

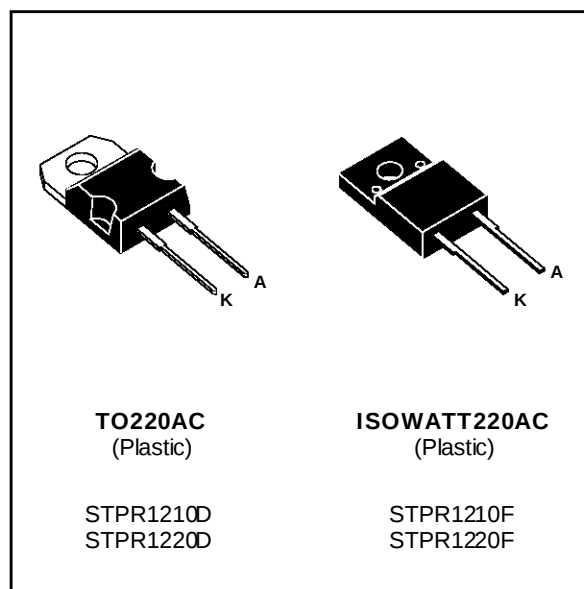
## ULTRA FAST RECOVERY RECTIFIER DIODES

- 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                       |              |                                      | 30                             | A    |
| I <sub>F(AV)</sub>                 | Average Forward Current<br>$\delta = 0.5$ | TO220AC      | T <sub>c</sub> = 115°C               | 12                             | A    |
|                                    |                                           | ISOWATT220AC | T <sub>c</sub> = 80°C                |                                |      |
| I <sub>FSM</sub>                   | Surge Non Repetitive Forward Current      |              | T <sub>p</sub> = 10 ms<br>Sinusoidal | 120                            | A    |
| T <sub>stg</sub><br>T <sub>j</sub> | Storage and Junction Temperature Range    |              |                                      | - 65 to + 150<br>- 65 to + 150 | °C   |

| Symbol           | Parameter                       | STPR           |                | Unit |
|------------------|---------------------------------|----------------|----------------|------|
|                  |                                 | 1210D<br>1210F | 1220D<br>1220F |      |
| 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      | 2.5   | °C/W |
|                      |               | ISOWATT220AC | 5.0   |      |

## STPR1210D/F / STPR1220D/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   | $\mu\text{A}$ |
|            | $T_j = 100^\circ\text{C}$ |                     |      |      | 0.8  | mA            |
| $V_F^{**}$ | $T_j = 125^\circ\text{C}$ | $I_F = 12\text{ A}$ |      |      | 0.99 | V             |
|            | $T_j = 125^\circ\text{C}$ | $I_F = 24\text{ A}$ |      |      | 1.20 |               |
|            | $T_j = 25^\circ\text{C}$  | $I_F = 24\text{ A}$ |      |      | 1.25 |               |

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

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

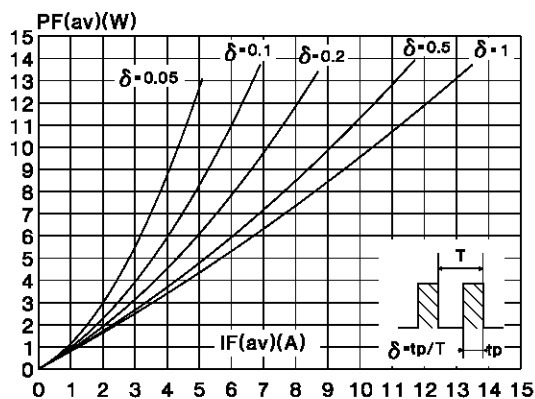
#### RECOVERY CHARACTERISTICS

| Symbol   | Tests Conditions         |                                                                   | Min. | Typ. | Max. | Unit |
|----------|--------------------------|-------------------------------------------------------------------|------|------|------|------|
| $t_{rr}$ | $T_j = 25^\circ\text{C}$ | $I_F = 0.5\text{ A}$ $I_R = 1\text{ A}$ $I_{rr} = 0.25\text{ A}$  |      |      | 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   |      | ns   |
| $V_{FP}$ | $T_j = 25^\circ\text{C}$ | $I_F = 1\text{ A}$ $t_r = 10\text{ ns}$                           |      | 3    |      | V    |

