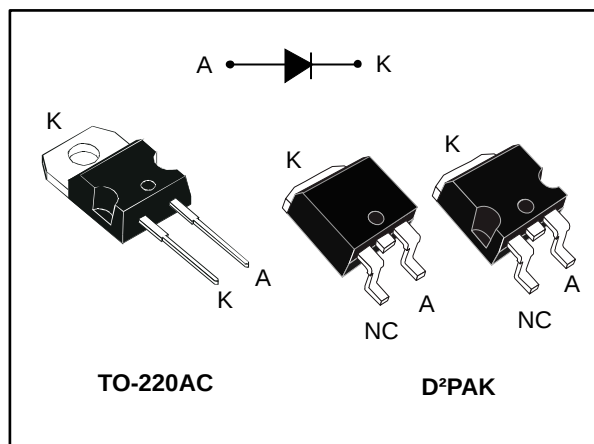


## Low drop OR-ing power Schottky diode

Datasheet - production data



### Description

Packaged in TO-220AC or D<sup>2</sup>PAK, this device is especially intended for use as an OR-ing diode in fault tolerant power supply equipments.

Table 1: Device summary

| Symbol       | Value  |
|--------------|--------|
| $I_{F(AV)}$  | 20 A   |
| $V_{RRM}$    | 15 V   |
| $V_F$ (typ.) | 0.28 V |
| $T_j$ (max.) | 125 °C |

### Features

- Very low forward voltage drop for less power dissipation and reduced heatsink size
- Reverse voltage suited to OR-ing of 3 V, 5 V and 12 V rails
- Avalanche capability specified
- ECOPACK<sup>®</sup>2 compliant component for D<sup>2</sup>PAK on demand

# 1 Characteristics

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

| Symbol              | Parameter                                             |                                                 | Value       | Unit |
|---------------------|-------------------------------------------------------|-------------------------------------------------|-------------|------|
| V <sub>RRM</sub>    | Repetitive peak reverse voltage                       |                                                 | 15          | V    |
| I <sub>F(RMS)</sub> | Forward rms current                                   |                                                 | 30          | A    |
| I <sub>F(AV)</sub>  | Average forward current                               | T <sub>C</sub> = 115 °C, DC                     | 20          | A    |
| I <sub>FSM</sub>    | Surge non repetitive forward current                  | t <sub>p</sub> = 10 ms sinusoidal               | 310         | A    |
| P <sub>ARM</sub>    | Repetitive peak avalanche power                       | t <sub>p</sub> = 10 μs, T <sub>j</sub> = 125 °C | 970         | W    |
| T <sub>stg</sub>    | Storage temperature range                             |                                                 | -65 to +150 | °C   |
| T <sub>j</sub>      | Maximum operating junction temperature <sup>(1)</sup> |                                                 | 125         |      |

**Notes:**

<sup>(1)</sup>(dP<sub>tot</sub>/dT<sub>j</sub>) < (1/R<sub>th(j-a)</sub>) condition to avoid thermal runaway for a diode on its own heatsink.

**Table 3: Thermal parameters**

| Symbol               | Parameter        | Max. value | Unit |
|----------------------|------------------|------------|------|
| R <sub>th(j-c)</sub> | Junction to case | 1.6        | °C/W |

**Table 4: Static electrical characteristics**

| Symbol                        | Parameter               | Test conditions         |                       | Min. | Typ. | Max. | Unit |
|-------------------------------|-------------------------|-------------------------|-----------------------|------|------|------|------|
| I <sub>R</sub> <sup>(1)</sup> | Reverse leakage current | T <sub>j</sub> = 25 °C  | V <sub>R</sub> = 15 V | -    |      | 6    | mA   |
|                               |                         | T <sub>j</sub> = 100 °C |                       | -    | 200  | 500  |      |
| V <sub>F</sub> <sup>(1)</sup> | Forward voltage drop    | T <sub>j</sub> = 25 °C  | I <sub>F</sub> = 19 A | -    |      | 0.41 | V    |
|                               |                         |                         | I <sub>F</sub> = 40 A | -    |      | 0.52 |      |
|                               |                         | T <sub>j</sub> = 125 °C | I <sub>F</sub> = 19 A | -    | 0.28 | 0.33 |      |
|                               |                         |                         | I <sub>F</sub> = 40 A |      | 0.42 | 0.50 |      |

