



# BC807H series

45 V, 500 mA PNP general-purpose transistors

Rev. 1 — 5 March 2019

Product data sheet

## 1. Product profile

### 1.1. General description

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

Table 1. Product overview

Type number	Package		NPN complement
	Nexperia	JEDEC	
BC807-16H	SOT23	TO-236AB	BC817K-16H
BC807-25H			BC817K-25H
BC807-40H			BC817K-40H

### 1.2. Features and benefits

- Three current gain selections
- High-temperature applications up to 175 °C
- AEC-Q101 qualified

### 1.3. Applications

- General-purpose switching and amplification

### 1.4. Quick reference data

Table 2. Quick reference data

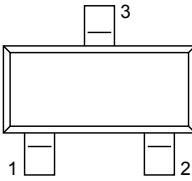
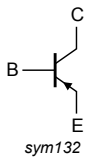
$T_{amb} = 25\text{ °C}$  unless otherwise specified.

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

[1] pulsed;  $t_p \leq 300\text{ }\mu\text{s}$ ;  $\delta \leq 0.02$

## 2. Pinning information

Table 3. Pinning

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

## 3. Ordering information

Table 4. Ordering information

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

## 4. Marking

Table 5. Marking

Type number		Marking code
BC807-16H	[1]	6S%
BC807-25H	[1]	6T%
BC807-40H	[1]	6U%

[1] % = placeholder for manufacturing site code

## 5. Limiting values

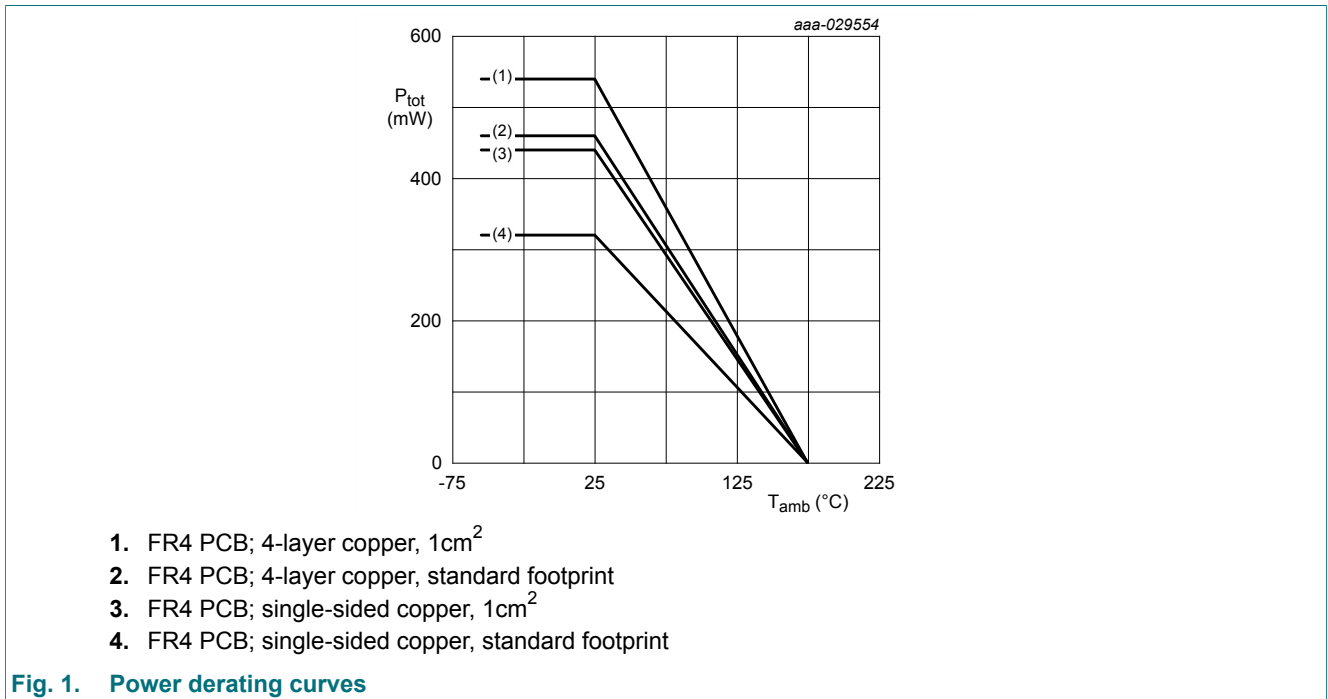
**Table 6. Limiting values**

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

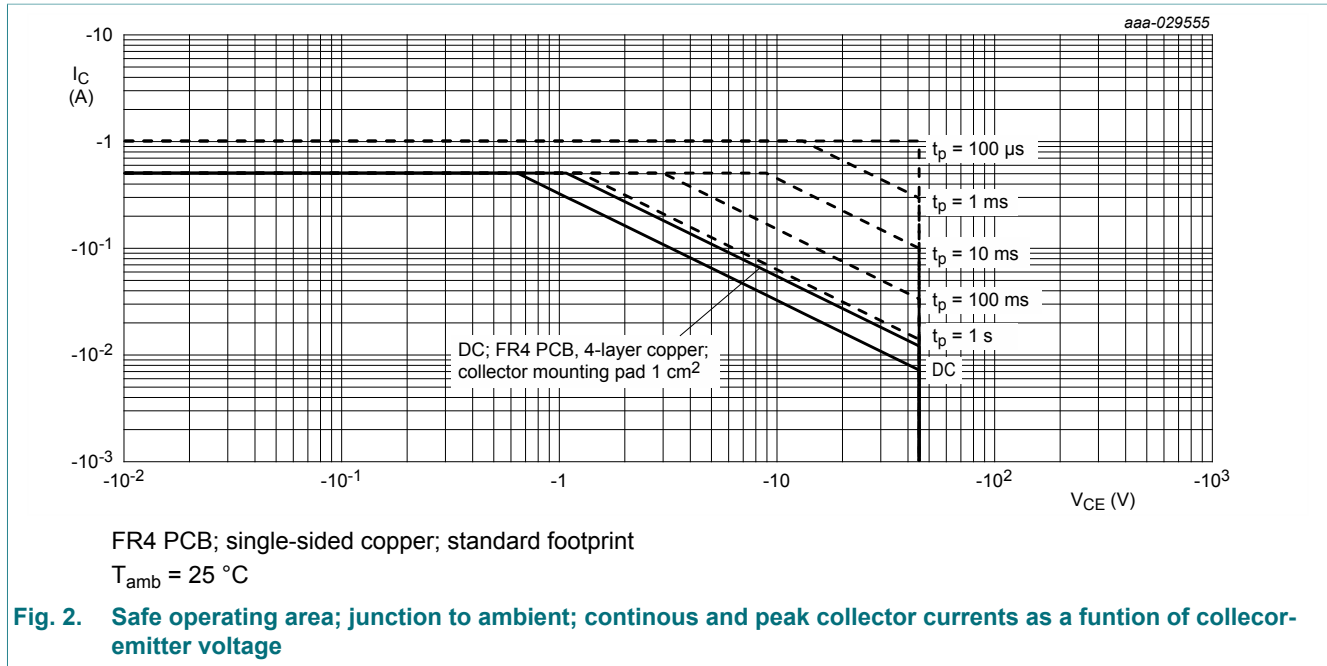
$T_{amb} = 25\text{ °C}$  unless otherwise specified.

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	-	-7	V	
$I_C$	collector current		-	-500	mA	
$I_{CM}$	peak collector current	single pulse; $t_p \leq 1\text{ ms}$	-	-1	A	
$I_{BM}$	peak base current	single pulse; $t_p \leq 1\text{ ms}$	-	-200	mA	
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[1]	-	320	mW
			[2]	-	440	mW
			[3]	-	460	mW
			[4]	-	540	mW
$T_j$	junction temperature		-	175	°C	
$T_{amb}$	ambient temperature		-55	175	°C	
$T_{stg}$	storage temperature		-65	175	°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 Printed-Circuit-Board (PCB); single-sided copper; tin-plated; mounting pad for collector 1 cm<sup>2</sup>.
- [3] Device mounted on an FR4 Printed-Circuit-Board (PCB); 4-layer copper; tin plated and standard footprint.
- [4] Device mounted on an FR4 Printed-Circuit-Board (PCB); 4-layer copper; tin-plated; mounting pad for collector 1 cm<sup>2</sup>.



