



# STPS2545CT/CG/CFP

## POWER SCHOTTKY RECTIFIER

### MAIN PRODUCT CHARACTERISTICS

|             |            |
|-------------|------------|
| $I_{F(AV)}$ | 2 x 12.5 A |
| $V_{RRM}$   | 45 V       |
| $T_j$ (max) | 175 °C     |
| $V_F$ (max) | 0.57 V     |

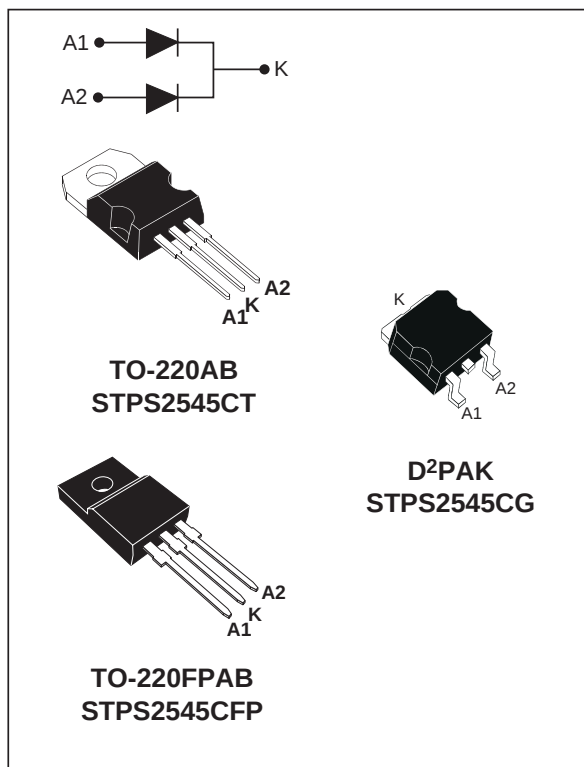
### FEATURES AND BENEFITS

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- EXTREMELY FAST SWITCHING
- LOW THERMAL RESISTANCE
- AVALANCHE CAPABILITY SPECIFIED

### DESCRIPTION

Dual center tap Schottky rectifier suited for Switch Mode Power Supplies and high frequency DC to DC converters.

This device is especially intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.



### ABSOLUTE RATINGS (limiting values, per diode)

| Symbol              | Parameter                                |                                |                           |            | Value       | Unit |
|---------------------|------------------------------------------|--------------------------------|---------------------------|------------|-------------|------|
| V <sub>RRM</sub>    | Repetitive peak reverse voltage          |                                |                           |            | 45          | V    |
| I <sub>F(RMS)</sub> | RMS forward current                      |                                |                           |            | 30          | A    |
| I <sub>F(AV)</sub>  | Average forward current δ = 0.5          | TO-220AB<br>D <sup>2</sup> PAK | Tc = 160°C                | Per diode  | 12.5        | A    |
|                     |                                          | TO-220FPAB                     | Tc = 140°C                | Per device | 25          |      |
| I <sub>FSM</sub>    | Surge non repetitive forward current     |                                | tp = 10 ms sinusoidal     |            | 200         | A    |
| I <sub>RRM</sub>    | Repetitive peak reverse current          |                                | tp = 2 μs square F = 1kHz |            | 1           | A    |
| I <sub>RSM</sub>    | Non repetitive peak reverse current      |                                | tp = 100 μs square        |            | 2           | A    |
| P <sub>ARM</sub>    | Repetitive peak avalanche power          |                                | tp = 1μs Tj = 25°C        |            | 4800        | W    |
| T <sub>stg</sub>    | Storage temperature range                |                                |                           |            | -65 to +175 | °C   |
| Tj                  | Maximum operating junction temperature * |                                |                           |            | 175         | °C   |
| dV/dt               | Critical rate of rise of reverse voltage |                                |                           |            | 10000       | V/μs |

\* :  $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$  thermal runaway condition for a diode on its own heatsink

# STPS2545CT/CG/CFP

## THERMAL RESISTANCES

| Symbol        | Parameter           |                               |           | Value | Unit |
|---------------|---------------------|-------------------------------|-----------|-------|------|
| $R_{th(j-c)}$ | Junction to ambient | TO-220AB / D <sup>2</sup> PAK | Per diode | 1.6   | °C/W |
|               |                     | TO-220FPAB                    |           | 4     |      |
|               |                     | TO-220AB / D <sup>2</sup> PAK | Total     | 1.1   | °C/W |
|               |                     | TO-220FPAB                    |           | 3.5   |      |
| $R_{th(c)}$   |                     | TO-220AB / D <sup>2</sup> PAK | Coupling  | 0.6   | °C/W |
|               |                     | TO-220FPAB                    |           | 3     |      |

