



PMBFJ174; PMBFJ175; PMBFJ176; PMBFJ177

P-channel silicon field-effect transistors

Rev. 3.0 — 24 January 2020

Product data sheet

1 Product profile

1.1 General description

Silicon symmetrical p-channel junction FETs in plastic microminiature SOT23 envelopes. They are intended for application with analogue switches, choppers, commutators etc. using SMD technology. A special feature is the interchangeability of the drain and source connections.

1.2 Quick reference data

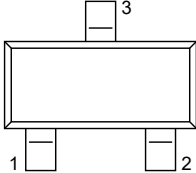

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------|----------------------------|--------------------------------------|-----|-----|-----|----------|
| V_{DS} | drain-source voltage | | 30 | - | 30 | V |
| V_{GS0} | gate-source voltage | | - | - | 30 | V |
| $-I_G$ | gate current | | - | - | 50 | mA |
| P_{tot} | total power dissipation | up to $T_{amb} = 25^\circ\text{C}$ | - | - | 300 | mW |
| $-I_{DSS}$ | drain current | $-V_{DS} = 15\text{ V}; V_{GS} = 0$ | | | | |
| | | PMBFJ174 | 20 | - | 135 | mA |
| | | PMBFJ175 | 7 | - | 70 | mA |
| | | PMBFJ176 | 2 | - | 35 | mA |
| $R_{DS\ on}$ | drain-source ON-resistance | $-V_{DS} = 0.1\text{ V}; V_{GS} = 0$ | | | | |
| | | PMBFJ174 | - | - | 85 | Ω |
| | | PMBFJ175 | - | - | 125 | Ω |
| | | PMBFJ176 | - | - | 250 | Ω |
| | | PMBFJ177 | - | - | 300 | Ω |



2 Pinning information

Table 2. Pinning

| Pin | Description ^[1] | | Simplified outline | Symbol |
|-----|----------------------------|--|--|---|
| 1 | drain | |  |  |
| 2 | source | | | |
| 3 | gate | | | |

[1] Drain and source are interchangeable.

3 Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|---------|--|---------|
| | Name | Description | Version |
| PMBFJ174 | - | plastic surface mounted package; 3 leads | SOT23 |
| PMBFJ175 | | | |
| PMBFJ176 | | | |
| PMBFJ177 | | | |

4 Marking

Table 4. Marking

| Type number | Marking code ^[1] |
|-------------|-----------------------------|
| PMBFJ174 | *6X |
| PMBFJ175 | *6W |
| PMBFJ176 | *6S |
| PMBFJ177 | *6Y |

[1] * = manufacturing site

5 Limiting values

Table 5. Limiting values

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

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-----------|----------------------|------------|-----|-----|------|
| V_{DS} | drain-source voltage | | 30 | 30 | V |
| V_{GSO} | gate-source voltage | | - | 30 | V |
| V_{GDO} | gate-drain voltage | | - | 30 | V |

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-----------|---------------------------|--------------------------|-----|-----|------|
| $-I_G$ | gate current (DC) | | - | 50 | mA |
| P_{tot} | total power dissipation | $T_{amb} = 25\text{ °C}$ | [1] | 300 | mW |
| T_{stg} | storage temperature range | | -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 6. Thermal characteristics

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

| Symbol | Parameter | Conditions | Typ | Unit |
|---------------|--|------------|-----|------|
| $R_{th(j-a)}$ | junction to ambient in free air thermal resistance | | 430 | K/W |

