



# THE DATASHEET OF STPR1520D





# STPR1520D/F

## ULTRA-FAST RECOVERY RECTIFIER DIODES

### MAIN PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	15 A
$V_{RRM}$	200 V
$T_j(\text{max})$	150°C
$V_F(\text{max})$	0.99 V
$t_{rr}(\text{max})$	30 ns

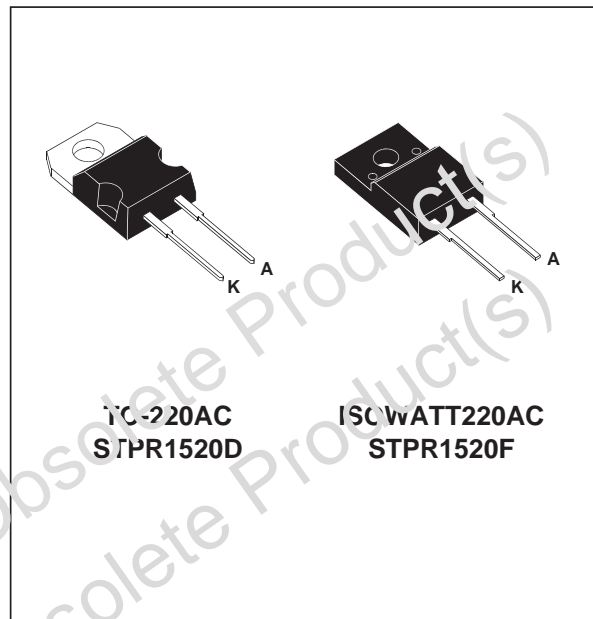
### FEATURES

- SUITED FOR SMPS
- LOW LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIME
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY

### DESCRIPTION

Low cost single chip rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged in TO-220AC and ISOWATT220AC, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.



Symbol	Parameter		Value	Unit	
$V_{RRM}$	Repetitive peak reverse voltage		200	V	
$I_{F(RMS)}$	RMS forward current		30	A	
$I_{F(AV)}$	Average forward current $\delta = 0.5$	TO-220AC	$T_c = 115^\circ\text{C}$	15	A
		ISOWATT220AC	$T_c = 70^\circ\text{C}$		
$I_{FSM}$	Surge non repetitive forward current		$T_p = 10\text{ ms}$ Sinusoidal	150	A
$T_{stg}$	Storage temperature range		- 65 to + 150	°C	
$T_j$	Maximum operating junction temperature		+ 150		

# STPR1520D/F

## THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AC	2	°C/W
		ISOWATT220AC	4.5	

## STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameters	Test conditions		Min.	Typ.	Max.	Unit
$I_R^*$	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			50	$\mu\text{A}$
		$T_j = 100^\circ\text{C}$				1	nA
$V_F^{**}$	Forward voltage drop	$T_j = 125^\circ\text{C}$	$I_F = 15\text{ A}$			0.99	V
		$T_j = 125^\circ\text{C}$	$I_F = 30\text{ A}$			1.20	
		$T_j = 25^\circ\text{C}$	$I_F = 30\text{ A}$			1.25	

Pulse test : \*  $t_p = 5\text{ ms}$ ,  $\delta < 2\%$

\*\*  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

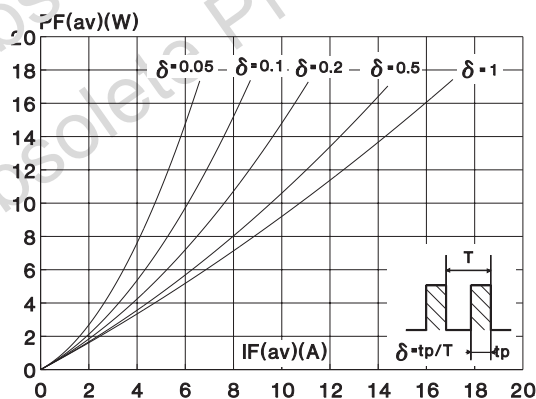
To evaluate the conduction losses use the following equation :

