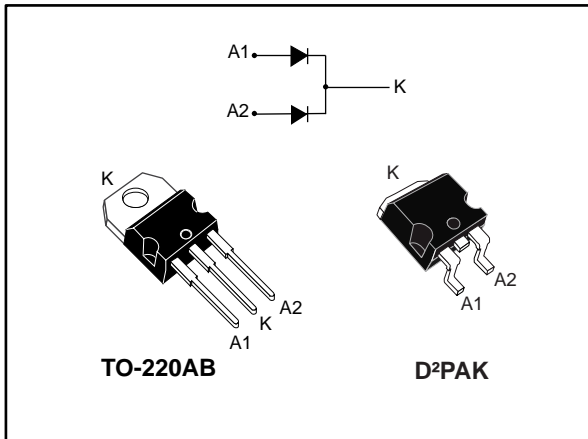


60 V field-effect rectifier diode

Datasheet - production data



Description

The device is based on a proprietary technology that achieves the best in class V_F/I_R trade-off for a given silicon surface.

This 60 V rectifier has been optimized for use in confined applications where both efficiency and thermal performance are key.

This device is suitable for use in adapters and chargers.

Table 1: Device summary

| Symbol | Value |
|--------------|----------|
| $I_{F(AV)}$ | 2 x 10 A |
| V_{RRM} | 60 V |
| V_F (typ.) | 0.365 V |
| T_j (max.) | 150 °C |

Features

- ST advanced rectifier process
- Stable leakage current over reverse voltage
- Reduced leakage current
- Low forward voltage drop
- High frequency operation

1 Characteristics

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

| Symbol | Parameter | | Value | Unit | |
|---------------------|---|-----------------------------------|-------------|------|---|
| V _{RRM} | Repetitive peak reverse voltage | | 60 | V | |
| I _{F(RMS)} | Forward rms current | | 30 | A | |
| I _{F(AV)} | Average forward current $\delta = 0.5$, square wave | T _C = 130 °C | Per diode | 10 | A |
| | | | Per device | 20 | |
| I _{FSM} | Surge non repetitive forward current | t _p = 10 ms sinusoidal | 140 | A | |
| T _{stg} | Storage temperature range | | -65 to +175 | °C | |
| T _j | Maximum operating junction temperature ⁽¹⁾ | | +150 | °C | |

Notes:

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

Table 3: Thermal resistance parameters

| Symbol | Parameter | | Max. value | Unit |
|----------------------|------------------|-----------|------------|------|
| R _{th(j-c)} | Junction to case | Per diode | 2.2 | °C/W |
| | | Total | 1.3 | |
| R _{th(c)} | Coupling | | 0.4 | |

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} | - | | 970 | μA |
| | | T _j = 125 °C | | - | 30 | 60 | mA |
| | | T _j = 125 °C | V _R = 45 V | - | 17 | 34 | |
| V _F ⁽²⁾ | Forward voltage drop | T _j = 25 °C | I _F = 2 A | - | 0.305 | 0.35 | V |
| | | T _j = 125 °C | | - | 0.25 | 0.29 | |
| | | T _j = 25 °C | I _F = 5 A | - | 0.38 | 0.425 | |
| | | T _j = 125 °C | | - | 0.365 | 0.415 | |
| | | T _j = 25 °C | I _F = 10 A | - | 0.48 | 0.535 | |
| | | T _j = 125 °C | | - | 0.51 | 0.575 | |

Notes:

⁽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:

