



# 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   |

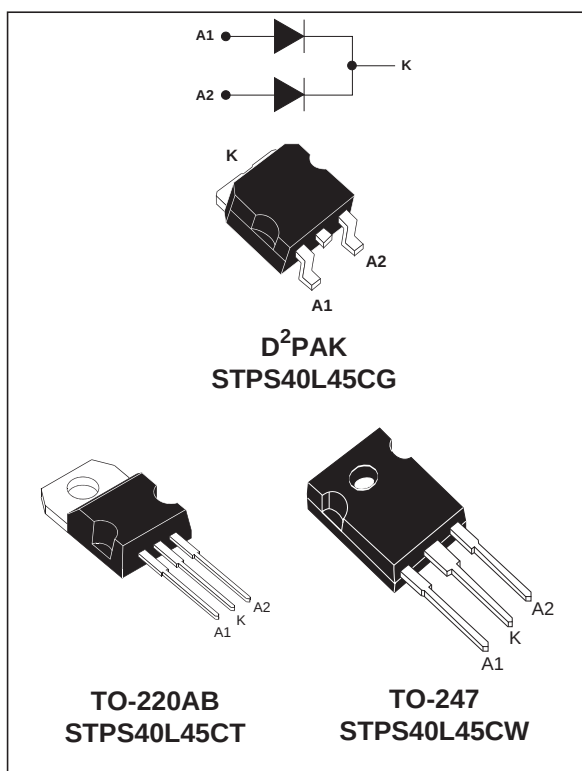
### FEATURES AND BENEFITS

- LOW FORWARD VOLTAGE DROP MEANING VERY SMALL CONDUCTION LOSSES
- LOW SWITCHING LOSSES ALLOWING HIGH FREQUENCY OPERATION
- AVALANCHE CAPABILITY SPECIFIED

### 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 <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                  | T <sub>c</sub> = 130°C<br>δ = 0.5          | Per diode<br>Per device | 20<br>40      | A    |
| I <sub>FSM</sub>    | Surge non repetitive forward current     | t <sub>p</sub> = 10 ms Sinusoidal          |                         | 230           | A    |
| I <sub>RRM</sub>    | Repetitive peak reverse current          | t <sub>p</sub> = 2 μs square F = 1kHz      |                         | 2             | A    |
| I <sub>RSM</sub>    | Non repetitive peak reverse current      | t <sub>p</sub> = 100 μs square             |                         | 3             | A    |
| P <sub>ARM</sub>    | Repetitive peak avalanche power          | t <sub>p</sub> = 1μs T <sub>j</sub> = 25°C |                         | 8100          | W    |
| T <sub>stg</sub>    | Storage temperature range                |                                            |                         | - 65 to + 150 | °C   |
| T <sub>j</sub>      | 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

## STPS40L45CT/CW

### THERMAL RESISTANCES

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

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

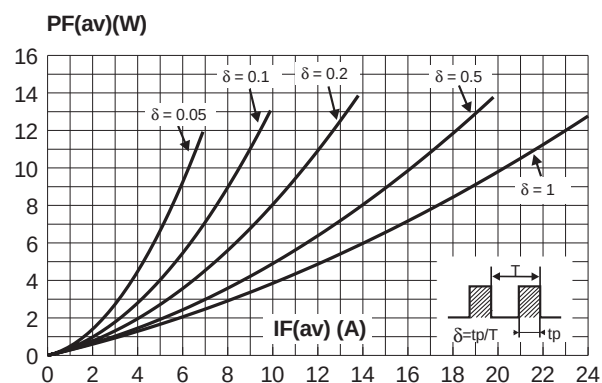
### STATIC ELECTRICAL CHARACTERISTICS (per diode)

| 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  |      |

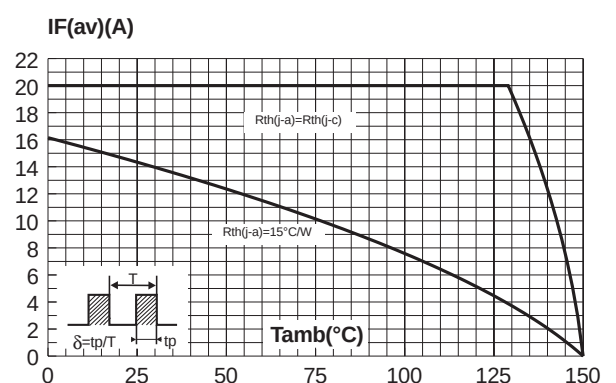
Pulse test : \*  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

