

DATA SHEET

PMBFJ108; PMBFJ109; PMBFJ110 N-channel junction FETs

Product specification
File under Discrete Semiconductors, SC07

April 1995

N-channel junction FETs

PMBFJ108; PMBFJ109; PMBFJ110

FEATURES

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

DESCRIPTION

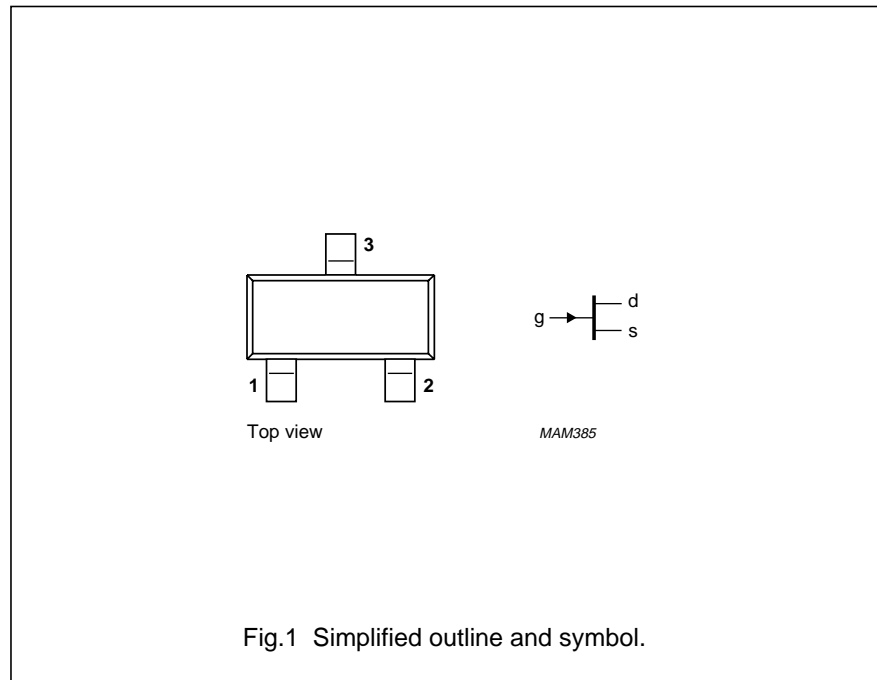
Symmetrical N-channel junction FETs in a SOT23 envelope. Intended for use in applications such as analog switches, choppers and commutators and in audio amplifiers.

PINNING - SOT23

| PIN | DESCRIPTION |
|-----|-------------|
| 1 | drain |
| 2 | source |
| 3 | gate |

Note

1. Drain and source are interchangeable.



LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-----------|--------------------------------|---------------------------------------|------|----------|------------------|
| V_{DS} | drain-source voltage | | – | ± 25 | V |
| V_{GSO} | gate-source voltage | | – | –25 | V |
| V_{GDO} | drain-drain voltage | | – | –25 | V |
| I_G | forward gate current (DC) | | | 50 | mA |
| P_{tot} | total power dissipation | $T_{amb} = 25^\circ\text{C}$; note 1 | – | 250 | mW |
| T_{stg} | storage temperature | | –65 | 150 | $^\circ\text{C}$ |
| T_j | operating junction temperature | | – | 150 | $^\circ\text{C}$ |

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THERMAL RESISTANCE

| SYMBOL | PARAMETER | VALUE | UNIT |
|---------------|-----------------------------------|-------|------|
| $R_{th\ j-a}$ | from junction to ambient (note 1) | 500 | K/W |

Notes

1. Mounted on an FR-4 printboard.

STATIC CHARACTERISTICS

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|----------------|---|---|----------------|---------------|----------|
| $-I_{GSS}$ | reverse gate current | $-V_{GS} = 15\text{ V}$ $V_{DS} = 0$ | – | 3 | nA |
| I_{DSX} | drain-source cut-off current | $V_{GS} = -10\text{ V}$ $V_{DS} = 5\text{ V}$ | – | 3 | nA |
| I_{DSS} | drain current PMBFJ108 PMBFJ109 PMBFJ110 | $V_{GS} = 0$ $V_{DS} = 15\text{ V}$ | 80 40 10 | – – – | mA |
| $-V_{(BR)GSS}$ | gate-source breakdown voltage | $-I_G = 1\text{ }\mu\text{A}$ $V_{DS} = 0$ | – | 25 | V |
| $-V_{GS(off)}$ | gate-source cut-off voltage PMBFJ108 PMBFJ109 PMBFJ110 | $I_D = 1\text{ }\mu\text{A}$ $V_{DS} = 5\text{ V}$ | 3 2 0.5 | 10 6 4 | V |
| $R_{DS(on)}$ | drain-source on-resistance PMBFJ108 PMBFJ109 PMBFJ110 | $V_{GS} = 0\text{ V}$ $V_{DS} = 0.1\text{ V}$ | – – – | 8 12 18 | Ω |

