

Hyperfast Rectifier, 2 x 5 A FRED Pt®



DESIGN SUPPORT TOOLS


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PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	2 x 5 A
V_R	200 V
V_F at I_F	0.74 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
- Ideal for automated placement
- Polyimide passivation for high reliability standard
- 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 hyper fast recovery rectifiers designed with optimized performance of forward voltage drop, hyper fast 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	$I_{F(AV)}$	$T_C = 165\text{ °C}$	5	A
per leg			10	
Non-repetitive peak surge current	I_{FSM}	$T_J = 25\text{ °C}$	100	
Operating junction and storage temperatures	T_J, T_{Stg}		-55 to +175	°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	$I_R = 100\text{ }\mu\text{A}$	200	-	-	V
Forward voltage	V_F	$I_F = 5\text{ A}$	-	0.90	1.04	
		$I_F = 10\text{ A}$	-	1.0	1.17	
		$I_F = 5\text{ A}, T_J = 150\text{ °C}$	-	0.74	0.84	
		$I_F = 10\text{ A}, T_J = 150\text{ °C}$	-	0.85	1.05	
Reverse leakage current per leg	I_R	$V_R = V_R$ rated	-	-	4	μA
		$T_J = 150\text{ °C}, V_R = V_R$ rated	-	-	80	
Junction capacitance per leg	C_T	$V_R = 200\text{ V}$	-	17	-	pF

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}	$I_F = 1\text{ A}$, $dI_F/dt = 100\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$	-	16	-	ns
		$I_F = 0.5\text{ A}$, $I_R = 1\text{ A}$, $I_{RR} = 0.25\text{ A}$	-	-	25	
		$T_J = 25\text{ }^{\circ}\text{C}$	-	21	-	
		$T_J = 125\text{ }^{\circ}\text{C}$	-	30	-	
Peak recovery current	I_{RRM}	$T_J = 25\text{ }^{\circ}\text{C}$	-	2.5	-	A
		$T_J = 125\text{ }^{\circ}\text{C}$	-	4	-	
Reverse recovery charge	Q_{rr}	$T_J = 25\text{ }^{\circ}\text{C}$	-	25	-	nC
		$T_J = 125\text{ }^{\circ}\text{C}$	-	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	R _{thJA} ⁽¹⁾⁽²⁾		-	73	90	°C/W
Thermal resistance, junction to case, per diode	R _{thJC} ⁽³⁾		-	2.1	2.5	
Marking device		Case style SlimDPAK (TO-252AE)	10CVH02			

Notes

- The heat generated must be less than thermal conductivity from junction to ambient; $dP_D/dT_J < 1/R_{thJA}$
- Free air, mounted or recommended copper pad area; thermal resistance R_{thJA} - junction to ambient
- Mounted on infinite heatsink

