



# PMBFJ111; PMBFJ112; PMBFJ113

N-channel junction FETs

Rev. 4 — 20 September 2011

Product data sheet

## 1. Product profile

### 1.1 General description

Symmetrical N-channel junction FETs in a SOT23 package.

### 1.2 Features and benefits

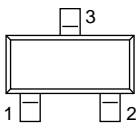

- High-speed switching
- Interchangeability of drain and source connections
- Low  $R_{DSon}$  at zero gate voltage ( $< 30 \Omega$  for PMBFJ111).

### 1.3 Applications

- Analog switches
- Choppers
- Commutators
- Multiplexers
- Thin and thick film hybrids.

## 2. Pinning information

Table 1. Pinning

| Pin | Description <sup>[1]</sup> | Simplified outline  | Symbol  |
|-----|----------------------------|---|---|
| 1   | drain                      |  |  |
| 2   | source                     |   |   |
| 3   | gate                       |   |   |

[1] Drain and source are interchangeable.

### 3. Ordering information

Table 2. Ordering information

| Type number | Package |  |         |
|-------------|---------|--|---------|
|             | Name    | Description                              | Version |
| PMBFJ111    | -       | plastic surface mounted package; 3 leads | SOT23   |
| PMBFJ112    |         |  |         |
| PMBFJ113    |         |  |         |

### 4. Marking

Table 3. Marking

| Type number | Marking code <sup>[1]</sup> |
|-------------|-----------------------------|
| PMBFJ111    | 41*                         |
| PMBFJ112    | 42*                         |
| PMBFJ113    | 47*                         |

[1] \* = p: Made in Hong Kong

\* = t: Made in Malaysia

\* = W: Made in China

### 5. Limiting values

Table 4. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol    | Parameter                 | Conditions               | Min | Max  | Unit |
|-----------|---------------------------|--------------------------|-----|------|------|
| $V_{DS}$  | drain-source voltage (DC) |                          | -   | ±40  | V    |
| $V_{GSO}$ | gate-source voltage       |                          | -   | -40  | V    |
| $V_{GDO}$ | gate-drain voltage        |                          | -   | -40  | V    |
| $I_G$     | forward gate current (DC) |                          | -   | 50   | mA   |
| $P_{tot}$ | total power dissipation   | $T_{amb} = 25\text{ °C}$ | [1] | 300  | mW   |
| $T_{stg}$ | storage temperature       |                          | -65 | +150 | °C   |
| $T_j$     | junction temperature      |                          | -   | 150  | °C   |

[1] Mounted on a ceramic substrate, 8 mm × 10 mm × 0.7 mm.

### 6. Thermal characteristics

Table 5. Thermal characteristics

$$T_j = P (R_{th(j-t)} + R_{th(t-s)} + R_{th(s-a)}) + T_{amb}$$

| Symbol        | Parameter                                   | Conditions | Typ     | Unit |
|---------------|---|------------|---------|------|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient |            | [1] 430 | K/W  |
|               | thermal resistance from junction to ambient |            | [2] 500 | K/W  |

[1] Mounted on a ceramic substrate, 8 mm × 10 mm × 0.7 mm.

[2] Mounted on printed circuit board.

## 7. Static characteristics

**Table 6. Static characteristics**

$T_j = 25\text{ °C}$ .

