



STPS6045CP/CPI/CW

POWER SCHOTTKY RECTIFIER

MAIN PRODUCT CHARACTERISTICS

| | |
|-------------------|---------------|
| $I_{F(AV)}$ | 2x30 A |
| V_{RRM} | 45 V |
| $T_j(\text{max})$ | 175 °C |
| $V_F(\text{max})$ | 0.63 V |

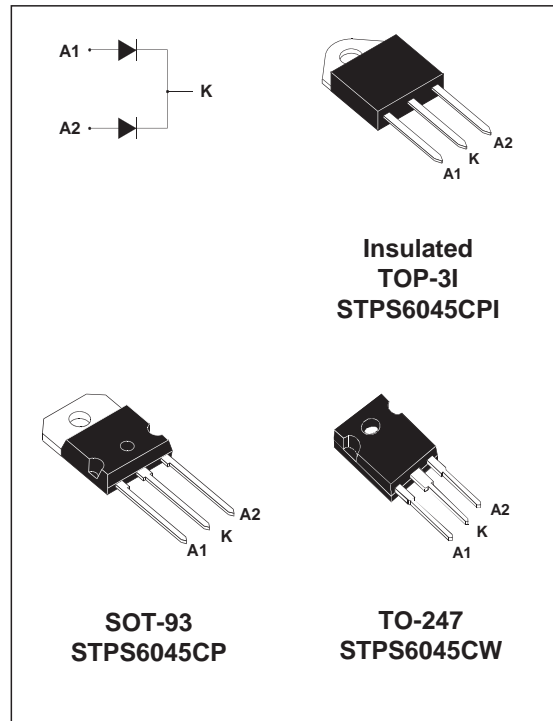
FEATURES AND BENEFITS

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- EXTREME FAST SWITCHING
- LOW THERMAL RESISTANCE
- INSULATED PACKAGE: TOP-3I
Insulating voltage = 2500V_{RMS}
Capacitance = 12pF
- AVALANCHE CAPABILITY SPECIFIED

DESCRIPTION

Dual center tap Schottky rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged either in SOT-93, TOP-3I or TO-247, 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 | | | 60 | A | |
| $I_{F(AV)}$ | Average forward current $\delta = 0.5$ | SOT-93 TO-247 | $T_c = 150^\circ\text{C}$ | Per diode | 30 | A |
| | | TOP-3I | $T_c = 130^\circ\text{C}$ | Per device | 60 | |
| I_{FSM} | Surge non repetitive forward current | | $t_p = 10 \text{ ms sinusoidal}$ | 400 | A | |
| I_{RRM} | Repetitive Peak reverse current | | $t_p = 2 \mu\text{s square}$ $F = 1 \text{ kHz}$ | 1 | A | |
| I_{RSM} | Non repetitive peak reverse current | | $t_p = 100 \mu\text{s square}$ | 3 | A | |
| P_{ARM} | Repetitive peak avalanche power | | $t_p = 1 \mu\text{s } T_j = 25^\circ\text{C}$ | 10600 | W | |
| T_{stg} | Storage temperature range | | | - 65 to + 175 | °C | |
| T_j | 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

THERMAL RESISTANCES

| Symbol | Parameter | | | Value | Unit |
|----------------------|------------------|-----------------|-----------|-------|------|
| R _{th(j-c)} | Junction to case | SOT-93 / TO-247 | Per diode | 0.95 | °C/W |
| | | | Total | 0.55 | |
| | | TOP-3I | Per diode | 1.8 | |
| | | | Total | 1.1 | |
| R _{th(c)} | | SOT-93 / TO-247 | Coupling | 0.15 | |
| | | TOP-3I | | 0.4 | |

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°C | V _R = V _{RRM} | | | 500 | μA |
| | | T _j = 125°C | | | 20 | 80 | mA |
| V _F * | Forward voltage drop | T _j = 125°C | I _F = 30 A | | 0.53 | 0.63 | V |
| | | T _j = 25°C | I _F = 60 A | | | 0.84 | |
| | | T _j = 125°C | I _F = 60 A | | 0.68 | 0.78 | |

