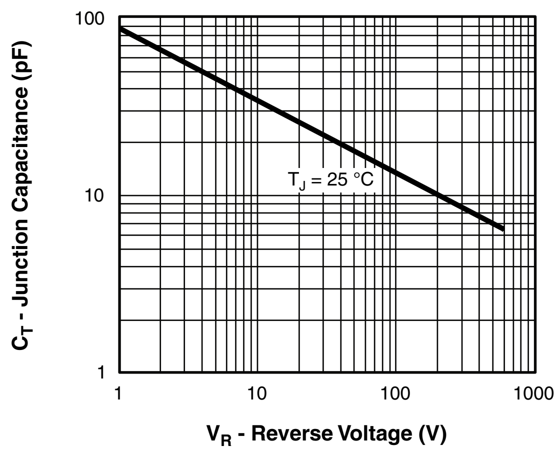


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

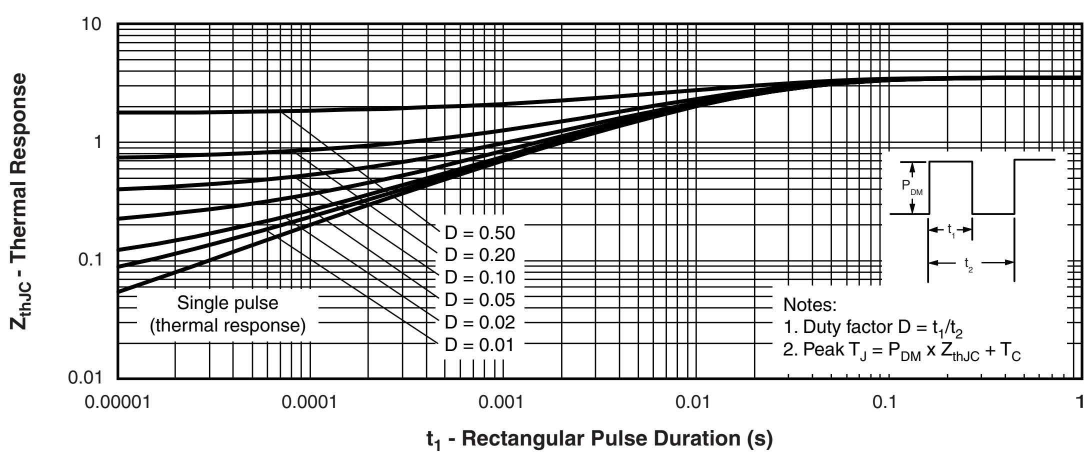


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

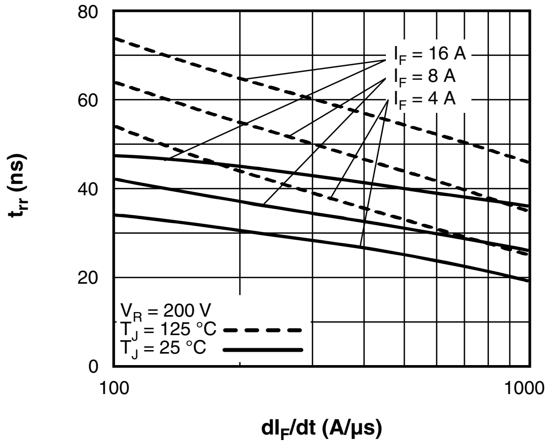


Fig. 5 - Typical Reverse Recovery Time vs. dI_F/dt

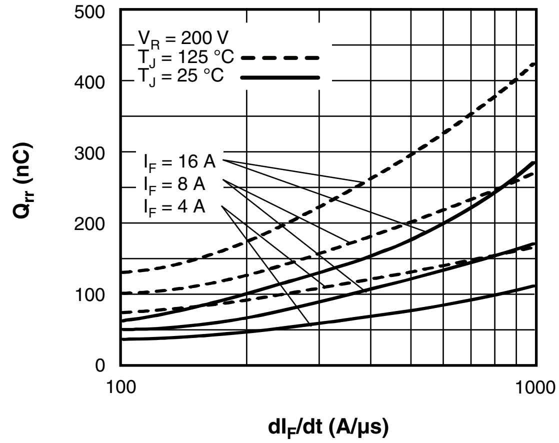


Fig. 7 - Typical Stored Charge vs. dI_F/dt

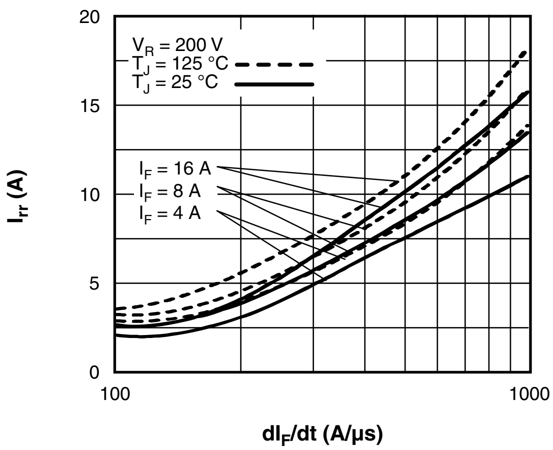


Fig. 6 - Typical Recovery Current vs. dI_F/dt

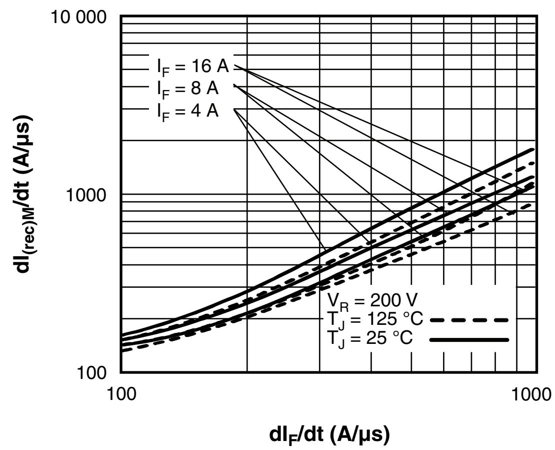
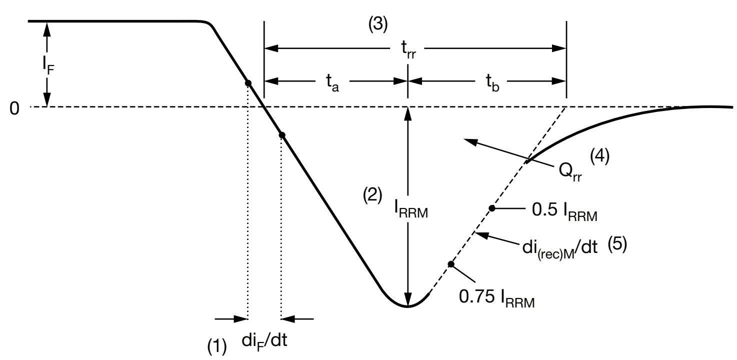


Fig. 8 - Typical $dI_{(rec)M}/dt$ vs. dI_F/dt



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

(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. 9 - Reverse Recovery Waveform and Definitions

