

# DATA SHEET

## **PDTC114Y series**

**NPN resistor-equipped transistors;**

**R1 = 10 k $\Omega$ , R2 = 47 k $\Omega$**

Product specification  
Supersedes data of 2003 Sep 10

2004 Aug 17

## NPN resistor-equipped transistors; R1 = 10 k $\Omega$ , R2 = 47 k $\Omega$

## PDTC114Y series

### FEATURES

- Built-in bias resistors
- Simplified circuit design
- Reduction of component count
- Reduced pick and place costs.

### APPLICATIONS

- General purpose switching and amplification
- Inverter and interface circuits
- Circuit driver.

### QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                 | TYP. | MAX. | UNIT       |
|------------------|---------------------------|------|------|------------|
| V <sub>CEO</sub> | collector-emitter voltage | –    | 50   | V          |
| I <sub>O</sub>   | output current (DC)       | –    | 100  | mA         |
| R1               | bias resistor             | 10   | –    | k $\Omega$ |
| R2               | bias resistor             | 47   | –    | k $\Omega$ |

### DESCRIPTION

NPN resistor-equipped transistor (see “Simplified outline, symbol and pinning” for package details).

### PRODUCT OVERVIEW

| TYPE NUMBER | PACKAGE       |        | MARKING CODE       | PNP COMPLEMENT |
|-------------|---------------|--------|--------------------|----------------|
|             | PHILIPS       | EIAJ   |                    |                |
| PDTC114YE   | SOT416        | SC-75  | 33                 | PDTA114YE      |
| PDTC114YEF  | SOT490        | SC-89  | 12                 | PDTA114YEF     |
| PDTC114YK   | SOT346        | SC-59  | 47                 | PDTA114YK      |
| PDTC114YM   | SOT883        | SC-101 | DU                 | PDTA114YM      |
| PDTC114YS   | SOT54 (TO-92) | SC-43  | TC114Y             | PDTA114YS      |
| PDTC114YT   | SOT23         | –      | *27 <sup>(1)</sup> | PDTA114YT      |
| PDTC114YU   | SOT323        | SC-70  | *30 <sup>(1)</sup> | PDTA114YU      |

### Note

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

NPN resistor-equipped transistors;  
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SIMPLIFIED OUTLINE, SYMBOL AND PINNING

| TYPE NUMBER  | SIMPLIFIED OUTLINE AND SYMBOL                                    | PINNING     |                              |
|--|--|-------------|------------------------------|
|  |  | PIN         | DESCRIPTION                  |
| PDTC114YS  | <p style="text-align: center;"><i>MAM364</i></p>                 | 1<br>2<br>3 | base<br>collector<br>emitter |
| PDTC114YE<br>PDTC114YEF<br>PDTC114YK<br>PDTC114YT<br>PDTC114YU | <p style="text-align: center;">Top view<br/><i>MDB269</i></p>    | 1<br>2<br>3 | base<br>emitter<br>collector |
| PDTC114YM  | <p style="text-align: center;">bottom view<br/><i>MHC506</i></p> | 1<br>2<br>3 | base<br>emitter<br>collector |

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**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             | –    | 50   | V    |
| V <sub>CEO</sub> | collector-emitter voltage     | open base                | –    | 50   | V    |
| V <sub>EBO</sub> | emitter-base voltage          | open collector           | –    | 10   | V    |
| V <sub>I</sub>   | input voltage                 |                          | –    | +40  | V    |
|                  |                               |                          | –    | –6   | V    |
| I <sub>O</sub>   | output current (DC)           |                          | –    | 100  | mA   |
| I <sub>CM</sub>  | peak collector current        |                          | –    | 100  | mA   |
| P <sub>tot</sub> | total power dissipation       | T <sub>amb</sub> ≤ 25 °C |      |      |      |
|                  | SOT54                         | note 1                   | –    | 500  | mW   |
|                  | SOT23                         | note 1                   | –    | 250  | mW   |
|                  | SOT346                        | note 1                   | –    | 250  | mW   |
|                  | SOT323                        | note 1                   | –    | 200  | mW   |
|                  | SOT416                        | note 1                   | –    | 150  | mW   |
|                  | SOT883                        | notes 2 and 3            | –    | 250  | mW   |
| SOT490           | notes 1 and 2                 | –                        | 250  | mW   |      |
| T <sub>stg</sub> | storage temperature           |                          | –65  | +150 | °C   |
| T <sub>j</sub>   | junction temperature          |                          | –    | 150  | °C   |
| T <sub>amb</sub> | operating ambient temperature |                          | –65  | +150 | °C   |

**Notes**

1. Refer to standard mounting conditions.
2. Reflow soldering is the only recommended soldering method.
3. Refer to SOT883 standard mounting conditions; FR4 with 60  $\mu$ m copper strip line.

