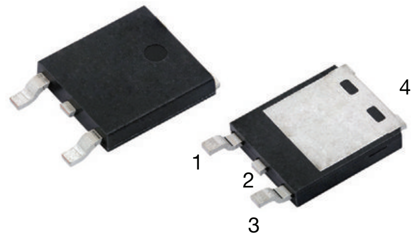
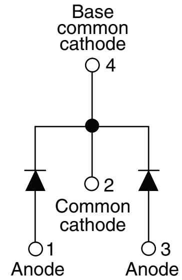
Hyperfast Rectifier, 2 x 4 A FRED Pt®

eSMP® Series



SlimDPAK (TO-252AE)



LINKS TO ADDITIONAL RESOURCES

3D Models

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	2 x 4 A
V_R	200 V
V_F at I_F	0.71 V
t_{rr} (typ.)	16 ns
T_J max.	175 °C
Package	SlimDPAK (TO-252AE)
Circuit configuration	Common cathode

FEATURES

- Hyperfast recovery time
- 175 °C max. operating junction temperature
- Low forward voltage drop reduced Q_{rr} and soft recovery
- Low leakage current
- Very low profile - typical height of 1.3 mm
- Polyimide passivation for high reliability standard
- Ideal for automated placement
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Meets JESD 201 class 2 whisker test
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT
HALOGEN FREE

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.

MECHANICAL DATA

Case: SlimDPAK (TO-252AE)

Molding compound meets UL 94 V-0 flammability rating Halogen-free, RoHS-compliant

Terminals: matte tin plated leads, solderable per J-STD-002

ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	TEST CONDITIONS	VALUES	UNITS
Peak repetitive reverse voltage		V_{RRM}		200	V
Average rectified forward current	per leg	$I_{F(AV)}$	T_C = 167 °C	4	A
	per device			8	
Non-repetitive peak surge current per leg		I_{FSM}	T_J = 25 °C, 10 ms sine pulse wave	100	
Operating junction and storage temperatures		T_J, T_{Stg}		-55 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 µA	200	-	-	V
Forward voltage per leg	V_F	I_F = 4 A	-	0.88	1.0	
		I_F = 8 A	-	0.97	1.14	
		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	µA
		T_J = 150 °C, V_R = V_R rated	-	-	80	
Junction capacitance per leg	C_T	V_R = 200 V	-	17	-	pF

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 A, dI_F/dt = 100 A/μs, V_R = 30 V		-	16	-	ns
		I_F = 0.5 A, I_R = 1 A, I_{RR} = 0.25 A		-	-	25	
		T_J = 25 °C	I_F = 4 A dI_F/dt = 200 A/μs V_R = 160 V	-	20	-	
		T_J = 125 °C		-	30	-	
Peak recovery current	I_{RRM}	T_J = 25 °C		-	2.5	-	A
		T_J = 125 °C		-	4	-	
Reverse recovery charge	Q_{rr}	T_J = 25 °C		-	25	-	nC
		T_J = 125 °C		-	60	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	T_J, T_{Stg}		-55	-	175	°C
Thermal resistance, junction to ambient per diode	R_{thJA} (1)(2)		-	73	90	°C/W
Thermal resistance, junction to mount per diode	R_{thJM} (3)		-	2.1	2.5	°C/W
Weight			-	0.20	-	g
Marking device		Case style SlimDPAK (TO-252AE)	8CVH02			

Notes

(1) The heat generated must be less than thermal conductivity from junction to ambient; $dP_D/dT_J < 1\ R_{thJA}$

(2) Free air, mounted or recommended copper pad area; thermal resistance R_{thJA} - junction to ambient

