

## LOW DROP POWER SCHOTTKY RECTIFIER

### MAIN PRODUCT CHARACTERISTICS

|             |          |
|-------------|----------|
| $I_{F(AV)}$ | 2 x 10 A |
| $V_{RRM}$   | 25 V     |
| $T_j (max)$ | 150 °C   |
| $V_F (max)$ | 0.35 V   |

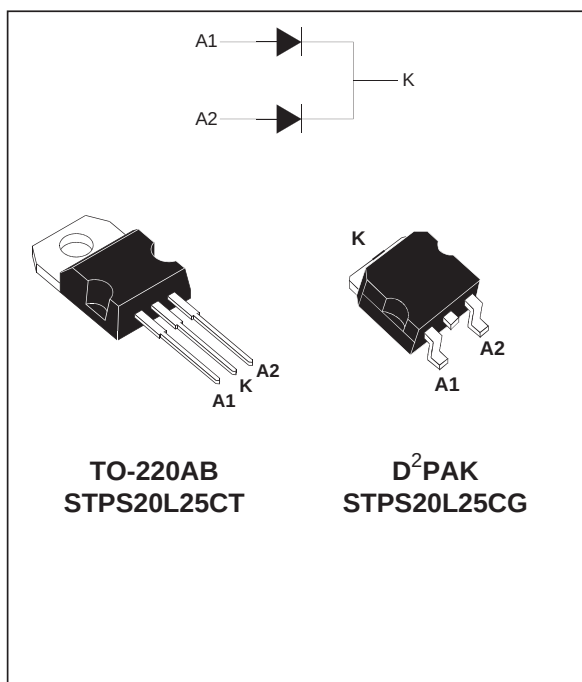
### FEATURES AND BENEFITS

- VERY LOW FORWARD VOLTAGE DROP FOR LESS POWER DISSIPATION AND REDUCED HEATSINK
- OPTIMIZED CONDUCTION/REVERSE LOSSES TRADE-OFF WHICH MEANS THE HIGHEST EFFICIENCY IN THE APPLICATIONS
- AVALANCHE CAPABILITY SPECIFIED

### DESCRIPTION

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

Packaged in TO-220AB and D<sup>2</sup>PAK, this device is especially intended for use as a rectifier at the secondary of 3.3V SMPS units.



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

| Symbol              | Parameter                                |                       |                         | Value         | Unit |
|---------------------|------------------------------------------|-----------------------|-------------------------|---------------|------|
| V <sub>RRM</sub>    | Repetitive peak reverse voltage          |                       |                         | 25            | V    |
| I <sub>F(RMS)</sub> | RMS forward current                      |                       |                         | 30            | A    |
| I <sub>F(AV)</sub>  | Average forward current                  | Tc = 145°C<br>δ = 0.5 | Per diode<br>Per device | 10<br>20      | A    |
| I <sub>FSM</sub>    | Surge non repetitive forward current     | tp = 10 ms Sinusoidal |                         | 220           | 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    |                         | 3             | A    |
| P <sub>ARM</sub>    | Repetitive peak avalanche power          | tp = 1μs Tj = 25°C    |                         | 5300          | W    |
| T <sub>stg</sub>    | Storage temperature range                |                       |                         | - 65 to + 150 | °C   |
| Tj                  | Maximum operating junction temperature * |                       |                         | 150           | °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

## STPS20L25CT/CG

### THERMAL RESISTANCES

| Symbol        | Parameter        |           | Value | Unit                 |
|---------------|------------------|-----------|-------|----------------------|
| $R_{th(j-c)}$ | Junction to case | Per diode | 1.5   | $^{\circ}\text{C/W}$ |
|               |                  | Total     | 0.8   |                      |
| $R_{th(c)}$   |                  | Coupling  | 0.1   |                      |

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)

