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[1]	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

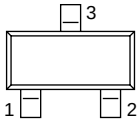
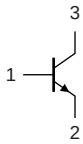
Table 2. Quick reference data *…continued*

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

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

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[1]	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[1]
2PD602AQL	SH*
2PD602ARL	SG*
2PD602ASL	SF*

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Table 5. Marking codes *…continued*

Type number	Marking code[1]
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	[1]	-	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	[1]	-	-	500	K/W

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

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7. Characteristics

Table 8. Characteristics

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

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

[1] Pulse test: $t_p \leq 300$ µs; $\delta \leq 0.02$.

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.

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9. Package outline

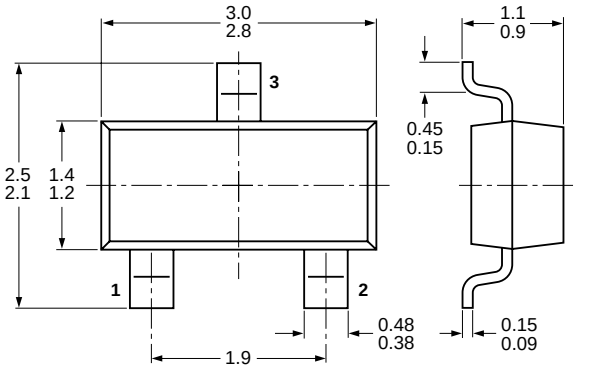

Fig 1. Package outline SOT23 (TO-236AB)

10. Packing information

Table 9. Packing methods

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

Type number[2]	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

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11. Soldering

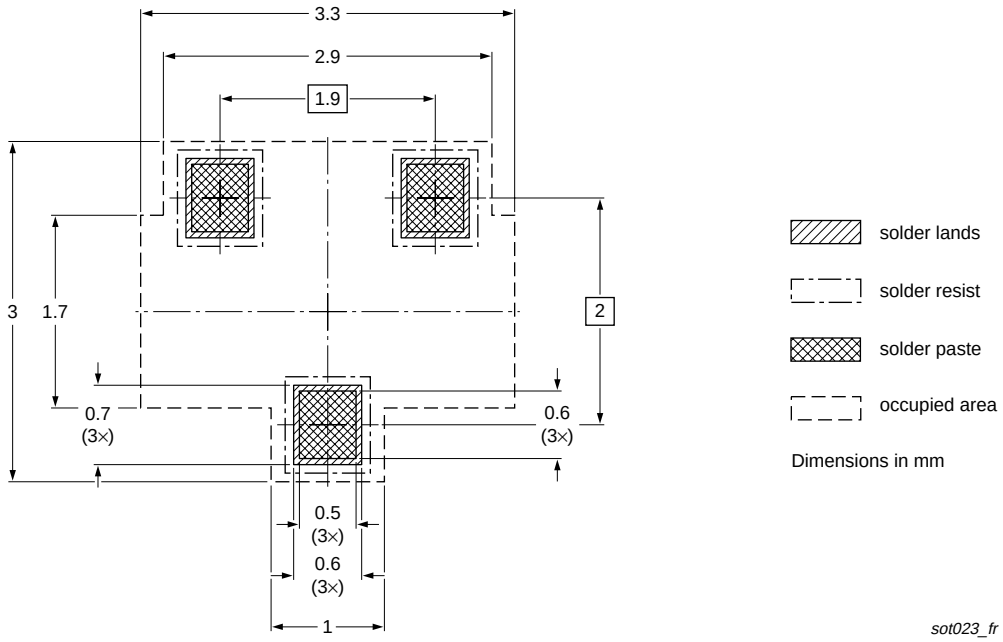

Fig 2. Reflow soldering footprint SOT23 (TO-236AB)

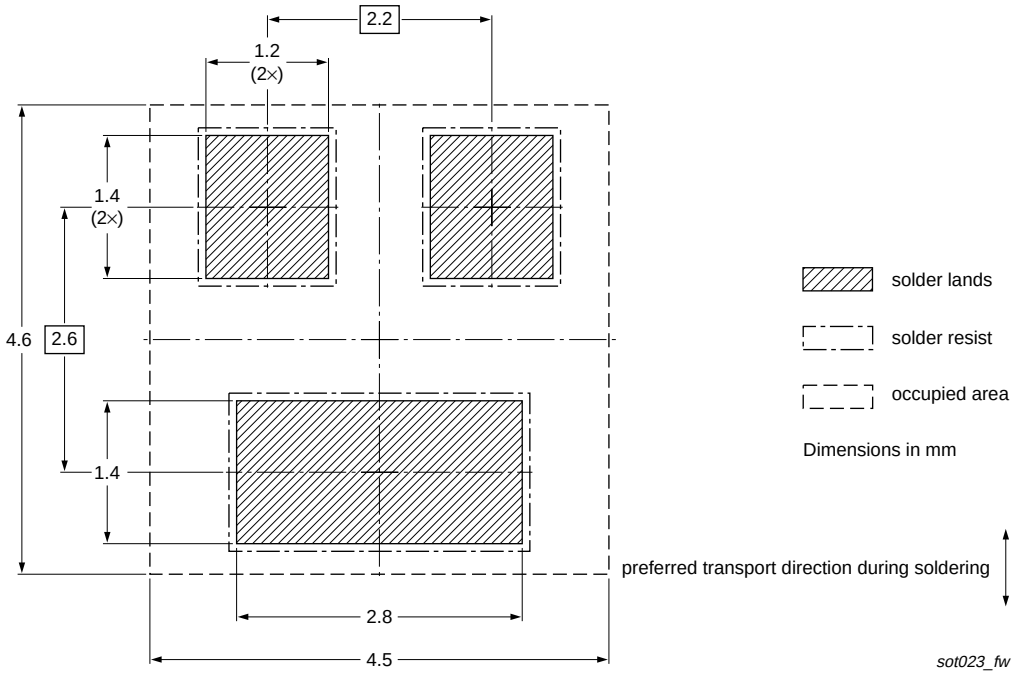

Fig 3. Wave soldering footprint SOT23 (TO-236AB)

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12. Revision history

Table 10. Revision history

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

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13. Legal information

13.1 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.

[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".

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15. Contents

1 Product profile 1
1.1 General description 1
1.2 Features 1
1.3 Applications 1
1.4 Quick reference data 1
2 Pinning information 2
3 Ordering information 2
4 Marking 2
5 Limiting values 3
6 Thermal characteristics 3
7 Characteristics 4
8 Test information 4
8.1 Quality information 4
9 Package outline 5
10 Packing information 5
11 Soldering 6
12 Revision history 7
13 Legal information 8
13.1 Data sheet status 8
13.2 Definitions 8
13.3 Disclaimers 8
13.4 Trademarks 8
14 Contact information 8
15 Contents 9

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