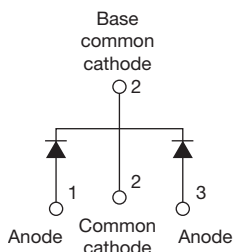


Hyperfast Rectifier, 2 x 4 A FRED Pt[®]


D-PAK (TO-252AA)


FEATURES

- Hyperfast recovery time
- 175 °C max. operating junction temperature
- Output rectification freewheeling
- Low forward voltage drop reduced Q_{rr} and soft recovery
- Low leakage current
- AEC-Q101 qualified
- Meets JESD 201 class 1A 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

PRODUCT SUMMARY

Package	D-PAK (TO-252AA)
$I_{F(AV)}$	2 x 4 A
V_R	200 V
V_F at I_F	0.95 V
t_{rr} (typ.)	23 ns
T_J max.	175 °C
Diode variation	Common cathode

DESCRIPTION/APPLICATIONS

State of the art hyperfast recovery rectifiers designed with optimized performance of forward voltage drop, hyperfast recovery time, and soft recovery.

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 PFC boost stage in the AC/DC section of SMPS inverters or as freewheeling diodes. Their extremely optimized stored charge and low recovery current minimize the switching losses and reduce over dissipation in the switching element and snubbers.

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Peak repetitive reverse voltage	V_{RRM}		200	V
Average rectified forward current	$I_{F(AV)}$	$T_C = 164$ °C	8	A
Non-repetitive peak surge current per leg	I_{FSM}	$T_J = 25$ °C	80	
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 per leg	V_F	$I_F = 4$ A	-	0.87	0.95	
		$I_F = 8$ A	-	0.95	1.10	
		$I_F = 4$ A, $T_J = 150$ °C	-	0.71	0.80	
		$I_F = 8$ A, $T_J = 150$ °C	-	0.8	1.0	
Reverse leakage current per leg	I_R	$V_R = V_R$ rated	-	-	4	μ A
		$T_J = 125$ °C, $V_R = V_R$ rated	-	-	40	
		$T_J = 150$ °C, $V_R = V_R$ rated	-	-	80	
Junction capacitance per leg	C_T	$V_R = 200$ V	-	17	-	pF
Series inductance	L_S	Measured lead to lead 5 mm from package body	-	8	-	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}	$I_F = 1\text{ A}$, $dI_F/dt = 100\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$	-	23	27	ns
		$T_J = 25\text{ }^{\circ}\text{C}$	-	20	-	
		$T_J = 125\text{ }^{\circ}\text{C}$	-	27	-	
Peak recovery current	I_{RRM}	$T_J = 25\text{ }^{\circ}\text{C}$	-	2	-	A
		$T_J = 125\text{ }^{\circ}\text{C}$	-	3.4	-	
Reverse recovery charge	Q_{rr}	$T_J = 25\text{ }^{\circ}\text{C}$	-	20	-	nC
		$T_J = 125\text{ }^{\circ}\text{C}$	-	46	-	

THERMAL - MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	T_J , T_{Stg}		- 65	-	175	$^{\circ}\text{C}$
Thermal resistance, $\frac{\text{per leg}}{\text{junction to case}}$ $\frac{\text{per device}}{\text{per device}}$	R_{thJC}		-	2.7	3.2	$^{\circ}\text{C}/\text{W}$
			-	1.35	1.6	
Approximate weight			0.3			g
			0.01			oz.
Marking device		Case style D-PAK	8CWH02FNH			

