

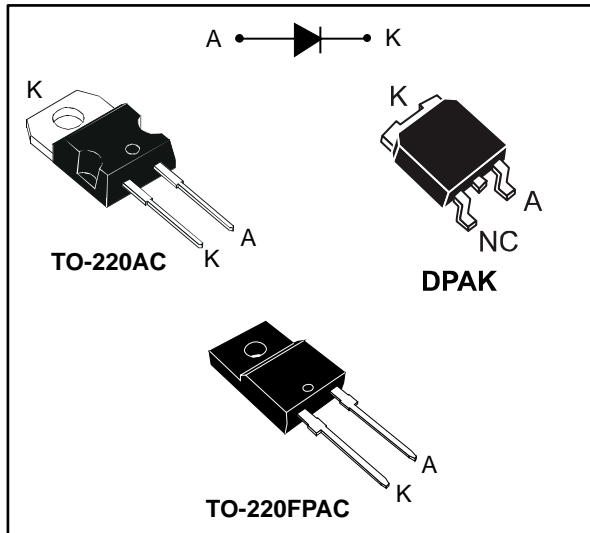


THE DATASHEET OF STTH8S06FP



Turbo 2 ultrafast high voltage rectifier

Datasheet - production data



Description

This device is an ultrafast diode based on 600 V Pt doping planar technology.

It can be used in hard switching conditions for power factor corrections. Its extremely low reverse recovery current reduces the switching power losses of the MOSFET and thus increases the overall application efficiency.

This diode is also intended for applications in power supplies and power conversions systems, and all sorts of power switching.

Table 1: Device summary

| Symbol | Value |
|-----------------|--------|
| $I_{F(AV)}$ | 8 A |
| V_{RRM} | 600 V |
| $I_{RM}(typ.)$ | 4.4 A |
| $V_F (typ.)$ | 1.5 V |
| $T_j (max.)$ | 175 °C |
| $t_{rr} (typ.)$ | 12 ns |

Features

- Ultrafast recovery
- Low reverse recovery current
- Low thermal resistance
- Higher frequency operation
- Reduces switching and conduction losses
- Insulated TO-220FPAC:
 - Insulating voltage = 2000 V_{RMS}
 - Package capacitance = 12 pF

1 Characteristics

Table 2: Absolute ratings (limiting values at 25 °C, unless otherwise specified)

| Symbol | Parameter | Value | Unit |
|--------------------|--|------------------------|------|
| V _{RRM} | Repetitive peak reverse voltage | 600 | V |
| I _{F(AV)} | Average forward current $\delta = 0.5$ square wave | 8 | A |
| I _{FSM} | Surge non repetitive forward current | t _p = 10 ms | A |
| T _{stg} | Storage temperature range | -65 to +175 | °C |
| T _j | Maximum operating junction temperature | 175 | |

Table 3: Thermal parameters

| Symbol | Parameter | Max. value | Unit |
|----------------------|------------------|----------------|------|
| R _{th(j-c)} | Junction to case | TO-220AC, DPAK | 3.0 |
| | | TO-220FPAC | 5.5 |

Table 4: Static electrical characteristics (per diode)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|----------------|-------------------------|-------------------------|------------------------|------|------|------|
| I _R | Reverse leakage current | T _j = 25 °C | V _R = 600 V | - | | 20 |
| | | T _j = 125 °C | | - | 25 | 200 |
| V _F | Forward voltage drop | T _j = 25 °C | I _F = 8 A | - | | 3.4 |
| | | T _j = 150 °C | | - | 1.5 | 1.9 |

To evaluate the maximum conduction losses, use the following equation:

$$P = 1.20 \times I_{F(AV)} + 0.087 \times I_{F(RMS)}^2$$

Table 5: Dynamic electrical characteristics

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|---------------------|--------------------------|-------------------------|------|------|------|------|
| t _{rr} | Reverse recovery time | T _j = 25 °C | - | 12 | 18 | ns |
| I _{RM} | Reverse recovery current | | | | | |
| S _{factor} | Softness factor | | | | | |
| Q _{rr} | Reverse recovery charges | T _j = 125 °C | - | 17 | | nC |
| I _{RM} | Reverse recovery current | | | | | |
| S _{factor} | Softness factor | | | | | |
| Q _{rr} | Reverse recovery charges | | | 90 | | nC |

