

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	-	BC807-25QA
BC817-40QA	(SOT1215)		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

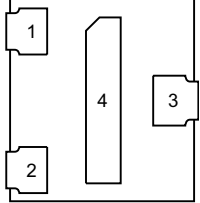
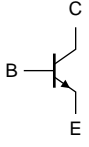
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base	-	-	45	V
I_C	collector current		-	-	500	mA
h_{FE}	DC current gain	$V_{CE} = 1\text{ V}; I_C = 100\text{ mA}$	[1]			
	BC817-25QA		160	-	400	
	BC817-40QA		250	-	600	

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



2. Pinning information

Table 3. Pinning

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 <p>Transparent top view</p>	 <p>sym123</p>
2	E	emitter		
3	C	collector		
4	C	collector		

3. Ordering information

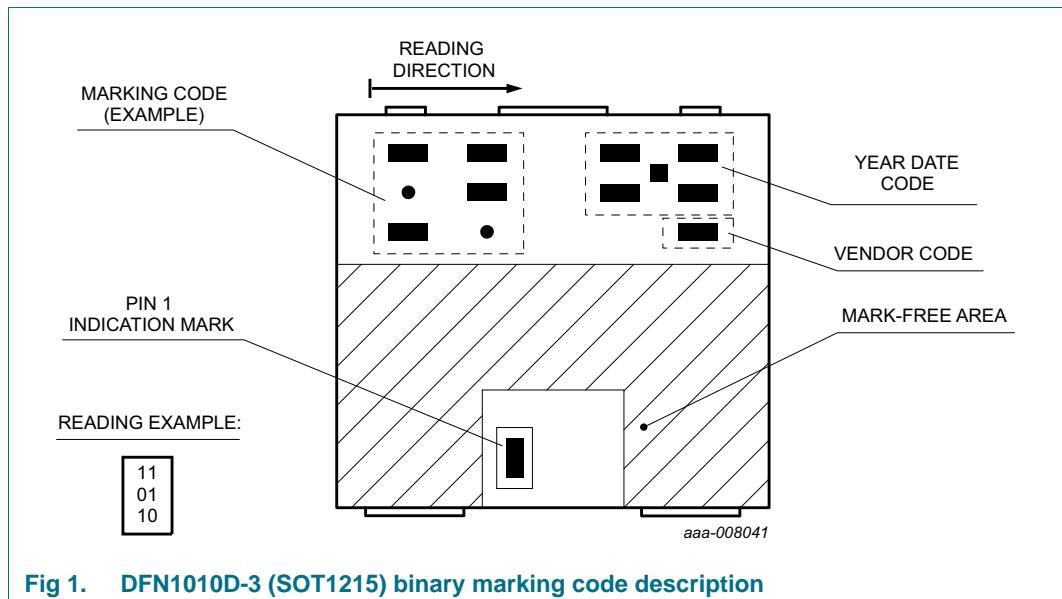
Table 4. Ordering information

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

4. Marking

Table 5. Marking codes

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



