



BC847QAS

45 V, 100 mA NPN/NPN general-purpose transistor

8 July 2015

Product data sheet

1. General description

NPN/NPN general-purpose transistor in a leadless ultra small DFN1010B-6 (SOT1216) Surface-Mounted Device (SMD) plastic package.

PNP/PNP complement: BC857QAS.

NPN/PNP complement: BC847QAPN.

2. Features and benefits

- Reduces component count
- Reduces pick and place costs
- AEC-Q101 qualified
- Low package height of 0.37 mm

3. Applications

- General-purpose switching and amplification
- Mobile applications

4. Quick reference data

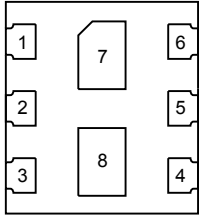
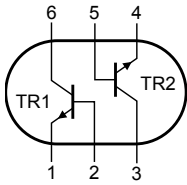
Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------------------|---------------------------|--|-----|-----|-----|------|
| Per transistor | | | | | | |
| V_{CEO} | collector-emitter voltage | open base | - | - | 45 | V |
| I_C | collector current | | - | - | 100 | mA |
| Per transistor | | | | | | |
| h_{FE} | DC current gain | $V_{CE} = 5\text{ V}; I_C = 2\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$ | 200 | - | 450 | |



5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|---------------|---|---|
| 1 | E1 | emitter TR1 |  <p>Transparent top view DFN1010B-6 (SOT1216)</p> |  <p>sym020</p> |
| 2 | B1 | base TR1 | | |
| 3 | C2 | collector TR2 | | |
| 4 | E2 | emitter TR2 | | |
| 5 | B2 | base TR2 | | |
| 6 | C1 | collector TR1 | | |
| 7 | C1 | collector TR1 | | |
| 8 | C2 | collector TR2 | | |

6. Ordering information

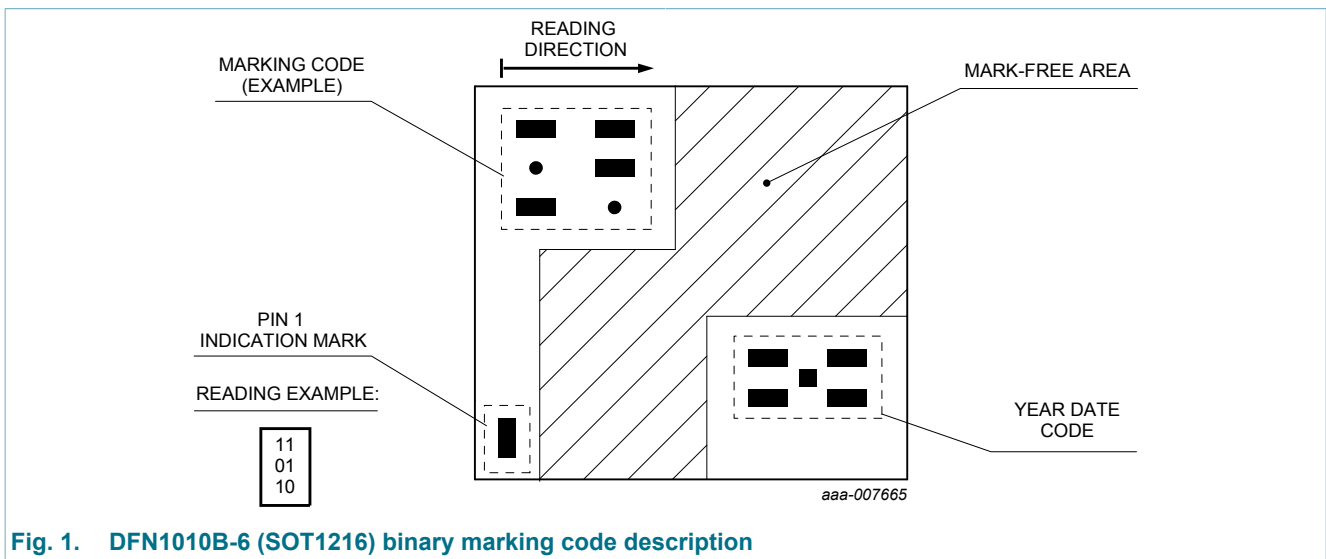
Table 3. Ordering information

| Type number | Package | | |
|-------------|------------|--|---------|
| | Name | Description | Version |
| BC847QAS | DFN1010B-6 | DFN1010B-6: plastic thermal enhanced ultra thin small outline package; no leads; 6 terminals | SOT1216 |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| BC847QAS | 00 01 00 |



