

# ANTREX Electronics

## Electronic Components Sourcing Information

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### Product Reference Information

|                      |                           |
|----------------------|---------------------------|
| <b>Part Number:</b>  | PMZB200UNEYL              |
| <b>Manufacturer:</b> | Nexperia USA Inc.         |
| <b>Package:</b>      | Please confirm with sales |
| <b>Availability:</b> | Please confirm with sales |

**Product Page:**

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**Note:**

This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.



# PMZB200UNE

30 V, N-channel Trench MOSFET

12 March 2015

Product data sheet

## 1. General description

N-channel enhancement mode Field-Effect Transistor (FET) in a leadless ultra small DFN1006B-3 (SOT883B) Surface-Mounted Device (SMD) plastic package using Trench MOSFET technology.

## 2. Features and benefits

- Very fast switching
- Low threshold voltage
- Trench MOSFET technology
- ElectroStatic Discharge (ESD) protection: 2 kV HBM
- Ultra thin package profile of 0.37 mm

## 3. Applications

- Relay driver
- High-speed line driver
- Low-side loadswitch
- Switching circuits

## 4. Quick reference data

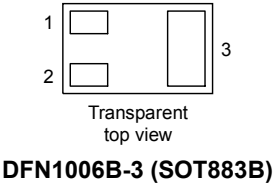
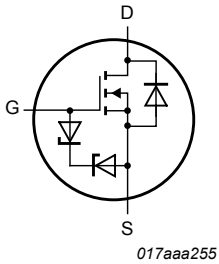
Table 1. Quick reference data

| Symbol                        | Parameter                        | Conditions                                                                    |     | Min | Typ | Max | Unit       |
|-------------------------------|----------------------------------|-------------------------------------------------------------------------------|-----|-----|-----|-----|------------|
| $V_{DS}$                      | drain-source voltage             | $T_J = 25\text{ }^{\circ}\text{C}$                                            |     | -   | -   | 30  | V          |
| $V_{GS}$                      | gate-source voltage              |                                                                               |     | -8  | -   | 8   | V          |
| $I_D$                         | drain current                    | $V_{GS} = 4.5\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$                 | [1] | -   | -   | 1.4 | A          |
| <b>Static characteristics</b> |                                  |                                                                               |     |     |     |     |            |
| $R_{DS(on)}$                  | drain-source on-state resistance | $V_{GS} = 4.5\text{ V}; I_D = 1.4\text{ A}; T_J = 25\text{ }^{\circ}\text{C}$ |     | -   | 210 | 250 | m $\Omega$ |

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and mounting pad for drain 1 cm<sup>2</sup>.

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline                                                                | Graphic symbol                                                                      |
|-----|--------|-------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1   | G      | gate        |  |  |
| 2   | S      | source      |                                                                                   |                                                                                     |
| 3   | D      | drain       |                                                                                   |                                                                                     |

6. Ordering information

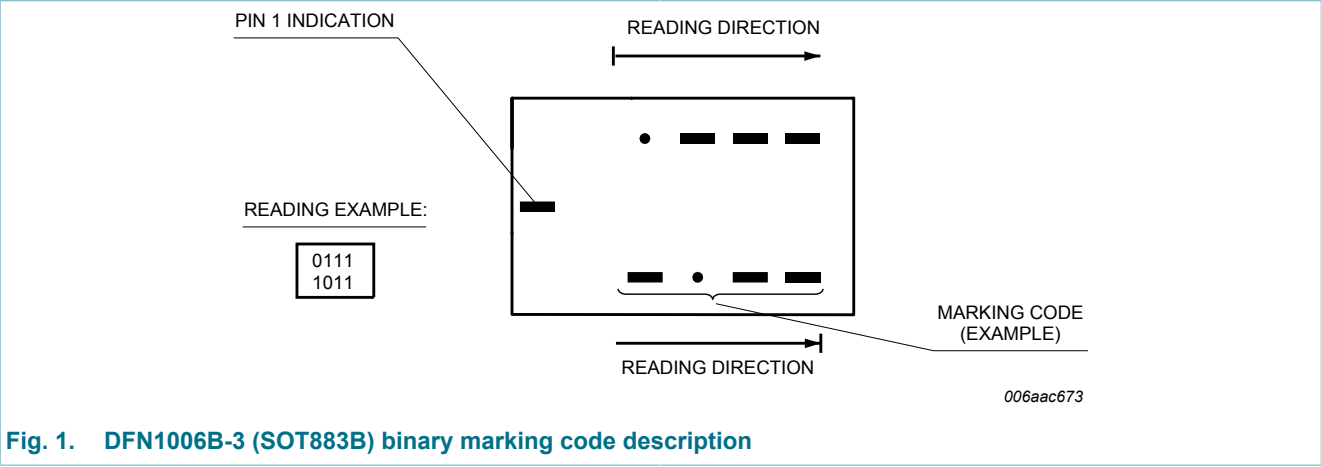
Table 3. Ordering information

| Type number | Package    |                                                                                            |         |
|-------------|------------|--------------------------------------------------------------------------------------------|---------|
|             | Name       | Description                                                                                | Version |
| PMZB200UNE  | DFN1006B-3 | DFN1006B-3: leadless ultra small plastic package; 3 solder lands; body 1.0 x 0.6 x 0.37 mm | SOT883B |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| PMZB200UNE  | 0101 0001    |

