



BC817KH series

45 V, 500 mA NPN general-purpose transistors

Rev. 2 — 30 September 2025

Product data sheet

1. General description

NPN general-purpose transistors in a small SOT23 Surface-Mounted Device (SMD) plastic package.

Table 1. Product overview

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

2. Features and benefits

- Three current gain selections
- High power dissipation capability
- High-temperature applications up to 175 °C

3. Applications

- General-purpose switching and amplification

4. Quick reference data

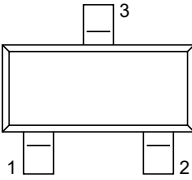
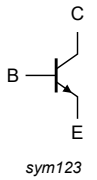
Table 2. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CE0}	collector-emitter voltage	open base		-	-	45	V
I_C	collector current	$T_{amb} = 25\text{ °C}$		-	-	500	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1\text{ ms}$; $T_{amb} = 25\text{ °C}$		-	-	1	A
h_{FE}	DC current gain						
	BC817K-16H	$V_{CE} = 1\text{ V}$; $I_C = 100\text{ mA}$; $T_{amb} = 25\text{ °C}$	[1]	100	-	250	
	BC817K-25H		[1]	160	-	400	
	BC817K-40H		[1]	250	-	600	

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

5. Pinning information

Table 3. Pinning

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 SOT23	 sym123
2	E	emitter		
3	C	collector		

6. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
BC817K-16H	SOT23	plastic, surface-mounted package; 3 leads	SOT23
BC817K-25H			
BC817K-40H			

7. Marking

Table 5. Marking

Type number	Marking code [1]	
BC817K-16H	[1]	%HD
BC817K-25H	[1]	%HE
BC817K-40H	[1]	%HF

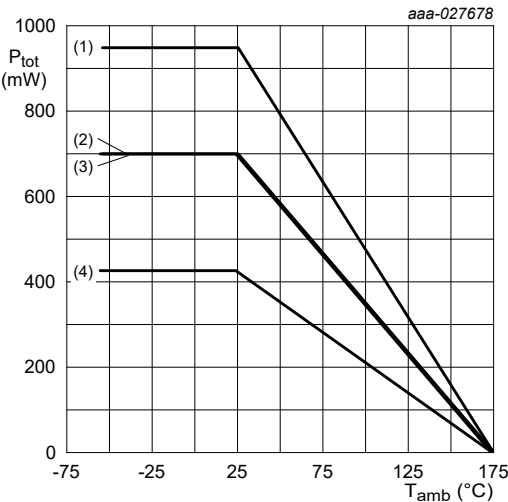
[1] % = placeholder for manufacturing site code

8. Limiting values

Table 6. Limiting values
In accordance with the Absolute Maximum Rating System (IEC 60134).

