



# BC817DPN

NPN/PNP general purpose transistor

27 November 2019

Product data sheet

## 1. General description

NPN/PNP general-purpose double transistors in an SOT457 (SC-74) plastic package.

## 2. Features and benefits

- Reduces component count
- Reduces pick and place costs
- AEC-Q101 qualified

## 3. Applications

- General purpose switching and amplification

## 4. Quick reference data

Table 1. Quick reference data

| Symbol                                                                                          | Parameter                 | Conditions                     | Min | Typ | Max | Unit |
|-------------------------------------------------------------------------------------------------|---------------------------|--------------------------------|-----|-----|-----|------|
| <b>Per transistor; for the PNP transistor with negative polarity</b>                            |                           |                                |     |     |     |      |
| $V_{CE0}$                                                                                       | collector-emitter voltage | open base                      | -   | -   | 45  | V    |
| $I_C$                                                                                           | collector current         |                                | -   | -   | 500 | mA   |
| $I_{CM}$                                                                                        | peak collector current    | single pulse; $t_p \leq 1$ ms  | -   | -   | 1   | A    |
| <b>Per transistor unless otherwise specified; for the PNP transistor with negative polarity</b> |                           |                                |     |     |     |      |
| $h_{FE}$                                                                                        | DC current gain           | $V_{CE} = 1$ V; $I_C = 100$ mA | [1] | 160 | -   | 400  |

[1] Pulsed test:  $t_p \leq 300$   $\mu$ s;  $\delta \leq 0.02$

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description   | Simplified outline           | Graphic symbol |
|-----|--------|---------------|------------------------------|----------------|
| 1   | E1     | emitter TR1   | <p>SC-74; TSOP6 (SOT457)</p> | <p>sym019</p>  |
| 2   | B1     | base TR1      |                              |                |
| 3   | C2     | collector TR2 |                              |                |
| 4   | E2     | emitter TR2   |                              |                |
| 5   | B2     | base TR2      |                              |                |
| 6   | C1     | collector TR1 |                              |                |

## 6. Ordering information

Table 3. Ordering information

| Type number | Package      |                                                          |         |
|-------------|--------------|----------------------------------------------------------|---------|
|             | Name         | Description                                              | Version |
| BC817DPN    | SC-74; TSOP6 | plastic, surface-mounted package (SC-74; TSOP6); 6 leads | SOT457  |

## 7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| BC817DPN    | N4           |

## 8. Limiting values

Table 5. Limiting values

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

| Symbol                                                               | Parameter                 | Conditions                    |     | Min | Max | Unit |
|----------------------------------------------------------------------|---------------------------|-------------------------------|-----|-----|-----|------|
| <b>Per transistor; for the PNP transistor with negative polarity</b> |                           |                               |     |     |     |      |
| $V_{CBO}$                                                            | collector-base voltage    | open emitter                  |     | -   | 50  | V    |
| $V_{CEO}$                                                            | collector-emitter voltage | open base                     |     | -   | 45  | V    |
| $V_{EBO}$                                                            | emitter-base voltage      | open collector                |     | -   | 5   | V    |
| $I_C$                                                                | collector current         |                               |     | -   | 500 | mA   |
| $I_{CM}$                                                             | peak collector current    | single pulse; $t_p \leq 1$ ms |     | -   | 1   | A    |
| $I_{BM}$                                                             | peak base current         |                               |     | -   | 200 | mA   |
| $P_{tot}$                                                            | total power dissipation   | $T_{amb} \leq 25$ °C          | [1] | -   | 370 | mW   |
| $T_j$                                                                | junction temperature      |                               |     | -   | 150 | °C   |
| $T_{amb}$                                                            | ambient temperature       |                               |     | -65 | 150 | °C   |
| $T_{stg}$                                                            | storage temperature       |                               |     | -65 | 150 | °C   |
| <b>Per device</b>                                                    |                           |                               |     |     |     |      |
| $P_{tot}$                                                            | total power dissipation   | $T_{amb} \leq 25$ °C          | [1] | -   | 600 | mW   |

[1] Device mounted on an FR4 Printed-Circuit Board (PCB); single-sided copper; tin plated; mounting pad for collector 1 cm<sup>2</sup>.

