

N-channel 800 V, 3.5  $\Omega$  typ., 2 A Zener-protected SuperMESH™ 5 Power MOSFET in DPAK, TO-220FP, TO-220 and IPAK packages

Datasheet – production data

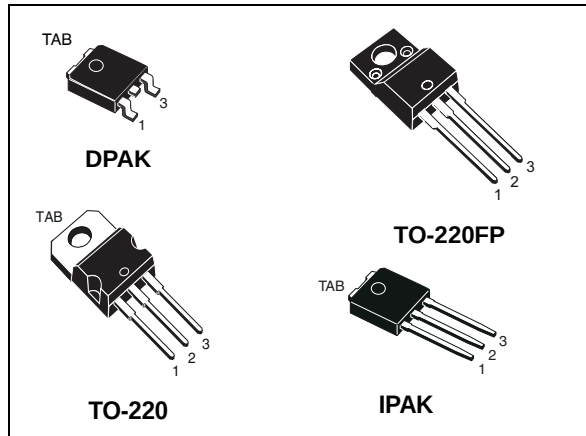
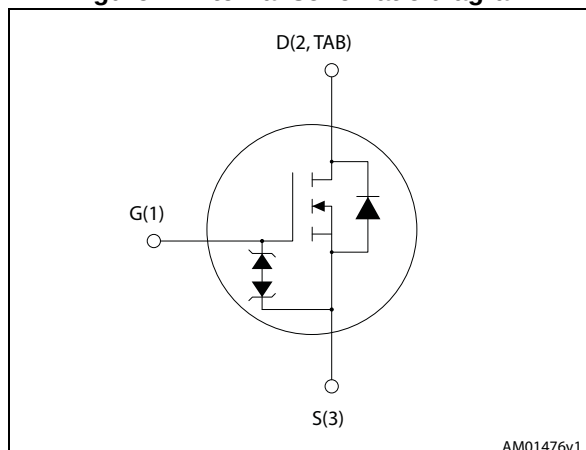


Figure 1. Internal schematic diagram



## Features

| Order codes | $V_{DS}$ | $R_{DS(on)max}$ | $I_D$ | $P_{TOT}$ |
|-------------|----------|-----------------|-------|-----------|
| STD2N80K5   | 800 V    | 4.5 $\Omega$    | 2 A   | 45 W      |
| STF2N80K5   |          |                 |       | 20 W      |
| STP2N80K5   |          |                 |       | 45 W      |
| STU2N80K5   |          |                 |       |           |

- TO-220 worldwide best  $R_{DS(on)}$
- Worldwide best FOM (figure of merit)
- Ultra low gate charge
- 100% avalanche tested
- Zener-protected

## Applications

- Switching applications

## Description

These devices are N-channel Power MOSFETs developed using SuperMESH™ 5 technology. This revolutionary, avalanche-rugged, high voltage Power MOSFET technology is based on an innovative proprietary vertical structure. The result is a drastic reduction in on-resistance and ultra low gate charge for applications which require superior power density and high efficiency.

Table 1. Device summary

| Order codes | Marking | Package  | Packaging     |
|-------------|---------|----------|---------------|
| STD2N80K5   | 2N80K5  | DPAK     | Tape and reel |
| STF2N80K5   |         | TO-220FP | Tube          |
| STP2N80K5   |         | TO-220   |               |
| STU2N80K5   |         | IPAK     |               |

Contents

1      **Electrical ratings** ..... 3

2      **Electrical characteristics** ..... 4

      2.1    **Electrical characteristics (curves)** ..... 6

3      **Test circuits** ..... 9

4      **Package mechanical data** ..... 10

5      **Packaging information** ..... 20

6      **Revision history** ..... 22



# 1 Electrical ratings

Table 2. Absolute maximum ratings

| Symbol                  | Parameter                                                                                                | Value                    |          | Unit |
|-------------------------|----------------------------------------------------------------------------------------------------------|--------------------------|----------|------|
|                         |                                                                                                          | DPAK,<br>TO-220,<br>IPAK | TO-220FP |      |
| $V_{GS}$                | Gate- source voltage                                                                                     | 30                       |          | V    |
| $I_D$                   | Drain current (continuous) at $T_C = 25\text{ °C}$                                                       | 2 <sup>(1)</sup>         |          | A    |
| $I_D$                   | Drain current (continuous) at $T_C = 100\text{ °C}$                                                      | 1.3                      |          | A    |
| $I_{DM}$ <sup>(2)</sup> | Drain current (pulsed)                                                                                   | 8                        |          | A    |
| $P_{TOT}$               | Total dissipation at $T_C = 25\text{ °C}$                                                                | 45                       | 20       | W    |
| $I_{AR}$                | Max current during repetitive or single pulse avalanche (pulse width limited by $T_{jmax}$ )             | 0.5                      |          | A    |
| $E_{AS}$                | Single pulse avalanche energy (starting $T_J = 25\text{ °C}$ , $I_D = I_{AS}$ , $V_{DD} = 50\text{ V}$ ) | 60.5                     |          | mJ   |
| $dv/dt$ <sup>(3)</sup>  | Peak diode recovery voltage slope                                                                        | 4.5                      |          | V/ns |
| $dv/dt$ <sup>(4)</sup>  | MOSFET $dv/dt$ ruggedness                                                                                | 50                       |          | V/ns |
| $T_j$                   | Operating junction temperature                                                                           | -55 to 150               |          | °C   |
| $T_{stg}$               | Storage temperature                                                                                      |                          |          | °C   |

1. For TO-220FP limited by maximum junction temperature.

2. Pulse width limited by safe operating area.

3.  $I_{SD} \leq 2\text{ A}$ ,  $di/dt \leq 100\text{ A}/\mu\text{s}$ , peak  $V_{DS} \leq V_{(BR)DSS}$

4.  $V_{DS} \leq 640\text{ V}$

Table 3. Thermal data

| Symbol         | Parameter                        | Value             |          |        |      | Unit |
|----------------|----------------------------------|-------------------|----------|--------|------|------|
|                |                                  | DPAK              | TO-220FP | TO-220 | IPAK |      |
| $R_{thj-case}$ | Thermal resistance junction-case | 2.78              | 6.25     | 2.78   | 2.78 | °C/W |
| $R_{thj-pcb}$  | Thermal resistance junction-pcb  | 50 <sup>(1)</sup> |          |        |      |      |
| $R_{thj-amb}$  | Thermal resistance junction-amb  |                   | 62.5     |        | 100  |      |

1. When mounted on FR-4 board of 1 inch<sup>2</sup>, 2 oz Cu.

## 2 Electrical characteristics

( $T_{CASE} = 25\text{ °C}$  unless otherwise specified).

**Table 4. On/off states**

| Symbol        | Parameter                                        | Test conditions                                    | Min. | Typ. | Max.     | Unit          |
|---------------|--------------------------------------------------|----------------------------------------------------|------|------|----------|---------------|
| $V_{(BR)DSS}$ | Drain-source breakdown voltage ( $V_{GS} = 0$ )  | $I_D = 1\text{ mA}$                                | 800  |      |          | V             |
| $I_{DSS}$     | Zero gate voltage drain current ( $V_{GS} = 0$ ) | $V_{DS} = 800\text{ V}$                            |      |      | 1        | $\mu\text{A}$ |
|               |                                                  | $V_{DS} = 800\text{ V}$ $T_J = 125\text{ °C}$      |      |      | 50       | $\mu\text{A}$ |
| $I_{GSS}$     | Gate body leakage current ( $V_{DS} = 0$ )       | $V_{GS} = \pm 20\text{ V}$                         |      |      | $\pm 10$ | $\mu\text{A}$ |
| $V_{GS(th)}$  | Gate threshold voltage                           | $V_{DS} = V_{GS}$ , $I_D = 100\text{ }\mu\text{A}$ | 3    | 4    | 5        | V             |
| $R_{DS(on)}$  | Static drain-source on-resistance                | $V_{GS} = 10\text{ V}$ , $I_D = 1\text{ A}$        |      | 3.5  | 4.5      | $\Omega$      |