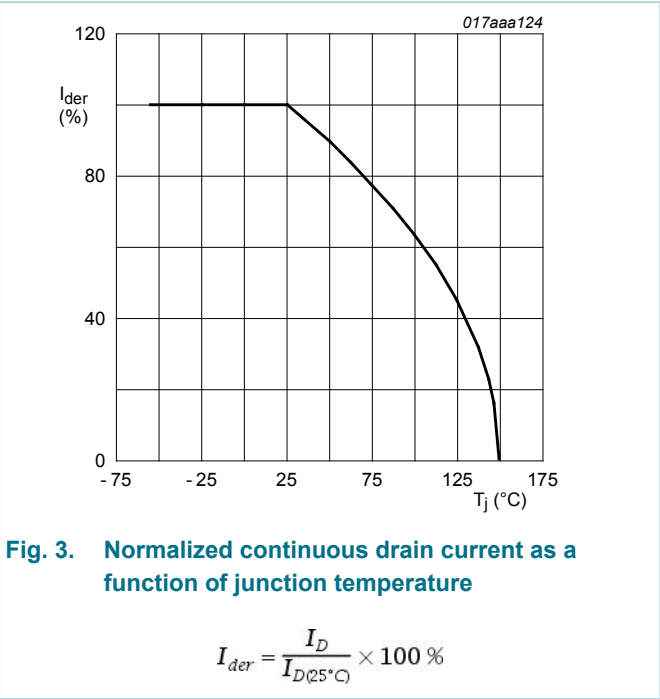
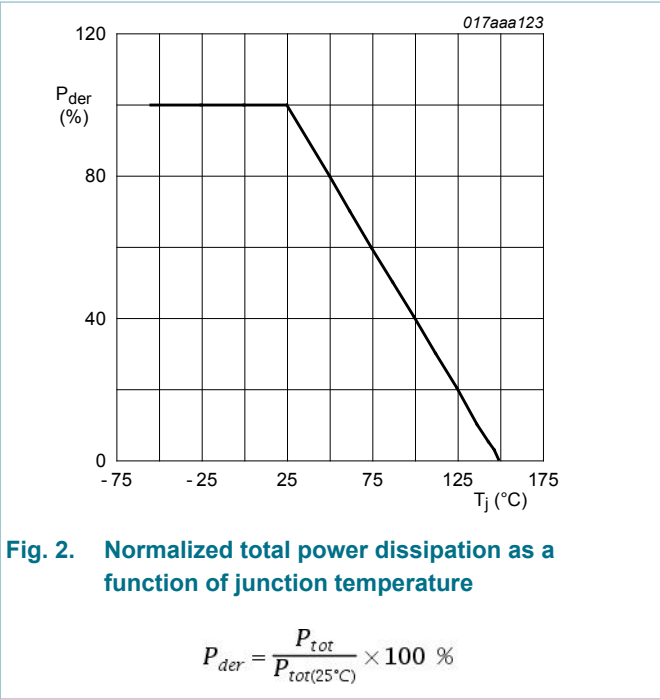


