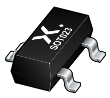


BC807K series

45 V, 500 mA PNP general-purpose transistors

Rev. 2 — 24 April 2018 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	
BC807K-16	SOT23	TO-236AB	BC817K-16
BC807K-25			BC817K-25
BC807K-40			BC817K-40

1.2 Features and benefits

- Three current gain selections
- High power dissipation capability
- AEC-Q101 qualified

1.3 Applications

- General-purpose switching and amplification

1.4 Quick reference data

Table 2. Quick reference data

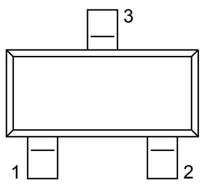
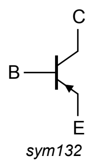
T_{amb} = 25 °C unless otherwise specified.

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					
	BC807K-16		[1]	100	-	250	-
	BC807K-25		[1]	160	-	400	-
	BC807K-40		[1]	250	-	600	-

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

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		
	Name	Description	Version
BC807K-16	TO-236AB	Plastic surface-mounted package; 3 leads	SOT23
BC807K-25			
BC807K-40			

4 Marking

Table 5. Marking

Type number		Marking code
BC807K-16	[1]	HA%
BC807K-25	[1]	HB%
BC807K-40	[1]	HC%

[1] % = placeholder for manufacturing site code

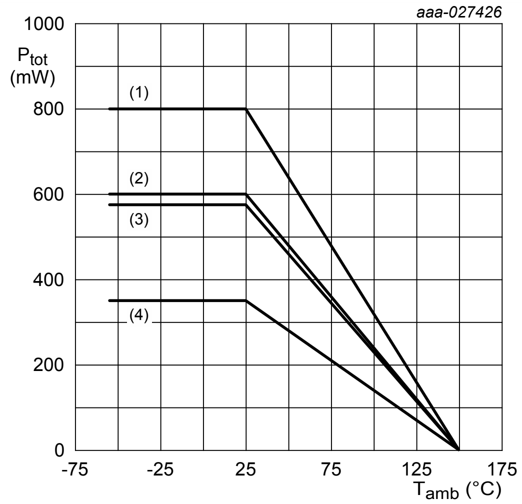
5 Limiting values

Table 6. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
V_{CBO}	collector-base voltage	open emitter		-	-50	V
V_{CEO}	collector-emitter voltage	open base		-	-45	V
V_{EBO}	emitter-base voltage	open collector		-	-5	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]	-	350	mW
			[2]	-	575	mW
			[3]	-	600	mW
			[4]	-	800	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-55	150	°C
T_{stg}	storage temperature			-65	150	°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.



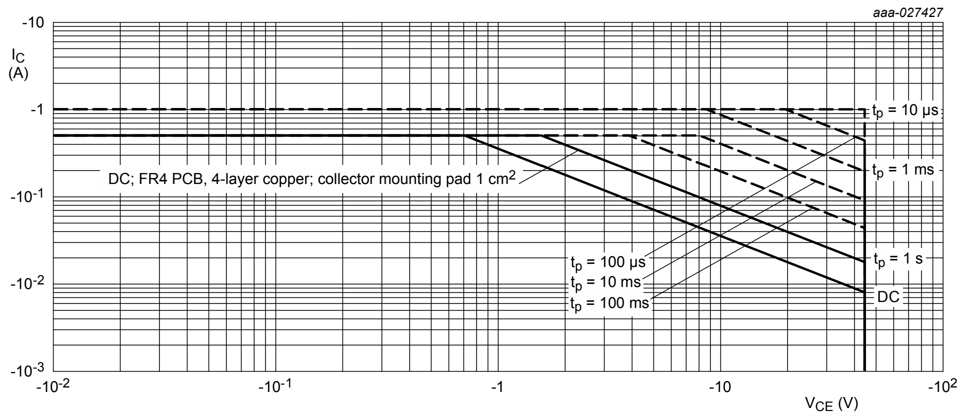
(1) FR4 PCB, 4-layer copper; 1 cm^2

(2) FR4 PCB, 4-layer copper; standard footprint

(3) FR4 PCB, single-sided copper; 1 cm^2

(4) FR4 PCB, single-sided copper; standard footprint

Figure 1. Power derating curves



FR4 PCB, single-sided copper; standard footprint; single pulse;

T_{amb} = 25 °C

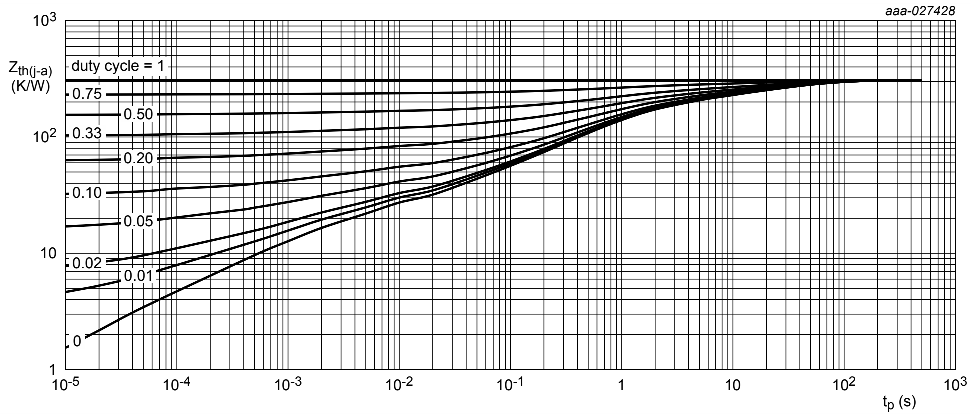
Figure 2. Safe operating area; junction to ambient; continous and peak collector currents as a function of collector-emitter voltage

6 Thermal characteristics

Table 7. Thermal characteristics

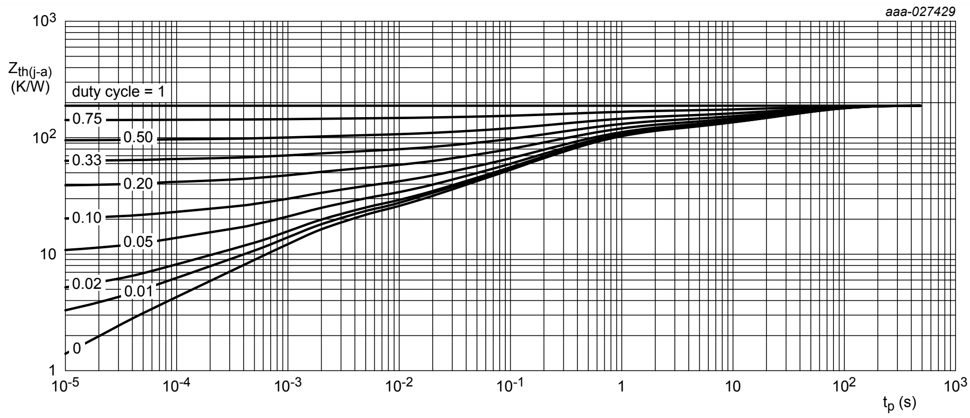
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	358	K/W
			[2]	-	-	218	K/W
			[3]	-	-	209	K/W
			[4]	-	-	157	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	60	K/W

[1] Device mounted on an FR4 PCB; single-sided copper; tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB; single-sided copper; tin-plated; mounting pad for collector 1 cm^2.
[3] Device mounted on an FR4 PCB; 4-layer copper; tin-plated and standard footprint.
[4] Device mounted on an FR4 PCB; 4-layer copper; tin-plated; mounting pad for collector 1 cm^2.