5. Limiting values

Table 6. Limiting values

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

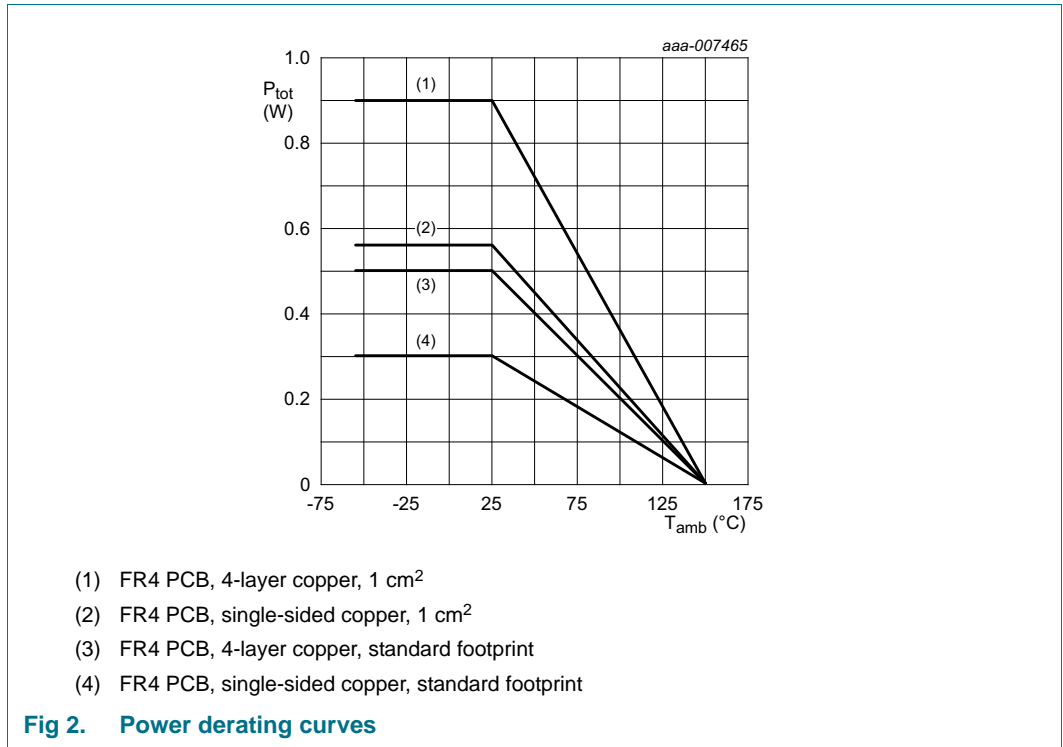
Symbol	Parameter	Conditions	Min	Max	Unit
V_{CBO}	collector-base voltage	open emitter	-	50	V
V_{CEO}	collector-emitter voltage	open base	-	45	V
V_{EBO}	emitter-base voltage	open collector	-	5	V
I_C	collector current		-	500	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms	-	1	A
I_{BM}	peak 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 cm².

[4] Device mounted on an FR4 PCB, 4-layer copper, tin-plated mounting pad for collector 1 cm².



6. Thermal characteristics

Table 7. Thermal characteristics

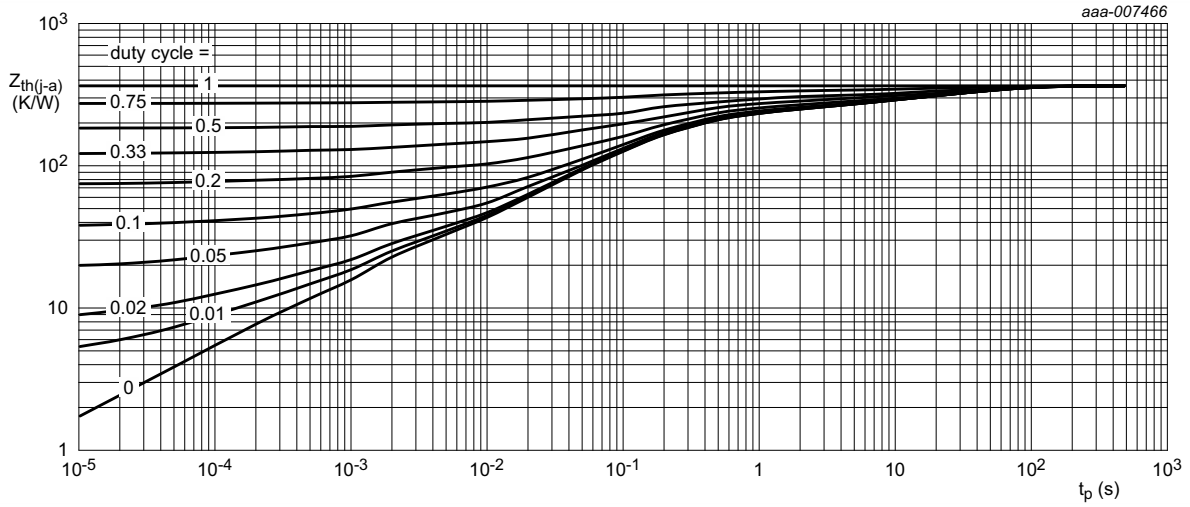
Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
R _{th(j-a)}	thermal resistance from junction to ambient	in free air	[1]	-	-	417	K/W
			[2]	-	-	250	K/W
			[3]	-	-	223	K/W
			[4]	-	-	139	K/W

[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.