1.2 Characteristics (curves)

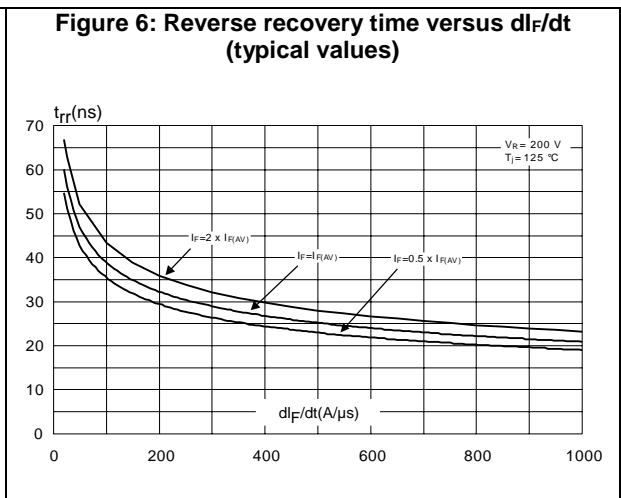
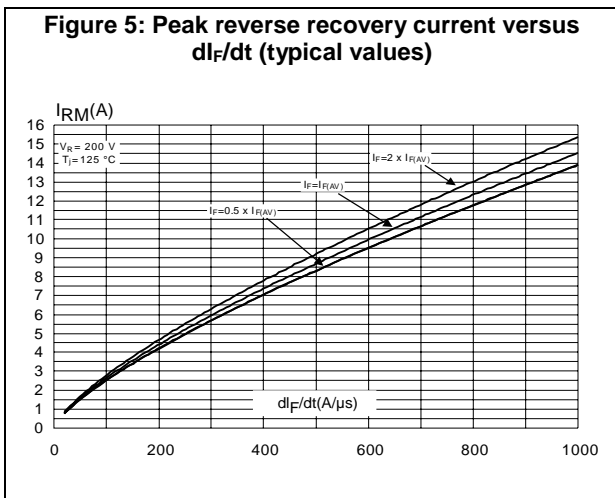
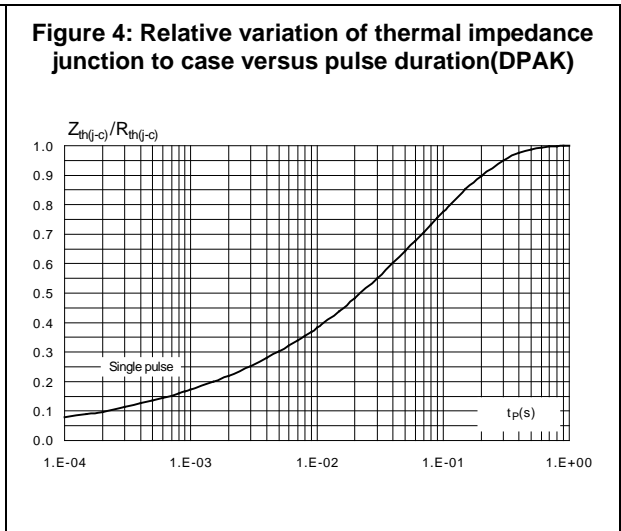
