



BC846BM

65 V, 100 mA NPN general-purpose transistor

20 August 2015

Product data sheet

1. General description

NPN general-purpose transistor in a leadless ultra small DFN1006-3 (SOT883) Surface-Mounted Device (SMD) plastic package.

PNP complement: BC856BM.

2. Features and benefits

- Leadless ultra small SMD plastic package
- Power dissipation comparable to SOT23
- AEC-Q101 qualified

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 |
|-----------|---------------------------|--|-----|-----|-----|------|
| V_{CE0} | collector-emitter voltage | open base | - | - | 65 | V |
| I_C | collector current | | - | - | 100 | mA |
| 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 | B | base | <p>Transparent top view DFN1006-3 (SOT883)</p> | <p>sym021</p> |
| 2 | E | emitter | | |
| 3 | C | collector | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|-----------|---|---------|
| | Name | Description | Version |
| BC846BM | DFN1006-3 | DFN1006-3: leadless ultra small plastic package; 3 solder lands | SOT883 |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| BC846BM | ZB |

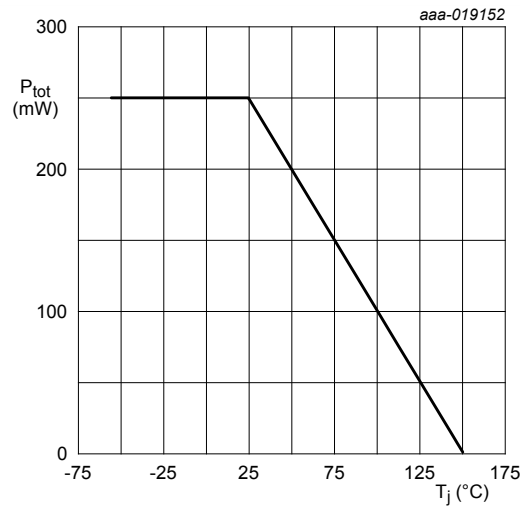
8. Limiting values

Table 5. Limiting values

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

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-----------|---------------------------|-------------------------------|-----|-----|------|
| V_{CBO} | collector-base voltage | open emitter | - | 80 | V |
| V_{CEO} | collector-emitter voltage | open base | - | 65 | V |
| V_{EBO} | emitter-base voltage | open collector | - | 6 | V |
| I_C | collector current | | - | 100 | mA |
| I_{CM} | peak collector current | single pulse; $t_p \leq 1$ ms | - | 200 | mA |
| I_{BM} | peak base current | | - | 200 | mA |
| P_{tot} | total power dissipation | $T_{amb} \leq 25$ °C | [1] | 250 | 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.



FR4 PCB, standard footprint

Fig. 1. Power derating curve DFN1006-3 (SOT883)

9. Thermal characteristics

Table 6. Thermal characteristics

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---------------|---|-------------|-----|-----|-----|-----|------|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] | - | - | 500 | K/W |

