

PMBT2907A

60V, 600 mA, PNP switching transistor

6 March 2015

Product data sheet

1. General description

PNP switching transistor in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

NPN complement: PMBT2222A

40V variant: PMBT2907

2. Features and benefits

Single general-purpose switching transistor

AEC-Q101 qualified

3. Applications

Switching and linear amplification

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V _{CEO}	collector-emitter voltage	open base	-	-	-60	V
I _C	collector current		-	-	-600	mA
h _{FE}	DC current gain	V_{CE} = -10 V; I_{C} = -150 mA; T_{amb} = 25 °C	100	-	300	

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	В	base	3	C
2	E	emitter		В—
3	С	collector	TO-236AB (SOT23)	E sym132



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6. Ordering information

Table 3. Ordering information

Type number	Package					
	Name	Description	Version			
PMBT2907A	TO-236AB	plastic surface-mounted package; 3 leads	SOT23			

7. Marking

Table 4. Marking codes

Type number	Marking code [1]
PMBT2907A	%2F

[1] % = placeholder for manufacturing site code

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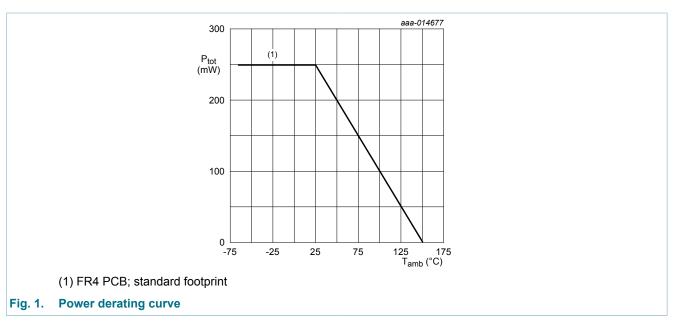
8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
V_{CBO}	collector-base voltage	open emitter		-	-60	V
V _{CEO}	collector-emitter voltage	open base		-	-60	V
V _{EBO}	emitter-base voltage	open collector		-	-5	V
I _C	collector current			-	-600	mA
I _{CM}	peak collector current	single pulse; t _p ≤ 1 ms		-	-800	mA
I _{BM}	peak base current			-	-200	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	250	mW
Tj	junction temperature			-	150	°C
T _{amb}	ambient temperature			-65	150	°C
T _{stg}	storage temperature			-65	150	°C

[1] Transistor mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.



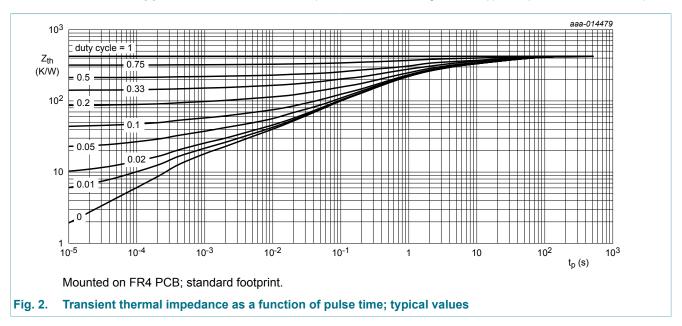
9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
R _{th(j-a)}	thermal resistance from junction to ambient	in free air	[1]	-	-	500	K/W
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[1] Transistor mounted on an FR4 printed-circuit board, single-sided copper, tin-plated and standard footprint.



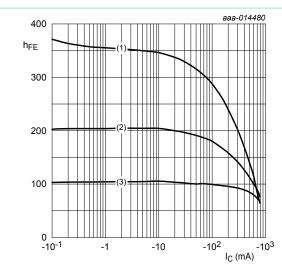
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10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
I _{CBO}	collector-base cut-off	V _{CB} = -50 V; I _E = 0 A; T _{amb} = 25 °C	-	-	-10	nA
	current	V _{CB} = -50 V; I _E = 0 A; T _j = 125 °C	-	-	-10	μA
I _{EBO}	emitter-base cut-off current	V _{EB} = -5 V; I _C = 0 A; T _{amb} = 25 °C	-	-	-50	nA
h _{FE}	DC current gain	V _{CE} = -10 V; I _C = -0.1 mA; T _{amb} = 25 °C	75	-	-	
		V_{CE} = -10 V; I_{C} = -1 mA; T_{amb} = 25 °C	100	-	-	
		V_{CE} = -10 V; I_{C} = -10 mA; T_{amb} = 25 °C	100	-	-	
		$V_{CE} = -10 \text{ V; } I_{C} = -150 \text{ mA;}$ $T_{amb} = 25 ^{\circ}\text{C}$	100	-	300	
		V_{CE} = -10 V; I_{C} = -500 mA; T_{amb} = 25 °C	50	-	-	
OLSat	collector-emitter saturation voltage	I_C = -150 mA; I_B = -15 mA; T_{amb} = 25 °C	-	-	-400	mV
		I_{C} = -500 mA; I_{B} = -50 mA; T_{amb} = 25 °C	-	-	-1.6	V
V _{BEsat}	base-emitter saturation voltage	I_{C} = -150 mA; I_{B} = -15 mA; T_{amb} = 25 °C	-	-	-1.3	V
		I_C = -500 mA; I_B = -50 mA; T_{amb} = 25 °C	-	-	-2.6	V
t _d	delay time	I _C = -150 mA; I _{Bon} = -15 mA;	-	-	12	ns
t _r	rise time	I _{Boff} = 15 mA; T _{amb} = 25 °C	-	-	30	ns
t _{on}	turn-on time		-	-	40	ns
t _s	storage time		-	-	300	ns
t _f	fall time		-	-	65	ns
t _{off}	turn-off time		-	-	365	ns
C _C	collector capacitance	$V_{CB} = -10 \text{ V}; I_E = 0 \text{ A}; i_e = 0 \text{ A};$ $f = 1 \text{ MHz}; T_{amb} = 25 \text{ °C}$	-	-	8	pF
C _E	emitter capacitance	V_{EB} = -2 V; I_{C} = 0 A; i_{c} = 0 A; f = 1 MHz; T_{amb} = 25 °C	-	-	30	pF
f _T	transition frequency	V_{CE} = -20 V; I_{C} = -50 mA; f = 100 MHz; T_{amb} = 25 °C	200	-	-	MHz

