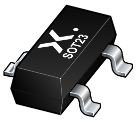


BC807-Q series

45 V, 500 mA PNP general-purpose transistors

Rev. 1 — 4 June 2021 Product data sheet

1. General description

PNP general-purpose transistor in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

Table 1. Product overview

Type number	Package			NPN complement
	Nexperia	JEDEC	JEITA	
BC807-Q	SOT23	TO-236AB	-	BC817-Q
BC807-16-Q				BC817-16-Q
BC807-25-Q				BC817-25-Q
BC807-40-Q				BC817-40-Q

2. Features and benefits

- High current
- Three current gain selections
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- General-purpose switching and amplification

4. Quick reference data

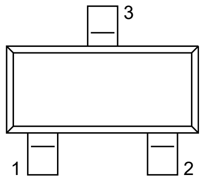
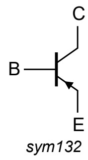
Table 2. Quick reference data

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

[1] pulsed; $t_p \leq 300$ µs; $\delta \leq 0.02$

5. Pinning information

Table 3. Pinning

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

6. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
BC807-Q	TO-236AB	Plastic surface-mounted package; 3 leads	SOT23
BC807-16-Q			
BC807-25-Q			
BC807-40-Q			

7. Marking

Table 5. Marking

Type number	Marking code[1]
BC807-Q	5D%
BC807-16-Q	5A%
BC807-25-Q	5B%
BC807-40-Q	5C%

[1] % = placeholder for manufacturing site code

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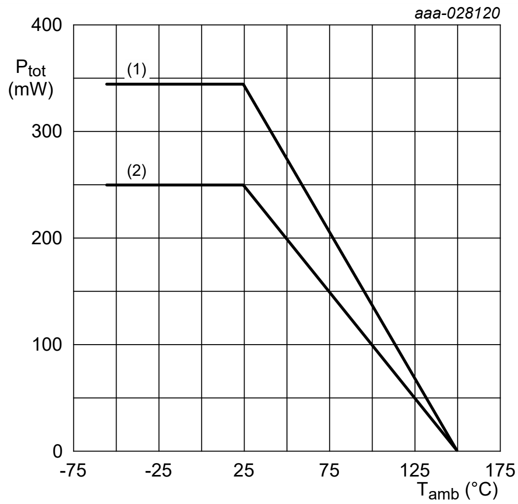
8. Limiting values

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] [2]	-	250	mW
			[3] [2]	-	345	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-65	150	°C
T_{stg}	storage temperature			-65	150	°C

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[2] Valid for all available selection groups.
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated; mounting pad for collector 1 cm_2.



(1) FFR4 PCB, single-sided copper; 1 cm^2
(2) FR4 PCB, single-sided copper; standard footprint

Fig. 1. Power derating curves for SOT23

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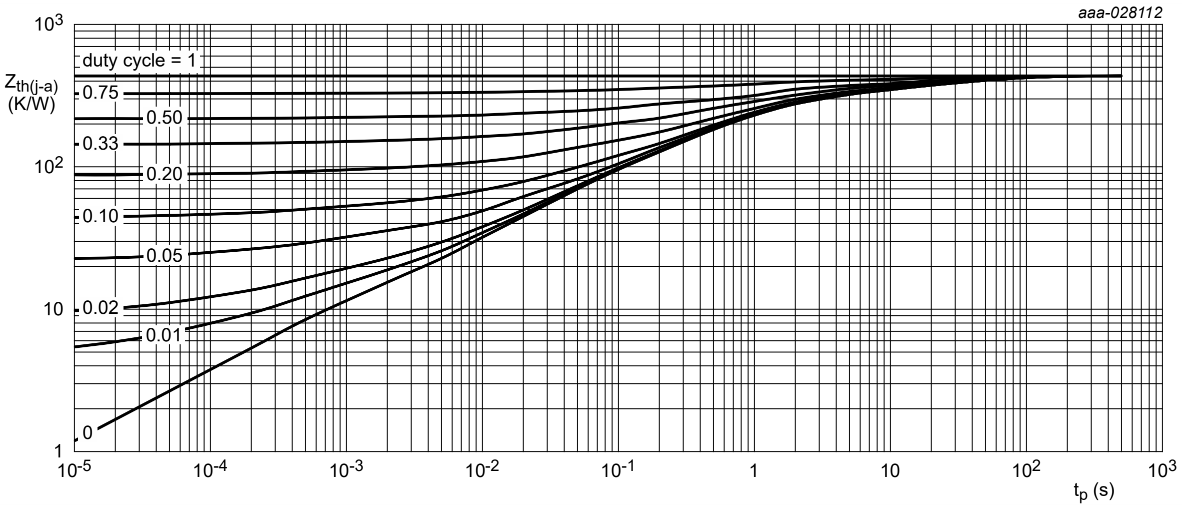
9. Thermal characteristics

