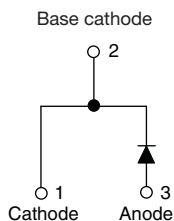


Hyperfast Rectifier, 30 A FRED Pt®



2L TO-220AC



FEATURES

- Hyper fast and soft recovery time
- Low forward voltage drop
- 175 °C maximum operating junction temperature
- Low leakage current
- True 2 pin package
- AEC-Q101 qualified
- Material categorization:
for definitions of compliance please see
www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

PRIMARY CHARACTERISTICS

$I_{F(AV)}$	30 A
V_R	650 V
V_F at I_F at 125 °C	1.6 V
t_{rr}	27 ns
T_J max.	175 °C
Package	2L TO-220AC
Circuit configuration	Single

DESCRIPTION / APPLICATIONS

Ultra low V_F , soft-switching hyper fast rectifiers optimized for discontinuous (critical) mode (DCM) power factor correction (PFC).

The minimized conduction loss, optimized stored charge and low recovery current minimized the switching losses and reduce over dissipation in the switching element and snubbers.

The device is also intended for use as a freewheeling diode in power supplies and other power switching applications.

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Repetitive peak reverse voltage	V_{RRM}		650	V
Average rectified forward current	$I_{F(AV)}$	$T_C = 120$ °C	30	A
Non-repetitive peak surge current	I_{FSM}	$T_C = 25$ °C	210	
Operating junction and storage temperature	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	$I_R = 250$ μ A	650	-	-	V
Forward voltage	V_F	$I_F = 30$ A	-	2.1	2.5	
		$I_F = 30$ A, $T_J = 125$ °C	-	1.6	1.7	
Reverse leakage current	I_R	$V_R = V_R$ rated	-	0.02	30	μ A
		$T_J = 150$ °C, $V_R = V_R$ rated	-	50	300	
Junction capacitance	C_T	$V_R = 200$ V	-	22	-	pF
Series inductance	L_S	Measured lead to lead 5 mm from package body	-	8.0	-	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}	$T_J = 25\text{ }^{\circ}\text{C}$	$I_F = 1\text{ A}$ $dI_F/dt = 100\text{ A}/\mu\text{s}$ $V_R = 30\text{ V}$	-	35	-	ns
		$T_J = 25\text{ }^{\circ}\text{C}$	$I_F = 30\text{ A}$ $dI_F/dt = 1000\text{ A}/\mu\text{s}$ $V_R = 400\text{ V}$	-	27	-	
		$T_J = 125\text{ }^{\circ}\text{C}$		-	88	-	
Peak recovery current	I_{RRM}	$T_J = 25\text{ }^{\circ}\text{C}$		-	15	-	A
		$T_J = 125\text{ }^{\circ}\text{C}$		-	24	-	
Reverse recovery charge	Q_{rr}	$T_J = 25\text{ }^{\circ}\text{C}$		-	330	-	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}		-	1.0	1.3	$^{\circ}\text{C}/\text{W}$
Thermal resistance, junction to ambient	R_{thJA}	Typical socket mount	-	-	70	
Thermal resistance, case to heat sink	R_{thCS}	Mounting surface, flat, smooth, and greased	-	-	0.5	
Weight			-	0.2	-	g
			-	0.07	-	oz.
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: 2L TO-220AC	ETX3007TH			