**Fig. 1. Power derating curves**



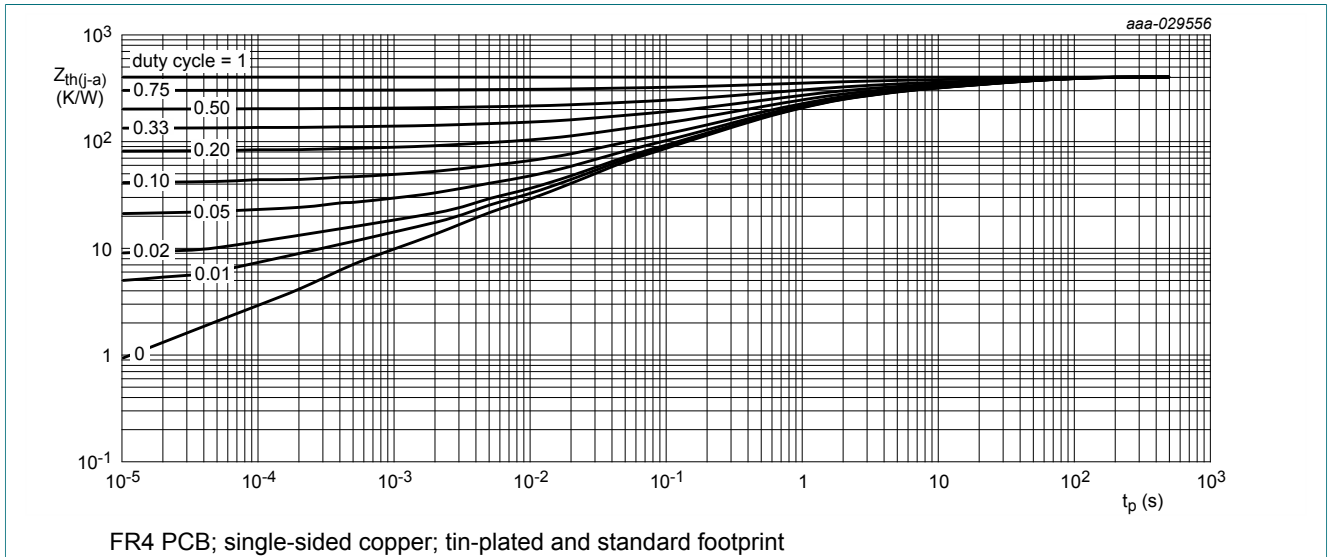
## 6. Thermal characteristics

**Table 7. Thermal characteristics**

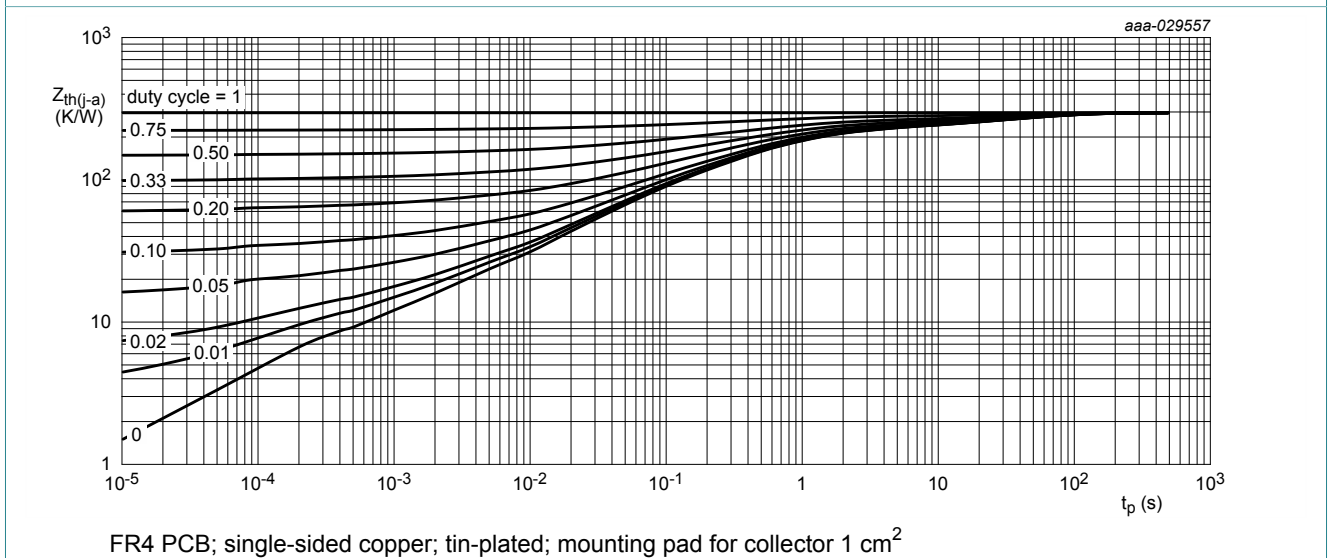
$T_{amb} = 25\text{ °C}$  unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	470	K/W
			[2]			340	K/W
			[3]			325	K/W
			[4]	-	-	280	K/W
$R_{(j-sp)}$	thermal resistance from junction to solder point			-	-	110	K/W

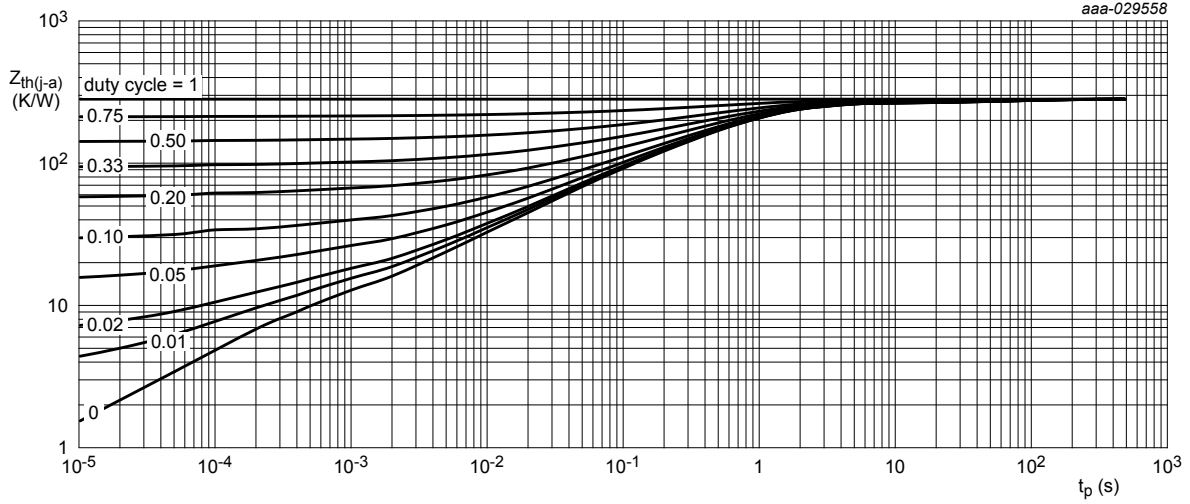
- [1] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided copper; tin-plated and standard footprint.
- [2] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided copper; tin-plated; mounting pad for collector 1 cm<sup>2</sup>.
- [3] Device mounted on an FR4 Printed-Circuit-Board (PCB); 4-layer copper; tin-plated and standard footprint.
- [4] Device mounted on an FR4 Printed-Circuit-Board (PCB); 4-layer copper; tin-plated; mounting pad for collector 1 cm<sup>2</sup>.



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

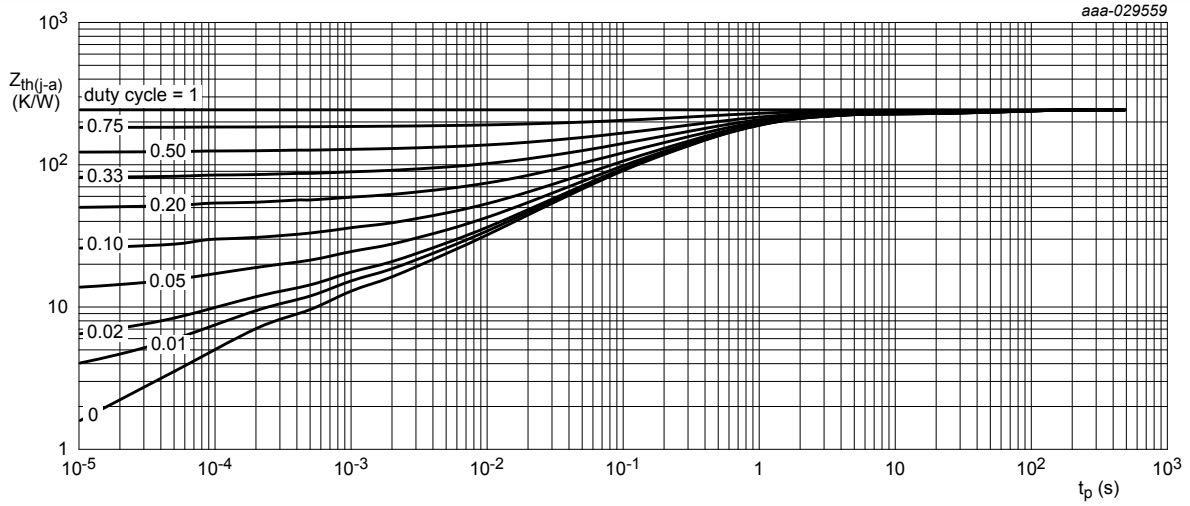


**Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values**



FR4 PCB; 4-layer copper; tin-plated and standard footprint

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



FR4 PCB; 4-layer copper; tin-plated; mounting pad for collector 1 cm<sup>2</sup>

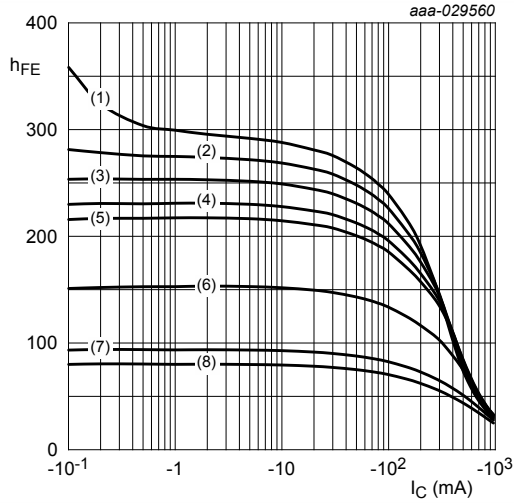
**Fig. 6. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values**

