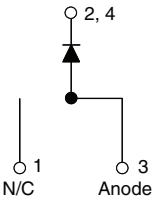
HEXFRED®, Ultrafast Soft Recovery Diode, 4 A

DPAK (TO-252AA)



FEATURES

- Ultrafast recovery time
- Ultrasoft recovery
- Very low I_{RRM}
- Very low Q_{rr}
- Guaranteed avalanche
- Specified at operating temperature
- AEC-Q101 qualified
- Meets JESD 201 class 2 whisker test
- 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	
$I_{F(AV)}$	4 A
V_R	600 V
V_F at I_F	1.4 V
t_{rr} typ.	17 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	$I_{F(AV)}$	T_C = 100 °C	4	A
Single pulse forward current	I_{FSM}		25	
Repetitive peak forward current	I_{FRM}	T_C = 116 °C	16	
Maximum power dissipation	P_D	T_C = 100 °C	10	W
Operating junction and storage temperatures	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 See fig. 1	V_F	I_F = 4 A	-	1.5	1.8	V
		I_F = 8 A	-	1.8	2.2	V
		I_F = 4 A, T_J = 125 °C	-	1.4	1.7	V
Maximum reverse leakage current	I_R	V_R = V_R rated	-	0.17	3.0	µA
		T_J = 125 °C, V_R = 0.8 x V_R rated	-	44	300	µA
Junction capacitance	C_T	V_R = 200 V	-	4	8	pF
Series inductance	L_S	Measured lead to lead 5 mm from package body	-	8.0	-	nH

DYNAMIC RECOVERY CHARACTERISTICS (T_C = 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/µA, V_R = 30 V		-	17	-	ns
		T_J = 25 °C	I_F = 4 A dI_F/dt = 200 A/µs V_R = 200 V	-	28	42	ns
		T_J = 125 °C		-	38	57	ns
Peak recovery current	I_{RRM}	T_J = 25 °C		-	2.9	5.2	A
		T_J = 125 °C		-	3.7	6.7	A
Reverse recovery charge	Q_{rr}	T_J = 25 °C		-	40	60	nC
		T_J = 125 °C		-	70	105	nC
Rate of fall of recovery current	$dI_{(rec)M}/dt$	T_J = 25 °C		-	280	-	A/µs
		T_J = 125 °C		-	235	-	A/µs

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}		-	-	5.0	°C/W
Thermal resistance, junction to ambient	R_{thJA}	Typical socket mount	-	-	80	°C/W
Weight			-	2.0	-	g
			-	0.07	-	oz.
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style DPAK (TO-252AA)	HFA04SD60SH			

