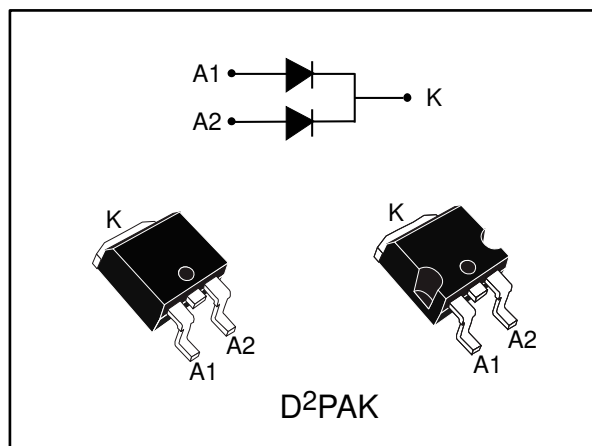


High efficiency ultrafast diode

Datasheet - production data



Description

Dual center tap rectifier suited for switch mode power supplies and high frequency DC to DC converters.

This device is especially intended for use in low voltage, high frequency inverters, freewheeling and polarity protection applications.

Table 1: Device summary

| Symbol | Value |
|----------------|-----------|
| $I_{F(AV)}$ | 2 x 6.5 A |
| V_{RRM} | 200 V |
| T_j (max) | 175 °C |
| V_F (typ) | 0.81 V |
| t_{rr} (typ) | 16 ns |

Features

- Suited for SMPS
- Low losses
- Low forward and reverse recovery time
- High surge current capability
- High junction temperature
- ECOPACK[®]2 compliant component for D²PAK on demand

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 | | 200 | V | |
| I _{F(RMS)} | Forward rms current | | 20 | A | |
| I _{F(peak)} | Average forward current δ = 0.5, square wave | T _C = 155 °C | Per diode | 6.5 | A |
| | | T _C = 145 °C | Per device | 13 | |
| I _{FSM} | Surge non repetitive forward current | t _p = 10 ms sinusoidal | | 70 | A |
| T _{stg} | Storage temperature range | | -65 to +175 | °C | |
| T _j | Maximum operating junction temperature | | 175 | °C | |

Table 3: Thermal parameter

| Symbol | Parameter | | Max. value | Unit |
|----------------------|------------------|-----------|------------|------|
| R _{th(j-c)} | Junction to case | Per diode | 3 | °C/W |
| | | Total | 1.9 | |
| R _{th(c)} | Coupling | | 0.8 | °C/W |

When the diodes 1 and 2 are used simultaneously:

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

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} | - | | 6 | μA |
| | | T _j = 125 °C | | - | 3 | 60 | |
| V _F ⁽²⁾ | Forward voltage drop | T _j = 25 °C | I _F = 6.5 A | - | | 1.10 | V |
| | | T _j = 125 °C | | - | 0.81 | 0.95 | |
| | | T _j = 25 °C | I _F = 13 A | - | | 1.25 | |
| | | T _j = 125 °C | | - | 0.95 | 1.10 | |

Notes:

⁽¹⁾Pulse test: t_p = 5 ms, δ < 2%

⁽²⁾Pulse test: t_p = 380 μs, δ < 2%

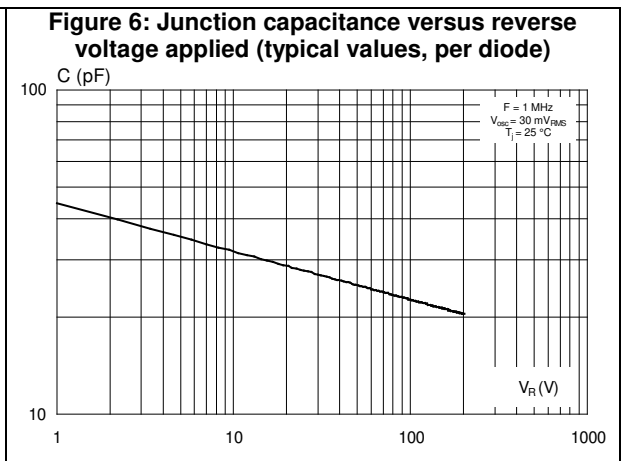
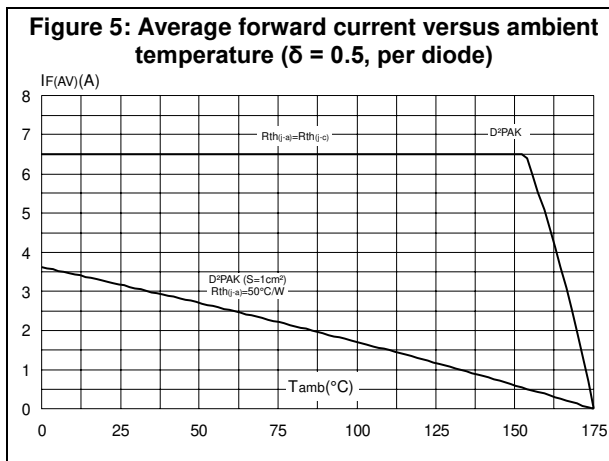
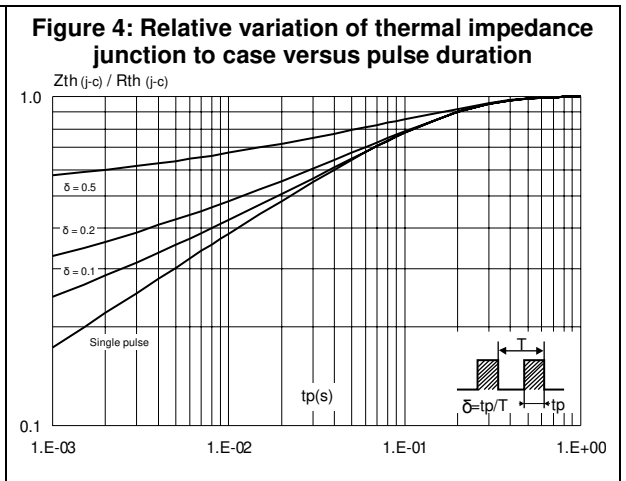
