

DATA SHEET

PDTC144E series

NPN resistor-equipped transistors;

R1 = 47 k Ω , R2 = 47 k Ω

Product specification
Supersedes data of 2004 Mar 23

2004 Aug 17

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PDTC144E 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 _{CEO} | collector-emitter voltage | – | 50 | V |
| I _O | output current (DC) | – | 100 | mA |
| R1 | bias resistor | 47 | – | k Ω |
| R2 | bias resistor | 47 | – | k Ω |

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 | | |
| PDTC144EE | SOT416 | SC-75 | 08 | PDTA144EE |
| PDTC144EEF | SOT490 | SC-89 | 08 | PDTA144EEF |
| PDTC144EK | SOT346 | SC-59 | 08 | PDTA144EK |
| PDTC144EM | SOT883 | SC-101 | E7 | PDTA144EM |
| PDTC144ES | SOT54 (TO-92) | SC-43 | TC144E | PDTA144ES |
| PDTC144ET | SOT23 | – | *08 ⁽¹⁾ | PDTA144ET |
| PDTC144EU | SOT323 | SC-70 | *08 ⁽¹⁾ | PDTA144EU |

Note

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

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SIMPLIFIED OUTLINE, SYMBOL AND PINNING

| TYPE NUMBER | SIMPLIFIED OUTLINE AND SYMBOL | PINNING | |
|--|--|-------------|------------------------------|
| | | PIN | DESCRIPTION |
| PDTC144ES | <p style="text-align: center;"><i>MAM364</i></p> | 1 2 3 | base collector emitter |
| PDTC144EE PDTC144EEF PDTC144EK PDTC144ET PDTC144EU | <p style="text-align: center;">Top view <i>MDB269</i></p> | 1 2 3 | base emitter collector |
| PDTC144EM | <p style="text-align: center;">bottom view <i>MHC506</i></p> | 1 2 3 | base emitter collector |

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ORDERING INFORMATION

| TYPE NUMBER | PACKAGE | | |
|-------------|---------|--|---------|
| | NAME | DESCRIPTION | VERSION |
| PDTC144EE | – | plastic surface mounted package; 3 leads | SOT416 |
| PDTC144EEF | – | plastic surface mounted package; 3 leads | SOT490 |
| PDTC144EK | – | plastic surface mounted package; 3 leads | SOT346 |
| PDTC144EM | – | leadless ultra small plastic package; 3 solder lands; body 1.0 × 0.6 × 0.5 mm | SOT883 |
| PDTC144ES | – | plastic single-ended leaded (through hole) package; 3 leads | SOT54 |
| PDTC144ET | – | plastic surface mounted package; 3 leads | SOT23 |
| PDTC144EU | – | plastic surface mounted package; 3 leads | SOT323 |

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 | – | 50 | V |
| V _{CEO} | collector-emitter voltage | open base | – | 50 | V |
| V _{EBO} | emitter-base voltage | open collector | – | 10 | V |
| V _I | input voltage positive negative | | – | +40 | V |
| | | | – | –10 | V |
| I _O | output current (DC) | | – | 100 | mA |
| I _{CM} | peak collector current | | – | 100 | mA |
| P _{tot} | total power dissipation SOT54 SOT23 SOT346 SOT323 SOT416 SOT490 SOT883 | T _{amb} ≤ 25 °C | | | |
| | | note 1 | – | 500 | mW |
| | | note 1 | – | 250 | mW |
| | | note 1 | – | 250 | mW |
| | | note 1 | – | 200 | mW |
| | | note 1 | – | 150 | mW |
| | | notes 1 and 2 | – | 250 | mW |
| notes 2 and 3 | – | 250 | mW | | |
| T _{stg} | storage temperature | | –65 | +150 | °C |
| T _j | junction temperature | | – | 150 | °C |
| T _{amb} | 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 μ m copper strip line.

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THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|----------------------|---|---------------|-------|------|
| R _{th(j-a)} | 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 |
| | SOT490 | notes 1 and 2 | 500 | K/W |
| SOT883 | notes 2 and 3 | 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 μ m copper strip line.