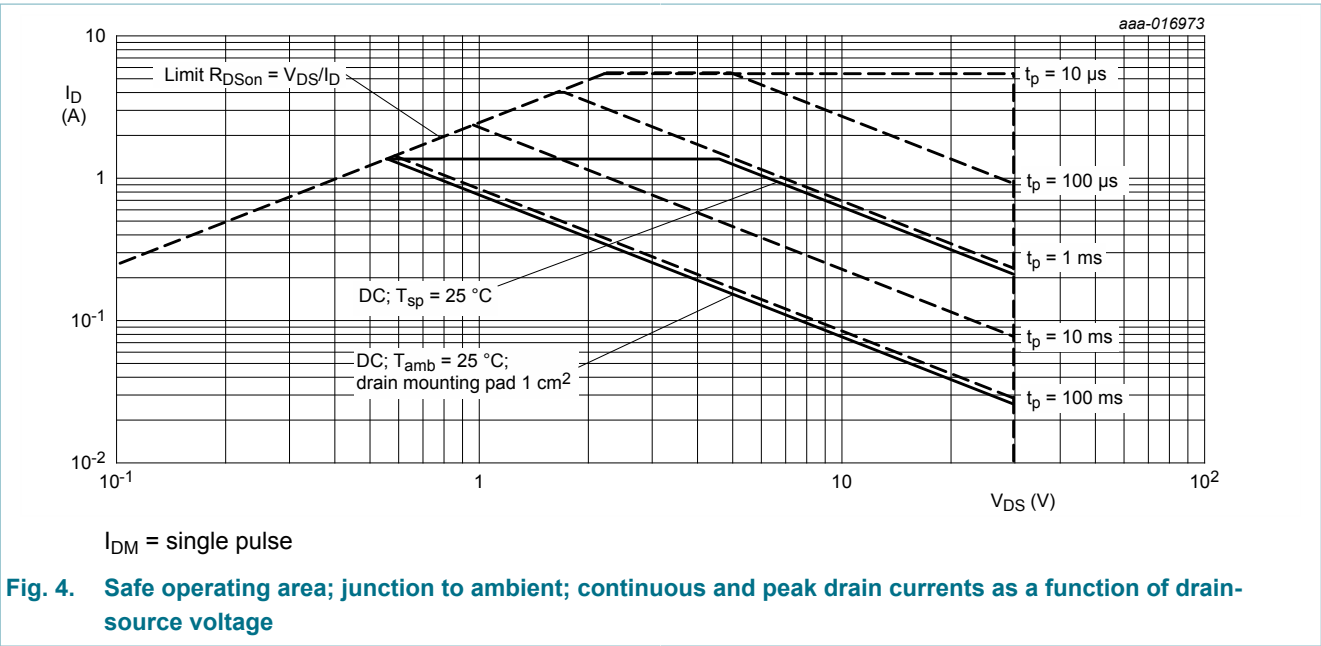
8. Limiting values

Table 5. Limiting values  
In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol             | Parameter               | Conditions                                                     |     | Min | Max  | Unit |
|--------------------|-------------------------|----------------------------------------------------------------|-----|-----|------|------|
| V <sub>DS</sub>    | drain-source voltage    | T <sub>j</sub> = 25 °C                                         |     | -   | 30   | V    |
| V <sub>GS</sub>    | gate-source voltage     |                                                                |     | -8  | 8    | V    |
| I <sub>D</sub>     | drain current           | V <sub>GS</sub> = 4.5 V; T <sub>amb</sub> = 25 °C              | [1] | -   | 1.4  | A    |
|                    |                         | V <sub>GS</sub> = 4.5 V; T <sub>amb</sub> = 100 °C             | [1] | -   | 0.9  | A    |
| I <sub>DM</sub>    | peak drain current      | T <sub>amb</sub> = 25 °C; single pulse; t <sub>p</sub> ≤ 10 μs |     | -   | 5    | A    |
| P <sub>tot</sub>   | total power dissipation | T <sub>amb</sub> = 25 °C                                       | [2] | -   | 350  | mW   |
|                    |                         |                                                                | [1] | -   | 760  | mW   |
|                    |                         | T <sub>sp</sub> = 25 °C                                        |     | -   | 6250 | mW   |
| T <sub>j</sub>     | junction temperature    |                                                                |     | -55 | 150  | °C   |
| T <sub>amb</sub>   | ambient temperature     |                                                                |     | -55 | 150  | °C   |
| T <sub>stg</sub>   | storage temperature     |                                                                |     | -65 | 150  | °C   |
| Source-drain diode |                         |                                                                |     |     |      |      |
| I <sub>S</sub>     | source current          | T <sub>amb</sub> = 25 °C                                       | [1] | -   | 0.7  | A    |

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and mounting pad for drain 1 cm<sup>2</sup>.  
[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.



