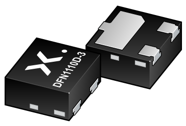


# BC807QB series

## 45 V, 500 mA PNP general-purpose transistors

Rev. 2 — 1 July 2023 | Product data sheet

## 1. General description

PNP general-purpose transistor in an ultra small DFN1110D-3 (SOT8015) leadless Surface-Mounted Device (SMD) plastic package with side-wettable flanks.

**Table 1. Product overview**

| Type number | Package | | | NPN complement |
|---|---|---|---|---|
| | Name | JEDEC | Version | |
| BC807-16QB | DFN1110D-3 | MO340-BA | SOT8015 | BC817-16QB |
| BC807-25QB | | | | BC817-25QB |
| BC807-40QB | | | | BC817-40QB |

## 2. Features and benefits

- High power dissipation capability
- High current
- Three current gain selections
- Suitable for Automatic Optical Inspection (AOI) of solder joint
- Smaller footprint compared to conventional leaded SMD packages
- Low package height of 0.5 mm

## 3. Applications

- General-purpose switching and amplification
- Space restricted applications

## 4. Quick reference data

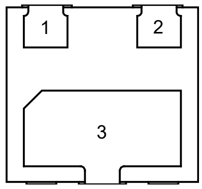
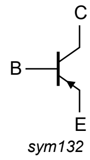
**Table 2. Quick reference data**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_{CEO}$ | collector-emitter voltage | open base; $T_{amb}$ = 25 °C | | - | - | -45 | V |
| $I_C$ | collector current | $T_{amb}$ = 25 °C | | - | - | -500 | mA |
| $I_{CM}$ | peak collector current | single pulse; $t_p \leq 1$ ms; $T_{amb}$ = 25 °C | | - | - | -1 | A |
| $h_{FE}$ | DC current gain | | | | | | |
| | BC807-16QB | $V_{CE}$ = -1 V; $I_C$ = -100 mA $T_{amb}$ = 25 °C | [1] | 100 | - | 250 | |
| | BC807-25QB | | [1] | 160 | - | 400 | |
| | BC807-40QB | | [1] | 250 | - | 600 | |

[1] pulsed; $t_p \leq 300$ μs; $\delta \leq 0.02$

## 5. Pinning information

**Table 3. Pinning**

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|---|---|---|---|---|
| 1 | B | base |   **DFN1110D-3 (SOT8015)** |   |
| 2 | E | emitter | | |
| 3 | C | collector | | |

## 6. Ordering information

**Table 4. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| BC807-16QB | DFN1110D-3 | DFN1110D-3: plastic thermal enhanced ultra thin small outline package; no leads; 3 terminals; body: 1.1 x 1.0 x 0.5 mm | SOT8015 (MO340-BA) |
| BC807-25QB | | | |
| BC807-40QB | | | |

## 7. Marking

**Table 5. Marking**

| Type number | Marking code |
|---|---|
| BC807-16QB | A8 |
| BC807-25QB | A9 |
| BC807-40QB | B2 |

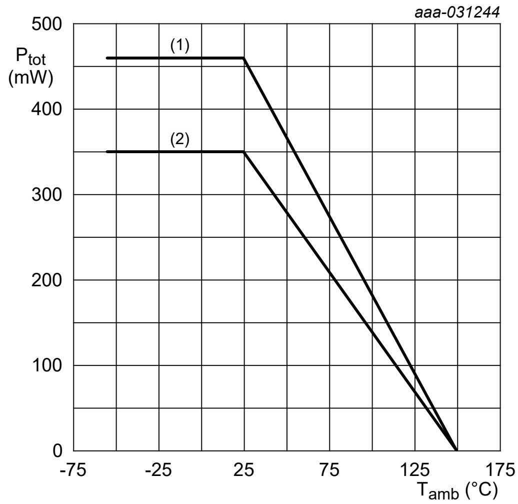
# 8. Limiting values

**Table 6. 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; $T_{amb}$ = 25 °C | | - | -50 | V |
| $V_{CEO}$ | collector-emitter voltage | open base; $T_{amb}$ = 25 °C | | - | -45 | V |
| $V_{EBO}$ | emitter-base voltage | open collector; $T_{amb}$ = 25 °C | | - | -5 | V |
| $I_C$ | collector current | $T_{amb}$ = 25 °C | | - | -500 | mA |
| $I_{CM}$ | peak collector current | single pulse; $t_p$ ≤ 1 ms; $T_{amb}$ = 25 °C | | - | -1 | A |
| $I_{BM}$ | peak base current | single pulse; $t_p$ ≤ 1 ms; $T_{amb}$ = 25 °C | | - | -200 | mA |
| $P_{tot}$ | total power dissipation | $T_{amb}$ ≤ 25 °C | [1] | - | 350 | mW |
| | | | [2] | - | 460 | 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 PCB, single-sided 35 µm copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB, single-sided 70 µm copper, tin-plated and standard footprint.