## 7. Characteristics

**Table 8. Characteristics**
 $T_{amb} = 25\text{ °C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = -100\ \mu\text{A}$ ; $I_E = 0\ \text{A}$	-50	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = -10\ \text{mA}$ ; $I_B = 0\ \text{A}$	-45	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	$I_E = -100\ \mu\text{A}$ ; $I_C = 0\ \text{A}$	-7	-	-	V
$I_{CBO}$	collector-base cut-off current	$V_{CB} = -25\ \text{V}$ ; $I_E = 0\ \text{A}$	-	-	-100	nA
		$V_{CB} = -25\ \text{V}$ ; $I_E = 0\ \text{A}$ ; $T_j = 150\text{ °C}$	-	-	-5	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = -5\ \text{V}$ ; $I_C = 0\ \text{A}$	-	-	-100	nA
$h_{FE}$	DC current gain					
	BC807-16H	$V_{CE} = -1\ \text{V}$ ; $I_C = -100\ \text{mA}$	[1]	100	-	250
	BC807-25H		[1]	160	-	400
	BC807-40H		[1]	250	-	600
	DC current gain	$V_{CE} = -1\ \text{V}$ ; $I_C = -500\ \text{mA}$	[1]	40	-	-
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = -500\ \text{mA}$ ; $I_B = -50\ \text{mA}$	[1]	-	-	-700 mV
$V_{BEsat}$	base-emitter saturation voltage	$I_C = -500\ \text{mA}$ ; $I_B = -50\ \text{mA}$	[1]			-1.2 V
$V_{BE}$	base-emitter voltage	$V_{CE} = -1\ \text{V}$ ; $I_C = -500\ \text{mA}$	[1]	-	-	-1.2 V
$f_T$	transition frequency	$V_{CE} = -5\ \text{V}$ ; $I_C = -10\ \text{mA}$ ; $f = 100\ \text{MHz}$		80	-	MHz
$C_c$	collector capacitance	$V_{CB} = -10\ \text{V}$ ; $I_E = I_C = 0\ \text{A}$ ; $f = 1\ \text{MHz}$		-	7	pF
$C_e$	emitter capacitance					
	BC807-16H	$V_{EB} = -0.5\ \text{V}$ ; $I_C = I_E = 0\ \text{A}$ ; $f = 1\ \text{MHz}$			50	pf
	BC807-25H				45	pF
	BC807-40H				37	pF

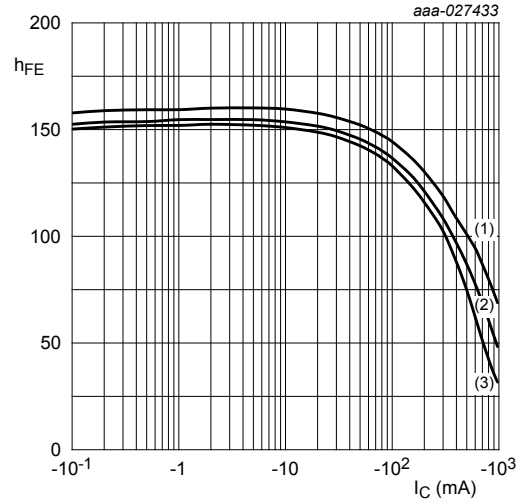
[1] pulsed;  $t_p \leq 300\ \mu\text{s}$ ;  $\delta \leq 0.02$



$V_{CE} = -1\text{ V}$

- (1)  $T_{amb} = 175\text{ °C}$
- (2)  $T_{amb} = 150\text{ °C}$
- (3)  $T_{amb} = 125\text{ °C}$
- (4)  $T_{amb} = 100\text{ °C}$
- (5)  $T_{amb} = 85\text{ °C}$
- (6)  $T_{amb} = 25\text{ °C}$
- (7)  $T_{amb} = -40\text{ °C}$
- (8)  $T_{amb} = -55\text{ °C}$

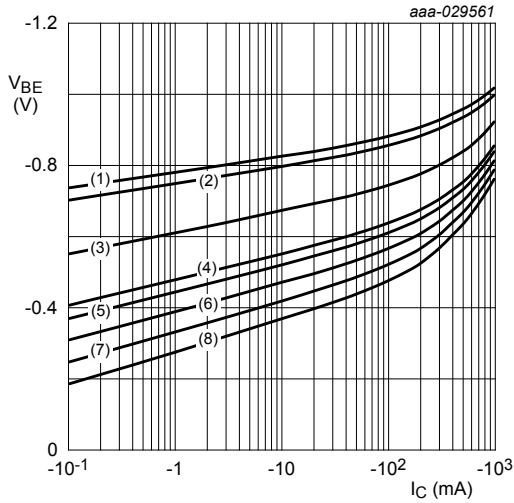
Fig. 7. BC807-16H: DC current gain as a function of collector current; typical values



$T_{amb} = 25\text{ °C}$

- (1)  $V_{CE} = -5\text{ V}$
- (2)  $V_{CE} = -2\text{ V}$
- (3)  $V_{CE} = -1\text{ V}$

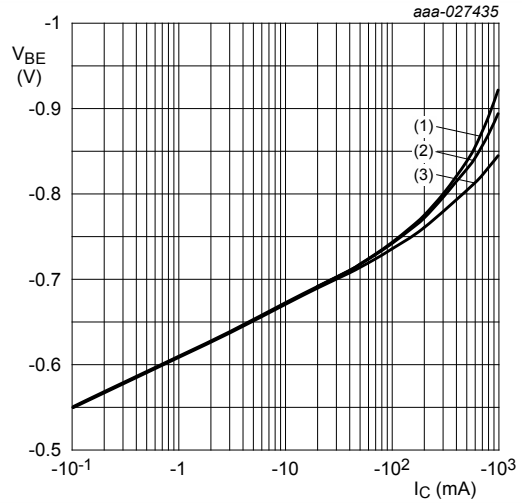
Fig. 8. BC807-16H: DC current gain as a function of collector current; typical values



$V_{CE} = -1\text{ V}$

- (1)  $T_{amb} = -55\text{ °C}$
- (2)  $T_{amb} = -40\text{ °C}$
- (3)  $T_{amb} = 25\text{ °C}$
- (4)  $T_{amb} = 85\text{ °C}$
- (5)  $T_{amb} = 100\text{ °C}$
- (6)  $T_{amb} = 125\text{ °C}$
- (7)  $T_{amb} = 150\text{ °C}$
- (8)  $T_{amb} = 175\text{ °C}$

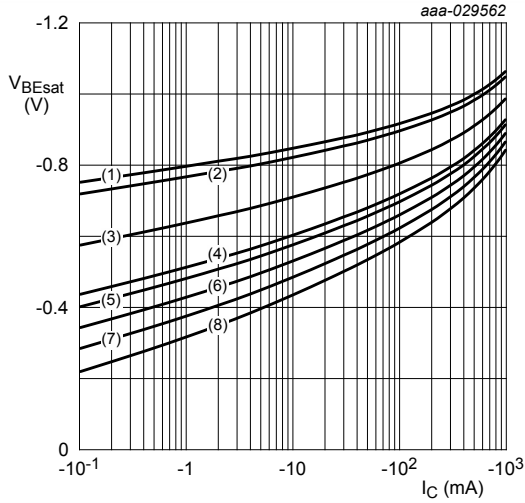
Fig. 9. BC807-16H: Base-emitter voltage as a function of collector current; typical values



$T_{amb} = 25\text{ °C}$

- (1)  $V_{CE} = -1\text{ V}$
- (2)  $V_{CE} = -2\text{ V}$
- (3)  $V_{CE} = -5\text{ V}$

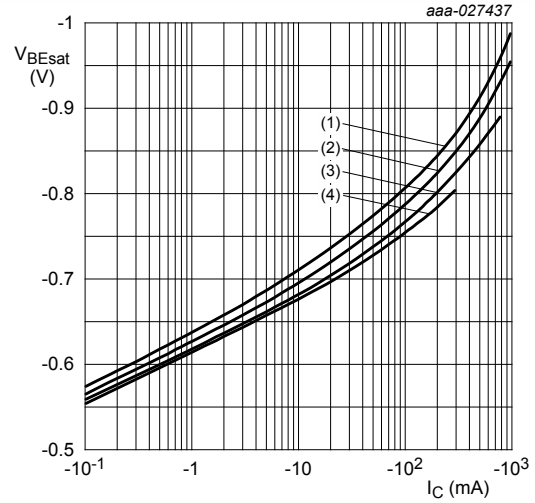
Fig. 10. BC807-16H: Base-emitter voltage as a function of collector current; typical values



