Important notice

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In data sheets and application notes which still contain NXP or Philips Semiconductors references, use the references to Nexperia, as shown below.


Instead of sales.addresses@www.nxp.com or sales.addresses@www.semiconductors.philips.com, use salesaddresses@nexperia.com (email)

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Should be replaced with:
- © Nexperia B.V. (year). All rights reserved.

If you have any questions related to the data sheet, please contact our nearest sales office via e-mail or telephone (details via salesaddresses@nexperia.com). Thank you for your cooperation and understanding.

Kind regards,

Team Nexperia
PDTA124T series
PNP resistor-equipped transistors; R1 = 22 kΩ, R2 = open
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

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>PARAMETER</th>
<th>TYP.</th>
<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{CEO}</td>
<td>collector-emitter voltage</td>
<td>–</td>
<td>–50</td>
<td>V</td>
</tr>
<tr>
<td>I_O</td>
<td>output current (DC)</td>
<td>–</td>
<td>–100</td>
<td>mA</td>
</tr>
<tr>
<td>R1</td>
<td>bias resistor</td>
<td>22</td>
<td>–</td>
<td>kΩ</td>
</tr>
<tr>
<td>R2</td>
<td>open</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

DESCRIPTION

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

PRODUCT OVERVIEW

<table>
<thead>
<tr>
<th>TYPE NUMBER</th>
<th>PACKAGE</th>
<th>MARKING CODE</th>
<th>NPN COMPLEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDTA124TE</td>
<td>SOT416</td>
<td>3R</td>
<td>PDTC124TE</td>
</tr>
<tr>
<td>PDTA124TEF</td>
<td>SOT490</td>
<td>24</td>
<td>PDTC124TEF</td>
</tr>
<tr>
<td>PDTA124TK</td>
<td>SOT346</td>
<td>59</td>
<td>PDTC124TK</td>
</tr>
<tr>
<td>PDTA124TM</td>
<td>SOT883</td>
<td>DJ</td>
<td>PDTC124TM</td>
</tr>
<tr>
<td>PDTA124TS</td>
<td>SOT54 (TO-92)</td>
<td>TA124T</td>
<td>PDTC124TS</td>
</tr>
<tr>
<td>PDTA124TT</td>
<td>SOT23</td>
<td>*AE(1)</td>
<td>PDTC124TT</td>
</tr>
<tr>
<td>PDTA124TU</td>
<td>SOT323</td>
<td>*7B(1)</td>
<td>PDTC124TU</td>
</tr>
</tbody>
</table>

Note

1. * = p: Made in Hong Kong.
2. ** = t: Made in Malaysia.
3. *** = W: Made in China.
NP resistor-equipped transistors; R1 = 22 kΩ, R2 = open

**PDTA124T series**

**SIMPLIFIED OUTLINE, SYMBOL AND PINNING**

<table>
<thead>
<tr>
<th>TYPE NUMBER</th>
<th>SIMPLIFIED OUTLINE AND SYMBOL</th>
<th>PINNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDTA124TS</td>
<td><img src="MAM552" alt="Top view" /> <img src="MDB268" alt="Bottom view" /></td>
<td>1 base, 2 collector, 3 emitter</td>
</tr>
<tr>
<td>PDTA124TE</td>
<td><img src="MDB272" alt="Top view" /></td>
<td>1 base, 2 emitter, 3 collector</td>
</tr>
<tr>
<td>PDTA124TEF</td>
<td><img src="MDB272" alt="Top view" /></td>
<td>1 base, 2 emitter, 3 collector</td>
</tr>
<tr>
<td>PDTA124TK</td>
<td><img src="MDB272" alt="Top view" /></td>
<td>1 base, 2 emitter, 3 collector</td>
</tr>
<tr>
<td>PDTA124TT</td>
<td><img src="MDB272" alt="Top view" /></td>
<td>1 base, 2 emitter, 3 collector</td>
</tr>
<tr>
<td>PDTA124TU</td>
<td><img src="MDB272" alt="Top view" /></td>
<td>1 base, 2 emitter, 3 collector</td>
</tr>
<tr>
<td>PDTA124TM</td>
<td><img src="MDB272" alt="Top view" /></td>
<td>1 base, 2 emitter, 3 collector</td>
</tr>
</tbody>
</table>
PNP resistor-equipped transistors;  
R1 = 22 kΩ, R2 = open

