# STPS30H60C

## Power Schottky rectifier

## Main product characteristics

| | |
|---|---|
| $I_{F(AV)}$ | 2 X 15 A |
| $V_{RRM}$ | 60 V |
| $T_j$ | 175° C |
| $V_{F\ (typ)}$ | 0.535 V |

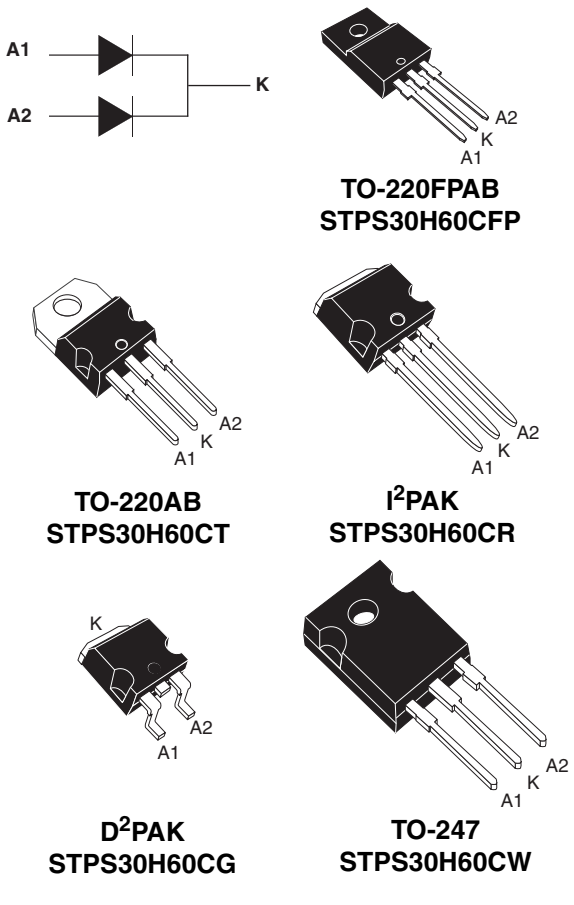
## Features and benefits

- High junction temperature capability
- Avalanche rated
- Low leakage current
- Good trade-off between leakage current and forward voltage drop
- High frequency operation

## Description

Dual centre tab Schottky rectifier suited for high frequency switch mode power supply.

Packaged in TO-220FPAB, TO-220AB, TO-247, $I^2PAK$, and $D^2PAK$, this device is intended to be used in notebook and LCD adaptors and desktop SMPS. In these applications the STPS30H60C provides a good margin between the remaining voltages applied on the diode and the voltage capability of the diode




## Order codes

| Part Number | Marking |
|---|---|
| STPS30H60CT | STPS30H60CT |
| STPS30H60CR | STPS30H60CR |
| STPS30H60CG-TR | STPS30H60CG |
| STPS30H60CG | STPS30H60CG |
| STPS30H60CW | STPS30H60CW |
| STPS30H60CFP | STPS30H60CFP |

# 1 Characteristics

**Table 1. Absolute ratings (limiting values per diode)**

| Symbol | Parameter | | | Value | Unit |
|---|---|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | | | 60 | V |
| $I_{F(RMS)}$ | RMS forward current | | | 30 | A |
| $I_{F(AV)}$ | Average forward current, $\delta = 0.5$ | TO-220AB $T_c = 155°$ C | Per diode | 15 | A |
| | | | Total package | 30 | |
| | | TO-220FPAB $T_c = 135°$ C | Per diode | 15 | |
| | | | Total package | 30 | |
| $I_{FSM}$ | Surge non repetitive forward current | $t_p$ = 10 ms Sinusoidal | | 230 | A |
| $P_{ARM}$ | Releative peak avalanche power | $T_j = 25°$ C | $t_p$ = 1 µs | 10 200 | W |
| $T_{stg}$ | Storage temperature range | | | -65 to + 175 | °C |
| $T_j$ | Maximum operating junction temperature(1) | | | 175 | °C |

