



**THE DATASHEET OF  
BC807-40HVL**





# 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

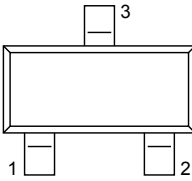
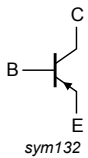
$T_{amb} = 25\text{ °C}$  unless otherwise specified.

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		 sym132
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

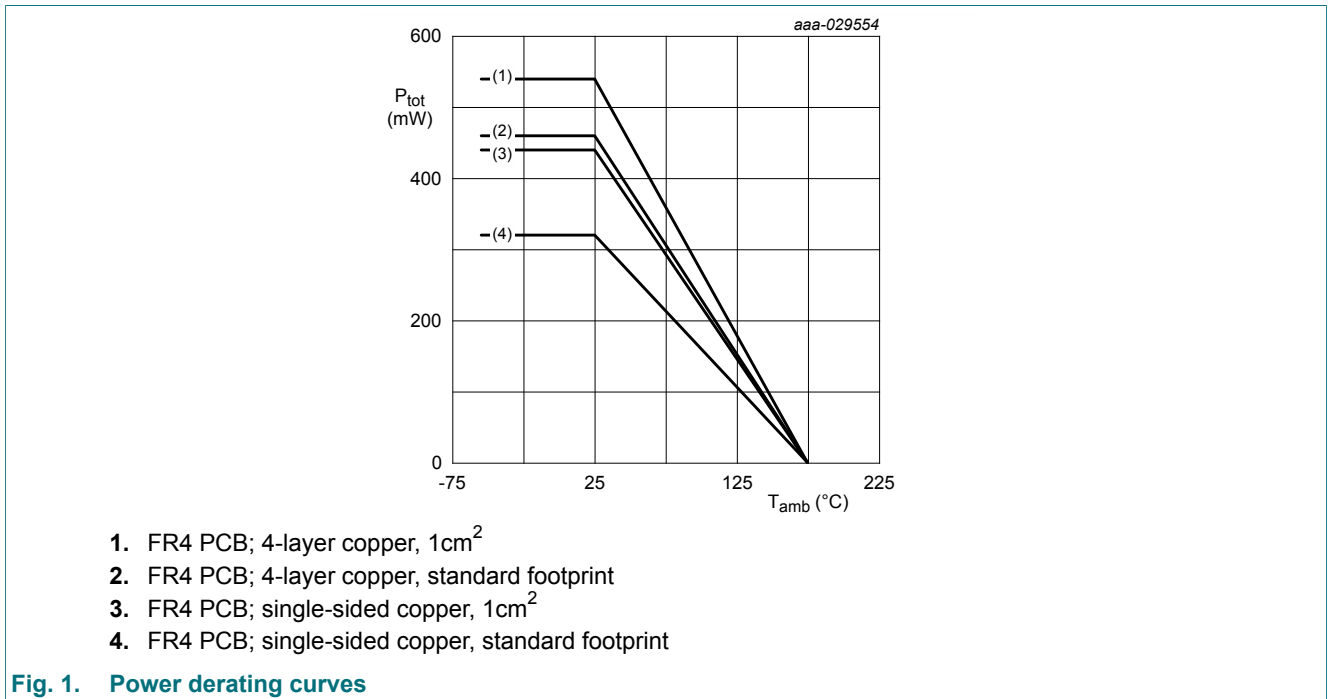
**Table 6. Limiting values**

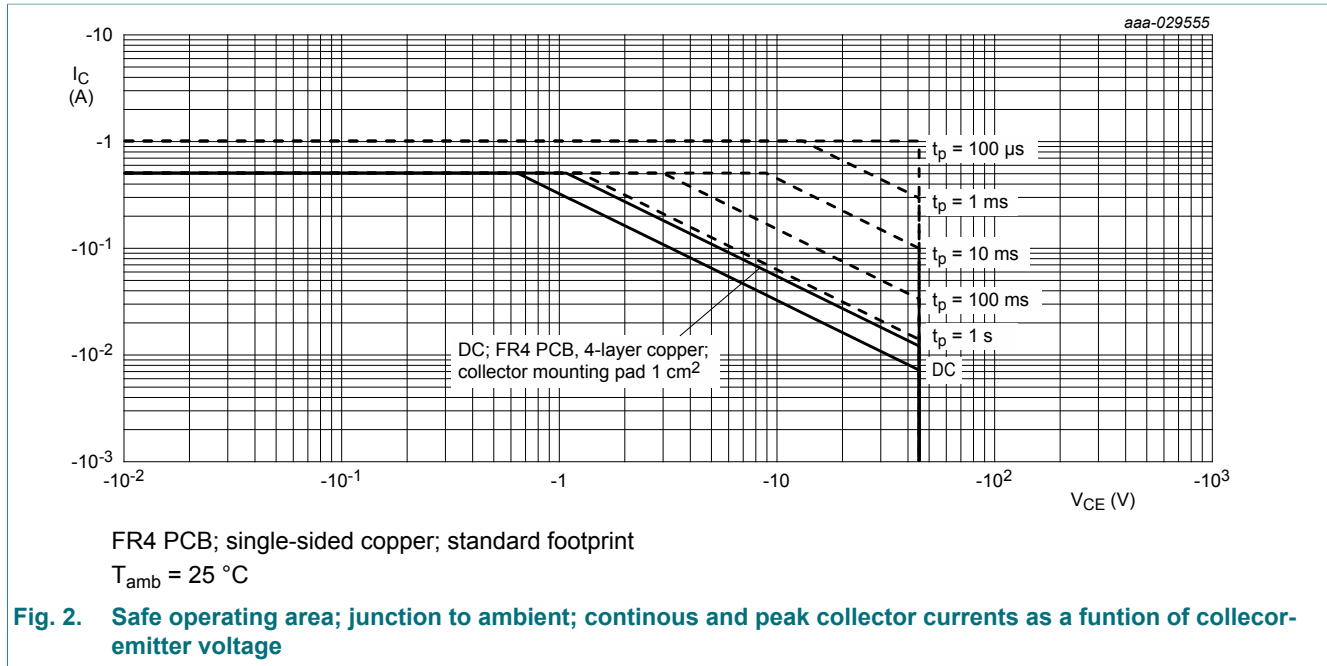
In accordance with the Absolute Maximum Rating System (IEC 60134).

$T_{amb} = 25\text{ °C}$  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>.





