

BC857BW/MIF Datasheet



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| | |
|------------------------------|--|
| DiGi Electronics Part Number | BC857BW/MIF-DG |
| Manufacturer | Nexperia USA Inc. |
| Manufacturer Product Number | BC857BW/MIF |
| Description | TRANS PNP 45V 0.1A SOT323 |
| Detailed Description | Bipolar (BJT) Transistor PNP 45 V 100 mA 100MHz 200 mW Surface Mount SOT-323 |



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

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Purchase and inquiry

Manufacturer Product Number:

BC857BW/MIF

Series:

-

Transistor Type:

PNP

Voltage - Collector Emitter Breakdown (Max):

45 V

Current - Collector Cutoff (Max):

15nA (ICBO)

Power - Max:

200 mW

Operating Temperature:

150°C (TJ)

Package / Case:

SC-70, SOT-323

Base Product Number:

BC857

Manufacturer:

Nexperia USA Inc.

Product Status:

Obsolete

Current - Collector (Ic) (Max):

100 mA

Vce Saturation (Max) @ Ib, Ic:

600mV @ 5mA, 100mA

DC Current Gain (hFE) (Min) @ Ic, Vce:

220 @ 2mA, 5V

Frequency - Transition:

100MHz

Mounting Type:

Surface Mount

Supplier Device Package:

SOT-323

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.21.0075

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99



BC856W; BC857W; BC858W

65 V, 100 mA PNP general-purpose transistors

Rev. 4 — 10 July 2023

Product data sheet

1. General description

PNP general-purpose transistors in a very small SOT323 (SC-70), Surface-Mounted Device (SMD) plastic package.

Table 1. Product overview

| Type number | Package | | NPN complement |
|-------------|----------|-------|----------------|
| | Nexperia | JEDEC | |
| BC856W | SOT323 | SC-70 | BC846W |
| BC856AW | | | BC846AW |
| BC856BW | | | BC846BW |
| BC857W | | | BC847W |
| BC857AW | | | BC847AW |
| BC857BW | | | BC847BW |
| BC857CW | | | BC847CW |
| BC858W | | | BC848W |

2. Features and benefits

- Low current (max. 100 mA)
- Low voltage (max. 65 V)

3. Applications

- General-purpose switching and amplification

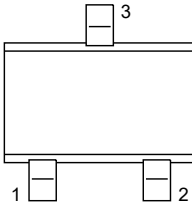
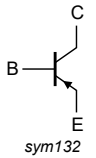
4. Quick reference data

Table 2. Quick reference data
 $T_{amb} = 25\text{ °C}$ unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------|---------------------------|--|-----|-----|------|------|
| V_{CEO} | collector-emitter voltage | open base | | | | |
| | BC856W | | - | - | -65 | V |
| | BC857W | | - | - | -45 | V |
| | BC858W | | - | - | -30 | V |
| I_C | collector current | | - | - | -100 | mA |
| I_{CM} | peak collector current | | - | - | -200 | mA |
| h_{FE} | DC current gain | | | | | |
| | BC856W | $V_{CE} = 5\text{ V}; I_C = 2\text{ mA}$ | 125 | - | 475 | |
| | BC857W; BC858W | | 125 | - | 800 | |
| | BC856AW; BC857AW | | 125 | - | 250 | |
| | BC856BW; BC857BW | | 220 | - | 475 | |
| | BC857CW | | 420 | - | 800 | |
| | | | | | | |

5. Pinning information

Table 3. Pinning information

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

6. Ordering information

Table 4. Ordering information

| Type number | Package | | Version |
|-------------|---------|--|---------|
| | Name | Description | |
| BC856W | SC-70 | plastic surface-mounted package; 3 leads | SOT323 |
| BC856AW | | | |
| BC856BW | | | |
| BC857W | | | |
| BC857AW | | | |
| BC857BW | | | |
| BC857CW | | | |
| BC858W | | | |

7. Marking

Table 5. Marking codes

| Type number | | Marking code |
|-------------|-----|--------------|
| BC856W | [1] | 3D% |
| BC856AW | [1] | 3A% |
| BC856BW | [1] | 3B% |
| BC857W | [1] | 3H% |
| BC857AW | [1] | 3E% |
| BC857CW | [1] | 3G% |
| BC858W | [1] | 3M% |

