PMBTA42

300 V, 100 mA NPN high-voltage transistor

11 November 2024 **Product data sheet**

1. General description

NPN high-voltage transistor in a small SOT23 Surface-Mounted Device (SMD) plastic package.

PNP complement: PMBTA92

2. Features and benefits

- High voltage (max. 300 V)
- AEC-Q101 qualified

3. Applications

- Telephony and professional communication equipment

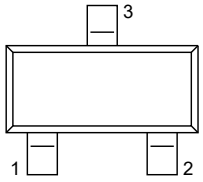
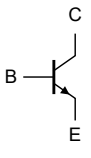
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base		-	-	300	V
I_C	collector current			-	-	100	mA
h_{FE}	DC current gain	V_{CE} = 10 V; I_C = 1 mA; T_{amb} = 25 °C		25	-	-	
		V_{CE} = 10 V; I_C = 10 mA; T_{amb} = 25 °C		40	-	-	
		V_{CE} = 10 V; I_C = 30 mA; T_{amb} = 25 °C		40	-	-	

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 SOT23	 sym021
2	E	emitter		
3	C	collector		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMBTA42	SOT23	plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body	SOT23

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
PMBTA42	%1D

[1] % = placeholder for manufacturing site code

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		-	300	V
V_{CEO}	collector-emitter voltage	open base		-	300	V
V_{EBO}	emitter-base voltage	open collector		-	6	V
I_C	collector current			-	100	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms		-	200	mA
I_{BM}	peak base current			-	100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	250	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-65	150	°C
T_{stg}	storage temperature			-65	150	°C

[1] Device 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	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	500	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	V_{CB} = 200 V; I_E = 0 A; T_{amb} = 25 °C		-	-	100	nA
I_{EBO}	emitter-base cut-off current	V_{EB} = 6 V; I_C = 0 A; T_{amb} = 25 °C		-	-	100	nA
h_{FE}	DC current gain	V_{CE} = 10 V; I_C = 1 mA; T_{amb} = 25 °C		25	-	-	
		V_{CE} = 10 V; I_C = 10 mA; T_{amb} = 25 °C		40	-	-	
		V_{CE} = 10 V; I_C = 30 mA; T_{amb} = 25 °C		40	-	-	
V_{CEsat}	collector-emitter saturation voltage	I_C = 20 mA; I_B = 2 mA; T_{amb} = 25 °C		-	-	500	mV
V_{BEsat}	base-emitter saturation voltage			-	-	900	mV
C_{re}	feedback capacitance	V_{CB} = 20 V; I_C = 0 A; i_c = 0 A; f = 1 MHz; T_{amb} = 25 °C		-	-	3	F
f_T	transition frequency	V_{CE} = 20 V; I_C = 10 mA; f = 100 MHz; T_{amb} = 25 °C		50	-	-	MHz

11. Test information

Quality information

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.

