

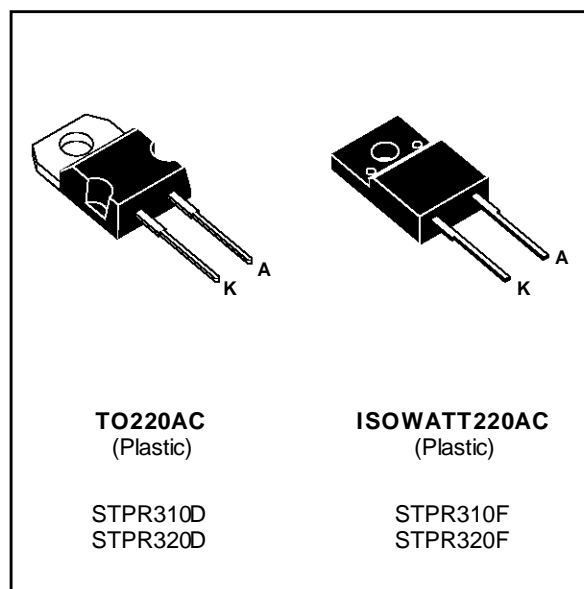
## ULTRA FAST RECOVERY RECTIFIER DIODES

- 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 TO220AC and ISOWATT220AC, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.



### ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit	
I <sub>F(RMS)</sub>	RMS Forward Current		10	A	
I <sub>F(AV)</sub>	Average Forward Current $\delta = 0.5$	TO220AC	T <sub>c</sub> = 125°C	3	A
		ISOWATT220AC	T <sub>c</sub> = 120°C		
I <sub>FSM</sub>	Surge Non Repetitive Forward Current		T <sub>p</sub> = 10 ms Sinusoidal	30	A
T <sub>stg</sub> T <sub>j</sub>	Storage and Junction Temperature Range		- 65 to + 150 - 65 to + 150		°C

Symbol	Parameter	STPR		Unit
		310D 310F	320D 320F	
V <sub>RRM</sub>	Repetitive Peak Reverse Voltage	100	200	V

### THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
R <sub>th(j-c)</sub>	Junction-case	TO220AC	6.5	°C/W
		ISOWATT220AC	8.5	

# STPR310D/F / STPR320D/F

## ELECTRICAL CHARACTERISTICS

### STATIC CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
$I_R^*$	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			50	$\mu\text{A}$
	$T_j = 100^\circ\text{C}$				0.5	$\text{mA}$
$V_F^{**}$	$T_j = 125^\circ\text{C}$	$I_F = 3\text{ A}$			0.99	V
	$T_j = 125^\circ\text{C}$	$I_F = 6\text{ A}$			1.20	
	$T_j = 25^\circ\text{C}$	$I_F = 6\text{ A}$			1.25	

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

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

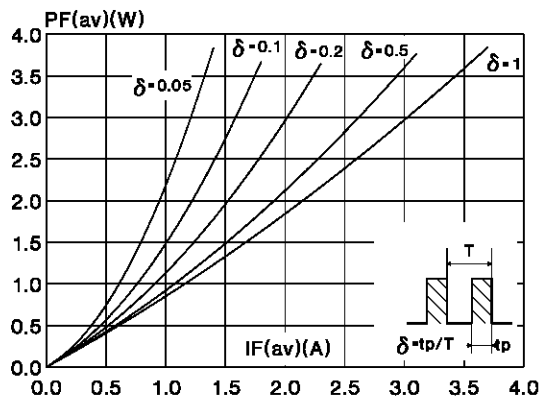
### RECOVERY CHARACTERISTICS

Symbol	Tests Conditions			Min.	Typ.	Max.	Unit
$t_{rr}$	$T_j = 25^\circ\text{C}$	$I_F = 0.5\text{ A}$	$I_R = 1\text{ A}$			30	ns
$t_{fr}$	$T_j = 25^\circ\text{C}$	$I_F = 1\text{ A}$	$t_r = 10\text{ ns}$		20		ns
$V_{FP}$	$T_j = 25^\circ\text{C}$	$I_F = 1\text{ A}$	$t_r = 10\text{ ns}$		3		V