**THERMAL CHARACTERISTICS**

| SYMBOL              | PARAMETER                                   | CONDITIONS    | VALUE | UNIT |
|---------------------|---|---------------|-------|------|
| R <sub>th j-a</sub> | thermal resistance from junction to ambient | in free air   |       |      |
|                     | SOT54                                       | note 1        | 250   | K/W  |
|                     | SOT23                                       | note 1        | 500   | K/W  |
|                     | SOT346                                      | note 1        | 500   | K/W  |
|                     | SOT323                                      | note 1        | 625   | K/W  |
|                     | SOT416                                      | note 1        | 833   | K/W  |
|                     | SOT883                                      | notes 2 and 3 | 500   | K/W  |
| SOT490              | notes 1 and 2                               | 500           | K/W   |      |

**Notes**

1. Refer to standard mounting conditions.
2. Reflow soldering is the only recommended soldering method.
3. Refer to SOT883 standard mounting conditions; FR4 with 60  $\mu$ m copper strip line.

NPN resistor-equipped transistors;  
 $R1 = 10\text{ k}\Omega$ ,  $R2 = 47\text{ k}\Omega$

PDTC114Y series

### CHARACTERISTICS

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

| SYMBOL              | PARAMETER                            | CONDITIONS  | MIN. | TYP. | MAX. | UNIT             |
|---------------------|--------------------------------------|---|------|------|------|------------------|
| $I_{\text{CBO}}$    | collector-base cut-off current       | $V_{\text{CB}} = 50\text{ V}$ ; $I_{\text{E}} = 0$  | –    | –    | 100  | nA               |
| $I_{\text{CEO}}$    | collector-emitter cut-off current    | $V_{\text{CE}} = 30\text{ V}$ ; $I_{\text{B}} = 0$  | –    | –    | 1    | $\mu\text{A}$    |
|                     |                                      | $V_{\text{CE}} = 30\text{ V}$ ; $I_{\text{B}} = 0$ ; $T_{\text{j}} = 150\text{ }^{\circ}\text{C}$ | –    | –    | 50   | $\mu\text{A}$    |
| $I_{\text{EBO}}$    | emitter-base cut-off current         | $V_{\text{EB}} = 5\text{ V}$ ; $I_{\text{C}} = 0$   | –    | –    | 150  | $\mu\text{A}$    |
| $h_{\text{FE}}$     | DC current gain                      | $V_{\text{CE}} = 5\text{ V}$ ; $I_{\text{C}} = 5\text{ mA}$                                       | 100  | –    | –    |                  |
| $V_{\text{CEsat}}$  | collector-emitter saturation voltage | $I_{\text{C}} = 5\text{ mA}$ ; $I_{\text{B}} = 0.25\text{ mA}$                                    | –    | –    | 100  | mV               |
| $V_{\text{i(off)}}$ | input-off voltage                    | $I_{\text{C}} = 100\text{ }\mu\text{A}$ ; $V_{\text{CE}} = 5\text{ V}$                            | –    | 0.7  | 0.5  | V                |
| $V_{\text{i(on)}}$  | input-on voltage                     | $I_{\text{C}} = 1\text{ mA}$ ; $V_{\text{CE}} = 0.3\text{ V}$                                     | 1.4  | 0.8  | –    | V                |
| R1                  | input resistor                       |   | 7    | 10   | 13   | $\text{k}\Omega$ |
| $\frac{R2}{R1}$     | resistor ratio                       |   | 3.7  | 4.7  | 5.7  |                  |
| $C_{\text{c}}$      | collector capacitance                | $I_{\text{E}} = i_{\text{e}} = 0$ ; $V_{\text{CB}} = 10\text{ V}$ ; $f = 1\text{ MHz}$            | –    | –    | 2.5  | pF               |

