



# STPS40L45CG/CT/CW

## LOW DROP POWER SCHOTTKY RECTIFIER

### MAIN PRODUCTS CHARACTERISTICS

|                   |          |
|-------------------|----------|
| $I_{F(AV)}$       | 2 x 20 A |
| $V_{RRM}$         | 45 V     |
| $T_j(\text{max})$ | 150 °C   |
| $V_F(\text{max})$ | 0.49 V   |

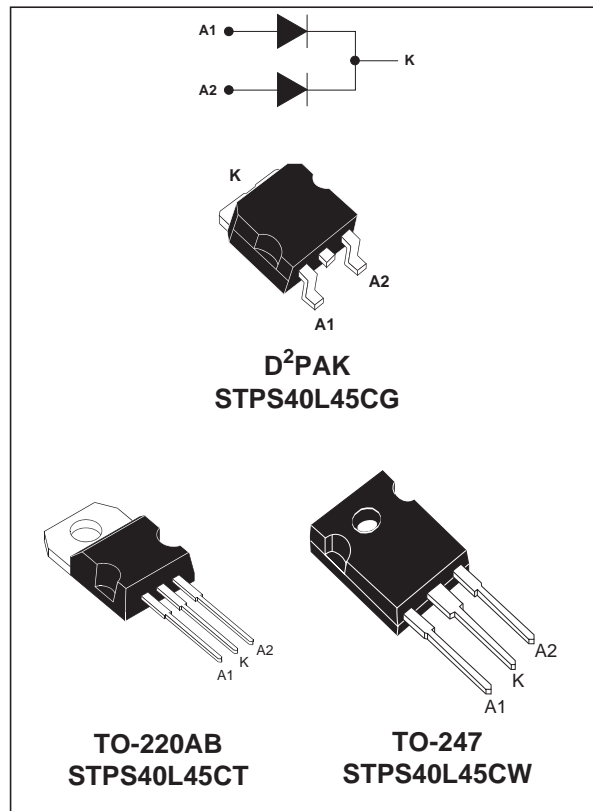
### FEATURES AND BENEFITS

- Low forward voltage drop meaning very small conduction losses
- Low switching losses allowing high frequency operation
- Avalanche rated

### DESCRIPTION

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

Packaged in TO-220AB, TO-247 and D<sup>2</sup>PAK these devices are 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             |   |
|--------------|--|--|---------------|------------------|---|
| $V_{RRM}$    | Repetitive peak reverse voltage          |  | 45            | V                |   |
| $I_{F(RMS)}$ | RMS forward current                      |  | 30            | A                |   |
| $I_{F(AV)}$  | Average forward current                  | $T_c = 130^\circ\text{C}$                        | Per diode     | 20               | A |
|              |  | $\delta = 0.5$                                   | Per device    | 40               | A |
| $I_{FSM}$    | Surge non repetitive forward current     | $t_p = 10 \text{ ms}$ Sinusoidal                 | 230           | A                |   |
| $I_{RRM}$    | Repetitive peak reverse current          | $t_p = 2 \mu\text{s}$ square $F = 1 \text{ kHz}$ | 2             | A                |   |
| $I_{RSM}$    | Non repetitive peak reverse current      | $t_p = 100 \mu\text{s}$ square                   | 3             | A                |   |
| $T_{stg}$    | Storage temperature range                |  | - 65 to + 150 | °C               |   |
| $T_j$        | Maximum operating junction temperature * |  | 150           | °C               |   |
| $dV/dt$      | Critical rate of rise of reverse voltage |  | 10000         | V/ $\mu\text{s}$ |   |

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

## STPS40L45CT/CW

### THERMAL RESISTANCES

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

When the diodes 1 and 2 are used simultaneously :  
 $\Delta T_j(\text{diode } 1) = P(\text{diode } 1) \times R_{th(j-c)}(\text{Per diode}) + P(\text{diode } 2) \times R_{th(c)}$

