

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 comlement
	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 °C unless otherwise specified.

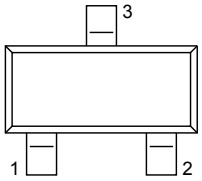
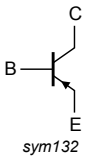
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base		-	-	-45	V
I_C	collector current			-	-	-500	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms		-	-	-1	A
h_{FE}	DC current gain	V_{CE} = -1 V; I_C = -100 mA					
	BC807-16H		[1]	100	-	250	
	BC807-25H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

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

nexperia

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		
	Name	Description	Version
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

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5. Limiting values

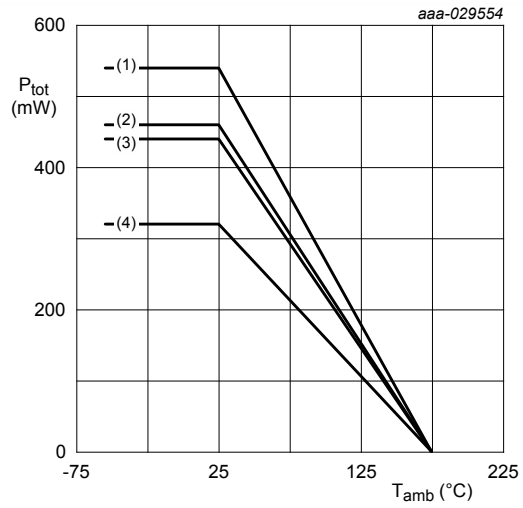
Table 6. Limiting values

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

T_{amb} = 25 °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; $t_p \leq 1$ 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]	-	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^2.
[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^2.

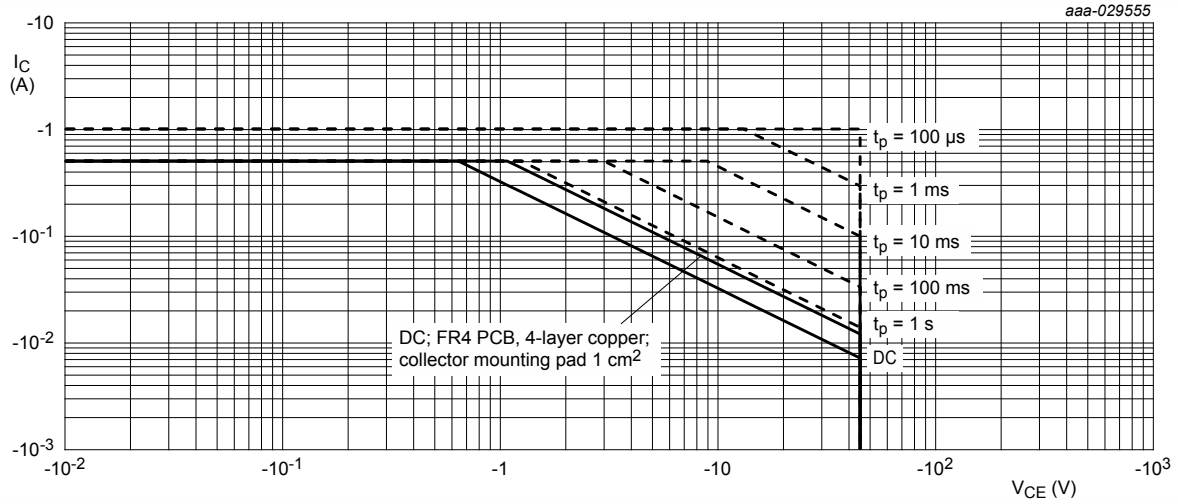


1. FR4 PCB; 4-layer copper, 1cm^2
2. FR4 PCB; 4-layer copper, standard footprint
3. FR4 PCB; single-sided copper, 1cm^2
4. FR4 PCB; single-sided copper, standard footprint

Fig. 1. Power derating curves

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FR4 PCB; single-sided copper; standard footprint

T_{amb} = 25 °C

Fig. 2. Safe operating area; junction to ambient; continous and peak collector currents as a funtion of collecor-emitter voltage

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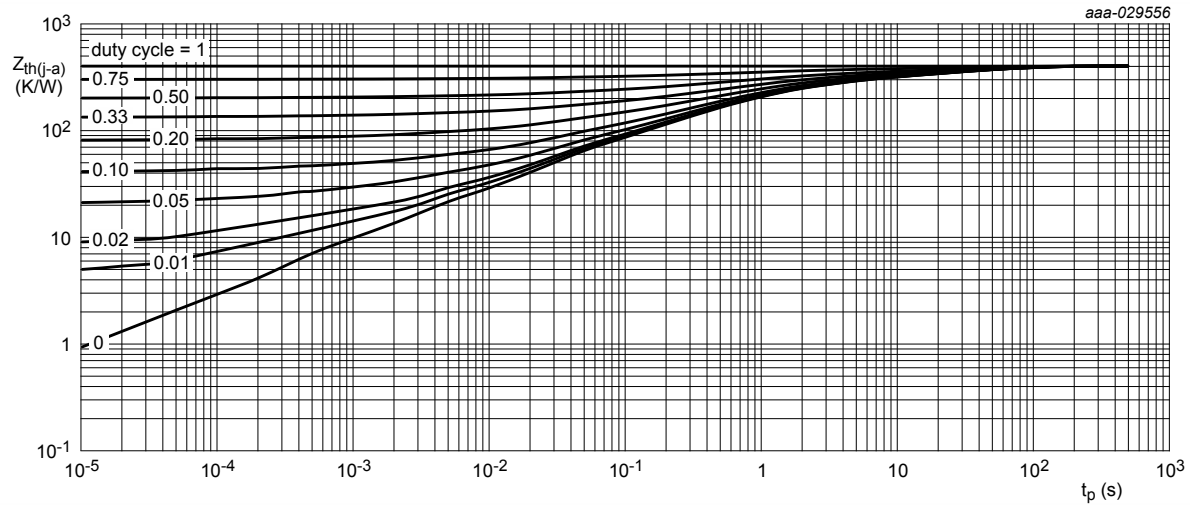
6. Thermal characteristics

