



# STPR620CT/CF/CFP

## ULTRA FAST RECOVERY RECTIFIER DIODES

### MAIN PRODUCT CHARACTERISTICS

|               |         |
|---------------|---------|
| $I_{F(AV)}$   | 2 x 3 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
- Low losses
- Low forward and reverse recovery time
- High surge current capability
- Insulated packages:  
ISOWATT220AB / TO-220FPAB  
Insulation voltage = 2000V DC  
Capacitance = 12pF

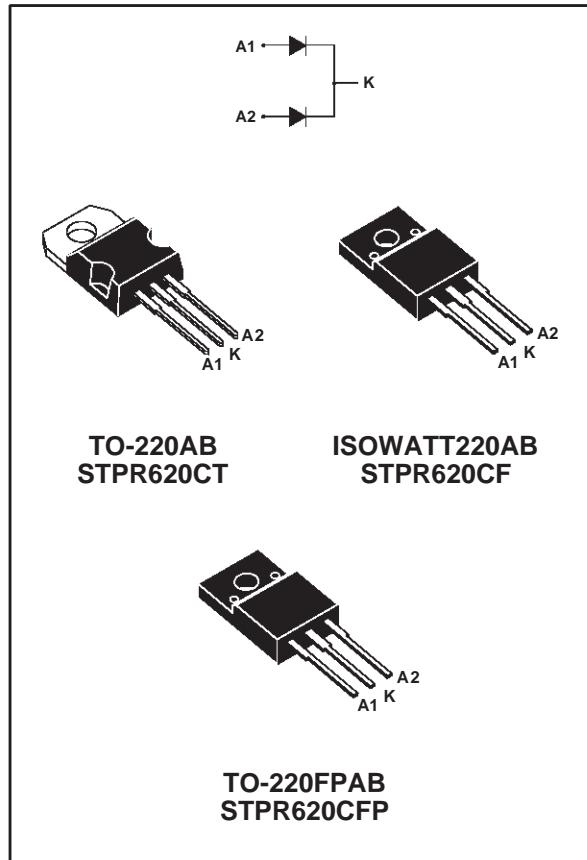
### DESCRIPTION

Low cost dual center tap rectifier suited for Switched Mode Power Supplies and high frequency DC to DC converters.

Packaged in TO-220AB, TO-220FPAB and ISOWATT220AB, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

### ABSOLUTE MAXIMUM (limiting values)

| Symbol       | Parameter                              |                            |                    | Value         | Unit |
|--------------|--|----------------------------|--------------------|---------------|------|
| $V_{RRM}$    | Repetitive peak reverse voltage        |                            |                    | 200           | V    |
| $I_{F(RMS)}$ | RMS forward current                    |                            | Per diode          | 10            | A    |
| $I_{F(AV)}$  | Average forward current $\delta = 0.5$ | TO-220AB                   | $T_c=125^\circ C$  | 3             | A    |
|              |  | ISOWATT220AB<br>TO-220FPAB | $T_c=120^\circ C$  | 6             |      |
| $I_{FSM}$    | Surge non repetitive forward current   |                            | tp=10ms sinusoidal | 30            | A    |
| $T_{stg}$    | Storage temperature range              |                            |                    | - 65 to + 150 | °C   |
| $T_j$        | Maximum junction temperature           |                            |                    | 150           | °C   |



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### THERMAL RESISTANCES

| Symbol        | Parameter        |                            | Value     | Unit |
|---------------|------------------|----------------------------|-----------|------|
| $R_{th(j-c)}$ | Junction to case | TO-220AB                   | Per diode | 6.5  |
|               |                  | ISOWATT220AB<br>TO-220FPAB | Per diode | 8.5  |

When the diodes 1 and 2 are used simultaneously :

$$\Delta T_j(\text{diode 1}) = P(\text{diode 1}) \times R_{th(j-c)} (\text{Per diode}) + P(\text{diode 2}) \times R_{th(c)}$$

