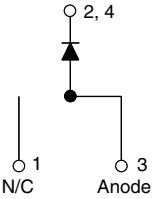
HEXFRED® Ultrafast Soft Recovery Diode, 8 A

DPAK (TO-252AA)



FEATURES

- Ultrafast recovery time
- Ultrasoft recovery
- Very low I_{RRM}
- Very low Q_{rr}
- Guaranteed avalanche
- Specified at operating conditions
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- 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

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	DPAK (TO-252AA)
Circuit configuration	Single

DESCRIPTION / APPLICATIONS

These diodes are optimized to reduce losses and EMI / RFI in high frequency power conditioning systems. The softness of the recovery eliminates the need for a snubber in most applications. These devices are ideally suited for freewheeling, flyback, power converters, motor drives, and other applications where high speed and reduced switching losses are design requirements.

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Cathode to anode voltage	V_{RRM}		600	V
Maximum continuous forward current	I_F	T_C = 100 °C	8	A
Single pulse forward current	I_{FSM}		60	
Peak repetitive forward current	I_{FRM}		24	
Maximum power dissipation	P_D	T_C = 100 °C	14	W
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
Breakdown voltage, blocking voltage	V_{BR}, V_R	I_R = 100 µA		600	-	-	V
Forward voltage	V_F	I_F = 8 A	See fig. 1	-	1.4	1.7	
		I_F = 16 A		-	1.7	2.1	
		I_F = 8 A, T_J = 125 °C		-	1.4	1.7	
Maximum reverse leakage current	I_R	V_R = V_R rated		-	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	t_{rr}	I_F = 1.0 A, dI_F/dt = 200 A/µs, V_R = 30 V		-	18	-	ns
		T_J = 25 °C	I_F = 8 A dI_F/dt = 200 A/µs V_R = 200 V	-	37	55	
		T_J = 125 °C		-	55	90	
Peak recovery current	I_{RRM}	T_J = 25 °C		-	3.5	5.0	A
		T_J = 125 °C		-	4.5	8.0	
Reverse recovery charge	Q_{rr}	T_J = 25 °C		-	65	138	nC
		T_J = 125 °C		-	124	360	
Rate of fall of recovery current	$dI_{(rec)M}/dt$	T_J = 25 °C		-	240	-	A/µs
		T_J = 125 °C		-	210	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Maximum junction and storage temperature range	T_J, T_{Stg}		-55	-	150	°C
Thermal resistance, junction to case	R_{thJC}		-	-	3.5	°C/W
Thermal resistance, junction to ambient	R_{thJA}	Typical socket mount	-	-	80	
Weight			-	2.0	-	g
			-	0.07	-	oz.
Marking device		Case style DPAK (TO-252AA)	HFA08SD60S			

