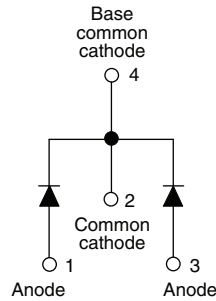


Ultra fast Rectifier, 2 x 3 A FRED Pt[®]


DPAK (TO-252AA)


FEATURES

- Ultra fast recovery time
- Low forward voltage drop
- Low leakage current
- 175 °C operating junction 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

DESCRIPTION / APPLICATIONS

Vishay Semiconductors' 200 V series are the state of the art hyper fast recovery rectifiers specifically designed with optimized performance of forward voltage drop and hyper fast recovery time.

The planar structure and the platinum doped life time control, guarantee the best overall performance, ruggedness and reliability characteristics.

These devices are intended for use in the output rectification stage of SMPS, UPS, DC/DC converters as well as freewheeling diode in low voltage inverters and chopper motor drives.

Their extremely optimized stored charge and low recovery current minimize the switching losses and reduce over dissipation in the switching element and snubbers.

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	2 x 3 A
V_R	200 V
V_F at I_F	0.9 V
t_{rr} typ.	See Recovery table
T_J max.	175 °C
Package	DPAK (TO-252AA)
Circuit configuration	Common cathode

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Peak repetitive reverse voltage	V_{RRM}		200	V
Average rectified forward current per device	$I_{F(AV)}$	Total device, rated V_R , $T_C = 159$ °C	6	A
Non-repetitive peak surge current	I_{FSM}		50	
Peak repetitive forward current per diode	I_{FM}	Rated V_R , square wave, 20 kHz, $T_C = 159$ °C	6	
Operating junction and storage temperatures	T_J, T_{Stg}		-65 to +175	°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	$I_R = 100$ μ A	200	-	-	V
Forward voltage	V_F	$I_F = 3$ A	-	0.9	1	
		$I_F = 3$ A, $T_J = 125$ °C	-	0.78	0.9	
		$I_F = 6$ A	-	1	1.2	
		$I_F = 6$ A, $T_J = 125$ °C	-	0.89	1.08	
Reverse leakage current	I_R	$V_R = V_R$ rated	-	-	5	μ A
		$T_J = 125$ °C, $V_R = V_R$ rated	-	-	100	
Junction capacitance	C_T	$V_R = 200$ V	-	12	-	pF
Series inductance	L_S	Measured lead to lead 5 mm from package body	-	8.0	-	nH

DYNAMIC RECOVERY CHARACTERISTICS ($T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Reverse recovery time	t_{rr}	$I_F = 1.0\text{ A}$, $di_F/dt = 50\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$	-	20	35	ns	
		$T_J = 25\text{ }^\circ\text{C}$	-	19	-		
		$T_J = 125\text{ }^\circ\text{C}$	-	26	-		
Peak recovery current	I_{RRM}	$I_F = 3\text{ A}$ $V_R = 160\text{ V}$ $di_F/dt = 200\text{ A}/\mu\text{s}$	$T_J = 25\text{ }^\circ\text{C}$	-	3.1	-	A
			$T_J = 125\text{ }^\circ\text{C}$	-	4.6	-	
Reverse recovery charge	Q_{rr}		$T_J = 25\text{ }^\circ\text{C}$	-	30	-	nC
			$T_J = 125\text{ }^\circ\text{C}$	-	60	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	
Maximum junction and storage temperature range	T_J, T_{Stg}	-65	-	175	$^\circ\text{C}$	
Thermal resistance, junction to case per leg	R_{thJC}	-	-	5	$^\circ\text{C}/\text{W}$	
Weight		-	0.3	-	g	
		-	0.01	-	oz.	
Mounting torque		6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)	
Marking device		Case style DPAK (TO-252AA)			6CWH02FNH	

