

ULTRA-FAST RECOVERY RECTIFIER DIODES

MAIN PRODUCTS CHARACTERISTICS

| | |
|----------------|--------|
| $I_{F(AV)}$ | 5 A |
| V_{RRM} | 200 V |
| T_j (max) | 150°C |
| V_F (max) | 0.99 V |
| t_{rr} (max) | 30 ns |

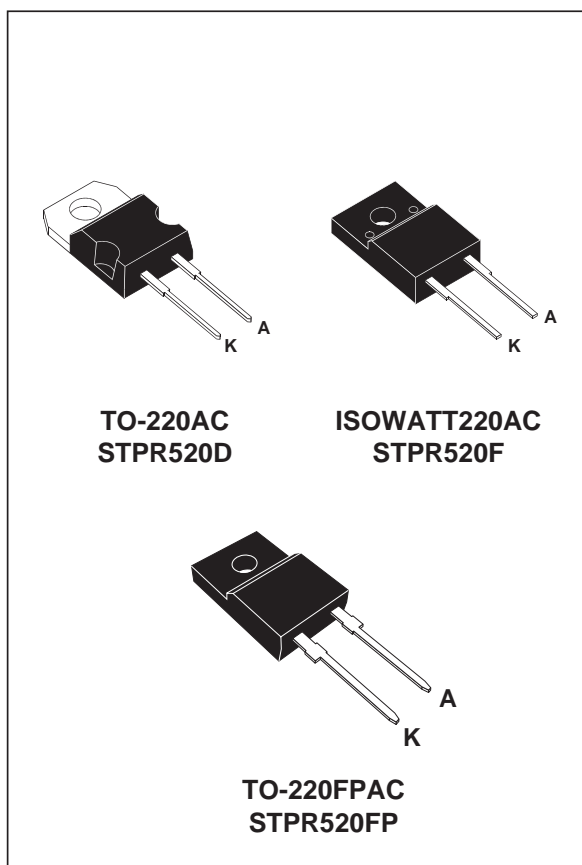
FEATURES

- Suited for SMPS
- Very low forward losses
- Negligible switching losses
- High surge current capability
- Insulated packages:
ISOWATT220AC / TO-220FPAC
Insulation voltage = 2000V DC
Capacitance = 12pF

DESCRIPTION

Low cost single chip rectifier suited for Switch Mode Power Supplies and high frequency DC to DC converters.

Packaged in TO-220AC, ISOWATT220AC and TO-220FPAC, 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 | | | 10 | A |
| $I_{F(AV)}$ | Average forward current $\delta = 0.5$ | TO-220AC | $T_c = 125^\circ\text{C}$ | 5 | A |
| | | ISOWATT220AC TO-220FPAC | $T_c = 115^\circ\text{C}$ | | |
| I_{FSM} | Surge non repetitive forward current | | $T_p = 10$ ms Sinusoidal | 50 | A |
| T_{stg} | Storage temperature range | | | - 65 to + 150 | °C |
| T_j | Maximum operating junction temperature | | | + 150 | |

STPR520D/F/FP

THERMAL RESISTANCES

| Symbol | Parameter | | Value | Unit |
|---------------|------------------|---------------------------|-------|------|
| $R_{th(j-c)}$ | Junction to case | TO-220AC | 4 | °C/W |
| | | ISOWATT220AC / TO-220FPAC | 6 | |

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 | μA |
| | | $T_j = 100^\circ\text{C}$ | | | | 0.5 | mA |
| V_F ** | Forward voltage drop | $T_j = 125^\circ\text{C}$ | $I_F = 5\text{ A}$ | | | 0.99 | V |
| | | $T_j = 125^\circ\text{C}$ | $I_F = 10\text{ A}$ | | | 1.20 | |
| | | $T_j = 25^\circ\text{C}$ | $I_F = 10\text{ A}$ | | | 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 :

$$P = 0.78 \times I_{F(AV)} + 0.042 \times I_F^2(RMS)$$

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.