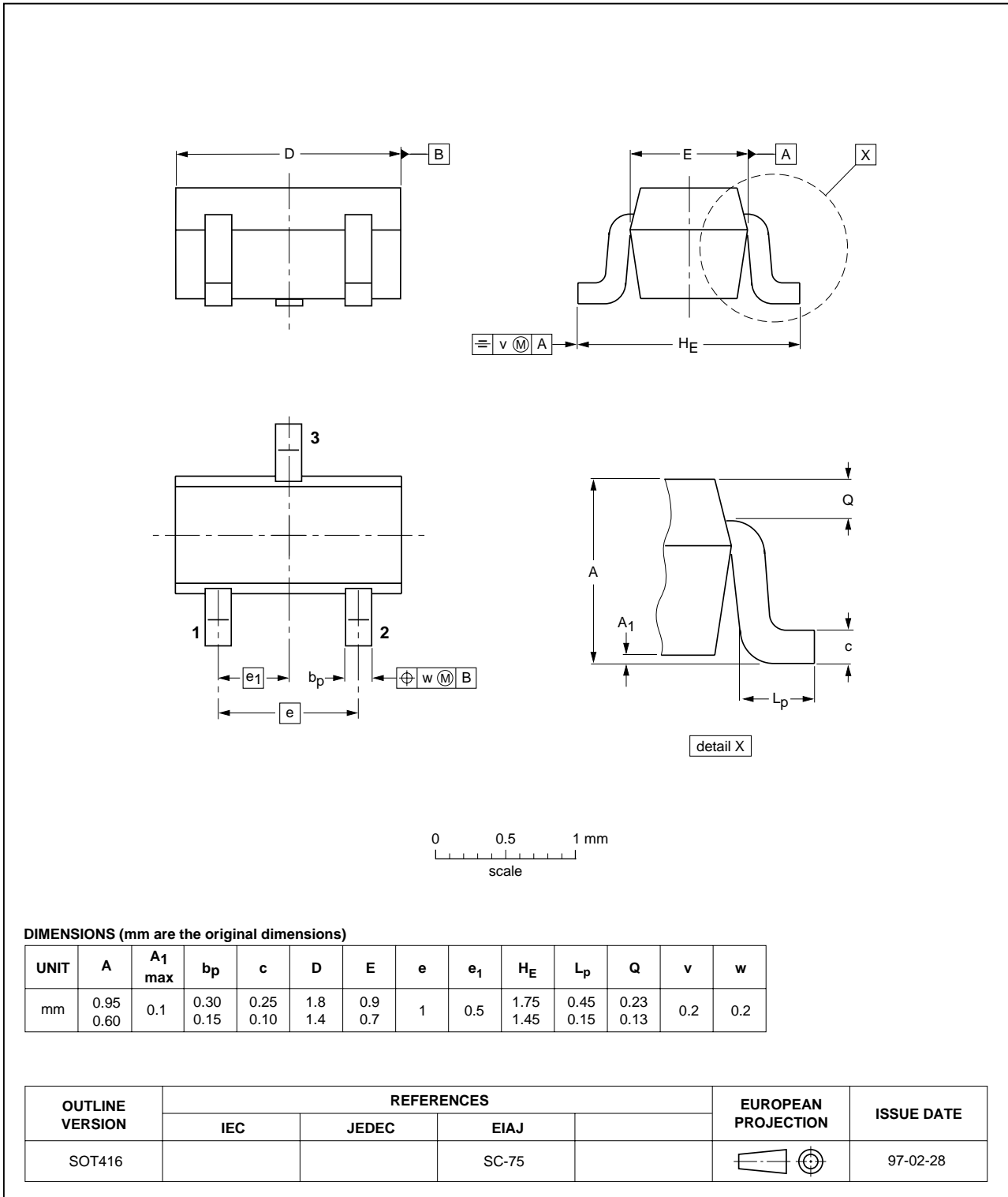
NPN resistor-equipped transistors;  
R1 = 10 kΩ, R2 = 47 kΩ

