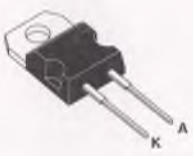
SGS-THOMSON MICROELECTRONICS

# STPR810D/F
# STPR820D/F

## ULTRA FAST RECOVERY RECTIFIER DIODES

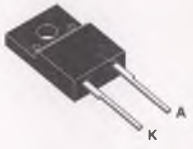
### FEATURES

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




**TO220AC**
(Plastic)

STPR810D
STPR820D




**ISOWATT220AC**
(Plastic)

STPR810F
STPR820F

### 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 |
|---|---|---|---|---|---|
| $I_{F(RMS)}$ | RMS Forward Current | | | 20 | A |
| $I_{F(AV)}$ | Average Forward Current $\delta = 0.5$ | TO220AC | Tc = 120°C | 8 | A |
| | | ISOWATT220AC | Tc = 100°C | | |
| $I_{FSM}$ | Surge Non Repetitive Forward Current | | Tp = 10 ms Sinusoidal | 80 | A |
| Tstg<br>Tj | Storage and Junction Temperature Range | | | - 65 to + 150<br>- 65 to + 150 | °C |

| Symbol | Parameter | STPR | | Unit |
|---|---|---|---|---|
| | | 810D<br>810F | 820D<br>820F | |
| $V_{RRM}$ | Repetitive Peak Reverse Voltage | 100 | 200 | V |

### THERMAL RESISTANCE

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| Rth (j-c) | Junction-case | TO220AC | 3.0 | °C/W |
| | | ISOWATT220AC | 5.5 | |

## ELECTRICAL CHARACTERISTICS

### STATIC CHARACTERISTICS

| Symbol | Tests Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_R$ * | Tj = 25°C | $V_R = V_{RRM}$ | | | 50 | µA |
| | Tj = 100°C | | | | 0.6 | mA |
| $V_F$ ** | Tj = 125°C | $i_F$ = 8 A | | | 0.99 | V |
| | Tj = 125°C | $I_F$ = 16 A | | | 1.20 | |
| | Tj = 25°C | $I_F$ = 16 A | | | 1.25 | |

**Pulse test :** * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

### RECOVERY CHARACTERISTICS

| Symbol | Tests Conditions | | | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|---|
| trr | Tj = 25°C | $I_F$ = 0.5 A | $I_R$ = 1A | Irr = 0.25 A | | | 30 | ns |
| tfr | Tj = 25°C | $I_F$ = 1 A | tr = 10 ns | $V_{FR} = 1.1 \times V_F$ | | 20 | | ns |
| $V_{FP}$ | Tj = 25°C | $I_F$ = 1 A | tr = 10 ns | | | 3 | | V |

To evaluate the conduction losses use the following equation :
$P = 0.78 \times I_{F(AV)} + 0.026\ I_F^2(RMS)$

