# BC858B-QVL Datasheet


https://www.DiGi-Electronics.com

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|---|---|
| DiGi Electronics Part Number | BC858B-QVL-DG |
| Manufacturer | Nexperia USA Inc. |
| Manufacturer Product Number | BC858B-QVL |
| Description | TRANS PNP 30V 0.1A TO236AB |
| Detailed Description | Bipolar (BJT) Transistor PNP 30 V 100 mA 100MHz 250 mW Surface Mount TO-236AB |

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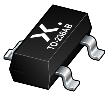
RFQ Email: Info@DiGi-Electronics.com

## Purchase and inquiry

| | |
|---|---|
| Manufacturer Product Number: | Manufacturer: |
| BC858B-QVL | Nexperia USA Inc. |
| Series: | Product Status: |
| - | Active |
| Transistor Type: | Current - Collector (Ic) (Max): |
| PNP | 100 mA |
| Voltage - Collector Emitter Breakdown (Max): | Vce Saturation (Max) @ Ib, Ic: |
| 30 V | 650mV @ 5mA, 100mA |
| Current - Collector Cutoff (Max): | DC Current Gain (hFE) (Min) @ Ic, Vce: |
| 15nA (ICBO) | 220 @ 2mA, 5V |
| Power - Max: | Frequency - Transition: |
| 250 mW | 100MHz |
| Operating Temperature: | Grade: |
| 150°C (TJ) | Automotive |
| Qualification: | Mounting Type: |
| AEC-Q101 | Surface Mount |
| Package / Case: | Supplier Device Package: |
| TO-236-3, SC-59, SOT-23-3 | TO-236AB |
| Base Product Number: | |
| BC858 | |

## Environmental & Export classification

| | |
|---|---|
| RoHS Status: | Moisture Sensitivity Level (MSL): |
| ROHS3 Compliant | 1 (Unlimited) |
| REACH Status: | ECCN: |
| REACH Unaffected | EAR99 |
| HTSUS: | |
| 8541.21.0075 | |



# BC856-Q; BC857-Q; BC858-Q

## 65 V, 100 mA PNP general-purpose transistors

Rev. 2 — 21 February 2022 Product data sheet

## 1. General description

PNP general-purpose transistors in a small SOT23 (TO-236AB), Surface-Mounted Device (SMD) plastic package.

**Table 1. Product overview**

| Type number | Package | | NPN complement |
|---|---|---|---|
| | Nexperia | JEDEC | |
| BC856-Q | SOT23 | TO-236AB | BC846-Q |
| BC856A-Q | | | BC846A-Q |
| BC856B-Q | | | BC846B-Q |
| BC857-Q | | | BC847-Q |
| BC857A-Q | | | BC847A-Q |
| BC857B-Q | | | BC847B-Q |
| BC857C-Q | | | BC847C-Q |
| BC858B-Q | | | BC848B-Q |

## 2. Features and benefits

- Low current (max. 100 mA)
- Low voltage (max. 65 V)
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 3. Applications

- General-purpose switching and amplification

## 4. Quick reference data

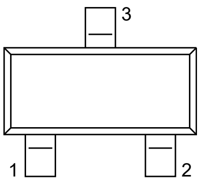
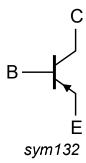
**Table 2. Quick reference data**

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{CEO}$ | collector-emitter voltage | open base | | | | |
| | BC856-Q; BC856A-Q; BC856B-Q | | - | - | -65 | V |
| | BC857-Q; BC857A-Q; BC857B-Q; BC857C-Q | | - | - | -45 | V |
| | BC858B-Q | | - | - | -30 | V |
| $I_C$ | collector current | | - | - | -100 | mA |
| $I_{CM}$ | peak collector current | | - | - | -200 | mA |
| $h_{FE}$ | DC current gain | | | | | |
| | BC856-Q | $V_{CE}$ = 5 V; $I_C$ = 2 mA | 125 | - | 475 | |
| | BC857-Q | | 125 | - | 800 | |
| | BC856A-Q; BC857A-Q | | 125 | - | 250 | |
| | BC856B-Q; BC857B-Q; BC858B-Q | | 220 | - | 475 | |
| | BC857C-Q | | 420 | - | 800 | |

