



BC847BVN

NPN/PNP general purpose transistor

20 May 2019

Product data sheet

1. General description

NPN/PNP transistor pair in a SOT666 plastic package.

2. Features and benefits

- 300 mW total power dissipation
- Very small 1.6 mm x 1.2 mm ultra thin package
- Excellent coplanarity due to straight leads
- Replaces two SC-75/SC-89 packaged transistors on same PCB area
- Reduced required PCB area
- Reduced pick and place costs.
- AEC-Q101 qualified

3. Applications

- General purpose switching and amplification
- Switch mode power supply complementary MOSFET driver
- Complementary driver for audio amplifiers.

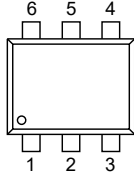
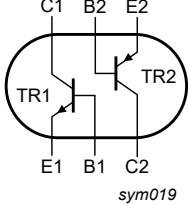
4. Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--|---------------------------|-------------------------------|-----|-----|-----|------|
| Per transistor; for the PNP transistor with negative polarity | | | | | | |
| V_{CEO} | collector-emitter voltage | open base | - | - | 45 | V |
| I_C | collector current | | - | - | 100 | mA |
| I_{CM} | peak collector current | single pulse; $t_p \leq 1$ ms | - | - | 200 | mA |
| h_{FE} | DC current gain | $V_{CE} = 5$ V; $I_C = 2$ mA | 200 | - | 450 | |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|---------------|--|--|
| 1 | E1 | emitter TR1 |  <p>SOT666</p> |  <p><i>sym019</i></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 |
| BC847BVN | SOT666 | plastic, surface-mounted package; 6 leads; 0.5 mm pitch; 1.6 mm x 1.2 mm x 0.55 mm body | SOT666 |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| BC847BVN | 13 |

8. Limiting values

Table 5. Limiting values

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

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|--|---------------------------|-------------------------------|-----|-----|-----|------|
| Per transistor; for the PNP transistor with negative polarity | | | | | | |
| 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 | | | - | 100 | mA |
| I_{CM} | peak collector current | single pulse; $t_p \leq 1$ ms | | - | 200 | mA |
| I_{BM} | peak base current | | | - | 200 | mA |
| P_{tot} | total power dissipation | $T_{amb} \leq 25$ °C | [1] | - | 200 | mW |
| T_j | junction temperature | | | - | 150 | °C |
| T_{amb} | ambient temperature | | | -65 | 150 | °C |
| T_{stg} | storage temperature | | | -65 | 150 | °C |
| Per device | | | | | | |
| P_{tot} | total power dissipation | $T_{amb} \leq 25$ °C | [1] | - | 300 | mW |

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

9. Thermal characteristics

Table 6. Thermal characteristics

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|-----------------------|---|-------------|---------|-----|-----|-----|------|
| Per transistor | | | | | | | |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] [2] | - | - | 416 | K/W |