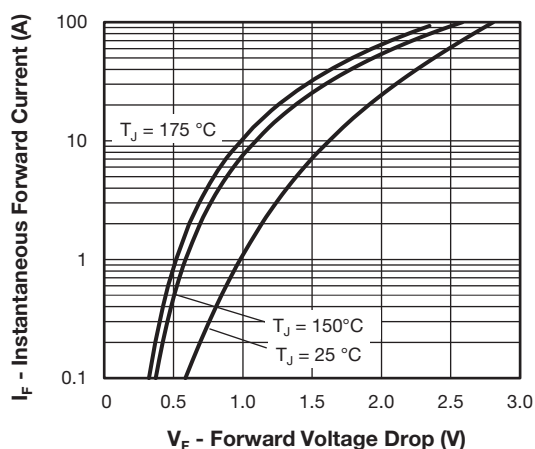


Fig. 1 - Typical Forward Voltage Drop Characteristics

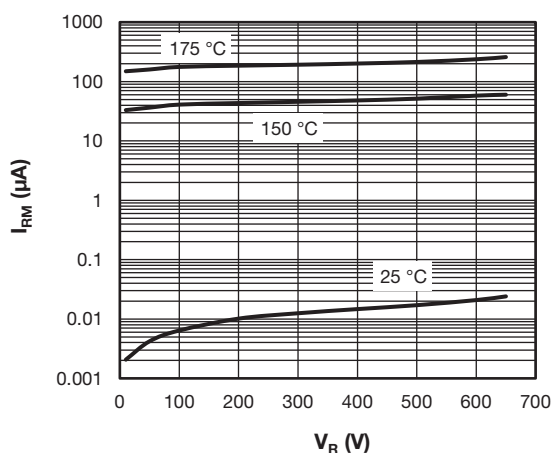


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

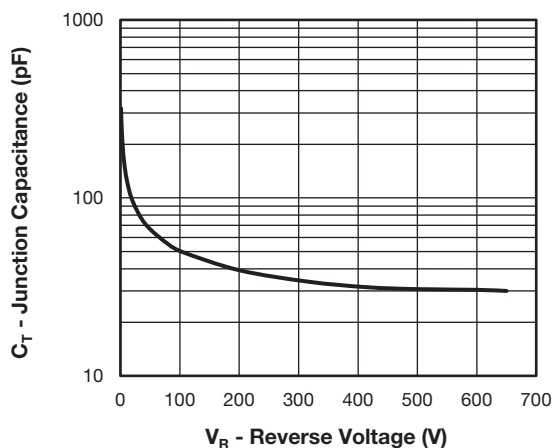


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

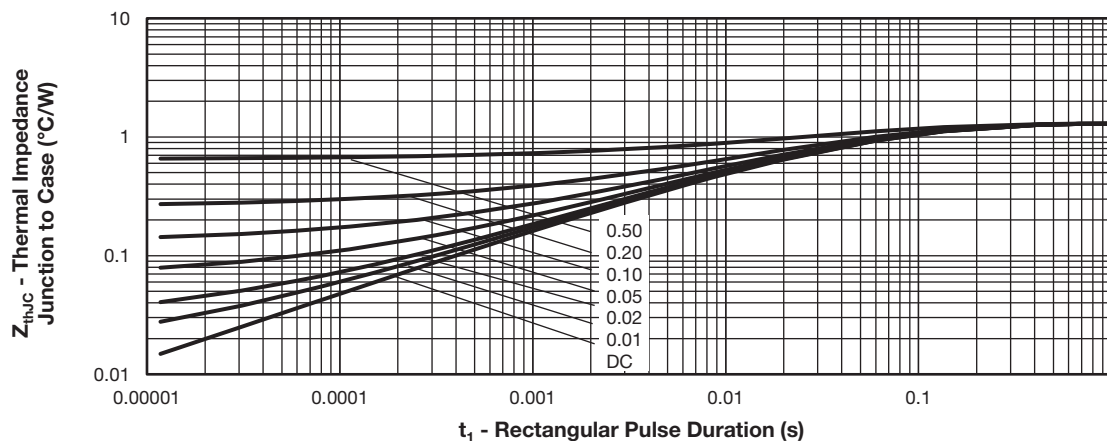
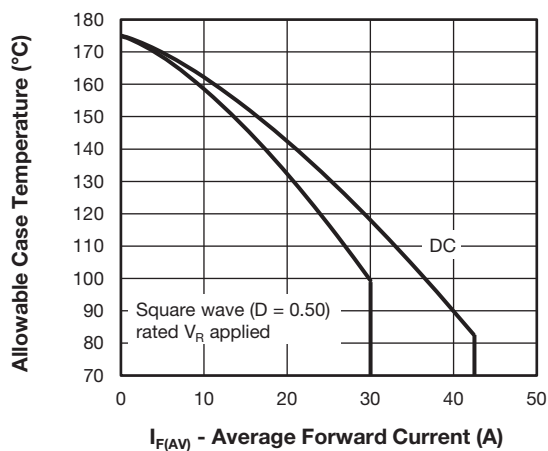

Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics


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

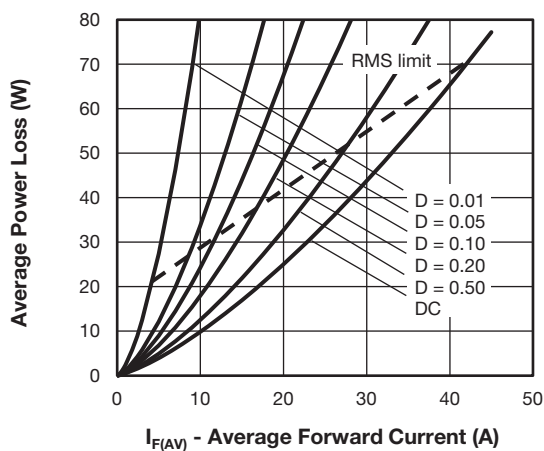


Fig. 6 - Forward Power Loss Characteristics

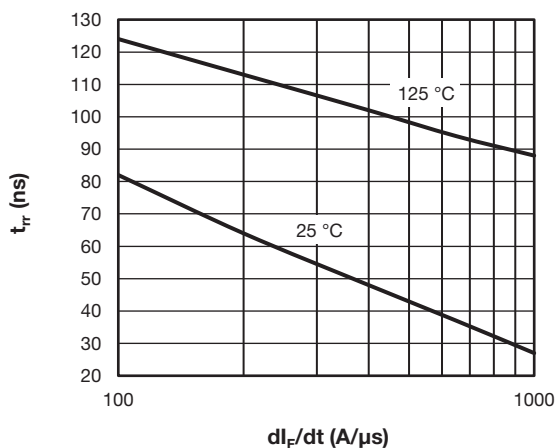
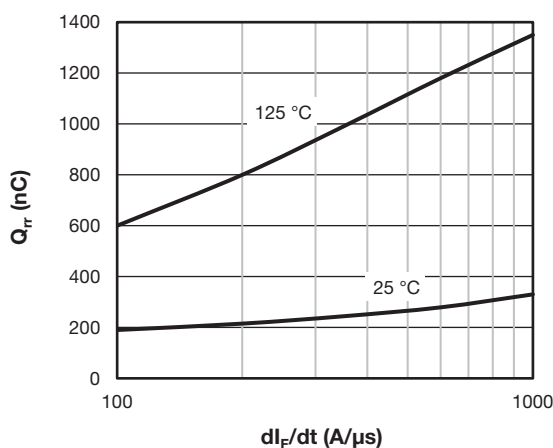
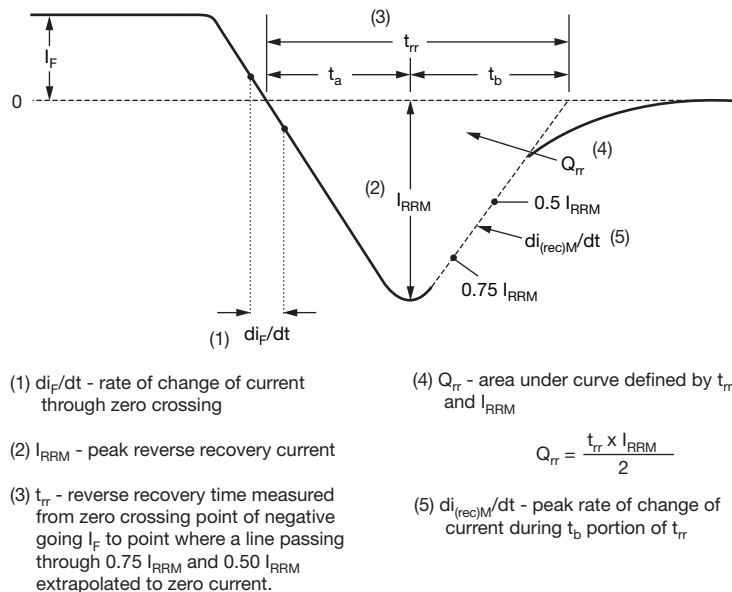

Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt

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


Fig. 9 - Reverse Recovery Waveform and Definitions

**ORDERING INFORMATION TABLE**

Device code	VS-	E	T	X	30	07	T	H	N3
	1	2	3	4	5	6	7	8	9

- | | | |
|----------|---|---|
| 1 | - | Vishay Semiconductors product |
| 2 | - | E = single diode |
| 3 | - | Package:
T = TO-220 |
| 4 | - | X = hyper fast recovery |
| 5 | - | Current rating (30 = 30 A) |
| 6 | - | Voltage rating (07 = 650 V) |
| 7 | - | T = True 2 pin TO-220 |
| 8 | - | H = AEC-Q101 qualified |
| 9 | - | Environmental digit:
N3 = halogen-free, RoHS-compliant, and totally lead (Pb)-free |

ORDERING INFORMATION (Example)