Table 7. Thermal characteristics

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

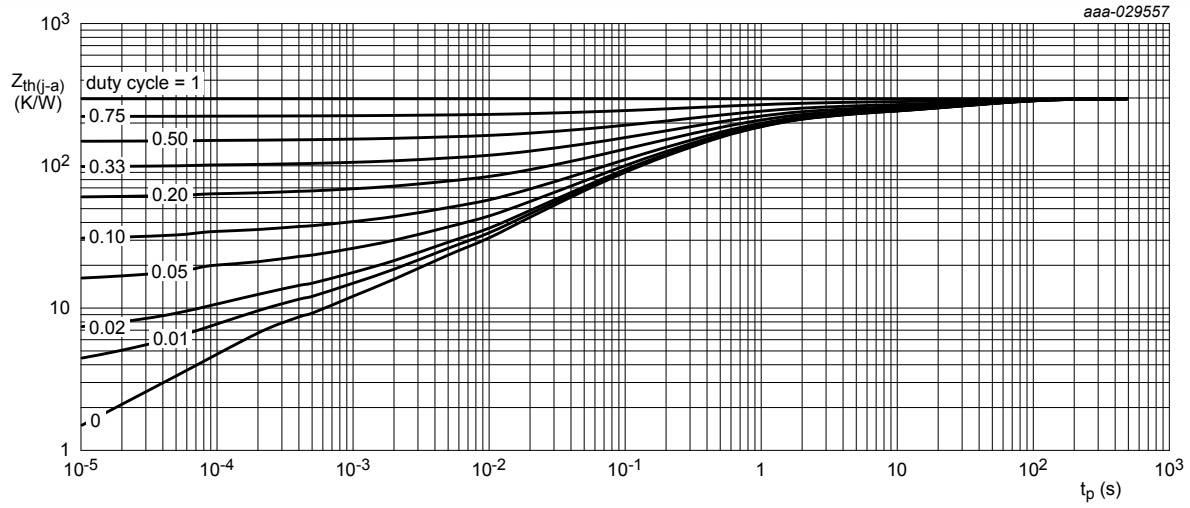
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	470	K/W
			[2]			340	K/W
			[3]			325	K/W
			[4]	-	-	280	K/W
$R_{(j-sp)}$	thermal resistance from junction to solder point			-	-	110	K/W

[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^2.
[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^2.



FR4 PCB; single-sided copper; tin-plated and standard footprint

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

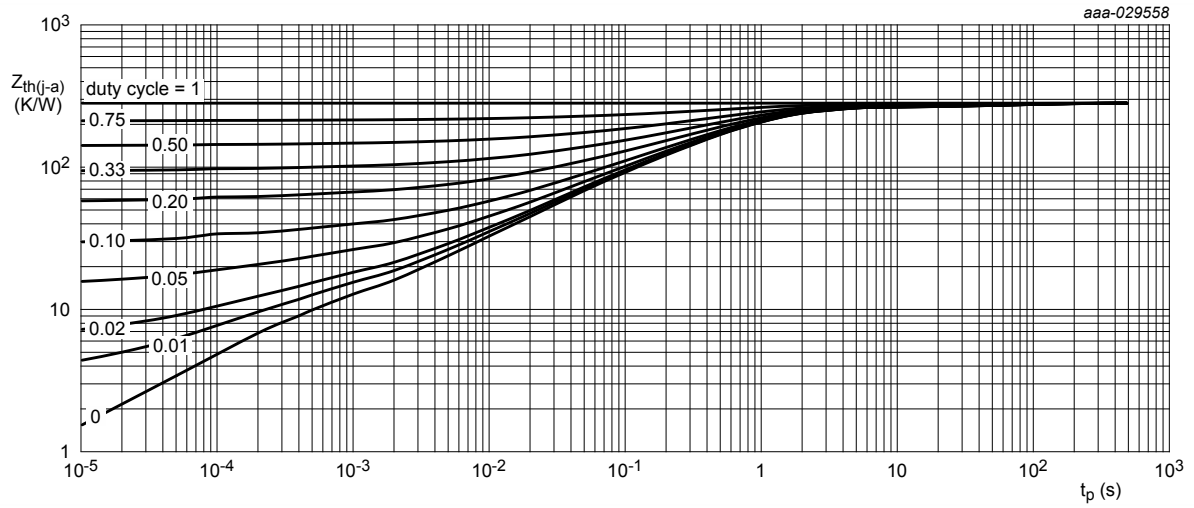


FR4 PCB; single-sided copper; tin-plated; mounting pad for collector 1 cm^2

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

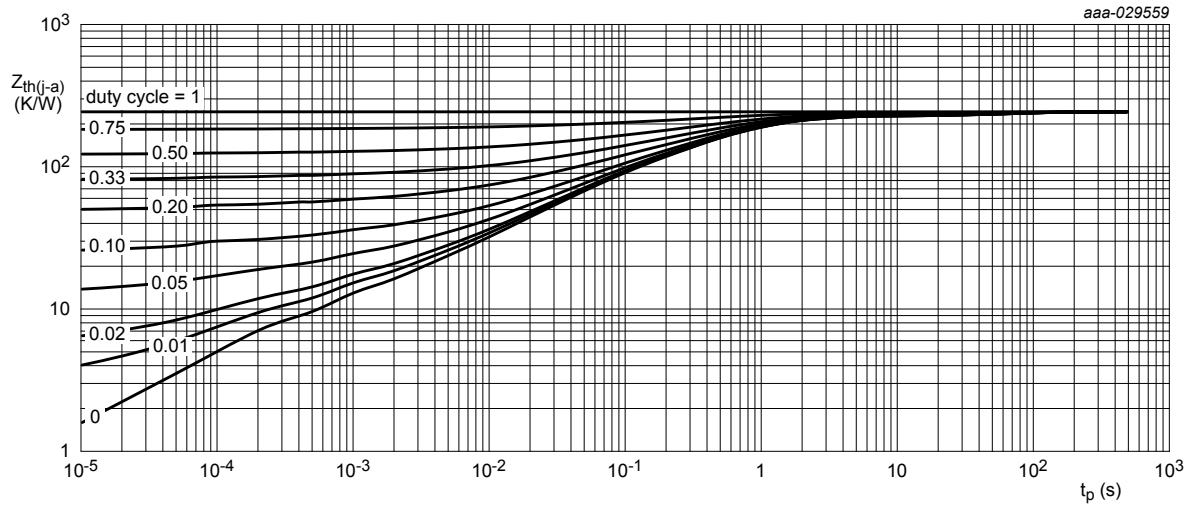
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FR4 PCB; 4-layer copper; tin-plated and standard footprint

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^2

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

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7. Characteristics

Table 8. Characteristics

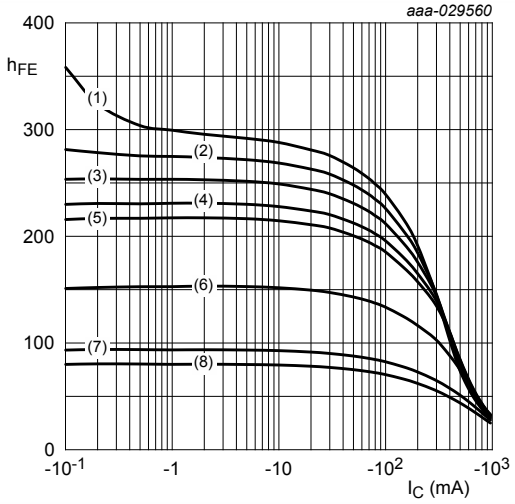
T_{amb} = 25 °C unless otherwise specified.