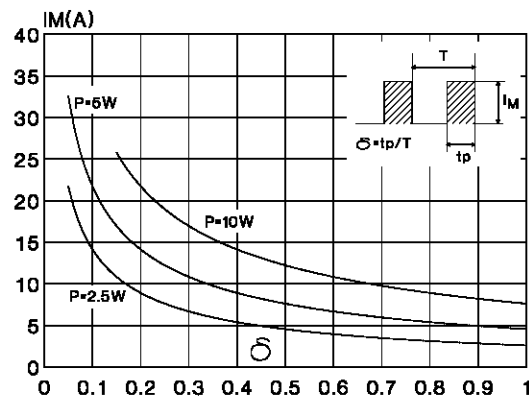
To evaluate the conduction losses use the following equation :

$$P = 0.78 \times I_F(\text{AV}) + 0.070 I_F^2(\text{RMS})$$

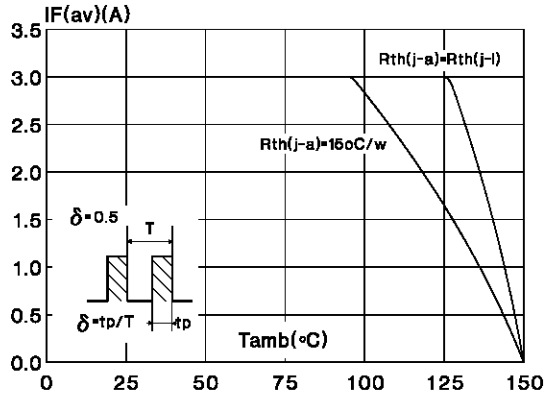
**Fig.1** : Average forward power dissipation versus average forward current.



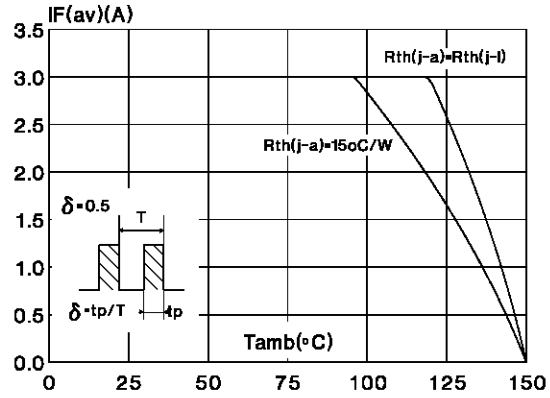
**Fig.2** : Peak current versus form factor.



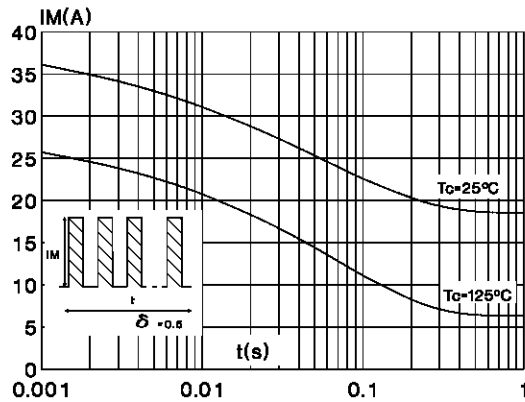
**Fig.3 :** Average current versus ambient temperature.  
(duty cycle : 0.5) (TO220AC)



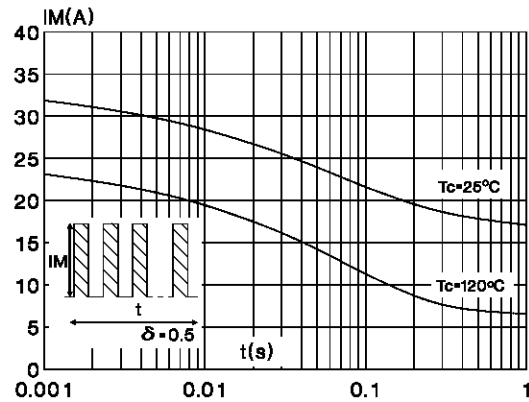
**Fig.4 :** Average current versus ambient temperature.  
(duty cycle : 0.5) (ISOWATT220AC)