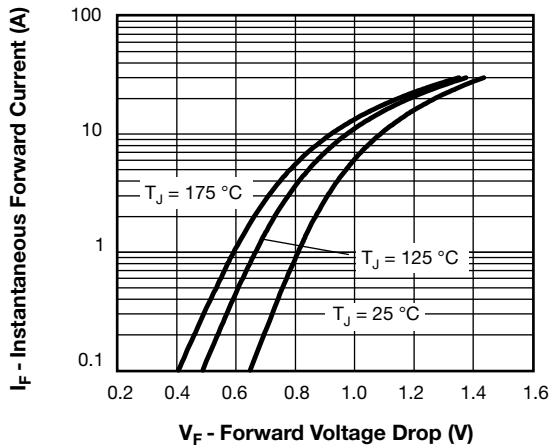


Fig. 1 - Maximum Forward Voltage Drop Characteristics

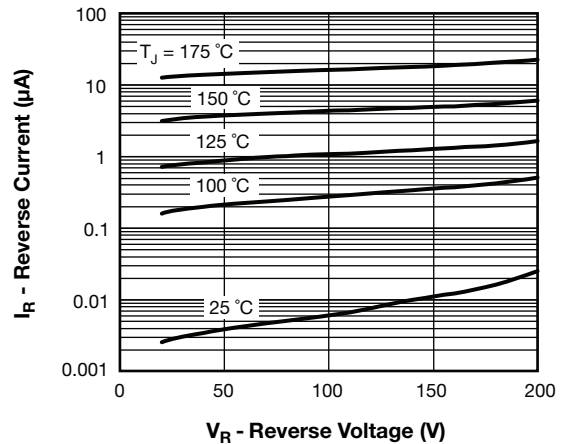


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

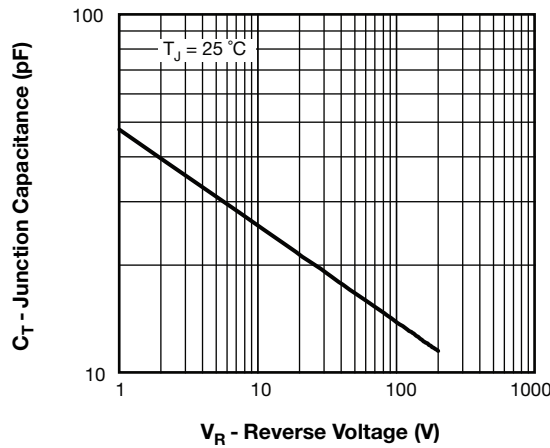


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

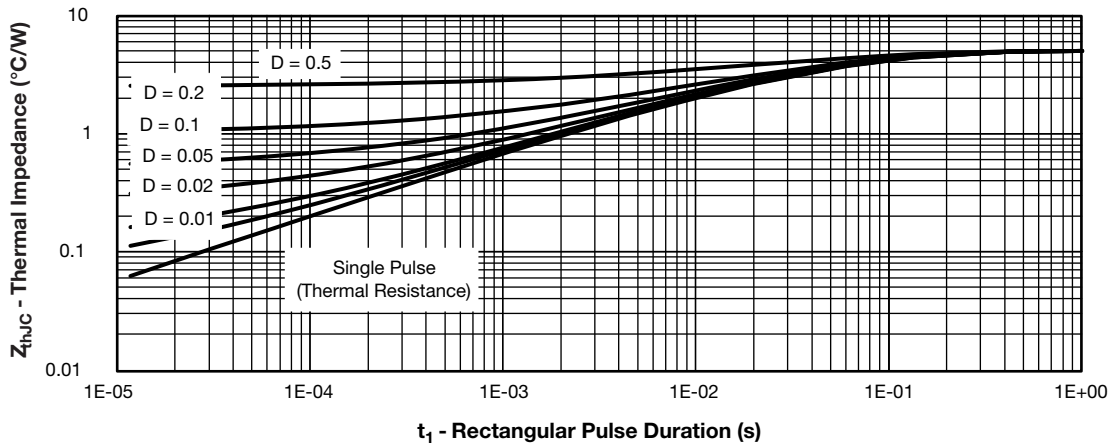


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

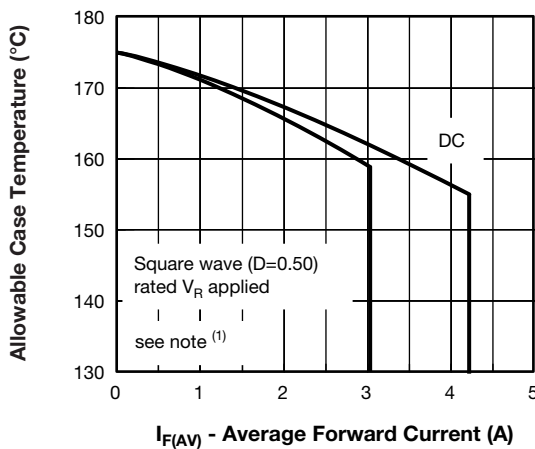


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

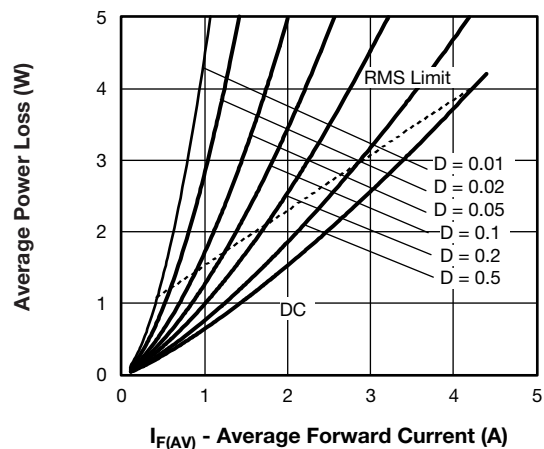


Fig. 6 - Forward Power Loss Characteristics

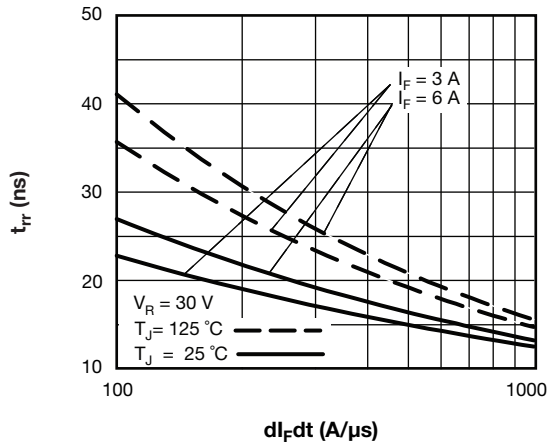


Fig. 7 - Typical Reverse Recovery vs. di_F/dt

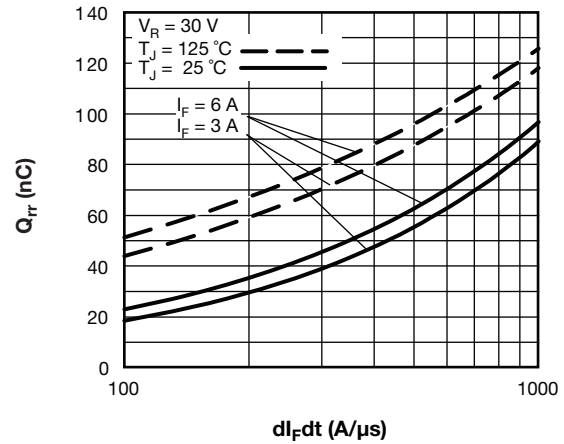


Fig. 8 - Typical Stored Charge vs. di_F/dt

Note

- (1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