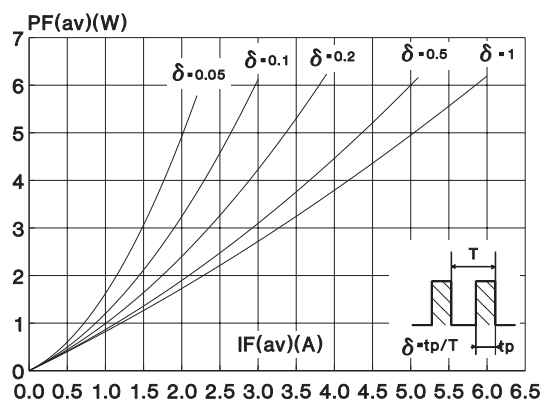


Fig. 2: Peak current versus form factor.

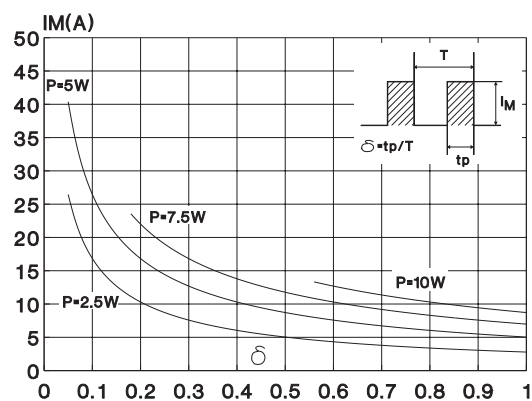


Fig. 3: Average current versus ambient temperature.

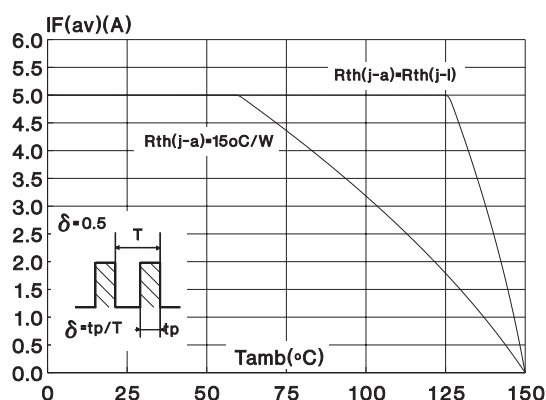


Fig. 4: Average current versus ambient temperature.

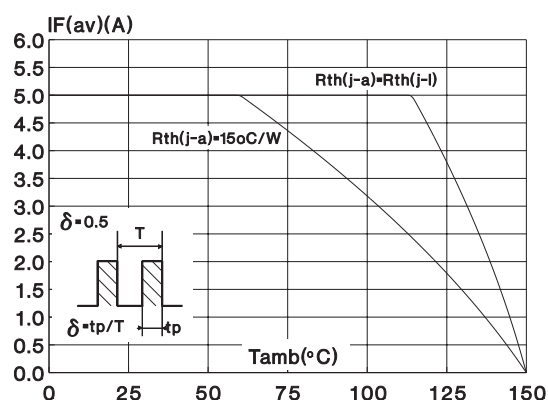


Fig. 5: Non repetitive surge peak forward current versus overload duration (maximum values) (TO-220AC).

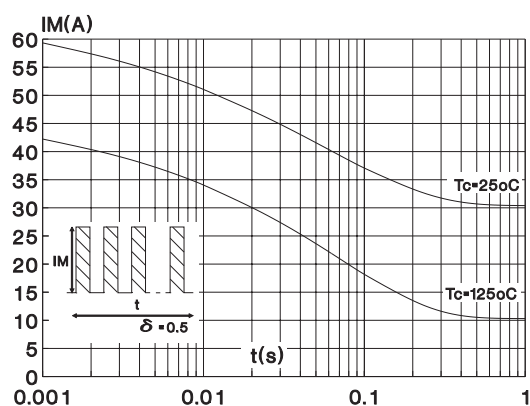


Fig. 6: Non repetitive surge peak forward current versus overload duration (maximum values) (ISOWATT220AC, TO-220FPAC).