PDTA124T series

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>TYPE NUMBER</th>
<th>PACKAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDTA124TE</td>
<td>plastic surface mounted package; 3 leads</td>
</tr>
<tr>
<td>PDTA124TEF</td>
<td>plastic surface mounted package; 3 leads</td>
</tr>
<tr>
<td>PDTA124TK</td>
<td>plastic surface mounted package; 3 leads</td>
</tr>
<tr>
<td>PDTA124TM</td>
<td>leadless ultra small plastic package; 3 solder lands; body 1.0 × 0.6 × 0.5 mm</td>
</tr>
<tr>
<td>PDTA124TS</td>
<td>plastic single-ended leaded (through hole) package; 3 leads</td>
</tr>
<tr>
<td>PDTA124TT</td>
<td>plastic surface mounted package; 3 leads</td>
</tr>
<tr>
<td>PDTA124TU</td>
<td>plastic surface mounted package; 3 leads</td>
</tr>
</tbody>
</table>

LIMITING VALUES

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

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>PARAMETER</th>
<th>CONDITIONS</th>
<th>MIN.</th>
<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vcbo</td>
<td>collector-base voltage</td>
<td>open emitter</td>
<td>–</td>
<td>−50</td>
<td>V</td>
</tr>
<tr>
<td>VCEO</td>
<td>collector-emitter voltage</td>
<td>open base</td>
<td>–</td>
<td>−50</td>
<td>V</td>
</tr>
<tr>
<td>VEBBO</td>
<td>emitter-base voltage</td>
<td>open collector</td>
<td>–</td>
<td>−5</td>
<td>V</td>
</tr>
<tr>
<td>IO</td>
<td>output current (DC)</td>
<td>–</td>
<td>−100</td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td>ICMP</td>
<td>peak collector current</td>
<td>–</td>
<td>−100</td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td>Ptot</td>
<td>total power dissipation</td>
<td>T_{amb} ≤ 25 °C</td>
<td>–</td>
<td>250</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td>SOT23</td>
<td>note 1</td>
<td>–</td>
<td>500</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td>SOT54</td>
<td>note 1</td>
<td>–</td>
<td>200</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td>SOT323</td>
<td>note 1</td>
<td>–</td>
<td>250</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td>SOT346</td>
<td>note 1</td>
<td>–</td>
<td>150</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td>SOT416</td>
<td>note 1</td>
<td>–</td>
<td>250</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td>SOT490</td>
<td>notes 1 and 2</td>
<td>–</td>
<td>250</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td>SOT883</td>
<td>notes 2 and 3</td>
<td>–</td>
<td>250</td>
<td>mW</td>
</tr>
<tr>
<td>Tstg</td>
<td>storage temperature</td>
<td>–65</td>
<td>+150</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>Tj</td>
<td>junction temperature</td>
<td>–</td>
<td>150</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>Tamb</td>
<td>operating ambient temperature</td>
<td>–65</td>
<td>+150</td>
<td>°C</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>PARAMETER</th>
<th>CONDITIONS</th>
<th>VALUE</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R_{th(j-a)}$</td>
<td>thermal resistance from junction to ambient</td>
<td>in free air</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOT23</td>
<td></td>
<td>note 1</td>
<td>500</td>
<td>K/W</td>
</tr>
<tr>
<td>SOT54</td>
<td></td>
<td>note 1</td>
<td>250</td>
<td>K/W</td>
</tr>
<tr>
<td>SOT323</td>
<td></td>
<td>note 1</td>
<td>625</td>
<td>K/W</td>
</tr>
<tr>
<td>SOT346</td>
<td></td>
<td>note 1</td>
<td>500</td>
<td>K/W</td>
</tr>
<tr>
<td>SOT416</td>
<td></td>
<td>note 1</td>
<td>833</td>
<td>K/W</td>
</tr>
<tr>
<td>SOT490</td>
<td></td>
<td>notes 1 and 2</td>
<td>500</td>
<td>K/W</td>
</tr>
<tr>
<td>SOT883</td>
<td></td>
<td>notes 2 and 3</td>
<td>500</td>
<td>K/W</td>
</tr>
</tbody>
</table>

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.

