



BC807QC-Q series

45 V, 500 mA PNP general-purpose transistors

Rev. 2 — 4 May 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
	Name	JEDEC	Version	
BC807-16QC-Q	DFN1412D-3	MO-340CA	SOT8009	BC817-16QC-Q
BC807-25QC-Q				BC817-25QC-Q
BC807-40QC-Q				BC817-40QC-Q

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
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- General-purpose switching and amplification
- Space restricted applications

4. Quick reference data

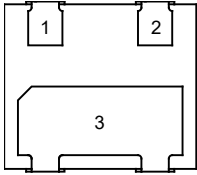
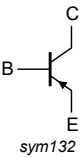
Table 2. Quick reference data

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

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

5. Pinning information

Table 3. Pinning

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 Bottom view DFN1412D-3 (SOT8009)	
2	E	emitter		
3	C	collector		

6. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
BC807-16QC-Q	DFN1412D-3	DFN1412D-3: plastic thermal enhanced ultra thin small outline package; no leads; 3 terminals; body: 1.4 x 1.2 x 0.5 mm	SOT8009 (MO-340CA)
BC807-25QC-Q			
BC807-40QC-Q			

7. Marking

Table 5. Marking

Type number	Marking code
BC807-16QC-Q	9J
BC807-25QC-Q	9K
BC807-40QC-Q	9L

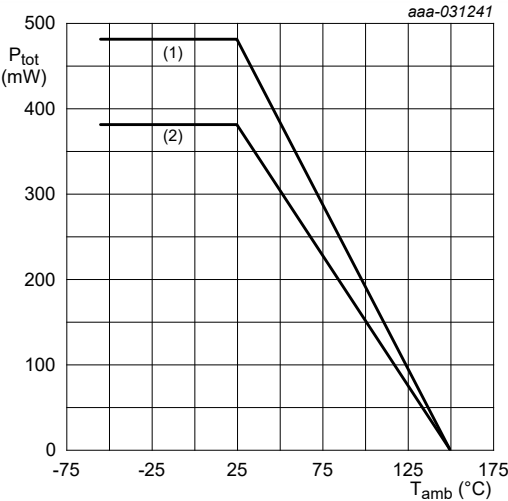
8. Limiting values

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]	380	mW
			[2]	480	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 SOT8009

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; $T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	-	-	329	K/W
			[2]	-	-	261	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.

