AUTOMOTIVE

RoHS

COMPLIANT

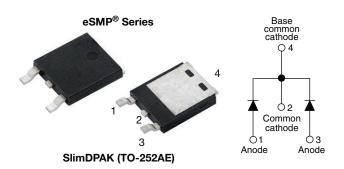
HALOGEN

FREE



Vishay Semiconductors

Hyperfast Rectifier, 2 x 5 A FRED Pt®



LINKS TO ADDITIONAL RESOURCES



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
- AEC-Q101 qualified, meets JESD 201 class 2 whisker test
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

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.

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 restified for your court	per leg		T _C = 165 °C	5	
Average rectified forward current	per device	I _{F(AV)}		10	А
Non-repetitive peak surge current	per leg	I _{FSM}	T _J = 25 °C, 10 ms sine pulse wave	100	
Operating junction and storage ter	nperatures	T _J , T _{Stq}		-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	-		
Forward voltage		I _F = 5 A	-	0.90	1.04	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
	V	I _F = 10 A	-	1.0	1.17	
	V _F	I _F = 5 A, T _J = 150 °C	-	0.74	0.84	
		I _F = 10 A, T _J = 150 °C	-	0.85	1.05	
Reverse leakage current per leg		V _R = V _R rated	-	-	4	μА
	IR	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
	t _{rr}	$I_F = 1 \text{ A}, dI_F/dt = 100 \text{ A/}\mu\text{s}, V_R = 30 \text{ V}$		ı	16	-	
Poverse receivery time		$I_F = 0.5 \text{ A}, I_R = 1 \text{ A}, I_{RR} = 0.25 \text{ A}$		ı	-	25]
Reverse recovery time		T _J = 25 °C	I _F = 5 A dI _F /dt = 200 A/µs V _R = 160 V	-	21	-	ns
		T _J = 125 °C		-	30	-	
Peak recovery current	I _{RRM}	T _J = 25 °C		-	2.5	-	A nC
		T _J = 125 °C		-	4	-	
Reverse recovery charge	Q _{rr}	T _J = 25 °C		-	25	-	
		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	R _{thJA} (1)(2)		-	73	90	°C/W
Thermal resistance, junction to mount, per diode	R _{thJM} (3)		-	2.1	2.5	C/VV
Weight			-	0.20	-	g
Marking device		Case style SlimDPAK (TO-252AE)	10CVH02			

Notes

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

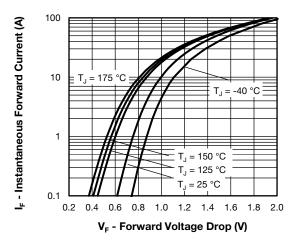


Fig. 1 - Typical Forward Voltage Drop Characteristics

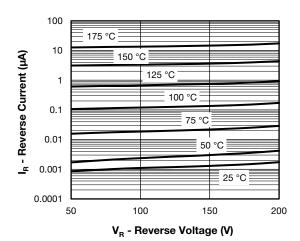


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

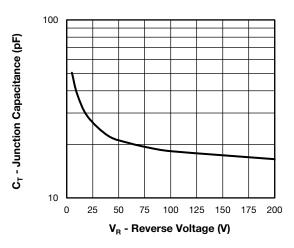


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

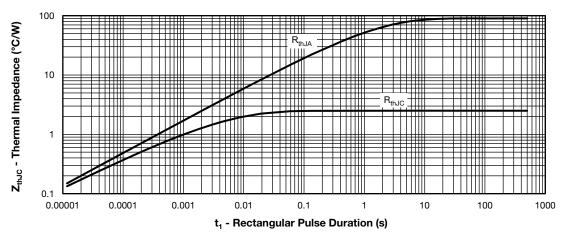


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

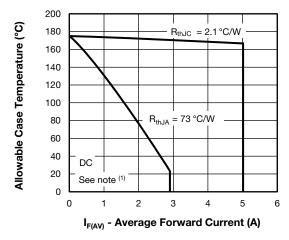


Fig. 5 - Maximum Allowable Case Temperature vs.
Average Forward Current

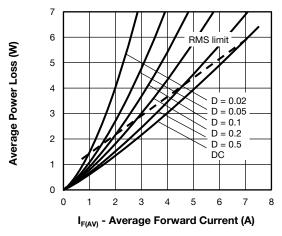


Fig. 6 - Forward Power Loss Characteristics

Note

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

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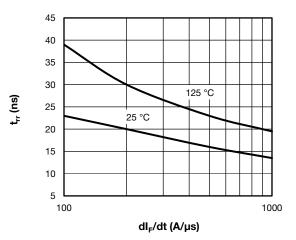


