

DATA SHEET

PDTC114Y series

NPN resistor-equipped transistors;

R1 = 10 k Ω , R2 = 47 k Ω

Product data sheet
Supersedes data of 2003 Sep 10

2004 Aug 17

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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 _{CEO} | collector-emitter voltage | – | 50 | V |
| I _O | output current (DC) | – | 100 | mA |
| R1 | bias resistor | 10 | – | 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 | | |
| 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 ⁽¹⁾ | PDTA114YT |
| PDTC114YU | SOT323 | SC-70 | *30 ⁽¹⁾ | PDTA114YU |

Note

- * = 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 |
| PDTC114YS | <p>MAM364</p> | 1 2 3 | base collector emitter |
| PDTC114YE PDTC114YEF PDTC114YK PDTC114YT PDTC114YU | <p>Top view</p> <p>MDB269</p> | 1 2 3 | base emitter collector |
| PDTC114YM | <p>bottom view</p> <p>MHC506</p> | 1 2 3 | base emitter collector |

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LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|------------------|-------------------------------|--------------------------|------|------|------|
| V _{CB0} | 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 | | – | +40 | V |
| | negative | | – | –6 | V |
| I _O | output current (DC) | | – | 100 | mA |
| I _{CM} | peak collector current | | – | 100 | mA |
| P _{tot} | total power dissipation | T _{amb} ≤ 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 _{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 μm copper strip line.

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 |
| | 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 μm copper strip line.

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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 | – | – | 100 | nA |
| I _{CEO} | collector-emitter cut-off current | V _{CE} = 30 V; I _B = 0 | – | – | 1 | μ A |
| | | V _{CE} = 30 V; I _B = 0; T _j = 150 °C | – | – | 50 | μ A |
| I _{EBO} | emitter-base cut-off current | V _{EB} = 5 V; I _C = 0 | – | – | 150 | μ A |
| h _{FE} | DC current gain | V _{CE} = 5 V; I _C = 5 mA | 100 | – | – | |
| V _{CEsat} | collector-emitter saturation voltage | I _C = 5 mA; I _B = 0.25 mA | – | – | 100 | mV |
| V _{i(off)} | input-off voltage | I _C = 100 μ A; V _{CE} = 5 V | – | 0.7 | 0.5 | V |
| V _{i(on)} | input-on voltage | I _C = 1 mA; V _{CE} = 0.3 V | 1.4 | 0.8 | – | V |
| R1 | input resistor | | 7 | 10 | 13 | k Ω |
| $\frac{R2}{R1}$ | resistor ratio | | 3.7 | 4.7 | 5.7 | |
| C _c | collector capacitance | I _E = i _e = 0; V _{CB} = 10 V; f = 1 MHz | – | – | 2.5 | pF |

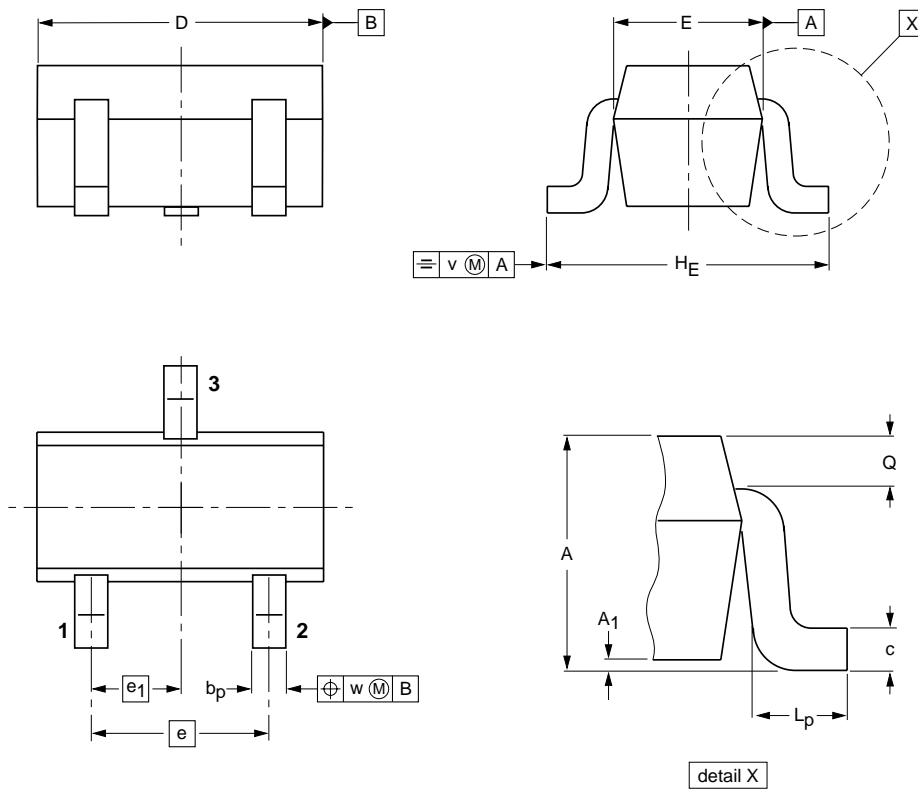
NPN resistor-equipped transistors;
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PACKAGE OUTLINES