[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 | | | |
| | BC856W | | - | -80 | V |
| | BC857W | | - | -50 | V |
| | BC858W | | - | -30 | V |
| V _{CEO} | collector-emitter voltage | open base | | | |
| | BC856W | | - | -65 | V |
| | BC857W | | - | -45 | V |
| | BC858W | | - | -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} ≤ 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 |

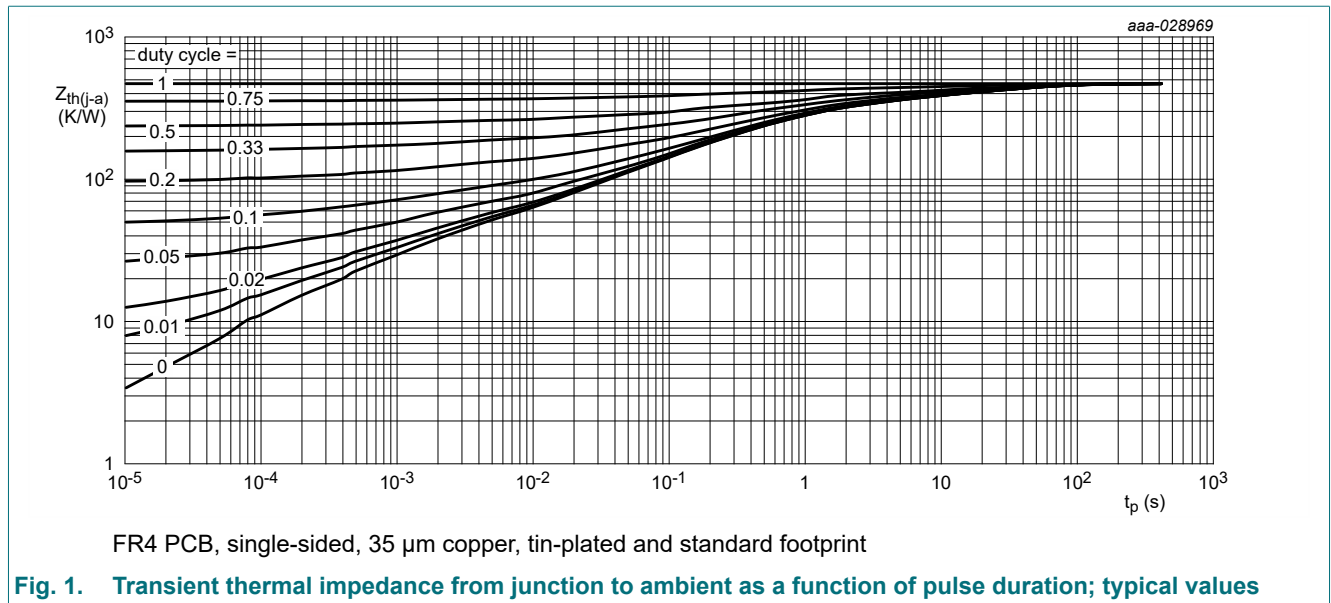
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided, 35 µm copper, tin-plated and standard footprint.