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

**Table 2. Thermal parameters**

| Symbol | Parameter | | | Value | Unit |
|---|---|---|---|---|---|
| $R_{th(j-c)}$ | Junction to case | TO-220AB, $I^2PAK$, $D^2PAK$, TO-247 | Per diode | 1.5 | °C/W |
| | | | Total | 0.8 | |
| | | TO-220FPAB | Per diode | 4.7 | |
| | | | Total | 3.95 | |
| $R_{th(c)}$ | Coupling | TO-220AB, $I^2PAK$, $D^2PAK$, TO-247 | | 0.1 | |
| | | TO-220FPAB | | 3.2 | |

**Table 3. Static electrical characteristics**

| Symbol | Parameter | Test conditions | | Min. | Typ | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $I_R$(1) | Reverse leakage current | $T_j = 25°$ C | $V_R = V_{RRM}$ | | | 60 | µA |
| | | $T_j = 125°$ C | | | 8 | 25 | mA |
| $V_F$(2) | Forward voltage drop | $T_j = 25°$ C | $I_F$ = 7.5 A | | | 550 | mV |
| | | $T_j = 125°$ C | | | 435 | 470 | |
| | | $T_j = 25°$ C | $I_F$ = 15 A | | | 660 | |
| | | $T_j = 125°$ C | | | 535 | 570 | |
| | | $T_j = 25°$ C | $I_F$ = 30 A | | | 820 | |
| | | $T_j = 125°$ C | | | 635 | 690 | |

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

To evaluate the conduction losses use the following equation:
$P = 0.45 \times I_{F(AV)} + 0.008 \times I_F{}^2{}_{(RMS)}$

