BC807-25QA; BC807-40QA

45 V, 500 mA PNP general-purpose transistors

Rev. 1 — 30 August 2013 Product data sheet

1. Product profile

1.1 General description

500 mA PNP general-purpose transistors in a leadless ultra small DFN1010D-3 (SOT1215) Surface-Mounted Device (SMD) plastic package with visible and solderable side pads.

Table 1. Product overview

Type number	Package		NPN complement
	NXP	JEITA	
BC807-25QA	DFN1010D-3 (SOT1215)	-	BC817-25QA
BC807-40QA			BC817-40QA

1.2 Features and benefits

- General-purpose transistor
- Two current gain selections
- Low package height of 0.37 mm
- AEC-Q101 qualified

1.3 Applications

- General-purpose switching and amplification
- Mobile applications

1.4 Quick reference data

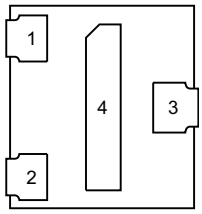
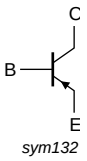
Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base	-	-	–45	V
I_C	collector current		-	-	–500	mA
h_{FE}	DC current gain	V_{CE} = –1 V; I_C = –100 mA [1]				
	BC807-25QA		160	-	400	
	BC807-40QA		250	-	600	

[1] Pulse test: $t_p \leq 300\ \mu s$; $\delta \leq 0.02$.

2. Pinning information

Table 3. Pinning

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

Transparent top view

sym132

3. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
BC807-25QA	DFN1010D-3	plastic thermal enhanced ultra thin small outline package; no leads; 3 terminals; body: 1.1 × 1.0 × 0.37 mm	SOT1215
BC807-40QA			