When the diodes 1 and 2 are used simultaneously :

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

## STATIC ELECTRICAL CHARACTERISTICS (per diode)

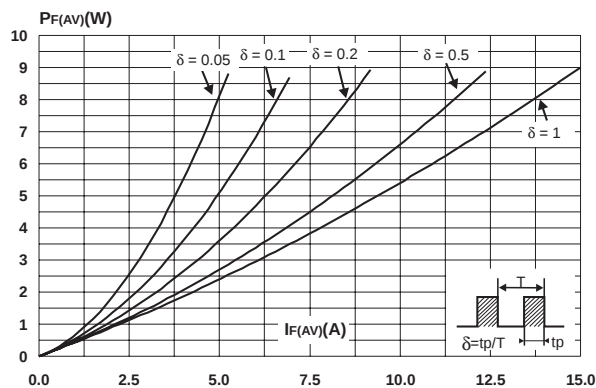
| Symbol  | Parameter               | Tests Conditions          |                       | Min. | Typ. | Max. | Unit          |
|---------|-------------------------|---------------------------|-----------------------|------|------|------|---------------|
| $I_R^*$ | Reverse leakage Current | $T_j = 25^\circ\text{C}$  | $V_R = V_{RRM}$       |      |      | 125  | $\mu\text{A}$ |
|         |                         | $T_j = 125^\circ\text{C}$ |                       |      | 9    | 25   | mA            |
| $V_F^*$ | Forward Voltage drop    | $T_j = 125^\circ\text{C}$ | $I_F = 12.5\text{ A}$ |      | 0.50 | 0.57 | V             |
|         |                         | $T_j = 25^\circ\text{C}$  | $I_F = 25\text{ A}$   |      |      | 0.84 |               |
|         |                         | $T_j = 125^\circ\text{C}$ | $I_F = 25\text{ A}$   |      | 0.65 | 0.72 |               |

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

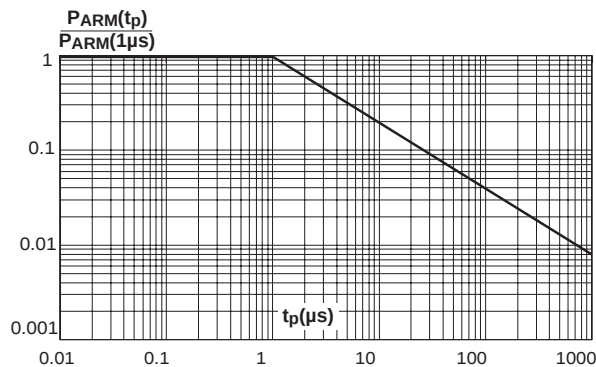
To evaluate the conduction losses use the following equation :

$$P = 0.42 \times I_{F(AV)} + 0.012 \times I_{F(RMS)}^2$$

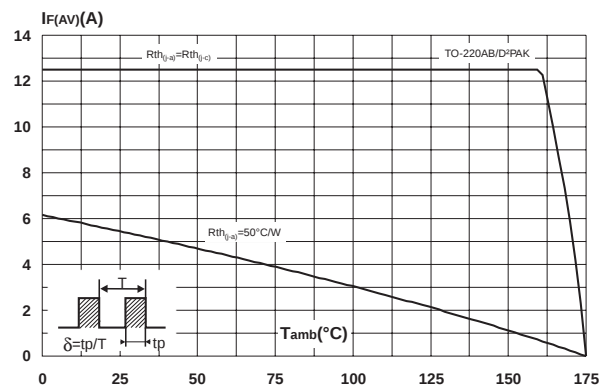
**Fig. 1:** Conduction losses versus average current.