$$P = 0.78 \times I_{F(AV)} + 0.014 \times I_F^2(RMS)$$

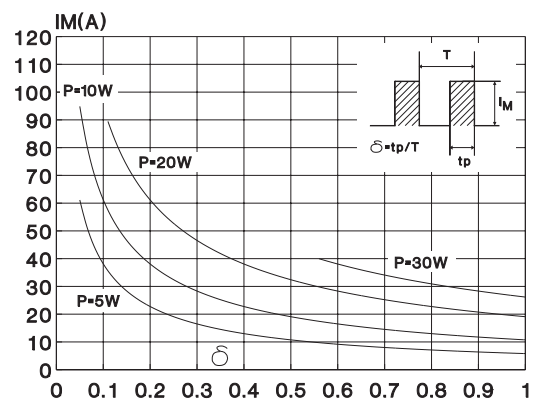
## RECOVERY CHARACTERISTICS

Symbol	Test conditions			Min.	Typ.	Max.	Unit
$t_{rr}$	$T_j = 25^\circ\text{C}$	$I_F = 0.5\text{ A}$	$i_{rr} = 0.25\text{ A}$ $I_R = 1\text{ A}$			30	ns
$t_{fr}$	$T_j = 25^\circ\text{C}$	$I_F = 1\text{ A}$	$t_r = 10\text{ ns}$ $V_{FR} = 1.1 \times V_F$		20		
$V_{FP}$	$T_j = 25^\circ\text{C}$	$I_F = 1\text{ A}$	$t_r = 10\text{ ns}$		3		V

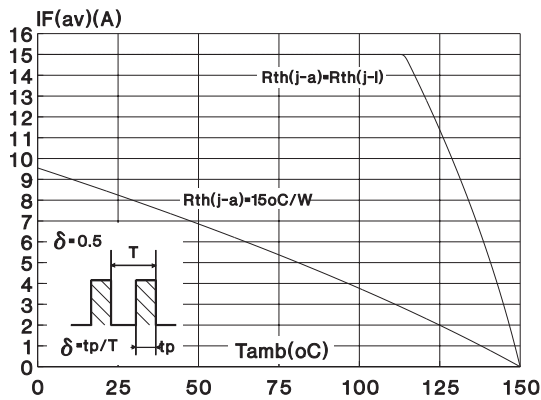
**Fig. 1:** Average forward power dissipation versus average forward current.



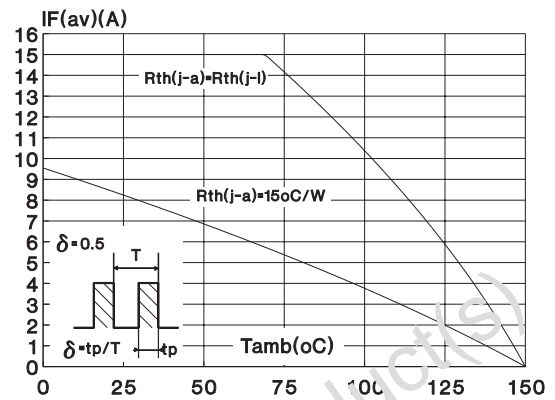
**Fig. 2:** Peak current versus form factor.



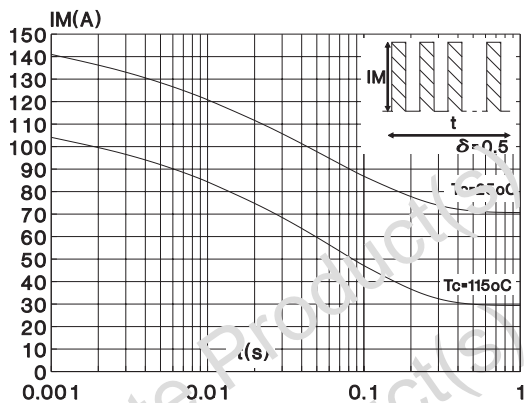
**Fig. 3:** Average current versus ambient temperature.



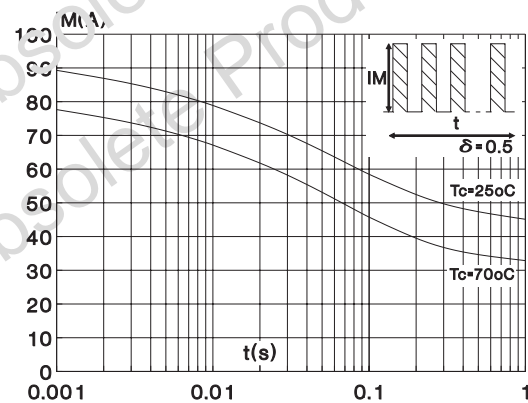
**Fig. 4:** Average current versus ambient temperature.