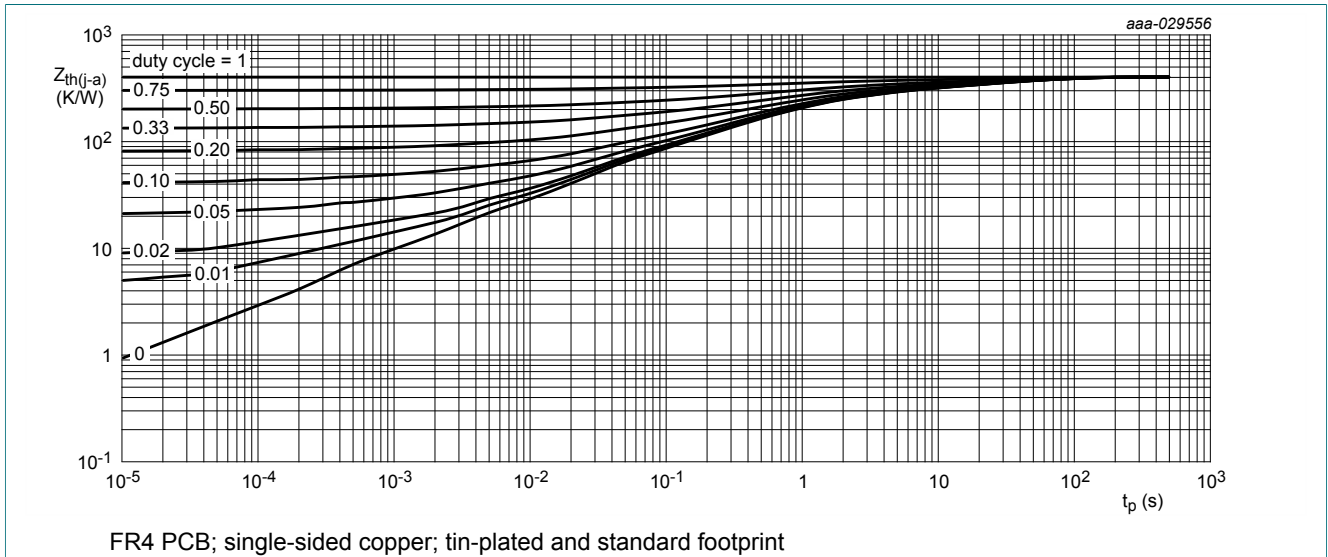
## 6. Thermal characteristics

**Table 7. Thermal characteristics**

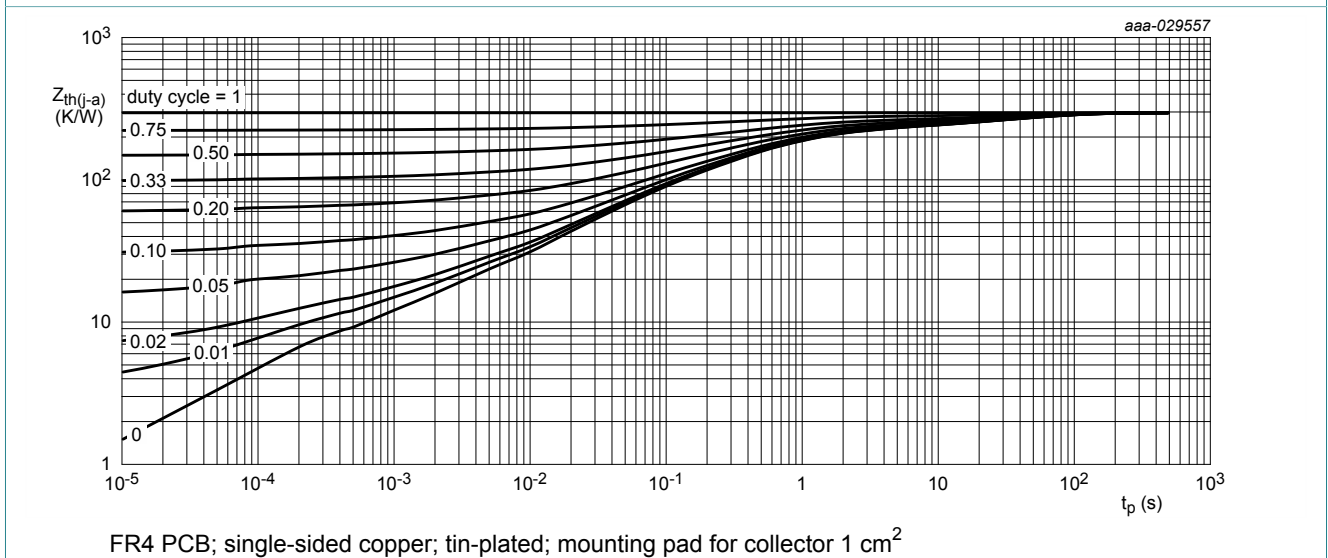
$T_{amb} = 25\text{ °C}$  unless otherwise specified.

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

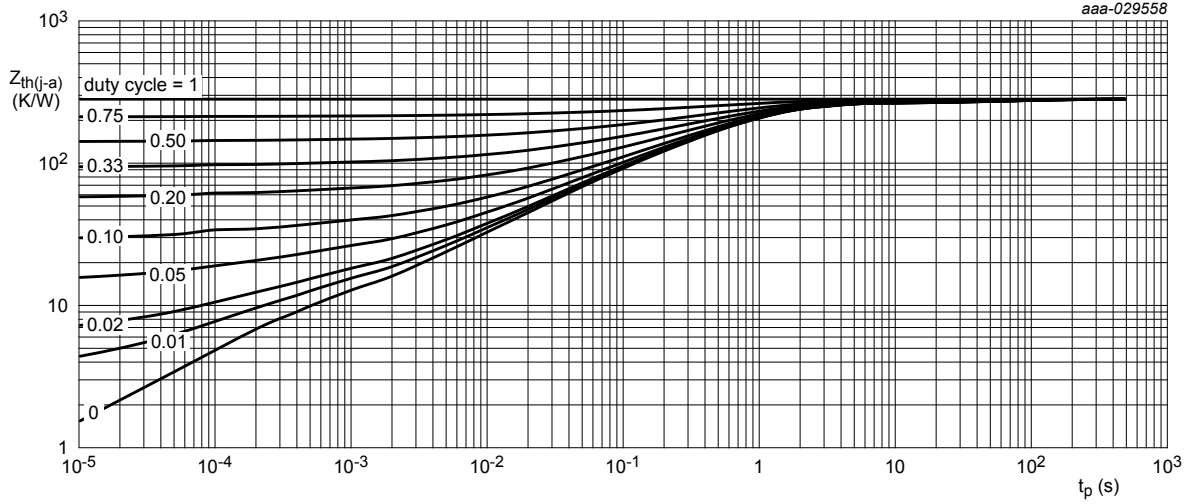
- [1] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided copper; tin-plated and standard footprint.
- [2] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided copper; tin-plated; mounting pad for collector 1 cm<sup>2</sup>.
- [3] Device mounted on an FR4 Printed-Circuit-Board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

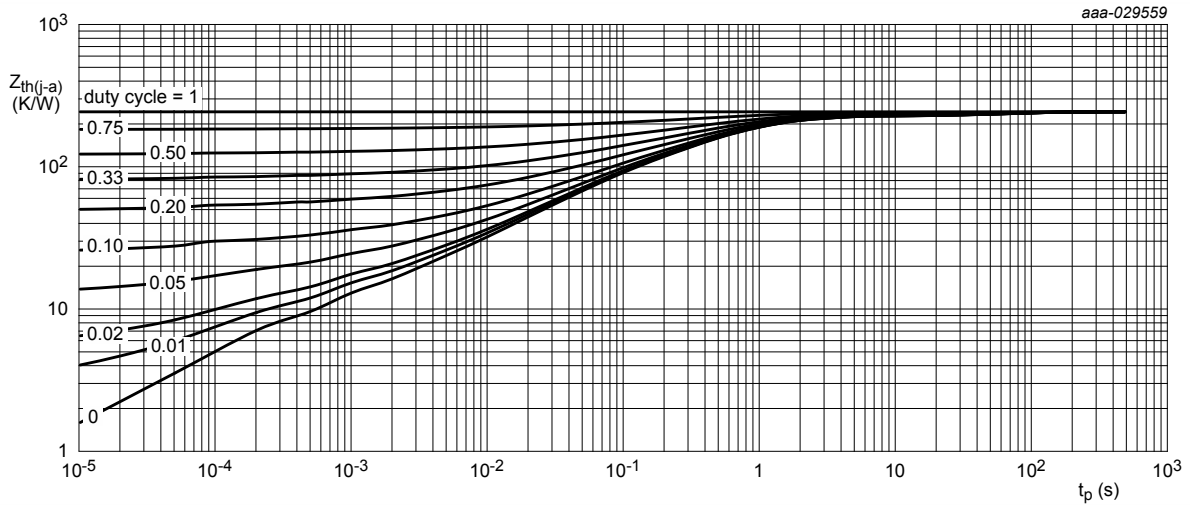


**Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values**



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>

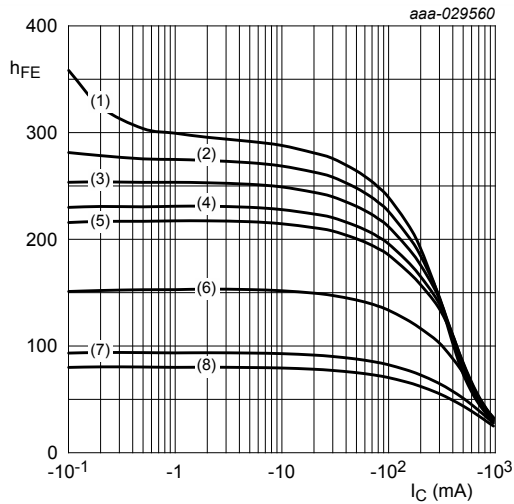
**Fig. 6. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values**