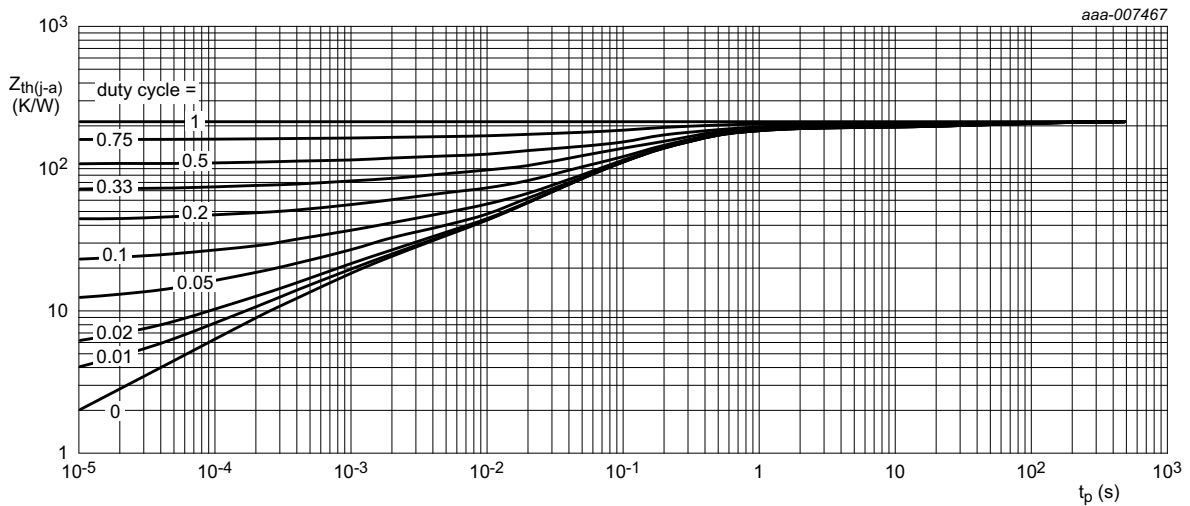
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated mounting pad for collector 1 cm².

[4] Device mounted on an FR4 PCB, 4-layer copper, tin-plated mounting pad for collector 1 cm².



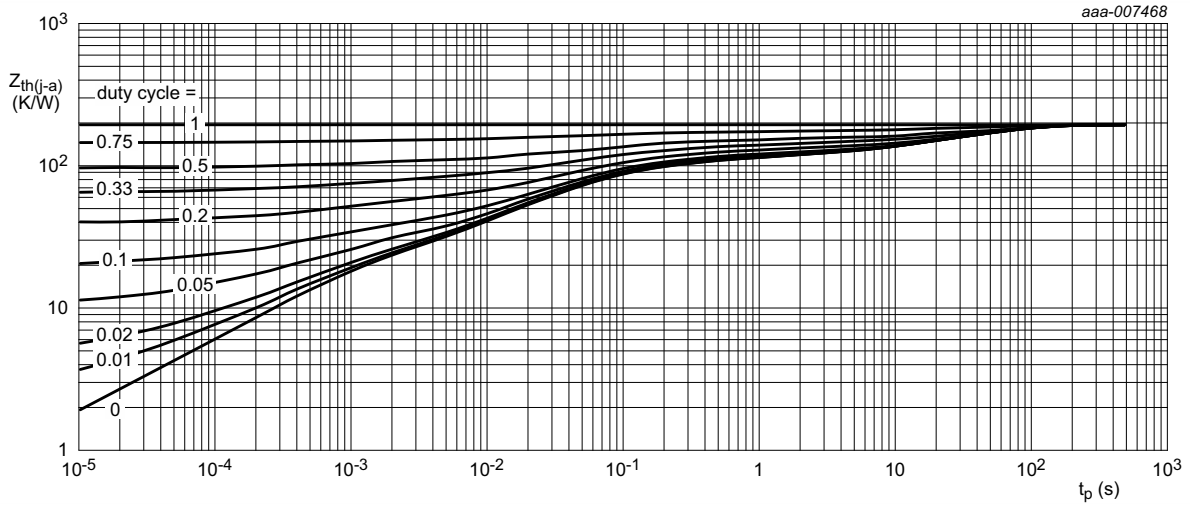
FR4 PCB, single-sided copper, standard footprint

