



BC857xQC series

45 V, 100 mA PNP general-purpose transistor

Rev. 1 — 27 October 2021

Product data sheet

1. General description

PNP general-purpose transistor in an ultra small DFN1412D-3 (SOT8009) leadless Surface-Mounted Device (SMD) plastic package with side-wettable flanks.

Table 1. Product overview

Type number	Package		NPN complement:
	Nexperia	JEDEC	
BC857AQC	SOT8009	MO-340CA	BC847AQC
BC857BQC			BC847BQC
BC857CQC			BC847CQC

2. Features and benefits

- High power dissipation capability
- 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

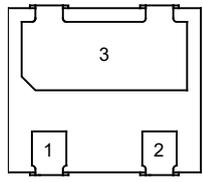
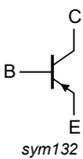
Table 2. Quick reference data

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base	-	-	-45	V
I_C	collector current		-	-	-100	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1\text{ ms}$	-	-	-200	mA
h_{FE}	DC current gain					
	BC857AQC	$V_{CE} = -5\text{ V}; I_C = -2\text{ mA}$	125	-	250	
	BC857BQC		220	-	475	
	BC857CQC		420	-	800	

5. Pinning information

Table 3. Pinning

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 <p>Transparent top view</p>	 <p>sym132</p>
2	E	emitter		
3	C	collector		

6. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
BC857AQC	DFN1412D-3	plastic leadless ultra small outline package with side-wettable flanks (SWF); 3 terminals; 0.8 mm pitch; body: 1.4 mm x 1.2 mm x 0.48 mm	SOT8009
BC857BQC			
BC857CQC			

7. Marking

Table 5. Marking

Type number	Marking code
BC857AQC	9F
BC857BQC	9G
BC857CQC	9H

8. Limiting values

Table 6. Limiting values

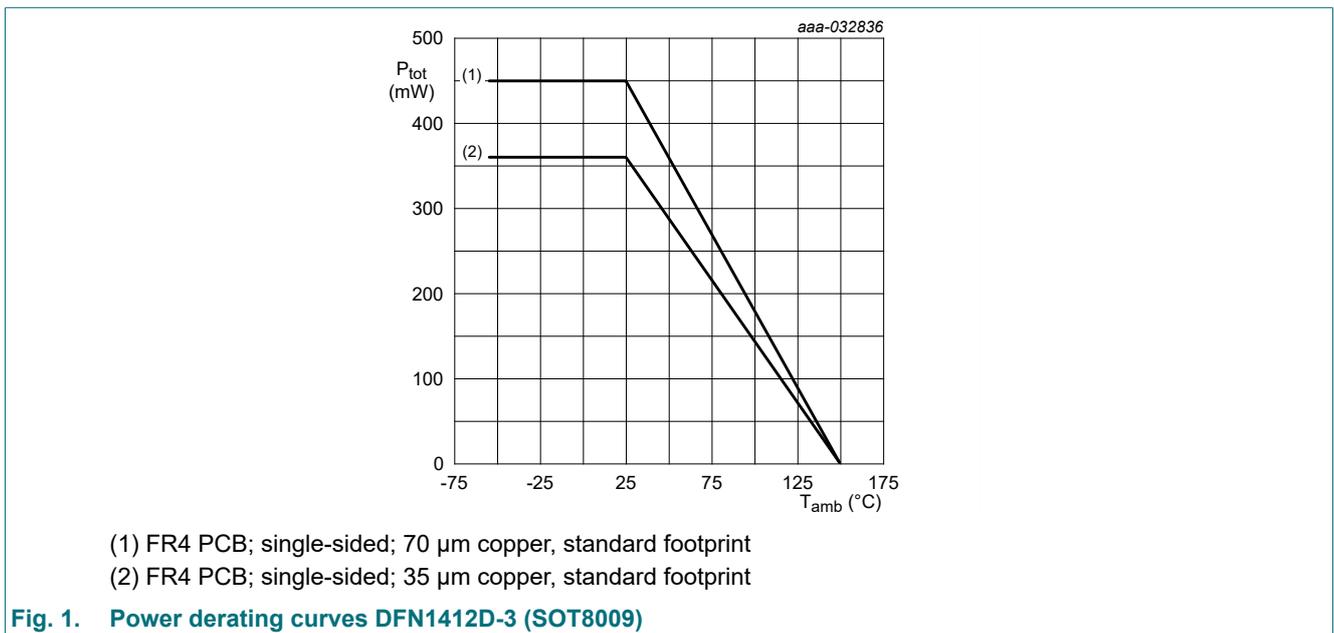
In accordance with the Absolute Maximum Rating System (IEC 60134).