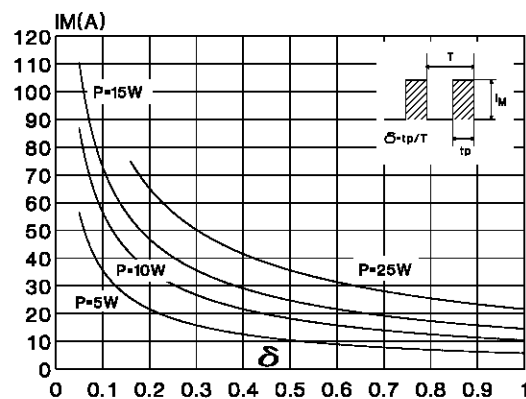
To evaluate the conduction losses use the following equation :

$$P = 0.78 \times I_F(\text{AV}) + 0.0175 I_F^2(\text{RMS})$$

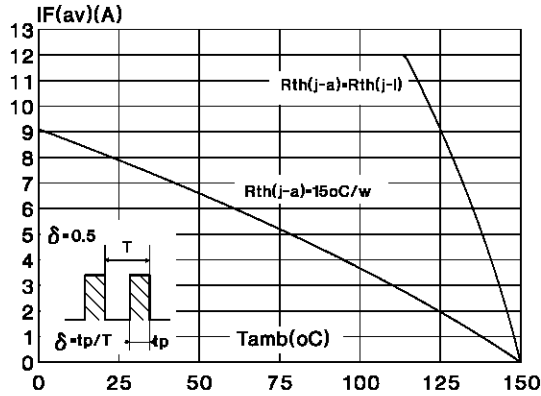
**Fig.1** : Average forward power dissipation versus average forward current.



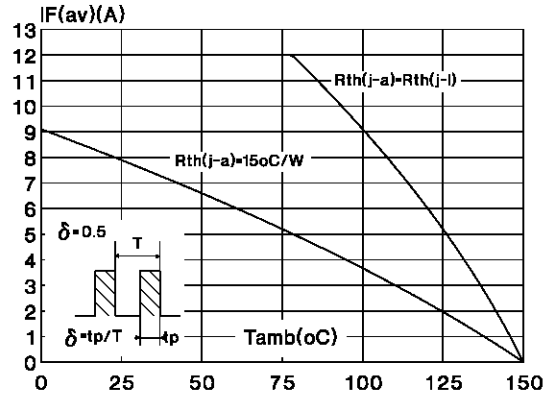
**Fig.2** : Peak current versus form factor.



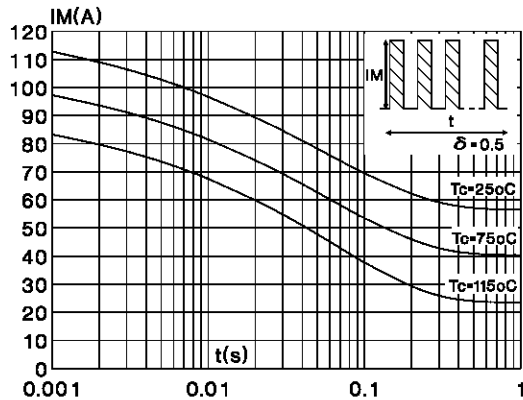
**Fig.3** : Average current versus ambient temperature.  
(duty cycle : 0.5) (TO220AC)