 Pd = forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
 Pd_{REV} = inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at V_{R1} = rated V_R

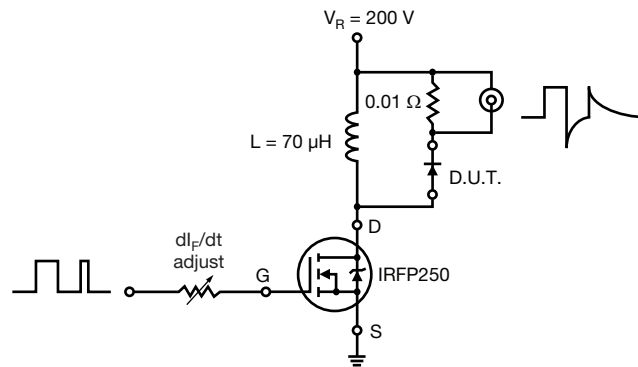
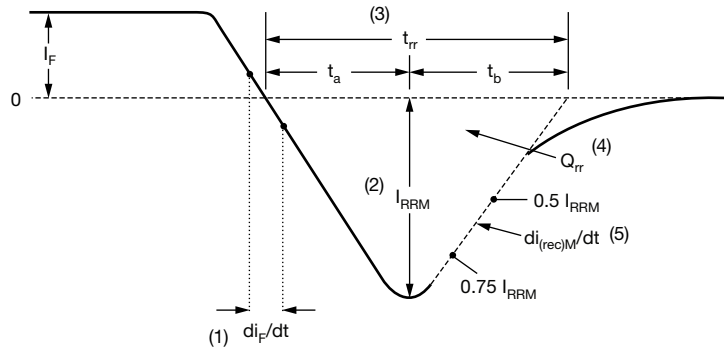


Fig. 9 - Reverse Recovery Parameter Test Circuit



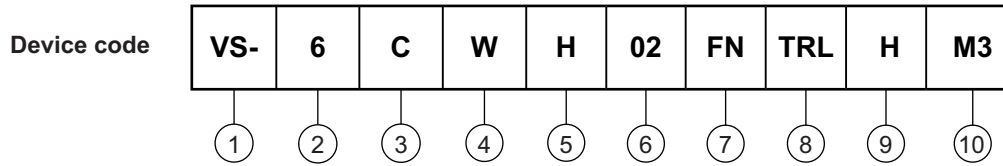
- (1) di_F/dt - rate of change of current through zero crossing
- (2) I_{RRM} - peak reverse recovery current
- (3) t_{rr} - reverse recovery time measured from zero crossing point of negative going I_F to point where a line passing through $0.75 I_{RRM}$ and $0.50 I_{RRM}$ extrapolated to zero current.
- (4) Q_{rr} - area under curve defined by t_{rr} and I_{RRM}
- (5) $di_{(rec)M}/dt$ - peak rate of change of current during t_b portion of t_{rr}

