



# 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

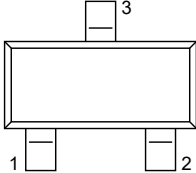

Table 1. Quick reference data

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 $T_{amb} = 25\text{ °C}$	-	-	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
		PMBFJ177	1.5	-	20	mA
$R_{DS\ on}$	drain-source ON-resistance	$-V_{DS} = 0.1\text{ V}; V_{GS} = 0$				
		PMBFJ174	-	-	85	$\Omega$
		PMBFJ175	-	-	125	$\Omega$
		PMBFJ176	-	-	250	$\Omega$
		PMBFJ177	-	-	300	$\Omega$



## 2 Pinning information

Table 2. Pinning

Pin	Description <sup>[1]</sup>	Simplified outline	Symbol
1	drain		 sym053
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 <sup>[1]</sup>
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 <sub>GSoff</sub>	gate-source cut-off voltage					
	PMBFJ174	-I <sub>D</sub> = 10 nA; V <sub>DS</sub> = -15 V	5	-	10	V
	PMBFJ175	-I <sub>D</sub> = 10 nA; V <sub>DS</sub> = -15 V	3	-	6	V
	PMBFJ176	-I <sub>D</sub> = 10 nA; V <sub>DS</sub> = -15 V	1	-	4	V
R <sub>DSon</sub>	drain-source on resistance					
	PMBFJ174	-V <sub>DS</sub> = 0.1 V; V <sub>GS</sub> = 0 V	-	-	85	Ω
	PMBFJ175	-V <sub>DS</sub> = 0.1 V; V <sub>GS</sub> = 0 V	-	-	125	Ω
	PMBFJ176	-V <sub>DS</sub> = 0.1 V; V <sub>GS</sub> = 0 V	-	-	250	Ω
	PMBFJ177	-V <sub>DS</sub> = 0.1 V; V <sub>GS</sub> = 0 V	-	-	300	Ω

## 8 Dynamic characteristics

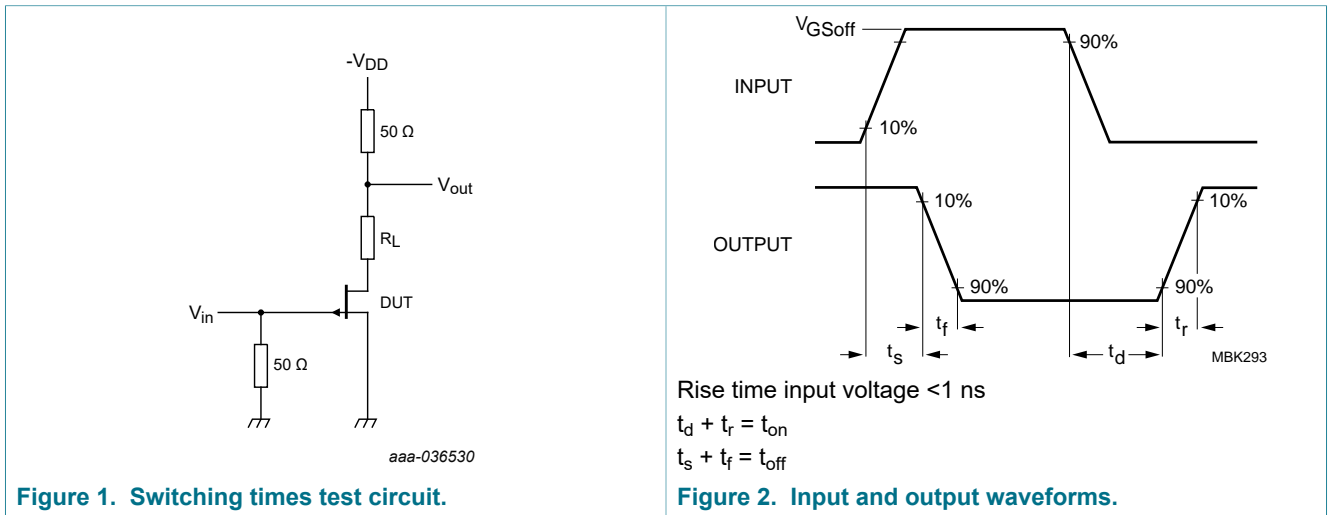
**Table 8. Dynamic characteristics**

T<sub>j</sub> = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
C <sub>iss</sub>	input capacitance	V <sub>GS</sub> = 10 V; V <sub>DS</sub> = 0 V; f = 1 MHz	-	8	-	pF
		V <sub>DS</sub> = 0 V; V <sub>GS</sub> = 0 V; f = 1 MHz	-	30	-	pF
C <sub>rs</sub>	feedback capacitance	V <sub>GS</sub> = 10 V; V <sub>DS</sub> = 0 V; f = 1 MHz	-	4	-	pF
<b>Switching times; see Figure 1 and Figure 2. Test conditions for switching times are as follows: <sup>[1]</sup></b>						
t <sub>d</sub>	delay time					
	PMBFJ174		-	2	-	ns
	PMBFJ175		-	5	-	ns
	PMBFJ176		-	15	-	ns
t <sub>r</sub>	rise time					
	PMBFJ174		-	5	-	ns
	PMBFJ175		-	10	-	ns
	PMBFJ176		-	20	-	ns
t <sub>on</sub>	turn-on time					
	PMBFJ174		-	7	-	ns
	PMBFJ175		-	15	-	ns
	PMBFJ176		-	35	-	ns
	PMBFJ177		-	45	-	ns