Plastic surface-mounted package; 3 leads

SOT416



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 | 0.95 0.60 | 0.1 | 0.30 0.15 | 0.25 0.10 | 1.8 1.4 | 0.9 0.7 | 1 | 0.5 | 1.75 1.45 | 0.45 0.15 | 0.23 0.13 | 0.2 | 0.2 |

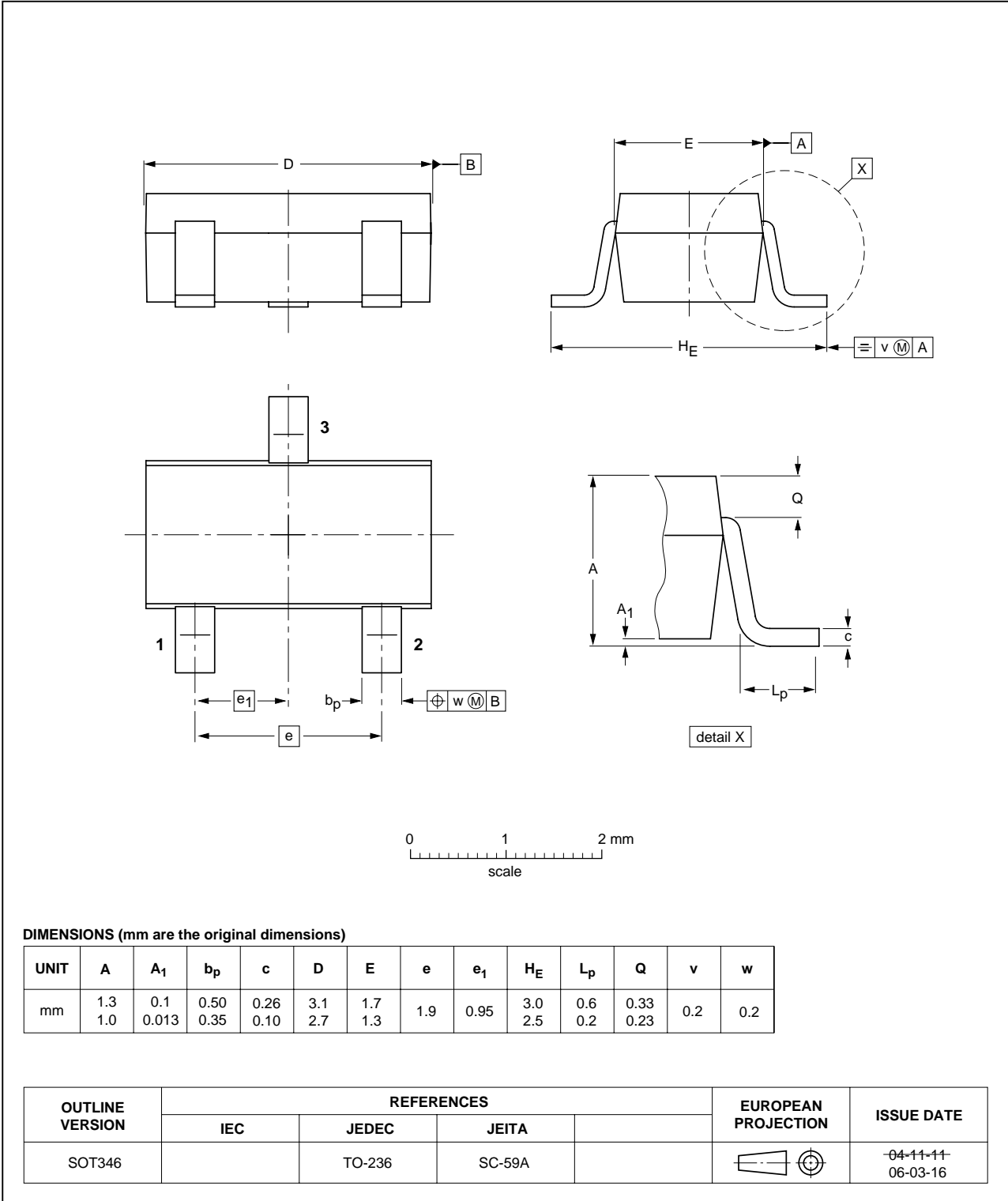
| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|--------------------|------------|-------|-------|--|------------------------|----------------------|
| | IEC | JEDEC | JEITA | | | |
| SOT416 | | | SC-75 | | | 04-11-04 06-03-16 |