$I_C / I_B = 10$

- (1)  $T_{amb} = -55\text{ }^\circ\text{C}$
- (2)  $T_{amb} = -40\text{ }^\circ\text{C}$
- (3)  $T_{amb} = 25\text{ }^\circ\text{C}$
- (4)  $T_{amb} = 85\text{ }^\circ\text{C}$
- (5)  $T_{amb} = 100\text{ }^\circ\text{C}$
- (6)  $T_{amb} = 125\text{ }^\circ\text{C}$
- (7)  $T_{amb} = 150\text{ }^\circ\text{C}$
- (8)  $T_{amb} = 175\text{ }^\circ\text{C}$

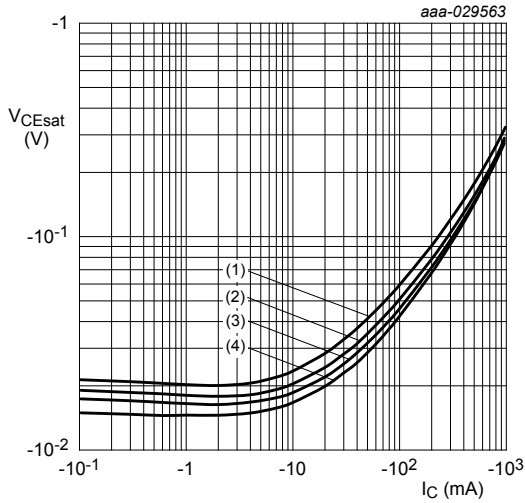
Fig. 11. BC807-16H: Base-emitter saturation voltage as a function of collector current; typical values



$T_{amb} = 25\text{ }^\circ\text{C}$

- (1)  $I_C / I_B = 10$
- (2)  $I_C / I_B = 20$
- (3)  $I_C / I_B = 50$
- (4)  $I_C / I_B = 100$

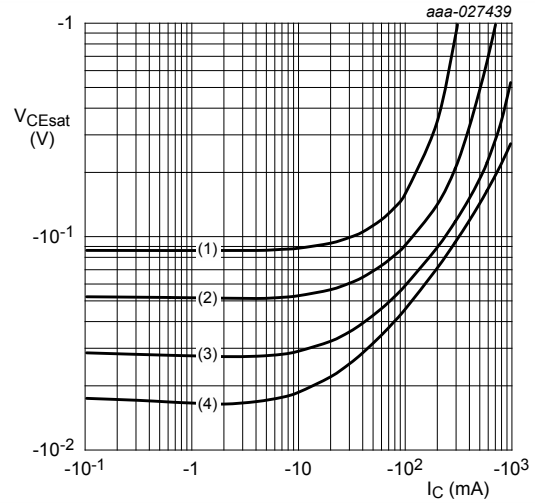
Fig. 12. BC807-16H: Base-emitter saturation voltage as a function of collector current; typical values



$I_C / I_B = 10$

- (1)  $T_{amb} = 175\text{ }^\circ\text{C}$
- (2)  $T_{amb} = 85\text{ }^\circ\text{C}$
- (3)  $T_{amb} = 25\text{ }^\circ\text{C}$
- (4)  $T_{amb} = -40\text{ }^\circ\text{C}$

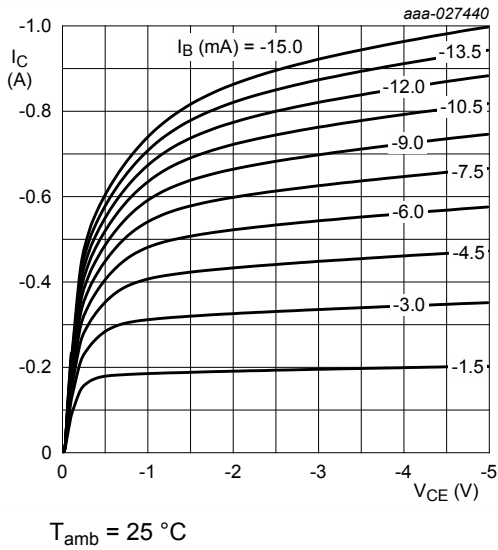
Fig. 13. BC807-16H: Collector-emitter saturation voltage as a function of collector current; typical values



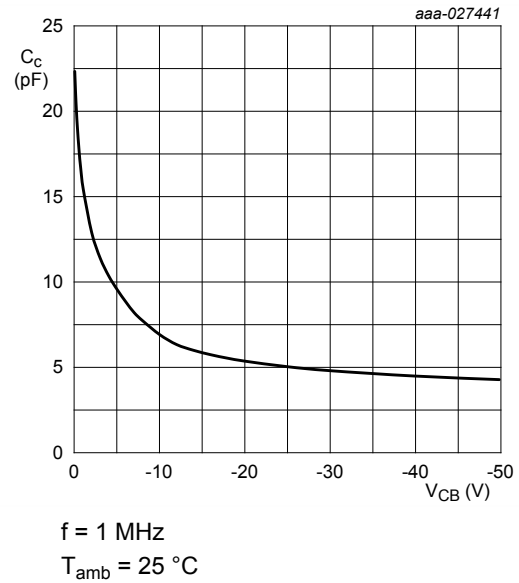
$T_{amb} = 25\text{ }^\circ\text{C}$

- (1)  $I_C / I_B = 100$
- (2)  $I_C / I_B = 50$
- (3)  $I_C / I_B = 20$
- (4)  $I_C / I_B = 10$

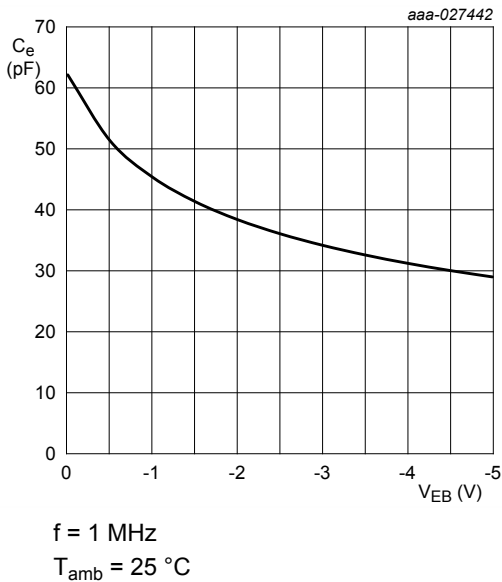
Fig. 14. BC807-16H: Collector-emitter saturation voltage as a function of collector current; typical values



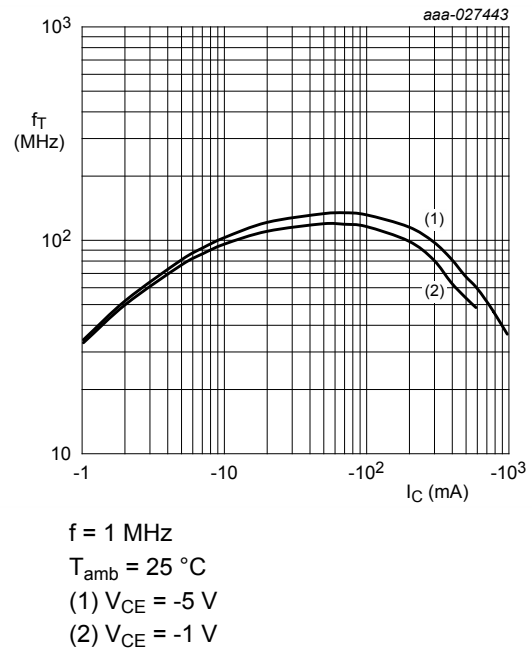
**Fig. 15. BC807-16H: Collector current as a function of collector-emitter voltage; typical values**



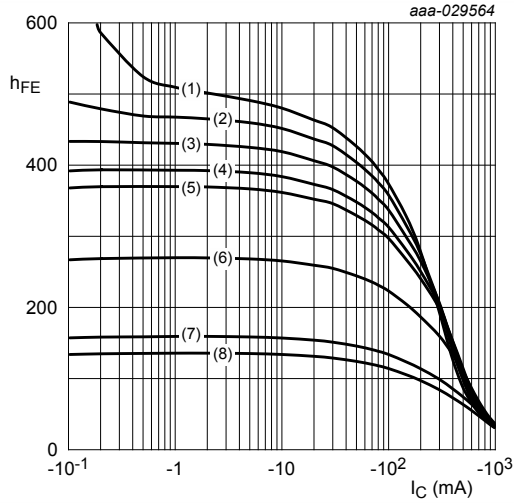
**Fig. 16. BC807-16H: Collector capacitance as a function of collector-base voltage; typical values**



**Fig. 17. BC807-16H: Emitter capacitance as a function of emitter-base voltage; typical values**



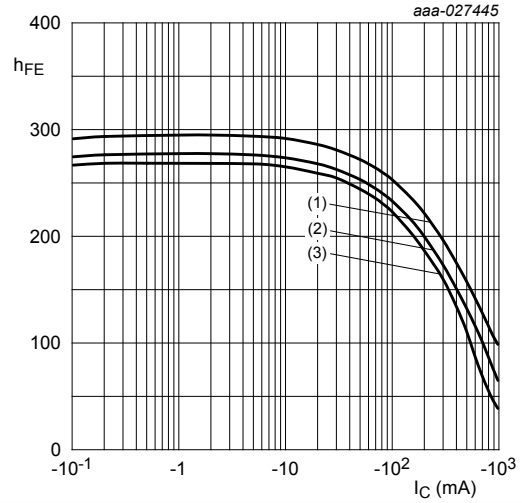
**Fig. 18. BC807-16H: Transition frequency as a function of collector current; typical values**