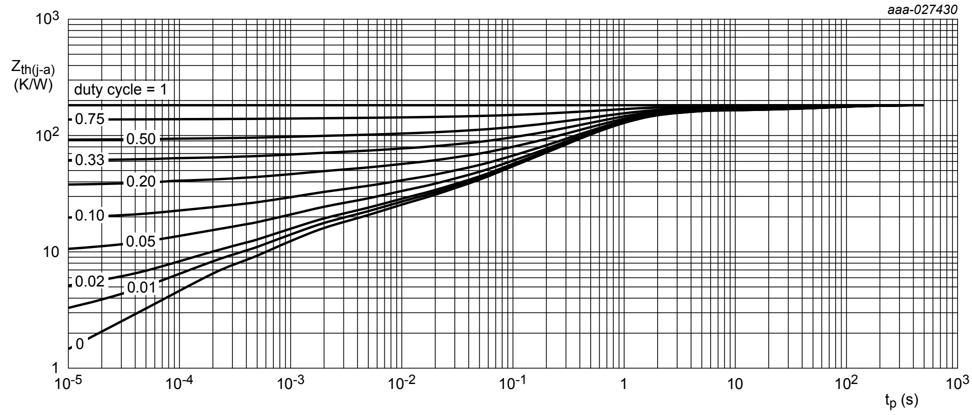
FR4 PCB; single-sided copper; tin-plated and standard footprint

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



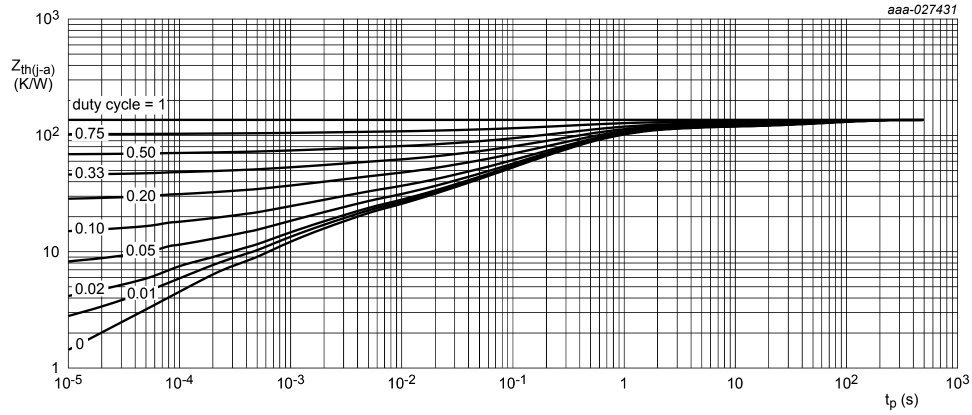
FR4 PCB; single-sided copper; tin-plated; mounting pad for collector 1 cm^2

Figure 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

Figure 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

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

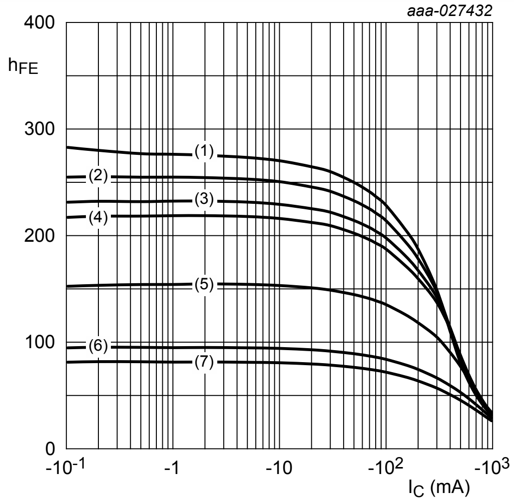
7 Characteristics

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		-5	-	-	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						
	BC807K-16	V_{CE} = -1 V; I_C = -100 mA	[1]	100	-	250	
	BC807K-25	V_{CE} = -1 V; I_C = -100 mA	[1]	160	-	400	
	BC807K-40	V_{CE} = -1 V; I_C = -100 mA	[1]	250	-	600	
	BC807K-16, -25, -40	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					
	BC807K-16			-	50	-	pF
	BC807K-25			-	45	-	pF
	BC807K-40			-	37	-	pF

[1] pulsed; t_p ≤ 300 µs; δ ≤ 0.02



V_{CE} = -1 V

(1) T_{amb} = 150 °C

(2) T_{amb} = 125 °C

(3) T_{amb} = 100 °C

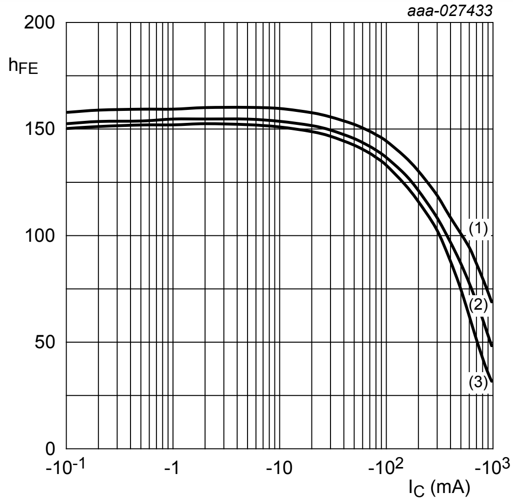
(4) T_{amb} = 85 °C

(5) T_{amb} = 25 °C

(6) T_{amb} = -40 °C

(7) T_{amb} = -55 °C

Figure 7. BC807K-16: DC current gain as a function of collector current; typical values



