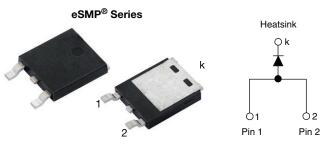
COMPLIANT HALOGEN

FREE



Vishay Semiconductors

Hyperfast Rectifier, 15 A FRED Pt®



SlimDPAK (TO-252AE)

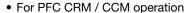
LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS				
I _{F(AV)}	15 A			
V_{R}	600 V			
V _F at I _F	0.98 V			
t _{rr} (typ.)	38 ns			
T _J max.	175 °C			
Package	SlimDPAK (TO-252AE)			
Circuit configuration	Single			

FEATURES

 Hyperfast recovery time, reduced Q_{rr} and soft recovery



• Low forward voltage drop, low power losses

• Low leakage current

 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 <u>www.vishay.com/doc?99912</u>

TYPICAL APPLICATIONS

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

Base PN/-M3 - 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}		600	V	
Average rectified forward current	I _{F(AV)}	T _C = 153 °C	15	۸	
Non-repetitive peak surge current	I _{FSM}	T _J = 25 °C, 10 ms sine pulse wave	180	A	
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	600	-	-	
Converse valtage	V _F	I _F = 15 A	-	1.15	1.35	V - µA
Forward voltage		I _F = 15 A, T _J = 150 °C	-	0.98	1.15	
Reverse leakage current	I _R	$V_R = V_R$ rated	-	-	10	
		T _J = 150 °C, V _R = V _R rated	-	-	120	
Junction capacitance	C _T	V _R = 600 V	-	17	-	pF



DYNAMIC RECOVERY CHARACTERISTICS (T _J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
		$I_F = 1 \text{ A, } dI_F/dt = 50 \text{ A/}\mu\text{s, } V_R = 30 \text{ V}$		-	50	-	ns
		$I_F = 1 \text{ A}, dI_F/dt = 100 \text{ A/}\mu\text{s}, V_R = 30 \text{ V}$		-	38	-	
Reverse recovery time	t _{rr}	$I_F = 0.5 \text{ A}, I_R = 1 \text{ A}, I_{RR} = 0.25 \text{ A}$		-	-	60	
		T _J = 25 °C	I _F = 15 A dI _F /dt = 500 A/μs V _B = 400 V	-	100	-	
		T _J = 125 °C		-	140	-	
Peak recovery current	I _{RRM}	T _J = 25 °C		-	17	-	Α
		T _J = 125 °C		-	24.7	-	A
Reverse recovery charge	Q _{rr}	T _J = 25 °C		-	850	-	nC
		T _J = 125 °C		_	1750	-	I IIC

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 mount	R_{thJM}		-	-	1.25	°C/W
Weight			-	0.20	-	g
Marking device		Case style SlimDPAK (TO-252AE)		15E\	/L06	•

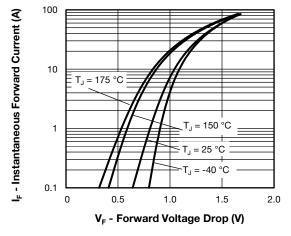


Fig. 1 - Typical Forward Voltage Drop Characteristics

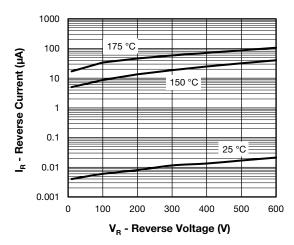


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage



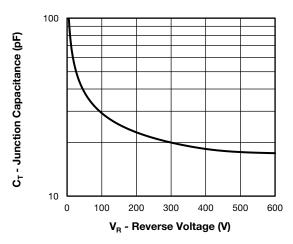


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

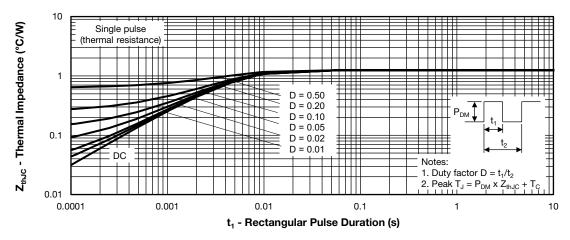


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

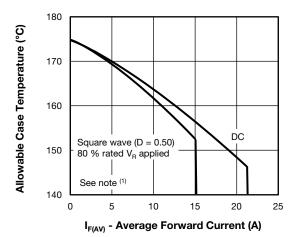


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Curren

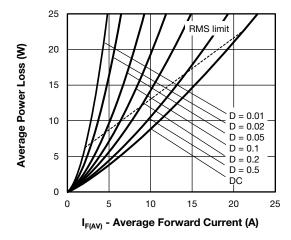


Fig. 6 - Forward Power Loss Characteristics

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 $V_{R1} = rated V_R$



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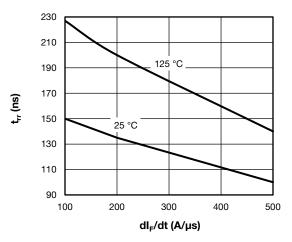


Fig. 7 - Typical Reverse Recovery Time vs. dl_F/dt

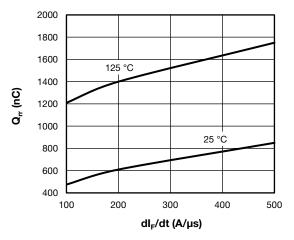
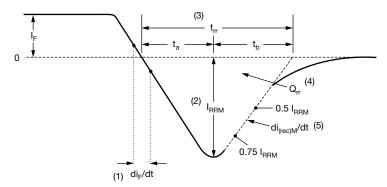


Fig. 8 - Typical Stored Charge vs. dl_E/dt



- (1) di_F/dt rate of change of current through zero crossing
- (2) I_{RRM} peak reverse recovery current
- (3) 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) \mathbf{Q}_{rr} area under curve defined by \mathbf{t}_{rr} and \mathbf{I}_{RRM}

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

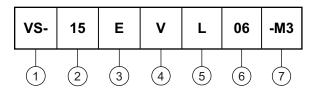
(5) $di_{(rec)M}/dt$ - peak rate of change of current during t_b portion of t_{rr}

Fig. 9 - Reverse Recovery Waveform and Definitions



ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product

2 - Current rating (15 = 15 A)

3 - Circuit configuration:

E = single die

4 - V = SlimDPAK

5 - Process type:

L = ultralow V_F ultrafast rectifier

6 - Voltage code (06 = 600 V)

7 - Environmental digit:

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

ORDERING INFORMATION (Example)						
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	PACKAGING DESCRIPTION		
VS-15EVL06-M3/I	0.20	I	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







Legal Disclaimer Notice

Vishay

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