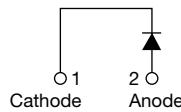


Hyperfast Rectifier, 15 A FRED Pt®


2L TO-220 FullPAK

FEATURES

- Hyperfast recovery time, extremely low Q_{rr}
- Low forward voltage drop
- 175 °C operating junction temperature
- Low leakage current
- Fully isolated package ($V_{INS} = 2500 \text{ V}_{RMS}$)
- 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


RoHS
COMPLIANT
HALOGEN
FREE

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	15 A
V_R	600 V
V_F at I_F	1.55 V
t_{rr} (typ.)	18 ns
T_J max.	175 °C
Package	2L TO-220 FullPAK
Circuit configuration	Single

DESCRIPTION / APPLICATIONS

State of the art 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 SMPS, inverters or as freewheeling diodes.

The 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}		600	V
Average rectified forward current in DC	$I_{F(AV)}$	$T_C = 71 \text{ }^\circ\text{C}$	15	A
Non-repetitive peak surge current	I_{FSM}	$T_J = 25 \text{ }^\circ\text{C}$	120	
Operating junction and storage temperatures	T_J, T_{Stg}		-65 to +175	°C

ELECTRICAL SPECIFICATIONS ($T_J = 25 \text{ }^\circ\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Breakdown voltage, blocking voltage	V_{BR}, V_R	$I_R = 100 \mu\text{A}$	600	-	-	V
Forward voltage	V_F	$I_F = 15 \text{ A}$	-	2.5	3.4	
		$I_F = 15 \text{ A}, T_J = 150 \text{ }^\circ\text{C}$	-	1.55	2	
Reverse leakage current	I_R	$V_R = V_R$ rated	-	0.02	36	μA
		$T_J = 150 \text{ }^\circ\text{C}, V_R = V_R$ rated	-	40	250	
Junction capacitance	C_T	$V_R = 600 \text{ V}$	-	12	-	pF
Series inductance	L_S	Measured lead to lead 5 mm from package body	-	8	-	nH

DYNAMIC RECOVERY CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Reverse recovery time	t_{rr}	$I_F = 1 \text{ A}, dI_F/dt = 100 \text{ A}/\mu\text{s}, V_R = 30 \text{ V}$	-	17	23	ns	
		$I_F = 15 \text{ A}, dI_F/dt = 100 \text{ A}/\mu\text{s}, V_R = 30 \text{ V}$	-	18	30		
		$T_J = 25^\circ\text{C}$	-	20	-		
		$T_J = 125^\circ\text{C}$	-	45	-		
Peak recovery current	I_{RRM}	$T_J = 25^\circ\text{C}$	-	2.7	-	A	
		$T_J = 125^\circ\text{C}$	-	5.5	-		
Reverse recovery charge	Q_{rr}	$T_J = 25^\circ\text{C}$	-	26	-	nC	
		$T_J = 125^\circ\text{C}$	-	130	-		
Reverse recovery time	t_{rr}	$T_J = 125^\circ\text{C}$	$I_F = 15 \text{ A}, dI_F/dt = 800 \text{ A}/\mu\text{s}, V_R = 390 \text{ V}$	-	32	-	ns
Peak recovery current	I_{RRM}		$I_F = 15 \text{ A}, dI_F/dt = 800 \text{ A}/\mu\text{s}, V_R = 390 \text{ V}$	-	17	-	A
Reverse recovery charge	Q_{rr}		$I_F = 15 \text{ A}, dI_F/dt = 800 \text{ A}/\mu\text{s}, V_R = 390 \text{ V}$	-	290	-	nC

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	T_J, T_{Stg}		-65	-	175	°C
Thermal resistance, junction-to-case	R_{thJC}		-	3.7	4.3	°C/W
Thermal resistance, junction-to-ambient	R_{thJA}	Typical socket mount	-	-	70	
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	ETX1506FP			

