



THE DATASHEET OF BC807-40QCZ



BC807QC 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 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	DFN1412D-3	MO-340CA	SOT8009	BC817-16QC
BC807-25QC				BC817-25QC
BC807-40QC				BC817-40QC

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

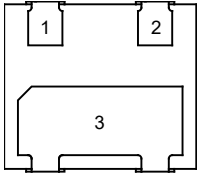
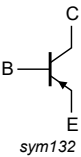
Table 2. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base; $T_{amb} = 25\text{ °C}$		-	-	-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	$V_{CE} = -1\text{ V}$; $I_C = -100\text{ mA}$ $T_{amb} = 25\text{ °C}$	[1]	100	-	250	
	BC807-25QC		[1]	160	-	400	
	BC807-40QC		[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	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			
BC807-40QC			

7. Marking

Table 5. Marking

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

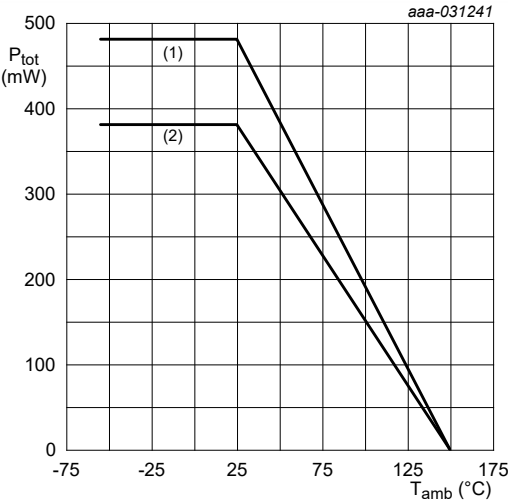
8. Limiting values

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; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-50	V
V_{CEO}	collector-emitter voltage	open base; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-45	V
V_{EBO}	emitter-base voltage	open collector; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-5	V
I_C	collector current	$T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-500	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1\text{ ms}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-1	A
I_{BM}	peak base current	single pulse; $t_p \leq 1\text{ ms}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ }^{\circ}\text{C}$ [1]	-	380	mW
		[2]	-	480	mW
T_j	junction temperature		-	150	$^{\circ}\text{C}$
T_{amb}	ambient temperature		-55	150	$^{\circ}\text{C}$
T_{stg}	storage temperature		-65	150	$^{\circ}\text{C}$

- [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; $T_{amb} = 25\text{ °C}$	[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.

