# STPS61L45C

## Power Schottky rectifier

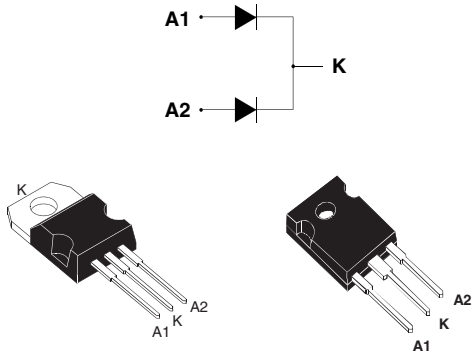
## Features

- High current capability
- Avalanche rated
- Low forward voltage drop current
- High frequency operation

## Description

Dual center tap schottky rectifier suited for high frequency switch mode power supplies.

Packaged in TO-247 and TO-220AB, this device provides desktop SMPS designers with a low forward voltage drop device, and reduced leakage current, with the objective of making the application compliant with environmental care standards, or suitable for 80+ requirements.




**TO-220AB**
**STPS61L45CT**

**TO-247**
**STPS61L45CW**

**Table 1. Device summary**

| | |
|---|---|
| $I_{F(AV)}$ | 2 x 30 A |
| $V_{RRM}$ | 45 V |
| $T_j$ (max) | 150 °C |
| $V_F$(typ) | 0.45 V |

# 1 Characteristics

**Table 2. Absolute ratings (limiting values per diode at 25 °C unless otherwise specified)**

| 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 δ = 0.5 | $T_c$ = 120 °C<br>$T_c$ = 115 °C | Per diode<br>Per device | 30<br>60 | A |
| $I_{FSM}$ | Surge non repetitive forward current | $t_p$ = 10 ms sinusoidal | | 500 | A |
| $P_{ARM}$ | Repetitive peak avalanche power | $t_p$ = 1 µs Tj = 25 °C | | 10000 | W |
| $T_{stg}$ | Storage temperature range | | | -65 to + 175 | °C |
| $T_j$ | Maximum operating junction temperature (1) | | | 150 | °C |

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid runaway for a diode on its own heatsink

**Table 3. Thermal resistances**

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $R_{th(j-c)}$ | Junction to case | Per diode<br>Total | 1.3<br>0.75 | °C/W |
| $R_{th(c)}$ | Coupling | | 0.2 | °C/W |

When the diodes 1 and 2 are used simultaneously :
ΔTj(diode 1) = P(diode1) x $R_{th(j-c)}$(Per diode) + P(diode 2) x $R_{th(c)}$.

**Table 4. Static electrical characteristics (per diode)**

| Symbol | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $I_R$ (1) | Reverse leakage current | $T_j$ = 25 °C | $V_R = V_{RRM}$ | | | 1.5 | mA |
| | | $T_j$ = 125 °C | | | 190 | 400 | |
| $V_F$ (2) | Forward voltage drop | $T_j$ = 25 °C | $I_F$ = 5 A | | 0.35 | | V |
| | | $T_j$ = 125 °C | | | 0.23 | | |
| | | $T_j$ = 25 °C | $I_F$ = 15 A | | 0.43 | 0.50 | |
| | | $T_j$ = 125 °C | | | 0.34 | 0.40 | |
| | | $T_j$ = 25 °C | $I_F$ = 30 A | | 0.50 | 0.56 | |
| | | $T_j$ = 125 °C | | | 0.45 | 0.51 | |

1. Pulse test: $t_p$ = 5 ms, δ < 2%
2. Pulse test: $t_p$ = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:
P = 0.3 x $I_{F(AV)}$ + 0.007 x $I_F{}^2{}_{(RMS)}$

