



# 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

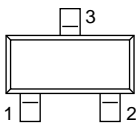

- High-speed switching
- Interchangeability of drain and source connections
- Low  $R_{DSon}$  at zero gate voltage ( $< 30 \Omega$  for PMBFJ111).

### 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 |                                          | Version |
|-------------|---------|------------------------------------------|---------|
|             | Name    | Description                              |         |
| 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 Figure 2</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   |

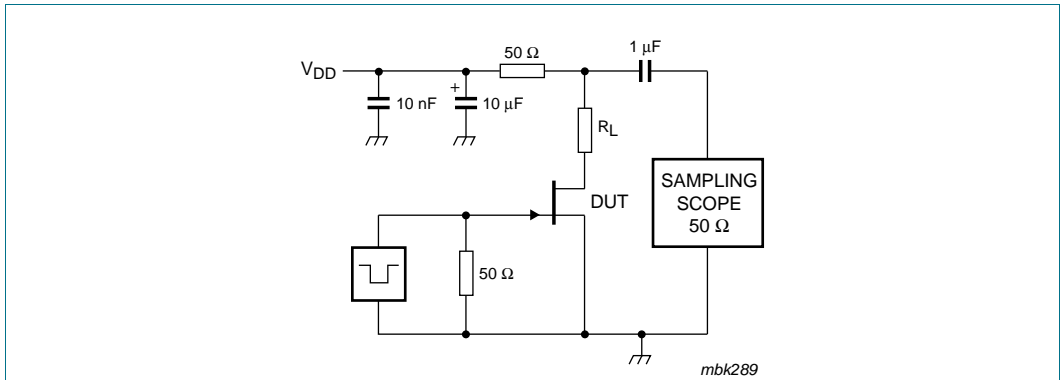
[1] Test conditions for switching times are as follows:

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

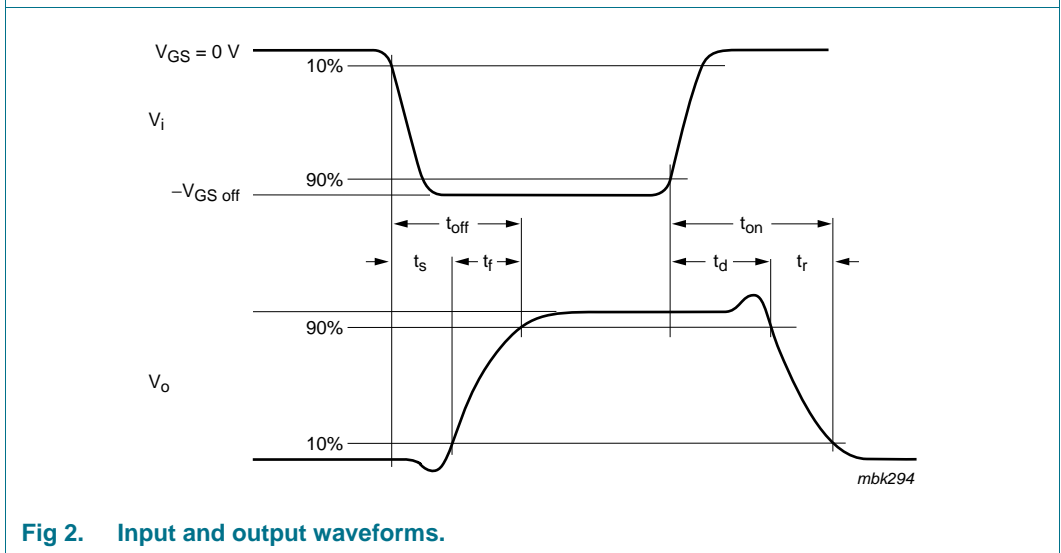
$V_{GSoff} = -12\text{ V}, R_L = 750\text{ }\Omega$  (PMBFJ111);