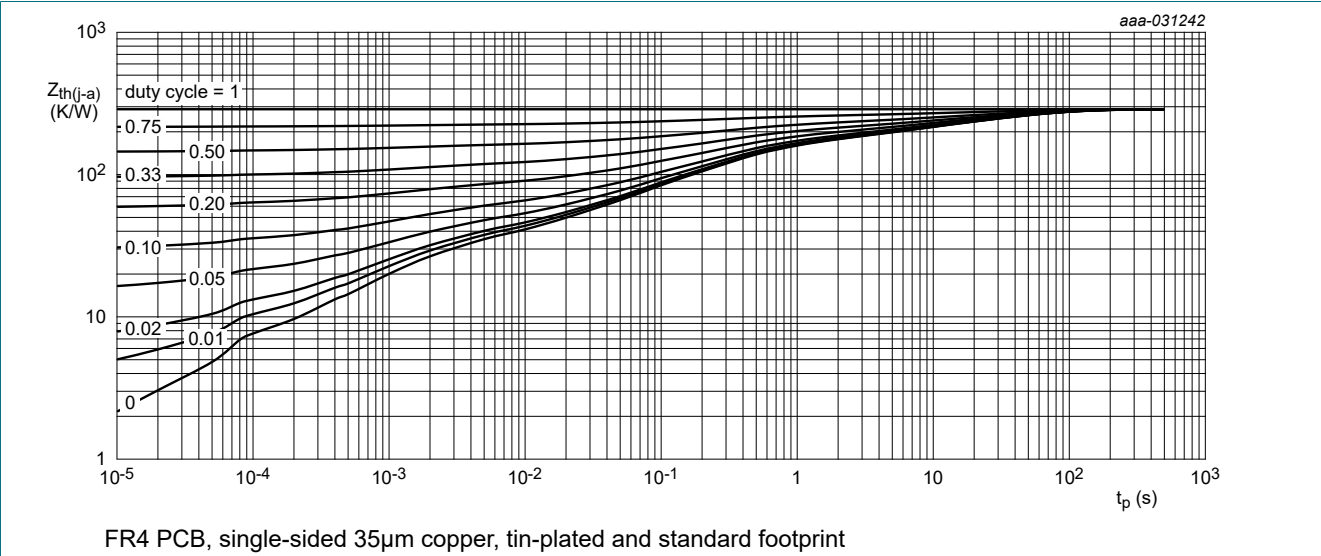


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

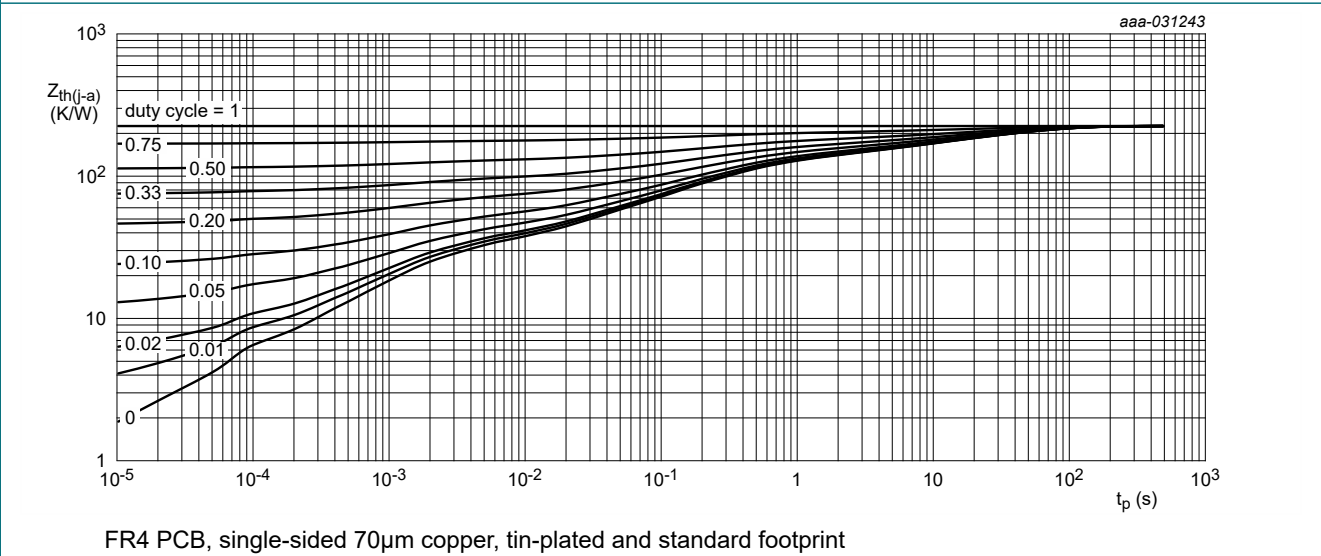


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 8. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = -100\ \mu\text{A}$; $I_E = 0\ \text{A}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		-50	-		V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = -10\ \text{mA}$; $I_E = 0\ \text{A}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		-45	-		V
$V_{(BR)EBO}$	emitter-base breakdown voltage	$I_E = -100\ \mu\text{A}$; $I_C = 0\ \text{A}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		-5	-		V
I_{CBO}	collector-base cut-off current	$V_{CB} = -20\ \text{V}$; $I_E = 0\ \text{A}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		-	-	-100	nA
		$V_{CB} = -20\ \text{V}$; $I_E = 0\ \text{A}$; $T_j = 150\ ^\circ\text{C}$		-	-	-5	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = -5\ \text{V}$; $I_C = 0\ \text{A}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		-	-	-100	nA
h_{FE}	DC current gain						
	BC807-16QC-Q	$V_{CE} = -1\ \text{V}$; $I_C = -100\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	[1]	100	-	250	
	BC807-25QC-Q		[1]	160	-	400	
	BC807-40QC-Q		[1]	250	-	600	
		$V_{CE} = -1\ \text{V}$; $I_C = -500\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	[1]	40	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = -500\ \text{mA}$; $I_B = -50\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	[1]	-	-	-700	mV
V_{BE}	base-emitter voltage	$V_{CE} = -1\ \text{V}$; $I_C = -500\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	[1] [2]	-	-	-1.2	V
f_T	transition frequency	$V_{CE} = -5\ \text{V}$; $I_C = -10\ \text{mA}$; $f = 100\ \text{MHz}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		80	-	-	MHz
C_c	collector capacitance	$V_{CB} = -10\ \text{V}$; $I_E = I_C = 0\ \text{A}$; $f = 1\ \text{MHz}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		-	5	-	pF