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

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

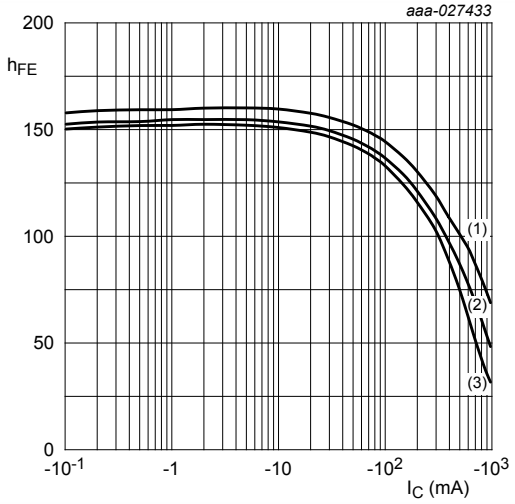
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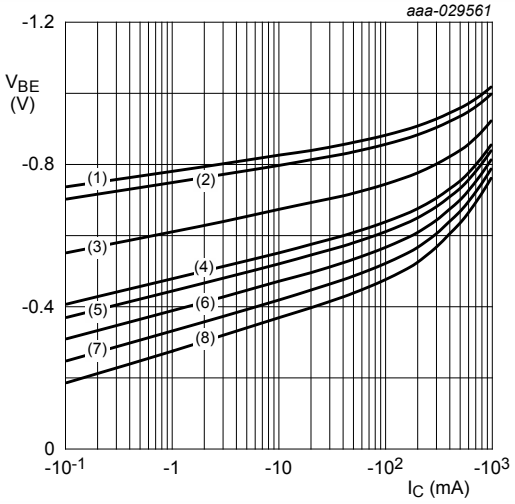
V_{CE} = -1 V
(1) T_{amb} = 175 °C
(2) T_{amb} = 150 °C
(3) T_{amb} = 125 °C
(4) T_{amb} = 100 °C
(5) T_{amb} = 85 °C
(6) T_{amb} = 25 °C
(7) T_{amb} = -40 °C
(8) T_{amb} = -55 °C

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



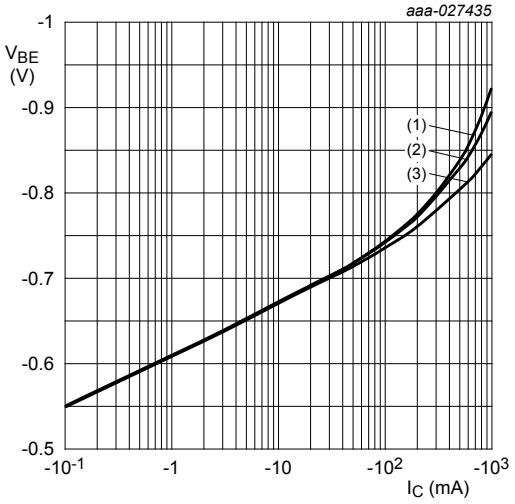
T_{amb} = 25 °C
(1) V_{CE} = -5 V
(2) V_{CE} = -2 V
(3) V_{CE} = -1 V

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



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

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

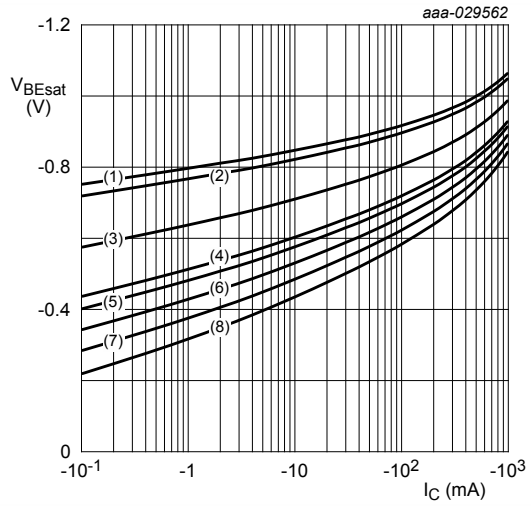


T_{amb} = 25 °C
(1) V_{CE} = -1 V
(2) V_{CE} = -2 V
(3) V_{CE} = -5 V

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

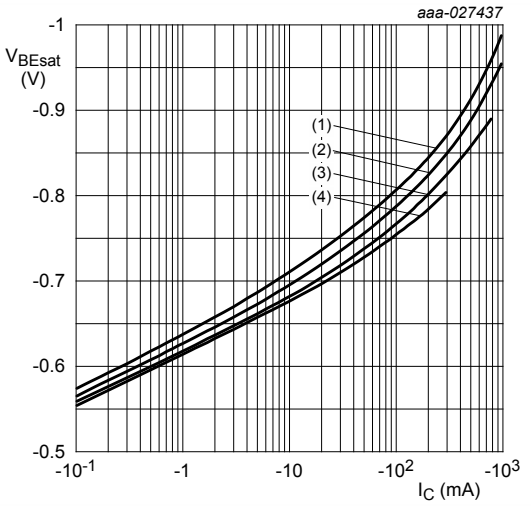
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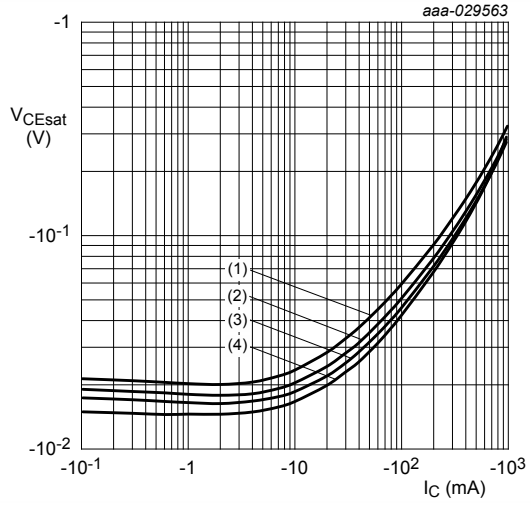
IC / IB = 10
(1) T_{amb} = -55 °C
(2) T_{amb} = -40 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = 85 °C
(5) T_{amb} = 100 °C
(6) T_{amb} = 125 °C
(7) T_{amb} = 150 °C
(8) T_{amb} = 175 °C

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



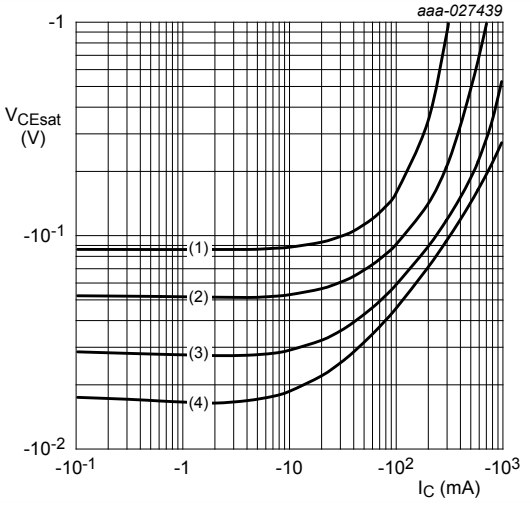
T_{amb} = 25 °C
(1) IC / IB = 10
(2) IC / IB = 20
(3) IC / IB = 50
(4) IC / IB = 100