**Figure 1. Conduction losses versus average forward current**

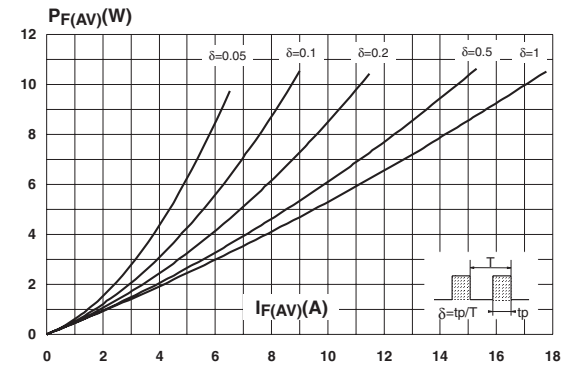



**Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)**

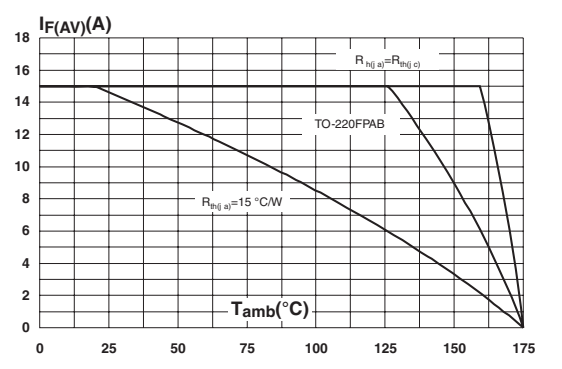



**Figure 3. Normalized avalanche power derating versus pulse duration**

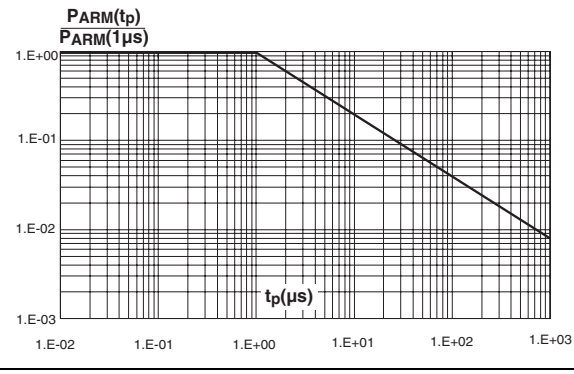



**Figure 4. Normalized avalanche power derating versus junction temperature**

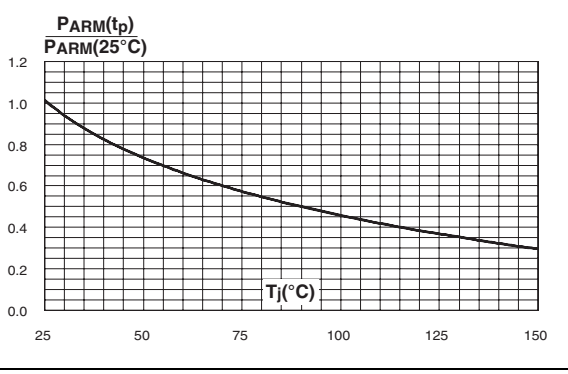



**Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (TO-220AB, TO-247 D²PAK, I²PAK)**

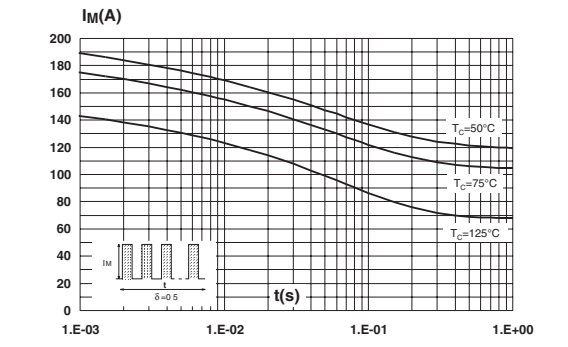



**Figure 6. Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (TO-220FPAB)**

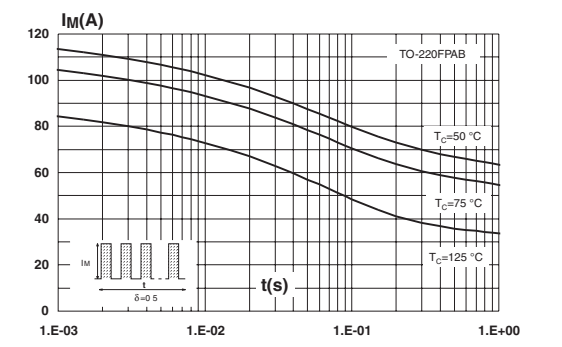


**Figure 7. Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB, TO-247 $D^2PAK$, $I^2PAK$)**

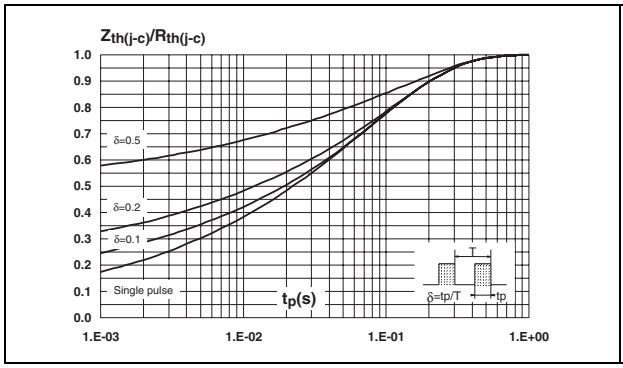