Table 7. Thermal characteristics

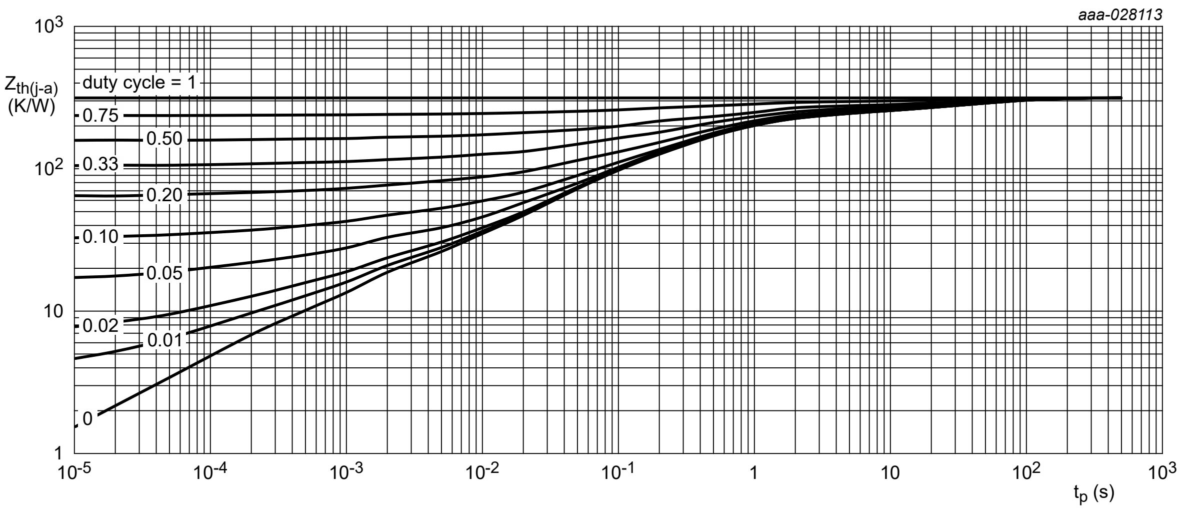
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] [2]	-	-	500	K/W
			[3] [2]	-	-	362	K/W

[1] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided copper; tin-plated and standard footprint.
[2] Valid for all available selection groups.
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated; monting pad for collector 1 cm^2.



FR4 PCB, single-sided, tin-plated and standard footprint

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



FR4 PCB, single-sided copper, tin-plated; mounting pad for collector 1 cm^2.

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

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10. Characteristics

Table 8. Characteristics

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

[1] pulsed; t_p ≤ 300 µs; δ ≤ 0.02
[2] V_{BE} decreases by about 2 mV/K with increasing temperature.

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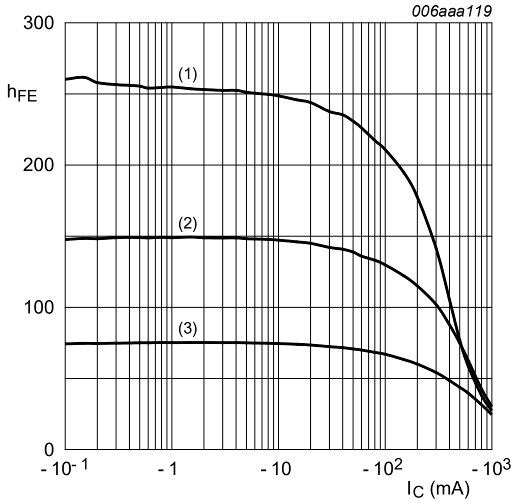
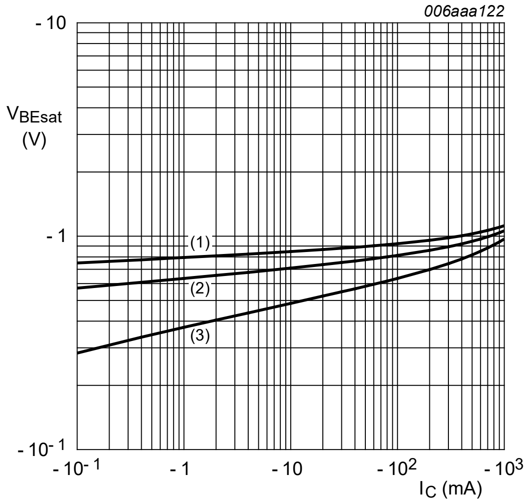