**Table 5. Dynamic**

| Symbol            | Parameter                             | Test conditions                                                        | Min. | Typ. | Max. | Unit     |
|-------------------|---------------------------------------|------------------------------------------------------------------------|------|------|------|----------|
| $C_{iss}$         | Input capacitance                     | $V_{DS} = 100\text{ V}$ , $f = 1\text{ MHz}$ , $V_{GS} = 0$            | -    | 105  | -    | pF       |
| $C_{oss}$         | Output capacitance                    |                                                                        | -    | 8    | -    | pF       |
| $C_{rss}$         | Reverse transfer capacitance          |                                                                        | -    | 0.5  | -    | pF       |
| $C_{o(tr)}^{(1)}$ | Equivalent capacitance time related   | $V_{GS} = 0$ , $V_{DS} = 0\text{ to }640\text{ V}$                     | -    | 16   | -    | pF       |
| $C_{o(er)}^{(2)}$ | Equivalent capacitance energy related |                                                                        | -    | 7    | -    | pF       |
| $R_G$             | Intrinsic gate resistance             | $f = 1\text{ MHz}$ , $I_D = 0$                                         | -    | 18   | -    | $\Omega$ |
| $Q_g$             | Total gate charge                     | $V_{DD} = 640\text{ V}$ , $I_D = 2\text{ A}$<br>$V_{GS} = 10\text{ V}$ | -    | 9.5  | -    | nC       |
| $Q_{gs}$          | Gate-source charge                    |                                                                        | -    | 1.5  | -    | nC       |
| $Q_{gd}$          | Gate-drain charge                     |                                                                        | -    | 7.5  | -    | nC       |

1. Time related is defined as a constant equivalent capacitance giving the same charging time as  $C_{oss}$  when  $V_{DS}$  increases from 0 to 80%  $V_{DSS}$
2. Energy related is defined as a constant equivalent capacitance giving the same stored energy as  $C_{oss}$  when  $V_{DS}$  increases from 0 to 80%  $V_{DSS}$

Table 6. Switching times

| Symbol       | Parameter           | Test conditions                                                                                | Min. | Typ. | Max. | Unit |
|--------------|---------------------|------------------------------------------------------------------------------------------------|------|------|------|------|
| $t_{d(on)}$  | Turn-on delay time  | $V_{DD} = 400\text{ V}$ , $I_D = 1\text{ A}$ ,<br>$R_G = 4.7\ \Omega$ , $V_{GS} = 10\text{ V}$ | -    | 8    | -    | ns   |
| $t_r$        | Rise time           |                                                                                                | -    | 12   | -    | ns   |
| $t_{d(off)}$ | Turn-off delay time |                                                                                                | -    | 19   | -    | ns   |
| $t_f$        | Fall time           |                                                                                                | -    | 32   | -    | ns   |

Table 7. Source drain diode

| Symbol          | Parameter                     | Test conditions                                                                                                             | Min. | Typ. | Max. | Unit          |
|-----------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------|------|------|---------------|
| $I_{SD}$        | Source-drain current          |                                                                                                                             | -    |      | 2    | A             |
| $I_{SDM}^{(1)}$ | Source-drain current (pulsed) |                                                                                                                             | -    |      | 8    | A             |
| $V_{SD}^{(2)}$  | Forward on voltage            | $I_{SD} = 2\text{ A}$ , $V_{GS} = 0$                                                                                        | -    |      | 1.5  | V             |
| $t_{rr}$        | Reverse recovery time         | $I_{SD} = 2\text{ A}$ , $V_{DD} = 60\text{ V}$<br>$di/dt = 100\text{ A}/\mu\text{s}$ ,                                      | -    | 255  |      | ns            |
| $Q_{rr}$        | Reverse recovery charge       |                                                                                                                             | -    | 1    |      | $\mu\text{C}$ |
| $I_{RRM}$       | Reverse recovery current      |                                                                                                                             | -    | 8    |      | A             |
| $t_{rr}$        | Reverse recovery time         | $I_{SD} = 2\text{ A}$ , $V_{DD} = 60\text{ V}$<br>$di/dt = 100\text{ A}/\mu\text{s}$ ,<br>$T_J = 150\text{ }^\circ\text{C}$ | -    | 285  |      | ns            |
| $Q_{rr}$        | Reverse recovery charge       |                                                                                                                             | -    | 1.45 |      | $\mu\text{C}$ |
| $I_{RRM}$       | Reverse recovery current      |                                                                                                                             | -    | 7.5  |      | A             |

1. Pulse width limited by safe operating area

2. Pulsed: pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5%

Table 8. Gate-source Zener diode

| Symbol        | Parameter                     | Test conditions                        | Min. | Typ. | Max. | Unit |
|---------------|-------------------------------|----------------------------------------|------|------|------|------|
| $V_{(BR)GSO}$ | Gate-source breakdown voltage | $I_{GS} = \pm 1\text{ mA}$ , $I_D = 0$ | 30   | -    | -    | V    |

The built-in back-to-back Zener diodes have been specifically designed to enhance not only the device's ESD capability, but also to make them capable of safely absorbing any voltage transients that may occasionally be applied from gate to source. In this respect, the Zener voltage is appropriate to achieve efficient and cost-effective protection of device integrity. The integrated Zener diodes thus eliminate the need for external components.