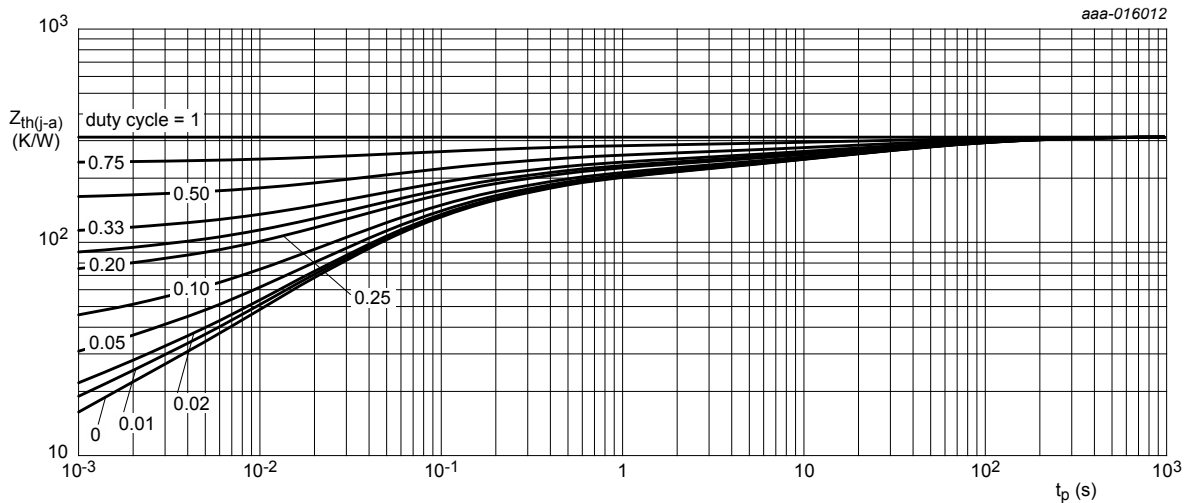


9. Thermal characteristics

Table 6. Thermal characteristics

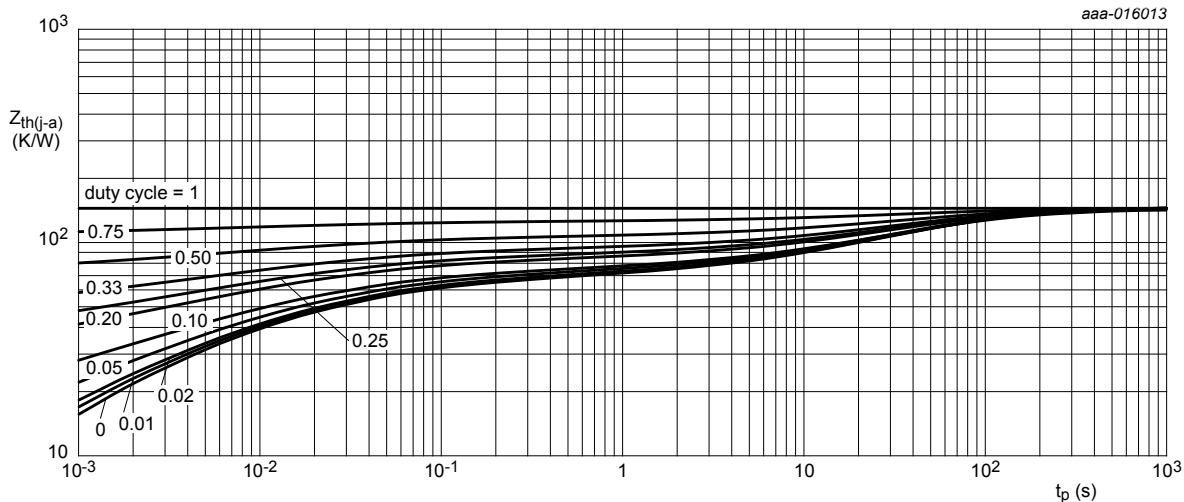
| Symbol         | Parameter                                        | Conditions  |     | Min | Typ | Max | Unit |
|----------------|--------------------------------------------------|-------------|-----|-----|-----|-----|------|
| $R_{th(j-a)}$  | thermal resistance from junction to ambient      | in free air | [1] | -   | 315 | 360 | K/W  |
|                |                                                  |             | [2] | -   | 145 | 165 | K/W  |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point |             |     | -   | 17  | 20  | K/W  |

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.  
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and mounting pad for drain  $1\text{ cm}^2$ .



FR4 PCB, standard footprint

Fig. 5. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



FR4 PCB, mounting pad for drain 1 cm<sup>2</sup>

Fig. 6. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

## 10. Characteristics

Table 7. Characteristics

| Symbol                  | Parameter                        | Conditions                                                                                                                 |  | Min  | Typ  | Max  | Unit |
|-------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------|--|------|------|------|------|
| Static characteristics  |                                  |                                                                                                                            |  |      |      |      |      |
| V <sub>(BR)DSS</sub>    | drain-source breakdown voltage   | I <sub>D</sub> = 250 μA; V <sub>GS</sub> = 0 V; T <sub>j</sub> = 25 °C                                                     |  | 30   | -    | -    | V    |
| V <sub>GSth</sub>       | gate-source threshold voltage    | I <sub>D</sub> = 250 μA; V <sub>DS</sub> = V <sub>GS</sub> ; T <sub>j</sub> = 25 °C                                        |  | 0.45 | 0.7  | 0.95 | V    |
| I <sub>DSS</sub>        | drain leakage current            | V <sub>DS</sub> = 30 V; V <sub>GS</sub> = 0 V; T <sub>j</sub> = 25 °C                                                      |  | -    | -    | 1    | μA   |
| I <sub>GSS</sub>        | gate leakage current             | V <sub>GS</sub> = 8 V; V <sub>DS</sub> = 0 V; T <sub>j</sub> = 25 °C                                                       |  | -    | -    | 5    | μA   |
|                         |                                  | V <sub>GS</sub> = -8 V; V <sub>DS</sub> = 0 V; T <sub>j</sub> = 25 °C                                                      |  | -    | -    | -5   | μA   |
|                         |                                  | V <sub>GS</sub> = 4.5 V; V <sub>DS</sub> = 0 V; T <sub>j</sub> = 25 °C                                                     |  | -    | -    | 1    | μA   |
|                         |                                  | V <sub>GS</sub> = -4.5 V; V <sub>DS</sub> = 0 V; T <sub>j</sub> = 25 °C                                                    |  | -    | -    | -1   | μA   |
|                         |                                  | V <sub>GS</sub> = 2.5 V; V <sub>DS</sub> = 0 V; T <sub>j</sub> = 25 °C                                                     |  | -    | -    | 100  | nA   |
|                         |                                  | V <sub>GS</sub> = -2.5 V; V <sub>DS</sub> = 0 V; T <sub>j</sub> = 25 °C                                                    |  | -    | -    | -100 | nA   |
| R <sub>DSon</sub>       | drain-source on-state resistance | V <sub>GS</sub> = 4.5 V; I <sub>D</sub> = 1.4 A; T <sub>j</sub> = 25 °C                                                    |  | -    | 210  | 250  | mΩ   |