(1) FR4 PCB; single-sided 70 µm copper, tin-plated and standard footprint
(2) FR4 PCB; single-sided 35 µm copper, tin-plated and standard footprint

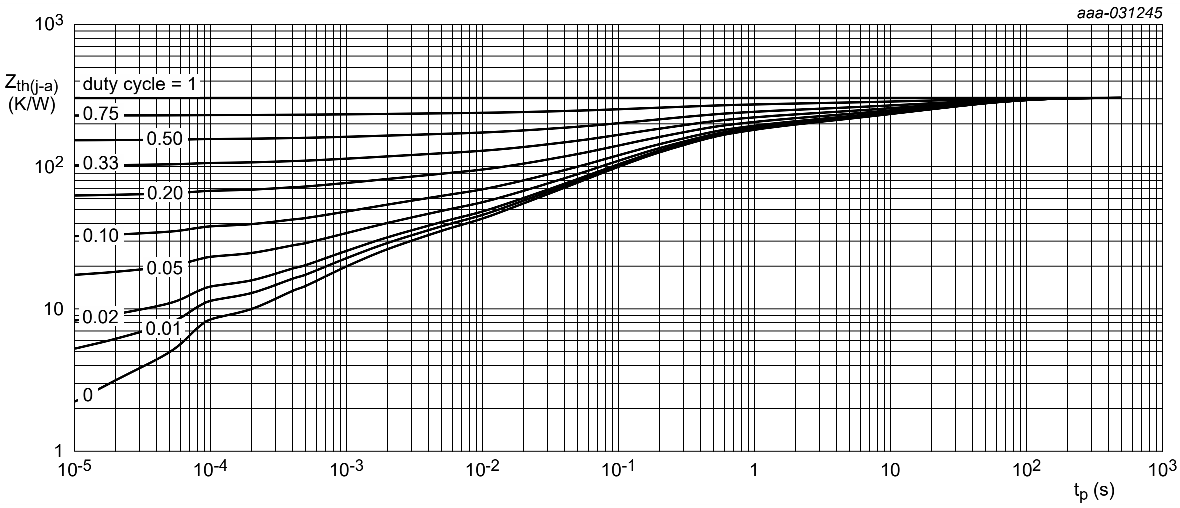
**Fig. 1. Power derating curves for SOT8015**

# 9. Thermal characteristics

**Table 7. Thermal characteristics**

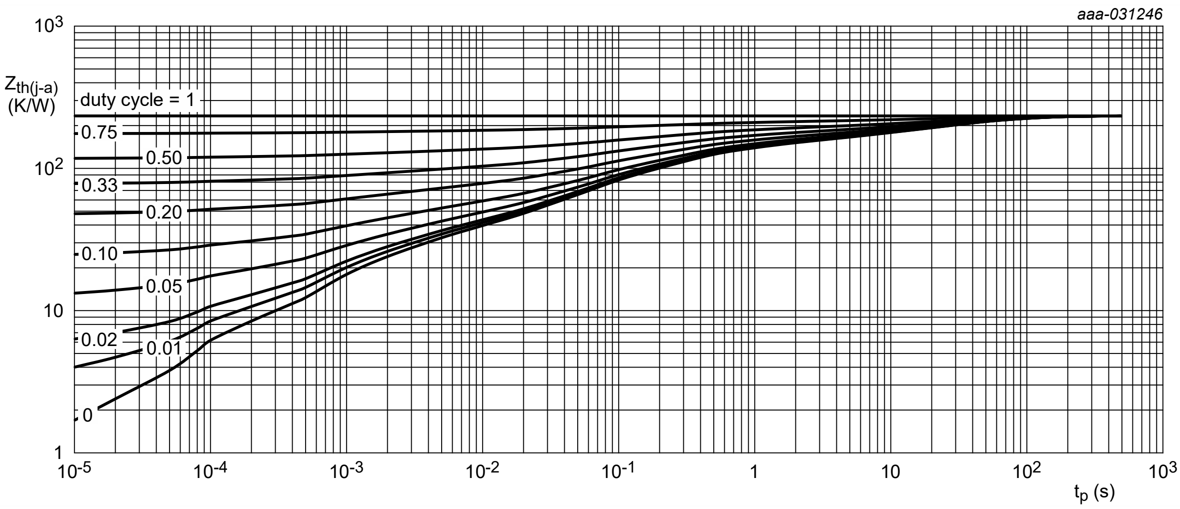
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air; $T_{amb}$ = 25 °C | [1] | - | - | 358 | K/W |
| | | | [2] | - | - | 272 | K/W |

[1] Device mounted on an FR4 PCB, single-sided 35 µm copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB, single-sided 70 µm copper, tin-plated and standard footprint.