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

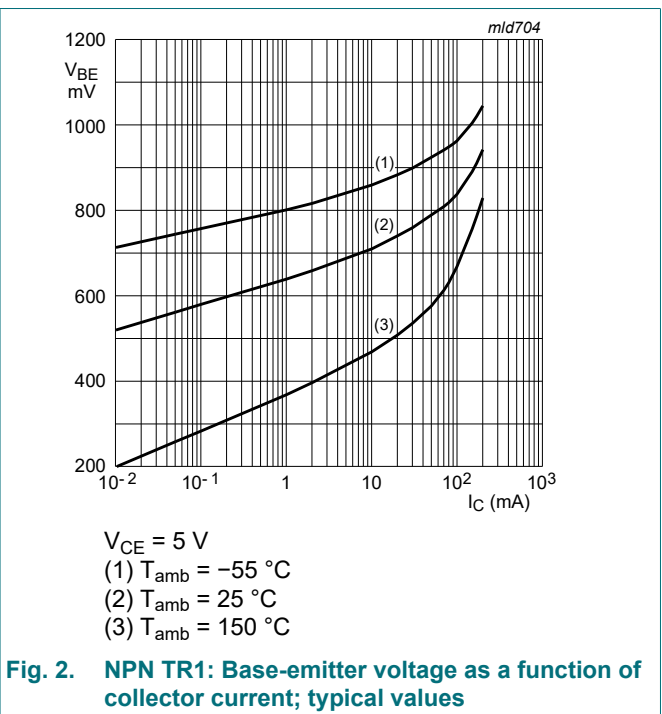
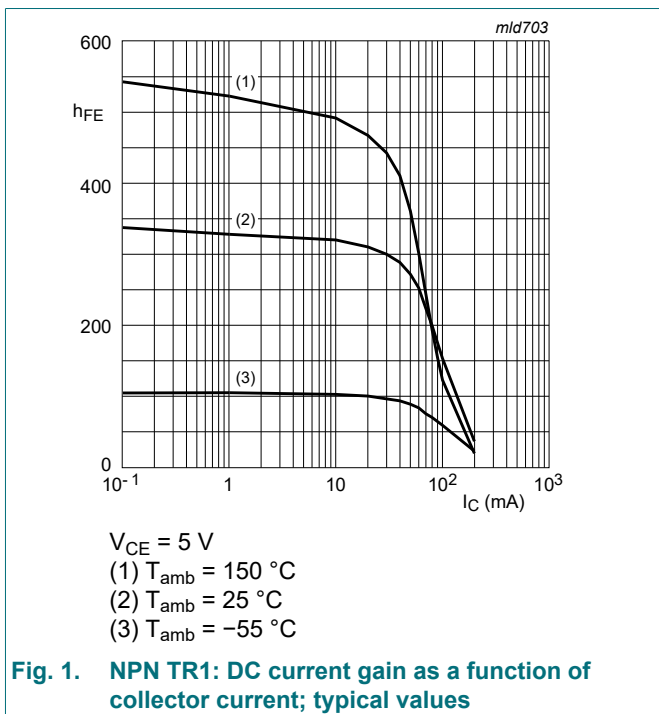
[2] Reflow soldering is the only recommended soldering method.

