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Kind regards,

Team Nexperia

# PDTA114T series

PNP resistor-equipped transistors; R1 = 10 k $\Omega$ , R2 = open

Rev. 07 — 20 April 2007

Product data sheet

## 1. Product profile

### 1.1 General description

PNP Resistor-Equipped Transistors (RET) family in small plastic packages.

Table 1. Product overview

| Type number              | Package |        |          | NPN complement |
|--------------------------|---------|--------|----------|----------------|
|                          | NXP     | JEITA  | JEDEC    |                |
| PDTA114TE                | SOT416  | SC-75  | -        | PDTC114TE      |
| PDTA114TK                | SOT346  | SC-59A | TO-236   | PDTC114TK      |
| PDTA114TM                | SOT883  | SC-101 | -        | PDTC114TM      |
| PDTA114TS <sup>[1]</sup> | SOT54   | SC-43A | TO-92    | PDTC114TS      |
| PDTA114TT                | SOT23   | -      | TO-236AB | PDTC114TT      |
| PDTA114TU                | SOT323  | SC-70  | -        | PDTC114TU      |

[1] Also available in SOT54A and SOT54 variant packages (see [Section 2](#)).

### 1.2 Features

- 100 mA output current capability
- Built-in bias resistors
- Simplifies circuit design
- Reduces component count
- Reduces pick and place costs

### 1.3 Applications

- Digital applications
- Control of IC inputs
- Cost-saving alternative to BC857 series in digital applications
- Low current peripheral driver

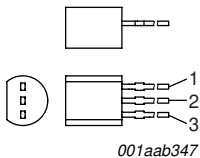
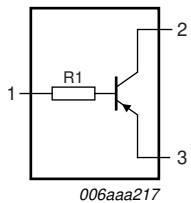
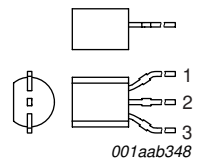
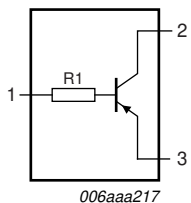
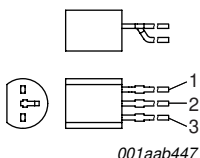
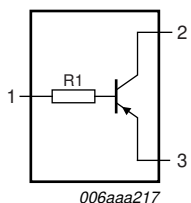
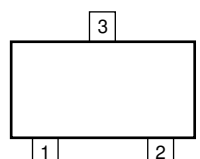
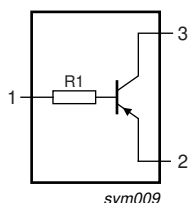
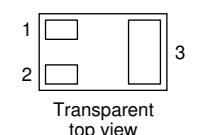
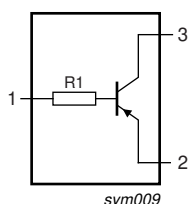
### 1.4 Quick reference data

Table 2. Quick reference data

| Symbol           | Parameter                 | Conditions | Min | Typ | Max  | Unit       |
|------------------|---------------------------|------------|-----|-----|------|------------|
| V <sub>CEO</sub> | collector-emitter voltage | open base  | -   | -   | -50  | V          |
| I <sub>O</sub>   | output current            |            | -   | -   | -100 | mA         |
| R1               | bias resistor 1 (input)   |            | 7   | 10  | 13   | k $\Omega$ |

**2. Pinning information**

**Table 3. Pinning**

| Pin                                  | Description        | Simplified outline   | Symbol   |
|--------------------------------------|--------------------|--|--|
| <b>SOT54</b>                         |                    |  |  |
| 1                                    | input (base)       |  <p>001aab347</p>              |  <p>006aaa217</p>   |
| 2                                    | output (collector) |  |  |
| 3                                    | GND (emitter)      |  |  |
| <b>SOT54A</b>                        |                    |  |  |
| 1                                    | input (base)       |  <p>001aab348</p>              |  <p>006aaa217</p>  |
| 2                                    | output (collector) |  |  |
| 3                                    | GND (emitter)      |  |  |
| <b>SOT54 variant</b>                 |                    |  |  |
| 1                                    | input (base)       |  <p>001aab447</p>            |  <p>006aaa217</p> |
| 2                                    | output (collector) |  |  |
| 3                                    | GND (emitter)      |  |  |
| <b>SOT23; SOT323; SOT346; SOT416</b> |                    |  |  |
| 1                                    | input (base)       |  <p>006aaa144</p>            |  <p>sym009</p>    |
| 2                                    | GND (emitter)      |  |  |
| 3                                    | output (collector) |  |  |
| <b>SOT883</b>                        |                    |  |  |
| 1                                    | input (base)       |  <p>Transparent top view</p> |  <p>sym009</p>    |
| 2                                    | GND (emitter)      |  |  |
| 3                                    | output (collector) |  |  |