FR4 PCB, single-sided 35µm copper, tin-plated and standard footprint

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




FR4 PCB, single-sided 70µm copper, tin-plated and standard footprint

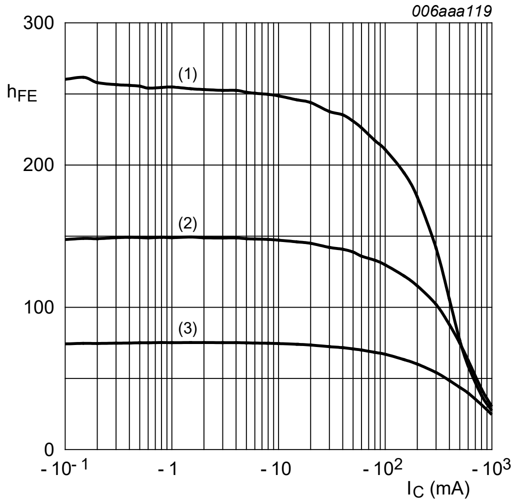
**Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values**

# 10. Characteristics

**Table 8. Characteristics**

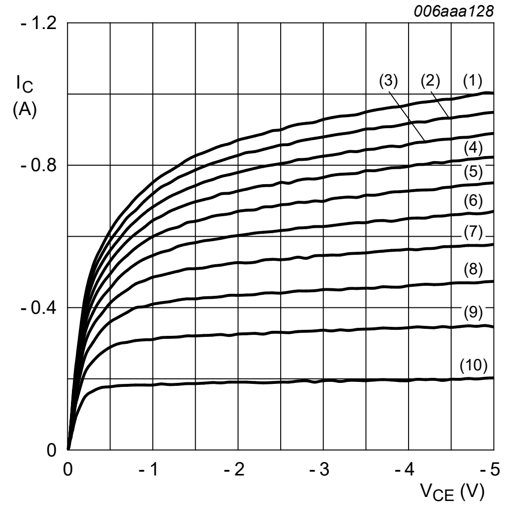
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_{(BR)CBO}$ | collector-base breakdown voltage | $I_C$ = -100 μA; $I_E$ = 0 A; $T_{amb}$ = 25 °C | | -50 | - | | V |
| $V_{(BR)CEO}$ | collector-emitter breakdown voltage | $I_C$ = -10 mA; $I_E$ = 0 A; $T_{amb}$ = 25 °C | | -45 | - | | V |
| $V_{(BR)EBO}$ | emitter-base breakdown voltage | $I_E$ = -100 μA; $I_C$ = 0 A; $T_{amb}$ = 25 °C | | -5 | - | | V |
| $I_{CBO}$ | collector-base cut-off current | $V_{CB}$ = -20 V; $I_E$ = 0 A; $T_{amb}$ = 25 °C | | - | - | -100 | nA |
| | | $V_{CB}$ = -20 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 | | | | | | |
| | BC807-16QB | $V_{CE}$ = -1 V; $I_C$ = -100 mA; $T_{amb}$ = 25 °C | [1] | 100 | - | 250 | |
| | BC807-25QB | | [1] | 160 | - | 400 | |
| | BC807-40QB | | [1] | 250 | - | 600 | |
| | | $V_{CE}$ = -1 V; $I_C$ = -500 mA; $T_{amb}$ = 25 °C | [1] | 40 | - | - | |
| $V_{CEsat}$ | collector-emitter saturation voltage | $I_C$ = -500 mA; $I_B$ = -50 mA; $T_{amb}$ = 25 °C | [1] | - | - | -700 | mV |
| $V_{BE}$ | base-emitter voltage | $V_{CE}$ = -1 V; $I_C$ = -500 mA; $T_{amb}$ = 25 °C | [1] [2] | - | - | -1.2 | V |
| $f_T$ | transition frequency | $V_{CE}$ = -5 V; $I_C$ = -10 mA; f = 100 MHz; $T_{amb}$ = 25 °C | | 80 | - | - | MHz |
| $C_c$ | collector capacitance | $V_{CB}$ = -10 V; $I_E$ = $i_e$ = 0 A; f = 1 MHz; $T_{amb}$ = 25 °C | | - | 5 | - | pF |

[1] pulsed; $t_p$ ≤ 300 μs; δ ≤ 0.02
[2] $V_{BE}$ decreases by about 2 mV/K with increasing temperature.