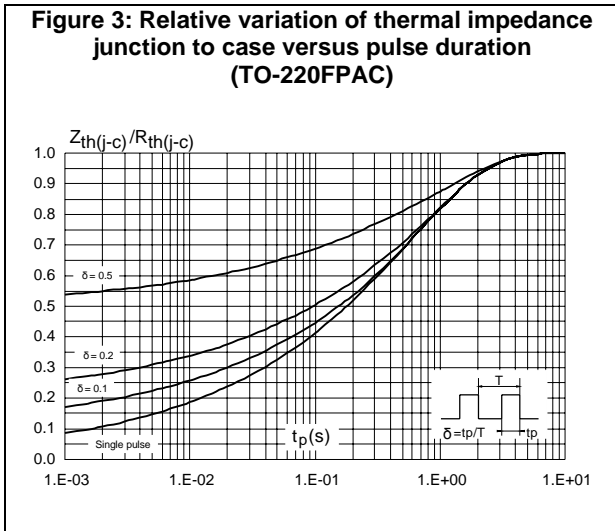
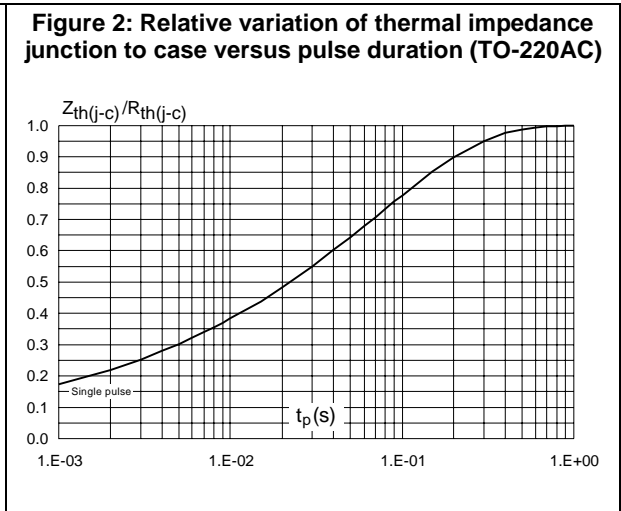
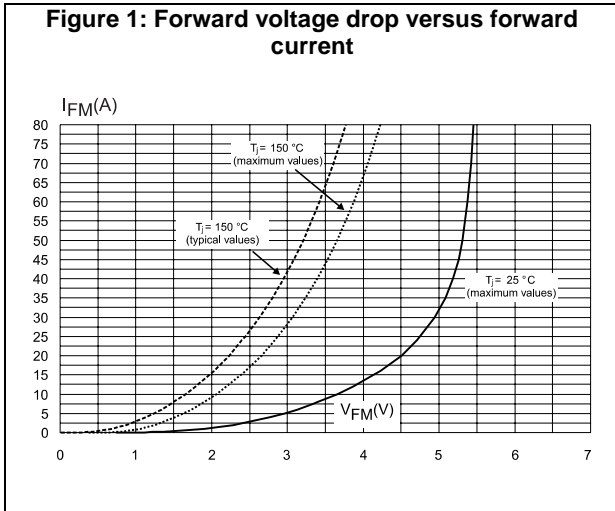