### ELECTRICAL CHARACTERISTICS

#### STATIC CHARACTERISTICS

| Symbol     | Test Conditions           |                     | Min. | Typ. | Max. | Unit          |
|------------|---------------------------|---------------------|------|------|------|---------------|
| $I_R^*$    | $T_j = 25^\circ\text{C}$  | $V_R = V_{RRM}$     |      |      | 50   | $\mu\text{A}$ |
|            | $T_j = 100^\circ\text{C}$ |                     |      |      | 0.6  | 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 :

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

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

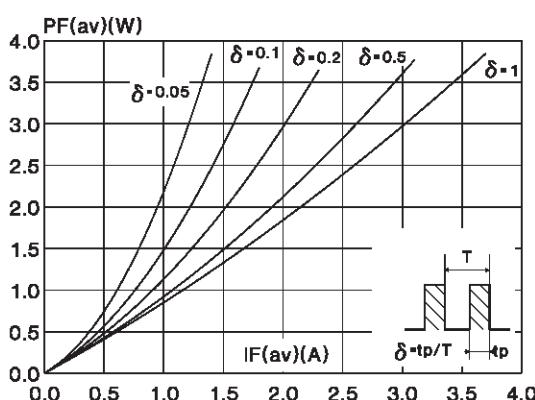
### RECOVERY CHARACTERISTICS

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

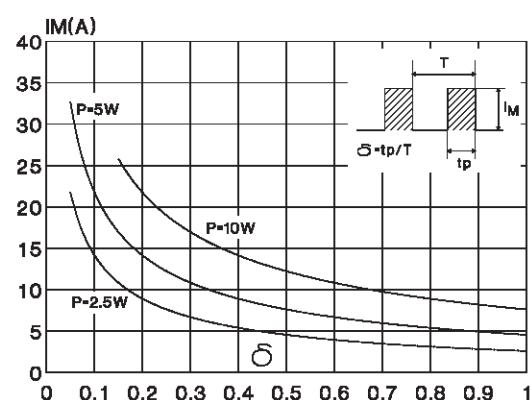
To evaluate the conduction losses use the following equation :

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

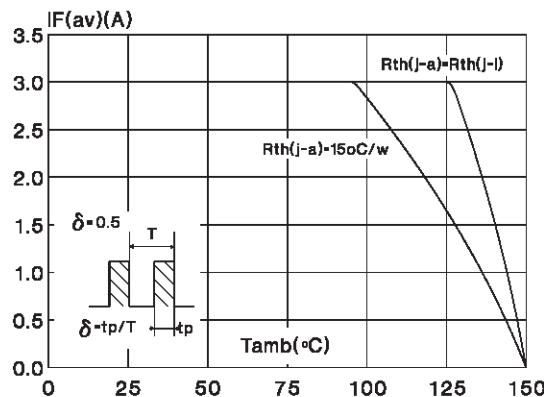
**Fig. 1:** Average forward power dissipation versus average forward current (Per diode).



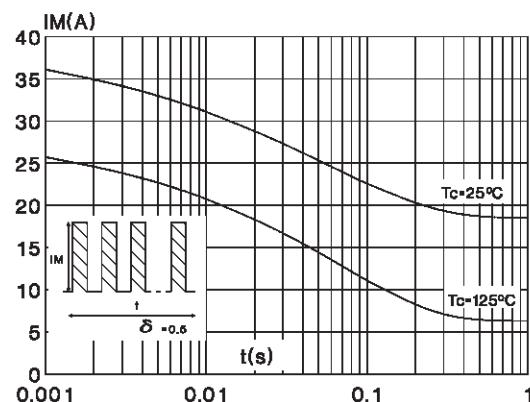
**Fig. 2:** Peak current versus form factor (Per diode).