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] | - | 625 | K/W |

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



10. Characteristics

Table 8. Characteristics
 $T_{amb} = 25\text{ °C}$ unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit | |
|---------------|--------------------------------------|---|------|------|------|---------------|----|
| $V_{(BR)CBO}$ | collector-base breakdown voltage | | | | | | |
| | BC856W | $I_C = -100\text{ }\mu\text{A}; I_E = 0\text{ A}$ | -80 | - | - | V | |
| | BC857W | | -50 | - | - | V | |
| | BC858W | | -30 | - | - | V | |
| $V_{(BR)CEO}$ | collector-emitter breakdown voltage | | | | | | |
| | BC856W | $I_C = -2\text{ mA}; I_B = 0\text{ A}$ | -65 | - | - | V | |
| | BC857W | | -45 | - | - | V | |
| | BC858W | | -30 | - | - | V | |
| $V_{(BR)EBO}$ | emitter-base breakdown voltage | $I_C = 0\text{ A}; I_E = -100\text{ }\mu\text{A}$ | -5 | - | - | V | |
| I_{CBO} | collector-base cut-off current | $V_{CB} = -30\text{ V}; I_E = 0\text{ A}$ | - | -1 | -15 | nA | |
| | | $V_{CB} = -30\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ °C}$ | - | - | -4 | 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 | | | | | | |
| | BC856W | $V_{CE} = -5\text{ V}; I_C = -2\text{ mA}$ | 125 | - | 475 | | |
| | BC857W; BC858W | | 125 | - | 800 | | |
| | BC856AW; BC857AW | | 125 | - | 250 | | |
| | BC857BW; BC858BW | | 220 | - | 475 | | |
| | BC857CW | | 420 | - | 800 | | |
| | | | | | | | |
| V_{CEsat} | collector-emitter saturation voltage | $I_C = -10\text{ mA}; I_B = -0.5\text{ mA}$ | - | -75 | -300 | mV | |
| | | $I_C = -100\text{ mA}; I_B = -5\text{ mA}$ | [1] | - | -250 | -600 | mV |
| V_{BEsat} | base-emitter saturation voltage | $I_C = -10\text{ mA}; I_B = -0.5\text{ mA}$ | [1] | - | -700 | - | mV |
| | | $I_C = -100\text{ mA}; I_B = -5\text{ mA}$ | [1] | - | -850 | - | mV |
| V_{BE} | base-emitter voltage | $V_{CE} = -5\text{ V}; I_C = -2\text{ mA}$ | -600 | -650 | -750 | mV | |
| | | $V_{CE} = -5\text{ V}; I_C = -10\text{ mA}$ | - | - | -820 | mV | |
| C_c | collector capacitance | $V_{CB} = -10\text{ V}; I_E = i_e = 0\text{ A}; f = 1\text{ MHz}$ | - | 3 | - | pF | |
| C_e | collector capacitance | $V_{EB} = -5\text{ V}; I_C = i_c = 0\text{ A}; f = 1\text{ MHz}$ | - | 12 | - | pF | |
| f_T | transition frequency | $V_{CE} = -5\text{ V}; I_C = -10\text{ mA}; f = 100\text{ MHz}$ | 100 | - | - | MHz | |
| NF | noise figure | $I_C = -200\text{ }\mu\text{A}; V_{CE} = -5\text{ V}; R_S = 2\text{ k}\Omega;$ $f = 1\text{ kHz}; B = 200\text{ Hz}$ | - | 2 | 10 | dB | |

[1] pulsed; $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02$

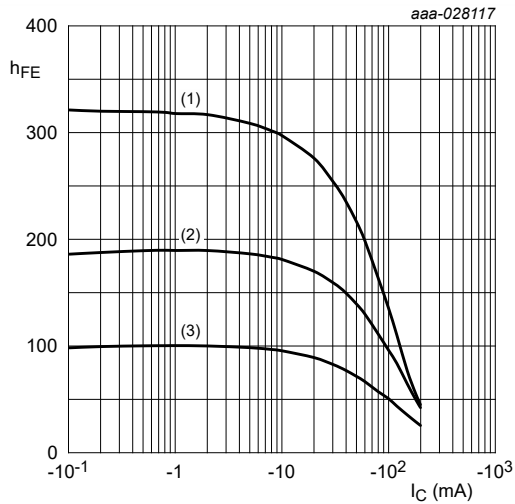

 $V_{CE} = -5 \text{ V}$
(1) $T_{amb} = 150 \text{ }^{\circ}\text{C}$ (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$ (3) $T_{amb} = -55 \text{ }^{\circ}\text{C}$

Fig. 2. BC857AW: DC current gain as a function of collector current; typical values