4. Marking

Table 5. Marking codes

Type number	Marking code
BC807-25QA	01 01 00
BC807-40QA	00 11 00

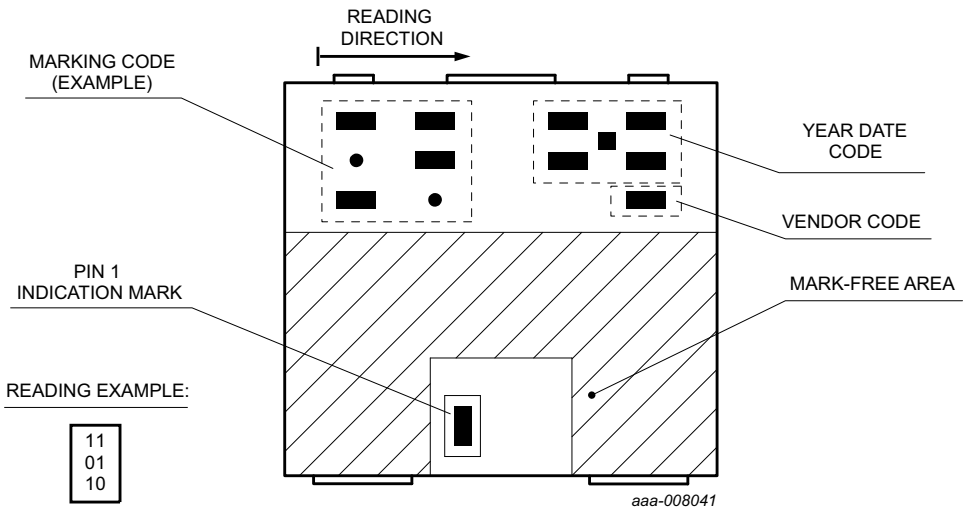


Fig 1. DFN1010D-3 (SOT1215) binary marking code description

5. Limiting values

Table 6. Limiting values

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

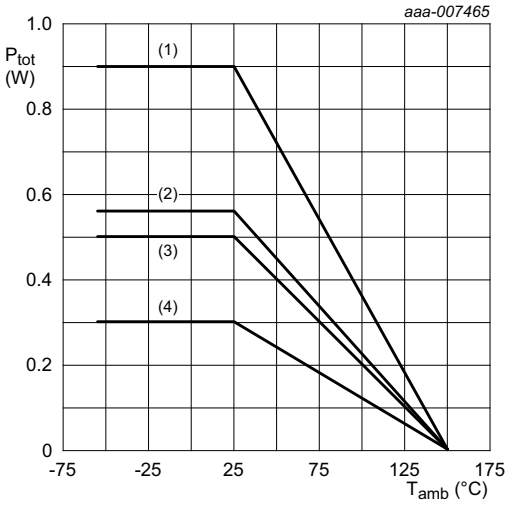
Symbol	Parameter	Conditions		Min	Max	Unit
V_{CBO}	collector-base voltage	open emitter		-	–50	V
V_{CEO}	collector-emitter voltage	open base		-	–45	V
V_{EBO}	emitter-base voltage	open collector		-	–5	V
I_C	collector current			-	–500	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms		-	–1	A
I_{BM}	peak base current	single pulse; $t_p \leq 1$ ms		-	–200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C				
			[1]	-	300	mW
			[2]	-	500	mW
			[3]	-	560	mW
			[4]		900	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 copper, tin-plated and standard footprint.

[2] Device mounted on an FR4 PCB, 4-layer copper, tin-plated and standard footprint.

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated mounting pad for collector 1 cm^2.

[4] Device mounted on an FR4 PCB, 4-layer copper, tin-plated mounting pad for collector 1 cm^2.



(1) FR4 PCB, 4-layer copper, 1 cm^2

(2) FR4 PCB, single-sided copper, 1 cm^2

(3) FR4 PCB, 4-layer copper, standard footprint

(4) FR4 PCB, single-sided copper, standard footprint

Fig 2. Power derating curves

6. Thermal characteristics

Table 7. Thermal characteristics

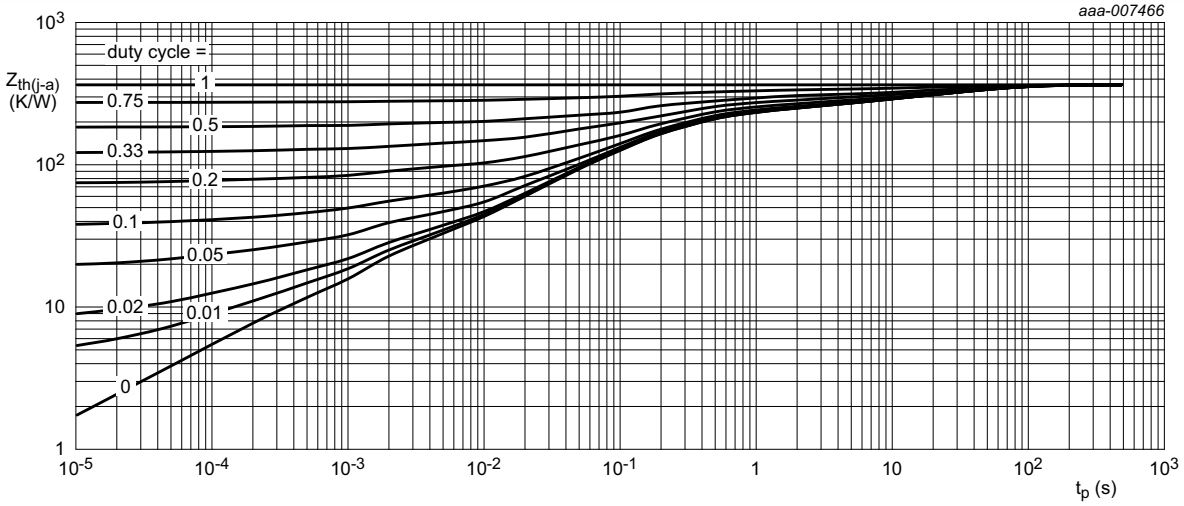
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air					
			[1]	-	-	417	K/W
			[2]	-	-	250	K/W
			[3]	-	-	223	K/W
			[4]	-	-	139	K/W

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

[2] Device mounted on an FR4 PCB, 4-layer copper, tin-plated and standard footprint.