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



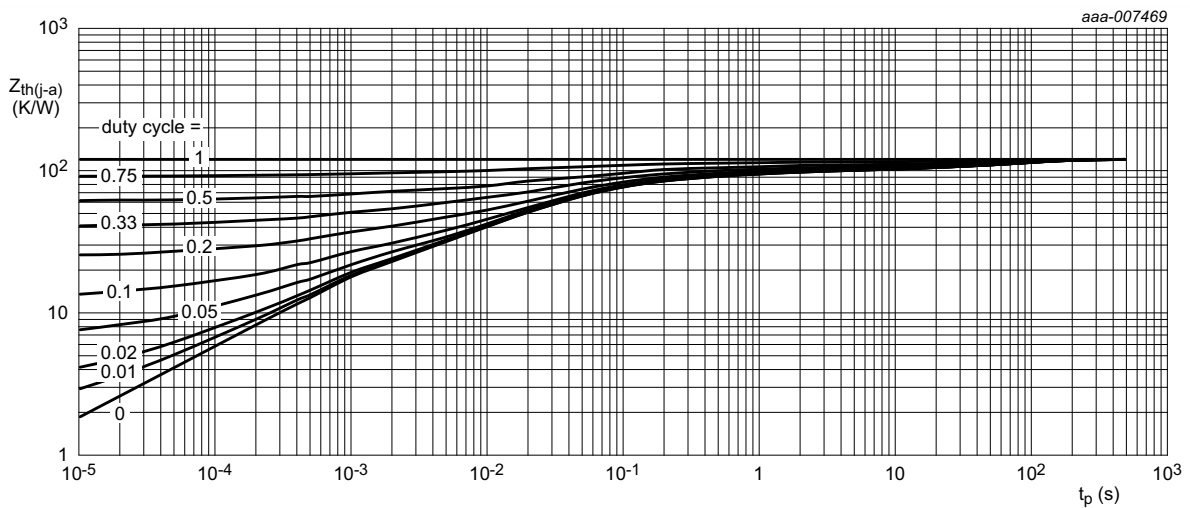
FR4 PCB, 4-layer copper, standard footprint

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



FR4 PCB, single-sided copper, 1 cm²

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



FR4 PCB, 4-layer copper, 1 cm²

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

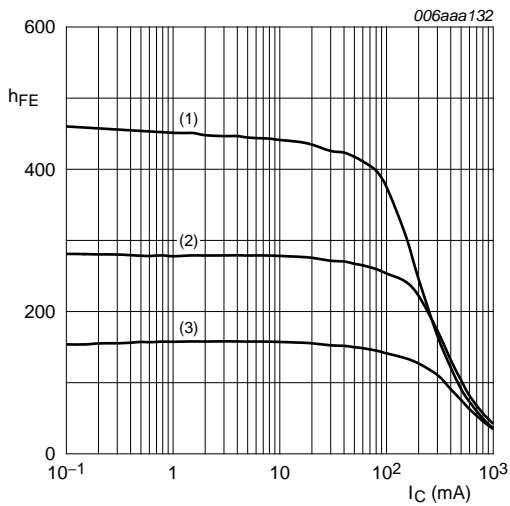
7. Characteristics

Table 8. Characteristics

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

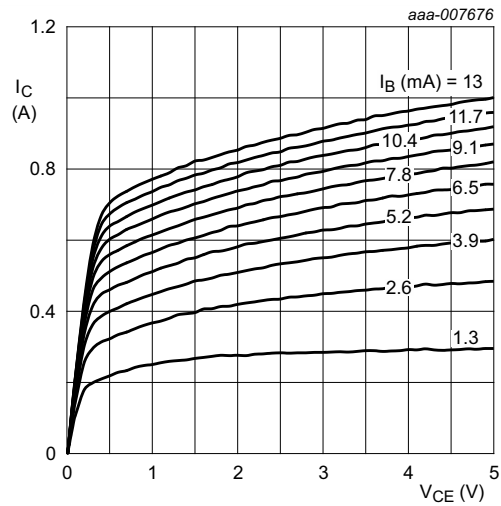
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I _{CBO}	collector-base cut-off current	V _{CB} = 20 V; I _E = 0 A	-	-	100	nA
		V _{CB} = 20 V; I _E = 0 A; T _j = 150 °C	-	-	5	μA
I _{EBO}	emitter-base cut-off current	V _{EB} = 5 V; I _C = 0 A	-	-	100	nA
h _{FE}	DC current gain	V _{CE} = 1 V; I _C = 100 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 ≤ 300 μs; δ ≤ 0.02.