### 3. Ordering information

Table 4. Ordering information

| Type number              | Package |   |         |
|--------------------------|---------|---|---------|
|                          | Name    | Description   | Version |
| PDTA114TE                | SC-75   | plastic surface-mounted package; 3 leads                                      | SOT416  |
| PDTA114TK                | SC-59A  | plastic surface-mounted package; 3 leads                                      | SOT346  |
| PDTA114TM                | SC-101  | leadless ultra small plastic package; 3 solder lands; body 1.0 × 0.6 × 0.5 mm | SOT883  |
| PDTA114TS <sup>[1]</sup> | SC-43A  | plastic single-ended leaded (through hole) package; 3 leads                   | SOT54   |
| PDTA114TT                | -       | plastic surface-mounted package; 3 leads                                      | SOT23   |
| PDTA114TU                | SC-70   | plastic surface-mounted package; 3 leads                                      | SOT323  |

[1] Also available in SOT54A and SOT54 variant packages (see [Section 2](#) and [Section 9](#)).

### 4. Marking

Table 5. Marking codes

| Type number | Marking code <sup>[1]</sup> |
|-------------|-----------------------------|
| PDTA114TE   | 11                          |
| PDTA114TK   | 23                          |
| PDTA114TM   | DE                          |
| PDTA114TS   | TA114T                      |
| PDTA114TT   | *11                         |
| PDTA114TU   | *23                         |

[1] \* = -: made in Hong Kong  
 \* = p: made in Hong Kong  
 \* = t: made in Malaysia  
 \* = W: made in China



## 5. Limiting values

**Table 6. 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                         | -      | -5   | V    |    |
| I <sub>O</sub>   | output current            |  | -      | -100 | mA   |    |
| I <sub>CM</sub>  | peak collector current    | single pulse;<br>t <sub>p</sub> ≤ 1 ms | -      | -100 | mA   |    |
| P <sub>tot</sub> | total power dissipation   | T <sub>amb</sub> ≤ 25 °C               |        |      |      |    |
|                  | PDTA114TE                 |  | [1]    | -    | 150  | mW |
|                  | PDTA114TK                 |  | [1]    | -    | 250  | mW |
|                  | PDTA114TM                 |  | [2][3] | -    | 250  | mW |
|                  | PDTA114TS                 |  | [1]    | -    | 500  | mW |
|                  | PDTA114TT                 |  | [1]    | -    | 250  | mW |
|                  | PDTA114TU                 |  | [1]    | -    | 200  | mW |
| T <sub>j</sub>   | junction temperature      |  | -      | 150  | °C   |    |
| T <sub>amb</sub> | ambient temperature       |  | -65    | +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.

[2] Reflow soldering is the only recommended soldering method.

[3] Device mounted on an FR4 PCB with 60  $\mu$ m copper strip line, standard footprint.

## 6. Thermal characteristics

**Table 7. Thermal characteristics**

| Symbol               | Parameter                                   | Conditions  | Min    | Typ | Max | Unit |     |
|----------------------|---|-------------|--------|-----|-----|------|-----|
| R <sub>th(j-a)</sub> | thermal resistance from junction to ambient | in free air |        |     |     |      |     |
|                      | PDTA114TE                                   |             | [1]    | -   | -   | 833  | K/W |
|                      | PDTA114TK                                   |             | [1]    | -   | -   | 500  | K/W |
|                      | PDTA114TM                                   |             | [2][3] | -   | -   | 500  | K/W |
|                      | PDTA114TS                                   |             | [1]    | -   | -   | 250  | K/W |
|                      | PDTA114TT                                   |             | [1]    | -   | -   | 500  | K/W |
|                      | PDTA114TU                                   |             | [1]    | -   | -   | 625  | K/W |

