

# ANTREX Electronics

## Electronic Components Sourcing Information

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### Product Reference Information

|                      |                           |
|----------------------|---------------------------|
| <b>Part Number:</b>  | PMH550UNEH                |
| <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.



# PMH550UNE

30 V, N-channel Trench MOSFET

6 February 2023

Product data sheet

## 1. General description

N-channel enhancement mode Field-Effect Transistor (FET) in a leadless ultra small DFN0606-3 (SOT8001) Surface-Mounted Device (SMD) plastic package using Trench MOSFET technology.

## 2. Features and benefits

- Low threshold voltage
- Very fast switching
- Trench MOSFET technology
- ElectroStatic Discharge (ESD) protection > 2 kV HBM
- Leadless ultra small and ultra thin SMD plastic package: 0.62 x 0.62 x 0.37 mm

## 3. Applications

- Relay driver
- High-speed line driver
- Low-side load switch
- Switching circuits

## 4. Quick reference data

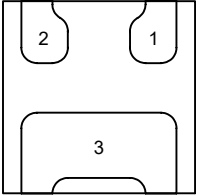
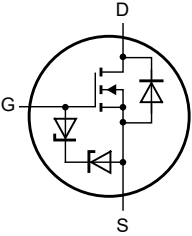
Table 1. Quick reference data

| Symbol                        | Parameter                        | Conditions                                                       |     | Min | Typ | Max | Unit |
|-------------------------------|----------------------------------|------------------------------------------------------------------|-----|-----|-----|-----|------|
| $V_{DS}$                      | drain-source voltage             | $T_j = 25\text{ °C}$                                             |     | -   | -   | 30  | V    |
| $V_{GS}$                      | gate-source voltage              |                                                                  |     | -8  | -   | 8   | V    |
| $I_D$                         | drain current                    | $V_{GS} = 4.5\text{ V}; T_{amb} = 25\text{ °C}$                  | [1] | -   | -   | 770 | mA   |
| <b>Static characteristics</b> |                                  |                                                                  |     |     |     |     |      |
| $R_{DS(on)}$                  | drain-source on-state resistance | $V_{GS} = 4.5\text{ V}; I_D = 770\text{ mA}; T_j = 25\text{ °C}$ |     | -   | 550 | 670 | mΩ   |

[1] Device mounted on an FR4 Printed-Circuit Board (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        | <br>Transparent top view<br><b>DFN0606-3 (SOT8001)</b> | <br>017aaa255 |
| 2   | S      | source      |                                                                                                                                         |                                                                                                  |
| 3   | D      | drain       |                                                                                                                                         |                                                                                                  |

6. Ordering information

Table 3. Ordering information

| Type number | Package   |                                                                                |         |
|-------------|-----------|--------------------------------------------------------------------------------|---------|
|             | Name      | Description                                                                    | Version |
| PMH550UNE   | DFN0606-3 | plastic, leadless ultra small package; 3 terminals; body 0.62 x 0.62 x 0.37 mm | SOT8001 |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| PMH550UNE   | 0001 0010    |