PDTC114Y series

PACKAGE OUTLINES

Plastic surface mounted package; 3 leads

SOT416

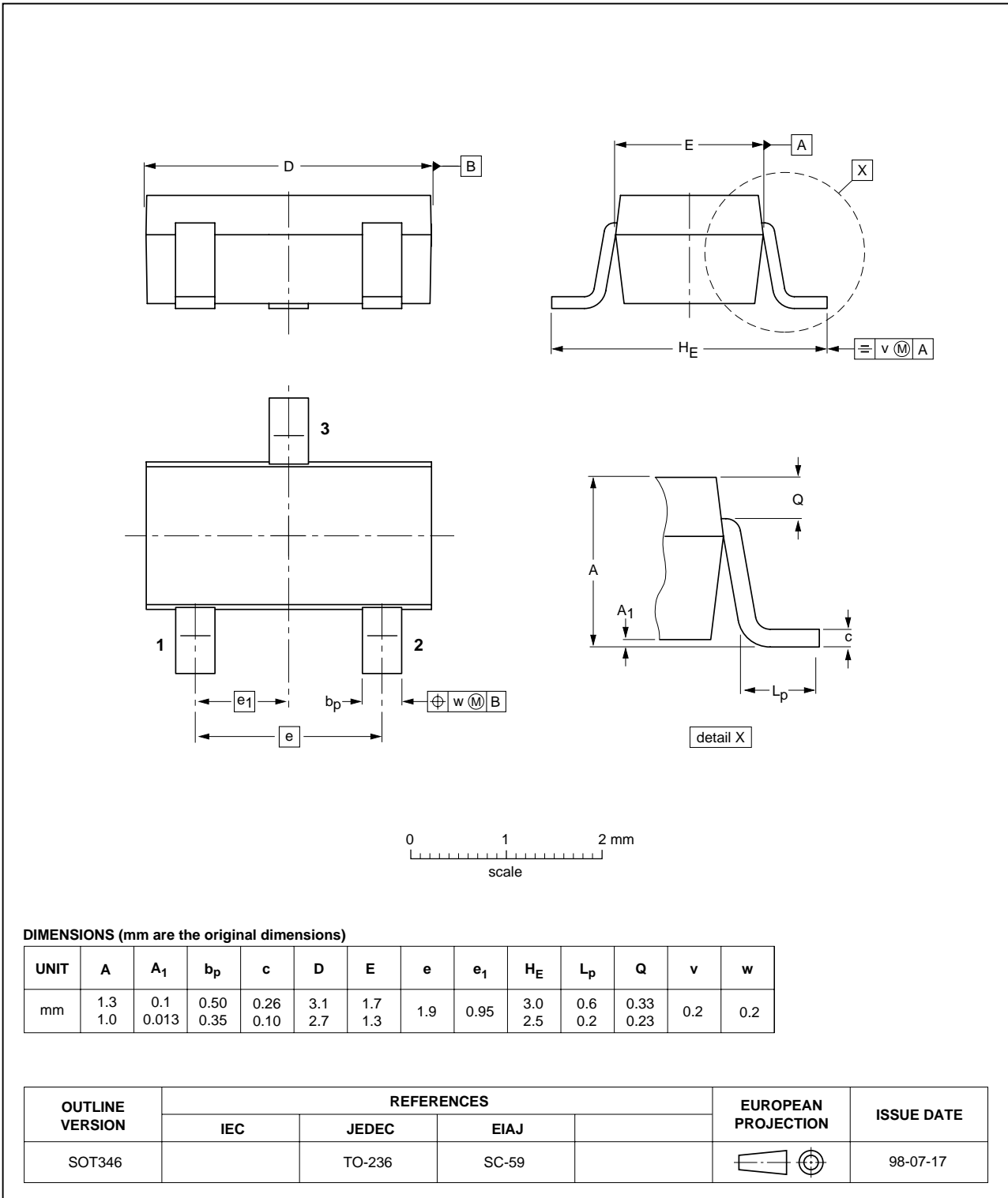


NPN resistor-equipped transistors;  
R1 = 10 kΩ, R2 = 47 kΩ

PDTC114Y series

Plastic surface mounted package; 3 leads

SOT346

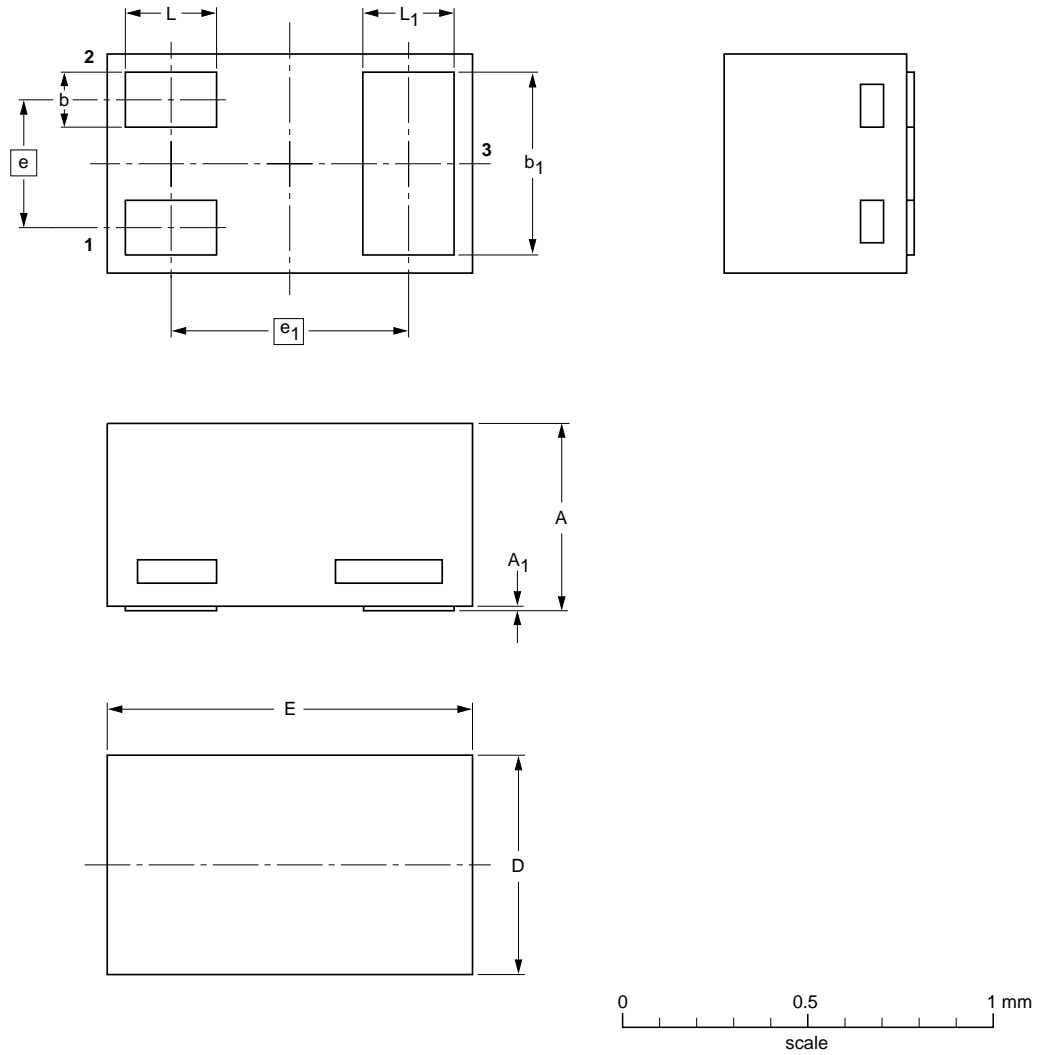


NPN resistor-equipped transistors;  
R1 = 10 kΩ, R2 = 47 kΩ

PDTC114Y series

Leadless ultra small plastic package; 3 solder lands; body 1.0 x 0.6 x 0.5 mm

SOT883



DIMENSIONS (mm are the original dimensions)

| UNIT | A <sup>(1)</sup> | A <sub>1</sub> max. | b            | b <sub>1</sub> | D            | E            | e    | e <sub>1</sub> | L            | L <sub>1</sub> |
|------|------------------|---------------------|--------------|----------------|--------------|--------------|------|----------------|--------------|----------------|
| mm   | 0.50<br>0.46     | 0.03                | 0.20<br>0.12 | 0.55<br>0.47   | 0.62<br>0.55 | 1.02<br>0.95 | 0.35 | 0.65           | 0.30<br>0.22 | 0.30<br>0.22   |

Note

1. Including plating thickness

| OUTLINE VERSION | REFERENCES |       |        | EUROPEAN PROJECTION | ISSUE DATE           |
|-----------------|------------|-------|--------|---------------------|----------------------|
|                 | IEC        | JEDEC | JEITA  |                     |                      |
| SOT883          |            |       | SC-101 |                     | 03-02-05<br>03-04-03 |