$$P = 0.255 \times I_{F(AV)} + 0.032 \times I_{F(RMS)}^2$$

1.1 Characteristics (curves)

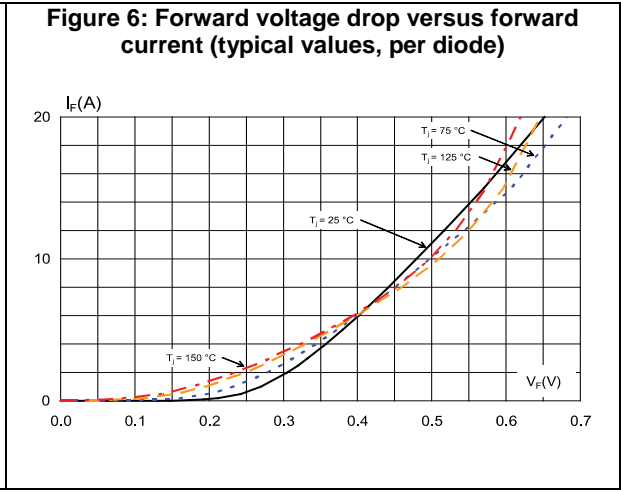
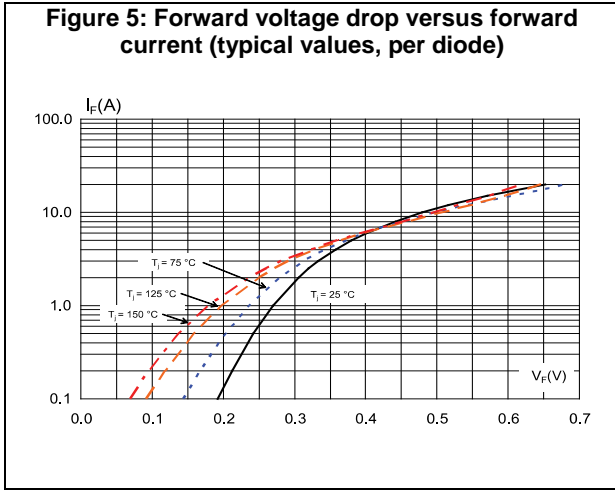