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

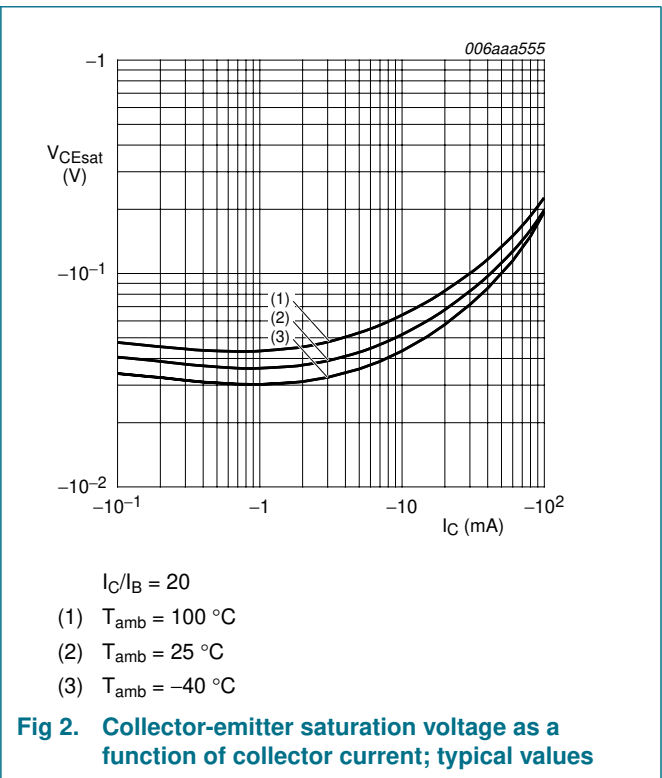
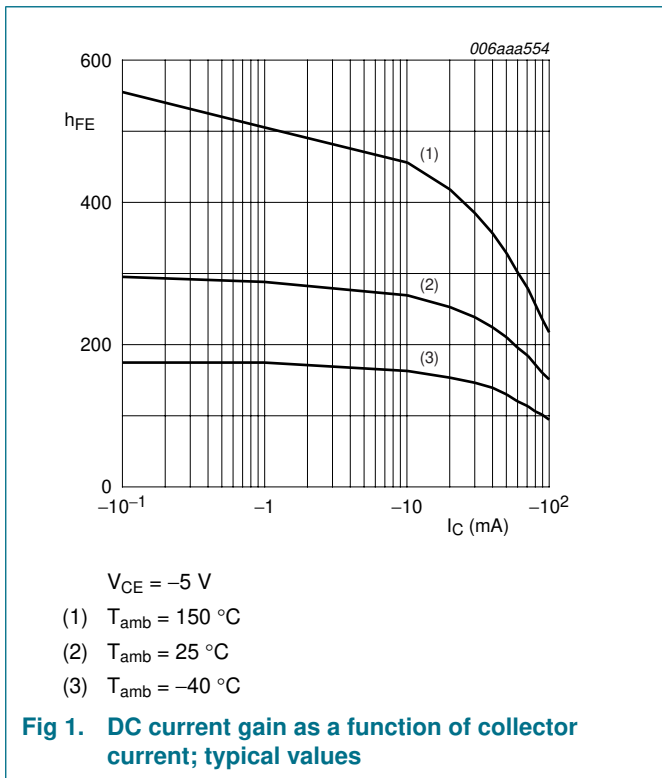
[2] Reflow soldering is the only recommended soldering method.

[3] Device mounted on an FR4 PCB with 60  $\mu$ m copper strip line, standard footprint.