(3) Mounted on infinite heatsink

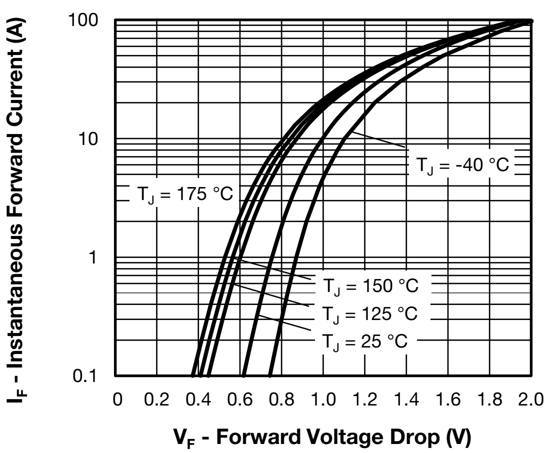


Fig. 1 - Typical Forward Voltage Drop Characteristics

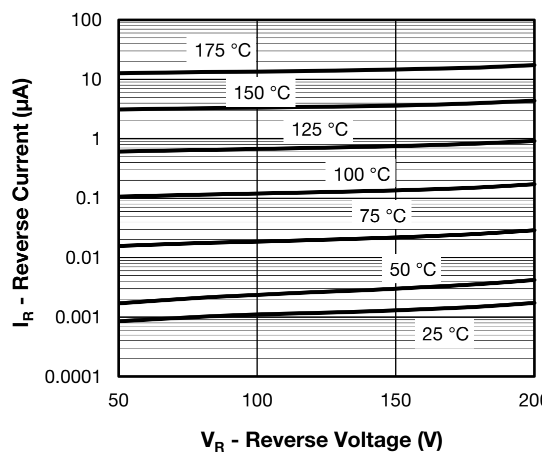


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

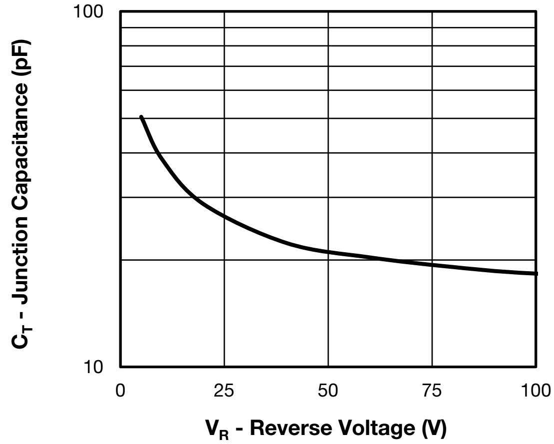


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

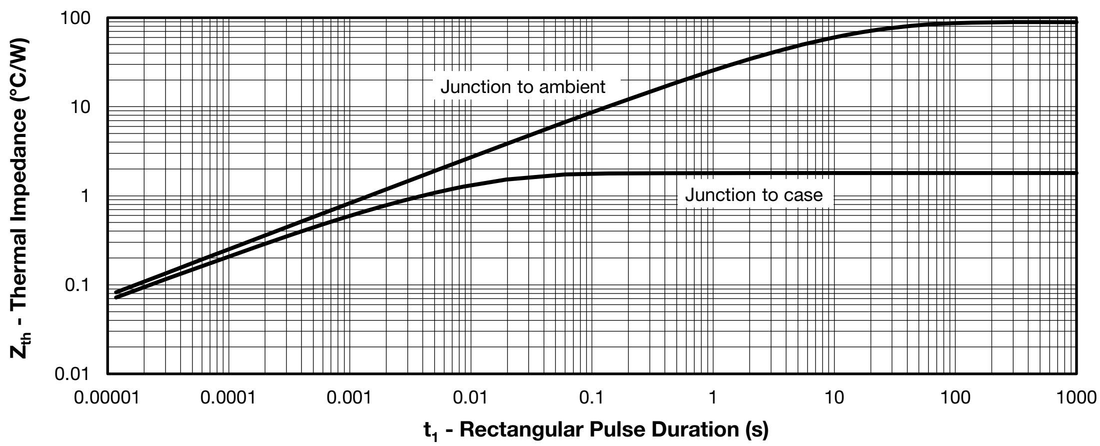


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

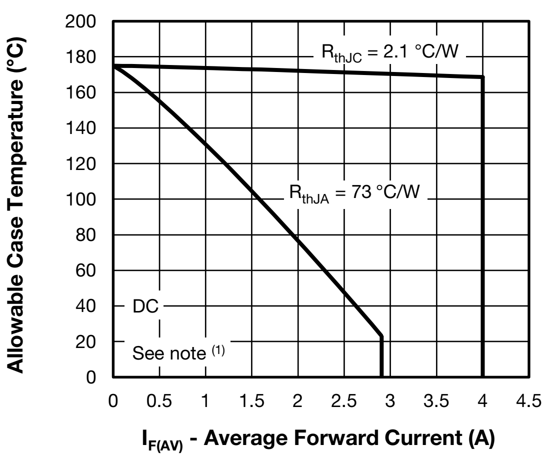


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

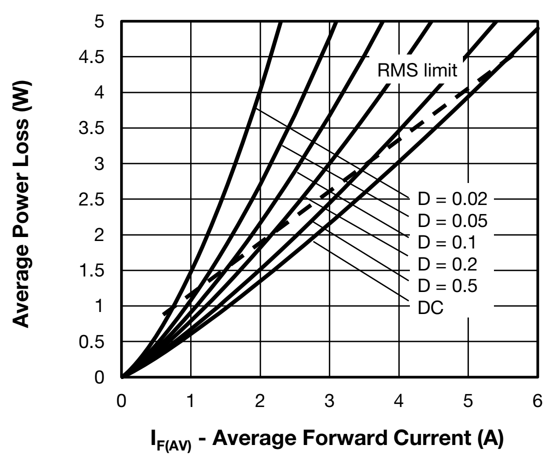


Fig. 6 - Forward Power Loss Characteristics

