



# PMBFJ108; PMBFJ109; PMBFJ110

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

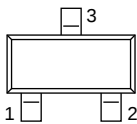
- High-speed switching
- Interchangeability of drain and source connections
- Low  $R_{DS(on)}$  at zero gate voltage ( $< 8 \Omega$  for PMBFJ108).

### 1.3 Applications

- Analog switches
- Choppers and commutators
- Audio amplifiers.

## 2. Pinning information

Table 1. Pinning

| Pin | Description <sup>[1]</sup> | Simplified outline                                                                    | Symbol                                                                                          |
|-----|----------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| 1   | drain                      |  | <br>sym053 |
| 2   | source                     |                                                                                       |                                                                                                 |
| 3   | gate                       |                                                                                       |                                                                                                 |

[1] Drain and source are interchangeable.

### 3. Ordering information

Table 2. Ordering information

| Type number | Package |                                          |         |
|-------------|---------|------------------------------------------|---------|
|             | Name    | Description                              | Version |
| PMBFJ108    | -       | plastic surface mounted package; 3 leads | SOT23   |
| PMBFJ109    |         |                                          |         |
| PMBFJ110    |         |                                          |         |

### 4. Marking

Table 3. Marking

| Type number | Marking code <sup>[1]</sup> |
|-------------|-----------------------------|
| PMBFJ108    | 38*                         |
| PMBFJ109    | 39*                         |
| PMBFJ110    | 40*                         |

[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) |                          | -                | $\pm 25$ | V    |
| $V_{GSO}$ | gate-source voltage       |                          | -                | -25      | V    |
| $V_{GDO}$ | gate-drain voltage        |                          | -                | -25      | V    |
| $I_G$     | forward gate current (DC) |                          | -                | 50       | mA   |
| $P_{tot}$ | total power dissipation   | $T_{amb} = 25\text{ °C}$ | <sup>[1]</sup> - | 250      | mW   |
| $T_{stg}$ | storage temperature       |                          | -65              | +150     | °C   |
| $T_j$     | junction temperature      |                          | -                | 150      | °C   |

[1] Mounted on an FR4 printed-circuit board.

### 6. Thermal characteristics

Table 5. Thermal characteristics

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

[1] Mounted on an FR4 printed-circuit board.

## 7. Static characteristics

**Table 6. Static characteristics**

$T_j = 25\text{ }^{\circ}\text{C}$ .

| Symbol        | Parameter                        | Conditions                                         | Min | Typ | Max  | Unit     |
|---------------|----------------------------------|----------------------------------------------------|-----|-----|------|----------|
| $I_{GSS}$     | gate-source leakage current      | $V_{GS} = -15\text{ V}; V_{DS} = 0\text{ V}$       | -   | -   | -3   | nA       |
| $I_{DSX}$     | drain-source cut-off current     | $V_{GS} = -10\text{ V}; V_{DS} = 5\text{ V}$       | -   | -   | 3    | nA       |
| $I_{DSS}$     | drain-source leakage current     |                                                    |     |     |      |          |
|               | PMBFJ108                         | $V_{GS} = 0\text{ V}; V_{DS} = 15\text{ V}$        | 80  | -   | -    | mA       |
|               | PMBFJ109                         | $V_{GS} = 0\text{ V}; V_{DS} = 15\text{ V}$        | 40  | -   | -    | mA       |
|               | PMBFJ110                         | $V_{GS} = 0\text{ V}; V_{DS} = 15\text{ V}$        | 10  | -   | -    | mA       |
| $V_{(BR)GSS}$ | gate-source breakdown voltage    | $I_G = -1\text{ }\mu\text{A}; V_{DS} = 0\text{ V}$ | -   | -   | -25  | V        |
| $V_{GSoff}$   | gate-source cut-off voltage      |                                                    |     |     |      |          |
|               | PMBFJ108                         | $I_D = 1\text{ }\mu\text{A}; V_{DS} = 5\text{ V}$  | -10 | -   | -3   | V        |
|               | PMBFJ109                         | $I_D = 1\text{ }\mu\text{A}; V_{DS} = 5\text{ V}$  | -6  | -   | -2   | V        |
|               | PMBFJ110                         | $I_D = 1\text{ }\mu\text{A}; V_{DS} = 5\text{ V}$  | -4  | -   | -0.5 | V        |
| $R_{DSon}$    | drain-source on-state resistance |                                                    |     |     |      |          |
|               | PMBFJ108                         | $V_{GS} = 0\text{ V}; V_{DS} = 0.1\text{ V}$       | -   | -   | 8    | $\Omega$ |
|               | PMBFJ109                         | $V_{GS} = 0\text{ V}; V_{DS} = 0.1\text{ V}$       | -   | -   | 12   | $\Omega$ |
|               | PMBFJ110                         | $V_{GS} = 0\text{ V}; V_{DS} = 0.1\text{ V}$       | -   | -   | 18   | $\Omega$ |