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

PDTC114Y series

Plastic surface-mounted package; 3 leads

SOT346

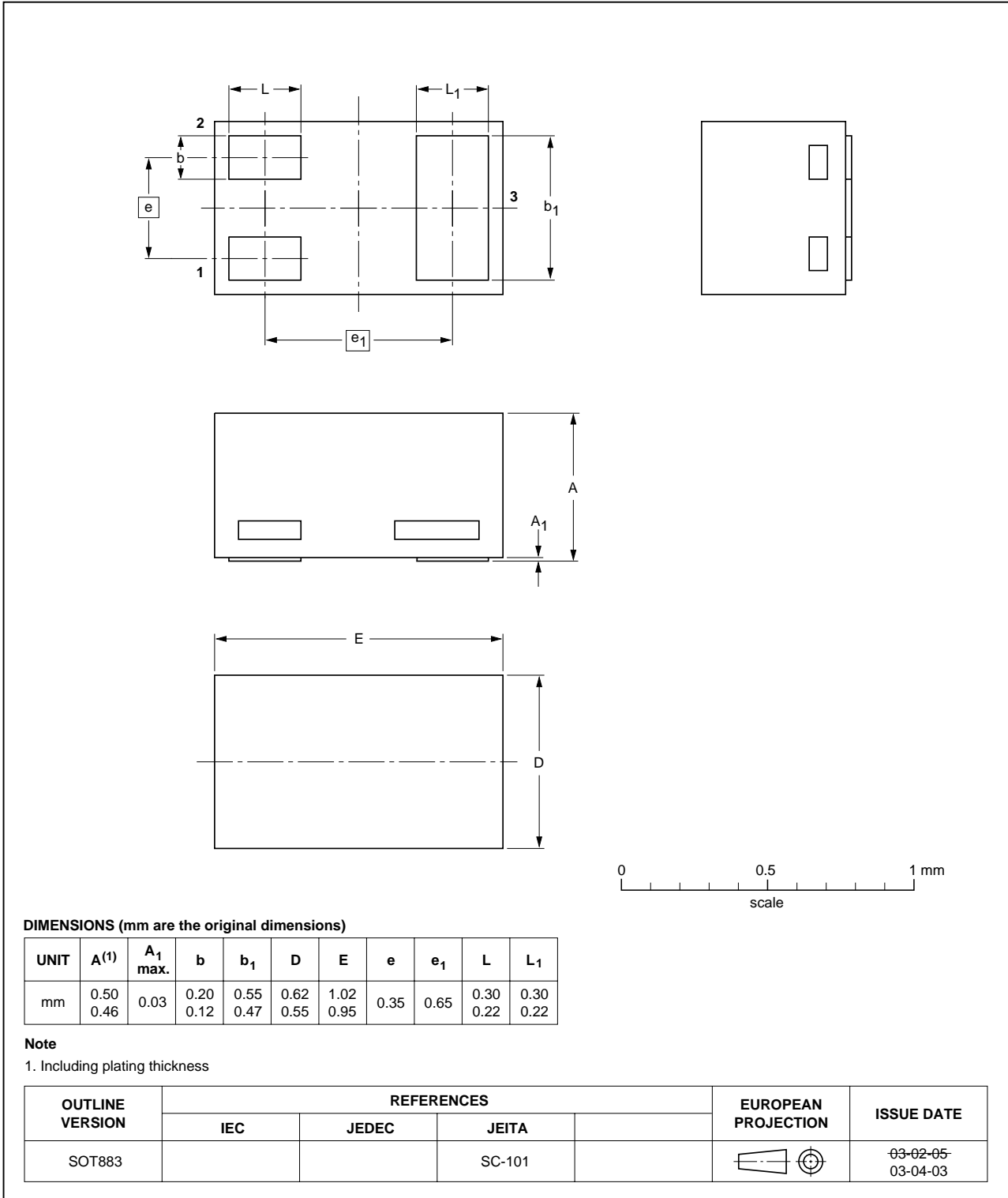


NPN resistor-equipped transistors;
R1 = 10 kΩ, R2 = 47 kΩ

PDTC114Y series

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

SOT883