$V_{CE} = -1\text{ V}$

- (1)  $T_{amb} = 175\text{ °C}$
- (2)  $T_{amb} = 150\text{ °C}$
- (3)  $T_{amb} = 125\text{ °C}$
- (4)  $T_{amb} = 100\text{ °C}$
- (5)  $T_{amb} = 85\text{ °C}$
- (6)  $T_{amb} = 25\text{ °C}$
- (7)  $T_{amb} = -40\text{ °C}$
- (8)  $T_{amb} = -55\text{ °C}$

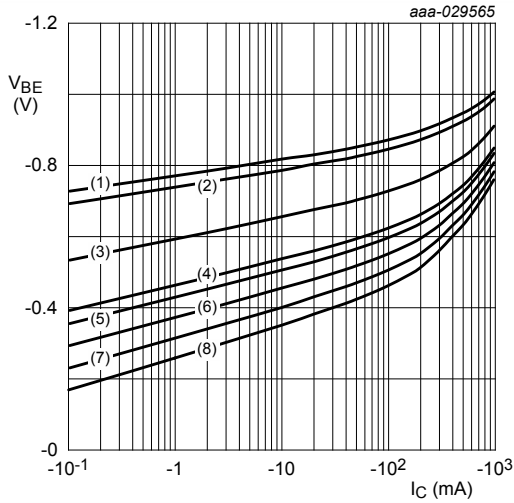
Fig. 19. BC807-25H: DC current gain as a function of collector current; typical values



$T_{amb} = 25\text{ °C}$

- (1)  $V_{CE} = -5\text{ V}$
- (2)  $V_{CE} = -2\text{ V}$
- (3)  $V_{CE} = -1\text{ V}$

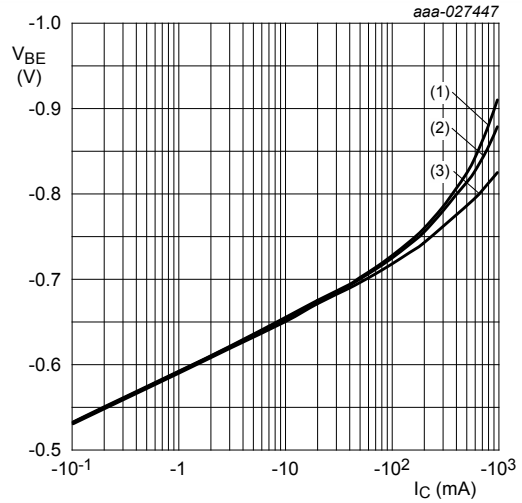
Fig. 20. BC807-25H: DC current gain as a function of collector current; typical values



$V_{CE} = -1\text{ V}$

- (1)  $T_{amb} = -55\text{ °C}$
- (2)  $T_{amb} = -40\text{ °C}$
- (3)  $T_{amb} = 25\text{ °C}$
- (4)  $T_{amb} = 85\text{ °C}$
- (5)  $T_{amb} = 100\text{ °C}$
- (6)  $T_{amb} = 125\text{ °C}$
- (7)  $T_{amb} = 150\text{ °C}$
- (8)  $T_{amb} = 175\text{ °C}$

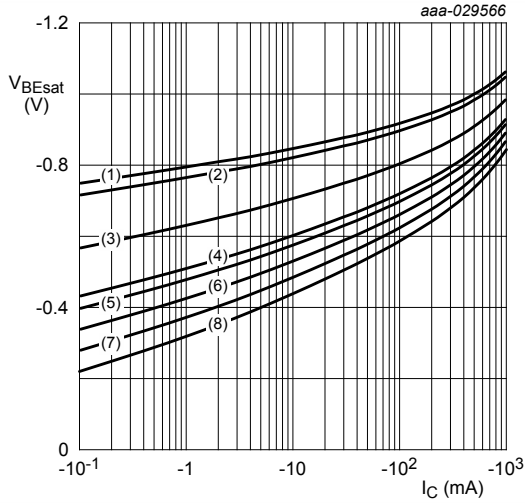
Fig. 21. BC807-25H: Base-emitter voltage as a function of collector current; typical values



$T_{amb} = 25\text{ °C}$

- (1)  $V_{CE} = -1\text{ V}$
- (2)  $V_{CE} = -2\text{ V}$
- (3)  $V_{CE} = -5\text{ V}$

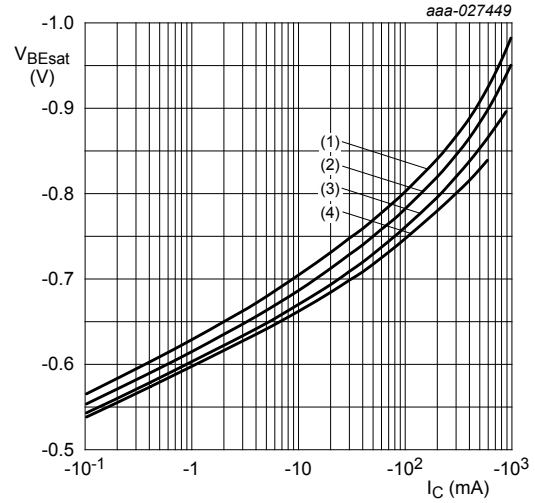
Fig. 22. BC807-25H: Base-emitter voltage as a function of collector current; typical values



$I_C / I_B = 10$

- (1)  $T_{amb} = -55\text{ }^\circ\text{C}$
- (2)  $T_{amb} = -40\text{ }^\circ\text{C}$
- (3)  $T_{amb} = 25\text{ }^\circ\text{C}$
- (4)  $T_{amb} = 85\text{ }^\circ\text{C}$
- (5)  $T_{amb} = 100\text{ }^\circ\text{C}$
- (6)  $T_{amb} = 125\text{ }^\circ\text{C}$
- (7)  $T_{amb} = 150\text{ }^\circ\text{C}$
- (8)  $T_{amb} = 175\text{ }^\circ\text{C}$

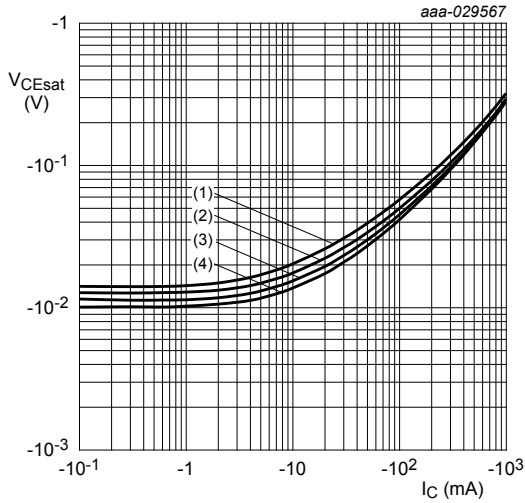
Fig. 23. BC807-25H: Base-emitter saturation voltage as a function of collector current; typical values



$T_{amb} = 25\text{ }^\circ\text{C}$

- (1)  $I_C / I_B = 10$
- (2)  $I_C / I_B = 20$
- (3)  $I_C / I_B = 50$
- (4)  $I_C / I_B = 100$

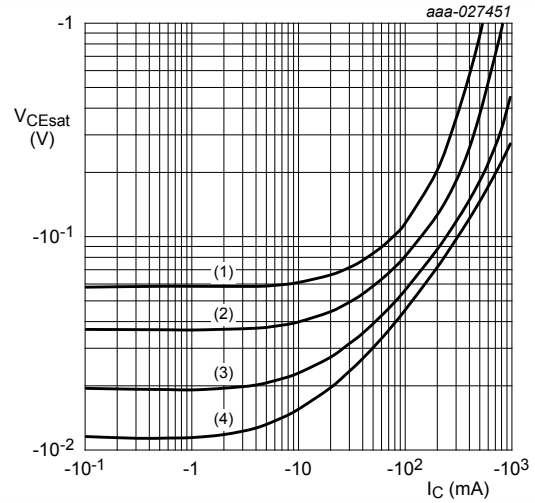
Fig. 24. BC807-25H: Base-emitter saturation voltage as a function of collector current; typical values



$I_C / I_B = 10$

- (1)  $T_{amb} = 175\text{ }^\circ\text{C}$
- (2)  $T_{amb} = 85\text{ }^\circ\text{C}$
- (3)  $T_{amb} = 25\text{ }^\circ\text{C}$
- (4)  $T_{amb} = -40\text{ }^\circ\text{C}$

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



$T_{amb} = 25\text{ }^\circ\text{C}$

- (1)  $I_C / I_B = 100$
- (2)  $I_C / I_B = 50$
- (3)  $I_C / I_B = 20$
- (4)  $I_C / I_B = 10$

Fig. 26. BC807-25H: Collector-emitter saturation voltage as a function of collector current; typical values

