



STPS41L45CG/CT/CR

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 |
| $V_F(\text{max})$ | 0.47 V |

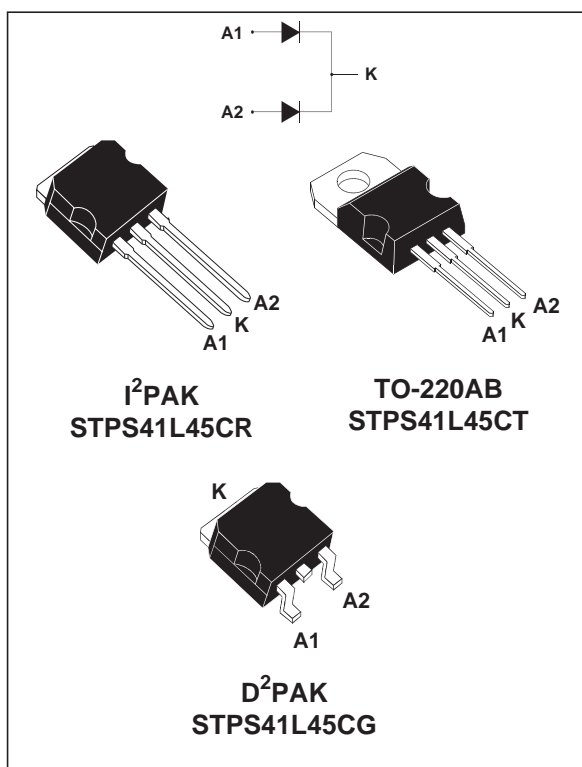
FEATURES AND BENEFITS

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low forward voltage drop
- Low thermal resistance

DESCRIPTION

Dual center tab Schottky rectifier suited for 5V output in off line AC/DC power supplies.

Packaged in D²PAK, I²PAK and TO-220AB this device is 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 | |
| I_{FSM} | Surge non repetitive forward current | $t_p = 10 \text{ ms}$ sinusoidal | 220 | A | |
| I_{RRM} | Peak repetitive reverse current | $t_p = 2 \mu\text{s}$ square $F = 1 \text{ kHz}$ | 1 | A | |
| T_{stg} | Storage temperature range | | - 65 to + 175 | °C | |
| T_j | Maximum operating junction temperature * | | 150 | °C | |
| dV/dt | Critical rate of rise 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

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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 | |

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 | $T_j = 25^{\circ}\text{C}$ | $V_R = V_{RRM}$ | | | 1.2 | mA |
| | | $T_j = 125^{\circ}\text{C}$ | | | 110 | 220 | 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 | 0.47 | |
| | | $T_j = 25^{\circ}\text{C}$ | $I_F = 40\text{ A}$ | | | 0.68 | |
| | | $T_j = 125^{\circ}\text{C}$ | $I_F = 40\text{ A}$ | | 0.60 | 0.66 | |

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

To evaluate the conduction losses use the following equation :

$$P = 0.28 \times I_{F(AV)} + 0.0095 I_{F(RMS)}^2$$

Fig. 1: Conduction losses versus average current.

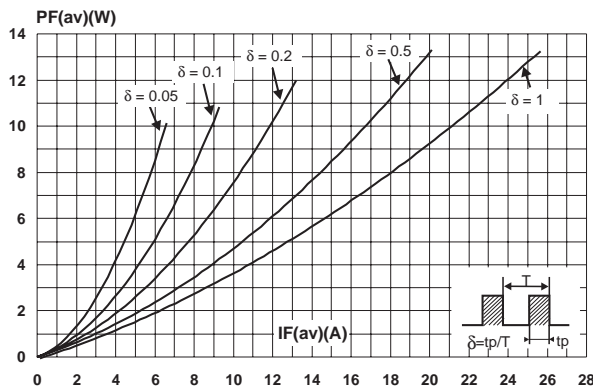


Fig. 2: Average forward current versus ambient temperature ($\delta = 0.5$).