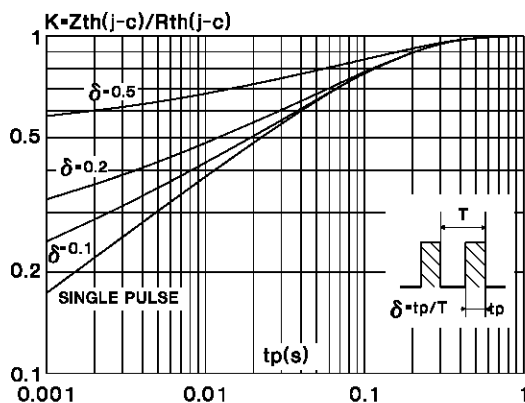
**Fig.5 :** Non repetitive surge peak forward current versus overload duration.  
(Maximum values) (TO220AC)



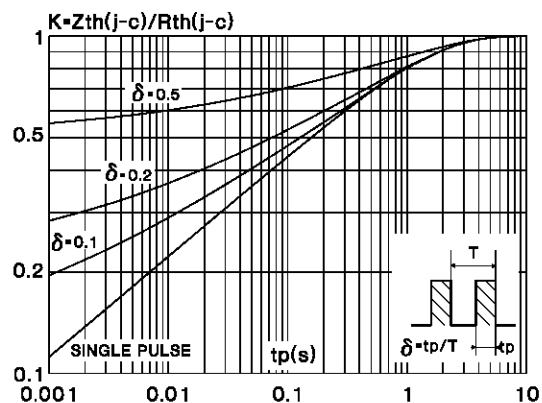
**Fig.6 :** Non repetitive surge peak forward current versus overload duration.  
(Maximum values) (ISOWATT220AC)



**Fig.7 :** Relative variation of thermal transient impedance junction to case versus pulse duration.  
(TO220AC)

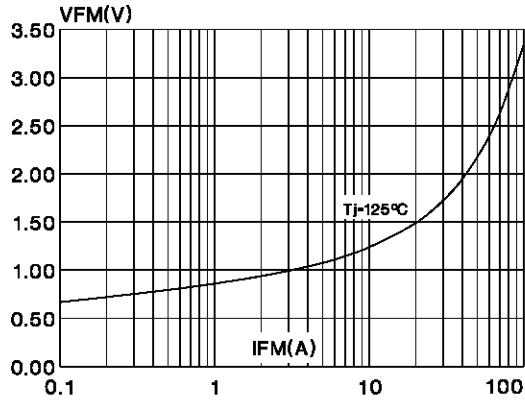


**Fig.8 :** Relative variation of thermal transient impedance junction to case versus pulse duration.  
(ISOWATT220AC)

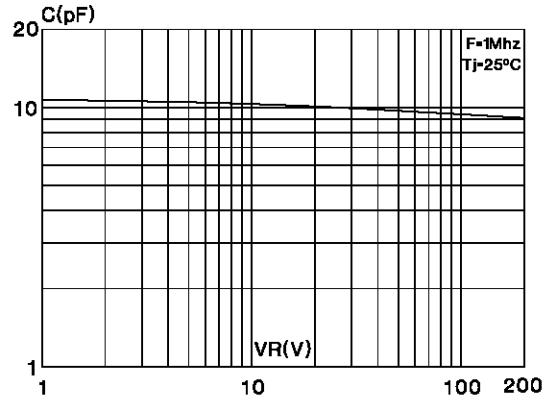


# STPR310D/F / STPR320D/F

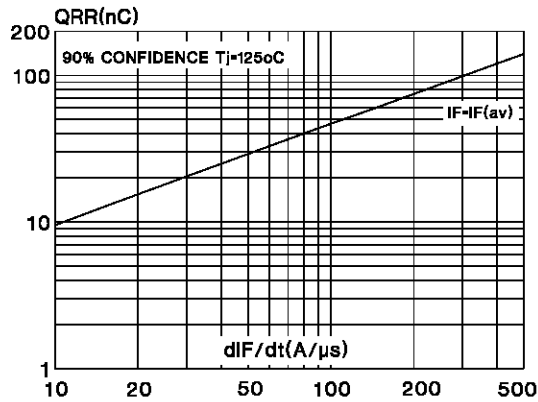
**Fig.9 :** Forward voltage drop versus forward current. (Maximum values)