ORDERING INFORMATION TABLE

Device code	VS-	HF	A	08	TB	60	S	L	-M3
	1	2	3	4	5	6	7	8	9

1 - Vishay Semiconductors product

2 - HEXFRED® family

3 - Process designator: A = electron irradiated

4 - Current rating (08 = 8 A)

5 - Package outline (TB = TO-220, 2 leads)

6 - Voltage rating (60 = 600 V)

7 - S = D^2PAK (TO-263AB)

8 -
- None = tube (50 pieces)
- L = tape and reel (left oriented)
- R = tape and reel (right oriented)

9 - Environmental digit:
-M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

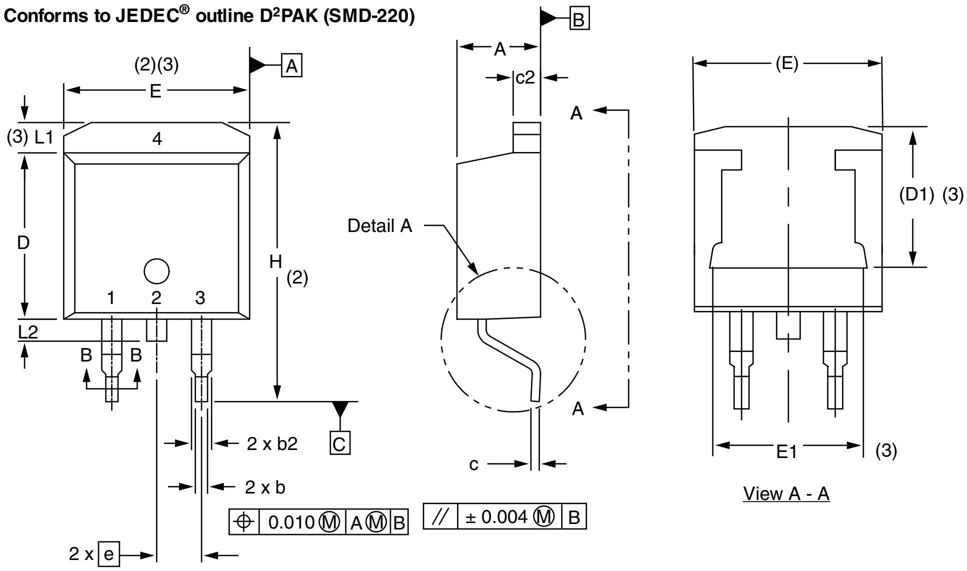
ORDERING INFORMATION (Example)		
PREFERRED P/N	**BASE QUANTITY**	**PACKAGING DESCRIPTION**
VS-HFA08TB60S-M3	50	Antistatic plastic tube
VS-HFA08TB60SR-M3	800	13" diameter reel
VS-HFA08TB60SL-M3	800	13" diameter reel