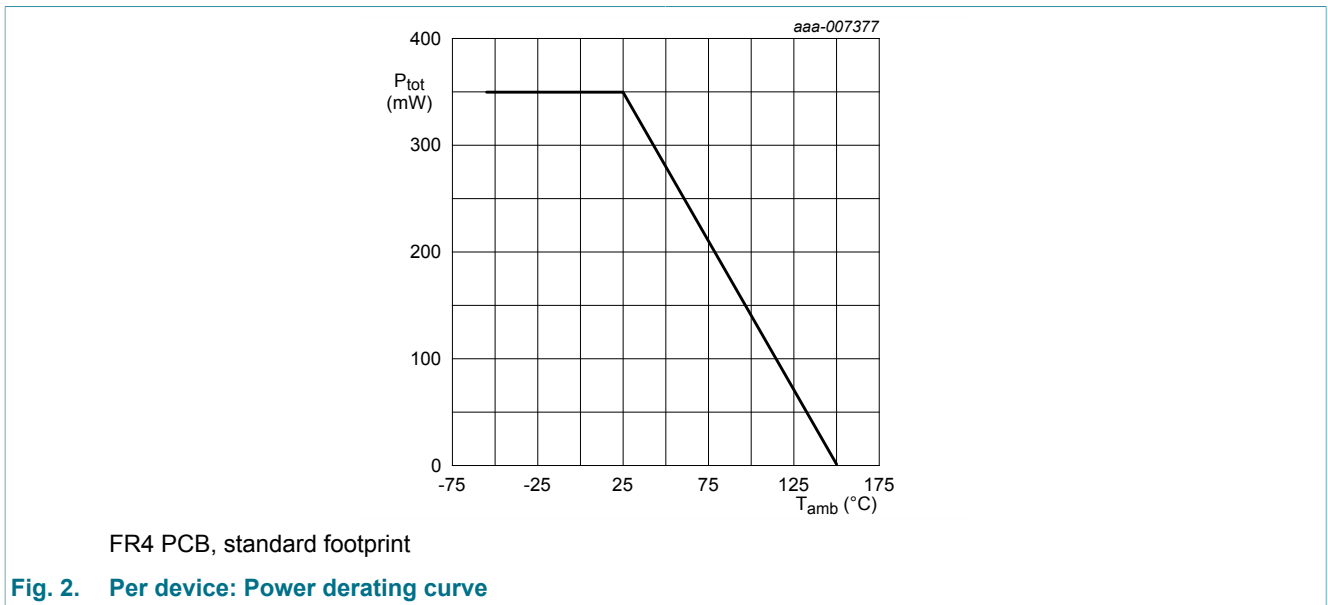
8. Limiting values

Table 5. Limiting values

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

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|-----------------------|---------------------------|-------------------------------------|-----|-----|-----|------|
| Per transistor | | | | | | |
| V _{CB0} | collector-base voltage | open emitter | | - | 50 | V |
| V _{CEO} | collector-emitter voltage | open base | | - | 45 | V |
| V _{EBO} | emitter-base voltage | open collector | | - | 6 | V |
| I _C | collector current | | | - | 100 | mA |
| I _{CM} | peak collector current | single pulse; t _p ≤ 1 ms | | - | 200 | mA |
| I _{BM} | peak base current | | | - | 100 | mA |
| P _{tot} | total power dissipation | T _{amb} ≤ 25 °C | [1] | - | 230 | mW |
| Per device | | | | | | |
| P _{tot} | total power dissipation | T _{amb} ≤ 25 °C | [1] | - | 350 | mW |
| T _j | junction temperature | | | - | 150 | °C |
| T _{amb} | ambient temperature | | | -55 | 150 | °C |
| T _{stg} | storage temperature | | | -65 | 150 | °C |