## 5. Pinning information

**Table 3. Pinning information**

| Pin | Symbol | Descrition | Simlified outline | Graphic symbol |
|---|---|---|---|---|
| 1 | B | base |  |  |
| 2 | E | emitter | | |
| 3 | C | collector | | |

## 6. Ordering information

**Table 4. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| BC856-Q | TO-236AB | plastic surface-mounted package; 3 leads | SOT23 |
| BC856A-Q | | | |
| BC856B-Q | | | |
| BC857-Q | | | |
| BC857A-Q | | | |
| BC857B-Q | | | |
| BC857C-Q | | | |
| BC858B-Q | | | |

## 7. Marking

**Table 5. Marking codes**

| Type number | | Marking code |
|---|---|---|
| BC856-Q | [1] | 3D% |
| BC856A-Q | [1] | 3A% |
| BC856B-Q | [1] | 3B% |
| BC857-Q | [1] | 3H% |
| BC857A-Q | [1] | 3E% |
| BC857B-Q | [1] | 3F% |
| BC857C-Q | [1] | 3G% |
| BC858B-Q | [1] | 3K% |

[1] % = placeholder for manufacturing site code

## 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 | | | | |
| | BC856-Q; BC856A-Q; BC856B-Q | | | - | -80 | V |
| | BC857-Q; BC857A-Q; BC857B-Q; BC857C-Q | | | - | -50 | V |
| | BC858B-Q | | | - | -30 | V |
| $V_{CEO}$ | collector-emitter voltage | open base | | | | |
| | BC856-Q; BC856A-Q; BC856B-Q | | | - | -65 | V |
| | BC857-Q; BC857A-Q; BC857B-Q; BC857C-Q | | | - | -45 | V |
| | BC858B-Q | | | - | -30 | V |
| $V_{EBO}$ | emitter-base voltage | open collector | | - | -5 | V |
| $I_C$ | collector current | | | - | -100 | mA |
| $I_{CM}$ | peak collector current | | | - | -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 | | | -65 | 150 | °C |
| $T_{stg}$ | storage temperature | | | -65 | 150 | °C |

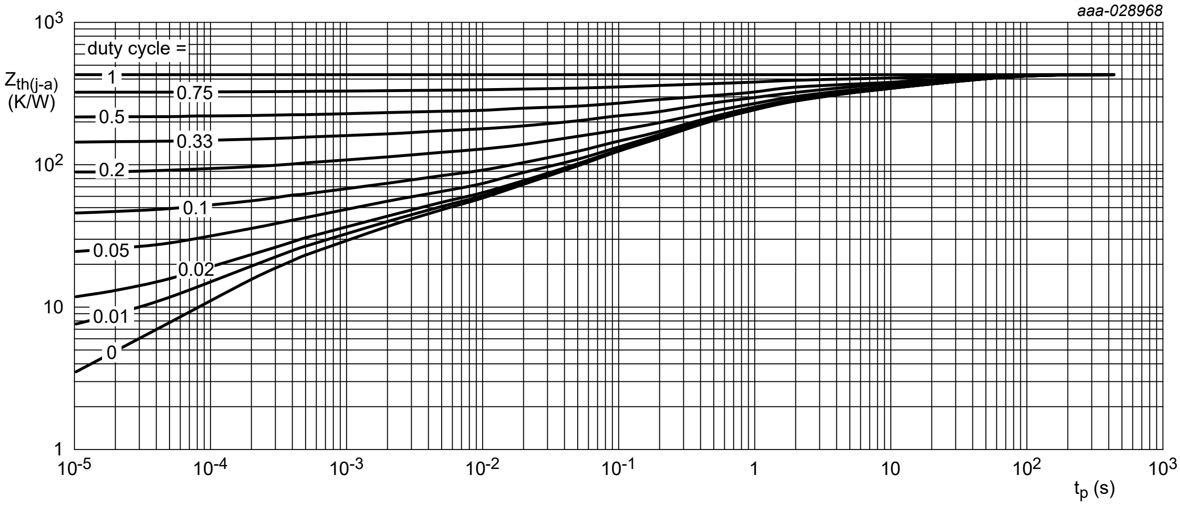
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided, 35 µm copper, tin-plated and standard footprint.

