BC807-16HR Datasheet

https://www.DiGi-Electronics.com

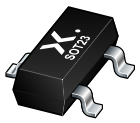
DiGi Electronics Part Number	BC807-16HR-DG
Manufacturer	Nexperia USA Inc.
Manufacturer Product Number	BC807-16HR
Description	BC807-16H/SOT23/TO-236AB
Detailed Description	Bipolar (BJT) Transistor PNP 45 V 500 mA 80MHz 320 mW Surface Mount TO-236AB

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
BC807-16HR	Nexperia USA Inc.
Series:	Product Status:
-	Active
Transistor Type:	Current - Collector (Ic) (Max):
PNP	500 mA
Voltage - Collector Emitter Breakdown (Max):	Vce Saturation (Max) @ Ib, Ic:
45 V	700mV @ 50mA, 500mA
Current - Collector Cutoff (Max):	DC Current Gain (hFE) (Min) @ Ic, Vce:
100nA (ICBO)	100 @ 100mA, 1V
Power - Max:	Frequency - Transition:
320 mW	80MHz
Operating Temperature:	Grade:
-55°C ~ 175°C (TA)	Automotive
Qualification:	Mounting Type:
AEC-Q101	Surface Mount
Package / Case:	Supplier Device Package:
TO-236-3, SC-59, SOT-23-3	TO-236AB
Base Product Number:	
BC807	

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8541.21.0095	



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

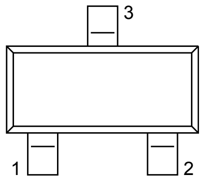
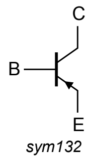
T_{amb} = 25 °C unless otherwise specified.

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 ≤ 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 ≤ 300 µs; δ ≤ 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		
	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

5. Limiting values

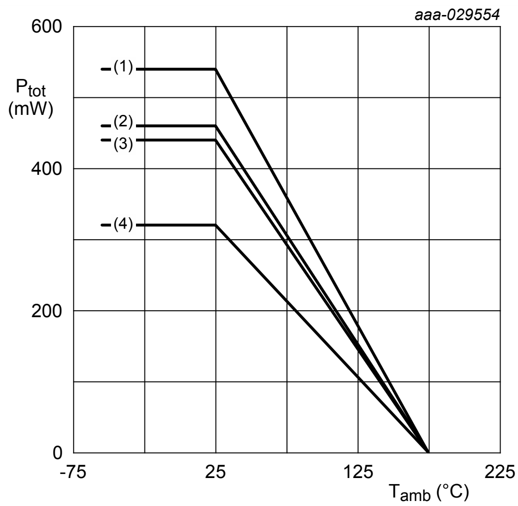
Table 6. Limiting values

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

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

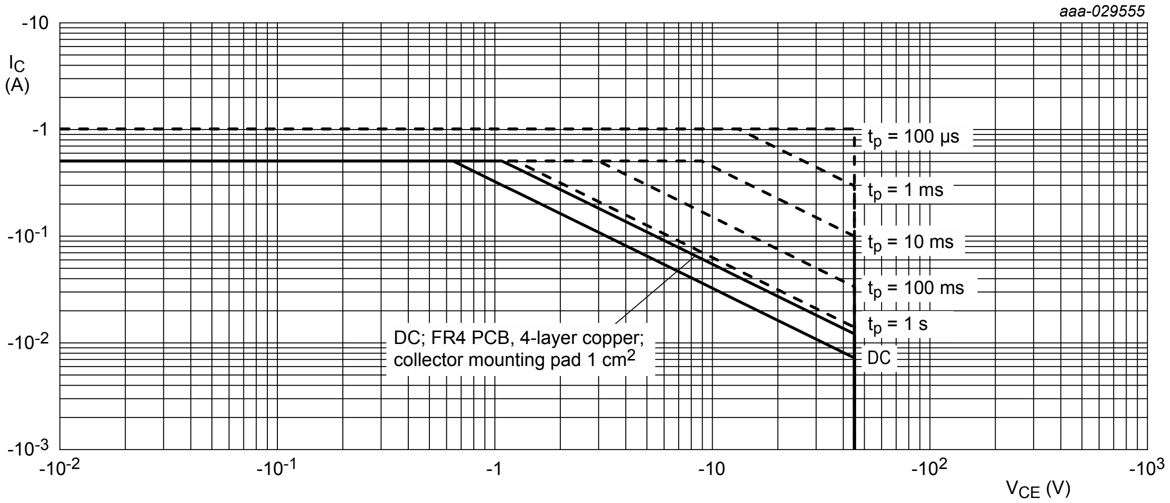
Symbol	Parameter	Conditions		Min	Max	Unit
V_{CBO}	collector-base voltage	open emitter		-	-50	V
V_{CEO}	collector-emitter voltage	open base		-	-45	V
V_{EBO}	emitter-base voltage	open collector		-	-7	V
I_C	collector current			-	-500	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms		-	-1	A
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