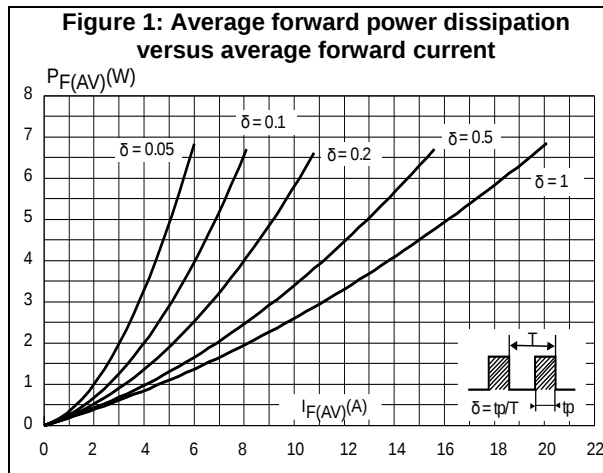
**Notes:**

<sup>(1)</sup>Pulse test: t<sub>p</sub> = 380 μs, δ < 2%

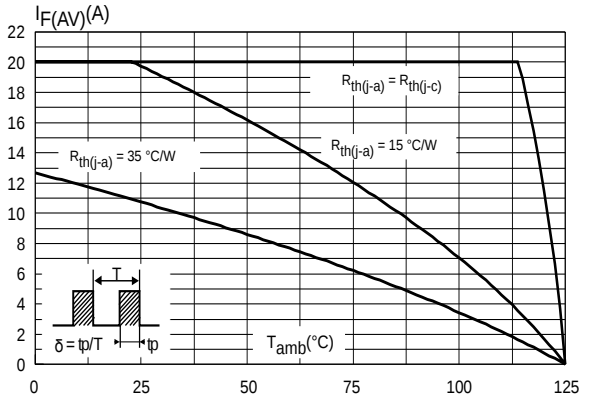
To evaluate the maximum conduction losses, use the following equation:

$$P = 0.18 \times I_{F(AV)} + 8.10^{-3} \times I_{F(RMS)}^2$$

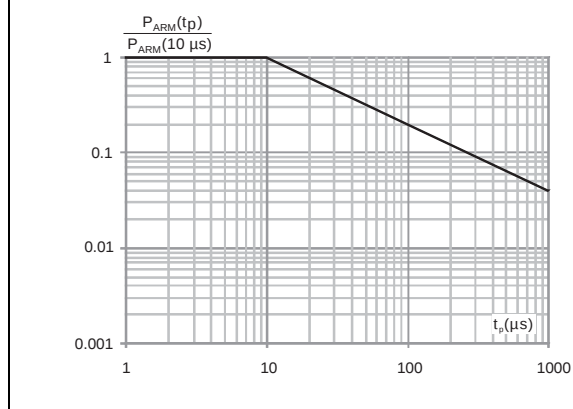
## 1.1 Characteristics (curves)



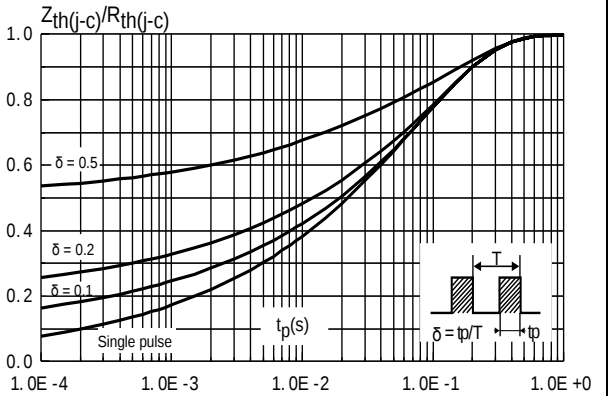
**Figure 2: Average forward current versus ambient temperature ( $\delta = 1$ )**