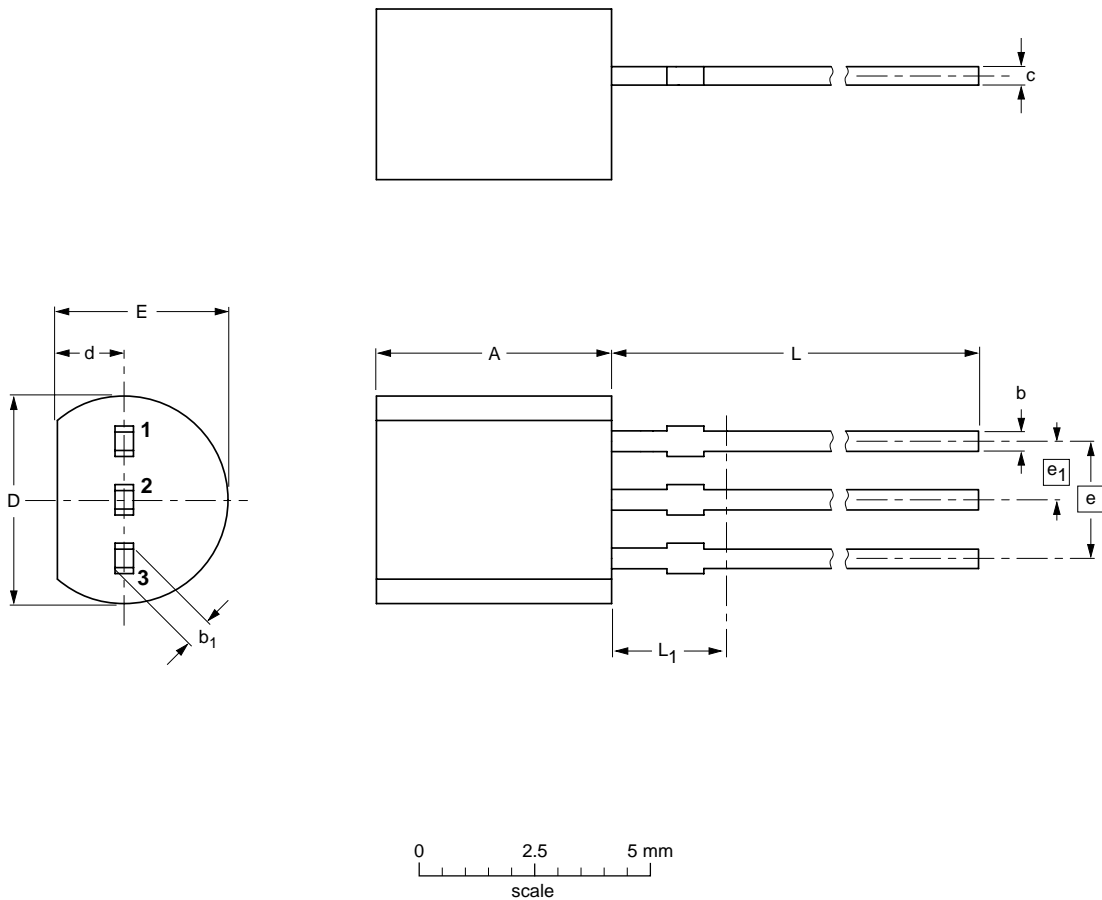


NPN resistor-equipped transistors;  
R1 = 10 kΩ, R2 = 47 kΩ

PDTC114Y series

Plastic single-ended leaded (through hole) package; 3 leads

SOT54



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

| UNIT | A          | b            | b <sub>1</sub> | c            | D          | d          | E          | e    | e <sub>1</sub> | L            | L <sub>1</sub> <sup>(1)</sup><br>max. |
|------|------------|--------------|----------------|--------------|------------|------------|------------|------|----------------|--------------|---------------------------------------|
| mm   | 5.2<br>5.0 | 0.48<br>0.40 | 0.66<br>0.55   | 0.45<br>0.38 | 4.8<br>4.4 | 1.7<br>1.4 | 4.2<br>3.6 | 2.54 | 1.27           | 14.5<br>12.7 | 2.5                                   |

**Note**

1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

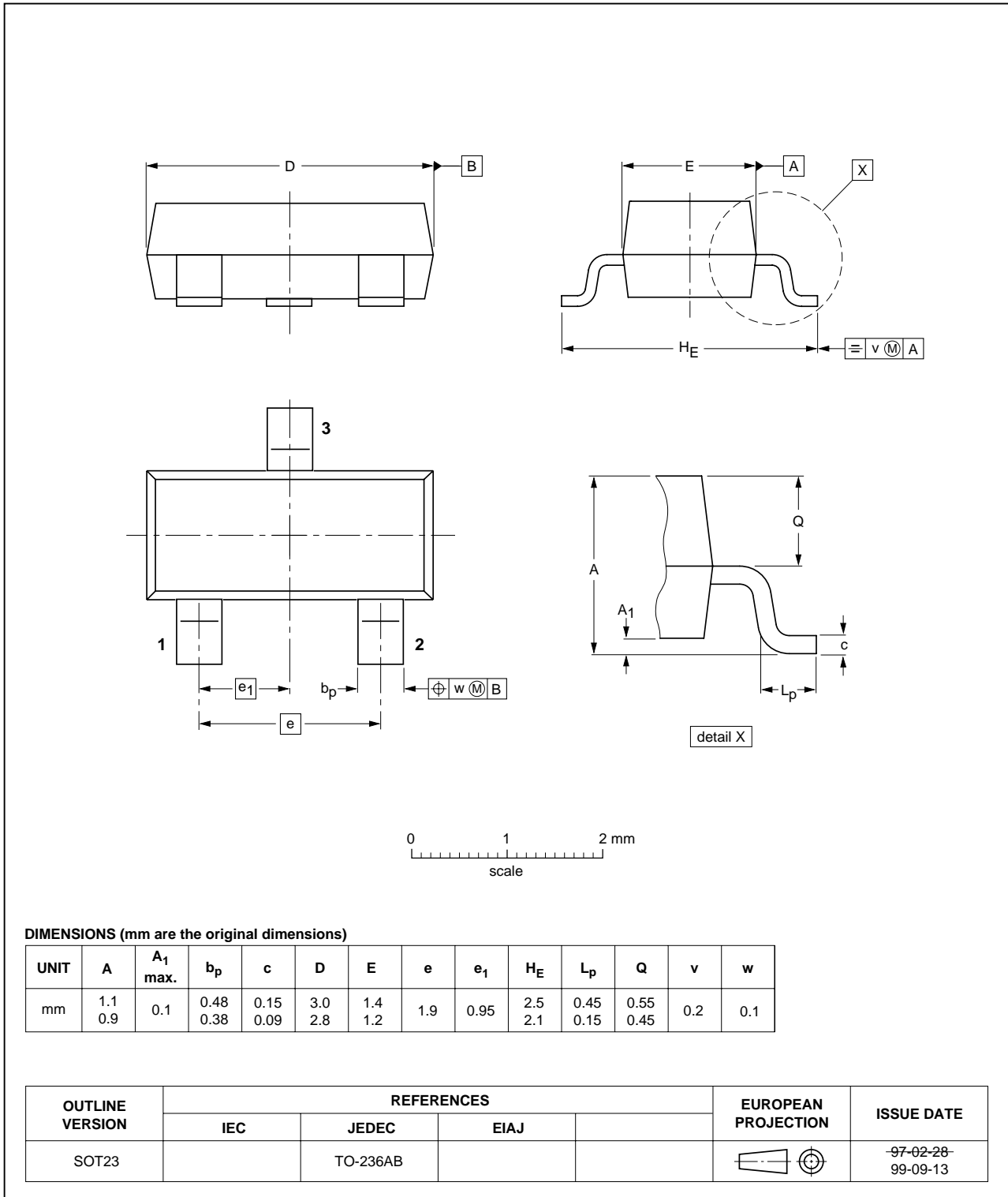
| OUTLINE VERSION | REFERENCES |       |        | EUROPEAN PROJECTION | ISSUE DATE            |
|-----------------|------------|-------|--------|---------------------|-----------------------|
|                 | IEC        | JEDEC | JEITA  |                     |                       |
| SOT54           |            | TO-92 | SC-43A |                     | -97-02-28<br>04-06-28 |