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area for DPAK and IPAK

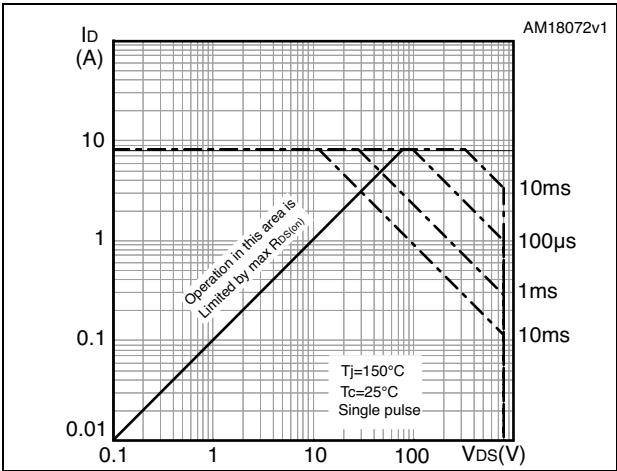


Figure 3. Thermal impedance for DPAK and IPAK

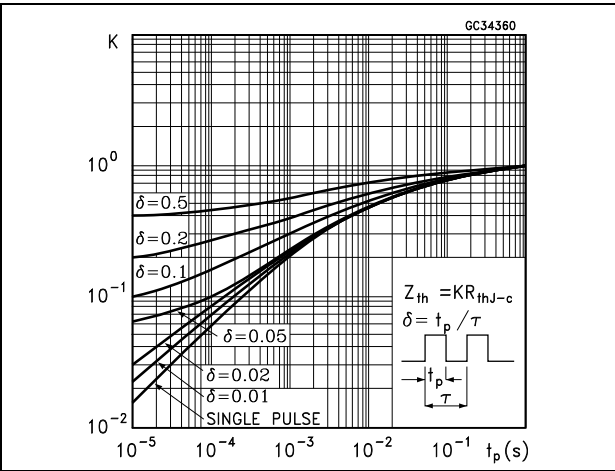


Figure 4. Safe operating area for TO-220FP

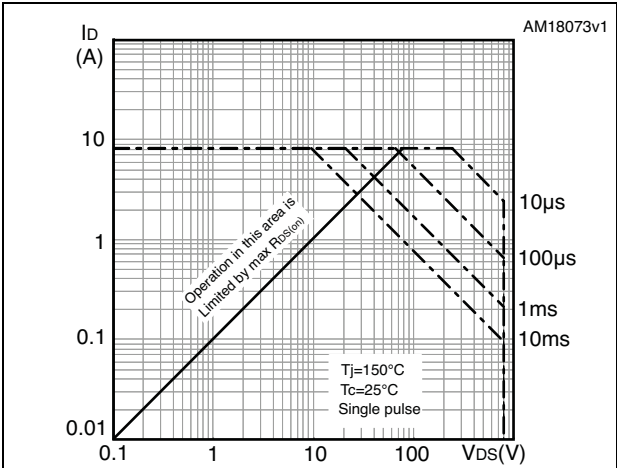


Figure 5. Thermal impedance for TO-220FP

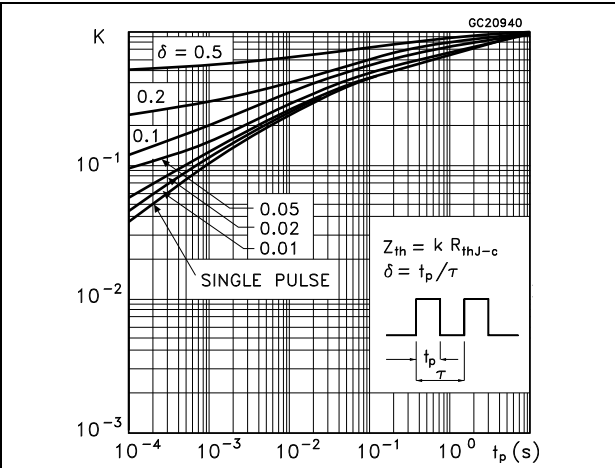


Figure 6. Safe operating area for TO-220

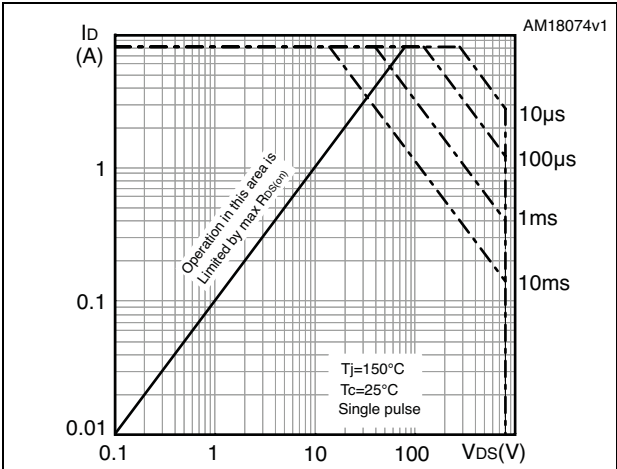


Figure 7. Thermal impedance for TO-220

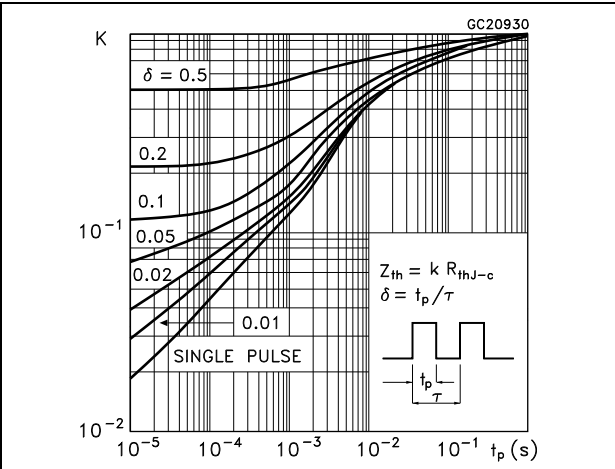


Figure 8. Output characteristics

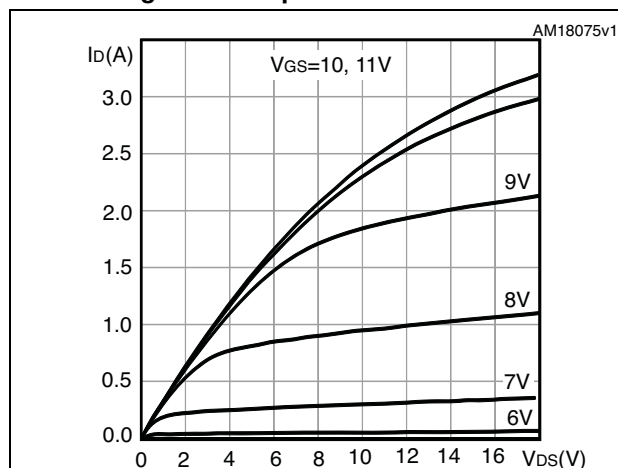


Figure 9. Transfer characteristics

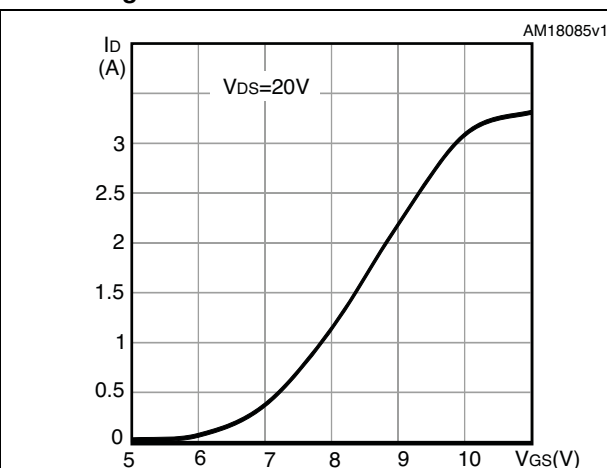


Figure 10. Gate charge vs gate-source voltage

