



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

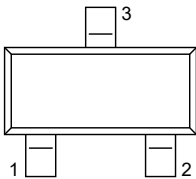

Table 1. Quick reference data

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
		PMBFJ177	1.5	-	20	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
	PMBFJ177	$V_{GS} = 20\text{ V}; V_{DS} = 0\text{ V}$		-	-	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
	PMBFJ177	$-V_{DS} = 15\text{ V}; V_{GS} = 10\text{ V}$		-	-	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
	PMBFJ177	$-V_{DS} = 15\text{ V}; V_{GS} = 0\text{ V}$		1.5	-	20	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	$-I_D = 10 \text{ nA}; V_{DS} = -15 \text{ V}$		5	-	10	V
	PMBFJ175	$-I_D = 10 \text{ nA}; V_{DS} = -15 \text{ V}$		3	-	6	V
	PMBFJ176	$-I_D = 10 \text{ nA}; V_{DS} = -15 \text{ V}$		1	-	4	V
	PMBFJ177	$-I_D = 10 \text{ nA}; V_{DS} = -15 \text{ V}$		0.8	-	2.25	V
R_{DSon}	drain-source on resistance						
	PMBFJ174	$-V_{DS} = 0.1 \text{ V}; V_{GS} = 0 \text{ V}$		-	-	85	Ω
	PMBFJ175	$-V_{DS} = 0.1 \text{ V}; V_{GS} = 0 \text{ V}$		-	-	125	Ω
	PMBFJ176	$-V_{DS} = 0.1 \text{ V}; V_{GS} = 0 \text{ V}$		-	-	250	Ω
	PMBFJ177	$-V_{DS} = 0.1 \text{ V}; V_{GS} = 0 \text{ V}$		-	-	300	Ω

8 Dynamic characteristics

Table 8. Dynamic characteristics

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
C_{iss}	input capacitance	$V_{GS} = 10 \text{ V}; V_{DS} = 0 \text{ V}; f = 1 \text{ MHz}$		-	8	-	pF
		$V_{DS} = 0 \text{ V}; V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$		-	30	-	pF
C_{rs}	feedback capacitance	$V_{GS} = 10 \text{ V}; V_{DS} = 0 \text{ V}; f = 1 \text{ MHz}$		-	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
	PMBFJ177			-	20	-	ns
t _f	fall time						
	PMBFJ174			-	10	-	ns
	PMBFJ175			-	20	-	ns
	PMBFJ176			-	20	-	ns
	PMBFJ177			-	25	-	ns
t _{off}	turn-off time						
	PMBFJ174			-	6	-	ns
	PMBFJ175			-	6	-	ns
	PMBFJ176			-	6	-	ns
	PMBFJ177			-	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);

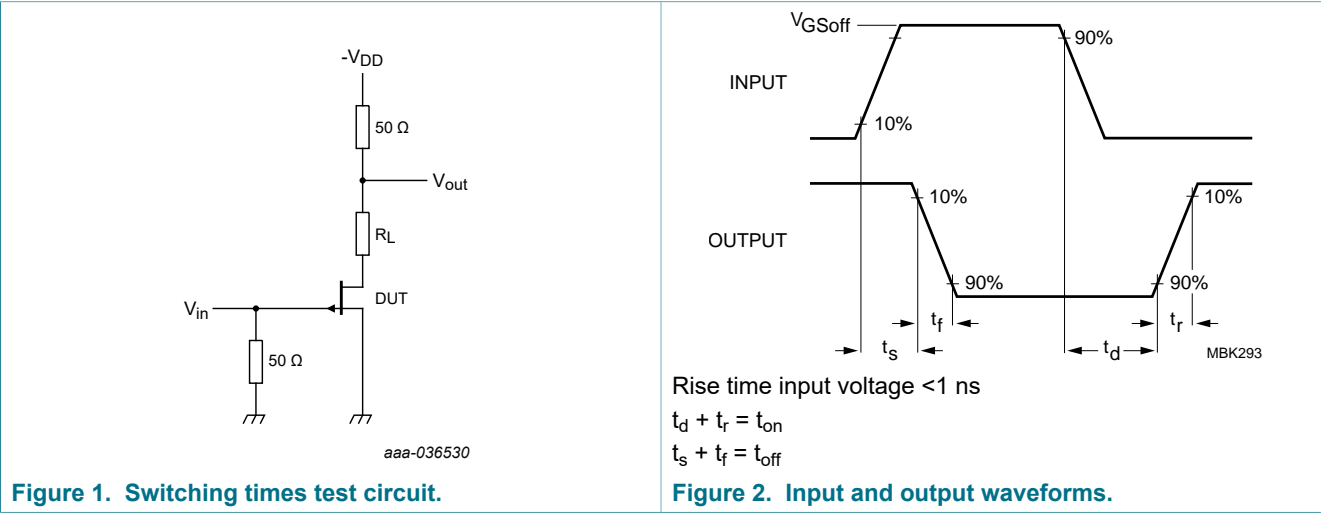


Figure 1. Switching times test circuit.