|                         |                                  | V <sub>GS</sub> = 4.5 V; I <sub>D</sub> = 1.4 A; T <sub>j</sub> = 150 °C                                                   |  | -    | 347  | 410  | mΩ   |
|                         |                                  | V <sub>GS</sub> = 2.5 V; I <sub>D</sub> = 1.2 A; T <sub>j</sub> = 25 °C                                                    |  | -    | 240  | 310  | mΩ   |
|                         |                                  | V <sub>GS</sub> = 1.8 V; I <sub>D</sub> = 1 A; T <sub>j</sub> = 25 °C                                                      |  | -    | 270  | 380  | mΩ   |
|                         |                                  | V <sub>GS</sub> = 1.5 V; I <sub>D</sub> = 0.01 A; T <sub>j</sub> = 25 °C                                                   |  | -    | 300  | 490  | mΩ   |
| g <sub>fs</sub>         | forward transconductance         | V <sub>DS</sub> = 10 V; I <sub>D</sub> = 1 A; T <sub>j</sub> = 25 °C                                                       |  | -    | 4.1  | -    | S    |
| Dynamic characteristics |                                  |                                                                                                                            |  |      |      |      |      |
| Q <sub>G(tot)</sub>     | total gate charge                | V <sub>DS</sub> = 15 V; I <sub>D</sub> = 1.5 A; V <sub>GS</sub> = 4.5 V; T <sub>j</sub> = 25 °C                            |  | -    | 1.6  | 2.7  | nC   |
| Q <sub>GS</sub>         | gate-source charge               |                                                                                                                            |  | -    | 0.1  | -    | nC   |
| Q <sub>GD</sub>         | gate-drain charge                |                                                                                                                            |  | -    | 0.4  | -    | nC   |
| C <sub>iss</sub>        | input capacitance                | V <sub>DS</sub> = 15 V; f = 1 MHz; V <sub>GS</sub> = 0 V; T <sub>j</sub> = 25 °C                                           |  | -    | 89   | -    | pF   |
| C <sub>oss</sub>        | output capacitance               |                                                                                                                            |  | -    | 11   | -    | pF   |
| C <sub>rss</sub>        | reverse transfer capacitance     |                                                                                                                            |  | -    | 9    | -    | pF   |
| t <sub>d(on)</sub>      | turn-on delay time               | V <sub>DS</sub> = 15 V; I <sub>D</sub> = 0.8 A; V <sub>GS</sub> = 4.5 V; R <sub>G(ext)</sub> = 6 Ω; T <sub>j</sub> = 25 °C |  | -    | 5    | -    | ns   |
| t <sub>r</sub>          | rise time                        |                                                                                                                            |  | -    | 10   | -    | ns   |
| t <sub>d(off)</sub>     | turn-off delay time              |                                                                                                                            |  | -    | 17   | -    | ns   |
| t <sub>f</sub>          | fall time                        |                                                                                                                            |  | -    | 3    | -    | ns   |
| Source-drain diode      |                                  |                                                                                                                            |  |      |      |      |      |
| V <sub>SD</sub>         | source-drain voltage             | I <sub>S</sub> = 0.7 A; V <sub>GS</sub> = 0 V; T <sub>j</sub> = 25 °C                                                      |  | -    | 0.86 | 1.2  | V    |