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

Symbol	Parameter	Conditions	Min	Max	Unit	
V_{CBO}	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; $t_p \leq 1\text{ ms}$	-	-200	mA	
I_{BM}	peak base current	single pulse; $t_p \leq 1\text{ ms}$	-	-100	mA	
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[1]	-	360	mW
			[2]	-	450	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; 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.



9. Thermal characteristics

Table 7. Thermal characteristics

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	348	K/W
			[2]	-	-	278	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.

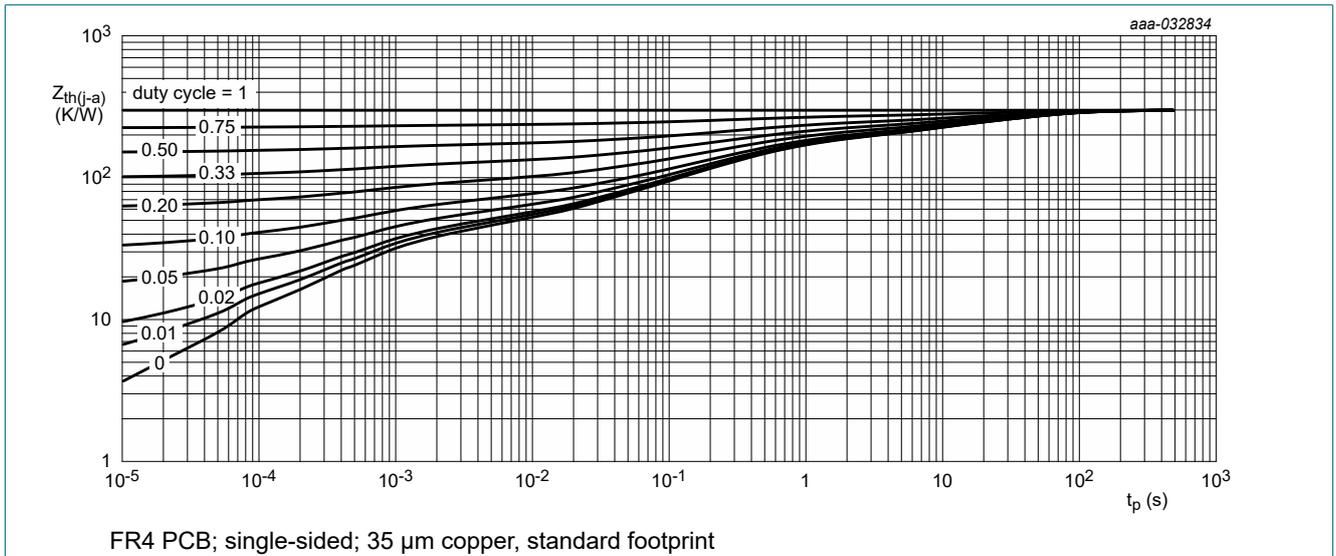


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

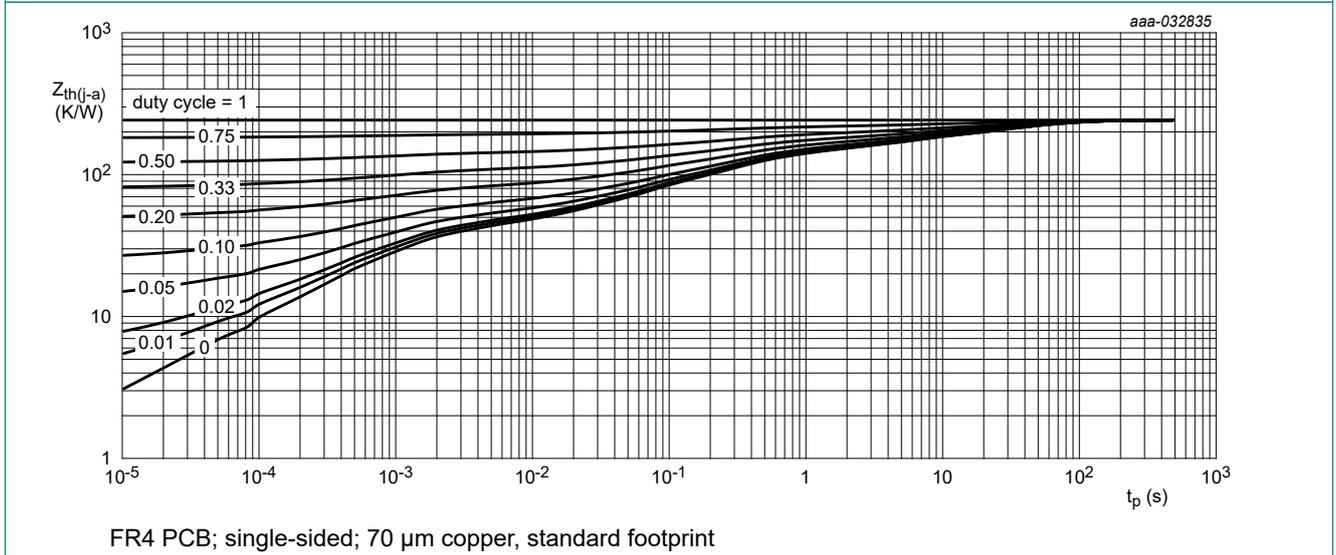


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

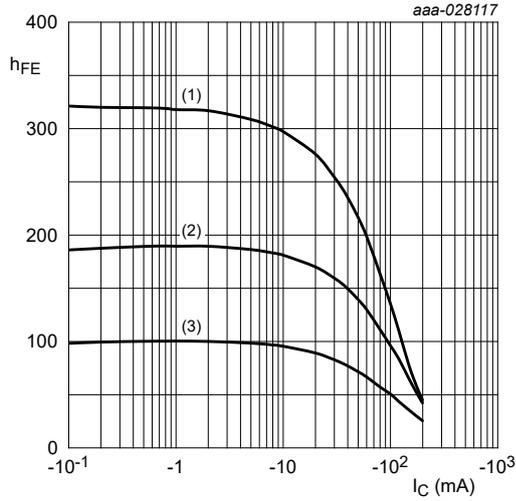
10. Characteristics

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	$I_C = -100\ \mu\text{A}$; $I_E = 0\ \text{A}$	-50	-	-	V
