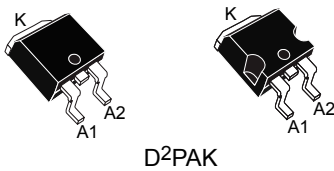
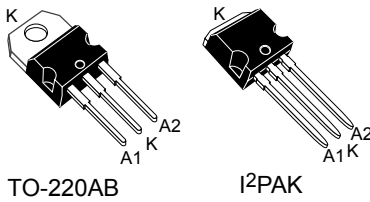
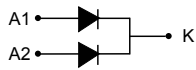


100 V power Schottky rectifier



Features

- Negligible switching losses
- Low leakage current
- Good trade-off between leakage current and forward voltage drop
- Low thermal resistance
- Avalanche specification
- ECOPACK[®]2 compliant

Applications

- Switching diode
- SMPS
- DC/DC converter
- LED lighting
- Desktop power supply

Description

This dual center tab Schottky rectifier is suited for switch mode power supply and high frequency DC to DC converters.

Packaged in D²PAK, I²PAK and TO-220AB, the **STPS41H100C** is optimized for use in high frequency inverters.

| Product status link | |
|-----------------------------|----------|
| STPS41H100C | |
| Product summary | |
| Symbol | Value |
| $I_{F(AV)}$ | 2 x 20 A |
| V_{RRM} | 100 V |
| T_j | 175 °C |
| V_F (typ.) | 0.62 V |

1 Characteristics

Table 1. Absolute ratings (limiting values, per diode, at 25 °C, unless otherwise specified)

| Symbol | Parameter | | Value | Unit | |
|---------------------|---|--|-------------|------|---|
| V _{RRM} | Repetitive peak reverse voltage | | 100 | V | |
| I _{F(RMS)} | Forward rms current | | 30 | A | |
| I _{F(AV)} | Average forward current, $\delta = 0.5$ square wave | T _c = 150 °C | Per diode | 20 | A |
| | | | Per device | 40 | |
| I _{FSM} | Surge non repetitive forward current | t _p = 10 ms sinusoidal | 220 | A | |
| P _{ARM} | Repetitive peak avalanche power | t _p = 10 μ s, T _j = 125 °C | 1300 | W | |
| T _{stg} | Storage temperature range | | -65 to +175 | °C | |
| T _j | Maximum operating junction temperature range ⁽¹⁾ | | 175 | °C | |

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

Table 2. Thermal resistance parameters

| Symbol | Parameter | | Max. value | Unit |
|----------------------|------------------|-----------|------------|------|
| R _{th(j-c)} | Junction to case | Per diode | 1.5 | °C/W |
| | | Total | 0.8 | |
| R _{th(c)} | Coupling | | 0.1 | |

When the diodes 1 and 2 are used simultaneously :

$$\Delta T_j(\text{diode 1}) = P(\text{diode1}) \times R_{th(j-c)}(\text{per diode}) + P(\text{diode 2}) \times R_{th(c)}$$

For more information, please refer to the following application note:

- AN5088 : Rectifiers thermal management, handling and mounting recommendations

Table 3. 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} | - | | 10 | μ A |
| | | T _j = 125 °C | | - | 3 | 10 | mA |
| V _F ⁽²⁾ | Forward voltage drop | T _j = 25 °C | I _F = 20 A | - | | 0.80 | V |
| | | T _j = 125 °C | | - | 0.62 | 0.67 | |
| | | T _j = 25 °C | I _F = 40 A | - | | 0.90 | |
| | | T _j = 125 °C | | - | 0.70 | 0.76 | |

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

2. Pulse test: t_p = 380 μ s, $\delta < 2\%$

To evaluate the conduction losses, use the following equation: $P = 0.58 \times I_{F(AV)} + 0.0045 \times I_{F(RMS)}^2$

For more information, please refer to the following application notes related to the power losses :

- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

1.1 Characteristics (curves)

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

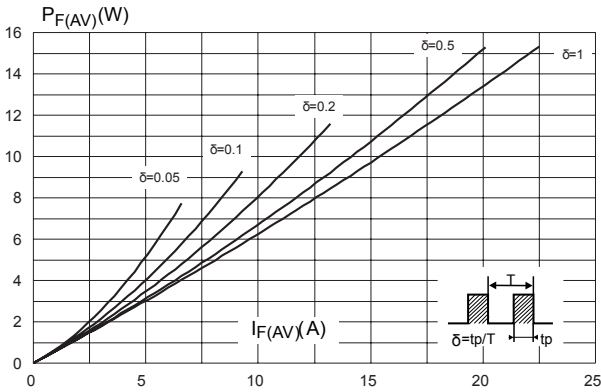


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$, per diode)

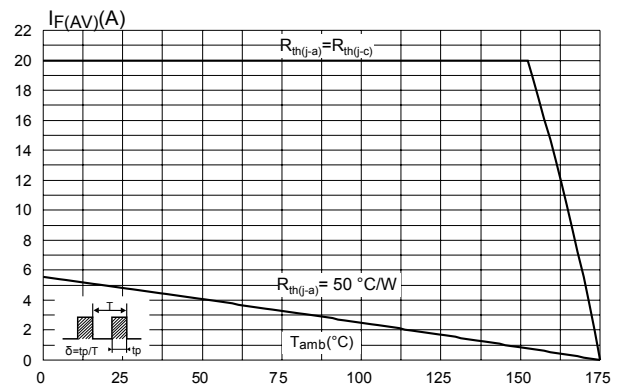


Figure 3. Normalized avalanche power derating versus pulse duration ($T_j = 125$ °C)

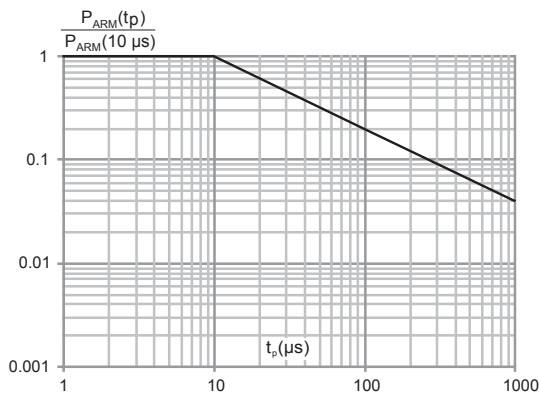


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

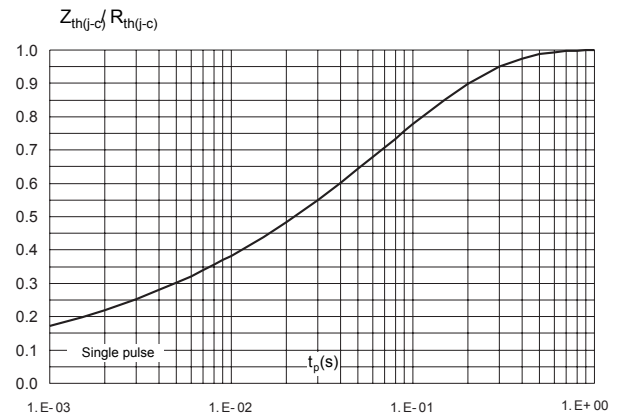


Figure 5. Reverse leakage current versus reverse voltage applied (typical values, per diode)

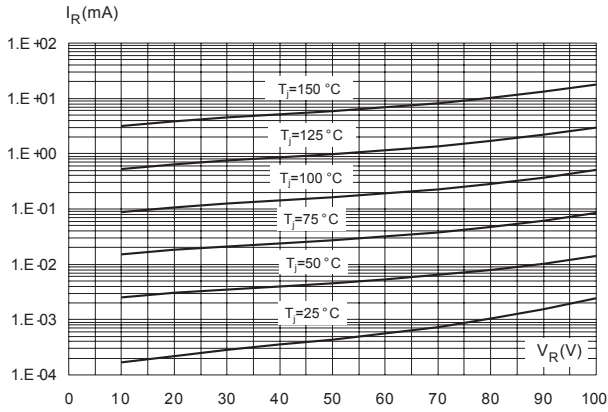


Figure 6. Junction capacitance versus reverse voltage applied (typical values, per diode)