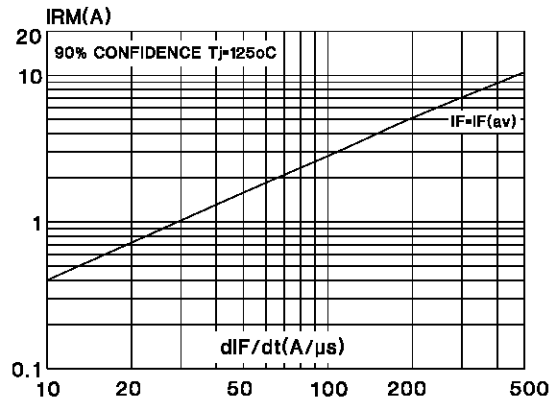
**Fig.10 :** Junction capacitance versus reverse voltage applied. (Typical values)



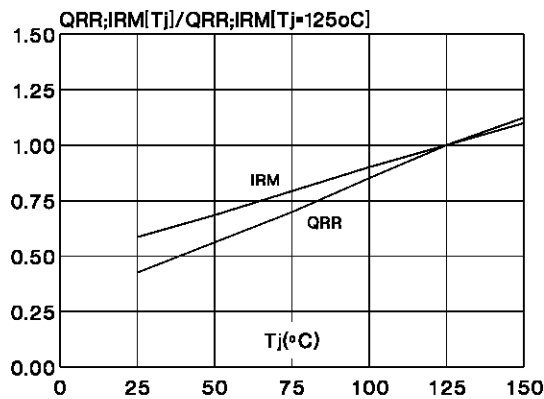
**Fig.11 :** Recovery charge versus  $dI/dt$ .



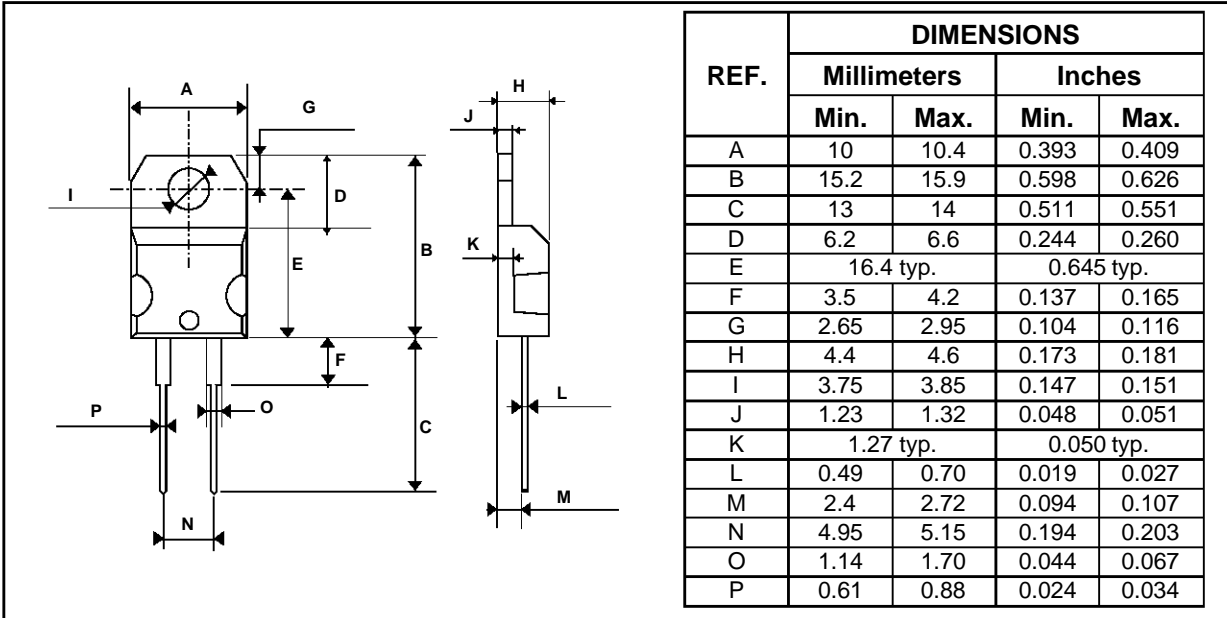
**Fig.12 :** Peak reverse current versus  $dI/dt$ .