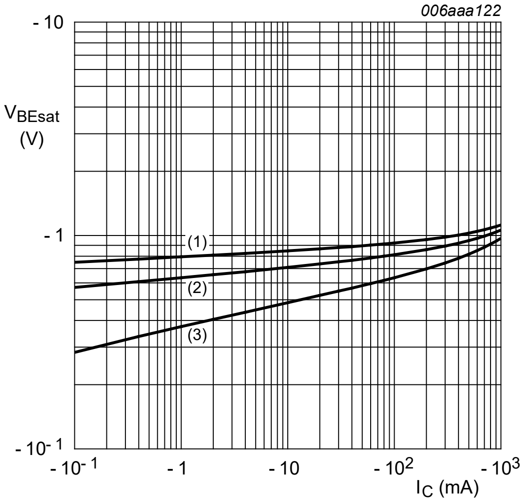

$V_{CE}$ = -1 V
(1) $T_{amb}$ = 150 °C
(2) $T_{amb}$ = 25 °C
(3) $T_{amb}$ = -55 °C

**Fig. 4. BC807-16QB: DC current gain as a function of collector current; typical values**



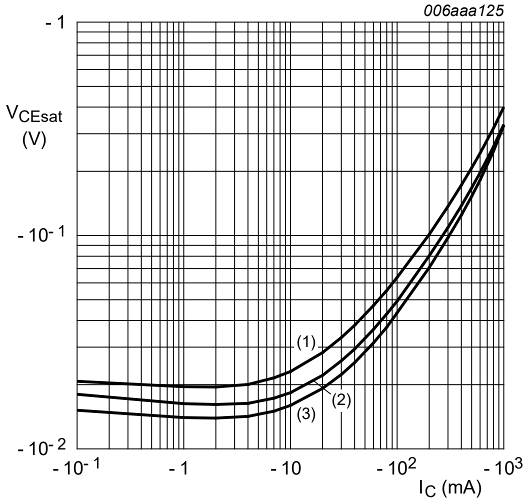

$T_{amb}$ = 25 °C
(1) $I_B$ = -16.0 mA
(2) $I_B$ = -14.4 mA
(3) $I_B$ = -12.8 mA
(4) $I_B$ = -11.2 mA
(5) $I_B$ = -9.6 mA
(6) $I_B$ = -8.0 mA
(7) $I_B$ = -6.4 mA
(8) $I_B$ = -4.8 mA
(9) $I_B$ = -3.2 mA
(10) $I_B$ = -1.6 mA