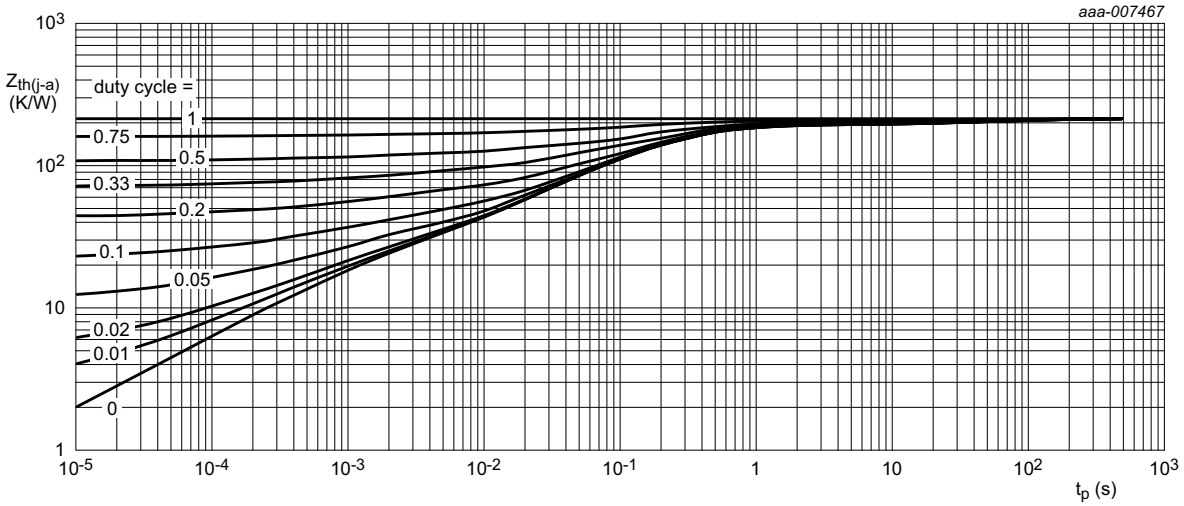
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated mounting pad for collector 1 cm^2.

[4] Device mounted on an FR4 PCB, 4-layer copper, tin-plated mounting pad for collector 1 cm^2.



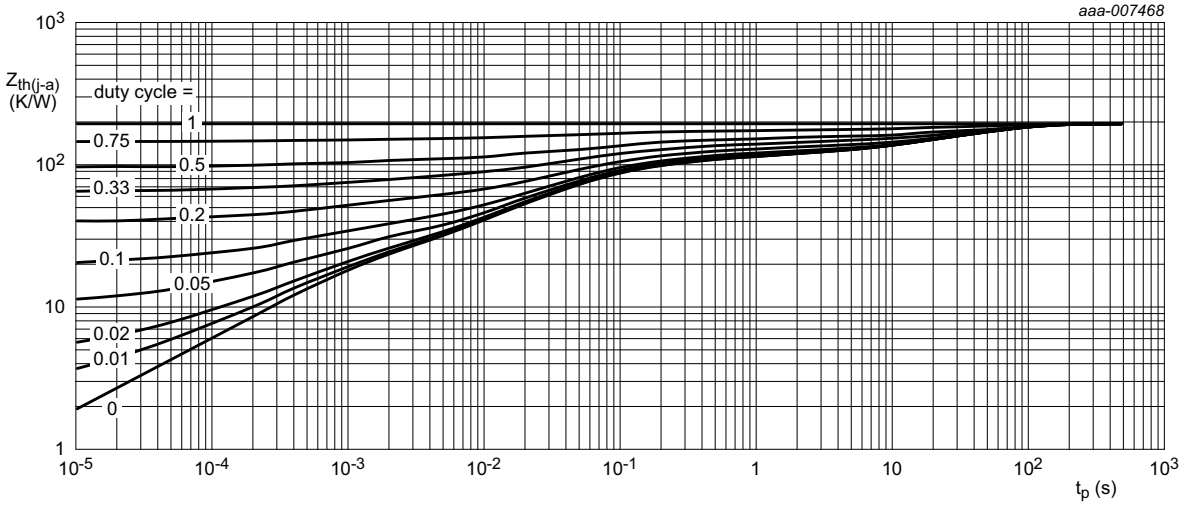
FR4 PCB, single-sided copper, standard footprint