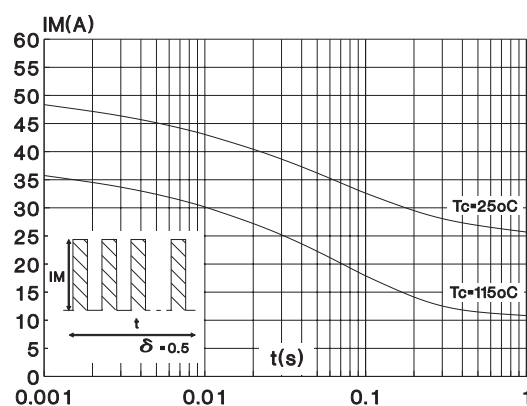


Fig. 7: Relative variation of thermal transient impedance junction to case versus pulse duration (TO-220AC).

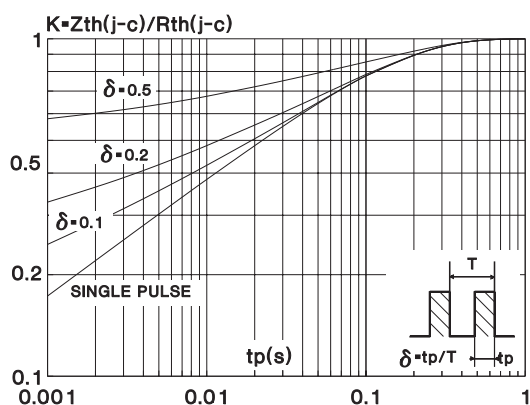


Fig. 8: Relative variation of thermal transient impedance junction to case versus pulse duration (ISOWATT220AC, TO-220FPAC).

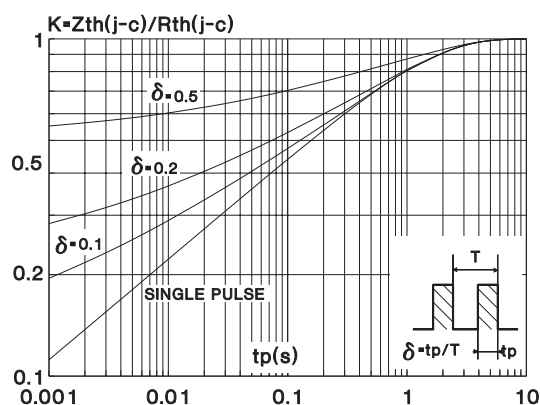


Fig. 9: Forward voltage drop versus forward current.

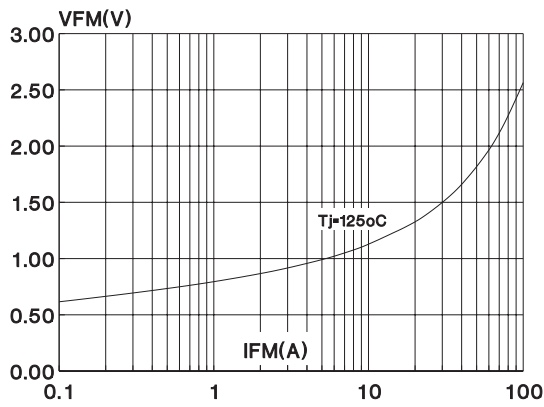


Fig. 10: Junction capacitance versus reverse voltage applied (typical values).

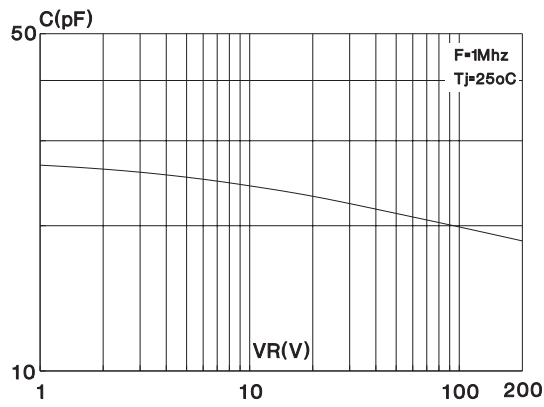


Fig. 11: Recovery charge versus dI_F/dt .

