

# **2PB709ART**

# 45 V, 100 mA PNP general-purpose transistor Rev. 01 — 19 March 2007

**Product data sheet** 

### **Product profile**

### 1.1 General description

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

NPN complement: 2PD601ART.

### 1.2 Features

- General-purpose transistor
- Small SMD plastic package

### 1.3 Applications

■ General-purpose switching and amplification

#### 1.4 Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
$V_{CEO}$	collector-emitter voltage	open base	-	-	-45	V
I <sub>C</sub>	collector current		-	-	-100	mA
h <sub>FE</sub>	DC current gain	$V_{CE} = -10 \text{ V};$ $I_{C} = -2 \text{ mA}$	210	-	340	

### 2. Pinning information

Table 2. **Pinning** 

Pin	Description	Simplified outline	Symbol
1	base		
2	emitter	3	3 
3	collector	1 2	1 — 2
			sym013



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# 3. Ordering information

Table 3. Ordering information

Type number	Package					
	Name	Description	Version			
2PB709ART	-	plastic surface-mounted package; 3 leads	SOT23			

### 4. Marking

Table 4. Marking codes

Type number	Marking code <sup>[1]</sup>
2PB709ART	C5*

<sup>[1] \* = -:</sup> made in Hong Kong

# 5. 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	-	-45	V
$V_{CEO}$	collector-emitter voltage	open base	-	-45	V
$V_{EBO}$	emitter-base voltage	open collector	-	-6	V
I <sub>C</sub>	collector current		-	-100	mA
I <sub>CM</sub>	peak collector current	$\begin{array}{l} \text{single pulse;} \\ t_p \leq 1 \text{ ms} \end{array}$	-	-200	mA
I <sub>BM</sub>	peak base current	$\begin{array}{l} \text{single pulse;} \\ t_p \leq 1 \text{ ms} \end{array}$	-	-100	mA
P <sub>tot</sub>	total power dissipation	$T_{amb} \le 25  ^{\circ}C$	<u>[1]</u> _	250	mW
Tj	junction temperature		-	150	°C
T <sub>amb</sub>	ambient temperature		-65	+150	°C
T <sub>stg</sub>	storage temperature		-65	+150	°C

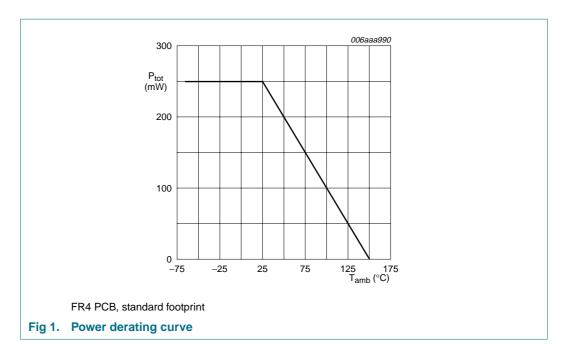
<sup>[1]</sup> Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

<sup>\* =</sup> p: made in Hong Kong

<sup>\* =</sup> t: made in Malaysia

<sup>\* =</sup> W: made in China

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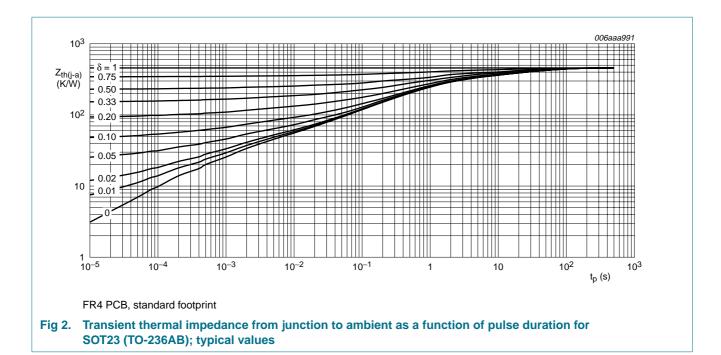
### 6. Thermal characteristics

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
$R_{th(j-sp)}$	thermal resistance from junction to solder point		-	-	140	K/W