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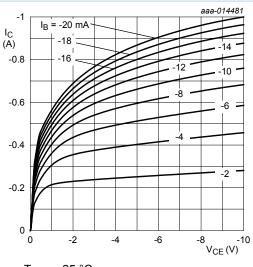
$$V_{CE} = -10 \text{ V}$$

(1)
$$T_{amb} = 150 \, ^{\circ}C$$

(2)
$$T_{amb} = 25 \, ^{\circ}C$$

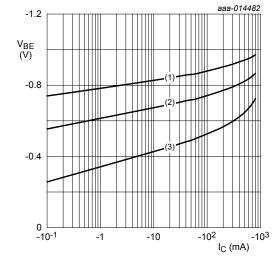
(3)
$$T_{amb} = -55$$
 °C

Fig. 3. DC current gain as a function of collector current; typical values



 T_{amb} = 25 °C

Fig. 4. Collector current as a function of collectoremitter voltage; typical values



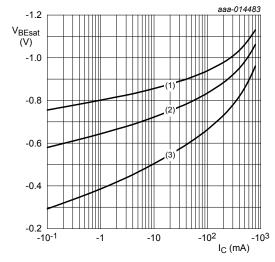
$$V_{CE} = -10 \text{ V}$$

(1)
$$T_{amb} = -55 \, ^{\circ}C$$

(2)
$$T_{amb}$$
 = 25 °C

(3)
$$T_{amb} = 150 \, ^{\circ}C$$

Fig. 5. Base-emitter voltage as a function of collector current; typical values



$$I_{\rm C}/I_{\rm B} = 10$$

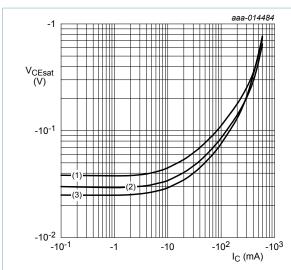
(1)
$$T_{amb} = -55 \, ^{\circ}C$$

(2)
$$T_{amb}$$
 = 25 °C

(3)
$$T_{amb} = 150 \, ^{\circ}C$$

Fig. 6. Base-emitter saturation voltage as a function of collector current; typical values

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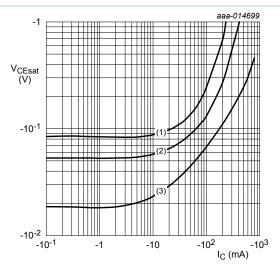
$$I_{\rm C}/I_{\rm B}=20$$

(1)
$$T_{amb} = 150 \, ^{\circ}C$$

(2)
$$T_{amb}$$
 = 25 °C

(3)
$$T_{amb} = -55 \, ^{\circ}C$$

Fig. 7. Collector-emitter saturation voltage as a function of collector current; typical values



$$T_{amb}$$
 = 25 °C

(1)
$$I_C/I_B = 100$$

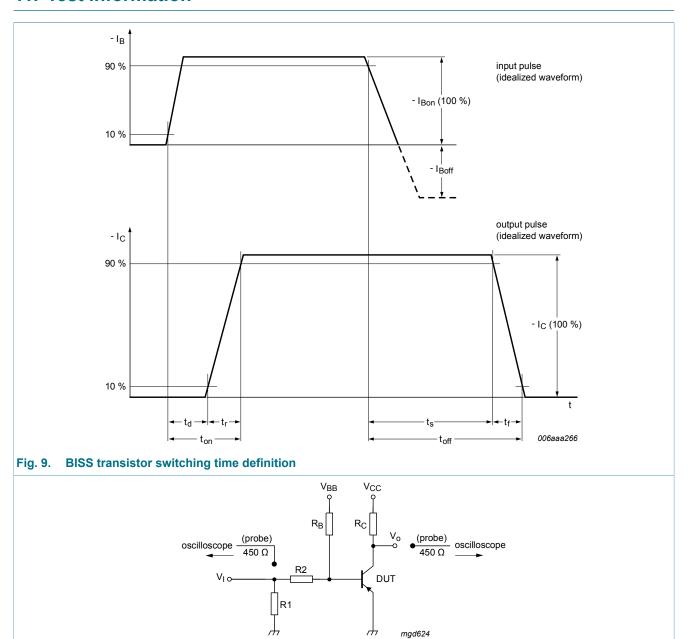
(2)
$$I_C/I_B = 50$$

(3)
$$I_C/I_B = 10$$

Fig. 8. Collector-emitter saturation voltage as a function of collector current; typical values