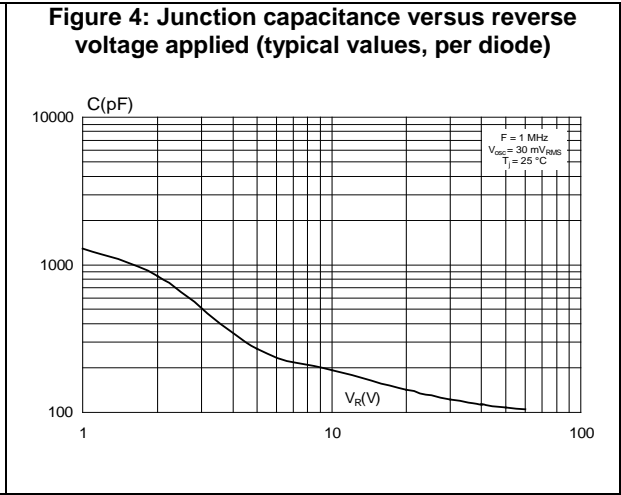
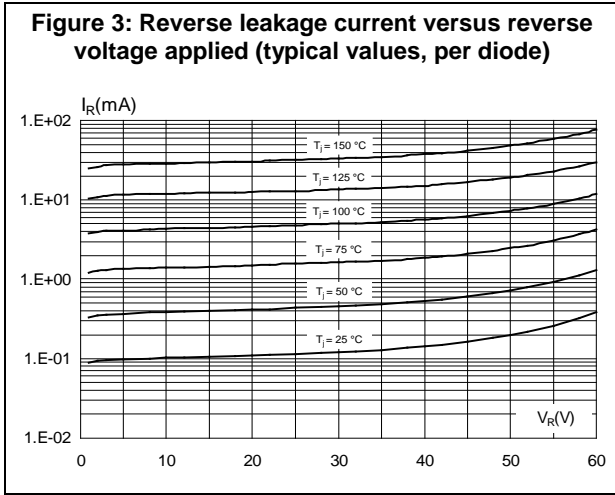
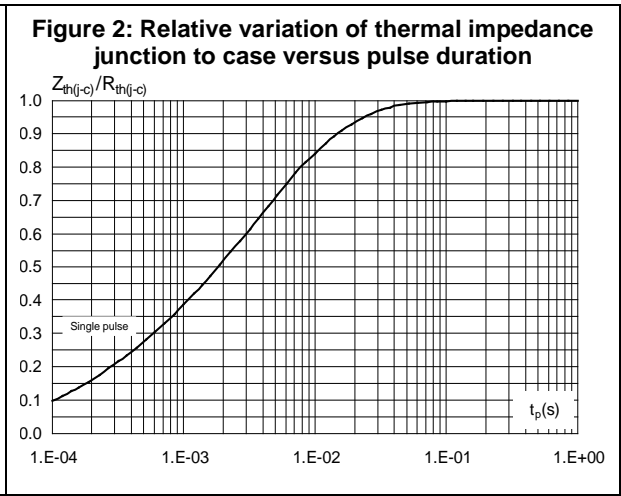
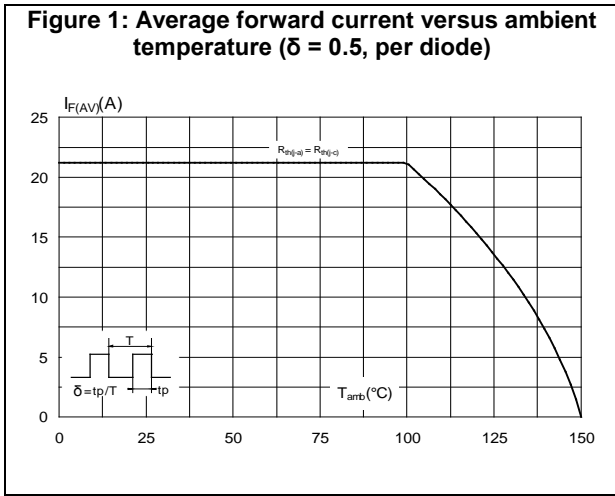
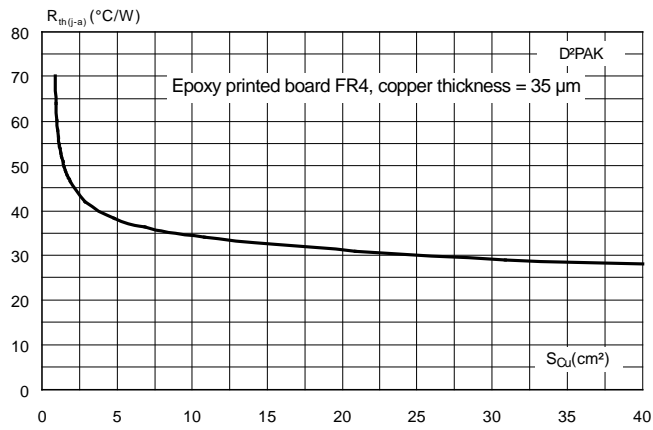