**Figure 1. Conduction losses versus average forward current (per diode)**

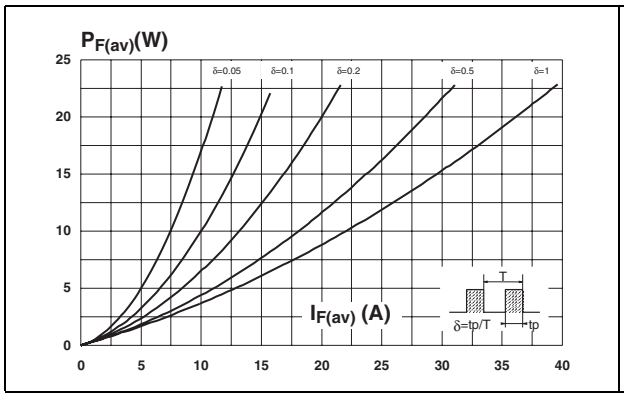



**Figure 2. Average forward current versus ambient temperature (δ = 0.5), (per diode)**

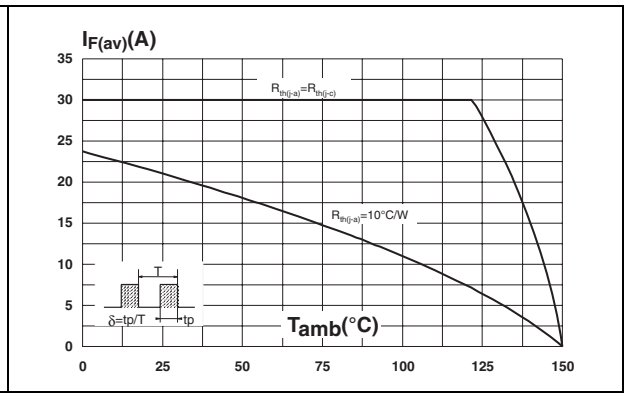



**Figure 3. Normalized avalanche power derating versus pulse duration**

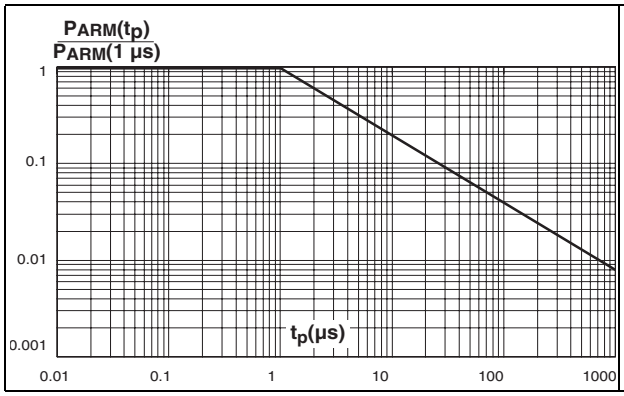



**Figure 4. Normalized avalanche power derating versus junction temperature**

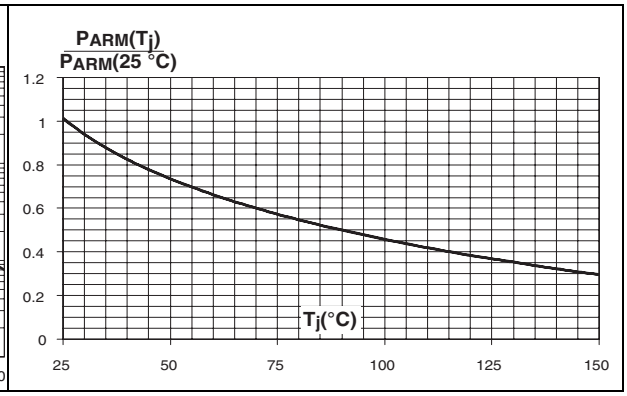



**Figure 5. Non repetitive surge peak forward current versus overload duration (per diode)**

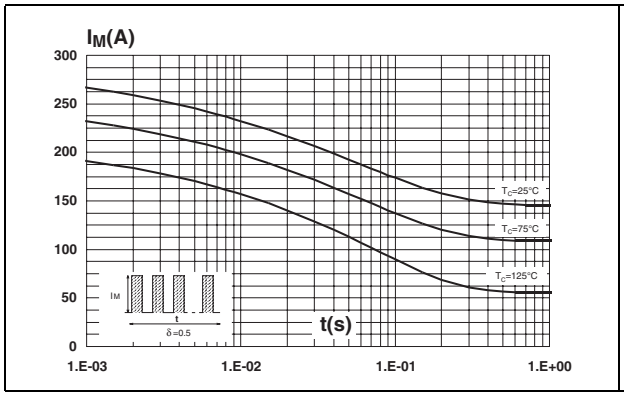



**Figure 6. Relative variation of thermal impedance junction to case versus pulse duration**

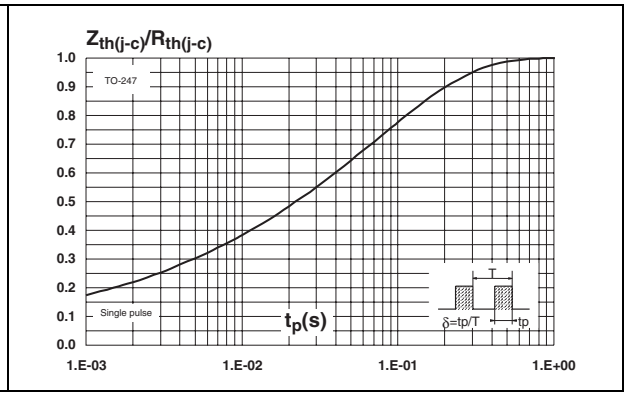