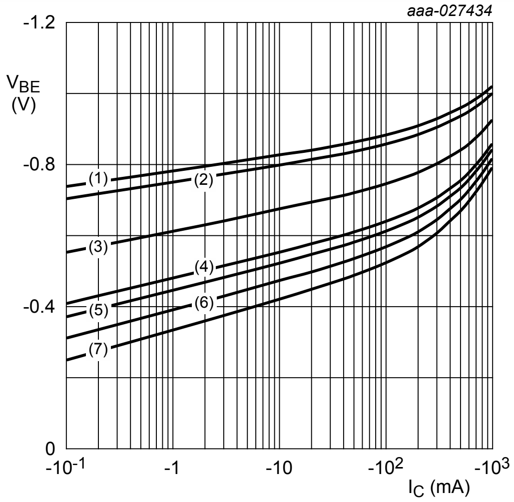
T_{amb} = 25 °C

(1) V_{CE} = -5 V

(2) V_{CE} = -2 V

(3) V_{CE} = -1 V

Figure 8. BC807K-16: 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

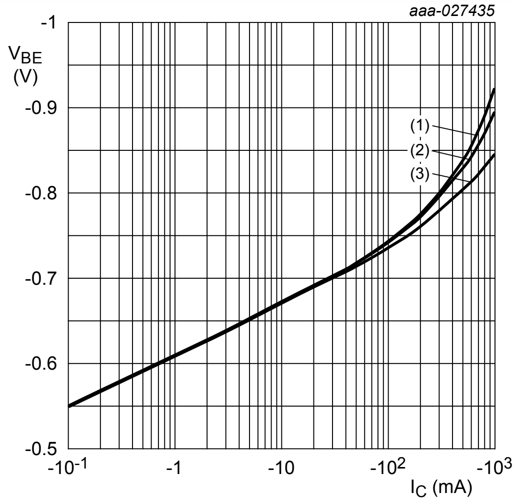
(4) T_{amb} = 85 °C

(5) T_{amb} = 100 °C

(6) T_{amb} = 125 °C

(7) T_{amb} = 150 °C

Figure 9. BC807K-16: Base-emitter voltage as a function of collector current; typical values



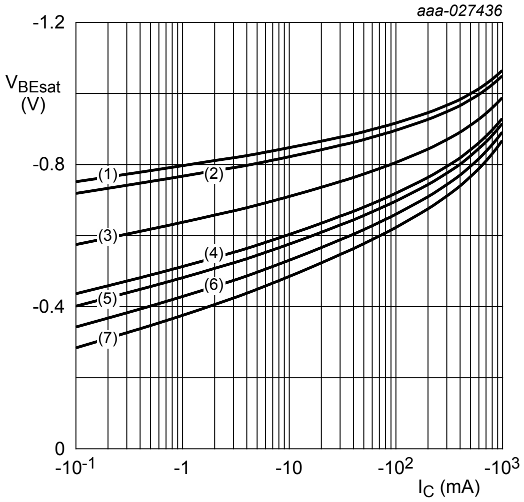
T_{amb} = 25 °C

(1) V_{CE} = -1 V

(2) V_{CE} = -2 V

(3) V_{CE} = -5 V

Figure 10. BC807K-16: Base-emitter voltage as a function of collector current; typical values



$I_C/I_B = 10$

(1) T_{amb} = -55 °C

(2) T_{amb} = -40°C

(3) T_{amb} = 25 °C

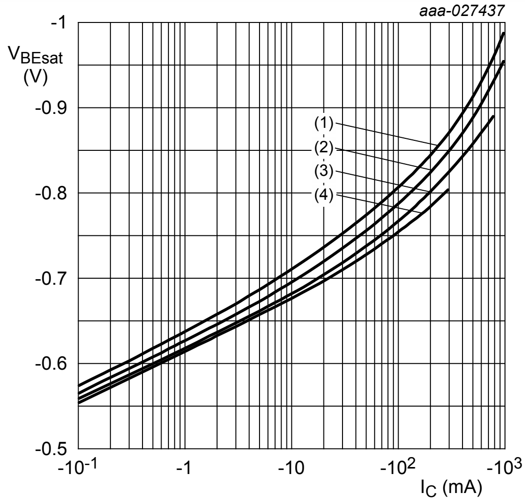
(4) T_{amb} = 85 °C

(5) T_{amb} = 100 °C

(6) T_{amb} = 125 °C

(7) T_{amb} = 150 °C

Figure 11. BC807K-16: Base-emitter saturation voltage as a function of collector current; typical values



T_{amb} = 25 °C

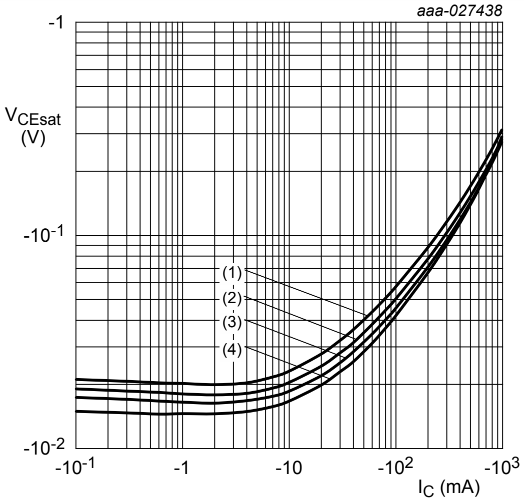
(1) $I_C/I_B = 10$

(2) $I_C/I_B = 20$

(3) $I_C/I_B = 50$

(4) $I_C/I_B = 100$

Figure 12. BC807K-16: Base-emitter saturation voltage as a function of collector current; typical values



$I_C/I_B = 10$

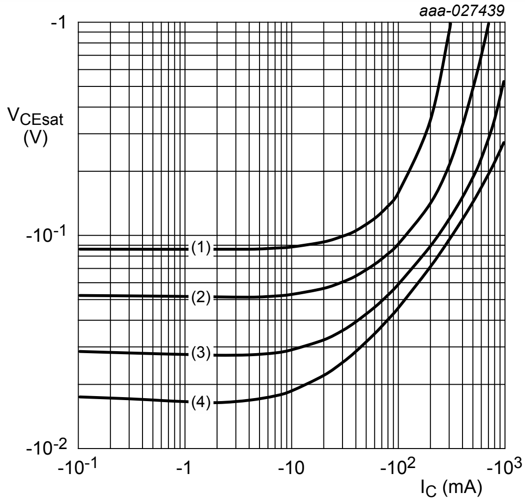
(1) T_{amb} = 150 °C

(2) T_{amb} = 85 °C

(3) T_{amb} = 25 °C

(4) T_{amb} = -40 °C

Figure 13. BC807K-16: Collector-emitter saturation voltage as a function of collector current; typical values



T_{amb} = 25 °C

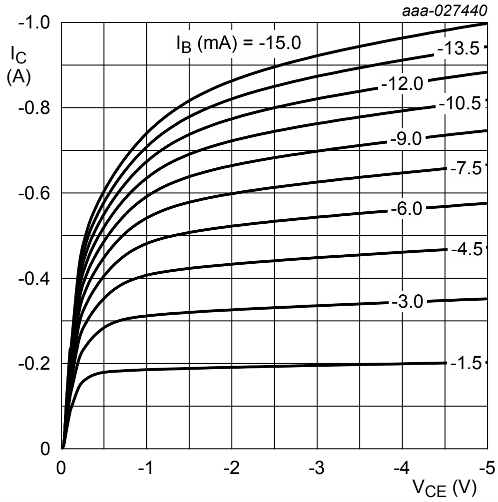
(1) $I_C/I_B = 100$

(2) $I_C/I_B = 50$

(3) $I_C/I_B = 20$

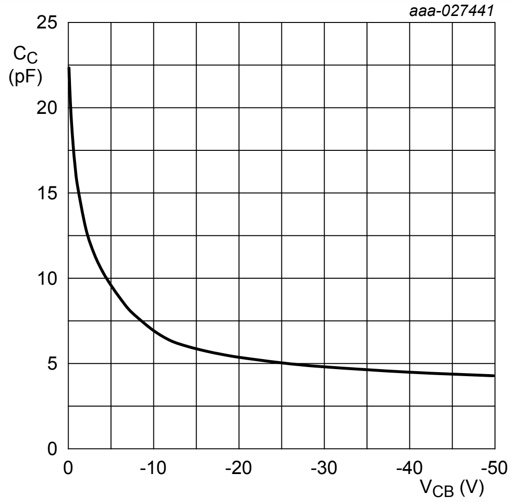
(4) $I_C/I_B = 10$

Figure 14. BC807K-16: Collector-emitter saturation voltage as a function of collector current; typical values



