



# 2PD602AQL; 2PD602ARL; 2PD602ASL

50 V, 500 mA NPN general-purpose transistors

Rev. 01 — 27 October 2008

Product data sheet

## 1. Product profile

### 1.1 General description

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

Table 1. Product overview

Type number <sup>[1]</sup>	Package		PNP complement
	Nexperia	JEDEC	
2PD602AQL	SOT23	TO-236AB	-
2PD602ARL			2PB710ARL
2PD602ASL			2PB710ASL
2PD602AQL/DG	SOT23	TO-236AB	-
2PD602ARL/DG			2PB710ARL/DG
2PD602ASL/DG			2PB710ASL/DG

[1] /DG: halogen-free

### 1.2 Features

- General-purpose transistors
- Three current gain selections
- AEC-Q101 qualified
- Small SMD plastic package

### 1.3 Applications

- General-purpose switching and amplification

### 1.4 Quick reference data

Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{CEO}$	collector-emitter voltage	open base	-	-	50	V
$I_C$	collector current		-	-	500	mA

nexperia

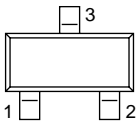
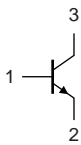
Table 2. Quick reference data ...continued

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$h_{FE}$	DC current gain	$V_{CE} = 10\text{ V};$ $I_C = 150\text{ mA}$	[1]			
	$h_{FE}$ group Q		85	-	170	
	$h_{FE}$ group R		120	-	240	
	$h_{FE}$ group S		170	-	340	

[1] Pulse test:  $t_p \leq 300\ \mu\text{s}; \delta \leq 0.02$ .

## 2. Pinning information

Table 3. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	base		
2	emitter		
3	collector		

*sym021*

## 3. Ordering information

Table 4. Ordering information

Type number <sup>[1]</sup>	Package		
	Name	Description	Version
2PD602AQL	-	plastic surface-mounted package; 3 leads	SOT23
2PD602ARL			
2PD602ASL			
2PD602AQL/DG	-	plastic surface-mounted package; 3 leads	SOT23
2PD602ARL/DG			
2PD602ASL/DG			

[1] /DG: halogen-free

## 4. Marking

Table 5. Marking codes

Type number	Marking code <sup>[1]</sup>
2PD602AQL	SH*
2PD602ARL	SG*
2PD602ASL	SF*

**Table 5. Marking codes ...continued**

Type number	Marking code <sup>[1]</sup>
2PD602AQL/DG	SX*
2PD602ARL/DG	SW*
2PD602ASL/DG	SV*

- [1] \* = -: made in Hong Kong  
 \* = p: made in Hong Kong  
 \* = t: made in Malaysia  
 \* = W: made in China

## 5. Limiting values

**Table 6. 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	-	50	V
$V_{EBO}$	emitter-base voltage	open collector	-	5	V
$I_C$	collector current		-	500	mA
$I_{CM}$	peak collector current	single pulse; $t_p \leq 1$ ms	-	1	A
$I_{BM}$	peak base current	single pulse; $t_p \leq 1$ ms	-	200	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25$ °C	<sup>[1]</sup> -	250	mW
$T_j$	junction temperature		-	150	°C
$T_{amb}$	ambient temperature		-55	+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.

## 6. Thermal characteristics

**Table 7. Thermal characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	<sup>[1]</sup> -	-	500	K/W

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

## 7. Characteristics

**Table 8. Characteristics**

$T_{amb} = 25\text{ °C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 60\text{ V}; I_E = 0\text{ A}$	-	-	10	nA
		$V_{CB} = 60\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ °C}$	-	-	5	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 4\text{ V}; I_C = 0\text{ A}$	-	-	10	nA
$h_{FE}$	DC current gain	$V_{CE} = 10\text{ V}; I_C = 500\text{ mA}$	[1] 40	-	-	
	$h_{FE}$ group Q	$V_{CE} = 10\text{ V}; I_C = 150\text{ mA}$	[1] 85	-	170	
	$h_{FE}$ group R	$V_{CE} = 10\text{ V}; I_C = 150\text{ mA}$	[1] 120	-	240	
	$h_{FE}$ group S	$V_{CE} = 10\text{ V}; I_C = 150\text{ mA}$	[1] 170	-	340	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 300\text{ mA}; I_B = 30\text{ mA}$	[1] -	-	600	mV
$f_T$	transition frequency	$V_{CE} = 10\text{ V}; I_C = 50\text{ mA}; f = 100\text{ MHz}$	[1]			
	$h_{FE}$ group Q		140	-	-	MHz
	$h_{FE}$ group R		160	-	-	MHz
	$h_{FE}$ group S		180	-	-	MHz
$C_c$	collector capacitance	$V_{CB} = 10\text{ V}; I_E = I_e = 0\text{ A}; f = 1\text{ MHz}$	-	-	15	pF