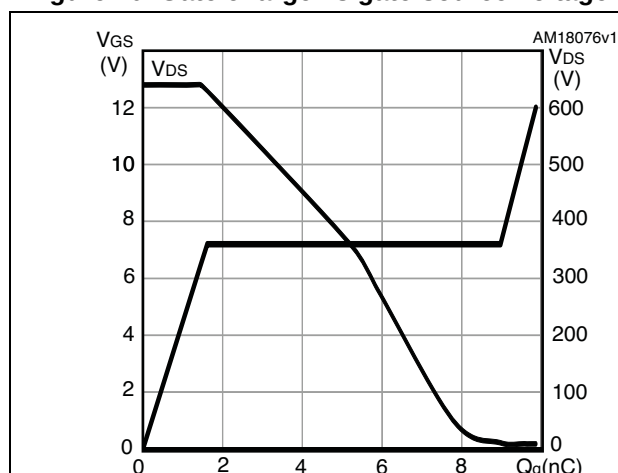


Figure 11. Static drain-source on-resistance

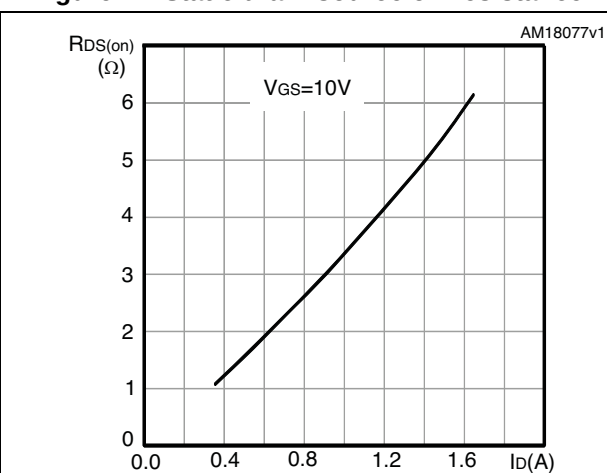


Figure 12. Capacitance variations

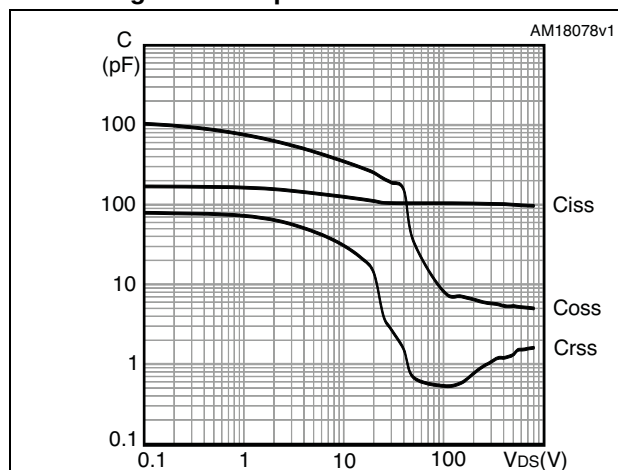


Figure 13. Output capacitance stored energy

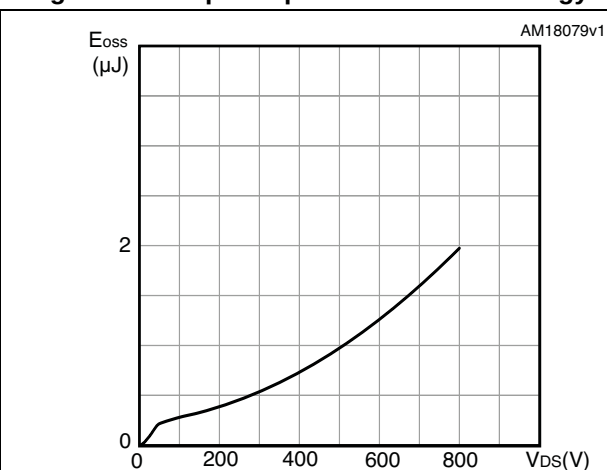


Figure 14. Normalized gate threshold voltage vs temperature

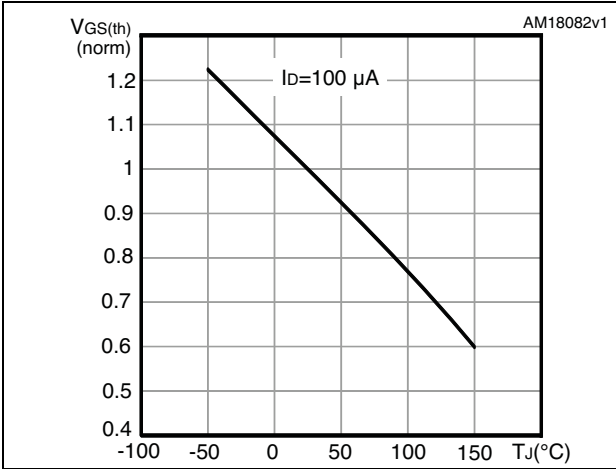


Figure 15. Normalized on-resistance vs temperature

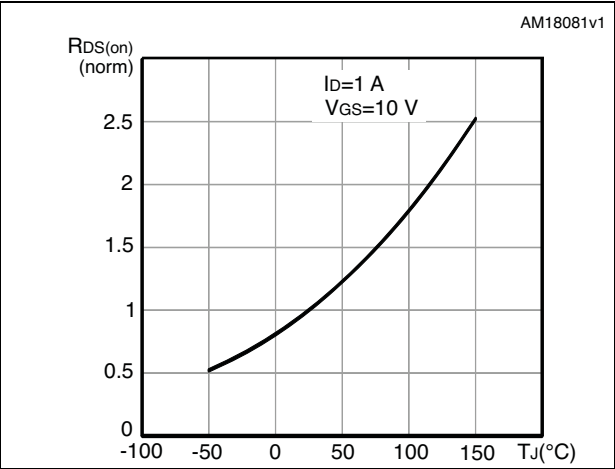


Figure 16. Normalized  $V_{DS}$  vs temperature

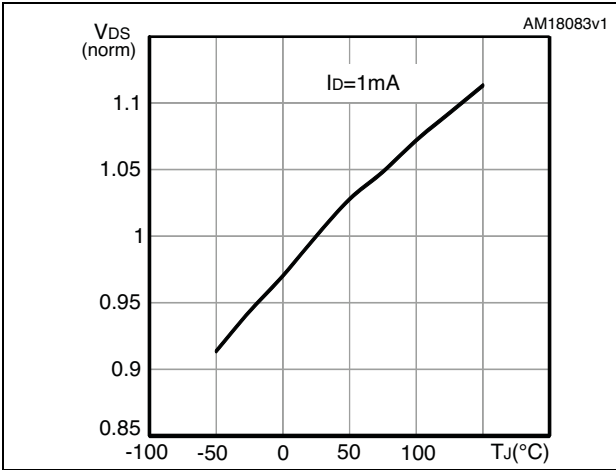


Figure 17. Source-drain diode forward characteristics

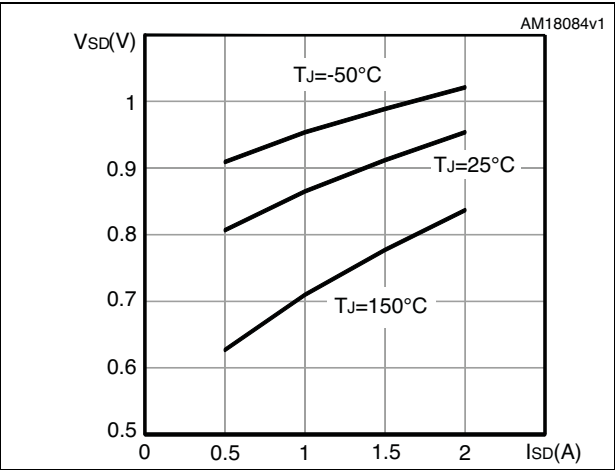
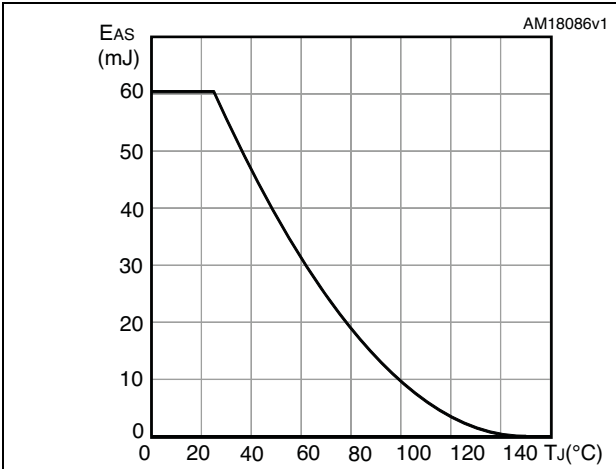