$V_{(BR)CES}$	collector-emitter peak voltage	$I_C = -2\ \text{mA}$; $I_E = 0\ \text{A}$	-45	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	$I_E = -100\ \mu\text{A}$; $I_C = 0\ \text{A}$	-6	-	-	V
I_{CBO}	collector-base cut-off current	$V_{CB} = -30\ \text{V}$; $I_E = 0\ \text{A}$	-	-	-15	nA
		$V_{CB} = -30\ \text{V}$; $I_E = 0\ \text{A}$; $T_j = 150\text{ °C}$	-	-	-5	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					
	BC857AQC	$V_{CE} = -5\ \text{V}$; $I_C = -2\ \text{mA}$	125	-	250	
	BC857BQC		220	-	475	
	BC857CQC		420	-	800	
V_{CEsat}	collector-emitter saturation voltage	$I_C = -10\ \text{mA}$; $I_B = -0.5\ \text{mA}$	-	-	-300	mV
		$I_C = -100\ \text{mA}$; $I_B = -5\ \text{mA}$ [1]	-	-	-650	mV
V_{BE}	base-emitter voltage	$V_{CE} = -5\ \text{V}$; $I_C = -2\ \text{mA}$ [2]	-600	-	-750	mV
		$V_{CE} = -5\ \text{V}$; $I_C = -10\ \text{mA}$ [2]	-	-	-820	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = -10\ \text{mA}$; $I_B = -0.5\ \text{mA}$	-	-700	-	mV
		$I_C = -100\ \text{mA}$; $I_B = -5\ \text{mA}$ [1]	-	-850	-	mV