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



IC / IB = 10
(1) T_{amb} = 175 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = -40 °C

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

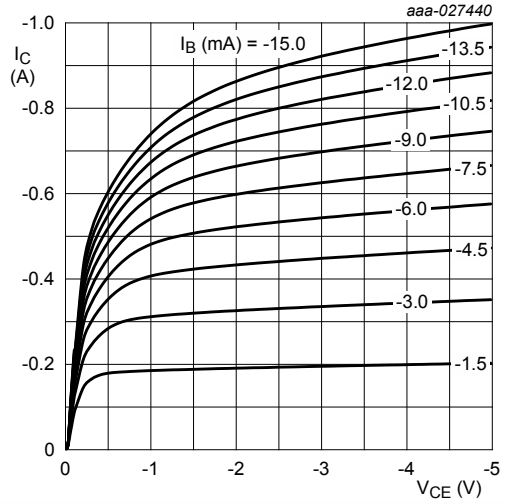


T_{amb} = 25 °C
(1) IC / IB = 100
(2) IC / IB = 50
(3) IC / IB = 20
(4) IC / IB = 10

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

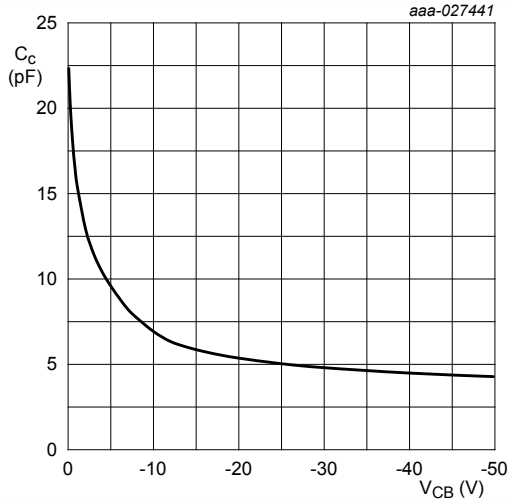
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T_{amb} = 25 °C

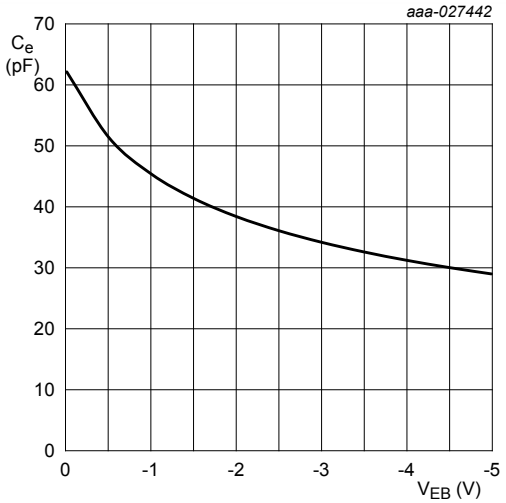
Fig. 15. BC807-16H: Collector current as a function of collector-emitter voltage; typical values



f = 1 MHz

T_{amb} = 25 °C

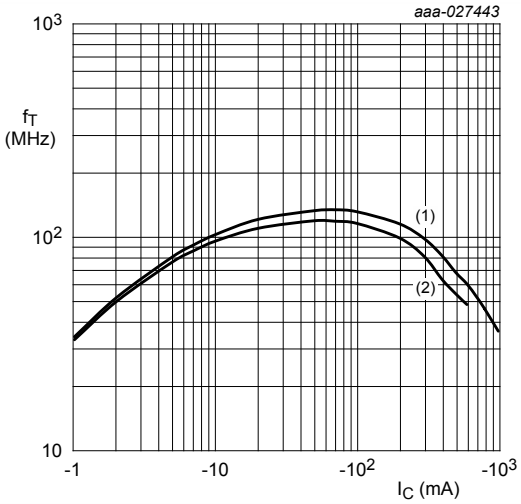
Fig. 16. BC807-16H: Collector capacitance as a function of collector-base voltage; typical values



f = 1 MHz

T_{amb} = 25 °C

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



f = 1 MHz

T_{amb} = 25 °C

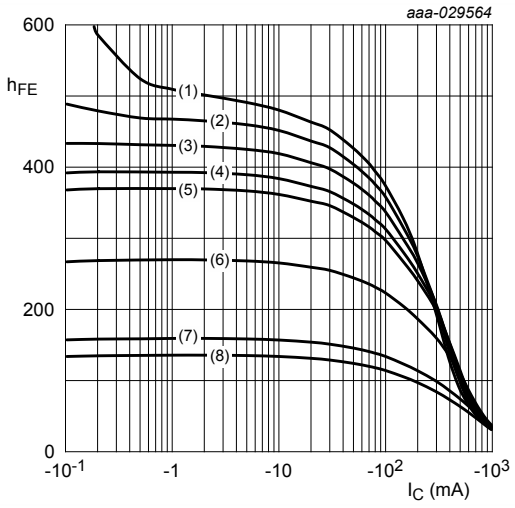
(1) V_{CE} = -5 V

(2) V_{CE} = -1 V

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

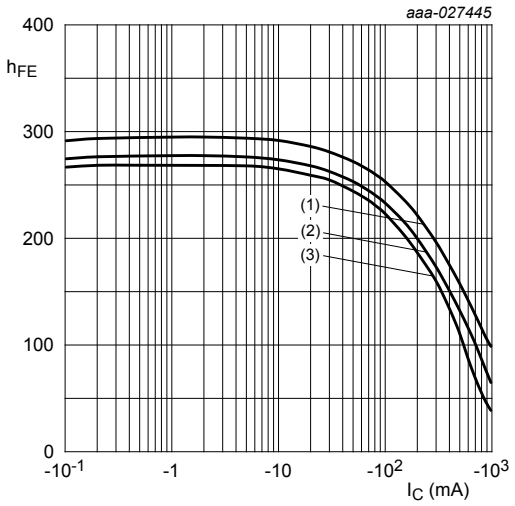
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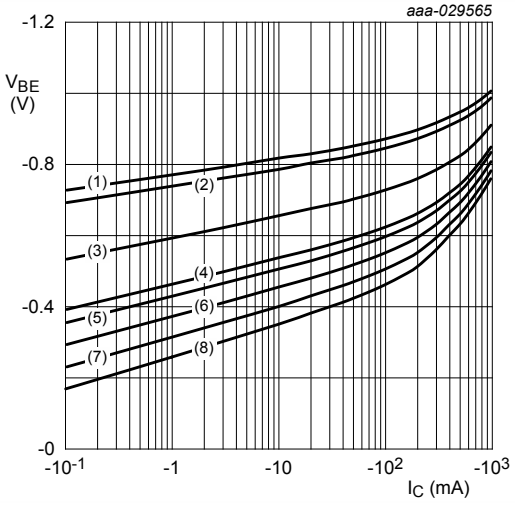
V_{CE} = -1 V
(1) T_{amb} = 175 °C
(2) T_{amb} = 150 °C
(3) T_{amb} = 125 °C
(4) T_{amb} = 100 °C
(5) T_{amb} = 85 °C
(6) T_{amb} = 25 °C
(7) T_{amb} = -40 °C
(8) T_{amb} = -55 °C