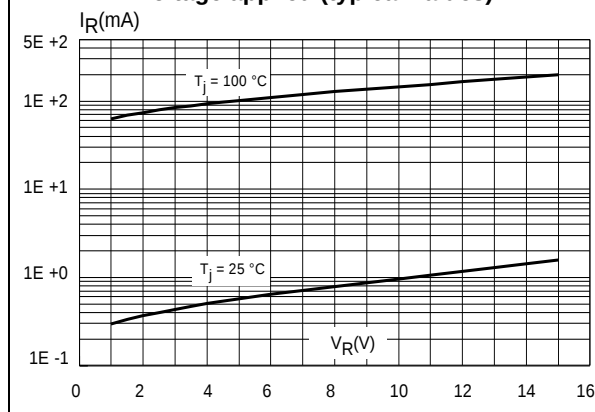
**Figure 3: Normalized avalanche power derating versus pulse duration ( $T_j = 125^{\circ}C$ )**



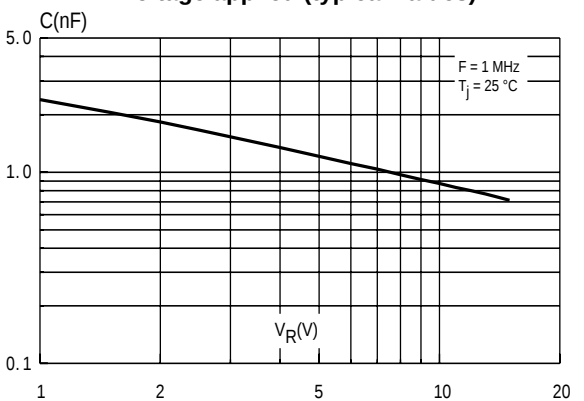
**Figure 4: Relative variation of thermal impedance junction to case versus pulse duration**



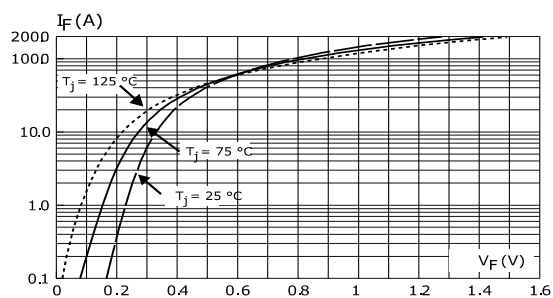
**Figure 5: Reverse leakage current versus reverse voltage applied (typical values)**



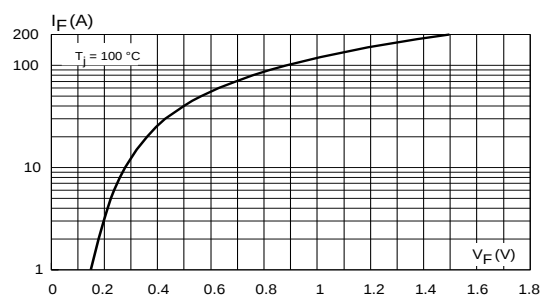
**Figure 6: Junction capacitance versus reverse voltage applied (typical values)**



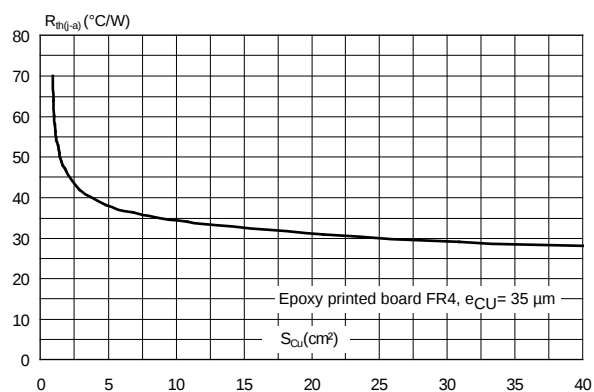
**Figure 7: Forward voltage drop versus forward current (typical values)**