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

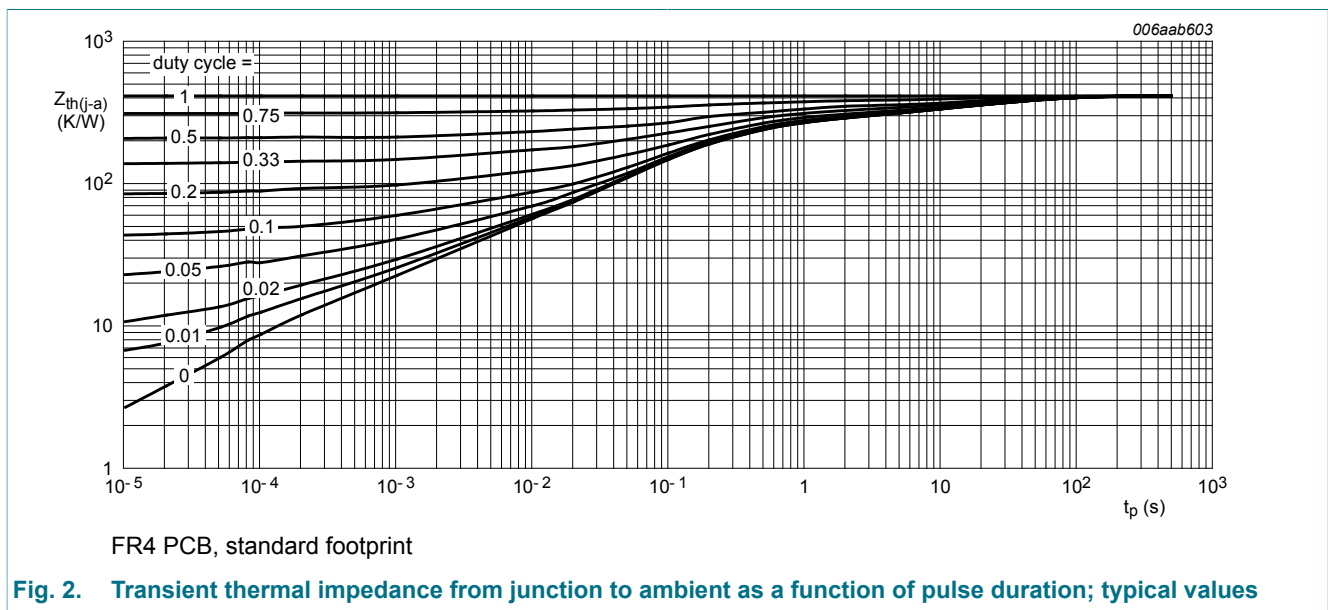
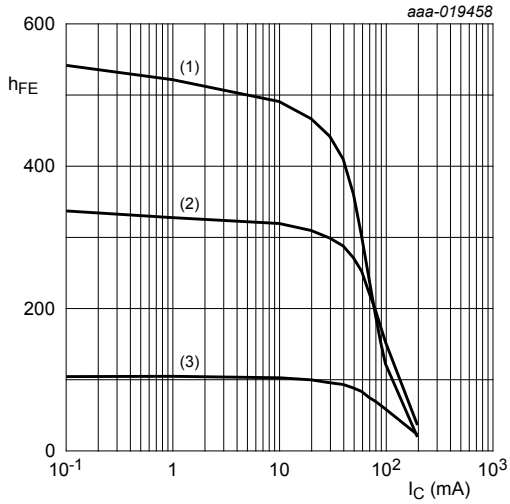


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

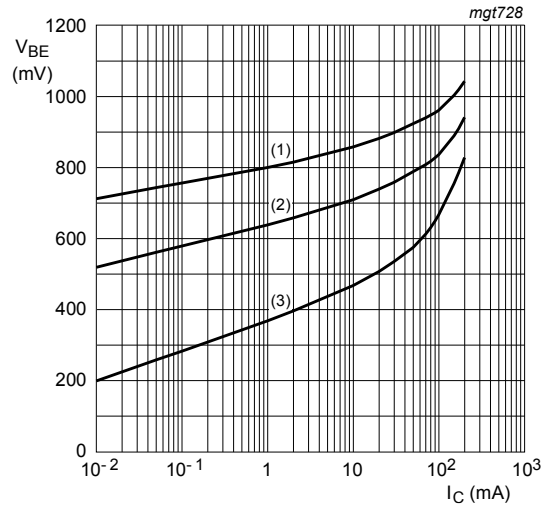
Table 7. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------|--------------------------------------|---|-----|-----|-----|------|
| I _{CBO} | collector-base cut-off current | V _{CB} = 30 V; I _E = 0 A; T _{amb} = 25 °C | - | - | 15 | nA |
| | | V _{CB} = 30 V; I _E = 0 A; T _j = 150 °C | - | - | 5 | μA |
| 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 | - | - | 200 | mV |
| | | I _C = 100 mA; I _B = 5 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C | - | 200 | 400 | 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; T _{amb} = 25 °C | - | 900 | - | mV |
| V _{BE} | base-emitter voltage | V _{CE} = 5 V; I _C = 2 mA; T _{amb} = 25 °C | 580 | 660 | 700 | mV |
| | | V _{CE} = 5 V; I _C = 10 mA; T _{amb} = 25 °C | - | - | 770 | mV |
| C _C | collector capacitance | V _{CB} = 10 V; I _E = 0 A; i _e = 0 A; f = 1 MHz; T _{amb} = 25 °C | - | 2 | 3 | pF |
| C _E | emitter capacitance | V _{EB} = 0.5 V; I _C = 0 A; 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 = 200 μA; R _S = 2 kΩ; f = 1 kHz; B = 200 Hz; T _{amb} = 25 °C | - | 2 | 10 | dB |