Pulse test : ** tp = 380 μs, δ < 2%

To evaluate the conduction losses use the following equation:

$$P = 0.48 \times I_{F(AV)} + 0.005 I_{F(RMS)}^2$$

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

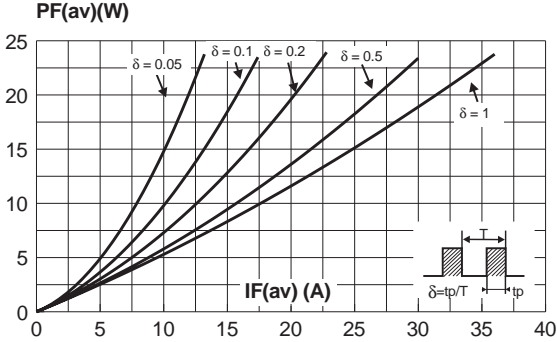


Fig. 3: Normalized avalanche power derating versus pulse duration.

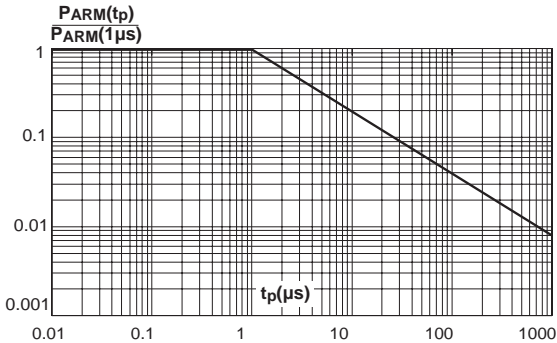


Fig. 2: Average current versus ambient temperature (δ=0.5, per diode).

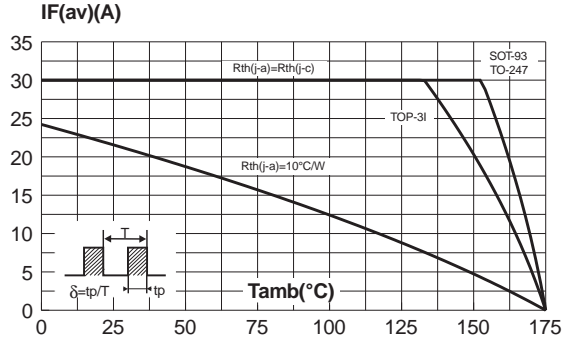


Fig. 4: Normalized avalanche power derating versus junction temperature.

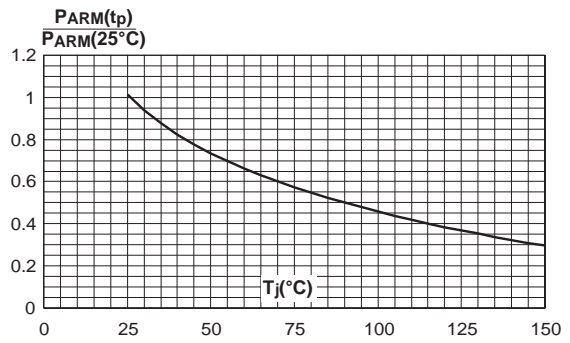


Fig. 5-1: Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (SOT-93 and TO-247).

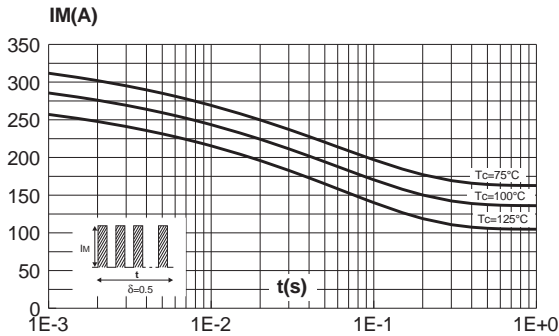


Fig. 5-2: Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (TOP-3I).