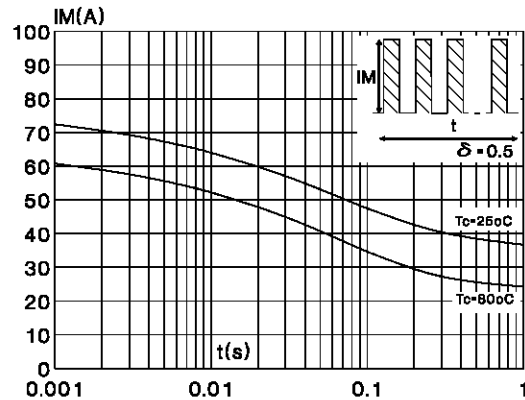
**Fig.4** : Average current versus ambient temperature.  
(duty cycle : 0.5) (ISOWATT220AC)



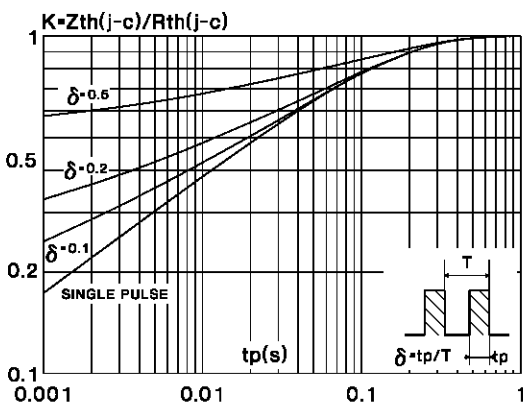
**Fig.5** : Non repetitive surge peak forward current versus  
overload duration.  
(Maximum values) (TO220AC)



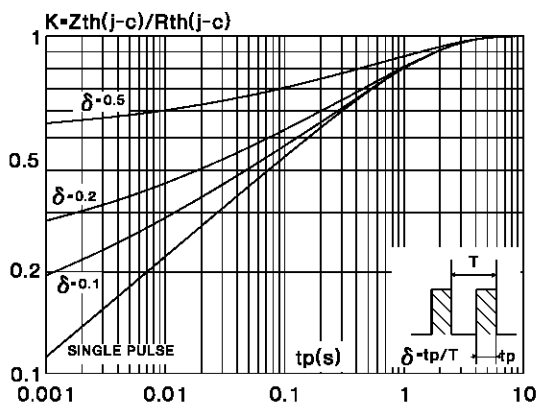
**Fig.6** : Non repetitive surge peak forward current versus  
overload duration.  
(Maximum values) (ISOWATT220AC)