**Fig. 5. BC807-16QB: Collector current as a function of collector-emitter voltage; typical values**



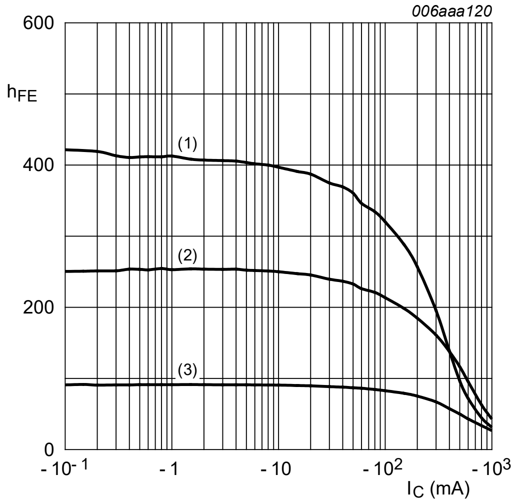

IC/IB = 10
(1) $T_{amb}$ = -55 °C
(2) $T_{amb}$ = 25 °C
(3) $T_{amb}$ = 150 °C

**Fig. 6. BC807-16QB: Base-emitter saturation voltage as a function of collector current; typical values**



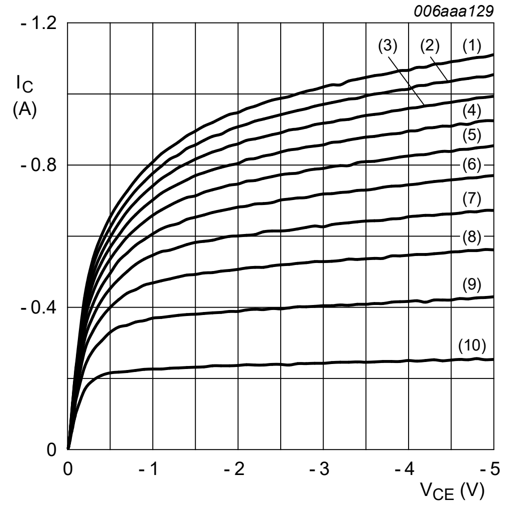

IC/IB = 10
(1) $T_{amb}$ = 150 °C
(2) $T_{amb}$ = 25 °C
(3) $T_{amb}$ = -55 °C

**Fig. 7. BC807-16QB: Collector-emitter saturation voltage as a function of collector current; typical values**



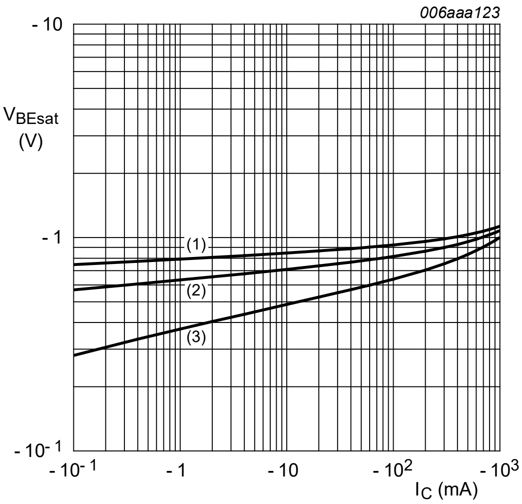

$V_{CE}$ = -1 V
(1) $T_{amb}$ = 150 °C
(2) $T_{amb}$ = 25 °C
(3) $T_{amb}$ = -55 °C

**Fig. 8. BC807-25QB: DC current gain as a function of collector current; typical values**



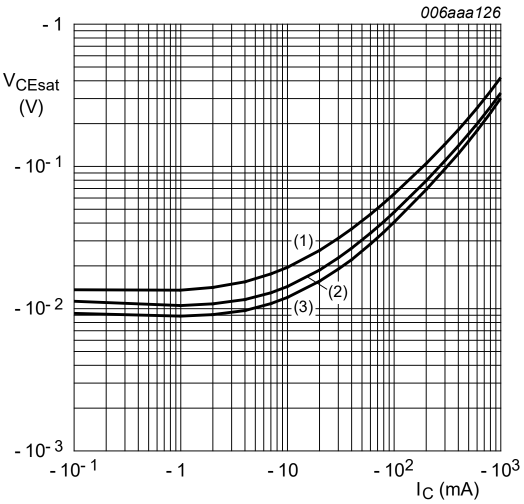

$T_{amb}$ = 25 °C
(1) $I_B$ = -13.0 mA
(2) $I_B$ = -11.7 mA
(3) $I_B$ = -10.4 mA
(4) $I_B$ = -9.1 mA
(5) $I_B$ = -7.8 mA
(6) $I_B$ = -6.5 mA
(7) $I_B$ = -5.2 mA
(8) $I_B$ = -3.9 mA
(9) $I_B$ = -2.6 mA
(10) $I_B$ = -1.3 mA