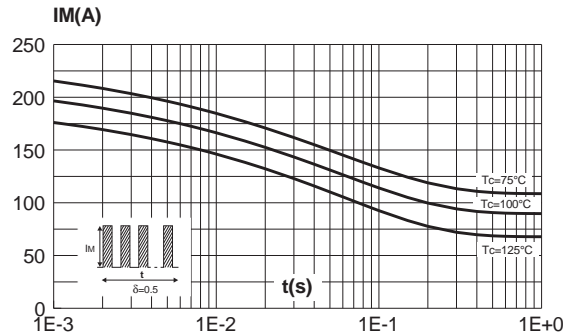


Fig. 6: Relative variation of thermal transient impedance junction to case versus pulse duration.

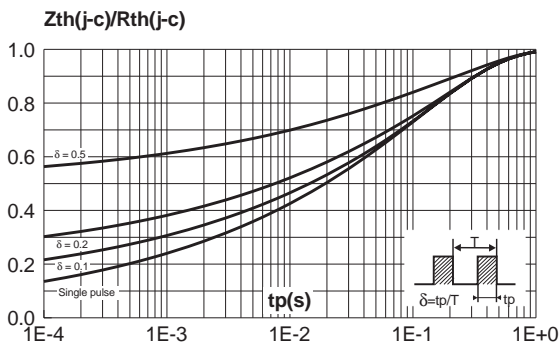


Fig. 7: Reverse leakage current versus reverse voltage applied (typical values, per diode).

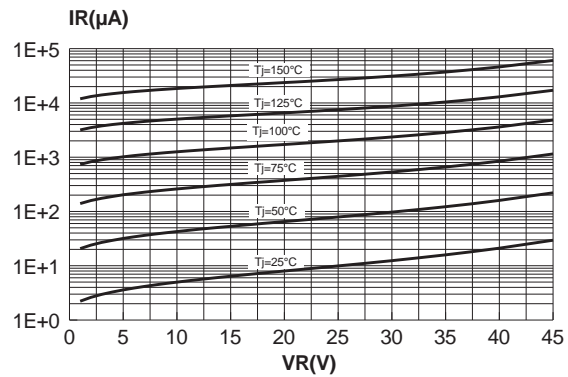


Fig. 8: Junction capacitance versus reverse voltage applied (typical values, per diode).

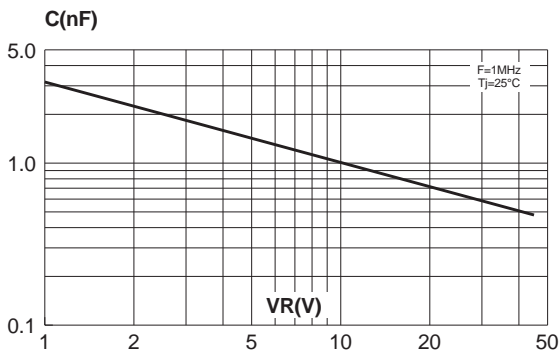
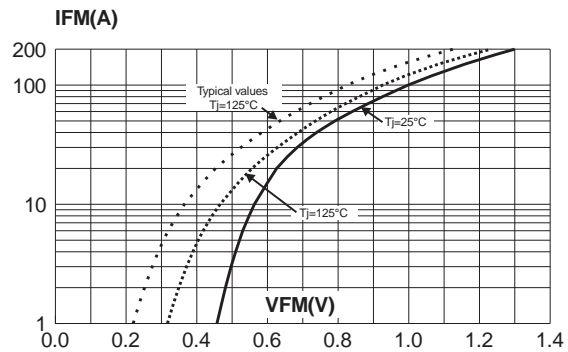
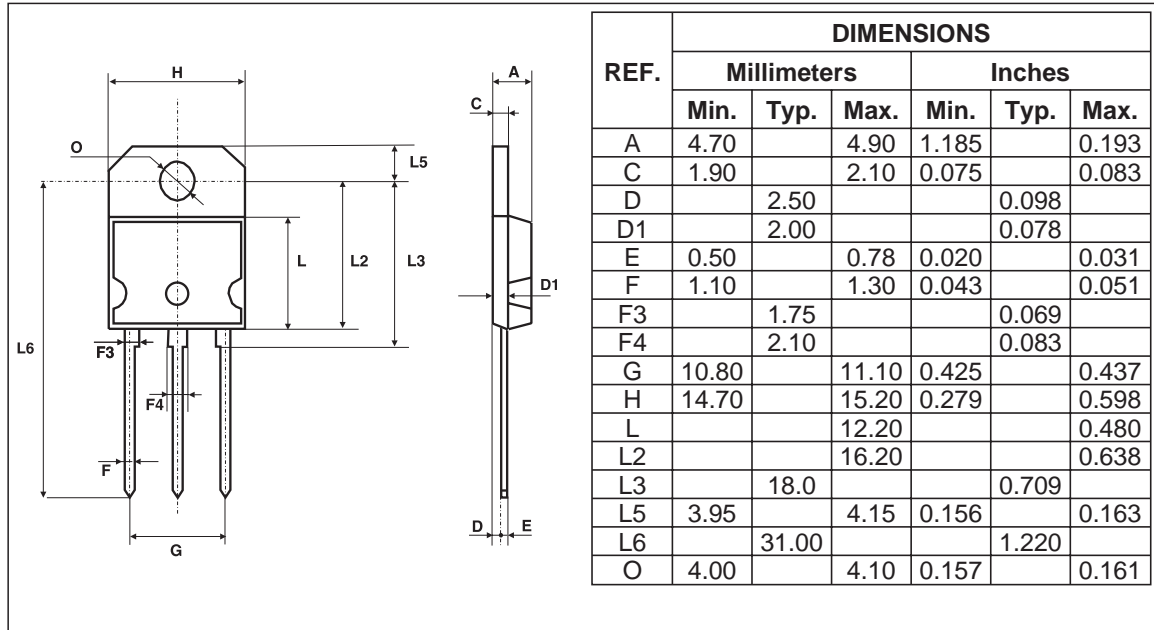