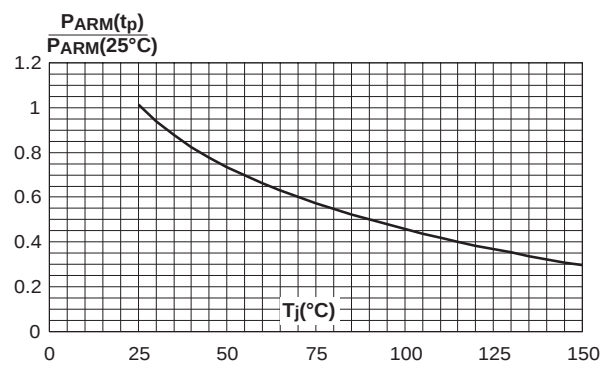
**Fig. 3:** Normalized avalanche power derating versus pulse duration.



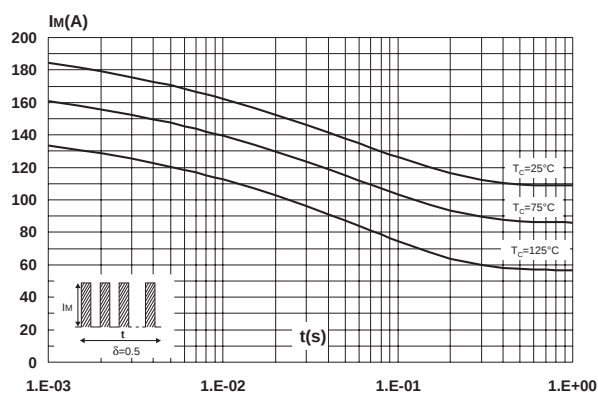
**Fig. 2:** Average forward current versus ambient temperature ( $\delta=0.5$ ).



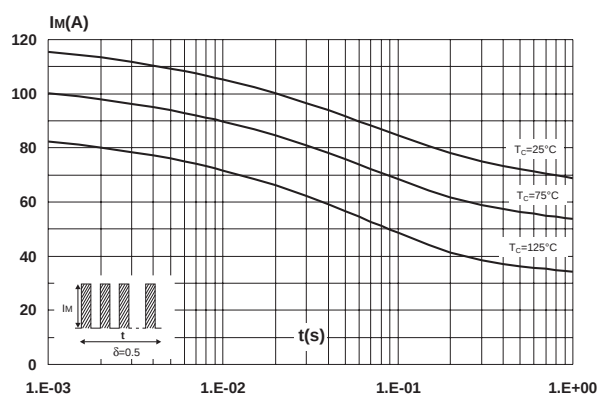
**Fig. 4:** Normalized avalanche power derating versus junction temperature.



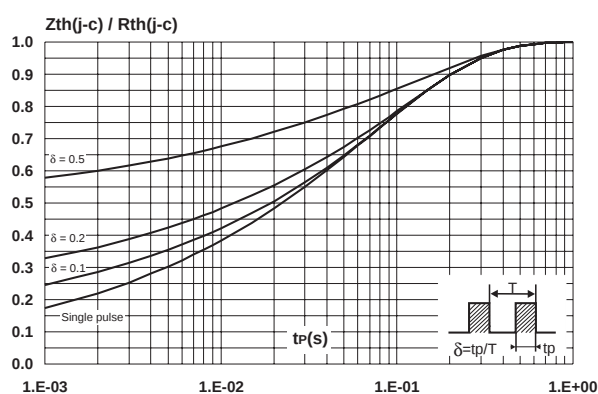
**Fig. 5-1:** Non repetitive surge peak forward current versus overload duration (maximum values) (TO-220AB, D<sup>2</sup>PAK).



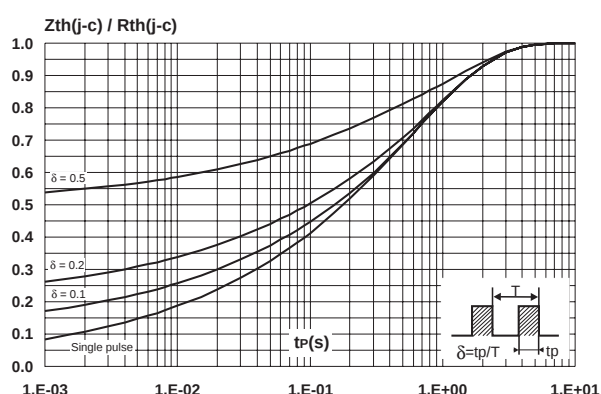
**Fig. 5-2:** Non repetitive surge peak forward current versus overload duration (maximum values) (TO-220FPAB).