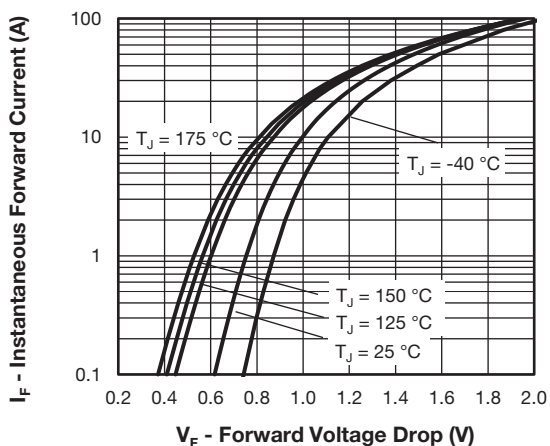


Fig. 1 - Typical Forward Voltage Drop Characteristics

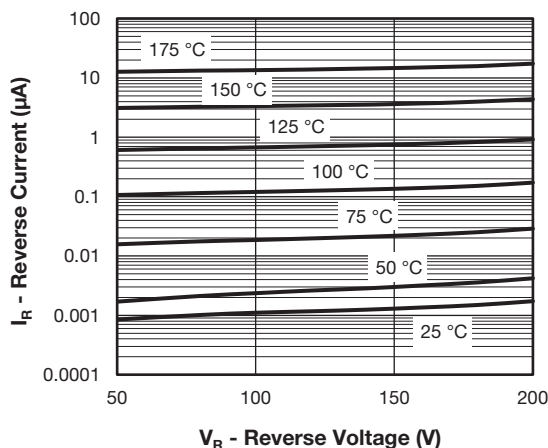


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

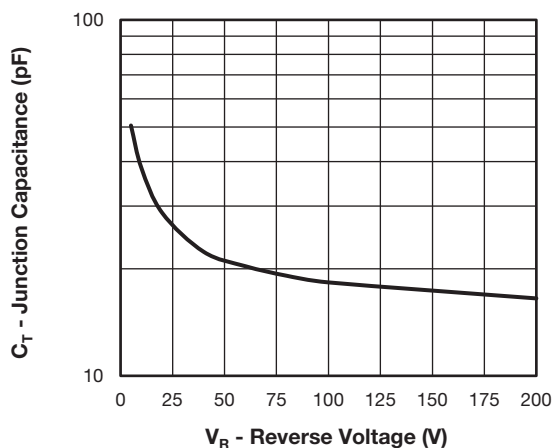


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

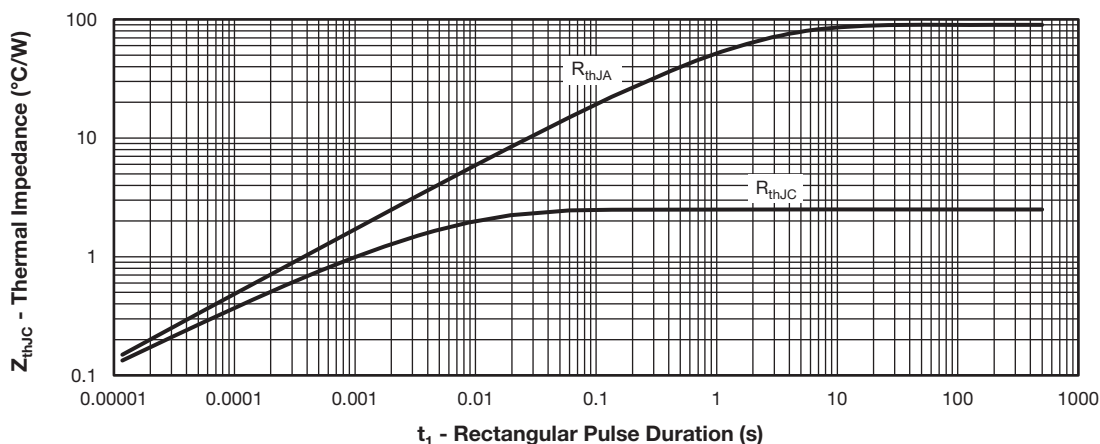


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

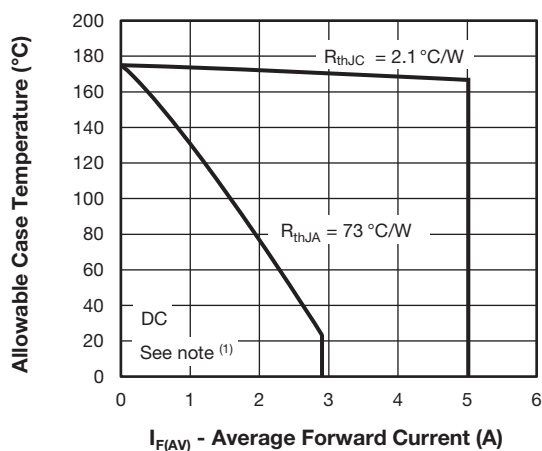


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

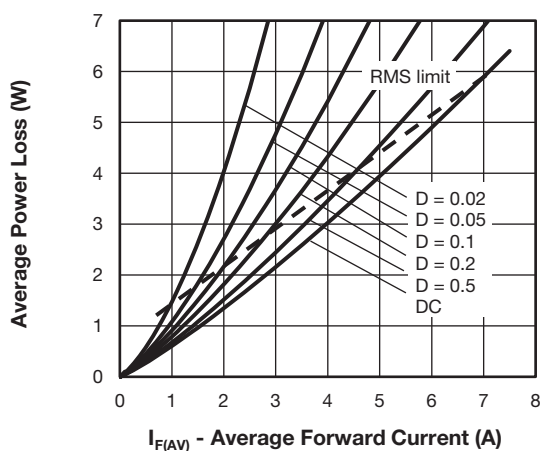


Fig. 6 - Forward Power Loss Characteristics

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$;
 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