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

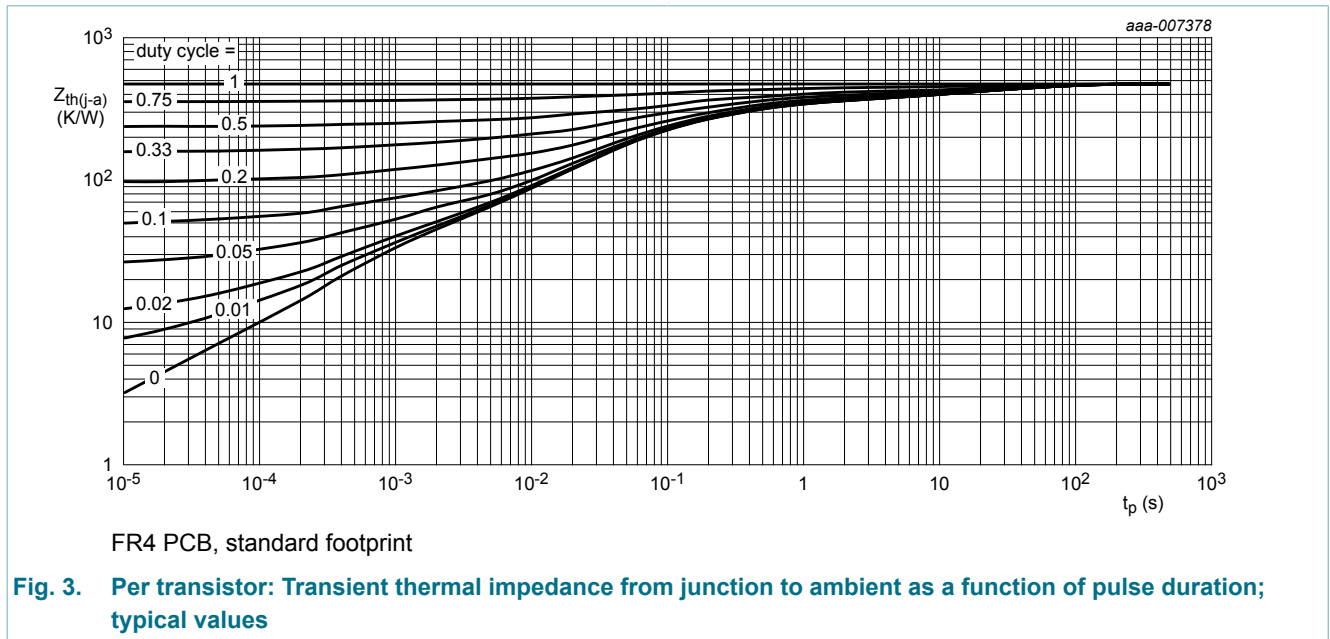


9. Thermal characteristics

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] | - | - | 543 | K/W |
| Per device | | | | | | | |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] | - | - | 357 | K/W |