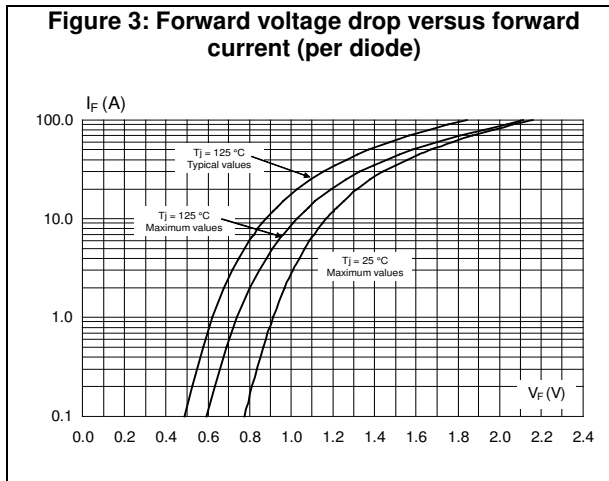
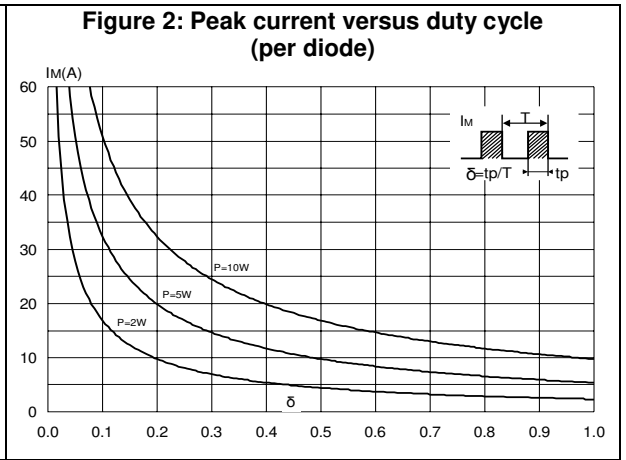
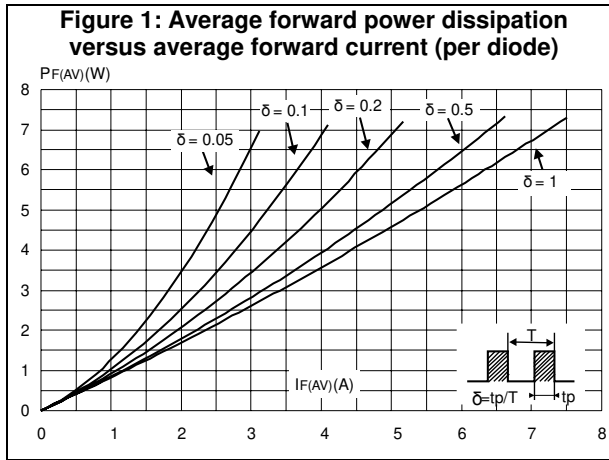
To evaluate the conduction losses, use the following equation:

