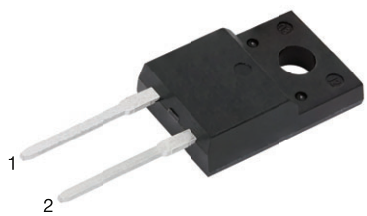
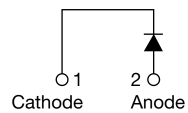
Hyperfast Rectifier, 30 A FRED Pt®





2L TO-220 FullPAK

FEATURES

- Hyperfast soft recovery time
- Low forward voltage drop
- 175 °C operating junction temperature
- Low leakage current
- Fully isolated package (V_{INS} = 2500 V_{RMS})
- True 2 pin package
- Designed and qualified according to JEDEC®-JESD 47
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free
RoHS COMPLIANT
HALOGEN FREE

LINKS TO ADDITIONAL RESOURCES

3D Models

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	30 A
V_R	600 V
V_F at I_F	1.40 V
t_{rr} (typ.)	22 ns
T_J max.	175 °C
Package	2L TO-220 FullPAK
Circuit configuration	Single

DESCRIPTION / APPLICATIONS

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 switch mode power supplies and inverters (air conditioning, high-frequency welding, UPS, and motor drives)

The 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: 2L TO-220 FullPACK

Molding compound meets UL 94 V-0 flammability rating

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 in DC	$I_{F(AV)}$		30	A
Non-repetitive peak surge current	I_{FSM}	T_J = 25 °C	280	
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	-	-	V
Forward voltage	V_F	I_F = 30 A	-	1.70	2.15	
		I_F = 30 A, T_J = 150 °C	-	1.40	1.65	
Reverse leakage current	I_R	V_R = V_R rated	-	0.02	10	μA
		T_J = 150 °C, V_R = V_R rated	-	36	300	
Junction capacitance	C_T	V_R = 600 V	-	19	-	pF

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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		-	22	-	ns
		T_J = 25 °C	I_F = 30 A, dI_F/dt = 200 A/μs, V_R = 400 V	-	90	-	
		T_J = 125 °C		-	110	-	
Peak recovery current	I_{RRM}	T_J = 25 °C		-	4.1	-	A
		T_J = 125 °C		-	9.4	-	
Reverse recovery charge	Q_{rr}	T_J = 25 °C		-	230	-	nC
		T_J = 125 °C		-	730	-	

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-case	R_{thJC}		-	2.40	3.10	°C/W
Thermal resistance, junction-to-ambient	R_{thJA}	Typical socket mount	-	45	-	
Typical thermal resistance, case-to-heatsink	R_{thCS}	Mounting surface, flat, smooth, and greased	-	0.5	-	
Weight			-	2	-	g
			-	0.07	-	oz.
Mounting torque			6 (5)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style 2L TO-220 FullPAK	ETH3106FP			

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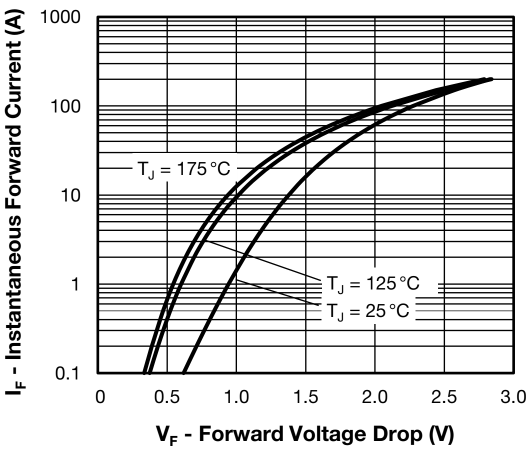