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



10. Characteristics

Table 7. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------------------|--------------------------------------|---|-----|-----|-----|------|
| Per transistor | | | | | | |
| I _{CBO} | collector-base cut-off current | V _{CB} = 30 V; I _E = 0 A; T _j = 150 °C | - | - | 5 | μA |
| | | V _{CB} = 30 V; I _E = 0 A; T _{amb} = 25 °C | - | - | 15 | nA |
| I _{EBO} | emitter-base cut-off current | V _{EB} = 5 V; I _C = 0 A; T _{amb} = 25 °C | - | - | 100 | nA |
| h _{FE} | DC current gain | V _{CE} = 5 V; I _C = 2 mA; T _{amb} = 25 °C | 200 | - | 450 | |
| V _{CEsat} | collector-emitter saturation voltage | I _C = 10 mA; I _B = 0.5 mA; T _{amb} = 25 °C | - | - | 100 | mV |
| | | I _C = 100 mA; I _B = 5 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C | - | - | 300 | mV |
| V _{BEsat} | base-emitter saturation voltage | I _C = 10 mA; I _B = 0.5 mA; T _{amb} = 25 °C | - | 760 | - | mV |
| | | I _C = 100 mA; I _B = 5 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C | - | 900 | - | mV |
| V _{BE} | base-emitter voltage | V _{CE} = 5 V; I _C = 2 mA; T _{amb} = 25 °C | 600 | 660 | 725 | mV |
| | | V _{CE} = 5 V; I _C = 10 mA; T _{amb} = 25 °C | - | 710 | 820 | mV |
| C _C | collector capacitance | V _{CB} = 10 V; I _E = 0 A; i _e = 0 A; f = 1 MHz; T _{amb} = 25 °C | - | - | 4 | pF |
| C _E | emitter capacitance | V _{EB} = 0.5 V; I _C = 0 A; f = 1 MHz; T _{amb} = 25 °C | - | 11 | - | pF |
| f _T | transition frequency | V _{CE} = 5 V; I _C = 10 mA; f = 100 MHz; T _{amb} = 25 °C | 100 | - | - | MHz |
| NF | noise figure | V _{CE} = 5 V; I _C = 0.2 mA; R _S = 2 kΩ; f = 1 MHz; B = 200 Hz; T _{amb} = 25 °C | - | - | 10 | dB |

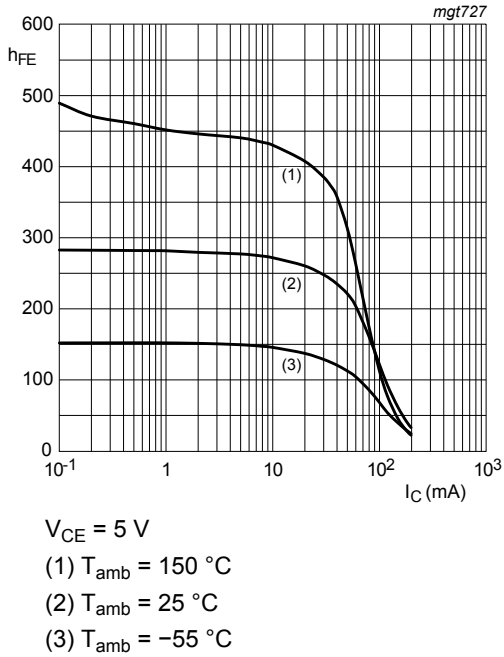


Fig. 4. DC current gain as a function of collector current; typical values

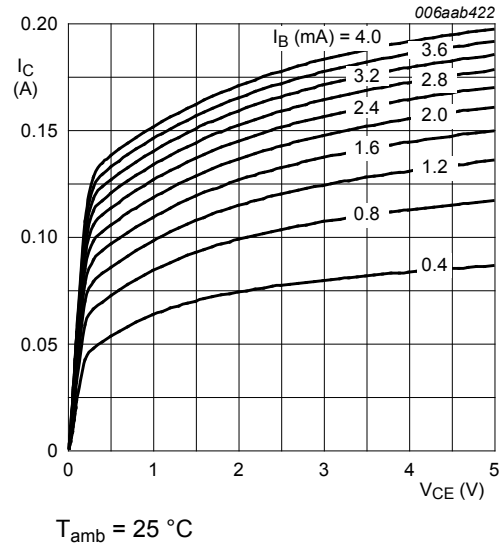


Fig. 5. Collector current as a function of collector-emitter voltage; typical values

