BC817-25QA; BC817-40QA

45 V, 500 mA NPN general-purpose transistors

Rev. 1 — 3 September 2013 Product data sheet

1. Product profile

1.1 General description

500 mA NPN 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		PNP complement
	NXP	JEITA	
BC817-25QA	DFN1010D-3 (SOT1215)	-	BC807-25QA
BC817-40QA			BC807-40QA

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

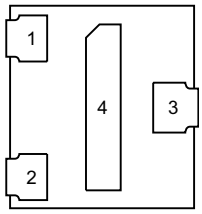
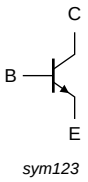
Table 2. Quick reference data

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]				
	BC817-25QA			160	-	400	
	BC817-40QA			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

sym123

3. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
BC817-25QA	DFN1010D-3	plastic thermal enhanced ultra thin small outline package; no leads; 3 terminals; body: 1.1 × 1.0 × 0.37 mm	SOT1215
BC817-40QA			

4. Marking

Table 5. Marking codes

Type number	Marking code
BC817-25QA	11 01 00
BC817-40QA	10 11 00

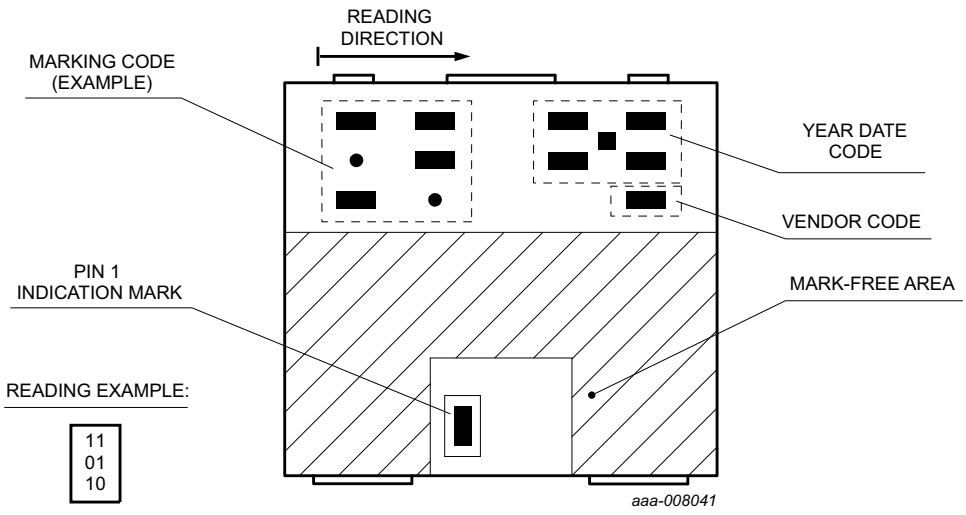


Fig 1. DFN1010D-3 (SOT1215) binary marking code description

5. Limiting values

Table 6. Limiting values

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

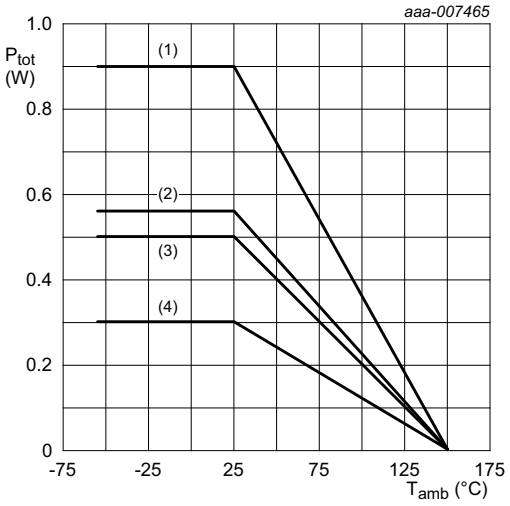
Symbol	Parameter	Conditions		Min	Max	Unit
V_{CBO}	collector-base voltage	open emitter		-	50	V
V_{CEO}	collector-emitter voltage	open base		-	45	V
V_{EBO}	emitter-base voltage	open collector		-	5	V
I_C	collector current			-	500	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms		-	1	A
I_{BM}	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