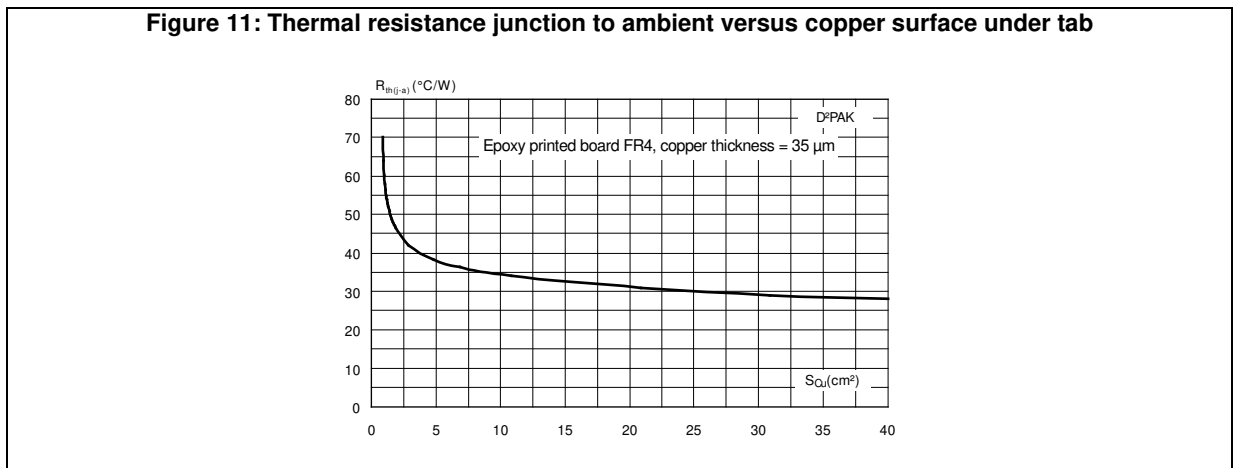
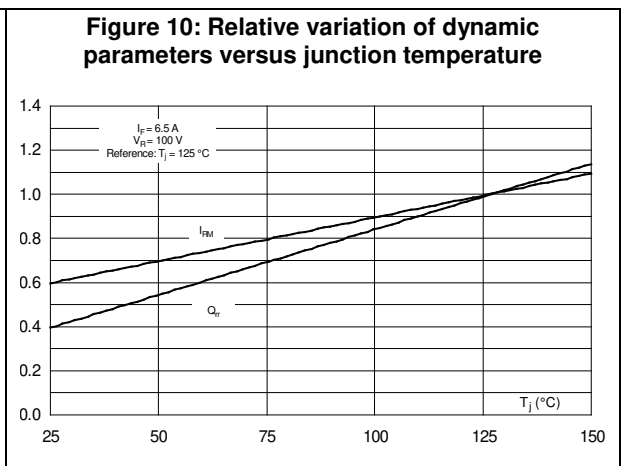
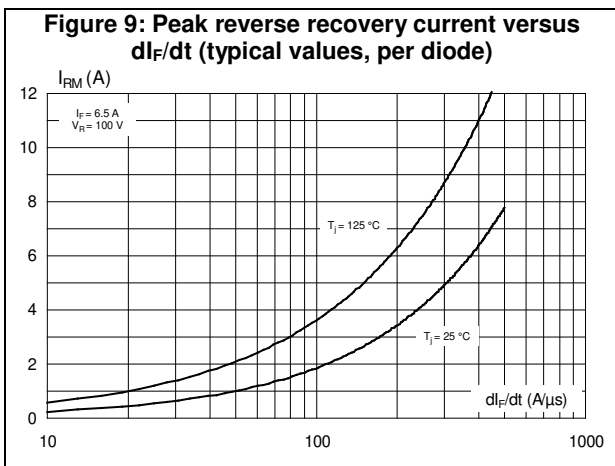
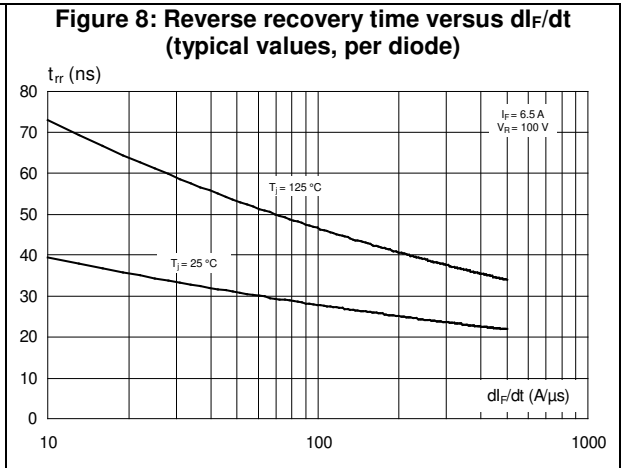
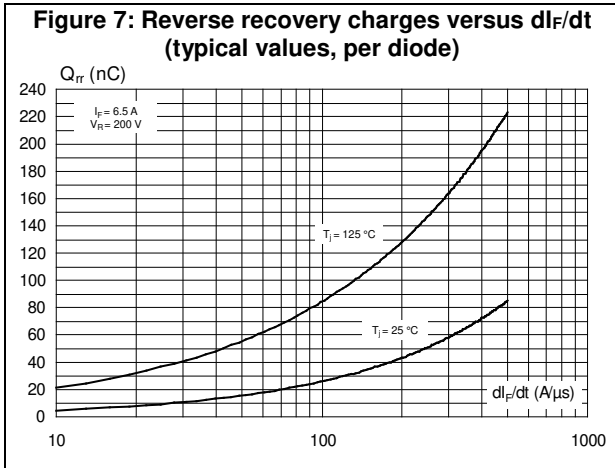
$$P = 0.80 \times I_{F(AV)} + 0.023 \times I_{F(RMS)}^2$$