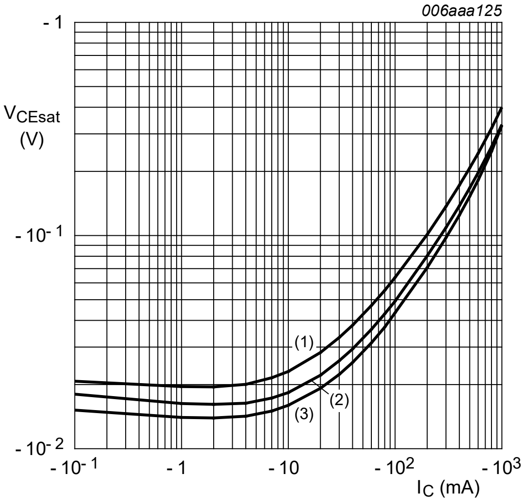
V_{CE} = -1 V
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

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



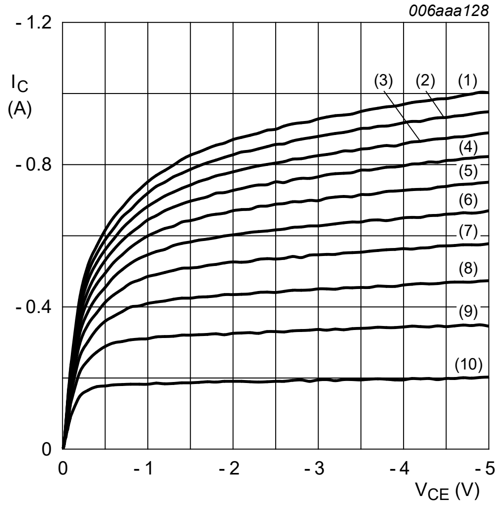
IC/IB = 10
(1) T_{amb} = -55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

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



IC/IB = 10
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

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



T_{amb} = 25 °C
(1) I_B = -16.0 mA
(2) I_B = -14.4 mA
(3) I_B = -12.8 mA
(4) I_B = -11.2 mA
(5) I_B = -9.6 mA
(6) I_B = -8.0 mA
(7) I_B = -6.4 mA
(8) I_B = -4.8 mA
(9) I_B = -3.2 mA
(10) I_B = -1.6 mA

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

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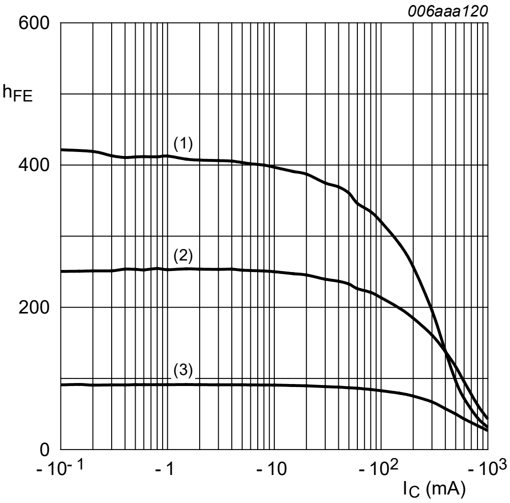
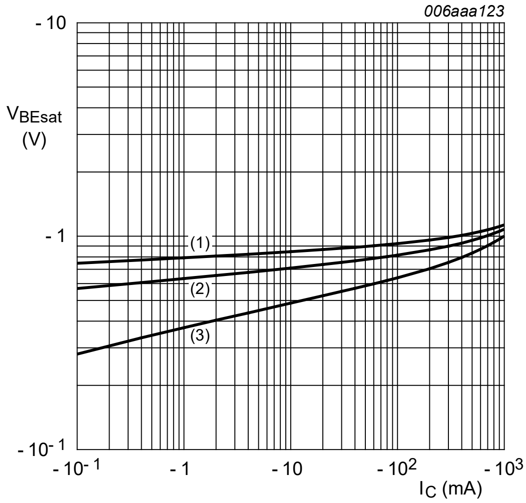