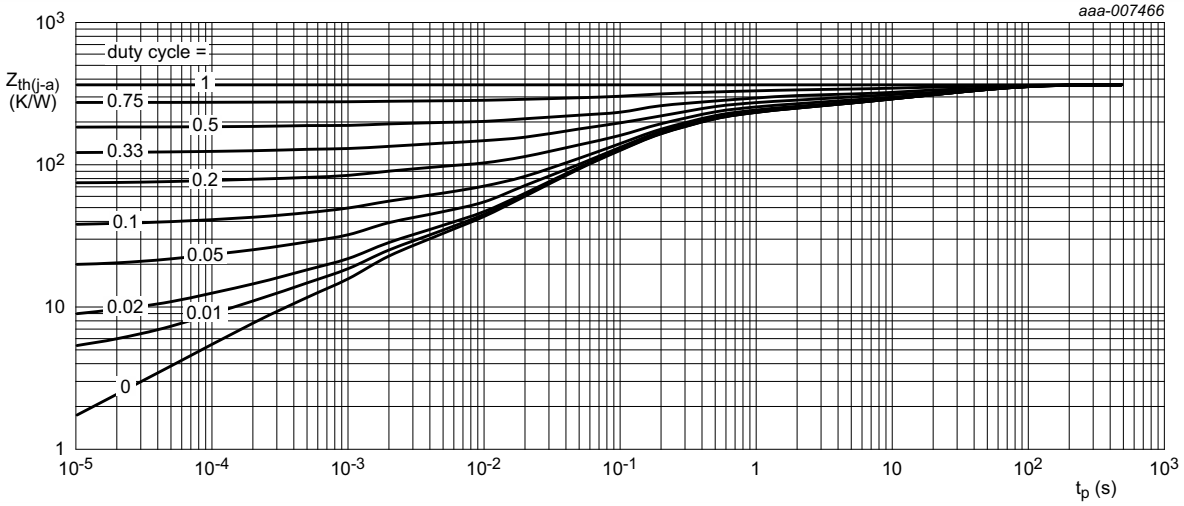
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air					
			[1]	-	-	417	K/W
			[2]	-	-	250	K/W
			[3]	-	-	223	K/W
			[4]	-	-	139	K/W

[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.

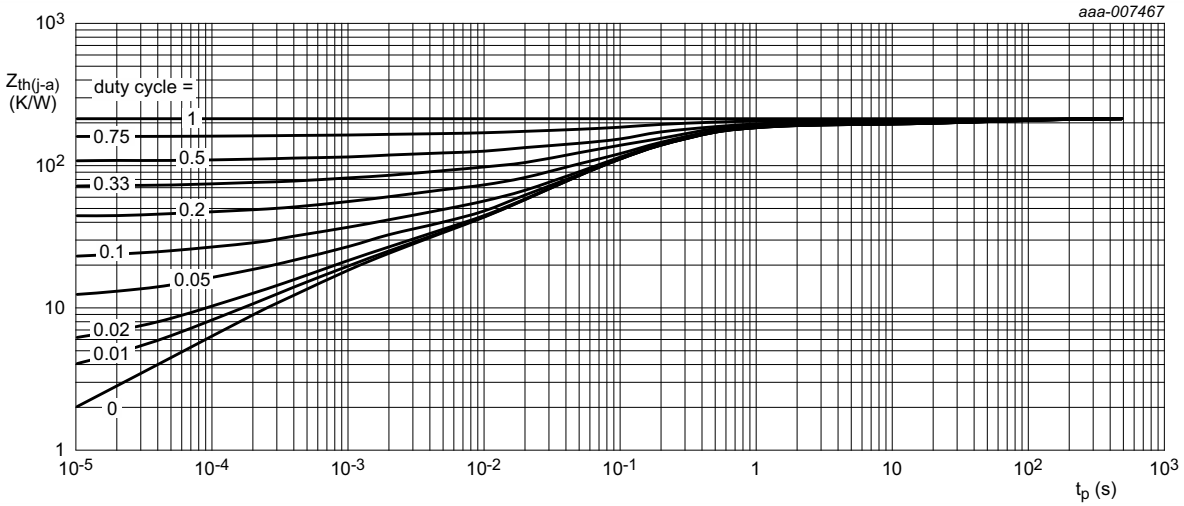
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated mounting pad for collector 1 cm^2.