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

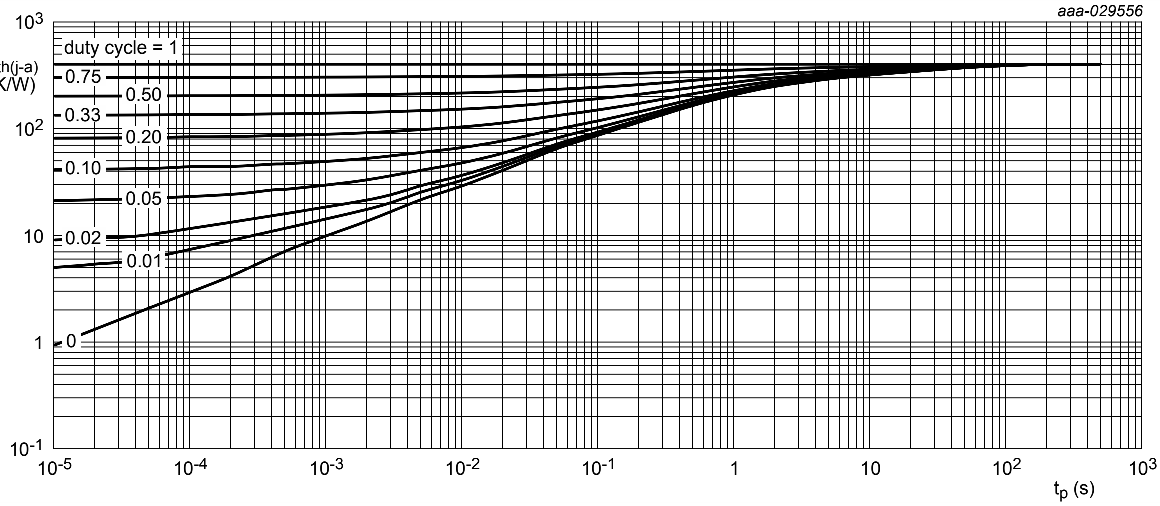
6. Thermal characteristics

Table 7. Thermal characteristics

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

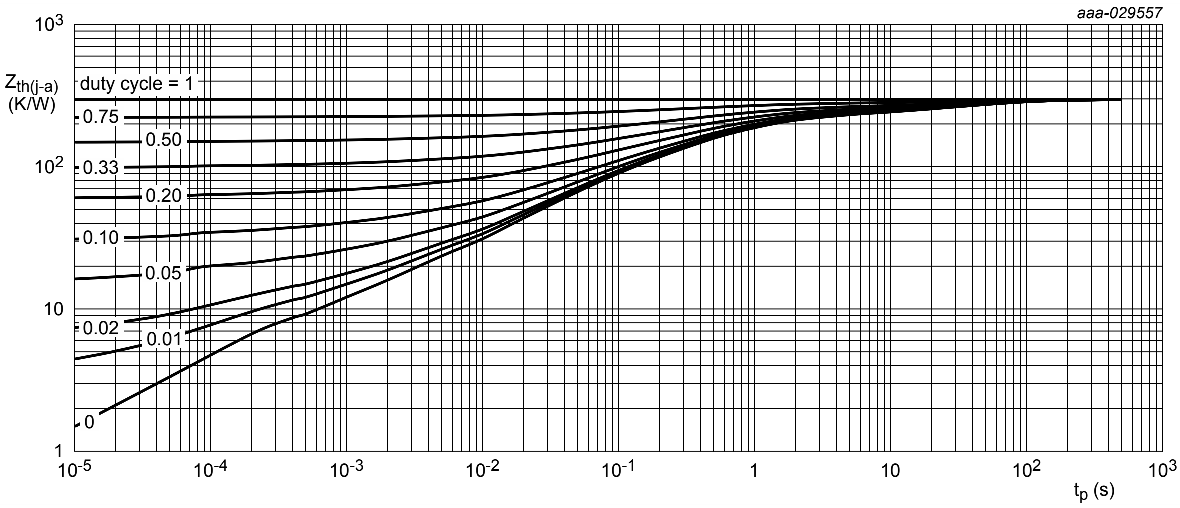
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	470	K/W
			[2]			340	K/W
			[3]			325	K/W
			[4]	-	-	280	K/W
$R_{(j-sp)}$	thermal resistance from junction to solder point			-	-	110	K/W

[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.



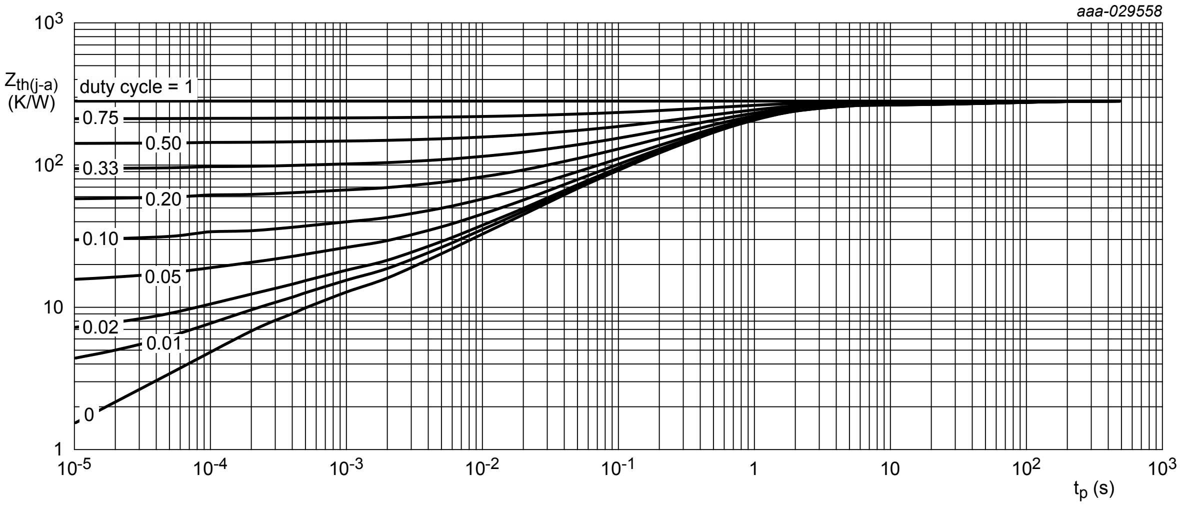
FR4 PCB; single-sided copper; tin-plated and standard footprint

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



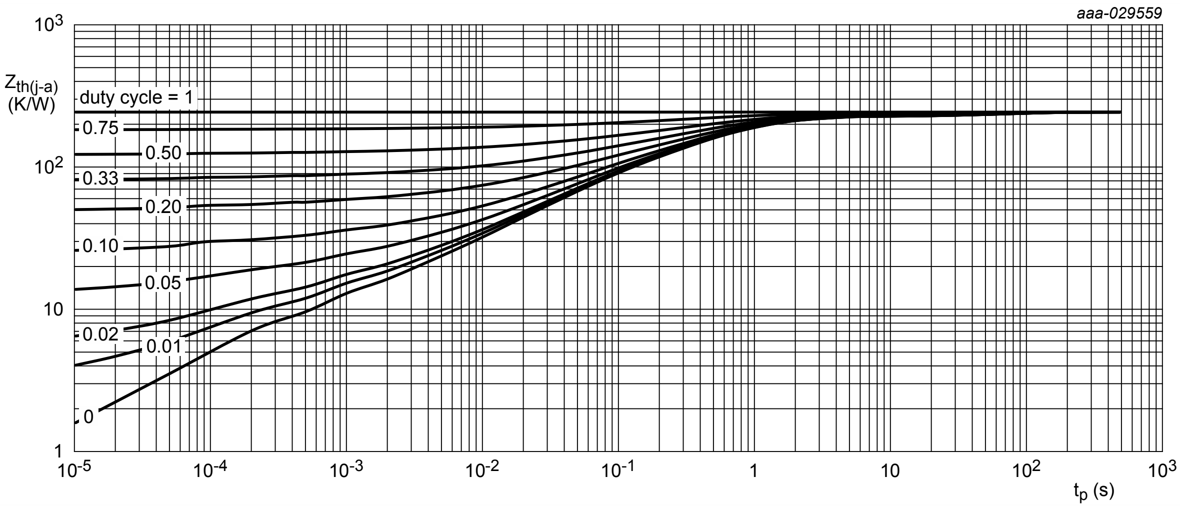
FR4 PCB; single-sided copper; tin-plated; mounting pad for collector 1 cm^2