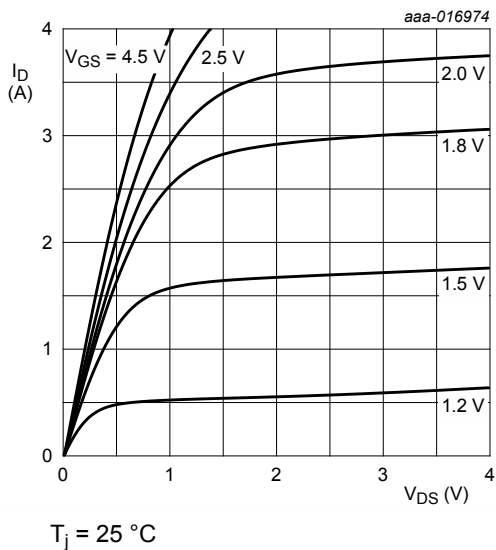


Fig. 7. Output characteristics: drain current as a function of drain-source voltage; typical values

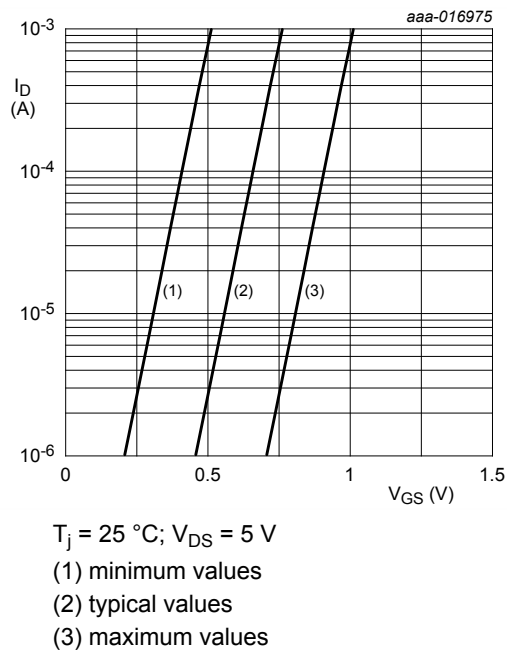


Fig. 8. Sub-threshold drain current as a function of gate-source voltage

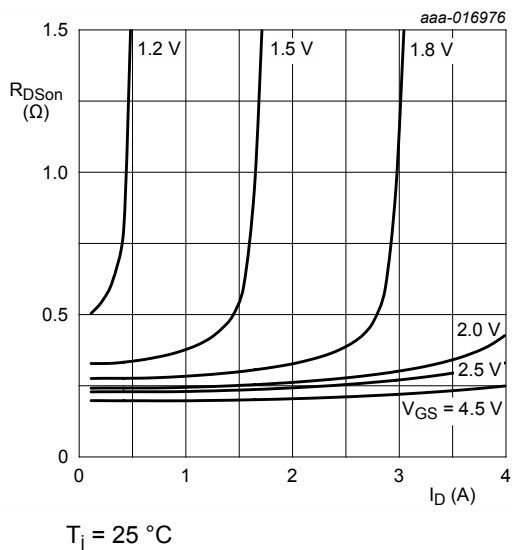


Fig. 9. Drain-source on-state resistance as a function of drain current; typical values

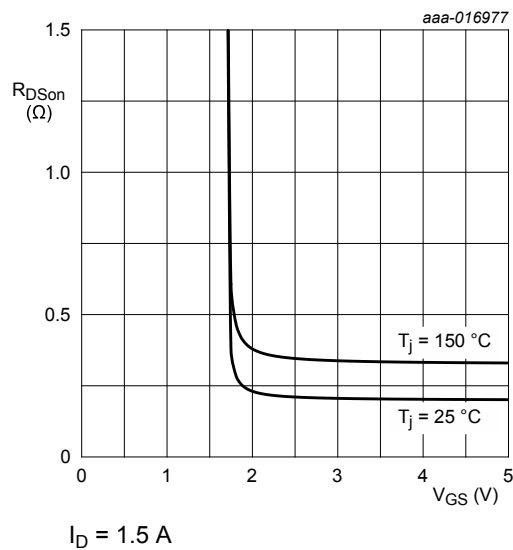


Fig. 10. Drain-source on-state resistance as a function of gate-source voltage; typical values

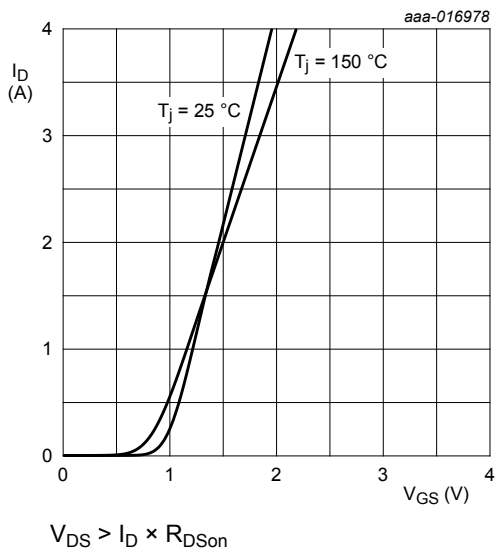


Fig. 11. Transfer characteristics: drain current as a function of gate-source voltage; typical values

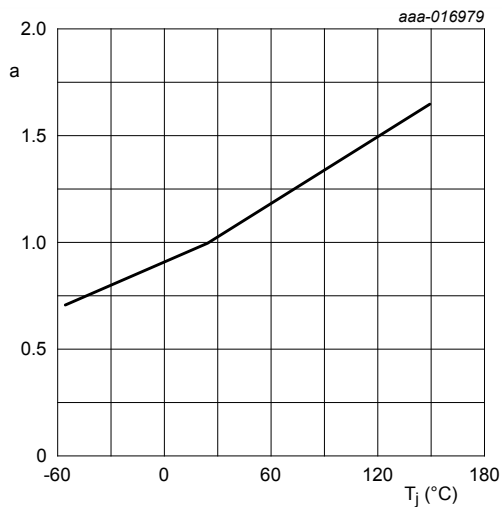
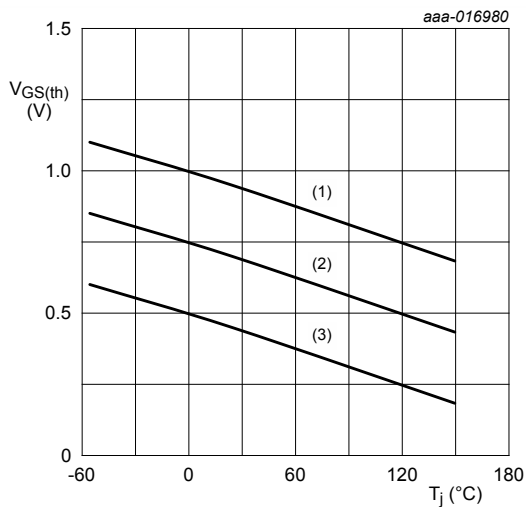