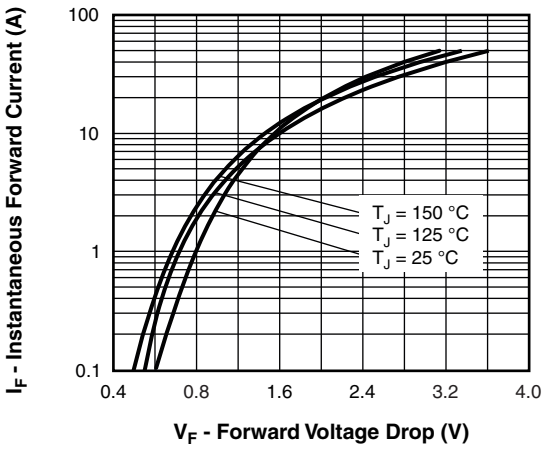


Fig. 1 - Typical Forward Voltage Drop Characteristics

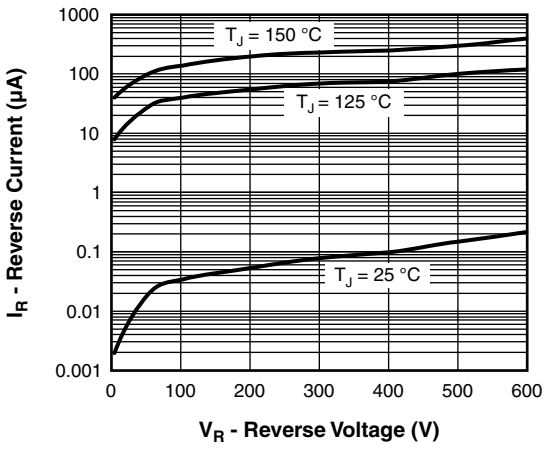


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

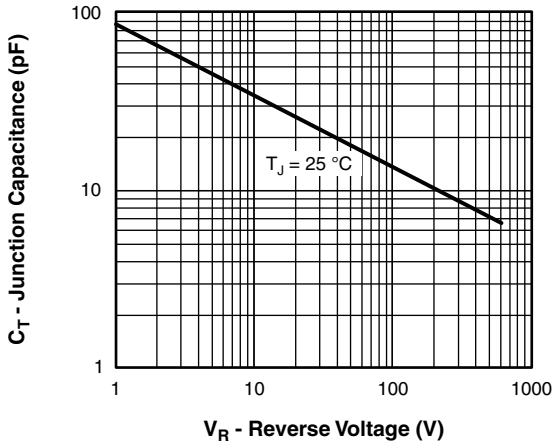


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

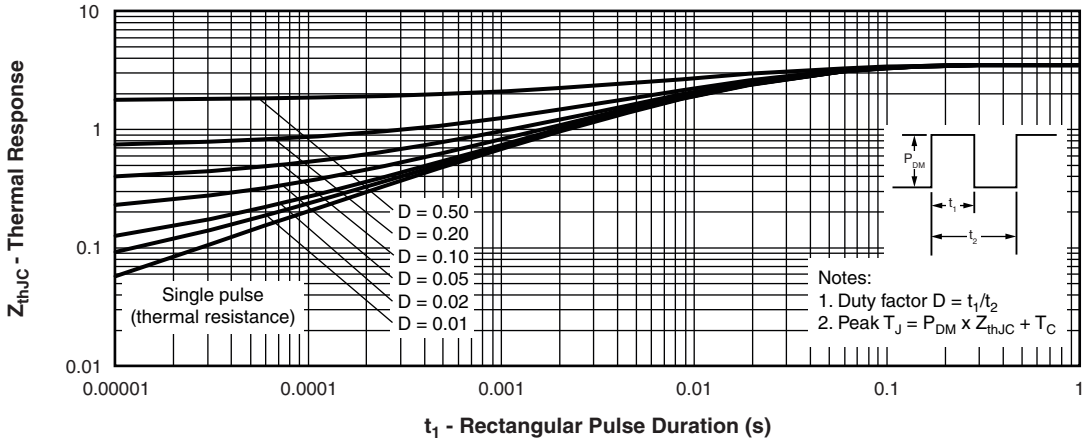


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

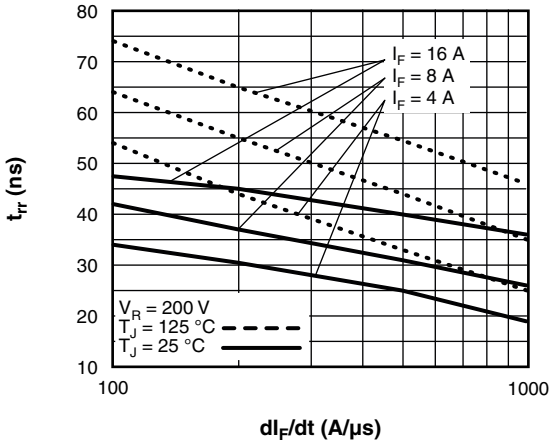


Fig. 5 - Typical Reverse Recovery Time vs. dI_F/dt

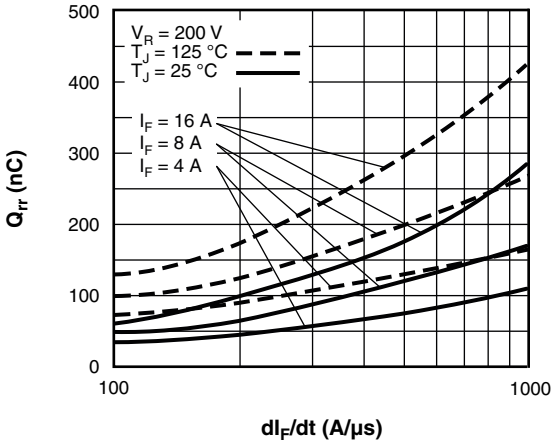


Fig. 7 - Typical Stored Charge vs. dI_F/dt

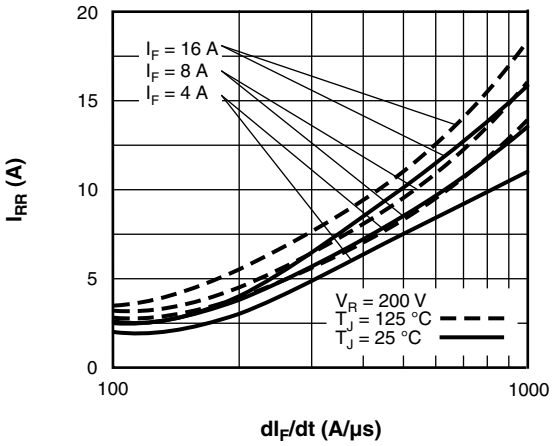


Fig. 6 - Typical Recovery Current vs. dI_F/dt

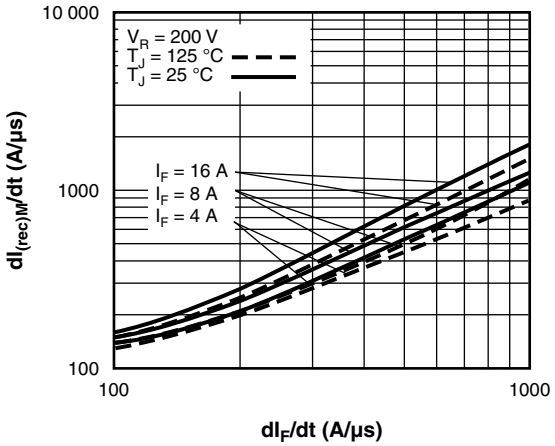