f_T	transition frequency	$V_{CE} = -5\ \text{V}$; $I_C = -10\ \text{mA}$; $f = 100\ \text{MHz}$	100	-	-	MHz
C_c	collector capacitance	$V_{CB} = -10\ \text{V}$; $I_E = I_C = 0\ \text{A}$; $f = 1\ \text{MHz}$	-	2	-	pF
C_e	emitter capacitance	$V_{EB} = -0.5\ \text{V}$; $I_C = I_E = 0\ \text{A}$; $f = 1\ \text{MHz}$	-	10	-	pF
NF	noise figure	$V_{CE} = -5\ \text{V}$; $I_C = -200\ \mu\text{A}$; $R_S = 2\ \text{k}\Omega$; $f = 1\ \text{kHz}$; $B = 200\ \text{Hz}$	-	-	10	dB

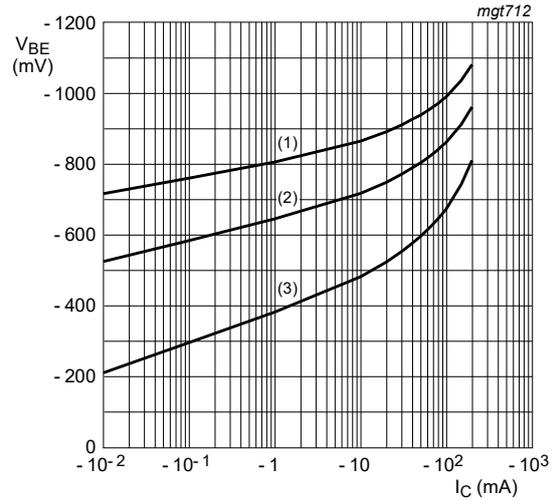
[1] pulsed; $t_p \leq 300\ \mu\text{s}$; $\delta \leq 0.02$

[2] V_{BE} decreases by about 2 mV/K with increasing temperature.



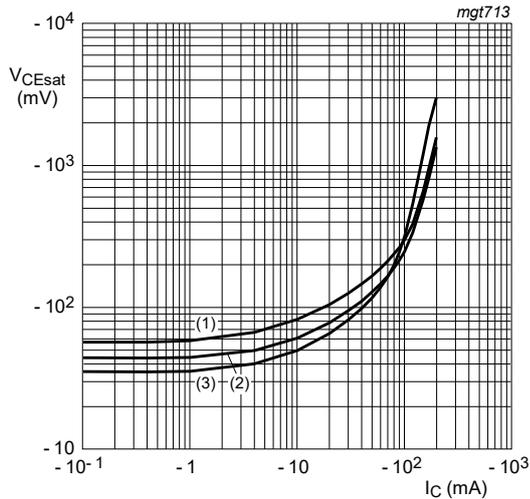
$V_{CE} = -5\text{ V}$
 (1) $T_{amb} = 150\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = -55\text{ °C}$

Fig. 4. BC857AQC: DC current gain as a function of collector current; typical values



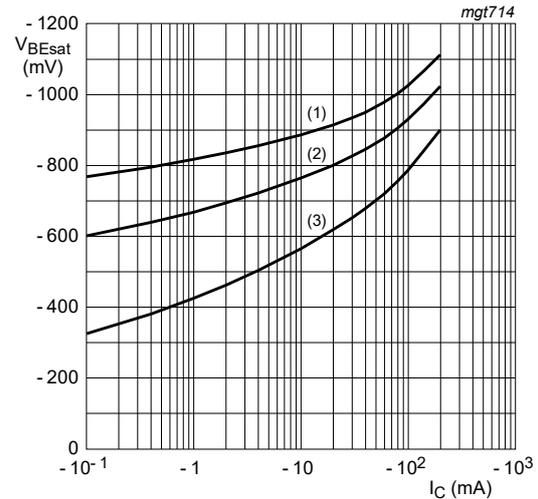
$V_{CE} = -5\text{ V}$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 150\text{ °C}$