# 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 | [1] | - | - | 500 | K/W |

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




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

**Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values**

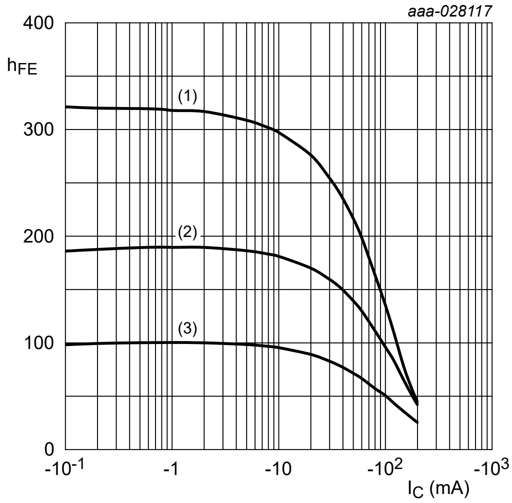
# 10. Characteristics

**Table 8. Characteristics**

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

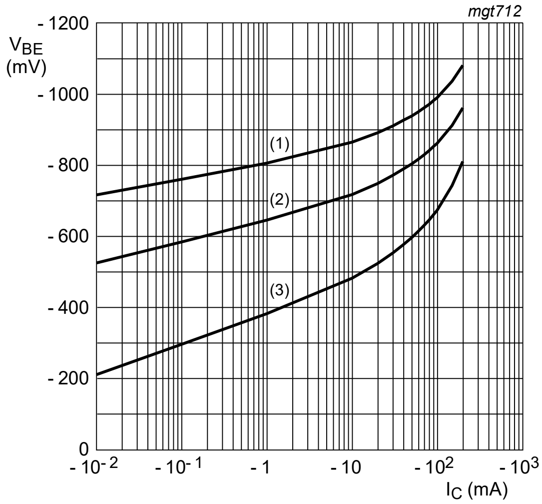
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_{(BR)CBO}$ | collector-base breakdown voltage | | | | | | |
| | BC856-Q; BC856A-Q; BC856B-Q | $I_C$ = -100 µA; $I_E$ = 0 A | | -80 | - | - | V |
| | BC857-Q; BC857A-Q; BC857B-Q; BC857C-Q | | | -50 | - | - | V |
| | BC858B-Q | | | -30 | - | - | V |
| $V_{(BR)CEO}$ | collector-emitter breakdown voltage | | | | | | |
| | BC856-Q; BC856A-Q; BC856B-Q | $I_C$ = -2 mA; $I_B$ = 0 A | | -65 | - | - | V |
| | BC857-Q; BC857A-Q; BC857B-Q; BC857C-Q | | | -45 | - | - | V |
| | BC858B-Q | | | -30 | - | - | V |
| $V_{(BR)EBO}$ | emitter-base breakdown voltage | $I_C$ = 0 A; $I_E$ = -100 µA | | -5 | - | - | V |
| $I_{CBO}$ | collector-base cut-off current | $V_{CB}$ = -30 V; $I_E$ = 0 A | | - | -1 | -15 | nA |
| | | $V_{CB}$ = -30 V; $I_E$ = 0 A; $T_j$ = 150 °C | | - | - | -4 | µA |
| $I_{EBO}$ | emitter-base cut-off current | $V_{EB}$ = -5 V; $I_C$ = 0 A | | - | - | -100 | nA |
| $h_{FE}$ | DC current gain | | | | | | |
| | BC856-Q | $V_{CE}$ = -5 V; $I_C$ = -2 mA | | 125 | - | 475 | |
| | BC857-Q | | | 125 | - | 800 | |
| | BC856A-Q; BC857A-Q | | | 125 | - | 250 | |
| | BC856B-Q; BC857B-Q; BC858B-Q | | | 220 | - | 475 | |
| | BC857C-Q | | | 420 | - | 800 | |
| $V_{CEsat}$ | collector-emitter saturation voltage | $I_C$ = -10 mA; $I_B$ = -0.5 mA | | - | -75 | -300 | mV |
| | | $I_C$ = -100 mA; $I_B$ = -5 mA | [1] | - | -250 | -650 | mV |
| $V_{BEsat}$ | base-emitter saturation voltage | $I_C$ = -10 mA; $I_B$ = -0.5 mA | [1] | - | -700 | - | mV |
| | | $I_C$ = -100 mA; $I_B$ = -5 mA | [1] | - | -850 | - | mV |
| $V_{BE}$ | base-emitter voltage | $V_{CE}$ = -5 V; $I_C$ = -2 mA | | -600 | -650 | -750 | mV |
| | | $V_{CE}$ = -5 V; $I_C$ = -10 mA | | - | - | -820 | mV |
| $C_c$ | collector capacitance | $V_{CB}$ = -10 V; $I_E$ = $i_e$ = 0 A; f = 1 MHz | | - | 4.5 | - | pF |
| $f_T$ | transition frequency | $V_{CE}$ = -5 V; $I_C$ = -10 mA; f = 100 MHz | | 100 | - | - | MHz |
| NF | noise figure | $I_C$ = -200 µA; $V_{CE}$ = -5 V; $R_S$ = 2 kΩ; f = 1 kHz; B = 200Hz | | - | 2 | 10 | dB |