## 9. Thermal characteristics

Table 6. Thermal characteristics

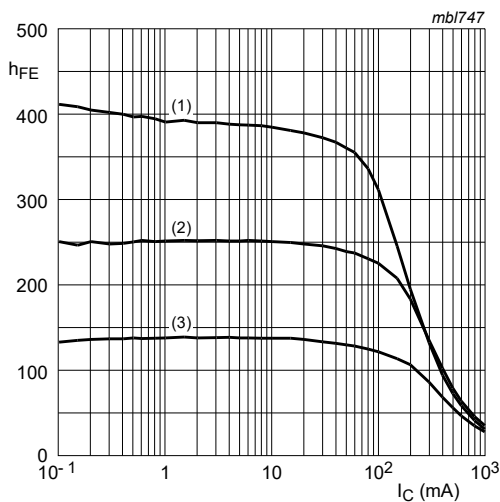
| Symbol            | Parameter                                   | Conditions  |     | Min | Typ | Max | Unit |
|-------------------|---------------------------------------------|-------------|-----|-----|-----|-----|------|
| <b>Per device</b> |                                             |             |     |     |     |     |      |
| $R_{th(j-a)}$     | thermal resistance from junction to ambient | in free air | [1] | -   | -   | 208 | K/W  |

[1] Device mounted on an FR4 PCB; single-sided copper; tin-plated; mounting pad for collector 1 cm<sup>2</sup>.

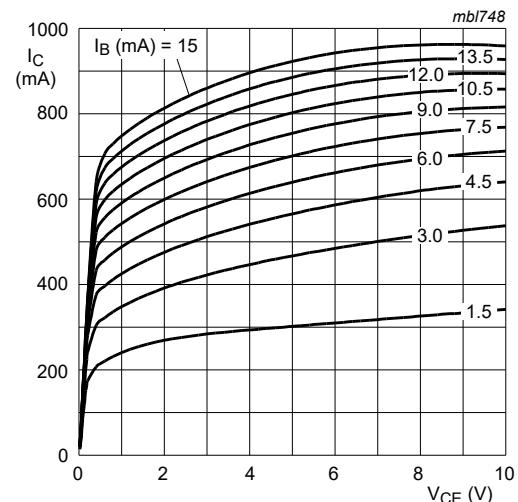
## 10. Characteristics

Table 7. Characteristics

| Symbol                                                                                          | Parameter                            | Conditions                                                                                            | Min     | Typ | Max | Unit          |
|-------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------------------------|---------|-----|-----|---------------|
| <b>Per transistor unless otherwise specified; for the PNP transistor with negative polarity</b> |                                      |                                                                                                       |         |     |     |               |
| $I_{CBO}$                                                                                       | collector-base cut-off current       | $V_{CB} = 20\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ °C}$                                      | -       | -   | 100 | nA            |
|                                                                                                 |                                      | $V_{CB} = 20\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ °C}$                                         | -       | -   | 5   | $\mu\text{A}$ |
| $I_{EBO}$                                                                                       | emitter-base cut-off current         | $V_{EB} = 5\text{ V}; I_C = 0\text{ A}; T_{amb} = 25\text{ °C}$                                       | -       | -   | 100 | nA            |
| $h_{FE}$                                                                                        | DC current gain                      | $V_{CE} = 1\text{ V}; I_C = 100\text{ mA}$                                                            | [1]     | 160 | -   | 400           |
|                                                                                                 |                                      | $V_{CE} = 1\text{ V}; I_C = 500\text{ mA}; T_{amb} = 25\text{ °C}$                                    | [1]     | 40  | -   | -             |
| $V_{CEsat}$                                                                                     | collector-emitter saturation voltage | $I_C = 500\text{ mA}; I_B = 50\text{ mA}; T_{amb} = 25\text{ °C}$                                     | [1]     | -   | 700 | mV            |
| $V_{BE}$                                                                                        | base-emitter voltage                 | $V_{CE} = 1\text{ V}; I_C = 500\text{ mA}$                                                            | [1] [2] | -   | 1.2 | V             |
| <b>NPN transistor</b>                                                                           |                                      |                                                                                                       |         |     |     |               |
| $C_c$                                                                                           | collector capacitance                | $V_{CB} = 10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ °C}$  | -       | 5   | -   | pF            |
| $f_T$                                                                                           | transition frequency                 | $V_{CE} = 5\text{ V}; I_C = 10\text{ mA}; f = 100\text{ MHz}; T_{amb} = 25\text{ °C}$                 | 100     | -   | -   | MHz           |
| <b>PNP transistor</b>                                                                           |                                      |                                                                                                       |         |     |     |               |
| $C_c$                                                                                           | collector capacitance                | $V_{CB} = -10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ °C}$ | -       | 9   | -   | pF            |
| $f_T$                                                                                           | transition frequency                 | $V_{CE} = -5\text{ V}; I_C = -10\text{ mA}; f = 100\text{ MHz}; T_{amb} = 25\text{ °C}$               | 80      | -   | -   | MHz           |