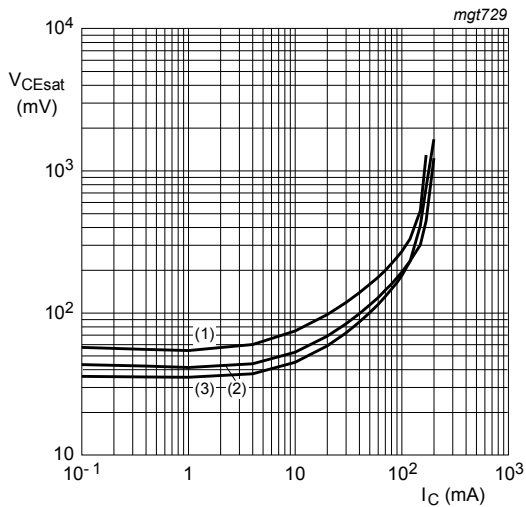
$V_{CE} = 5\text{ V}$
 (1) $T_{amb} = 150\text{ }^{\circ}\text{C}$
 (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$
 (3) $T_{amb} = -55\text{ }^{\circ}\text{C}$

Fig. 3. DC current gain as a function of collector current; typical values



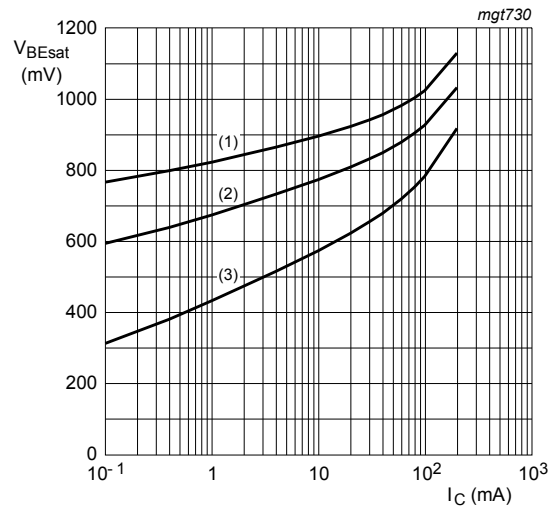
$V_{CE} = 5\text{ V}$
 (1) $T_{amb} = -55\text{ }^{\circ}\text{C}$
 (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$
 (3) $T_{amb} = 150\text{ }^{\circ}\text{C}$

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



$I_C/I_B = 20$
 (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. 5. Collector-emitter saturation voltage as a function of collector current; typical values



$I_C/I_B = 10$
 (1) $T_{amb} = -55\text{ }^{\circ}\text{C}$
 (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$
 (3) $T_{amb} = 150\text{ }^{\circ}\text{C}$