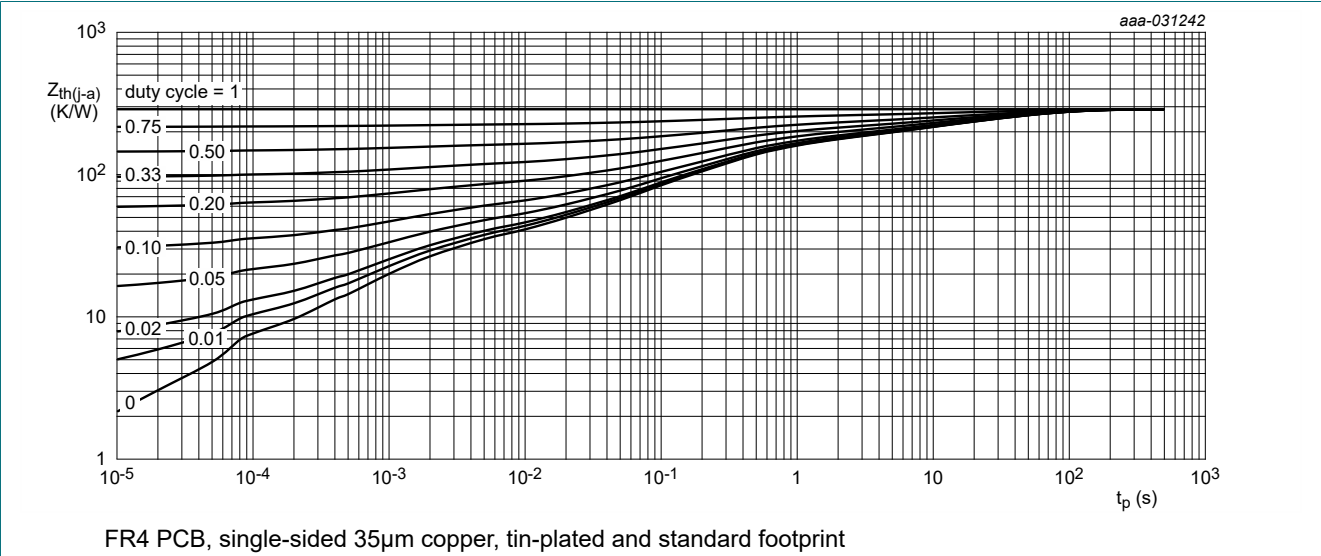


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

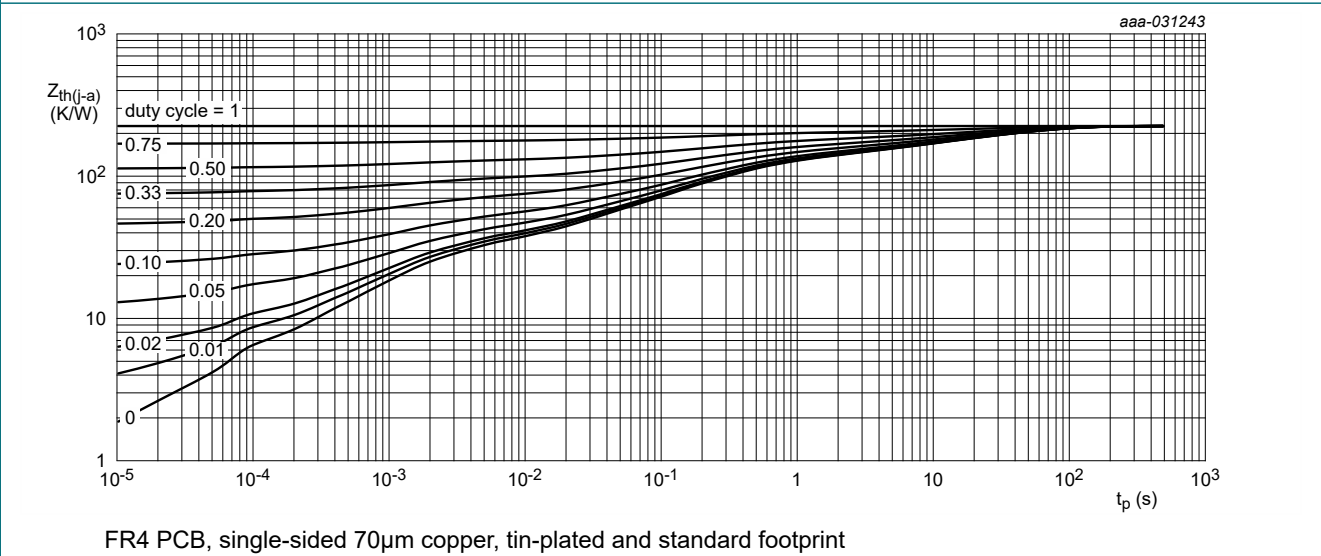


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 8. Characteristics

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

[1] pulsed; $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$
[2] V_{BE} decreases by about 2 mV/K with increasing temperature.