CHARACTERISTICS

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

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>PARAMETER</th>
<th>CONDITIONS</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{CBO}$</td>
<td>collector-base cut-off current</td>
<td>$V_{CB} = -50 , V; , I_E = 0 , A$</td>
<td>–</td>
<td>–</td>
<td>–100</td>
<td>nA</td>
</tr>
<tr>
<td>$I_{CEO}$</td>
<td>collector-emitter cut-off current</td>
<td>$V_{CE} = -30 , V; , I_B = 0 , A$</td>
<td>–</td>
<td>–</td>
<td>–1</td>
<td>μA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{CE} = -30 , V; , I_B = 0 , A; , T_j = 150 , ^\circ C$</td>
<td>–</td>
<td>–</td>
<td>50</td>
<td>μA</td>
</tr>
<tr>
<td>$I_{EBO}$</td>
<td>emitter-base cut-off current</td>
<td>$V_{EB} = -5 , V; , I_C = 0 , A$</td>
<td>–</td>
<td>–</td>
<td>–100</td>
<td>nA</td>
</tr>
<tr>
<td>$h_{FE}$</td>
<td>DC current gain</td>
<td>$V_{CE} = -5 , V; , I_C = -1 , mA$</td>
<td>100</td>
<td></td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>$V_{CEsat}$</td>
<td>collector-emitter saturation voltage</td>
<td>$I_C = -10 , mA; , I_B = -0.5 , mA$</td>
<td>–</td>
<td>–</td>
<td>150</td>
<td>mV</td>
</tr>
<tr>
<td>$R1$</td>
<td>input resistor</td>
<td></td>
<td>15.4</td>
<td>22</td>
<td>28.6</td>
<td>kΩ</td>
</tr>
<tr>
<td>$C_C$</td>
<td>collector capacitance</td>
<td>$I_E = i_e = 0 , A; , V_{CB} = -10 , V; , f = 1 , MHz$</td>
<td>–</td>
<td>–</td>
<td>3</td>
<td>pF</td>
</tr>
</tbody>
</table>
PNP resistor-equipped transistors;
R1 = 22 kΩ, R2 = open

PDTA124T series

PACKAGE OUTLINES

Plastic surface-mounted package; 3 leads

SOT23

DIMENSIONS (mm are the original dimensions)

<table>
<thead>
<tr>
<th>UNIT</th>
<th>A</th>
<th>A₁ max.</th>
<th>b_p</th>
<th>c</th>
<th>D</th>
<th>E</th>
<th>e</th>
<th>e₁</th>
<th>H_E</th>
<th>L_p</th>
<th>Q</th>
<th>v</th>
<th>w</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.1</td>
<td>0.9</td>
<td>0.1</td>
<td>0.48 0.38</td>
<td>0.15 0.09</td>
<td>3.0 2.8</td>
<td>1.4 1.2</td>
<td>1.9 0.95</td>
<td>2.5 2.1</td>
<td>0.45 0.15</td>
<td>0.55 0.45</td>
<td>0.2 0.1</td>
<td></td>
</tr>
</tbody>
</table>

OUTLINE VERSION

IEC | JEDEC | JEITA
---|-------|-------
SOT23 | TO-236AB | 

REFERENCES

EUROPEAN PROJECTION

ISSUE DATE

2004 Aug 04
PNP resistor-equipped transistors;
R1 = 22 kΩ, R2 = open

PDTA124T series

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

SOT54

DIMENSIONS (mm are the original dimensions)