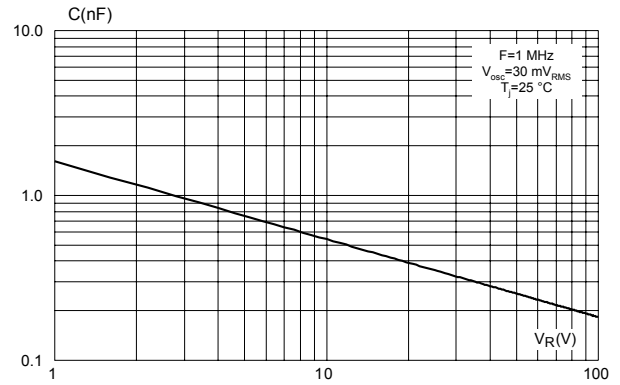


Figure 7. Forward voltage drop versus forward current (per diode)

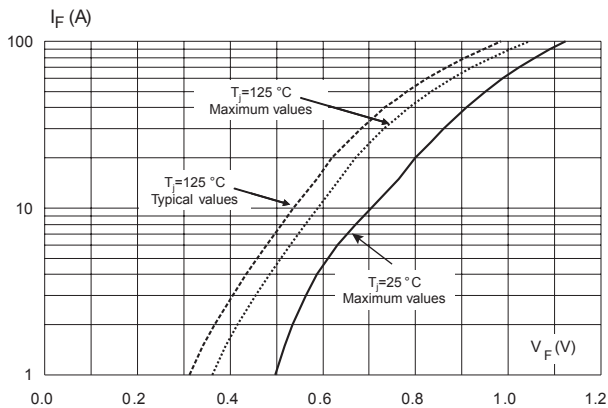
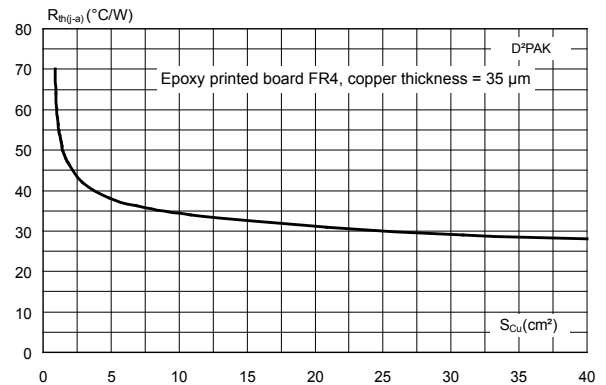


Figure 8. Thermal resistance junction to ambient versus copper surface under tab



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.

2.1 TO-220AB package information

- Epoxy meets UL 94,V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 N·m
- Maximum torque value: 0.70 N·m