**Figure 8. Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB)**

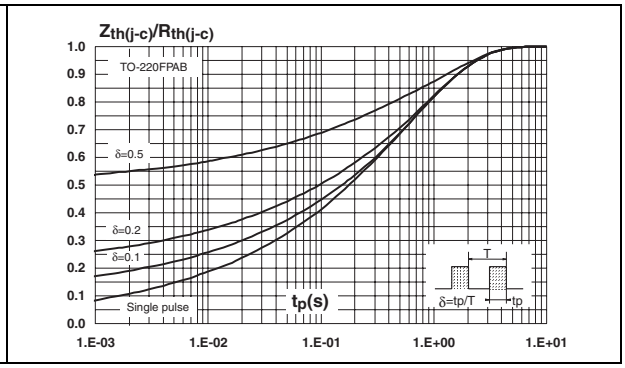



**Figure 9. Reverse leakage current versus reverse voltage applied (typical values, per diode)**

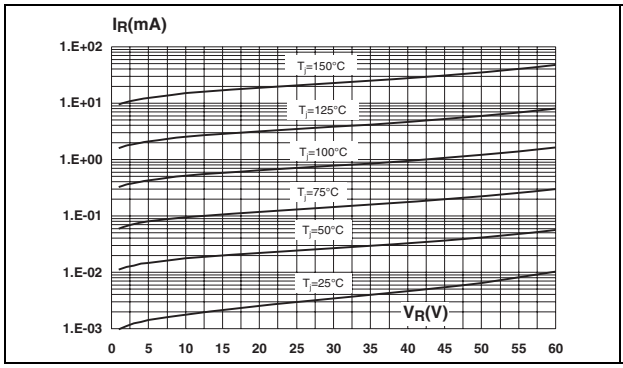



**Figure 10. Junction capacitance versus reverse voltage applied (typical values, per diode)**

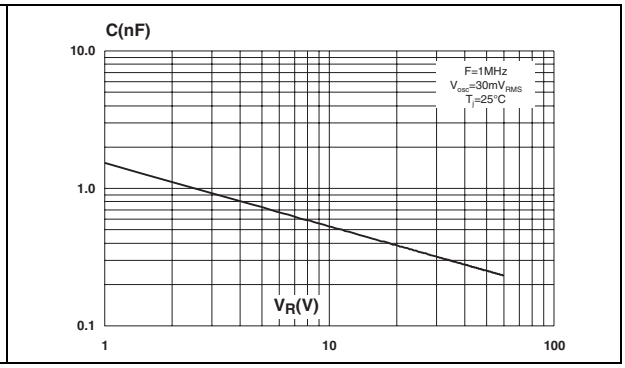



**Figure 11. Forward voltage drop versus forward current (per diode)**

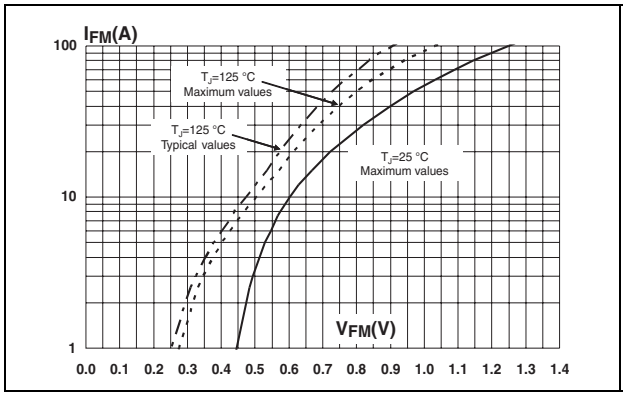
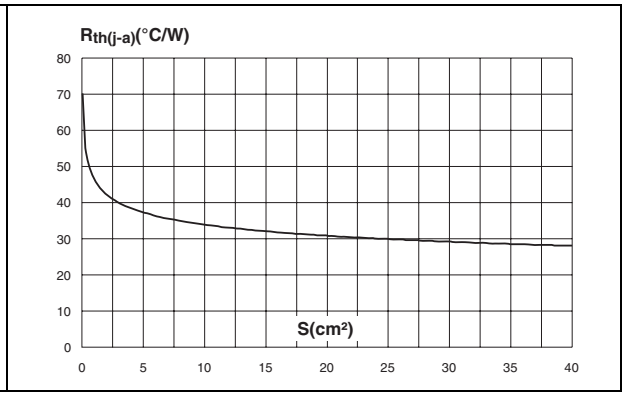


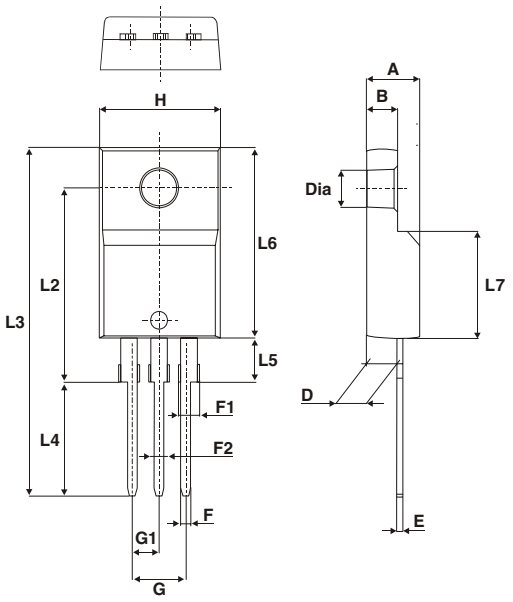

**Figure 12. Thermal resistance junction to ambient versus copper surface under tab (epoxy printed board FR4, copper thickness = 35 µm) ($D^2PAK$)**