**Fig. 9. BC807-25QB: Collector current as a function of collector-emitter voltage; typical values**



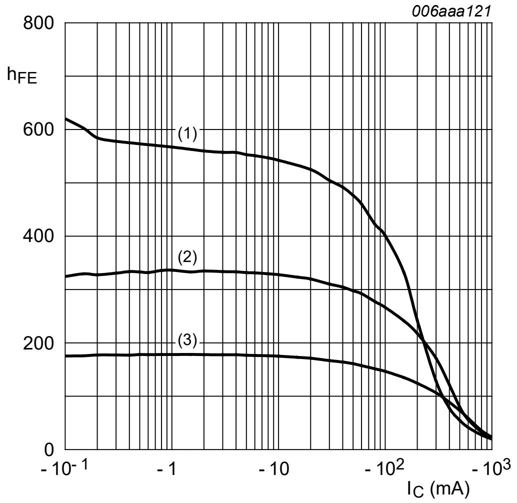

IC/IB = 10
(1) $T_{amb}$ = -55 °C
(2) $T_{amb}$ = 25 °C
(3) $T_{amb}$ = 150 °C

**Fig. 10. BC807-25QB: Base-emitter saturation voltage as a function of collector current; typical values**




IC/IB = 10
(1) $T_{amb}$ = 150 °C
(2) $T_{amb}$ = 25 °C
(3) $T_{amb}$ = -55 °C

**Fig. 11. BC807-25QB: Collector-emitter saturation voltage as a function of collector current; typical values**



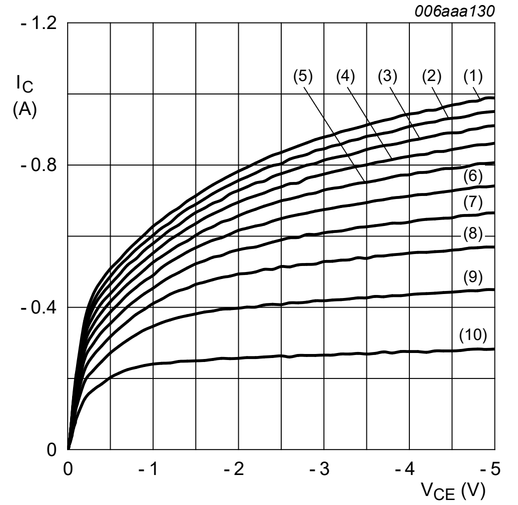

$V_{CE}$ = -1 V

(1) $T_{amb}$ = 150 °C

(2) $T_{amb}$ = 25 °C

(3) $T_{amb}$ = -55 °C

**Fig. 12. BC807-40QB: DC current gain as a function of collector current; typical values**




$T_{amb}$ = 25 °C

(1) $I_B$ = -12.0 mA

(2) $I_B$ = -10.8 mA

(3) $I_B$ = -9.6 mA

(4) $I_B$ = -8.4 mA

(5) $I_B$ = -7.2 mA

(6) $I_B$ = -6.0 mA

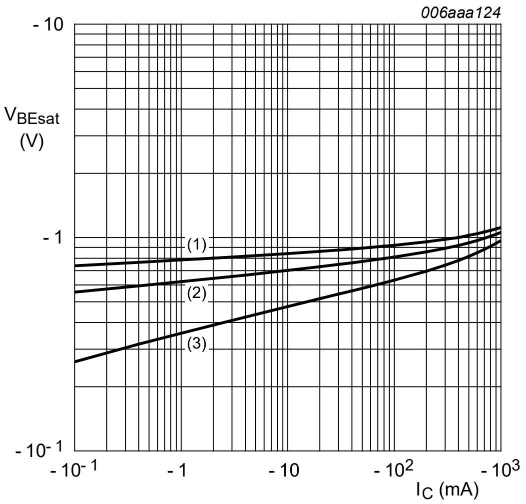
(7) $I_B$ = -4.8 mA

(8) $I_B$ = -3.6 mA

(9) $I_B$ = -2.4 mA

(10) $I_B$ = -1.2 mA

**Fig. 13. BC807-40QB: Collector current as a function of collector-emitter voltage; typical values**



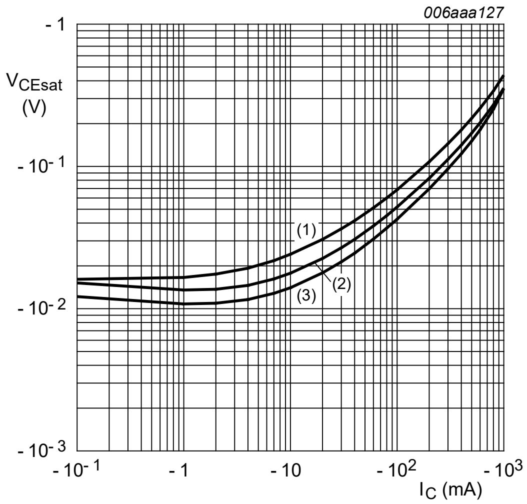

IC/IB = 10

(1) $T_{amb}$ = -55 °C

(2) $T_{amb}$ = 25 °C