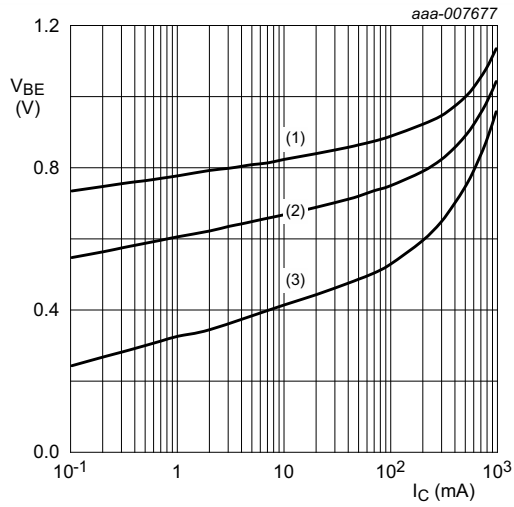
V_{CE} = 1 V
 (1) T_{amb} = 100 °C
 (2) T_{amb} = 25 °C
 (3) T_{amb} = -55 °C

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



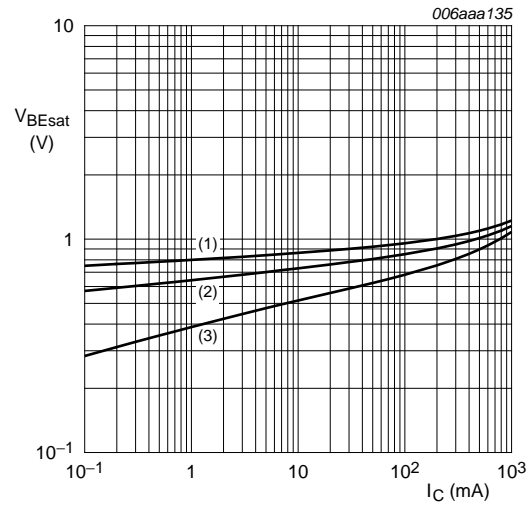
T_{amb} = 25 °C

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



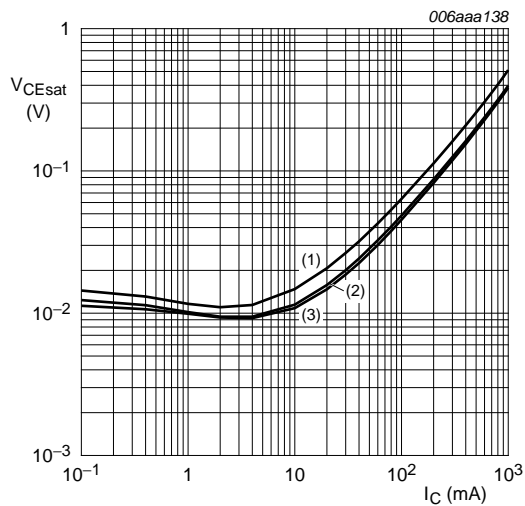
- $V_{CE} = 1\text{ V}$
- (1) $T_{amb} = -55^\circ\text{C}$
 - (2) $T_{amb} = 25^\circ\text{C}$
 - (3) $T_{amb} = 100^\circ\text{C}$