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

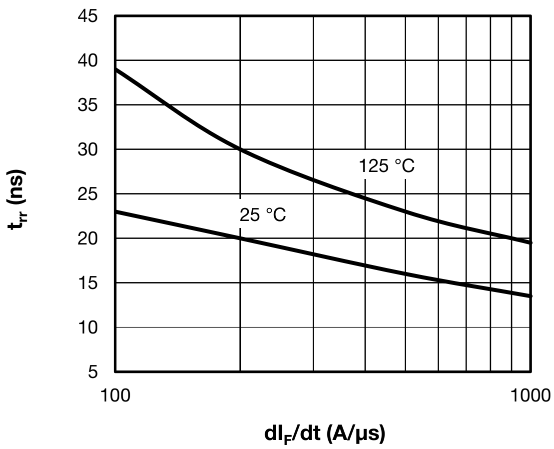


Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt

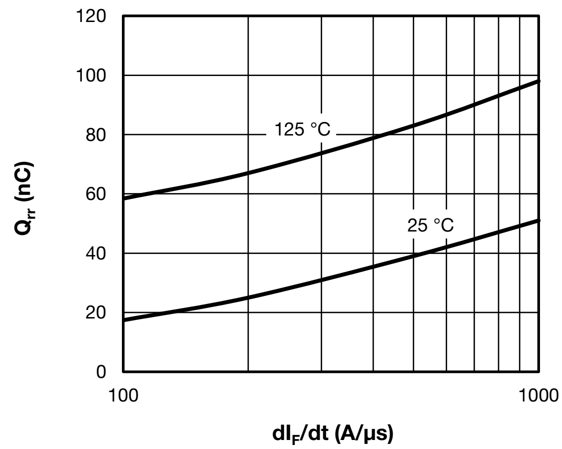
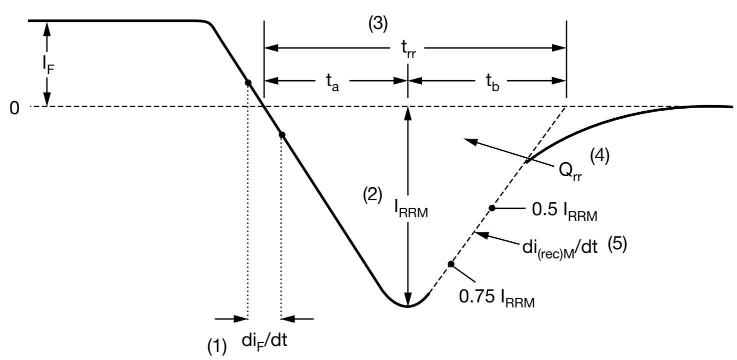


Fig. 8 - Typical Stored Charge vs. dI_F/dt



(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. 9 - Reverse Recovery Waveform and Definitions

ORDERING INFORMATION TABLE

Device code	VS-	8	C	V	H	02	-M3
	1	2	3	4	5	6	7

1 - Vishay Semiconductors product

2 - Current rating (8 = 8 A)

3 - Circuit configuration:
C = common cathode

4 - V = SlimDPAK

5 - Process type,
H = hyperfast recovery

6 - Voltage code (02 = 200 V)