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

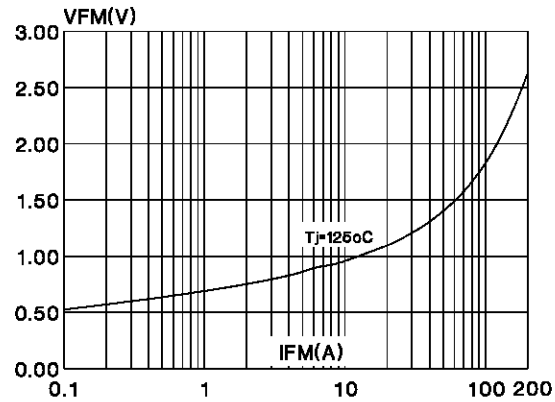


**Fig.8** : Relative variation of thermal transient impedance  
junction to case versus pulse duration.  
(ISOWATT220AC)

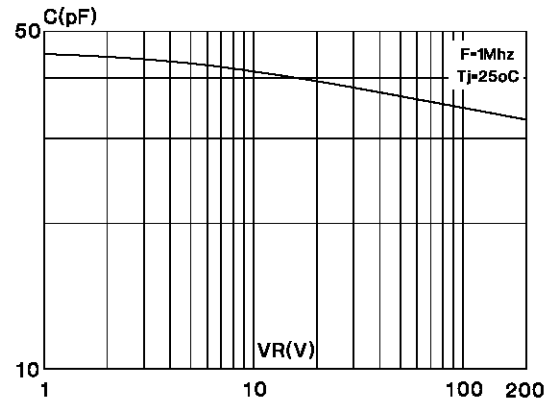


## STPR1210D/F / STPR1220D/F

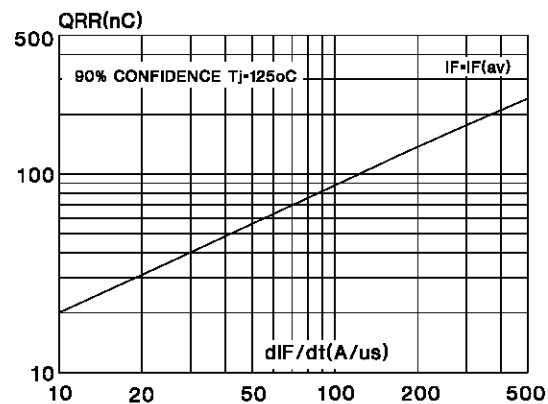
**Fig.9 :** Forward voltage drop versus forward current.  
(Maximum values)



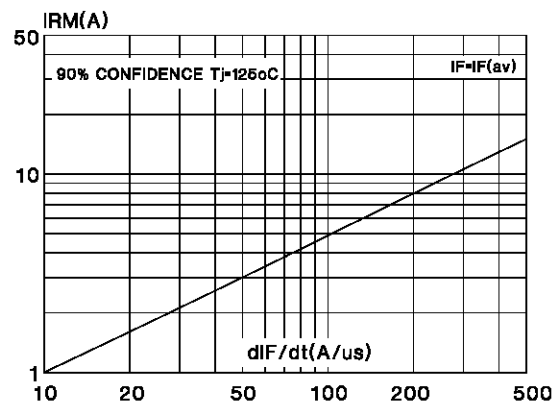
**Fig.10 :** Junction capacitance versus reverse voltage applied. (Typical values)



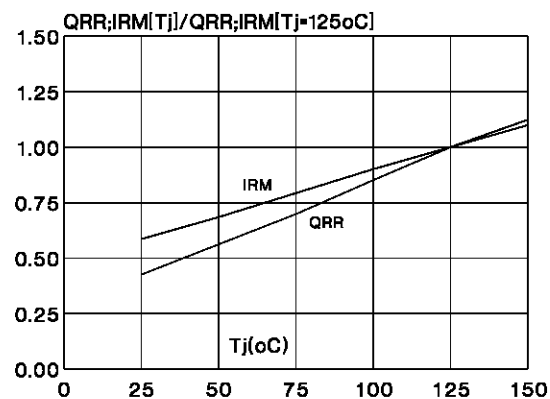
**Fig.11 :** Recovery charge versus  $dI_F/dt$ .