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



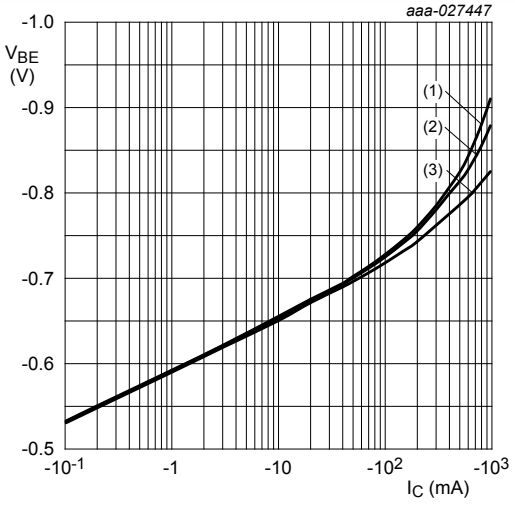
T_{amb} = 25 °C
(1) V_{CE} = -5 V
(2) V_{CE} = -2 V
(3) V_{CE} = -1 V

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



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

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

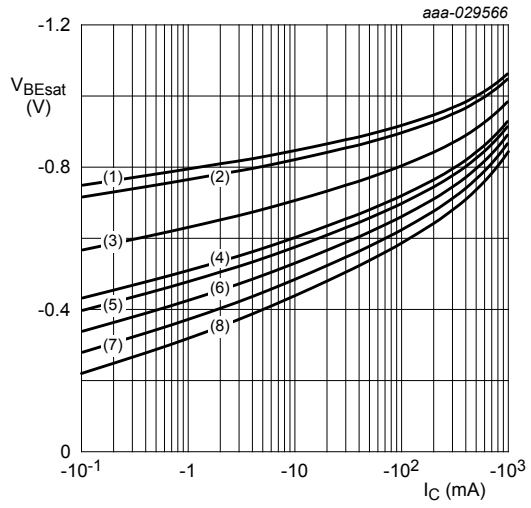


T_{amb} = 25 °C
(1) V_{CE} = -1 V
(2) V_{CE} = -2 V
(3) V_{CE} = -5 V

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

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IC / IB = 10

(1) T_{amb} = -55 °C

(2) T_{amb} = -40 °C

(3) T_{amb} = 25 °C

(4) T_{amb} = 85 °C

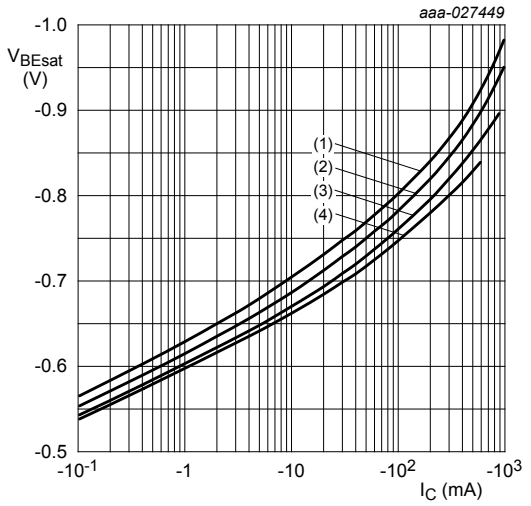
(5) T_{amb} = 100 °C

(6) T_{amb} = 125 °C

(7) T_{amb} = 150 °C

(8) T_{amb} = 175 °C

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



T_{amb} = 25 °C

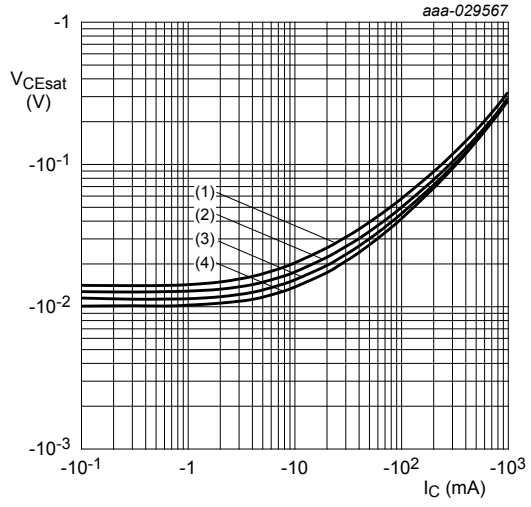
(1) IC / IB = 10

(2) IC / IB = 20

(3) IC / IB = 50

(4) IC / IB = 100

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



IC / IB = 10

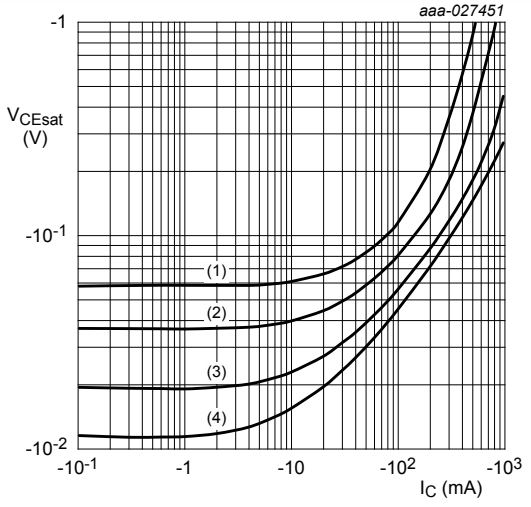
(1) T_{amb} = 175 °C

(2) T_{amb} = 85 °C

(3) T_{amb} = 25 °C

(4) T_{amb} = -40 °C

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



T_{amb} = 25 °C

(1) IC / IB = 100

(2) IC / IB = 50

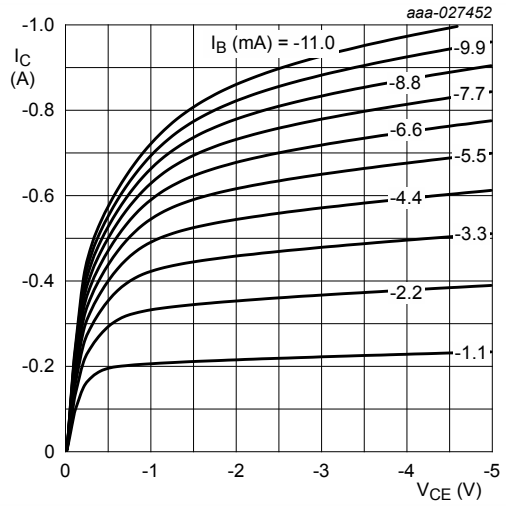
(3) IC / IB = 20

(4) IC / IB = 10

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

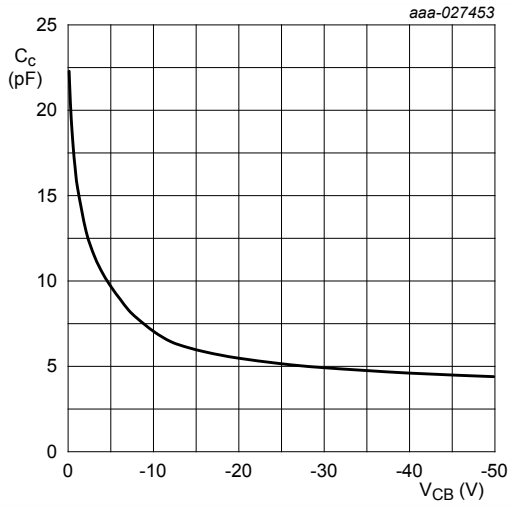
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T_{amb} = 25 °C

