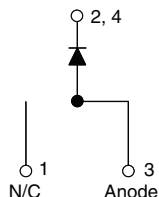


# HEXFRED® Ultrafast Soft Recovery Diode, 8 A



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](http://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 / 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.

## 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

## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Cathode to anode voltage	$V_{RRM}$		600	V
Maximum continuous forward current	$I_F$	$T_C = 100\text{ °C}$	8	A
Single pulse forward current	$I_{FSM}$		60	
Peak repetitive forward current	$I_{FRM}$		24	
Maximum power dissipation	$P_D$	$T_C = 100\text{ °C}$	14	W
Operating junction and storage temperature range	$T_J, T_{Stg}$		-55 to +150	°C

## ELECTRICAL SPECIFICATIONS ( $T_J = 25\text{ °C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Breakdown voltage, blocking voltage	$V_{BR}, V_R$	$I_R = 100\text{ }\mu\text{A}$	600	-	-	V
Forward voltage	$V_F$	$I_F = 8\text{ A}$	-	1.4	1.7	
		$I_F = 16\text{ A}$	-	1.7	2.1	
		$I_F = 8\text{ A}, T_J = 125\text{ °C}$	-	1.4	1.7	
Maximum reverse leakage current	$I_R$	$V_R = V_R$ rated	-	0.3	5.0	$\mu\text{A}$
		$T_J = 125\text{ °C}, V_R = 0.8 \times V_R$ rated	-	100	500	
Junction capacitance	$C_T$	$V_R = 200\text{ V}$ 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 <sub>J</sub> = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> = 1.0 A, dI <sub>F</sub> /dt = 200 A/μs, V <sub>R</sub> = 30 V		-	18	-	ns
		T <sub>J</sub> = 25 °C	I <sub>F</sub> = 8 A dI <sub>F</sub> /dt = 200 A/μs V <sub>R</sub> = 200 V	-	37	55	
		T <sub>J</sub> = 125 °C		-	55	90	
Peak recovery current	I <sub>RRM</sub>	T <sub>J</sub> = 25 °C		-	3.5	5.0	A
		T <sub>J</sub> = 125 °C		-	4.5	8.0	
Reverse recovery charge	Q <sub>rr</sub>	T <sub>J</sub> = 25 °C		-	65	138	nC
		T <sub>J</sub> = 125 °C		-	124	360	
Rate of fall of recovery current	dI <sub>(rec)</sub> M/dt	T <sub>J</sub> = 25 °C		-	240	-	A/μs
		T <sub>J</sub> = 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	$^{\circ}\text{C}$
Thermal resistance, junction to case	$R_{thJC}$		-	-	3.5	$^{\circ}\text{C}/\text{W}$
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			