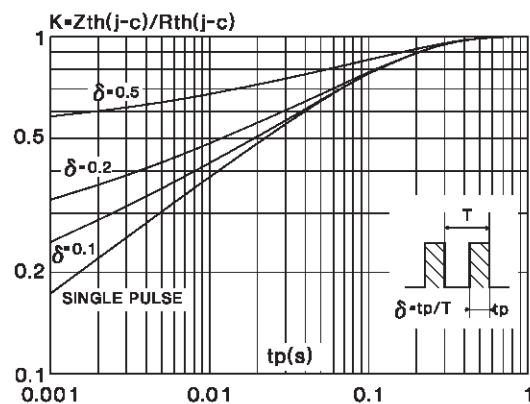
**Fig. 3:** Average current versus ambient temperature.(duty cycle: 0.5) (TO-220AB)



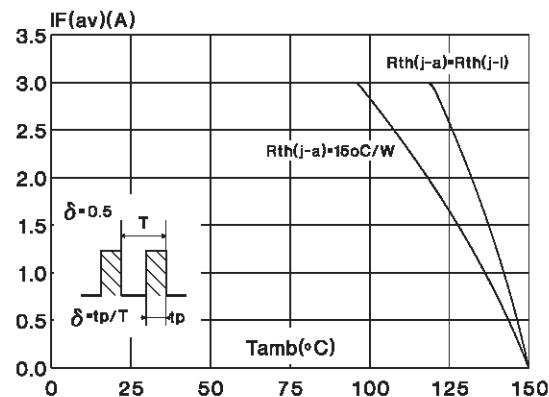
**Fig. 5:** Non repetitive surge peak forward current versus overload duration (Maximum values) (Per diode) (TO-220AB).



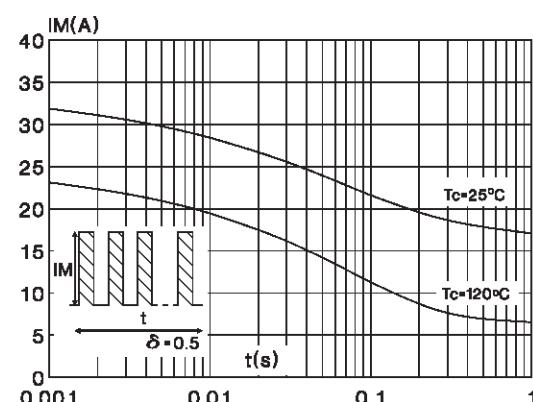
**Fig. 7:** Relative variation of thermal transient impedance junction to case versus pulse duration (Per diode) (TO-220AB).



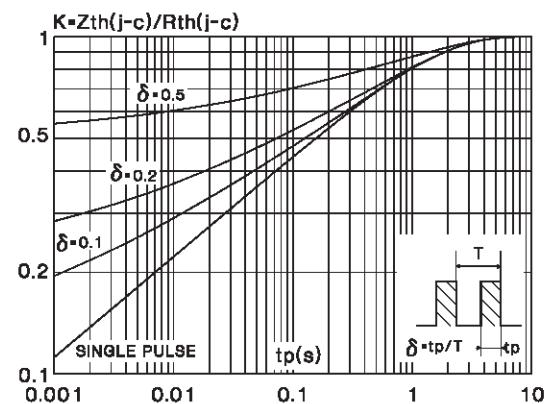
**Fig. 4:** Average current versus ambient temperature.(duty cycle : 0.5) (ISOWATT220AB / TO-220FPAB)



**Fig. 6:** Non repetitive surge peak forward current versus overload duration (Maximum values) (Per diode) (ISOWATT220AB / TO-220FPAB).

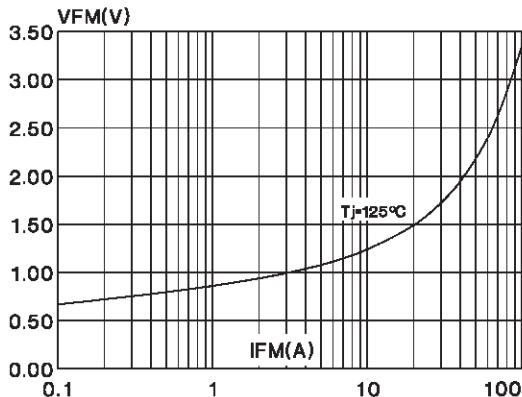


**Fig. 8:** Relative variation of thermal transient impedance junction to case versus pulse duration (Per diode) (ISOWATT220AB / TO-220FPAB).