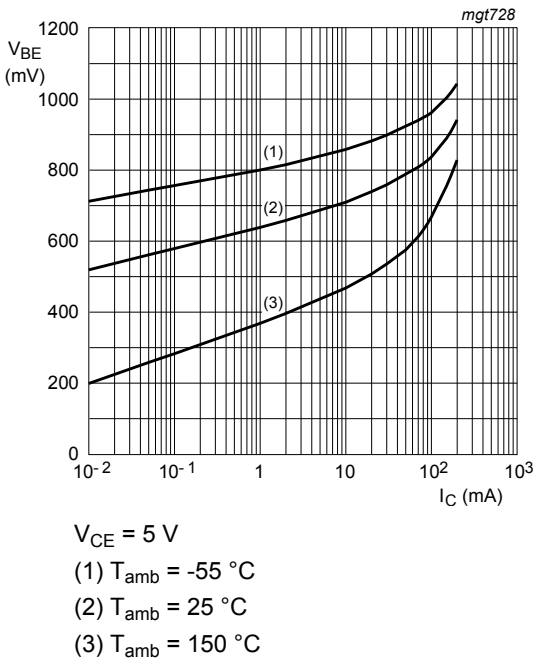


Fig. 6. Base-emitter voltage as a function of collector current; typical values

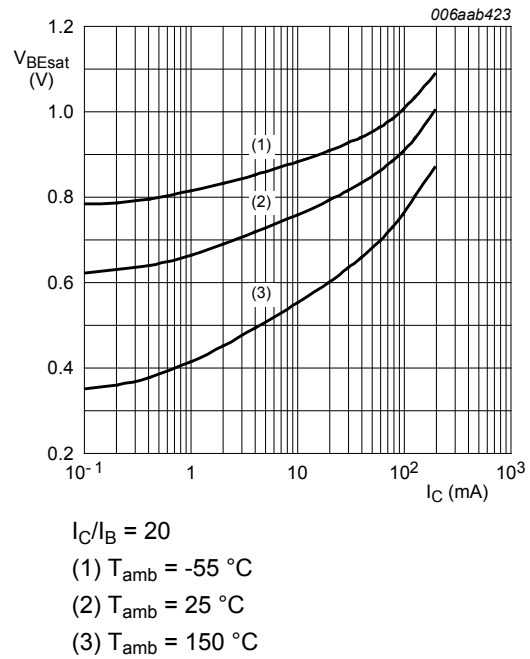
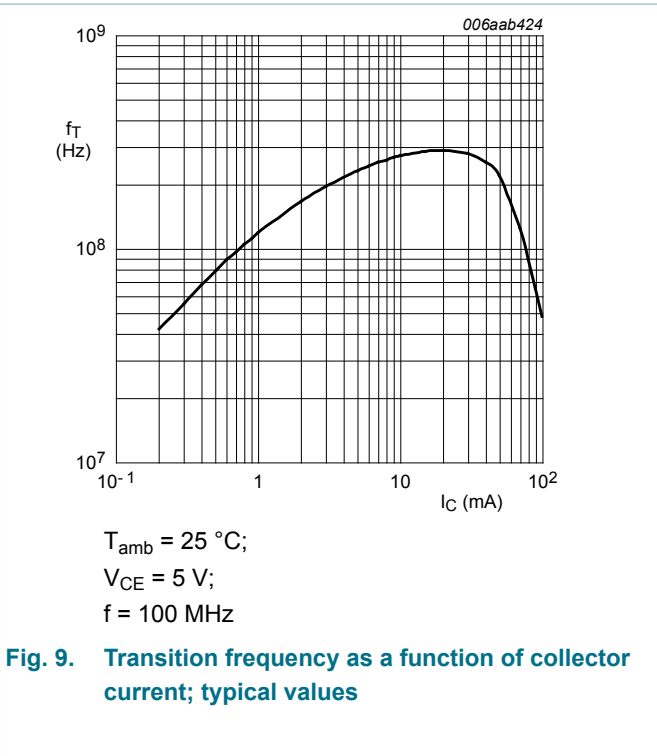
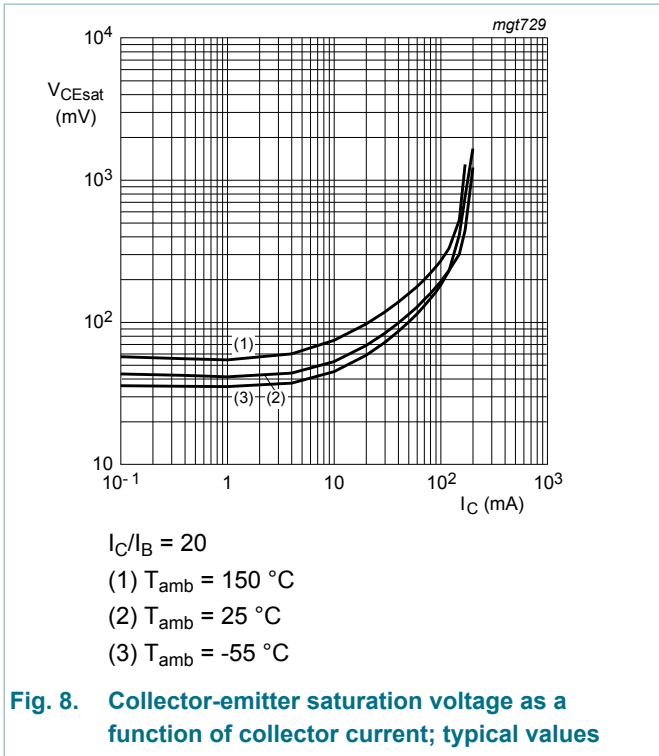