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



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

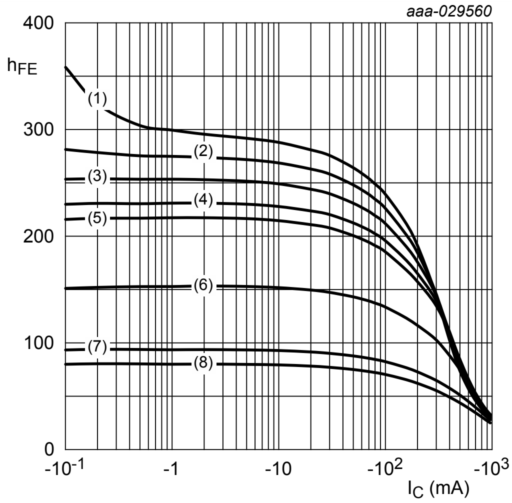
7. Characteristics

Table 8. Characteristics

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

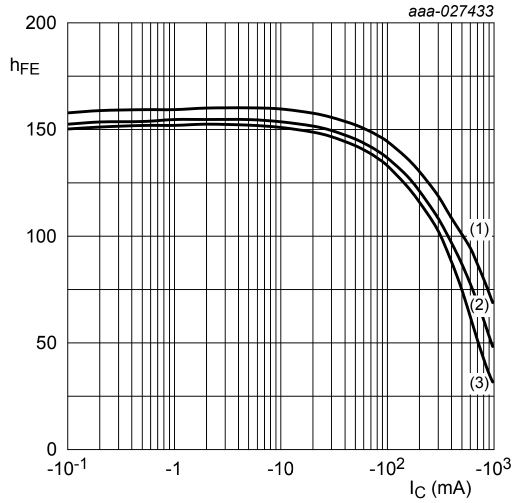
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)CBO}$	collector-base breakdown voltage	I_C = -100 µA; I_E = 0 A		-50	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	I_C = -10 mA; I_B = 0 A		-45	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	I_E = -100 µA; I_C = 0 A		-7	-	-	V
I_{CBO}	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; $\delta \leq 0.02$



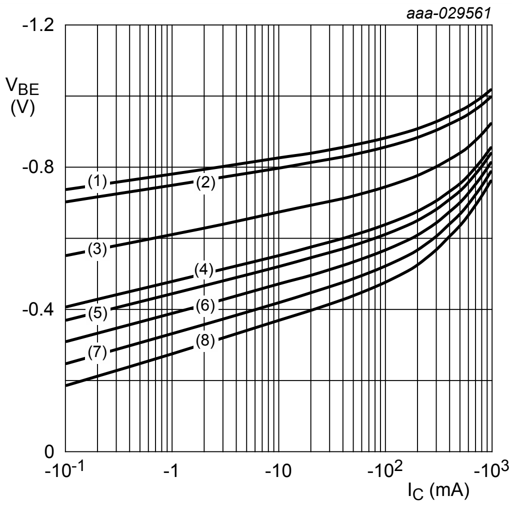
V_{CE} = -1 V
(1) T_{amb} = 175 °C
(2) T_{amb} = 150 °C
(3) T_{amb} = 125 °C
(4) T_{amb} = 100 °C
(5) T_{amb} = 85 °C
(6) T_{amb} = 25 °C
(7) T_{amb} = -40 °C
(8) T_{amb} = -55 °C

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



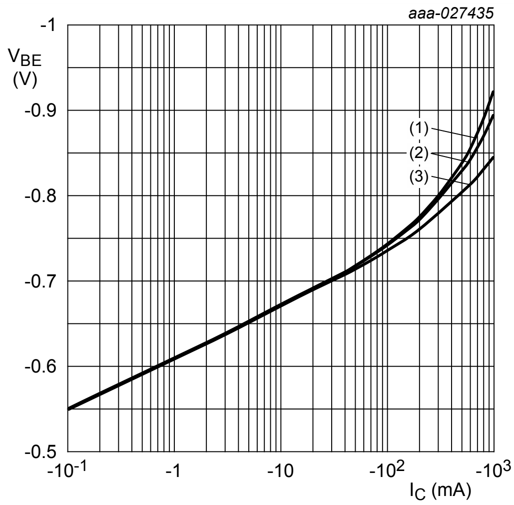
T_{amb} = 25 °C
(1) V_{CE} = -5 V
(2) V_{CE} = -2 V
(3) V_{CE} = -1 V

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



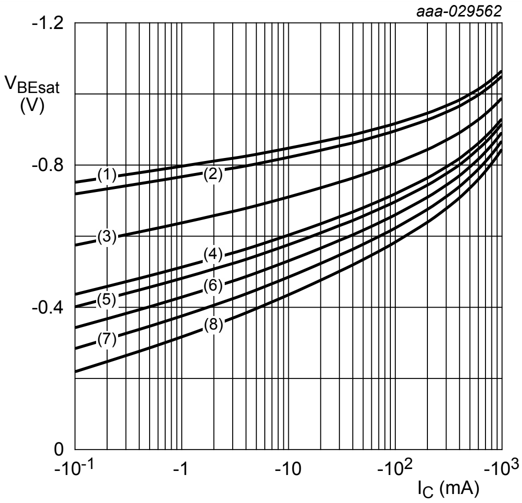
V_{CE} = -1 V
(1) T_{amb} = -55 °C
(2) T_{amb} = -40 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = 85 °C
(5) T_{amb} = 100 °C
(6) T_{amb} = 125 °C
(7) T_{amb} = 150 °C
(8) T_{amb} = 175 °C