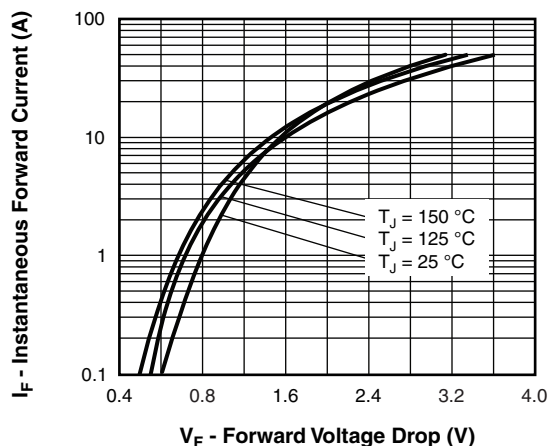


Fig. 1 - Typical Forward Voltage Drop Characteristics

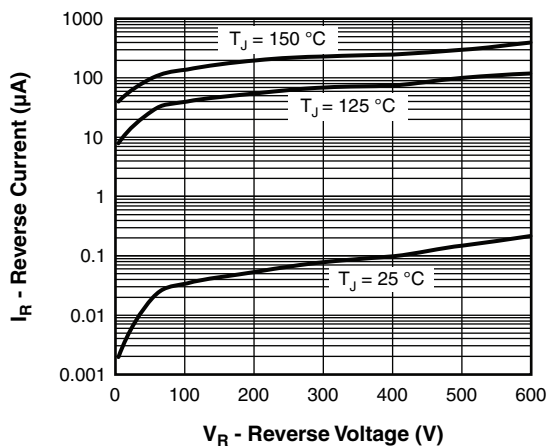


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

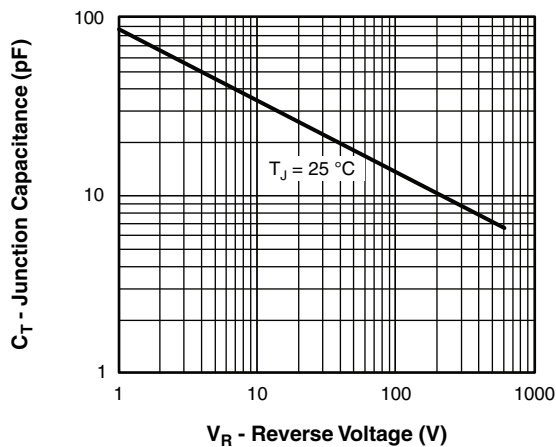
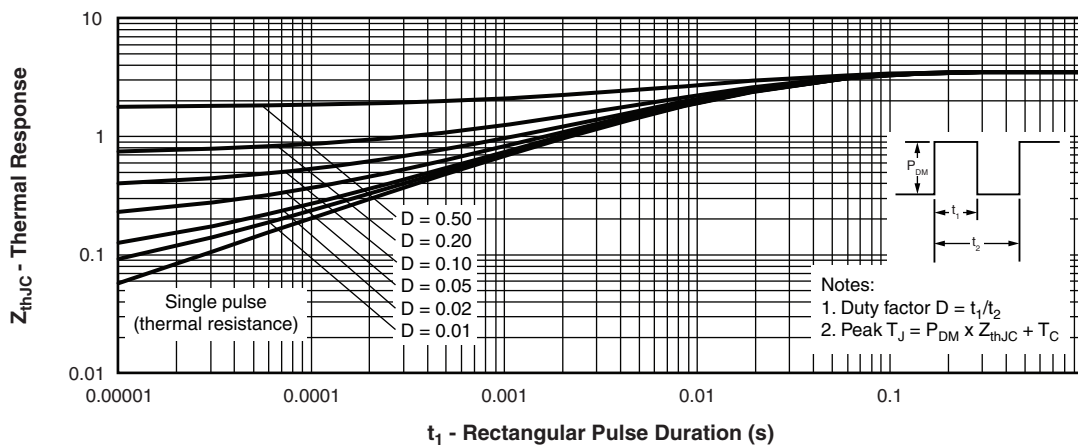
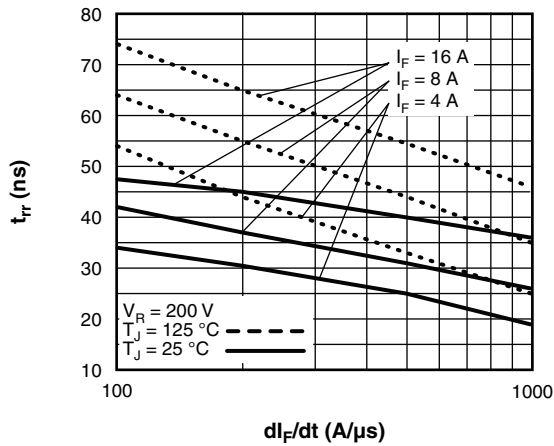
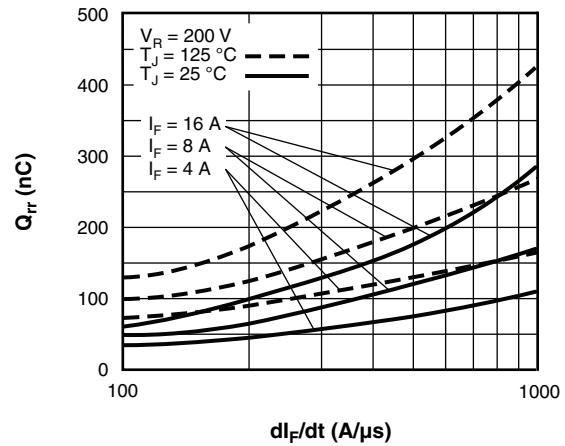
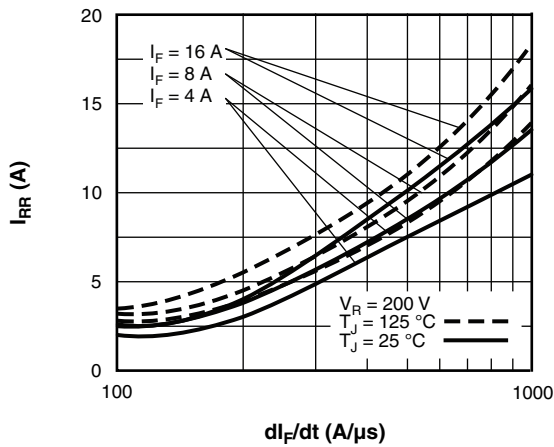
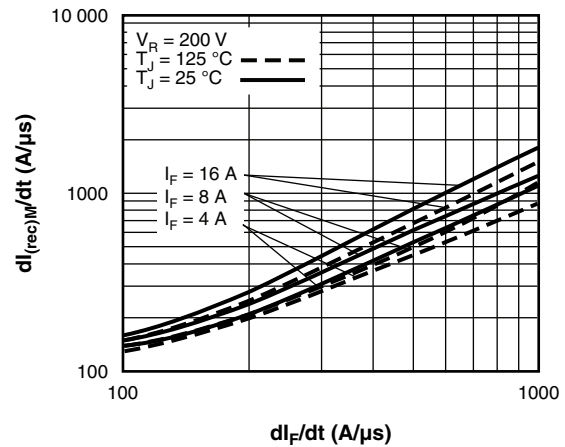