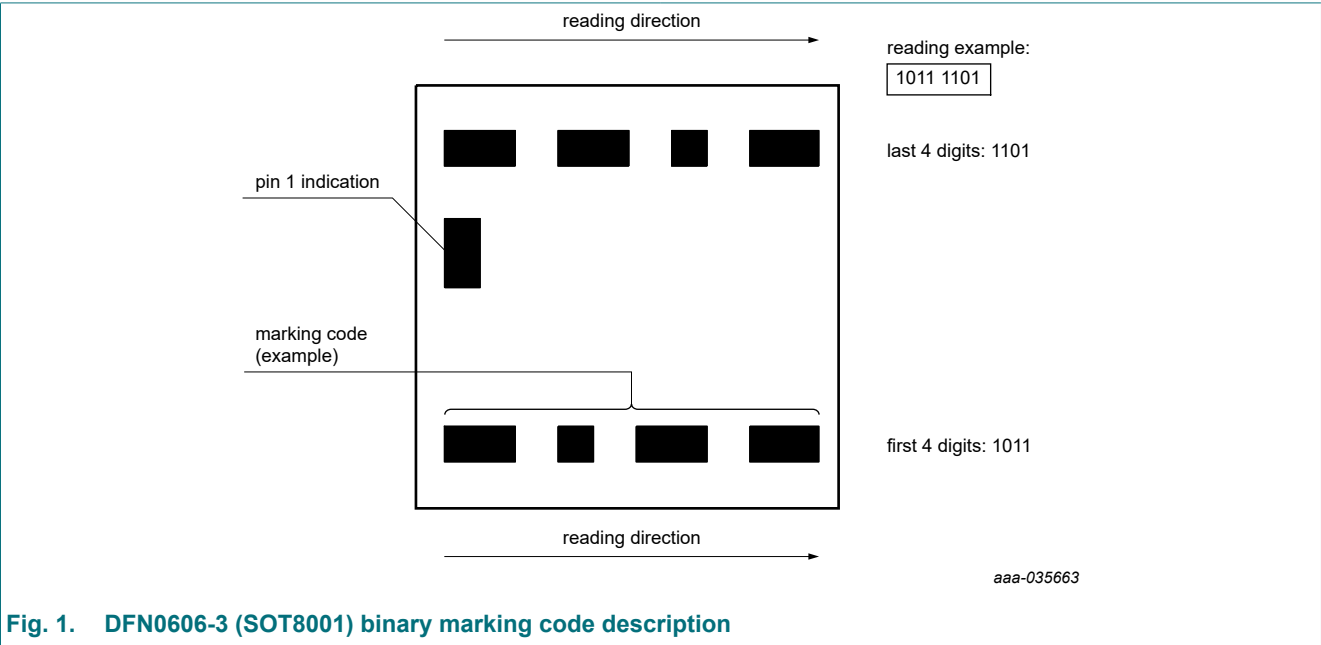


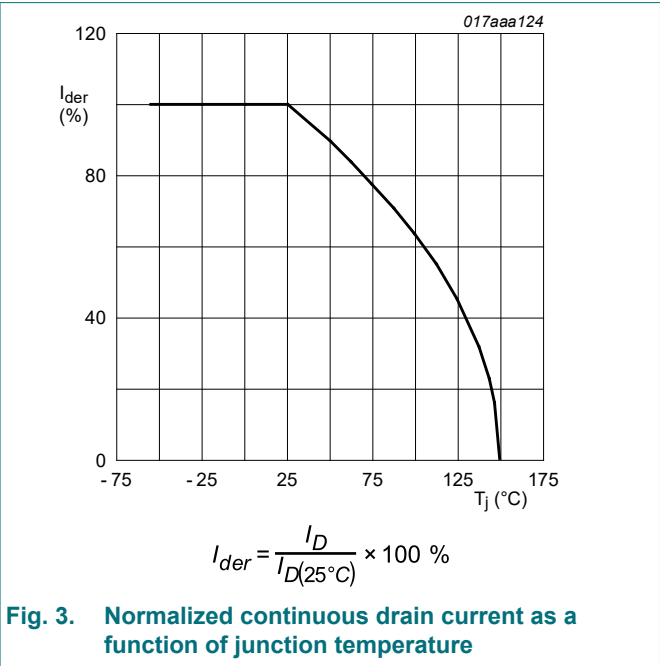
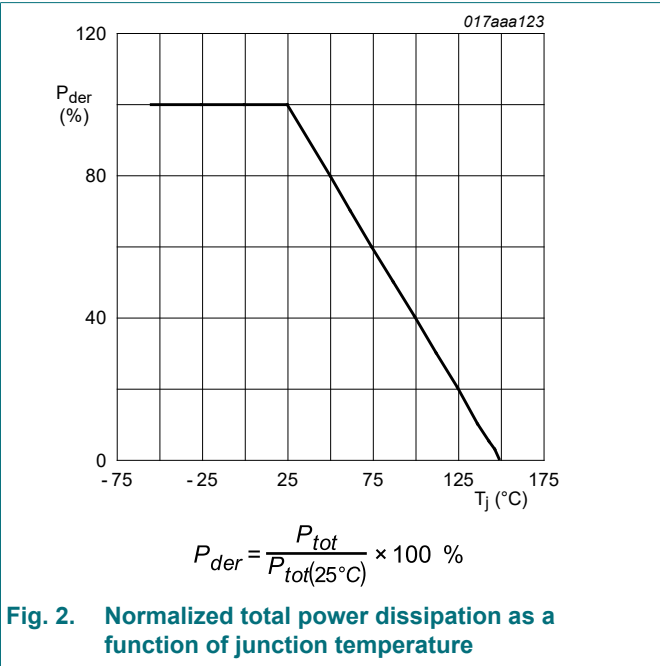
Fig. 1. DFN0606-3 (SOT8001) binary marking code description