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



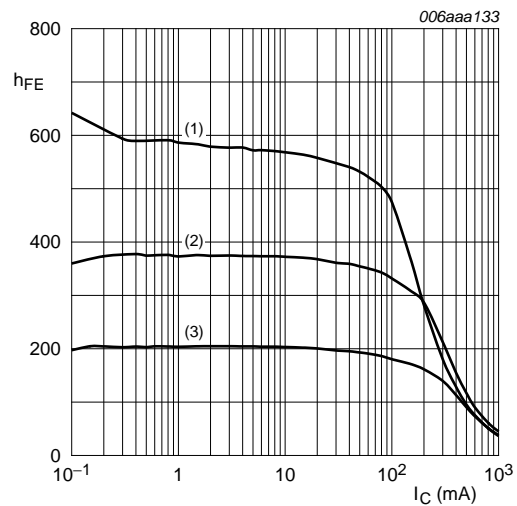
- $I_C/I_B = 10$
- (1) $T_{amb} = -55^\circ\text{C}$
 - (2) $T_{amb} = 25^\circ\text{C}$
 - (3) $T_{amb} = 100^\circ\text{C}$

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



- $I_C/I_B = 10$
- (1) $T_{amb} = -55^\circ\text{C}$
 - (2) $T_{amb} = 25^\circ\text{C}$
 - (3) $T_{amb} = 100^\circ\text{C}$

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



- $V_{CE} = 1\text{ V}$
- (1) $T_{amb} = 100^\circ\text{C}$
 - (2) $T_{amb} = 25^\circ\text{C}$
 - (3) $T_{amb} = -55^\circ\text{C}$

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

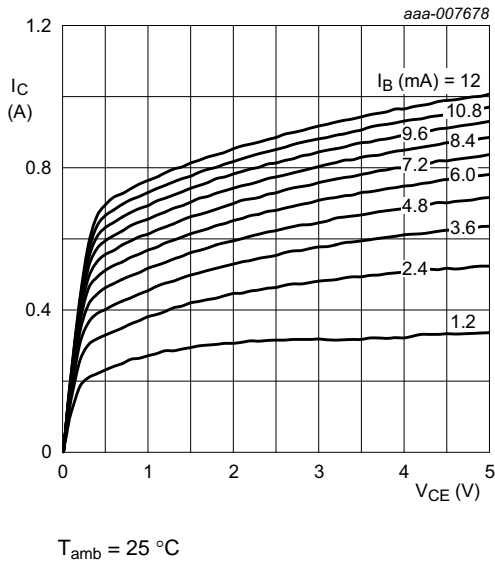


Fig 13. BC817-40QA: Collector current as a function of collector-emitter voltage; typical values

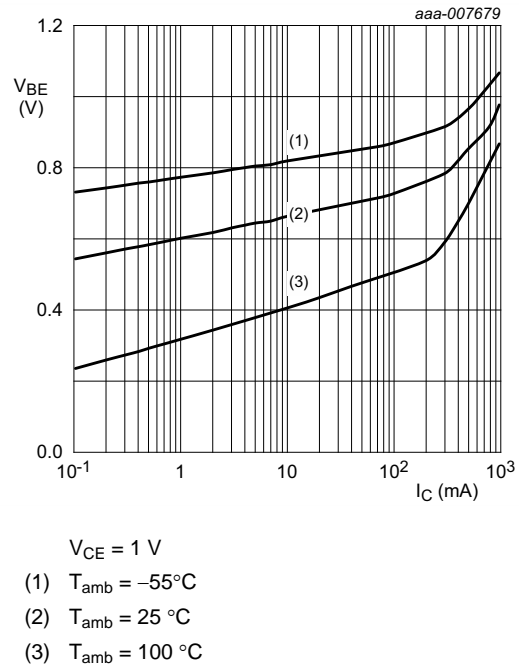


Fig 14. BC817-40QA: Base-emitter voltage as a function of collector current; typical values

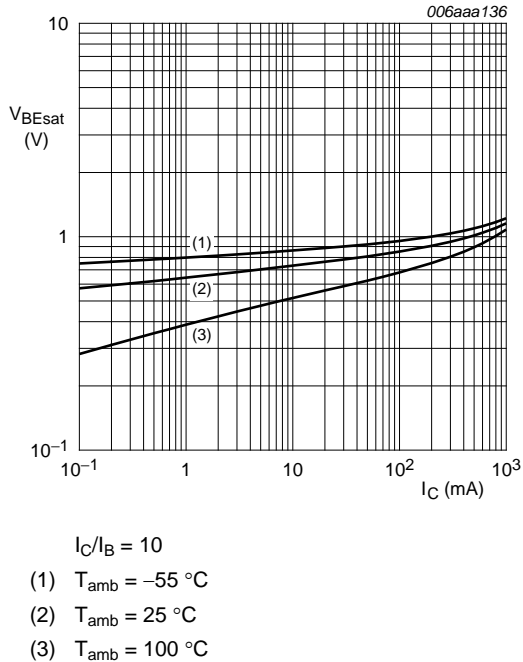


Fig 15. BC817-40QA: Base-emitter saturation voltage as a function of collector current; typical values