[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.

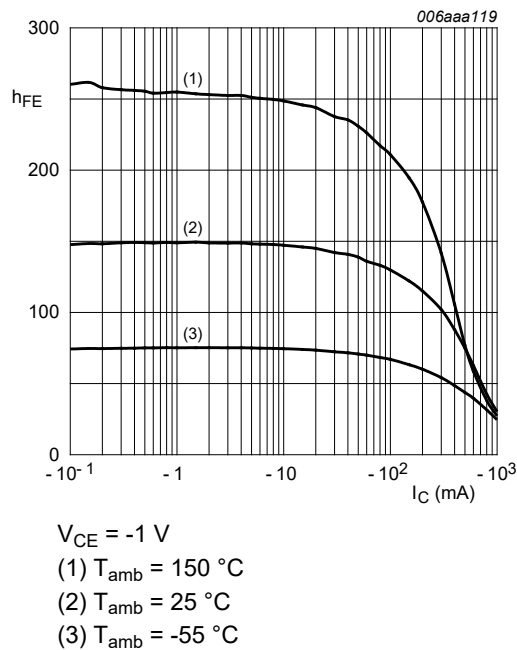


Fig. 4. BC807-16QC-Q: DC current gain as a function of collector current; typical values

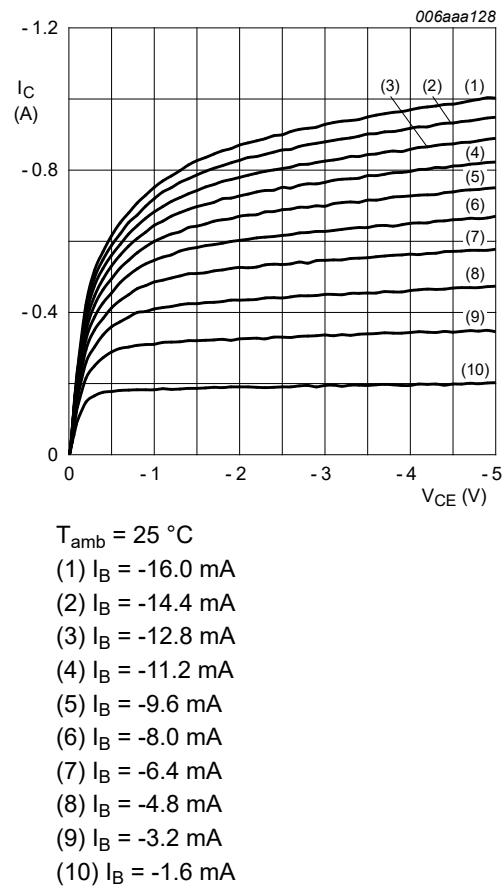


Fig. 5. BC807-16QC-Q: Collector current as a function of collector-emitter voltage; typical values

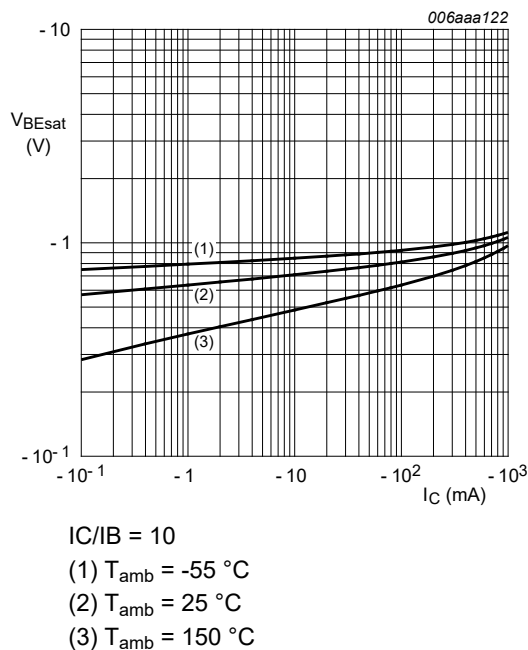


Fig. 6. BC807-16QC-Q: Base-emitter saturation voltage as a function of collector current; typical values