Figure 7: Thermal resistance junction to ambient versus copper surface under tab for D²PAK (typical values)



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 UL94,V0
- Recommended torque value: 0.55 N·m (for TO-220AB)
- Maximum torque value: 0.6 N·m (for TO-220AB)

2.1 TO-220AB package information

Figure 8: TO-220AB package outline

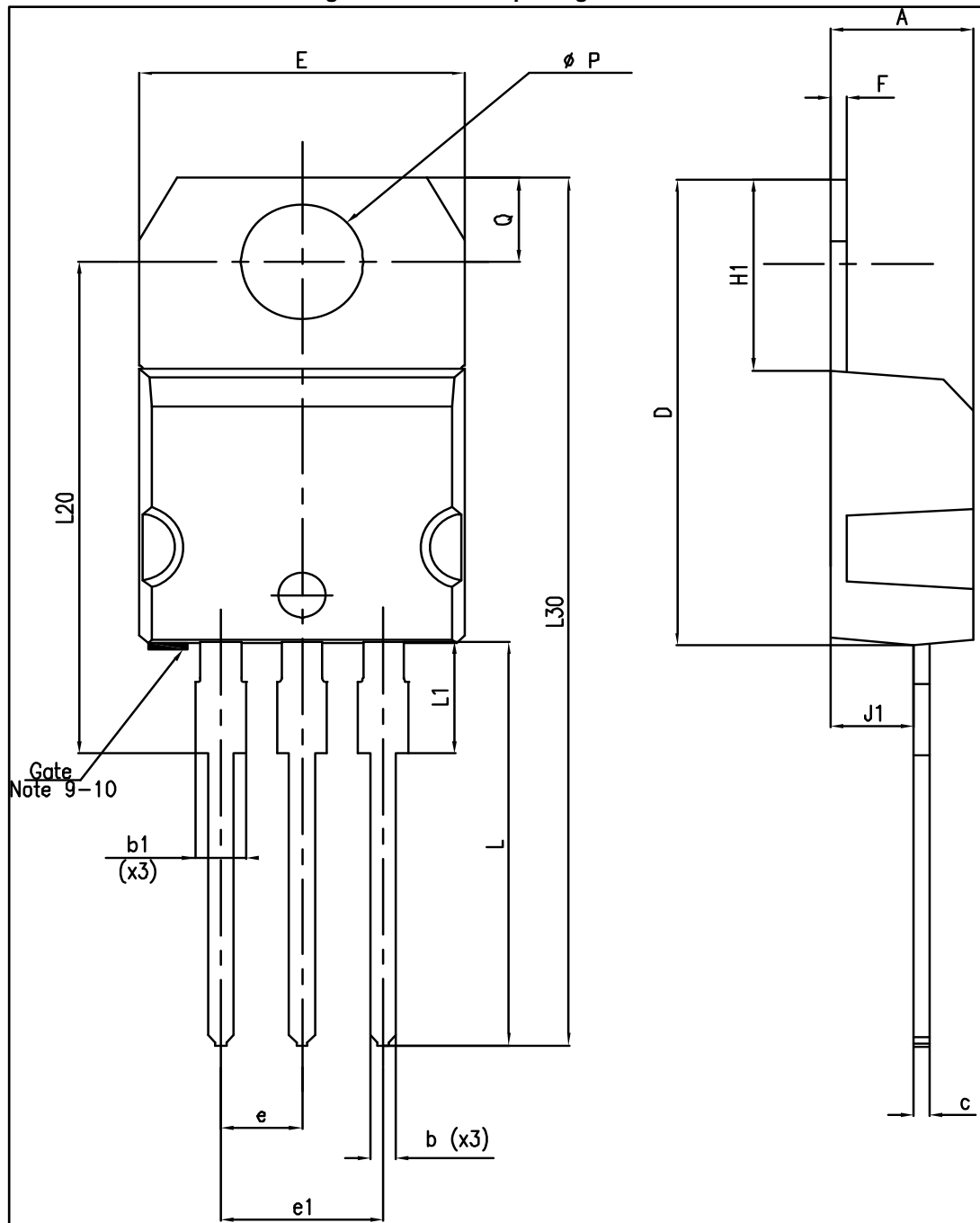


Table 5: TO-220AB package mechanical data

| Ref. | Dimensions | | | |
|------|-------------|-------|------------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.40 | 4.60 | 0.173 | 0.181 |
| b | 0.61 | 0.88 | 0.024 | 0.035 |
| b1 | 1.14 | 1.70 | 0.045 | 0.067 |
| c | 0.48 | 0.70 | 0.019 | 0.028 |
| D | 15.25 | 15.75 | 0.600 | 0.620 |
| 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 | 0.51 | 0.60 | 0.020 | 0.024 |
| J1 | 2.40 | 2.72 | 0.094 | 0.107 |
| H1 | 6.20 | 6.60 | 0.244 | 0.256 |
| 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 | |
| Ø P | 3.75 | 3.85 | 0.148 | 0.156 |
| Q | 2.65 | 2.95 | 0.104 | 0.116 |

