# DATA SHEET



# 2PD601A series

## NPN general purpose transistors; 50 V, 100 mA

Product specification
Supersedes data of 2002 Jun 26

2004 Feb 12

Philips Semiconductors

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# NPN general purpose transistors; 50 V, 100 mA

# 2PD601A series

## FEATURES

- Available in SOT323 (SC-70) and SOT346 (SC-59) packages
- Available in three different DC current gain versions (Q, R, S).

## APPLICATIONS

- General purpose switching and amplification.

## DESCRIPTION

NPN general purpose transistors (see “Simplified outline, symbol and pinning” for package details).

## QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MIN. | MAX. | UNIT |
|---|---|---|---|---|
| $V_{CEO}$ | collector-emitter voltage | – | 50 | V |
| $I_C$ | collector current (DC) | – | 100 | mA |
| $h_{FE}$ | DC current gain | | | |
| | group Q | 160 | 260 | |
| | group R | 210 | 340 | |
| | group S | 290 | 460 | |

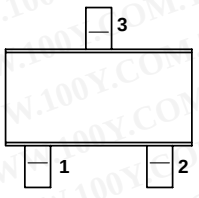
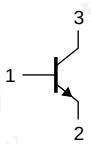
## PRODUCT OVERVIEW

| TYPE NUMBER | PACKAGE | | MARKING CODE | $h_{FE}$ GROUP |
|---|---|---|---|---|
| | PHILIPS | EIAJ | | |
| 2PD601AQ | SOT346 | SC-59 | ZQ | Q |
| 2PD601AR | SOT346 | SC-59 | ZR | R |
| 2PD601AS | SOT346 | SC-59 | ZS | S |
| 2PD601AQW | SOT323 | SC-70 | *6D | Q |
| 2PD601ARW | SOT323 | SC-70 | *6E | R |
| 2PD601ASW | SOT323 | SC-70 | *6F | S |

**Note**

1. * = p: Made in Hong Kong.
   * = t: Made in Malaysia.
   * = W: Made in China.

## SIMPLIFIED OUTLINE, SYMBOL AND PINNING

| TYPE NUMBER | SIMPLIFIED OUTLINE AND SYMBOL | PINNING | |
|---|---|---|---|
| | | PIN | DESCRIPTION |
| 2PD601AQ<br>2PD601AR<br>2PD601AS<br>2PD601AQW<br>2PD601ARW<br>2PD601ASW |  Top view  MAM321 | 1<br>2<br>3 | base<br>emitter<br>collector |

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## ORDERING INFORMATION

| TYPE NUMBER | PACKAGE | | |
|---|---|---|---|
| | NAME | DESCRIPTION | VERSION |
| 2PD601AQ | – | plastic surface mounted package; 3 leads | SOT346 |
| 2PD601AR | | | |
| 2PD601AS | | | |
| 2PD601AQW | – | plastic surface mounted package; 3 leads | SOT323 |
| 2PD601ARW | | | |
| 2PD601ASW | | | |

## 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 | – | 6 | V |
| $I_C$ | collector current (DC) | | – | 100 | mA |
| $I_{CM}$ | peak collector current | | – | 200 | mA |
| $P_{tot}$ | total power dissipation | $T_{amb} \leq 25$ °C; note 1 | | | |
| | SOT346 | | – | 250 | mW |
| | SOT323 | | – | 200 | mW |
| $T_{stg}$ | storage temperature | | –65 | +150 | °C |
| $T_j$ | junction temperature | | – | 150 | °C |
| $T_{amb}$ | operating ambient temperature | | –65 | +150 | °C |

**Note**

1. Refer to SOT346 (SC-59) and SOT323 (SC-70) standard mounting conditions.

## THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|---|---|---|---|---|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | note 1 | | |
| | SOT346 | | 500 | K/W |
| | SOT323 | | 625 | K/W |

**Note**

1. Refer to SOT346 (SC-59) and SOT323 (SC-70) standard mounting conditions.

### Soldering

Reflow soldering is the only recommended soldering method.