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



IC / IB = 10

(1) T_{amb} = -55 °C

(2) T_{amb} = -40 °C

(3) T_{amb} = 25 °C

(4) T_{amb} = 85 °C

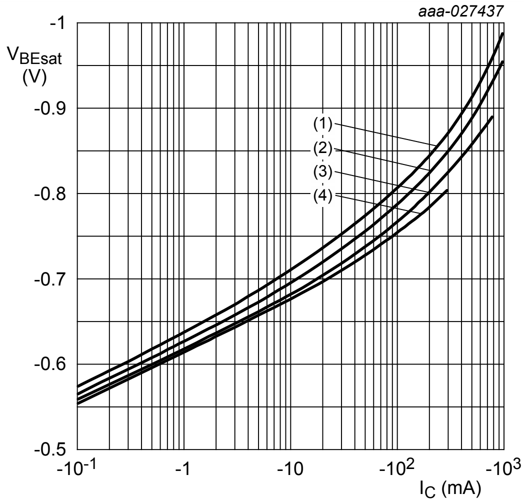
(5) T_{amb} = 100 °C

(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

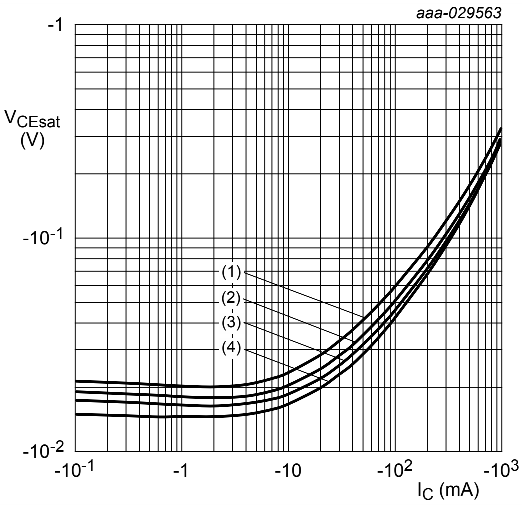
(1) IC / IB = 10

(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

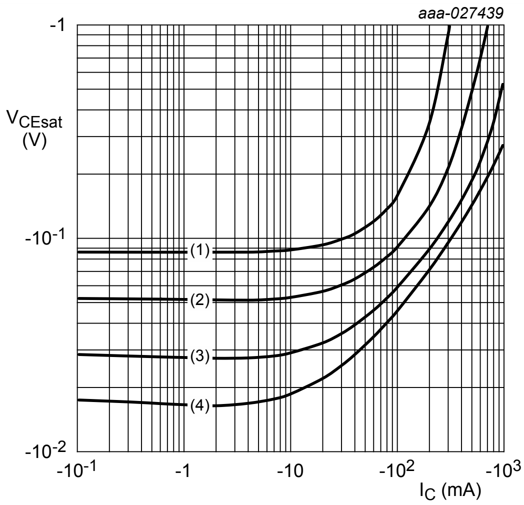
(1) T_{amb} = 175 °C

(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

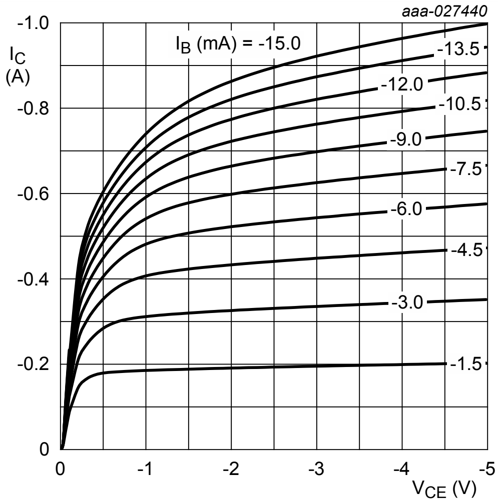
(1) IC / IB = 100

(2) IC / IB = 50

(3) IC / IB = 20

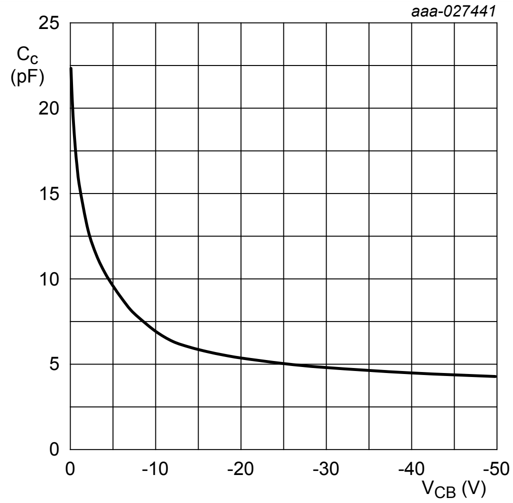
(4) IC / IB = 10

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



T_{amb} = 25 °C

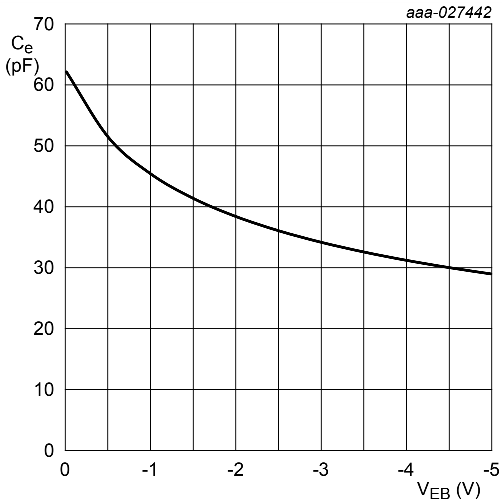
Fig. 15. BC807-16H: Collector current as a function of collector-emitter voltage; typical values



f = 1 MHz

T_{amb} = 25 °C

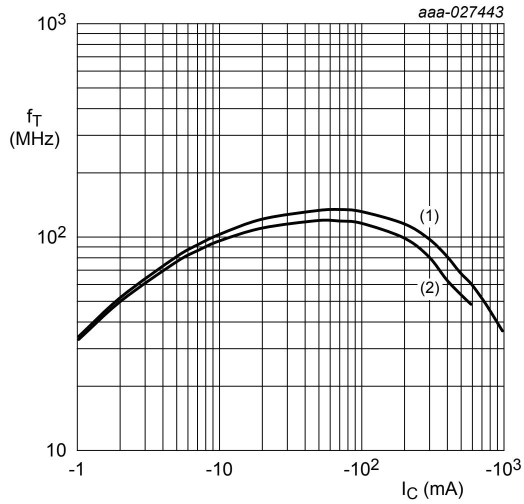
Fig. 16. BC807-16H: Collector capacitance as a function of collector-base voltage; typical values



f = 1 MHz

T_{amb} = 25 °C

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



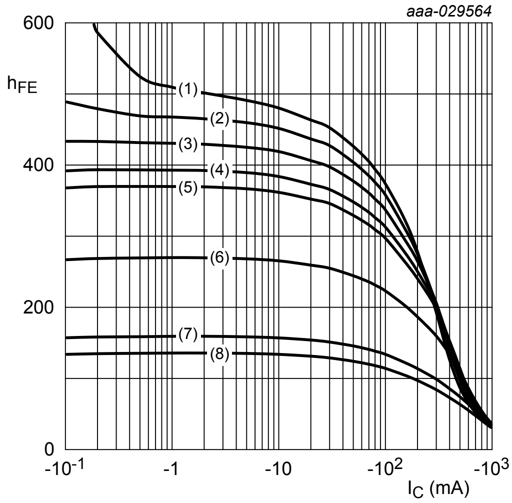
f = 1 MHz

T_{amb} = 25 °C

(1) V_{CE} = -5 V

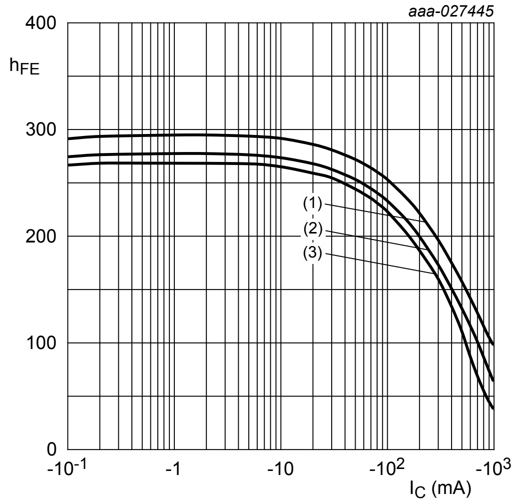
(2) V_{CE} = -1 V

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



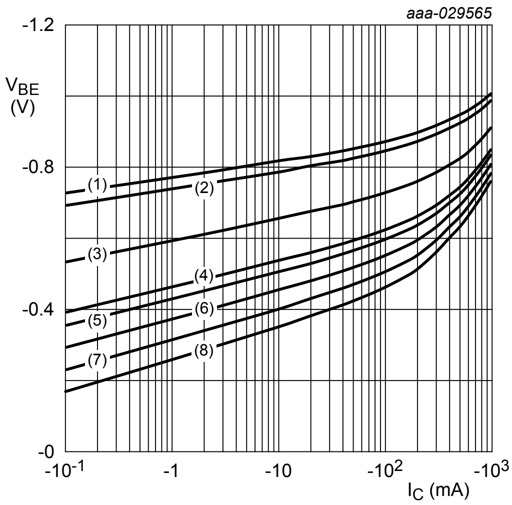
V_{CE} = -1 V
(1) T_{amb} = 175 °C
(2) T_{amb} = 150 °C
(3) T_{amb} = 125 °C
(4) T_{amb} = 100 °C
(5) T_{amb} = 85 °C
(6) T_{amb} = 25 °C
(7) T_{amb} = -40 °C
(8) T_{amb} = -55 °C