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

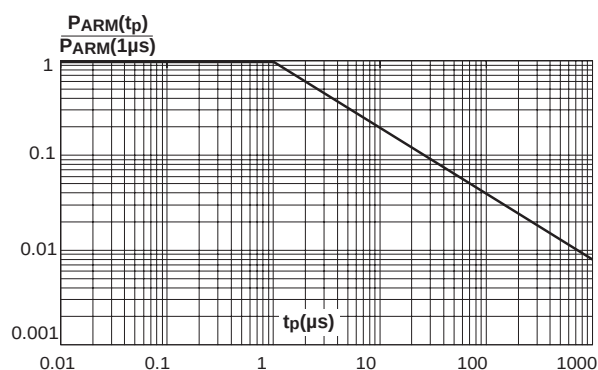
**Fig. 1:** Average forward power dissipation versus average forward current (per diode).



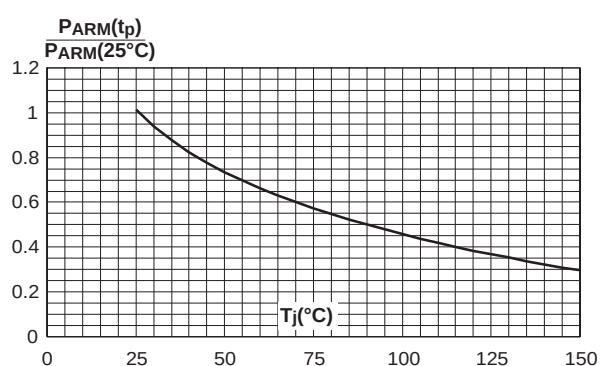
**Fig. 2:** Average forward current versus ambient temperature ( $\delta = 0.5$ , per diode)



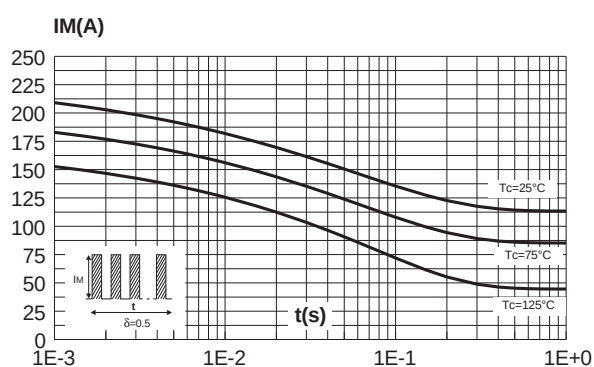
**Fig. 3:** Normalized avalanche power derating versus pulse duration.



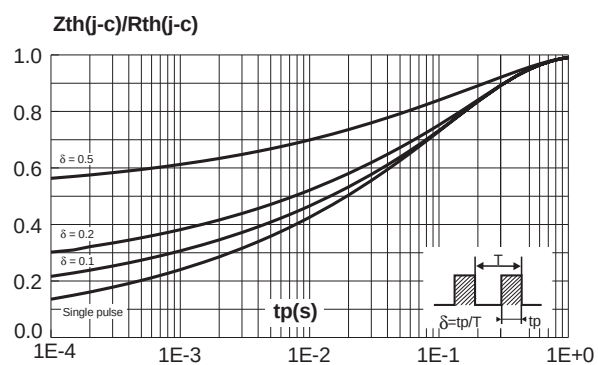
**Fig. 4:** Normalized avalanche power derating versus junction temperature.



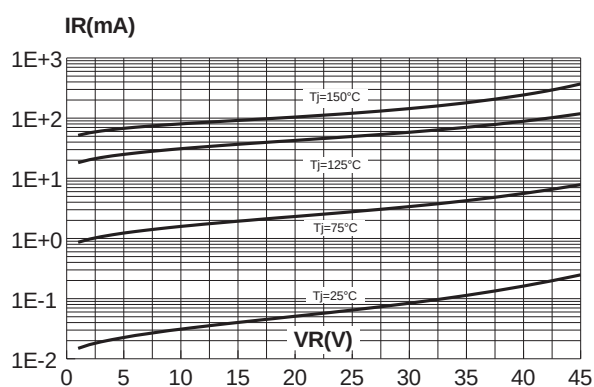
**Fig. 5:** Non repetitive surge peak forward current versus overload duration (maximum values, per diode).