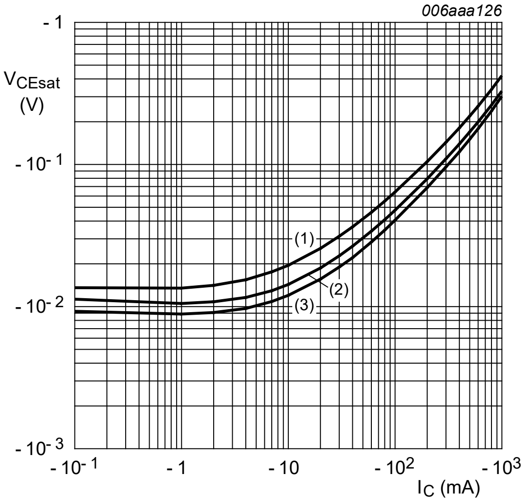
V_{CE} = -1 V
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

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



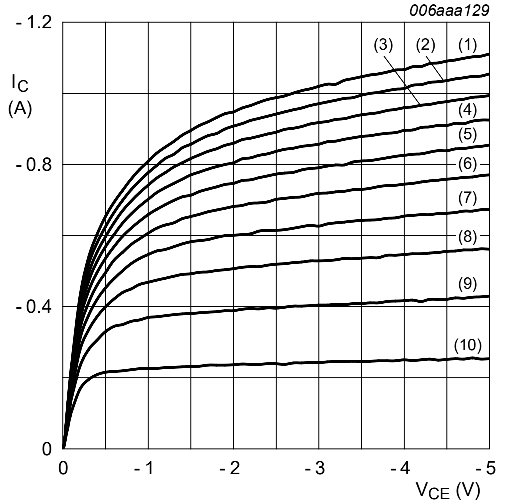
IC/IB = 10
(1) T_{amb} = -55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

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



IC/IB = 10
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

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



T_{amb} = 25 °C
(1) I_B = -13.0 mA
(2) I_B = -11.7 mA
(3) I_B = -10.4 mA
(4) I_B = -9.1 mA
(5) I_B = -7.8 mA
(6) I_B = -6.5 mA
(7) I_B = -5.2 mA
(8) I_B = -3.9 mA
(9) I_B = -2.6 mA
(10) I_B = -1.3 mA

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

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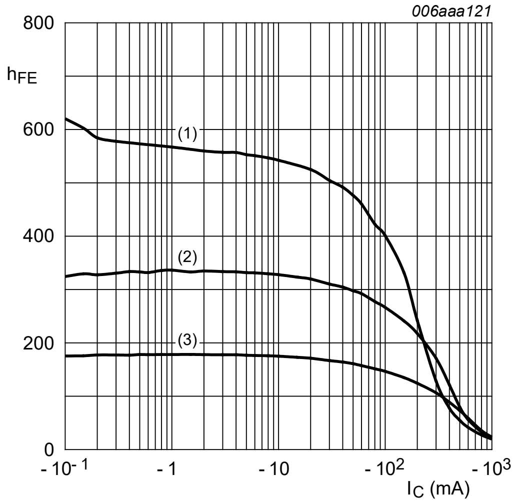
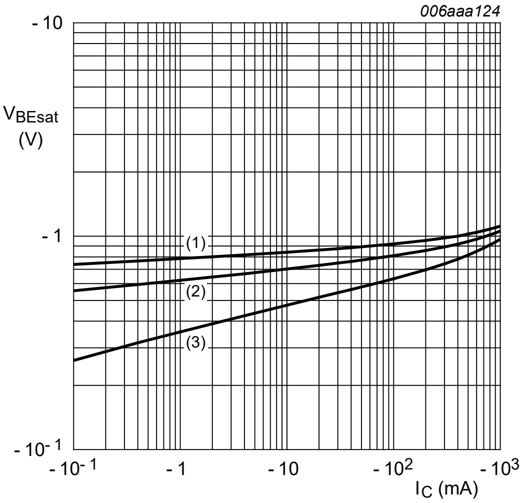