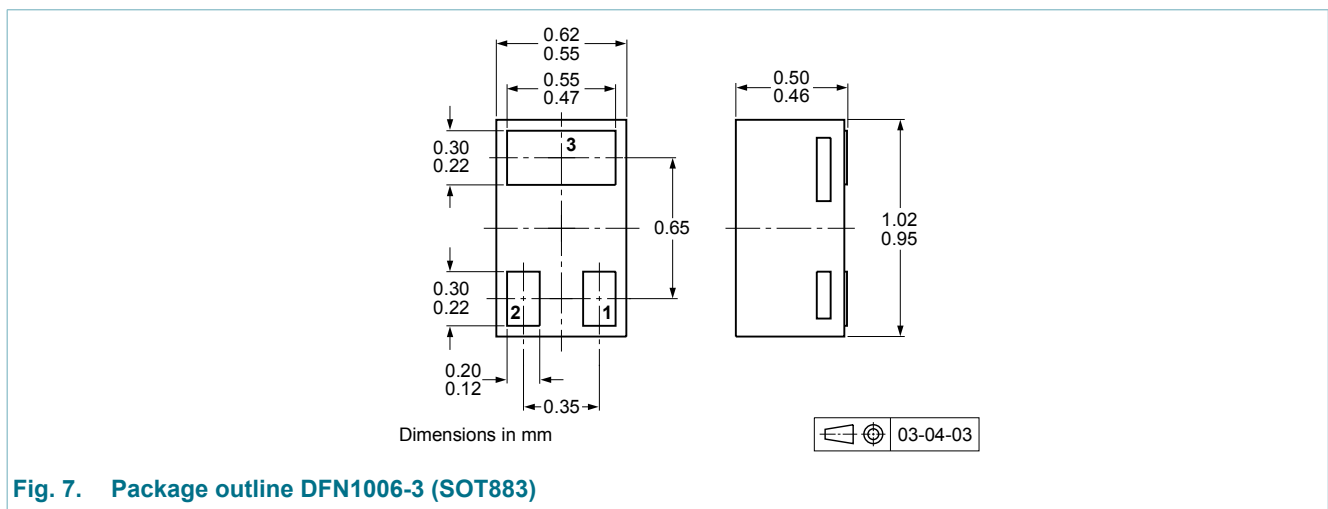
Fig. 6. Base-emitter saturation voltage as a function of collector current; typical values

11. Test information

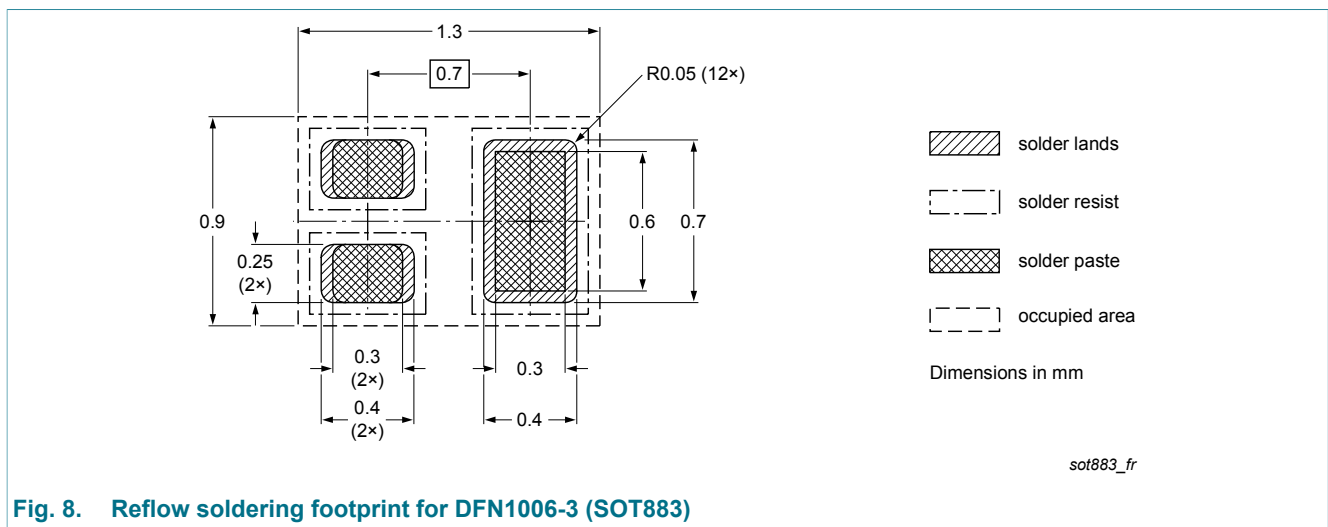
11.1 Quality information

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



14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|---------------|--------------|--------------------|---------------|------------|
| BC846BM v.1 | 20150820 | 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. |

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