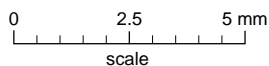
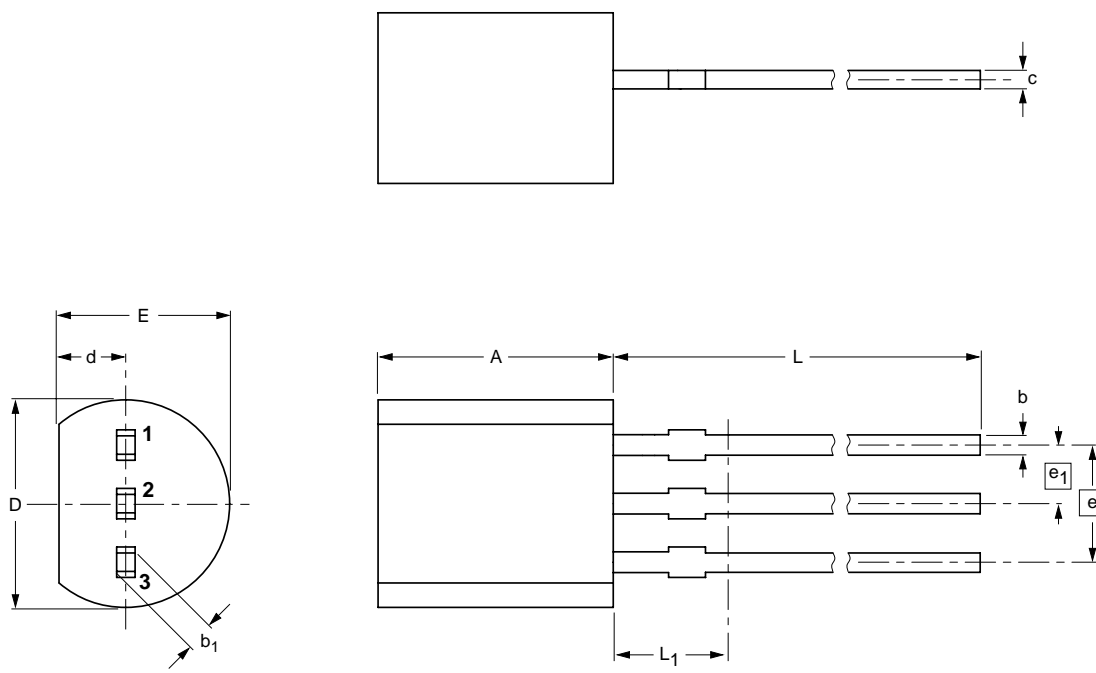


NPN resistor-equipped transistors;
R1 = 10 kΩ, R2 = 47 kΩ

PDTC114Y series

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

SOT54



DIMENSIONS (mm are the original dimensions)

| UNIT | A | b | b 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.