## CHARACTERISTICS

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

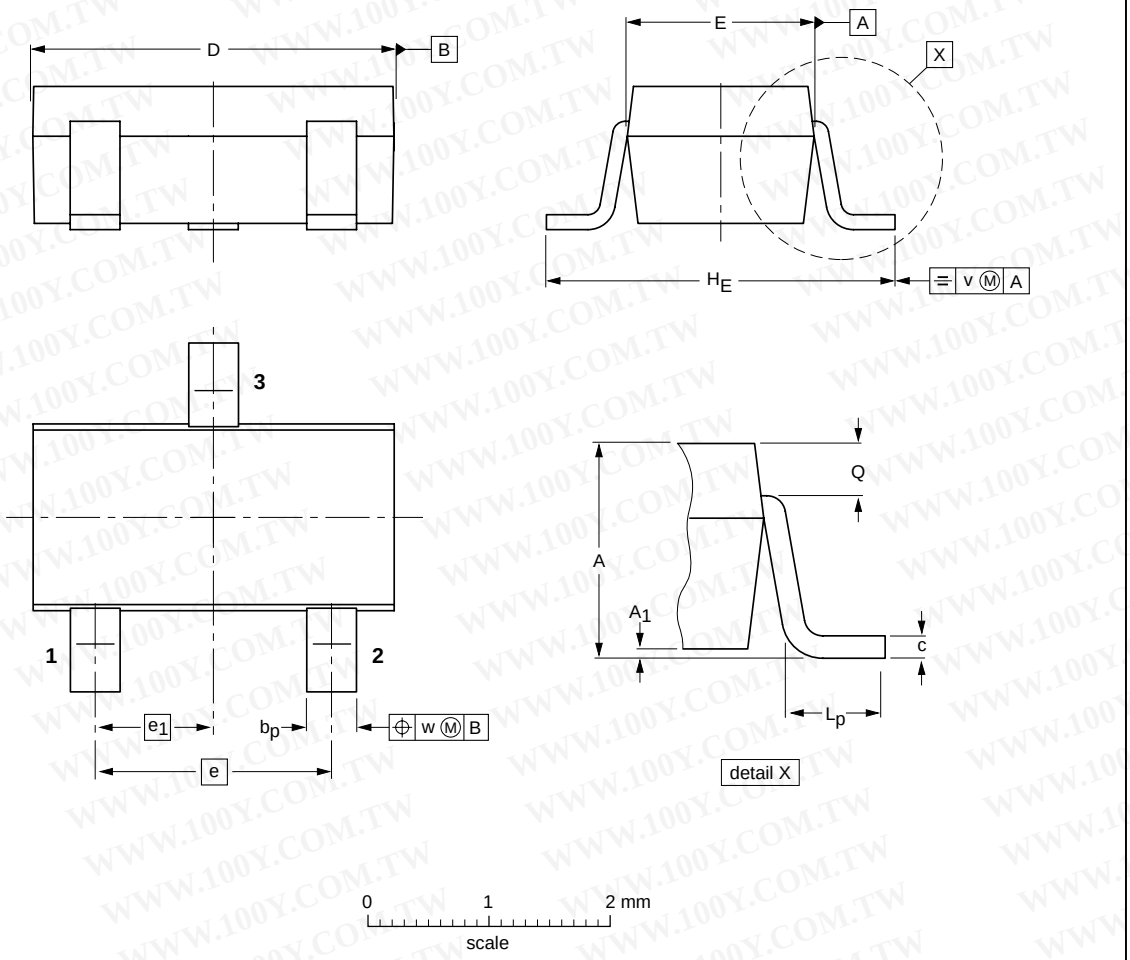
| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| $I_{CBO}$ | collector-base cut-off current | $I_E$ = 0; $V_{CB}$ = 60 V | – | 10 | nA |
| | | $I_E$ = 0; $V_{CB}$ = 60 V; $T_j$ = 150 °C | – | 5 | µA |
| $I_{EBO}$ | emitter-base cut-off current | $I_C$ = 0; $V_{EB}$ = 5 V | – | 10 | nA |
| $h_{FE}$ | DC current gain | $I_C$ = 100 mA; $V_{CE}$ = 2 V; note 1 | 90 | – | |
| $h_{FE}$ | DC current gain | $I_C$ = 2 mA; $V_{CE}$ = 10 V | | | |
| | group Q | | 160 | 260 | |
| | group R | | 210 | 340 | |
| | group S | | 290 | 460 | |
| $V_{CEsat}$ | collector-emitter saturation voltage | $I_C$ = 100 mA; $I_B$ = 10 mA; note 1 | – | 250 | mV |
| $C_c$ | collector capacitance | $I_E$ = $i_e$ = 0; $V_{CB}$ = 10 V; f = 1 MHz | – | 3 | pF |
| $f_T$ | transition frequency | $I_C$ = 2 mA; $V_{CE}$ = 10 V; f = 100 MHz | 100 | – | MHz |