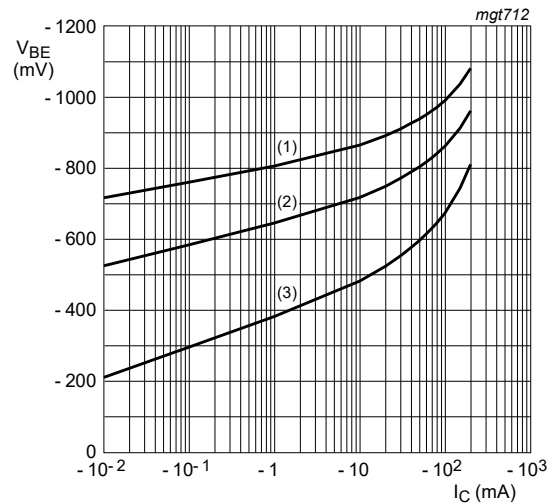

 $V_{CE} = -5 \text{ V}$
(1) $T_{amb} = -55 \text{ }^{\circ}\text{C}$ (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$ (3) $T_{amb} = 150 \text{ }^{\circ}\text{C}$

Fig. 3. BC857AW: Base-emitter voltage as a function of collector current; typical values

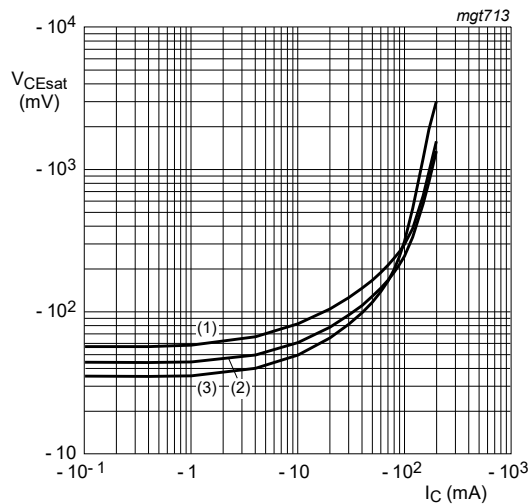

 $I_C/I_B = 20$
(1) $T_{amb} = 150 \text{ }^{\circ}\text{C}$ (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$ (3) $T_{amb} = -55 \text{ }^{\circ}\text{C}$

Fig. 4. BC857AW: Collector-emitter saturation voltage as a function of collector current; typical values

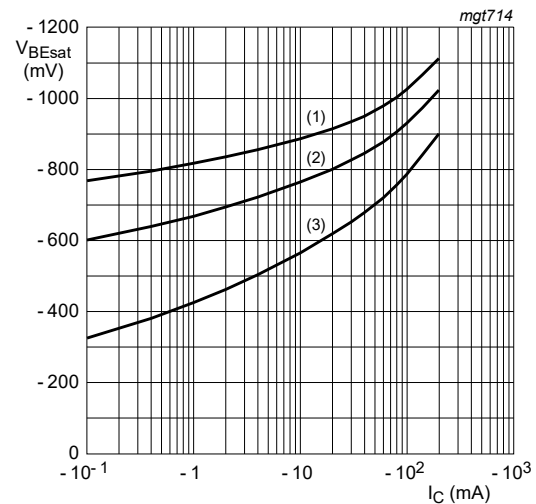
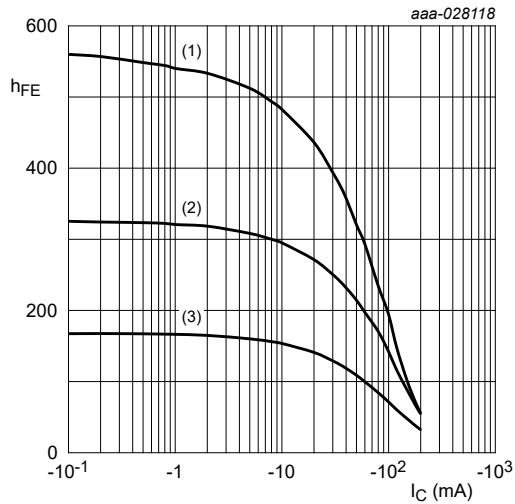

 $I_C/I_B = 20$
(1) $T_{amb} = -55 \text{ }^{\circ}\text{C}$ (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$ (3) $T_{amb} = 150 \text{ }^{\circ}\text{C}$