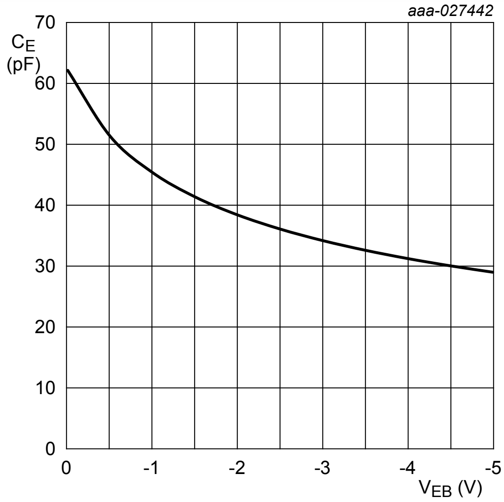
T_{amb} = 25 °C

Figure 15. BC807K-16: Collector current as a function of collector-emitter voltage; typical values



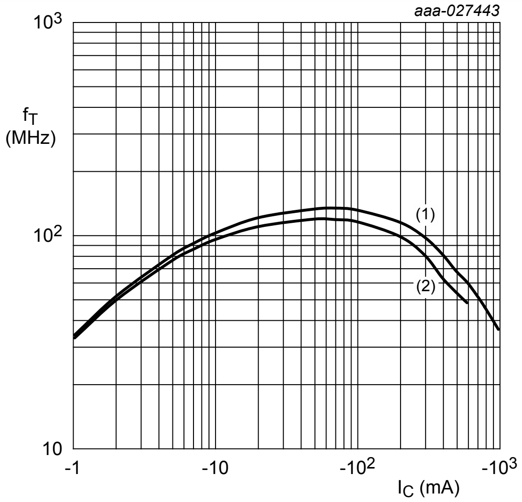
f = 1 MHz; T_{amb} = 25 °C

Figure 16. BC807K-16: Collector capacitance as a function of collector-base voltage; typical values



f = 1 MHz; T_{amb} = 25 °C

Figure 17. BC807K-16: Emitter capacitance as a function of emitter-base voltage; typical values

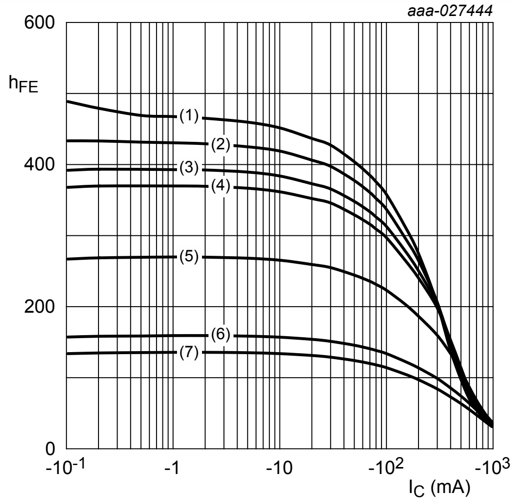


f = 100 MHz; T_{amb} = 25 °C

(1) V_{CE} = -5 V

(2) V_{CE} = -1 V

Figure 18. BC807K-16: Transition frequency as a function of collector current voltage; typical values



V_{CE} = -1 V

(1) T_{amb} = 150 °C

(2) T_{amb} = 125 °C

(3) T_{amb} = 100 °C

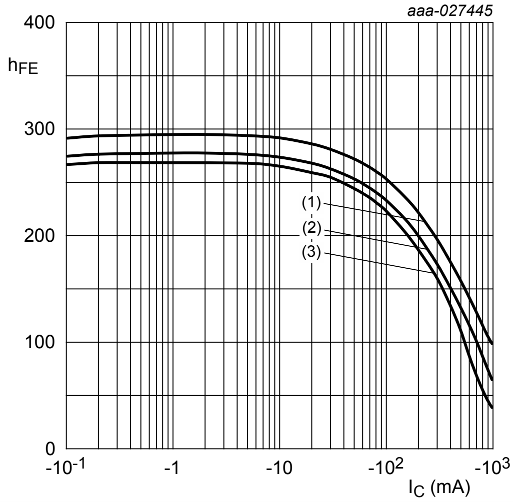
(4) T_{amb} = 85 °C

(5) T_{amb} = 25 °C

(6) T_{amb} = -40 °C

(7) T_{amb} = -55 °C

Figure 19. BC807K-25: DC current gain as a function of collector current; typical values



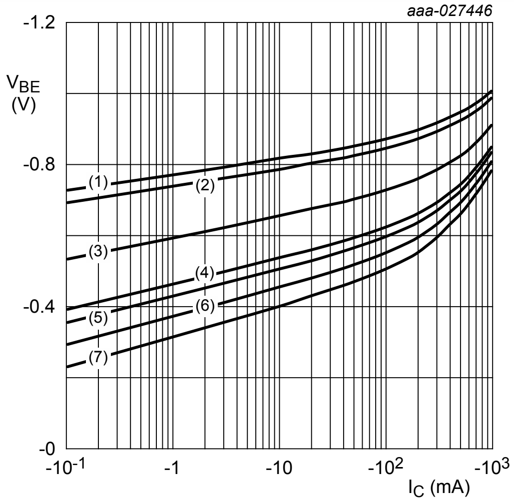
T_{amb} = 25 °C

(1) V_{CE} = -5 V

(2) V_{CE} = -2 V

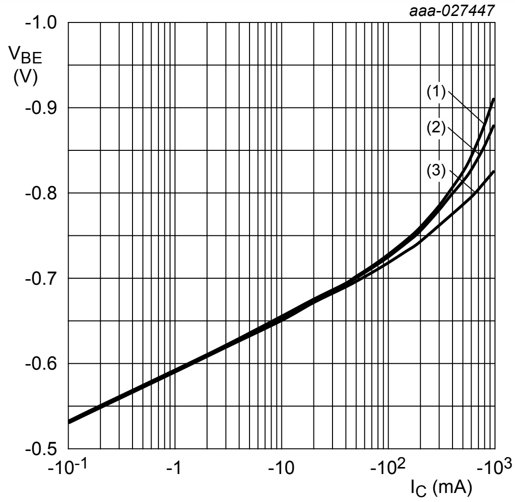
(3) V_{CE} = -1 V

Figure 20. BC807K-25: DC current gain as a function of collector current; typical values