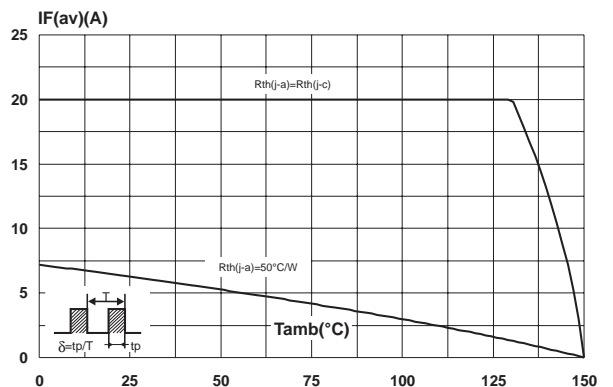


Fig. 3: Non repetitive surge peak forward current versus overload duration (maximum values).

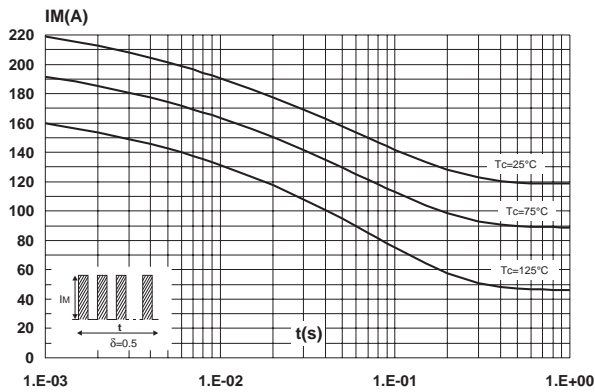


Fig. 4: Relative variation of thermal impedance junction to case versus pulse duration.

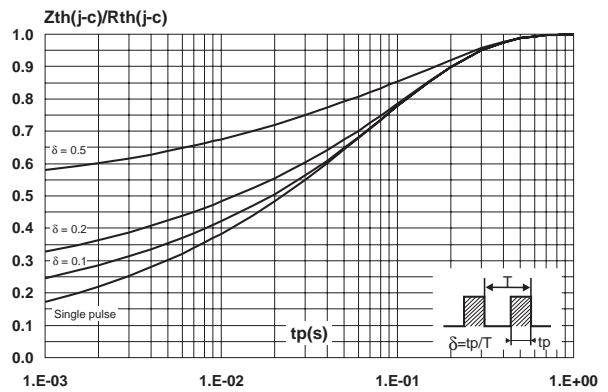


Fig. 5: Reverse leakage current versus reverse voltage applied (typical values).

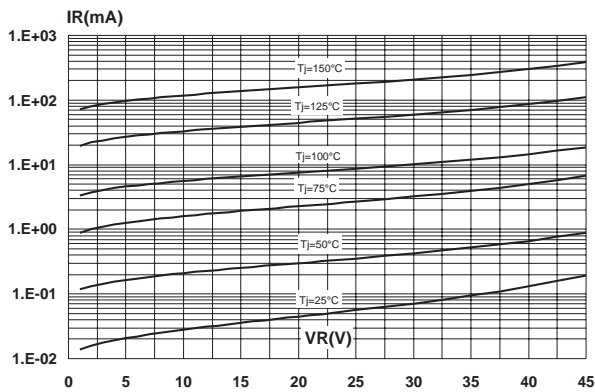


Fig. 6: Junction capacitance versus reverse voltage applied (typical values).

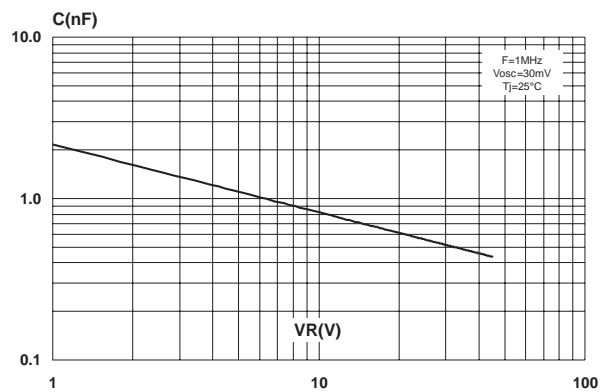


Fig. 7: Forward voltage drop versus forward current.