[1] pulsed; $t_p$ ≤ 300 µs; δ ≤ 0.02



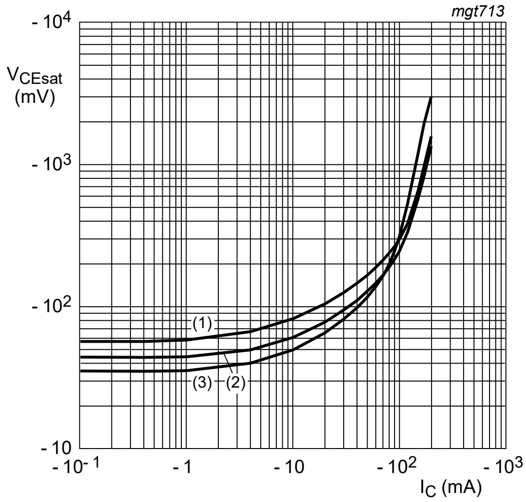

$V_{CE}$ = -5 V
(1) $T_{amb}$ = 150 °C
(2) $T_{amb}$ = 25 °C
(3) $T_{amb}$ = -55 °C

**Fig. 2. BC856A-Q; BC857A-Q: DC current gain as a function of collector current; typical values**



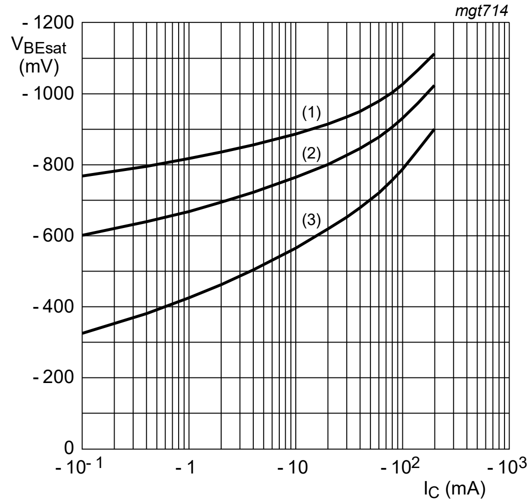

$V_{CE}$ = -5 V
(1) $T_{amb}$ = -55 °C
(2) $T_{amb}$ = 25 °C
(3) $T_{amb}$ = 150 °C