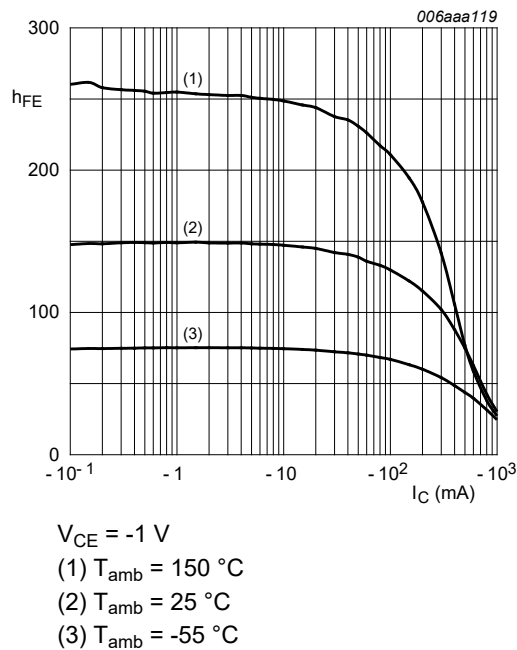


Fig. 4. BC807-16QC: DC current gain as a function of collector current; typical values

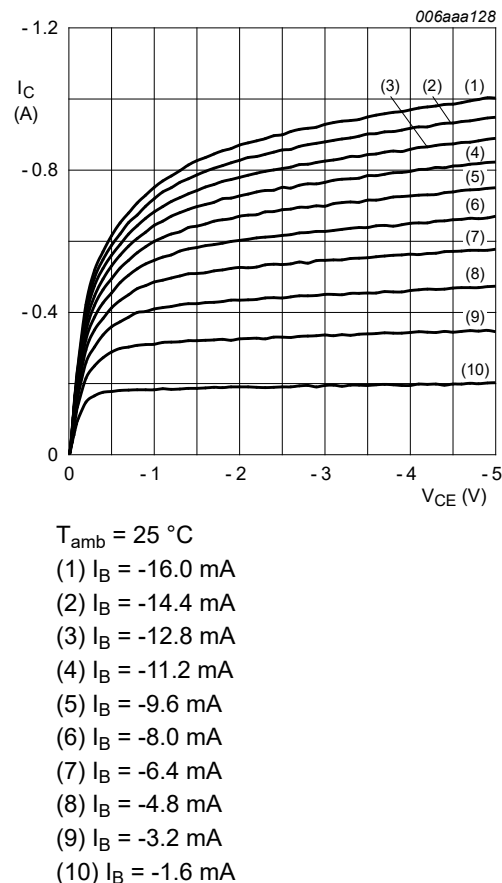


Fig. 5. BC807-16QC: Collector current as a function of collector-emitter voltage; typical values

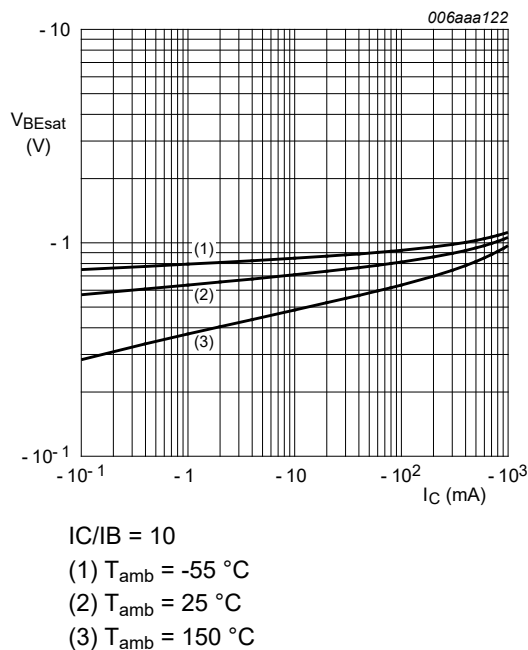


Fig. 6. BC807-16QC: Base-emitter saturation voltage as a function of collector current; typical values