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



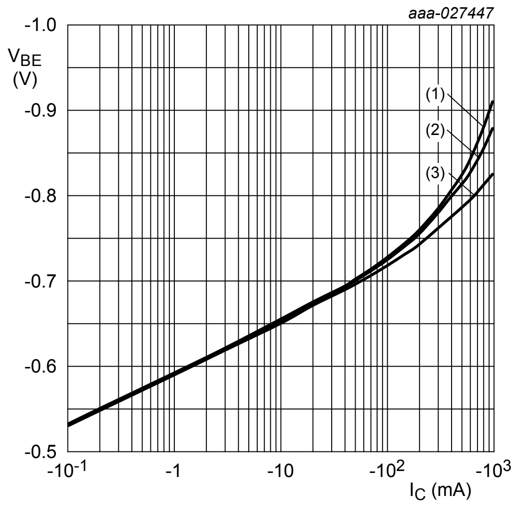
T_{amb} = 25 °C
(1) V_{CE} = -5 V
(2) V_{CE} = -2 V
(3) V_{CE} = -1 V

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



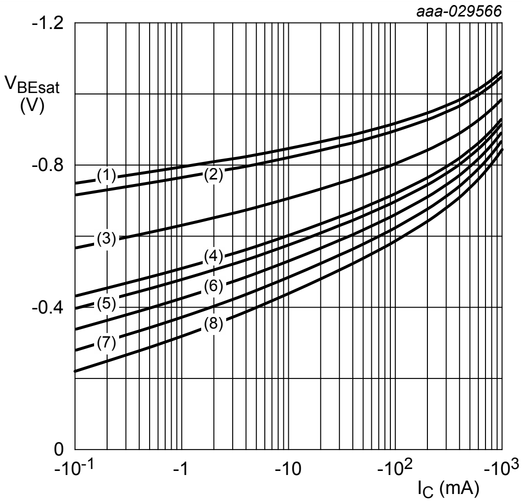
V_{CE} = -1 V
(1) T_{amb} = -55 °C
(2) T_{amb} = -40 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = 85 °C
(5) T_{amb} = 100 °C
(6) T_{amb} = 125 °C
(7) T_{amb} = 150 °C
(8) T_{amb} = 175 °C

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



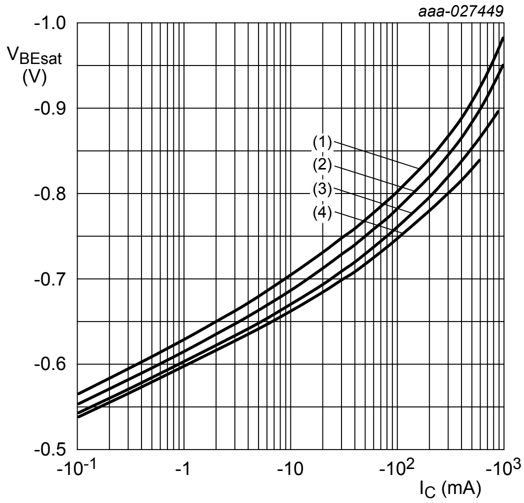
T_{amb} = 25 °C
(1) V_{CE} = -1 V
(2) V_{CE} = -2 V
(3) V_{CE} = -5 V

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



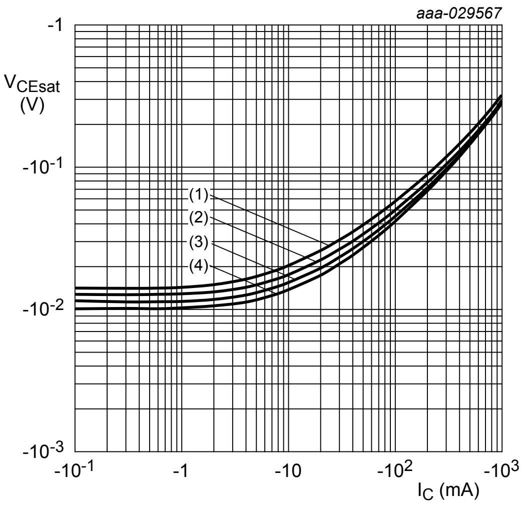
IC / IB = 10
(1) T_{amb} = -55 °C
(2) T_{amb} = -40 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = 85 °C
(5) T_{amb} = 100 °C
(6) T_{amb} = 125 °C
(7) T_{amb} = 150 °C
(8) T_{amb} = 175 °C

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



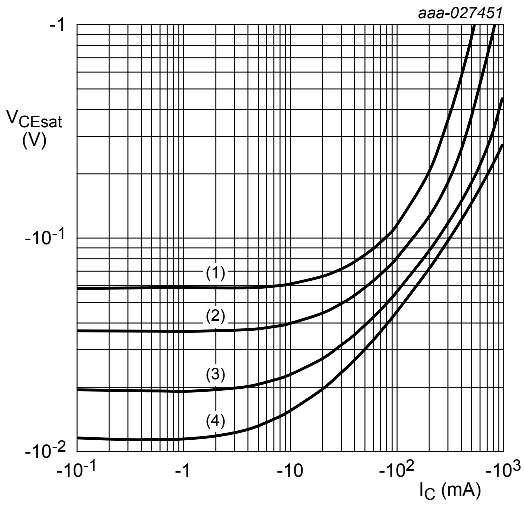
T_{amb} = 25 °C
(1) IC / IB = 10
(2) IC / IB = 20
(3) IC / IB = 50
(4) IC / IB = 100

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



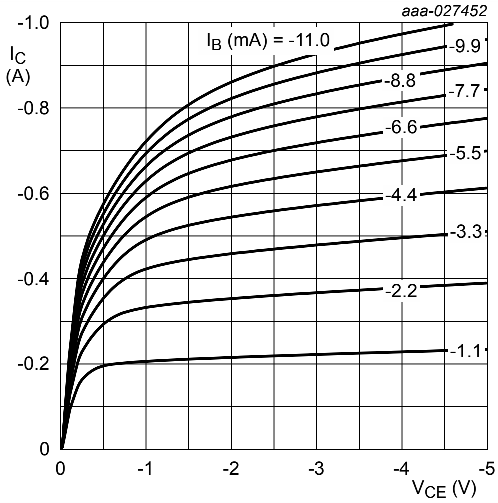
IC / IB = 10
(1) T_{amb} = 175 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = -40 °C