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

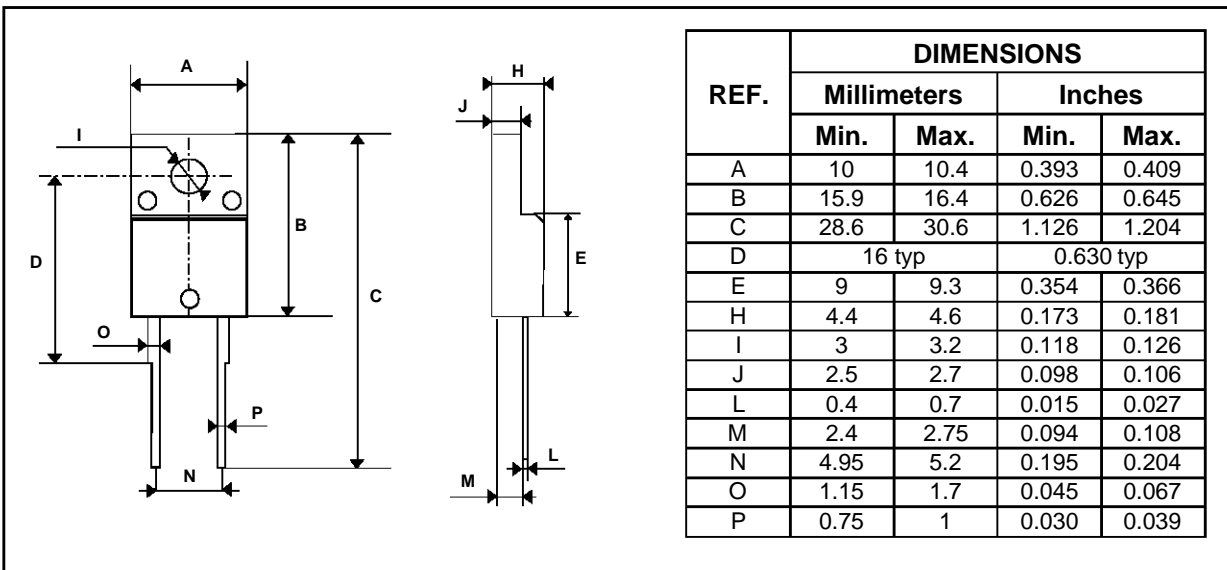


**PACKAGE MECHANICAL DATA**  
TO220AC (JEDEC outline)



Cooling method : C  
 Marking : Type number  
 Weight : 1.9 g  
 Recommended torque value : 0.55m.N  
 Maximum torque value : 0.7m.N

**PACKAGE MECHANICAL DATA**  
ISOWATT220AC (JEDEC outline)



Cooling method : C  
 Marking : Type number  
 Weight : 2 g  
 Recommended torque value : 0.55m.N  
 Maximum torque value : 0.70m.N  
 Electrical Isolation : 2000V DC  
 Capacitance : 12pF

Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1994 SGS-THOMSON Microelectronics - All Rights Reserved

TURBOSWITCH, TRANSIL, TRISIL, SNUBBERLESS are Trademarks of SGS-THOMSON Microelectronics.

SGS-THOMSON Microelectronics GROUP OF COMPANIES

Australia - Brazil - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands - Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A