Table 5: Dynamic electrical characteristics (per diode)

| Symbol | Parameter | Test conditions | | Min. | Typ. | Max. | Unit |
|----------|--------------------------|----------------------|--|------|------|------|------|
| t_{rr} | Reverse recovery time | $T_j = 25\text{ °C}$ | $I_F = 0.5\text{ A}$, $I_{rr} = 0.25\text{ A}$, $I_R = 1\text{ A}$ | - | 16 | 25 | ns |
| t_{fr} | Forward recovery time | | $I_F = 6.5\text{ A}$, $dI_F/dt = 100\text{ A}/\mu\text{s}$, $V_{FR} = 1.1 \times V_{Fmax}$, | - | 70 | | ns |
| V_{FP} | Forward recovery voltage | | $I_F = 6.5\text{ A}$, $dI_F/dt = 100\text{ A}/\mu\text{s}$ | - | 2.2 | | V |

1.1 Characteristics (curves)





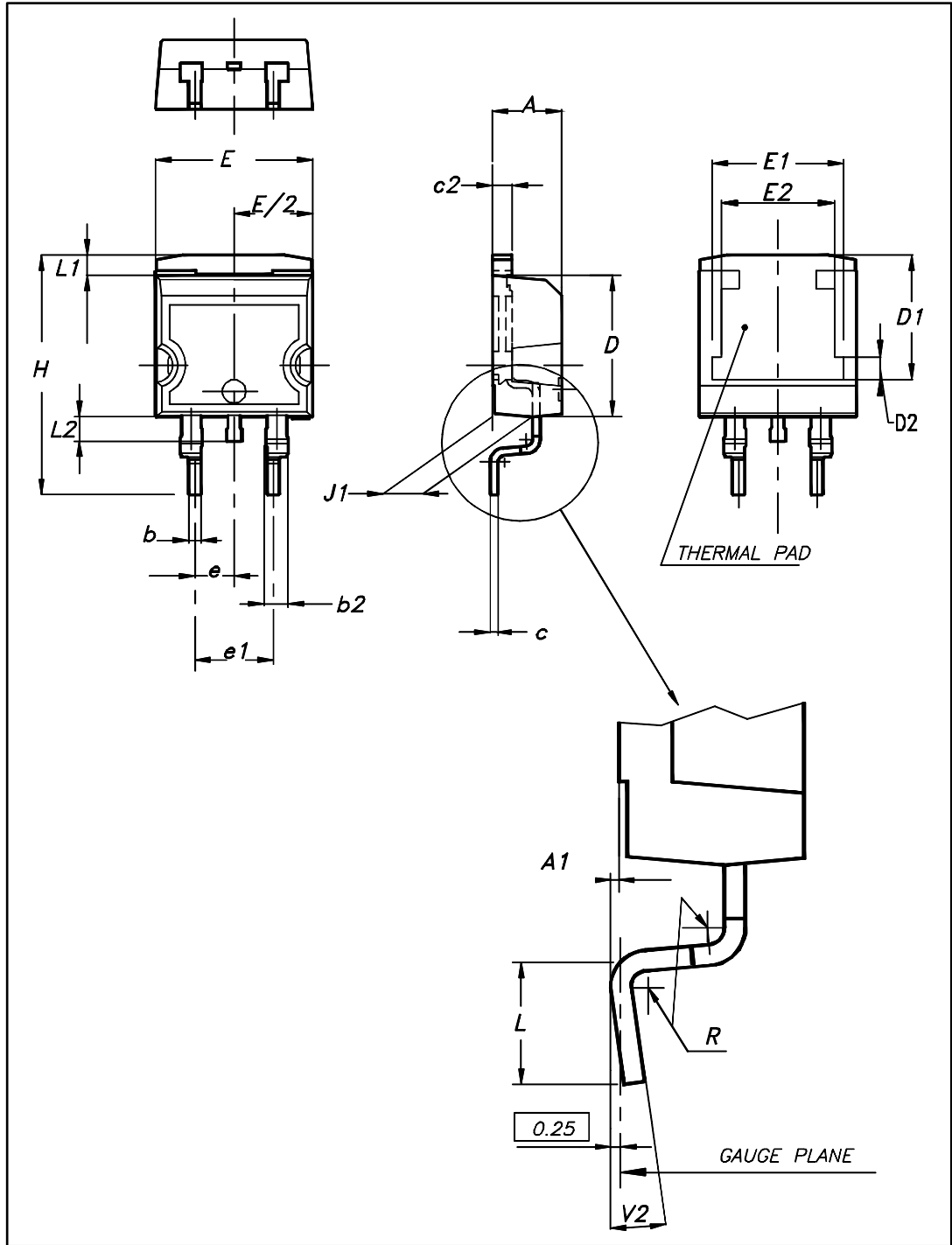
2 Package information

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 UL94, V0

2.1 D²PAK package information

Figure 12: D²PAK package outline

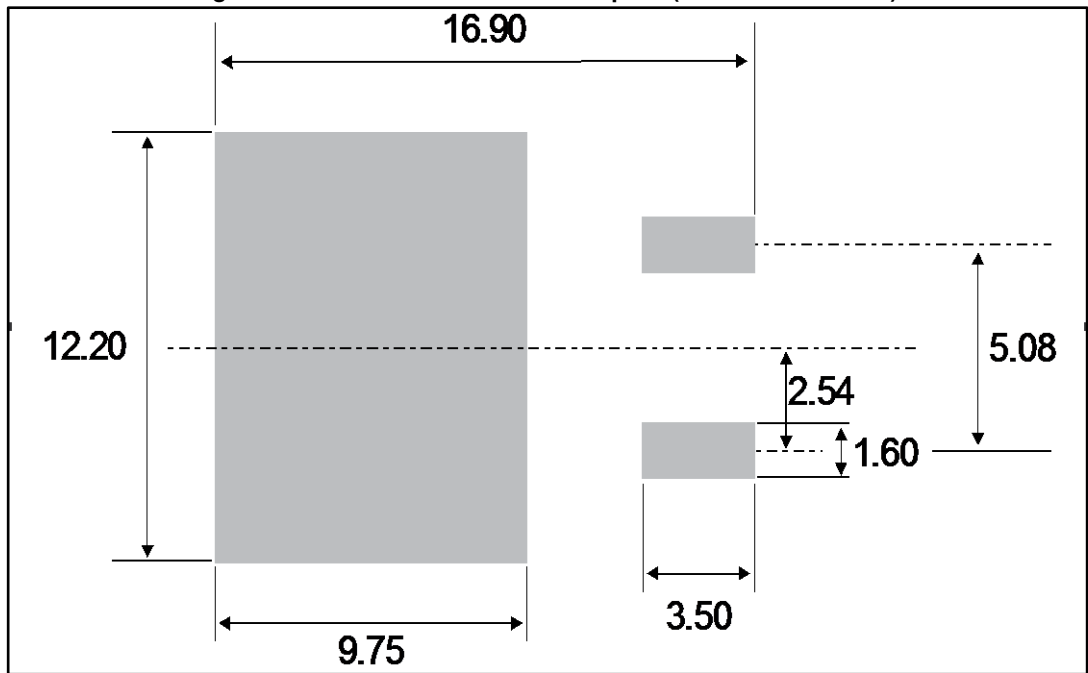


This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 6: D²PAK package mechanical data

| Ref. | Dimensions | | | |
|------|-------------|-------|--------|-------|
| | Millimeters | | Inches | |
| | 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 13: D²PAK recommended footprint (dimensions in mm)



3 Ordering information

Table 7: Ordering information

| Order code | Marking | Package | Weight | Base qty. | Delivery mode |
|---------------|------------|--------------------|--------|-----------|---------------|
| STTH1302CG-TR | STTH1302CG | D ² PAK | 1.38 g | 1000 | Tape and reel |

4 Revision history

Table 8: Document revision history

| Date | Revision | Changes |
|-------------|----------|--|
| 27-Jun-2012 | 3 | Initial version, previously mentioned as revision 2A. |
| 21-Aug-2017 | 4 | Updated features, package silhouette and Table 1: "Device summary" in cover page. Updated Section 1: "Characteristics" , Section 1.1: "Characteristics (curves)" , Section 2: "Package information" and Table 7: "Ordering information" . |

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