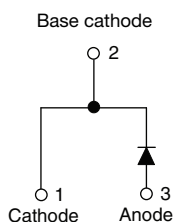


Hyperfast Rectifier, 8 A FRED Pt® G5



TO-220AC 2L



FEATURES

- Hyperfast and optimized Q_{rr}
- Best in class forward voltage drop and switching losses trade off
- Optimized for high speed operation
- 175 °C maximum operating junction temperature
- Polyimide passivation
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

LINKS TO ADDITIONAL RESOURCES



3D Models



Application Notes

PRIMARY CHARACTERISTICS

$I_{F(AV)}$	8 A
V_R	1200 V
V_F at I_F at 125 °C	1.8 V
t_{rr}	33 ns
T_J max.	175 °C
Package	TO-220AC 2L
Circuit configuration	Single

DESCRIPTION / APPLICATIONS

Featuring a unique combination of low conduction and switching losses, this rectifier is the right choice for high frequency converters, both soft switched / resonant. Specifically designed to improve efficiency of PFC and output rectification stages of EV / HEV battery charging stations, booster stage of solar inverters and UPS applications, these devices are perfectly matched to operate with MOSFETs or high speed IGBTs.

MECHANICAL DATA

Case: TO-220AC 2L

Molding compound meets UL 94 V-0 flammability rating

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

Polarity: as per marking device details

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Repetitive peak reverse voltage	V_{RRM}		1200	V
Average rectified forward current	$I_{F(AV)}$	$T_C = 122\text{ °C}$, $D = 0.50$	8	A
Repetitive peak forward current	I_{FRM}	$T_C = 122\text{ °C}$, $D = 0.50$, $f = 20\text{ kHz}$	16	
Non-repetitive peak surge current	I_{FSM}	$T_C = 45\text{ °C}$, $t_p = 10\text{ ms}$, sine wave	65	
Operating junction and storage temperature	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	$I_R = 100\text{ }\mu\text{A}$	1200	-	-	V
Forward voltage	V_F	$I_F = 8\text{ A}$	-	1.9	2.5	
		$I_F = 8\text{ A}$, $T_J = 125\text{ °C}$	-	1.8	-	
Reverse leakage current	I_R	$V_R = V_R$ rated	-	-	50	μA
		$T_J = 125\text{ °C}$, $V_R = V_R$ rated	-	-	500	
Junction capacitance	C_T	$V_R = 200\text{ V}$	-	5	-	pF
Series inductance	L_S	Measured 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}	$I_F = 1.0\text{ A}$, $di_F/dt = 100\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$	-	33	55	ns
		$T_J = 25\text{ }^{\circ}\text{C}$	-	100	-	
		$T_J = 125\text{ }^{\circ}\text{C}$	-	165	-	
Peak recovery current	I_{RRM}	$T_J = 25\text{ }^{\circ}\text{C}$	-	8.0	-	A
		$T_J = 125\text{ }^{\circ}\text{C}$	-	10	-	
Reverse recovery charge	Q_{rr}	$T_J = 25\text{ }^{\circ}\text{C}$	-	300	-	nC
		$T_J = 125\text{ }^{\circ}\text{C}$	-	700	-	
Reverse recovery time	t_{rr}	$T_J = 25\text{ }^{\circ}\text{C}$	-	60	-	ns
		$T_J = 125\text{ }^{\circ}\text{C}$	-	80	-	
Peak recovery current	I_{RRM}	$T_J = 25\text{ }^{\circ}\text{C}$	-	16	-	A
		$T_J = 125\text{ }^{\circ}\text{C}$	-	26	-	
Reverse recovery charge	Q_{rr}	$T_J = 25\text{ }^{\circ}\text{C}$	-	570	-	nC
		$T_J = 125\text{ }^{\circ}\text{C}$	-	1350	-	

THERMAL - MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal resistance, junction-to-case	R_{thJC}		-	-	2.3	$^{\circ}\text{C}/\text{W}$
Weight			-	2	-	g
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)
Maximum junction and storage temperature range	T_J , T_{Stg}		-55	-	175	$^{\circ}\text{C}$
Marking device		Case style TO-220AC 2L	E5TH0812			