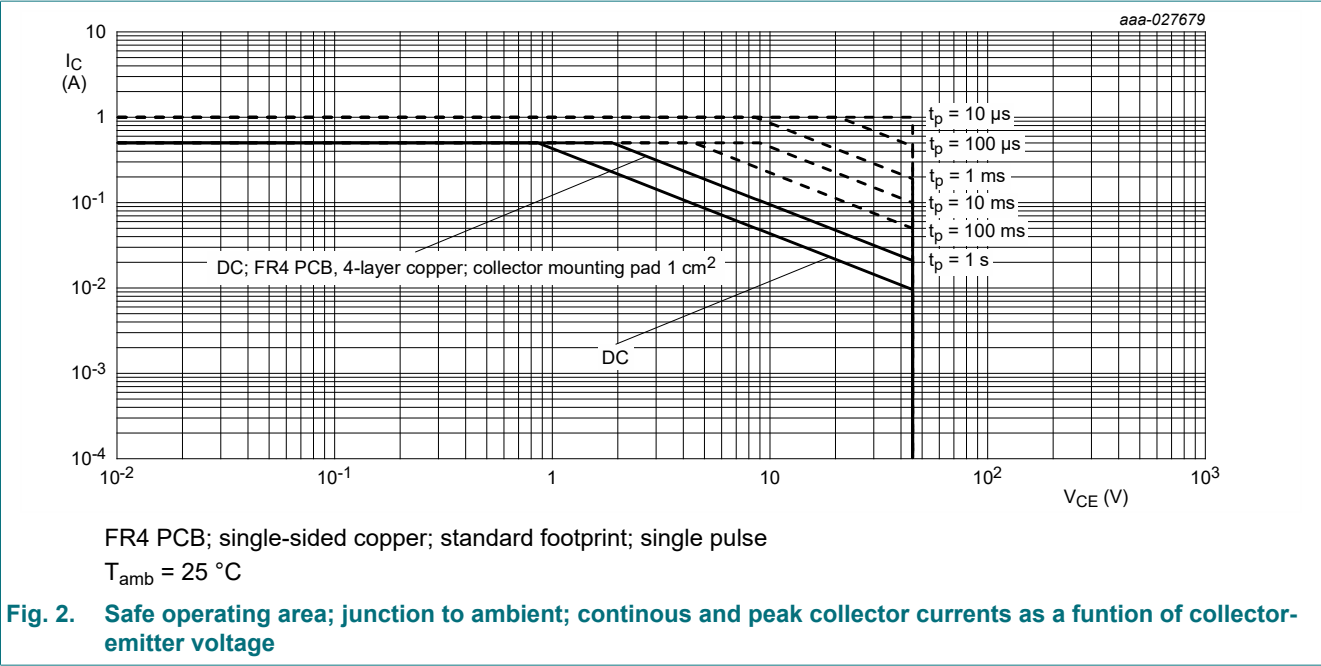
Symbol	Parameter	Conditions	Min	Max	Unit
V _{CBO}	collector-base voltage	open emitter	-	50	V
V _{CEO}	collector-emitter voltage	open base	-	45	V
V _{EBO}	emitter-base voltage	open collector	-	7	V
I _C	collector current		-	500	mA
I _{CM}	peak collector current	single pulse; t _p ≤ 1 ms	-	1	A
I _{BM}	peak base current	single pulse; t _p ≤ 1 ms	-	200	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	425	mW
			[2]	700	mW
			[3]	700	mW
			[4]	950	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 PCB; single-sided copper; tin-plated; mounting pad for collector 1 cm².
[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 cm².



- (1) FR4 PCB; 4-layer copper, 1 cm²
(2) FR4 PCB; single-sided copper, 1 cm²
(3) FR4 PCB; 4-layer copper; standard footprint
(4) FR4 PCB; single-sided copper; standard footprint

Fig. 1. Power derating curves



9. 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; $T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	-	-	353	K/W
			[2]	-	-	215	K/W
			[3]	-	-	215	K/W
			[4]	-	-	158	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 cm².
[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 cm².