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



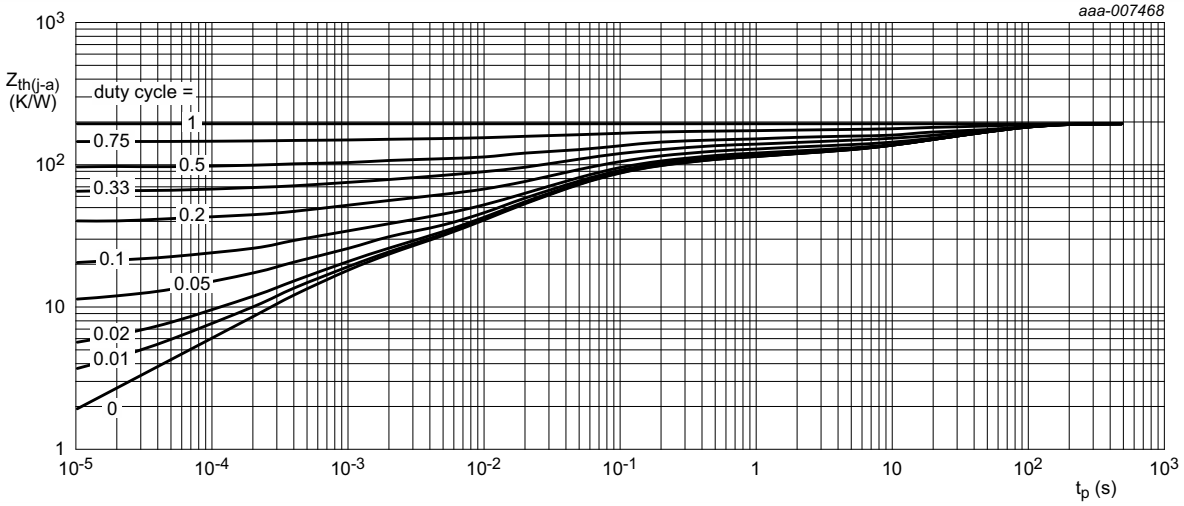
FR4 PCB, single-sided copper, standard footprint

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



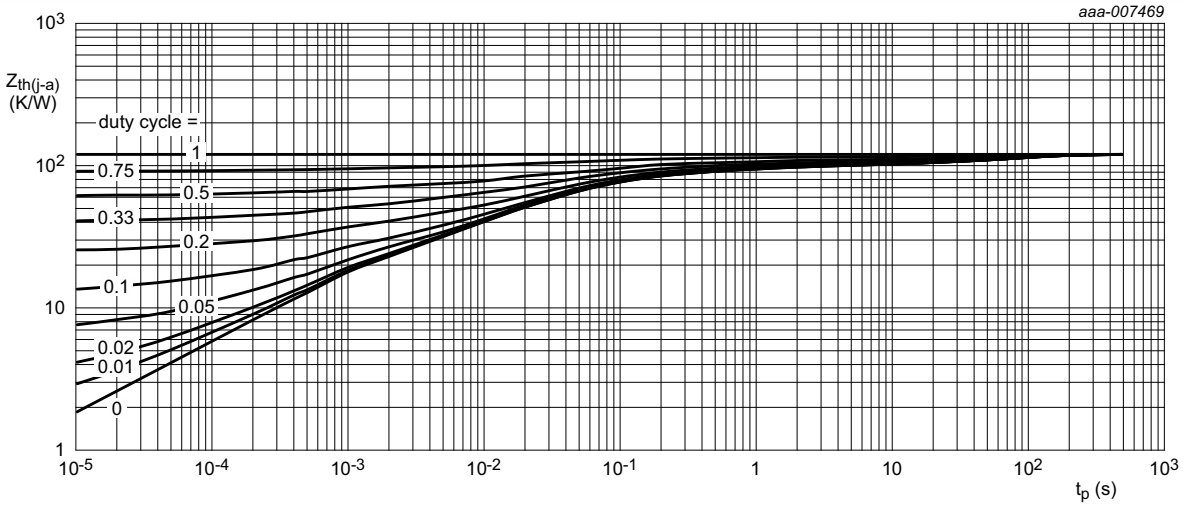
FR4 PCB, 4-layer copper, standard footprint