# 2 Package mechanical data

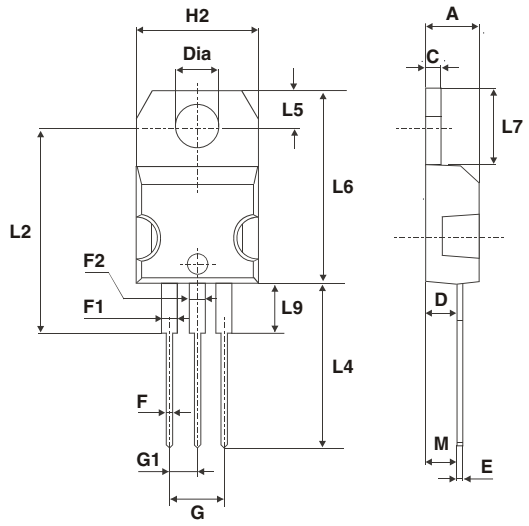
- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.8 Nm
- Maximum torque value: 1.0 Nm

**Table 4. TO-220FPAB dimensions**



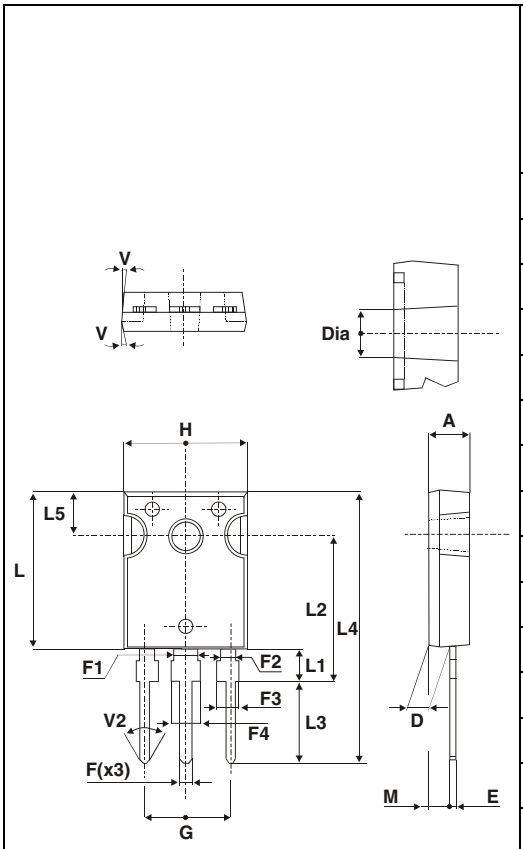

| Ref. | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.4 | 4.6 | 0.173 | 0.181 |
| B | 2.5 | 2.7 | 0.098 | 0.106 |
| D | 2.5 | 2.75 | 0.098 | 0.108 |
| E | 0.45 | 0.70 | 0.018 | 0.027 |
| F | 0.75 | 1 | 0.030 | 0.039 |
| F1 | 1.15 | 1.70 | 0.045 | 0.067 |
| F2 | 1.15 | 1.70 | 0.045 | 0.067 |
| G | 4.95 | 5.20 | 0.195 | 0.205 |
| G1 | 2.4 | 2.7 | 0.094 | 0.106 |
| H | 10 | 10.4 | 0.393 | 0.409 |
| L2 | 16 Typ. | | 0.63 Typ. | |
| L3 | 28.6 | 30.6 | 1.126 | 1.205 |
| L4 | 9.8 | 10.6 | 0.386 | 0.417 |
| L5 | 2.9 | 3.6 | 0.114 | 0.142 |
| L6 | 15.9 | 16.4 | 0.626 | 0.646 |
| L7 | 9.00 | 9.30 | 0.354 | 0.366 |
| Dia. | 3.00 | 3.20 | 0.118 | 0.126 |