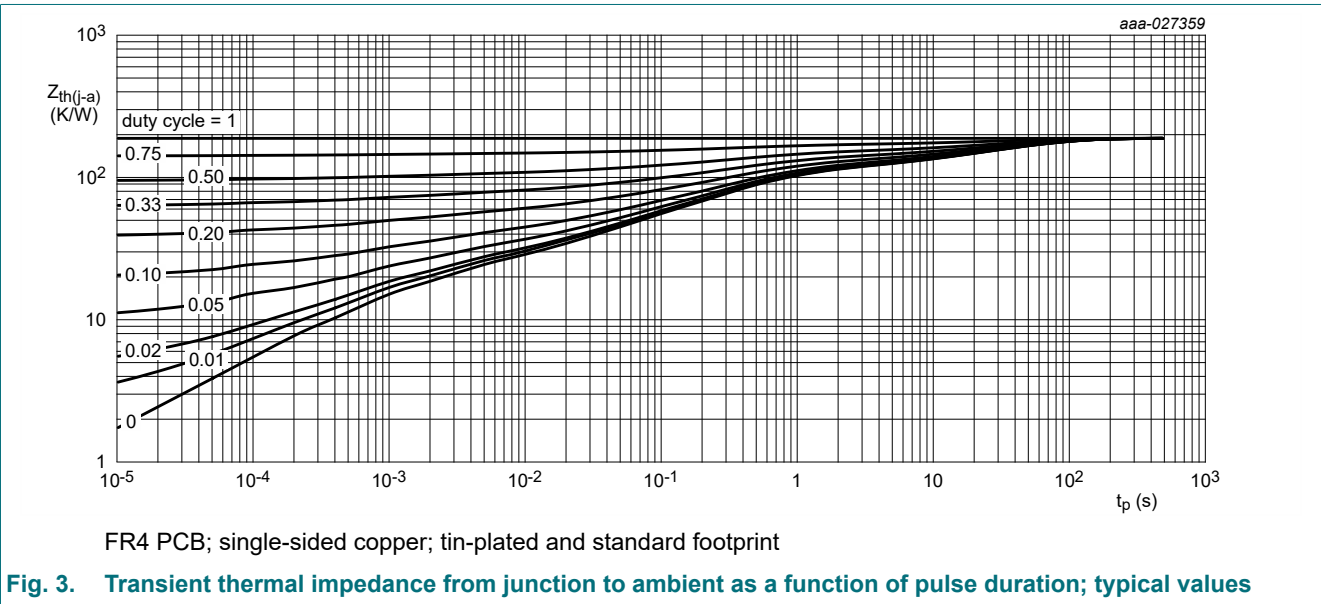


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