Fig. 1 - Forward Voltage Drop Characteristics

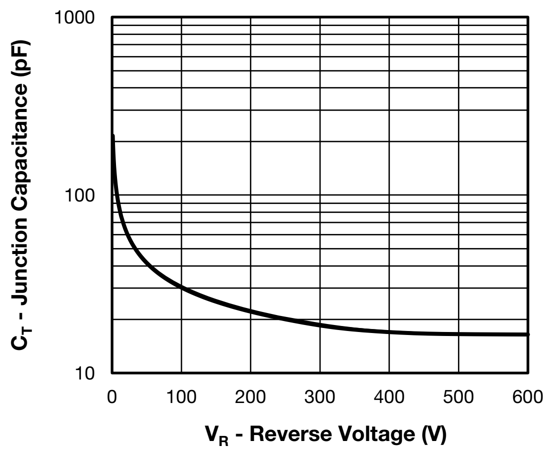

Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

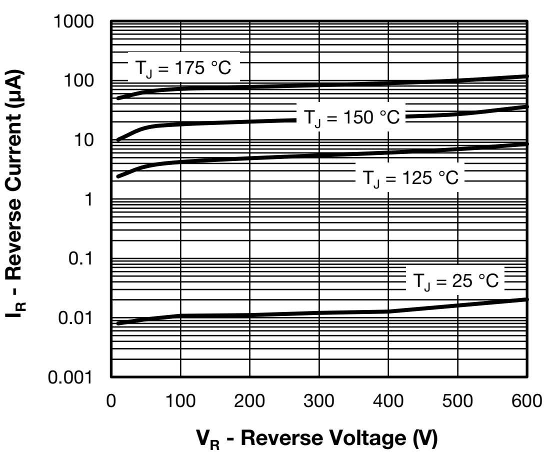

Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

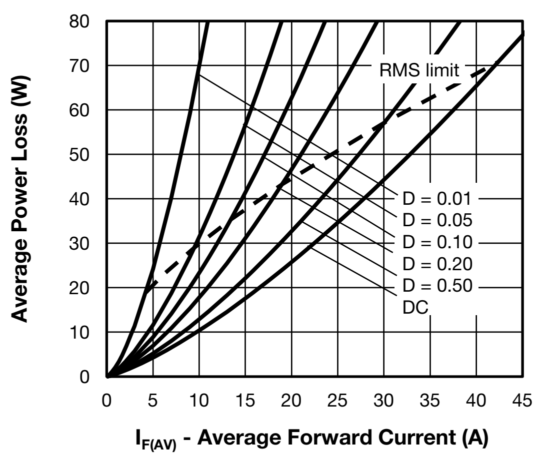

Fig. 4 - Forward Power Loss Characteristics

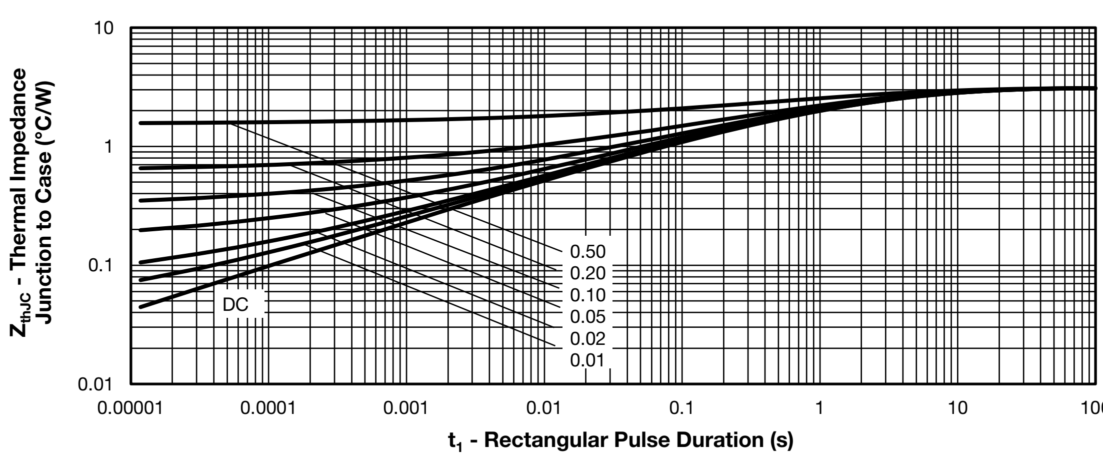

Fig. 5 - Transient Thermal Impedance, Junction to Case

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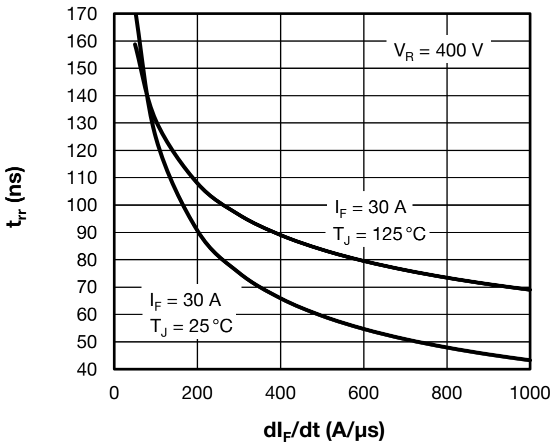