**Note**

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

## PACKAGE OUTLINES

**Plastic surface mounted package; 3 leads** **SOT346**

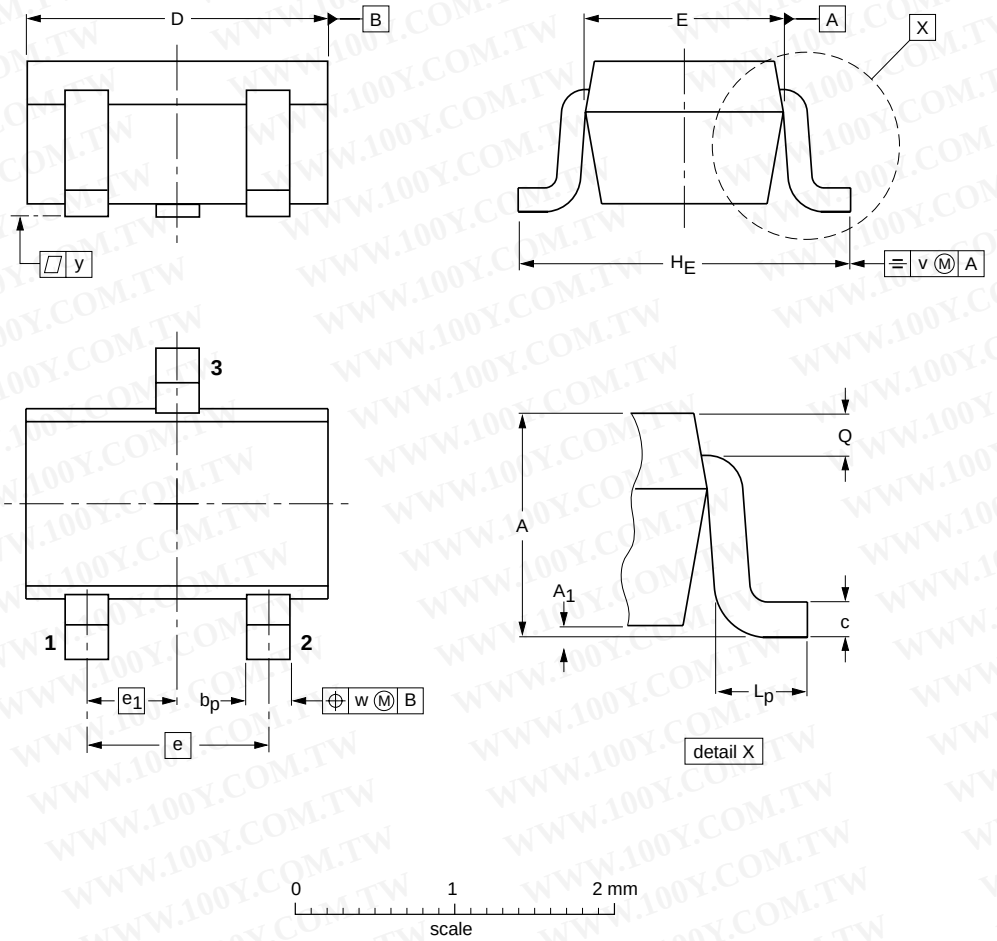



**DIMENSIONS (mm are the original dimensions)**

| UNIT | A | $A_1$ | $b_p$ | c | D | E | e | $e_1$ | $H_E$ | $L_p$ | Q | v | w |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.3<br>1.0 | 0.1<br>0.013 | 0.50<br>0.35 | 0.26<br>0.10 | 3.1<br>2.7 | 1.7<br>1.3 | 1.9 | 0.95 | 3.0<br>2.5 | 0.6<br>0.2 | 0.33<br>0.23 | 0.2 | 0.2 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | EIAJ | | | |
| SOT346 | | TO-236 | SC-59 | | | 98-07-17 |

**Plastic surface mounted package; 3 leads** **SOT323**




**DIMENSIONS (mm are the original dimensions)**

| UNIT | A | $A_1$ max | $b_p$ | c | D | E | e | $e_1$ | $H_E$ | $L_p$ | Q | v | w |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.1<br>0.8 | 0.1 | 0.4<br>0.3 | 0.25<br>0.10 | 2.2<br>1.8 | 1.35<br>1.15 | 1.3 | 0.65 | 2.2<br>2.0 | 0.45<br>0.15 | 0.23<br>0.13 | 0.2 | 0.2 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | EIAJ | | | |
| SOT323 | | | SC-70 | | | 97-02-28 |

## DATA SHEET STATUS

| LEVEL | DATA SHEET STATUS(1) | PRODUCT STATUS(2)(3) | DEFINITION |
|---|---|---|---|
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