Table 5. TO-220AB dimensions



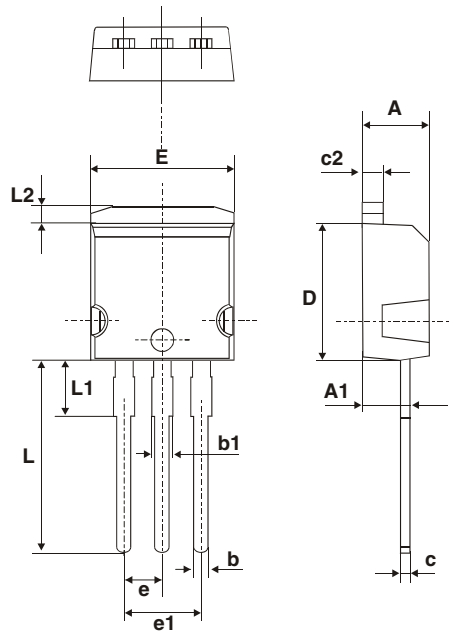

| Ref | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.40 | 4.60 | 0.173 | 0.181 |
| C | 1.23 | 1.32 | 0.048 | 0.051 |
| D | 2.40 | 2.72 | 0.094 | 0.107 |
| E | 0.49 | 0.70 | 0.019 | 0.027 |
| F | 0.61 | 0.88 | 0.024 | 0.034 |
| F1 | 1.14 | 1.70 | 0.044 | 0.066 |
| F2 | 1.14 | 1.70 | 0.044 | 0.066 |
| G | 4.95 | 5.15 | 0.194 | 0.202 |
| G1 | 2.40 | 2.70 | 0.094 | 0.106 |
| H2 | 10 | 10.40 | 0.393 | 0.409 |
| L2 | 16.4 typ. | | 0.645 typ. | |
| L4 | 13 | 14 | 0.511 | 0.551 |
| L5 | 2.65 | 2.95 | 0.104 | 0.116 |
| L6 | 15.25 | 15.75 | 0.600 | 0.620 |
| L7 | 6.20 | 6.60 | 0.244 | 0.259 |
| L9 | 3.50 | 3.93 | 0.137 | 0.154 |
| M | 2.6 typ. | | 0.102 typ. | |
| Diam. | 3.75 | 3.85 | 0.147 | 0.151 |

**Table 6. TO-247 dimensions**



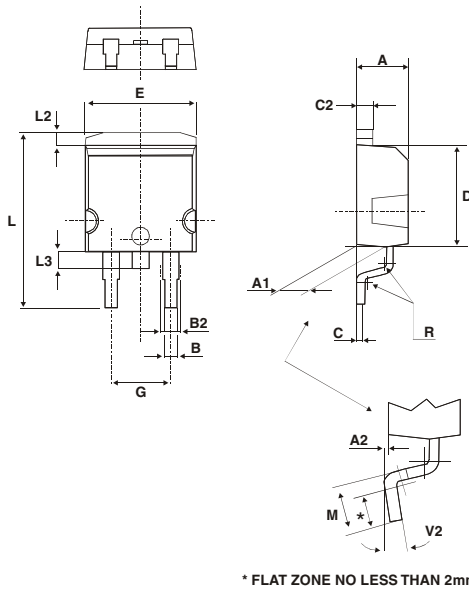

| REF | DIMENSIONS | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 4.85 | | 5.15 | 0.191 | | 0.203 |
| D | 2.20 | | 2.60 | 0.086 | | 0.102 |
| E | 0.40 | | 0.80 | 0.015 | | 0.031 |
| F | 1.00 | | 1.40 | 0.039 | | 0.055 |
| F1 | | 3.00 | | | 0.118 | |
| F2 | | 2.00 | | | 0.078 | |
| F3 | 2.00 | | 2.40 | 0.078 | | 0.094 |
| F4 | 3.00 | | 3.40 | 0.118 | | 0.133 |
| G | | 10.90 | | | 0.429 | |
| 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 | | | 0.728 | |
| L3 | 14.20 | | 14.80 | 0.559 | | 0.582 |
| L4 | | 34.60 | | | 1.362 | |
| L5 | | 5.50 | | | 0.216 | |
| M | 2.00 | | 3.00 | 0.078 | | 0.118 |
| V | | 5° | | | 5° | |
| V2 | | 60° | | | 60° | |
| Dia. | 3.55 | | 3.65 | 0.139 | | 0.143 |