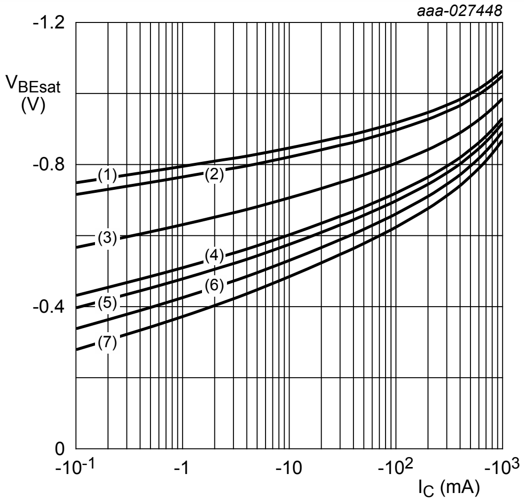
V_{CE} = -1 V
(1) T_{amb} = -55 °C
(2) T_{amb} = -40°C
(3) T_{amb} = 25 °C
(4) T_{amb} = 85 °C
(5) T_{amb} = 100 °C
(6) T_{amb} = 125 °C
(7) T_{amb} = 150 °C

Figure 21. BC807K-25: 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

Figure 22. BC807K-25: Base-emitter voltage as a function of collector current; typical values



$I_C/I_B = 10$

(1) T_{amb} = -55 °C

(2) T_{amb} = -40°C

(3) T_{amb} = 25 °C

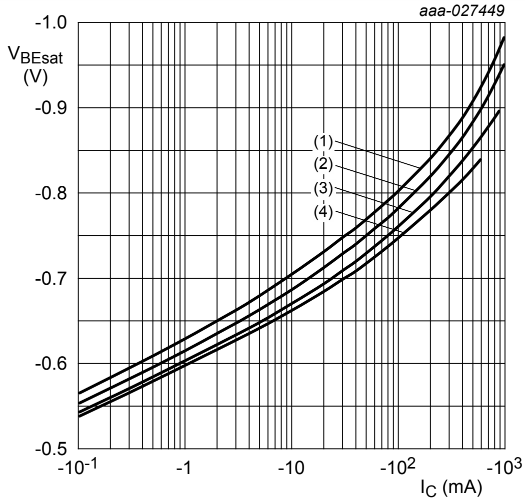
(4) T_{amb} = 85 °C

(5) T_{amb} = 100 °C

(6) T_{amb} = 125 °C

(7) T_{amb} = 150 °C

Figure 23. BC807K-25: Base-emitter saturation voltage as a function of collector current; typical values



T_{amb} = 25 °C

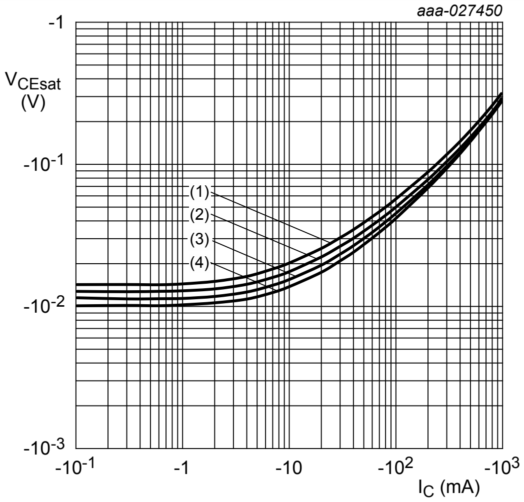
(1) $I_C/I_B = 10$

(2) $I_C/I_B = 20$

(3) $I_C/I_B = 50$

(4) $I_C/I_B = 100$

Figure 24. BC807K-25: Base-emitter saturation voltage as a function of collector current; typical values



$I_C/I_B = 10$

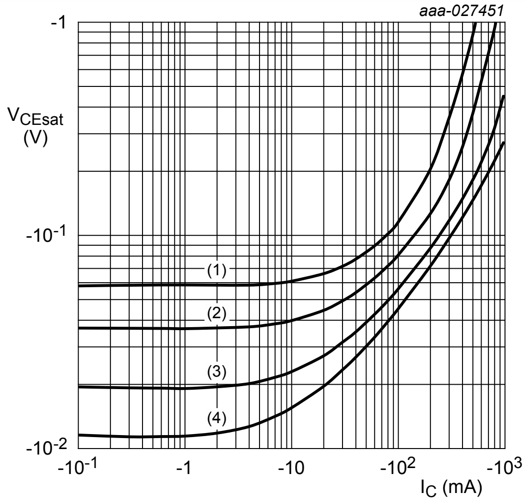
(1) T_{amb} = 150 °C

(2) T_{amb} = 85 °C

(3) T_{amb} = 25 °C

(4) T_{amb} = -40 °C

Figure 25. BC807K-25: Collector-emitter saturation voltage as a function of collector current; typical values



T_{amb} = 25 °C

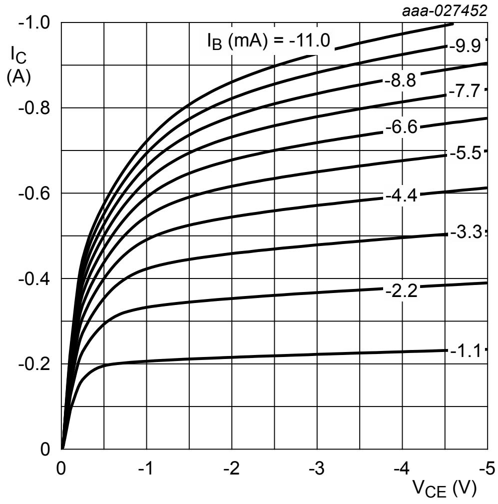
(1) $I_C/I_B = 100$

(2) $I_C/I_B = 50$

(3) $I_C/I_B = 20$

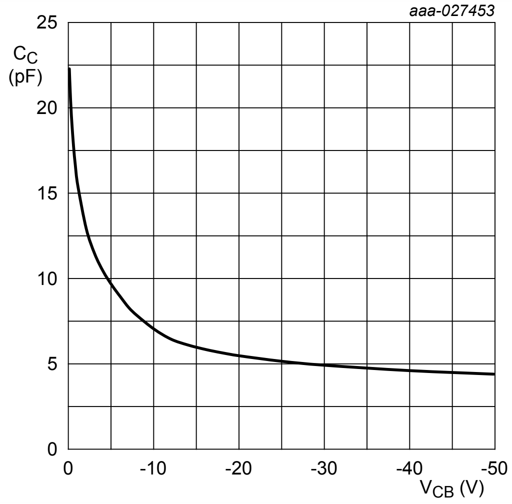
(4) $I_C/I_B = 10$

Figure 26. BC807K-25: Collector-emitter saturation voltage as a function of collector current; typical values