2.2 D²PAK package information

Figure 9: D²PAK package outline

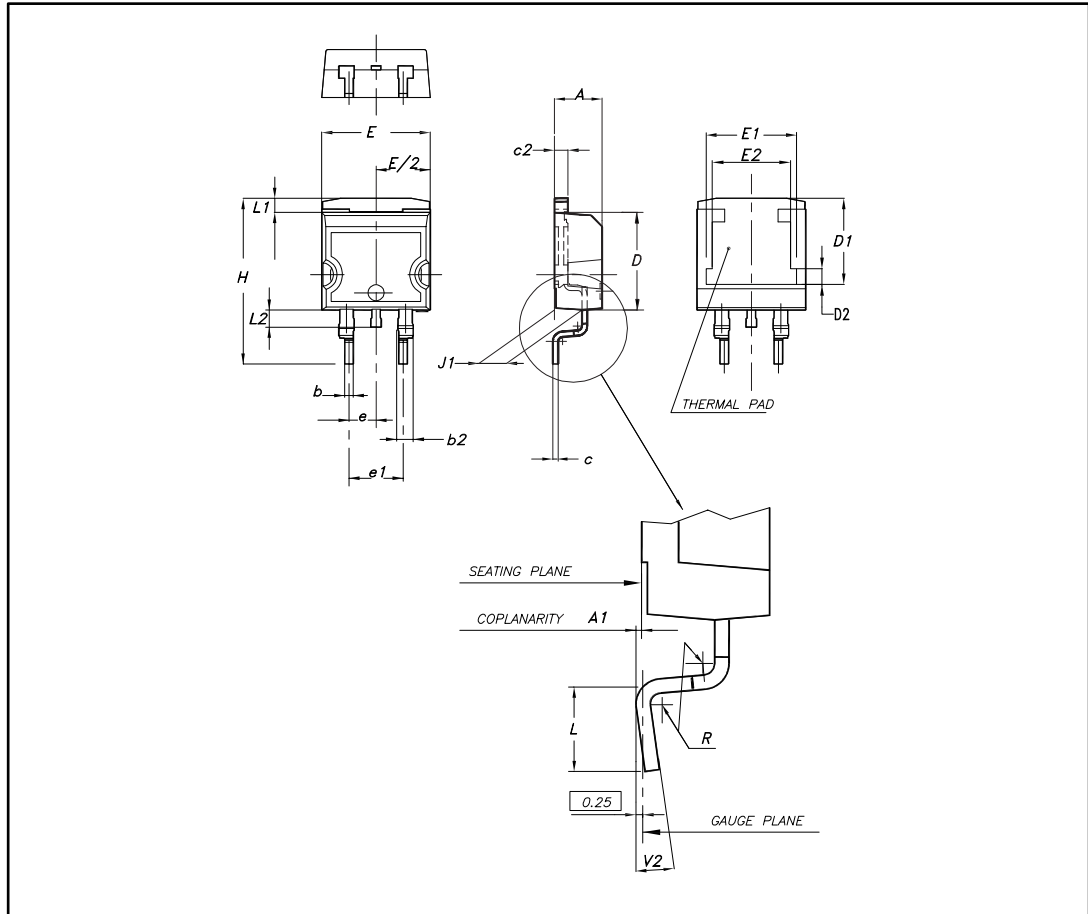
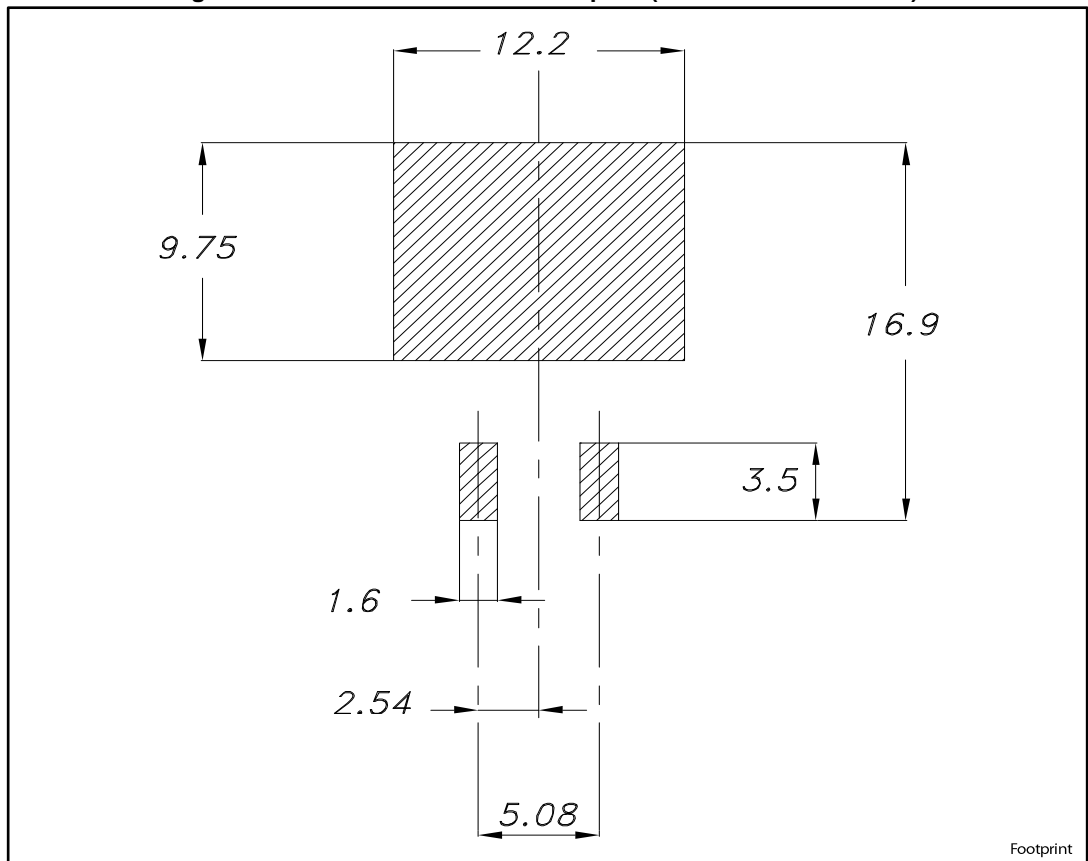