**Figure 8: Forward voltage drop versus forward current (maximum values)**



**Figure 9: Thermal resistance junction to ambient versus copper surface under tab for D<sup>2</sup>PAK**

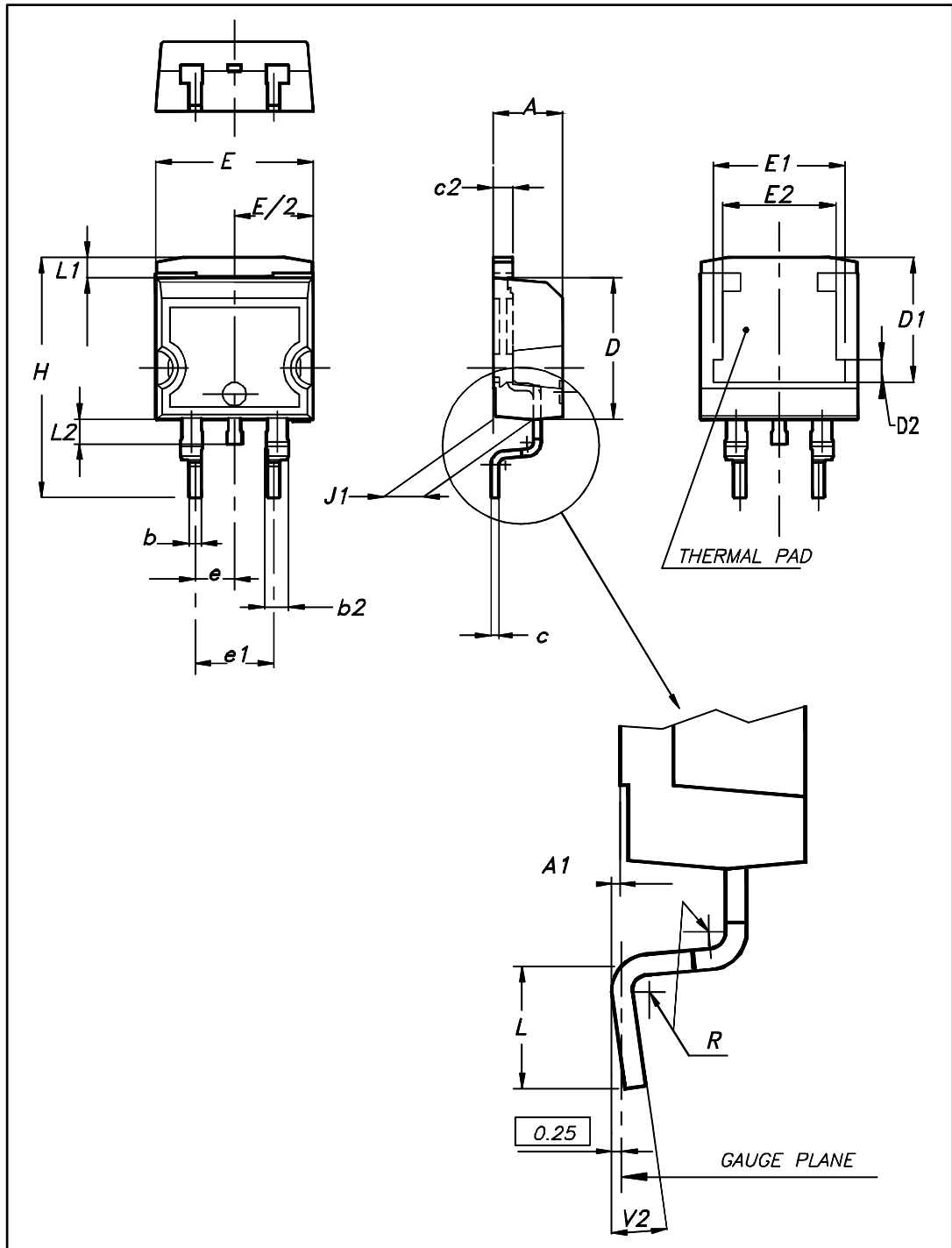


## 2 Package information

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](http://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 (for TO-220AC)
- Maximum torque value: 0.7 N·m (for TO-220AC)