**Figure 7. Reverse leakage current versus reverse voltage applied (typical values, per diode)**

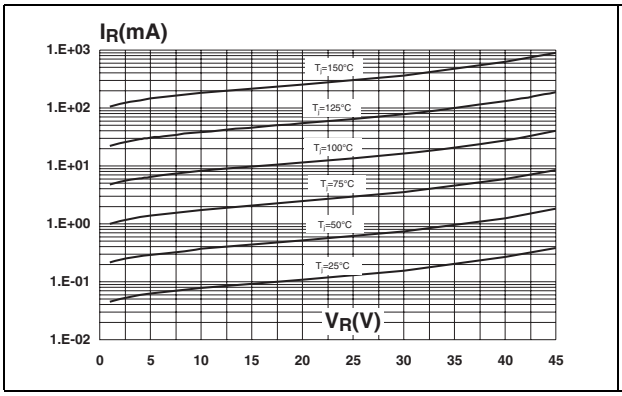



**Figure 8. Junction capacitance versus reverse voltage applied (typical values, per diode)**

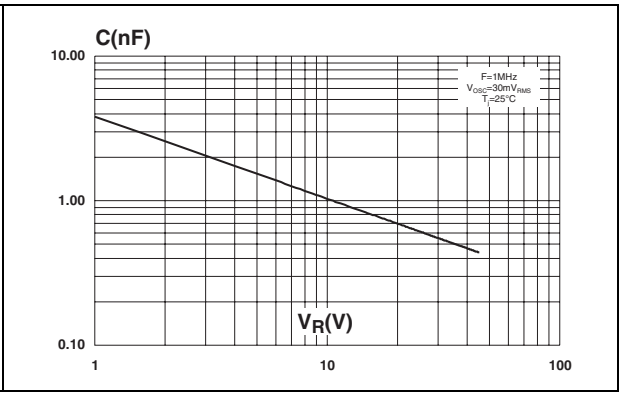
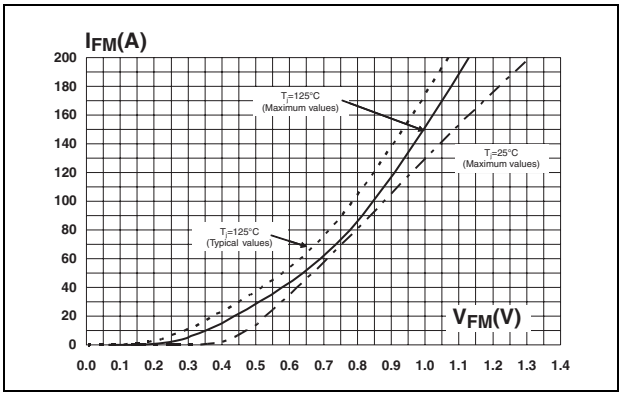



**Figure 9. Forward voltage drop versus forward current (per diode)**



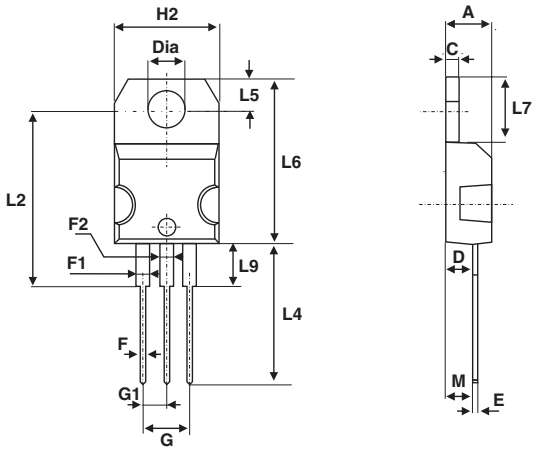
# 2 Package information

- Epoxy meets UL94, V0
- Cooling method: C
- Recommended torque values for: TO-220AB 0.4 to 0.6 N·m
- Recommended torque values for: TO-247 0.9 to 1.2 N·m

In order to meet environmental requirements, ST (also) offers these devices in ECOPACK® packages. ECOPACK® packages are Lead-free. The category of second level Interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label.