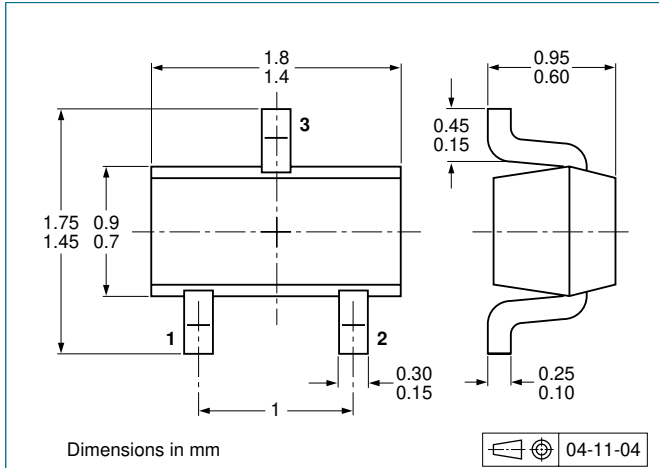
**7. Characteristics**

**Table 8. Characteristics**  
*T<sub>amb</sub> = 25 °C unless otherwise specified.*

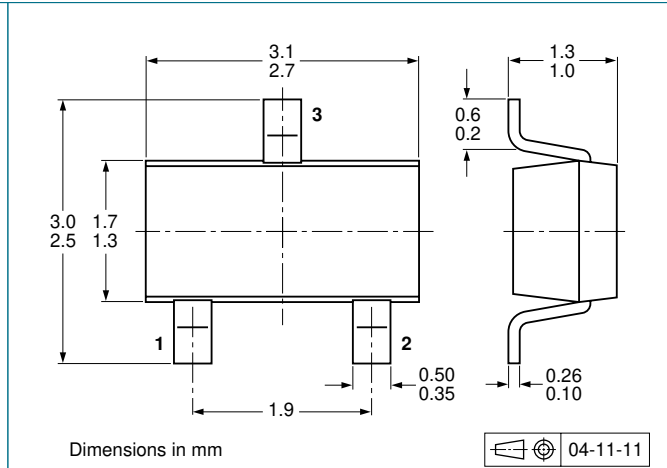
| Symbol             | Parameter                            | Conditions  | Min | Typ | Max  | Unit |
|--------------------|--------------------------------------|---|-----|-----|------|------|
| I <sub>CBO</sub>   | collector-base cut-off current       | V <sub>CB</sub> = -50 V; I <sub>E</sub> = 0 A                             | -   | -   | -100 | nA   |
| I <sub>CEO</sub>   | collector-emitter cut-off current    | V <sub>CE</sub> = -30 V; I <sub>B</sub> = 0 A                             | -   | -   | -1   | μA   |
|                    |                                      | V <sub>CE</sub> = -30 V; I <sub>B</sub> = 0 A; T <sub>j</sub> = 150 °C    | -   | -   | -50  | μA   |
| I <sub>EBO</sub>   | emitter-base cut-off current         | V <sub>EB</sub> = -5 V; I <sub>C</sub> = 0 A                              | -   | -   | -100 | nA   |
| h <sub>FE</sub>    | DC current gain                      | V <sub>CE</sub> = -5 V; I <sub>C</sub> = -1 mA                            | 200 | -   | -    |      |
| V <sub>CEsat</sub> | collector-emitter saturation voltage | I <sub>C</sub> = -10 mA; I <sub>B</sub> = -0.5 mA                         | -   | -   | -150 | mV   |
| R1                 | bias resistor 1 (input)              |   | 7   | 10  | 13   | kΩ   |
| C <sub>c</sub>     | collector capacitance                | V <sub>CB</sub> = -10 V; I <sub>E</sub> = i <sub>e</sub> = 0 A; f = 1 MHz | -   | -   | 3    | pF   |



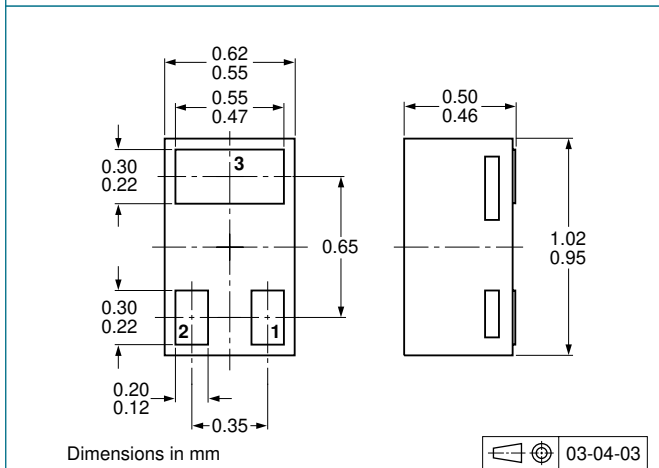
**8. Package outline**



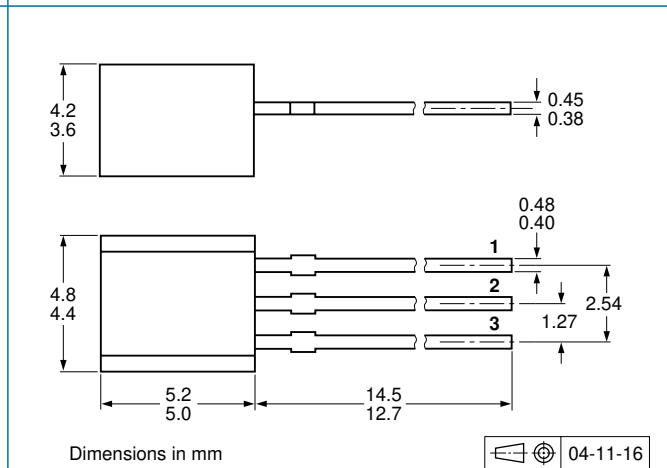
**Fig 3. Package outline SOT416 (SC-75)**