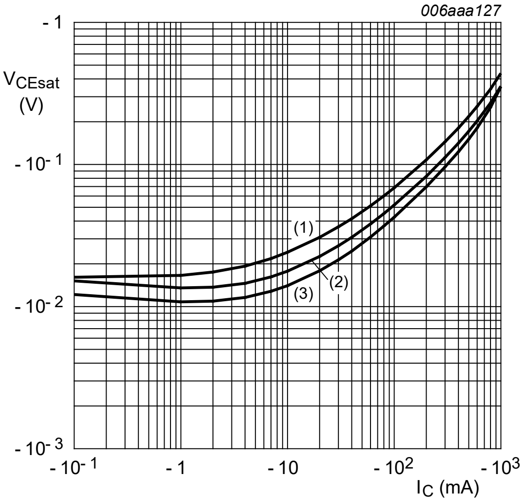
V_{CE} = -1 V
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

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



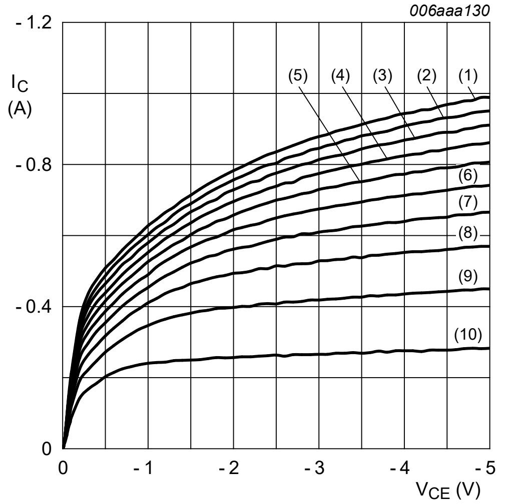
IC/IB = 10
(1) T_{amb} = -55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

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



IC/IB = 10
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

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



T_{amb} = 25 °C
(1) I_B = -12.0 mA
(2) I_B = -10.8 mA
(3) I_B = -9.6 mA
(4) I_B = -8.4 mA
(5) I_B = -7.2 mA
(6) I_B = -6.0 mA
(7) I_B = -4.8 mA
(8) I_B = -3.6 mA
(9) I_B = -2.4 mA
(10) I_B = -1.2 mA

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

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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

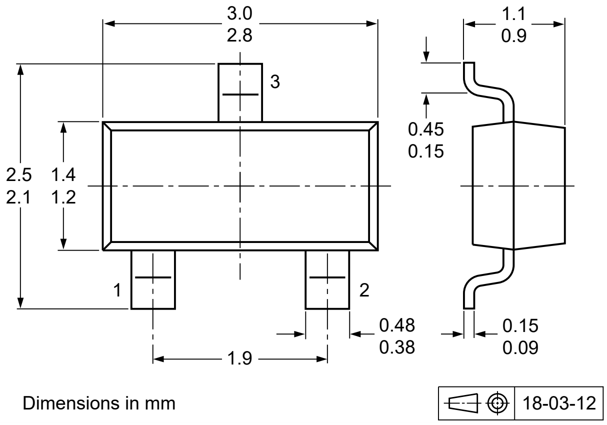

Fig. 16. Package outline SOT23 (TO-236AB)