## 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	$V_{CB} = -10\ \text{V}$ ; $I_E = i_e = 0\ \text{A}$ ; $f = 1\ \text{MHz}$		-	7	pF
$C_e$	emitter capacitance					
	BC807-16H	$V_{EB} = -0.5\ \text{V}$ ; $I_C = i_c = 0\ \text{A}$ ; $f = 1\ \text{MHz}$			50	pf
	BC807-25H				45	pF
	BC807-40H				37	pF

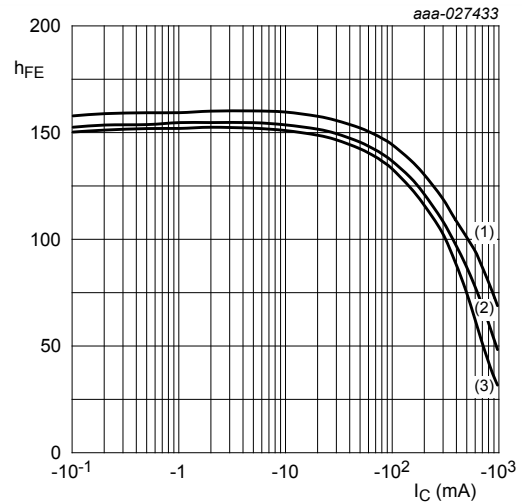
[1] pulsed;  $t_p \leq 300\ \mu\text{s}$ ;  $\delta \leq 0.02$



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

- (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)  $T_{amb} = -55\text{ °C}$

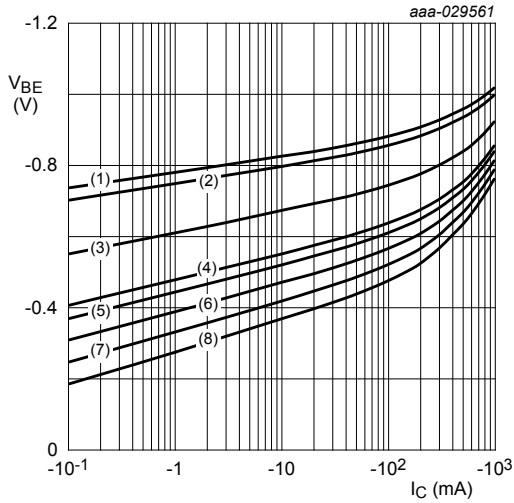
Fig. 7. BC807-16H: DC current gain as a function of collector current; typical values



$T_{amb} = 25\text{ °C}$

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

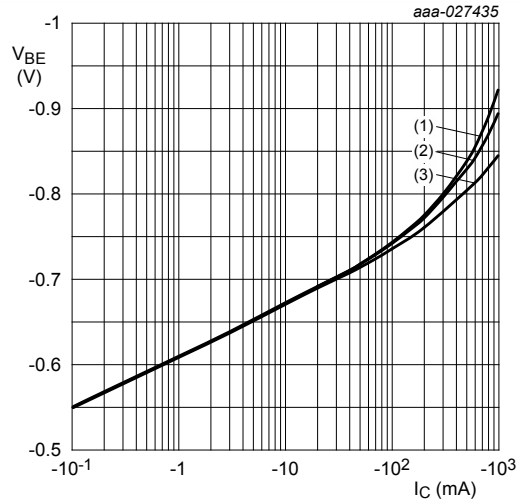
Fig. 8. BC807-16H: DC current gain as a function of collector current; typical values



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

- (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)  $T_{amb} = 175\text{ °C}$

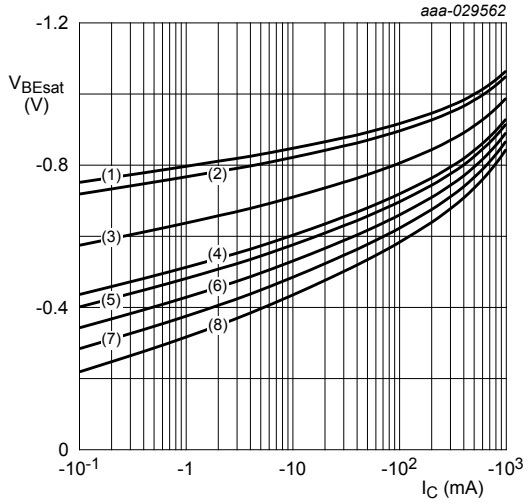
Fig. 9. BC807-16H: Base-emitter voltage as a function of collector current; typical values



$T_{amb} = 25\text{ °C}$

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

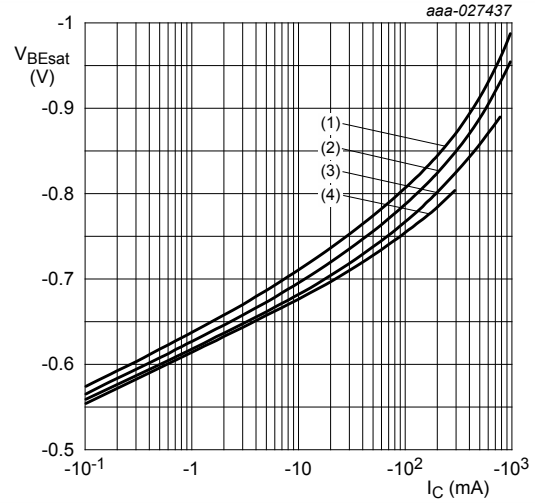
Fig. 10. BC807-16H: Base-emitter voltage as a function of collector current; typical values



$I_C / I_B = 10$

- (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)  $T_{amb} = 175\text{ }^\circ\text{C}$

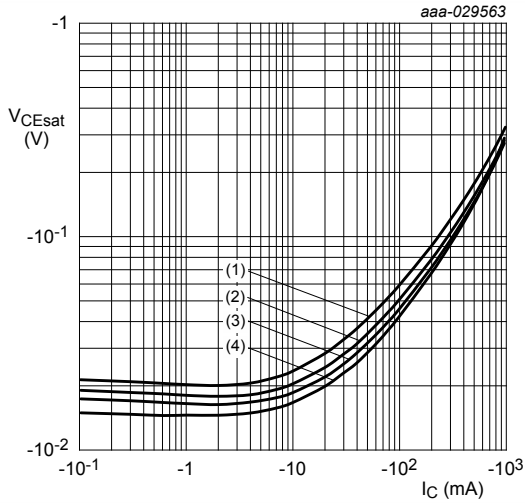
Fig. 11. BC807-16H: Base-emitter saturation voltage as a function of collector current; typical values