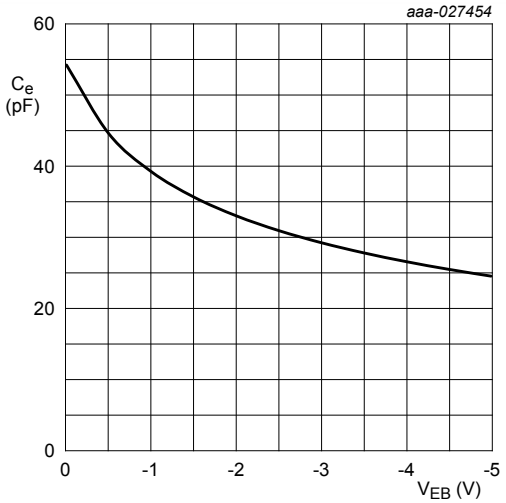
Fig. 27. BC807-25H: Collector current as a function of collector-emitter voltage; typical values



f = 1 MHz

T_{amb} = 25 °C

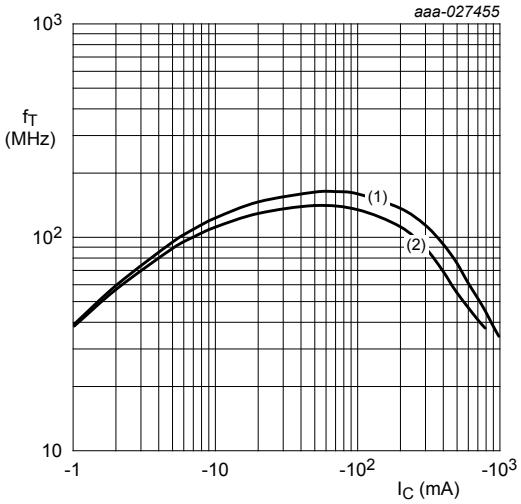
Fig. 28. BC807-25H: Collector capacitance as a function of collector-base voltage; typical values



f = 1 MHz

T_{amb} = 25 °C

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



f = 1 MHz

T_{amb} = 25 °C

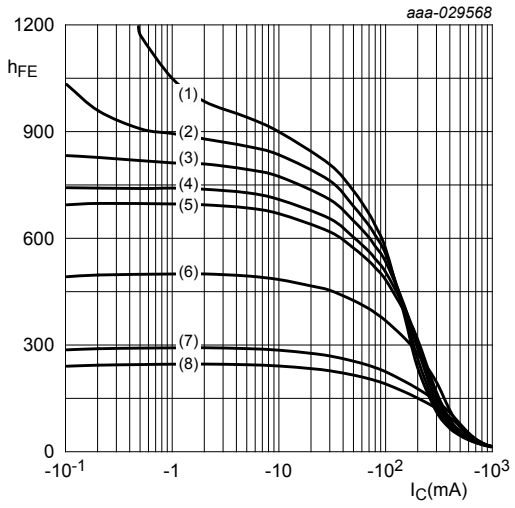
(1) V_{CE} = -5 V

(2) V_{CE} = -1 V

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

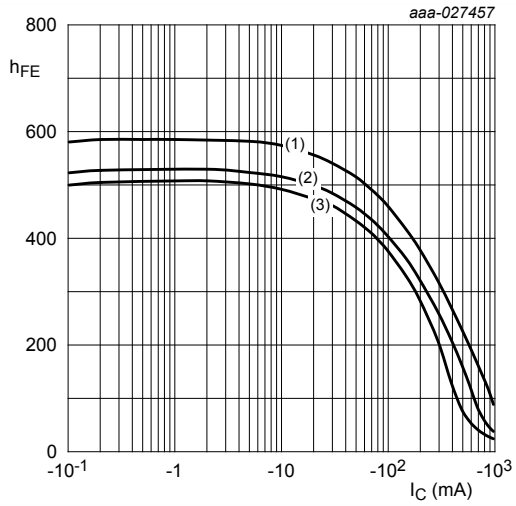
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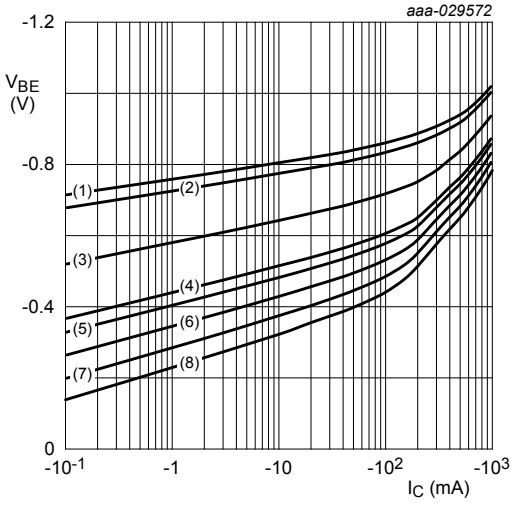
V_{CE} = -1 V
(1) T_{amb} = 175 °C
(2) T_{amb} = 150 °C
(3) T_{amb} = 125 °C
(4) T_{amb} = 100 °C
(5) T_{amb} = 85 °C
(6) T_{amb} = 25 °C
(7) T_{amb} = -40 °C
(8) T_{amb} = -55 °C

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



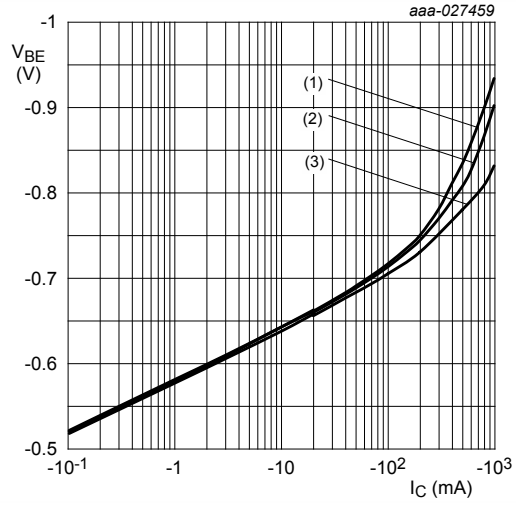
T_{amb} = 25 °C
(1) V_{CE} = -5 V
(2) V_{CE} = -2 V
(3) V_{CE} = -1 V