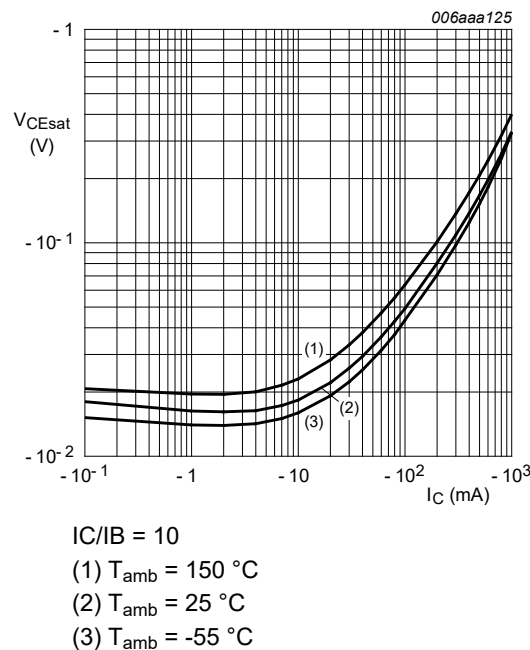


Fig. 7. BC807-16QC: Collector-emitter saturation voltage as a function of collector current; typical values

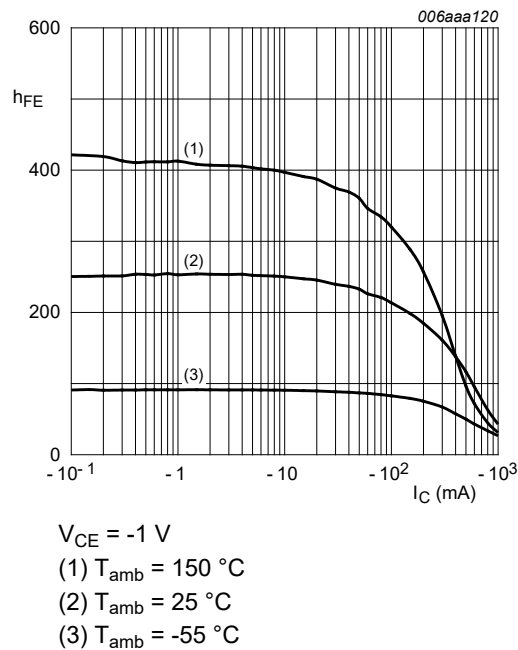


Fig. 8. BC807-25QC: DC current gain as a function of collector current; typical values

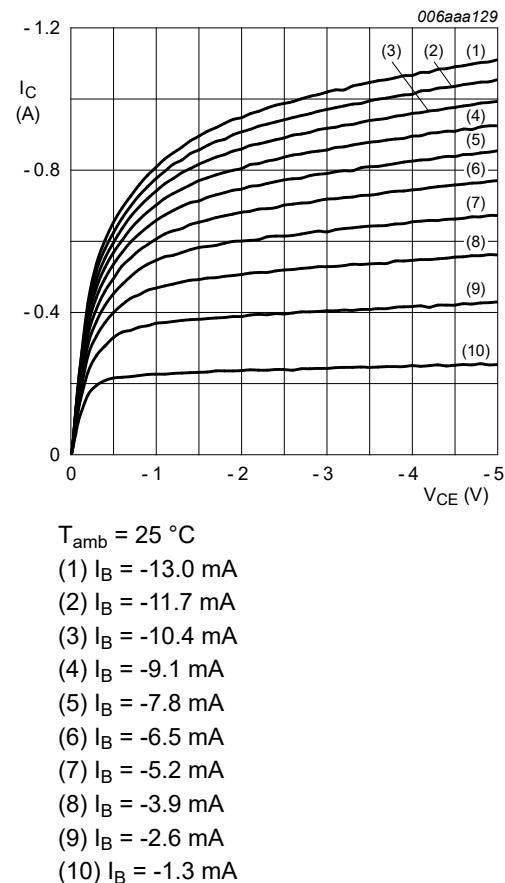


Fig. 9. BC807-25QC: Collector current as a function of collector-emitter voltage; typical values