CHARACTERISTICS

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---------------------|--------------------------------------|---|------|------|------|------------|
| I _{CBO} | collector-base cut-off current | V _{CB} = 50 V; I _E = 0 A | – | – | 100 | nA |
| I _{CEO} | collector-emitter cut-off current | V _{CE} = 30 V; I _B = 0 A | – | – | 1 | μ A |
| | | V _{CE} = 30 V; I _B = 0 A; T _j = 150 °C | – | – | 50 | μ A |
| I _{EBO} | emitter-base cut-off current | V _{EB} = 5 V; I _C = 0 A | – | – | 90 | μ A |
| h _{FE} | DC current gain | V _{CE} = 5 V; I _C = 5 mA | 80 | – | – | |
| V _{CEsat} | collector-emitter saturation voltage | I _C = 10 mA; I _B = 0.5 mA | – | – | 150 | mV |
| V _{i(off)} | input-off voltage | I _C = 100 μ A; V _{CE} = 5 V | – | 1.2 | 0.8 | V |
| V _{i(on)} | input-on voltage | I _C = 2 mA; V _{CE} = 0.3 V | 3 | 1.6 | – | V |
| R1 | input resistor | | 33 | 47 | 61 | k Ω |
| $\frac{R2}{R1}$ | resistor ratio | | 0.8 | 1 | 1.2 | |
| C _c | collector capacitance | I _E = i _e = 0 A; V _{CB} = 10 V; f = 1 MHz | – | – | 2.5 | pF |

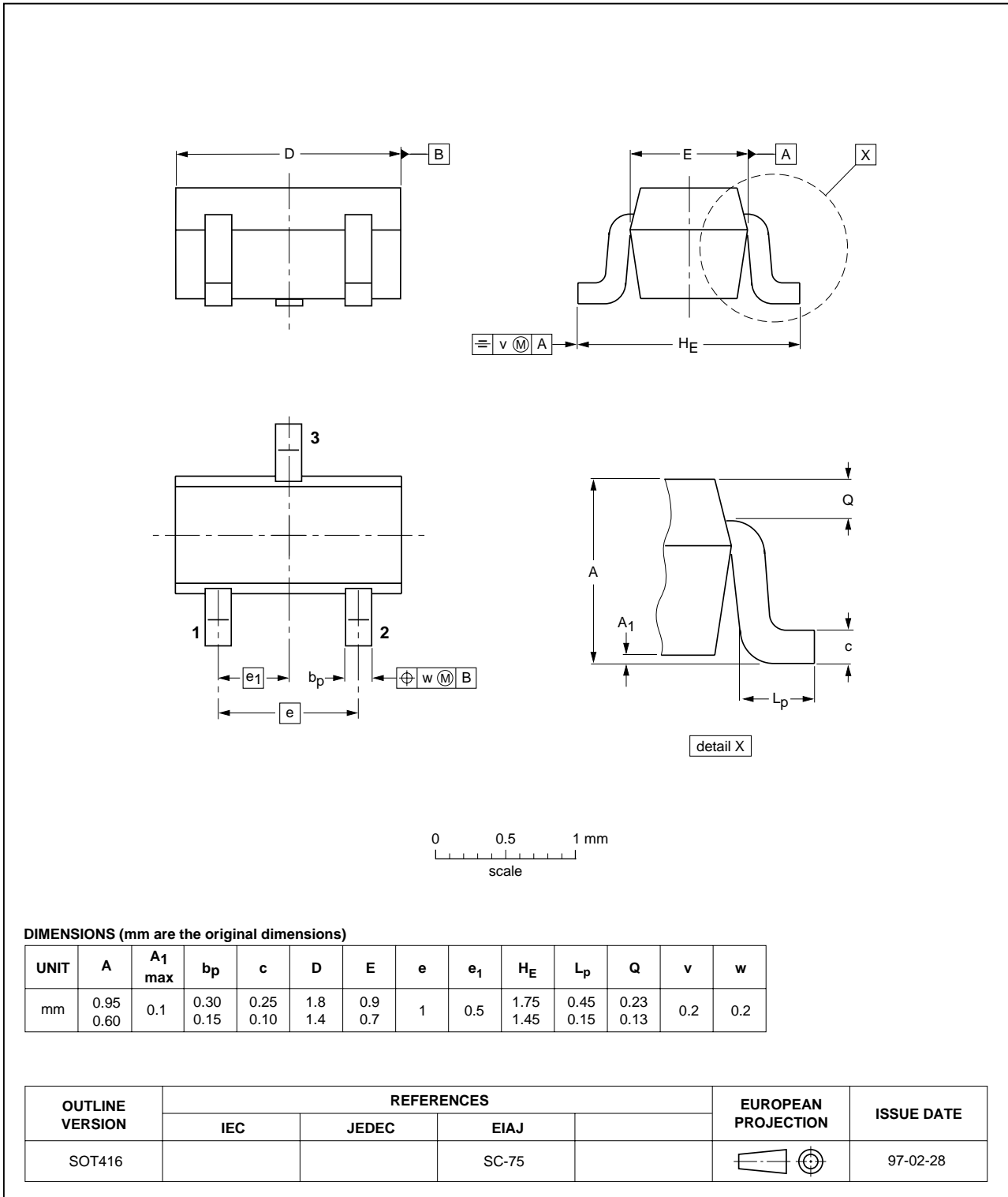
NPN resistor-equipped transistors;
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PDTC144E series