**Fig. 3. BC856A-Q; BC857A-Q: Base-emitter voltage as a function of collector current; typical values**



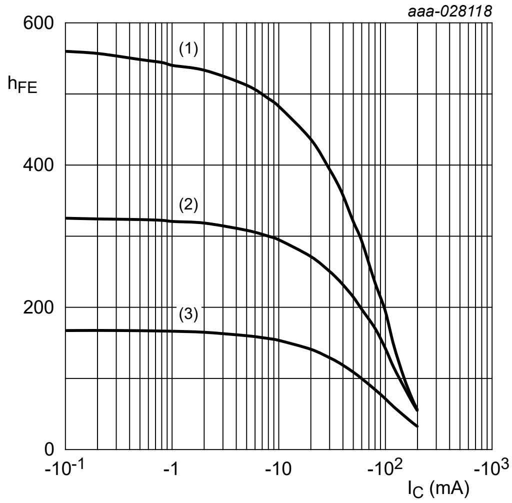

$I_C/I_B$ = 20
(1) $T_{amb}$ = 150 °C
(2) $T_{amb}$ = 25 °C
(3) $T_{amb}$ = -55 °C

**Fig. 4. BC856A-Q; BC857A-Q: Collector-emitter saturation voltage as a function of collector current; typical values**



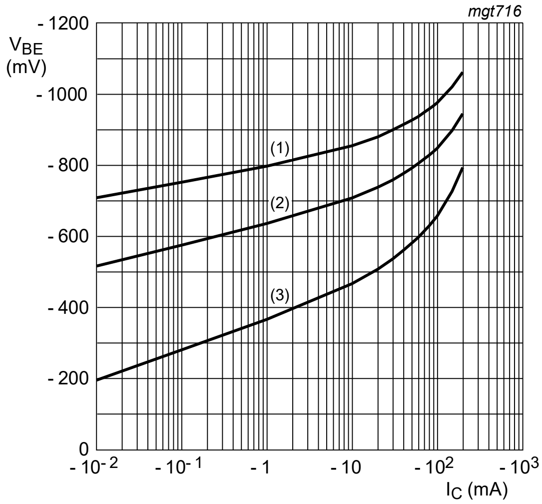

$I_C/I_B$ = 20
(1) $T_{amb}$ = -55 °C
(2) $T_{amb}$ = 25 °C
(3) $T_{amb}$ = 150 °C

**Fig. 5. BC856A-Q; BC857A-Q: Base-emitter saturation voltage as a function of collector current; typical values**



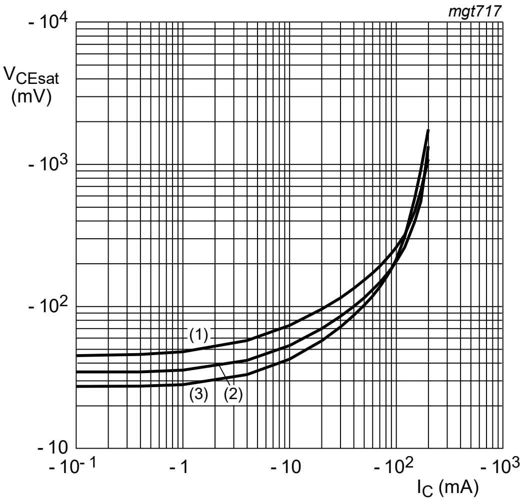

$V_{CE}$ = -5 V
(1) $T_{amb}$ = 150 °C
(2) $T_{amb}$ = 25 °C
(3) $T_{amb}$ = -55 °C