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

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

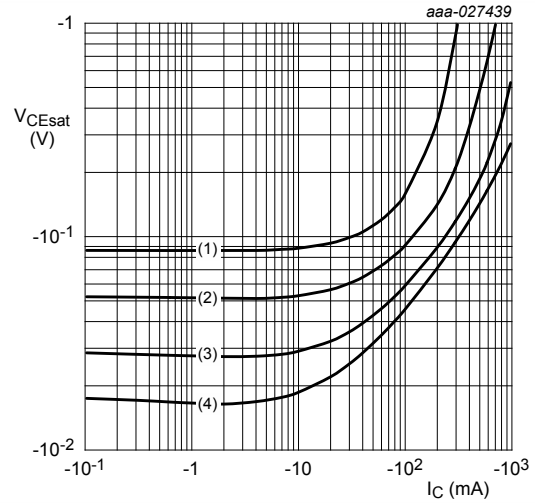
Fig. 12. BC807-16H: Base-emitter saturation voltage as a function of collector current; typical values



$I_C / I_B = 10$

- (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

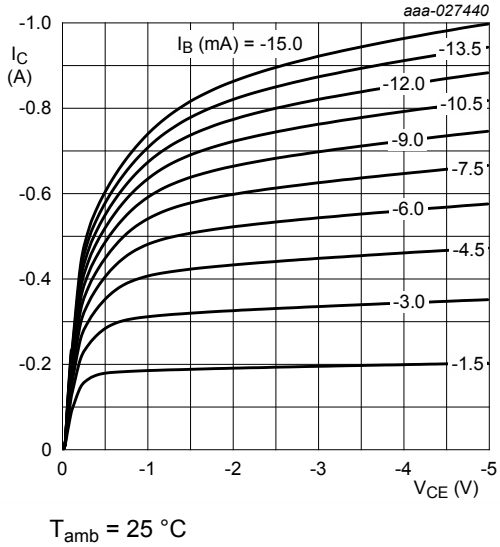


Fig. 15. BC807-16H: Collector current as a function of collector-emitter voltage; typical values

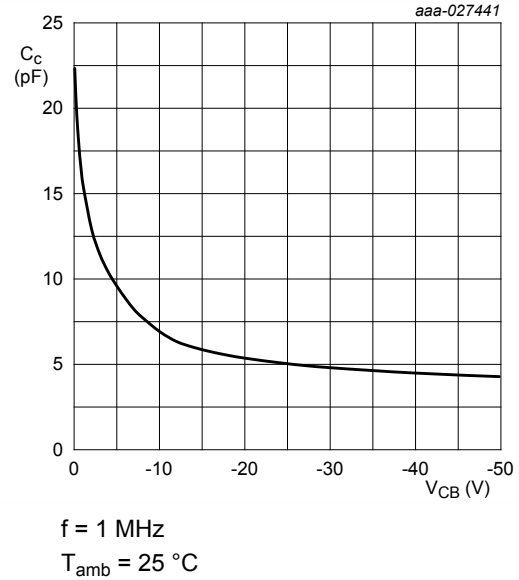


Fig. 16. BC807-16H: Collector capacitance as a function of collector-base voltage; typical values

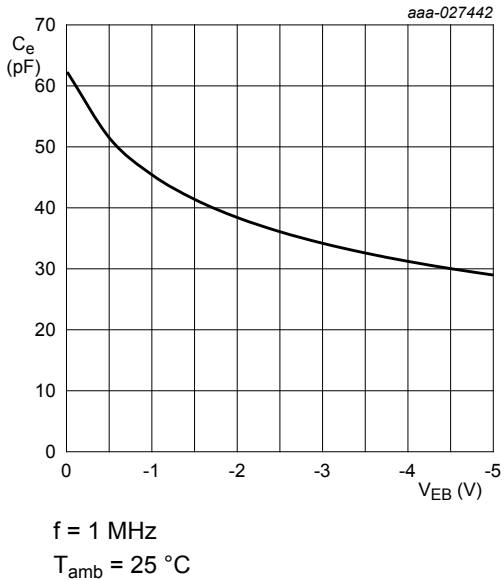


Fig. 17. BC807-16H: Emitter capacitance as a function of emitter-base voltage; typical values

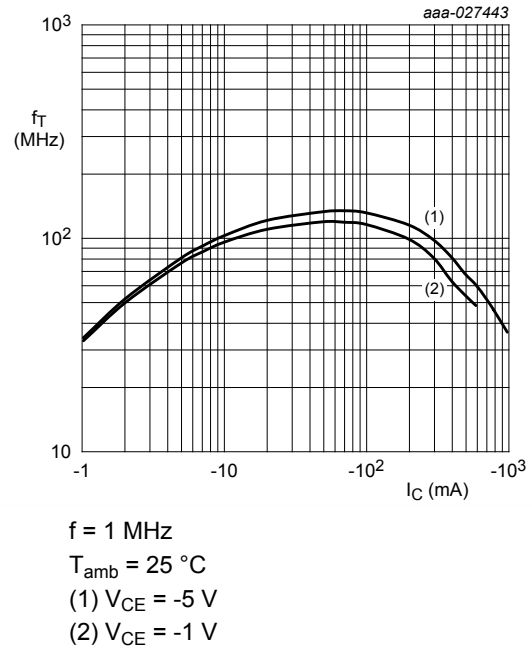
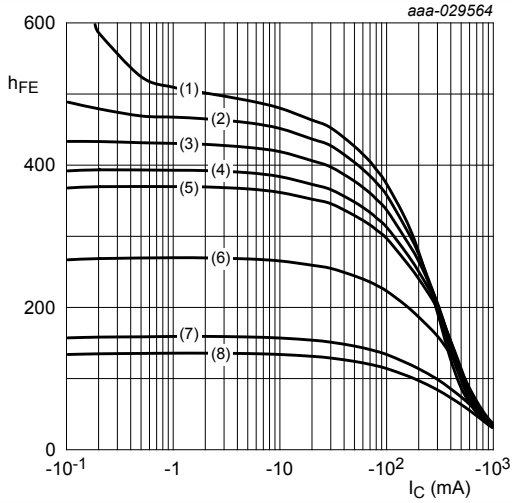


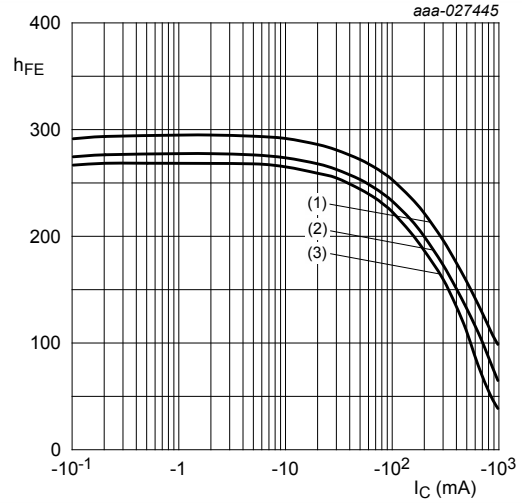
Fig. 18. BC807-16H: Transition frequency as a function of collector current; typical values



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

- (1)  $T_{amb} = 175 \text{ }^\circ\text{C}$
- (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)  $T_{amb} = -55 \text{ }^\circ\text{C}$

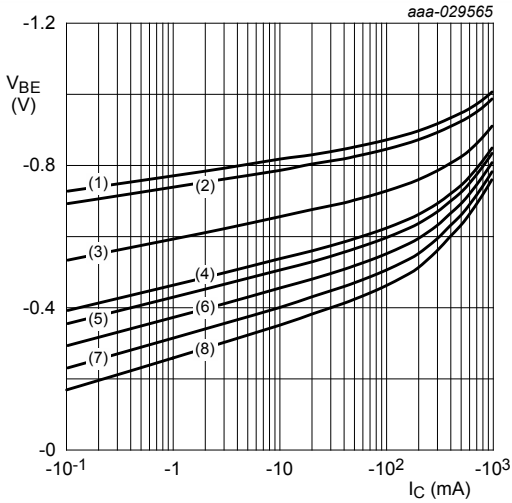
Fig. 19. BC807-25H: DC current gain as a function of collector current; typical values