7 Static characteristics

Table 7. Static characteristics

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---------------|-------------------------------|---|-----|-----|-----|------|
| I_{GSS} | gate cut-off current | | | | | |
| | PMBFJ174 | $V_{GS} = 20\text{ V}; V_{DS} = 0\text{ V}$ | - | - | 1 | nA |
| | PMBFJ175 | $V_{GS} = 20\text{ V}; V_{DS} = 0\text{ V}$ | - | - | 1 | nA |
| | PMBFJ176 | $V_{GS} = 20\text{ V}; V_{DS} = 0\text{ V}$ | - | - | 1 | nA |
| $-I_{DSX}$ | drain cut-off current | | | | | |
| | PMBFJ174 | $-V_{DS} = 15\text{ V}; V_{GS} = 10\text{ V}$ | - | - | 1 | nA |
| | PMBFJ175 | $-V_{DS} = 15\text{ V}; V_{GS} = 10\text{ V}$ | - | - | 1 | nA |
| | PMBFJ176 | $-V_{DS} = 15\text{ V}; V_{GS} = 10\text{ V}$ | - | - | 1 | nA |
| $-I_{DSS}$ | drain current | | | | | |
| | PMBFJ174 | $V_{DS} = -15\text{ V}; V_{GS} = 0\text{ V}$ | 20 | - | 135 | mA |
| | PMBFJ175 | $-V_{DS} = 15\text{ V}; V_{GS} = 0\text{ V}$ | 7 | - | 70 | mA |
| | PMBFJ176 | $-V_{DS} = 15\text{ V}; V_{GS} = 0\text{ V}$ | 2 | - | 35 | mA |
| $V_{(BR)GSS}$ | gate-source breakdown voltage | | | | | |
| | PMBFJ174 | $I_G = 1\text{ }\mu\text{A}; V_{DS} = 0\text{ V}$ | - | - | 30 | V |
| | PMBFJ175 | $I_G = 1\text{ }\mu\text{A}; V_{DS} = 0\text{ V}$ | - | - | 30 | V |
| | PMBFJ176 | $I_G = 1\text{ }\mu\text{A}; V_{DS} = 0\text{ V}$ | - | - | 30 | V |
| | PMBFJ177 | $I_G = 1\text{ }\mu\text{A}; V_{DS} = 0\text{ V}$ | - | - | 30 | V |

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------|---|--|-----|-----|-----|------|
| V _{GSoff} | gate-source cut-off voltage | | | | | |
| | PMBFJ174 | -I _D = 10 nA; V _{DS} = -15 V | 5 | - | 10 | V |
| | PMBFJ175 | -I _D = 10 nA; V _{DS} = -15 V | 3 | - | 6 | V |
| | PMBFJ176 | -I _D = 10 nA; V _{DS} = -15 V | 1 | - | 4 | V |
| R _{DSon} | drain-source on resistance | | | | | |
| | PMBFJ174 | -V _{DS} = 0.1 V; V _{GS} = 0 V | - | - | 85 | Ω |
| | PMBFJ175 | -V _{DS} = 0.1 V; V _{GS} = 0 V | - | - | 125 | Ω |
| | PMBFJ176 | -V _{DS} = 0.1 V; V _{GS} = 0 V | - | - | 250 | Ω |
| PMBFJ177 | -V _{DS} = 0.1 V; V _{GS} = 0 V | | - | - | 300 | Ω |