(3) $T_{amb}$ = 150 °C

**Fig. 14. BC807-40QB: Base-emitter saturation voltage as a function of collector current; typical values**




IC/IB = 10

(1) $T_{amb}$ = 150 °C

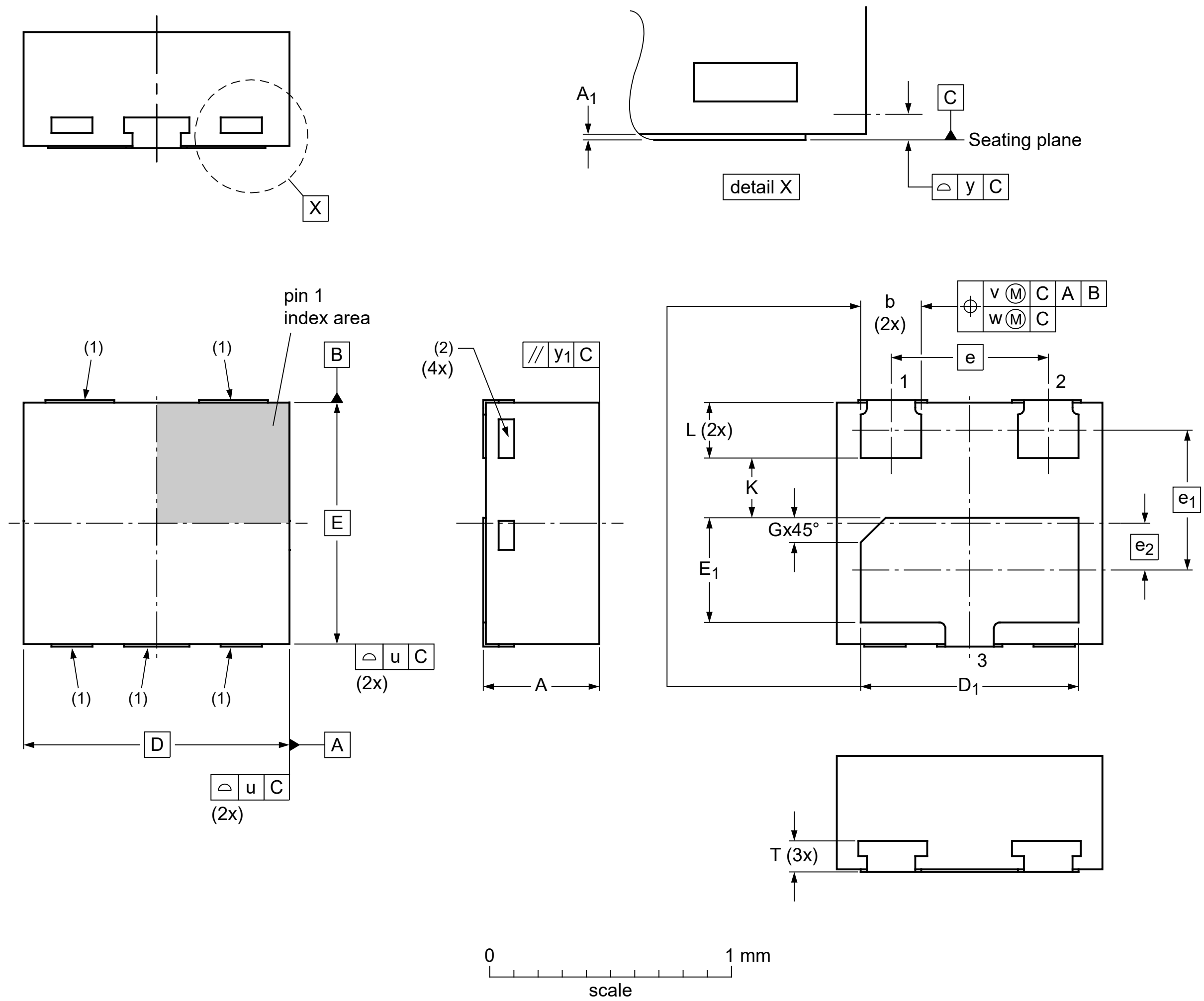
(2) $T_{amb}$ = 25 °C

(3) $T_{amb}$ = -55 °C

**Fig. 15. BC807-40QB: Collector-emitter saturation voltage as a function of collector current; typical values**

## 11. Package outline

**DFN1110D-3: plastic, leadless extremely thin small outline package with side-wettable flanks (SWF); 3 terminals; 0.65 mm pitch; 1.1 mm x 1 mm x 0.48 mm body** **SOT8015**




Dimensions (mm are the original dimensions)

| Unit | | A | $A_1$ | b | D | $D_1$ | E | $E_1$ | e | $e_1$ | $e_2$ | G | K | L | T | u | v | w | y | y1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | max | 0.50 | 0.040 | 0.30 | | 0.95 | | 0.48 | | | | | | 0.27 | 0.22 | | | | | |
| | nom | 0.47 | 0.020 | 0.25 | 1.1 | 0.90 | 1 | 0.43 | 0.65 | 0.58 | 0.19 | 0.09 (ref) | | 0.23 | 0.16 | 0.05 | 0.1 | 0.05 | 0.05 | 0.05 |
| | min | 0.44 | 0.005 | 0.22 | | 0.87 | | 0.40 | | | | | 0.2 | 0.20 | 0.10 | | | | | |

Note
1. Side Wettable Flank, protrusion max. 0.02 mm.
2. Visible depend upon used manufacturing technology.
Dimension A and T are including plating thickness.