12. Package outline

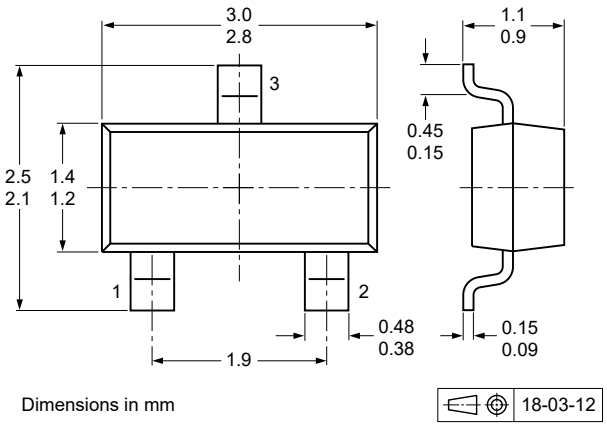


Fig. 1. Package outline SOT23

13. Soldering

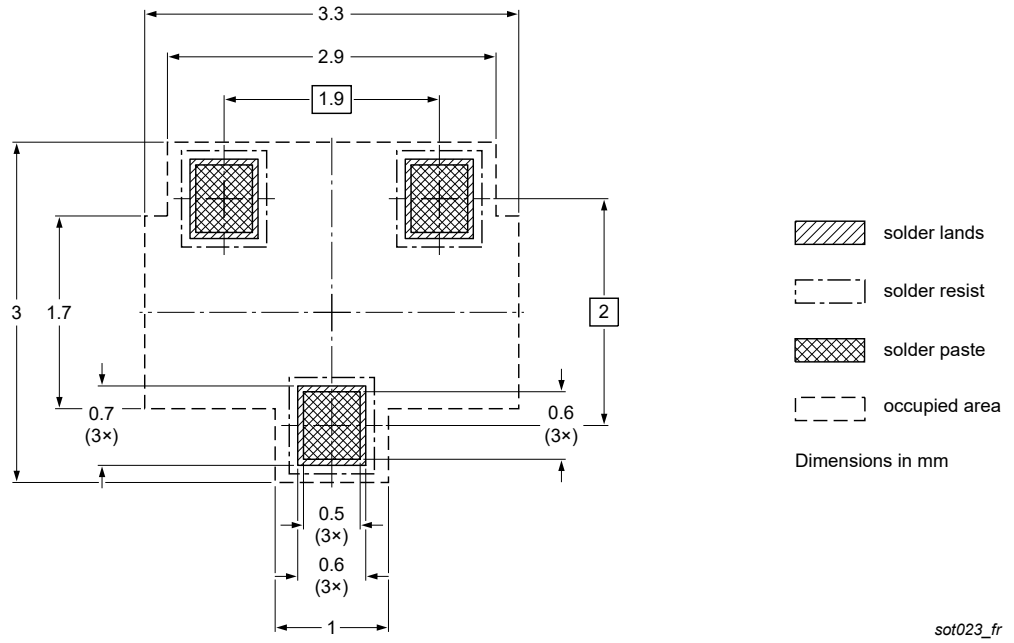


Fig. 2. Reflow soldering footprint for SOT23

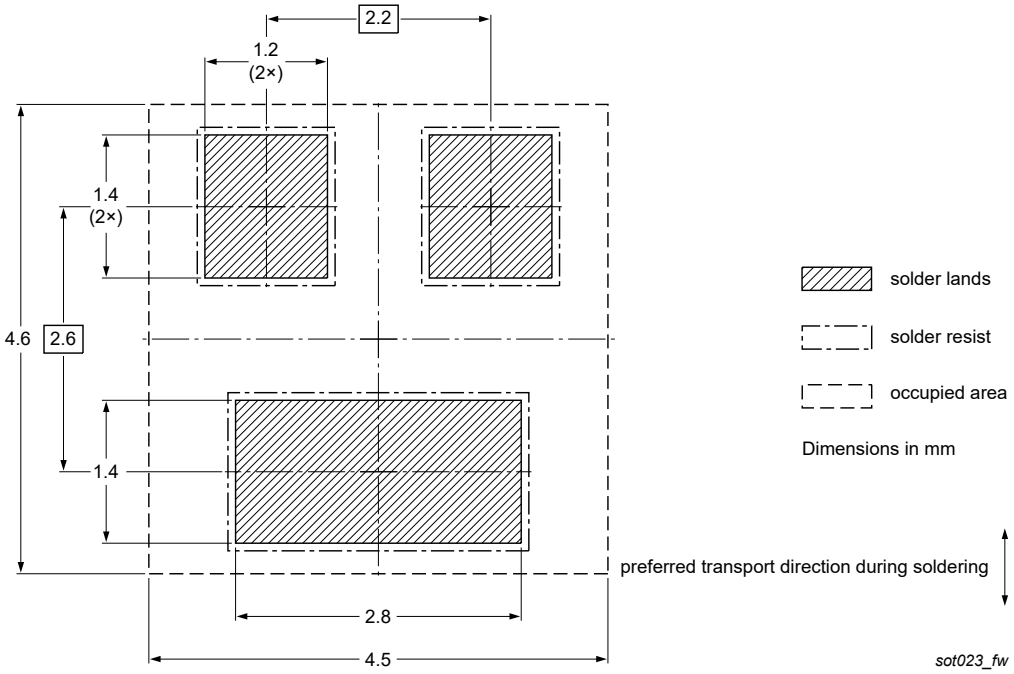


Fig. 3. Wave soldering footprint for SOT23

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMBTA42 v.8	20241111	Product data sheet	-	PMBTA42 v.7
Modifications:	• Data sheet turned back to automotive qualification again			
PMBTA42 v.7	20241009	Product data sheet	-	PMBTA42 v.6
PMBTA42 v.6	20230703	Product data sheet	-	PMBTA42 _5
PMBTA42 _5	20081212	Product data sheet	-	PMBTA42 _4
PMBTA42 _4	20040122	Product specification	-	PMBTA42 _3
PMBTA42 _3	19990422	Product specification	-	PMBTA42_43_CNV_2

15. Legal information

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.

[1] Please consult the most recently issued document before initiating or completing a design.
[2] The term 'short data sheet' is explained in section "Definitions".
[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at https://www.nexperia.com.

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