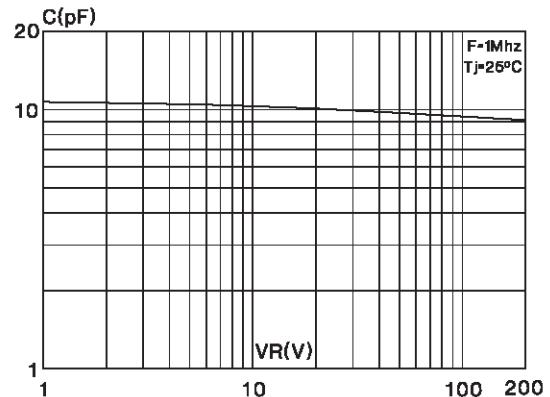


## STPR620CT/CF/CFP

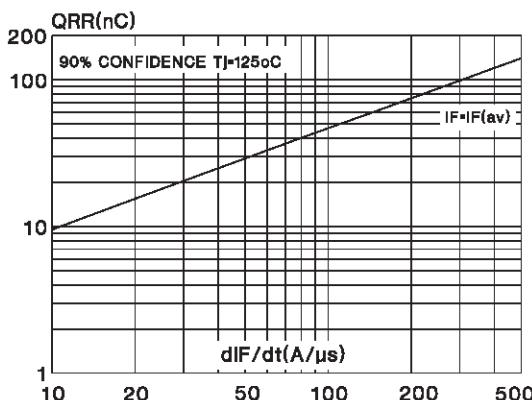
**Fig. 9:** Forward voltage drop versus forward current. (Maximum values) (Per diode).



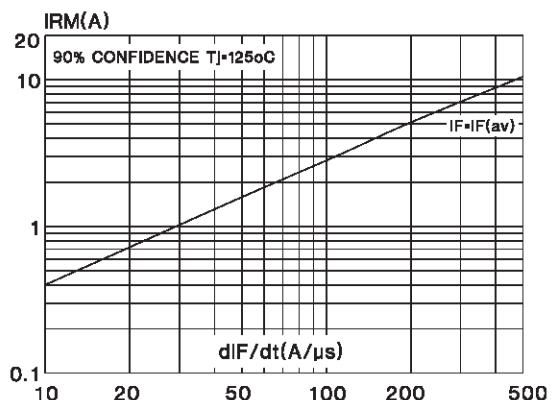
**Fig. 10:** Junction capacitance versus reverse voltage applied (Typical values) (Per diode).



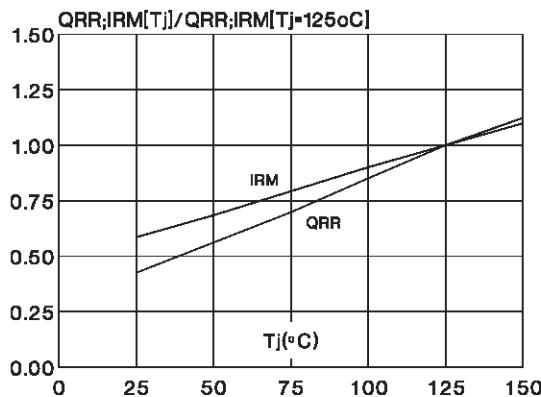
**Fig. 11:** Recovery charges versus  $dI_F/dt$  (Per diode).