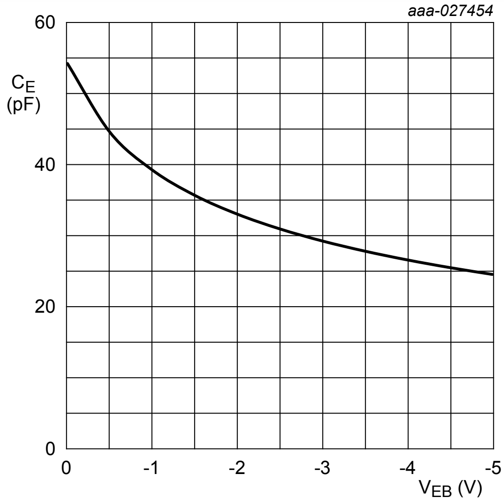
T_{amb} = 25 °C

Figure 27. BC807K-25: Collector current as a function of collector-emitter voltage; typical values



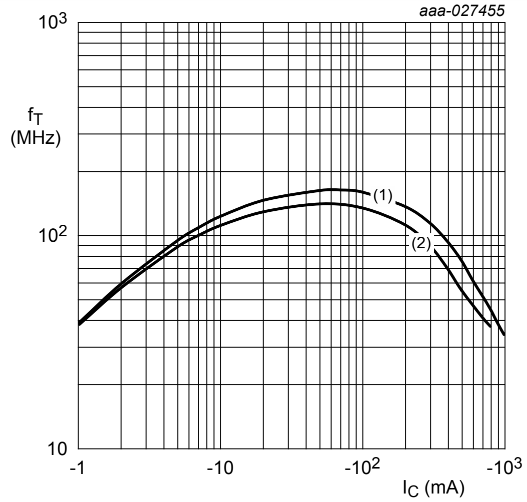
f = 1 MHz; T_{amb} = 25 °C

Figure 28. BC807K-25: Collector capacitance as a function of collector-base voltage; typical values



f = 1 MHz; T_{amb} = 25 °C

Figure 29. BC807K-25: Emitter capacitance as a function of emitter-base voltage; typical values

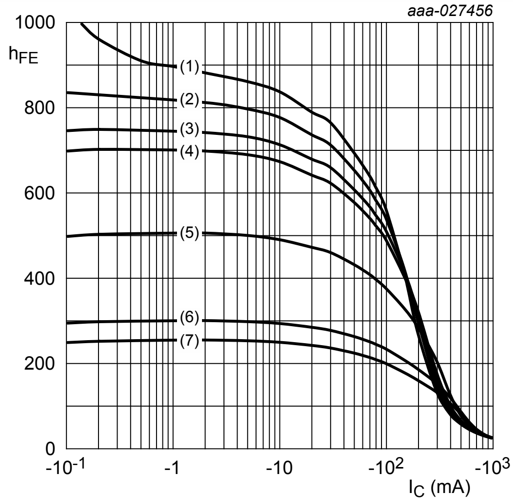


f = 100 MHz; T_{amb} = 25 °C

(1) V_{CE} = -5 V

(2) V_{CE} = -1 V

Figure 30. BC807K-25: Transition frequency as a function of collector current voltage; typical values



V_{CE} = -1 V

(1) T_{amb} = 150 °C

(2) T_{amb} = 125 °C

(3) T_{amb} = 100 °C

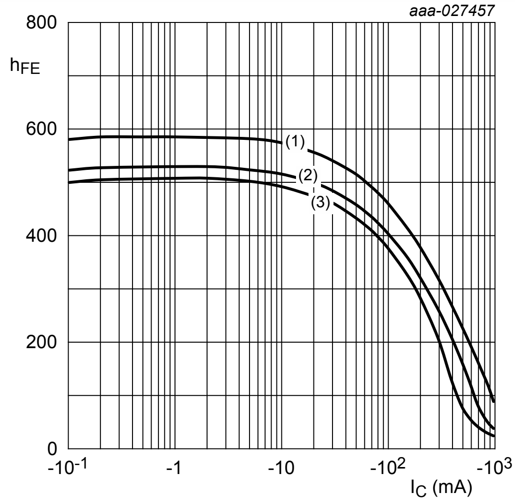
(4) T_{amb} = 85 °C

(5) T_{amb} = 25 °C

(6) T_{amb} = -40 °C

(7) T_{amb} = -55 °C

Figure 31. BC807K-40: DC current gain as a function of collector current; typical values



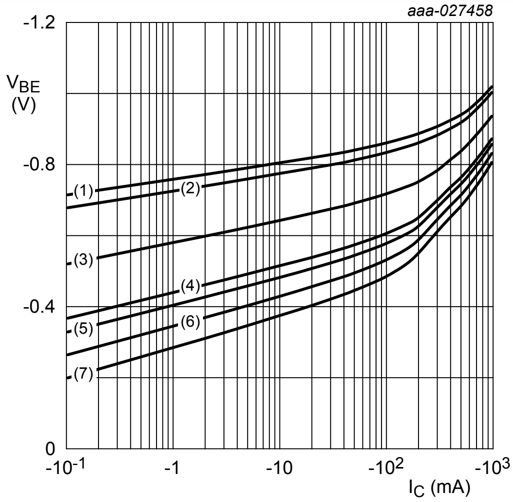
T_{amb} = 25 °C

(1) V_{CE} = -5 V

(2) V_{CE} = -2 V

(3) V_{CE} = -1 V

Figure 32. BC807K-40: 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

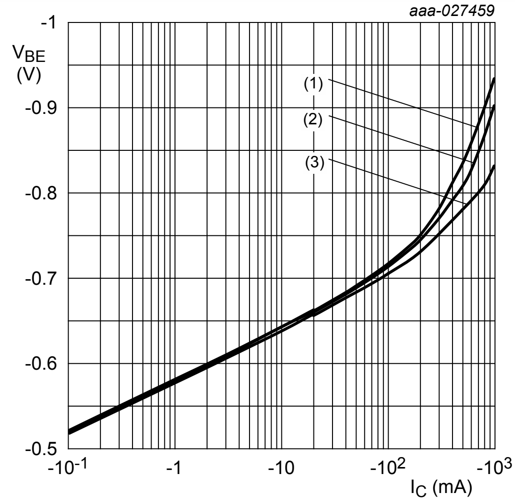
(4) T_{amb} = 85 °C

(5) T_{amb} = 100 °C

(6) T_{amb} = 125 °C

(7) T_{amb} = 150 °C

Figure 33. BC807K-40: Base-emitter voltage as a function of collector current; typical values