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



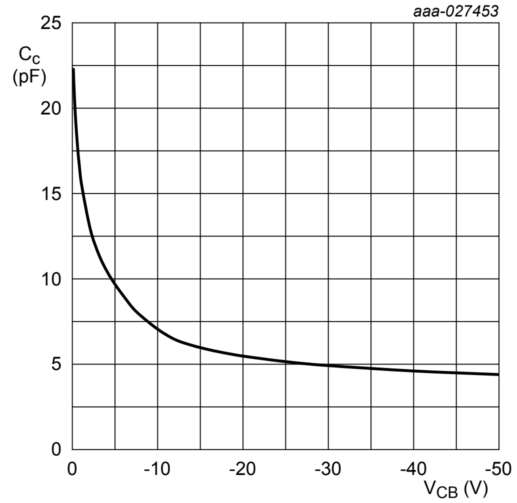
T_{amb} = 25 °C
(1) IC / IB = 100
(2) IC / IB = 50
(3) IC / IB = 20
(4) IC / IB = 10

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



T_{amb} = 25 °C

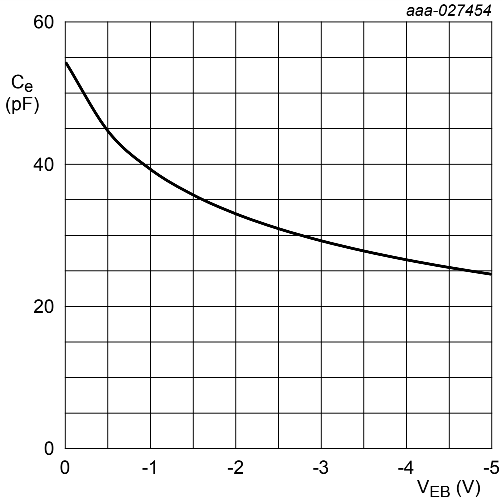
Fig. 27. BC807-25H: Collector current as a function of collector-emitter voltage; typical values



f = 1 MHz

T_{amb} = 25 °C

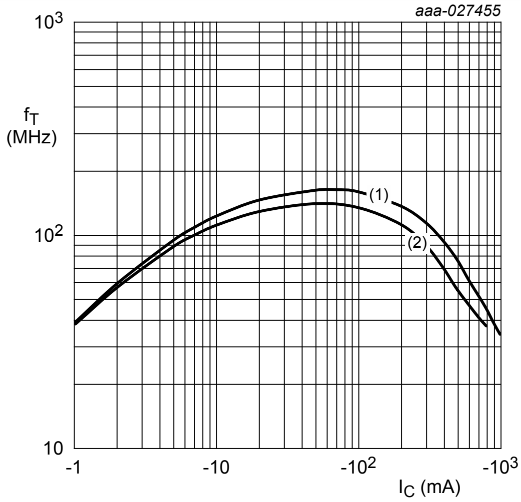
Fig. 28. BC807-25H: Collector capacitance as a function of collector-base voltage; typical values



f = 1 MHz

T_{amb} = 25 °C

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



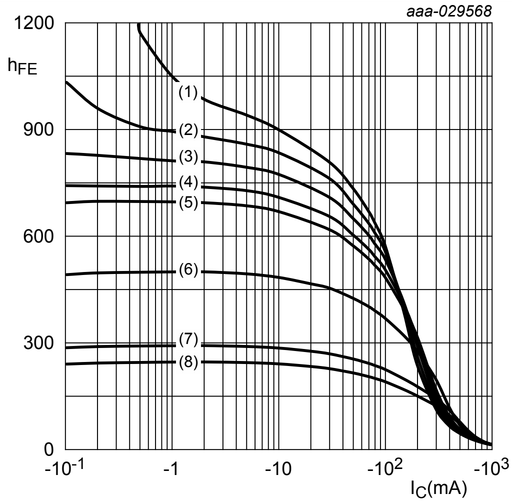
f = 1 MHz

T_{amb} = 25 °C

(1) V_{CE} = -5 V

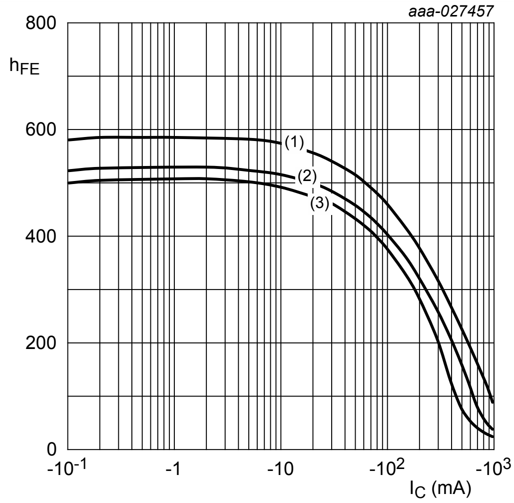
(2) V_{CE} = -1 V

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



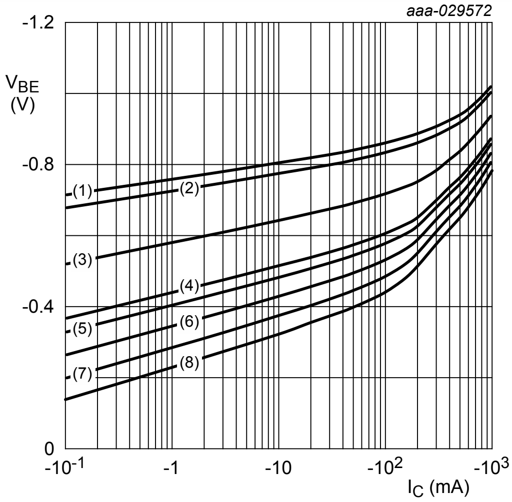
V_{CE} = -1 V
(1) T_{amb} = 175 °C
(2) T_{amb} = 150 °C
(3) T_{amb} = 125 °C
(4) T_{amb} = 100 °C
(5) T_{amb} = 85 °C
(6) T_{amb} = 25 °C
(7) T_{amb} = -40 °C
(8) T_{amb} = -55 °C

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



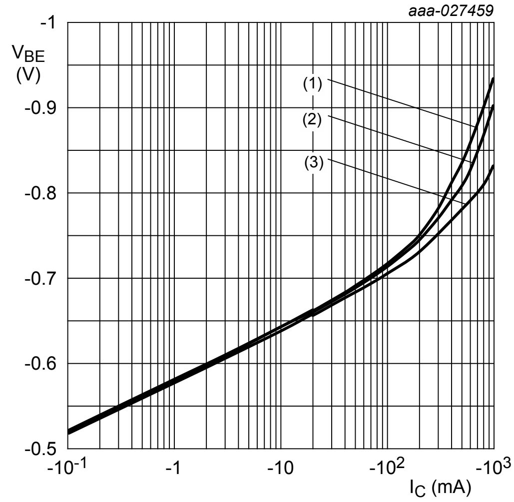
T_{amb} = 25 °C
(1) V_{CE} = -5 V
(2) V_{CE} = -2 V
(3) V_{CE} = -1 V