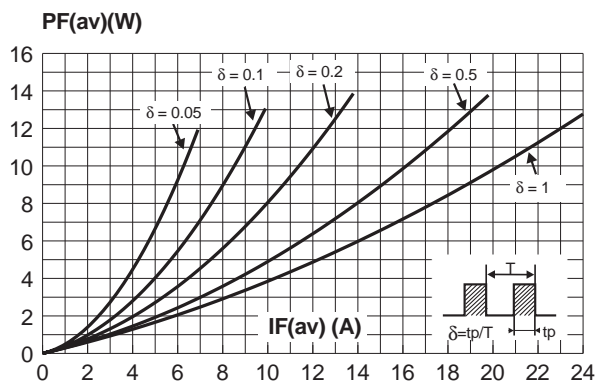
### STATIC ELECTRICAL CHARACTERISTICS (per diode)

| Symbol  | Parameter               | Tests Conditions            |                      | Min. | Typ. | Max. | Unit |
|---------|-------------------------|-----------------------------|----------------------|------|------|------|------|
| $I_R^*$ | Reverse leakage current | $T_j = 25^{\circ}\text{C}$  | $V_R = V_{RRM}$      |      |      | 0.6  | mA   |
|         |                         | $T_j = 125^{\circ}\text{C}$ |                      |      | 140  | 280  | mA   |
| $V_F^*$ | Forward voltage drop    | $T_j = 25^{\circ}\text{C}$  | $I_F = 20 \text{ A}$ |      |      | 0.53 | V    |
|         |                         | $T_j = 125^{\circ}\text{C}$ | $I_F = 20 \text{ A}$ |      | 0.42 | 0.49 |      |
|         |                         | $T_j = 25^{\circ}\text{C}$  | $I_F = 40 \text{ A}$ |      |      | 0.69 |      |
|         |                         | $T_j = 125^{\circ}\text{C}$ | $I_F = 40 \text{ A}$ |      | 0.6  | 0.7  |      |

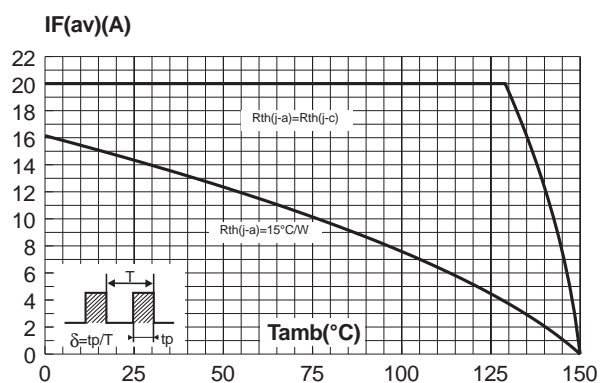
Pulse test : \*  $t_p = 380 \mu\text{s}$ ,  $\delta < 2\%$

To evaluate the conduction losses use the following equation :  
 $P = 0.28 \times I_{F(AV)} + 0.0105 I_{F(RMS)}^2$

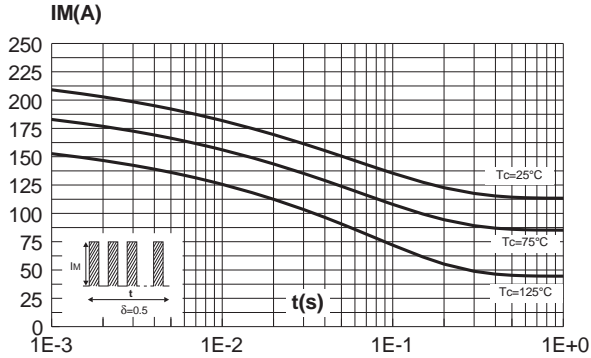
**Fig. 1:** Average forward power dissipation versus average forward current (per diode).