Figure 2. Input and output waveforms.

9 Package outline

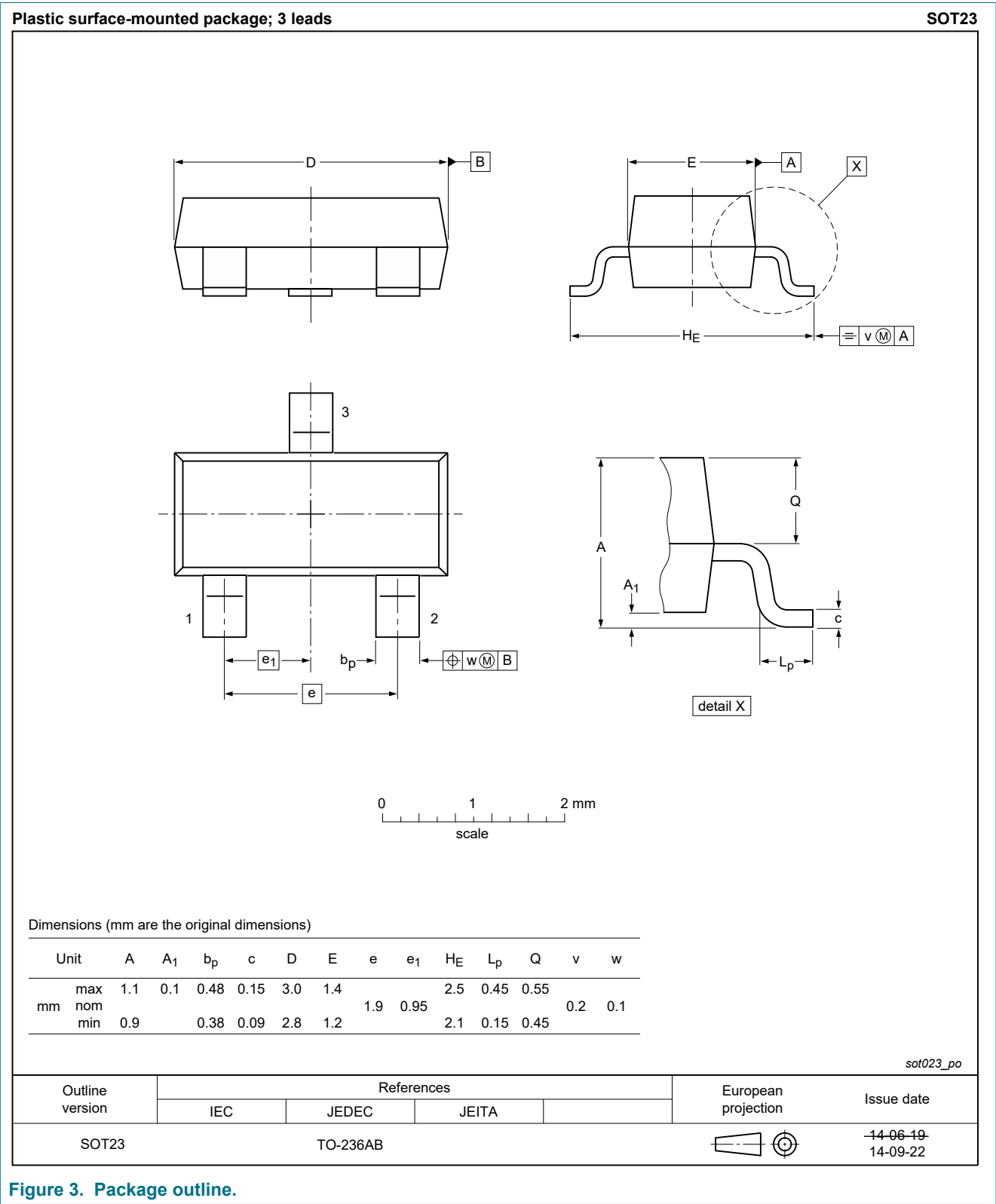


Figure 3. Package outline.

10 Revision history

Revision history

Revision number	Date	Description
3.0	20200124	Product data sheet
modification	• 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
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.
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[2] The term 'short data sheet' is explained in section "Definitions".

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