<table>
<thead>
<tr>
<th>UNIT</th>
<th>A</th>
<th>b</th>
<th>b₁</th>
<th>c</th>
<th>D</th>
<th>d</th>
<th>E</th>
<th>e</th>
<th>e₁</th>
<th>L</th>
<th>L₁ (max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>5.2</td>
<td>0.48</td>
<td>0.66</td>
<td>0.45</td>
<td>4.8</td>
<td>1.7</td>
<td>4.2</td>
<td>2.54</td>
<td>1.27</td>
<td>14.5</td>
<td>12.7</td>
</tr>
</tbody>
</table>

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

OUTLINE VERSION
- IEC
- JEDEC
- JEITA

REFERENCES
- TO-92
- SC-43A

EUROPEAN PROJECTION

ISSUE DATE
- 04-06-28
- 04-11-16

2004 Aug 04

7
PNP resistor-equipped transistors; R1 = 22 kΩ, R2 = open

PDTA124T series

Plastic surface-mounted package; 3 leads

SOT323

DIMENSIONS (mm are the original dimensions)

<table>
<thead>
<tr>
<th>UNIT</th>
<th>A</th>
<th>A₁</th>
<th>b_p</th>
<th>c</th>
<th>D</th>
<th>E</th>
<th>e</th>
<th>e₁</th>
<th>H_E</th>
<th>l_p</th>
<th>Q</th>
<th>v</th>
<th>w</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>1.1</td>
<td>0.1</td>
<td>0.4</td>
<td>0.25</td>
<td>2.2</td>
<td>1.35</td>
<td>1.3</td>
<td>0.65</td>
<td>2.2</td>
<td>2.0</td>
<td>0.45</td>
<td>0.23</td>
<td>0.2</td>
</tr>
<tr>
<td>0.8</td>
<td>0.1</td>
<td>0.3</td>
<td>0.10</td>
<td>1.8</td>
<td>1.15</td>
<td>1.05</td>
<td>0.65</td>
<td>2.0</td>
<td>1.5</td>
<td>0.13</td>
<td>0.20</td>
<td>0.2</td>
<td>0.2</td>
</tr>
</tbody>
</table>

OUTLINE VERSION

SOT323

REFERENCES

IEC  
JEDEC  
JEITA  

EUROPEAN PROJECTION  

ISSUE DATE

04-11-04  
06-03-16
PNP resistor-equipped transistors; R1 = 22 kΩ, R2 = open

PDTA124T series

Plastic surface-mounted package; 3 leads

SOT346

DIMENSIONS (mm are the original dimensions)

<table>
<thead>
<tr>
<th>UNIT</th>
<th>A</th>
<th>A1</th>
<th>b_p</th>
<th>c</th>
<th>D</th>
<th>E</th>
<th>e</th>
<th>e1</th>
<th>HE</th>
<th>L_p</th>
<th>Q</th>
<th>v</th>
<th>w</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>1.3</td>
<td>0.1</td>
<td>0.50</td>
<td>0.26</td>
<td>3.1</td>
<td>1.7</td>
<td>1.9</td>
<td>0.95</td>
<td>3.0</td>
<td>2.5</td>
<td>0.6</td>
<td>0.33</td>
<td>0.23</td>
</tr>
<tr>
<td></td>
<td>1.0</td>
<td>0.013</td>
<td>0.35</td>
<td>0.10</td>
<td>2.7</td>
<td>1.3</td>
<td>0.95</td>
<td>2.5</td>
<td>0.6</td>
<td>0.2</td>
<td>0.33</td>
<td>0.23</td>
<td>0.2</td>
</tr>
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</table>

OUTLINE VERSION | REFERENCES | EUROPEAN PROJECTION | ISSUE DATE
----------------|-------------|----------------------|----------------
SOT346           | TO-236      | SC-59A               | 04-11-11 06-03-16
PNP resistor-equipped transistors; R1 = 22 kΩ, R2 = open