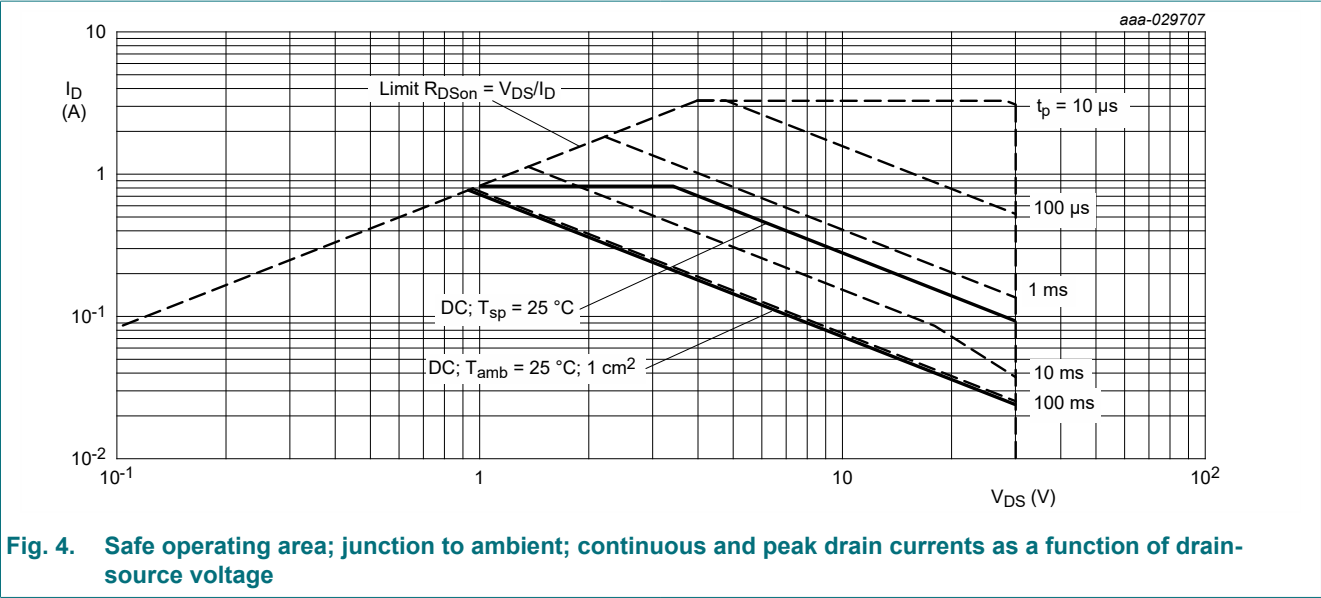
8. Limiting values

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] | -   | 770 | mA   |
|                    |                         | V <sub>GS</sub> = 4.5 V; T <sub>amb</sub> = 100 °C             | [1] | -   | 485 | mA   |
| I <sub>DM</sub>    | peak drain current      | T <sub>amb</sub> = 25 °C; single pulse; t <sub>p</sub> ≤ 10 μs |     | -   | 3   | A    |
| P <sub>tot</sub>   | total power dissipation | T <sub>amb</sub> = 25 °C                                       | [2] | -   | 380 | mW   |
|                    |                         |                                                                | [1] | -   | 710 | mW   |
|                    |                         | T <sub>sp</sub> = 25 °C                                        |     | -   | 2.8 | W    |
| 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] | -   | 680 | mA   |

- [1] Device mounted on an FR4 Printed-Circuit Board (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] | -   | 285 | 330 | K/W  |
|                |                                                  |             | [2] | -   | 150 | 175 | K/W  |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point |             |     | -   | 38  | 45  | 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 cm<sup>2</sup>.