Fig. 5. BC857AQC: Base-emitter voltage as a function of collector current; typical values



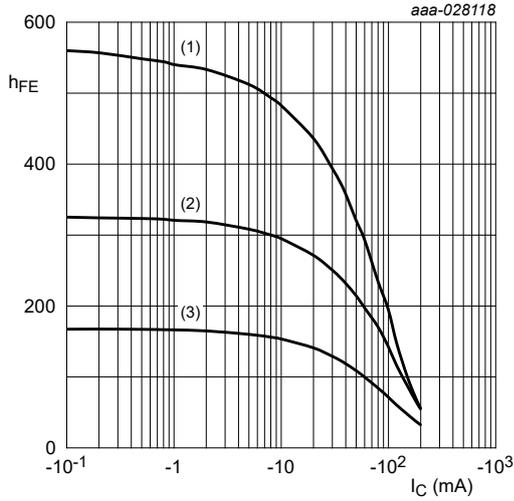
$I_C / I_B = 20$
 (1) $T_{amb} = 150\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = -55\text{ °C}$

Fig. 6. BC857AQC: Collector-emitter saturation voltage as a function of collector current; typical values



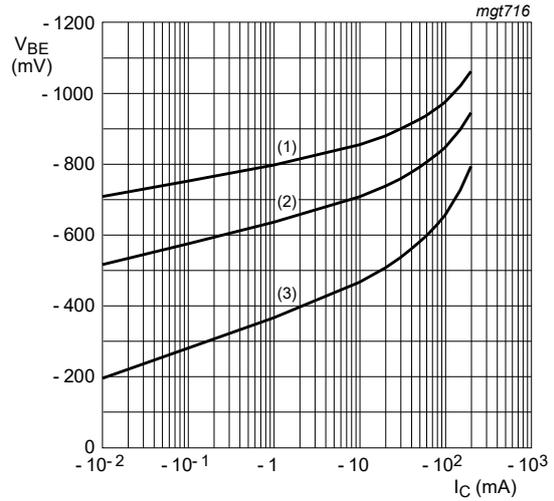
$I_C / I_B = 20$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 150\text{ °C}$

Fig. 7. BC857AQC: Base-emitter saturation voltage as a function of collector current; typical values



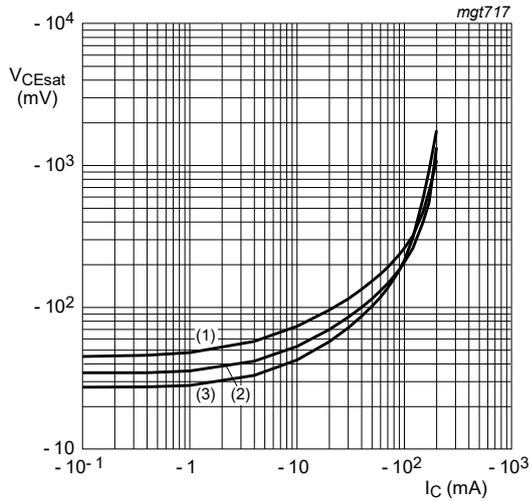
$V_{CE} = -5\text{ V}$
 (1) $T_{amb} = 150\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = -55\text{ °C}$

Fig. 8. BC857BQC: DC current gain as a function of collector current; typical values