Figure 7: Reverse recovery charges versus di_F/dt (typical values)

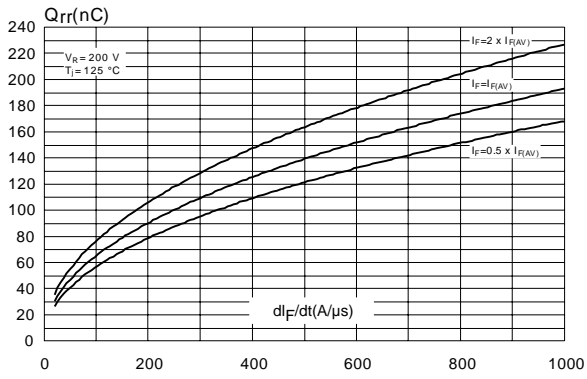


Figure 8: Junction capacitance versus reverse voltage applied (typical values)

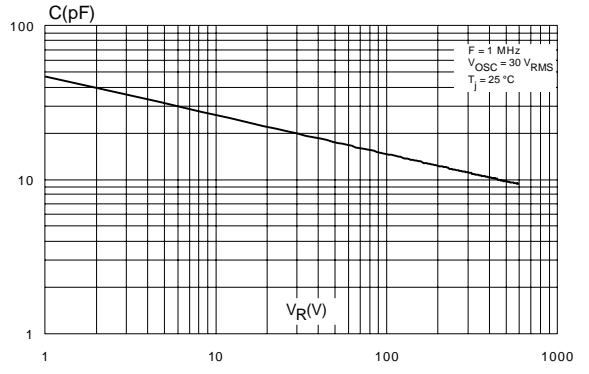
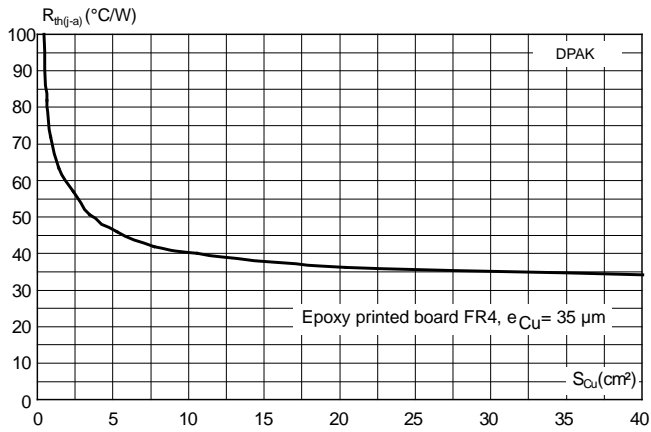


Figure 9: Thermal resistance junction to ambient versus copper surface under tab (DPAK, typical values)



2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

- Cooling method: by conduction (C)
- Epoxy meets UL 94,V0
- Recommended torque value: 0.55 N·m
- Maximum torque value: 0.7 N·m