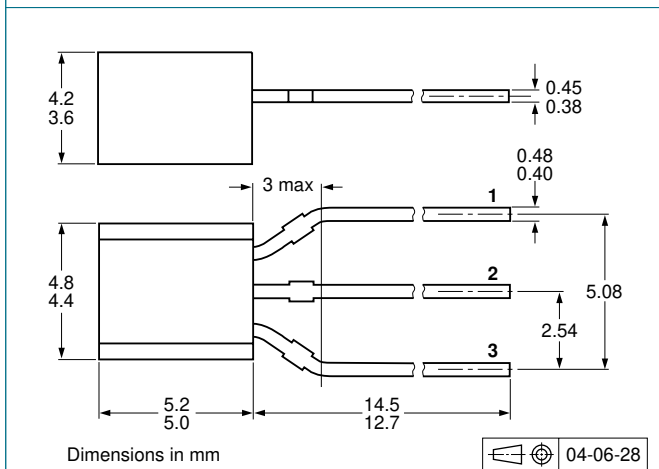
**Fig 4. Package outline SOT346 (SC-59A/TO-236)**



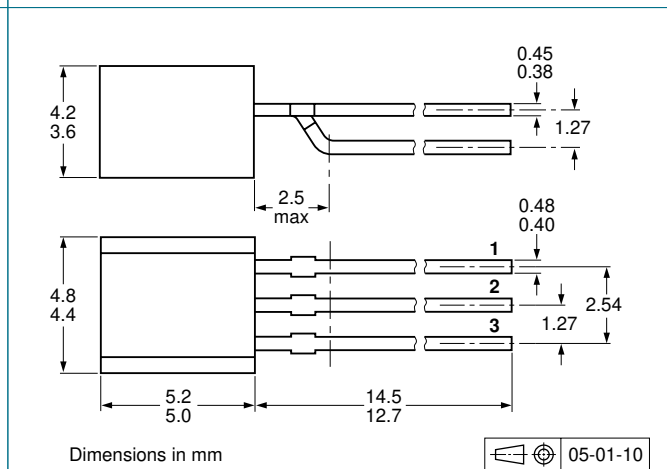
**Fig 5. Package outline SOT883 (SC-101)**



**Fig 6. Package outline SOT54 (SC-43A/TO-92)**

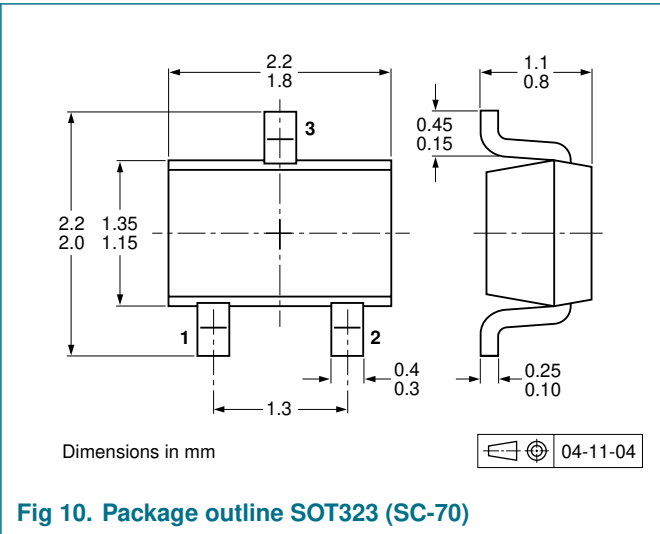
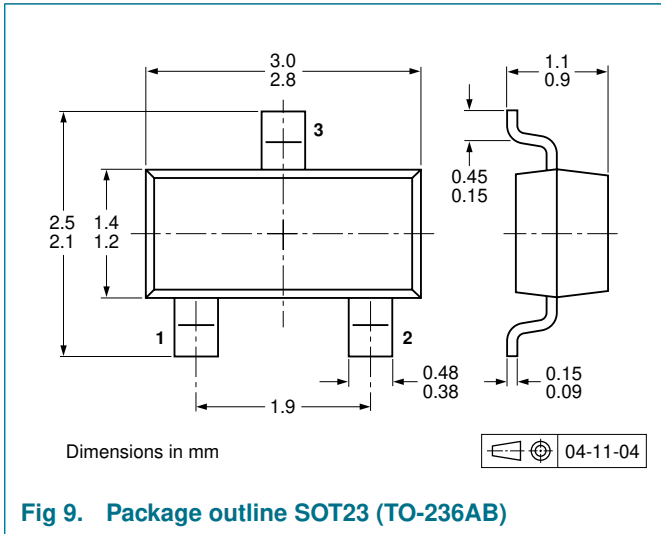