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

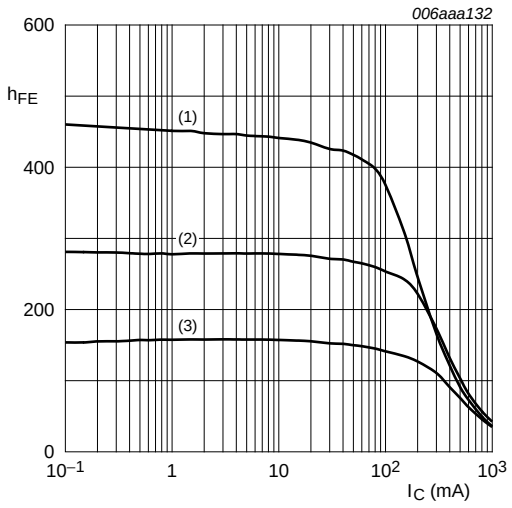
7. Characteristics

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]				
	BC817-25QA			160	-	400	
	BC817-40QA			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		-	3	-	pF
f_T	transition frequency	V_{CE} = 5 V; I_C = 10 mA; f = 100 MHz		100	-	-	MHz

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



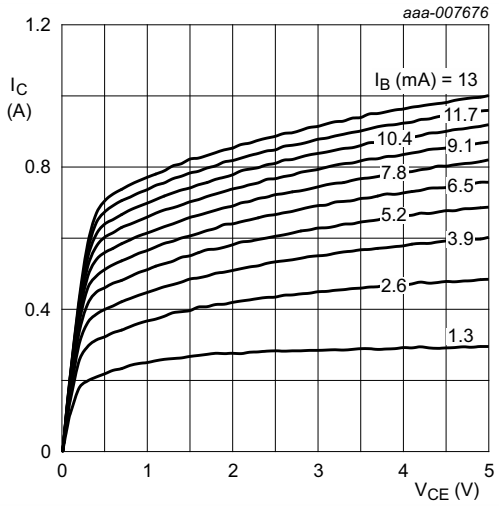
V_{CE} = 1 V

(1) T_{amb} = 100 °C

(2) T_{amb} = 25 °C

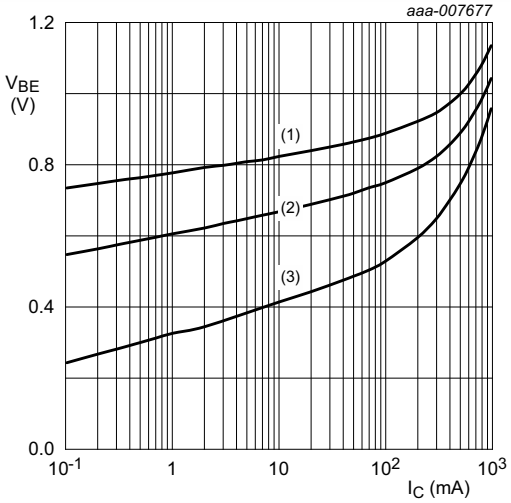
(3) T_{amb} = −55 °C

Fig 7. BC817-25QA: DC current gain as a function of collector current; typical values



T_{amb} = 25 °C

Fig 8. BC817-25QA: Collector current as a function of collector-emitter voltage; typical values