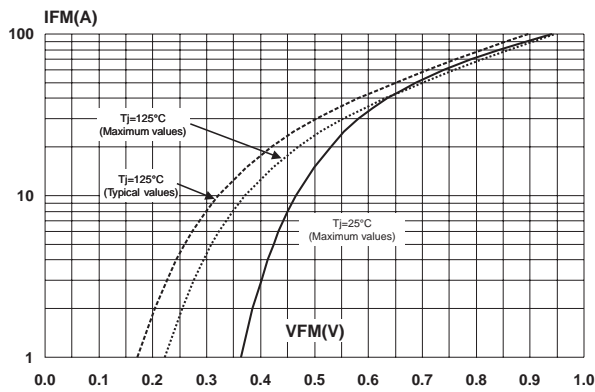
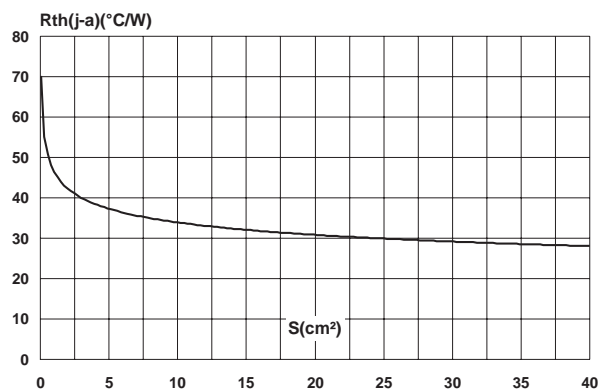
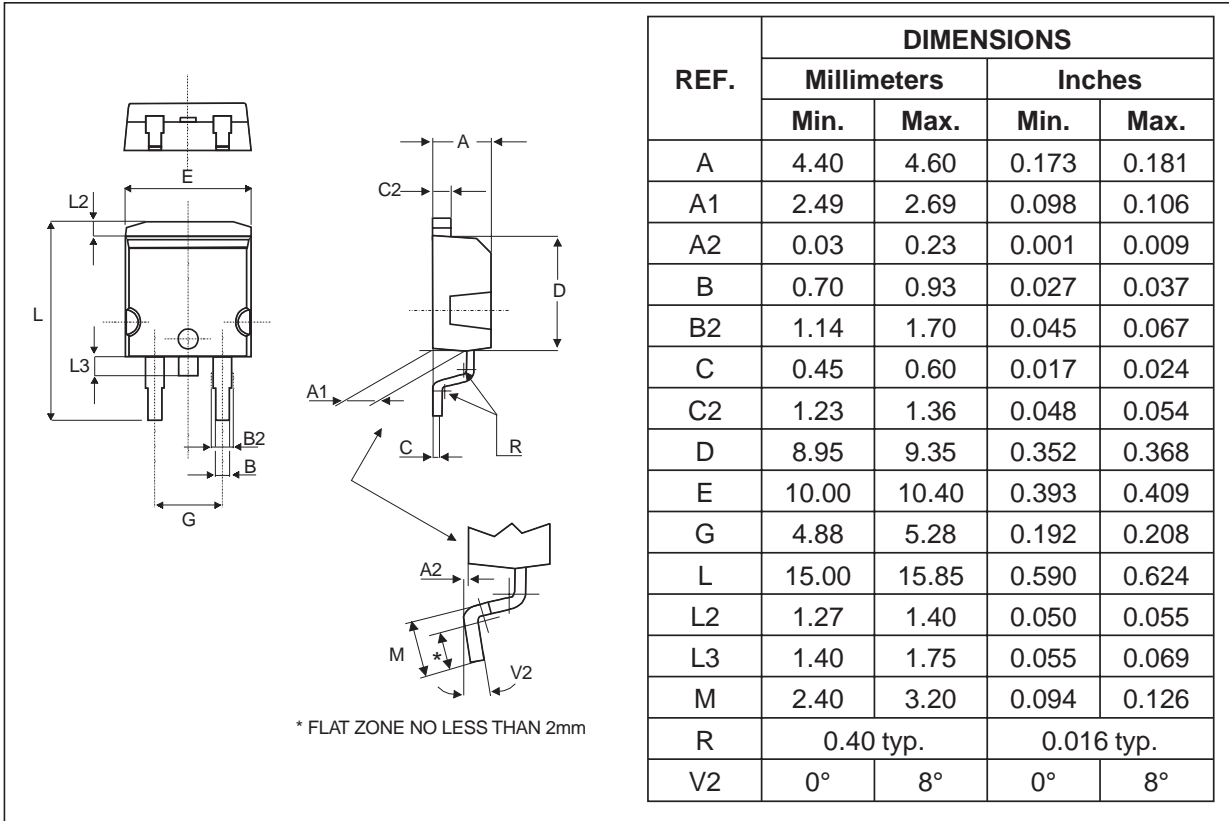