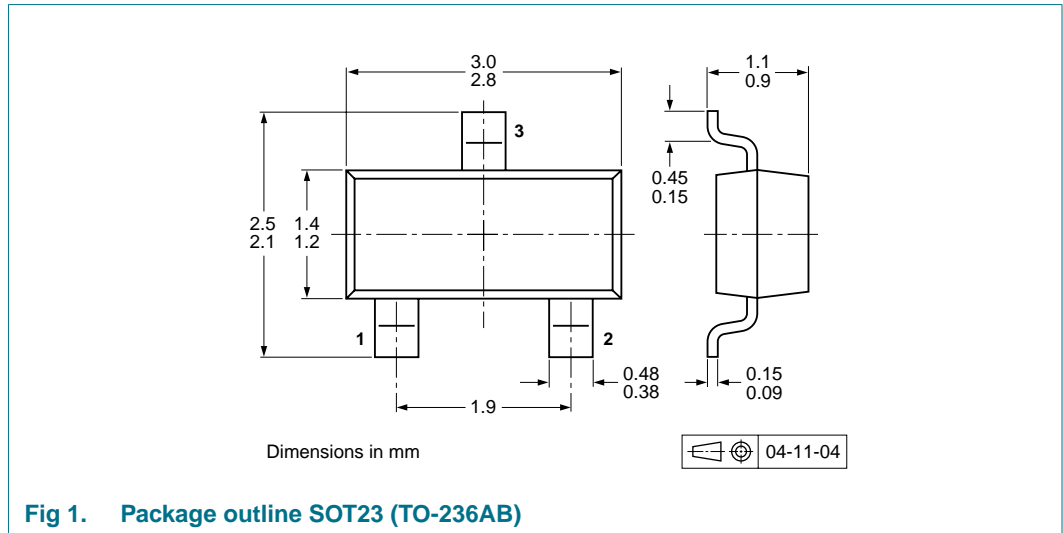
[1] Pulse test:  $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02$ .

## 8. Test information

### 8.1 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.

## 9. Package outline



## 10. Packing information

**Table 9. Packing methods**

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

Type number <sup>[2]</sup>	Package	Description	Packing quantity	
			3000	10000
2PD602AQL	SOT23	4 mm pitch, 8 mm tape and reel	-215	-235
2PD602ARL				
2PD602ASL				
2PD602AQL/DG	SOT23	4 mm pitch, 8 mm tape and reel	-215	-235
2PD602ARL/DG				
2PD602ASL/DG				

[1] For further information and the availability of packing methods, see [Section 14](#).