| Symbol        | Parameter                        | Conditions   | Min | Typ | Max  | Unit     |
|---------------|----------------------------------|--|-----|-----|------|----------|
| $I_{GSS}$     | gate-source leakage current      | $V_{GS} = -15\text{ V}; V_{DS} = 0\text{ V}$       | -   | -   | -1   | nA       |
| $I_{DSS}$     | drain-source leakage current     |  |     |     |      |          |
|               | PMBFJ111                         | $V_{GS} = 0\text{ V}; V_{DS} = 15\text{ V}$        | 20  | -   | -    | mA       |
|               | PMBFJ112                         | $V_{GS} = 0\text{ V}; V_{DS} = 15\text{ V}$        | 5   | -   | -    | mA       |
|               | PMBFJ113                         | $V_{GS} = 0\text{ V}; V_{DS} = 15\text{ V}$        | 2   | -   | -    | mA       |
| $V_{(BR)GSS}$ | gate-source breakdown voltage    | $I_G = -1\text{ }\mu\text{A}; V_{DS} = 0\text{ V}$ | -40 | -   | -    | V        |
| $V_{GSoff}$   | gate-source cut-off voltage      |  |     |     |      |          |
|               | PMBFJ111                         | $I_D = 1\text{ }\mu\text{A}; V_{DS} = 5\text{ V}$  | -10 | -   | -3   | V        |
|               | PMBFJ112                         | $I_D = 1\text{ }\mu\text{A}; V_{DS} = 5\text{ V}$  | -5  | -   | -1   | V        |
|               | PMBFJ113                         | $I_D = 1\text{ }\mu\text{A}; V_{DS} = 5\text{ V}$  | -3  | -   | -0.5 | V        |
| $R_{DSon}$    | drain-source on-state resistance |  |     |     |      |          |
|               | PMBFJ111                         | $V_{GS} = 0\text{ V}; V_{DS} = 0.1\text{ V}$       | -   | -   | 30   | $\Omega$ |
|               | PMBFJ112                         | $V_{GS} = 0\text{ V}; V_{DS} = 0.1\text{ V}$       | -   | -   | 50   | $\Omega$ |
|               | PMBFJ113                         | $V_{GS} = 0\text{ V}; V_{DS} = 0.1\text{ V}$       | -   | -   | 100  | $\Omega$ |

## 8. Dynamic characteristics

**Table 7. Dynamic characteristics**

| Symbol   | Parameter            | Conditions   | Min | Typ | Max | Unit |
|--|----------------------|--|-----|-----|-----|------|
| $C_{iss}$  | input capacitance    | $V_{DS} = 0\text{ V}; V_{GS} = -10\text{ V}; f = 1\text{ MHz}$                       | -   | 6   | -   | pF   |
|  |                      | $V_{DS} = 0\text{ V}; V_{GS} = 0\text{ V}; f = 1\text{ MHz}; T_{amb} = 25\text{ °C}$ | -   | 22  | 28  | pF   |
| $C_{rss}$  | feedback capacitance |  | -   | 3   | -   | pF   |
| <b>Switching times; see <a href="#">Figure 2</a></b> |                      |  |     |     |     |      |
| $t_r$  | rise time            |  | [1] | 6   | -   | ns   |
| $t_{on}$   | turn-on time         |  | [1] | 13  | -   | ns   |
| $t_f$  | fall time            |  | [1] | 15  | -   | ns   |
| $t_{off}$  | turn-off time        |  | [1] | 35  | -   | ns   |

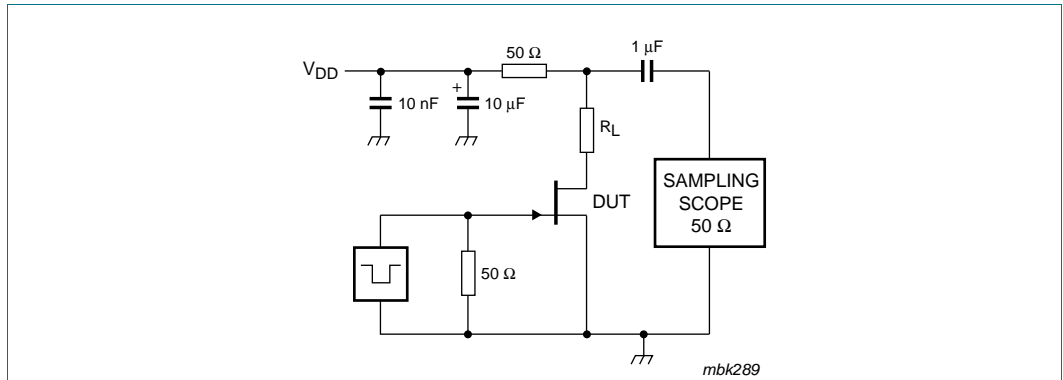
[1] Test conditions for switching times are as follows:

$V_{DD} = 10\text{ V}, V_{GS} = 0\text{ V}$  to  $V_{GSoff}$  (all types);

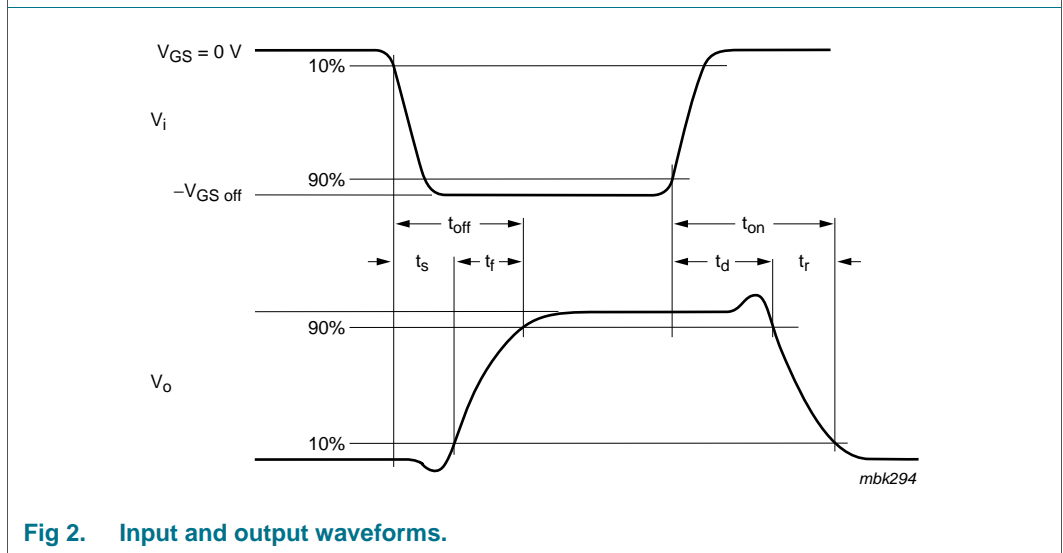
$V_{GSoff} = -12\text{ V}, R_L = 750\text{ }\Omega$  (PMBFJ111);

$V_{GSoff} = -7\text{ V}, R_L = 1550\text{ }\Omega$  (PMBFJ112);

$V_{GSoff} = -5\text{ V}, R_L = 3150\text{ }\Omega$  (PMBFJ113).