8 Dynamic characteristics

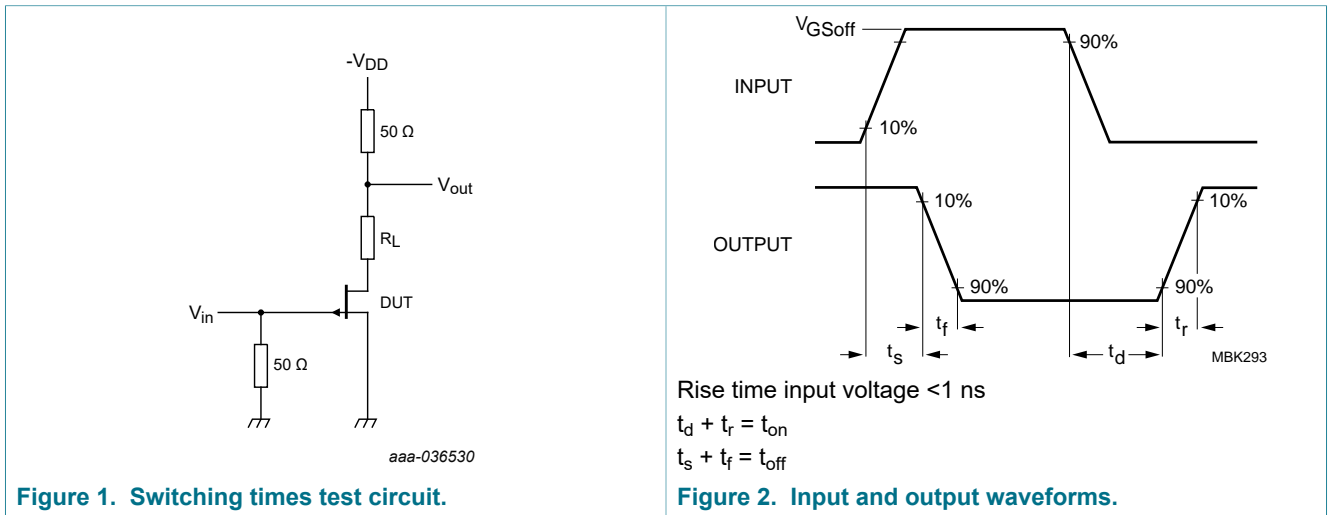
Table 8. Dynamic characteristics

T_j = 25 °C unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit | |
|---|----------------------|--|-----|-----|-----|------|----|
| C _{iss} | input capacitance | V _{GS} = 10 V; V _{DS} = 0 V; f = 1 MHz | - | 8 | - | pF | |
| | | V _{DS} = 0 V; V _{GS} = 0 V; f = 1 MHz | - | 30 | - | pF | |
| C _{rs} | feedback capacitance | V _{GS} = 10 V; V _{DS} = 0 V; f = 1 MHz | - | 4 | - | pF | |
| Switching times; see Figure 1 and Figure 2. Test conditions for switching times are as follows: ^[1] | | | | | | | |
| t _d | delay time | | | | | | |
| | PMBFJ174 | | - | 2 | - | ns | |
| | PMBFJ175 | | - | 5 | - | ns | |
| | PMBFJ176 | | - | 15 | - | ns | |
| PMBFJ177 | | | - | 20 | - | ns | |
| | t _r | rise time | | | | | |
| | | PMBFJ174 | | - | 5 | - | ns |
| | | PMBFJ175 | | - | 10 | - | ns |
| PMBFJ176 | | | - | 20 | - | ns | |
| PMBFJ177 | | | - | 25 | - | ns | |
| | t _{on} | turn-on time | | | | | |
| | | PMBFJ174 | | - | 7 | - | ns |
| | | PMBFJ175 | | - | 15 | - | ns |
| PMBFJ176 | | | - | 35 | - | ns | |
| PMBFJ177 | | | - | 45 | - | ns | |

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------------|---------------------|------------|-----|-----|-----|------|
| t _s | storage temperature | | | | | |
| | PMBFJ174 | | - | 5 | - | ns |
| | PMBFJ175 | | - | 10 | - | ns |
| | PMBFJ176 | | - | 15 | - | ns |
| t _f | fall time | | | | | |
| | PMBFJ174 | | - | 10 | - | ns |
| | PMBFJ175 | | - | 20 | - | ns |
| | PMBFJ176 | | - | 20 | - | ns |
| t _{off} | turn-off time | | | | | |
| | PMBFJ174 | | - | 6 | - | ns |
| | PMBFJ175 | | - | 6 | - | ns |
| | PMBFJ176 | | - | 6 | - | ns |
| t _{off} | turn-off time | | | | | |
| | PMBFJ174 | | - | 6 | - | ns |
| | PMBFJ175 | | - | 6 | - | ns |
| | PMBFJ176 | | - | 6 | - | ns |

- [1] -V_{DD} = 10 V, V_{GSoff} = 12 V, R_L = 560 Ω, V_{GSon} = 0 V (PMBFJ174);
- V_{DD} = 6 V, V_{GSoff} = 8 V, R_L = 1200 Ω, V_{GSon} = 0 V (PMBFJ175);
- V_{DD} = 6 V, V_{GSoff} = 6 V, R_L = 2000 Ω, V_{GSon} = 0 V (PMBFJ176);
- V_{DD} = 6 V, V_{GSoff} = 3 V, R_L = 2900 Ω, V_{GSon} = 0 V (PMBFJ177);