NPN resistor-equipped transistors;  
R1 = 10 kΩ, R2 = 47 kΩ

PDTC114Y series

Plastic surface mounted package; 3 leads

SOT23

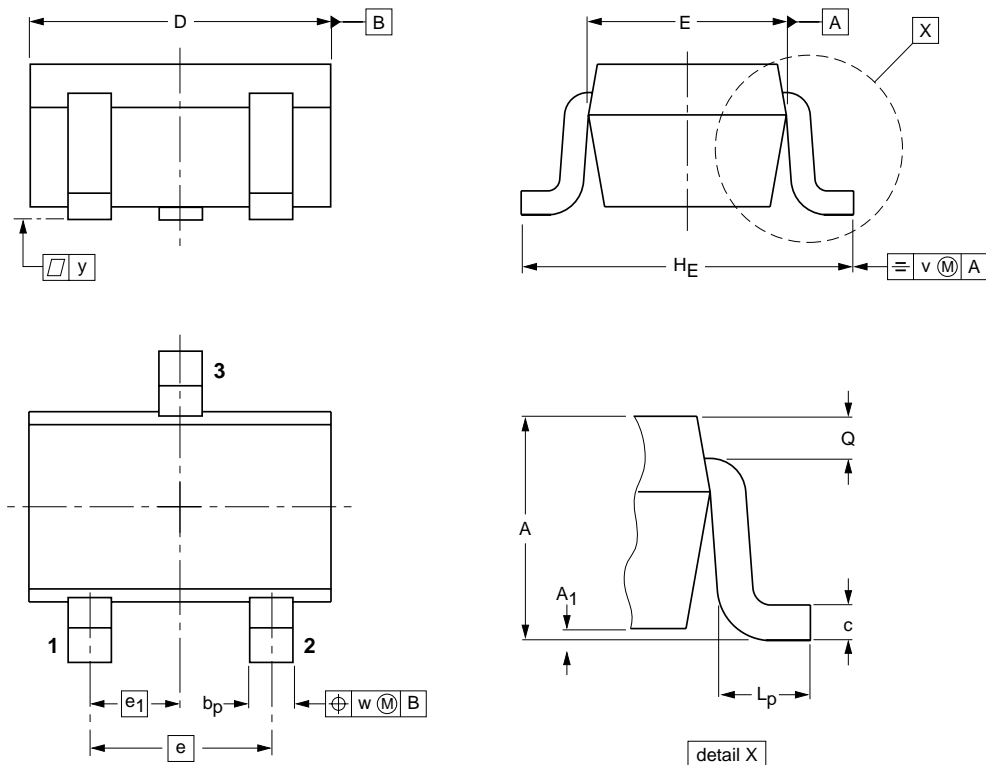


NPN resistor-equipped transistors;  
R1 = 10 kΩ, R2 = 47 kΩ

PDTC114Y series

Plastic surface mounted package; 3 leads

SOT323



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

| UNIT | A          | A <sub>1</sub><br>max | b <sub>p</sub> | c            | D          | E            | e   | e <sub>1</sub> | H <sub>E</sub> | L <sub>p</sub> | 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 |