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

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### 7. Characteristics

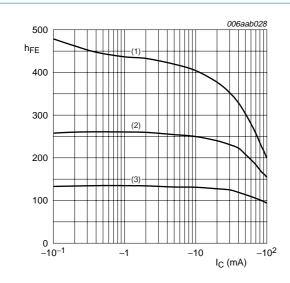
Table 7. Characteristics

 $T_{amb} = 25 \,^{\circ}C$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
Cyllibol	i arameter	Conditions	141111	ijΡ	IVIAA	Oilit
$I_{CBO}$		$V_{CB} = -45 \text{ V}; I_E = 0 \text{ A}$	-	-	-10	nA
	current	$V_{CB} = -45 \text{ V}; I_{E} = 0 \text{ A};$ $T_{j} = 150 ^{\circ}\text{C}$	-	-	<b>-</b> 5	μΑ
I <sub>EBO</sub>	emitter-base cut-off current	$V_{EB} = -5 \text{ V}; I_C = 0 \text{ A}$	-	-	<b>–10</b>	nA
h <sub>FE</sub>	DC current gain	$V_{CE} = -10 \text{ V};$ $I_{C} = -2 \text{ mA}$	210	-	340	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = -100 \text{ mA};$ $I_B = -10 \text{ mA}$	<u>[1]</u> _	-	-500	mV
f <sub>T</sub>	transition frequency	$V_{CE} = -10 \text{ V};$ $I_{C} = -1 \text{ mA};$ f = 100  MHz	70	-	-	MHz
C <sub>c</sub>	collector capacitance	$V_{CB} = -10 \text{ V};$ $I_E = i_e = 0 \text{ A};$ f = 1  MHz	-	-	5	pF

<sup>[1]</sup> Pulse test:  $t_p \le 300 \ \mu s; \ \delta \le 0.02.$ 

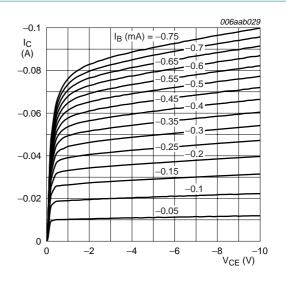
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$$V_{CE} = -10 \text{ V}$$

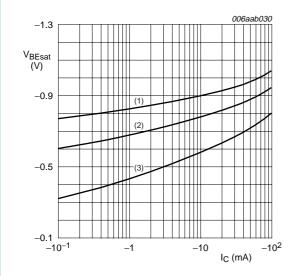
- (1)  $T_{amb} = 150 \, ^{\circ}C$
- (2)  $T_{amb} = 25 \, ^{\circ}C$
- (3)  $T_{amb} = -55 \, ^{\circ}C$

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



T<sub>amb</sub> = 25 °C

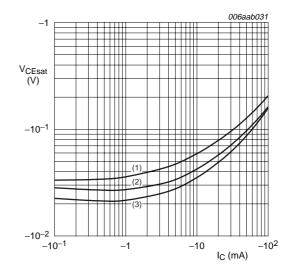
Fig 4. Collector current as a function of collector-emitter voltage; typical values





- (1)  $T_{amb} = -55 \,^{\circ}C$
- (2) T<sub>amb</sub> = 25 °C
- (3)  $T_{amb} = 150 \, ^{\circ}C$

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



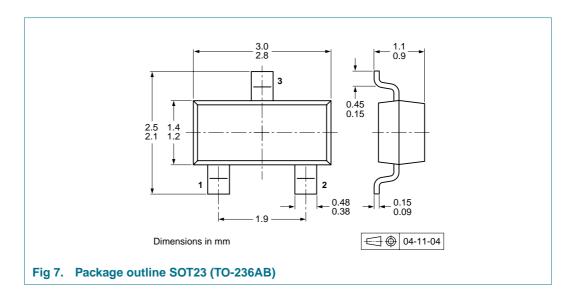
 $I_{\rm C}/I_{\rm B} = 10$ 

- (1)  $T_{amb} = 150 \, ^{\circ}C$
- (2)  $T_{amb} = 25 \, ^{\circ}C$
- (3)  $T_{amb} = -55 \, ^{\circ}C$

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

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# 8. Package outline



# 9. Packing information

Table 8. Packing methods

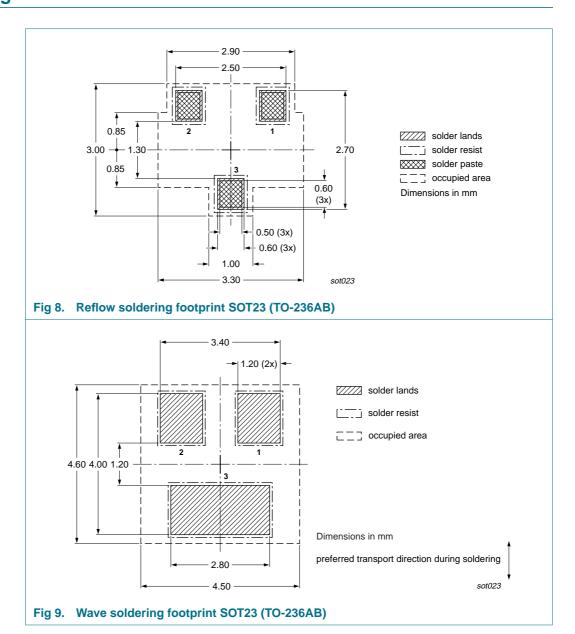
The indicated -xxx are the last three digits of the 12NC ordering code.[1]

Type number	Package	Description	Packing qu	antity
			3000	10000
2PB709ART	SOT23	4 mm pitch, 8 mm tape and reel	-215	-235

<sup>[1]</sup> For further information and the availability of packing methods, see Section 13.

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# 10. Soldering



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# 11. Revision history

### Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
2PB709ART_1	20070319	Product data sheet	-	-

#### 45 V, 100 mA PNP general-purpose transistor

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

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