PACKAGE OUTLINES

Plastic surface mounted package; 3 leads

SOT416

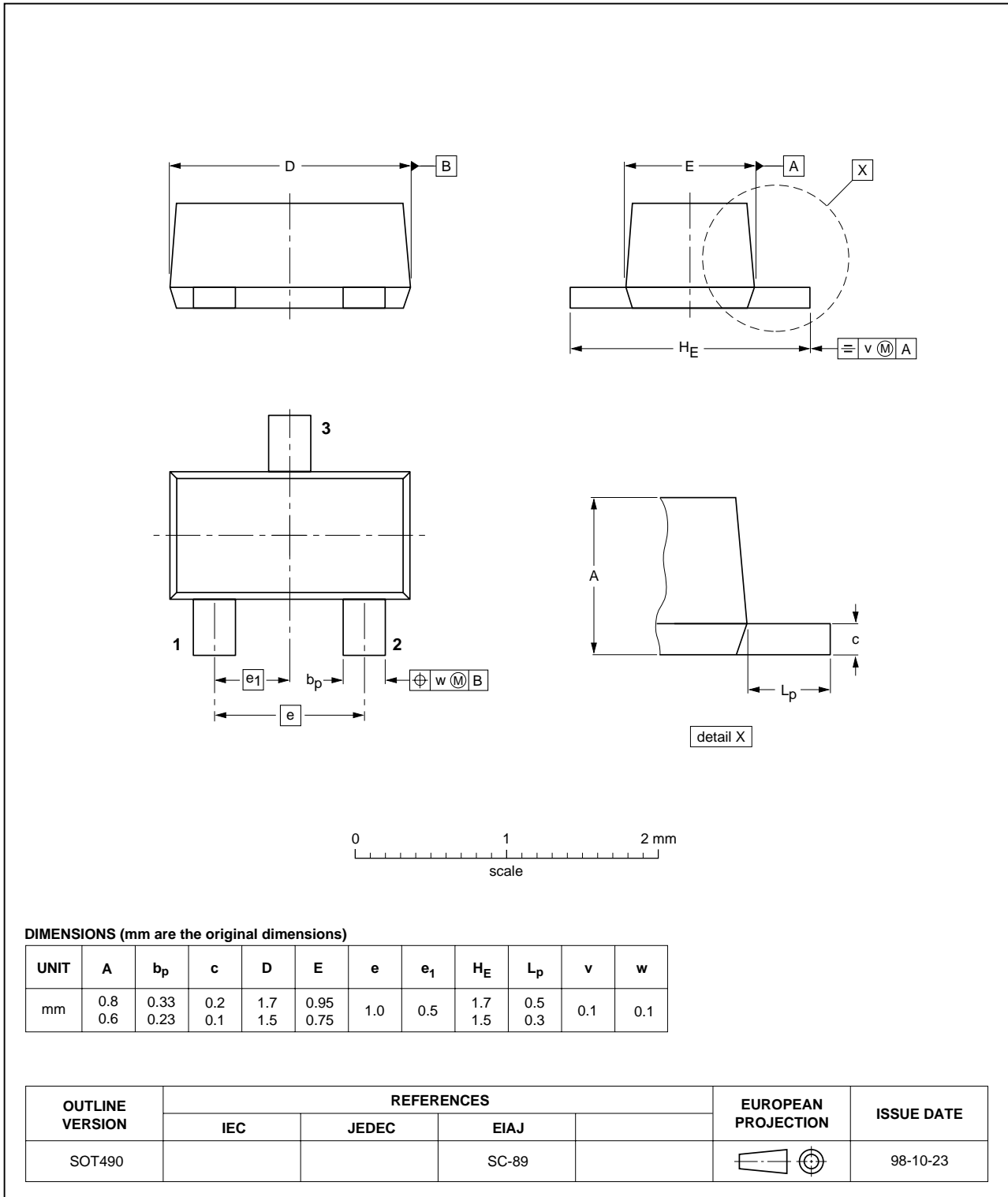


NPN resistor-equipped transistors;
R1 = 47 kΩ, R2 = 47 kΩ

PDTC144E series

Plastic surface mounted package; 3 leads

SOT490

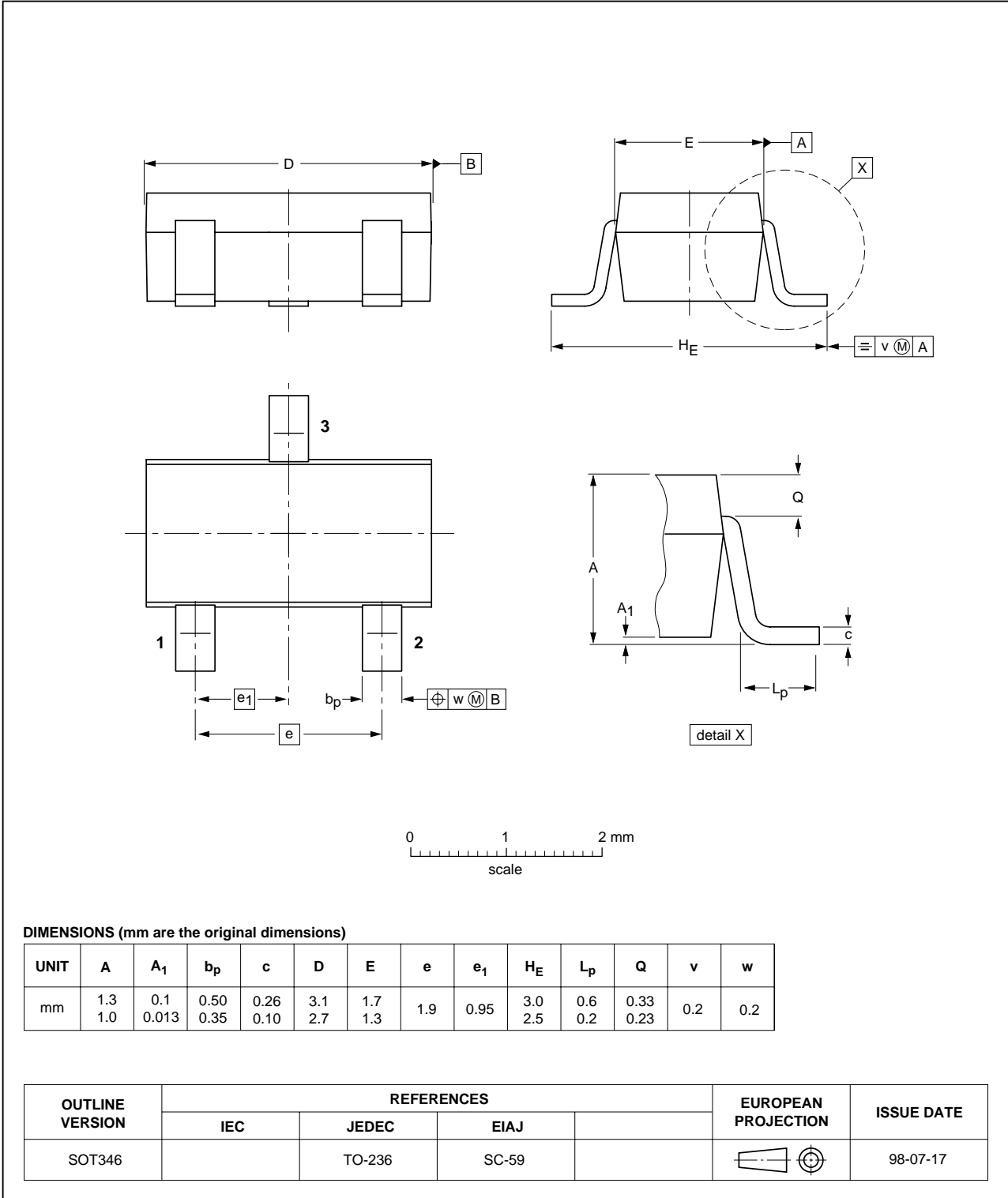


NPN resistor-equipped transistors;