Figure 18. Maximum avalanche energy vs starting  $T_J$



### 3 Test circuits

Figure 19. Switching times test circuit for resistive load

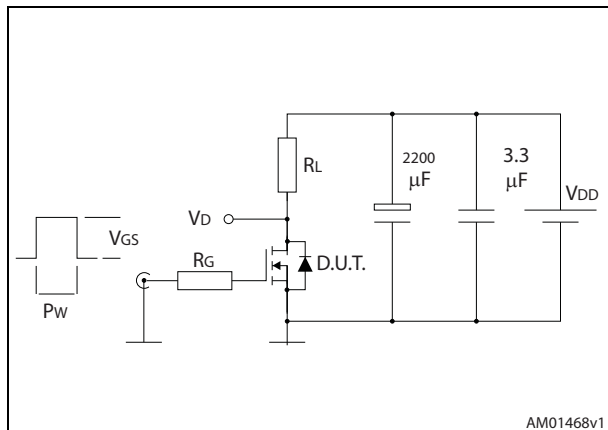


Figure 20. Gate charge test circuit



Figure 21. Test circuit for inductive load switching and diode recovery times



Figure 22. Unclamped inductive load test circuit



Figure 23. Unclamped inductive waveform



Figure 24. Switching time waveform



## 4 Package mechanical data

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

Figure 25. DPAK (TO-252) type A drawing

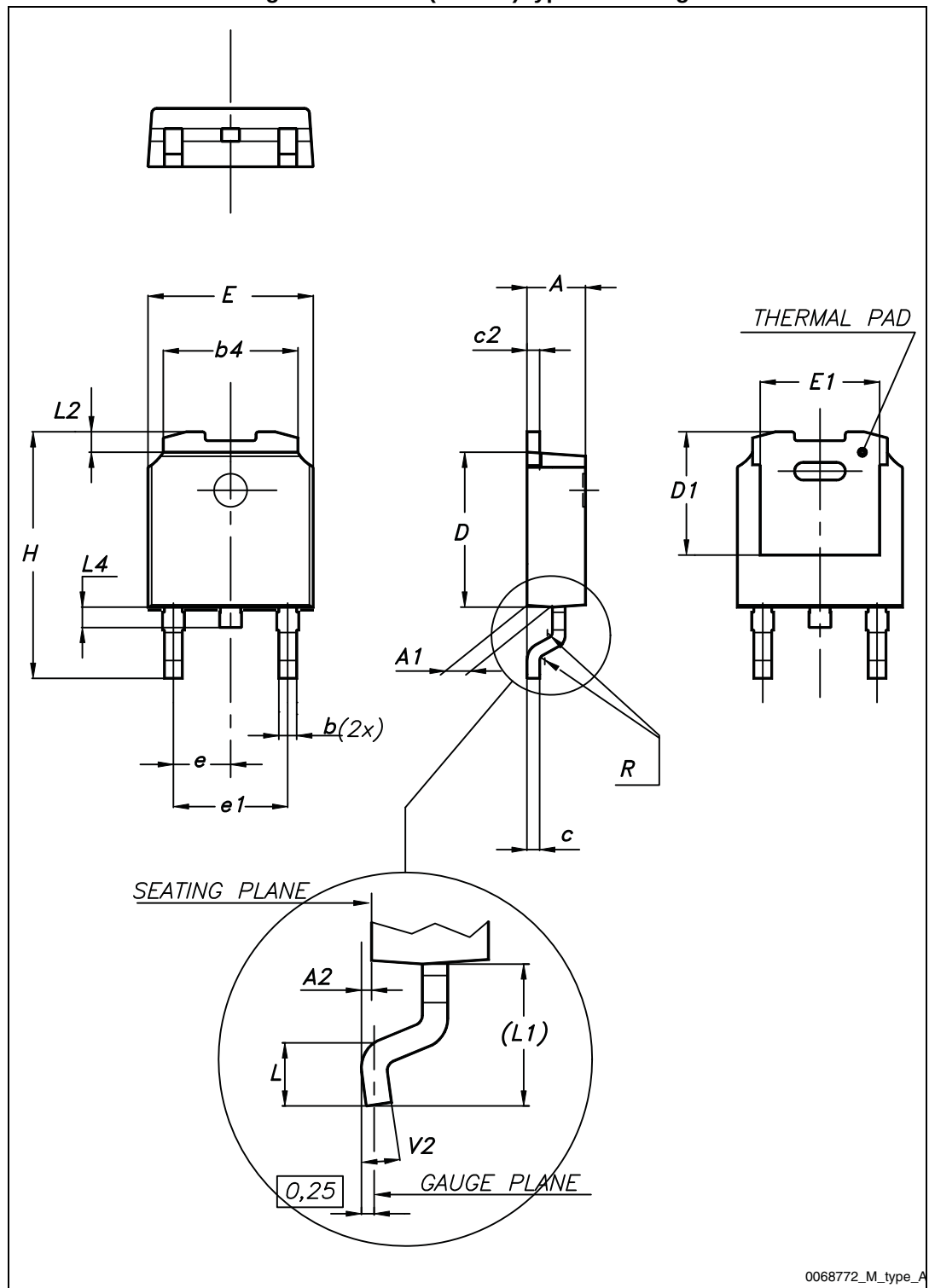
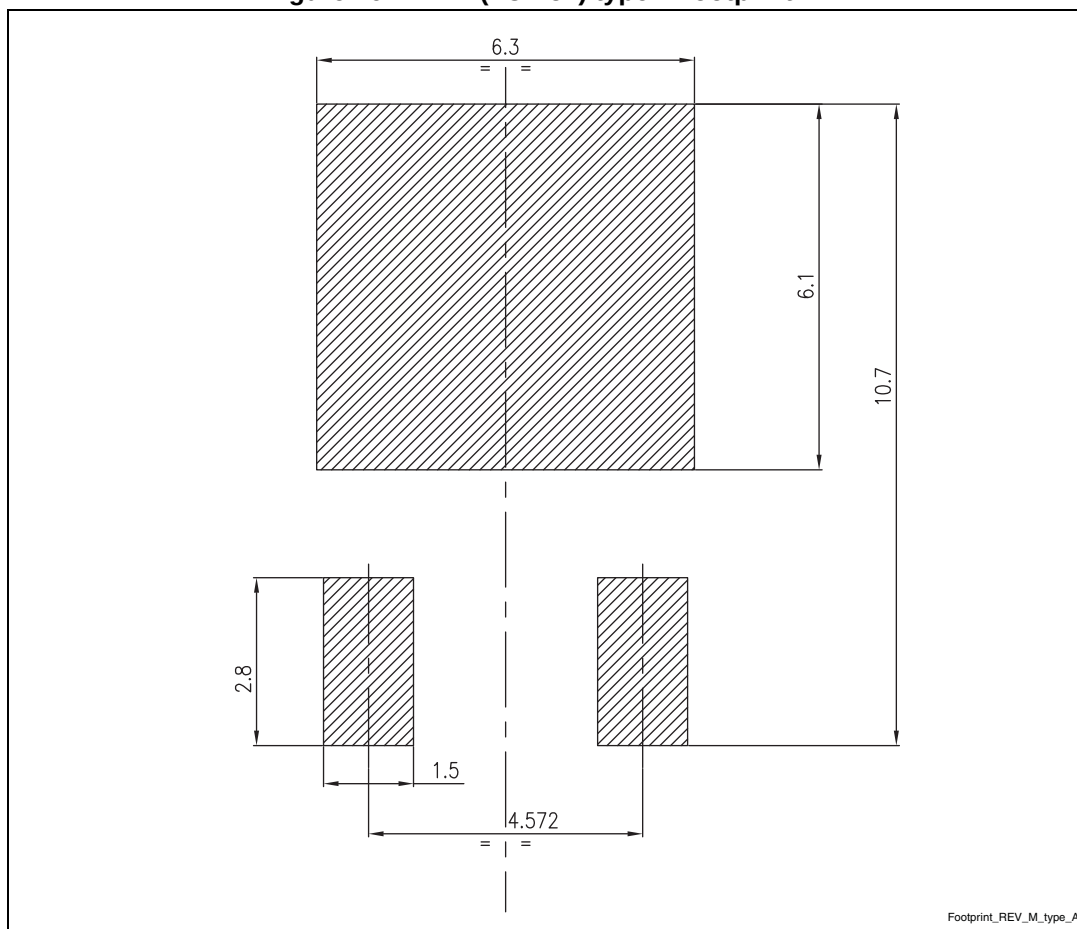


Table 9. DPAK (TO-252) type A mechanical data

| Dim. | mm   |      |       |
|------|------|------|-------|
|      | Min. | Typ. | Max.  |
| A    | 2.20 |      | 2.40  |
| A1   | 0.90 |      | 1.10  |
| A2   | 0.03 |      | 0.23  |
| b    | 0.64 |      | 0.90  |
| b4   | 5.20 |      | 5.40  |
| c    | 0.45 |      | 0.60  |
| c2   | 0.48 |      | 0.60  |
| D    | 6.00 |      | 6.20  |
| D1   |      | 5.10 |       |
| E    | 6.40 |      | 6.60  |
| E1   |      | 4.70 |       |
| e    |      | 2.28 |       |
| e1   | 4.40 |      | 4.60  |
| H    | 9.35 |      | 10.10 |
| L    | 1.00 |      | 1.50  |
| (L1) |      | 2.80 |       |
| L2   |      | 0.80 |       |
| L4   | 0.60 |      | 1.00  |
| R    |      | 0.20 |       |
| V2   | 0°   |      | 8°    |