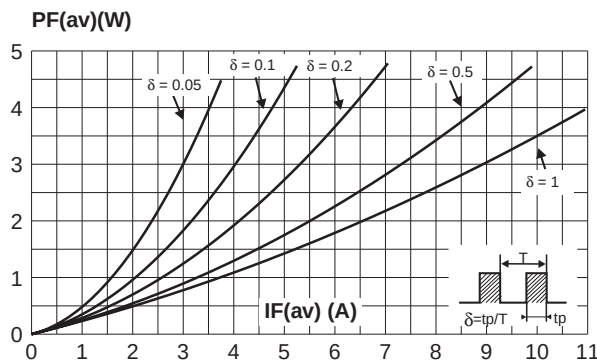
| Symbol  | Tests conditions        | Tests conditions            | Min.                | Typ. | Max. | Unit          |
|---------|-------------------------|-----------------------------|---------------------|------|------|---------------|
| $I_R^*$ | Reverse leakage current | $T_j = 25^{\circ}\text{C}$  | $V_R = V_{RRM}$     |      | 800  | $\mu\text{A}$ |
|         |                         | $T_j = 125^{\circ}\text{C}$ |                     | 125  | 250  | $\text{mA}$   |
| $V_F^*$ | Forward voltage drop    | $T_j = 25^{\circ}\text{C}$  | $I_F = 10\text{ A}$ |      | 0.46 | $\text{V}$    |
|         |                         | $T_j = 125^{\circ}\text{C}$ | $I_F = 10\text{ A}$ | 0.30 | 0.35 |               |
|         |                         | $T_j = 25^{\circ}\text{C}$  | $I_F = 20\text{ A}$ |      | 0.56 |               |
|         |                         | $T_j = 125^{\circ}\text{C}$ | $I_F = 20\text{ A}$ | 0.41 | 0.48 |               |

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

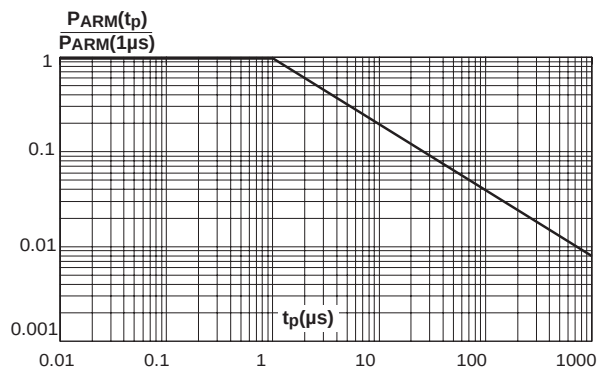
To evaluate the maximum conduction losses use the following equation :

$$P = 0.22 \times I_{F(AV)} + 0.013 I_{F(RMS)}^2$$

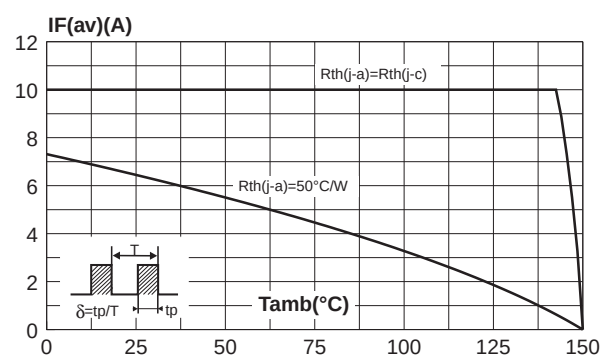
**Fig. 1:** Average forward power dissipation versus average forward current.



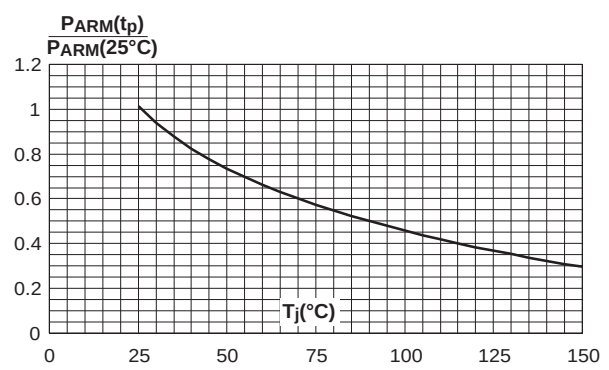
**Fig. 3:** Normalized avalanche power derating versus pulse duration.



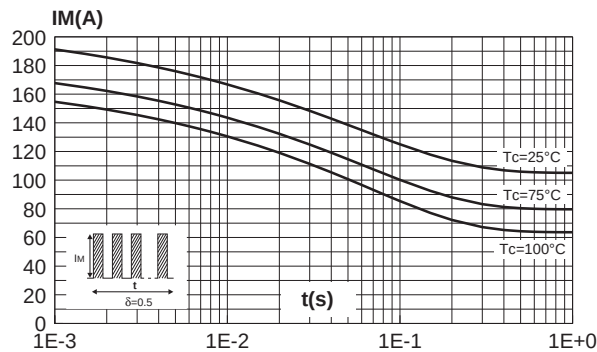
**Fig. 2:** Average forward current versus ambient temperature ( $\delta = 0.5$ ).