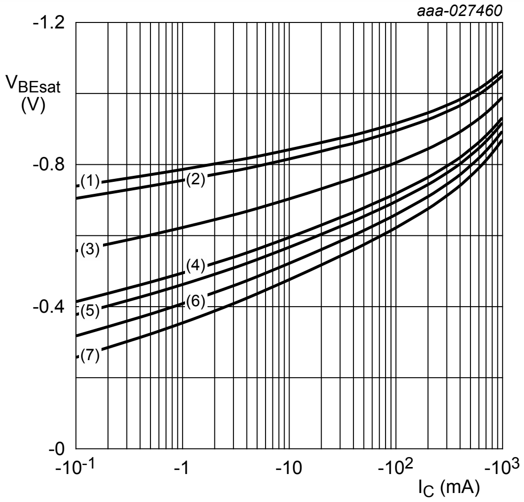
T_{amb} = 25 °C

(1) V_{CE} = -1 V

(2) V_{CE} = -2 V

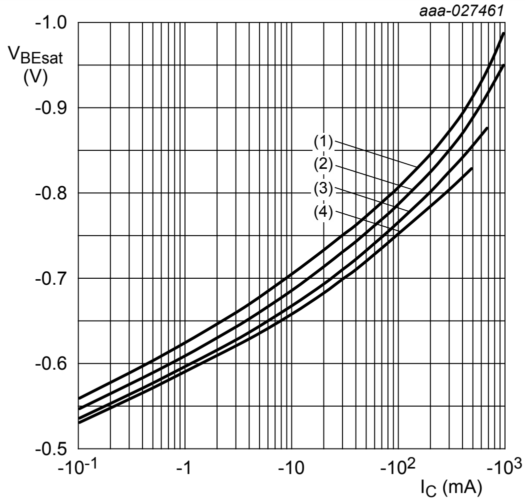
(3) V_{CE} = -5 V

Figure 34. BC807K-40: Base-emitter voltage as a function of collector current; typical values



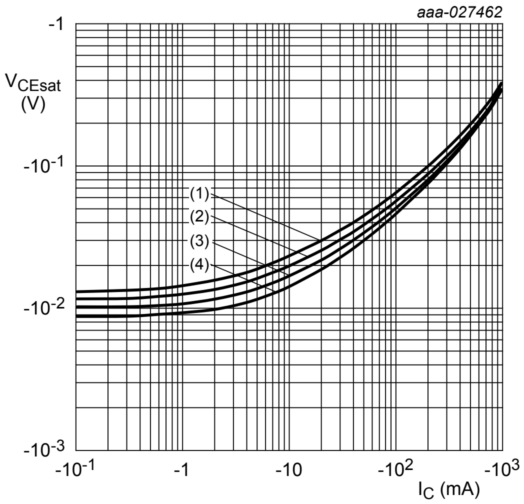
$I_C/I_B = 10$
(1) T_{amb} = -55 °C
(2) T_{amb} = -40°C
(3) T_{amb} = 25 °C
(4) T_{amb} = 85 °C
(5) T_{amb} = 100 °C
(6) T_{amb} = 125 °C
(7) T_{amb} = 150 °C

Figure 35. BC807K-40: Base-emitter saturation voltage as a function of collector current; typical values



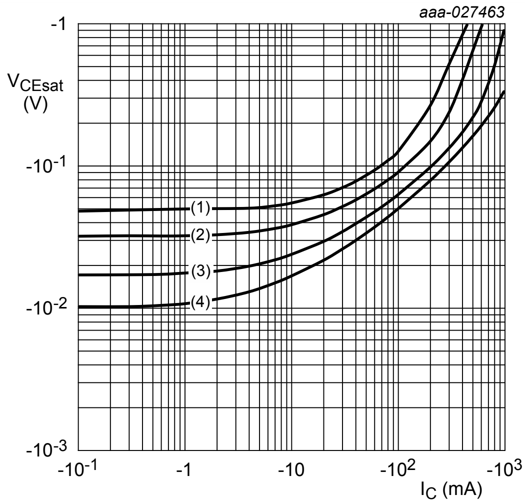
T_{amb} = 25 °C
(1) $I_C/I_B = 10$
(2) $I_C/I_B = 20$
(3) $I_C/I_B = 50$
(4) $I_C/I_B = 100$

Figure 36. BC807K-40: Base-emitter saturation voltage as a function of collector current; typical values



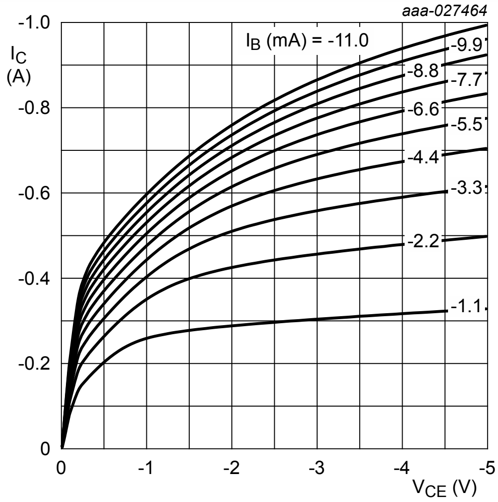
$I_C/I_B = 10$
(1) T_{amb} = 150 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = -40 °C

Figure 37. BC807K-40: Collector-emitter saturation voltage as a function of collector current; typical values



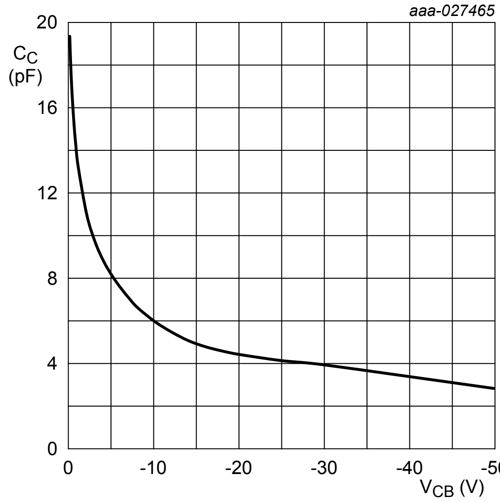
T_{amb} = 25 °C
(1) $I_C/I_B = 100$
(2) $I_C/I_B = 50$
(3) $I_C/I_B = 20$
(4) $I_C/I_B = 10$

Figure 38. BC807K-40: Collector-emitter saturation voltage as a function of collector current; typical values



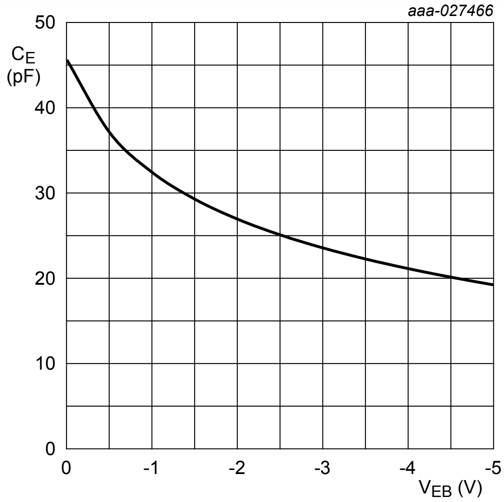
T_{amb} = 25 °C

Figure 39. BC807K-40: Collector current as a function of collector-emitter voltage; typical values



