

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
	NXP	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_{CE0}	collector-emitter voltage	open base	-	-	50	V
I_C	collector current		-	-	500	mA



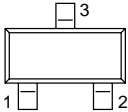
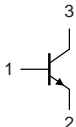
Table 2. Quick reference data ...continued

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
h_{FE}	DC current gain	$V_{CE} = 10\text{ V};$ $I_C = 150\text{ mA}$	[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		 sym021
2	emitter		
3	collector		

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*

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.

7. Characteristics

Table 8. Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$ 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	
		$V_{CB} = 60\text{ V}; I_E = 0\text{ A};$ $T_j = 150\text{ }^{\circ}\text{C}$	-	-	5	μA	
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	

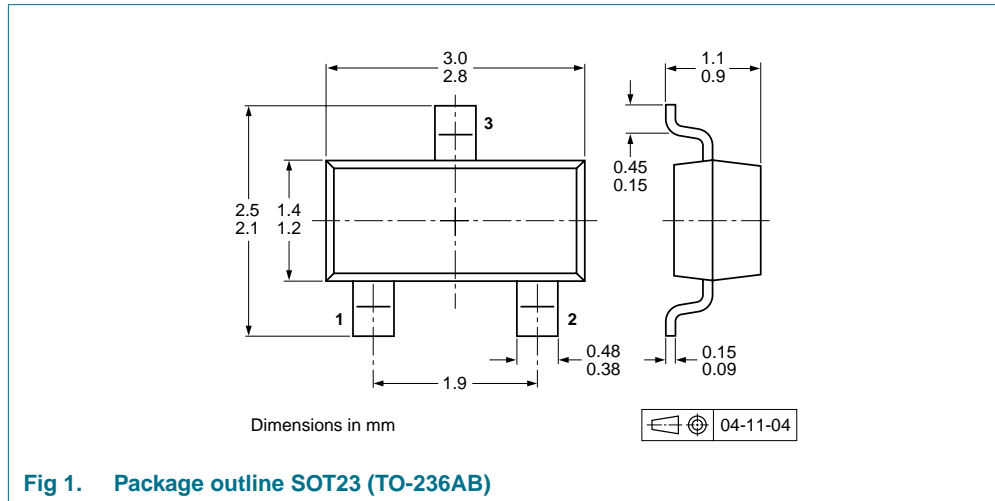
[1] Pulse test: $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02$.

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.^[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

11. Soldering

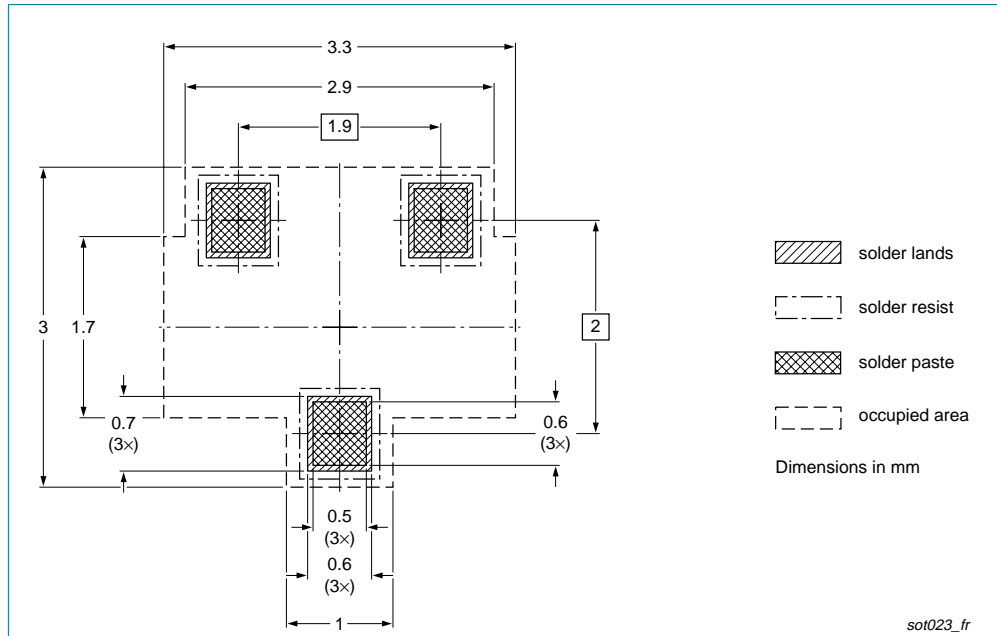


Fig 2. Reflow soldering footprint SOT23 (TO-236AB)

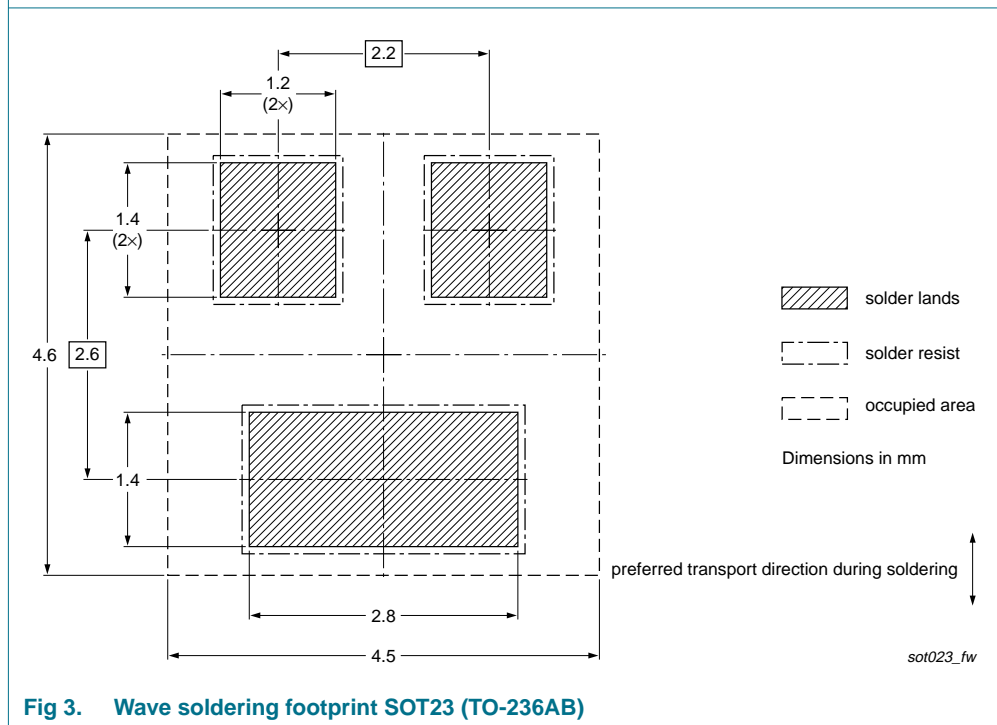


Fig 3. Wave soldering footprint SOT23 (TO-236AB)

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 ^{[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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