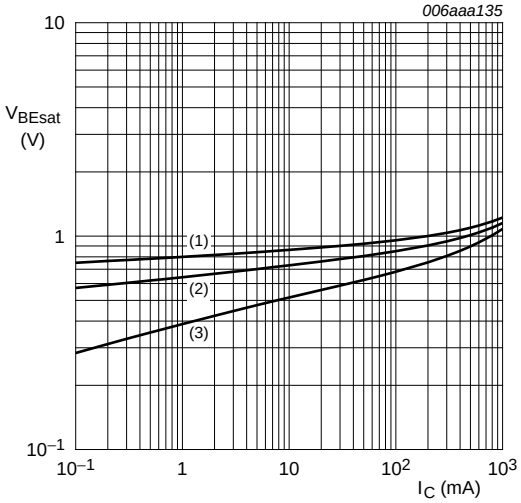
V_{CE} = 1 V

(1) T_{amb} = −55°C

(2) T_{amb} = 25 °C

(3) T_{amb} = 100 °C

Fig 9. BC817-25QA: Base-emitter voltage as a function of collector current; typical values



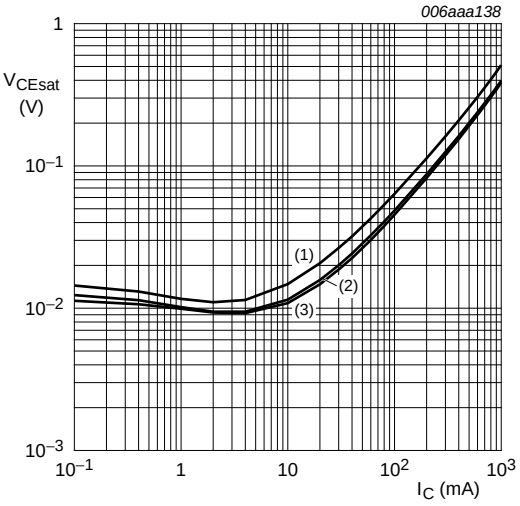
I_C/I_B = 10

(1) T_{amb} = −55 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = 100 °C

Fig 10. BC817-25QA: Base-emitter saturation voltage as a function of collector current; typical values



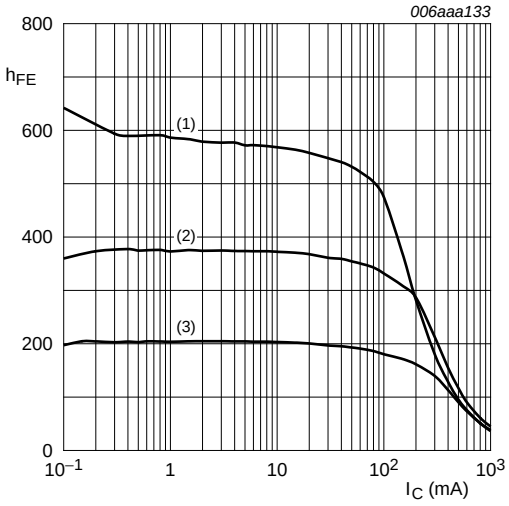
I_C/I_B = 10

(1) T_{amb} = −55°C

(2) T_{amb} = 25 °C

(3) T_{amb} = 100 °C

Fig 11. BC817-25QA: Collector-emitter saturation voltage as a function of collector current; typical values