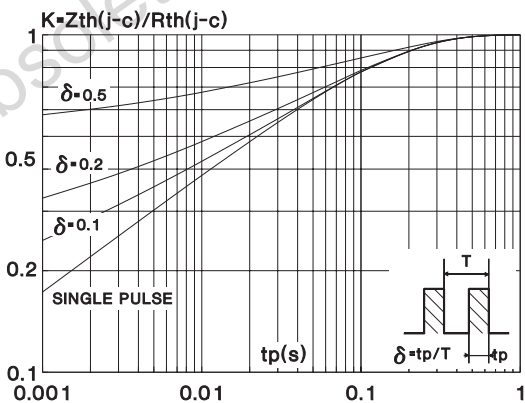
**Fig. 5:** Non repetitive surge peak forward current versus overload duration (maximum values) (TO-220AC)



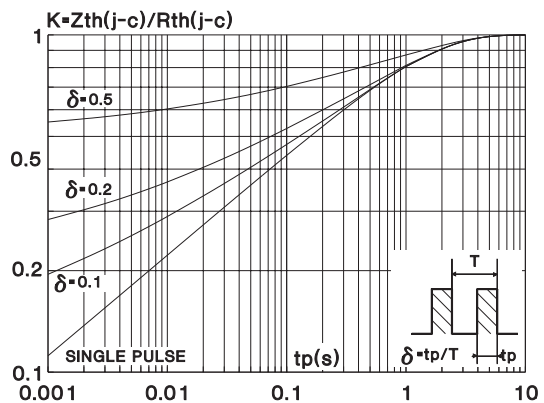
**Fig. 6:** Non repetitive surge peak forward current versus overload duration (maximum values) (ISOWATT220AC).



**Fig. 7:** Relative variation of thermal transient impedance junction to case versus pulse duration (TO-220AC).

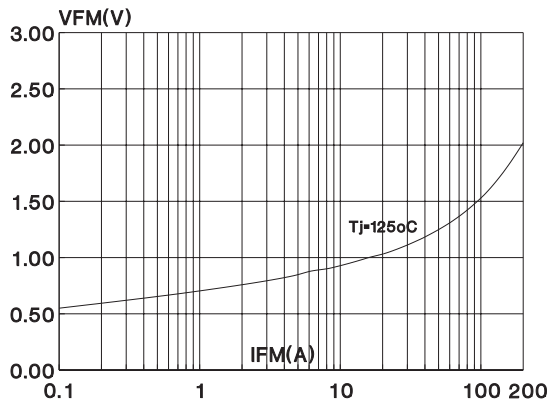


**Fig. 8:** Relative variation of thermal transient impedance junction to case versus pulse duration (ISOWATT220AC).

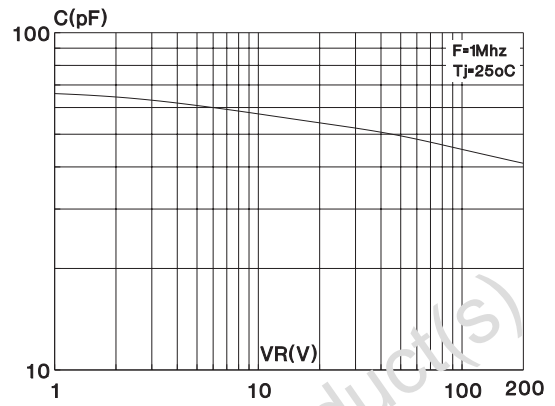


# STPR1520D/F

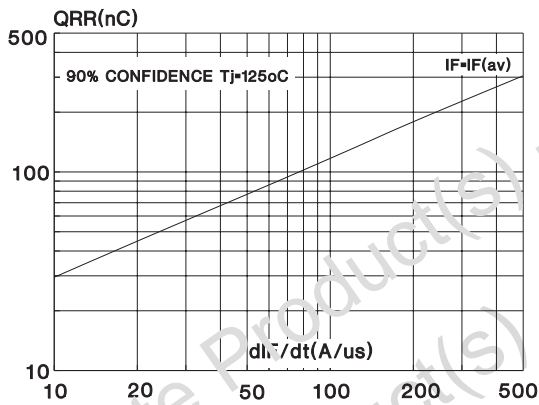
**Fig. 9:** Forward voltage drop versus forward current.