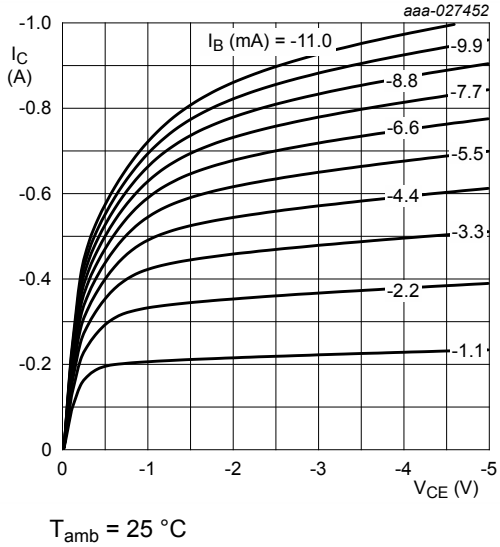


Fig. 27. BC807-25H: Collector current as a function of collector-emitter voltage; typical values

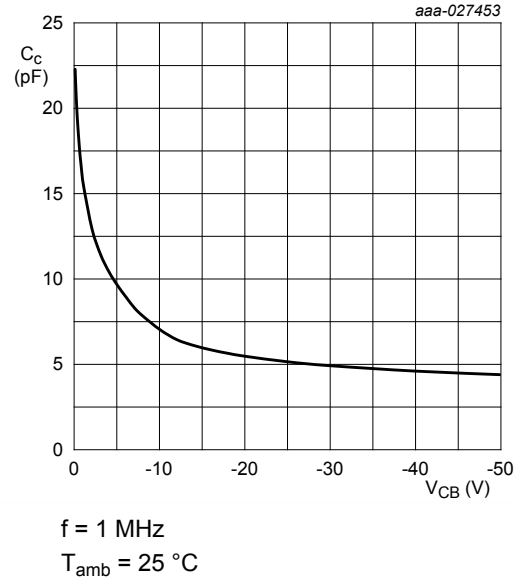


Fig. 28. BC807-25H: Collector capacitance as a function of collector-base voltage; typical values

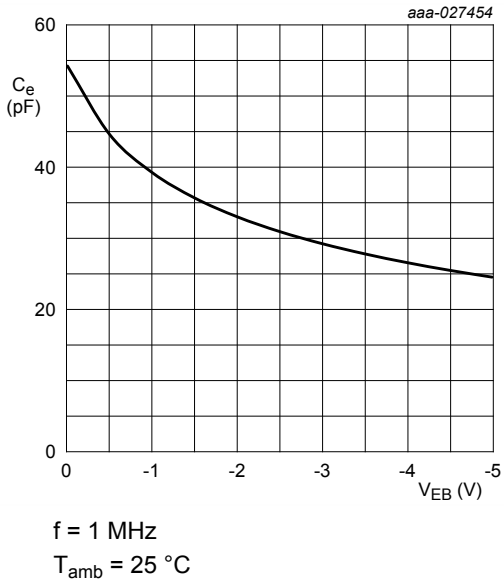


Fig. 29. BC807-25H: Emitter capacitance as a function of emitter-base voltage; typical values

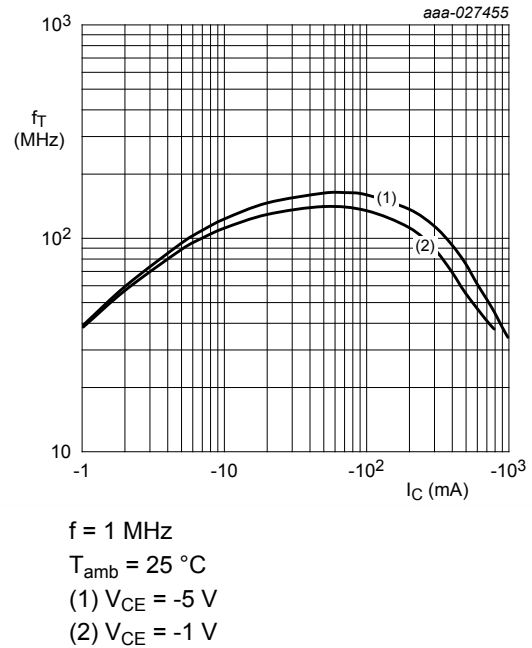
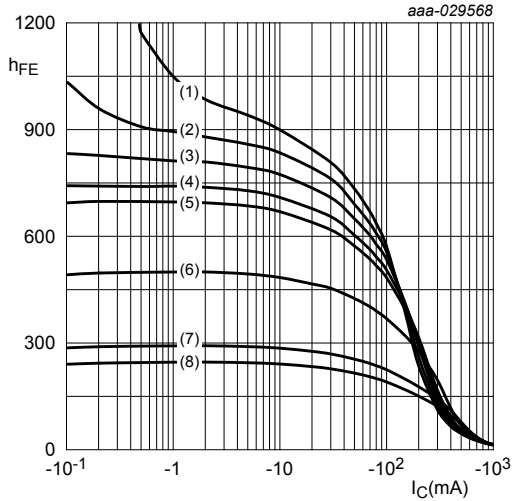


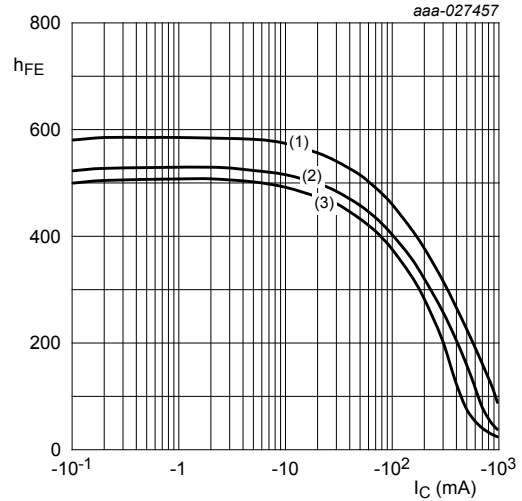
Fig. 30. BC807-25H: Transition frequency as a function of collector current; typical values



$V_{CE} = -1 \text{ V}$

- (1)  $T_{amb} = 175 \text{ }^\circ\text{C}$
- (2)  $T_{amb} = 150 \text{ }^\circ\text{C}$
- (3)  $T_{amb} = 125 \text{ }^\circ\text{C}$
- (4)  $T_{amb} = 100 \text{ }^\circ\text{C}$
- (5)  $T_{amb} = 85 \text{ }^\circ\text{C}$
- (6)  $T_{amb} = 25 \text{ }^\circ\text{C}$
- (7)  $T_{amb} = -40 \text{ }^\circ\text{C}$
- (8)  $T_{amb} = -55 \text{ }^\circ\text{C}$

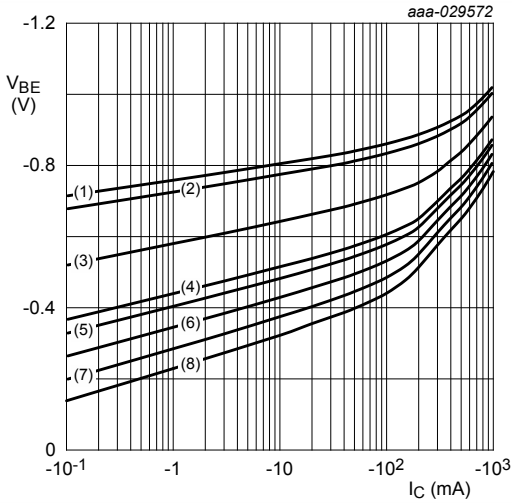
Fig. 31. BC807-40H: DC current gain as a function of collector current; typical values



$T_{amb} = 25 \text{ }^\circ\text{C}$

- (1)  $V_{CE} = -5 \text{ V}$
- (2)  $V_{CE} = -2 \text{ V}$
- (3)  $V_{CE} = -1 \text{ V}$

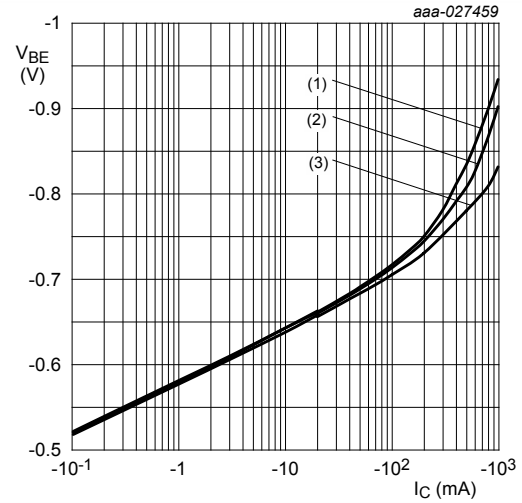
Fig. 32. BC807-40H: DC current gain as a function of collector current; typical values



$V_{CE} = -1 \text{ V}$

- (1)  $T_{amb} = -55 \text{ }^\circ\text{C}$
- (2)  $T_{amb} = -40 \text{ }^\circ\text{C}$
- (3)  $T_{amb} = 25 \text{ }^\circ\text{C}$
- (4)  $T_{amb} = 85 \text{ }^\circ\text{C}$
- (5)  $T_{amb} = 100 \text{ }^\circ\text{C}$
- (6)  $T_{amb} = 125 \text{ }^\circ\text{C}$
- (7)  $T_{amb} = 150 \text{ }^\circ\text{C}$
- (8)  $T_{amb} = 175 \text{ }^\circ\text{C}$