Fig. 6 - Typical Reverse Recovery Time vs. dI_F/dt

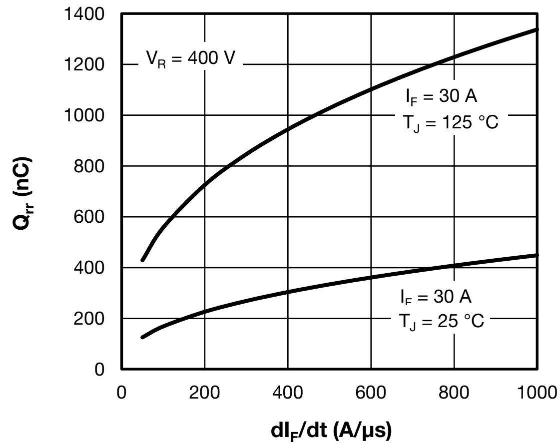

Fig. 7 - Typical Reverse Recovery Charge vs. dI_F/dt

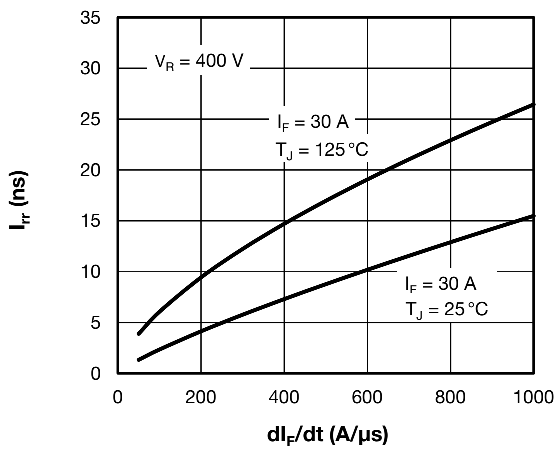

Fig. 8 - Typical Reverse Recovery Current vs. dI_F/dt

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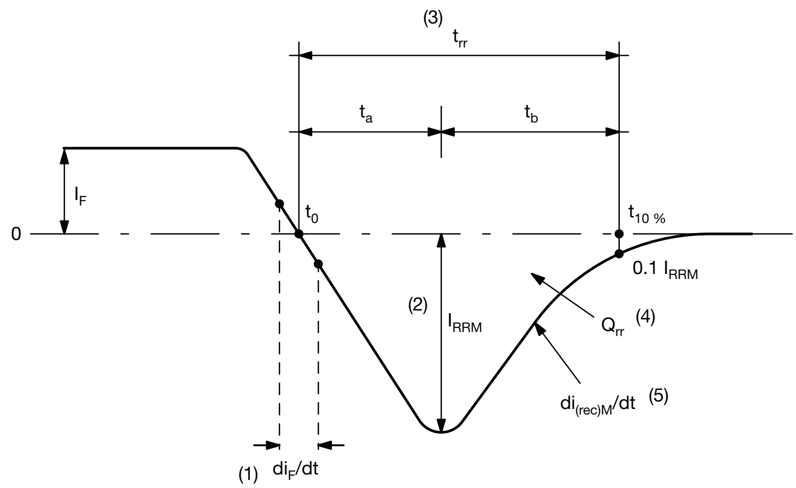

Fig. 9 - Reverse Recovery Waveform and Definitions

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	T	H	31	06	FP	-N3
	1	2	3	4	5	6	7	8

1 - Vishay Semiconductors product

2 - Circuit configuration:
E = single

3 - T = TO-220

4 - H = hyperfast recovery time

5 - Current code: 31 = 30 A

6 - Voltage code: 06 = 600 V

7 - FP = 2L TO-220 FullPAK

8 - Environmental digit:
-N3 = halogen-free, RoHS-compliant, and totally lead (Pb)-free

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?96157
Part marking information	www.vishay.com/doc?95392

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