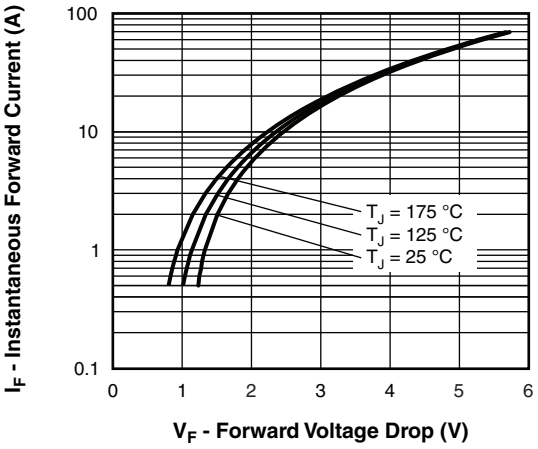


Fig. 1 - Typical Forward Voltage Drop Characteristics

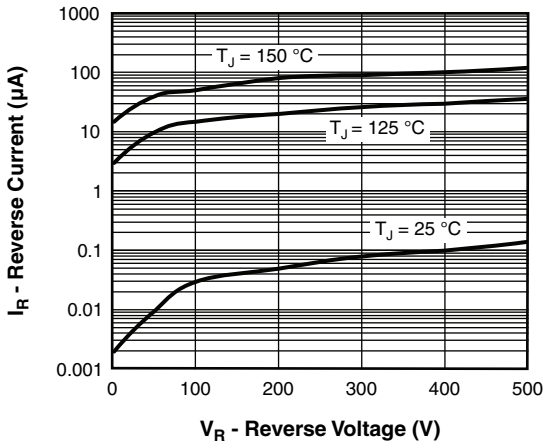


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

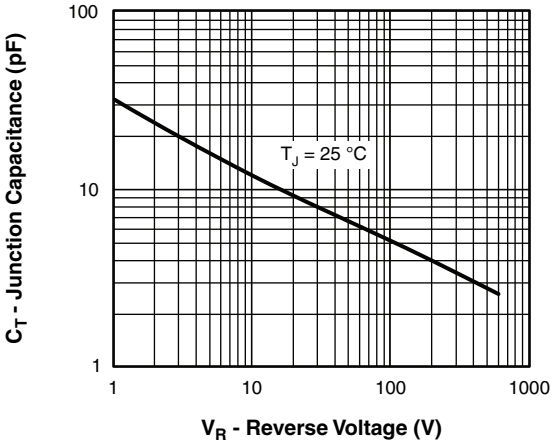


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

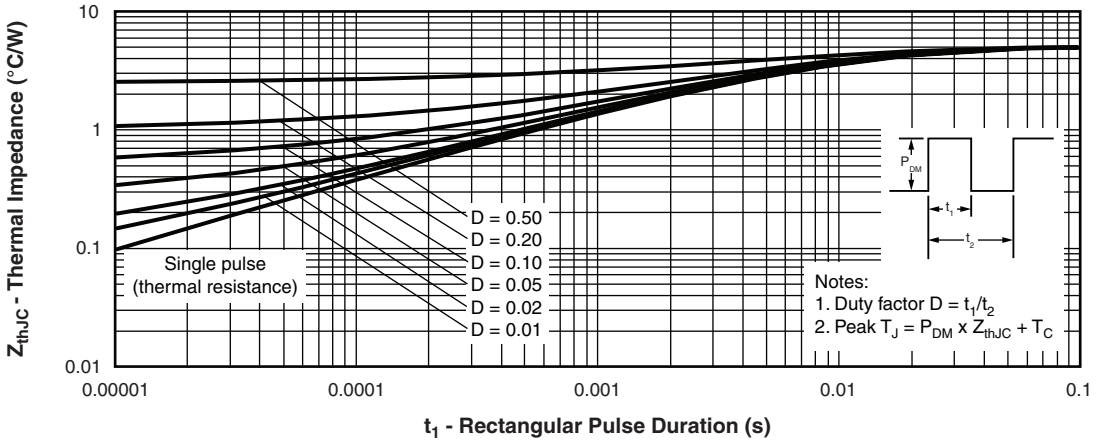


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

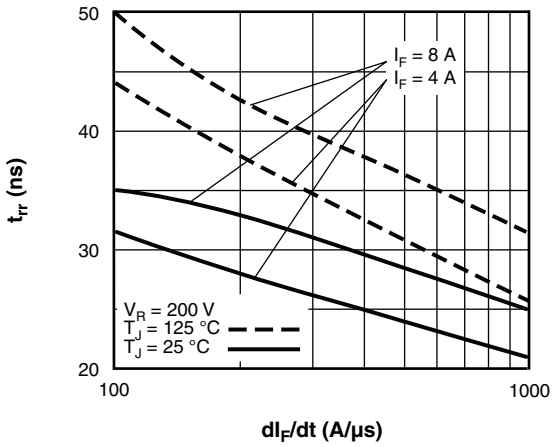


Fig. 5 - Typical Reverse Recovery Time vs. dI_F/dt

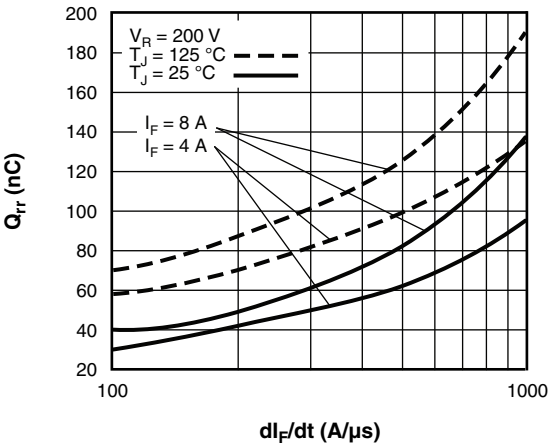


Fig. 7 - Typical Stored Charge vs. dI_F/dt

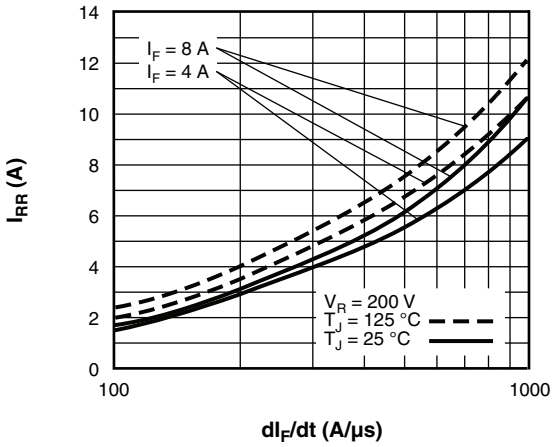


Fig. 6 - Typical Recovery Current vs. dI_F/dt

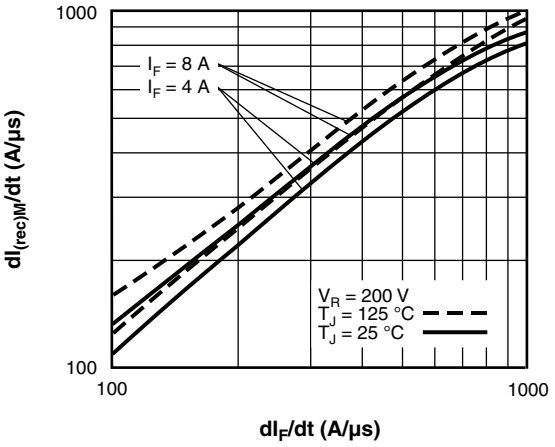


Fig. 8 - Typical $dI_{(rec)M}/dt$ vs. dI_F/dt

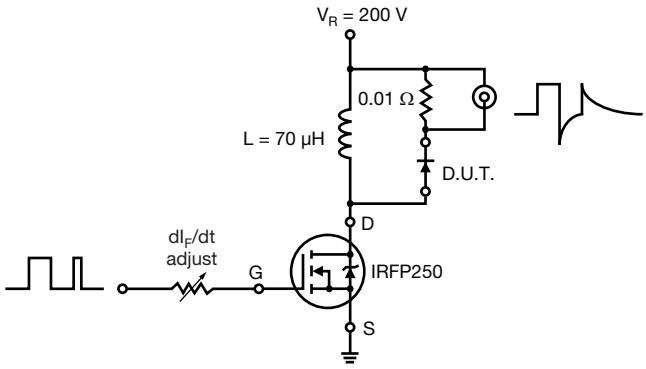
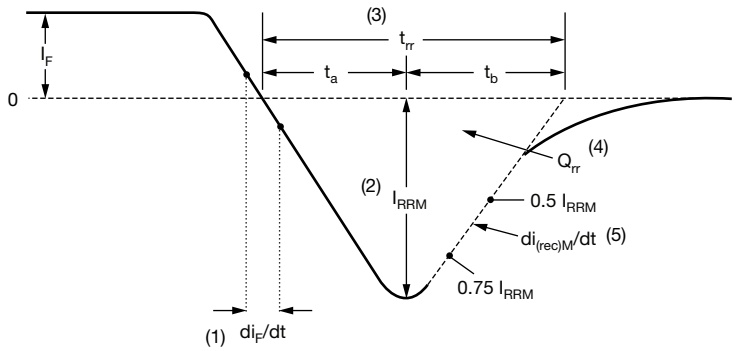


Fig. 9 - Reverse Recovery Parameter Test Circuit



(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}

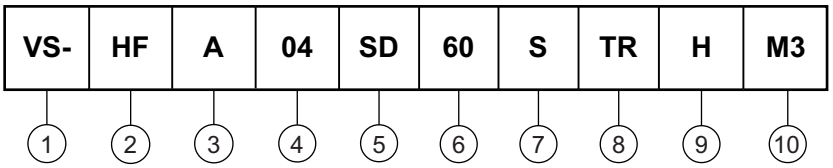
$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

(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 (04 = 4 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 - H = AEC-Q101 qualified
10 - Environmental digit:
M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

ORDERING INFORMATION (Example)			