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
t <sub>s</sub>	storage temperature					
	PMBFJ174		-	5	-	ns
	PMBFJ175		-	10	-	ns
	PMBFJ176		-	15	-	ns
t <sub>f</sub>	fall time					
	PMBFJ174		-	10	-	ns
	PMBFJ175		-	20	-	ns
	PMBFJ176		-	20	-	ns
t <sub>off</sub>	turn-off time					
	PMBFJ174		-	6	-	ns
	PMBFJ175		-	6	-	ns
	PMBFJ176		-	6	-	ns
t <sub>off</sub>	turn-off time					
	PMBFJ174		-	6	-	ns
	PMBFJ175		-	6	-	ns
	PMBFJ176		-	6	-	ns

- [1] -V<sub>DD</sub> = 10 V, V<sub>GSoff</sub> = 12 V, R<sub>L</sub> = 560 Ω, V<sub>GSon</sub> = 0 V (PMBFJ174);
- V<sub>DD</sub> = 6 V, V<sub>GSoff</sub> = 8 V, R<sub>L</sub> = 1200 Ω, V<sub>GSon</sub> = 0 V (PMBFJ175);
- V<sub>DD</sub> = 6 V, V<sub>GSoff</sub> = 6 V, R<sub>L</sub> = 2000 Ω, V<sub>GSon</sub> = 0 V (PMBFJ176);
- V<sub>DD</sub> = 6 V, V<sub>GSoff</sub> = 3 V, R<sub>L</sub> = 2900 Ω, V<sub>GSon</sub> = 0 V (PMBFJ177);



9 Package outline

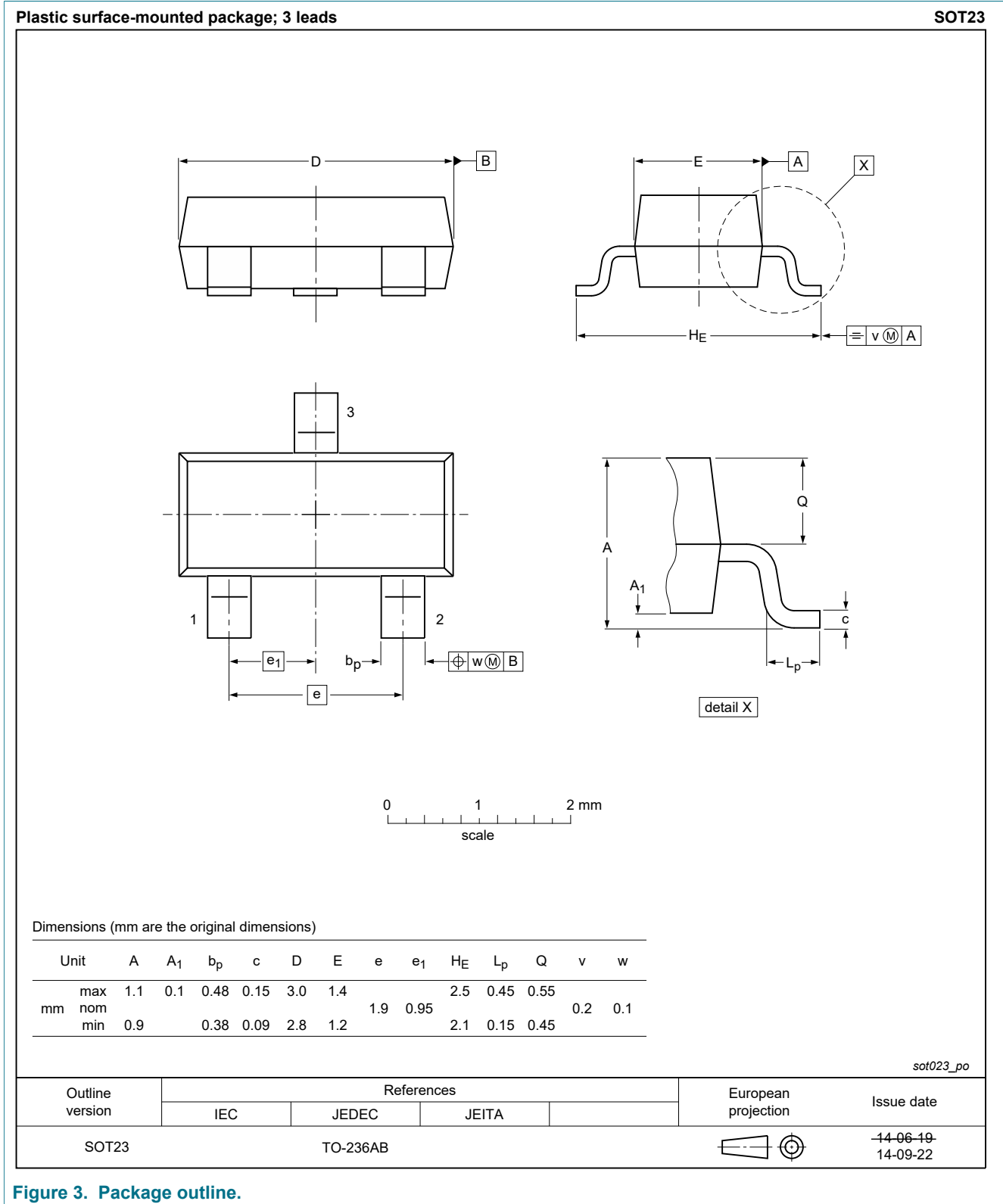


Figure 3. Package outline.

## 10 Revision history

### Revision history

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

## 11 Legal information

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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.
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