Fig. 7 - Typical Reverse Recovery Time vs. dl_F/dt

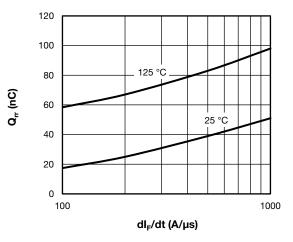
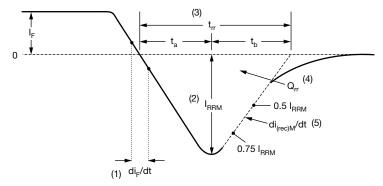


Fig. 8 - Typical Stored Charge vs. dl_E/dt



- (1) di_F/dt rate of change of current through zero crossing
- (2) I_{RRM} peak reverse recovery current
- (3) $\rm t_{rr}$ reverse recovery time measured from zero crossing point of negative going $\rm I_{r}$ to point where a line passing through 0.75 $\rm I_{RRM}$ and 0.50 $\rm I_{RRM}$ extrapolated to zero current.
- (4) \mathbf{Q}_{rr} area under curve defined by \mathbf{t}_{rr} and \mathbf{I}_{RRM}

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

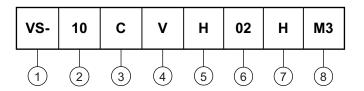
(5) di_{(rec)M}/dt - peak rate of change of current during t_b portion of t_{rr}

Fig. 9 - Reverse Recovery Waveform and Definitions



ORDERING INFORMATION TABLE

Device code



- 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 H = AEC-Q101 qualified
- 8 M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

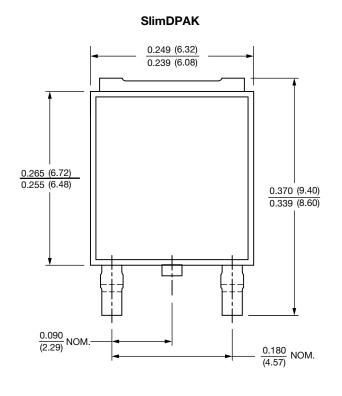
ORDERING INFORMATION (Example)						
PREFERRED P/N QUANTITY PER REEL MINIMUM ORDER QUANTITY PACKAGING DESCRIPTION						
VS-10CVH02HM3/I	4500	4500	13"diameter plastic tape and reel			

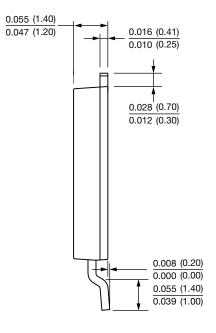
LINKS TO RELATED DOCUMENTS				
Dimensions <u>www.vishay.com/doc?96081</u>				
Part marking information	www.vishay.com/doc?96085			
Packaging information	www.vishay.com/doc?88869			



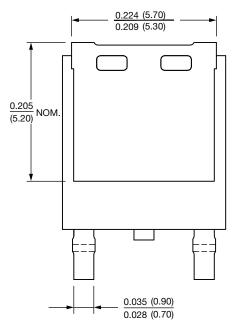
SlimDPAK

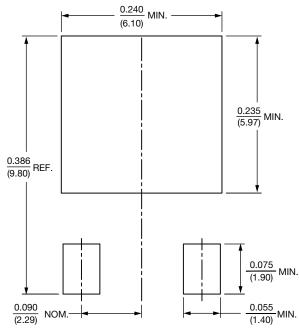
DIMENSIONS in inches (millimeters)





Mounting Pad Layout







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Vishay

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