**Fig. 6. BC856B-Q; BC857B-Q; BC858B-Q: DC current gain as a function of collector current; typical values**



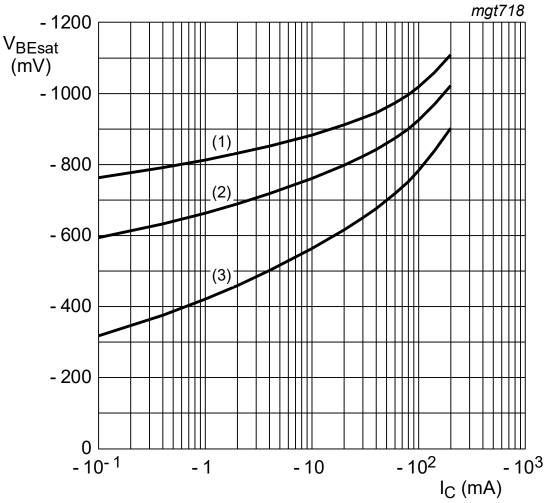

$V_{CE}$ = -5 V
(1) $T_{amb}$ = -55 °C
(2) $T_{amb}$ = 25 °C
(3) $T_{amb}$ = 150 °C

**Fig. 7. BC856B-Q; BC857B-Q; BC858B-Q: Base-emitter voltage as a function of collector current; typical values**



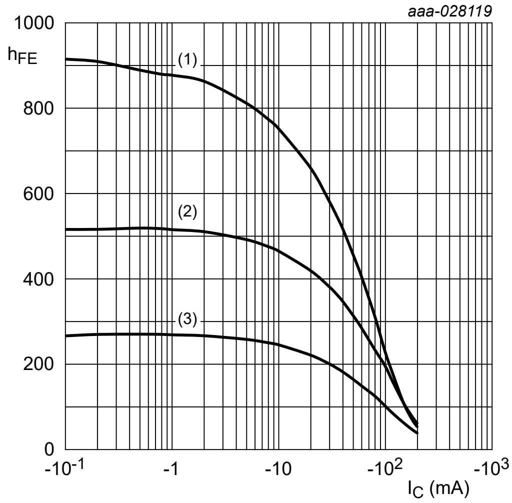

$I_C/I_B$ = 20
(1) $T_{amb}$ = 150 °C
(2) $T_{amb}$ = 25 °C
(3) $T_{amb}$ = -55 °C

**Fig. 8. BC856B-Q; BC857B-Q; BC858B-Q: Collector-emitter saturation voltage as a function of collector current; typical values**



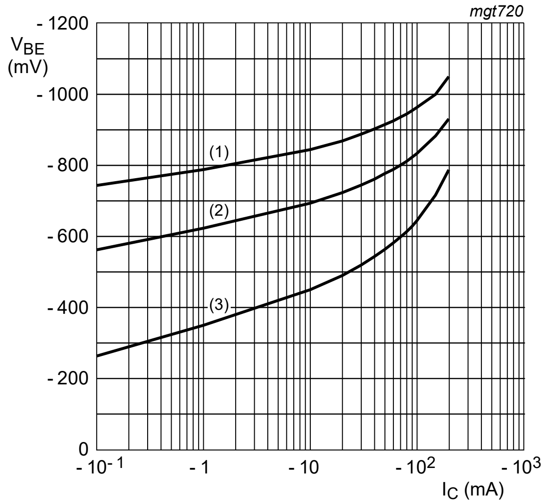

$I_C/I_B$ = 20
(1) $T_{amb}$ = -55 °C
(2) $T_{amb}$ = 25 °C
(3) $T_{amb}$ = 150 °C

**Fig. 9. BC856B-Q; BC857B-Q; BC858B-Q: Base-emitter saturation voltage as a function of collector current; typical values**



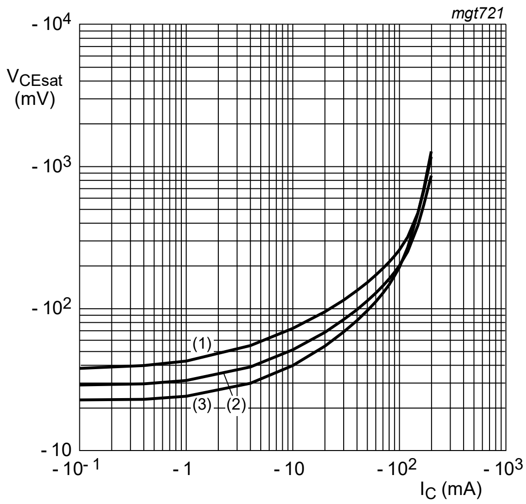

$V_{CE}$ = -5 V
(1) $T_{amb}$ = 150 °C
(2) $T_{amb}$ = 25 °C
(3) $T_{amb}$ = -55 °C