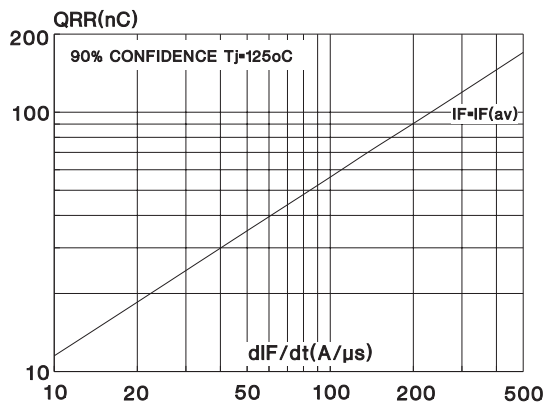


Fig. 12: Peak reverse current versus dI_F/dt .

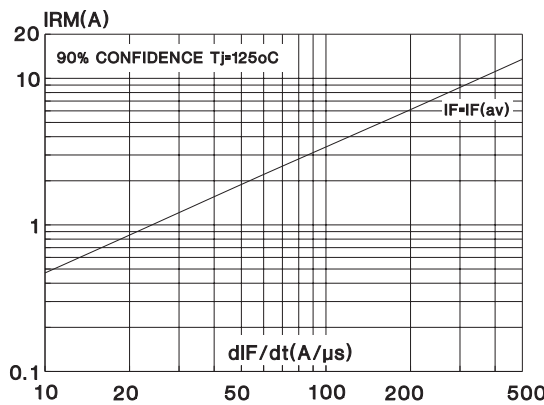
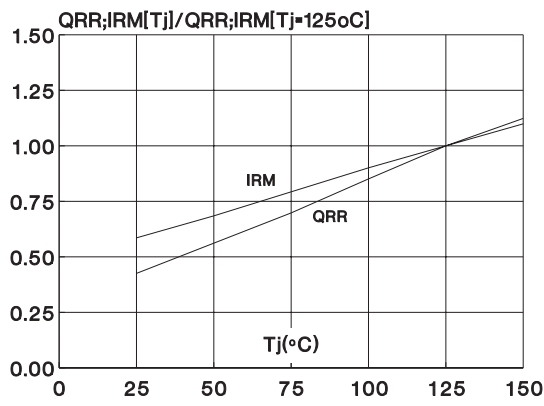
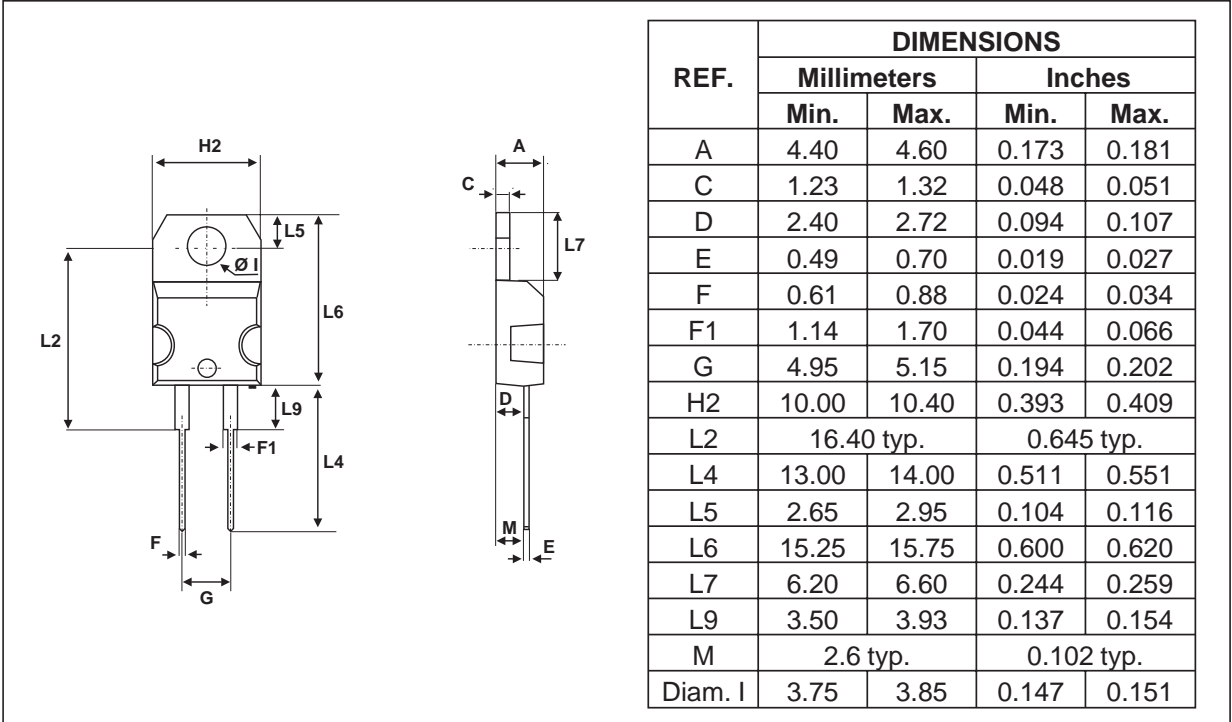