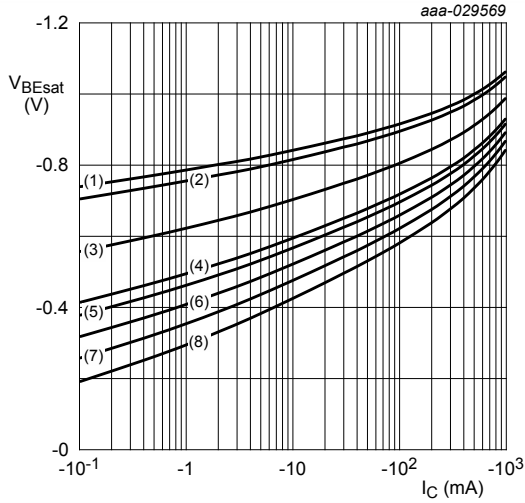
Fig. 33. BC807-40H: Base-emitter voltage as a function of collector current; typical values



$T_{amb} = 25 \text{ }^\circ\text{C}$

- (1)  $V_{CE} = -1 \text{ V}$
- (2)  $V_{CE} = -2 \text{ V}$
- (3)  $V_{CE} = -5 \text{ V}$

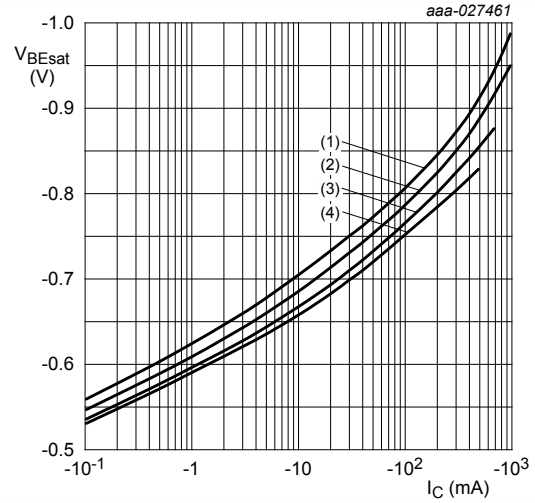
Fig. 34. BC807-40H: Base-emitter voltage as a function of collector current; typical values



$I_C / I_B = 10$

- (1)  $T_{amb} = -55\text{ }^\circ\text{C}$
- (2)  $T_{amb} = -40\text{ }^\circ\text{C}$
- (3)  $T_{amb} = 25\text{ }^\circ\text{C}$
- (4)  $T_{amb} = 85\text{ }^\circ\text{C}$
- (5)  $T_{amb} = 100\text{ }^\circ\text{C}$
- (6)  $T_{amb} = 125\text{ }^\circ\text{C}$
- (7)  $T_{amb} = 150\text{ }^\circ\text{C}$
- (8)  $T_{amb} = 175\text{ }^\circ\text{C}$

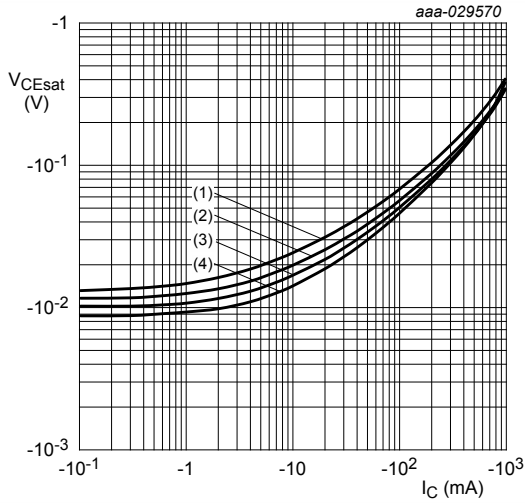
Fig. 35. BC807-40H: Base-emitter saturation voltage as a function of collector current; typical values



$T_{amb} = 25\text{ }^\circ\text{C}$

- (1)  $I_C / I_B = 10$
- (2)  $I_C / I_B = 20$
- (3)  $I_C / I_B = 50$
- (4)  $I_C / I_B = 100$

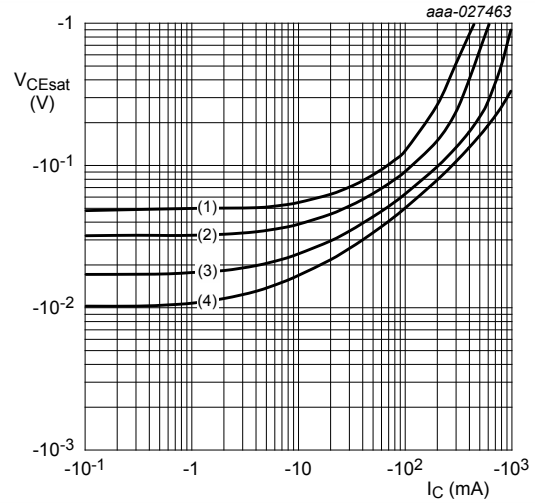
Fig. 36. BC807-40H: Base-emitter saturation voltage as a function of collector current; typical values



$I_C / I_B = 10$

- (1)  $T_{amb} = 175\text{ }^\circ\text{C}$
- (2)  $T_{amb} = 85\text{ }^\circ\text{C}$
- (3)  $T_{amb} = 25\text{ }^\circ\text{C}$
- (4)  $T_{amb} = -40\text{ }^\circ\text{C}$

Fig. 37. BC807-40H: Collector-emitter saturation voltage as a function of collector current; typical values



$T_{amb} = 25\text{ }^\circ\text{C}$

- (1)  $I_C / I_B = 100$
- (2)  $I_C / I_B = 50$
- (3)  $I_C / I_B = 20$
- (4)  $I_C / I_B = 10$

Fig. 38. BC807-40H: Collector-emitter saturation voltage as a function of collector current; typical values

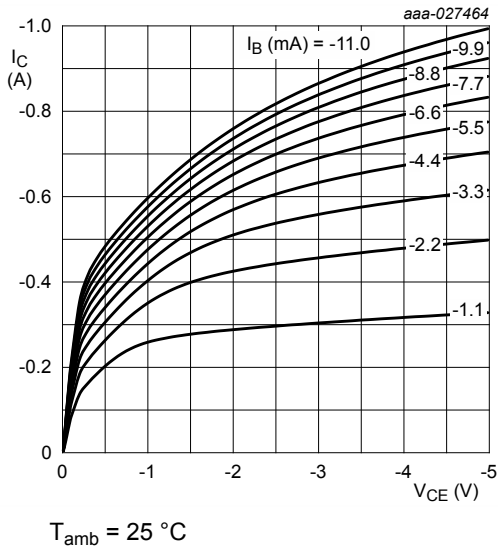


Fig. 39. BC807-40H: Collector current as a function of collector-emitter voltage; typical values

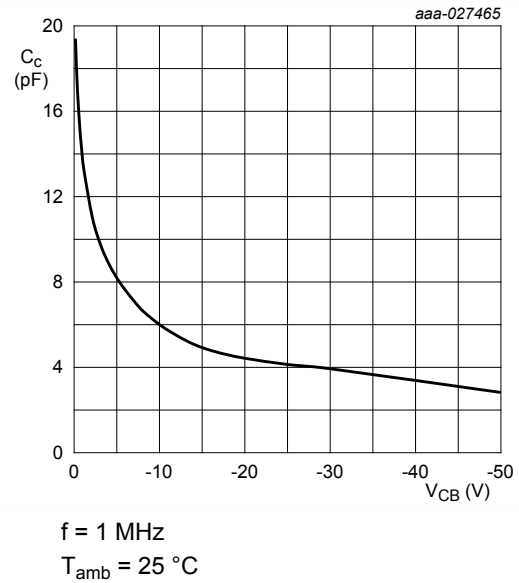


Fig. 40. BC807-40H: Collector capacitance as a function of collector-base voltage; typical values

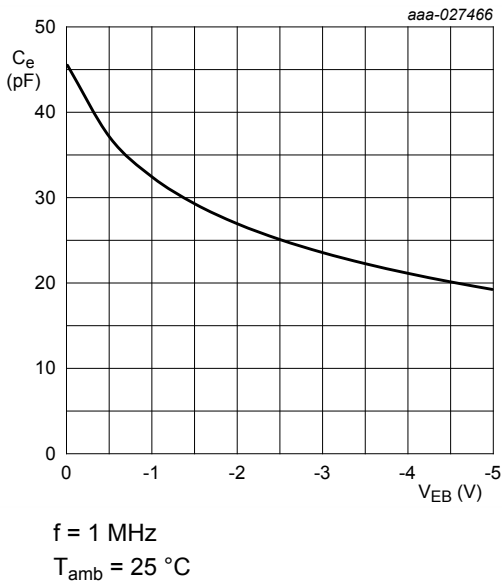


Fig. 41. BC807-40H: Emitter capacitance as a function of emitter-base voltage; typical values

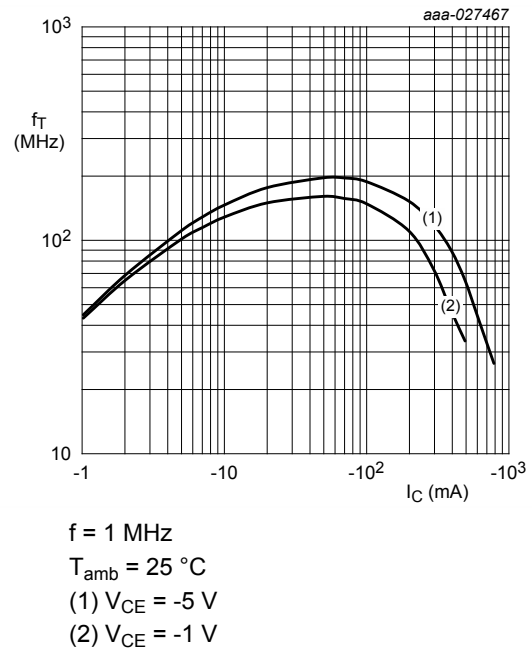


Fig. 42. BC807-40H: Transition frequency as a function of collector current; typical values