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



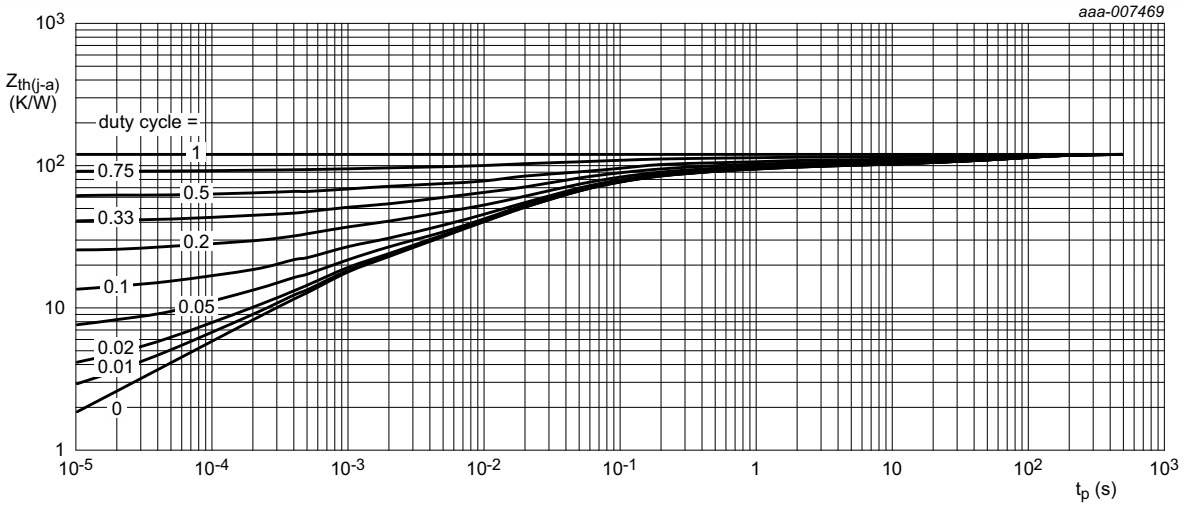
FR4 PCB, 4-layer copper, standard footprint