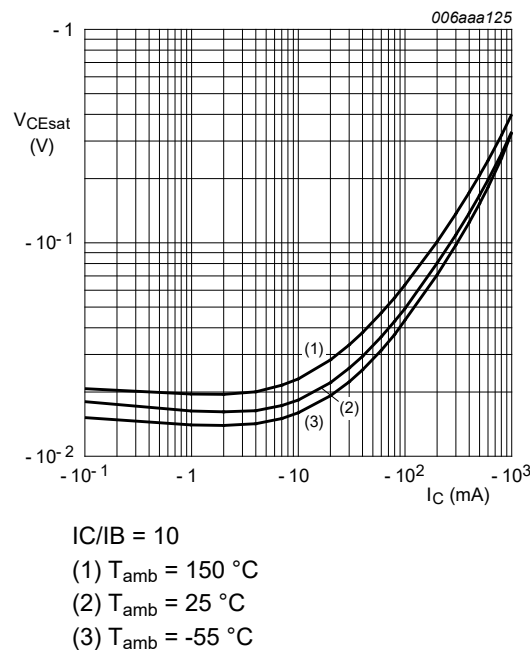


Fig. 7. BC807-16QC-Q: Collector-emitter saturation voltage as a function of collector current; typical values

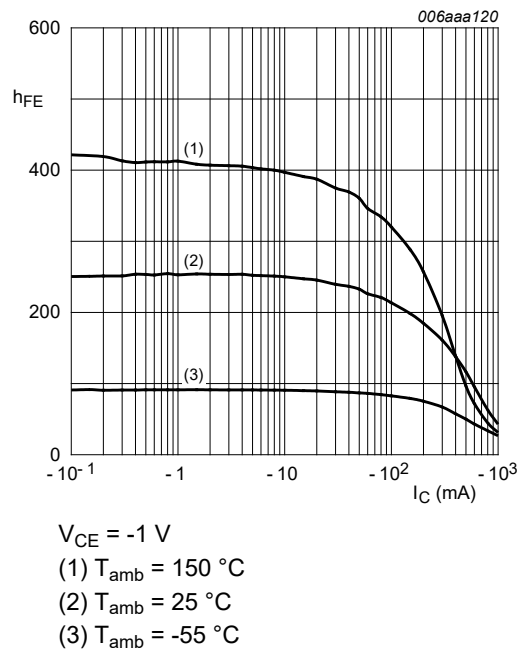


Fig. 8. BC807-25QC-Q: DC current gain as a function of collector current; typical values

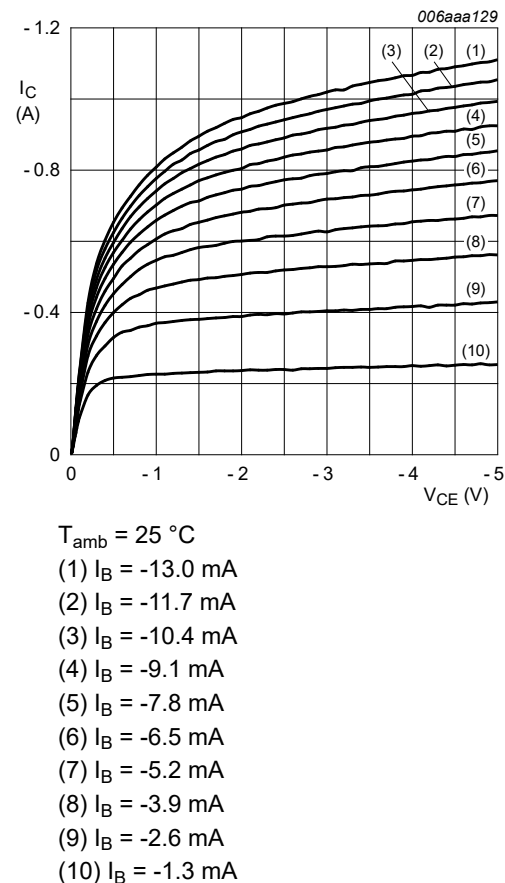


Fig. 9. BC807-25QC-Q: Collector current as a function of collector-emitter voltage; typical values