[1] Pulsed test:  $t_p \leq 300\text{ }\mu\text{s}$ ;  $\delta \leq 0.02$ [2]  $V_{BE}$  decreases by approximately  $-2\text{ mV/k}$  with increasing temperature. $V_{CE} = 1\text{ V}$ (1)  $T_{amb} = 150\text{ °C}$ (2)  $T_{amb} = 25\text{ °C}$ (3)  $T_{amb} = -55\text{ °C}$ 

**Fig. 1. TR1 (NPN): DC current gain as a function of collector current; typical values**

 $T_{amb} = 25\text{ °C}$ 

**Fig. 2. TR1 (NPN): Collector current as a function of collector-emitter voltage; typical values**

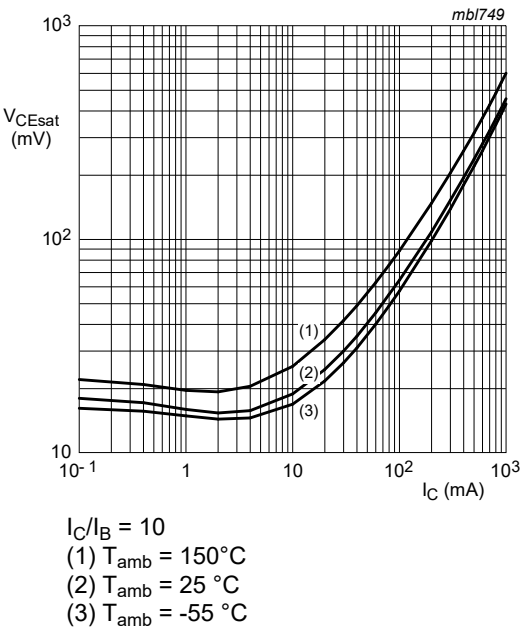


Fig. 3. TR1 (NPN): Collector-emitter saturation voltage as a function of collector current; typical values

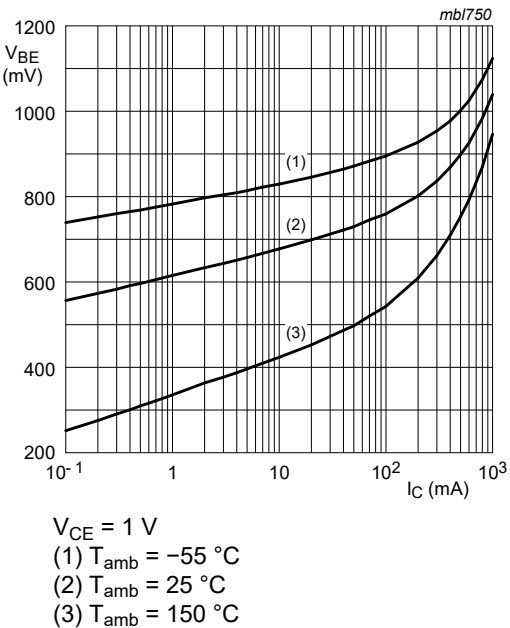


Fig. 4. TR1 (NPN): Base-emitter voltage as a function of collector current; typical values

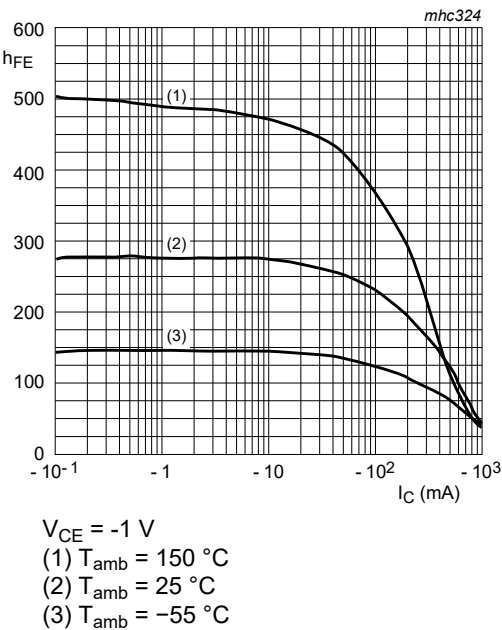


Fig. 5. TR2 (PNP): DC current gain as a function of collector current; typical values