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

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

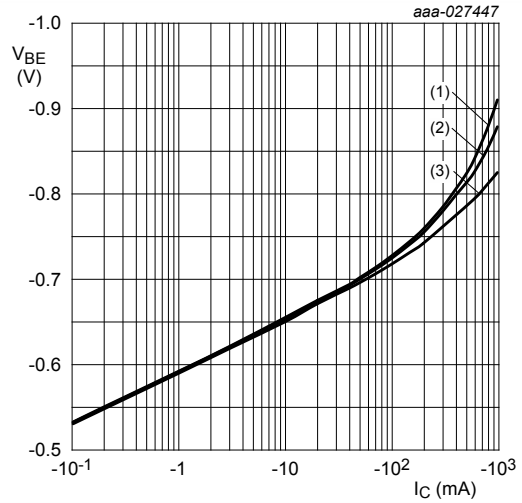
Fig. 20. BC807-25H: DC current gain as a function of collector current; typical values



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

- (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)  $T_{amb} = 175 \text{ }^\circ\text{C}$

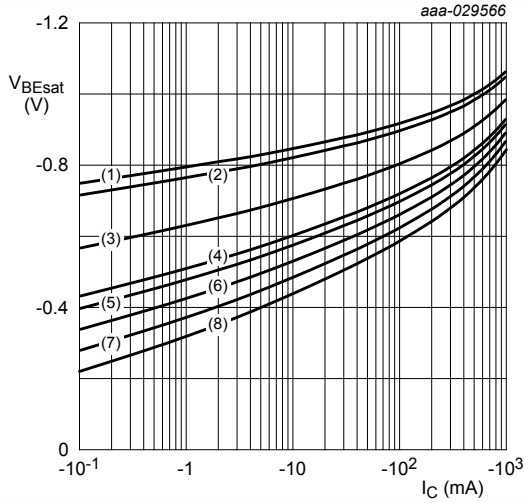
Fig. 21. BC807-25H: Base-emitter voltage as a function of collector current; typical values



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

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

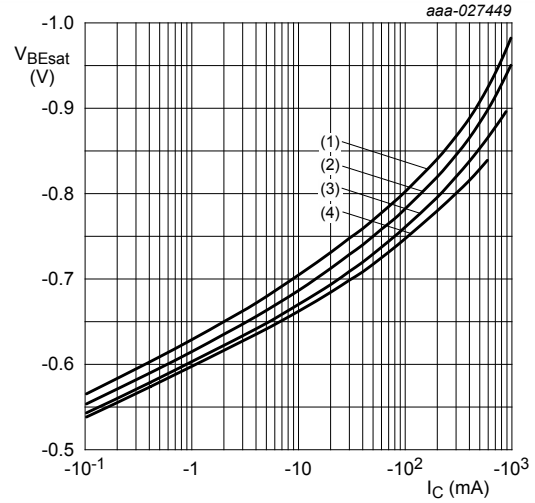
Fig. 22. BC807-25H: Base-emitter voltage as a function of collector current; typical values



$I_C / I_B = 10$

- (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)  $T_{amb} = 175\text{ }^\circ\text{C}$

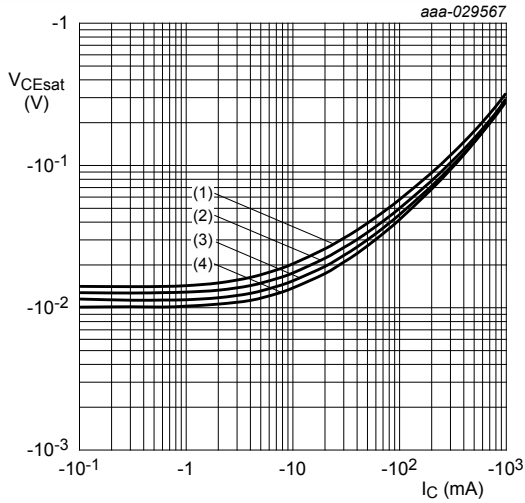
Fig. 23. BC807-25H: Base-emitter saturation voltage as a function of collector current; typical values



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

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

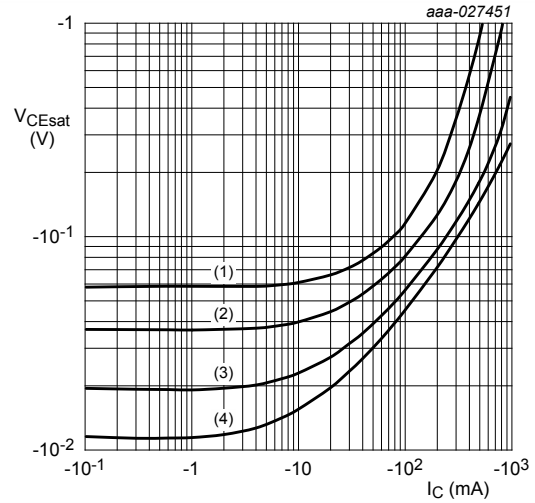
Fig. 24. BC807-25H: Base-emitter saturation voltage as a function of collector current; typical values



$I_C / I_B = 10$

- (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

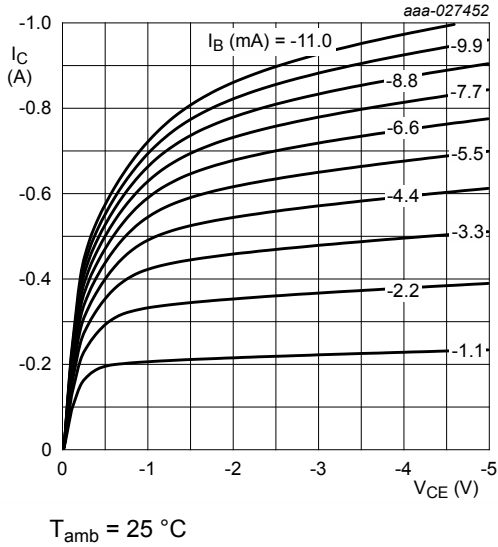


Fig. 27. BC807-25H: Collector current as a function of collector-emitter voltage; typical values

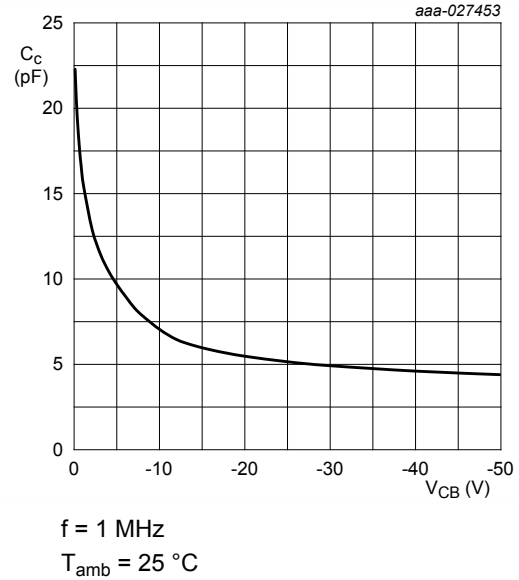


Fig. 28. BC807-25H: Collector capacitance as a function of collector-base voltage; typical values