Figure 26. DPAK (TO-252) type A footprint (a)



a. All dimensions are in millimeters

Figure 27. TO-220FP drawing

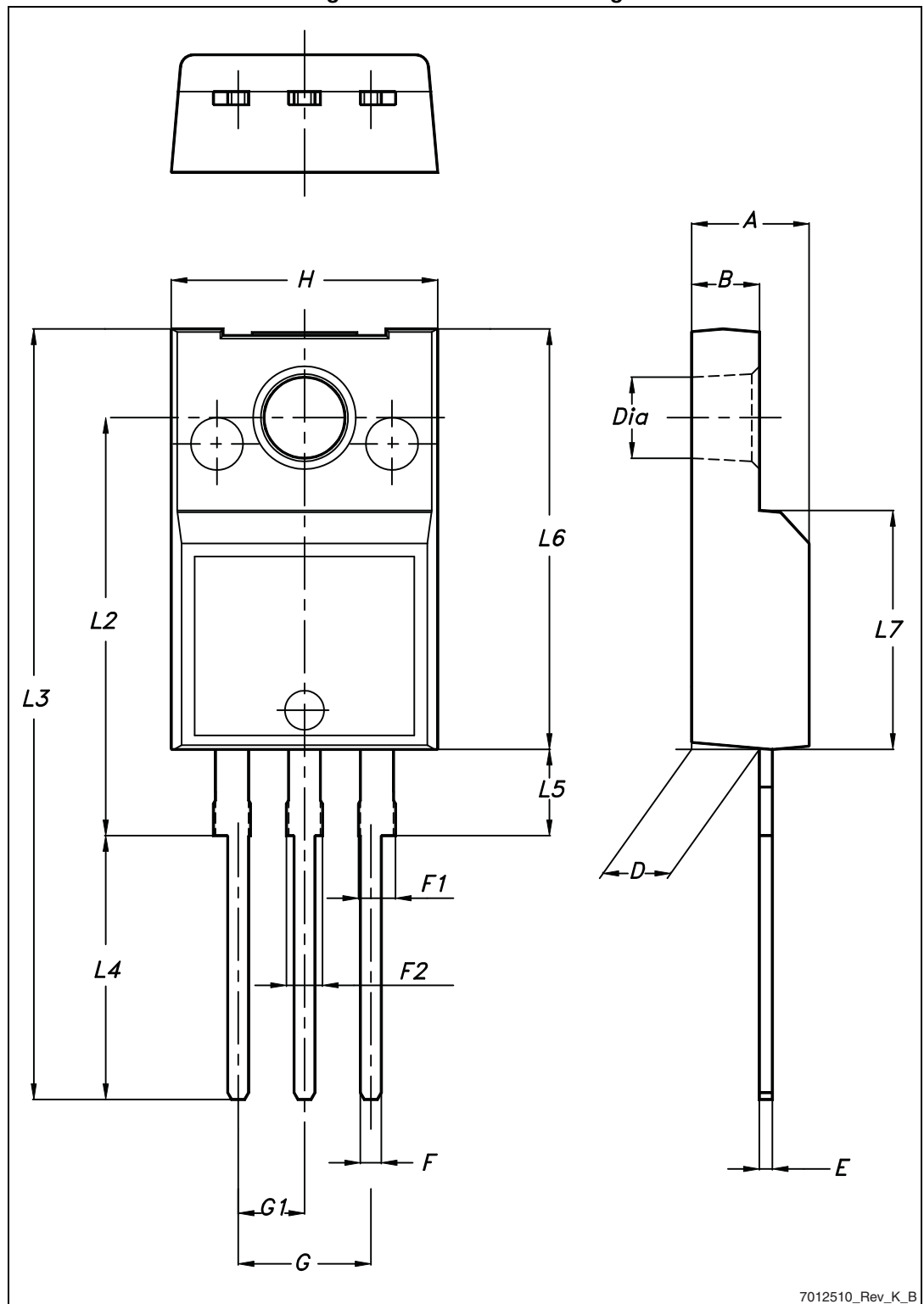
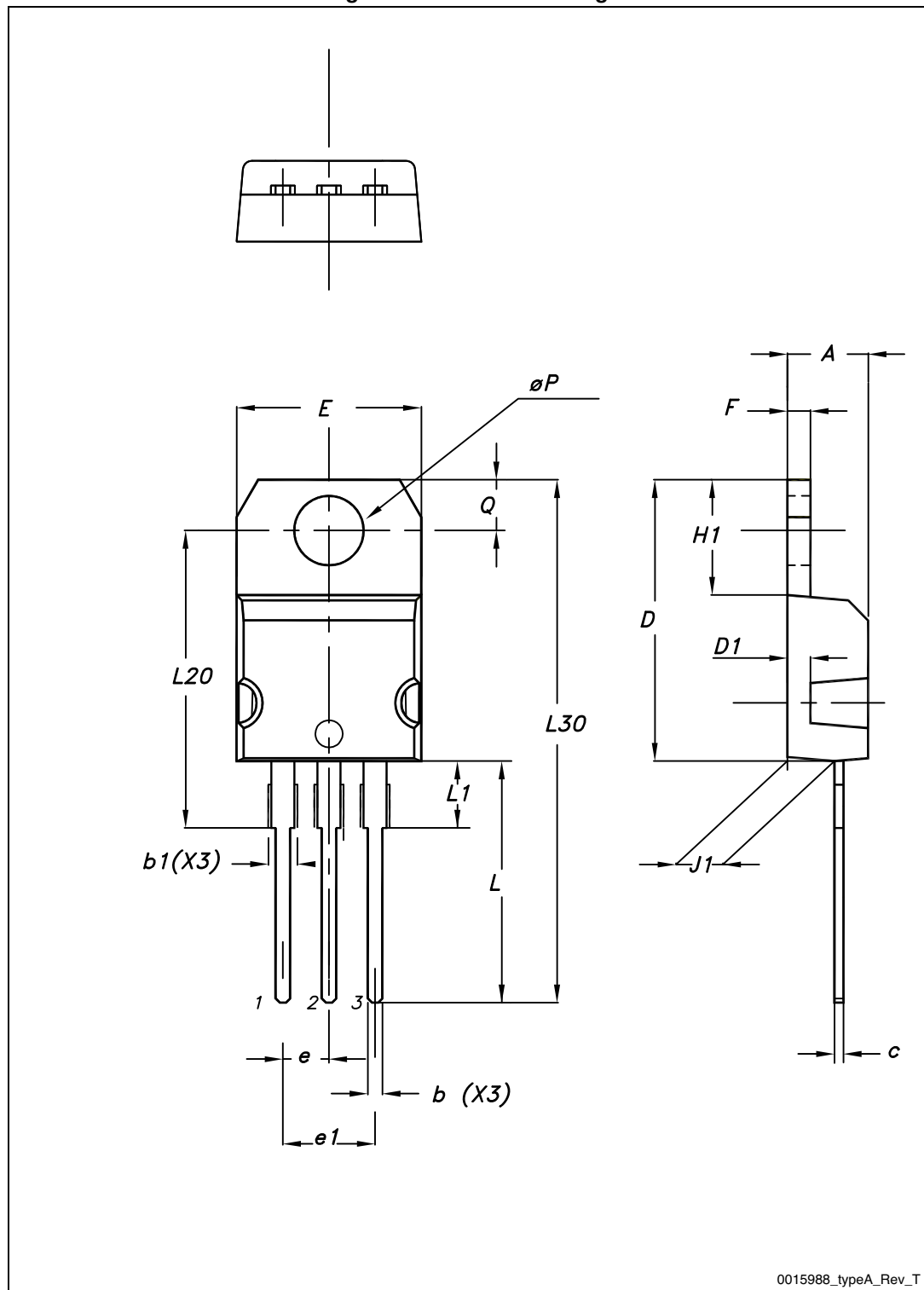


Table 10. TO-220FP mechanical data

| Dim. | mm   |      |      |
|------|------|------|------|
|      | Min. | Typ. | Max. |
| A    | 4.4  |      | 4.6  |
| B    | 2.5  |      | 2.7  |
| D    | 2.5  |      | 2.75 |
| E    | 0.45 |      | 0.7  |
| F    | 0.75 |      | 1    |
| F1   | 1.15 |      | 1.70 |
| F2   | 1.15 |      | 1.70 |
| G    | 4.95 |      | 5.2  |
| G1   | 2.4  |      | 2.7  |
| H    | 10   |      | 10.4 |
| L2   |      | 16   |      |
| L3   | 28.6 |      | 30.6 |
| L4   | 9.8  |      | 10.6 |
| L5   | 2.9  |      | 3.6  |
| L6   | 15.9 |      | 16.4 |
| L7   | 9    |      | 9.3  |
| Dia  | 3    |      | 3.2  |