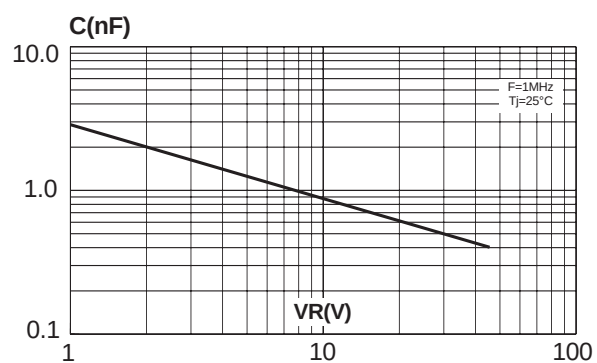
**Fig. 6:** Relative variation of thermal impedance junction to case versus pulse duration.



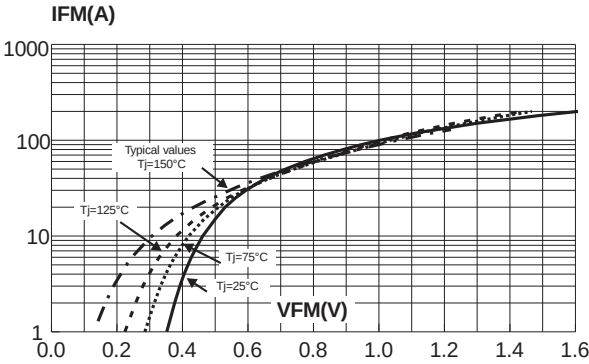
**Fig. 7:** Reverse leakage current versus reverse voltage applied (typical values, per diode).



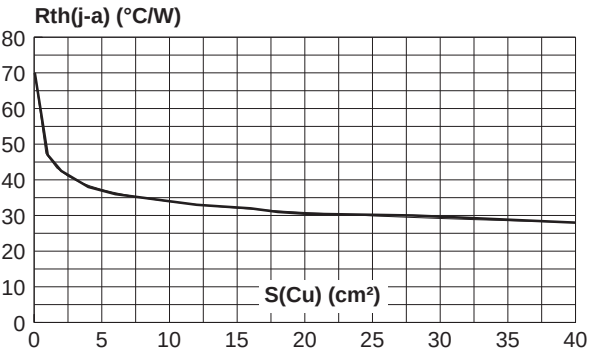
**Fig. 8:** Junction capacitance versus reverse voltage applied (typical values, per diode).



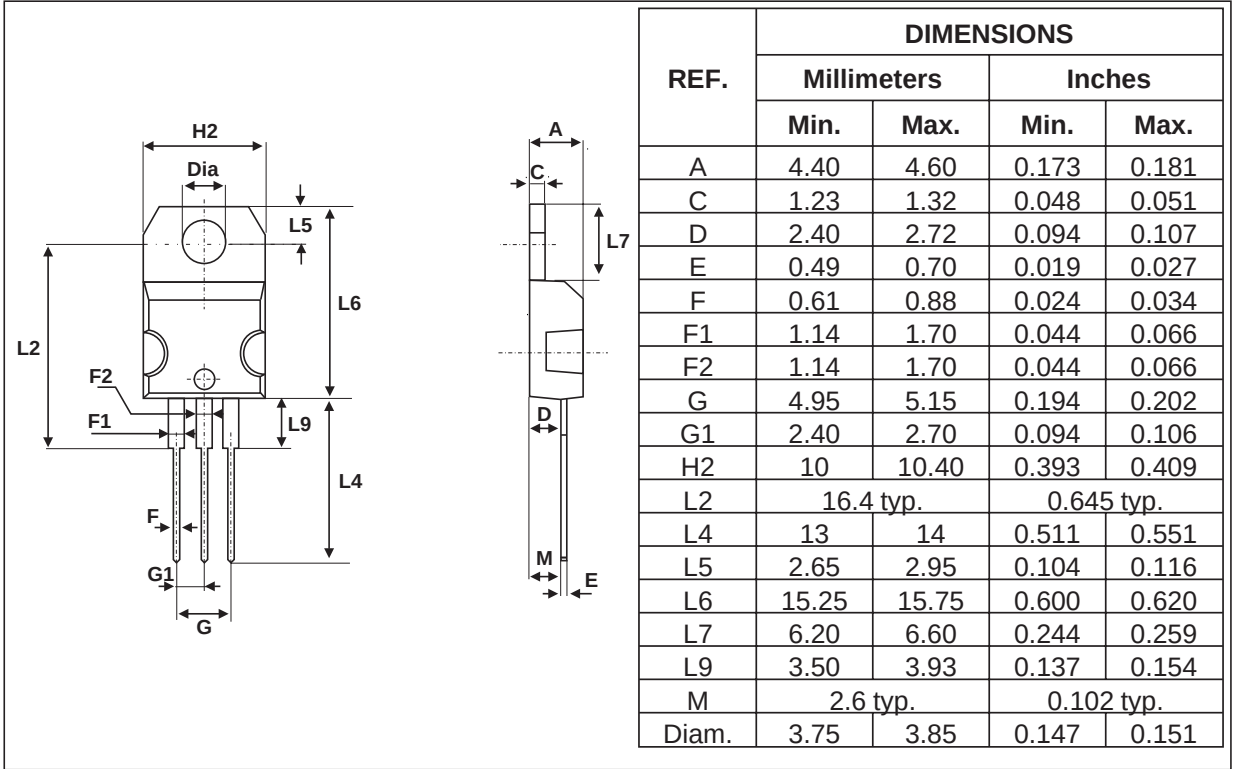
**Fig. 9:** Forward voltage drop versus forward current (maximum values, per diode).