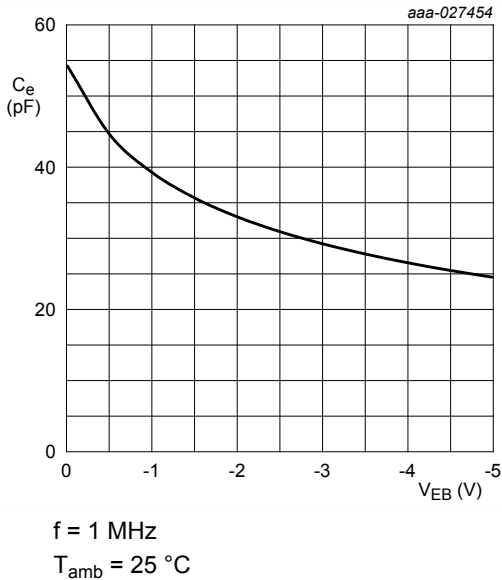


Fig. 29. BC807-25H: Emitter capacitance as a function of emitter-base voltage; typical values

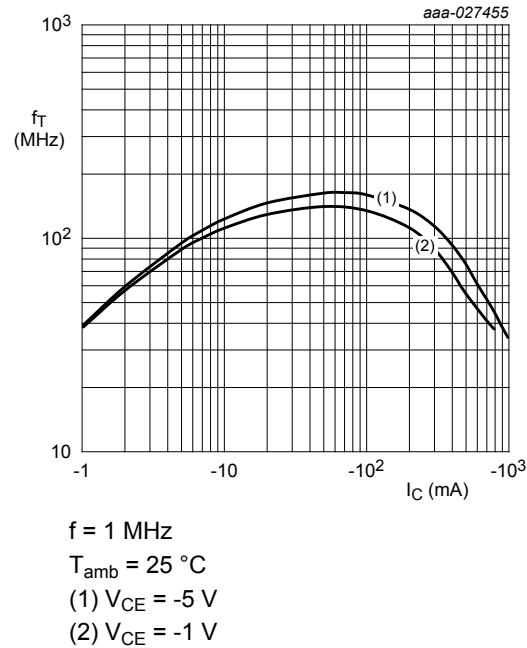
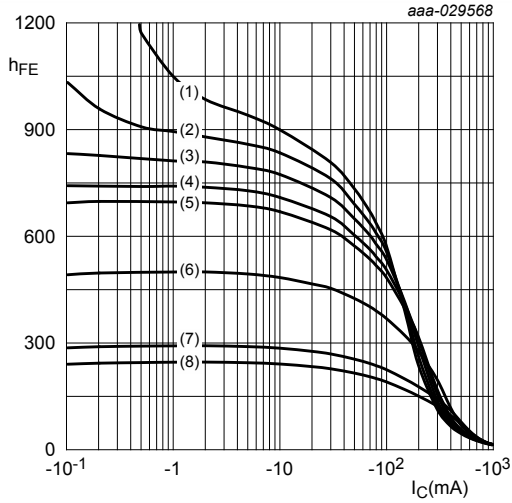


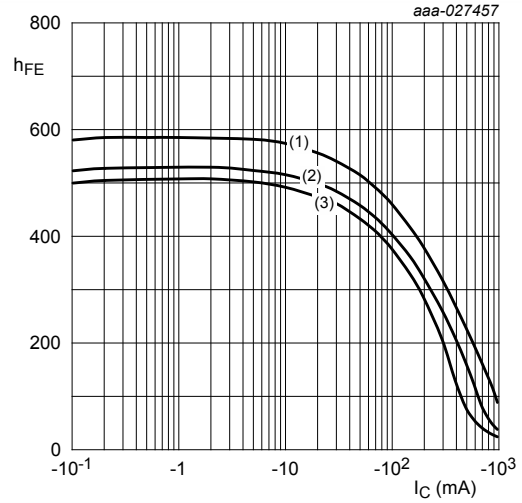
Fig. 30. BC807-25H: Transition frequency as a function of collector current; typical values



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

- (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)  $T_{amb} = -55 \text{ }^\circ\text{C}$

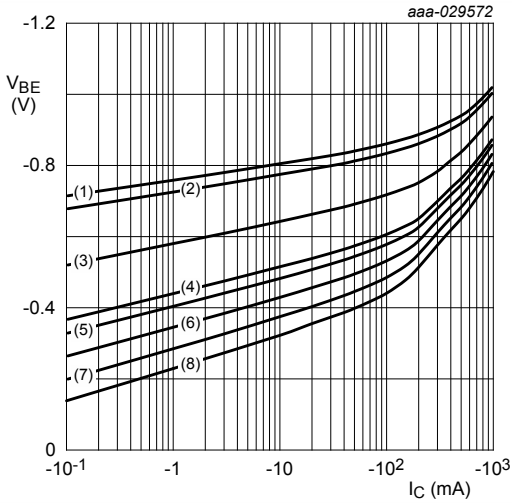
Fig. 31. BC807-40H: DC current gain as a function of collector current; typical values



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

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

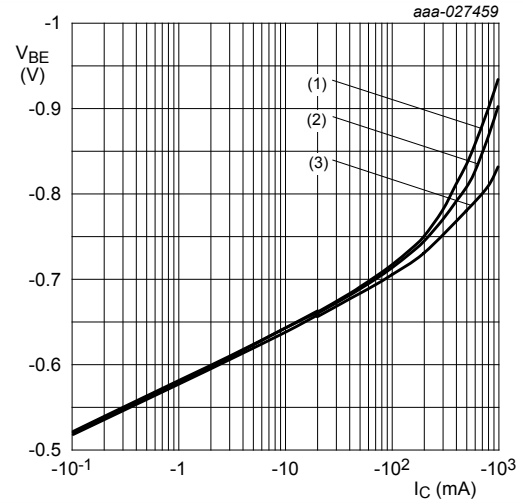
Fig. 32. BC807-40H: DC current gain as a function of collector current; typical values



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

- (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)  $T_{amb} = 175 \text{ }^\circ\text{C}$

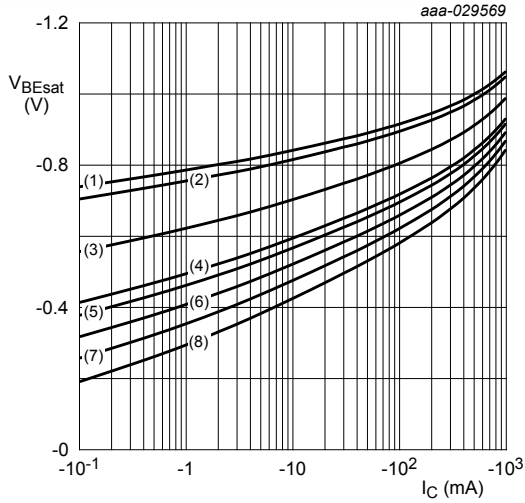
Fig. 33. BC807-40H: Base-emitter voltage as a function of collector current; typical values



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

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

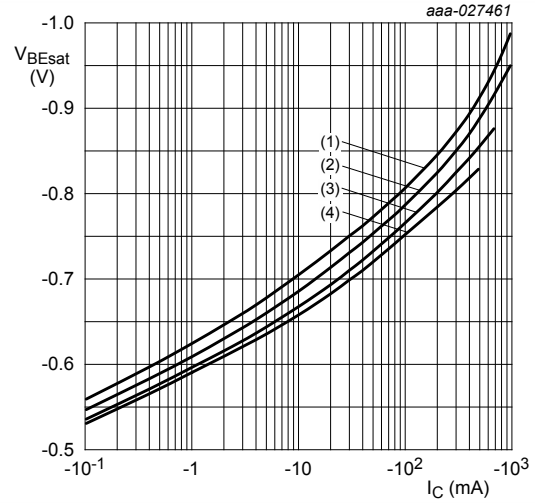
Fig. 34. BC807-40H: Base-emitter voltage as a function of collector current; typical values