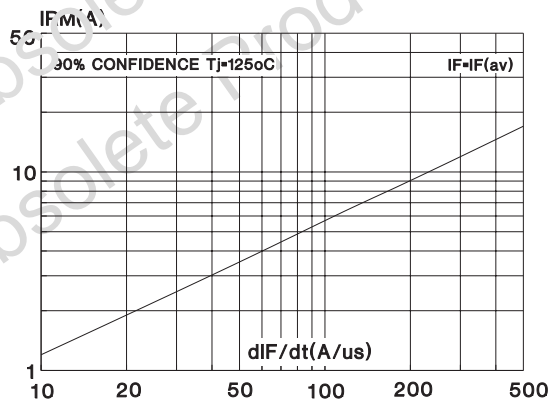
**Fig. 10:** Junction capacitance versus reverse voltage applied (typical values).



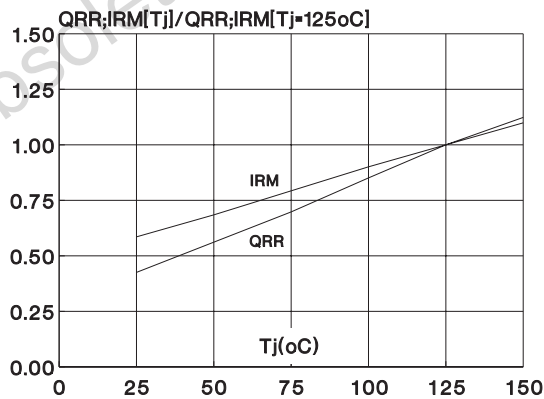
**Fig. 11:** Recovery charge versus  $di_F/dt$ .