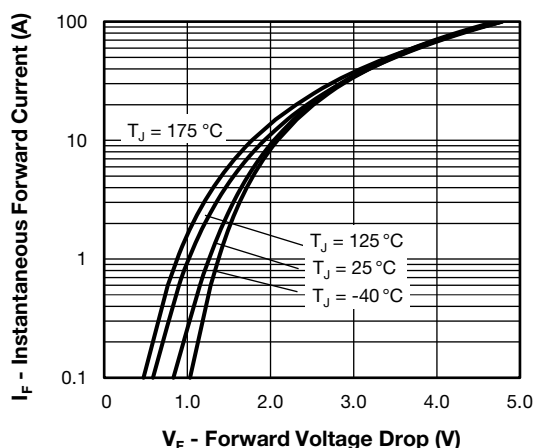


Fig. 1 - Forward Voltage Drop Characteristics

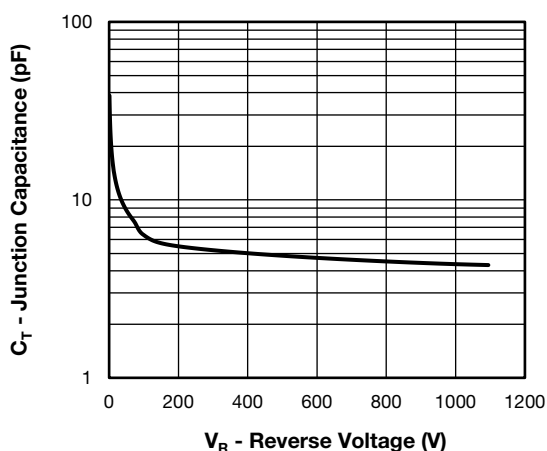


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

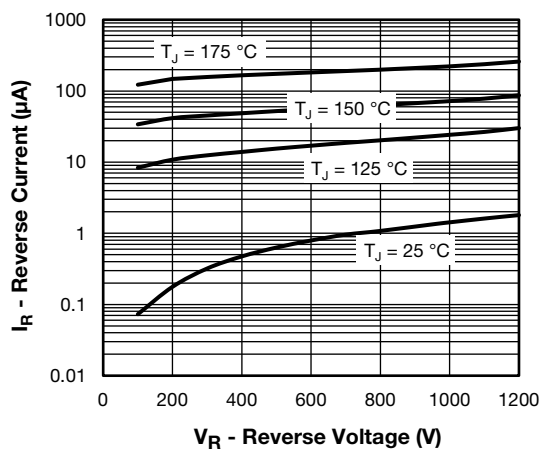


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

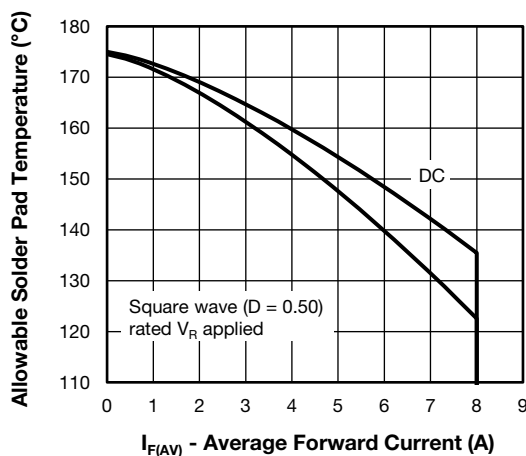


Fig. 4 - Maximum Allowable Case Temperature vs. Average Forward Current

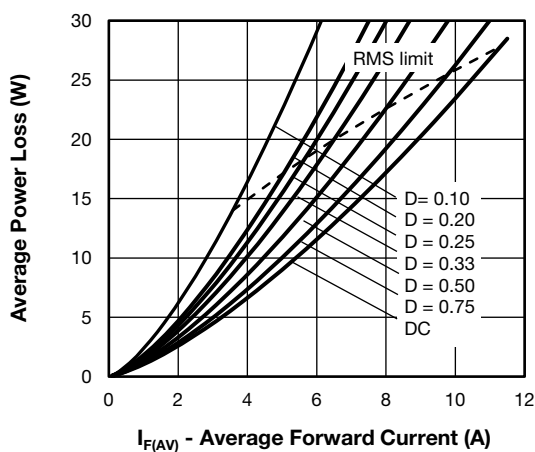


Fig. 5 - Forward Power Loss Characteristics

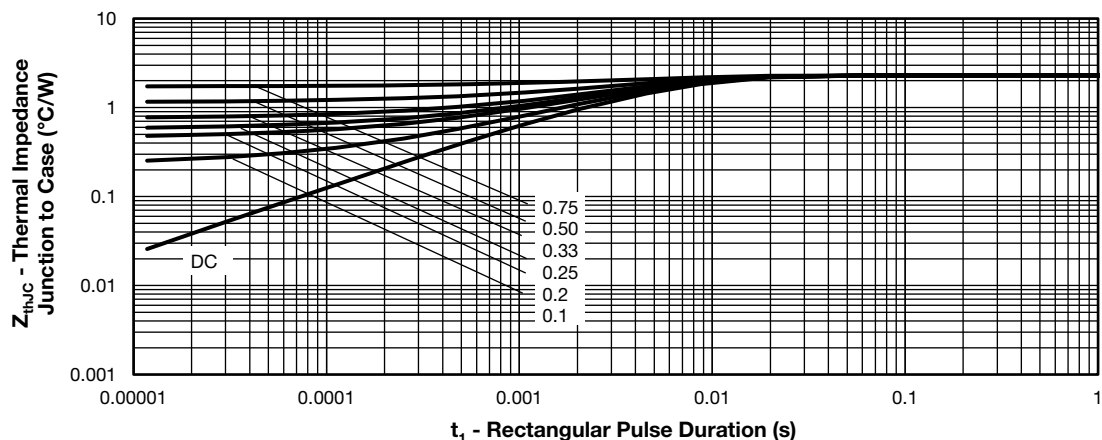
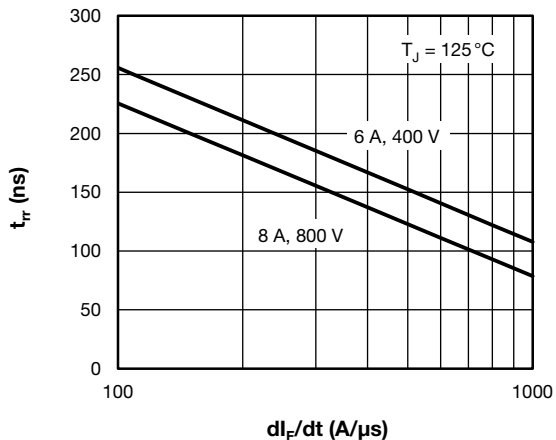
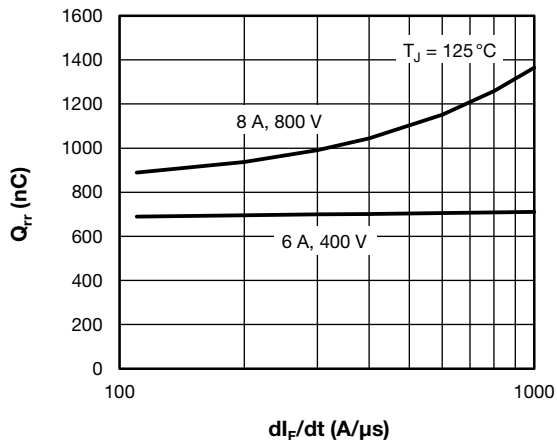
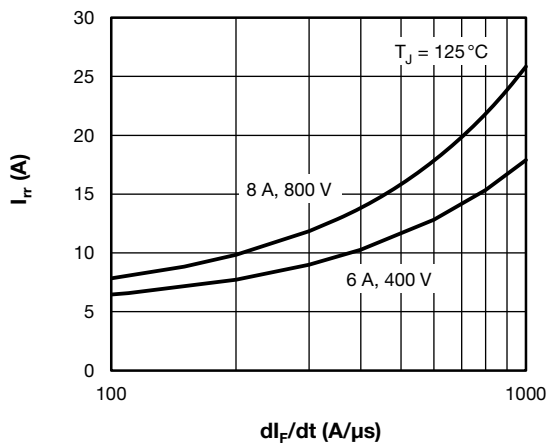


Fig. 6 - Transient Thermal Impedance, Junction to Case


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

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

Fig. 9 - Typical Recovery Current vs. dI_F/dt

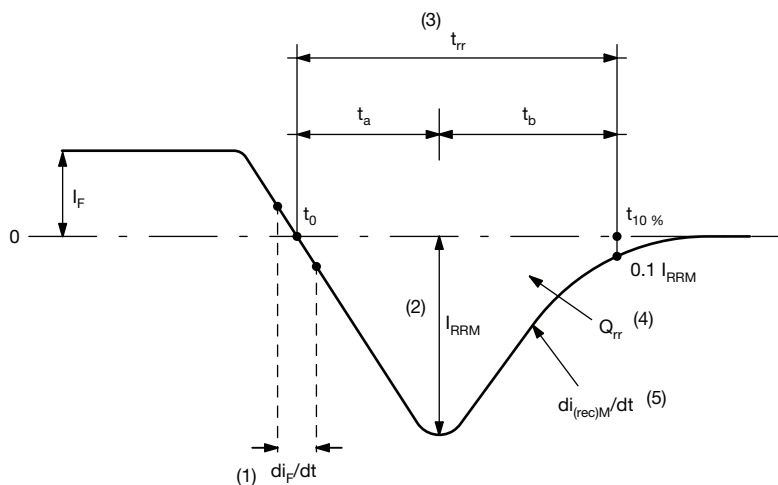


Fig. 10 - Reverse Recovery Waveform and Definitions

Notes

- (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 t_0 , crossing point of negative going I_F , to point $t_{10\%}$, 0.1 I_{RRM}
- (4) Q_{rr} - area under curve defined by t_0 and $t_{10\%}$

$$Q_{rr} = \int_{t_0}^{t_{10\%}} I(t) dt$$

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

ORDERING INFORMATION TABLE

Device code

VS-	E	5	T	H	08	12	-M3
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1 2 3 4 5 6 7 8

- 1 - Vishay Semiconductors product
- 2 - E = single diode
- 3 - 5 = FRED generation 5
- 4 - Package:
T = TO-220AC 2L
- 5 - H = hyperfast recovery
- 6 - Current rating (08 = 8 A)
- 7 - Voltage rating (12 = 1200 V)
- 8 - Environmental digit:
-M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free

ORDERING INFORMATION (Example)

PREFERRED P/N	BASE QUANTITY	PACKAGING DESCRIPTION
VS-E5TH0812-M3	50	Antistatic plastic tubes

LINKS TO RELATED DOCUMENTS

Dimensions	www.vishay.com/doc?96156
Part marking information	www.vishay.com/doc?95391



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