**Fig. 10. BC857C-Q: DC current gain as a function of collector current; typical values**



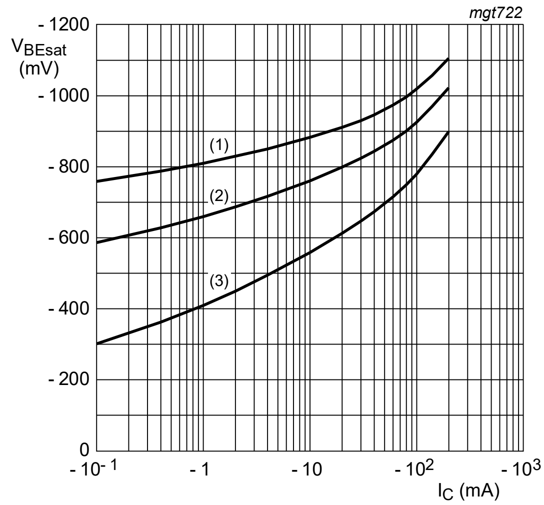

$V_{CE}$ = -5 V
(1) $T_{amb}$ = -55 °C
(2) $T_{amb}$ = 25 °C
(3) $T_{amb}$ = 150 °C

**Fig. 11. BC857C-Q: Base-emitter voltage as a function of collector current; typical values**




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

**Fig. 12. BC857C-Q: Collector-emitter saturation voltage as a function of collector current; typical values**




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

**Fig. 13. BC857C-Q: 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

**Table 9. Package outline**

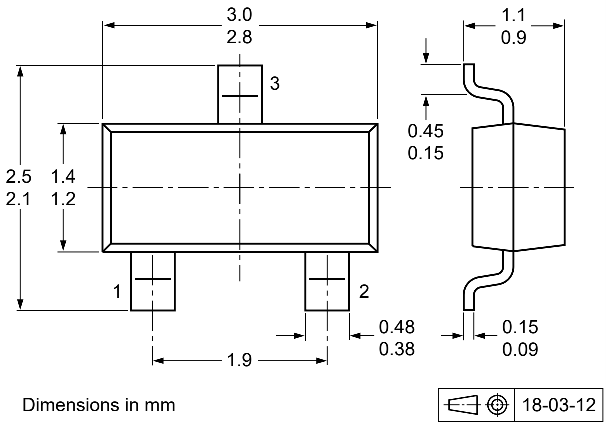



**Fig. 14. Package outline SOT23 (TO-236AB)**

## 13. Soldering

**Table 10. Soldering**

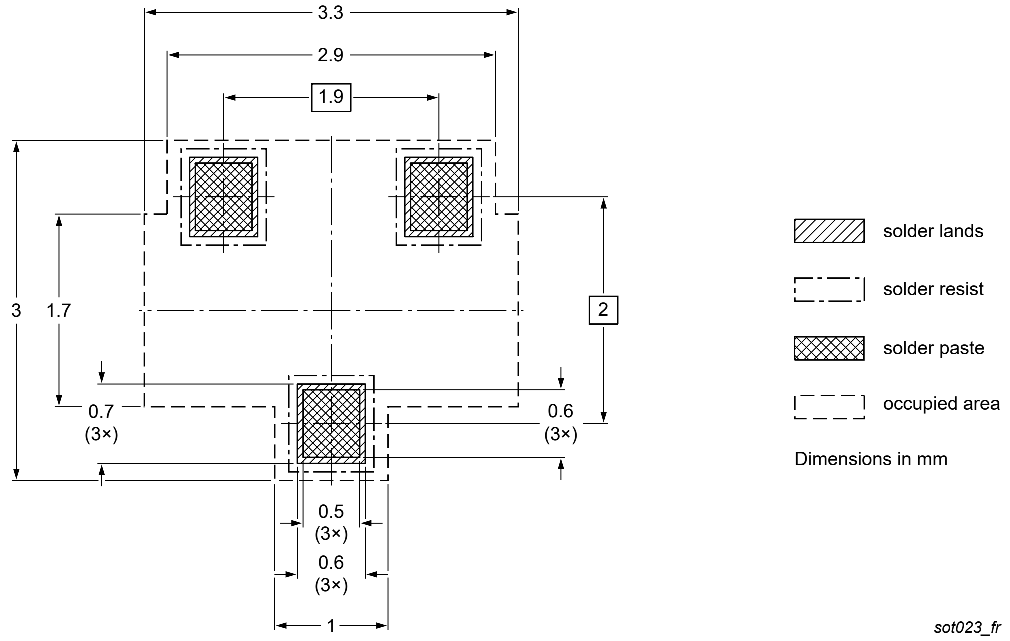