2.1 TO-220AC package information

Figure 10: TO-220AC package outline

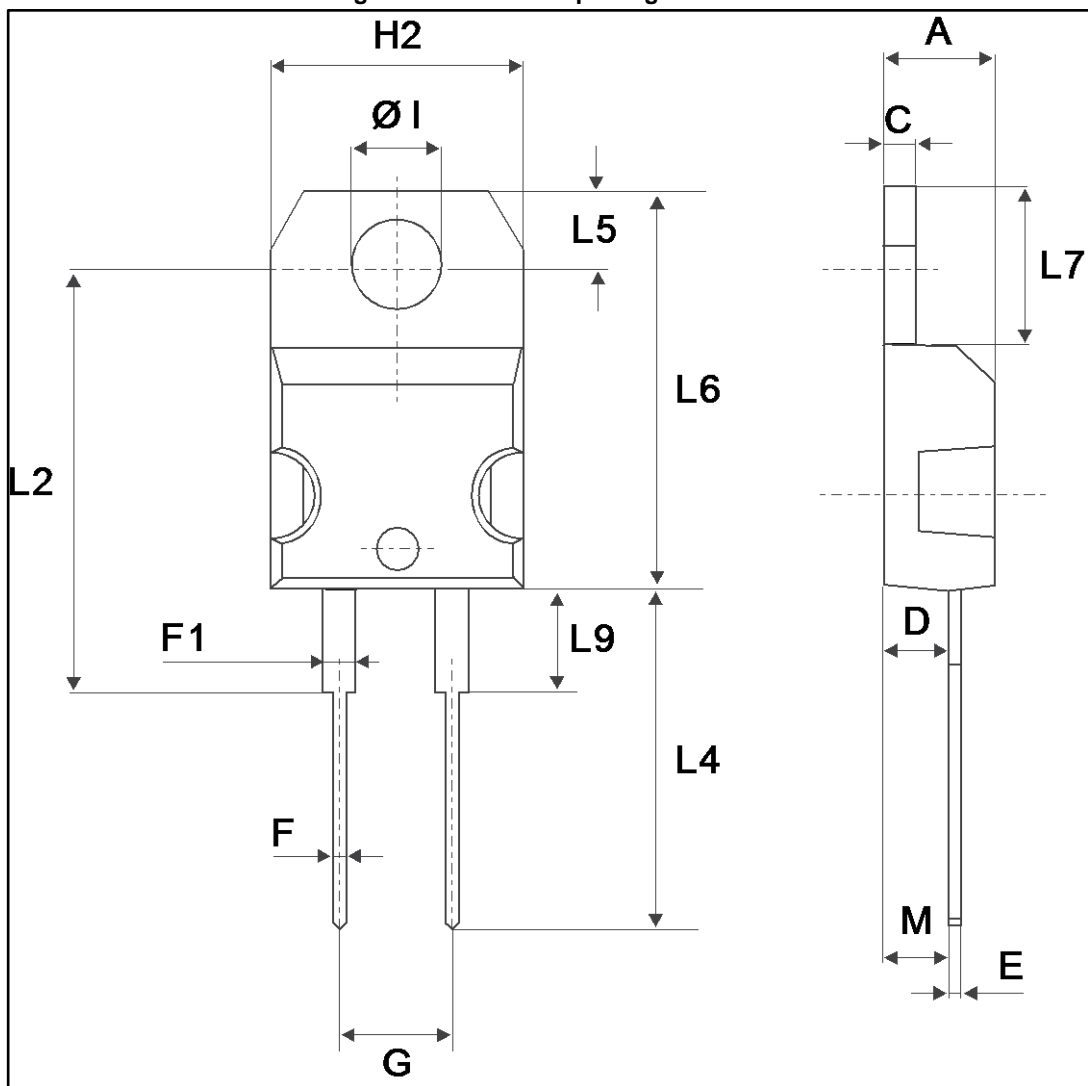


Table 6: TO-220AC package mechanical data

| 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 |
| G | 4.95 | 5.15 | 0.194 | 0.202 |
| H2 | 10.00 | 10.40 | 0.393 | 0.409 |
| L2 | 16.40 typ. | | 0.645 typ. | |
| L4 | 13.00 | 14.00 | 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 |