PDTA124T series

Plastic surface-mounted package; 3 leads

SOT416

DIMENSIONS (mm are the original dimensions)

<table>
<thead>
<tr>
<th>UNIT</th>
<th>A</th>
<th>A1 max</th>
<th>b_p</th>
<th>c</th>
<th>D</th>
<th>E</th>
<th>e</th>
<th>e1</th>
<th>H_E</th>
<th>L_p</th>
<th>Q</th>
<th>v</th>
<th>w</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>0.95</td>
<td>0.60</td>
<td>0.1</td>
<td>0.30</td>
<td>0.15</td>
<td>0.25</td>
<td>1.8</td>
<td>1.4</td>
<td>0.9</td>
<td>0.9</td>
<td>1.75</td>
<td>0.45</td>
<td>0.23</td>
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<tr>
<td></td>
<td>0.5</td>
<td>0.5</td>
<td>0.15</td>
<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
<td>0.7</td>
<td>0.7</td>
<td>1</td>
<td>0.5</td>
<td>1.45</td>
<td>0.15</td>
<td>0.13</td>
</tr>
</tbody>
</table>

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

IEC | JEDEC | JEITA | SC-75 | 04-11-04 | 06-03-16

2004 Aug 04

10
PNP resistor-equipped transistors; R1 = 22 kΩ, R2 = open

PDTA124T series

Plastic surface-mounted package; 3 leads

SOT490

DIMENSIONS (mm are the original dimensions)

<table>
<thead>
<tr>
<th>UNIT</th>
<th>A</th>
<th>bp</th>
<th>c</th>
<th>D</th>
<th>E</th>
<th>e</th>
<th>e₁</th>
<th>Hₑ</th>
<th>Lₑ</th>
<th>v</th>
<th>w</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>0.8</td>
<td>0.33</td>
<td>0.23</td>
<td>0.2</td>
<td>1.7</td>
<td>0.95</td>
<td>1.0</td>
<td>0.5</td>
<td>1.7</td>
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OUTLINE VERSION

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<tr>
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<th>JEITA</th>
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<td>SOT490</td>
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REFERENCES

EUROPEAN PROJECTION

ISSUE DATE

05-07-28

06-03-16

05-07-28

06-03-16
PNP resistor-equipped transistors; 
R1 = 22 kΩ, R2 = open

PDTA124T 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)

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<tr>
<th>UNIT</th>
<th>A₁ max.</th>
<th>b</th>
<th>b₁</th>
<th>D</th>
<th>E</th>
<th>e</th>
<th>e₁</th>
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<td>mm</td>
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<td>0.20</td>
<td>0.55</td>
<td>0.62</td>
<td>1.02</td>
<td>0.35</td>
<td>0.30</td>
<td>0.30</td>
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<td></td>
<td>0.46</td>
<td>0.12</td>
<td>0.47</td>
<td>0.55</td>
<td>0.95</td>
<td>0.65</td>
<td>0.30</td>
<td>0.30</td>
<td>0.22</td>
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**Note**
1. Including plating thickness

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<th>EUROPEAN PROJECTION</th>
<th>ISSUE DATE</th>
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2004 Aug 04
PNP resistor-equipped transistors;  
R1 = 22 kΩ, R2 = open  

PDTA124T series

DATA SHEET STATUS

<table>
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<tr>
<th>DOCUMENT STATUS(1)</th>
<th>PRODUCT STATUS(2)</th>
<th>DEFINITION</th>
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<tbody>
<tr>
<td>Objective data sheet</td>
<td>Development</td>
<td>This document contains data from the objective specification for product development.</td>
</tr>
<tr>
<td>Preliminary data sheet</td>
<td>Qualification</td>
<td>This document contains data from the preliminary specification.</td>
</tr>
<tr>
<td>Product data sheet</td>
<td>Production</td>
<td>This document contains the product specification.</td>
</tr>
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Notes

1. Please consult the most recently issued document before initiating or completing a design.
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