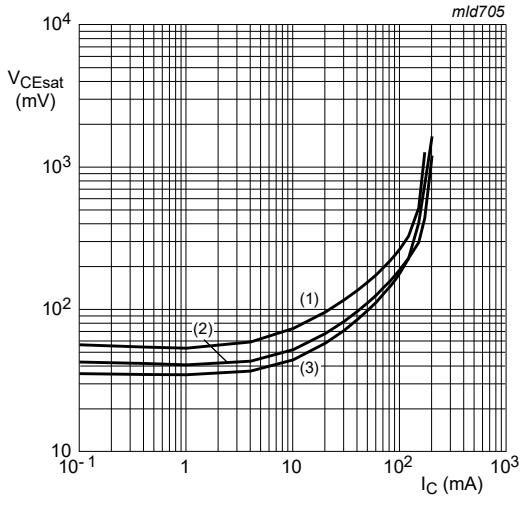
10. Characteristics

Table 7. Characteristics

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

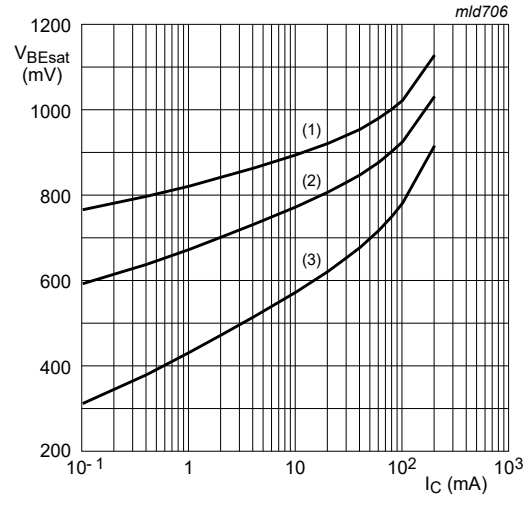
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--|--------------------------------------|---|------|------|------|---------------|
| Per transistor; for the PNP transistor with negative polarity | | | | | | |
| I_{CBO} | collector-base cut-off current | $V_{CB} = 30\text{ V}; I_E = 0\text{ A}$ | - | - | 15 | nA |
| | | $V_{CB} = 30\text{ V}; I_E = 0\text{ A}; T_J = 150\text{ °C}$ | - | - | 5 | μA |
| I_{EBO} | emitter-base cut-off current | $V_{EB} = 5\text{ V}; I_C = 0\text{ A}$ | - | - | 100 | nA |
| h_{FE} | DC current gain | $V_{CE} = 5\text{ V}; I_C = 2\text{ mA}$ | 200 | - | 450 | |
| V_{CEsat} | collector-emitter saturation voltage | $I_C = 10\text{ mA}; I_B = 0.5\text{ mA}; T_{amb} = 25\text{ °C}$ | - | - | 100 | mV |
| | | $I_C = 100\text{ mA}; I_B = 5\text{ mA}; \text{ Pulsed test: } t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02$ | - | - | 300 | mV |
| V_{BEsat} | base-emitter saturation voltage | $I_C = 10\text{ mA}; I_B = 0.5\text{ mA}$ | - | 755 | - | mV |
| f_T | transition frequency | $V_{CE} = 5\text{ V}; I_C = 10\text{ mA}; f = 100\text{ MHz}$ | 100 | - | - | MHz |
| NPN transistor | | | | | | |
| V_{BE} | base-emitter voltage | $V_{CE} = 5\text{ V}; I_C = 2\text{ mA}$ | 580 | 655 | 700 | mV |
| C_c | collector capacitance | $V_{CB} = 10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}$ | - | - | 1.5 | pF |
| C_e | emitter capacitance | $V_{EB} = 500\text{ mV}; I_C = 0\text{ A}; i_c = 0\text{ A}; f = 1\text{ MHz}$ | - | 11 | - | pF |
| PNP transistor | | | | | | |
| V_{BE} | base-emitter voltage | $V_{CE} = -5\text{ V}; I_C = -2\text{ mA}$ | -600 | -655 | -750 | mV |
| C_c | collector capacitance | $V_{CB} = -10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ °C}$ | - | - | 2.2 | pF |
| C_e | emitter capacitance | $V_{EB} = -500\text{ mV}; I_C = 0\text{ A}; i_c = 0\text{ A}; f = 1\text{ MHz}$ | - | 10 | - | pF |





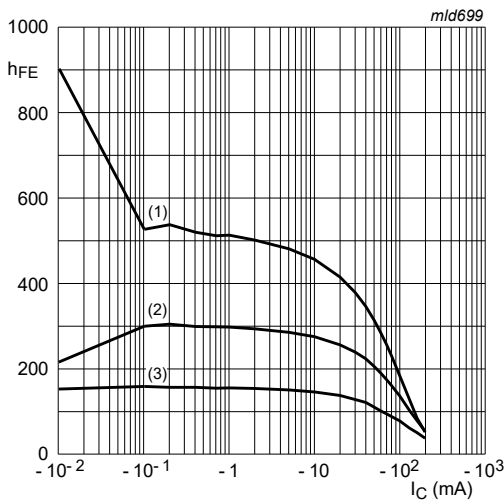
$I_C/I_B = 20$
 (1) $T_{amb} = 150\text{ }^\circ\text{C}$
 (2) $T_{amb} = 25\text{ }^\circ\text{C}$
 (3) $T_{amb} = -55\text{ }^\circ\text{C}$