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

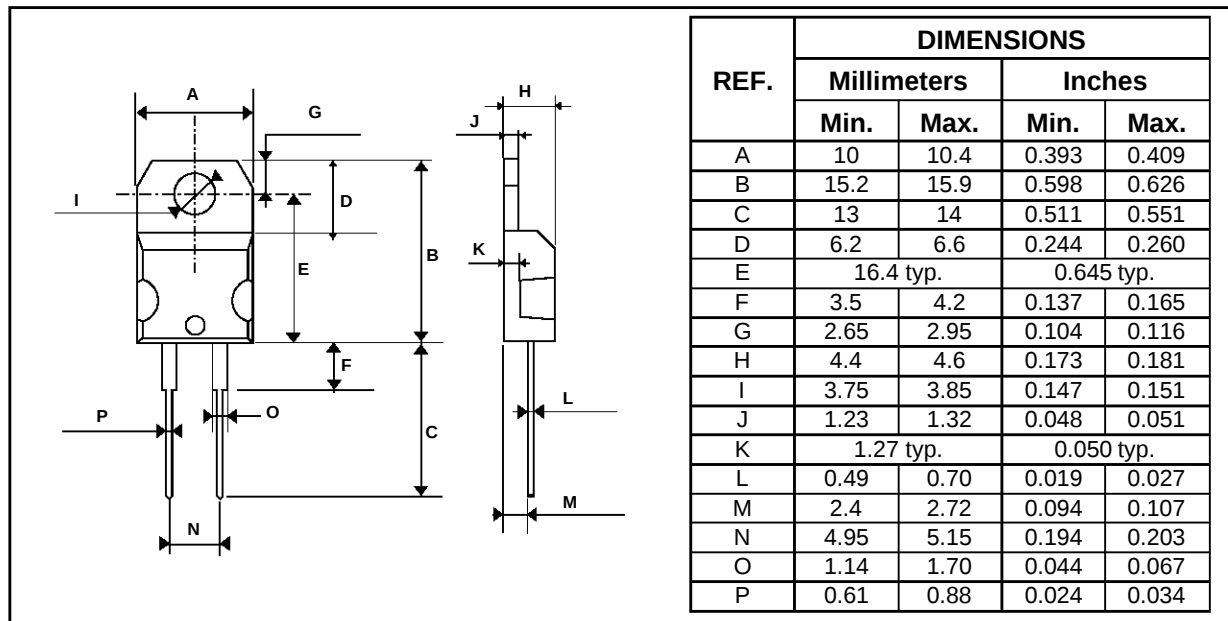


**Fig.13 :** Dynamic parameters versus junction temperature.



**PACKAGE MECHANICAL DATA**

TO220AC (JEDEC outline)



Cooling method : C

Marking : Type number

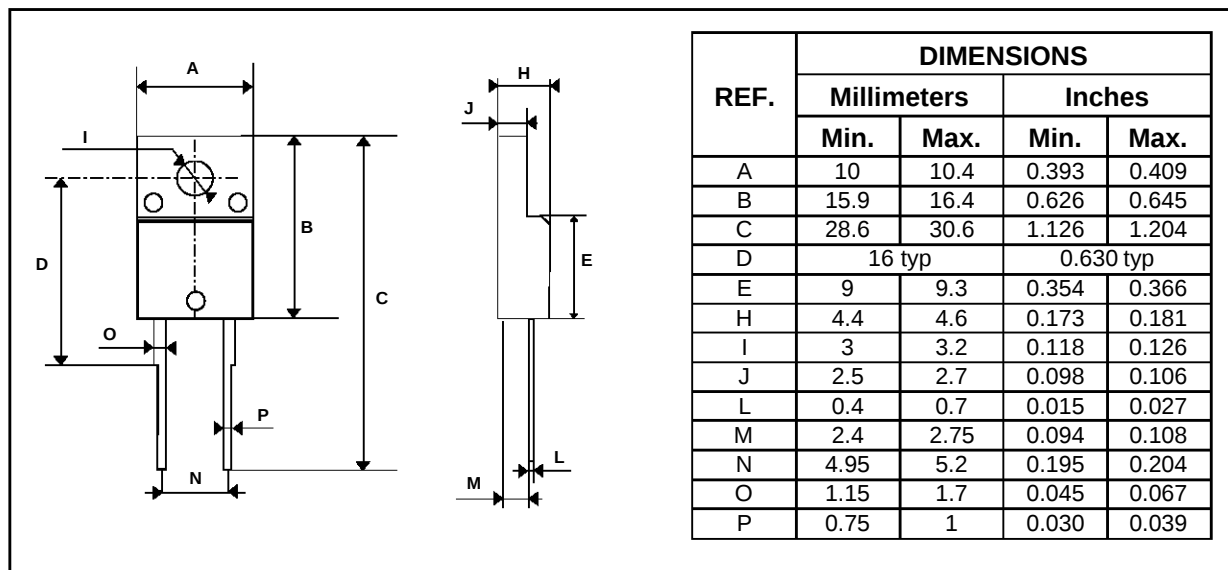
Weight : 1.9 g

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

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