Fig. 8: Thermal resistance junction to ambient versus copper surface under tab (epoxy printed board FR4, Cu = 35µm) (STPS41L45CG only).

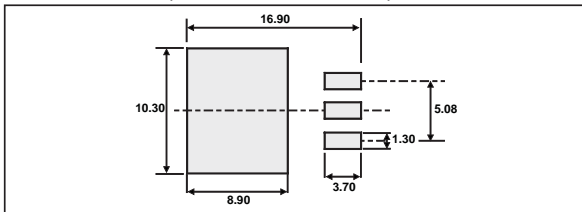


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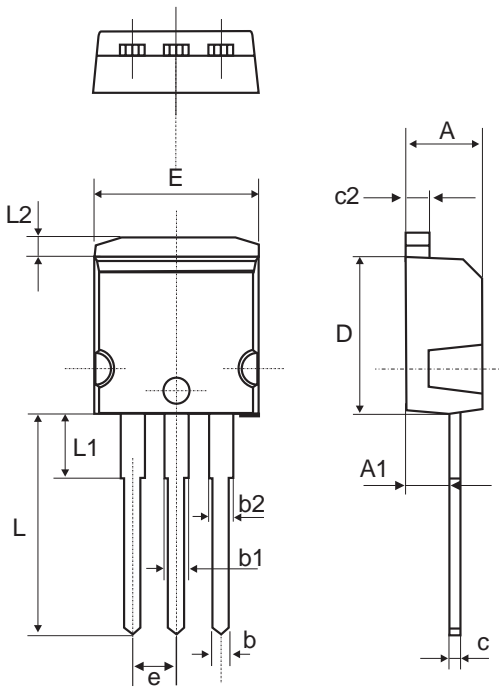
PACKAGE MECHANICAL DATA
D²PAK



FOOTPRINT (dimensions in mm)