$I_C / I_B = 10$

- (1)  $T_{amb} = -55\text{ °C}$
- (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)  $T_{amb} = 175\text{ °C}$

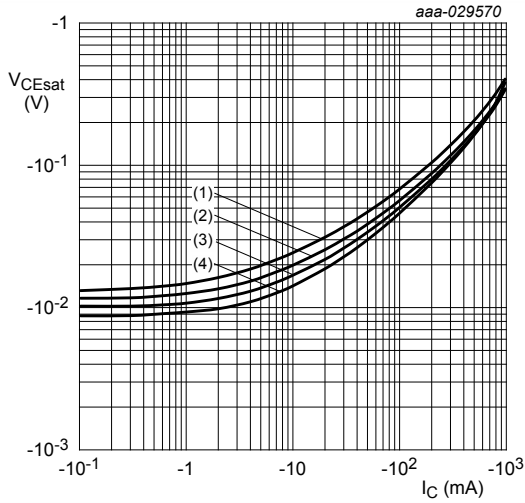
Fig. 35. BC807-40H: Base-emitter saturation voltage as a function of collector current; typical values



$T_{amb} = 25\text{ °C}$

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

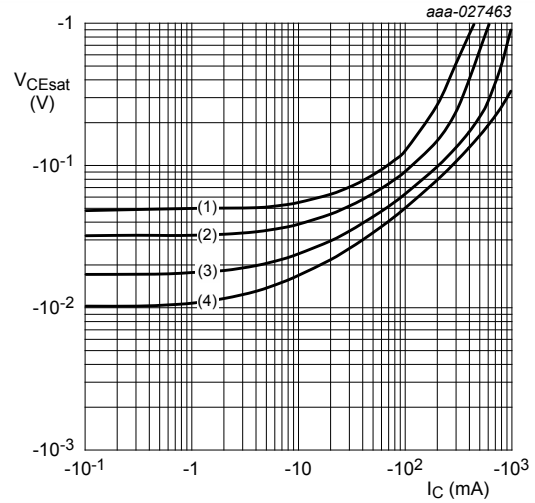
Fig. 36. BC807-40H: Base-emitter saturation voltage as a function of collector current; typical values



$I_C / I_B = 10$

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

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



$T_{amb} = 25\text{ °C}$

- (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

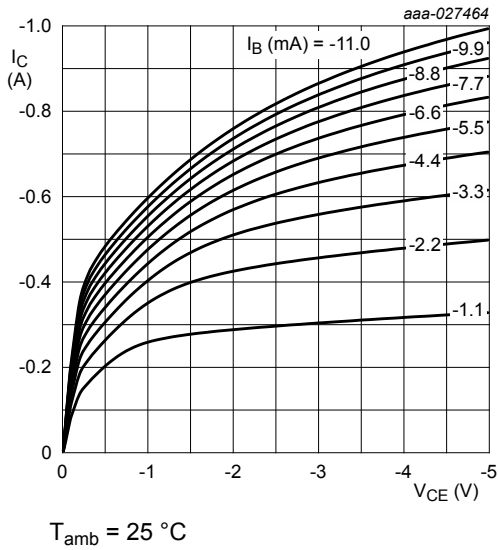


Fig. 39. BC807-40H: Collector current as a function of collector-emitter voltage; typical values

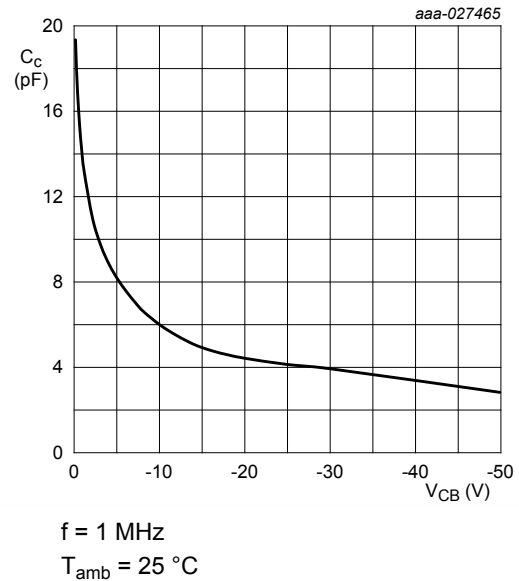


Fig. 40. BC807-40H: Collector capacitance as a function of collector-base voltage; typical values

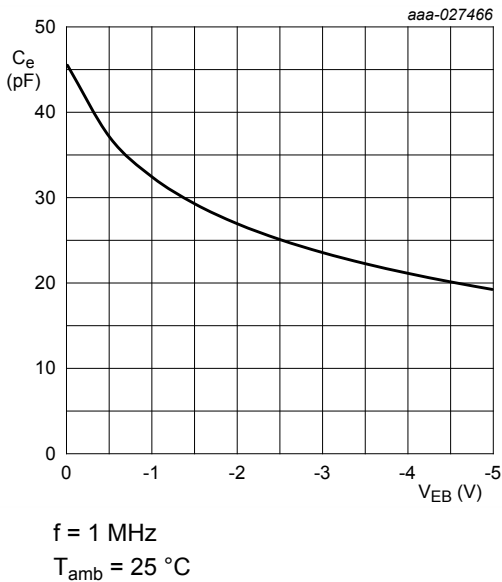


Fig. 41. BC807-40H: Emitter capacitance as a function of emitter-base voltage; typical values

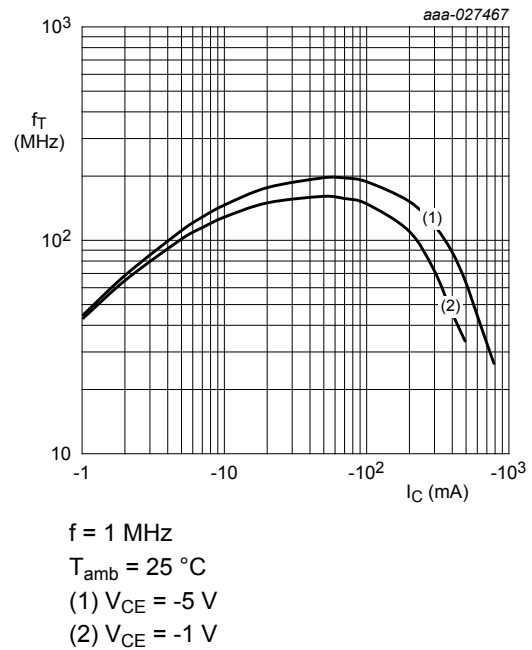


Fig. 42. BC807-40H: Transition frequency as a function of collector current; typical values