Fig. 5. BC857AW: Base-emitter saturation voltage as a function of collector current; typical values



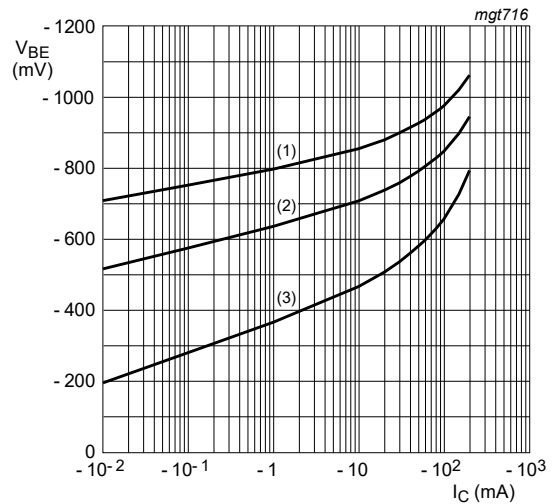
$$V_{CE} = -5 \text{ V}$$

$$(1) T_{amb} = 150 \text{ }^\circ\text{C}$$

$$(2) T_{amb} = 25 \text{ }^\circ\text{C}$$

$$(3) T_{amb} = -55 \text{ }^\circ\text{C}$$

Fig. 6. BC857BW: DC current gain as a function of collector current; typical values



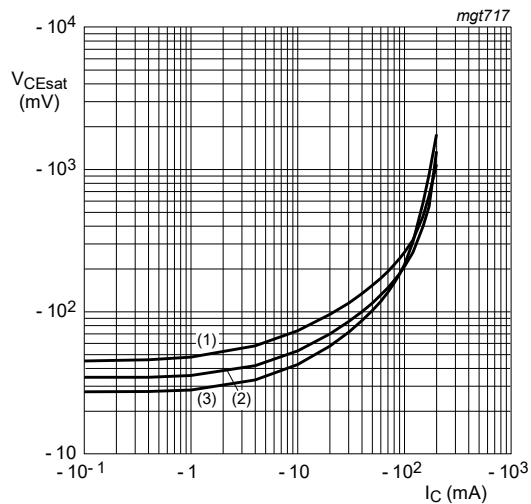
$$V_{CE} = -5 \text{ V}$$

$$(1) T_{amb} = -55 \text{ }^\circ\text{C}$$

$$(2) T_{amb} = 25 \text{ }^\circ\text{C}$$

$$(3) T_{amb} = 150 \text{ }^\circ\text{C}$$

Fig. 7. BC857BW: Base-emitter voltage as a function of collector current; typical values



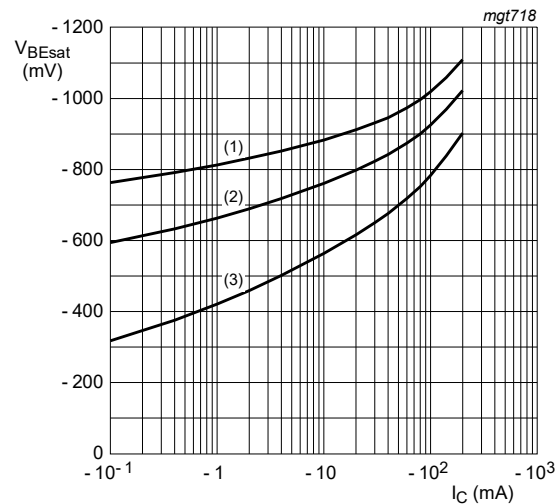
$$I_C/I_B = 20$$

$$(1) T_{amb} = 150 \text{ }^\circ\text{C}$$

$$(2) T_{amb} = 25 \text{ }^\circ\text{C}$$

$$(3) T_{amb} = -55 \text{ }^\circ\text{C}$$

Fig. 8. BC857BW: Collector-emitter saturation voltage as a function of collector current; typical values