**Fig. 15. Reflow soldering footprint SOT23 (TO-236AB)**

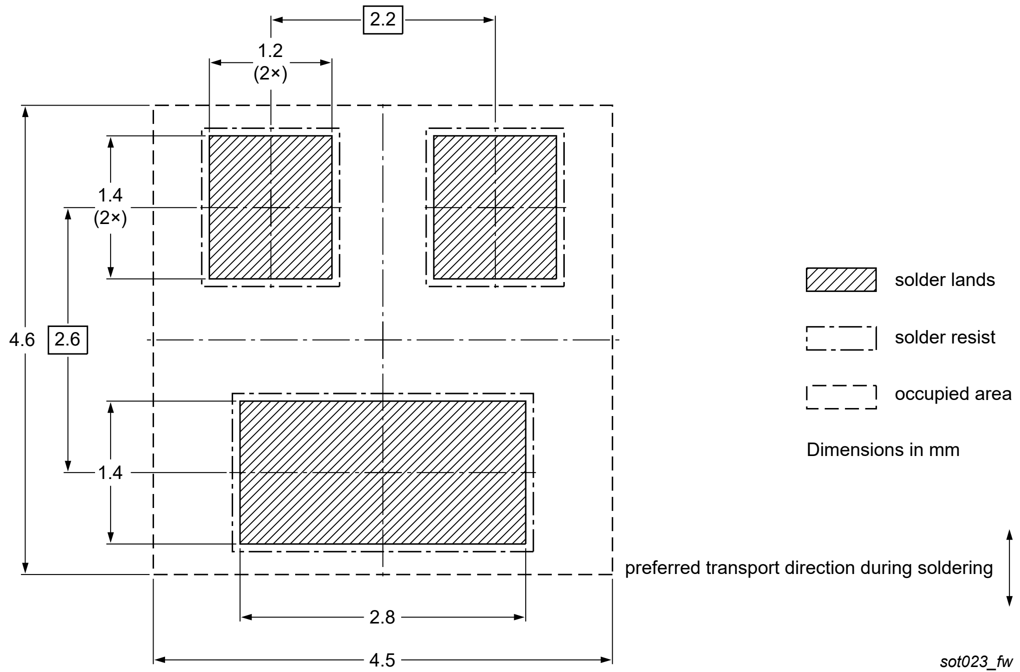



**Fig. 16. Wave soldering footprint SOT23 (TO-236AB)**

## 14. Revision history

**Table 11. Revision history**

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| BC856-Q_BC857-Q_BC858-Q v.2 | 20220221 | Product data sheet | - | BC856-Q_BC857-Q_BC858-Q v.1 |
| Modifications: | • Quick reference data: BC856-Q corrected to BC856B-Q at $h_{FE}$<br>• Limiting values and Characteristics: Product names changed to detailed descriptions | | | |
| BC856-Q_BC857-Q_BC858-Q v.1 | 20210624 | 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. |

[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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