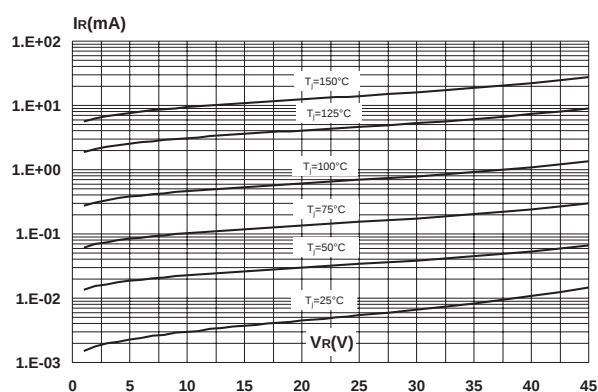
**Fig. 6-1:** Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB, D<sup>2</sup>PAK).



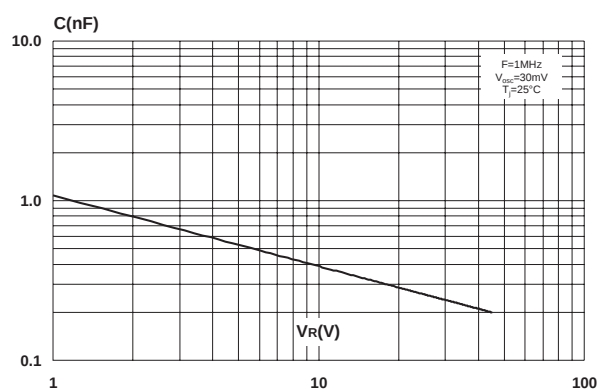
**Fig. 6-2:** Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB).



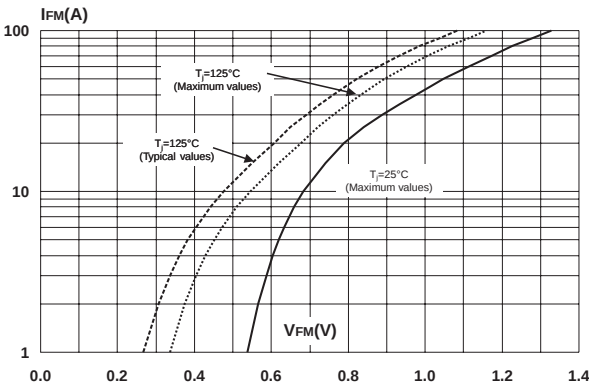
**Fig. 7:** Reverse leakage current versus reverse voltage applied (typical values).



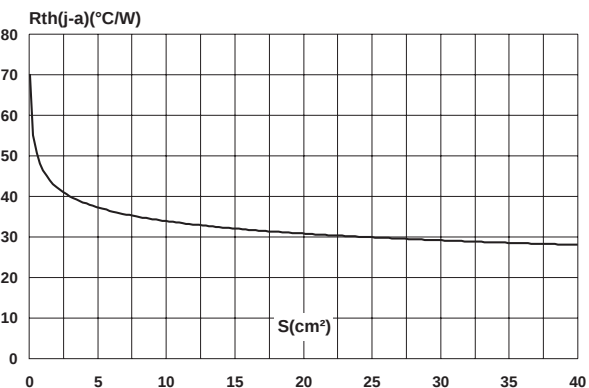
**Fig. 8:** Junction capacitance versus reverse voltage applied (typical values).