## 8. Dynamic characteristics

**Table 7. Dynamic characteristics**

$T_j = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

| Symbol                                | Parameter            | Conditions                                                                                         | Min | Typ | Max | Unit |
|---------------------------------------|----------------------|----------------------------------------------------------------------------------------------------|-----|-----|-----|------|
| $C_{iss}$                             | input capacitance    | $V_{DS} = 0\text{ V}; V_{GS} = -10\text{ V}; f = 1\text{ MHz}$                                     | -   | 15  | 30  | pF   |
|                                       |                      | $V_{DS} = 0\text{ V}; V_{GS} = 0\text{ V}; f = 1\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$ | -   | 50  | 85  | pF   |
| $C_{rss}$                             | feedback capacitance | $V_{DS} = 0\text{ V}; V_{GS} = -10\text{ V}; f = 1\text{ MHz}$                                     | -   | 8   | 15  | pF   |
| <b>Switching times (see Figure 2)</b> |                      |                                                                                                    |     |     |     |      |
| $t_d$                                 | delay time           |                                                                                                    | [1] | -   | 2   | ns   |
| $t_{on}$                              | turn-on time         |                                                                                                    | [1] | -   | 4   | ns   |
| $t_s$                                 | storage time         |                                                                                                    | [1] | -   | 4   | ns   |
| $t_{off}$                             | turn-off time        |                                                                                                    | [1] | -   | 6   | ns   |

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

$V_{DD} = 1.5\text{ V}$ ,  $V_{GS} = 0\text{ V}$  to  $V_{GSoff}$  (all types);

$V_{GSoff} = -12\text{ V}$ ,  $R_L = 100\text{ }\Omega$  (PMBFJ108);

$V_{GSoff} = -7\text{ V}$ ,  $R_L = 100\text{ }\Omega$  (PMBFJ109);

$V_{GSoff} = -5\text{ V}$ ,  $R_L = 100\text{ }\Omega$  (PMBFJ110).

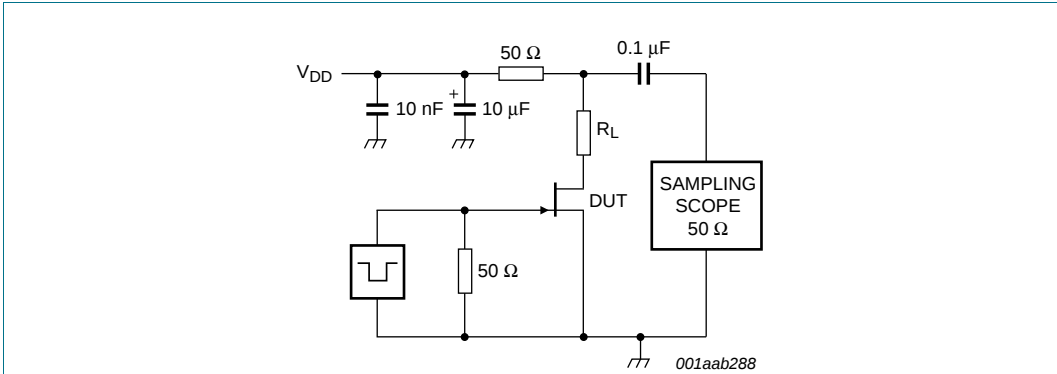


Fig 1. Switching circuit.

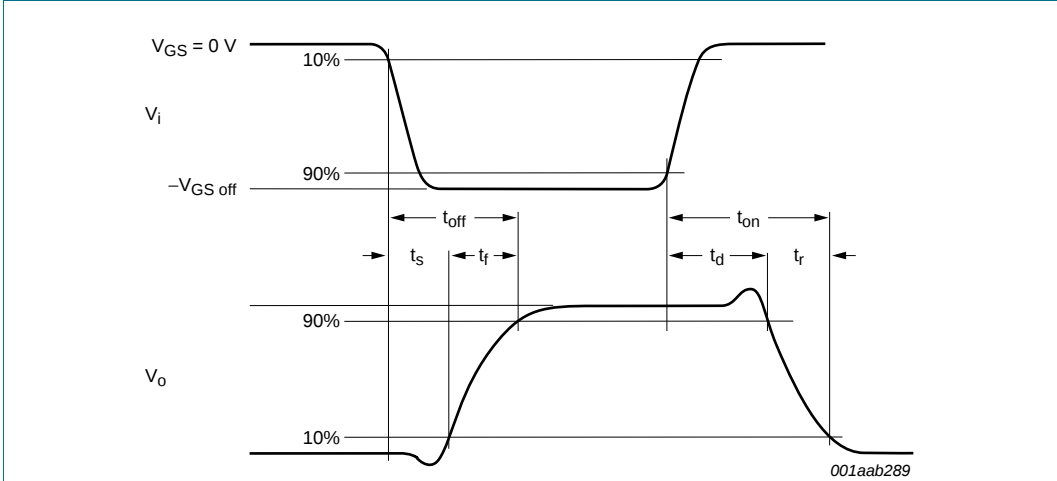


Fig 2. Input and output waveforms.