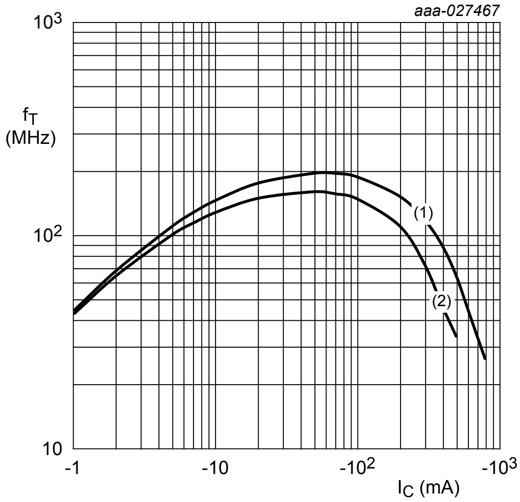
f = 1 MHz; T_{amb} = 25 °C

Figure 40. BC807K-40: Collector capacitance as a function of collector-base voltage; typical values



f = 1 MHz; T_{amb} = 25 °C

Figure 41. BC807K-40: Emitter capacitance as a function of emitter-base voltage; typical values



f = 100 MHz; T_{amb} = 25 °C

(1) V_{CE} = -5 V

(2) V_{CE} = -1 V

Figure 42. BC807K-40: Transition frequency as a function of collector current voltage; 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

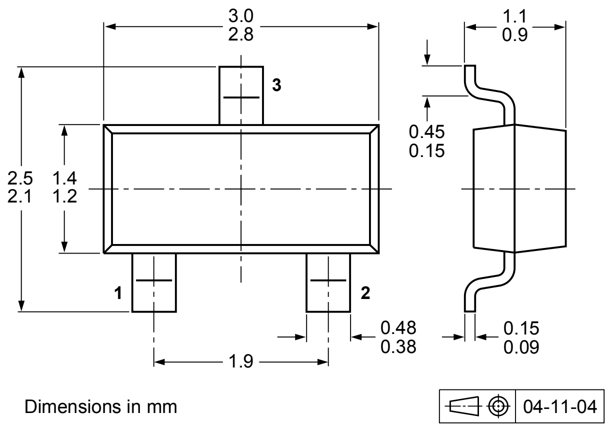


Figure 43. Package outline SOT23 (TO-236)

10 Soldering

Table 10. Soldering

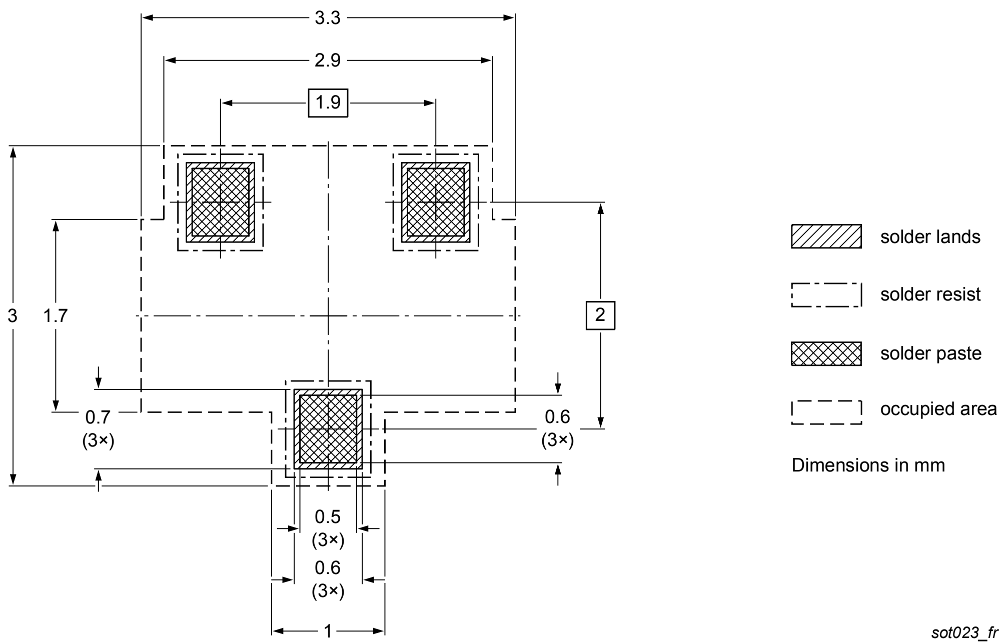


Figure 44. Reflow soldering footprint for SOT23 (TO-236AB)

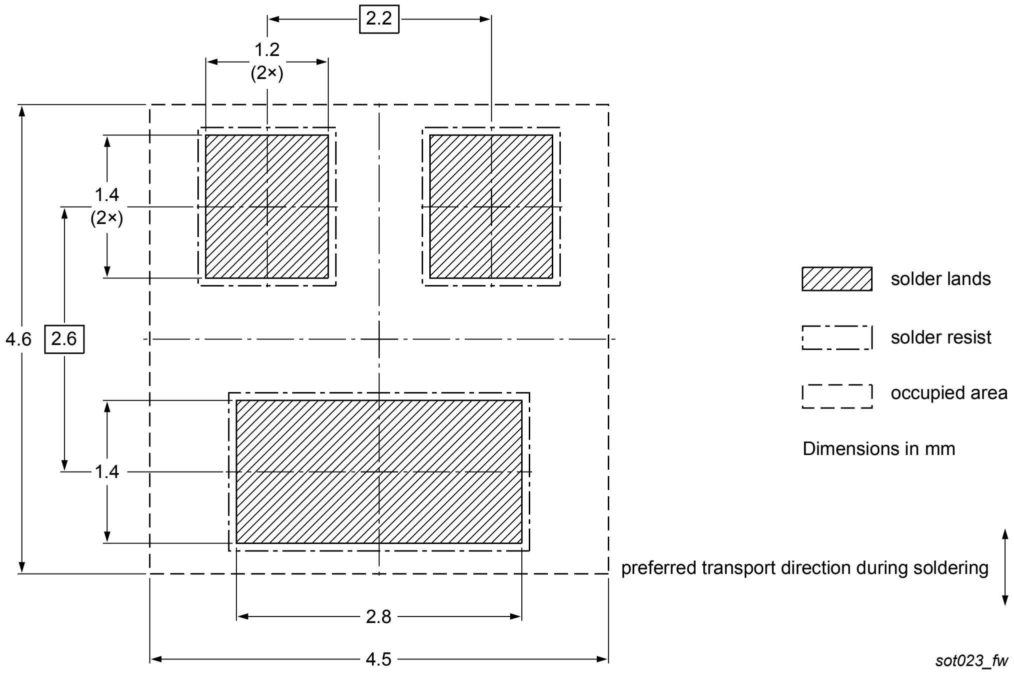


Figure 45. Wave soldering footprint for SOT23 (TO-236AB)

11 Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BC807K_SER v.2	20180424	Product data sheet	-	BC807_SER v.1
Modifications:	• Characteristics: Figures are updated			
BC807_SER v.1	20171108	Product data sheet	-	-

12 Legal information

12.1 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 URL http://www.nexperia.com.

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