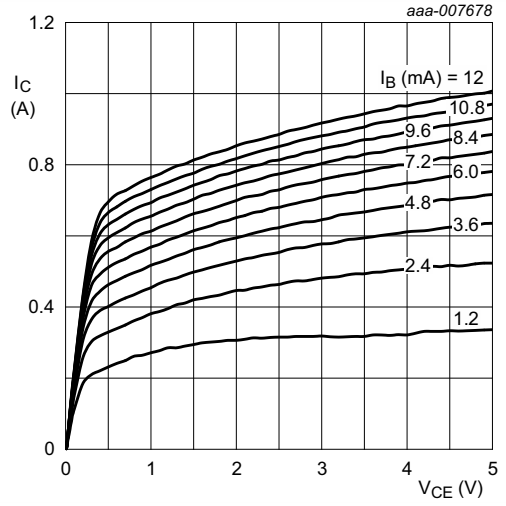
V_{CE} = 1 V

(1) T_{amb} = 100 °C

(2) T_{amb} = 25 °C

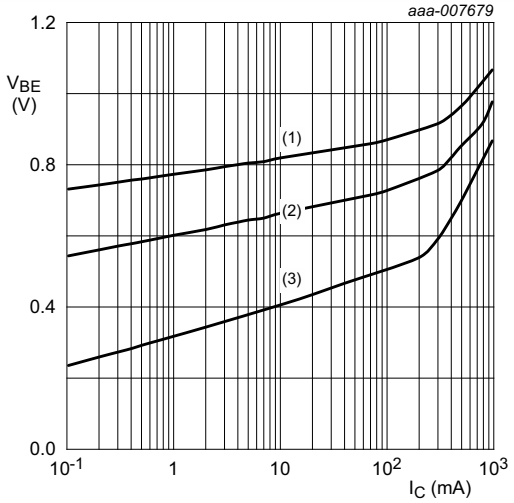
(3) T_{amb} = −55 °C

Fig 12. BC817-40QA: DC current gain as a function of collector current; typical values



T_{amb} = 25 °C

Fig 13. BC817-40QA: Collector current as a function of collector-emitter voltage; typical values



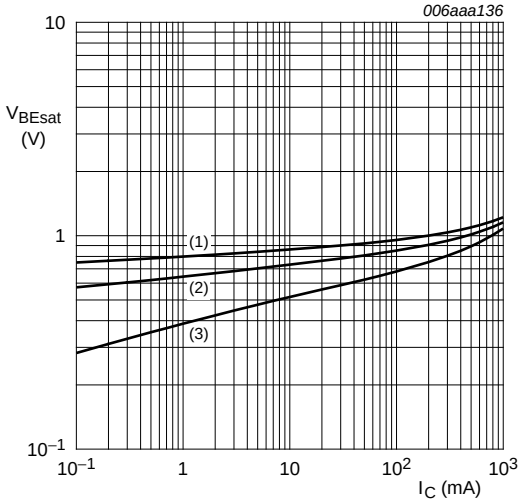
V_{CE} = 1 V

(1) T_{amb} = −55°C

(2) T_{amb} = 25 °C

(3) T_{amb} = 100 °C

Fig 14. BC817-40QA: Base-emitter voltage as a function of collector current; typical values



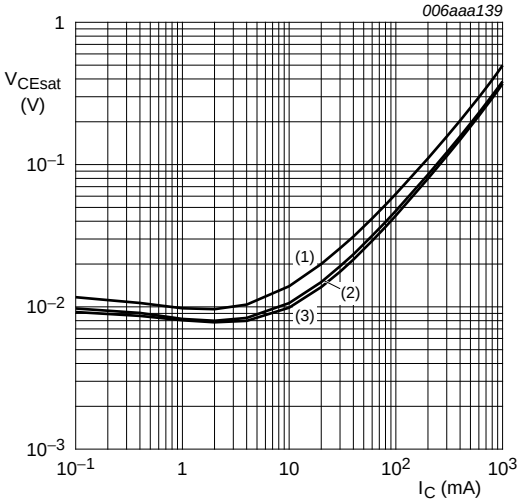
I_C/I_B = 10

(1) T_{amb} = −55 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = 100 °C

Fig 15. BC817-40QA: 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. BC817-40QA: 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

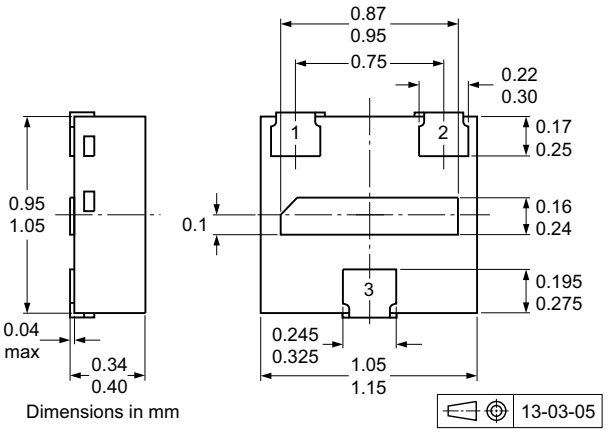


Fig 17. Package outline DFN1010D-3 (SOT1215)