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11. Test information



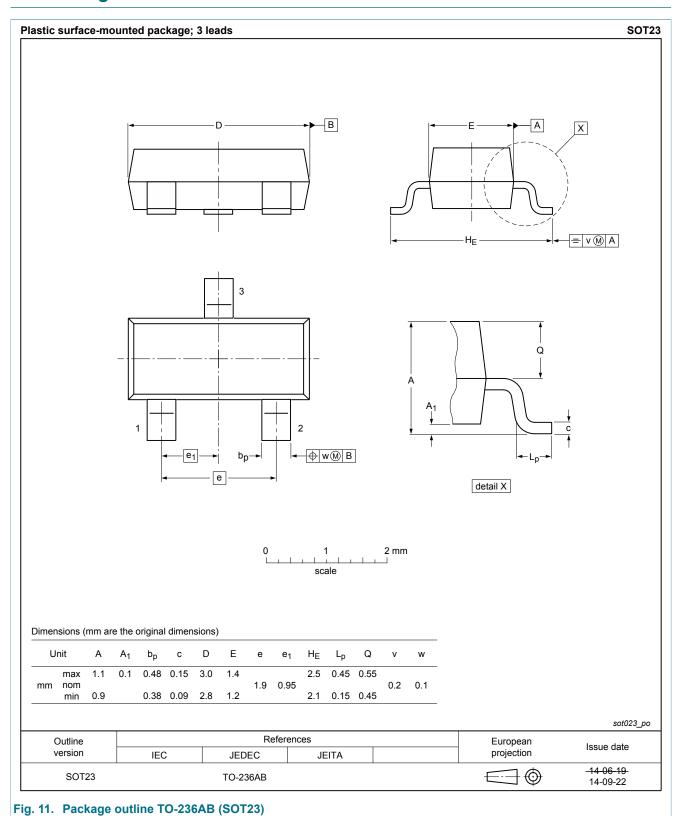
11.1 Quality information

Fig. 10. Test circuit for switching times

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard *Q101 - Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

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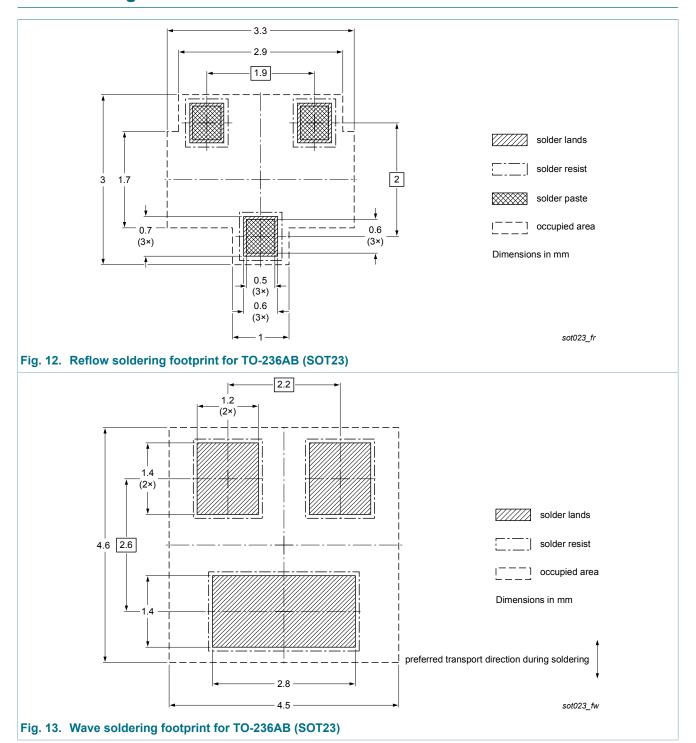
12. Package outline



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13. Soldering



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14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMBT2907A v.5	20150306	Product data sheet	-	PMBT2907_ PMBT2907A v.4
Modifications:	of NXP Semiconducture. Legal texts have be	ctors en adapted to the new co	signed to comply with the ompany name where app nto two separate data she	ropriate
PMBT2907_ PMBT2907A v.4	20040116	Product data sheet	-	PMBT2907_ PMBT2907A v.3
PMBT2907_ PMBT2907A v.3	19990427	Product specification	-	PMBT2907_ PMBT2907A v.2
PMBT2907_ PMBT2907A v.2	19970904	Product specification	-	PMBT2907_ PMBT2907A v.1
PMBT2907_ PMBT2907A v.1	19970507	Product specification	-	-

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15.1 Data sheet status

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.
Product [short] data sheet	Production	This document contains the product specification.

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