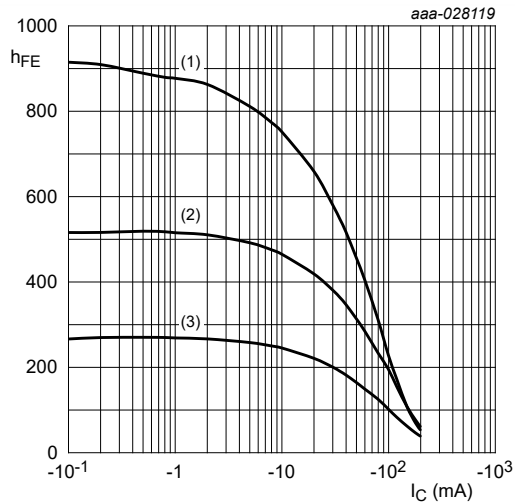
$$I_C/I_B = 20$$

$$(1) T_{amb} = -55 \text{ }^\circ\text{C}$$

$$(2) T_{amb} = 25 \text{ }^\circ\text{C}$$

$$(3) T_{amb} = 150 \text{ }^\circ\text{C}$$

Fig. 9. BC857BW: Base-emitter saturation voltage as a function of collector current; typical values



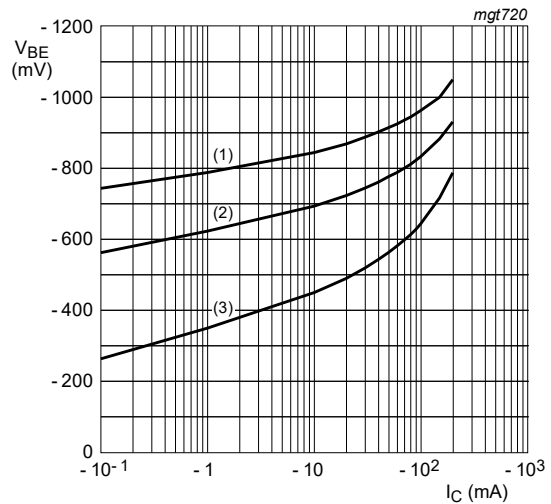
$$V_{CE} = -5 \text{ V}$$

(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. 10. BC857CW: DC current gain as a function of collector current; typical values



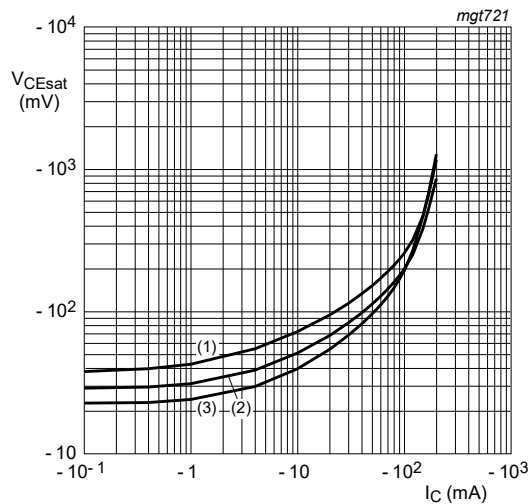
$$V_{CE} = -5 \text{ V}$$

(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. 11. BC857CW: Base-emitter voltage as a function of collector current; typical values



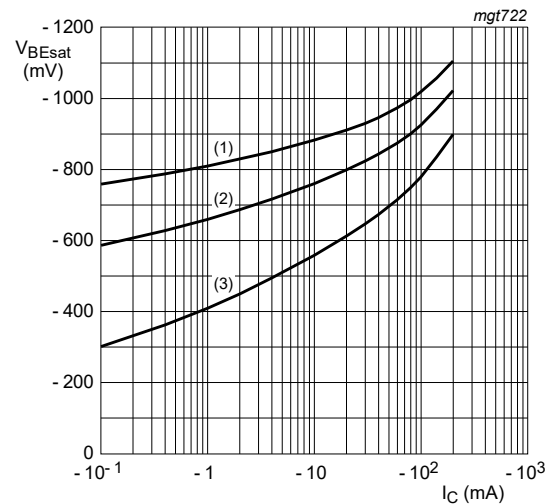
$$I_C/I_B = 20$$

(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. 12. BC857CW: Collector-emitter saturation voltage as a function of collector current; typical values