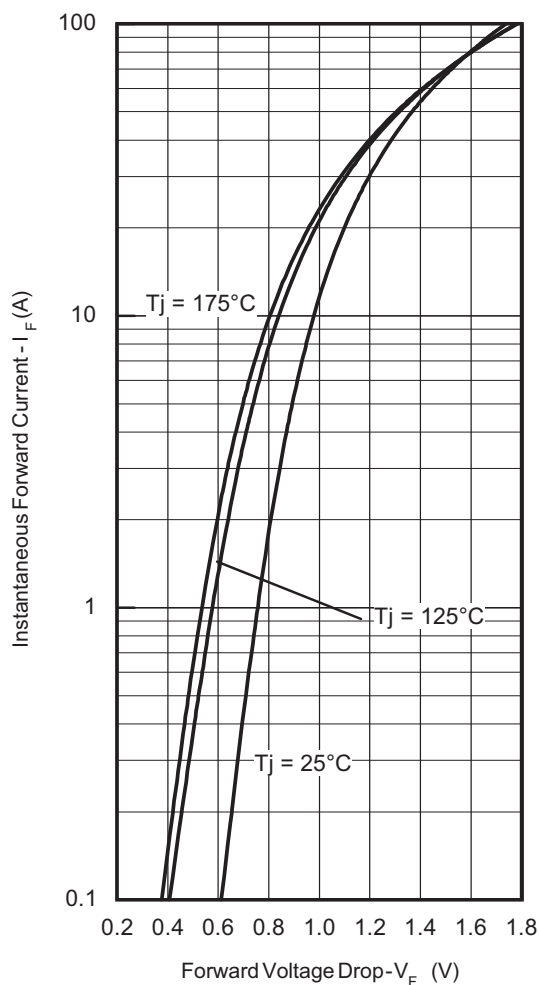


Fig. 1 - Typical Forward Voltage Drop Characteristics

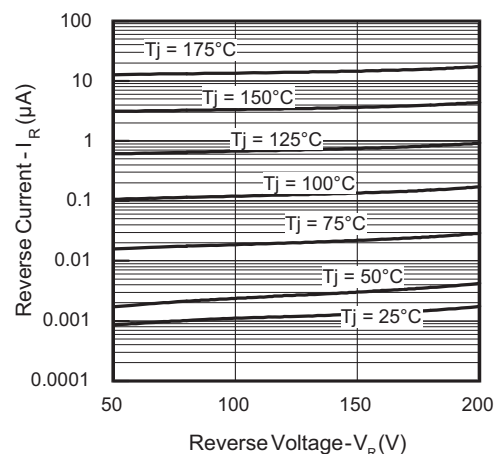


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

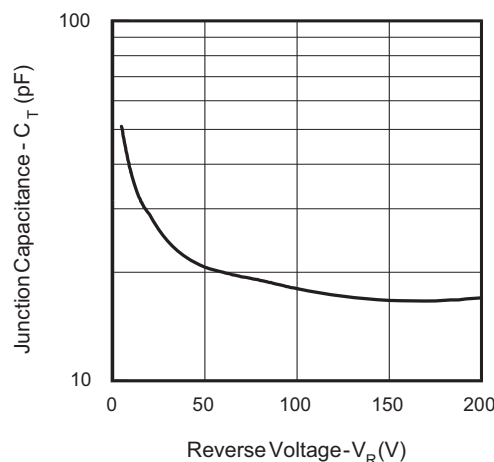
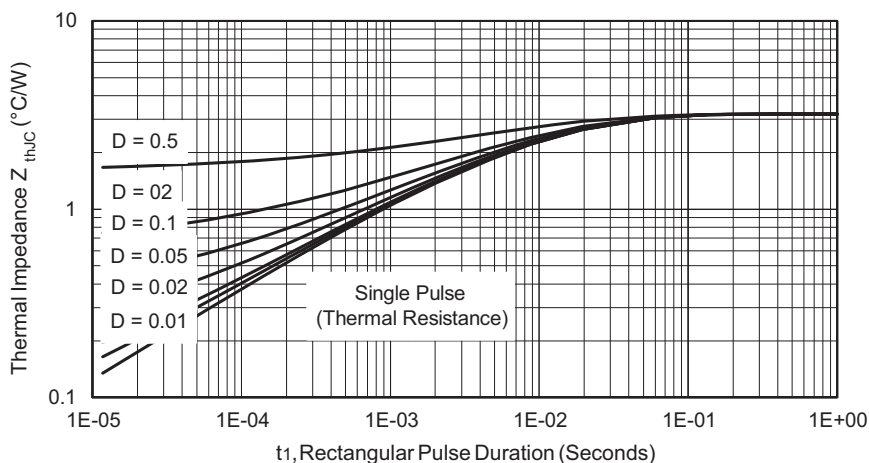