[2] /DG: halogen-free

11. Soldering

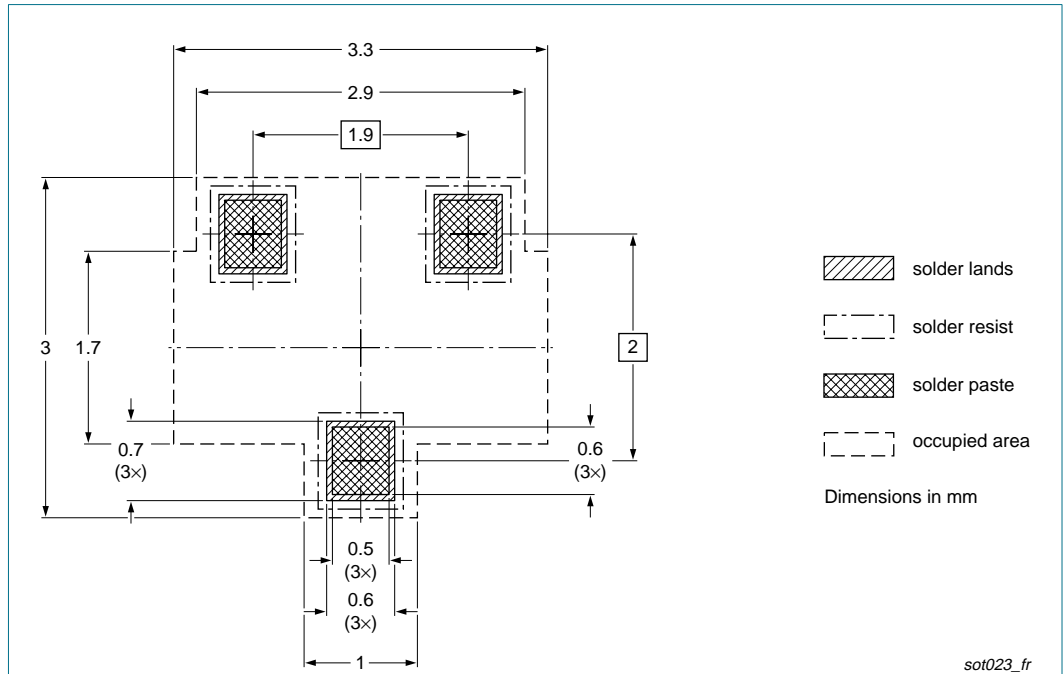


Fig 2. Reflow soldering footprint SOT23 (TO-236AB)

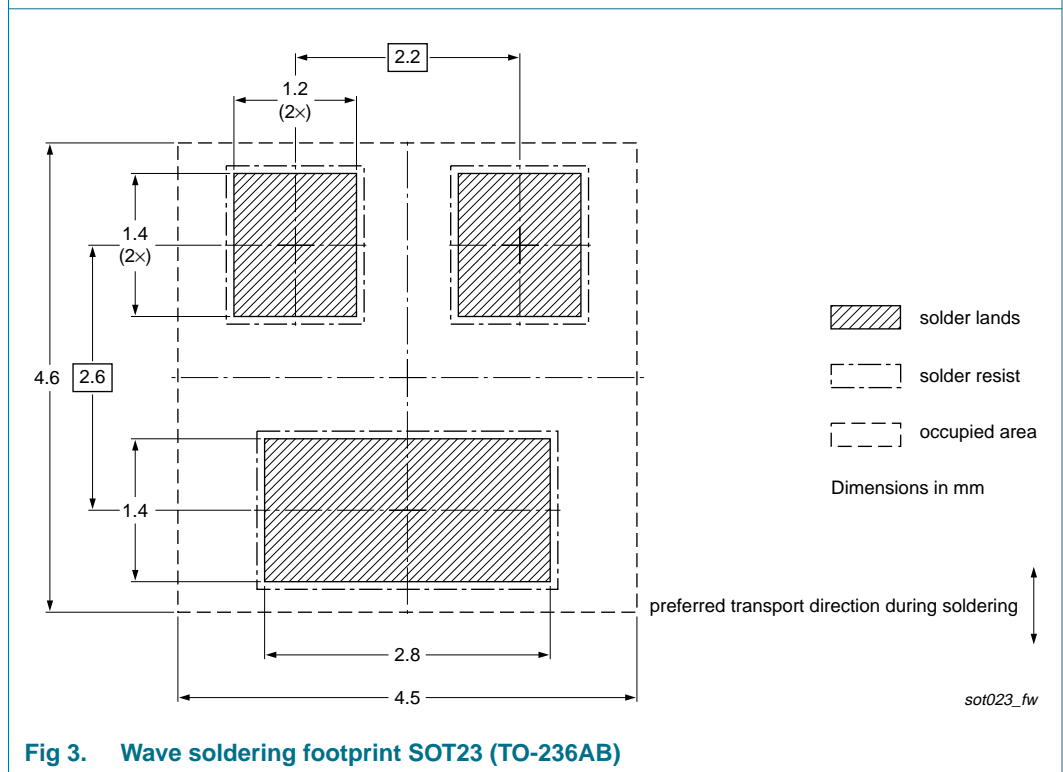


Fig 3. Wave soldering footprint SOT23 (TO-236AB)

## 12. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
2PD602AXL_1	20081027	Product data sheet	-	-

## 13. Legal information

### 13.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	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 URL <http://www.nexperia.com>.

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For sales office addresses, please send an email to: [salesaddresses@nexperia.com](mailto:salesaddresses@nexperia.com)



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