Figure 28. TO-220 drawing



0015988\_typeA\_Rev\_T

Table 11. TO-220 mechanical data

| Dim. | mm    |       |       |
|------|-------|-------|-------|
|      | Min.  | Typ.  | Max.  |
| A    | 4.40  |       | 4.60  |
| b    | 0.61  |       | 0.88  |
| b1   | 1.14  |       | 1.70  |
| c    | 0.48  |       | 0.70  |
| D    | 15.25 |       | 15.75 |
| D1   |       | 1.27  |       |
| E    | 10    |       | 10.40 |
| e    | 2.40  |       | 2.70  |
| e1   | 4.95  |       | 5.15  |
| F    | 1.23  |       | 1.32  |
| H1   | 6.20  |       | 6.60  |
| J1   | 2.40  |       | 2.72  |
| L    | 13    |       | 14    |
| L1   | 3.50  |       | 3.93  |
| L20  |       | 16.40 |       |
| L30  |       | 28.90 |       |
| ØP   | 3.75  |       | 3.85  |
| Q    | 2.65  |       | 2.95  |

Figure 29. IPAK (TO-251) drawing

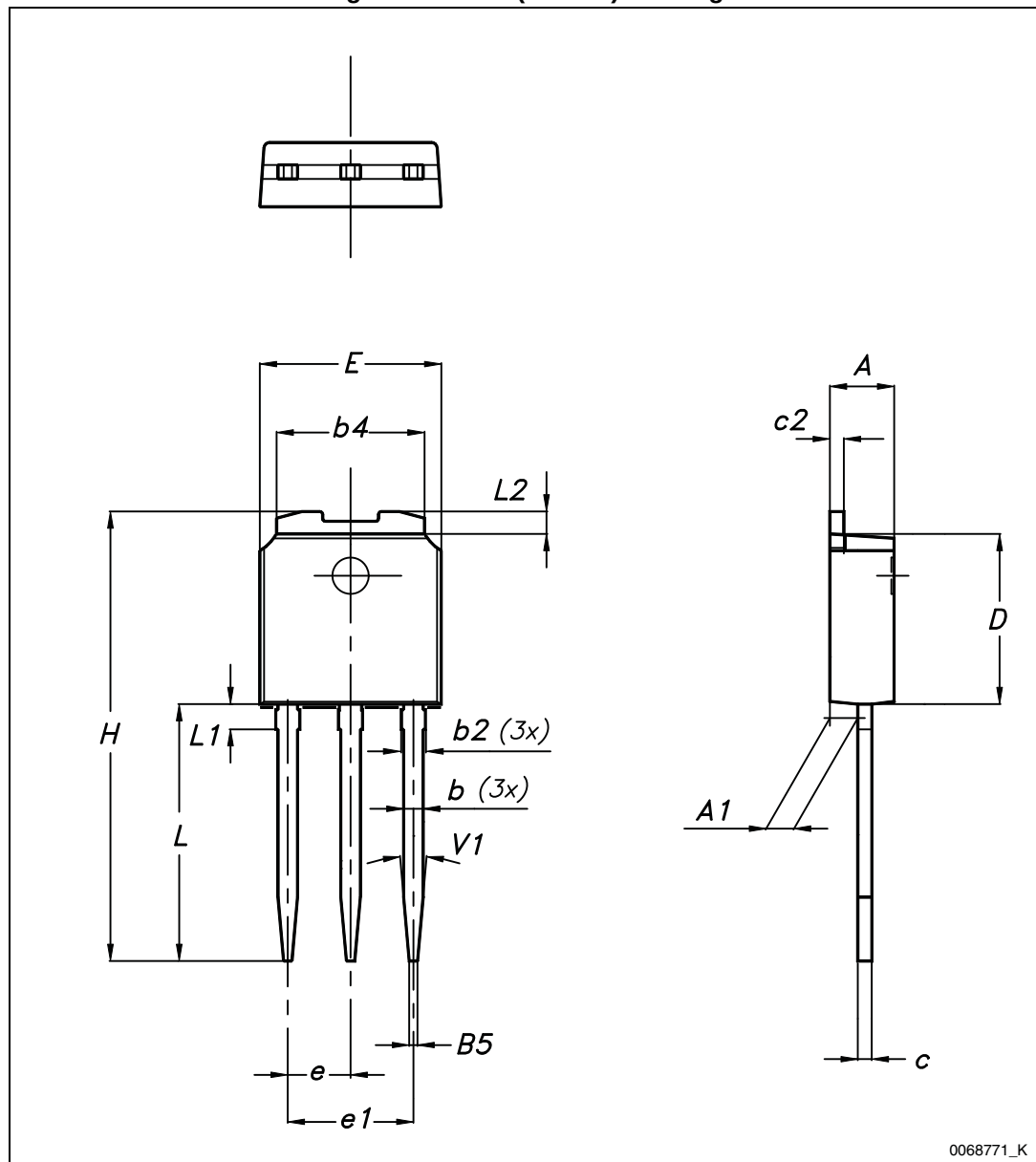


Table 12. IPAK (TO-251) mechanical data

| DIM | mm.  |       |      |
|-----|------|-------|------|
|     | min. | typ.  | max. |
| A   | 2.20 |       | 2.40 |
| A1  | 0.90 |       | 1.10 |
| b   | 0.64 |       | 0.90 |
| b2  |      |       | 0.95 |
| b4  | 5.20 |       | 5.40 |
| B5  |      | 0.30  |      |
| c   | 0.45 |       | 0.60 |
| c2  | 0.48 |       | 0.60 |
| D   | 6.00 |       | 6.20 |
| E   | 6.40 |       | 6.60 |
| e   |      | 2.28  |      |
| e1  | 4.40 |       | 4.60 |
| H   |      | 16.10 |      |
| L   | 9.00 |       | 9.40 |
| L1  | 0.80 |       | 1.20 |
| L2  |      | 0.80  | 1.00 |
| V1  |      | 10°   |      |