Fig. 8 - Typical $dI_{(rec)M}/dt$ vs. dI_F/dt

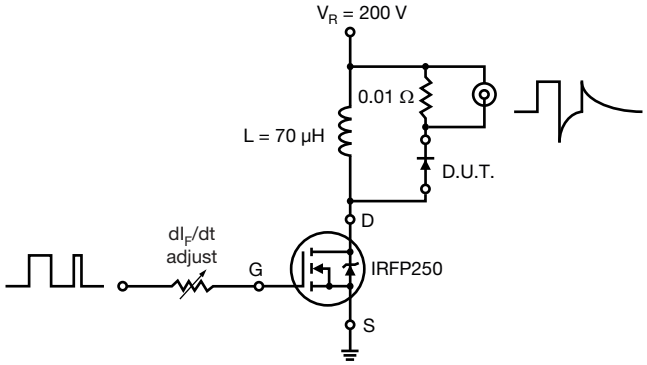
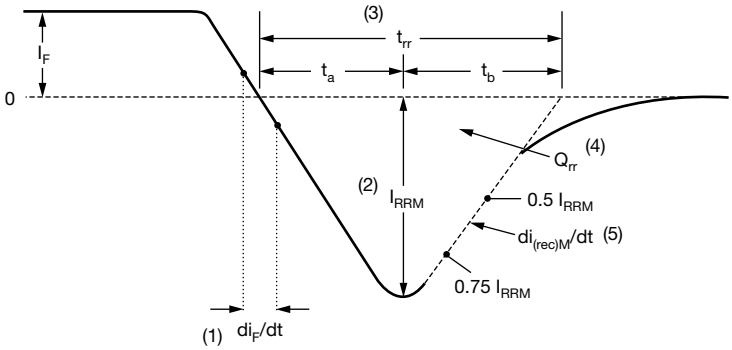


Fig. 9 - Reverse Recovery Parameter Test Circuit



(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}

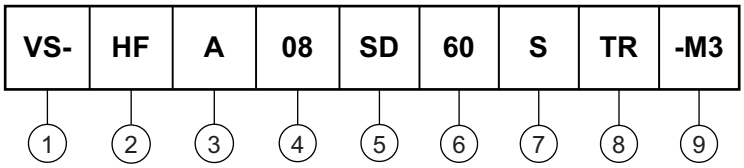
$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

(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

ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product

2 - HEXFRED® family

3 - Electron irradiated

4 - Current rating (08 = 8 A)

5 - D-PAK

6 - Voltage rating (60 = 600 V)

7 - S = D-PAK

8 - • TR = tape and reel
• R = tape and reel (right oriented)
• L = tape and reel (left oriented)