R1 = 47 kΩ, R2 = 47 kΩ

PDTC144E series

Plastic surface mounted package; 3 leads

SOT346

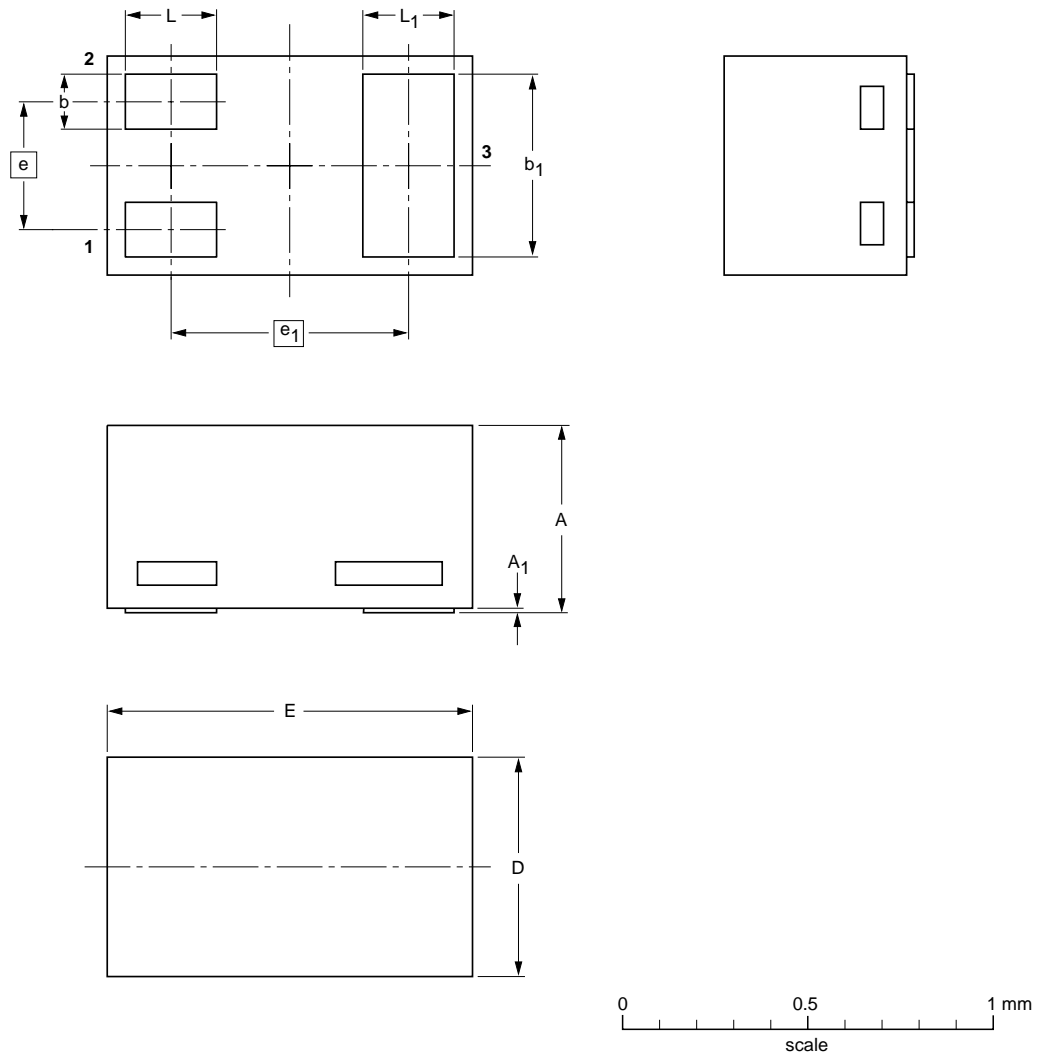


NPN resistor-equipped transistors;
R1 = 47 kΩ, R2 = 47 kΩ

PDTC144E 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 ⁽¹⁾ | A ₁ max. | b | b ₁ | D | E | e | e ₁ | L | L ₁ |