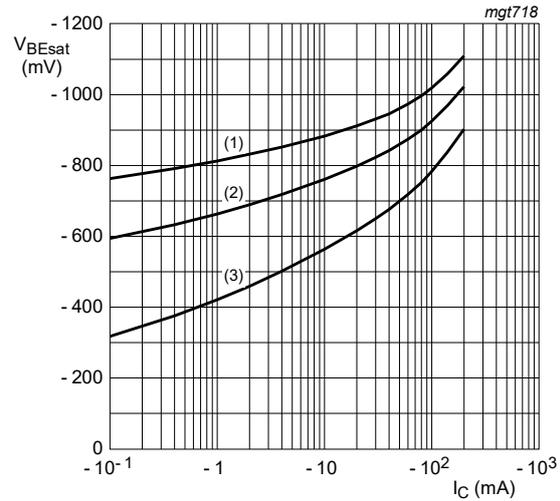
$V_{CE} = -5\text{ V}$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 150\text{ °C}$

Fig. 9. BC857BQC: Base-emitter voltage as a function of collector current; typical values



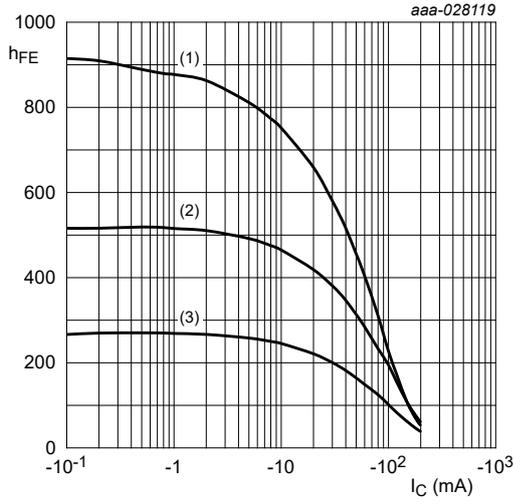
$I_C / I_B = 20$
 (1) $T_{amb} = 150\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = -55\text{ °C}$

Fig. 10. BC857BQC: Collector-emitter saturation voltage as a function of collector current; typical values



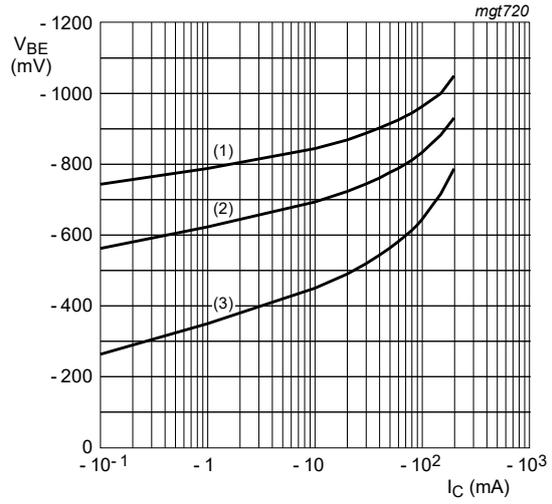
$I_C / I_B = 20$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 150\text{ °C}$

Fig. 11. BC857BQC: Base-emitter saturation voltage as a function of collector current; typical values



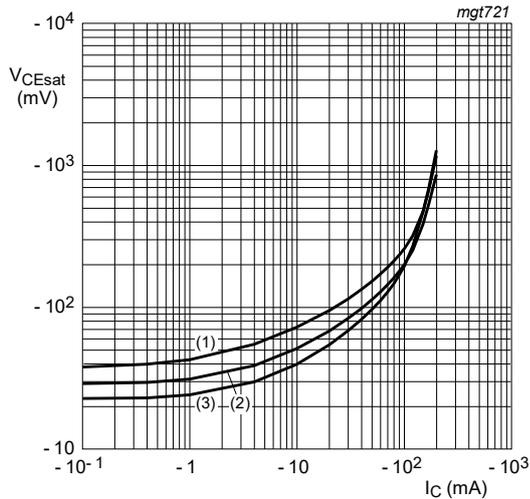
$V_{CE} = -5\text{ V}$
 (1) $T_{amb} = 150\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = -55\text{ °C}$

Fig. 12. BC857CQC: DC current gain as a function of collector current; typical values