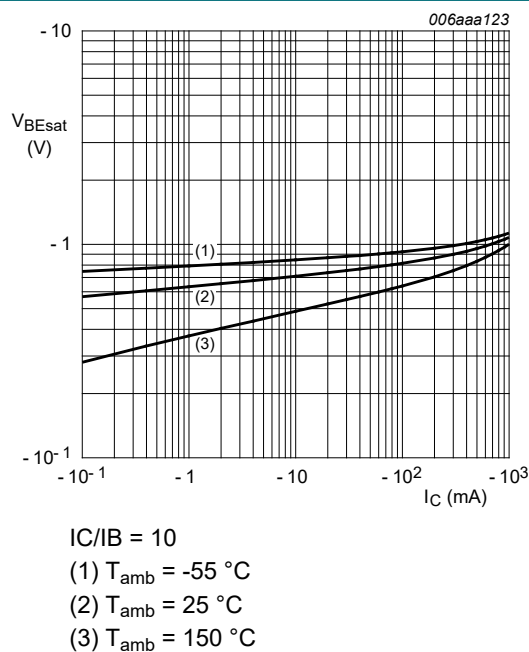


Fig. 10. BC807-25QC-Q: Base-emitter saturation voltage as a function of collector current; typical values

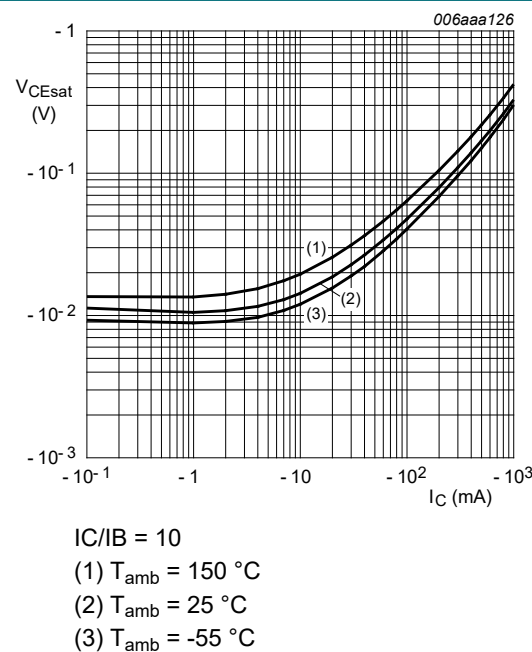


Fig. 11. BC807-25QC-Q: Collector-emitter saturation voltage as a function of collector current; typical values

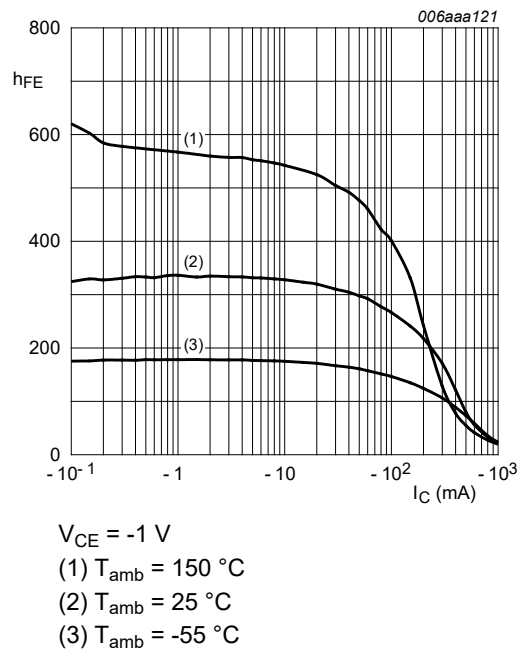


Fig. 12. BC807-40QC-Q: DC current gain as a function of collector current; typical values