10. Soldering

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

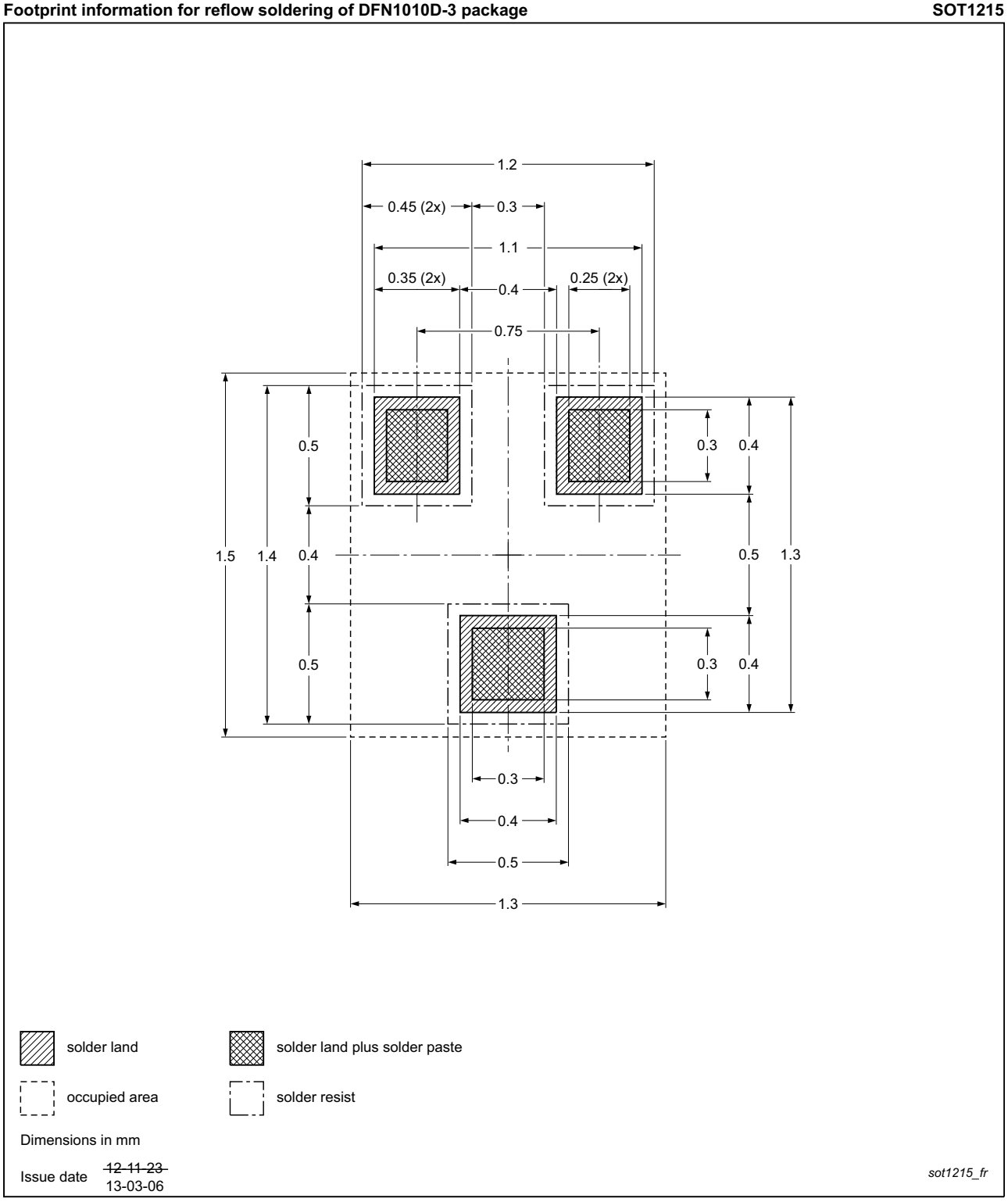


Fig 18. Reflow soldering footprint for DFN1010D-3 (SOT1215)

11. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BC817-25QA_40QA v.1	20130903	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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

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14. Contents

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