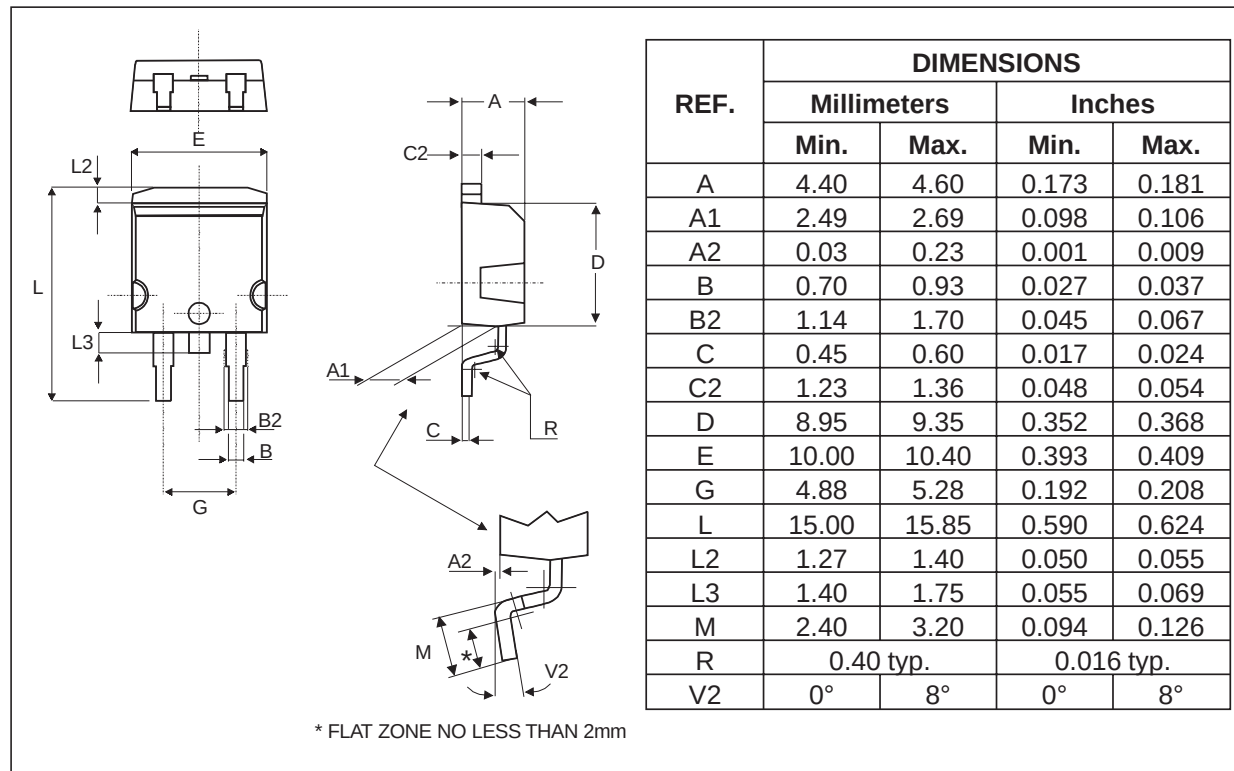
**Fig. 10:** Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness: 35μm) (STPS40L45CG only).