$$I_C/I_B = 20$$

(1) $T_{amb} = -55 \text{ }^{\circ}\text{C}$

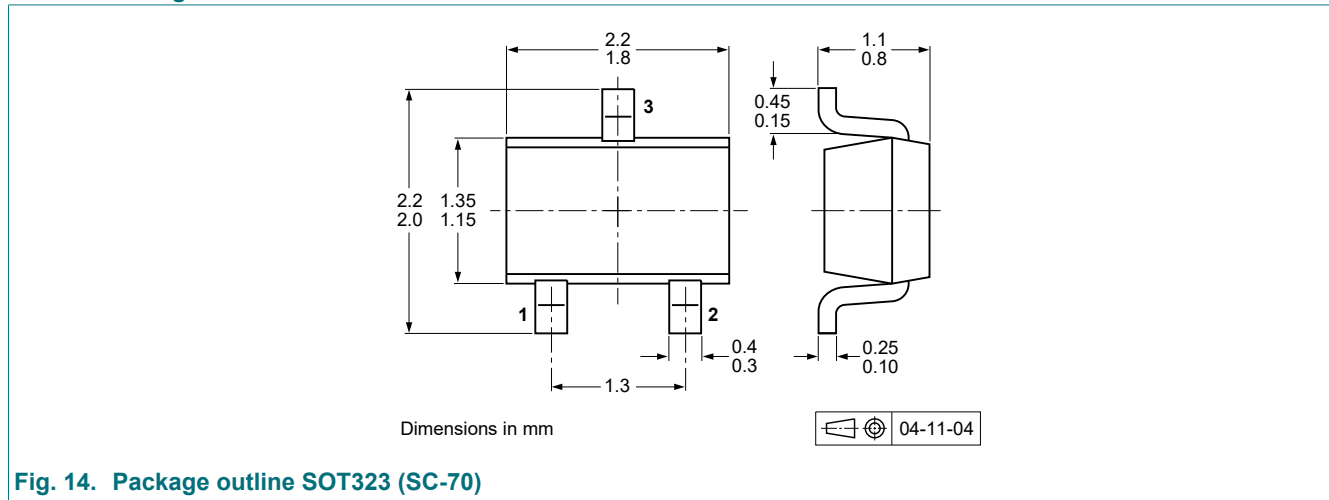
(2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$

(3) $T_{amb} = 150 \text{ }^{\circ}\text{C}$

Fig. 13. BC857CW: Base-emitter saturation voltage as a function of collector current; typical values