2.2 TO-220FPAC package information

Figure 11: TO-220FPAC package outline

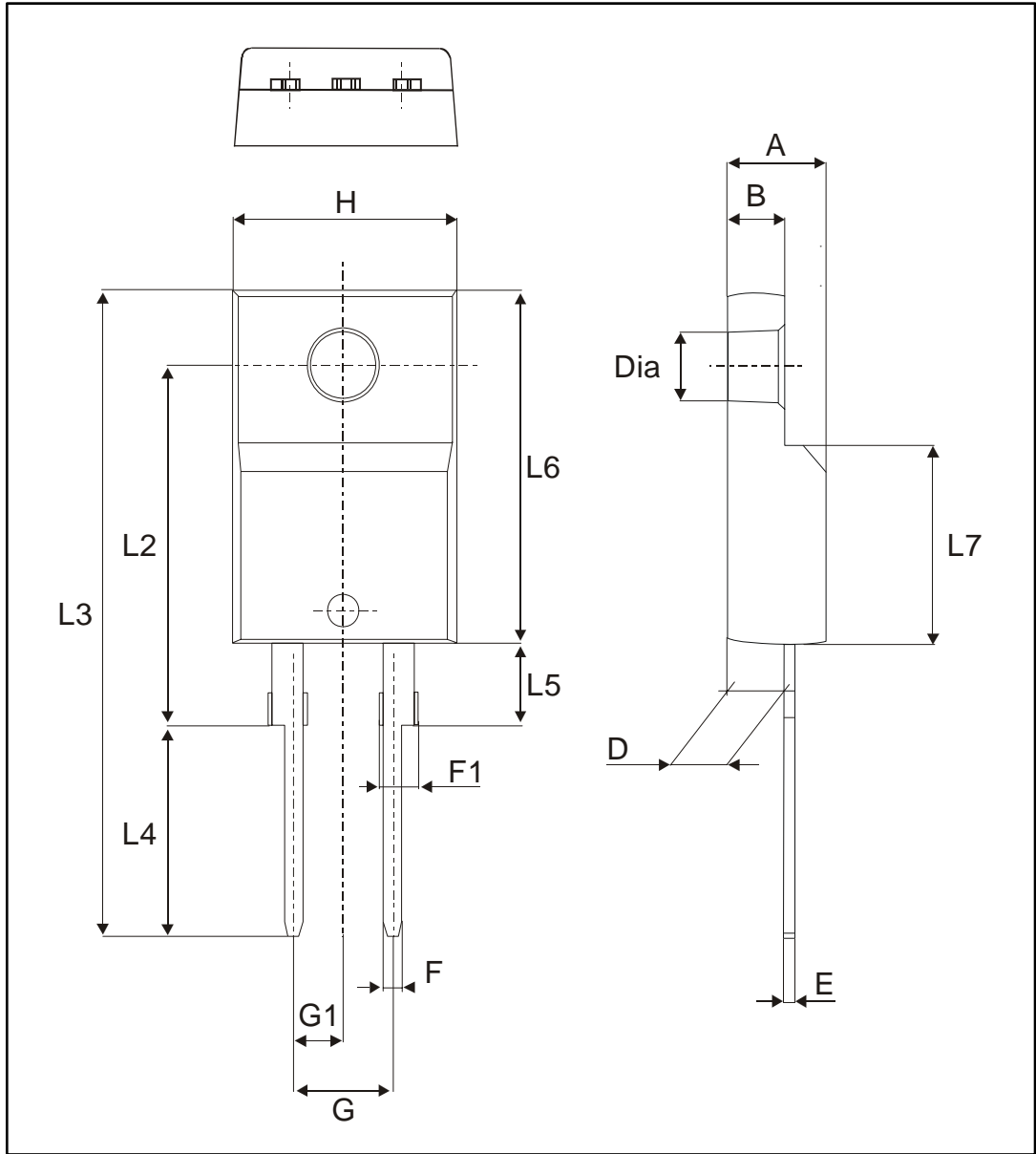
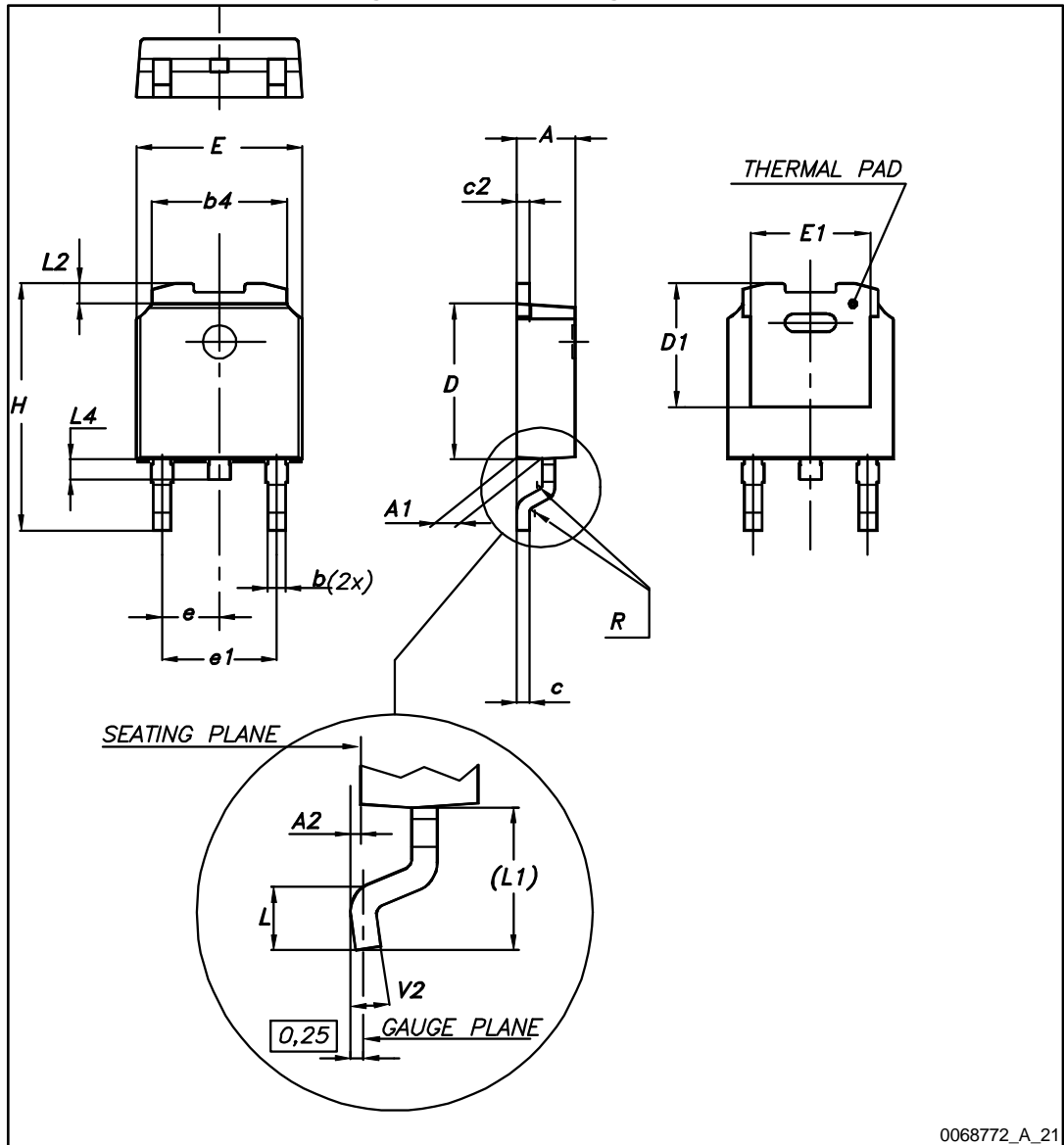