*sot8015_po*

| Outline version | References | | | | European projection | Issue date |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT8015 | | MO-340BA | | | | ~~19-12-02~~ 19-12-04 |

**Fig. 16. Package outline DFN1110D-3 (SOT8015)**

## 12. Soldering

**Footprint information for reflow soldering of DFN1110D-3 package** **SOT8015**

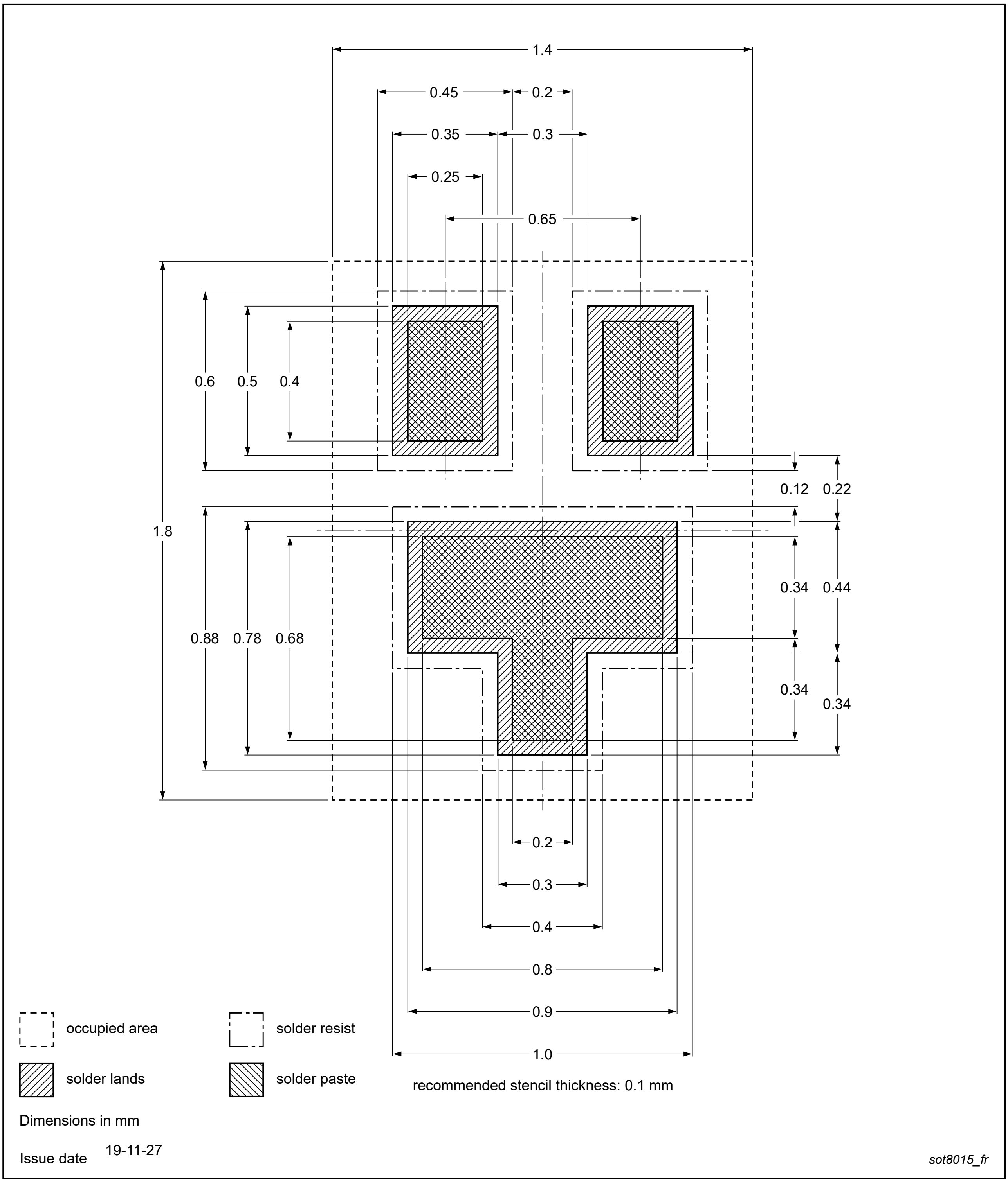



**Fig. 17. Reflow soldering footprint for DFN1110D-3 (SOT8015)**

# 13. Revision history

**Table 9. Revision history**

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| BC807QB_SER v.2 | 20230701 | Product data sheet | - | BC807QB_SER v.1 |
| Modifications: | • Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s). | | | |
| BC807QB_SER v.1 | 20201210 | Product data sheet | - | - |

# 14. 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. |

[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".
[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at https://www.nexperia.com.

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