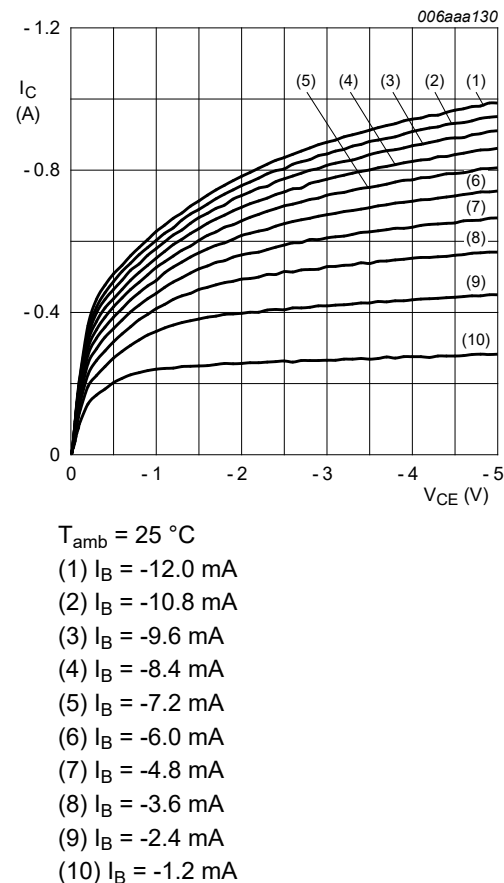


Fig. 13. BC807-40QC-Q: Collector current as a function of collector-emitter voltage; typical values

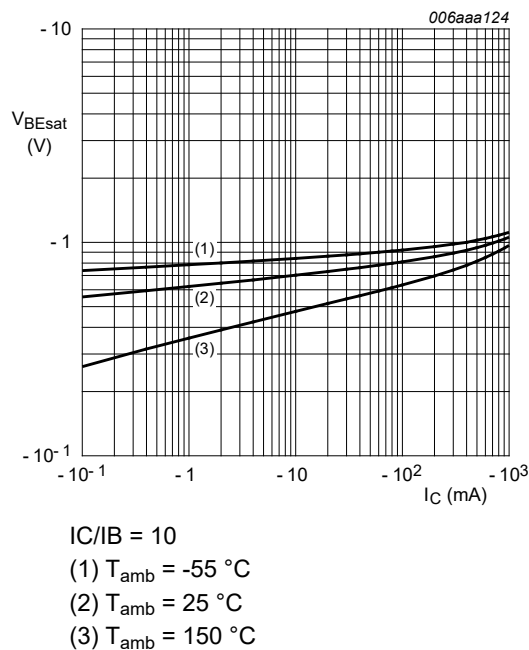


Fig. 14. BC807-40QC-Q: Base-emitter saturation voltage as a function of collector current; typical values