11. Package outline

Table 9. Package outline



12. Soldering

Table 10. Soldering

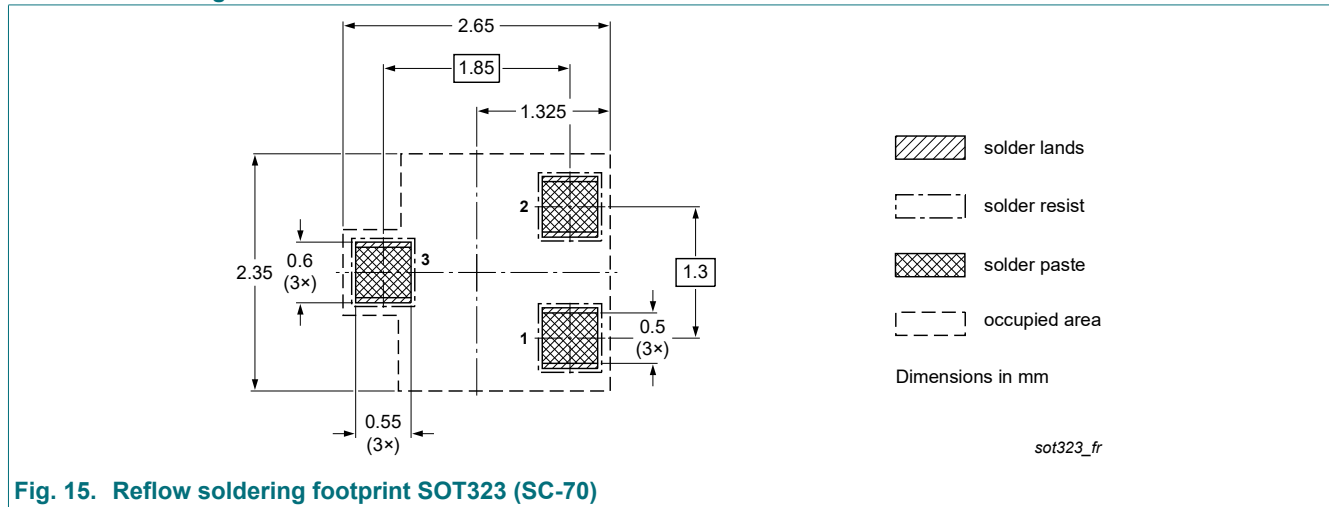


Fig. 15. Reflow soldering footprint SOT323 (SC-70)

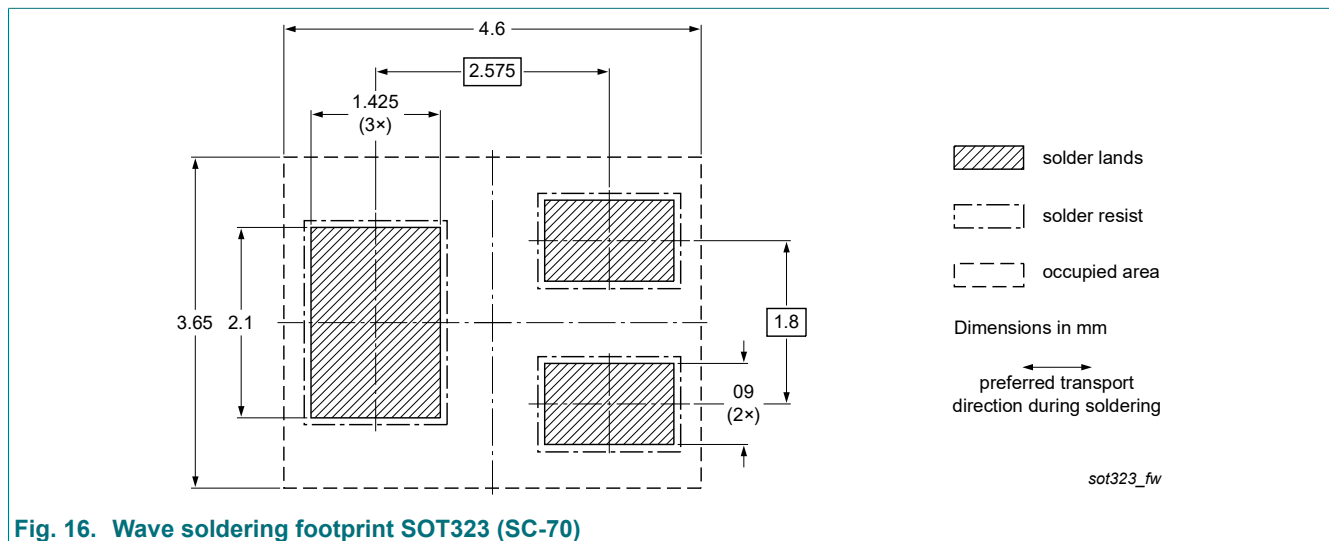


Fig. 16. Wave soldering footprint SOT323 (SC-70)

13. Revision history

Table 11. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|--------------------------|---|--------------------|---------------|--------------------------|
| BC856W_BC857W_BC858W v.4 | 20230710 | Product data sheet | - | BC856W_BC857W_BC858W v.3 |
| Modifications: | <ul style="list-style-type: none"> Quick reference data: typos corrected | | | |
| BC856W_BC857W_BC858W v.3 | 20230701 | Product data sheet | - | BC856W_BC857W_BC858W v.2 |
| BC856W_BC857W_BC858W v.2 | 20020204 | Product data sheet | - | BC856W_BC857W_BC858W v.1 |
| BC856W_BC857W_BC858W v.1 | 19990412 | 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".
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