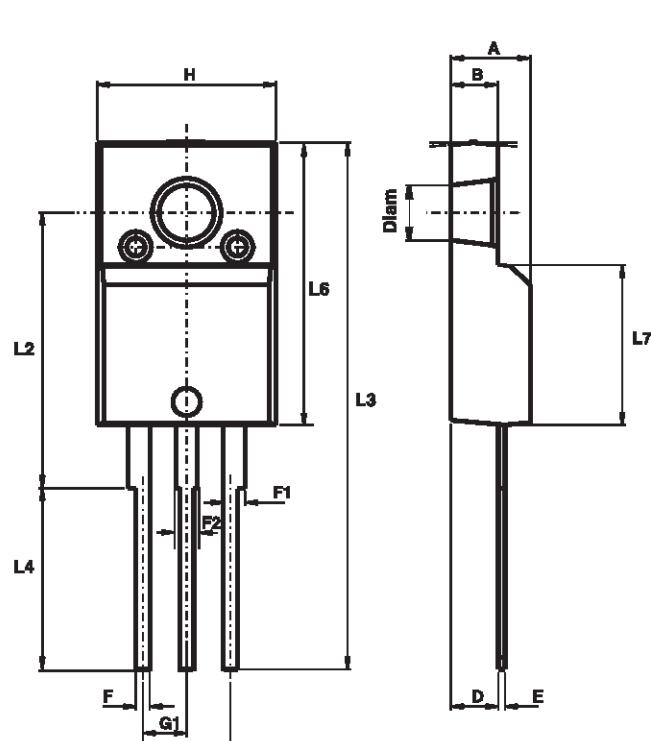
**Fig. 12:** Peak reverse current versus  $dI_F/dt$  (Per diode).



**Fig. 13:** Dynamic parameters versus junction temperature (Per diode).



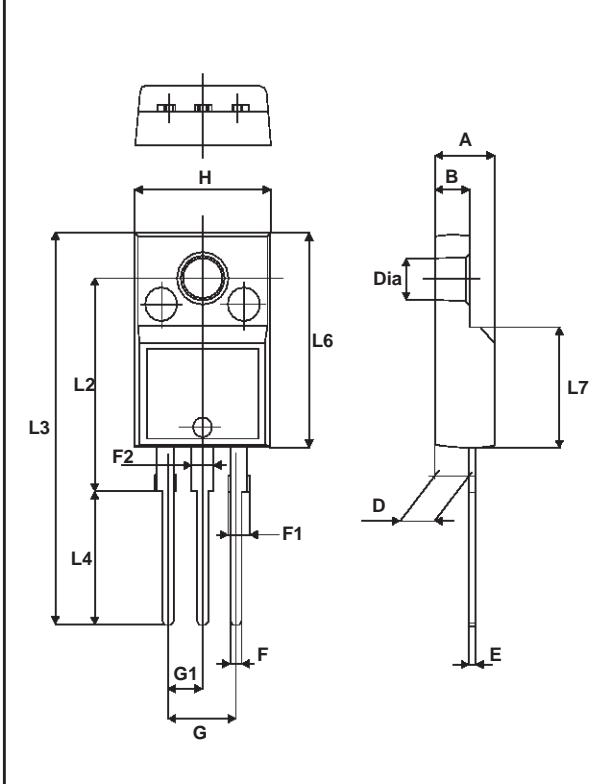
**PACKAGE MECHANICAL DATA**  
ISOWATT220AB (JEDEC outline)



| REF. | DIMENSIONS  |       |            |       |
|------|-------------|-------|------------|-------|
|      | Millimeters |       | Inches     |       |
|      | Min.        | Max.  | Min.       | Max.  |
| A    | 4.40        | 4.60  | 0.173      | 0.181 |
| B    | 2.50        | 2.70  | 0.098      | 0.106 |
| D    | 2.50        | 2.75  | 0.098      | 0.108 |
| E    | 0.40        | 0.70  | 0.016      | 0.028 |
| F    | 0.75        | 1.00  | 0.030      | 0.039 |
| F1   | 1.15        | 1.70  | 0.045      | 0.067 |
| F2   | 1.15        | 1.70  | 0.045      | 0.067 |
| G    | 4.95        | 5.20  | 0.195      | 0.205 |
| G1   | 2.40        | 2.70  | 0.094      | 0.106 |
| H    | 10.00       | 10.40 | 0.394      | 0.409 |
| L2   | 16.00 typ.  |       | 0.630 typ. |       |
| L3   | 28.60       | 30.60 | 1.125      | 1.205 |
| L4   | 9.80        | 10.60 | 0.386      | 0.417 |
| L6   | 15.90       | 16.40 | 0.626      | 0.646 |
| L7   | 9.00        | 9.30  | 0.354      | 0.366 |
| Diam | 3.00        | 3.20  | 0.118      | 0.126 |