|------|------------------|------------------------|--------------|----------------|--------------|--------------|------|----------------|--------------|----------------|
| mm | 0.50 0.46 | 0.03 | 0.20 0.12 | 0.55 0.47 | 0.62 0.55 | 1.02 0.95 | 0.35 | 0.65 | 0.30 0.22 | 0.30 0.22 |

Note

1. Including plating thickness

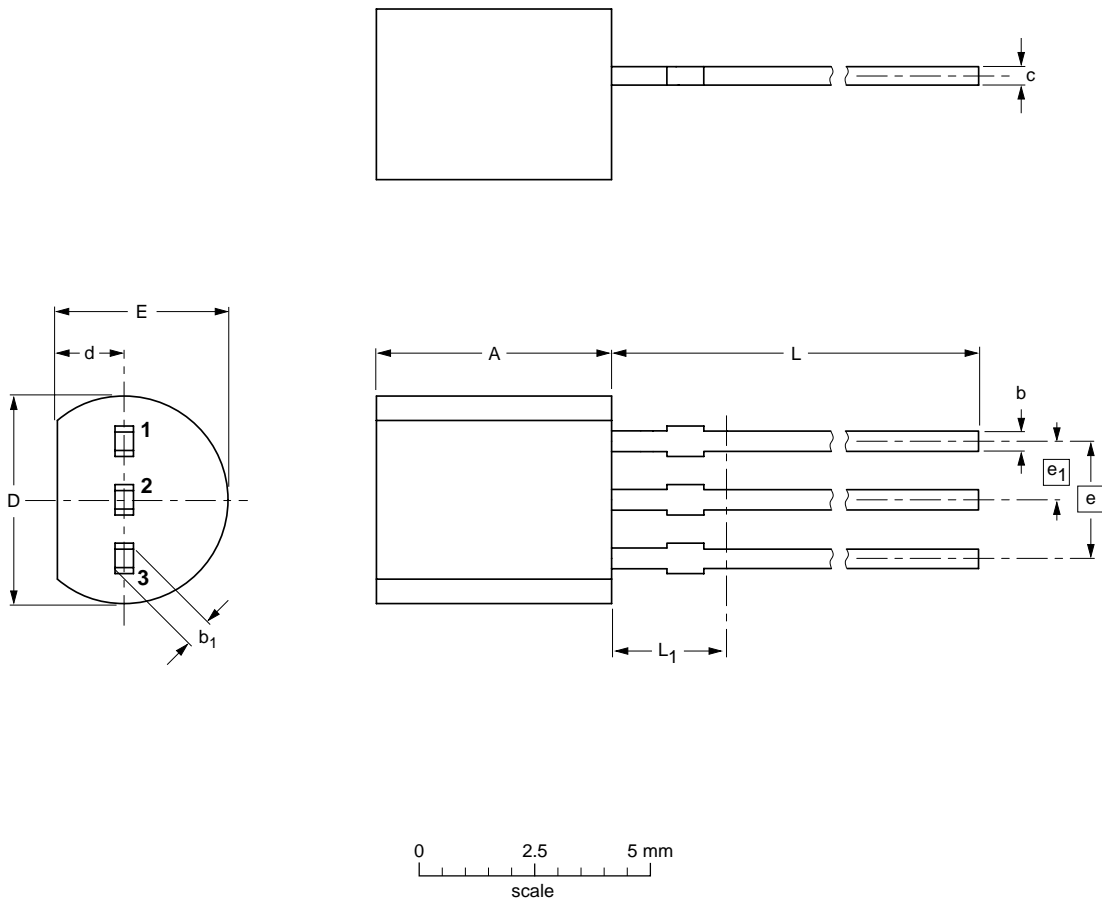
| OUTLINE VERSION | REFERENCES | | | EUROPEAN PROJECTION | ISSUE DATE |
|--------------------|------------|-------|--------|------------------------|----------------------|
| | IEC | JEDEC | JEITA | | |
| SOT883 | | | SC-101 | | 03-02-05 03-04-03 |