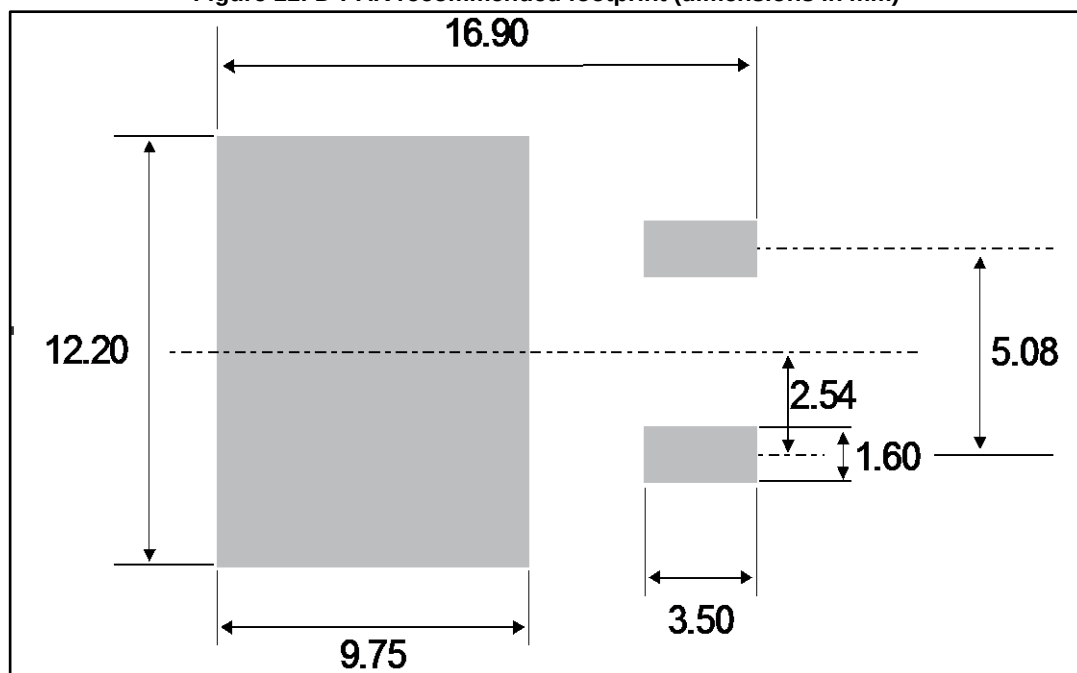
## 2.1 D<sup>2</sup>PAK package information

Figure 10: D<sup>2</sup>PAK package outline

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

Table 5: D<sup>2</sup>PAK 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 11: D<sup>2</sup>PAK recommended footprint (dimensions in mm)