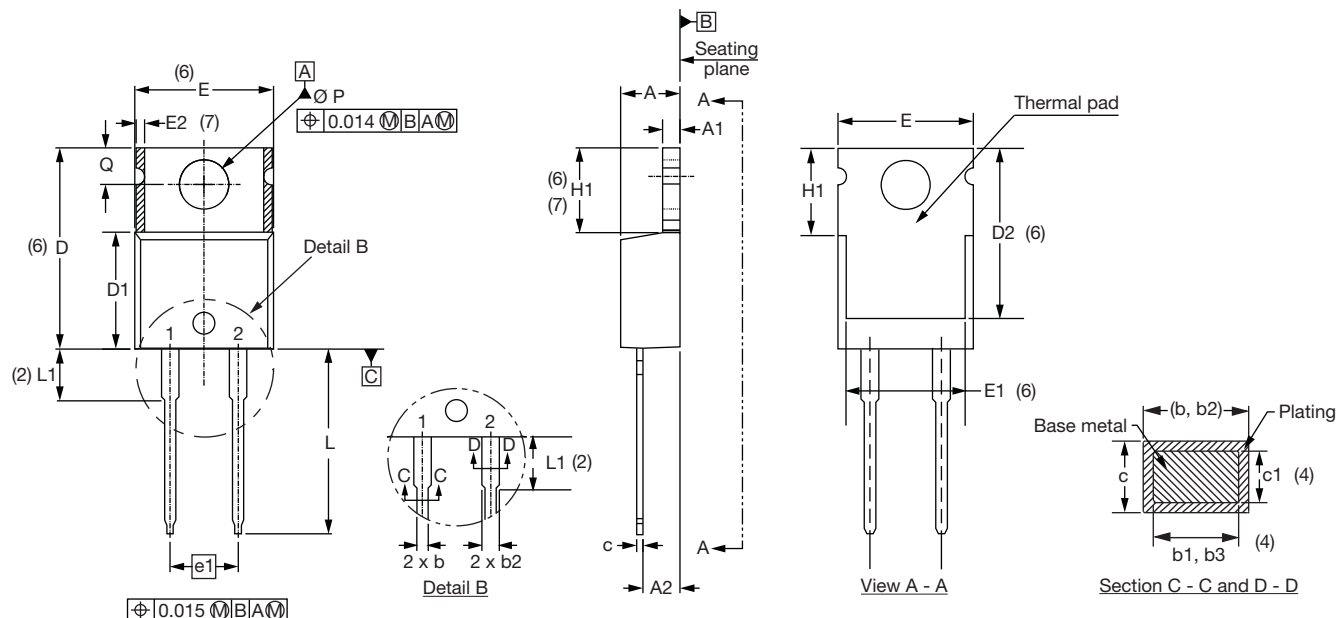
PREFERRED P/N	QUANTITY PER TUBE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-ETX3007THN3	50	1000	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS

Dimensions	www.vishay.com/doc?96069
Part marking information	www.vishay.com/doc?95391
SPICE model	www.vishay.com/doc?96532

2L TO-220AC

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.25	4.65	0.167	0.183	
A1	1.14	1.40	0.045	0.055	
A2	2.56	2.92	0.101	0.115	
b	0.69	1.01	0.027	0.040	
b1	0.38	0.97	0.015	0.038	4
b2	1.20	1.73	0.047	0.068	
b3	1.14	1.73	0.045	0.068	4
c	0.36	0.61	0.014	0.024	
c1	0.36	0.56	0.014	0.022	4
D	14.85	15.25	0.585	0.600	3
D1	8.38	9.02	0.330	0.355	
D2	11.68	12.88	0.460	0.507	6
E	10.11	10.51	0.398	0.414	3, 6

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
E1	6.86	8.89	0.270	0.350	6
E2	-	0.76	-	0.030	7
e	2.41	2.67	0.095	0.105	
e1	4.88	5.28	0.192	0.208	
H1	6.09	6.48	0.240	0.255	6, 7
L	13.52	14.02	0.532	0.552	
L1	3.32	3.82	0.131	0.150	2
Ø P	3.54	3.73	0.139	0.147	
Q	2.60	3.00	0.102	0.118	

Notes

- Dimensioning and tolerancing as per ASME Y14.5M-1994
- Lead dimension and finish uncontrolled in L1
- Dimension D, D1 and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body
- Dimension b1, b3 and c1 apply to base metal only
- Controlling dimension: inches
- Thermal pad contour optional within dimensions E, H1, D2 and E1
- Dimension E2 x H1 define a zone where stamping and singulation irregularities are allowed
- Outline conforms to JEDEC® TO-220, except D2, where JEDEC® minimum is 0.480".



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