Fig 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



FR4 PCB, single-sided copper, 1 cm^2

Fig 5. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



FR4 PCB, 4-layer copper, 1 cm^2

Fig 6. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

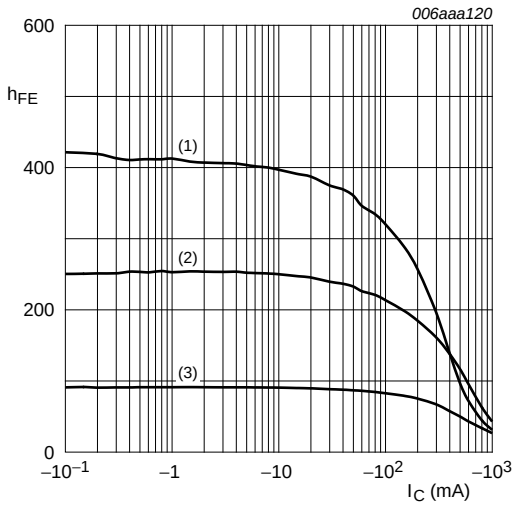
7. Characteristics

Table 8. Characteristics

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	V_{CB} = –20 V; I_E = 0 A		-	-	–100	nA
		V_{CB} = –20 V; I_E = 0 A; T_j = 150 °C		-	-	–5	µA
I_{EBO}	emitter-base cut-off current	V_{EB} = –5 V; I_C = 0 A		-	-	–100	nA
h_{FE}	DC current gain	V_{CE} = –1 V; I_C = –100 mA	[1]				
	BC807-25QA			160	-	400	
	BC807-40QA			250	-	600	
h_{FE}	DC current gain	V_{CE} = –1 V; I_C = –500 mA	[1]	40	-	-	
V_{CEsat}	collector-emitter saturation voltage	I_C = –500 mA; I_B = –50 mA	[1]	-	-	–700	mV
V_{BE}	base-emitter voltage	I_C = –500 mA; V_{CE} = –1 V	[1]	-	-	–1.2	V
C_c	collector capacitance	V_{CB} = –10 V; I_E = i_e = 0 A; f = 1 MHz		-	6	-	pF
f_T	transition frequency	V_{CE} = –5 V; I_C = –10 mA; f = 100 MHz		80	-	-	MHz

[1] Pulse test: $t_p \leq 300$ µs; $\delta \leq 0.02$.



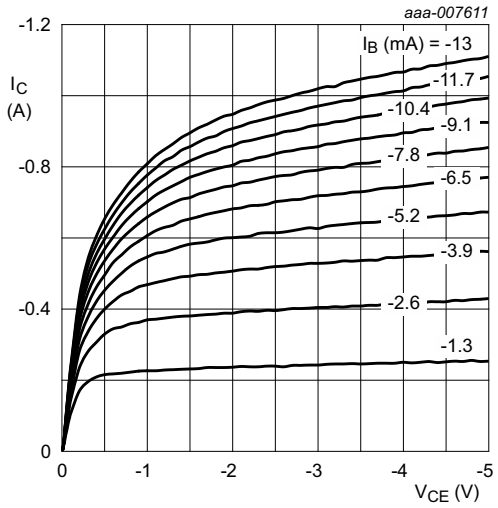
V_{CE} = –1 V

(1) T_{amb} = 100 °C

(2) T_{amb} = 25 °C

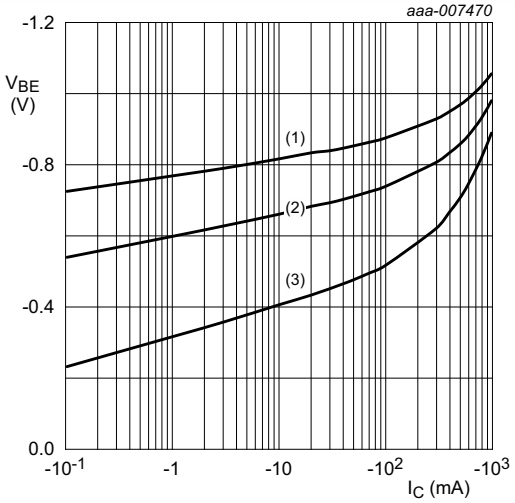
(3) T_{amb} = –55 °C

Fig 7. BC807-25QA: DC current gain as a function of collector current; typical values



T_{amb} = 25 °C

Fig 8. BC807-25QA: Collector current as a function of collector-emitter voltage; typical values