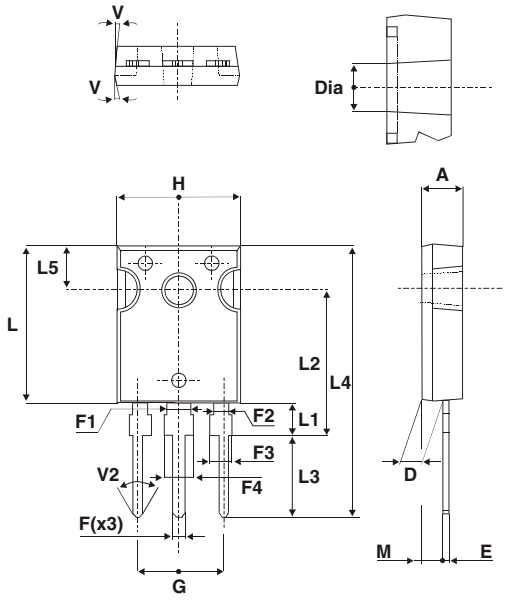
ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

**Table 5. TO-220AB dimensions**




| Ref. | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.40 | 4.60 | 0.173 | 0.181 |
| C | 1.23 | 1.32 | 0.048 | 0.106 |
| D | 2.40 | 2.72 | 0.094 | 0.009 |
| E | 0.49 | 0.70 | 0.019 | 0.037 |
| F | 0.61 | 0.88 | 0.024 | 0.067 |
| F1 | 1.14 | 1.70 | 0.044 | 0.024 |
| F2 | 1.14 | 1.70 | 0.044 | 0.054 |
| G | 4.95 | 5.15 | 0.194 | 0.368 |
| G1 | 2.40 | 2.70 | 0.094 | 0.409 |
| H2 | 10 | 10.40 | 0.393 | 0.208 |
| L2 | 16.4 typ | | 0.645 typ | |
| L4 | 13 | 14 | 0.511 | 0.055 |
| L5 | 2.65 | 2.95 | 0.104 | 0.069 |
| L6 | 15.25 | 15.75 | 0.600 | 0.126 |
| L7 | 6.20 | 6.60 | 0.244 | |
| L9 | 3.50 | 3.93 | 0.137 | |
| M | 2.6 typ. | | 0.102 typ. | |
| Diam. | 3.75 | 3.85 | 0.147 | 0.151 |

**Table 6. TO-247 dimensions**




| Ref. | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.85 | 5.15 | 0.191 | 0.203 |
| D | 2.20 | 2.60 | 0.086 | 0.102 |
| E | 0.40 | 0.80 | 0.015 | 0.031 |
| F | 1.00 | 1.40 | 0.039 | 0.055 |
| F1 | 3.00 typ. | | 0.118 typ. | |
| F2 | 2.00 typ. | | 0.078 typ. | |
| F3 | 2.00 | 2.40 | 0.078 | 0.094 |
| F4 | 3.00 | 3.40 | 0.118 | 0.133 |
| G | 10.90 typ. | | 0.429 typ. | |
| H | 15.45 | 15.75 | 0.608 | 0.620 |
| L | 19.85 | 20.15 | 0.781 | 0.793 |
| L1 | 3.70 | 4.30 | 0.145 | 0.169 |
| L2 | 18.50 typ. | | 0.728 typ. | |
| L3 | 14.20 | 14.80 | 0.559 | 0.582 |
| L4 | 34.60 typ. | | 1.362 typ. | |
| L5 | 5.50 typ. | | 0.216 typ. | |
| M | 2.00 | 3.00 | 0.078 | 0.118 |
| V | 5° typ. | | 5° typ. | |
| V2 | 60° typ. | | 60° typ. | |
| Dia. | 3.55 | 3.65 | 0.139 | 0.143 |

# 3 Ordering information

**Table 7. Ordering information**

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|---|---|---|---|---|---|
| STPS61L45CW | STPS61L45CW | TO-247 | 4.4 g | 30 | Tube |
| STPS61L45CT | STPS61L45CT | TO-220AB | 2.2 g | 50 | Tube |

# 4 Revision history

**Table 8. Document revision history**

| Date | Revision | Description of changes |
|---|---|---|
| 14-Nov-2007 | 1 | Initial release |

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