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DYNAMIC CHARACTERISTICS

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

| SYMBOL | PARAMETER | CONDITIONS | TYP. | MAX. | UNIT |
|------------------------------------|----------------------|---|------|------|------|
| C_{is} | input capacitance | $V_{DS} = 0$ $-V_{GS} = 10\text{ V}$ $f = 1\text{ MHz}$ | 15 | 30 | pF |
| C_{is} | input capacitance | $V_{DS} = 0$ $-V_{GS} = 0$ $f = 1\text{ MHz}$ $T_{amb} = 25\text{ }^\circ\text{C}$ | 50 | 85 | pF |
| C_{rs} | feedback capacitance | $V_{DS} = 0$ $-V_{GS} = 10\text{ V}$ $f = 1\text{ MHz}$ | 8 | 15 | pF |
| Switching times (see Fig.2) | | | | | |
| t_d | delay time | note 1 | 2 | – | ns |
| t_{on} | turn-on time | note 1 | 4 | – | ns |
| t_s | storage time | note 1 | 4 | – | ns |
| t_{off} | turn-off time | note 1 | 6 | – | ns |

Notes

- Test conditions for switching times are as follows:
 $V_{DD} = 1.5\text{ V}$, $V_{GS} = 0$ to $-V_{GS(off)}$ (all types);
 $-V_{GS(off)} = 12\text{ V}$, $R_L = 100\text{ }\Omega$ (PMBFJ108);
 $-V_{GS(off)} = 7\text{ V}$, $R_L = 100\text{ }\Omega$ (PMBFJ109);
 $-V_{GS(off)} = 5\text{ V}$, $R_L = 100\text{ }\Omega$ (PMBFJ110).

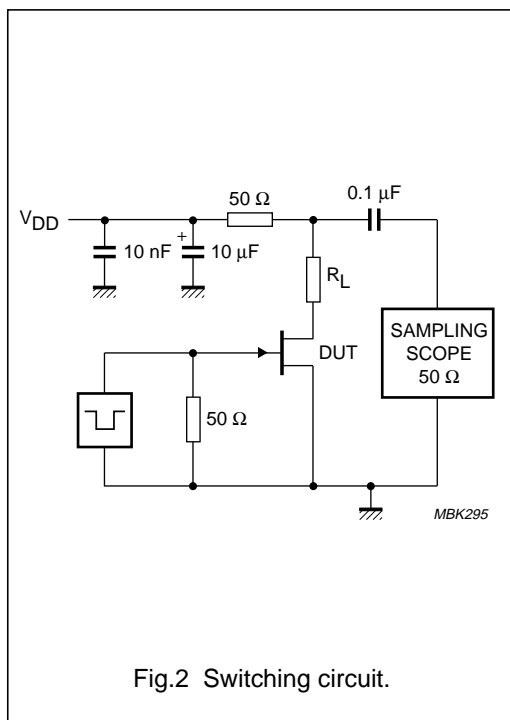


Fig.2 Switching circuit.