**Fig 7. Package outline SOT54A**



**Fig 8. Package outline SOT54 variant**





## 9. Packing information

**Table 9. Packing methods**

The indicated -xxx are the last three digits of the 12NC ordering code.<sup>[1]</sup>

| Type number | Package       | Description                    | Packing quantity |      |       |
|-------------|---------------|--------------------------------|------------------|------|-------|
|             |               |                                | 3000             | 5000 | 10000 |
| PDTA114TE   | SOT416        | 4 mm pitch, 8 mm tape and reel | -115             | -    | -135  |
| PDTA114TK   | SOT346        | 4 mm pitch, 8 mm tape and reel | -115             | -    | -135  |
| PDTA114TM   | SOT883        | 2 mm pitch, 8 mm tape and reel | -                | -    | -315  |
| PDTA114TS   | SOT54         | bulk, straight leads           | -                | -412 | -     |
|             | SOT54A        | tape and reel, wide pitch      | -                | -    | -116  |
|             |               | tape ammopack, wide pitch      | -                | -    | -126  |
|             | SOT54 variant | bulk, delta pinning            | -                | -112 | -     |
| PDTA114TT   | SOT23         | 4 mm pitch, 8 mm tape and reel | -215             | -    | -235  |
| PDTA114TU   | SOT323        | 4 mm pitch, 8 mm tape and reel | -115             | -    | -135  |

[1] For further information and the availability of packing methods, see [Section 12](#).

## 10. Revision history

**Table 10. Revision history**

| Document ID       | Release date | Data sheet status  | Change notice | Supersedes  |
|-------------------|--------------|--|---------------|---|
| PDTA114T_SER_7    | 20070420     | Product data sheet   | -             | PDTA114T_SERIES_6   |
| Modifications:    |              | <ul style="list-style-type: none"> <li>The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> <li>Type number PDTA114TEF removed</li> <li><a href="#">Section 1.2 “Features”</a>: amended</li> <li><a href="#">Section 1.3 “Applications”</a>: amended</li> <li><a href="#">Table 4 “Ordering information”</a>: added</li> <li><a href="#">Table 5 “Marking codes”</a>: enhanced table note section</li> <li><a href="#">Table 6 “Limiting values”</a>: I<sub>CM</sub> peak collector current conditions added</li> <li><a href="#">Figure 1, 2, 7 and 8</a>: added</li> <li><a href="#">Figure 3, 4, 5, 6, 9 and 10</a>: superseded by minimized package outline drawings</li> <li><a href="#">Section 9 “Packing information”</a>: added</li> <li><a href="#">Section 11 “Legal information”</a>: updated</li> </ul> |               |   |
| PDTA114T_SERIES_6 | 20040802     | Product specification  | -             | PDTA114T_SERIES_5   |
| PDTA114T_SERIES_5 | 20030909     | Product specification  | -             | PDTA114T_SERIES_4   |
| PDTA114T_SERIES_4 | 20030410     | Product specification  | -             | PDTA114TE_2<br>PDTA114TK_3<br>PDTA114TS_2<br>PDTA114TT_3<br>PDTA114TU_3 |
| PDTA114TE_2       | 19980723     | Preliminary specification  | -             | PDTA114TE_1   |
| PDTA114TK_3       | 19980515     | Product specification  | -             | PDTA114TK_2   |
| PDTA114TS_2       | 19980515     | Product specification  | -             | PDTA114TS_1   |
| PDTA114TT_3       | 19990413     | Objective specification  | -             | PDTA114TT_2   |
| PDTA114TU_3       | 19990413     | Product specification  | -             | PDTA114TU_2   |

## 11. Legal information

### 11.1 Data sheet status

| Document status <sup>[1][2]</sup> | Product status <sup>[3]</sup> | 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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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