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



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

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

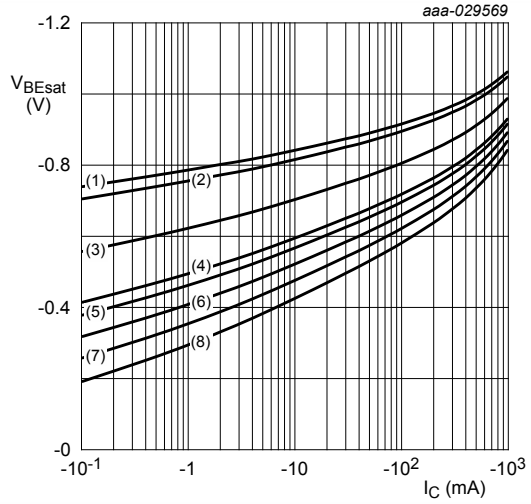


T_{amb} = 25 °C
(1) V_{CE} = -1 V
(2) V_{CE} = -2 V
(3) V_{CE} = -5 V

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

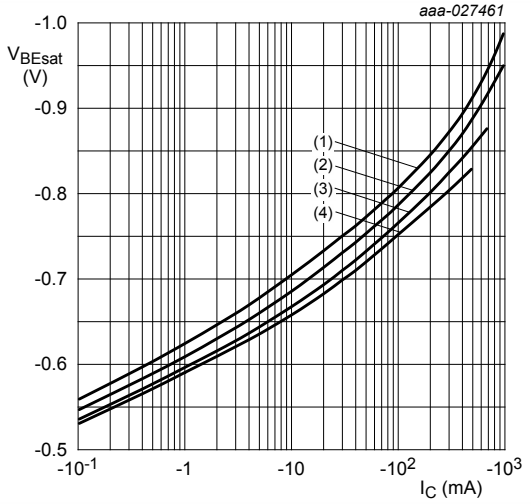
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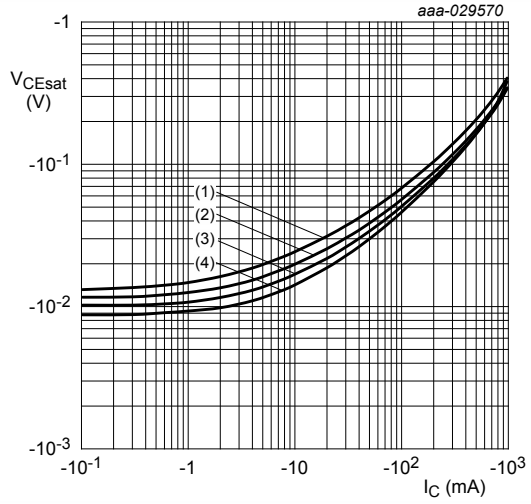
IC / IB = 10
(1) T_{amb} = -55 °C
(2) T_{amb} = -40 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = 85 °C
(5) T_{amb} = 100 °C
(6) T_{amb} = 125 °C
(7) T_{amb} = 150 °C
(8) T_{amb} = 175 °C

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



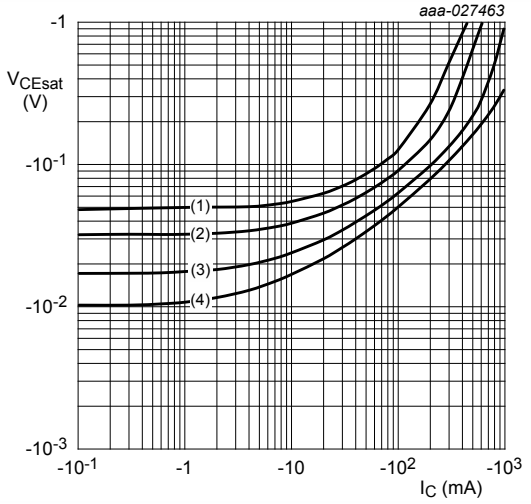
T_{amb} = 25 °C
(1) IC / IB = 10
(2) IC / IB = 20
(3) IC / IB = 50
(4) IC / IB = 100

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



IC / IB = 10
(1) T_{amb} = 175 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = -40 °C

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

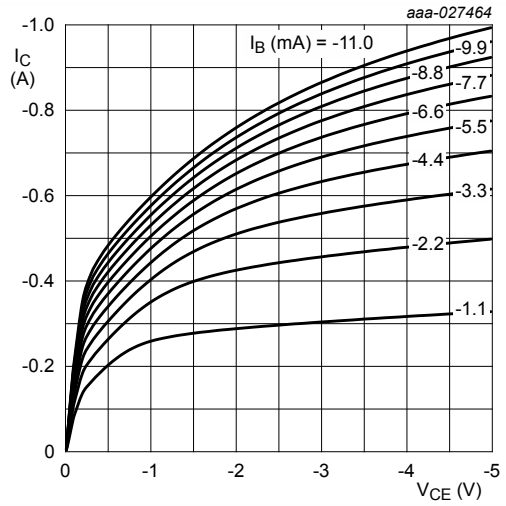


T_{amb} = 25 °C
(1) IC / IB = 100
(2) IC / IB = 50
(3) IC / IB = 20
(4) IC / IB = 10

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

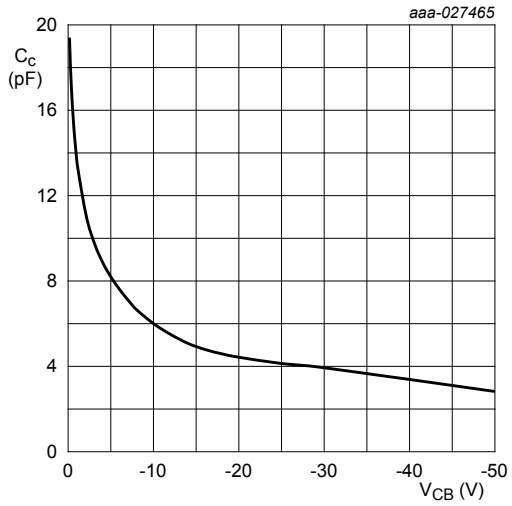
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T_{amb} = 25 °C