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

Fig. 10 - Reverse Recovery Waveform and Definitions



ORDERING INFORMATION TABLE



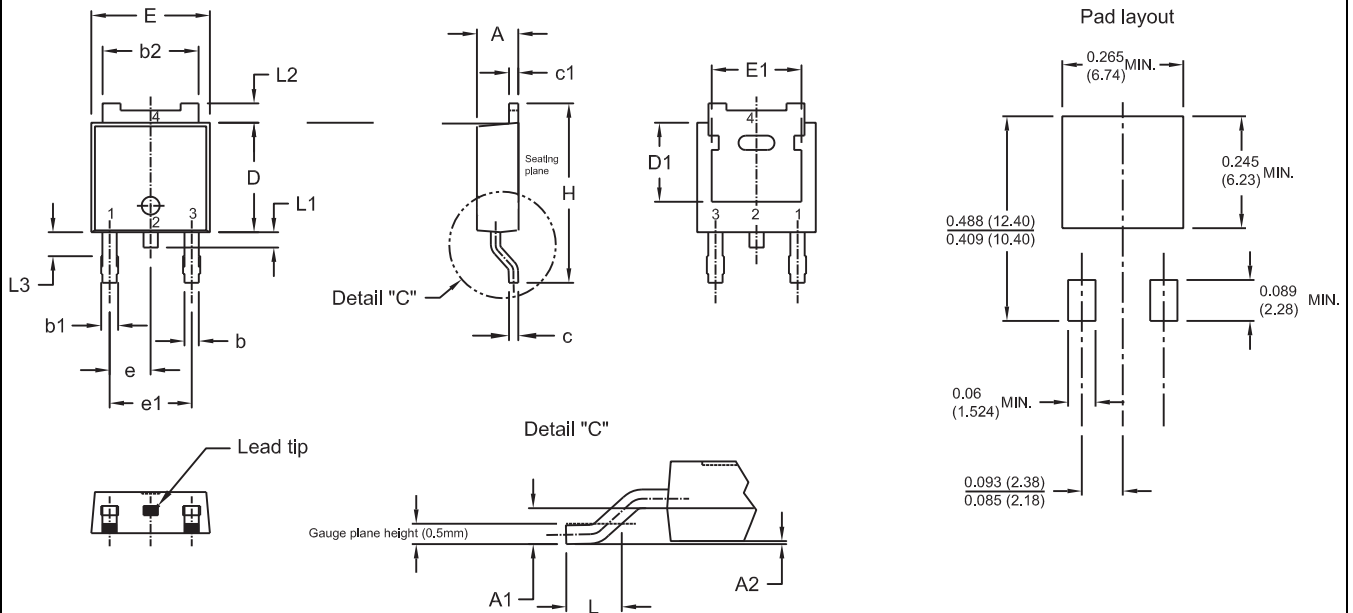
- 1** - Vishay Semiconductors product
- 2** - Current rating (6 = 6 A)
- 3** - Center tap configuration
- 4** - Package identifier:
W = DPAK
- 5** - H = hyperfast recovery
- 6** - Voltage rating (02 = 200 V)
- 7** - FN = TO-252AA
- 8** -
 - None = tube (50 pieces)
 - TR = tape and reel
 - TRL = tape and reel (left oriented)
 - TRR = tape and reel (right 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-6CWH02FNHM3	75	3000	Antistatic plastic tube
VS-6CWH02FNTRHM3	2000	2000	13" diameter reel
VS-6CWH02FNTRRHM3	3000	3000	13" diameter reel
VS-6CWH02FNTRLHM3	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

D-PAK (TO-252AA)

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES	SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.			MIN.	MAX.	MIN.	MAX.	
A	2.21	2.38	0.087	0.094		A1	0.89	1.14	0.035	0.045	
A2	0.71	0.88	0.028	0.035		H	9.65	10.41	0.380	0.410	
b	0.76	1.14	0.030	0.045		L	1.40	1.78	0.055	0.070	
b1	5.23	5.44	0.206	0.214		e	2.28 BSC		0.09 BSC		
b2	6.48	6.73	0.255	0.2655		e1	4.57 BSC		0.18 BSC		
C	0.46	0.58	0.018	0.023		L1	0.64	1.02	0.025	0.040	
C1	5.97	6.22	0.235	0.2455		L2	0.89	1.27	0.035	0.050	
D	4.32	4.45	0.170	0.175		L3	1.15	1.52	0.040	0.060	
D1											
E											
E1											

Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Lead dimension uncontrolled in L3 only for reference
- (3) Dimension D1, E1, L2 and b2 establish a minimum mounting surface for thermal pad
- (4) Dimensions D and E do not include mold flash.
- (5) 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.

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.