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



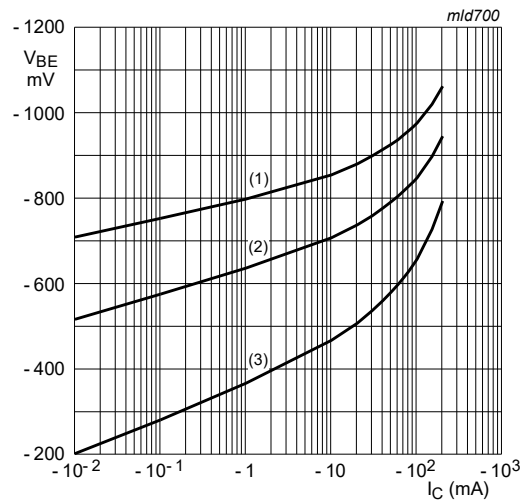
$I_C/I_B = 20$
 (1) $T_{amb} = -55\text{ }^\circ\text{C}$
 (2) $T_{amb} = 25\text{ }^\circ\text{C}$
 (3) $T_{amb} = 150\text{ }^\circ\text{C}$

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



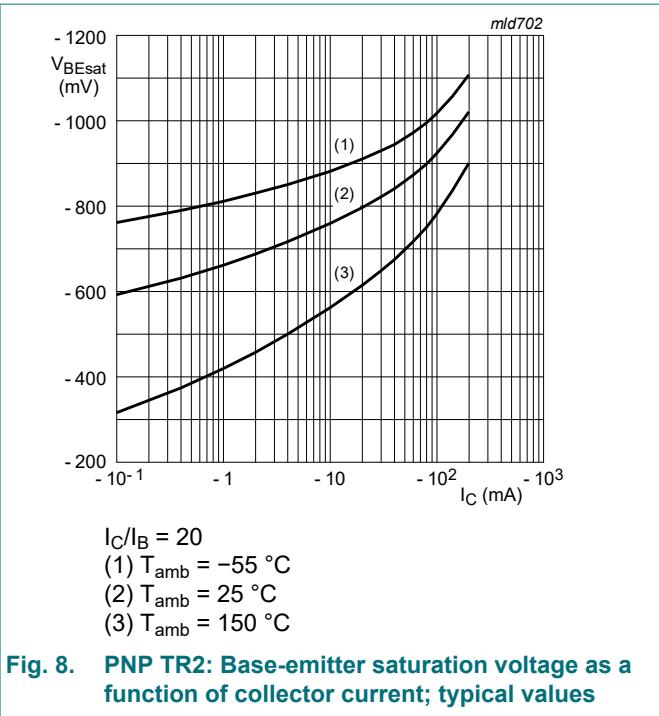
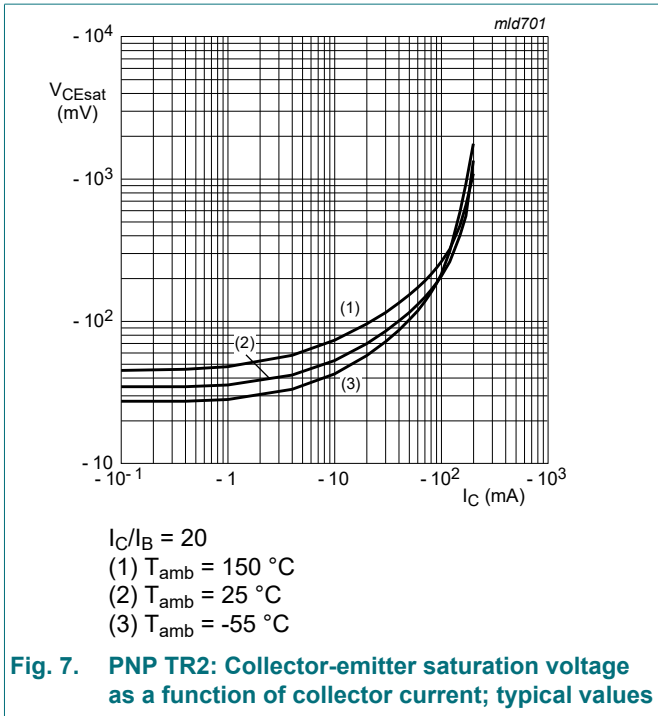
$V_{CE} = -5\text{ V}$
 (1) $T_{amb} = 150\text{ }^\circ\text{C}$
 (2) $T_{amb} = 25\text{ }^\circ\text{C}$
 (3) $T_{amb} = -55\text{ }^\circ\text{C}$