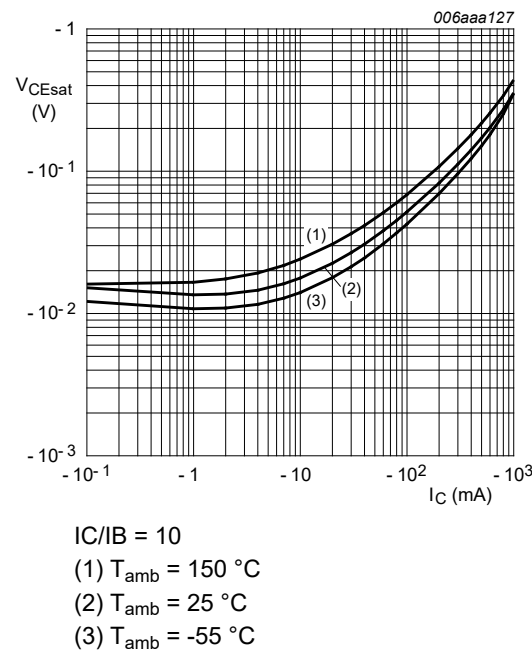


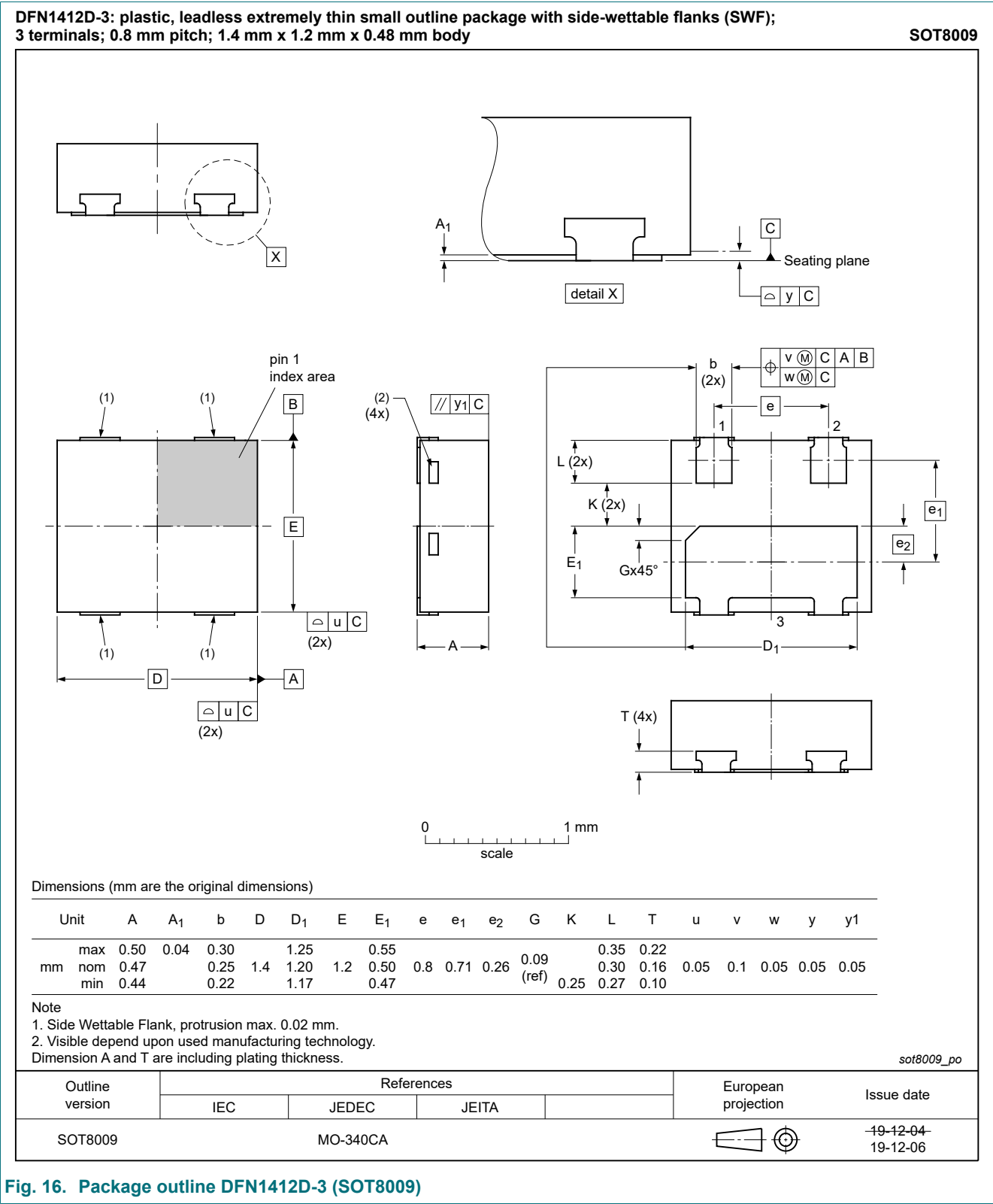
Fig. 15. BC807-40QC-Q: Collector-emitter saturation voltage as a function of collector current; typical values