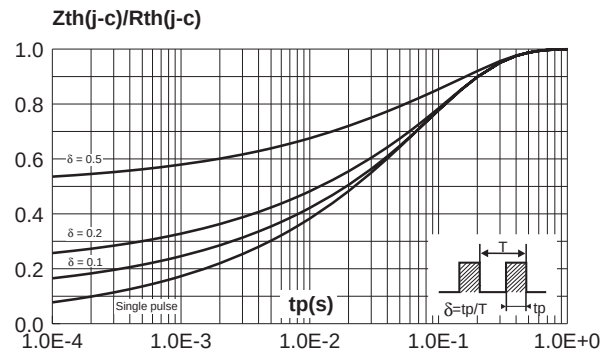
**Fig. 4:** Normalized avalanche power derating versus junction temperature.



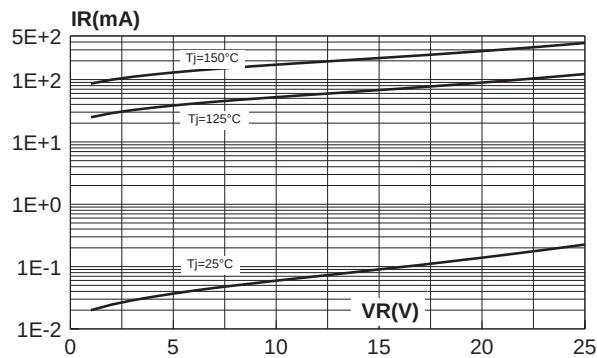
**Fig. 5:** Non repetitive surge peak forward current versus overload duration (maximum values).



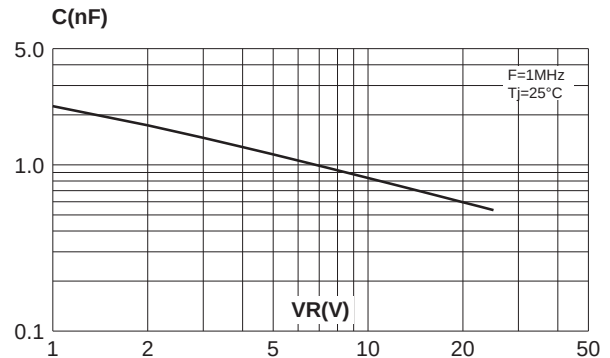
**Fig. 6:** Relative variation of thermal impedance junction to case versus pulse duration.



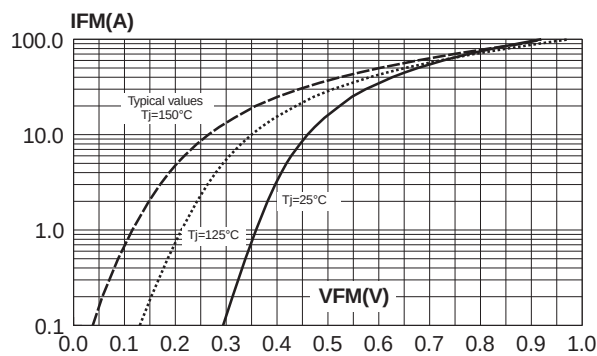
**Fig. 7:** Reverse leakage current versus reverse voltage applied (typical values).



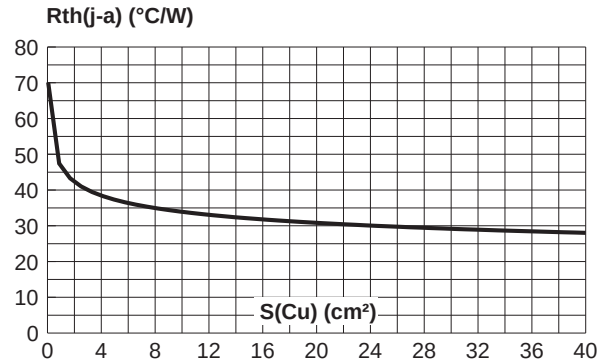
**Fig. 8:** Junction capacitance versus reverse voltage applied (typical values).