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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.  $dI_F/dt$

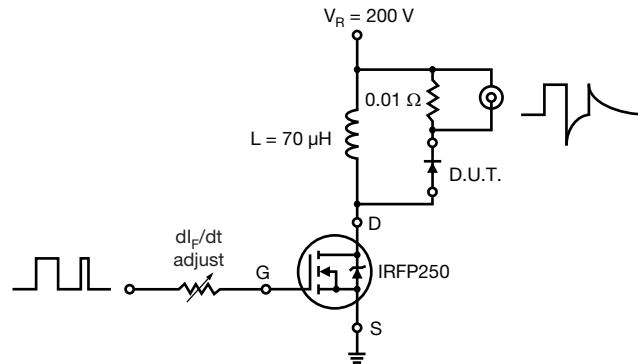


Fig. 9 - Reverse Recovery Parameter Test Circuit

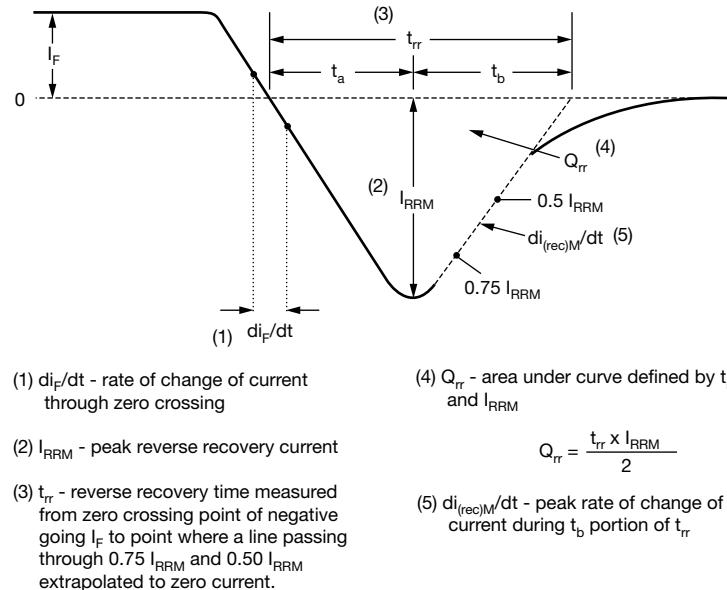


Fig. 10 - Reverse Recovery Waveform and Definitions

**ORDERING INFORMATION TABLE**

Device code	<b>VS-</b>	<b>HF</b>	<b>A</b>	<b>08</b>	<b>SD</b>	<b>60</b>	<b>S</b>	<b>TR</b>	<b>-M3</b>
	①	②	③	④	⑤	⑥	⑦	⑧	⑨

- |          |   |                                                                                                                                                               |
|----------|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>①</b> | - | Vishay Semiconductors product                                                                                                                                 |
| <b>②</b> | - | HEXFRED® family                                                                                                                                               |
| <b>③</b> | - | Electron irradiated                                                                                                                                           |
| <b>④</b> | - | Current rating (08 = 8 A)                                                                                                                                     |
| <b>⑤</b> | - | D-PAK                                                                                                                                                         |
| <b>⑥</b> | - | Voltage rating (60 = 600 V)                                                                                                                                   |
| <b>⑦</b> | - | S = D-PAK                                                                                                                                                     |
| <b>⑧</b> | - | <ul style="list-style-type: none"><li>• TR = tape and reel</li><li>• R = tape and reel (right oriented)</li><li>• L = tape and reel (left oriented)</li></ul> |
| <b>⑨</b> | - | Environmental digit:<br>-M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free                                                                   |