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

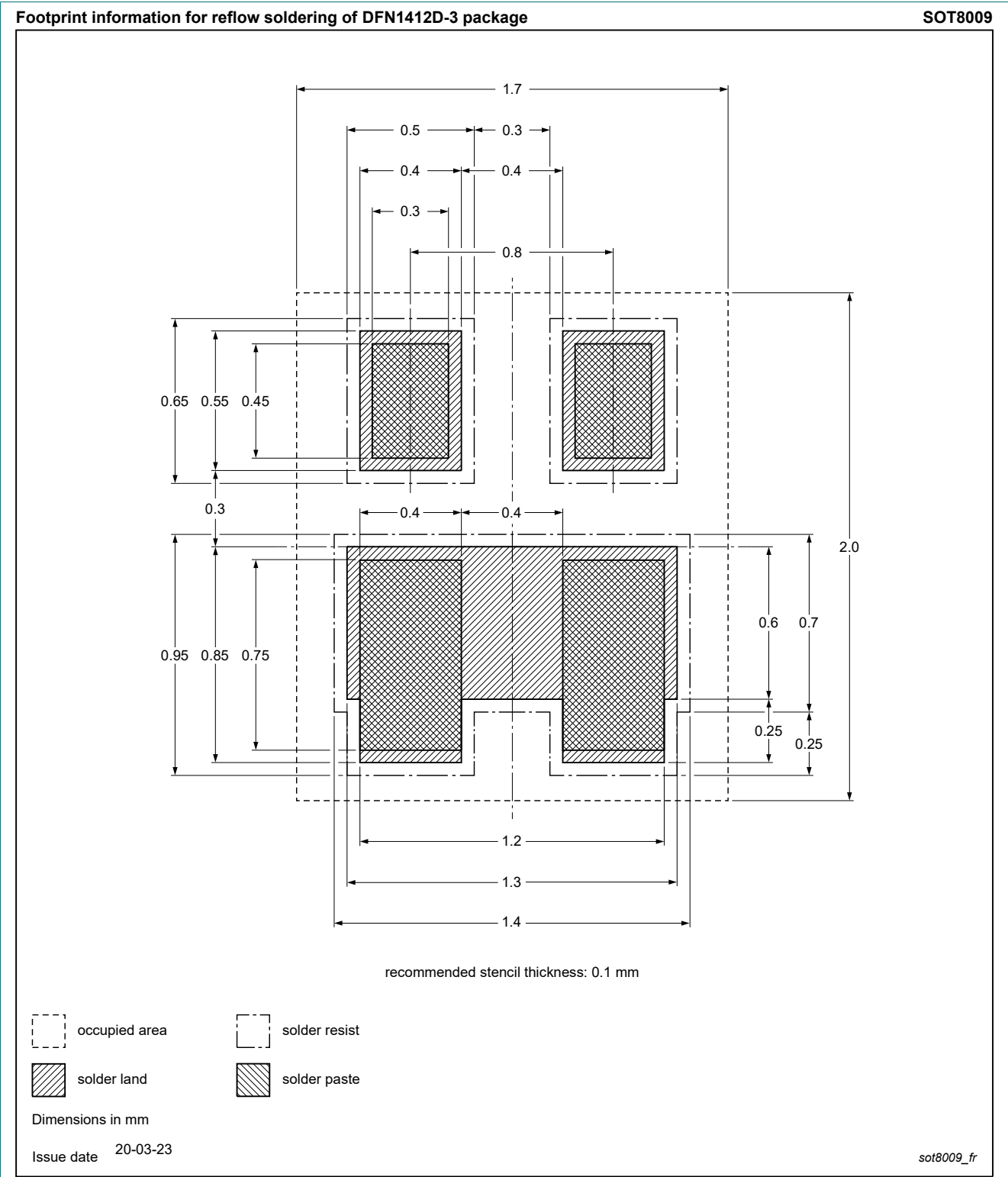


Fig. 17. Reflow soldering footprint for DFN1412D-3 (SOT8009)

14. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BC807QC-Q_SER v.2	20210504	Product data sheet	-	BC807QC-Q_SER v.1
Modifications:	• Features and benefits: added recommendation for automotive applications			
BC807QC-Q_SER v.1	20210216	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.

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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. Test information.....	9
11.1. Quality information.....	9
12. Package outline.....	10
13. Soldering.....	11
14. Revision history.....	12
15. Legal information.....	13

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