**Fig. 12:** Peak reverse current versus  $di_F/dt$ .

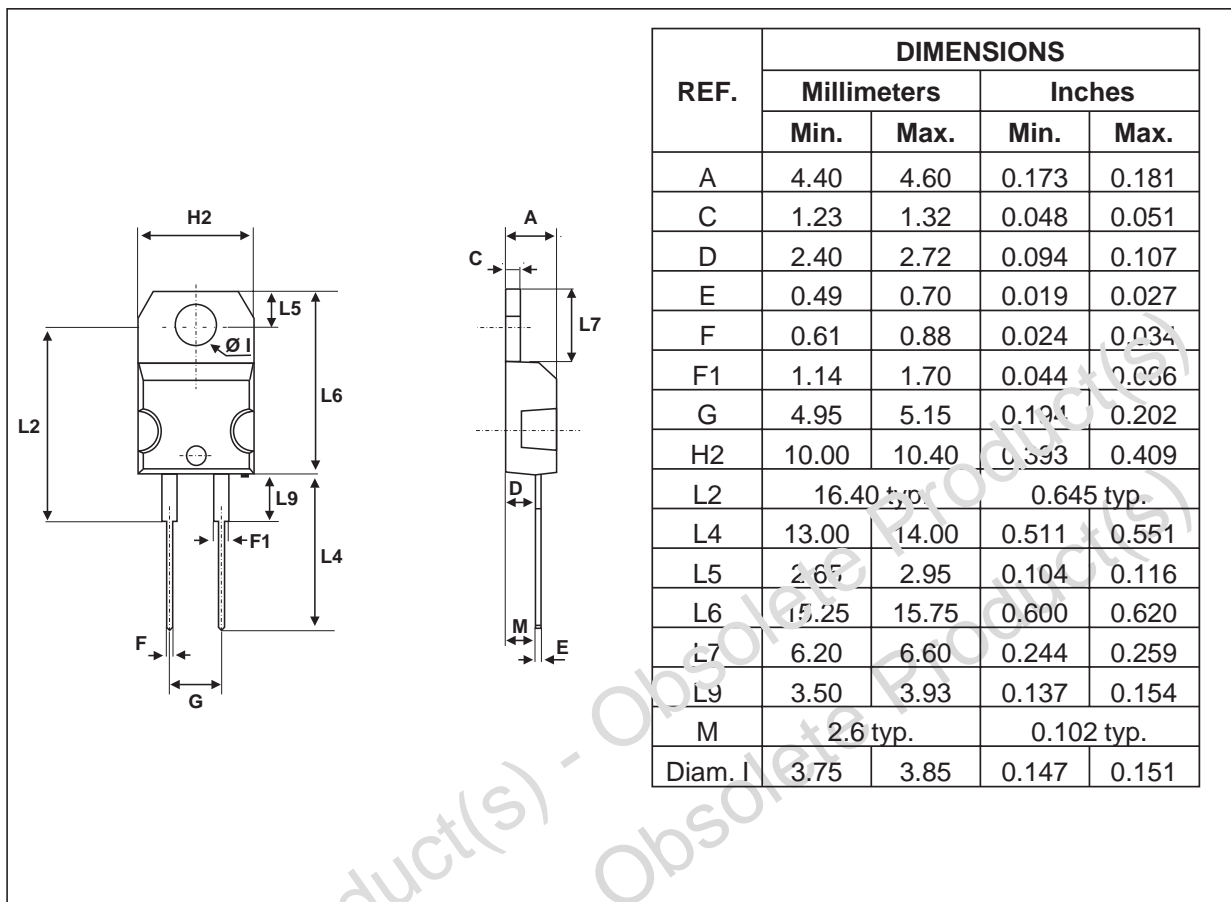


**Fig. 13:** Dynamic parameters versus junction temperature.



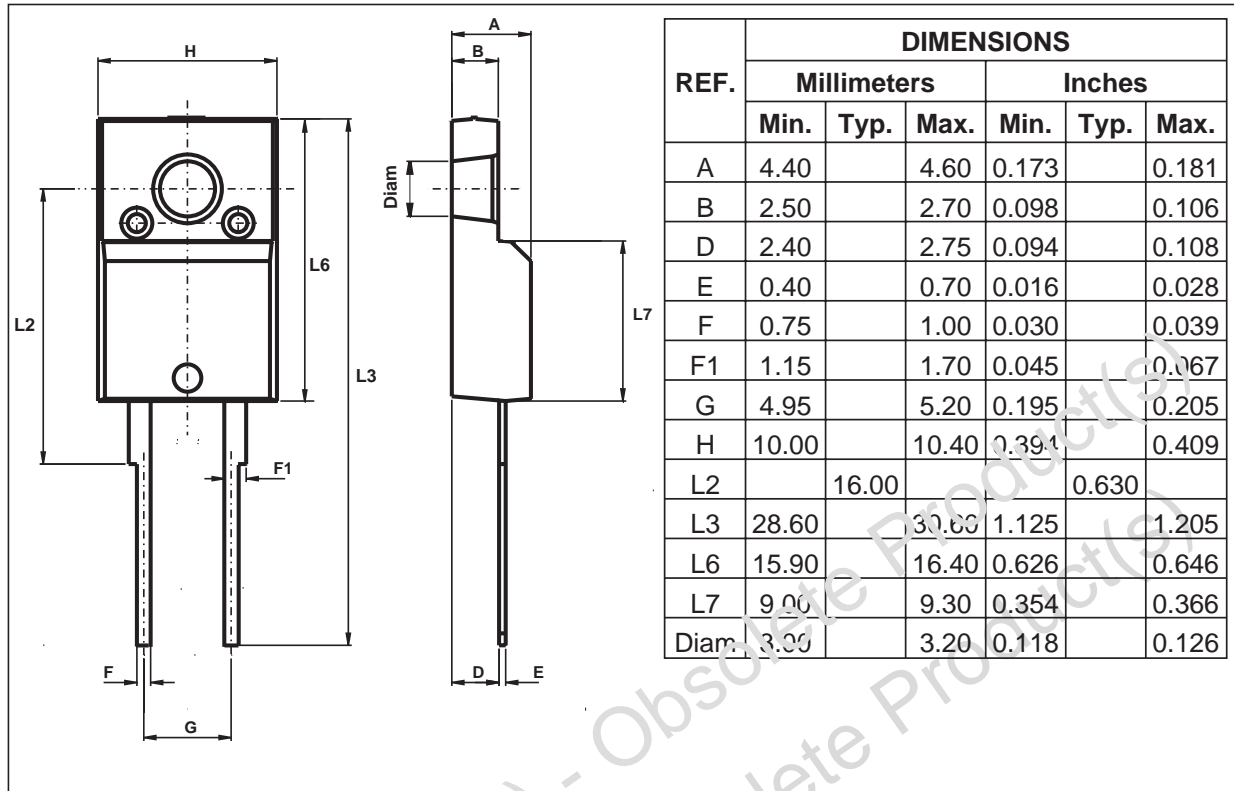
## PACKAGE MECHANICAL DATA

TO-220AC



**STPR1520D/F**

**PACKAGE MECHANICAL DATA**  
ISOWATT220AC



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