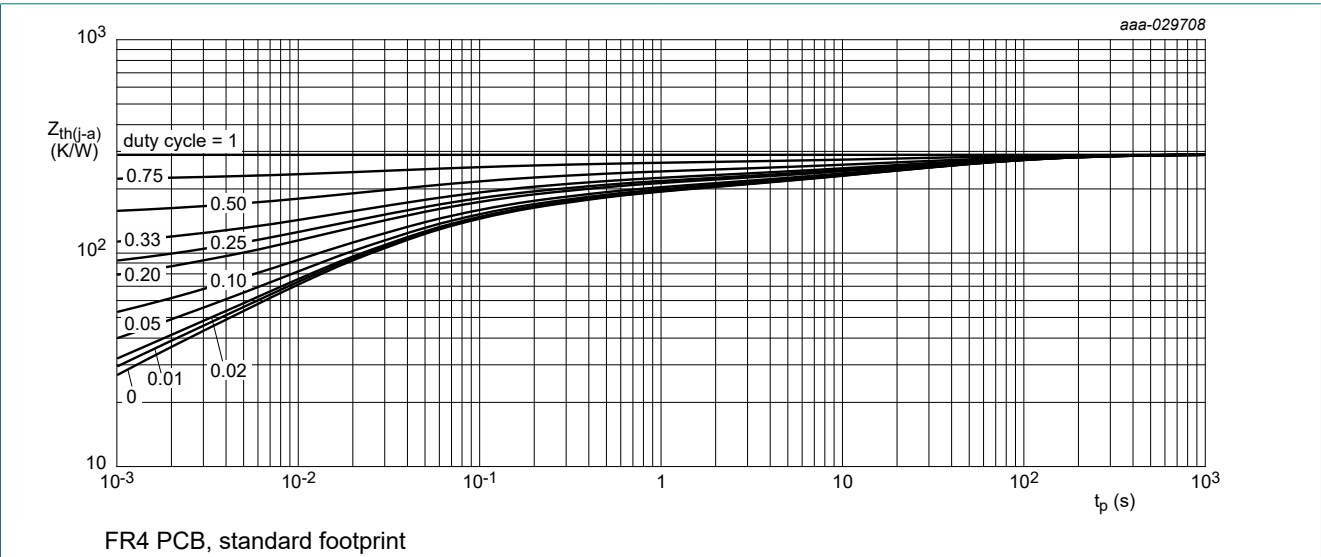


Fig. 5. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

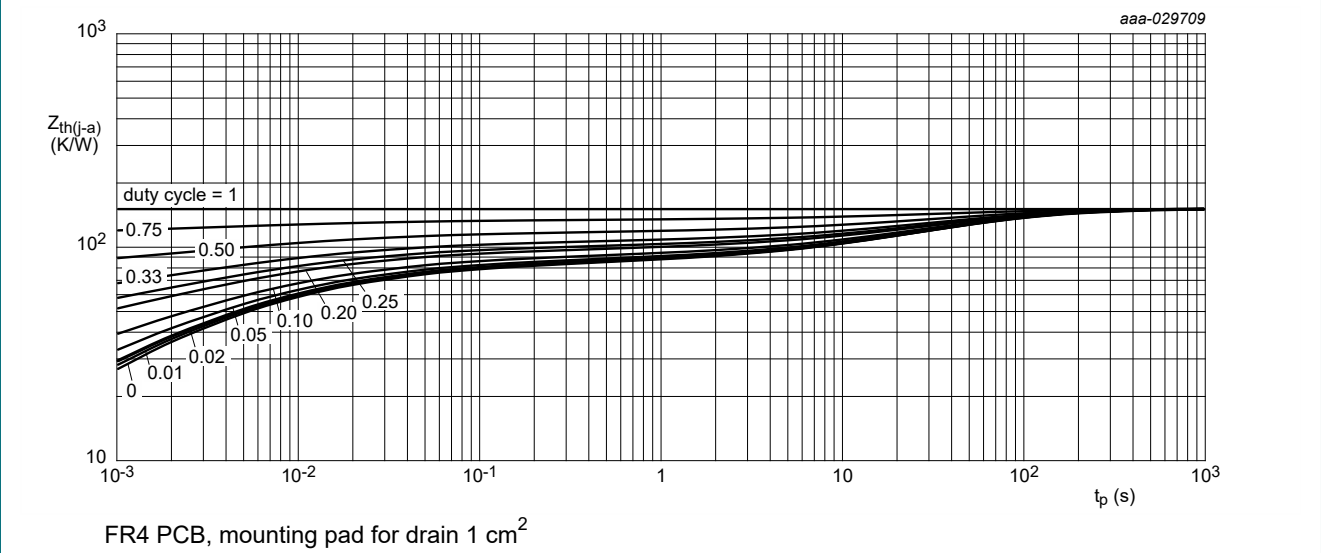


Fig. 6. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

## 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> = 770 mA; T <sub>j</sub> = 25 °C                                                  |  | -    | 550  | 670  | mΩ   |
|                         |                                  | V <sub>GS</sub> = 4.5 V; I <sub>D</sub> = 770 mA; T <sub>j</sub> = 150 °C                                                 |  | -    | 990  | 1200 | mΩ   |
|                         |                                  | V <sub>GS</sub> = 2.5 V; I <sub>D</sub> = 770 mA; T <sub>j</sub> = 25 °C                                                  |  | -    | 660  | 900  | mΩ   |
|                         |                                  | V <sub>GS</sub> = 1.8 V; I <sub>D</sub> = 80 mA; T <sub>j</sub> = 25 °C                                                   |  | -    | 770  | 1120 | mΩ   |
|                         |                                  | V <sub>GS</sub> = 1.5 V; I <sub>D</sub> = 10 mA; T <sub>j</sub> = 25 °C                                                   |  | -    | 890  | 1500 | mΩ   |
| g <sub>fs</sub>         | forward transconductance         | V <sub>DS</sub> = 10 V; I <sub>D</sub> = 770 mA; T <sub>j</sub> = 25 °C                                                   |  | -    | 2.2  | -    | S    |
| R <sub>G</sub>          | gate resistance                  | f = 1 MHz                                                                                                                 |  | -    | 19   | -    | Ω    |
| Dynamic characteristics |                                  |                                                                                                                           |  |      |      |      |      |
| Q <sub>G(tot)</sub>     | total gate charge                | V <sub>DS</sub> = 15 V; I <sub>D</sub> = 770 mA; V <sub>GS</sub> = 4 V; T <sub>j</sub> = 25 °C                            |  | -    | 0.38 | 0.4  | nC   |
| Q <sub>GS</sub>         | gate-source charge               |                                                                                                                           |  | -    | 0.1  | -    | nC   |
| Q <sub>GD</sub>         | gate-drain charge                |                                                                                                                           |  | -    | 0.1  | -    | 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                                          |  | -    | 30.3 | -    | pF   |
| C <sub>oss</sub>        | output capacitance               |                                                                                                                           |  | -    | 5.1  | -    | pF   |
| C <sub>rss</sub>        | reverse transfer capacitance     |                                                                                                                           |  | -    | 3.7  | -    | pF   |
| t <sub>d(on)</sub>      | turn-on delay time               | V <sub>DS</sub> = 15 V; I <sub>D</sub> = 770 mA; V <sub>GS</sub> = 4 V; R <sub>G(ext)</sub> = 6 Ω; T <sub>j</sub> = 25 °C |  | -    | 1    | -    | ns   |
| t <sub>r</sub>          | rise time                        |                                                                                                                           |  | -    | 2    | -    | ns   |
| t <sub>d(off)</sub>     | turn-off delay time              |                                                                                                                           |  | -    | 4    | -    | ns   |
| t <sub>f</sub>          | fall time                        |                                                                                                                           |  | -    | 2    | -    | ns   |
| Source-drain diode      |                                  |                                                                                                                           |  |      |      |      |      |
| V <sub>SD</sub>         | source-drain voltage             | I <sub>S</sub> = 680 mA; V <sub>GS</sub> = 0 V; T <sub>j</sub> = 25 °C                                                    |  | -    | 0.9  | 1.2  | V    |