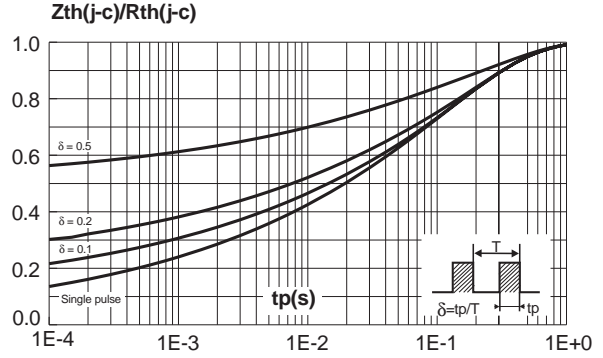
**Fig. 2:** Average forward current versus ambient temperature ( $\delta = 0.5$ , per diode)



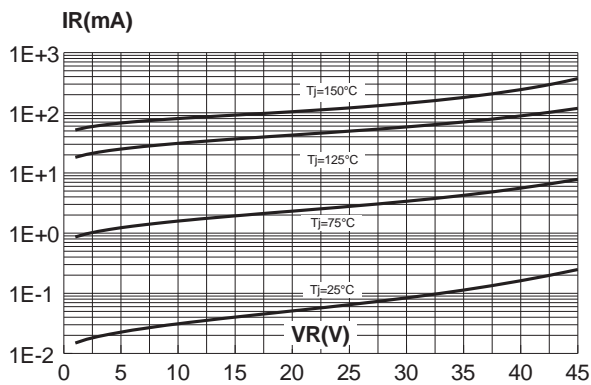
**Fig. 3:** Non repetitive surge peak forward current versus overload duration (maximum values, per diode).



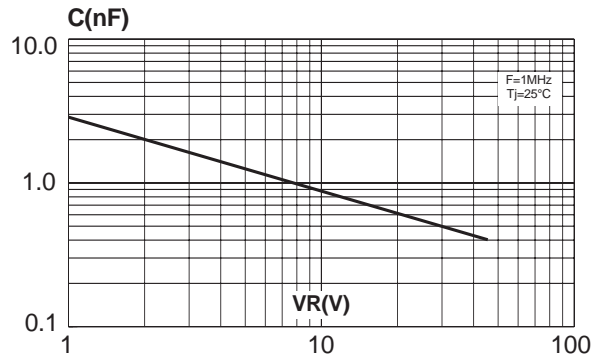
**Fig. 4:** Relative variation of thermal impedance junction to case versus pulse duration.



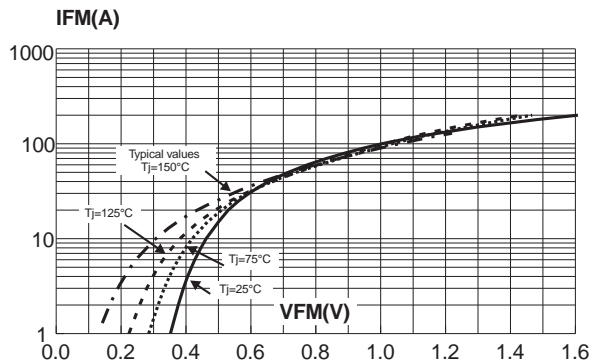
**Fig. 5:** Reverse leakage current versus reverse voltage applied (typical values, per diode).



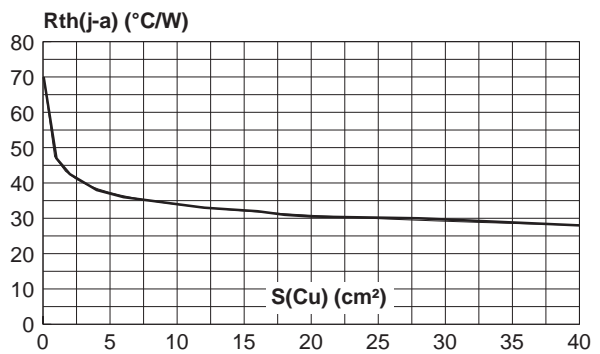
**Fig. 6:** Junction capacitance versus reverse voltage applied (typical values, per diode).