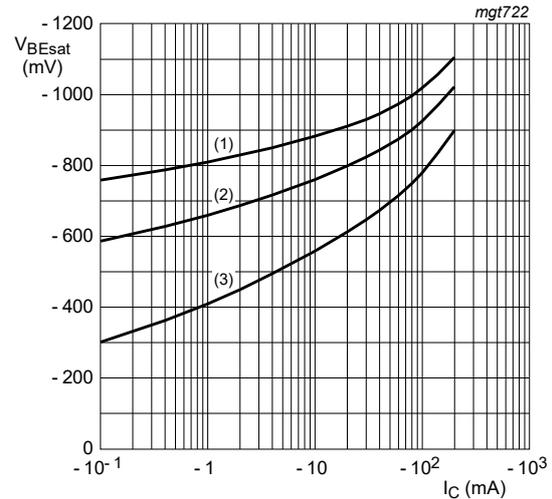
$V_{CE} = -5\text{ V}$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 150\text{ °C}$

Fig. 13. BC857CQC: Base-emitter voltage as a function of collector current; typical values



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

Fig. 14. BC857CQC: Collector-emitter saturation voltage as a function of collector current; typical values



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

Fig. 15. BC857CQC: Base-emitter saturation voltage as a function of collector current; typical values

11. Package outline

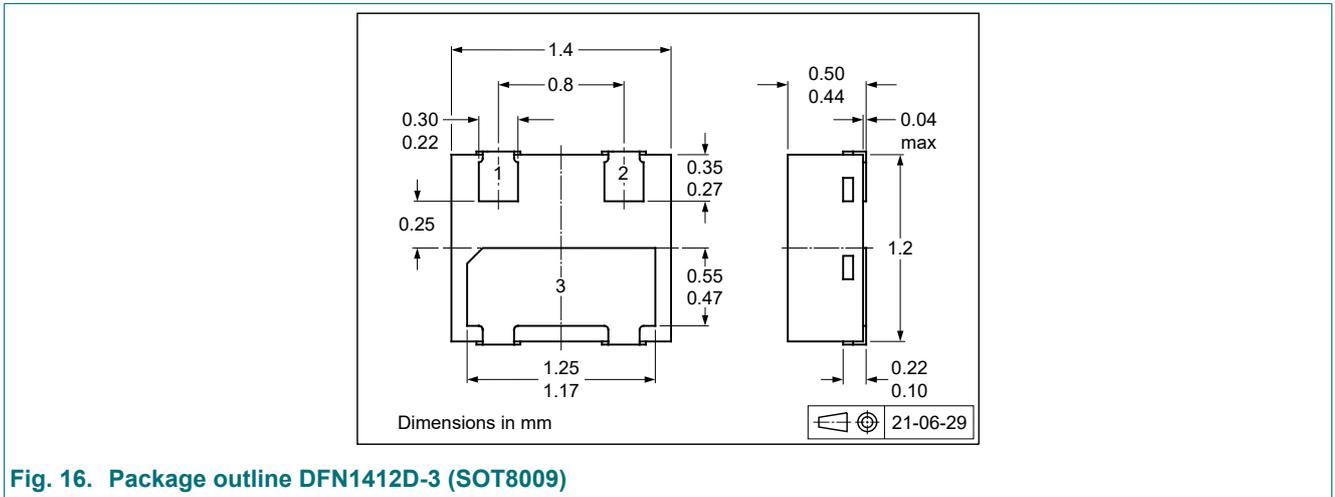


Fig. 16. Package outline DFN1412D-3 (SOT8009)