## 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

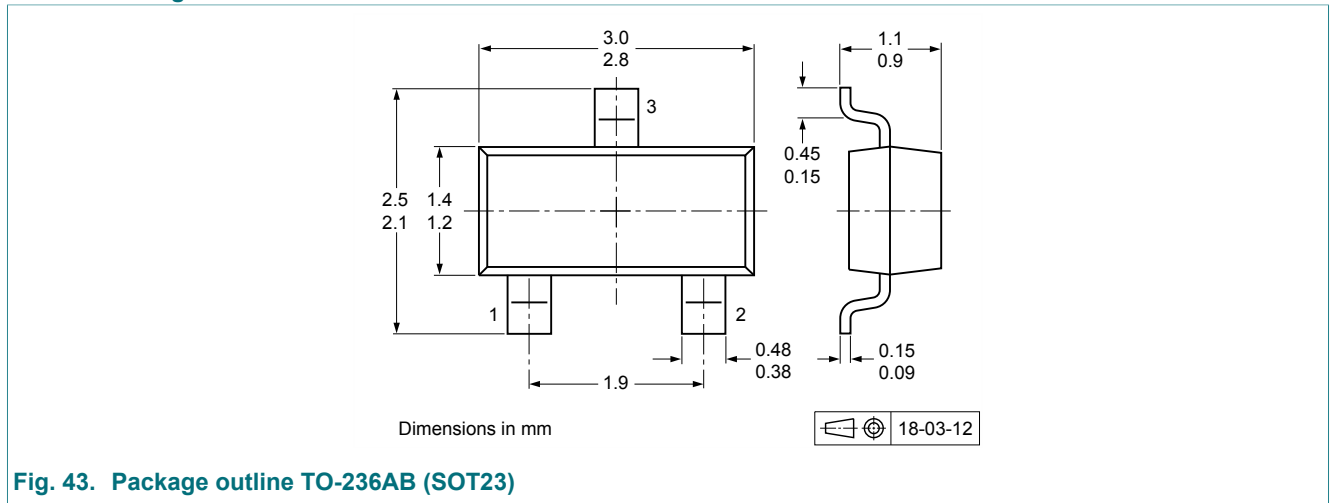


Fig. 43. Package outline TO-236AB (SOT23)

## 10. Soldering

Table 10. Soldering

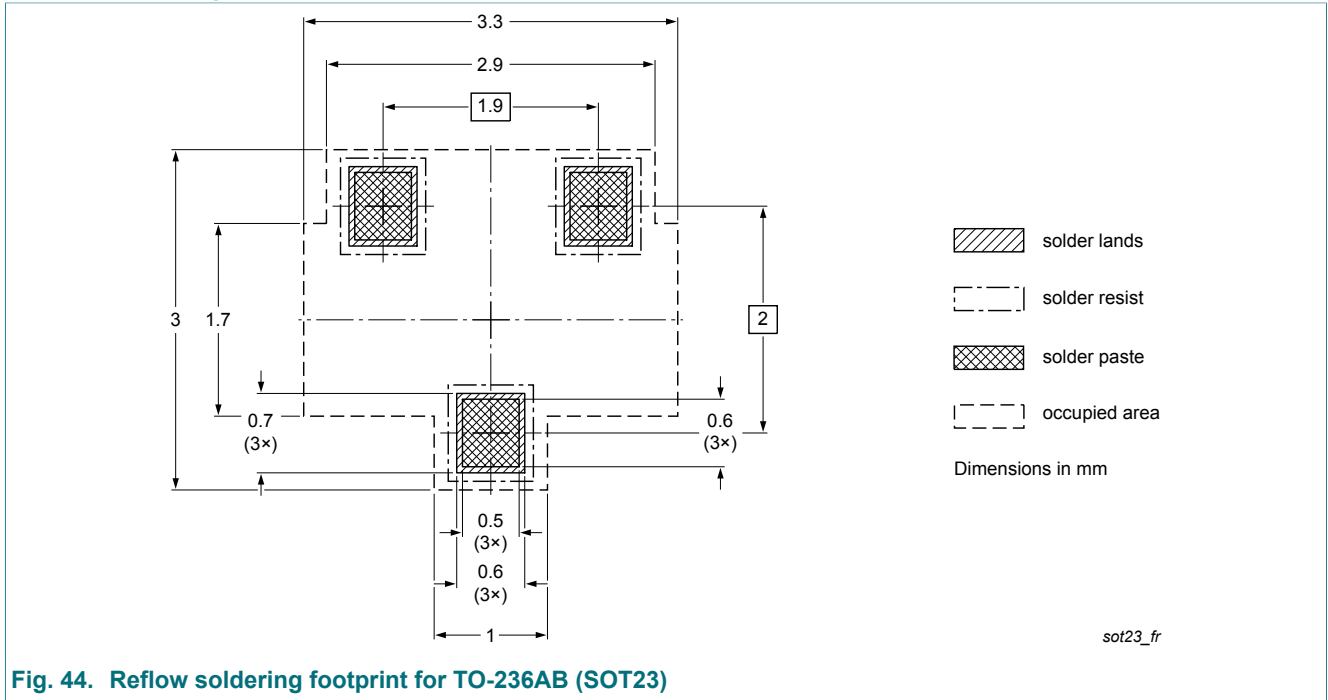


Fig. 44. Reflow soldering footprint for TO-236AB (SOT23)

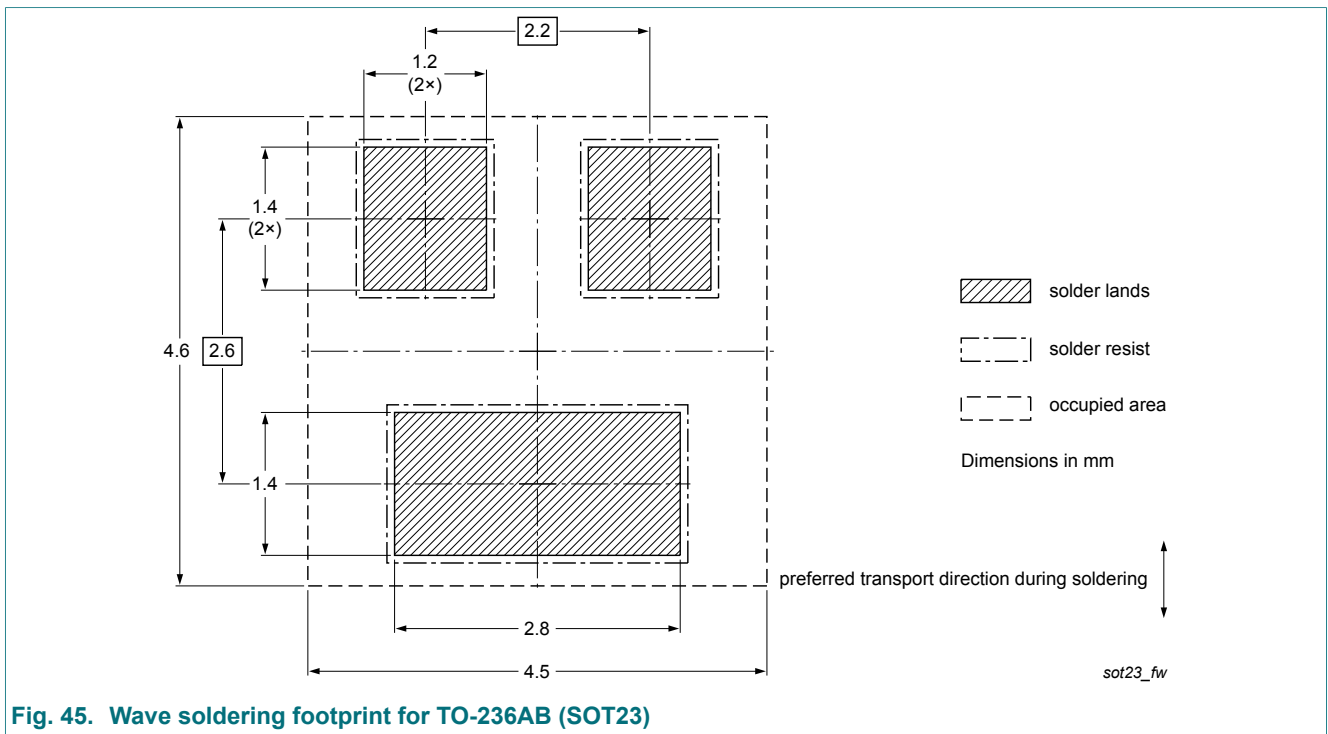


Fig. 45. Wave soldering footprint for TO-236AB (SOT23)

## 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".
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