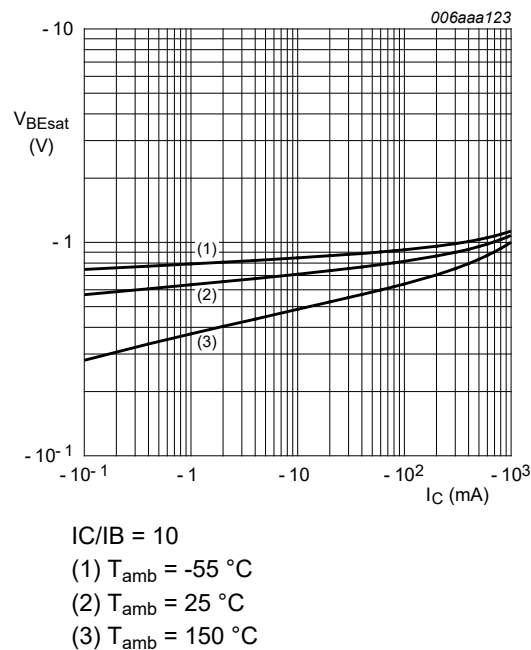


Fig. 10. BC807-25QC: Base-emitter saturation voltage as a function of collector current; typical values

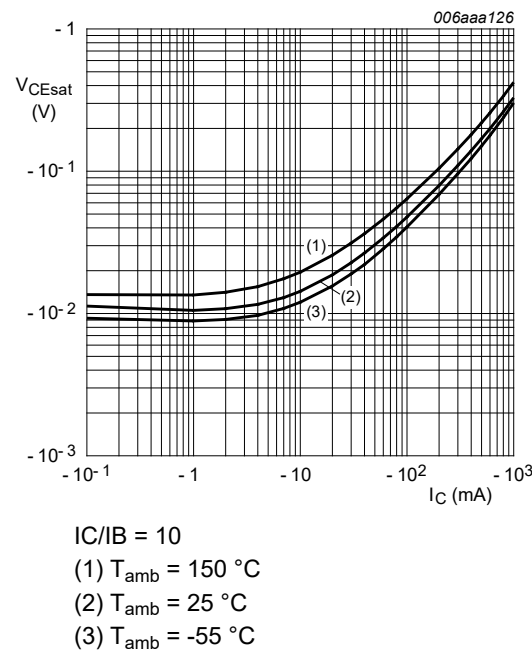


Fig. 11. BC807-25QC: Collector-emitter saturation voltage as a function of collector current; typical values

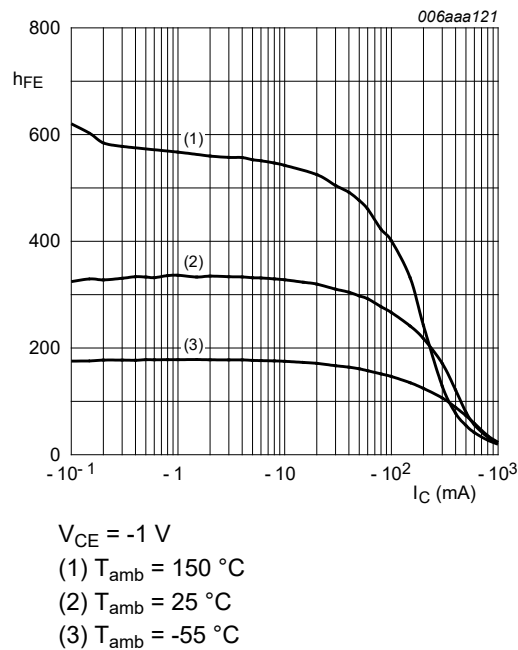


Fig. 12. BC807-40QC: DC current gain as a function of collector current; typical values