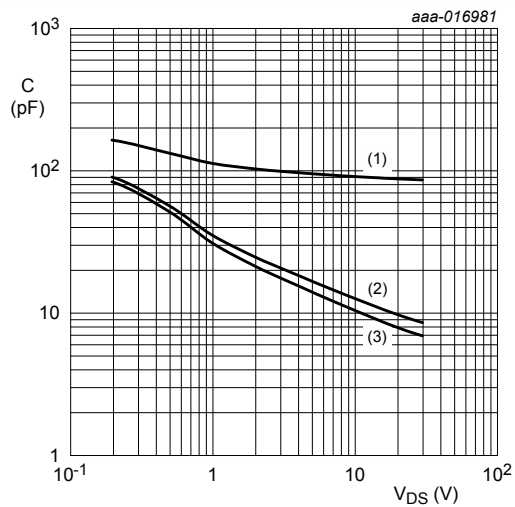
Fig. 12. Normalized drain-source on-state resistance as a function of junction temperature; typical values

$$a = \frac{R_{DSon}}{R_{DSon(25^{\circ}\text{C})}}$$



$I_D = 0.25\text{ mA}$ ;  $V_{DS} = V_{GS}$   
(1) maximum values  
(2) typical values  
(3) minimum values

Fig. 13. Gate-source threshold voltage as a function of junction temperature



$f = 1\text{ MHz}$ ;  $V_{GS} = 0\text{ V}$   
(1)  $C_{iss}$   
(2)  $C_{oss}$   
(3)  $C_{rss}$