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

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

SOT54



DIMENSIONS (mm are the original dimensions)

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

Note

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

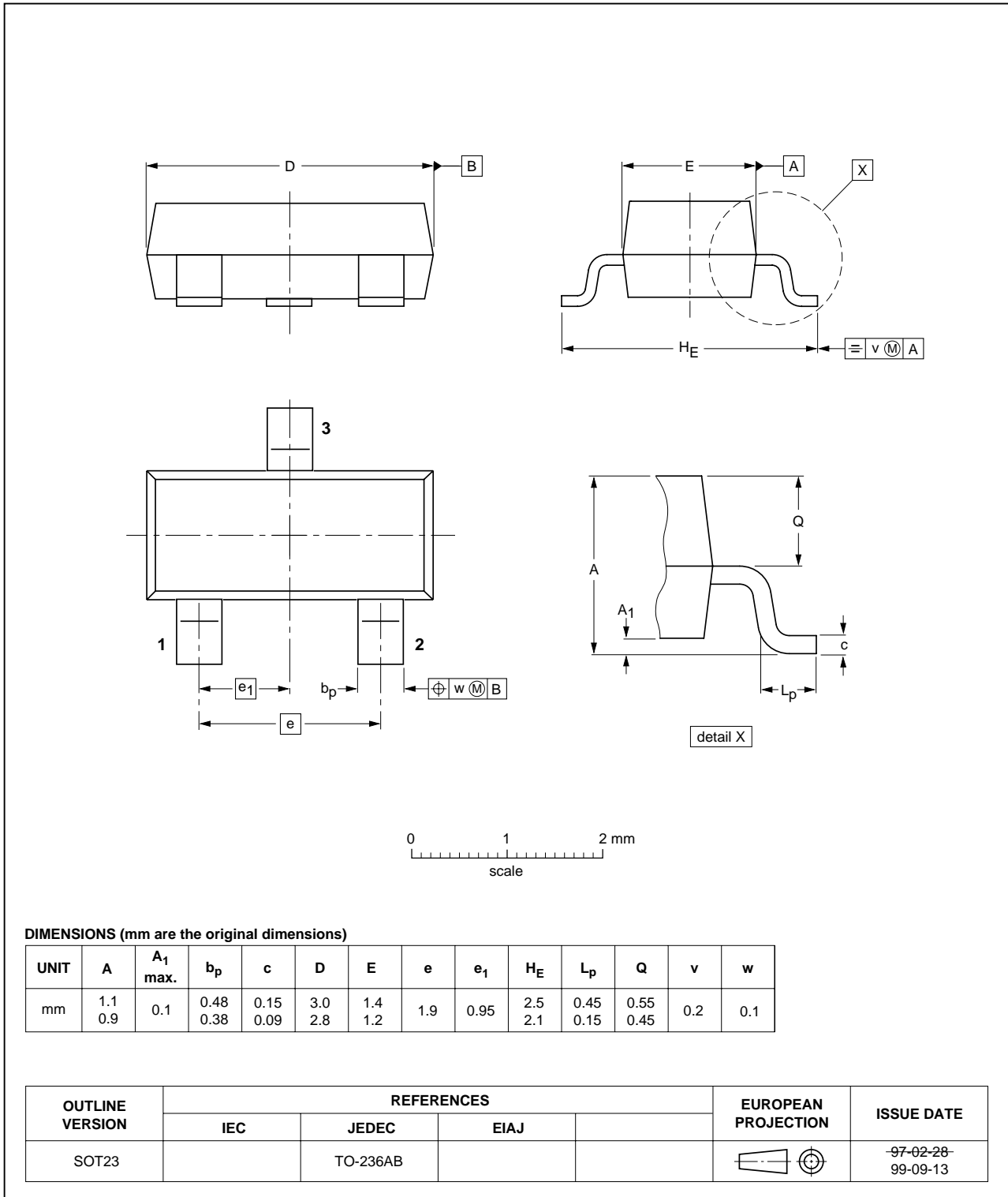
| OUTLINE VERSION | REFERENCES | | | EUROPEAN PROJECTION | ISSUE DATE |
|--------------------|------------|-------|--------|------------------------|-----------------------|
| | IEC | JEDEC | JEITA | | |
| SOT54 | | TO-92 | SC-43A | | -97-02-28 04-06-28 |