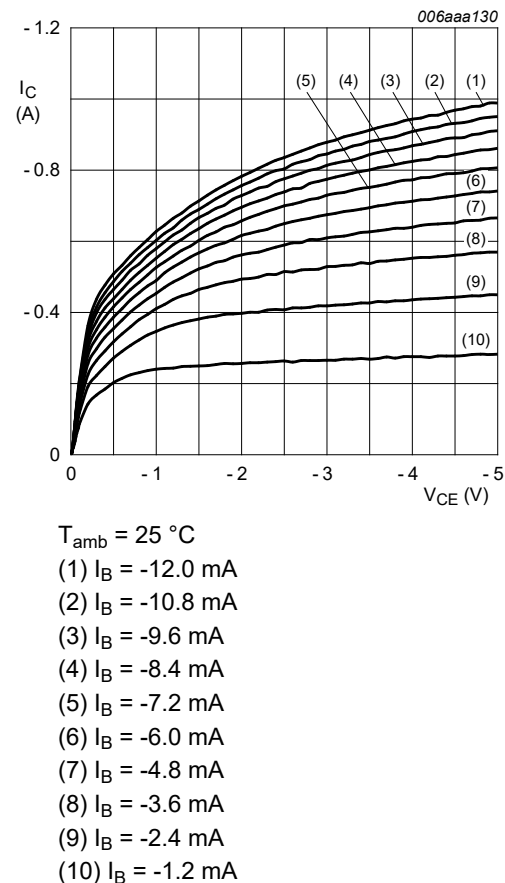


Fig. 13. BC807-40QC: Collector current as a function of collector-emitter voltage; typical values

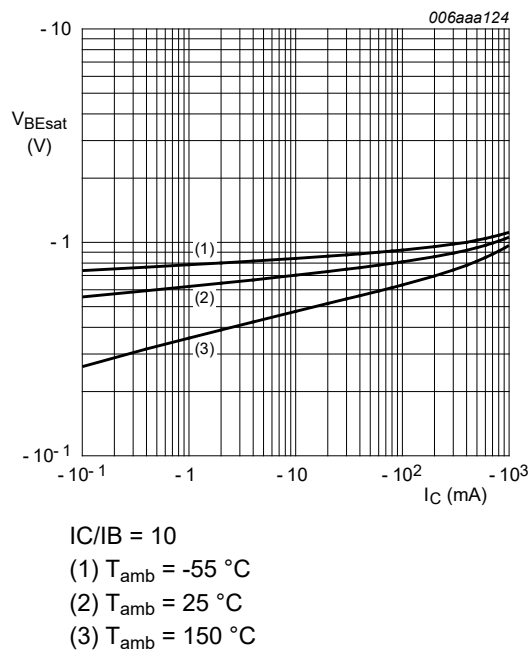


Fig. 14. BC807-40QC: Base-emitter saturation voltage as a function of collector current; typical values