Table 7: TO-220FPAC package mechanical data

| Ref. | Dimensions | | | |
|------|-------------|-------|------------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.40 | 4.60 | 0.173 | 0.181 |
| B | 2.50 | 2.70 | 0.098 | 0.106 |
| D | 2.50 | 2.75 | 0.098 | 0.108 |
| E | 0.45 | 0.70 | 0.018 | 0.027 |
| F | 0.75 | 1.00 | 0.030 | 0.039 |
| F1 | 1.15 | 1.70 | 0.045 | 0.067 |
| G | 4.95 | 5.20 | 0.195 | 0.205 |
| G1 | 2.40 | 2.70 | 0.094 | 0.106 |
| H | 10.00 | 10.40 | 0.393 | 0.409 |
| L2 | 16.00 typ. | | 0.630 typ. | |
| L3 | 28.60 | 30.60 | 0.126 | 1.205 |
| L4 | 9.80 | 10.60 | 0.386 | 0.417 |
| L5 | 2.90 | 3.60 | 0.114 | 0.142 |
| L6 | 15.90 | 16.40 | 0.626 | 0.646 |
| L7 | 9.00 | 9.30 | 0.354 | 0.366 |
| Dia. | 3.00 | 3.20 | 0.118 | 0.126 |

2.3 DPAK package information

Figure 12: DPAK package outline

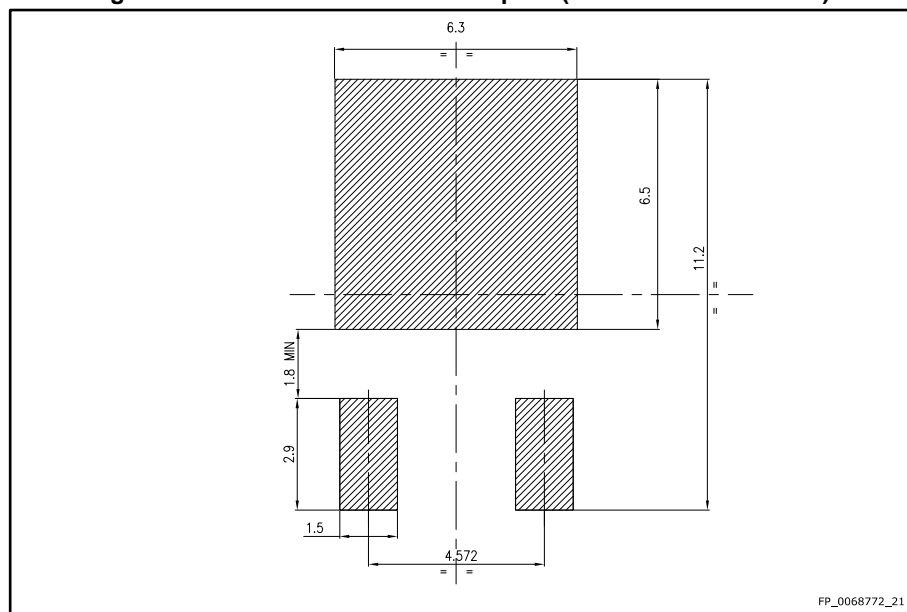


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Table 8: DPAK mechanical data

| Dim. | Dimensions | | | | | |
|------|-------------|------|-------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 2.20 | | 2.40 | 0.087 | | 0.094 |
| A1 | 0.90 | | 1.10 | 0.035 | | 0.043 |
| A2 | 0.03 | | 0.23 | 0.001 | | 0.009 |
| b | 0.64 | | 0.90 | 0.025 | | 0.035 |
| b4 | 5.20 | | 5.40 | 0.205 | | 0.213 |
| c | 0.45 | | 0.60 | 0.018 | | 0.024 |
| c2 | 0.48 | | 0.60 | 0.019 | | 0.024 |
| D | 6.00 | | 6.20 | 0.236 | | 0.244 |
| D1 | 4.95 | 5.10 | 5.25 | 0.201 | 0.195 | 0.207 |
| E | 6.40 | | 6.60 | 0.252 | | 0.260 |
| E1 | 4.60 | 4.70 | 4.80 | 0.181 | 0.185 | 0.189 |
| e | 2.16 | 2.28 | 2.40 | 0.085 | 0.090 | 0.094 |
| e1 | 4.40 | | 4.60 | 0.173 | | 0.181 |
| H | 9.35 | | 10.10 | 0.368 | | 0.398 |
| L | 1.00 | | 1.50 | 0.039 | | 0.059 |
| (L1) | 2.60 | 2.80 | 3.00 | 0.102 | 0.110 | 0.118 |
| L2 | 0.65 | 0.80 | 0.95 | 0.026 | 0.031 | 0.037 |
| L4 | 0.60 | | 1.00 | 0.024 | | 0.039 |
| R | | 0.20 | | | 0.008 | |
| V2 | 0° | | 8° | 0° | | 8° |

Figure 13: DPAK recommended footprint (dimensions are in mm)



3 Ordering information

Table 9: Ordering information

| Order code | Marking | Package | Weight | Base qty. | Delivery mode |
|--------------|------------|------------|--------|-----------|---------------|
| STTH8S06D | STTH8S06D | TO-220AC | 1.9 g | 50 | Tube |
| STTH8S06FP | STTH8S06FP | TO-220FPAC | 1.64 g | 50 | Tube |
| STTH8S06B-TR | STTH8 S06B | DPAK | 0.35 g | 2500 | Tape and reel |

4 Revision history

Table 10: Document revision history

| Date | Revision | Changes |
|-------------|----------|---|
| 18-Dec-2007 | 1 | first issue |
| 10-Feb-2017 | 2 | Added DPAK package. Updated Section "Features" . |

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