12. Soldering

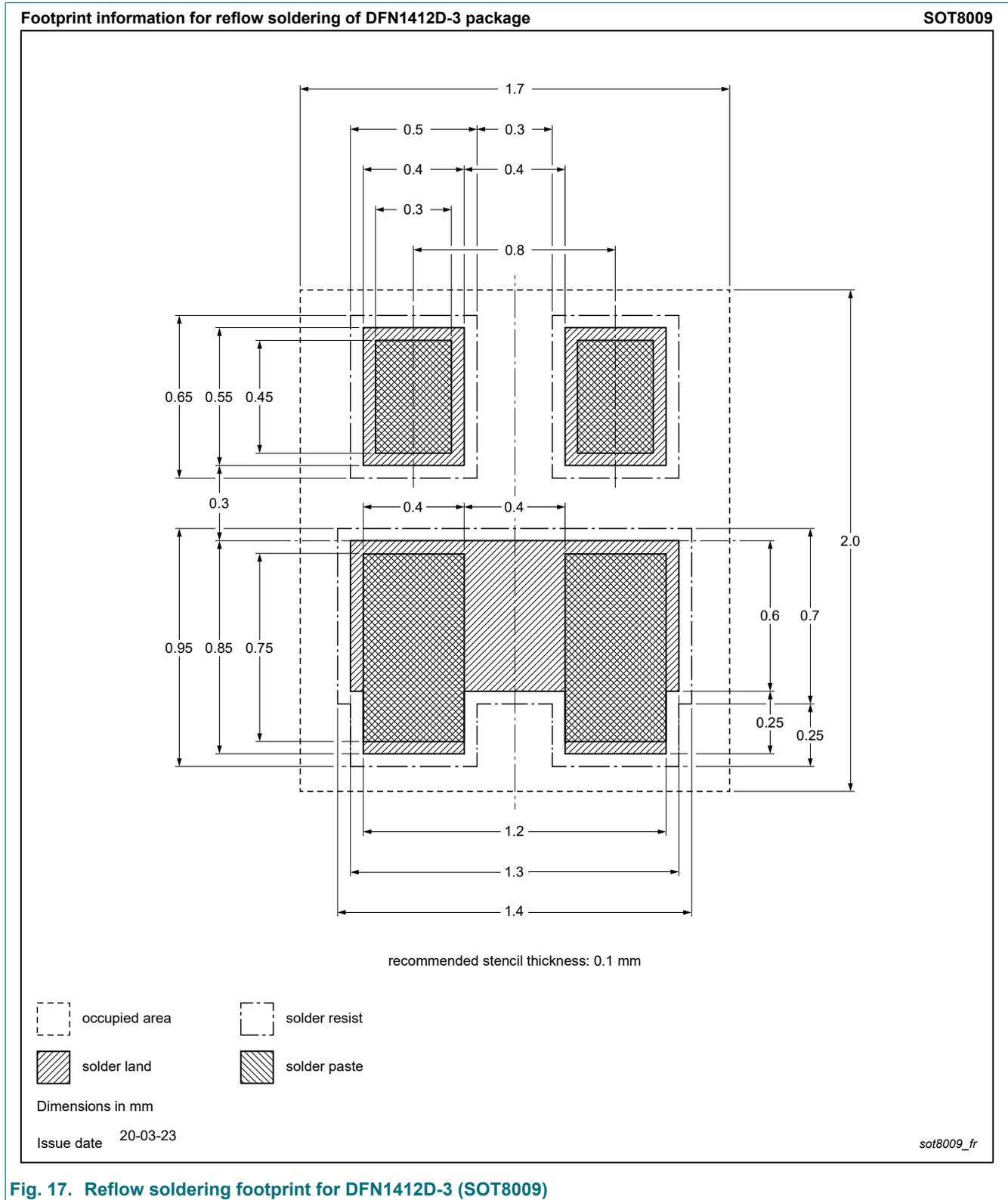


Fig. 17. Reflow soldering footprint for DFN1412D-3 (SOT8009)

13. Revision history

Table 9. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BC857XQC_SER v.1	20211027	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.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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Contents

1. General description.....	1
2. Features and benefits.....	1
3. Applications.....	1
4. Quick reference data.....	1
5. Pinning information.....	2
6. Ordering information.....	2
7. Marking.....	2
8. Limiting values.....	3
9. Thermal characteristics.....	4
10. Characteristics.....	5
11. Package outline.....	9
12. Soldering.....	10
13. Revision history.....	11
14. Legal information.....	12

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