Table 7. $I^2PAK$ dimensions



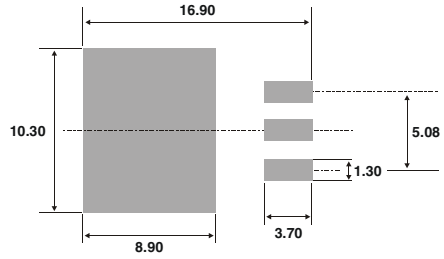

| REF. | DIMENSIONS | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.40 | 4.60 | 0.173 | 0.181 |
| A1 | 2.40 | 2.72 | 0.094 | 0.107 |
| b | 0.61 | 0.88 | 0.024 | 0.035 |
| b1 | 1.14 | 1.70 | 0.044 | 0.067 |
| c | 0.49 | 0.70 | 0.019 | 0.028 |
| c2 | 1.23 | 1.32 | 0.048 | 0.052 |
| D | 8.95 | 9.35 | 0.352 | 0.368 |
| e | 2.40 | 2.70 | 0.094 | 0.106 |
| e1 | 4.95 | 5.15 | 0.195 | 0.203 |
| E | 10 | 10.40 | 0.394 | 0.409 |
| L | 13 | 14 | 0.512 | 0.551 |
| L1 | 3.50 | 3.93 | 0.138 | 0.155 |
| L2 | 1.27 | 1.40 | 0.050 | 0.055 |

Table 8. D²PAK dimensions




| 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 |
| A2 | 0.03 | 0.23 | 0.001 | 0.009 |
| B | 0.70 | 0.93 | 0.027 | 0.037 |
| B2 | 1.14 | 1.70 | 0.045 | 0.067 |
| C | 0.45 | 0.60 | 0.017 | 0.024 |
| C2 | 1.23 | 1.36 | 0.048 | 0.054 |
| D | 8.95 | 9.35 | 0.352 | 0.368 |
| E | 10.00 | 10.40 | 0.393 | 0.409 |
| G | 4.88 | 5.28 | 0.192 | 0.208 |
| L | 15.00 | 15.85 | 0.590 | 0.624 |
| L2 | 1.27 | 1.40 | 0.050 | 0.055 |
| L3 | 1.40 | 1.75 | 0.055 | 0.069 |
| M | 2.40 | 3.20 | 0.094 | 0.126 |
| R | 0.40 typ. | | 0.016 typ. | |
| V2 | 0° | 8° | 0° | 8° |

Figure 13. Footprint (dimensions in millimeters)

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# 3 Ordering information

| Part Number | Marking | Package | Weight | Base qty | Delivery mode |
|---|---|---|---|---|---|
| STPS30H60CT | STPS30H60CT | TO-220AB | 2.23 g | 50 | Tube |
| STPS30H60CR | STPS30H60CR | $I^2PAK$ | 1.49 g | 50 | Tube |
| STPS30H60CG | STPS30H60CG | $D^2PAK$ | 1.48 g | 50 | Tube |
| STPS30H60CG-TR | STPS30H60CG-TR | $D^2PAK$ | 1.48 g | 1000 | Tape & reel |
| STPS30H60CW | STPS30H60W | TO-247 | 4.46 g | 30 | Tube |
| STPS30H60CFP | STPS30H60CFP | TO-220FPAB | 2.00 g | 50 | Tube |

# 4 Revision history

| Date | Revision | Description of Changes |
|---|---|---|
| 27-Feb-2006 | 1 | First issue |
| 31-Mar-2007 | 2 | Added TO-220FPAB package. Updated thermal parameters in Table 2. |

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