Fig. 7. Base-emitter saturation voltage as a function of collector current; typical values

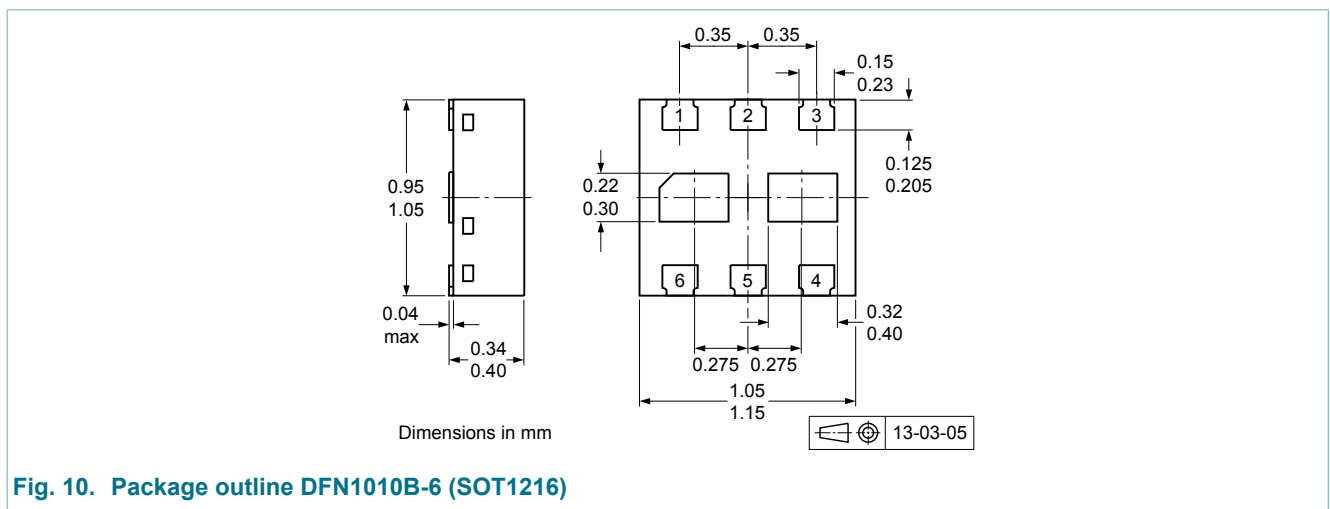


11. Test information

11.1 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



13. Soldering

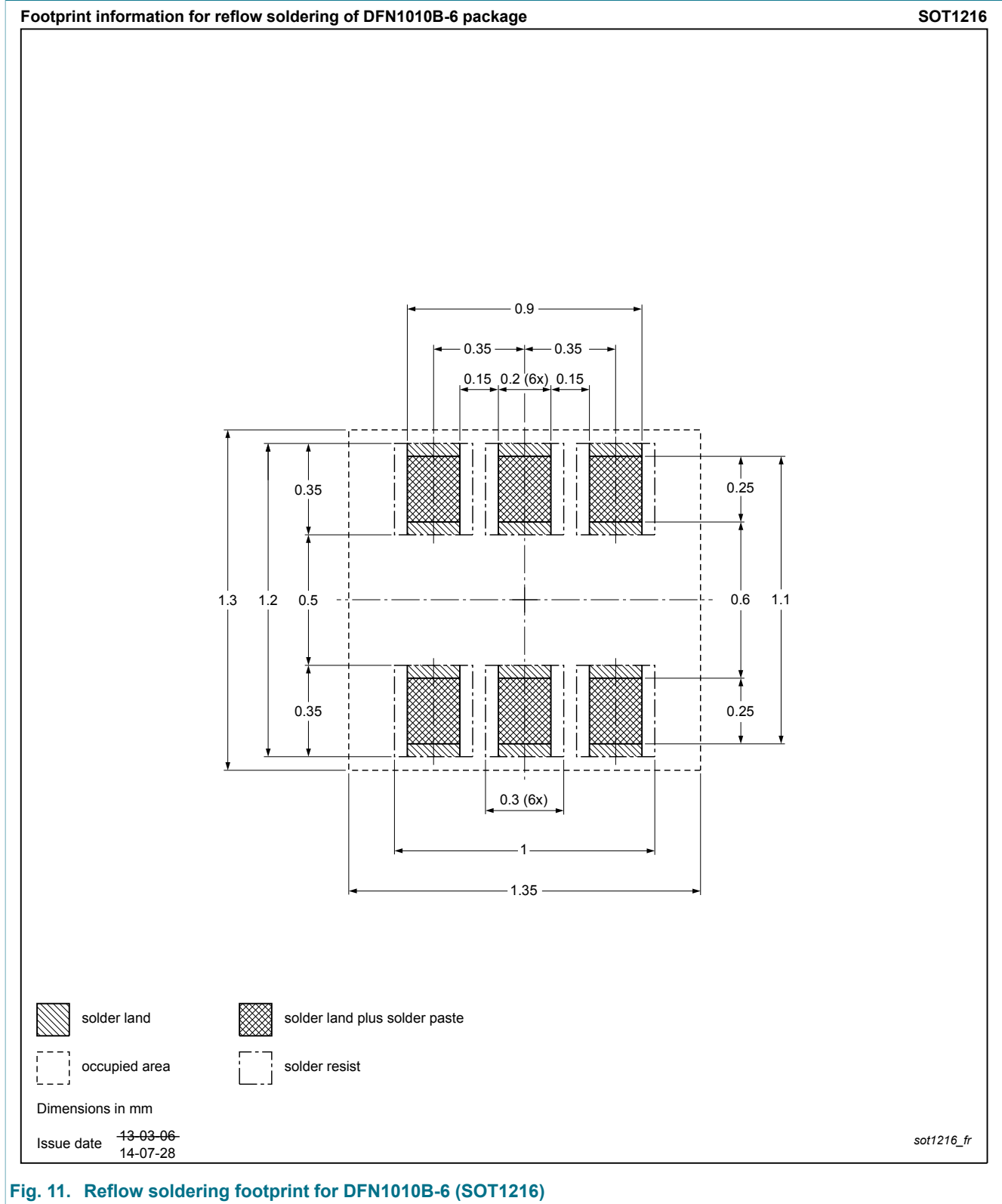


Fig. 11. Reflow soldering footprint for DFN1010B-6 (SOT1216)

14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|---------------|---|--------------------|---------------|--------------|
| BC847QAS v.2 | 20150708 | Product data sheet | - | BC847QAS v.1 |
| Modification: | <ul style="list-style-type: none">Change of binary marking code position. | | | |
| BC847QAS v.1 | 20140729 | Product data sheet | - | - |

15. Legal information

15.1 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. |

- [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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