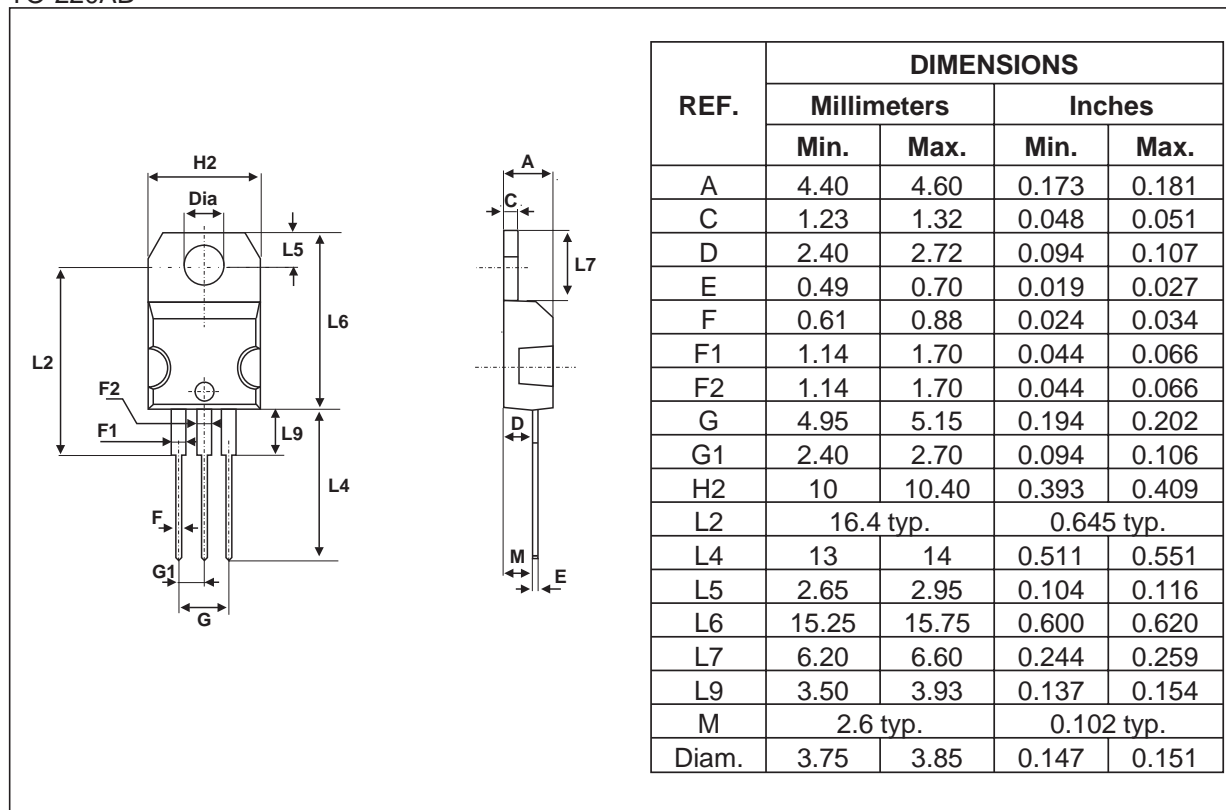
PACKAGE MECHANICAL DATA
I²PAK



| REF. | DIMENSIONS | | | |
|------|-------------|------|--------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.40 | 4.60 | 0.173 | 0.181 |
| A1 | 2.49 | 2.69 | 0.098 | 0.106 |
| b | 0.70 | 0.93 | 0.028 | 0.037 |
| b1 | 1.14 | 1.17 | 0.044 | 0.046 |
| b2 | 1.14 | 1.17 | 0.044 | 0.046 |
| c | 0.45 | 0.60 | 0.018 | 0.024 |
| c2 | 1.23 | 1.36 | 0.048 | 0.054 |
| D | 8.95 | 9.35 | 0.352 | 0.368 |
| e | 2.40 | 2.70 | 0.094 | 0.106 |
| E | 10.0 | 10.4 | 0.394 | 0.409 |
| L | 13.1 | 13.6 | 0.516 | 0.535 |
| L1 | 3.48 | 3.78 | 0.137 | 0.149 |
| L2 | 1.27 | 1.40 | 0.050 | 0.055 |

STPS41L45CG / STPS41L45CT / STPS41L45CR

PACKAGE MECHANICAL DATA
TO-220AB



| Ordering type | Marking | Package | Weight | Base qty | Delivery mode |
|----------------|-------------|--------------------|--------|----------|---------------|
| STPS41L45CG | STPS41L45CG | D ² PAK | 1.48 g | 50 | Tube |
| STPS41L45CG-TR | STPS41L45CG | D ² PAK | 1.48 g | 1000 | Tape & reel |
| STPS41L45CT | STPS41L45CT | TO-220AB | 2.20 g | 50 | Tube |
| STPS41L45CR | STPS41L45CR | I ² PAK | 1.49 g | 50 | Tube |

- Epoxy meets UL94,V0

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