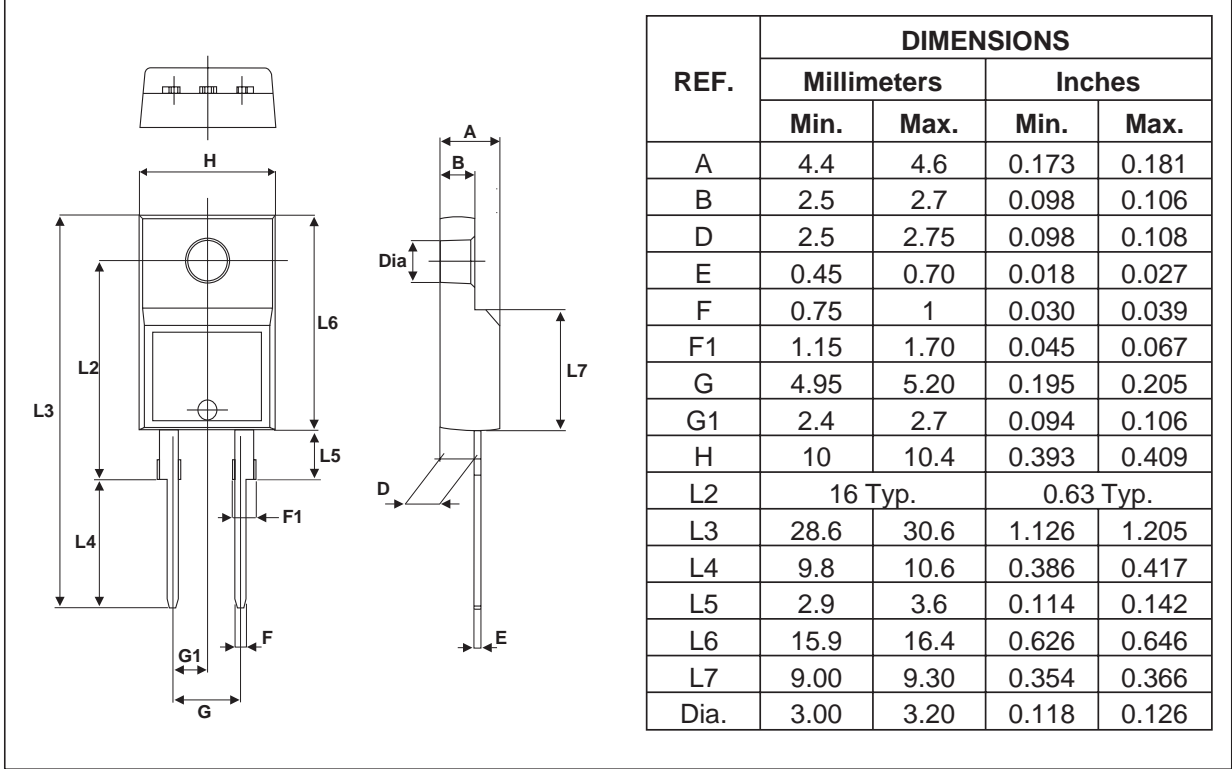
Fig. 13: Dynamic parameters versus junction temperature.