## 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

Table 9. Package outline

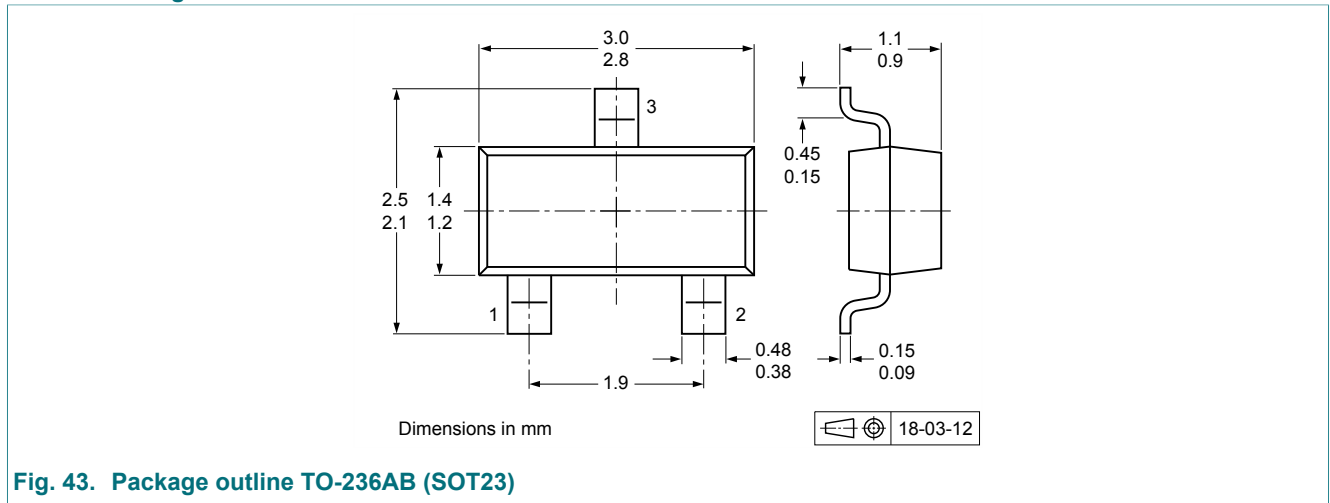


Fig. 43. Package outline TO-236AB (SOT23)

## 10. Soldering

Table 10. Soldering

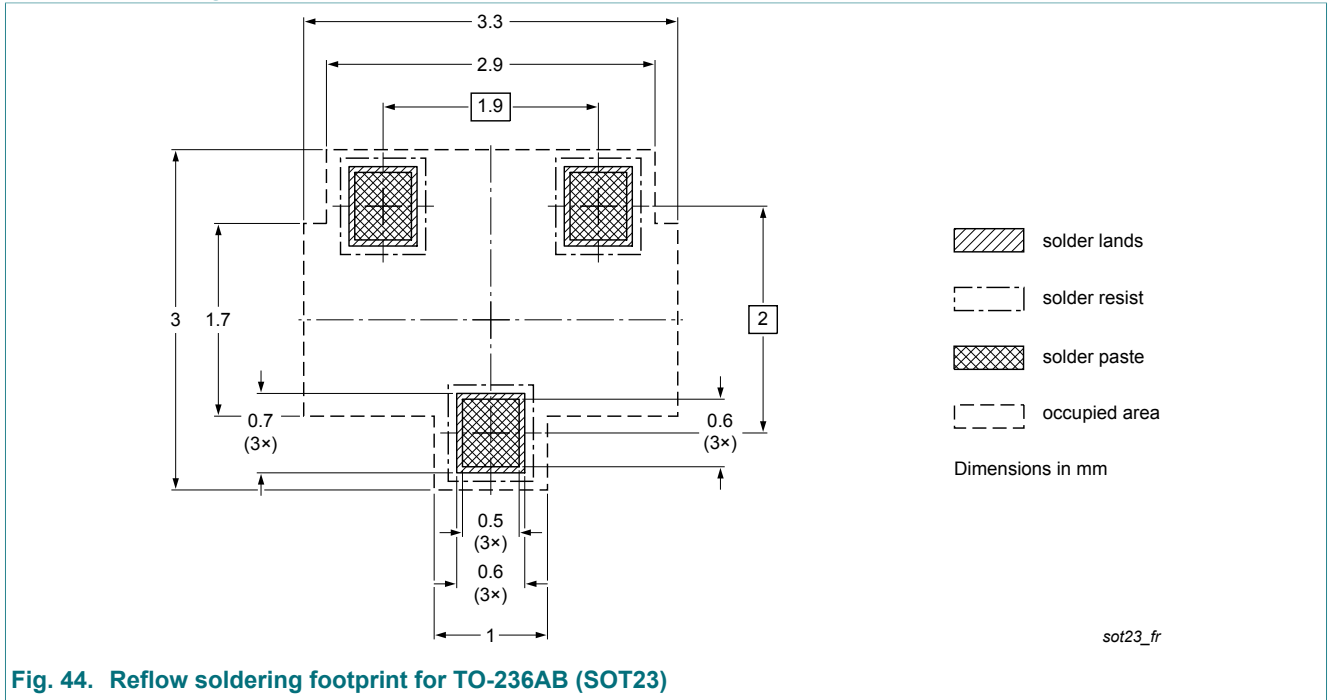


Fig. 44. Reflow soldering footprint for TO-236AB (SOT23)

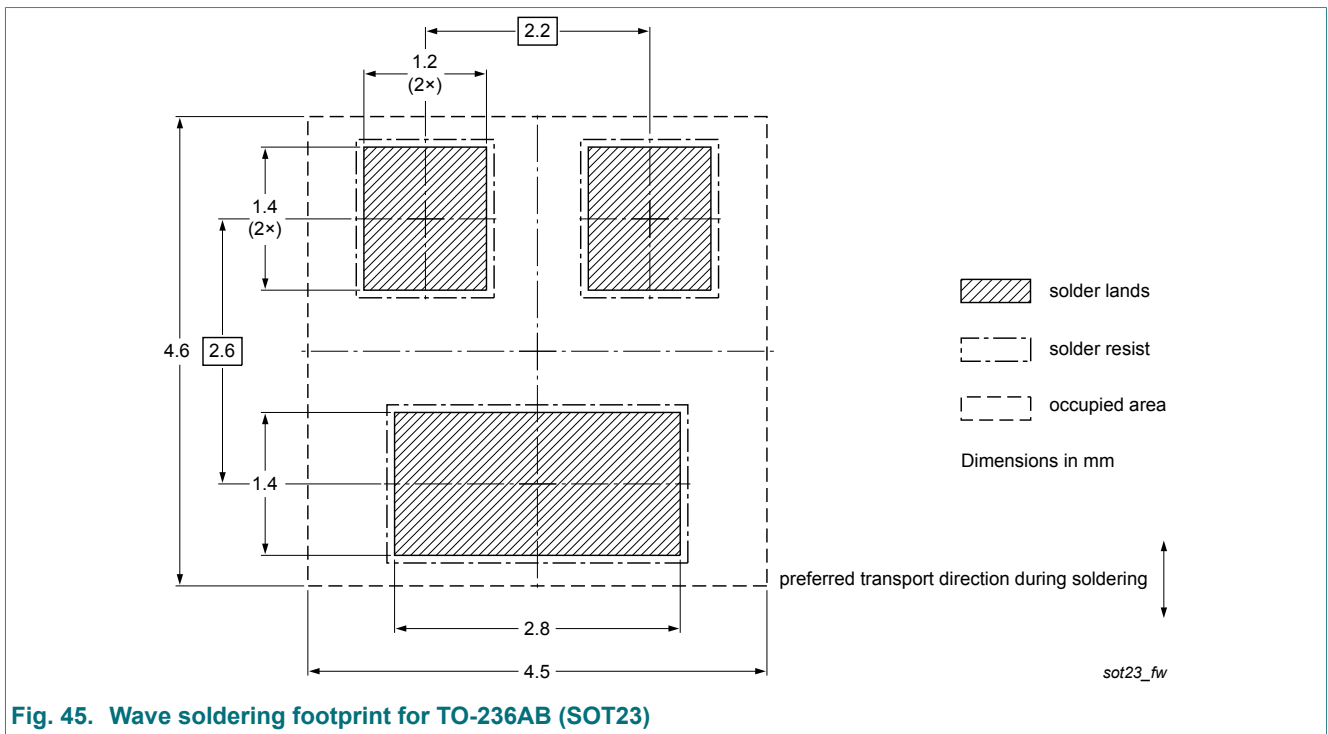


Fig. 45. Wave soldering footprint for TO-236AB (SOT23)

## 11. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BC807H_SER v.1	20190305	Product data sheet	-	-

## 12. 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: 5 March 2019