**Fig. 7:** Forward voltage drop versus forward current (maximum values, per diode).

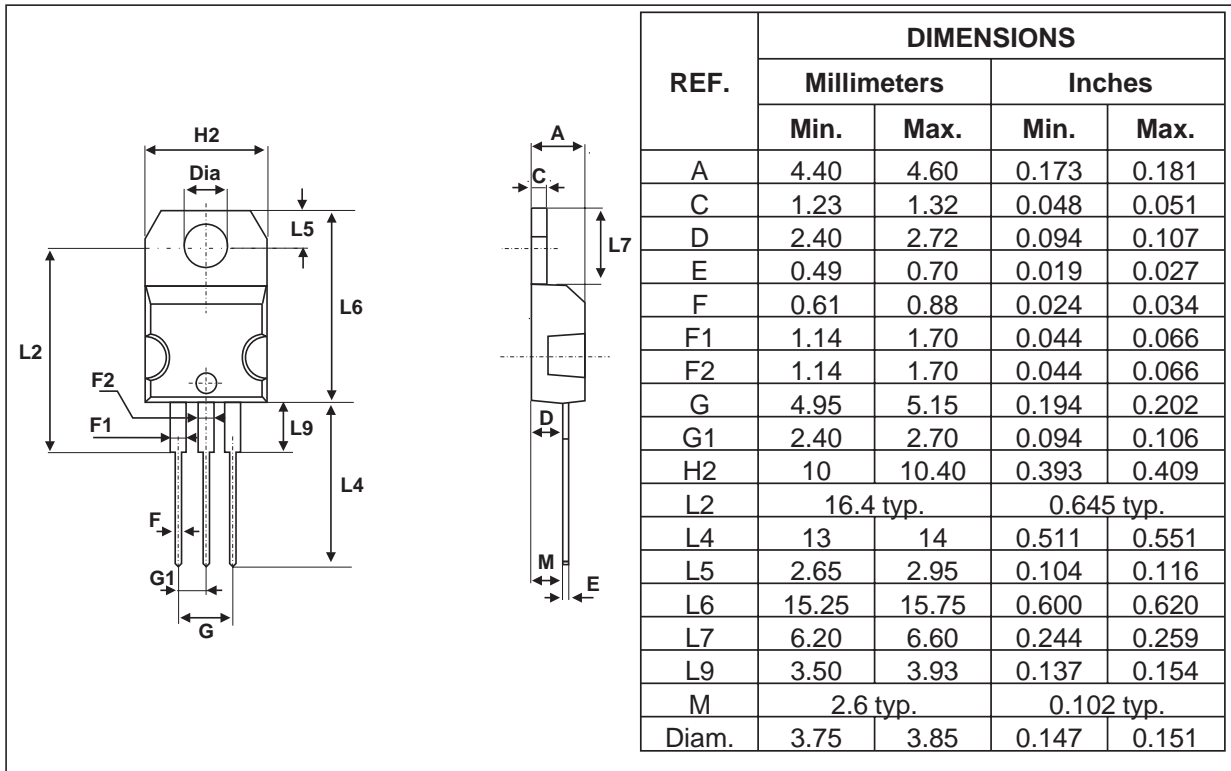


**Fig. 8:** Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness: 35 $\mu\text{m}$ ) (STPS40L45CG only).



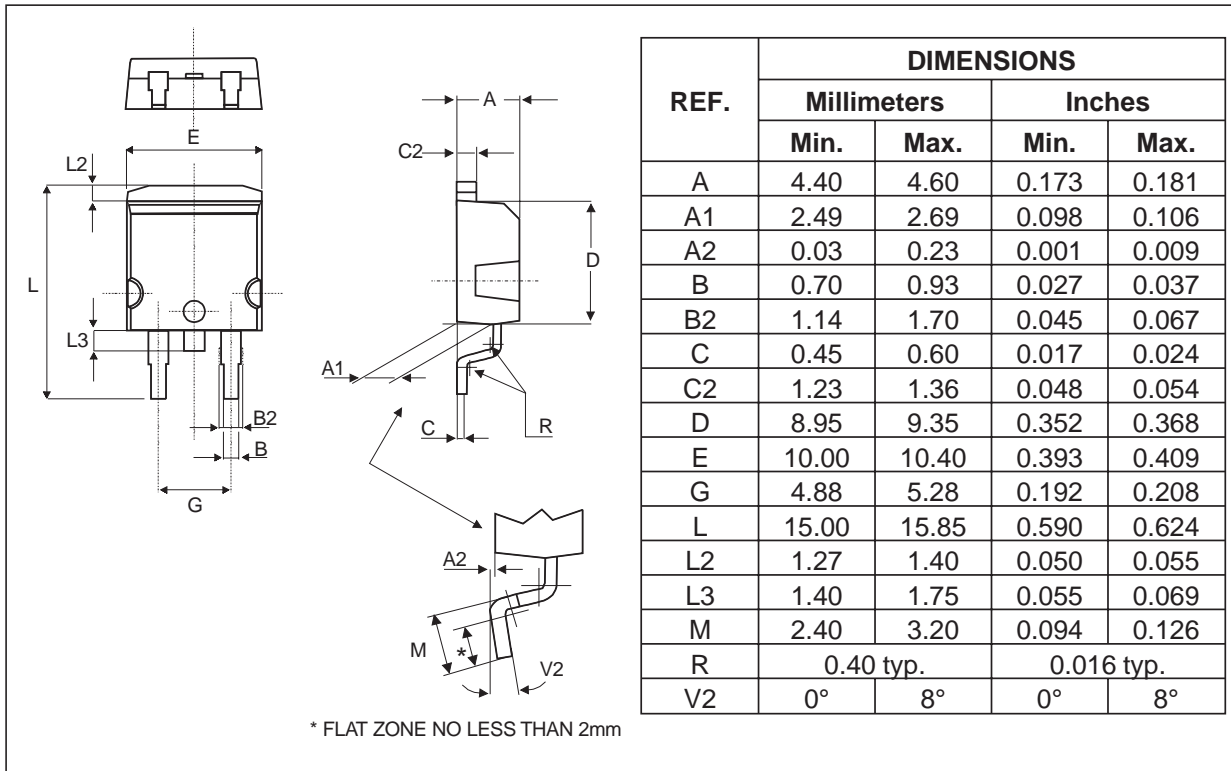
# STPS40L45CT/CW

## PACKAGE MECHANICAL DATA TO-220AB



- Cooling method : C
- Recommended torque value : 0.55m.N
- Maximum torque value : 0.70 m.N

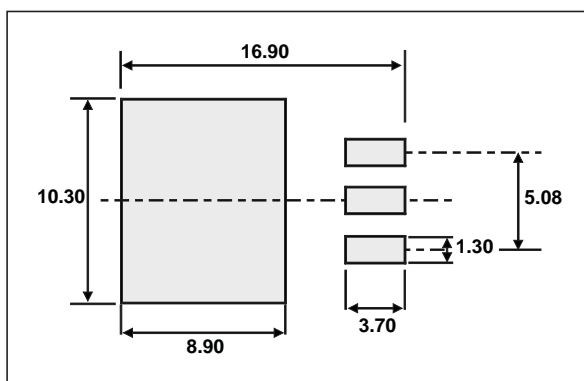
**PACKAGE MECHANICAL DATA**  
D<sup>2</sup>PAK



- Cooling method : by conduction (method C)