PACKAGE MECHANICAL DATA
TO-220AC

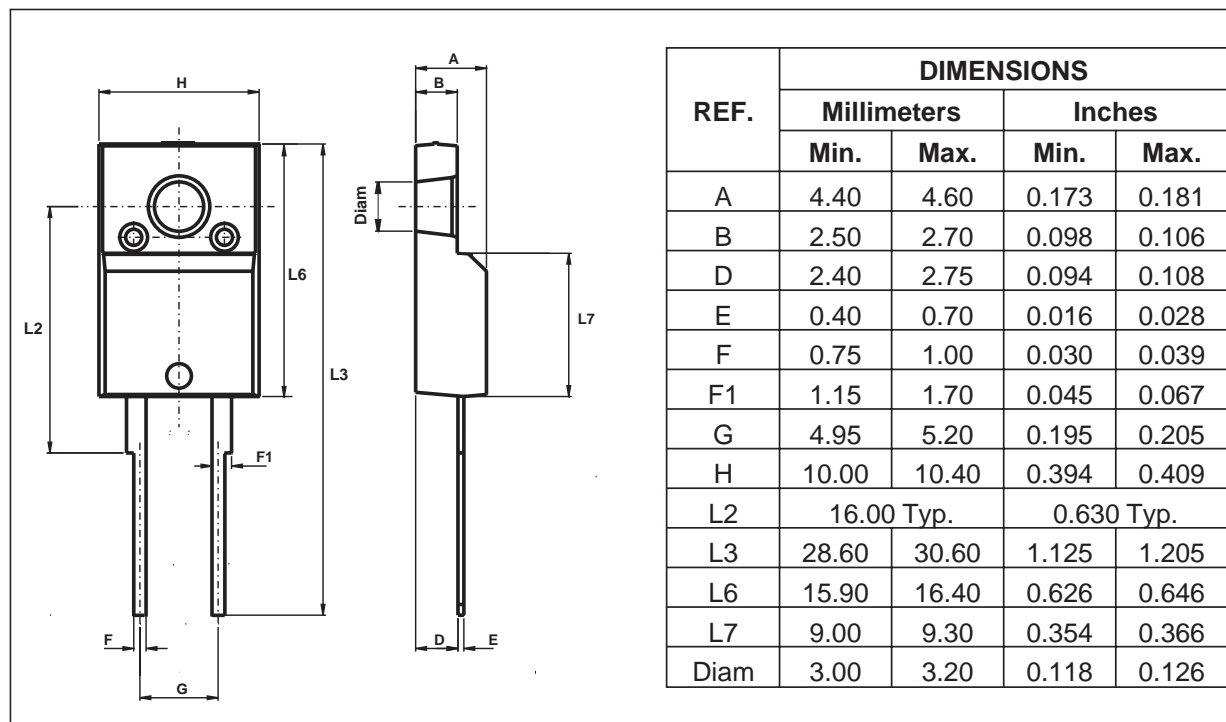


PACKAGE MECHANICAL DATA
TO-220FPAC



STPR520D/F/FP

PACKAGE MECHANICAL DATA ISOWATT220AC



| Type | Marking | Package | Weight | Base Qty | Delivery mode |
|-----------|-----------|--------------|--------|----------|---------------|
| STPR520D | STPR520D | TO-220AC | 2.3 g | 50 | Tube |
| STPR520F | STPR520F | ISOWATT220AC | 2 g | 50 | Tube |
| STPR520FP | STPR520FP | TO-220FPAC | 1.8 g | 50 | Tube |

- Cooling method: by conduction (C)
- Recommended torque value (ISOWATT220AC, TO-220FPAC): 0.55 nm
- Maximum torque value (ISOWATT220AC, TO-220FPAC): 0.7 Nm
- Recommended torque value (TO-220AC): 0.8 Nm
- Maximum torque value (TO-220AC): 1.0 Nm
- Epoxy meets UL94, V0

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