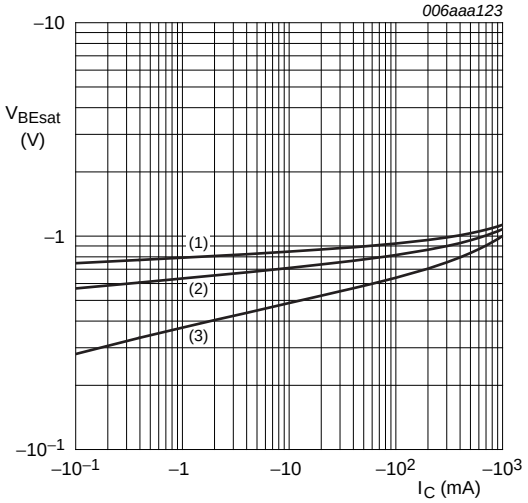
V_{CE} = −1 V

(1) T_{amb} = −55°C

(2) T_{amb} = 25 °C

(3) T_{amb} = 100 °C

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



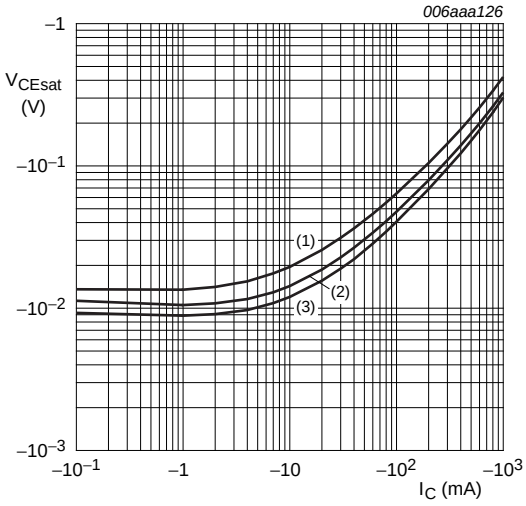
I_C/I_B = 10

(1) T_{amb} = −55 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = 100 °C

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



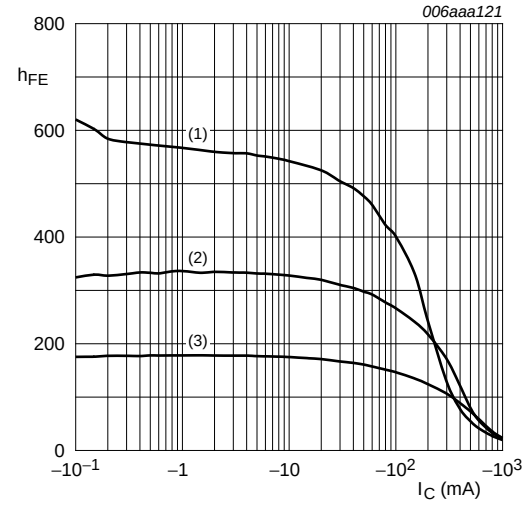
I_C/I_B = 10

(1) T_{amb} = −55°C

(2) T_{amb} = 25 °C

(3) T_{amb} = 100 °C

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



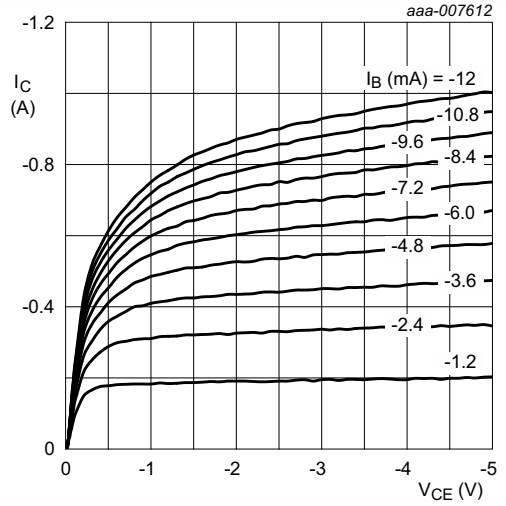
V_{CE} = −1 V

(1) T_{amb} = 100 °C

(2) T_{amb} = 25 °C

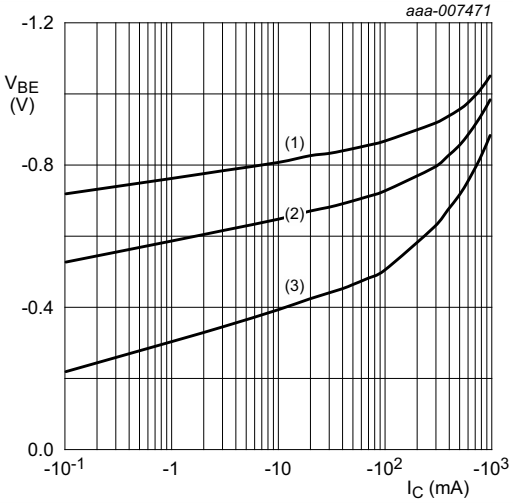
(3) T_{amb} = −55 °C

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



T_{amb} = 25 °C