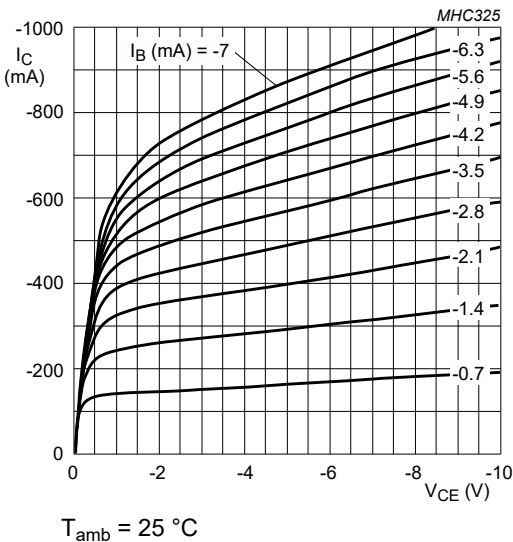


Fig. 6. TR2 (PNP): Collector current as a function of collector-emitter voltage; typical values

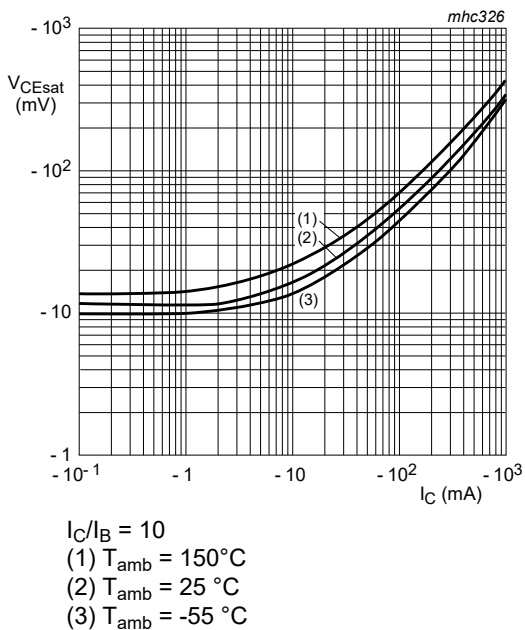


Fig. 7. TR2 (PNP): Collector-emitter saturation voltage as a function of collector current; typical values

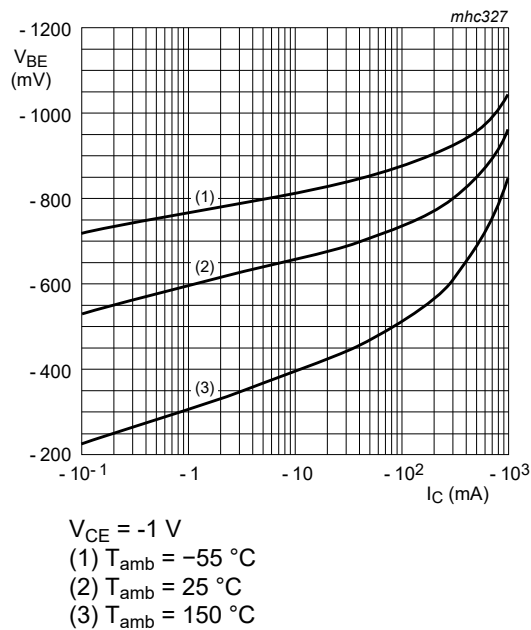


Fig. 8. TR2 (PNP): Base-emitter voltage as a function of collector current; typical values

11. Test information

Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - *Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