9 Package outline

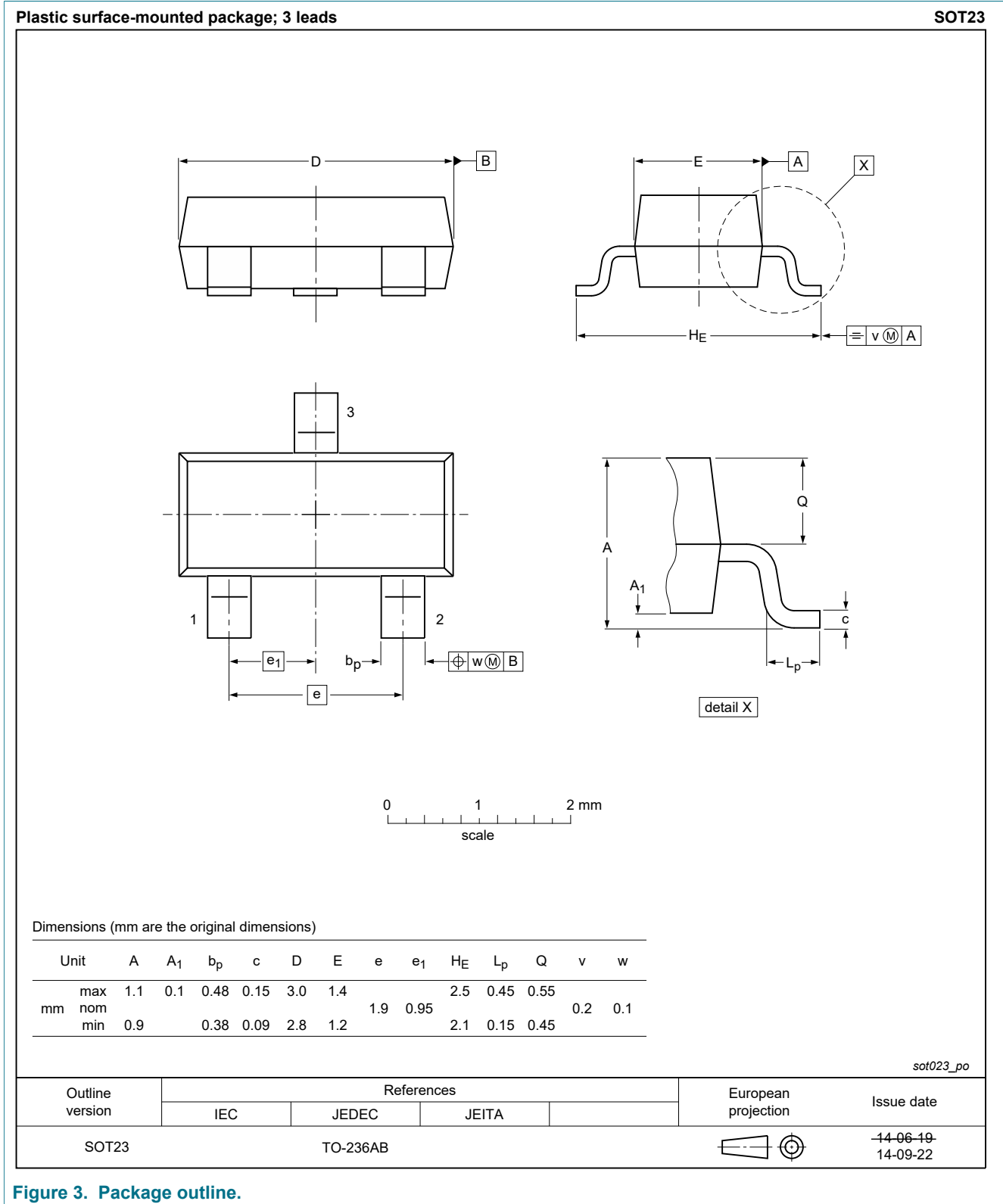


Figure 3. Package outline.

10 Revision history

Revision history

| Revision number | Date | Description |
|-----------------|----------|--|
| 3.0 | 20200124 | Product data sheet |
| modification | | <ul style="list-style-type: none">• adapted the notation of the manufacturing code |
| 2.0 | 19950401 | product data sheet |
| 1.0 | | Initial version of the document |

11 Legal information

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| Document status ^{[1][2]} | Product status ^[3] | Definition |
|-----------------------------------|-------------------------------|---|
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