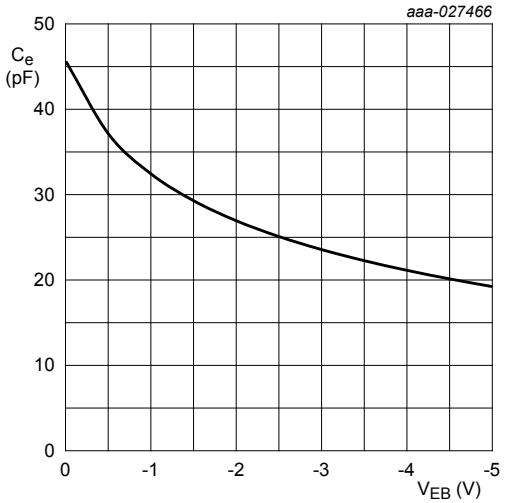
Fig. 39. BC807-40H: Collector current as a function of collector-emitter voltage; typical values



f = 1 MHz

T_{amb} = 25 °C

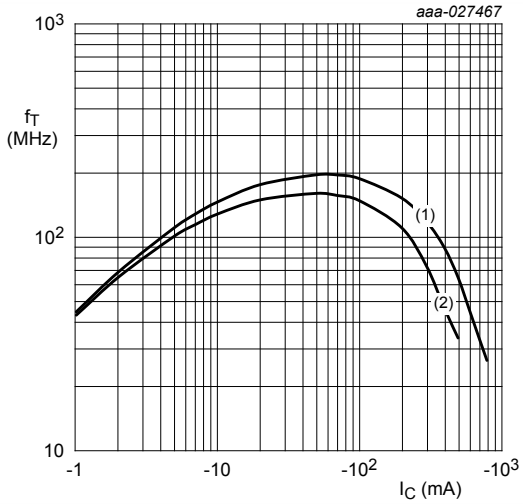
Fig. 40. BC807-40H: Collector capacitance as a function of collector-base voltage; typical values



f = 1 MHz

T_{amb} = 25 °C

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



f = 1 MHz

T_{amb} = 25 °C

(1) V_{CE} = -5 V

(2) V_{CE} = -1 V

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.

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9. Package outline

Table 9. Package outline

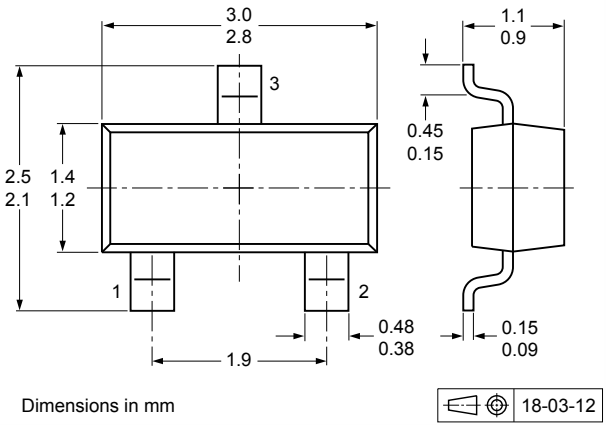


Fig. 43. Package outline TO-236AB (SOT23)

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10. Soldering

Table 10. Soldering

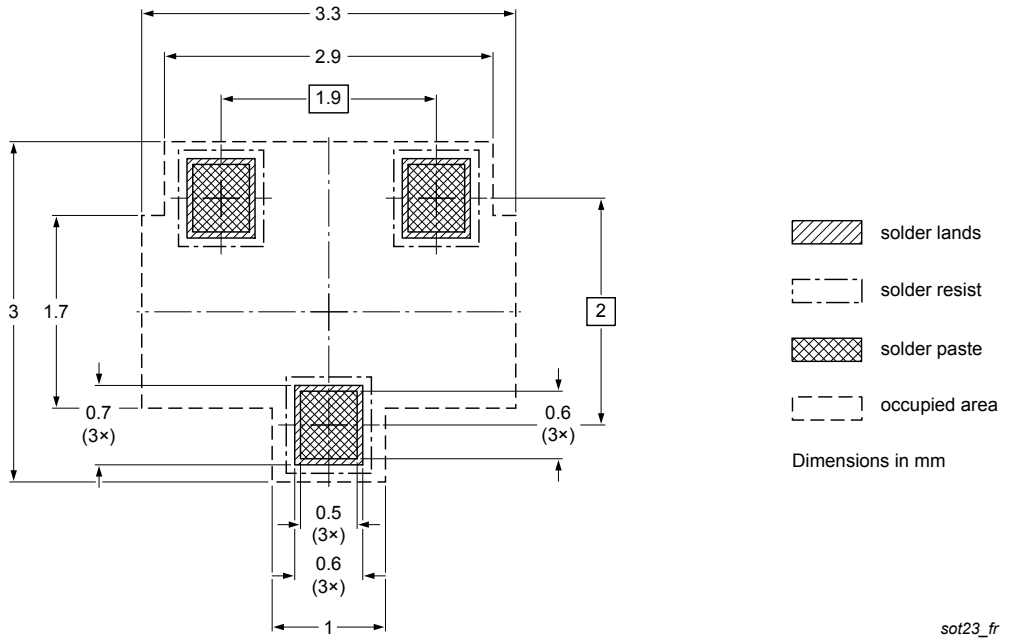


Fig. 44. Reflow soldering footprint for TO-236AB (SOT23)

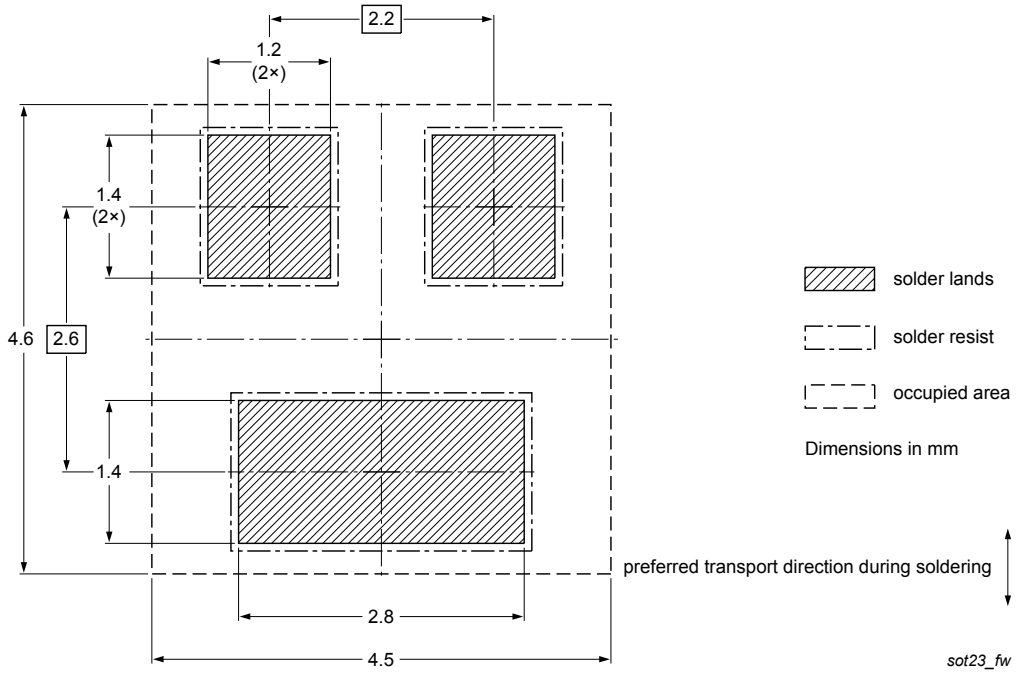


Fig. 45. Wave soldering footprint for TO-236AB (SOT23)

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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	-	-

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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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Date of release: 5 March 2019