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

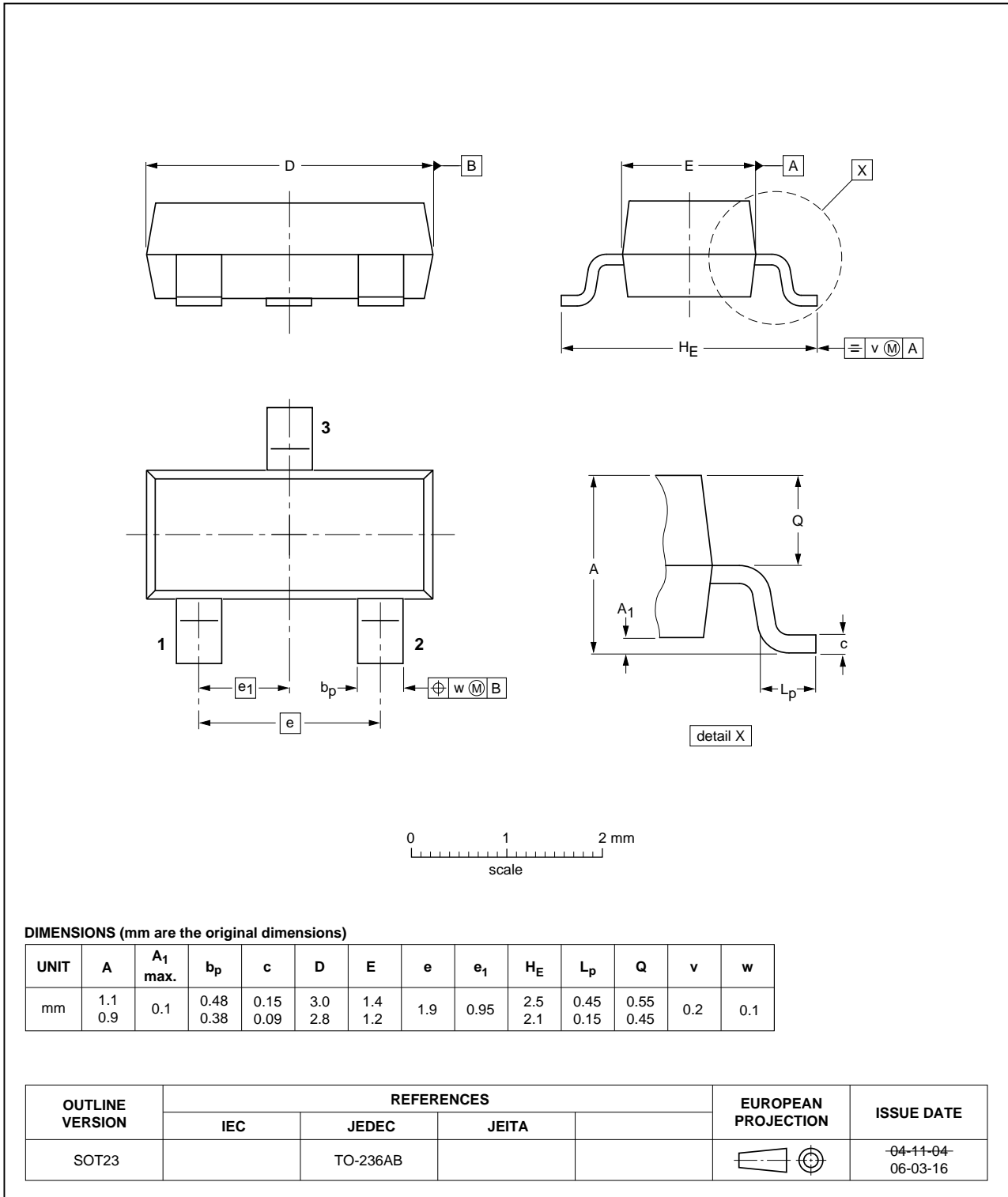


Fig 3. Package outline.

## 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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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