## 5 Packaging information

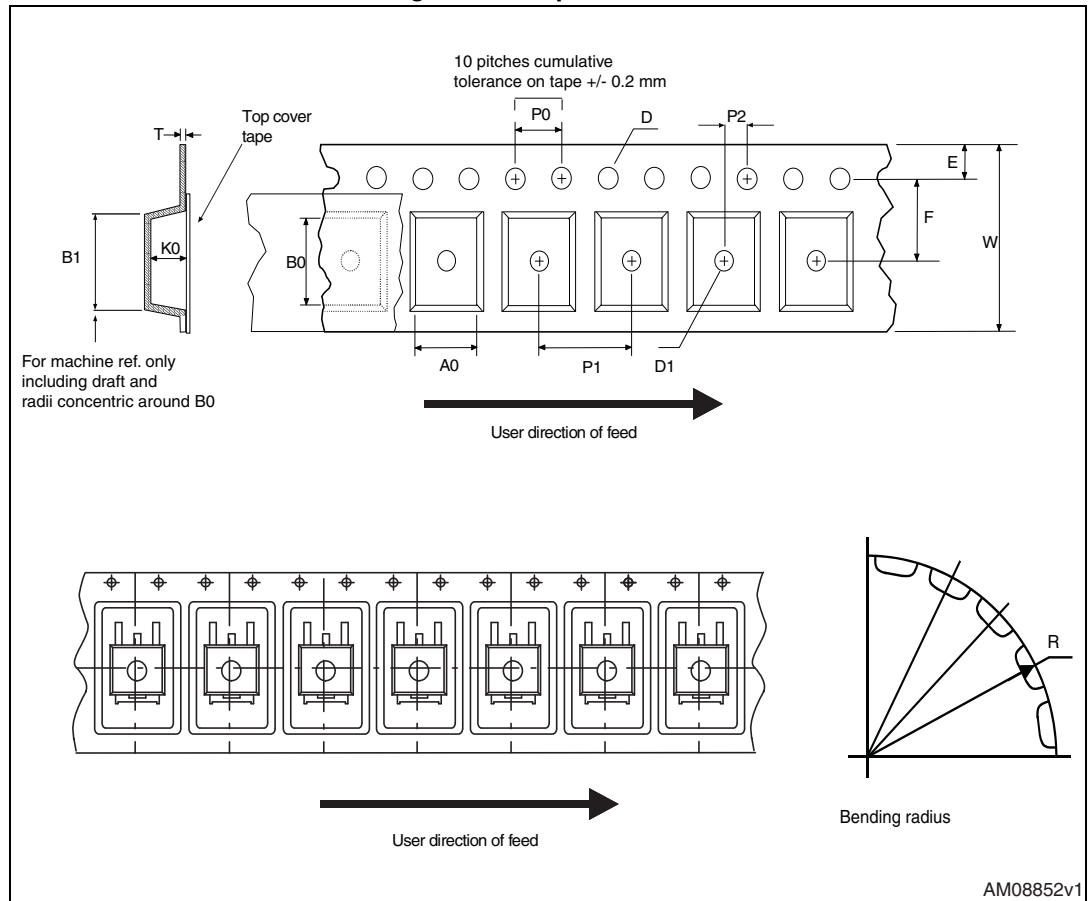
**Figure 30. Tape for DPAK**

Figure 31. Reel for DPAK

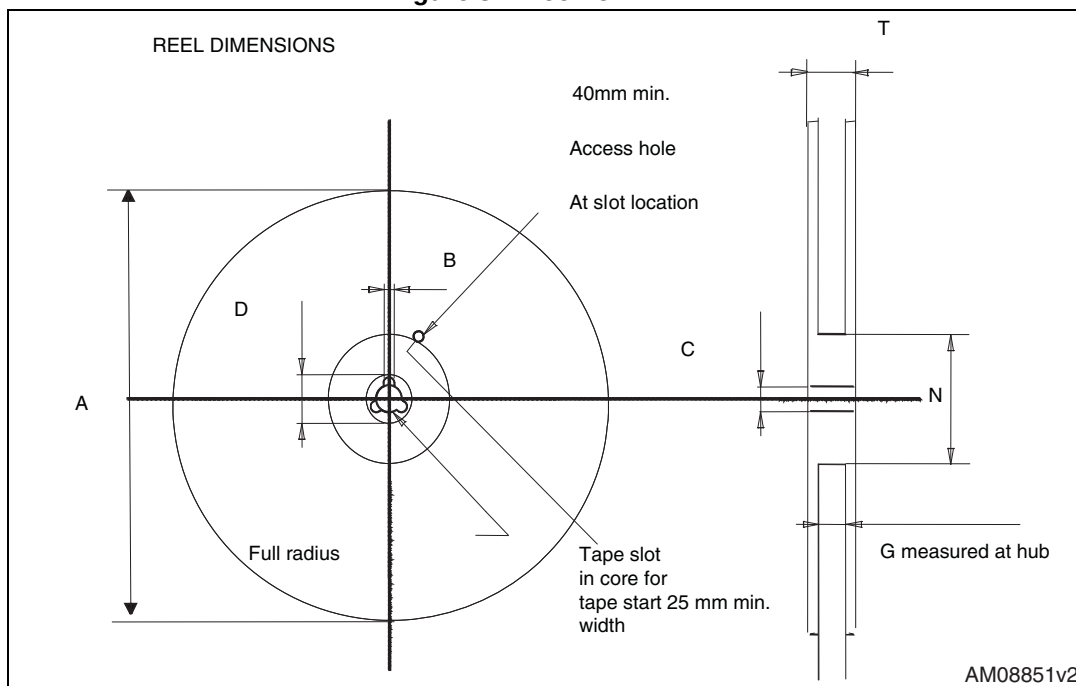


Table 13. DPAK tape and reel mechanical data

| Tape |      |      | Reel      |      |      |
|------|------|------|-----------|------|------|
| Dim. | mm   |      | Dim.      | mm   |      |
|      | Min. | Max. |           | Min. | Max. |
| A0   | 6.8  | 7    | A         |      | 330  |
| B0   | 10.4 | 10.6 | B         | 1.5  |      |
| B1   |      | 12.1 | C         | 12.8 | 13.2 |
| D    | 1.5  | 1.6  | D         | 20.2 |      |
| D1   | 1.5  |      | G         | 16.4 | 18.4 |
| E    | 1.65 | 1.85 | N         | 50   |      |
| F    | 7.4  | 7.6  | T         |      | 22.4 |
| K0   | 2.55 | 2.75 |           |      |      |
| P0   | 3.9  | 4.1  | Base qty. |      | 2500 |
| P1   | 7.9  | 8.1  | Bulk qty. |      | 2500 |
| P2   | 1.9  | 2.1  |           |      |      |
| R    | 40   |      |           |      |      |
| T    | 0.25 | 0.35 |           |      |      |
| W    | 15.7 | 16.3 |           |      |      |

## 6 Revision history

**Table 14. Document revision history**

| Date        | Revision | Changes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11-Jul-2013 | 1        | First release.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 18-Feb-2014 | 2        | <ul style="list-style-type: none"><li>– Added: IPAK package</li><li>– Modified: <math>E_{AS}</math> value in <a href="#">Table 2</a></li><li>– Modified: <math>R_{thj-case}</math> in <a href="#">Table 3</a></li><li>– Modified: typical values in <a href="#">Table 5</a>, <a href="#">6</a> and <a href="#">7</a></li><li>– Added: <a href="#">Section 2.1: Electrical characteristics (curves)</a></li><li>– Updated: <a href="#">Figure 25</a>, <a href="#">26</a> and <a href="#">Table 9</a></li><li>– Added: <a href="#">Table 12</a> and <a href="#">Figure 29</a></li><li>– Minor text changes</li></ul> |

**Please Read Carefully:**

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

**UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.**

**ST PRODUCTS ARE NOT DESIGNED OR AUTHORIZED FOR USE IN: (A) SAFETY CRITICAL APPLICATIONS SUCH AS LIFE SUPPORTING, ACTIVE IMPLANTED DEVICES OR SYSTEMS WITH PRODUCT FUNCTIONAL SAFETY REQUIREMENTS; (B) AERONAUTIC APPLICATIONS; (C) AUTOMOTIVE APPLICATIONS OR ENVIRONMENTS, AND/OR (D) AEROSPACE APPLICATIONS OR ENVIRONMENTS. WHERE ST PRODUCTS ARE NOT DESIGNED FOR SUCH USE, THE PURCHASER SHALL USE PRODUCTS AT PURCHASER'S SOLE RISK, EVEN IF ST HAS BEEN INFORMED IN WRITING OF SUCH USAGE, UNLESS A PRODUCT IS EXPRESSLY DESIGNATED BY ST AS BEING INTENDED FOR "AUTOMOTIVE, AUTOMOTIVE SAFETY OR MEDICAL" INDUSTRY DOMAINS ACCORDING TO ST PRODUCT DESIGN SPECIFICATIONS. PRODUCTS FORMALLY ESCC, QML OR JAN QUALIFIED ARE DEEMED SUITABLE FOR USE IN AEROSPACE BY THE CORRESPONDING GOVERNMENTAL AGENCY.**

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2014 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

[www.st.com](http://www.st.com)



# AMEYA360

## Components Supply Platform

Authorized Distribution Brand :



Website :

Welcome to visit [www.ameya360.com](http://www.ameya360.com)

Contact Us :

➤ Address :

401 Building No.5, JiuGe Business Center, Lane 2301, Yishan Rd  
Minhang District, Shanghai , China

➤ Sales :

Direct +86 (21) 6401-6692

Email [amall@ameya360.com](mailto:amall@ameya360.com)

QQ 800077892

Skype ameyasales1 ameyasales2

➤ Customer Service :

Email [service@ameya360.com](mailto:service@ameya360.com)

➤ Partnership :

Tel +86 (21) 64016692-8333

Email [mkt@ameya360.com](mailto:mkt@ameya360.com)