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## Product Reference Information

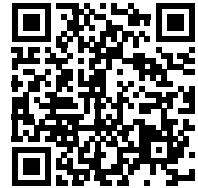
**Part Number:** 2PD602AQL,215  
**Manufacturer:** Nexperia USA Inc.  
**Package:** TO-236-3, SC-59, SOT-23-3  
**Availability:** Please confirm with sales

### Product Page:

<https://antrexco.com/product/details/nexperia-usa-inc/2pd602aql-215.html>

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### Note:

This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.

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# 2PD602AQL

50 V, 500 mA NPN general-purpose transistor

25 May 2023

Product data sheet

## 1. General description

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

## 2. Features and benefits

- General-purpose transistor
- Small SMD plastic package
- AEC-Q101 qualified

## 3. Applications

- General-purpose switching and amplification

## 4. Quick reference data

Table 1. 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   |
| $h_{FE}$  | DC current gain           | $V_{CE} = 10\text{ V}$ ; $I_C = 150\text{ mA}$ ; pulsed; $t_p \leq 300\text{ }\mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25\text{ }^\circ\text{C}$ | 85  | -   | 170 |      |

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------|--------------------|----------------|
| 1   | B      | base        | <br>SOT23          | <br>sym021     |
| 2   | E      | emitter     |                    |                |
| 3   | C      | collector   |                    |                |

6. Ordering information

Table 3. Ordering information

| Type number | Package |                                                                                          |         |
|-------------|---------|------------------------------------------------------------------------------------------|---------|
|             | Name    | Description                                                                              | Version |
| 2PD602AQL   | 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] |
|-------------|-----------------|
| 2PD602AQL   | SH%             |

[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 <sub>CBO</sub> | collector-base voltage    | open emitter                        |     | -   | 60  | V    |
| V <sub>CEO</sub> | collector-emitter voltage | open base                           |     | -   | 50  | V    |
| V <sub>EBO</sub> | emitter-base voltage      | open collector                      |     | -   | 5   | V    |
| I <sub>C</sub>   | collector current         |                                     |     | -   | 500 | mA   |
| I <sub>CM</sub>  | peak collector current    | single pulse; t <sub>p</sub> ≤ 1 ms |     | -   | 1   | A    |
| I <sub>BM</sub>  | peak base current         |                                     |     | -   | 200 | mA   |
| P <sub>tot</sub> | total power dissipation   | T <sub>amb</sub> ≤ 25 °C            | [1] | -   | 250 | mW   |
| T <sub>j</sub>   | junction temperature      |                                     |     | -   | 150 | °C   |
| T <sub>amb</sub> | ambient temperature       |                                     |     | -55 | 150 | °C   |
| T <sub>stg</sub> | 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 <sub>th(j-a)</sub> | 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       | $V_{CB} = 60\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$                                                                      | -   | -   | 10  | nA            |
|             |                                      | $V_{CB} = 60\text{ V}; I_E = 0\text{ A}; T_{amb} = 150\text{ }^{\circ}\text{C}$                                                                     | -   | -   | 5   | $\mu\text{A}$ |
| $I_{EBO}$   | emitter-base cut-off current         | $V_{EB} = 4\text{ V}; I_C = 0\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$                                                                       | -   | -   | 10  | nA            |
| $h_{FE}$    | DC current gain                      | $V_{CE} = 10\text{ V}; I_C = 500\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^{\circ}\text{C}$ | 40  | -   | -   |               |
|             |                                      | $V_{CE} = 10\text{ V}; I_C = 150\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^{\circ}\text{C}$ | 85  | -   | 170 |               |
| $V_{CEsat}$ | collector-emitter saturation voltage | $I_C = 300\text{ mA}; I_B = 30\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^{\circ}\text{C}$   | -   | -   | 600 | mV            |
| $C_c$       | collector capacitance                | $V_{CB} = 10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$                                  | -   | -   | 15  | pF            |
| $f_T$       | transition frequency                 | $V_{CE} = 10\text{ V}; I_C = 50\text{ mA}; f = 100\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$                                                | 140 | -   | -   | 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