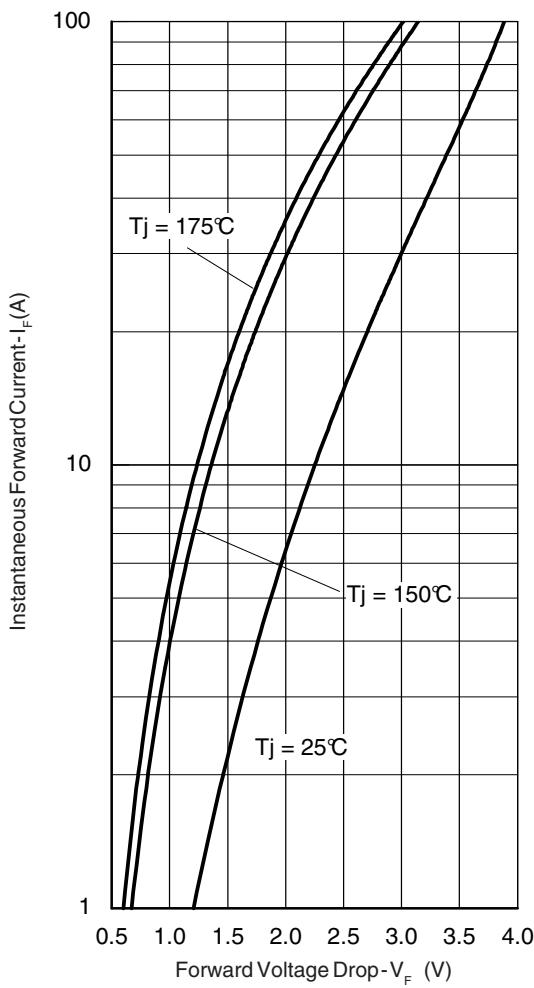


Fig. 1 - Typical Forward Voltage Drop Characteristics

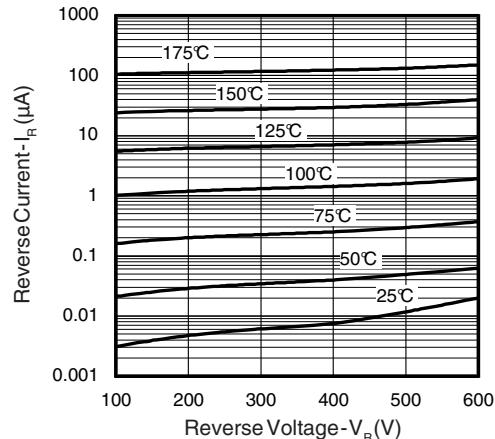


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

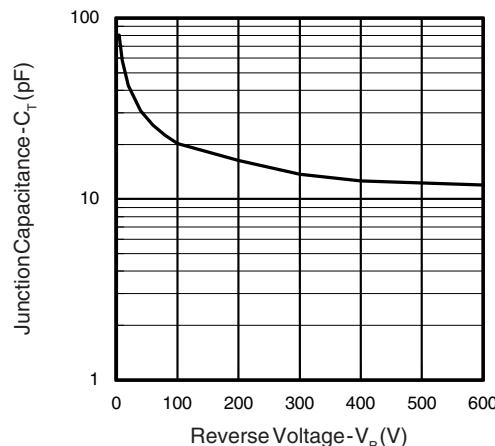


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

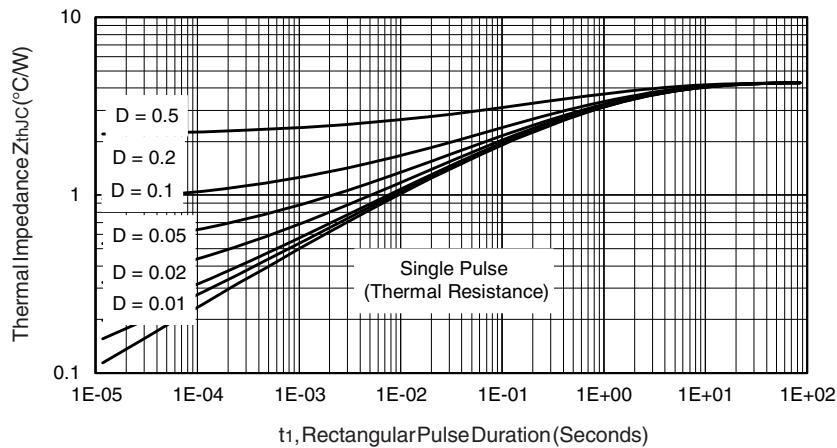


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

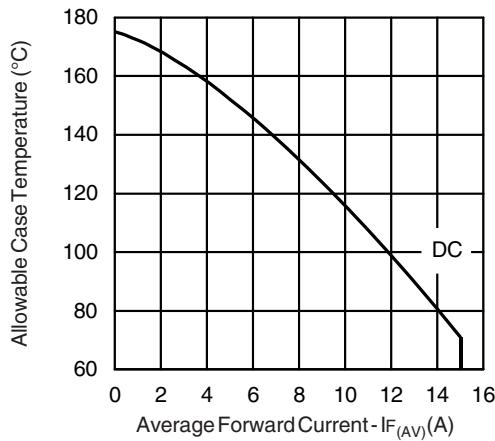


Fig. 5 - Maximum Allowable Case Temperature vs.