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

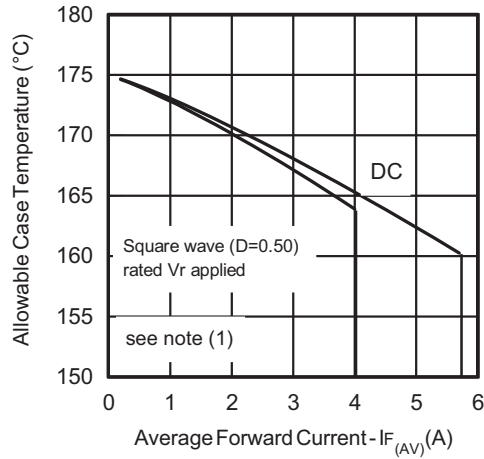


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

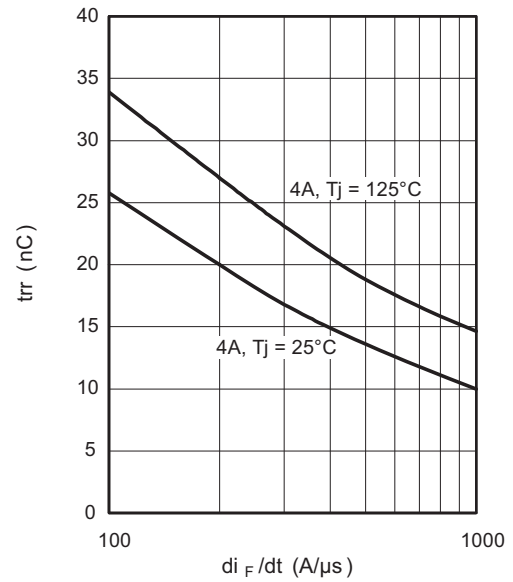


Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt

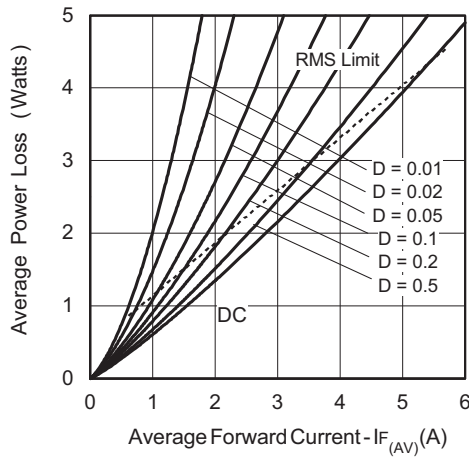


Fig. 6 - Forward Power Loss Characteristics

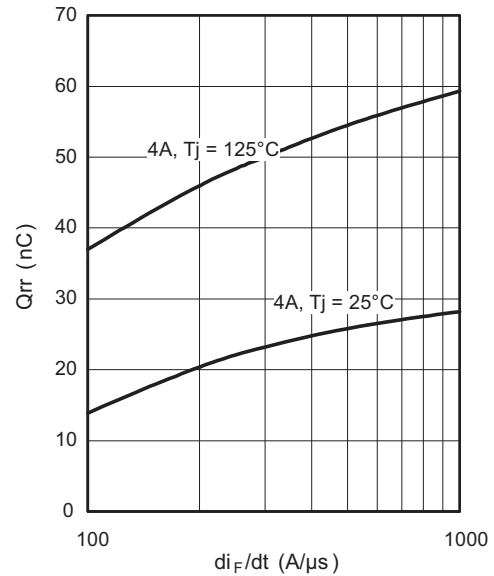


Fig. 8 - Typical Stored Charge vs. dI_F/dt

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$;
 P_d = Forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
 P_{dREV} = Inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at V_{R1} = Rated V_R

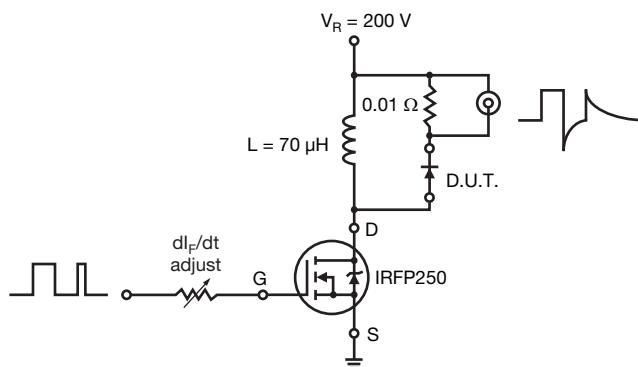
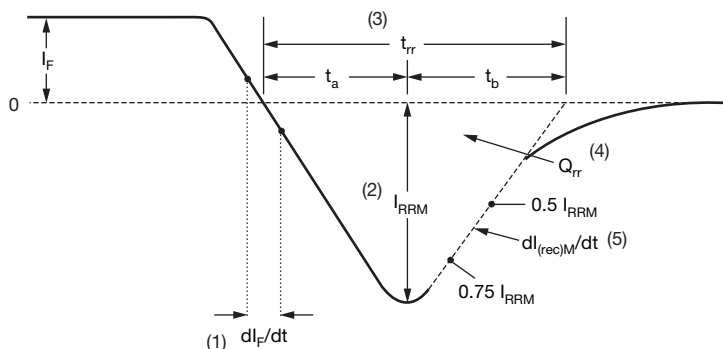


Fig. 9 - Reverse Recovery Parameter Test Circuit



(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}

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

(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	VS-	8	C	W	H	02	FN	TRL	H	M3
	1	2	3	4	5	6	7	8	9	10

- | | | |
|-----------|---|---|
| 1 | - | Vishay Semiconductors product |
| 2 | - | Current rating (8 = 8 A) |
| 3 | - | Circuit configuration:
C = Common cathode |
| 4 | - | Package identifier:
W = D-PAK |
| 5 | - | H = Hyperfast recovery |
| 6 | - | Voltage rating (02 = 200 V) |
| 7 | - | FN = TO-252AA |
| 8 | - | <ul style="list-style-type: none">• None = Tube• 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-8CWH02FNHM3	75	3000	Antistatic plastic tube
VS-8CWH02FNTRHM3	2000	2000	13" diameter reel
VS-8CWH02FNTRRHM3	3000	3000	13" diameter reel
VS-8CWH02FNTRLHM3	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



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