**Fig 1. Switching circuit.**



**Fig 2. Input and output waveforms.**

9. Package outline

Plastic surface-mounted package; 3 leads

SOT23

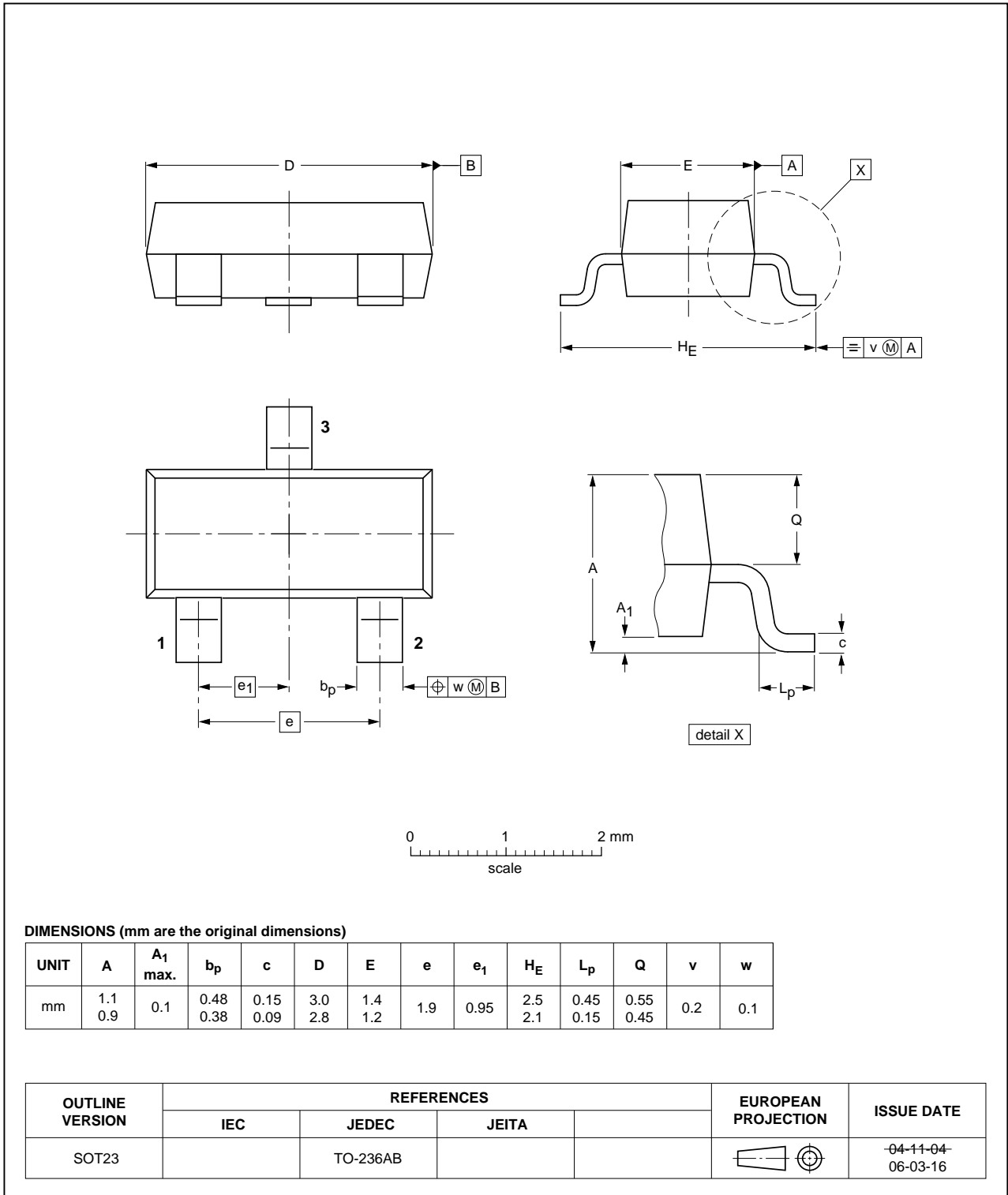


Fig 3. Package outline.

## 10. Revision history

Table 8. Revision history

| Document ID                              | Release date | Data sheet status  | Change notice | Supersedes               |
|--|--------------|--|---------------|--------------------------|
| PMBFJ111_112_113 v.4                     | 20110920     | Product data sheet   | -             | PMBFJ111_112_113 v.3     |
| Modifications:                           |              | <ul style="list-style-type: none"><li>• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li><li>• Package outline drawings have been updated to the latest version.</li></ul> |               |                          |
| PMBFJ111_112_113 v.3<br>(9397 750 13402) | 20040804     | Product data sheet   | -             | PMBFJ111_112_113_CNV v.2 |
| PMBFJ111_112_113_CNV v.2                 | 19971201     | Product specification  | -             | -                        |

## 11. Legal information

### 11.1 Data sheet status

| Document status <sup>[1][2]</sup> | Product status <sup>[3]</sup> | 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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