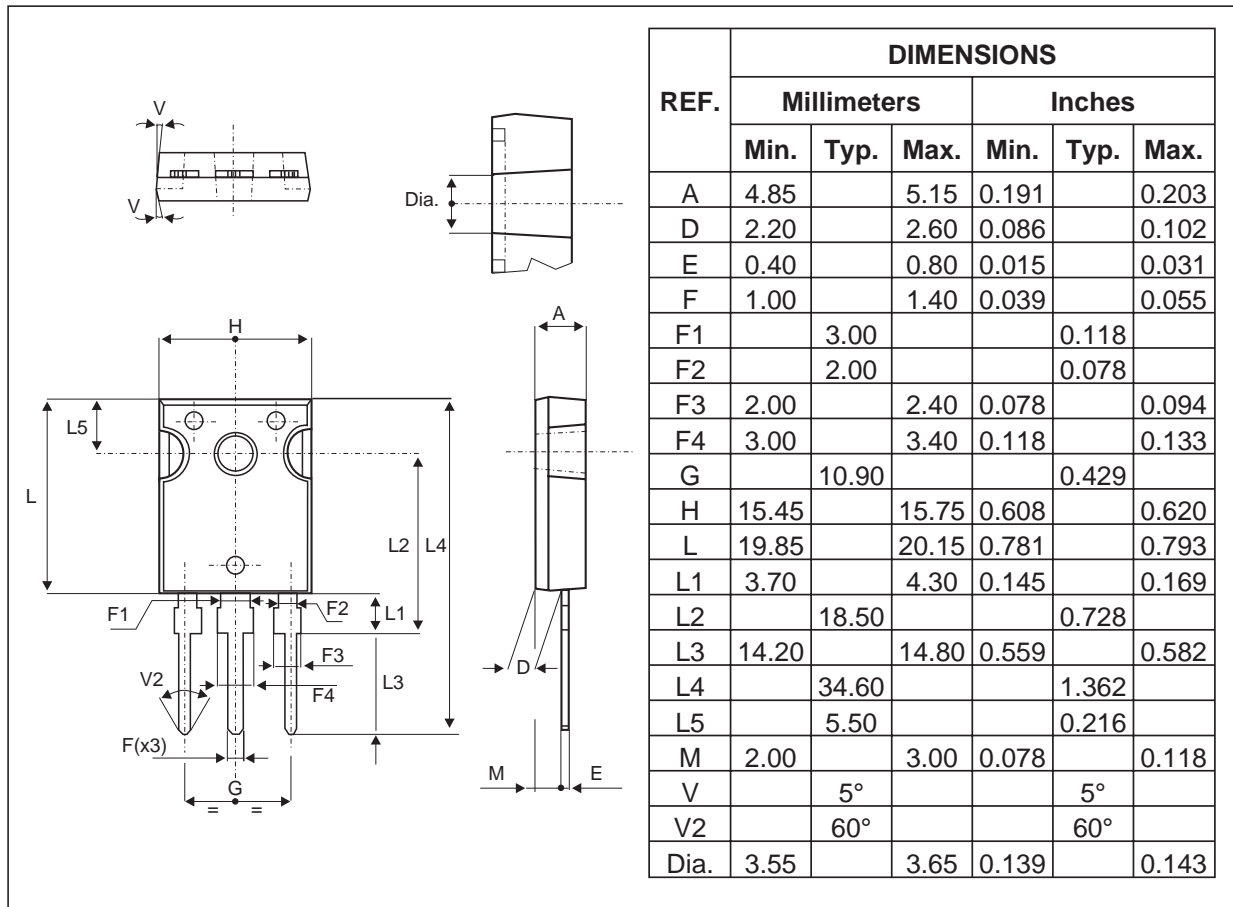
**FOOT PRINT (in millimeters)**

D<sup>2</sup>PAK



# STPS40L45CT/CW

## PACKAGE MECHANICAL DATA TO-247



- Cooling method : C
- Recommended torque value : 0.8m.N
- Maximum torque value : 1.0m.N

| Ordering type | Marking     | Package  | Weight | Base qty | Delivery mode |
|---------------|-------------|----------|--------|----------|---------------|
| STPS40L45CG   | STPS40L45CG | D2PAK    | 1.8g   | 500      | Tape & Reel   |
| STPS40L45CT   | STPS40L45CT | TO-220AB | 2g     | 50       | Tube          |
| STPS40L45CW   | STPS40L45CW | TO-247   | 4.4g   | 30       | Tube          |

- Epoxy meets UL94,V0

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