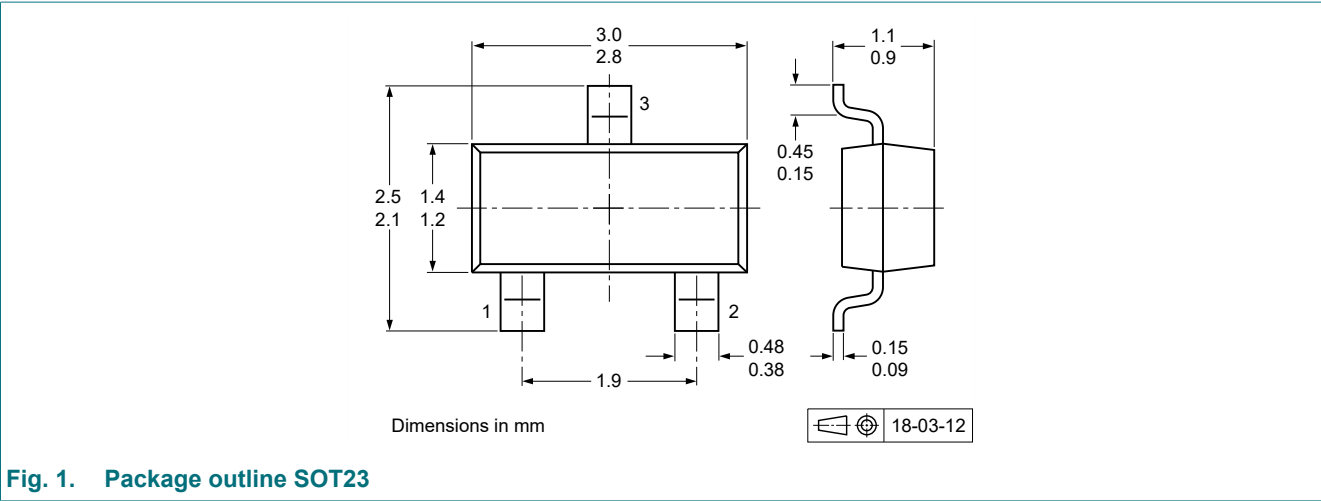


Fig. 1. Package outline SOT23

13. Soldering

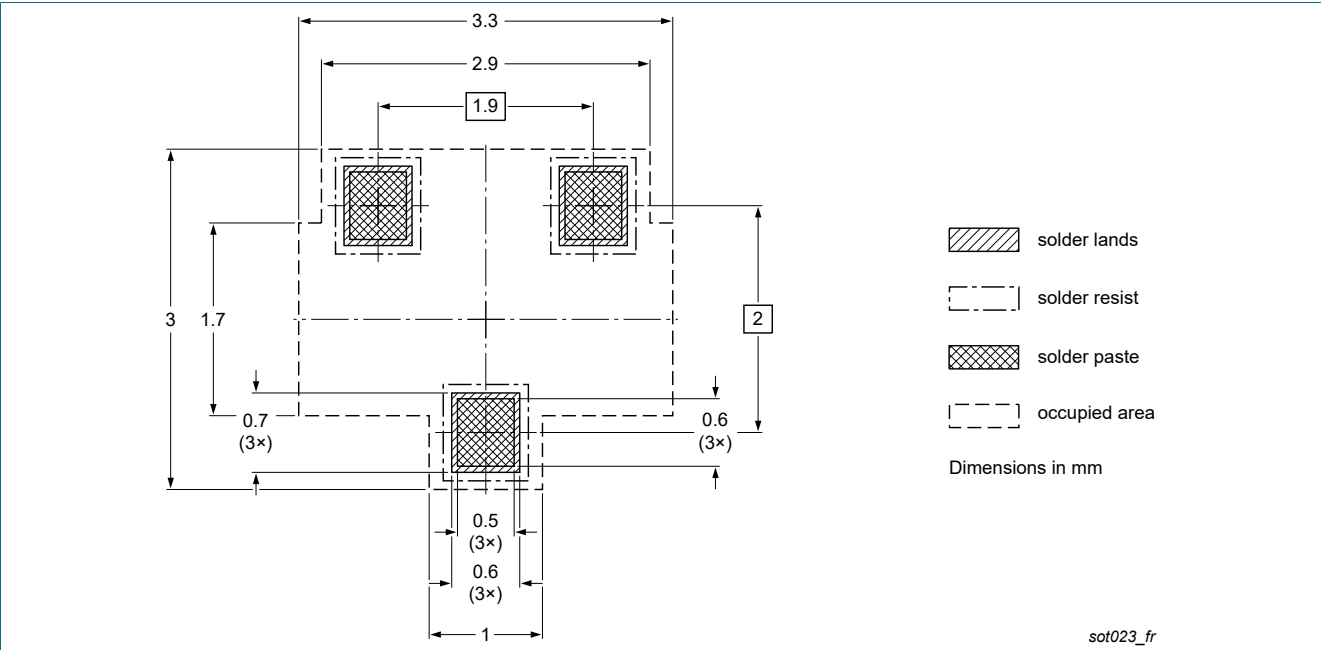


Fig. 2. Reflow soldering footprint for SOT23

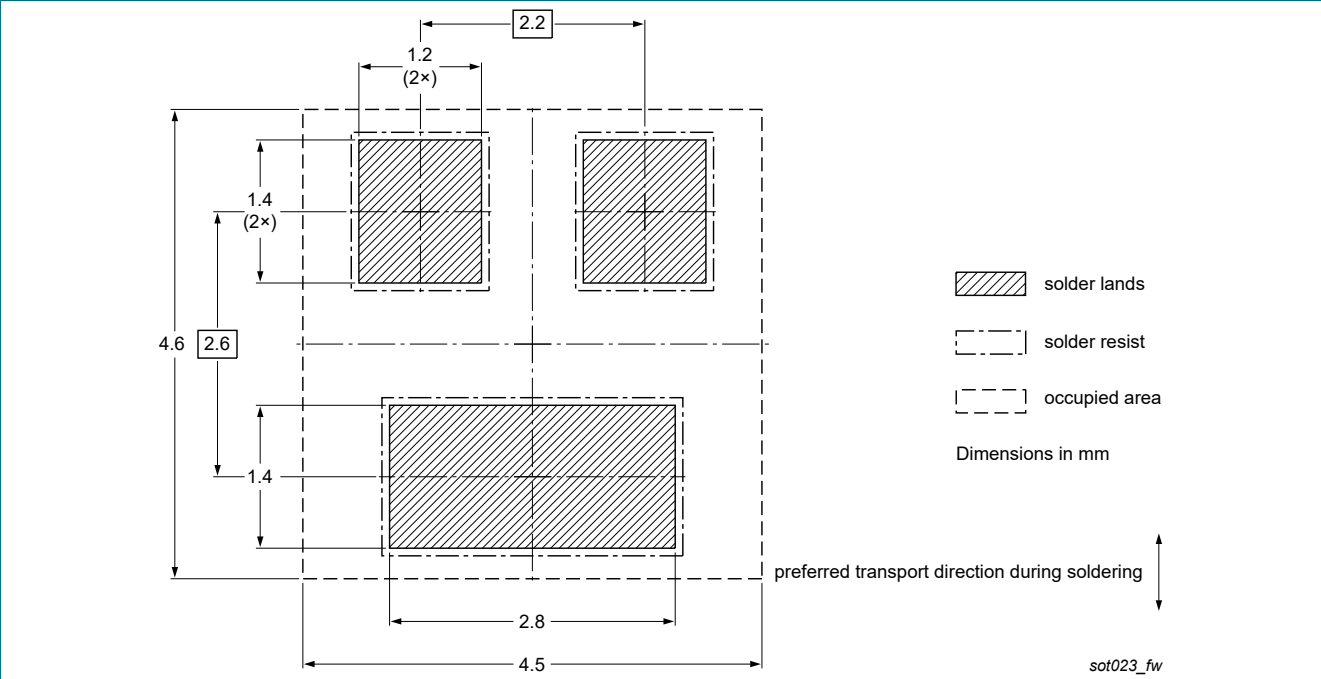


Fig. 3. Wave soldering footprint for SOT23

## 14. Revision history

Table 8. Revision history

| Data sheet ID  | Release date                                                                                                                                          | Data sheet status  | Change notice | Supersedes  |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|-------------|
| 2PD602AQL v.2  | 20230525                                                                                                                                              | Product data sheet | -             | 2PD602AXL_1 |
| Modifications: | <ul style="list-style-type: none"><li>Family data sheet splitted to single type data sheets.</li><li>Section "Packing information" removed.</li></ul> |                    |               |             |
| 2PD602AXL_1    | 20081027                                                                                                                                              | Product data sheet | -             | -           |

## 15. Legal information

### Data sheet status

| Document status<br>[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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