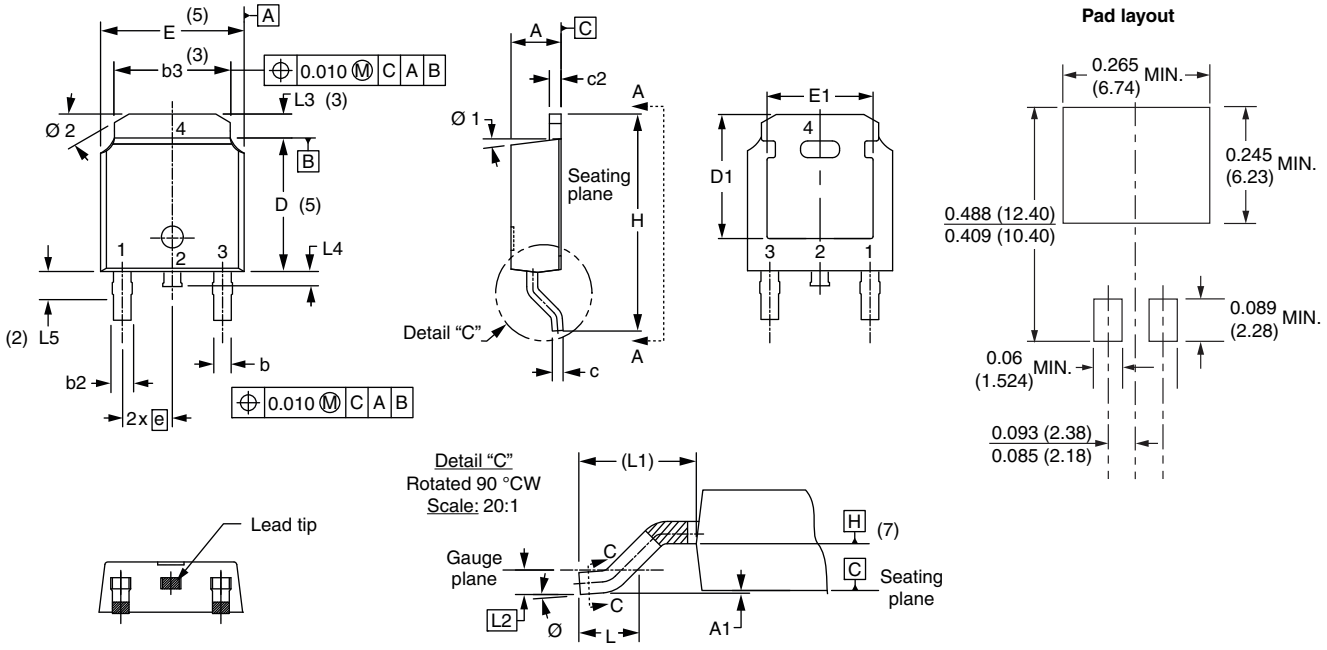
9 - Environmental digit:
-M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

ORDERING INFORMATION (Example)		
PREFERRED P/N	**BASE QUANTITY**	**PACKAGING DESCRIPTION**
VS-HFA08SD60S-M3	75	Antistatic plastic tube
VS-HFA08SD60STR-M3	2000	13" diameter reel
VS-HFA08SD60SL-M3	3000	13" diameter reel
VS-HFA08SD60SR-M3	3000	13" diameter reel

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95627
Part marking information	www.vishay.com/doc?95176
Packaging information	www.vishay.com/doc?95033

D-PAK (TO-252AA) "M"

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	2.18	2.39	0.086	0.094	
A1	-	0.13	-	0.005	
b	0.64	0.89	0.025	0.035	
b2	0.76	1.14	0.030	0.045	
b3	4.95	5.46	0.195	0.215	3
c	0.46	0.61	0.018	0.024	
c2	0.46	0.89	0.018	0.035	
D	5.97	6.22	0.235	0.245	5
D1	5.21	-	0.205	-	3
E	6.35	6.73	0.250	0.265	5
E1	4.32	-	0.170	-	3

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
e	2.29 BSC		0.090 BSC		
H	9.40	10.41	0.370	0.410	
L	1.40	1.78	0.055	0.070	
L1	2.74 BSC		0.108 REF.		
L2	0.51 BSC		0.020 BSC		
L3	0.89	1.27	0.035	0.050	3
L4	-	1.02	-	0.040	
L5	1.14	1.52	0.045	0.060	2
Ø	0°	10°	0°	10°	
Ø1	0°	15°	0°	15°	
Ø2	25°	35°	25°	35°	

Notes

(1) Dimensioning and tolerancing as per ASME Y14.5M-1994
(2) Lead dimension uncontrolled in L5
(3) Dimension D1, E1, L3 and b3 establish a minimum mounting surface for thermal pad
(4) Section C - C dimension apply to the flat section of the lead between 0.13 and 0.25 mm (0.005 and 0.10") from the lead tip
(5) 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 outermost extremes of the plastic body
(6) Dimension b1 and c1 applied to base metal only
(7) Datum A and B to be determined at datum plane H
(8) Outline conforms to JEDEC® outline TO-252AA

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.