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.

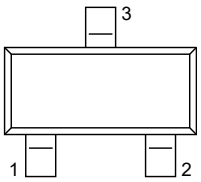
1.2 Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{DS}	drain-source voltage			30	-	30	V
V_{GSo}	gate-source voltage			-	-	30	V
$-I_G$	gate current			-	-	50	mA
P_{tot}	total power dissipation	up to T_{amb} = 25 ° C		-	-	300	mW
$-I_{DSS}$	drain current	$-V_{DS}$ = 15 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 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 ° 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 ° C unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_{GSS}	gate cut-off current						
	PMBFJ174	V_{GS} = 20 V; V_{DS} = 0 V		-	-	1	nA
	PMBFJ175	V_{GS} = 20 V; V_{DS} = 0 V		-	-	1	nA
	PMBFJ176	V_{GS} = 20 V; V_{DS} = 0 V		-	-	1	nA
	PMBFJ177	V_{GS} = 20 V; V_{DS} = 0 V		-	-	1	nA
$-I_{DSX}$	drain cut-off current						
	PMBFJ174	$-V_{DS}$ = 15 V; V_{GS} = 10 V		-	-	1	nA
	PMBFJ175	$-V_{DS}$ = 15 V; V_{GS} = 10 V		-	-	1	nA
	PMBFJ176	$-V_{DS}$ = 15 V; V_{GS} = 10 V		-	-	1	nA
	PMBFJ177	$-V_{DS}$ = 15 V; V_{GS} = 10 V		-	-	1	nA
$-I_{DSS}$	drain current						
	PMBFJ174	V_{DS} = -15 V; V_{GS} = 0 V		20	-	135	mA
	PMBFJ175	$-V_{DS}$ = 15 V; V_{GS} = 0 V		7	-	70	mA
	PMBFJ176	$-V_{DS}$ = 15 V; V_{GS} = 0 V		2	-	35	mA
	PMBFJ177	$-V_{DS}$ = 15 V; V_{GS} = 0 V		1.5	-	20	mA
$V_{(BR)GSS}$	gate-source breakdown voltage						
	PMBFJ174	I_G = 1 µA; V_{DS} = 0 V		-	-	30	V
	PMBFJ175	I_G = 1 µA; V_{DS} = 0 V		-	-	30	V
	PMBFJ176	I_G = 1 µA; V_{DS} = 0 V		-	-	30	V
	PMBFJ177	I_G = 1 µA; V_{DS} = 0 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
	PMBFJ177	$-I_D$ = 10 nA; V_{DS} = -15 V		0.8	-	2.25	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 1and 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);

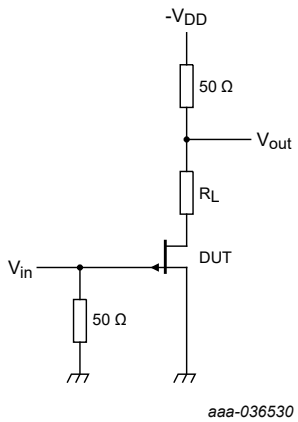
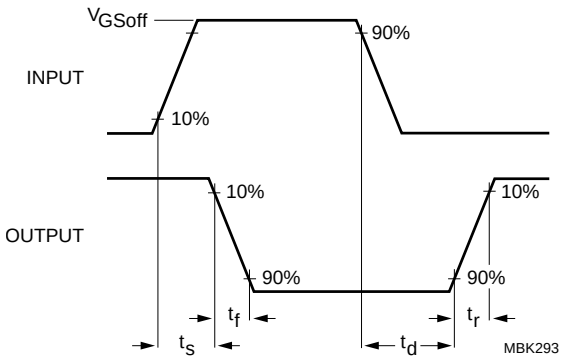


Figure 1. Switching times test circuit.



Rise time input voltage <1 ns

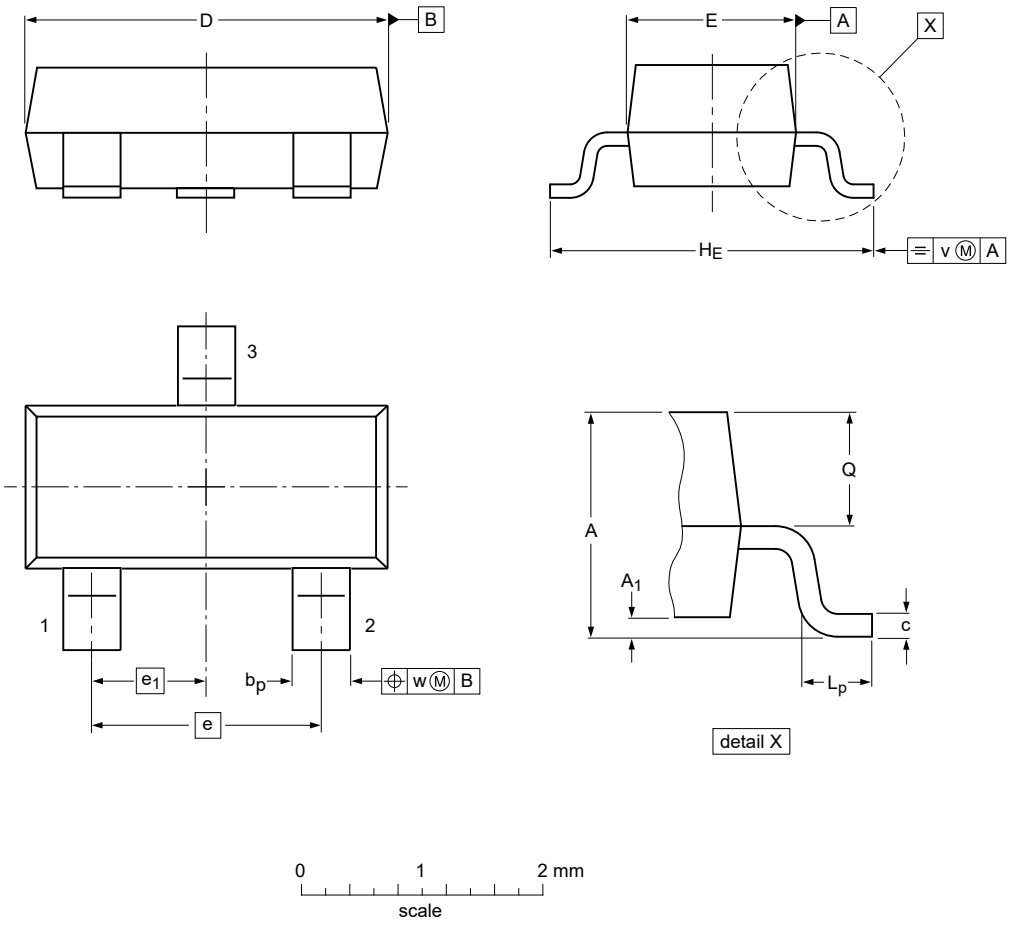
$t_d + t_r = t_{on}$

$t_s + t_f = t_{off}$

Figure 2. Input and output waveforms.

9 Package outline

Plastic surface-mounted package; 3 leads **SOT23**



Dimensions (mm are the original dimensions)

Unit		A	A_1	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w
mm	max	1.1	0.1	0.48	0.15	3.0	1.4			2.5	0.45	0.55		
	nom							1.9	0.95				0.2	0.1
	min	0.9		0.38	0.09	2.8	1.2			2.1	0.15	0.45		

sot023_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT23		TO-236AB				~~14-06-19~~ 14-09-22

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.
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