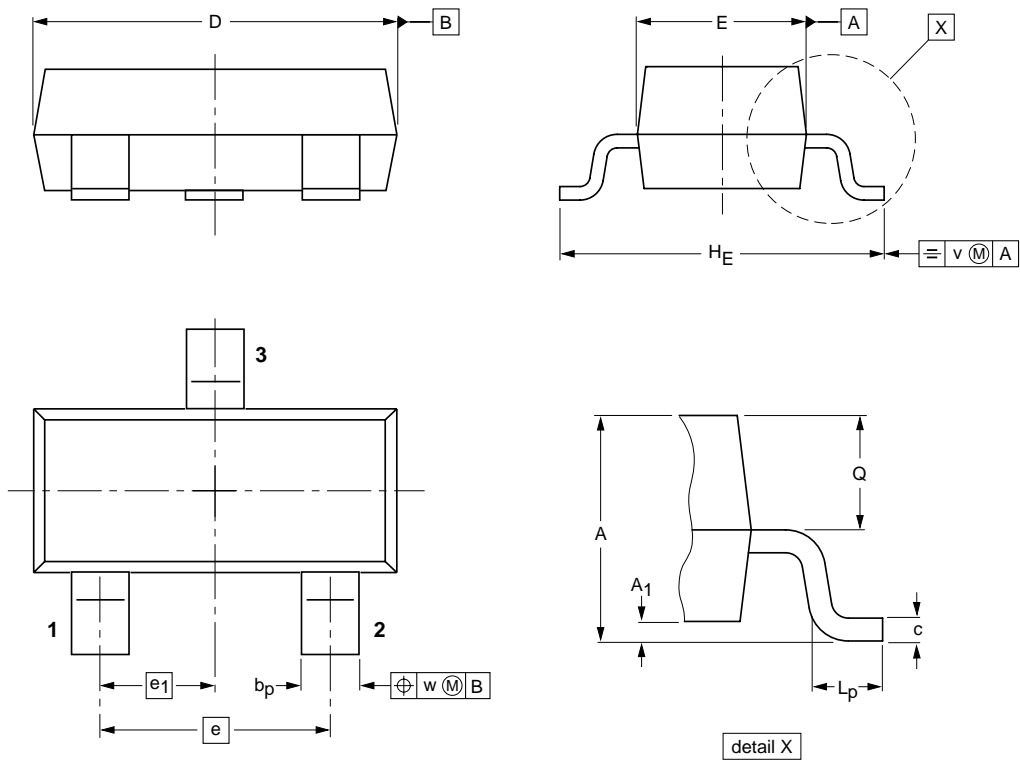
| OUTLINE VERSION | REFERENCES | | | EUROPEAN PROJECTION | ISSUE DATE |
|--------------------|------------|-------|--------|------------------------|----------------------|
| | IEC | JEDEC | JEITA | | |
| SOT54 | | TO-92 | SC-43A | | 04-06-28 04-11-16 |

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

PDTC114Y series

Plastic surface-mounted package; 3 leads

SOT23



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 0.9 | 0.1 | 0.48 0.38 | 0.15 0.09 | 3.0 2.8 | 1.4 1.2 | 1.9 | 0.95 | 2.5 2.1 | 0.45 0.15 | 0.55 0.45 | 0.2 | 0.1 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|--------------------|------------|----------|-------|--|------------------------|----------------------|
| | IEC | JEDEC | JEITA | | | |
| SOT23 | | TO-236AB | | | | 04-11-04 06-03-16 |

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 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 |