## STPR620CT/CF/CFP

### PACKAGE MECHANICAL DATA TO-220FPAB



| REF. | DIMENSIONS  |      |           |       |
|------|-------------|------|-----------|-------|
|      | Millimeters |      | Inches    |       |
|      | Min.        | Max. | Min.      | Max.  |
| A    | 4.4         | 4.9  | 0.173     | 0.193 |
| B    | 2.5         | 2.9  | 0.098     | 0.114 |
| D    | 2.45        | 2.75 | 0.096     | 0.108 |
| E    | 0.4         | 0.70 | 0.016     | 0.027 |
| F    | 0.60        | 1    | 0.024     | 0.039 |
| F1   | 1.15        | 1.70 | 0.045     | 0.067 |
| F2   | 1.15        | 1.70 | 0.045     | 0.067 |
| G    | 4.95        | 5.20 | 0.195     | 0.204 |
| G1   | 2.40        | 2.70 | 0.094     | 0.106 |
| H    | 10          | 10.7 | 0.393     | 0.421 |
| L2   | 16 Typ.     |      | 0.63 Typ. |       |
| L3   | 28.6        | 30.6 | 1.126     | 1.204 |
| L4   | 9.8         | 10.7 | 0.385     | 0.421 |
| L6   | 15.8        | 16.4 | 0.621     | 0.645 |
| L7   | 9.00        | 9.90 | 0.354     | 0.389 |
| Dia. | 2.9         | 3.50 | 0.114     | 0.18  |

- Cooling method : by conduction (C)
- Recommended torque value (ISOWATT220AB, TO-220FPAB): 0.55 Nm
- Maximum torque value (ISOWATT220AB, TO-220FPAB): 0.7 Nm
- Recommended torque value (TO-220AB): 0.8 Nm
- Maximum torque value (TO-220AB): 1.0 Nm
- Epoxy meets UL94, V0

**PACKAGE MECHANICAL DATA**  
TO-220AB (JEDEC outline)

| REF.  | DIMENSIONS  |       |            |       |
|-------|-------------|-------|------------|-------|
|       | Millimeters |       | Inches     |       |
|       | Min.        | Max.  | Min.       | Max.  |
| A     | 4.40        | 4.60  | 0.173      | 0.181 |
| C     | 1.23        | 1.32  | 0.048      | 0.051 |
| D     | 2.40        | 2.72  | 0.094      | 0.107 |
| E     | 0.49        | 0.70  | 0.019      | 0.027 |
| F     | 0.61        | 0.88  | 0.024      | 0.034 |
| F1    | 1.14        | 1.70  | 0.044      | 0.066 |
| F2    | 1.14        | 1.70  | 0.044      | 0.066 |
| G     | 4.95        | 5.15  | 0.194      | 0.202 |
| G1    | 2.40        | 2.70  | 0.094      | 0.106 |
| H2    | 10          | 10.40 | 0.393      | 0.409 |
| L2    | 16.4 typ.   |       | 0.645 typ. |       |
| L4    | 13          | 14    | 0.511      | 0.551 |
| L5    | 2.65        | 2.95  | 0.104      | 0.116 |
| L6    | 15.25       | 15.75 | 0.600      | 0.620 |
| L7    | 6.20        | 6.60  | 0.244      | 0.259 |
| L9    | 3.50        | 3.93  | 0.137      | 0.154 |
| M     | 2.6 typ.    |       | 0.102 typ. |       |
| Diam. | 3.75        | 3.85  | 0.147      | 0.151 |

| Type       | Marking    | Package      | Weight | Base Qty | Delivery mode |
|------------|------------|--------------|--------|----------|---------------|
| STPR620CT  | STPR620CT  | TO-220AB     | 2.23 g | 50       | Tube          |
| STPR620CF  | STPR620CF  | ISOWATT220AB | 2.2 g  | 50       | Tube          |
| STPR620CFP | STPR620CFP | TO-220FPAB   | 2 g    | 50       | Tube          |

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