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

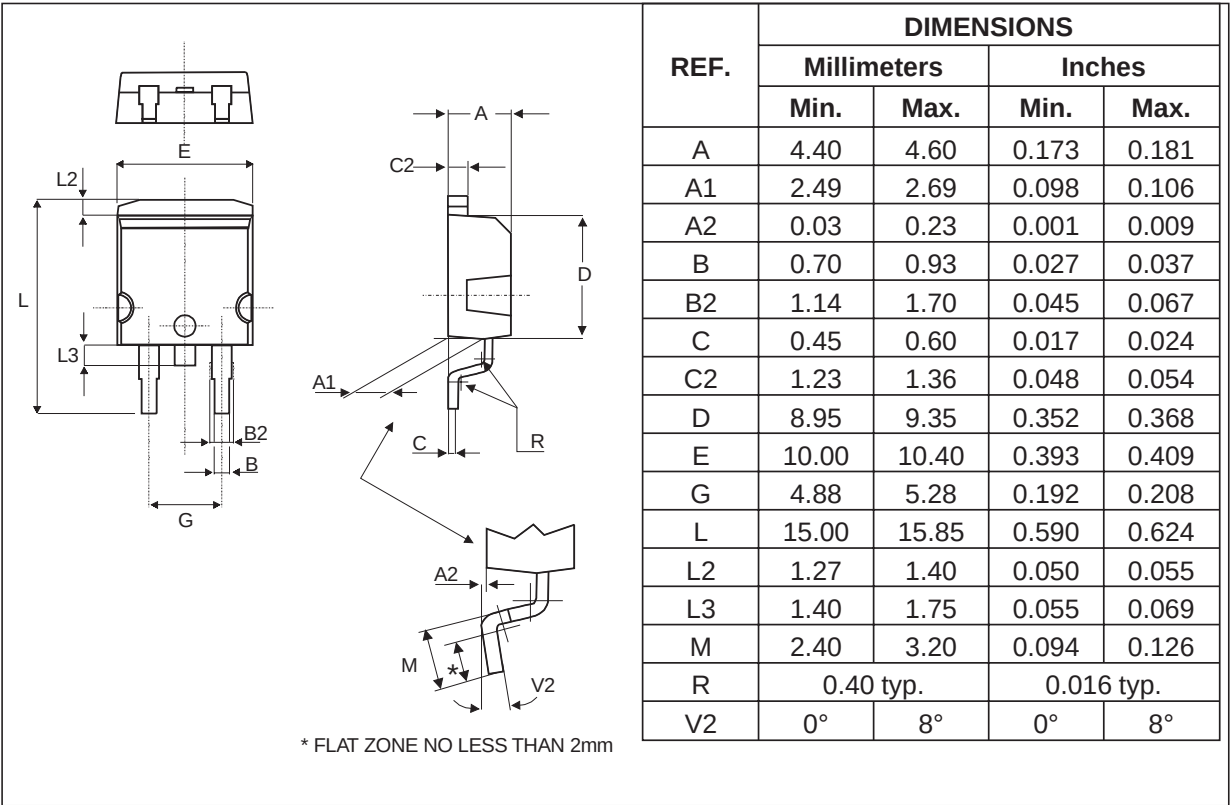


**Fig. 10:** Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness : 35  $\mu\text{m}$ ). (STPS20L25G only)

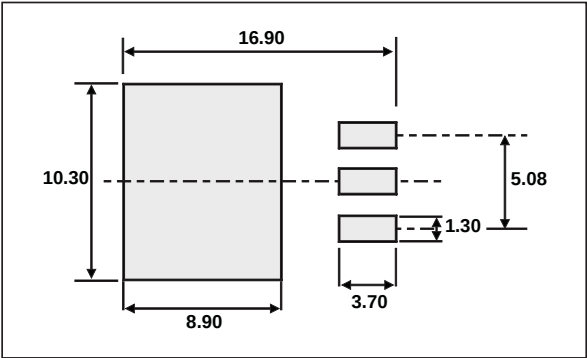


STPS20L25CT/CG

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



FOOTPRINT DIMENSIONS (in millimeters)



- COOLING METHOD: BY CONDUCTION (METHOD C)



**PACKAGE MECHANICAL DATA**  
 TO-220AB

| 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 |

- COOLING METHOD : C
- RECOMMENDED TORQUE VALUE : 0.55 M.N
- MAXIMUM TORQUE VALUE : 0.70 M.N

| Ordering type  | Marking     | Package            | Weight | Base qty | Delivery mode |
|----------------|-------------|--------------------|--------|----------|---------------|
| STPS20L25CT    | STPS20L25CT | TO-220AB           | 2.23g  | 50       | Tube          |
| STPS20L25CG    | STPS20L25CG | D <sup>2</sup> PAK | 1.48g  | 50       | Tube          |
| STPS20L25CG-TR | STPS20L25CG | D <sup>2</sup> PAK | 1.48g  | 1000     | Tape & reel   |

- EPOXY MEETS UL94,V0

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