Fig. 14. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values

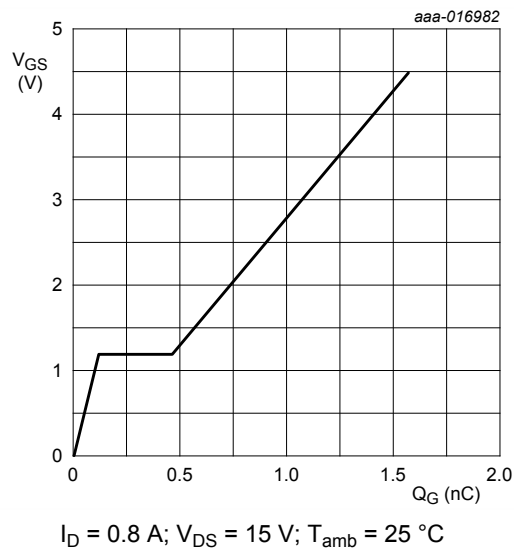


Fig. 15. Gate-source voltage as a function of gate charge; typical values

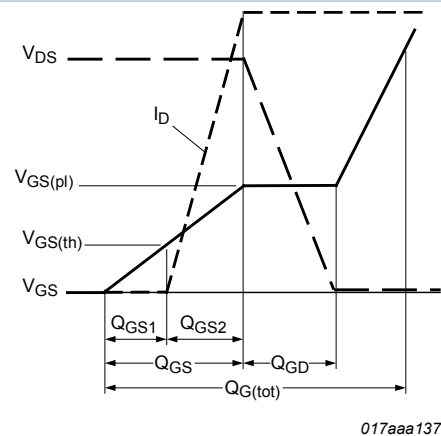


Fig. 16. MOSFET transistor: Gate charge waveform definitions

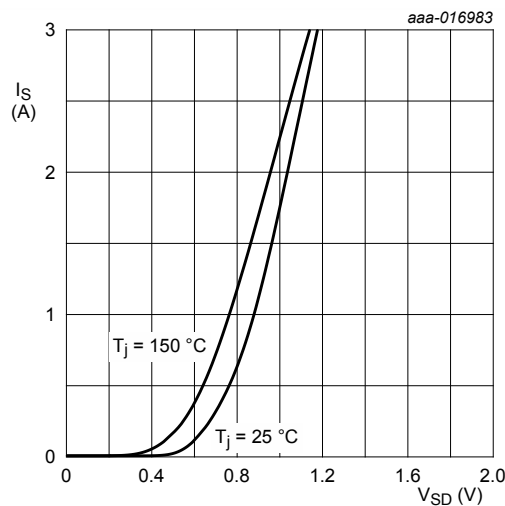


Fig. 17. Source current as a function of source-drain voltage; typical values

11. Test information

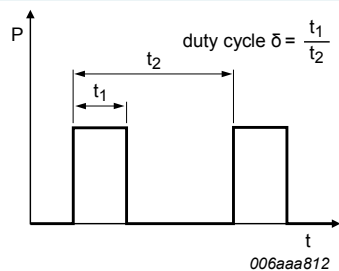
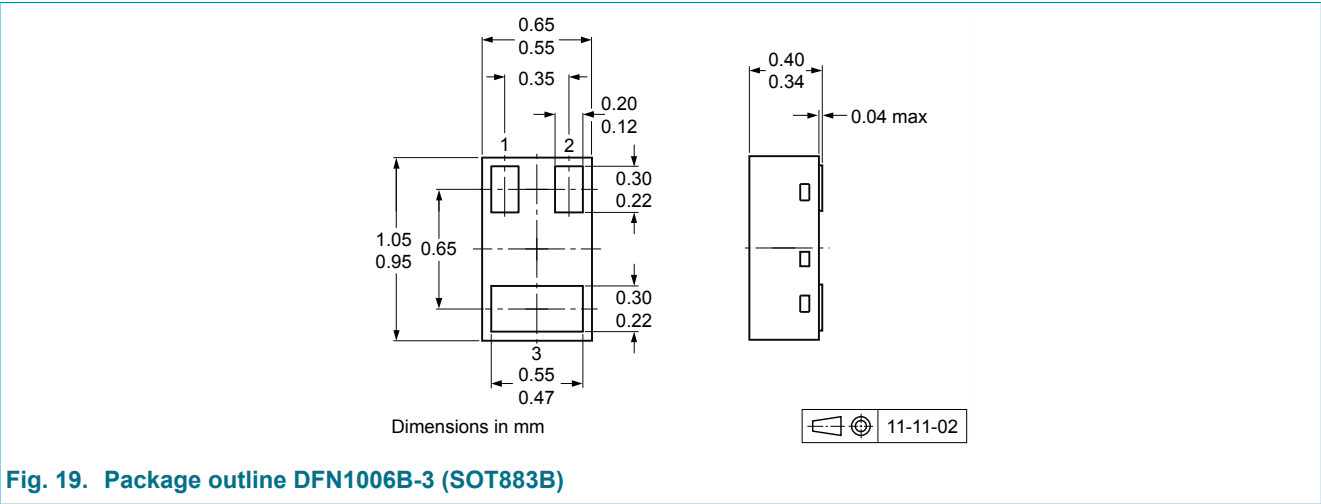
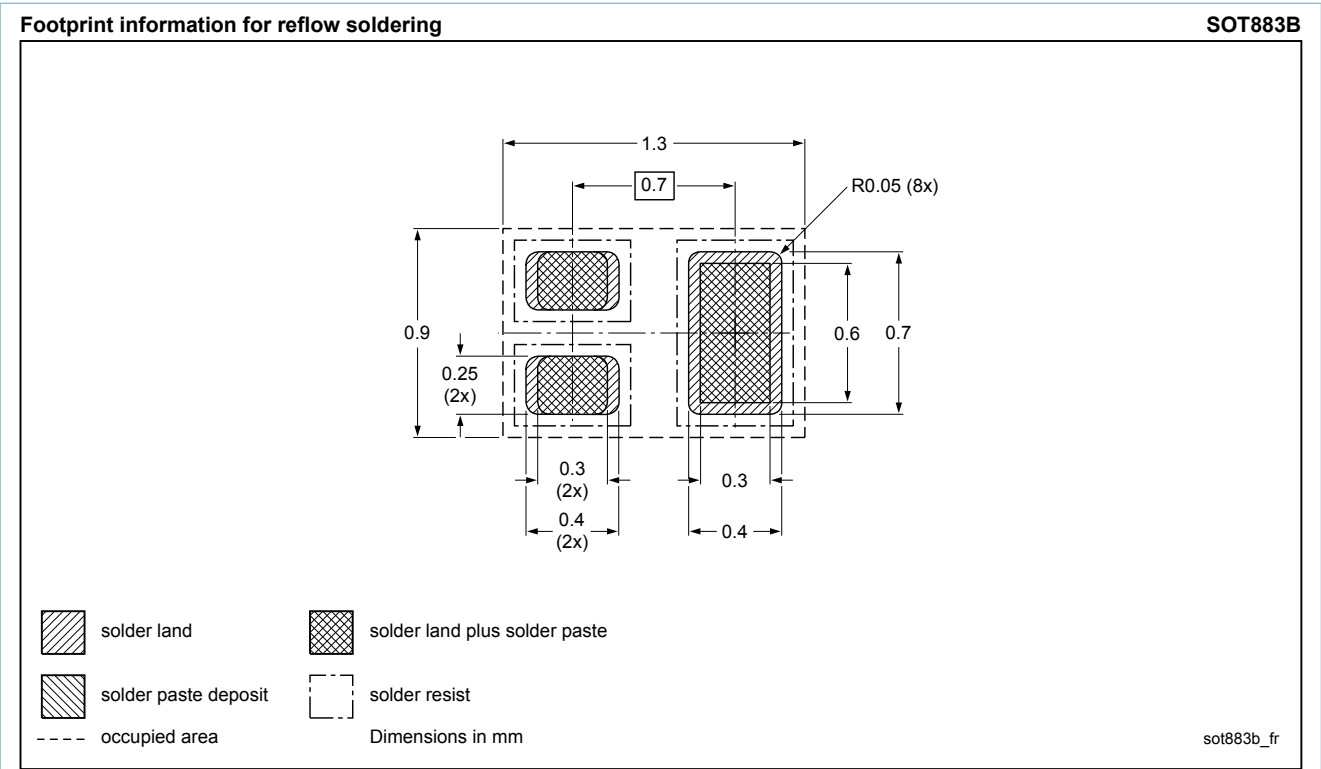


Fig. 18. Duty cycle definition

12. Package outline



13. Soldering



14. Revision history

Table 8. Revision history

| Data sheet ID  | Release date | Data sheet status  | Change notice | Supersedes |
|----------------|--------------|--------------------|---------------|------------|
| PMZB200UNE v.1 | 20150312     | Product data sheet | -             | -          |

## 15. Legal information

### 15.1 Data sheet status

| Document status [1][2]         | Product status [3] | Definition                                                                            |
|--------------------------------|--------------------|---------------------------------------------------------------------------------------|
| Objective [short] data sheet   | Development        | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification      | This document contains data from the preliminary specification.                       |
| Product [short] data sheet     | Production         | This document contains the product specification.                                     |

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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