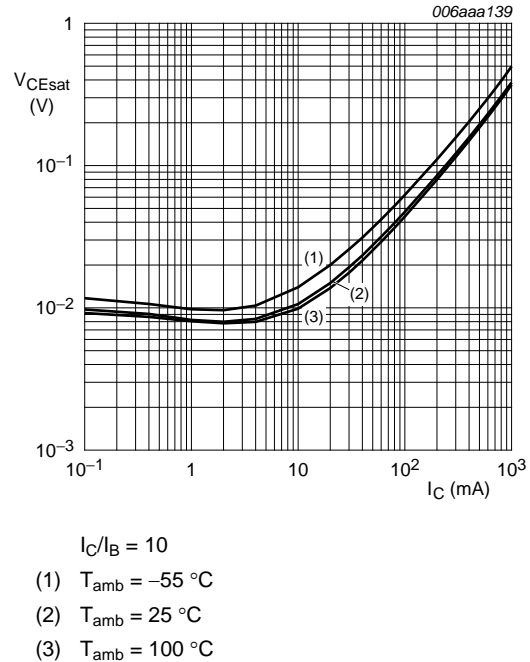


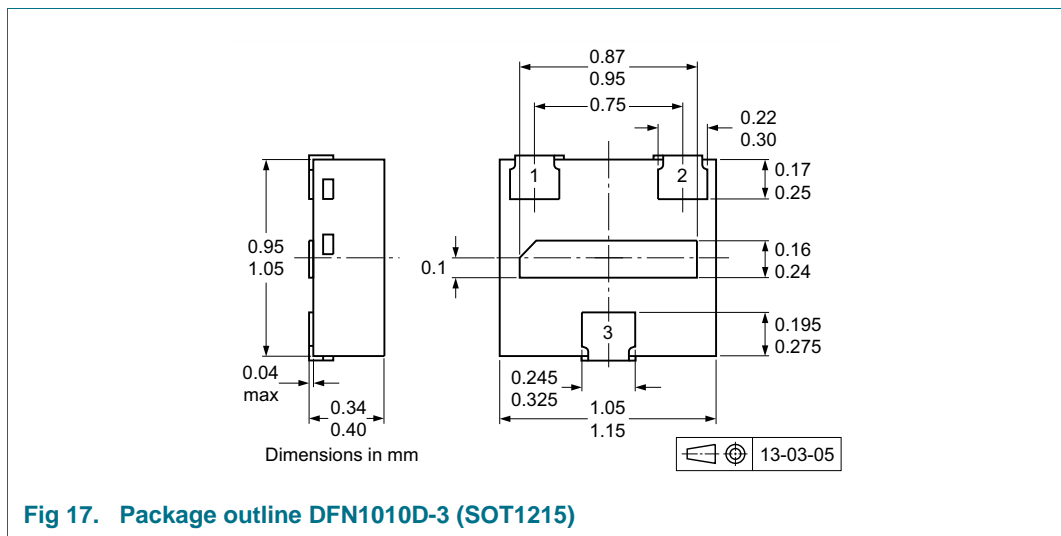
Fig 16. BC817-40QA: Collector-emitter saturation voltage as a function of collector current; typical values