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

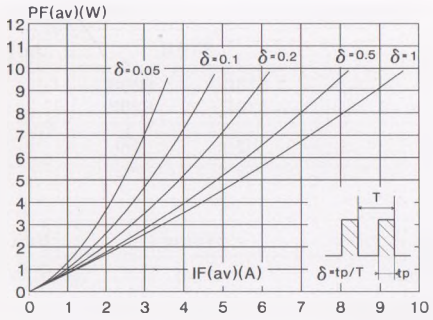



**Fig.2 :** Peak current versus form factor.

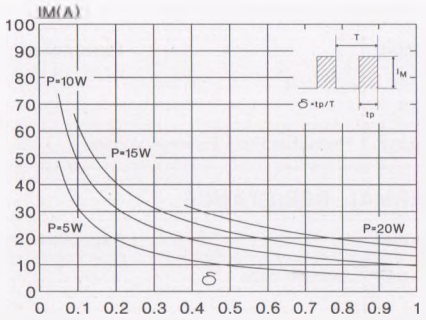


**Fig.3 :** Average current versus ambient temperature. (duty cycle : 0.5) (TO220AC)

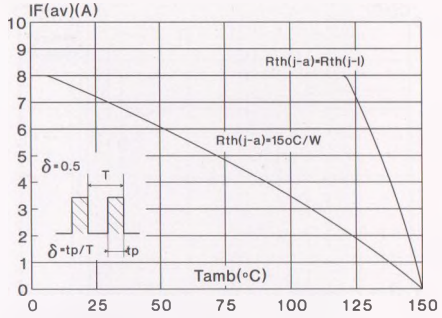



**Fig.4 :** Average current versus ambient temperature. (duty cycle : 0.5) (ISOWATT220AC)

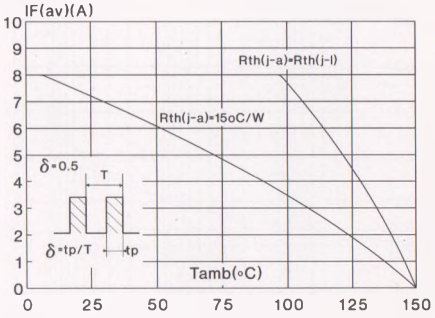



**Fig.5 :** Non repetitive surge peak forward current versus overload duration. (Maximum values) (TO220AC)

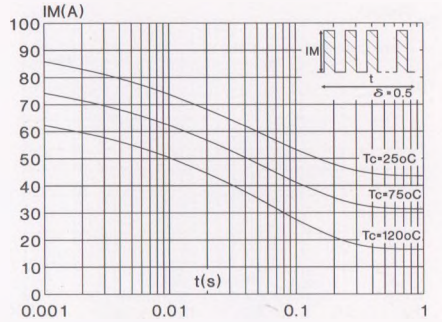



**Fig.6 :** Non repetitive surge peak forward current versus overload duration. (Maximum values) (ISOWATT220AC)

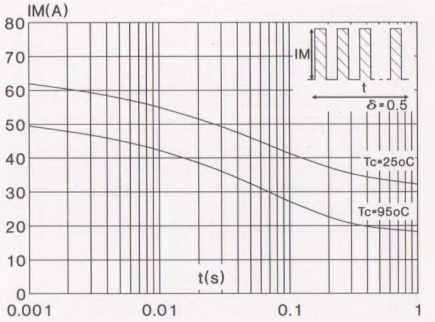



**Fig.7 :** Relative variation of thermal transient impedance junction to case versus pulse duration. (TO220AC)

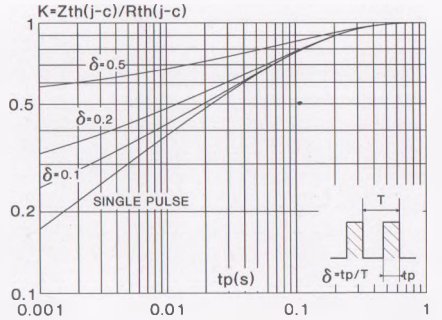



**Fig.8 :** Relative variation of thermal transient impedance junction to case versus pulse duration. (ISOWATT220AC)

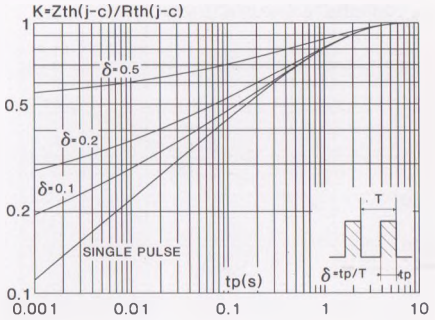


**Fig.9 :** Forward voltage drop versus forward current. (Maximum values)

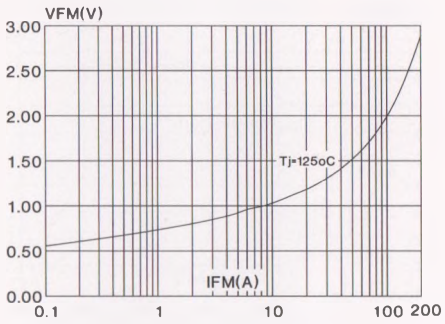



**Fig.10 :** Junction capacitance versus reverse voltage applied. (Typical values)

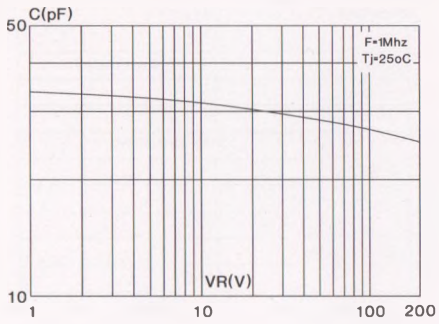



**Fig.11 :** Recovery charge versus dIF/dt.

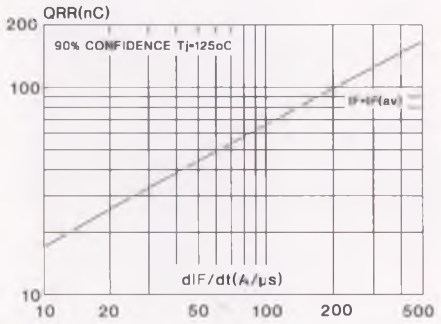



**Fig.12 :** Peak reverse current versus dIF/dt.

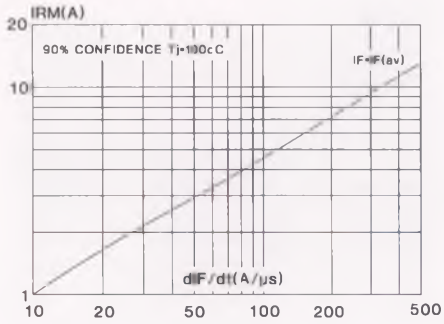



**Fig.13 :** Dynamic parameters versus junction temperature.