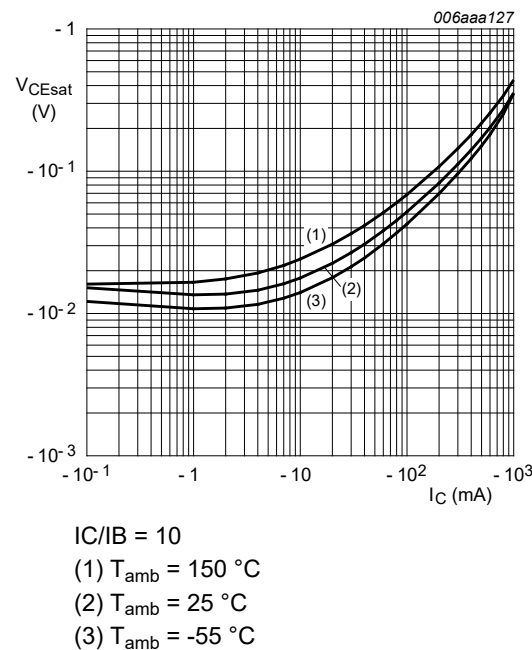
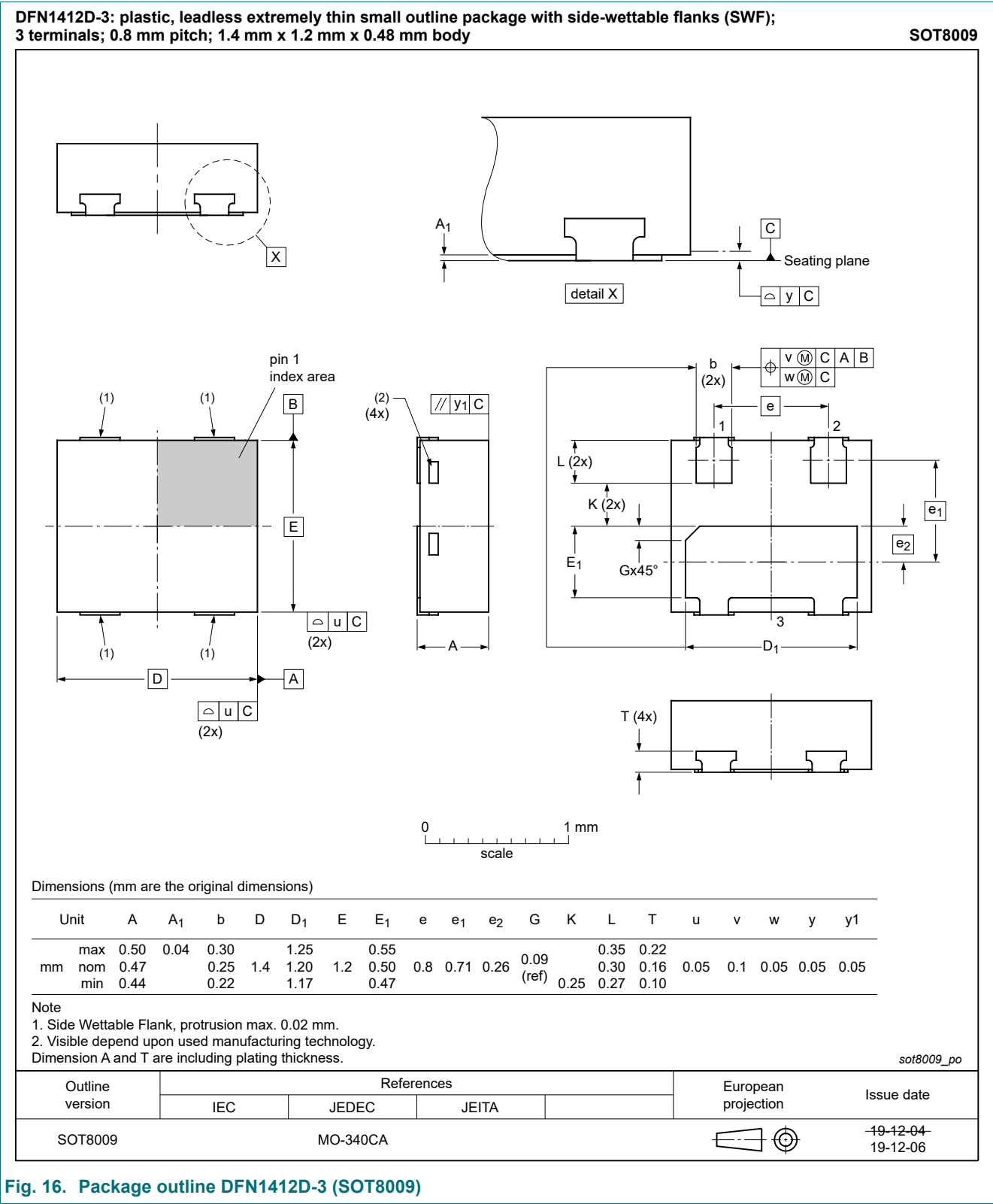


Fig. 15. BC807-40QC: Collector-emitter saturation voltage as a function of collector current; typical values