9. Package outline

Plastic surface-mounted package; 3 leads

SOT23

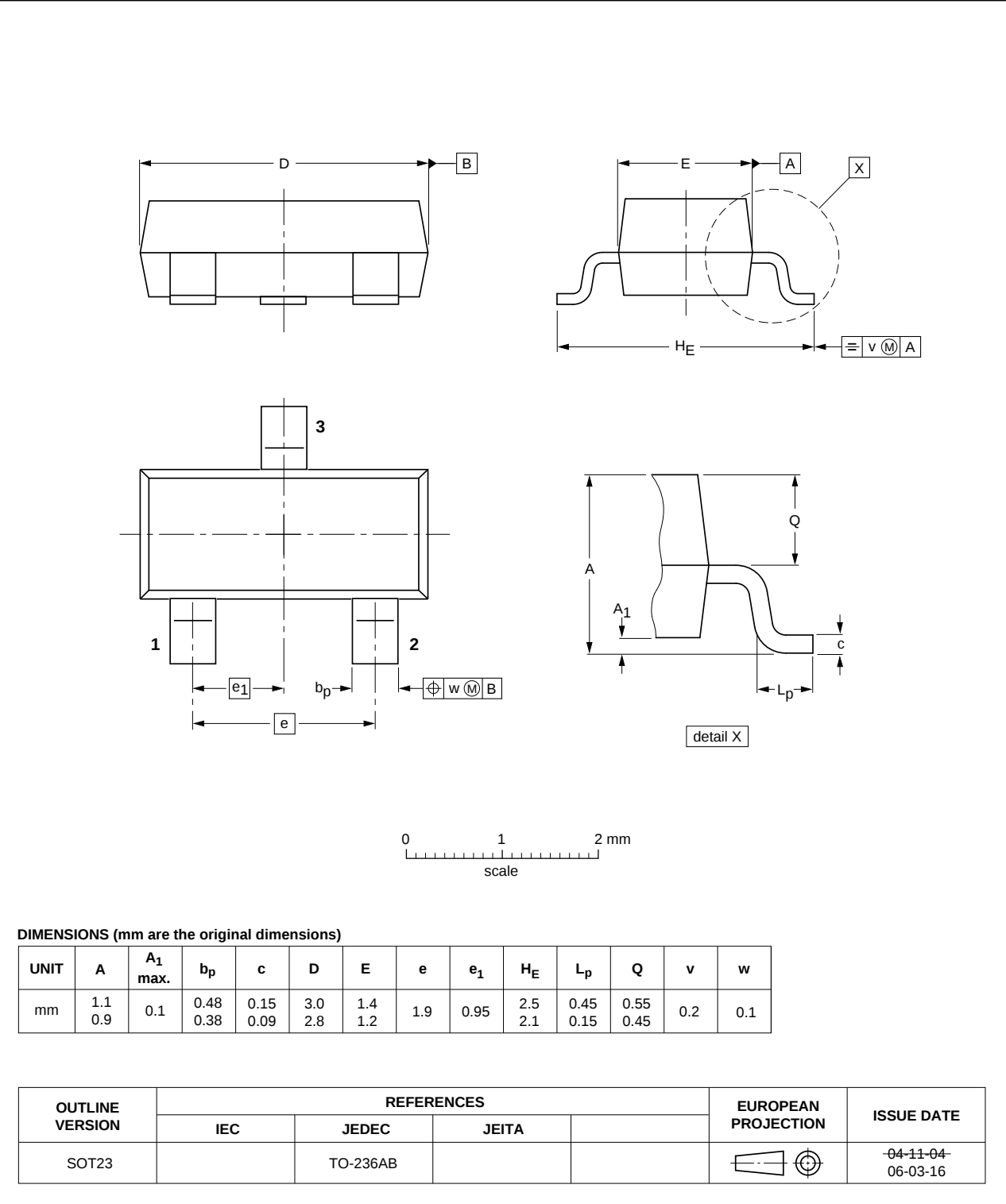


Fig 3. Package outline.

## 10. Revision history

**Table 8.** Revision history

| Document ID                              | Release date                                                                                                                                                                                                                                                                                                                         | Data sheet status     | Change notice | Supersedes               |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|--------------------------|
| PMBFJ108_109_110 v.4                     | 20110920                                                                                                                                                                                                                                                                                                                             | Product data sheet    | -             | PMBFJ108_109_110 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> |                       |               |                          |
| PMBFJ108_109_110 v.3<br>(9397 750 13401) | 20040804                                                                                                                                                                                                                                                                                                                             | Product data sheet    | -             | PMBFJ108_109_110_CNV v.2 |
| PMBFJ108_109_110_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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