Table 6: D²PAK package mechanical data

| Ref. | Dimensions | | | | | |
|------|-------------|------|-------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 4.40 | | 4.60 | 0.173 | | 0.181 |
| A1 | 0.03 | | 0.23 | 0.001 | | 0.009 |
| b | 0.70 | | 0.93 | 0.028 | | 0.037 |
| b2 | 1.14 | | 1.70 | 0.045 | | 0.067 |
| c | 0.45 | | 0.60 | 0.018 | | 0.024 |
| c2 | 1.23 | | 1.36 | 0.048 | | 0.053 |
| D | 8.95 | | 9.35 | 0.352 | | 0.368 |
| D1 | 7.50 | 7.75 | 8.00 | 0.295 | 0.305 | 0.315 |
| D2 | 1.10 | 1.30 | 1.50 | 0.043 | 0.051 | 0.060 |
| E | 10 | | 10.40 | 0.394 | | 0.409 |
| E1 | 8.50 | 8.70 | 8.90 | 0.335 | 0.343 | 0.346 |
| E2 | 6.85 | 7.05 | 7.25 | 0.266 | 0.278 | 0.282 |
| e | | 2.54 | | | 0.100 | |
| e1 | 4.88 | | 5.28 | 0.190 | | 0.205 |
| H | 15 | | 15.85 | 0.591 | | 0.624 |
| J1 | 2.49 | | 2.69 | 0.097 | | 0.106 |
| L | 2.29 | | 2.79 | 0.090 | | 0.110 |
| L1 | 1.27 | | 1.40 | 0.049 | | 0.055 |
| L2 | 1.30 | | 1.75 | 0.050 | | 0.069 |
| R | | 0.4 | | | 0.015 | |
| V2 | 0° | | 8° | 0° | | 8° |

Figure 10: D²PAK recommended footprint (dimensions are in mm)



3 Ordering information

Table 7: Ordering information

| Order code | Marking | Package | Weight | Base qty. | Delivery mode |
|----------------|------------|--------------------|--------|-----------|---------------|
| FERD20L60CTS | FD20L60CTS | TO-220AB | 1.38 g | 50 | Tube |
| FERD20L60CG-TR | FD20L60CG | D ² PAK | 1.43 g | 1000 | Tape and reel |

4 Revision history

Table 8: Document revision history

| Date | Revision | Changes |
|-------------|----------|------------------|
| 01-Sep-2017 | 1 | Initial release. |

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