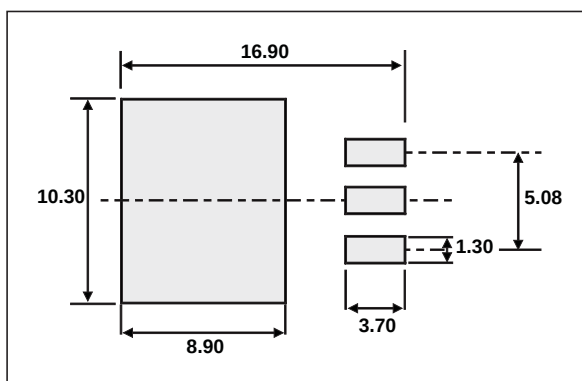
**PACKAGE MECHANICAL DATA**  
TO-220AB

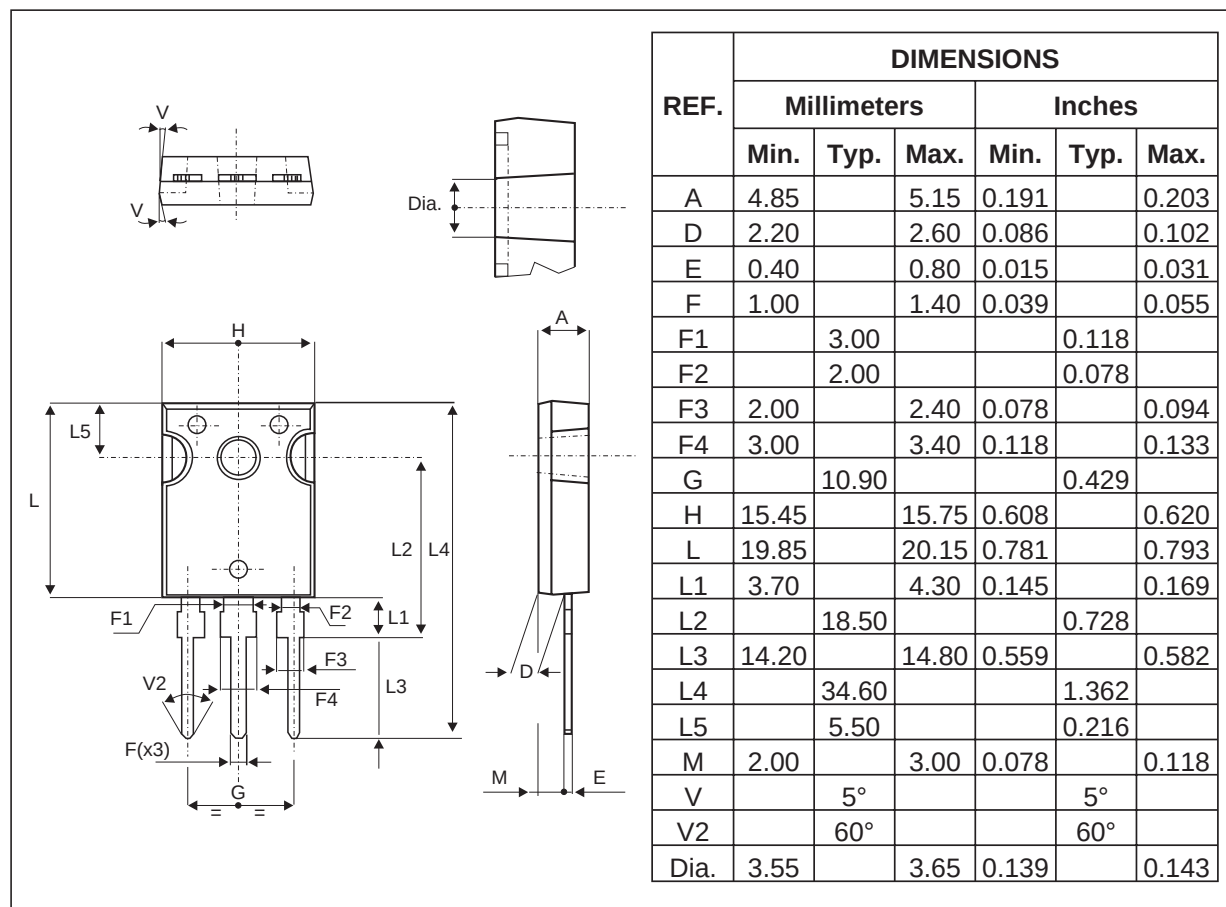


- COOLING METHOD : C
- RECOMMENDED TORQUE VALUE : 0.55M.N
- MAXIMUM TORQUE VALUE : 0.70 M.N

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


- COOLING METHOD : BY CONDUCTION (METHOD C)

**FOOT PRINT (in millimeters)**
**D<sup>2</sup>PAK**


**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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