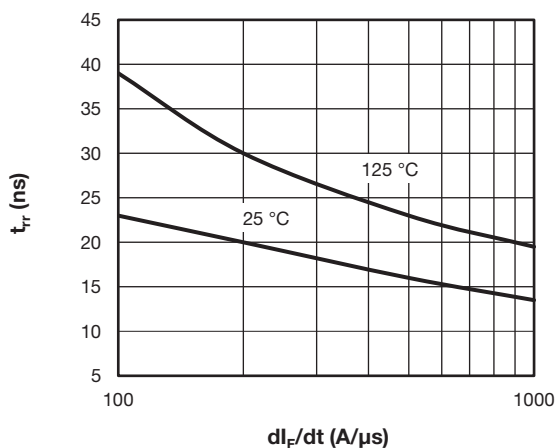


Fig. 7 - Typical Reverse Recovery Time vs. di_F/dt

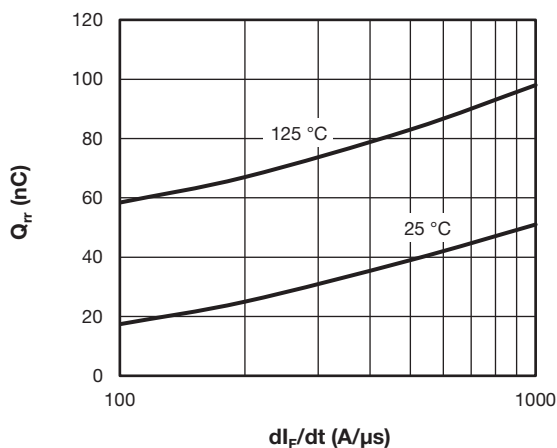


Fig. 8 - Typical Stored Charge vs. di_F/dt

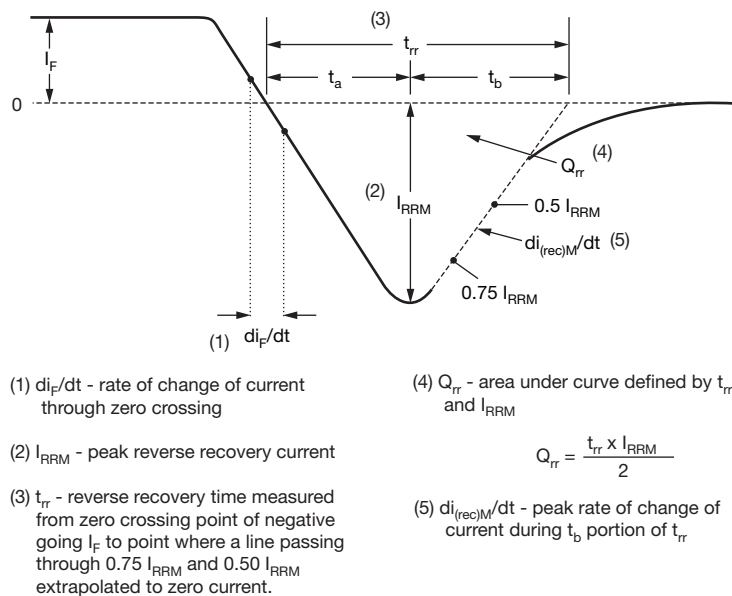


Fig. 9 - Reverse Recovery Waveform and Definitions

**ORDERING INFORMATION TABLE**

Device code	VS-	10	C	V	H	02	-M3
	1	2	3	4	5	6	7
1	- Vishay Semiconductors product						
2	- Current rating (10 = 10 A)						
3	- Circuit configuration: C = common cathode						
4	- V = SlimDPAK						
5	- Process type, H = hyper fast 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-10CVH02-M3/I	4500	4500	13" diameter plastic tape and reel