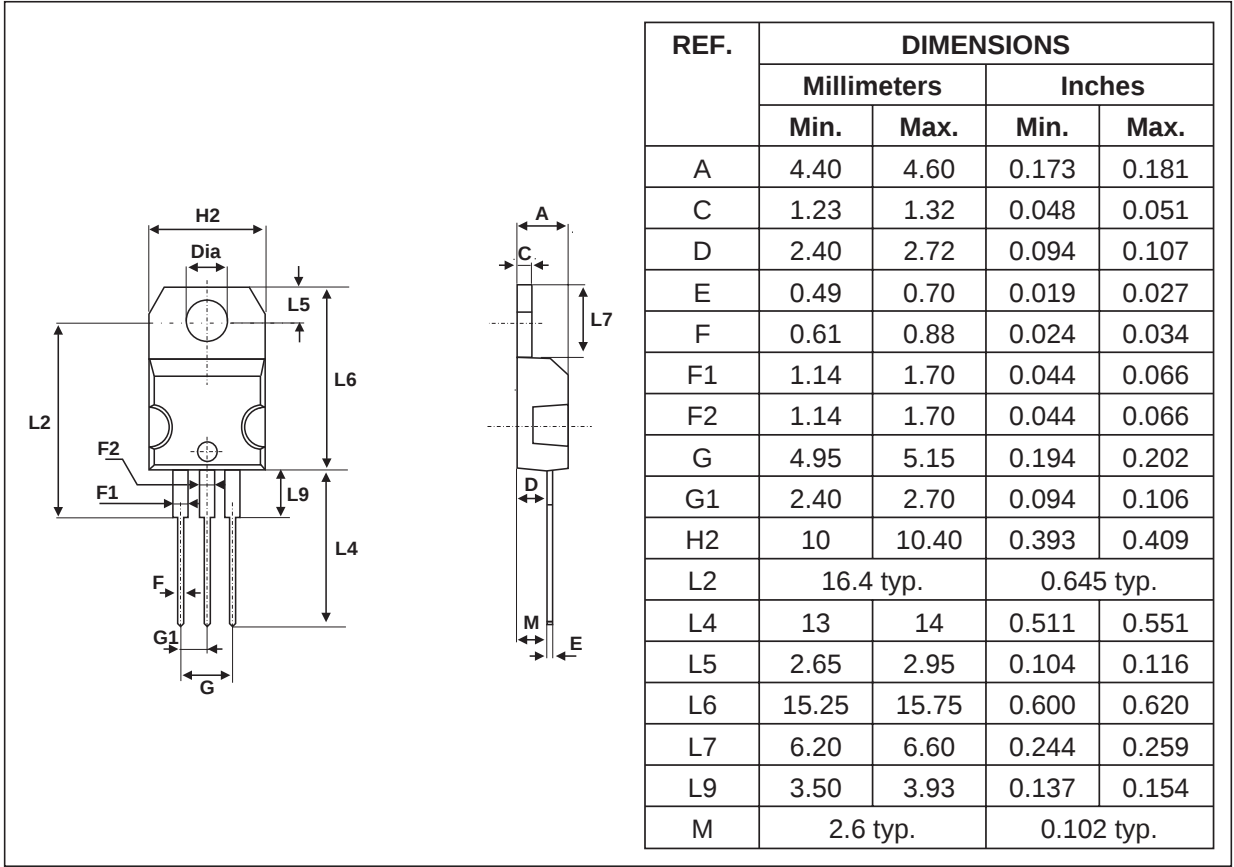
**Fig. 9:** Forward voltage drop versus forward current.



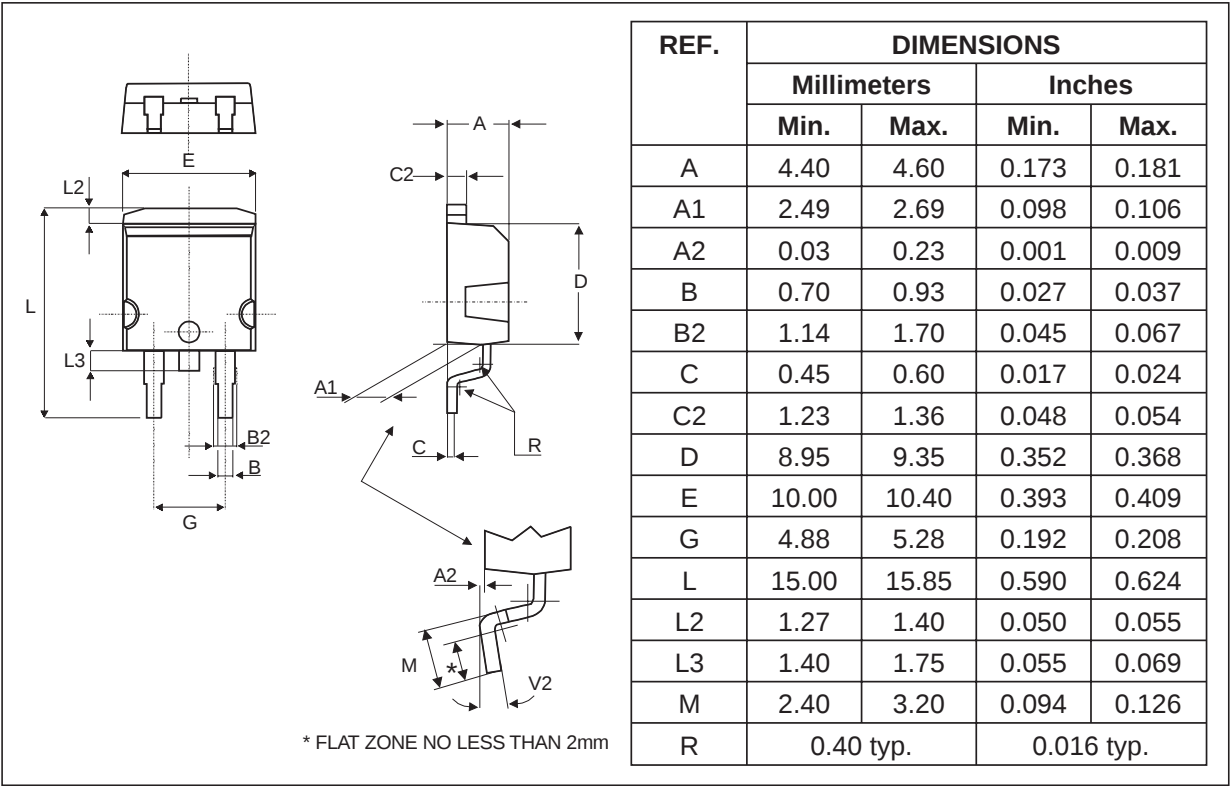
**Fig. 10:** Thermal resistance junction to ambient versus copper surface under tab (epoxy printed board FR4, Cu = 35μm).