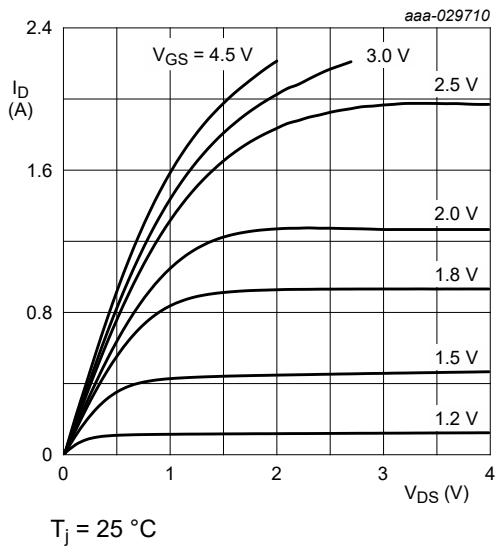


Fig. 7. Output characteristics: drain current as a function of drain-source voltage; typical values

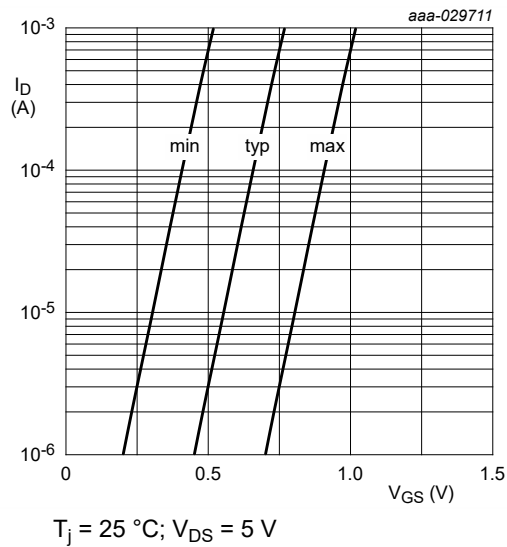


Fig. 8. Sub-threshold drain current as a function of gate-source voltage

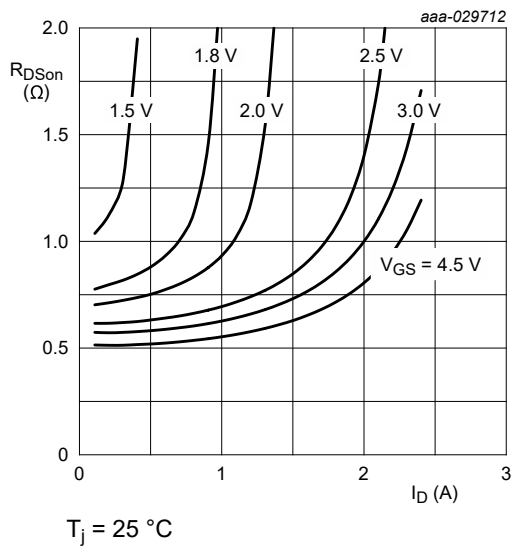


Fig. 9. Drain-source on-state resistance as a function of drain current; typical values

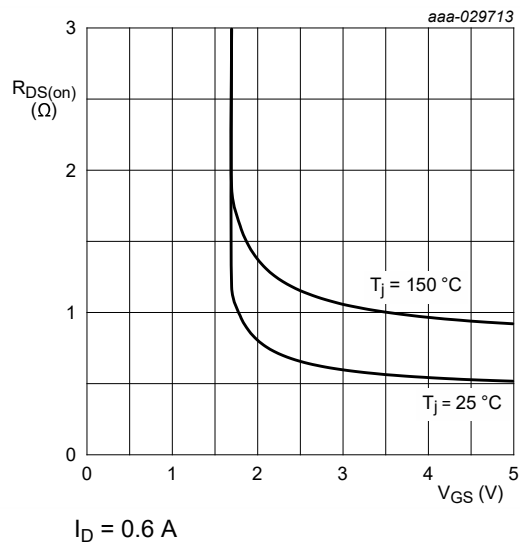


Fig. 10. Drain-source on-state resistance as a function of gate-source voltage; typical values

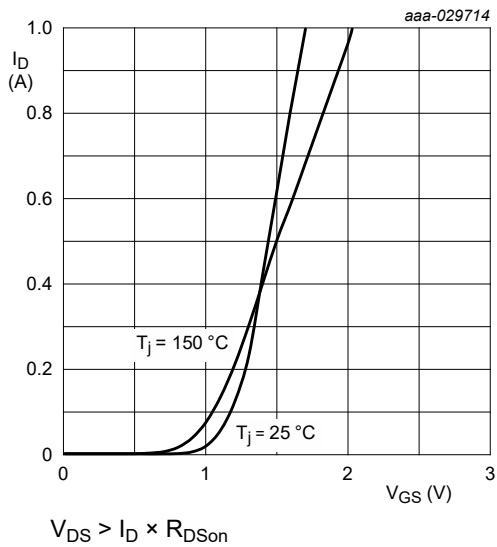


Fig. 11. Transfer characteristics: drain current as a function of gate-source voltage; typical values