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



$V_{CE} = -5\text{ V}$
 (1) $T_{amb} = -55\text{ }^\circ\text{C}$
 (2) $T_{amb} = 25\text{ }^\circ\text{C}$
 (3) $T_{amb} = 150\text{ }^\circ\text{C}$

Fig. 6. PNP TR2: 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

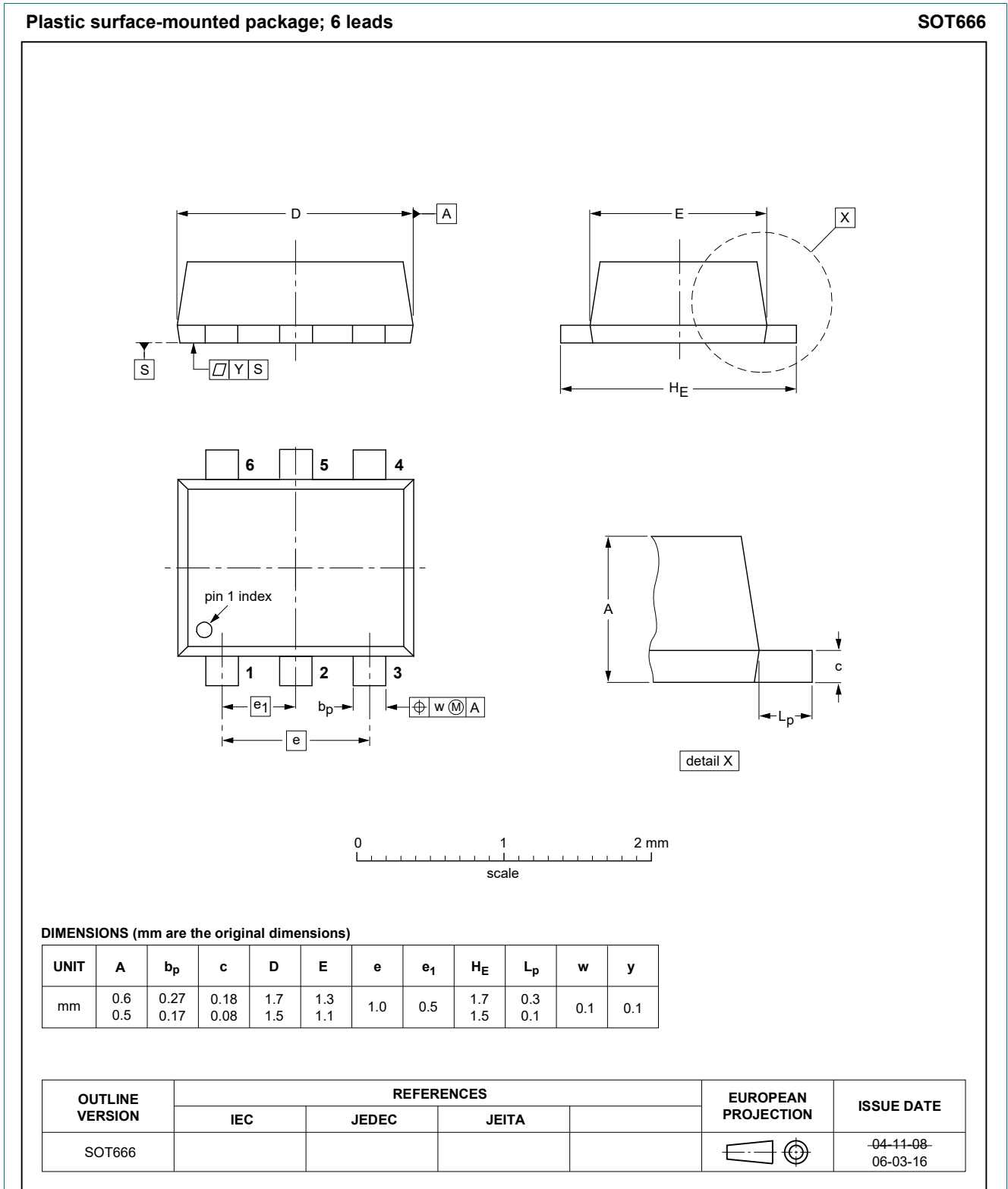


Fig. 9. Package outline SOT666

13. Soldering

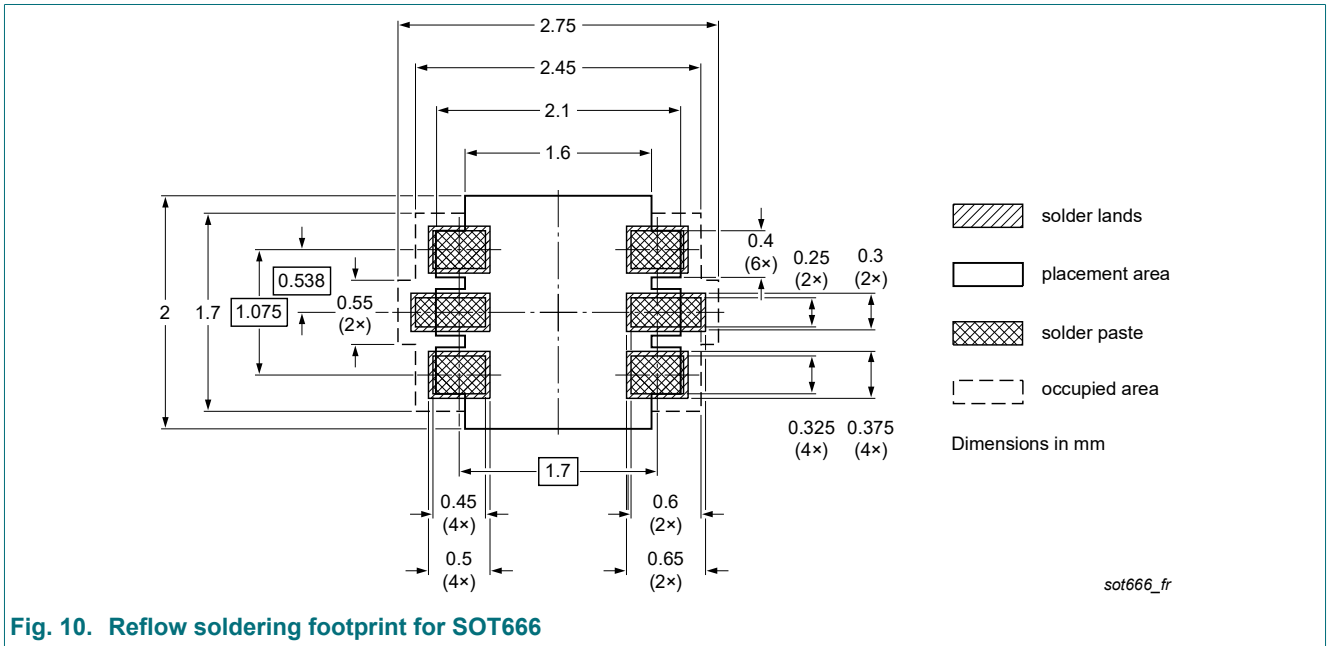


Fig. 10. Reflow soldering footprint for SOT666

14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|--|--------------------|---------------|--------------|
| BC847BVN v.3 | 20190520 | Product data sheet | - | BC847BVN v.2 |
| Modifications: | <ul style="list-style-type: none">The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.Legal texts have been adapted to the new company name where appropriate. | | | |
| BC847BVN v.2 | 20011107 | Product data sheet | - | BC847BVN v.1 |
| BC847BVN v.1 | 20010830 | Product data sheet | - | - |

15. Legal information

Data sheet status

| Document status [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. |

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- [2] The term 'short data sheet' is explained in section "Definitions".
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