Figure 9. TO-220AB package outline

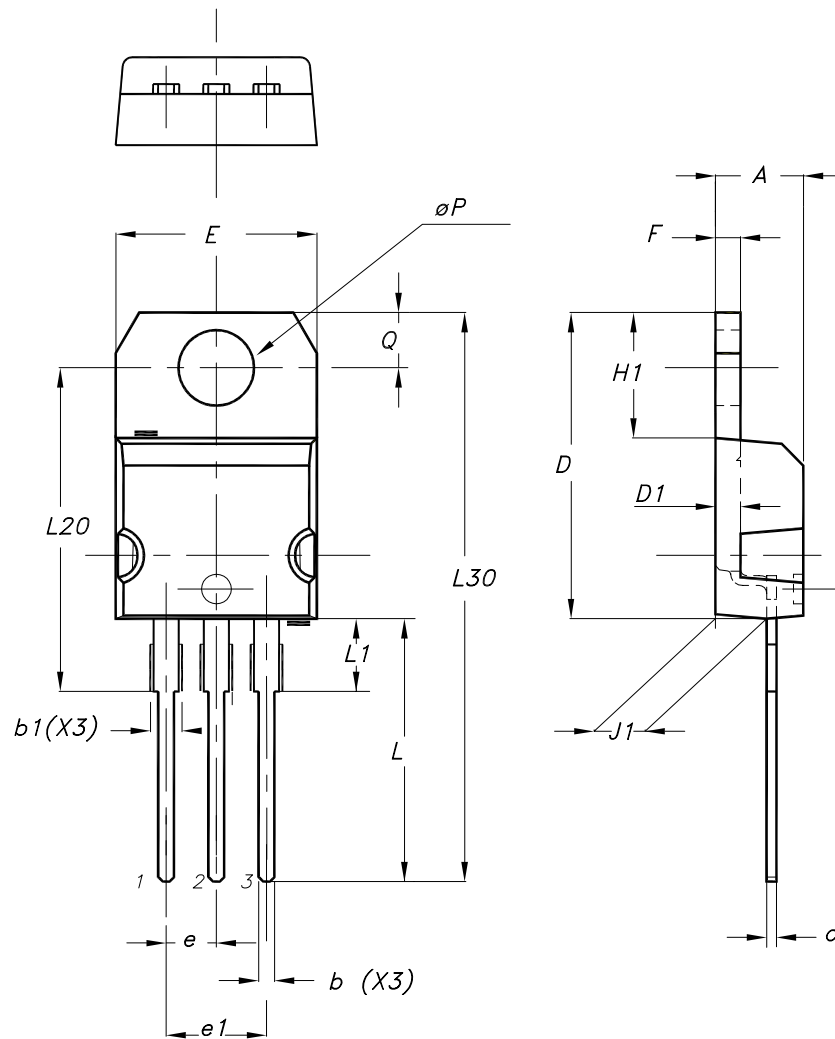


Table 4. TO-220AB package mechanical data

| Ref. | Dimensions | | | |
|------|-------------|-------|-----------------------------|-------|
| | Millimeters | | Inches (for reference only) | |
| | Min. | Max. | Min. | Max. |
| A | 4.40 | 4.60 | 0.173 | 0.181 |
| b | 0.61 | 0.88 | 0.240 | 0.035 |
| b1 | 1.14 | 1.55 | 0.045 | 0.061 |
| c | 0.48 | 0.70 | 0.019 | 0.028 |
| D | 15.25 | 15.75 | 0.600 | 0.620 |
| D1 | 1.27 typ. | | 0.050 typ. | |
| E | 10.00 | 10.40 | 0.394 | 0.409 |
| e | 2.40 | 2.70 | 0.094 | 0.106 |
| e1 | 4.95 | 5.15 | 0.195 | 0.203 |
| F | 1.23 | 1.32 | 0.048 | 0.052 |
| H1 | 6.20 | 6.60 | 0.244 | 0.260 |
| J1 | 2.40 | 2.72 | 0.094 | 0.107 |
| L | 13.00 | 14.00 | 0.512 | 0.551 |
| L1 | 3.50 | 3.93 | 0.138 | 0.155 |
| L20 | 16.40 typ. | | 0.646 typ. | |
| L30 | 28.90 typ. | | 1.138 typ. | |
| θP | 3.75 | 3.85 | 0.148 | 0.152 |
| Q | 2.65 | 2.95 | 0.104 | 0.116 |

2.2 I²PAK package information

- Epoxy meets UL 94, V0
- Cooling method: by conduction (C)