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



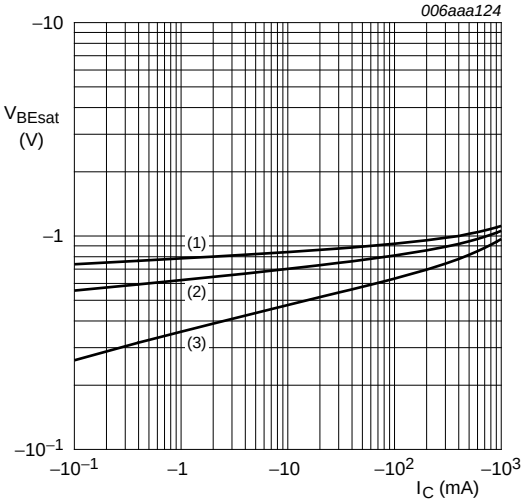
V_{CE} = −1 V

(1) T_{amb} = −55°C

(2) T_{amb} = 25 °C

(3) T_{amb} = 100 °C

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



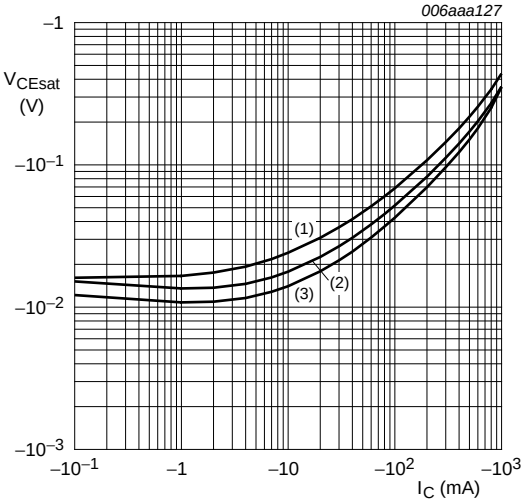
I_C/I_B = 10

(1) T_{amb} = −55 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = 100 °C

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



I_C/I_B = 10

(1) T_{amb} = −55 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = 100 °C

Fig 16. BC807-40QA: Collector-emitter saturation voltage as a function of collector current; typical values

8. Test information

8.1 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.

9. Package outline

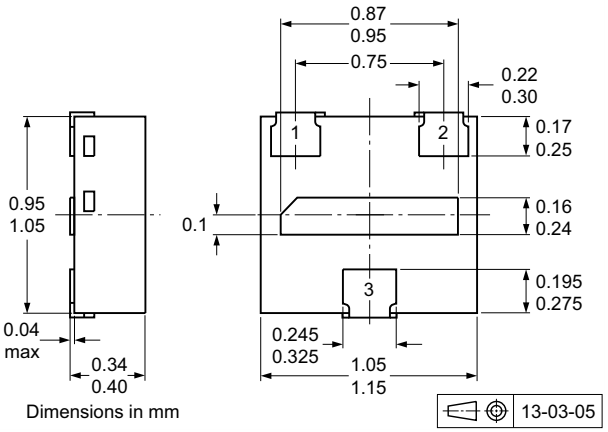


Fig 17. Package outline DFN1010D-3 (SOT1215)