PREFERRED P/N	**QUANTITY PER T/R**	**MINIMUM ORDER QUANTITY**	**PACKAGING DESCRIPTION**
VS-HFA04SD60SHM3	75	3000	Antistatic plastic tube
VS-HFA04SD60STRHM3	2000	2000	13" diameter reel
VS-HFA04SD60STRRHM3	3000	3000	13" diameter reel
VS-HFA04SD60STRLHM3	3000	3000	13" diameter reel

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95519
Part marking information	www.vishay.com/doc?95518
Packaging information	www.vishay.com/doc?95033

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.

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.

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Diodes - General Purpose, Power, Switching ***category:***

Click to view products by Vishay ***manufacturer:***

Other Similar products are found below :

RD0306T-H BAV17-TR BAV19-TR 1N3611 NTE156A NTE525 NTE571 NTE574 NTE5804 NTE5806 NTE6244 1SS181-TP 1SS193,LF 1SS400CST2RA SDAA13 SHN2D02FUTW1T1G LS4151GS08 1N4449 1N456A 1N4934-E3/73 1N914B 1N914BTR RFUH20TB3S BAS 28 E6327 BAV199-TP BAW56DWQ-7-F BAW75-TAP MM230L-CAA IDW40E65D1 JAN1N3600 LL4151-GS18 053684A SMMSD4148T3G 707803H NSVDAN222T1G SP000010217 CDSZC01100-HF BAV199E6433HTMA1 BAV70M3T5G SMBT2001T1G NTE5801 NTE5800 NTE5808 NTE6240 NTE6248 BAS28-7 BAW56HDW-13 BAS28 TR VS-HFA04SD60STR-M3 NSVM1MA152WKT1G