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13. Soldering

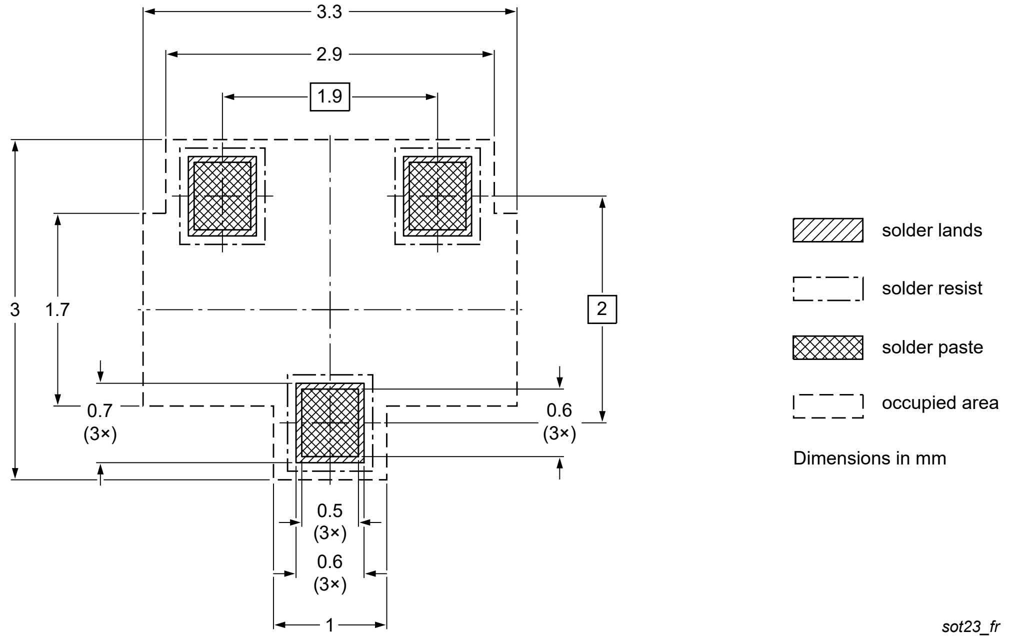

Fig. 17. Reflow soldering footprint for SOT23 (TO-236AB)

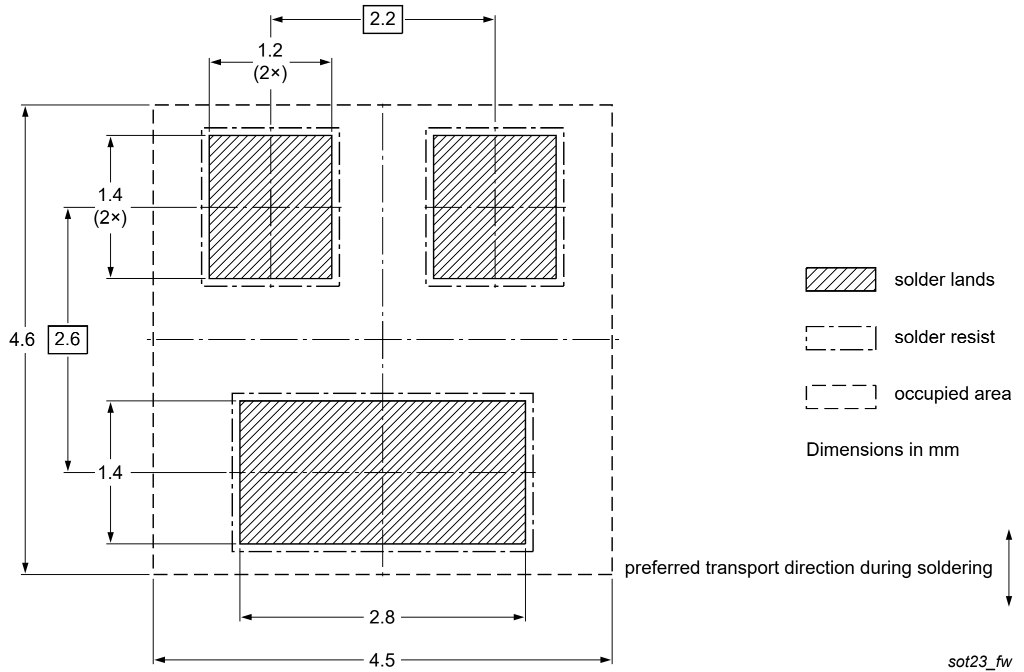

Fig. 18. Wave soldering footprint for SOT23 (TO-236AB)

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14. Revision history

Table 9. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BC807-Q_SER v.1	20210608	Product data sheet	-	-

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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.

[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 https://www.nexperia.com.

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Date of release: 4 June 2021

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