Figure 10. I²PAK package outline

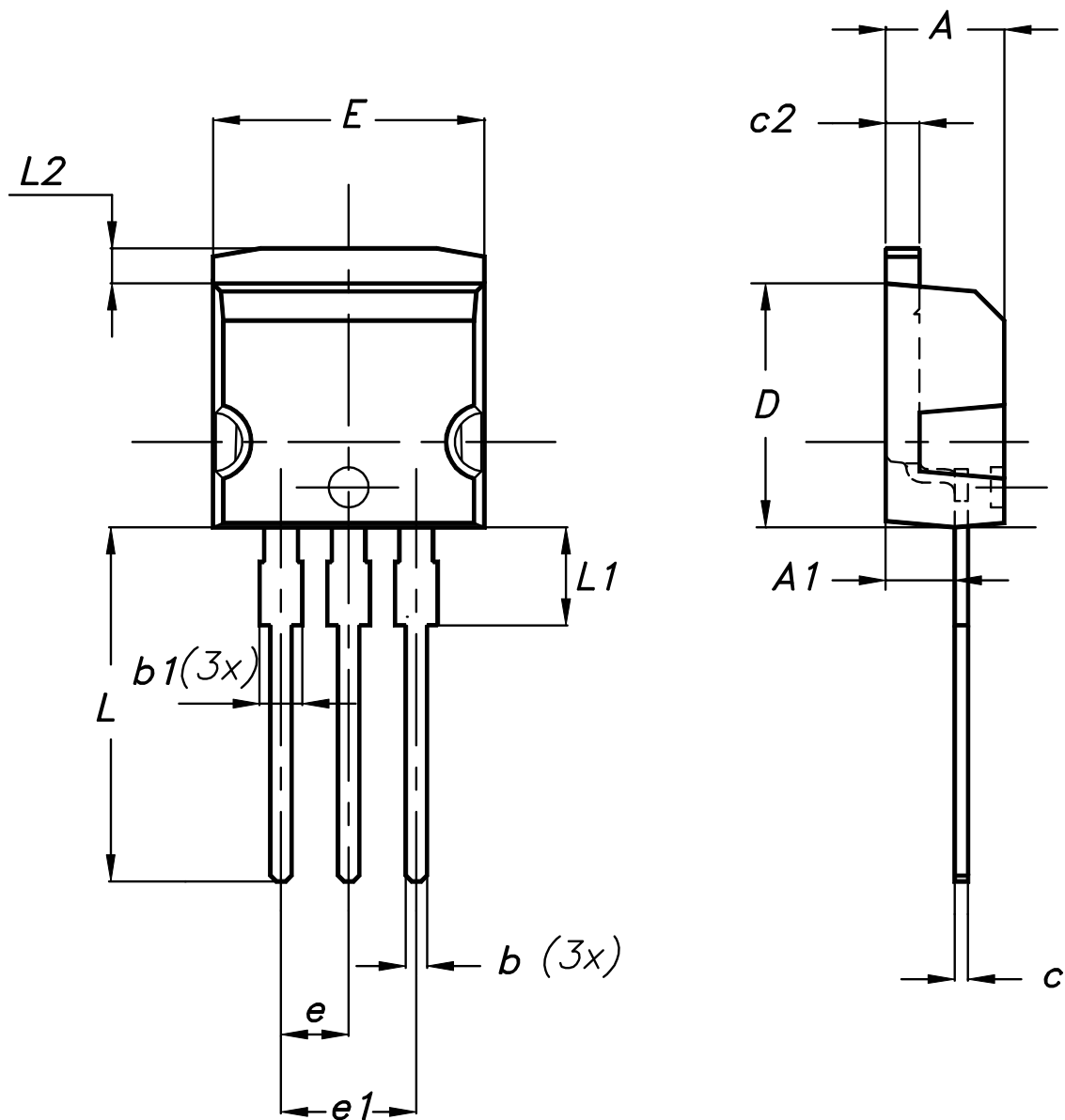


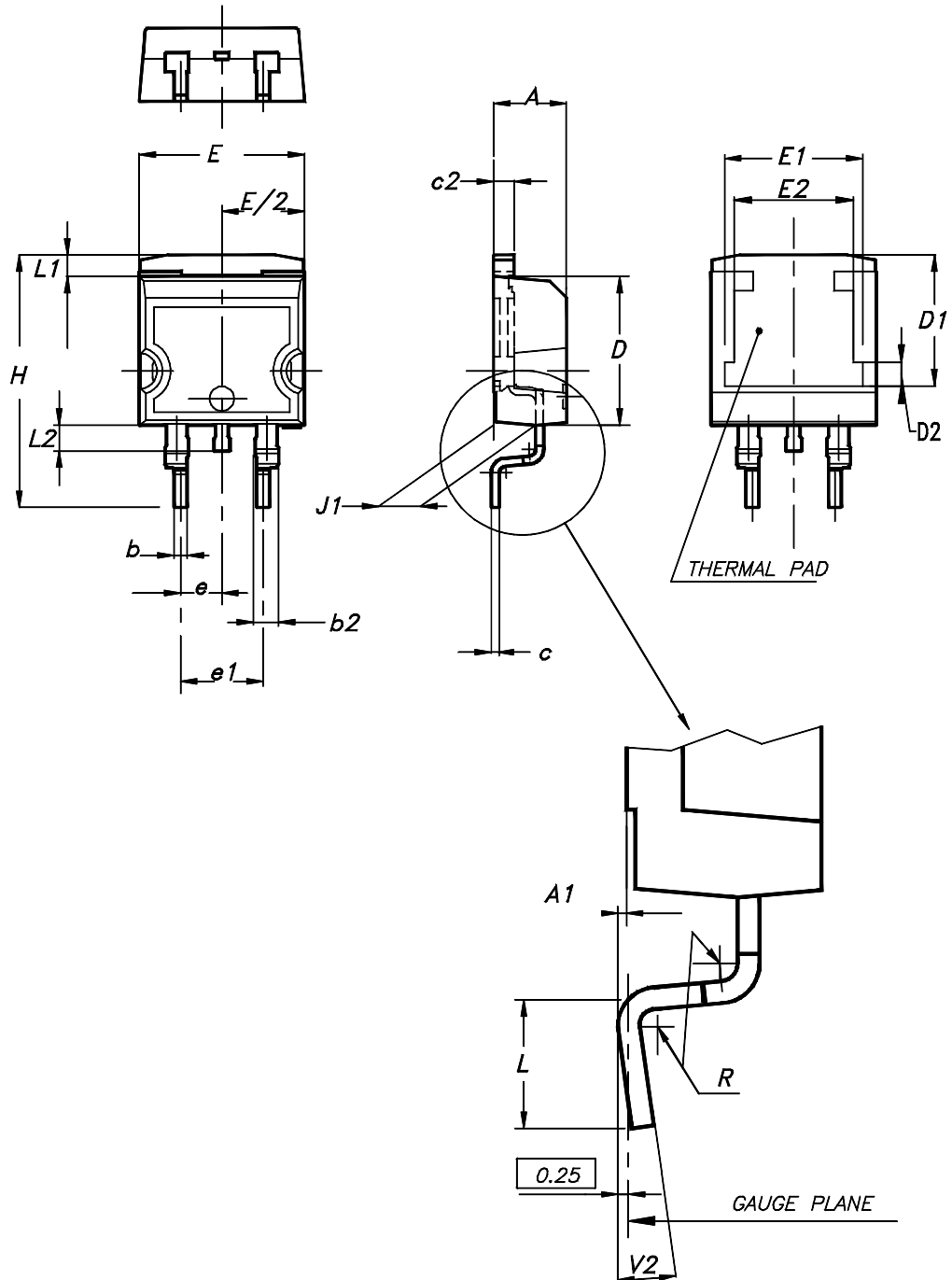
Table 5. I²PAK package mechanical data

| Ref. | Dimensions | | | |
|------|-------------|-------|-----------------------------|-------|
| | Millimeters | | Inches (for reference only) | |
| | 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 | 10.00 | 10.40 | 0.394 | 0.409 |
| L | 13.00 | 14.00 | 0.512 | 0.551 |
| L1 | 3.50 | 3.93 | 0.138 | 0.155 |
| L2 | 1.27 | 1.40 | 0.050 | 0.055 |