11. Package outline



12. Soldering

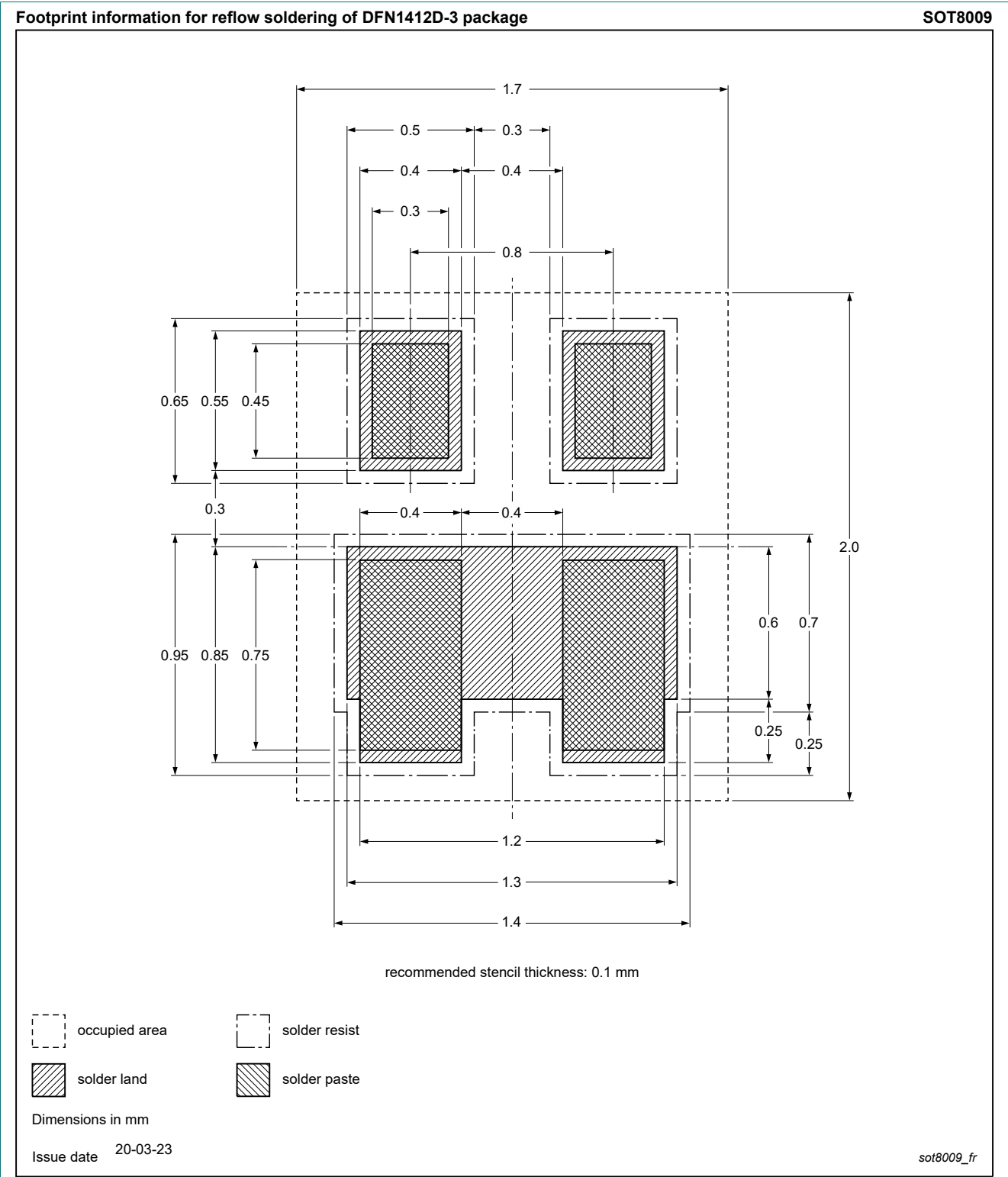


Fig. 17. Reflow soldering footprint for DFN1412D-3 (SOT8009)

13. Revision history

Table 9. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BC807QC_SER v.2	20230701	Product data sheet	-	BC807QC_SER v.1
Modifications:	Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).			
BC807QC_SER v.1	20210104	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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