12. Package outline

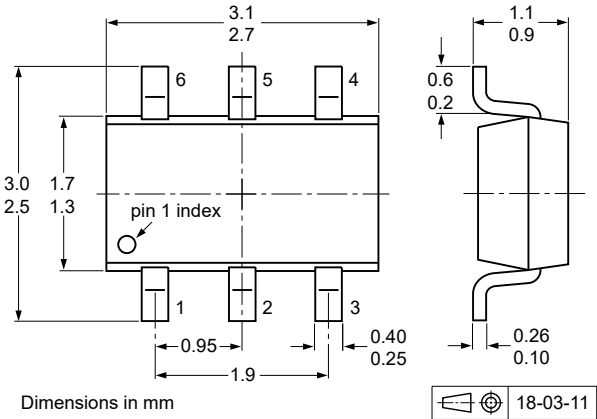
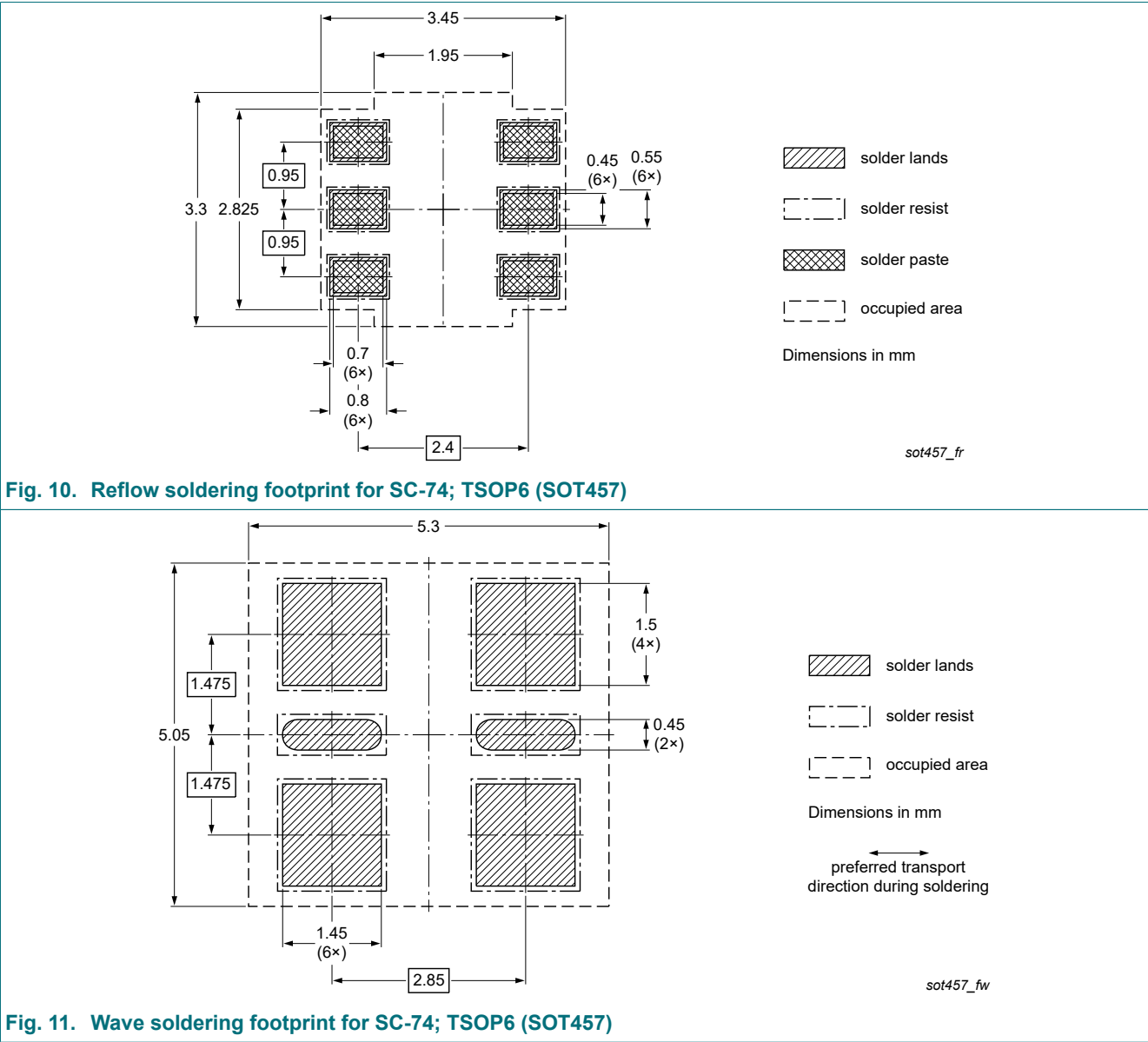


Fig. 9. Package outline SC-74; TSOP6 (SOT457)

13. Soldering



## 14. Revision history

Table 8. Revision history

| Data sheet ID  | Release date                                                                                                                                                                                                                           | Data sheet status  | Change notice | Supersedes   |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|--------------|
| BC817DPN v.3   | 20191127                                                                                                                                                                                                                               | Product data sheet | -             | BC817DPN v.2 |
| Modifications: | <ul style="list-style-type: none"><li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li><li>Legal texts have been adapted to the new company name where appropriate.</li></ul> |                    |               |              |
| BC817DPN v.2   | 20021122                                                                                                                                                                                                                               | Product data sheet | -             | BC817DPN v.1 |
| BC817DPN v.1   | 20020809                                                                                                                                                                                                                               | Product data sheet | -             | -            |

## 15. Legal information

### Data sheet status

| Document status<br>[1][2]      | Product status [3] | 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".
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For sales office addresses, please send an email to: [salesaddresses@nexperia.com](mailto:salesaddresses@nexperia.com)

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