Average Forward Current

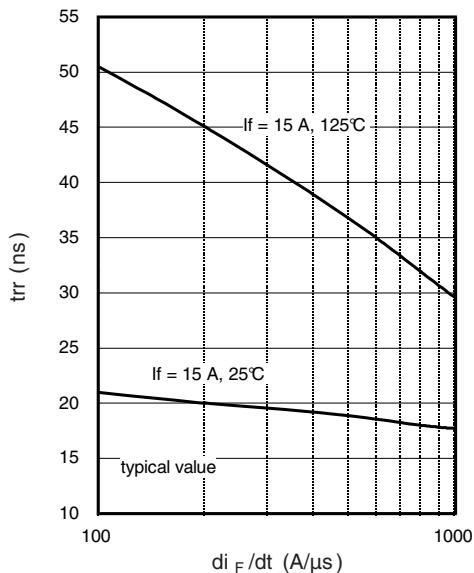


Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt

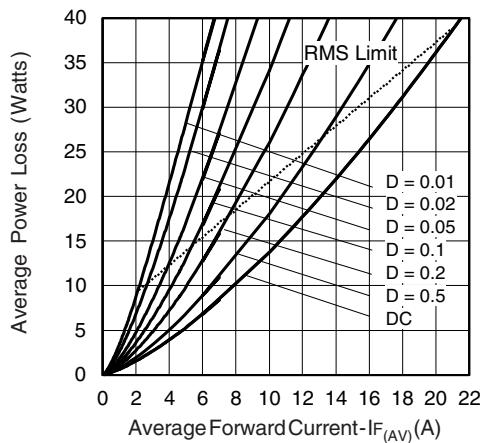


Fig. 6 - Forward Power Loss Characteristics

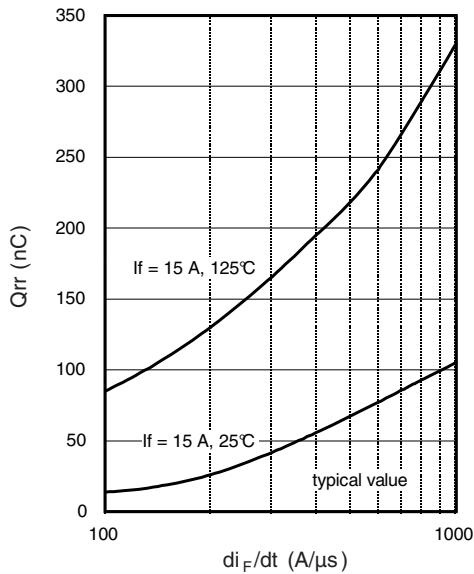


Fig. 8 - Typical Stored Charge vs. dI_F/dt

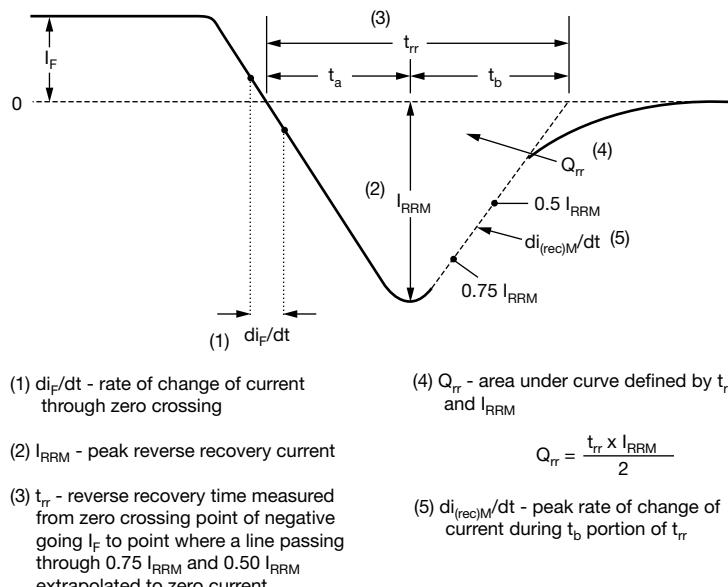


Fig. 9 - Reverse Recovery Waveform and Definitions

ORDERING INFORMATION TABLE

Device code	VS-	E	T	X	15	06	FP	-M3
	1	2	3	4	5	6	7	8

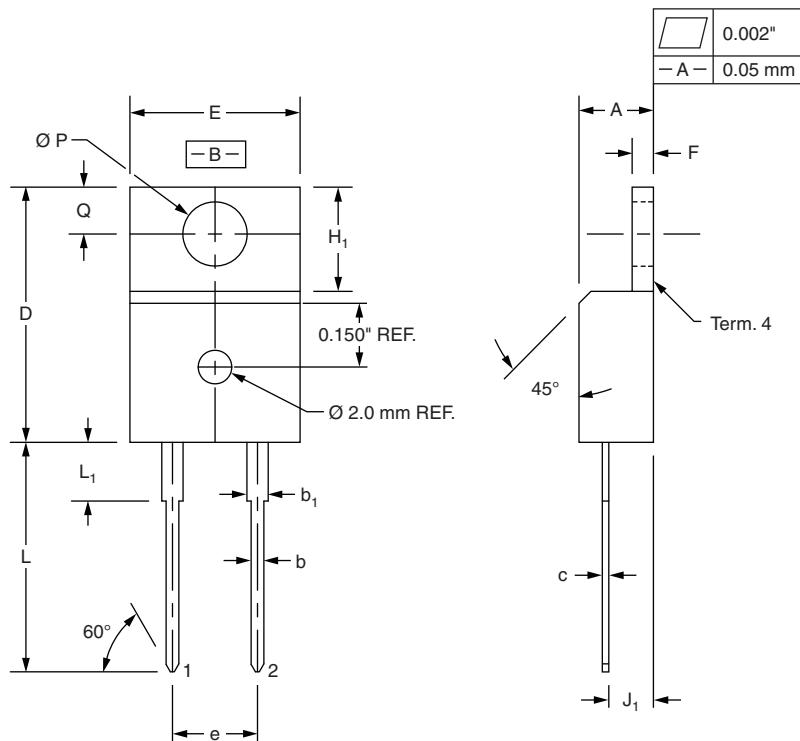
- 1** - Vishay Semiconductors product
- 2** - Circuit configuration:
E = single
- 3** - T = TO-220
- 4** - X = hyperfast recovery time
- 5** - Current code: 15 = 15 A
- 6** - Voltage code: 06 = 600 V
- 7** - FP = 2L TO-220 FullPAK
- 8** - Environmental digit:
-M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

ORDERING INFORMATION (Example)			
PREFERRED P/N	QUANTITY PER TUBE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-ETX1506FP-M3	50	1000	Antistatic plastic tube