NPN resistor-equipped transistors;
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PDTC144E series

Plastic surface mounted package; 3 leads

SOT23

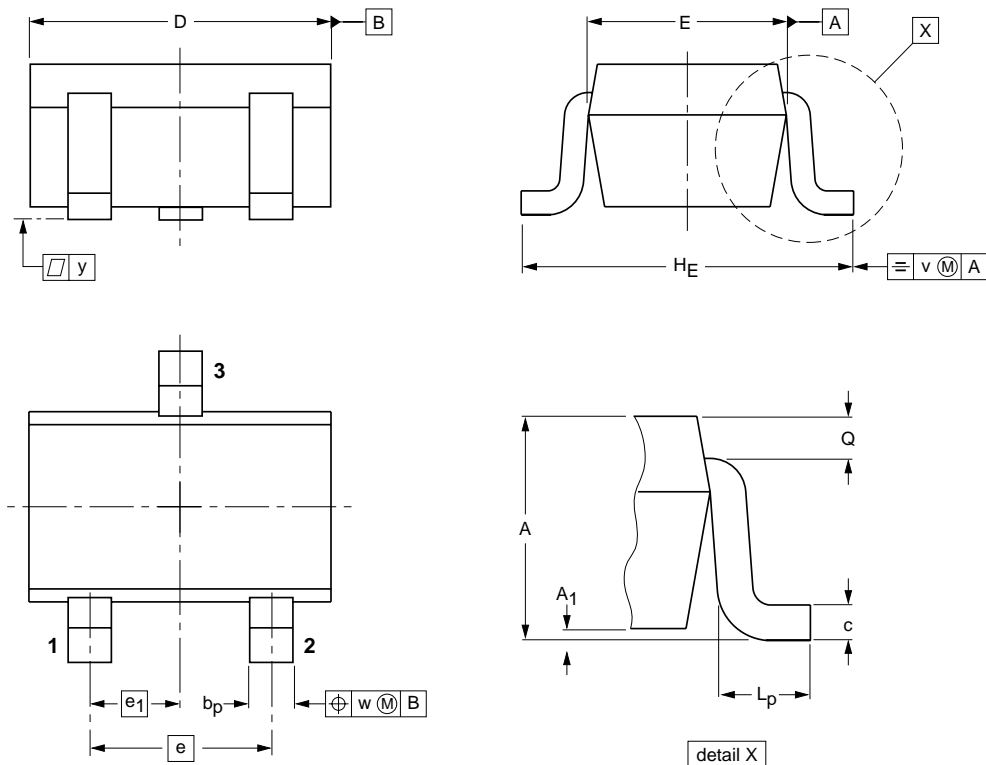


NPN resistor-equipped transistors;
R1 = 47 kΩ, R2 = 47 kΩ

PDTC144E series

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 0.8 | 0.1 | 0.4 0.3 | 0.25 0.10 | 2.2 1.8 | 1.35 1.15 | 1.3 | 0.65 | 2.2 2.0 | 0.45 0.15 | 0.23 0.13 | 0.2 | 0.2 |

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

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DATA SHEET STATUS

| LEVEL | DATA SHEET STATUS ⁽¹⁾ | PRODUCT STATUS ⁽²⁾⁽³⁾ | DEFINITION |
|-------|----------------------------------|----------------------------------|--|
| I | Objective data | Development | This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice. |
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