10. Soldering

Footprint information for reflow soldering of DFN1010D-3 package **SOT1215**

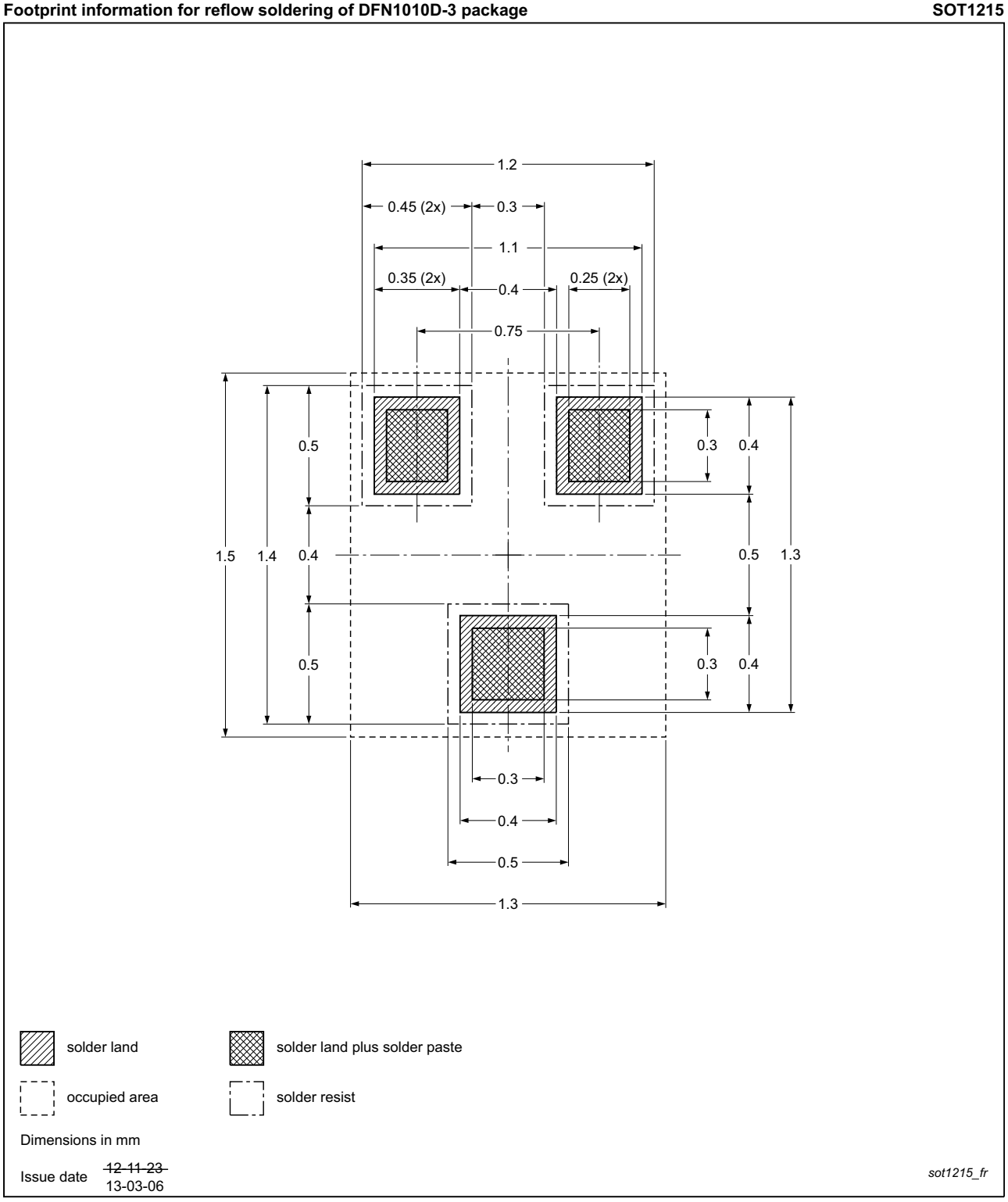


Fig 18. Reflow soldering footprint for DFN1010D-3 (SOT1215)

11. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BC807-25QA_40QA v.1	20130830	Product data sheet	-	-

12. Legal information

12.1 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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14. Contents

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