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



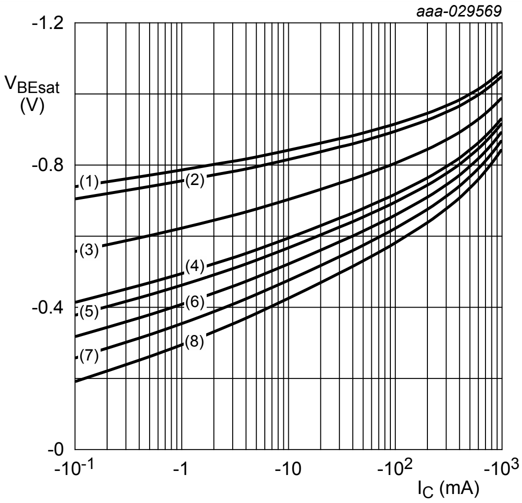
V_{CE} = -1 V
(1) T_{amb} = -55 °C
(2) T_{amb} = -40 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = 85 °C
(5) T_{amb} = 100 °C
(6) T_{amb} = 125 °C
(7) T_{amb} = 150 °C
(8) T_{amb} = 175 °C

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



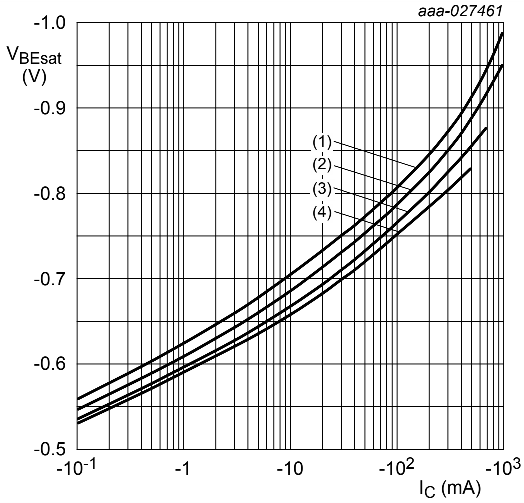
T_{amb} = 25 °C
(1) V_{CE} = -1 V
(2) V_{CE} = -2 V
(3) V_{CE} = -5 V

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



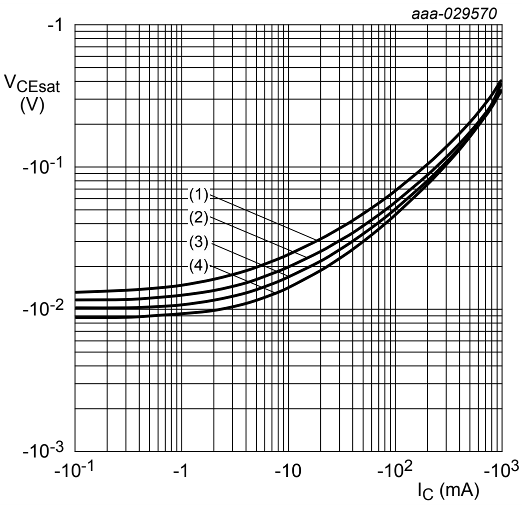
IC / IB = 10
(1) T_{amb} = -55 °C
(2) T_{amb} = -40 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = 85 °C
(5) T_{amb} = 100 °C
(6) T_{amb} = 125 °C
(7) T_{amb} = 150 °C
(8) T_{amb} = 175 °C

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



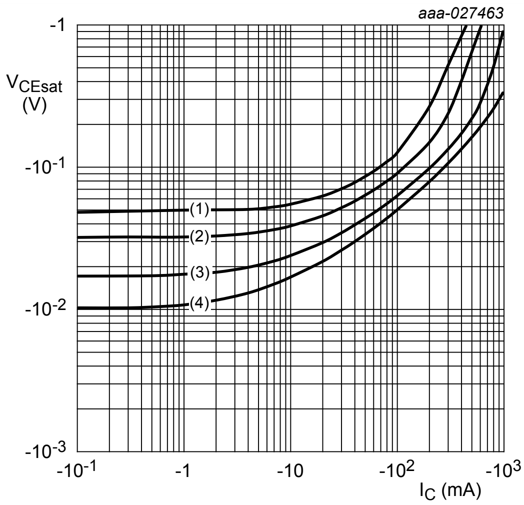
T_{amb} = 25 °C
(1) IC / IB = 10
(2) IC / IB = 20
(3) IC / IB = 50
(4) IC / IB = 100

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



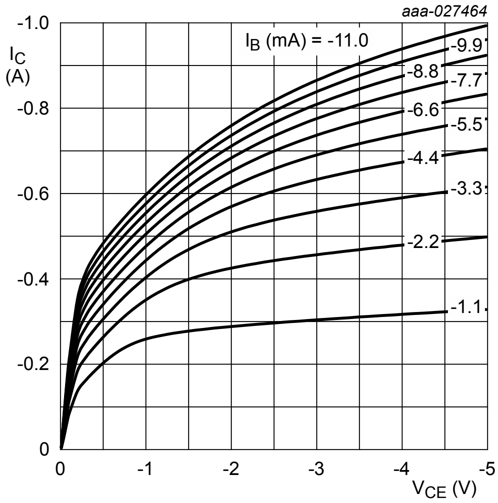
IC / IB = 10
(1) T_{amb} = 175 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = -40 °C

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



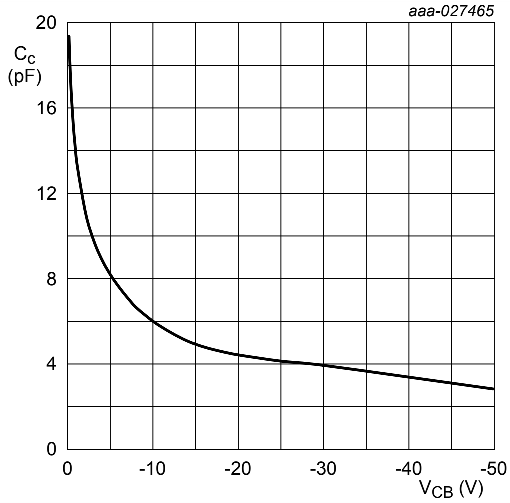
T_{amb} = 25 °C
(1) IC / IB = 100
(2) IC / IB = 50
(3) IC / IB = 20
(4) IC / IB = 10