## 2.2 TO-220AC package information

Figure 12: TO-220AC package outline

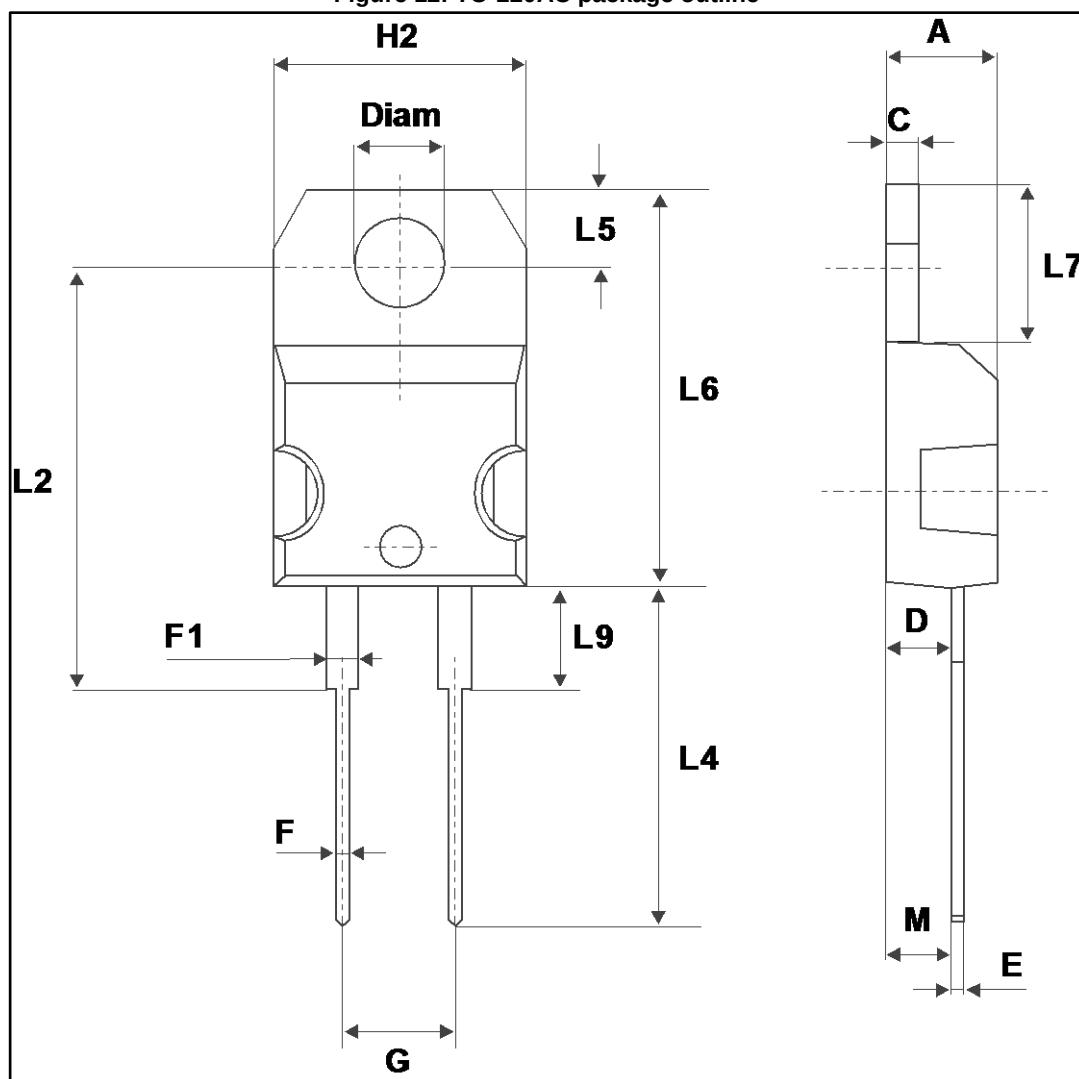


Table 6: TO-220AC package mechanical data

| 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 |

### 3 Ordering information

Table 7: Ordering information

| Order code    | Marking    | Package            | Weight | Base qty. | Delivery mode |
|---------------|------------|--------------------|--------|-----------|---------------|
| STPS20L15D    | STPS20L15D | TO-220AC           | 1.86 g | 50        | Tube          |
| STPS20L15G-TR | STPS20L15G | D <sup>2</sup> PAK | 1.38 g | 1000      | Tape and reel |

### 4 Revision history

Table 8: Document revision history

| Date        | Revision | Changes                                                                                                                                                                                                                                                |
|-------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 24-Jul-2012 | 3        |                                                                                                                                                                                                                                                        |
| 13-Oct-2016 | 4        | Updated cover page, <a href="#">Section 3.1: "Characteristics (curves)"</a> , <a href="#">Section 3: "Characteristics"</a> , <a href="#">Section 4.2: "D<sup>2</sup>PAK package information"</a> and <a href="#">Table 7: "Ordering information"</a> . |

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