7 - -M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

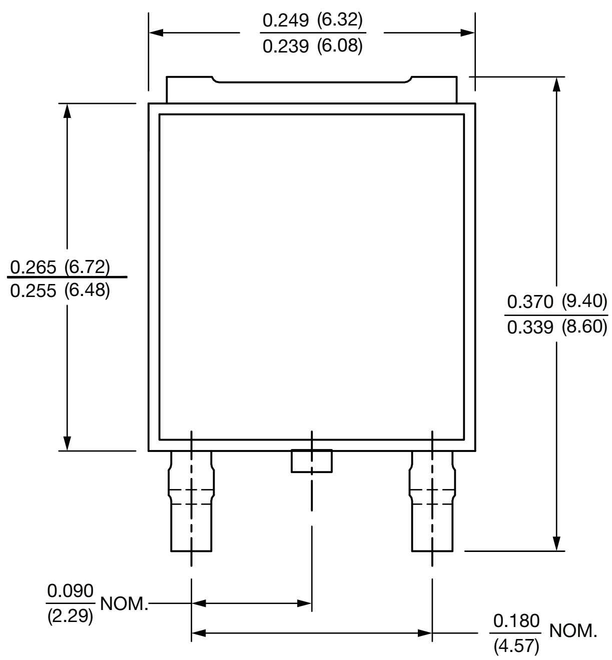
ORDERING INFORMATION (Example)			
PREFERRED P/N	**QUANTITY PER REEL**	**MINIMUM ORDER QUANTITY**	**PACKAGING DESCRIPTION**
VS-8CVH02-M3/I	4500	4500	13"diameter plastic tape and reel

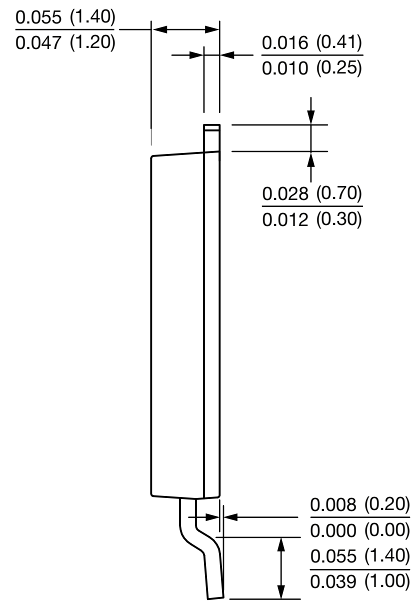
LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?96081
Part marking information	www.vishay.com/doc?96085
Packaging information	www.vishay.com/doc?88869
SPICE model	www.vishay.com/doc?97122

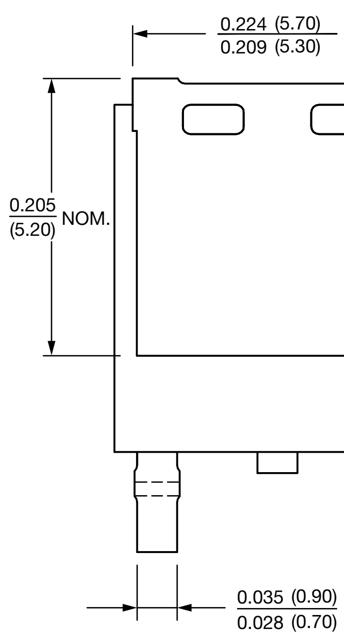
SlimDPAK

DIMENSIONS in inches (millimeters)

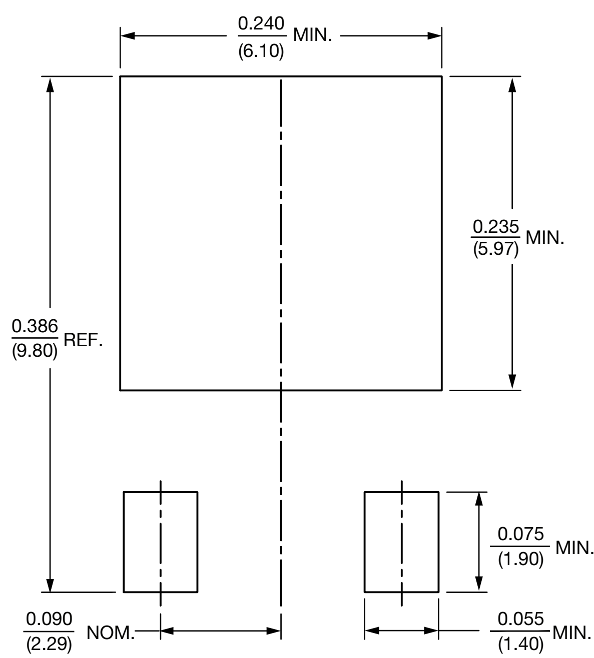
SlimDPAK







Mounting Pad Layout



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