2.3 D²PAK package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)

Figure 11. D²PAK package outline

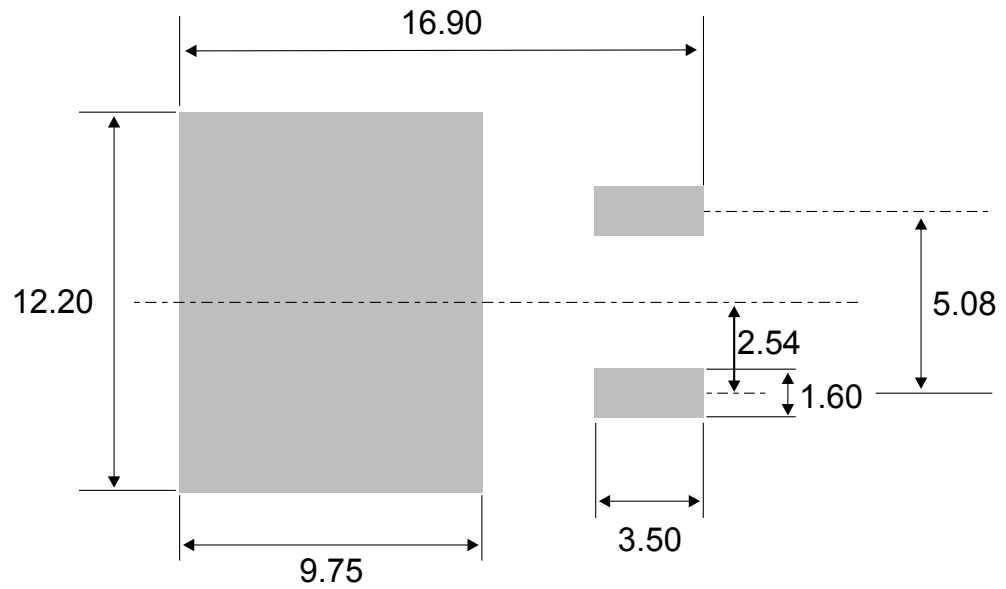


Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 6. D²PAK package mechanical data

| Ref. | Dimensions | | | |
|------|-------------|-------|-----------------------------|-------|
| | Millimeters | | Inches (for reference only) | |
| | Min. | Max. | Min. | Max. |
| A | 4.36 | 4.60 | 0.172 | 0.181 |
| A1 | 0.00 | 0.25 | 0.000 | 0.010 |
| b | 0.70 | 0.93 | 0.028 | 0.037 |
| b2 | 1.14 | 1.70 | 0.045 | 0.067 |
| c | 0.38 | 0.69 | 0.015 | 0.027 |
| c2 | 1.19 | 1.36 | 0.047 | 0.053 |
| D | 8.60 | 9.35 | 0.339 | 0.368 |
| D1 | 6.90 | 8.00 | 0.272 | 0.311 |
| D2 | 1.10 | 1.50 | 0.043 | 0.060 |
| E | 10.00 | 10.55 | 0.394 | 0.415 |
| E1 | 8.10 | 8.90 | 0.319 | 0.346 |
| E2 | 6.85 | 7.25 | 0.266 | 0.282 |
| e | 2.54 typ. | | 0.100 | |
| e1 | 4.88 | 5.28 | 0.190 | 0.205 |
| H | 15.00 | 15.85 | 0.591 | 0.624 |
| J1 | 2.49 | 2.90 | 0.097 | 0.112 |
| L | 1.90 | 2.79 | 0.075 | 0.110 |
| L1 | 1.27 | 1.65 | 0.049 | 0.065 |
| L2 | 1.30 | 1.78 | 0.050 | 0.070 |
| R | 0.4 typ. | | 0.015 | |
| V2 | 0° | 8° | 0° | 8° |

Figure 12. D²PAK recommended footprint (dimensions in mm)



3 Ordering information

Table 7. Ordering information

| Order code | Marking | Package | Weight | Base qty. | Delivery mode |
|-----------------|--------------|--------------------|--------|-----------|---------------|
| STPS41H100CT | STPS41H100CT | TO-220AB | 1.95 g | 50 | Tube |
| STPS41H100CG | STPS41H100CG | D ² PAK | 1.38 g | 50 | Tube |
| STPS41H100CG-TR | STPS41H100CG | D ² PAK | 1.38 g | 10000 | Tape and reel |
| STPS41H100CR | STPS41H100CR | I ² PAK | 1.50 g | 30 | Tube |

Revision history

Table 8. Document revision history

| Date | Version | Changes |
|-------------|---------|---|
| Jul-2003 | 3A | Previous release. |
| 15-Jul-2011 | 4 | Updated Table 5. |
| 11-Apr-2012 | 5 | Removed order codes STPS41H100CR-H and STPS41H100CT-H. Replaced paragraph under Table 5. |
| 27-Jun-2018 | 6 | Updated Table 1. Absolute ratings (limiting values, per diode, at 25 °C, unless otherwise specified). Updated Section 1.1 Characteristics (curves). |

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