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

True 2 Pin TO-220

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.32	4.57	0.170	0.180
b	0.71	0.91	0.028	0.036
b ₁	1.15	1.39	0.045	0.055
c	0.36	0.53	0.014	0.021
D	14.99	15.49	0.590	0.610
E	10.04	10.41	0.395	0.410
e	5.08 BSC		0.200 BSC	
F	1.22	1.37	0.048	0.054
H ₁	5.97	6.47	0.235	0.255
J ₁	2.54	2.79	0.100	0.110
L	13.47	13.97	0.530	0.550
L ₁ ⁽¹⁾	3.31	3.81	0.130	0.150
Ø P	3.79	3.88	0.149	0.153
Q	2.60	2.84	0.102	0.112

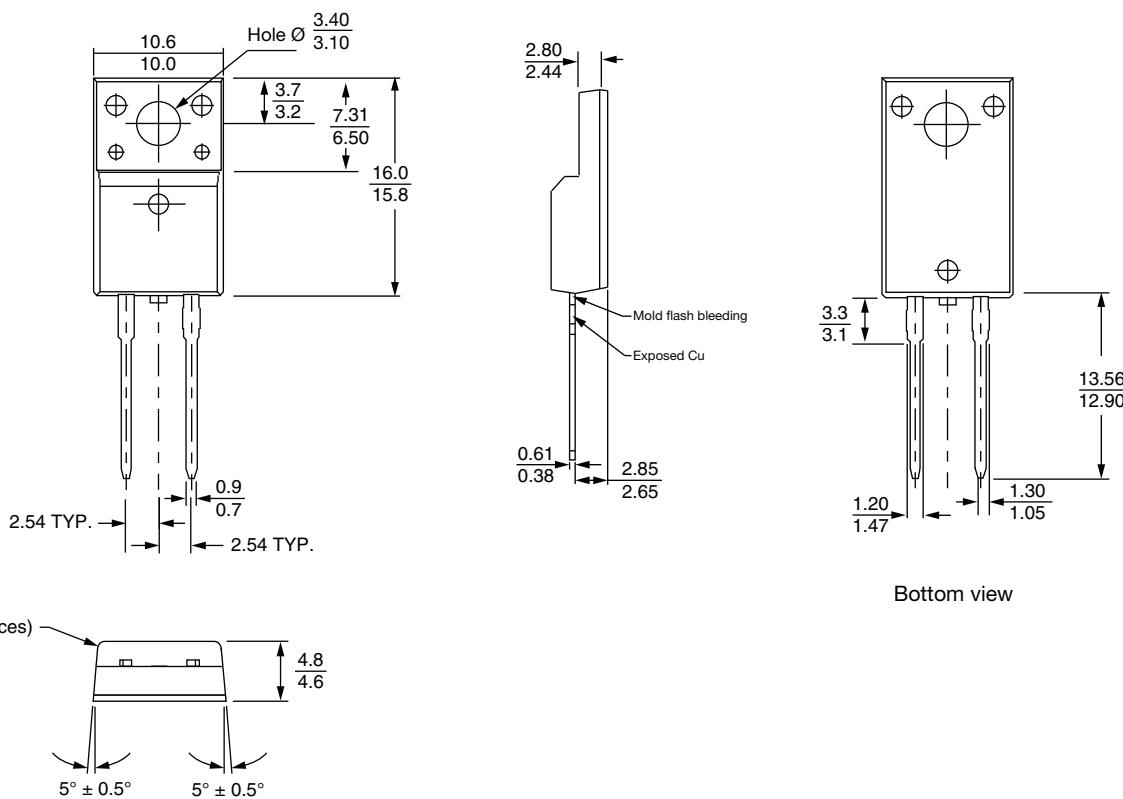
Notes

⁽¹⁾ Lead dimension and finish uncontrolled in L₁

- Lead dimension and pitch uncontrolled in L1
 - These dimensions are within allowable dimensions of JEDEC TO-220AB rev. J outline dated 3-24-87
 - Controlling dimension: Inch

2L TO-220 FullPAK

DIMENSIONS in millimeters



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