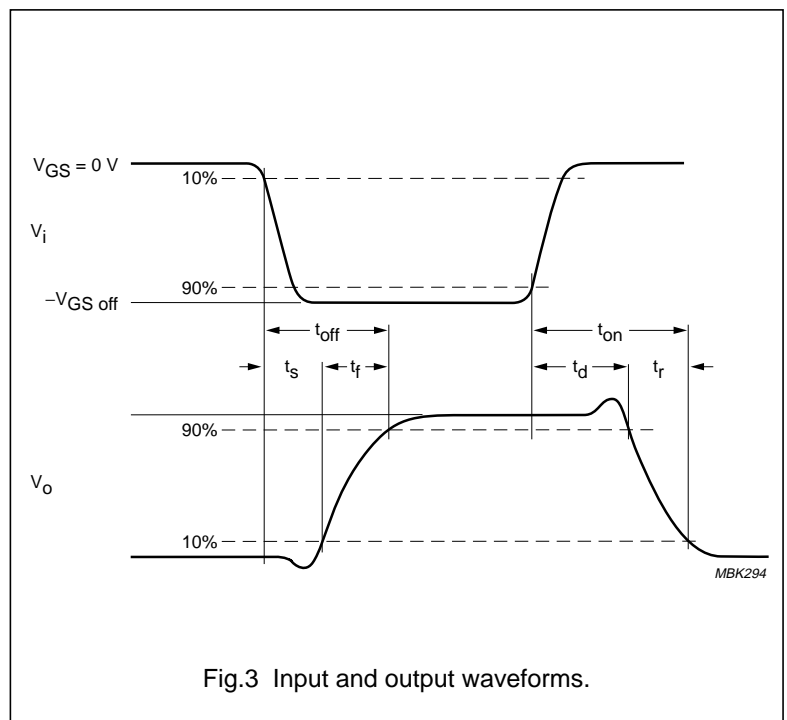


Fig.3 Input and output waveforms.

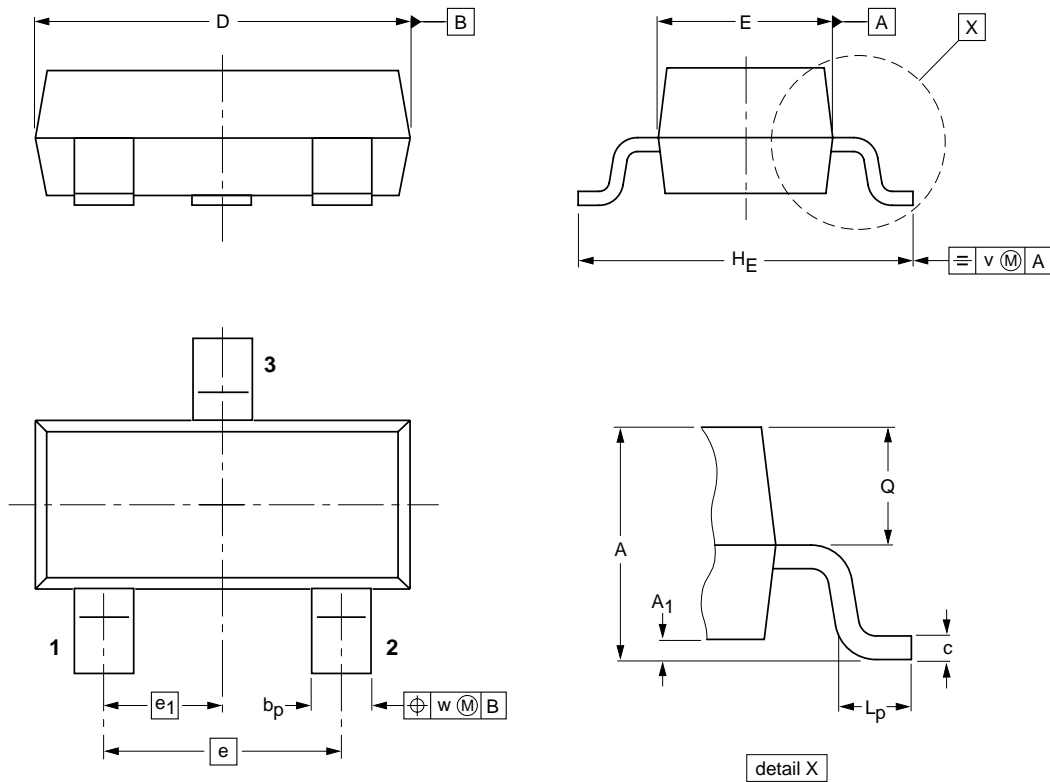
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PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT23



DIMENSIONS (mm are the original dimensions)

| UNIT | A | A ₁ max. | b _p | c | D | E | e | e ₁ | H _E | L _p | Q | v | w |
|------|------------|------------------------|----------------|--------------|------------|------------|-----|----------------|----------------|----------------|--------------|-----|-----|
| mm | 1.1 0.9 | 0.1 | 0.48 0.38 | 0.15 0.09 | 3.0 2.8 | 1.4 1.2 | 1.9 | 0.95 | 2.5 2.1 | 0.45 0.15 | 0.55 0.45 | 0.2 | 0.1 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|-------|------|--|---------------------|------------|
| | IEC | JEDEC | EIAJ | | | |
| SOT23 | | | | | | 97-02-28 |

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PMBFJ108;
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| Data sheet status | |
|---|--|
| Objective specification | This data sheet contains target or goal specifications for product development. |
| Preliminary specification | This data sheet contains preliminary data; supplementary data may be published later. |
| Product specification | This data sheet contains final product specifications. |
| Short-form specification | The data in this specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook. |
| Limiting values | |
| Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability. | |
| Application information | |
| Where application information is given, it is advisory and does not form part of the specification. | |

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