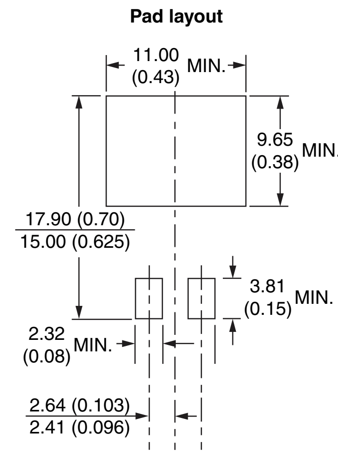
LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?96164
Part marking information	www.vishay.com/doc?95444
Packaging information	www.vishay.com/doc?96424
SPICE model	www.vishay.com/doc?96596

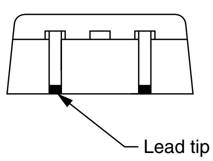
D2PAK

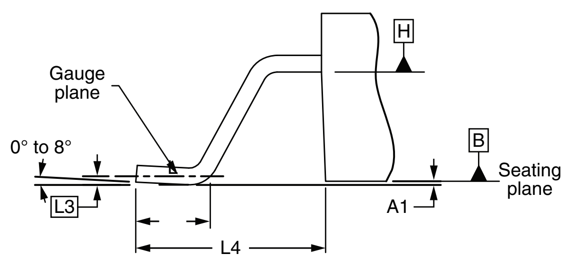
DIMENSIONS in millimeters and inches

Conforms to JEDEC® outline D2PAK (SMD-220)

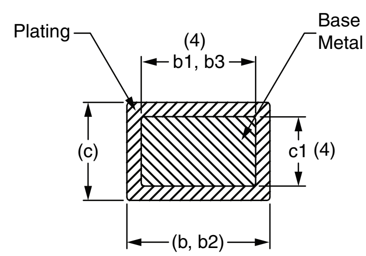








Detail "A"
Rotated 90 °CW
Scale: 8:1



Section B - B and C - C
Scale: None

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	0.160	0.190	
A1	0.00	0.254	0.000	0.010	
b	0.51	0.99	0.020	0.039	
b1	0.51	0.89	0.020	0.035	4
b2	1.14	1.78	0.045	0.070	
b3	1.14	1.73	0.045	0.068	4
c	0.38	0.74	0.015	0.029	
c1	0.38	0.58	0.015	0.023	4
c2	1.14	1.65	0.045	0.065	
D	8.51	9.65	0.335	0.380	2
D1	6.86	8.00	0.270	0.315	3
E	9.65	10.67	0.380	0.420	2, 3
E1	7.90	8.80	0.311	0.346	3
e	2.54 BSC		0.100 BSC		
H	14.61	15.88	0.575	0.625	
L	1.78	2.79	0.070	0.110	
L1	-	1.65	-	0.066	3
L2	1.27	1.78	0.050	0.070	
L3	0.25 BSC		0.010 BSC		
L4	4.78	5.28	0.188	0.208	

Notes

(1) Dimensioning and tolerancing per ASME Y14.5 M-1994

(2) Dimension D 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 outmost extremes of the plastic body

(3) Thermal pad contour optional within dimension E, L1, D1 and E1

(4) Dimension b1 and c1 apply to base metal only

(5) Datum A and B to be determined at datum plane H

(6) Controlling dimension: inches

(7) Outline conforms to JEDEC® outline TO-263AB

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