**ORDERING INFORMATION** (Example)

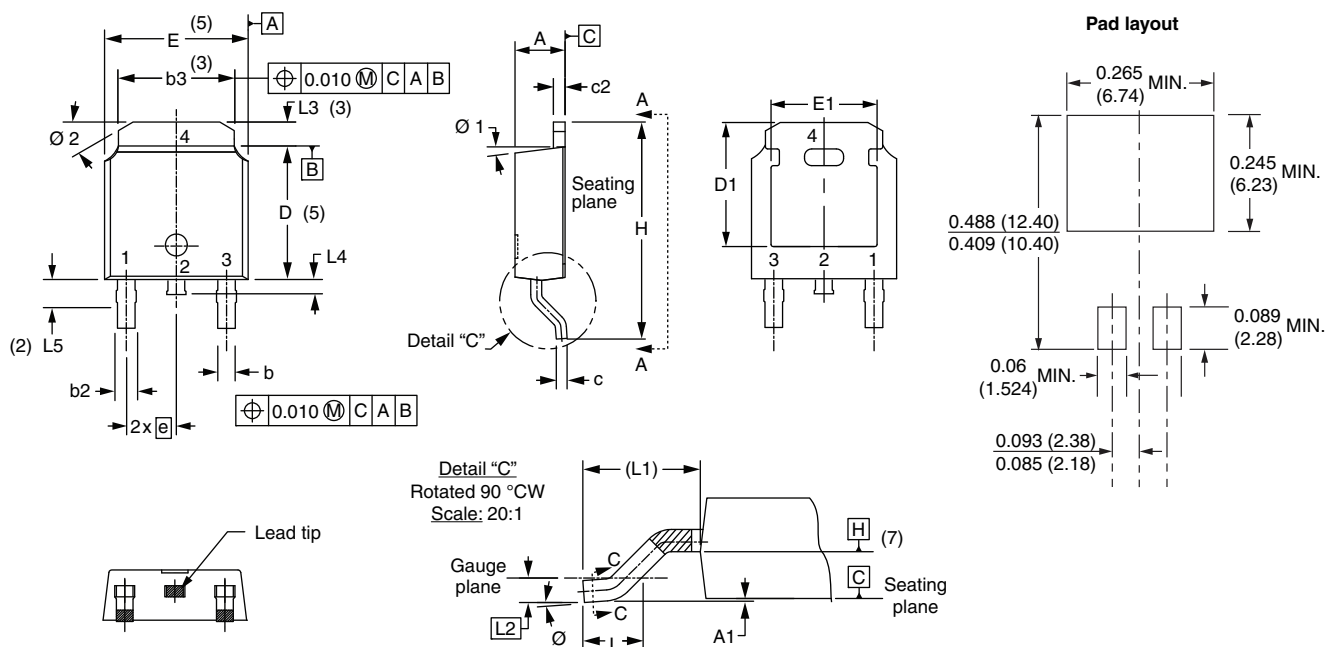
PREFERRED P/N	BASE QUANTITY	PACKAGING DESCRIPTION
VS-HFA08SD60S-M3	75	Antistatic plastic tube
VS-HFA08SD60STR-M3	2000	13" diameter reel
VS-HFA08SD60SL-M3	3000	13" diameter reel
VS-HFA08SD60SR-M3	3000	13" diameter reel

**LINKS TO RELATED DOCUMENTS**

Dimensions	<a href="http://www.vishay.com/doc?95627">www.vishay.com/doc?95627</a>
Part marking information	<a href="http://www.vishay.com/doc?95176">www.vishay.com/doc?95176</a>
Packaging information	<a href="http://www.vishay.com/doc?95033">www.vishay.com/doc?95033</a>

## D-PAK (TO-252AA) “M”

**DIMENSIONS** in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES		SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.				MIN.	MAX.	MIN.	MAX.	
A	2.18	2.39	0.086	0.094			e	2.29 BSC		0.090 BSC		
A1	-	0.13	-	0.005			H	9.40	10.41	0.370	0.410	
b	0.64	0.89	0.025	0.035			L	1.40	1.78	0.055	0.070	
b2	0.76	1.14	0.030	0.045			L1	2.74 BSC		0.108 REF.		
b3	4.95	5.46	0.195	0.215	3		L2	0.51 BSC		0.020 BSC		
c	0.46	0.61	0.018	0.024			L3	0.89	1.27	0.035	0.050	3
c2	0.46	0.89	0.018	0.035			L4	-	1.02	-	0.040	
D	5.97	6.22	0.235	0.245	5		L5	1.14	1.52	0.045	0.060	2
D1	5.21	-	0.205	-	3		Ø	0°	10°	0°	10°	
E	6.35	6.73	0.250	0.265	5		Ø1	0°	15°	0°	15°	
E1	4.32	-	0.170	-	3		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



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