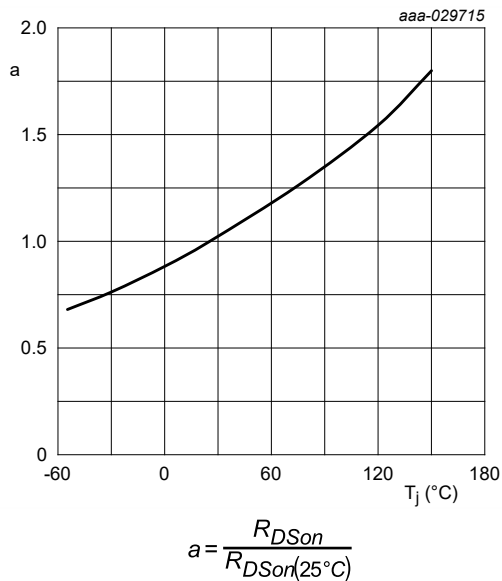


Fig. 12. Normalized drain-source on-state resistance as a function of junction temperature; typical values

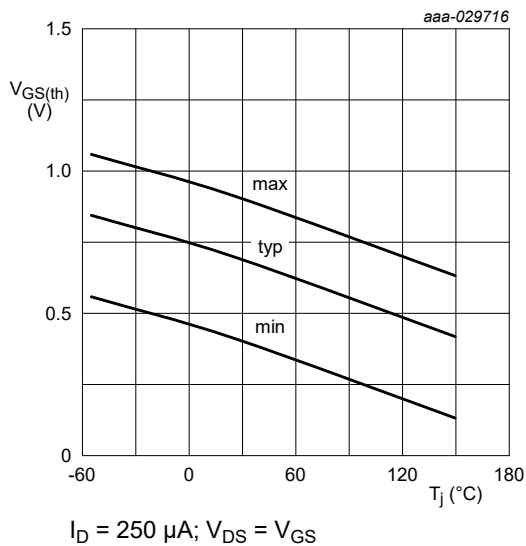


Fig. 13. Gate-source threshold voltage as a function of junction temperature

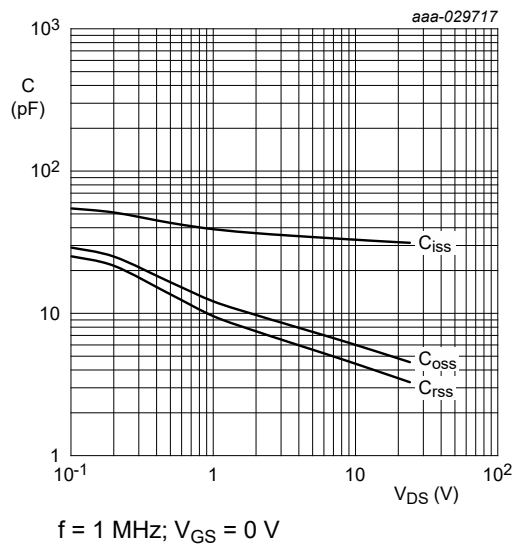


Fig. 14. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values

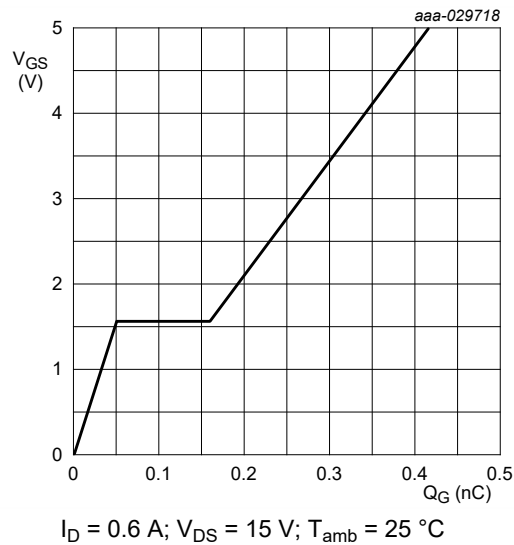


Fig. 15. Gate-source voltage as a function of gate charge; typical values

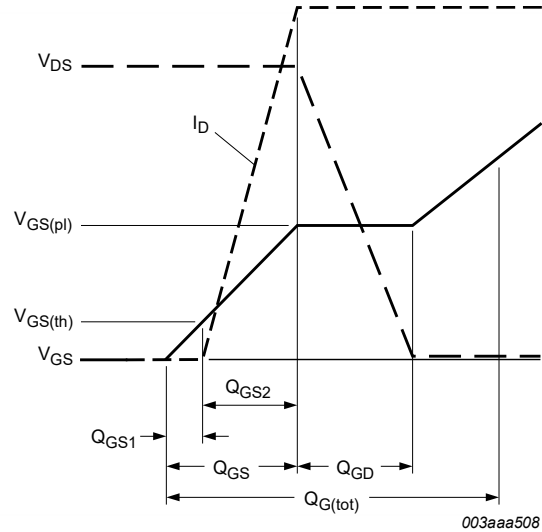


Fig. 16. Gate charge waveform definitions

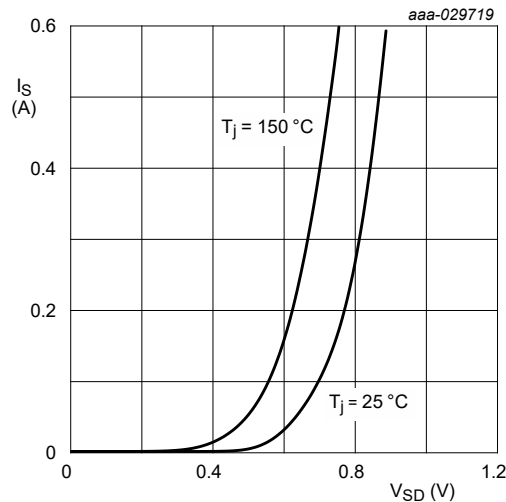


Fig. 17. Source current as a function of source-drain voltage; typical values