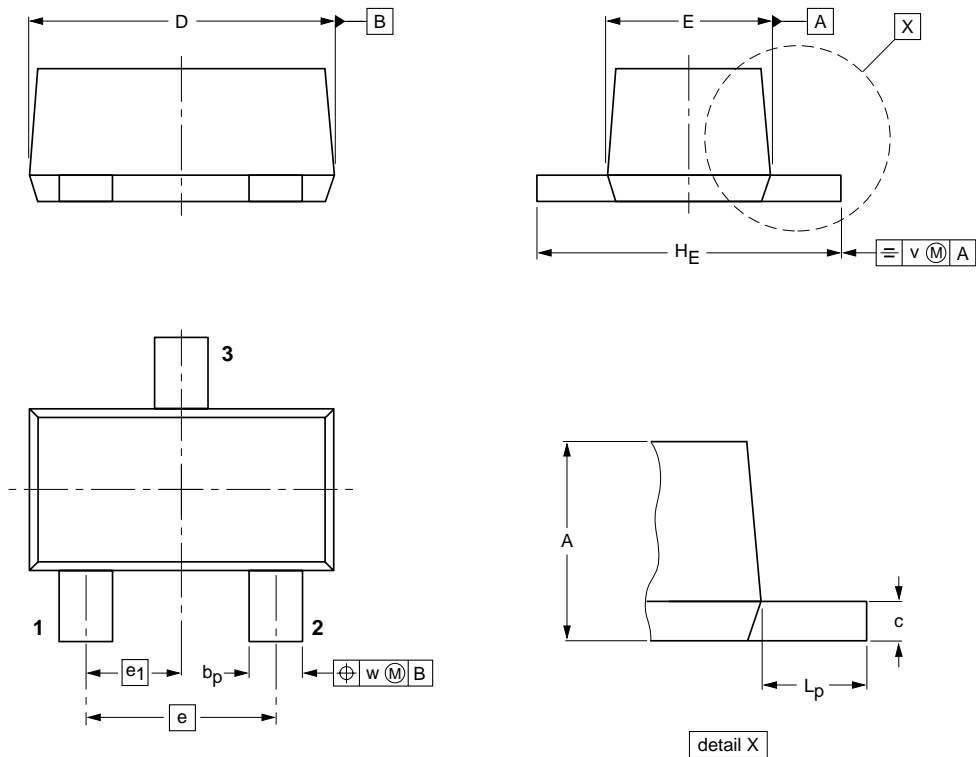
| OUTLINE<br>VERSION | REFERENCES |       |       |  | EUROPEAN<br>PROJECTION | ISSUE DATE |
|--------------------|------------|-------|-------|--|------------------------|------------|
|                    | IEC        | JEDEC | EIAJ  |  |                        |            |
| SOT323             |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

NPN resistor-equipped transistors;  
R1 = 10 kΩ, R2 = 47 kΩ

PDTC114Y series

Plastic surface mounted package; 3 leads

SOT490



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

| UNIT | A          | b <sub>p</sub> | c          | D          | E            | e   | e <sub>1</sub> | H <sub>E</sub> | L <sub>p</sub> | v   | w   |
|------|------------|----------------|------------|------------|--------------|-----|----------------|----------------|----------------|-----|-----|
| mm   | 0.8<br>0.6 | 0.33<br>0.23   | 0.2<br>0.1 | 1.7<br>1.5 | 0.95<br>0.75 | 1.0 | 0.5            | 1.7<br>1.5     | 0.5<br>0.3     | 0.1 | 0.1 |

| OUTLINE VERSION | REFERENCES |       |       | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|-------|-------|---------------------|------------|
|                 | IEC        | JEDEC | EIAJ  |                     |            |
| SOT490          |            |       | SC-89 |                     | 98-10-23   |

NPN resistor-equipped transistors;  
R1 = 10 k $\Omega$ , R2 = 47 k $\Omega$

PDTC114Y series

#### DATA SHEET STATUS

| LEVEL | DATA SHEET STATUS <sup>(1)</sup> | PRODUCT STATUS <sup>(2)(3)</sup> | DEFINITION   |
|-------|----------------------------------|----------------------------------|--|
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