Fig. 9: Forward voltage drop versus forward current (maximum values, per diode).

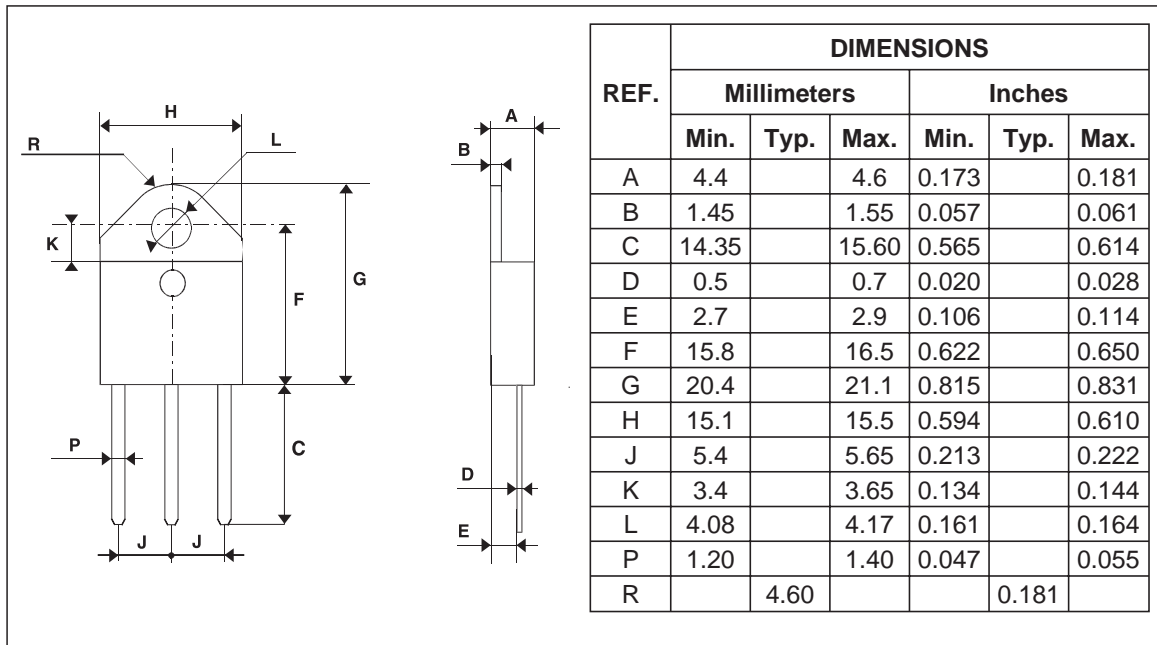


STPS6045CP/CPI/CW

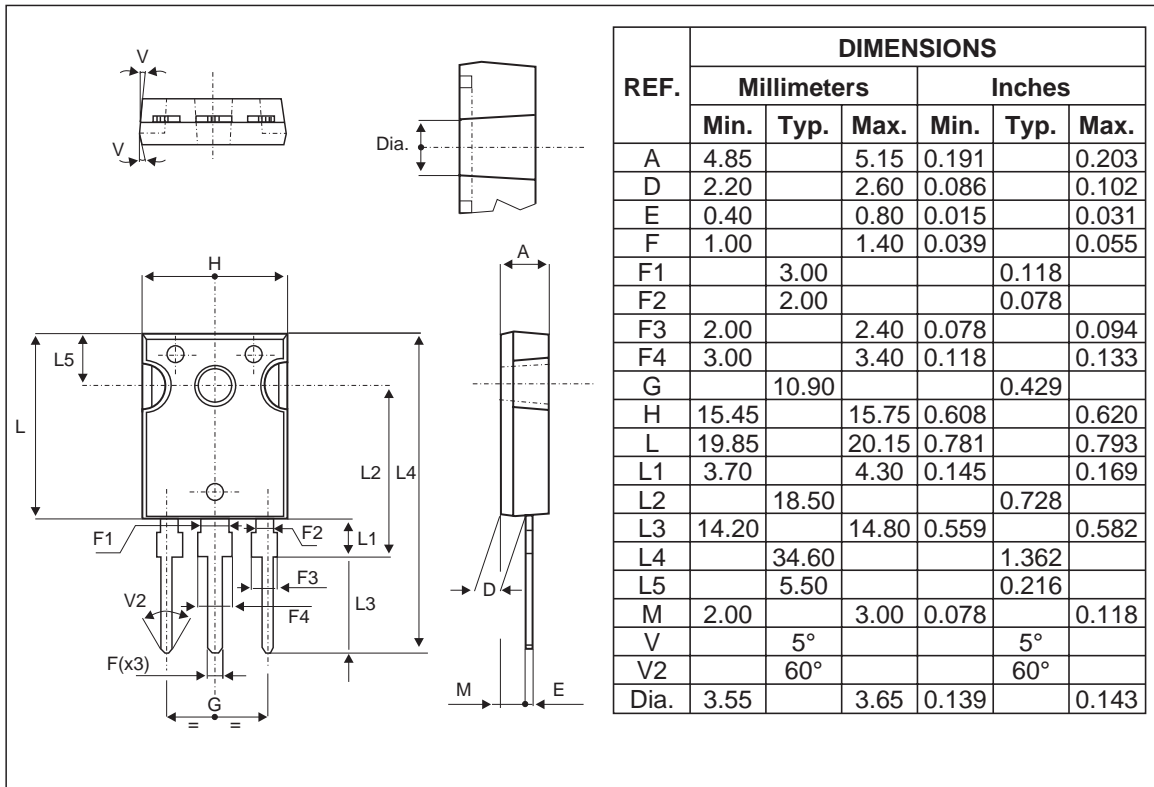
PACKAGE MECHANICAL DATA SOT-93



PACKAGE MECHANICAL DATA TOP-3I (isolated)



PACKAGE MECHANICAL DATA
TO-247



| Type | Marking | Package | Weight | Base qty | Delivery mode |
|-------------|-------------|---------|---------|----------|---------------|
| STPS6045CP | STPS6045CP | SOT-93 | 3.97 g. | 30 | Tube |
| STPS6045CPI | STPS6045CPI | TOP-3I | 4.46 g. | 120 | Bulk |
| STPS6045CW | STPS6045CW | TO-247 | 4.36 g. | 30 | Tube |

- Cooling method: by conduction (C)
- Recommended torque value: 0.8 N.m.
- Maximum torque value: 1.0 N.m.
- Epoxy meets UL94,V0

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