11. Test information

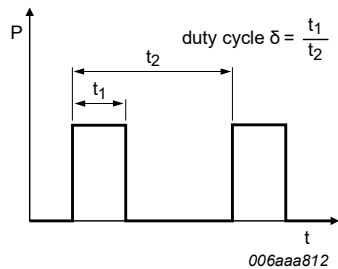
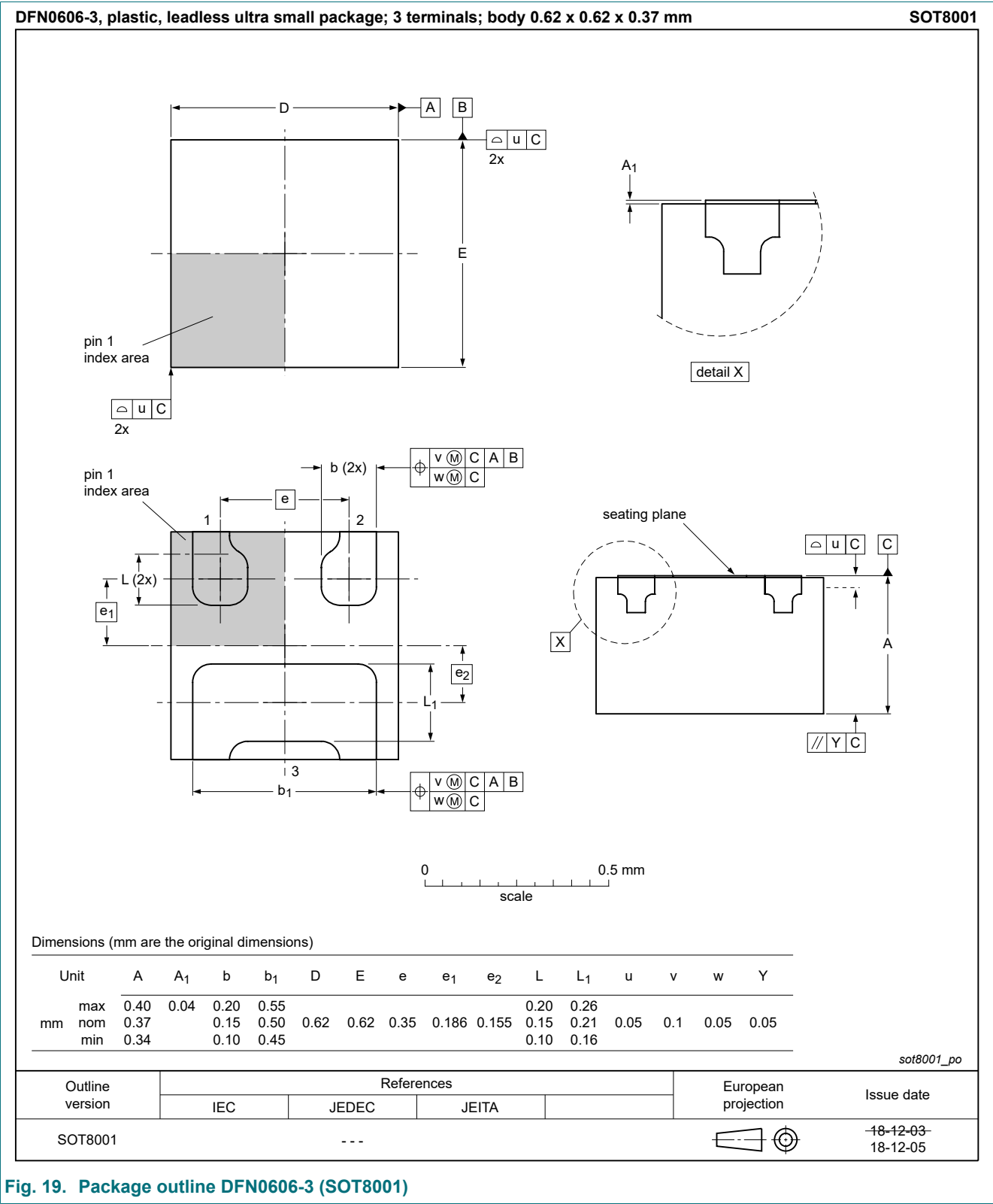
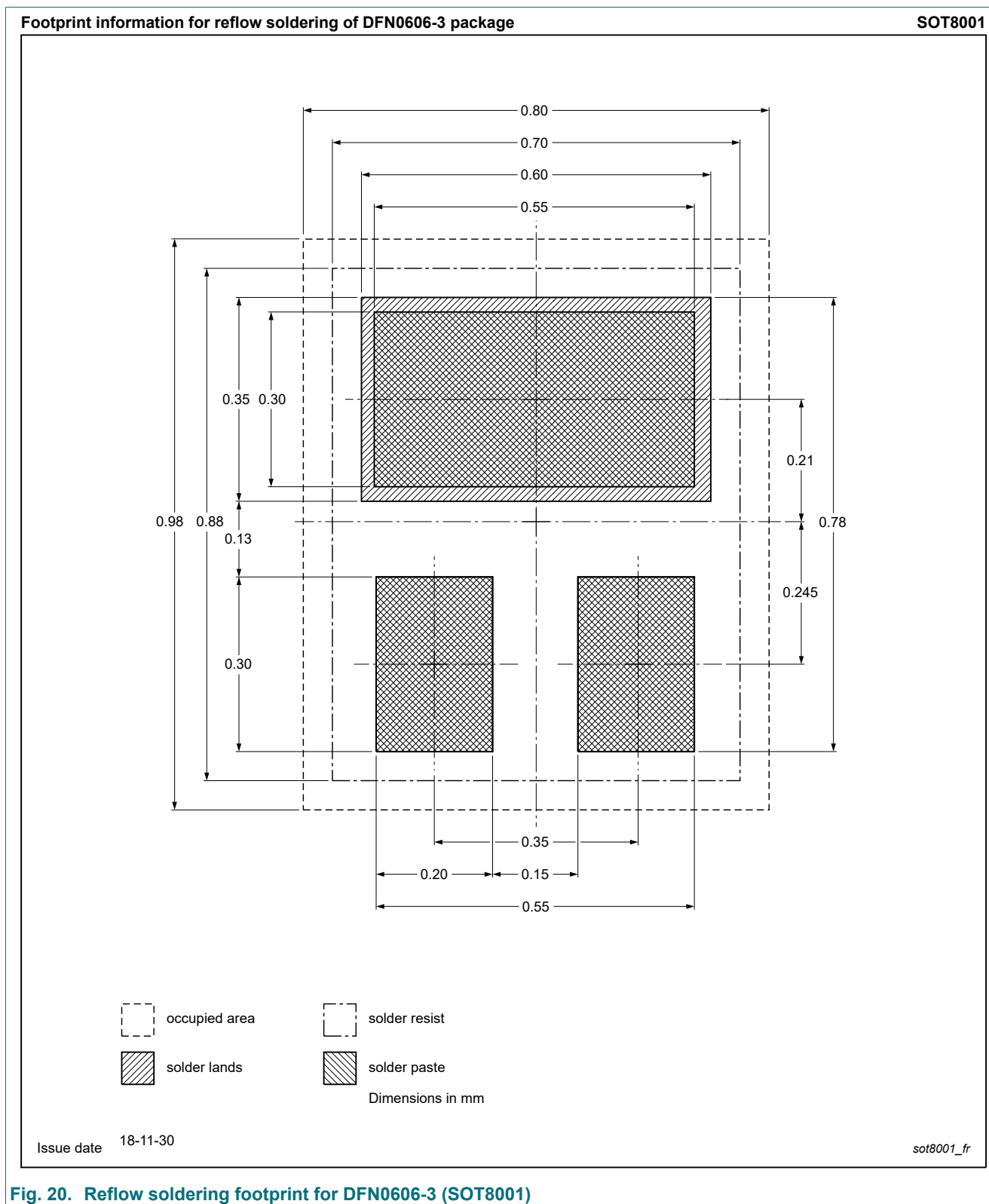


Fig. 18. Duty cycle definition

12. Package outline



## 13. Soldering



**Fig. 20. Reflow soldering footprint for DFN0606-3 (SOT8001)**

14. Revision history

Table 8. Revision history

| Data sheet ID  | Release date                                                                           | Data sheet status  | Change notice | Supersedes    |
|----------------|----------------------------------------------------------------------------------------|--------------------|---------------|---------------|
| PMH550UNE v.2  | 20230206                                                                               | Product data sheet | -             | PMH550UNE v.1 |
| Modifications: | <ul style="list-style-type: none"><li>Fig. 1, clarifying the reading example</li></ul> |                    |               |               |
| PMH550UNE v.1  | 20190308                                                                               | Product data sheet | -             | -             |

## 15. Legal information

### Data sheet status

| Document status<br>[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.
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Date of release: 6 February 2023