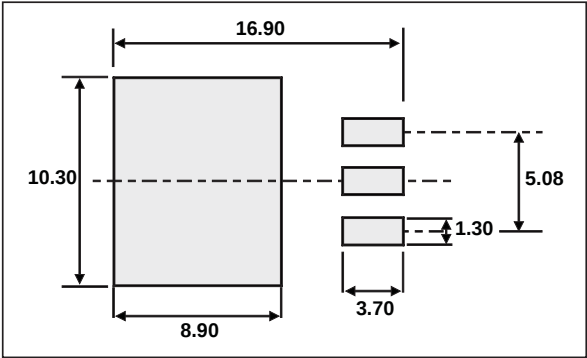
**PACKAGE MECHANICAL DATA**  
**TO-220AB**



PACKAGE MECHANICAL DATA  
D<sup>2</sup>PAK



FOOTPRINT



**PACKAGE MECHANICAL DATA**  
 TO-220FPAB

| REF. | DIMENSIONS  |      |           |       |
|------|-------------|------|-----------|-------|
|      | Millimeters |      | Inches    |       |
|      | Min.        | Max. | Min.      | Max.  |
| A    | 4.4         | 4.6  | 0.173     | 0.181 |
| B    | 2.5         | 2.7  | 0.098     | 0.106 |
| D    | 2.5         | 2.75 | 0.098     | 0.108 |
| E    | 0.45        | 0.70 | 0.018     | 0.027 |
| F    | 0.75        | 1    | 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   | 2.4         | 2.7  | 0.094     | 0.106 |
| H    | 10          | 10.4 | 0.393     | 0.409 |
| L2   | 16 Typ.     |      | 0.63 Typ. |       |
| L3   | 28.6        | 30.6 | 1.126     | 1.205 |
| L4   | 9.8         | 10.6 | 0.386     | 0.417 |
| L5   | 2.9         | 3.6  | 0.114     | 0.142 |
| L6   | 15.9        | 16.4 | 0.626     | 0.646 |
| L7   | 9.00        | 9.30 | 0.354     | 0.366 |
| Dia. | 3.00        | 3.20 | 0.118     | 0.126 |

| Ordering type | Marking     | Package            | Weight | Base qty | Delivery mode |
|---------------|-------------|--------------------|--------|----------|---------------|
| STPS2545CT    | STPS2545CT  | TO-220AB           | 2.20 g | 50       | Tube          |
| STPS2545CFP   | STPS2545CFP | TO-220FPAB         | 2.0 g  | 50       | Tube          |
| STPS2545CG    | STPS2545CG  | D <sup>2</sup> PAK | 1.48 g | 50       | Tube          |
| STPS2545CG-TR | STPS2545CG  | D <sup>2</sup> PAK | 1.48 g | 1000     | Tape & reel   |

**EPOXY MEETS UL94,V0**

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