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



T_{amb} = 25 °C

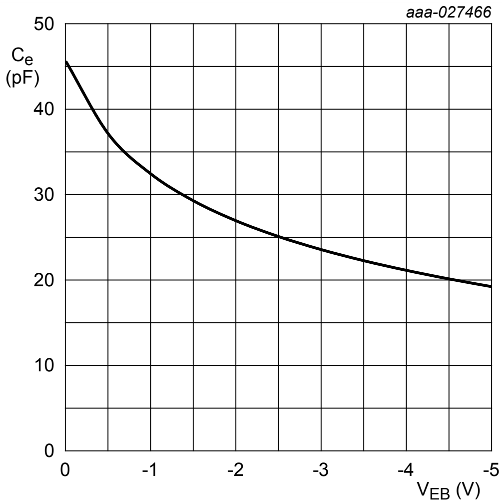
Fig. 39. BC807-40H: Collector current as a function of collector-emitter voltage; typical values



f = 1 MHz

T_{amb} = 25 °C

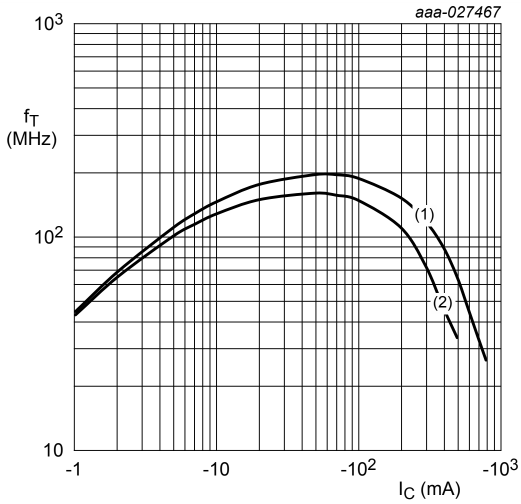
Fig. 40. BC807-40H: Collector capacitance as a function of collector-base voltage; typical values



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.

9. Package outline

Table 9. Package outline

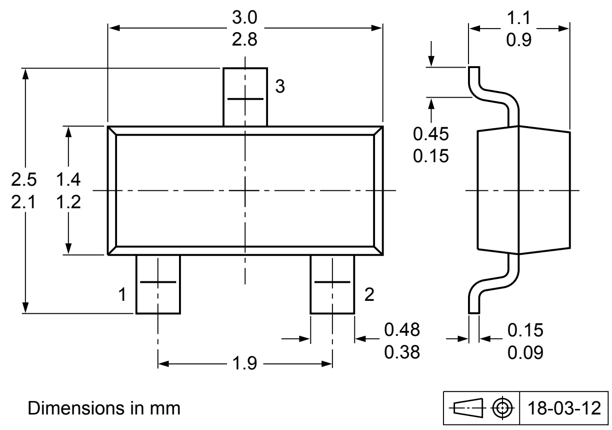


Fig. 43. Package outline TO-236AB (SOT23)

10. Soldering

Table 10. Soldering

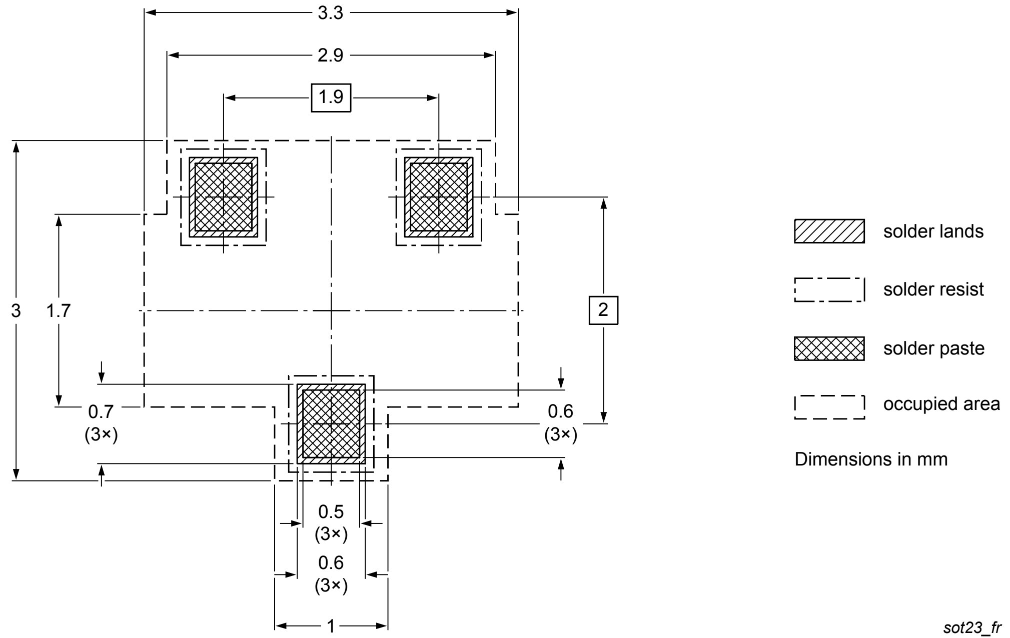


Fig. 44. Reflow soldering footprint for TO-236AB (SOT23)

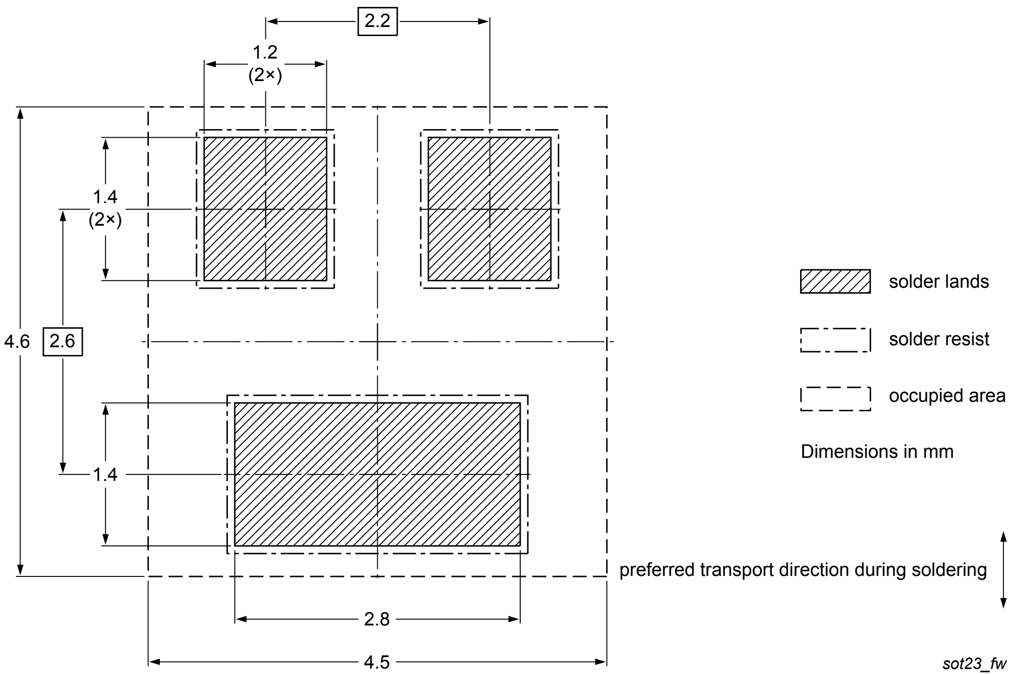


Fig. 45. Wave soldering footprint for TO-236AB (SOT23)

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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	-	-

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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