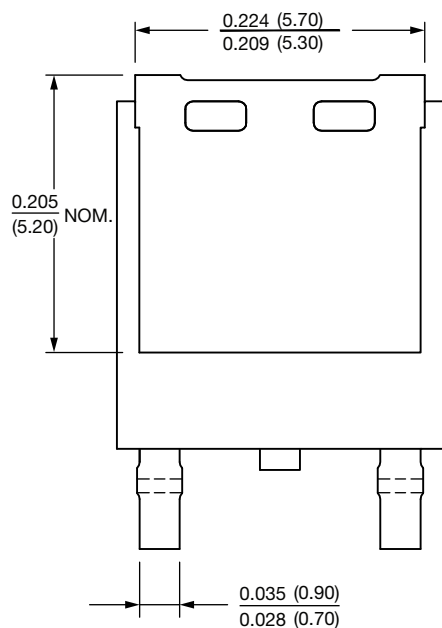
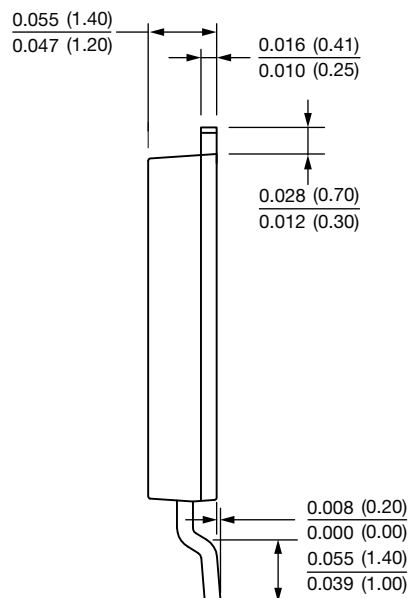
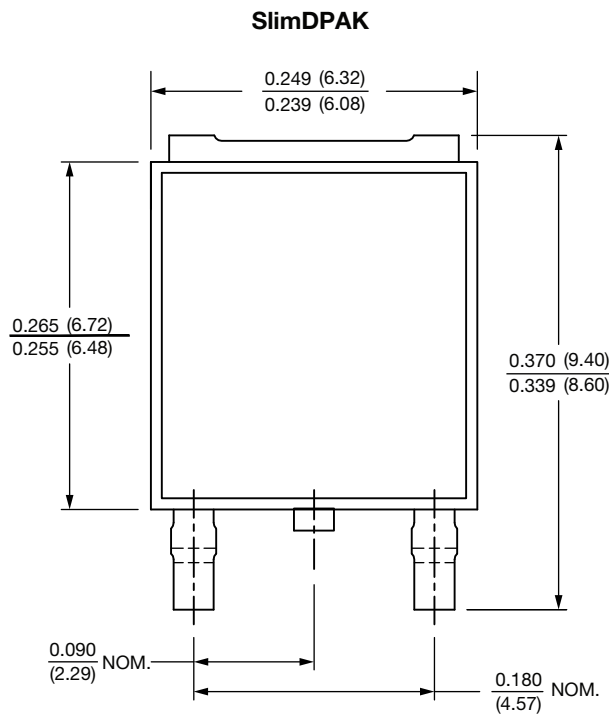
LINKS TO RELATED DOCUMENTS

Dimensions	www.vishay.com/doc?96081
Part marking information	www.vishay.com/doc?96085
Packaging information	www.vishay.com/doc?88869

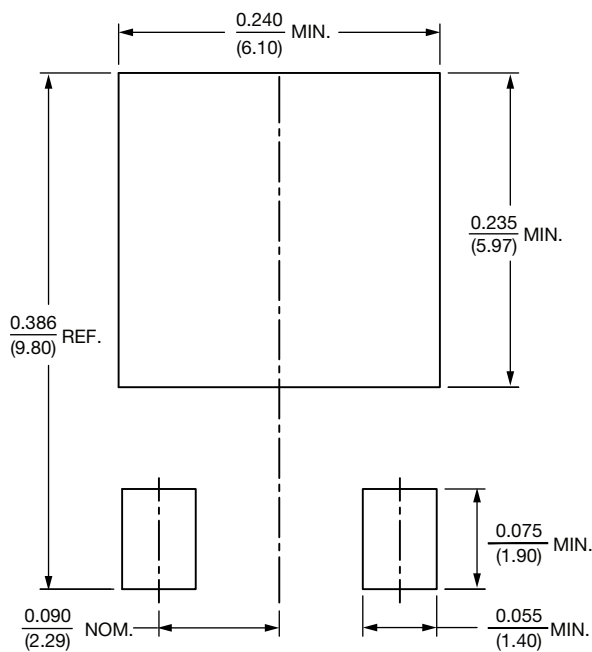


SlimDPAK

DIMENSIONS in inches (millimeters)



Mounting Pad Layout





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