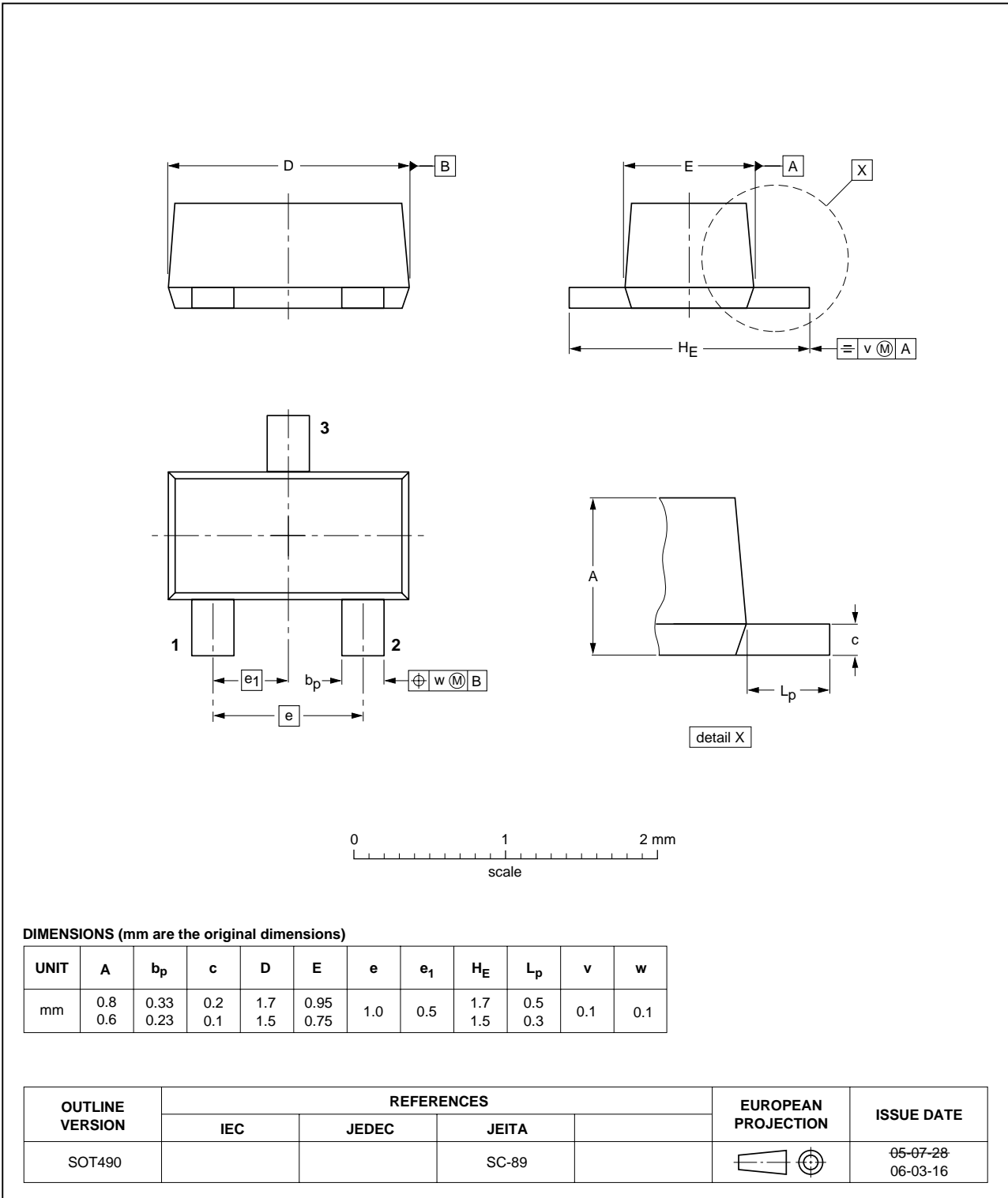
| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|--------------------|------------|-------|-------|--|------------------------|---------------------------------|
| | IEC | JEDEC | JEITA | | | |
| SOT323 | | | SC-70 | | | 04-11-04 06-03-16 |

NPN resistor-equipped transistors;
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Plastic surface-mounted package; 3 leads

SOT490



NPN resistor-equipped transistors;
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PDTC114Y series

DATA SHEET STATUS

| DOCUMENT STATUS ⁽¹⁾ | PRODUCT STATUS ⁽²⁾ | DEFINITION |
|--------------------------------|-------------------------------|---|
| Objective data sheet | Development | This document contains data from the objective specification for product development. |
| Preliminary data sheet | Qualification | This document contains data from the preliminary specification. |
| Product data sheet | Production | This document contains the product specification. |

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Contact information

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Printed in The Netherlands

R75/06/pp14

Date of release: 2004 Aug 17

Document order number: 9397 750 13665