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



10. Soldering

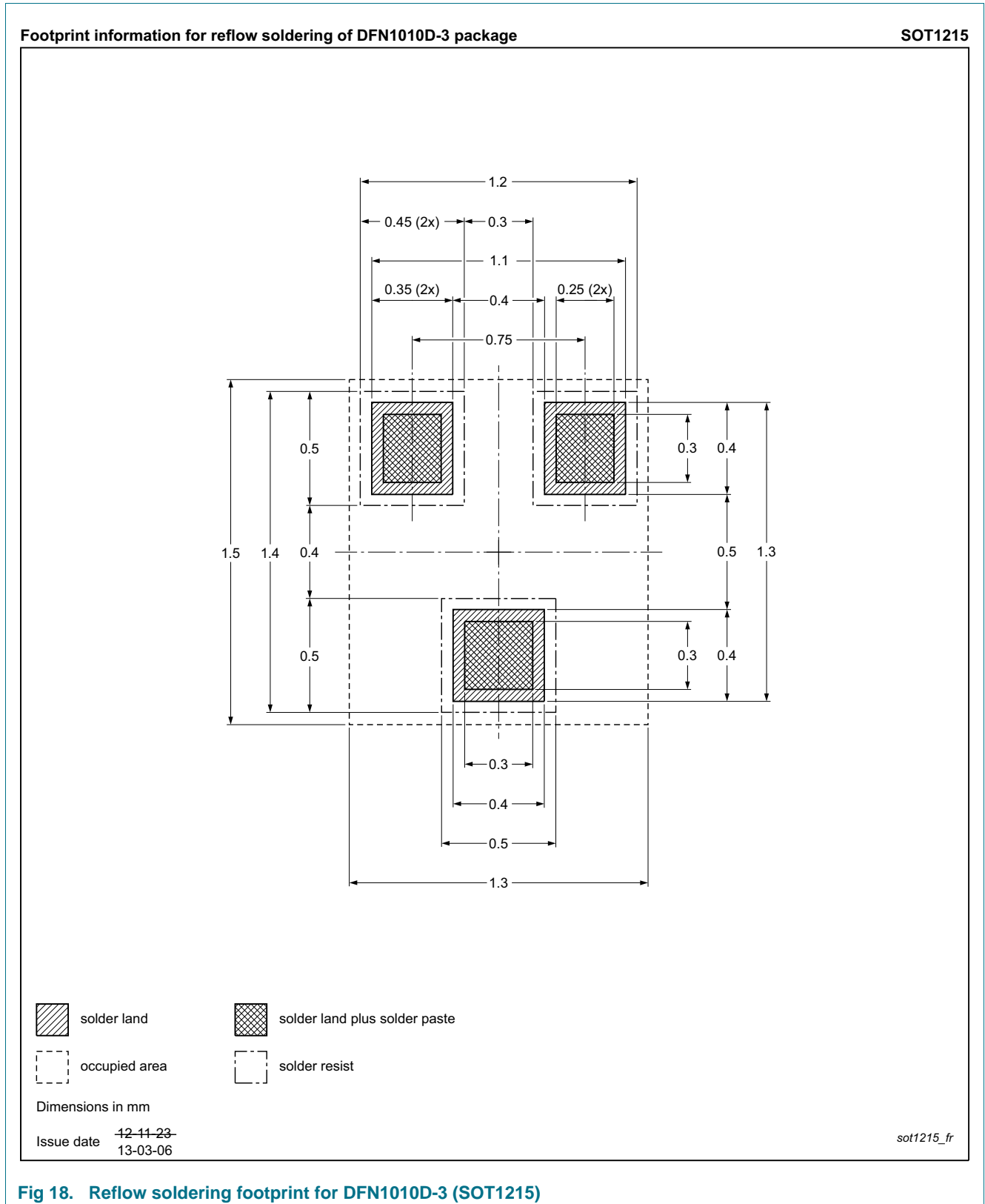


Fig 18. Reflow soldering footprint for DFN1010D-3 (SOT1215)

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.
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14. Contents

1	Product profile	1
1.1	General description	1
1.2	Features and benefits	1
1.3	Applications	1
1.4	Quick reference data	1
2	Pinning information	2
3	Ordering information	2
4	Marking	2
5	Limiting values	3
6	Thermal characteristics	4
7	Characteristics	7
8	Test information	10
8.1	Quality information	10
9	Package outline	10
10	Soldering	11
11	Revision history	12
12	Legal information	13
12.1	Data sheet status	13
12.2	Definitions	13
12.3	Disclaimers	13
12.4	Trademarks	14
13	Contact information	14
14	Contents	15

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