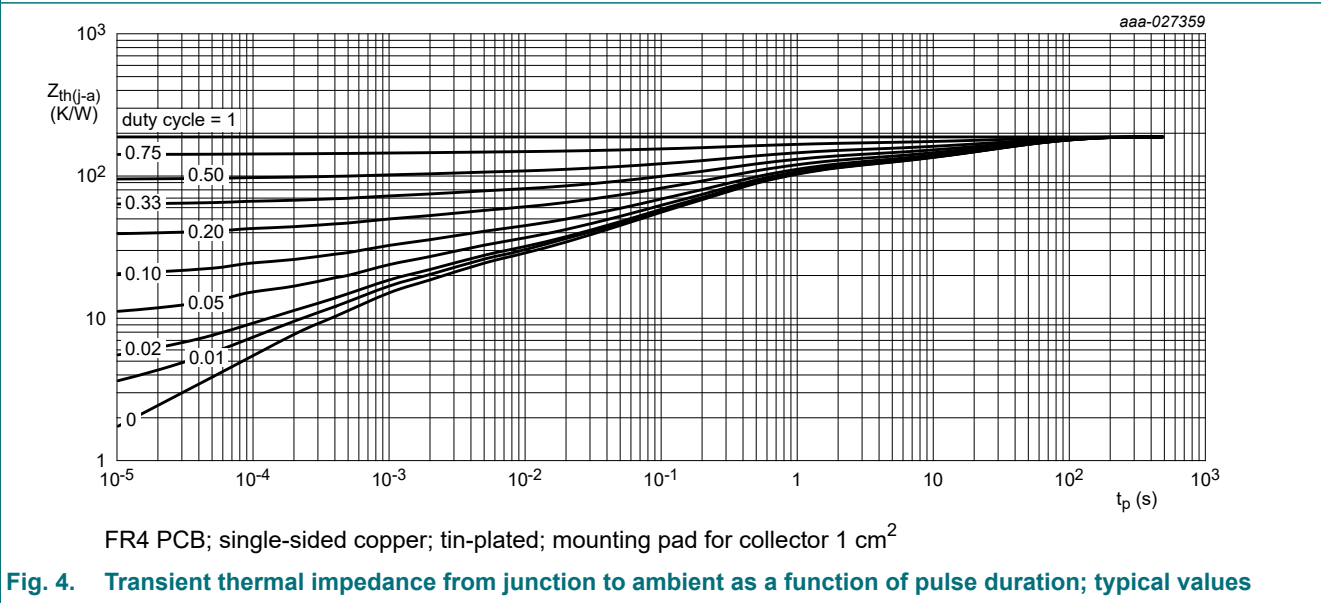
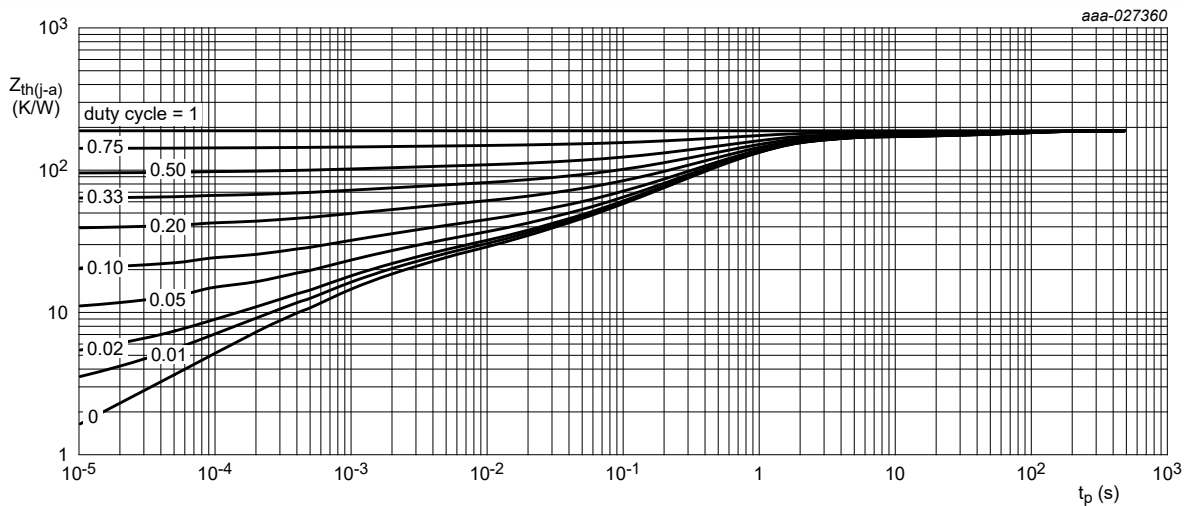
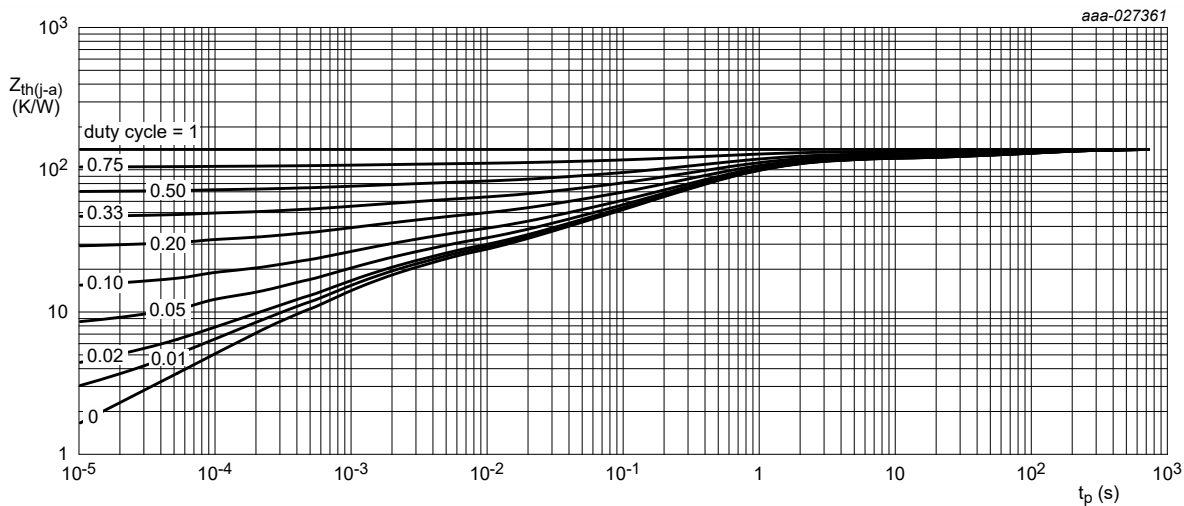


Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



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 cm²

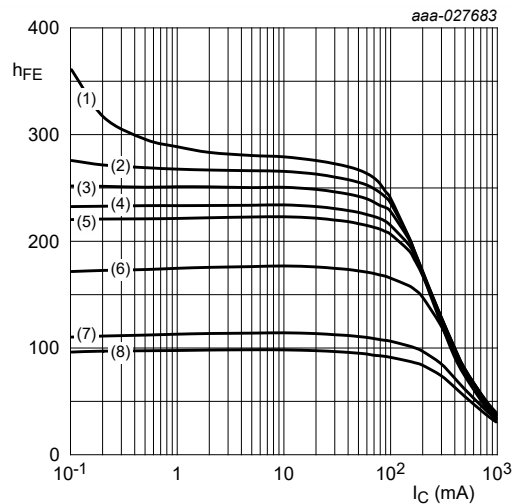
Fig. 6. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 8. Characteristics

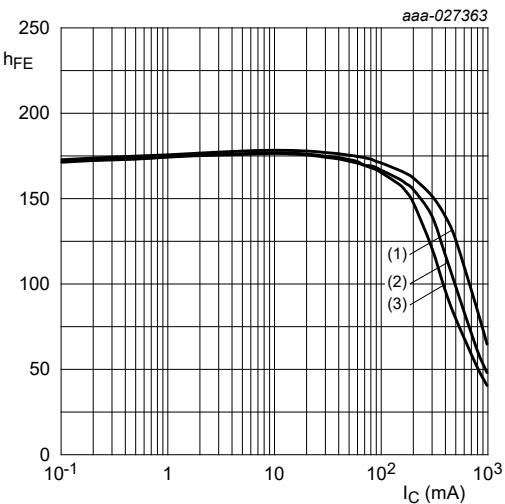
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = 100\text{ }\mu\text{A}$; $I_E = 0\text{ A}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$		50	-		V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = 10\text{ mA}$; $I_B = 0\text{ A}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$		45	-		V
$V_{(BR)EBO}$	emitter-base breakdown voltage	$I_E = 100\text{ }\mu\text{A}$; $I_C = 0\text{ A}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$		7	-		V
I_{CBO}	collector-base cut-off current	$V_{CB} = 25\text{ V}$; $I_E = 0\text{ A}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	100	nA
		$V_{CB} = 25\text{ V}$; $I_E = 0\text{ A}$; $T_J = 150\text{ }^{\circ}\text{C}$		-	-	5	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5\text{ V}$; $I_C = 0\text{ A}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	100	nA
h_{FE}	DC current gain						
	BC817K-16H	$V_{CE} = 1\text{ V}$; $I_C = 100\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	100	-	250	
	BC817K-25H		[1]	160	-	400	
	BC817K-40H		[1]	250	-	600	
	BC817K-16H BC817K-25H BC817K-40H	$V_{CE} = 1\text{ V}$; $I_C = 500\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	40	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 500\text{ mA}$; $I_B = 50\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	-	-	700	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = 500\text{ mA}$; $I_B = 50\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	-	-	1.2	V
V_{BE}	base-emitter voltage	$V_{CE} = 1\text{ V}$; $I_C = 500\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	-	-	1.2	V
f_T	transition frequency	$V_{CE} = 5\text{ V}$; $I_C = 10\text{ mA}$; $f = 100\text{ MHz}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$		100	-	-	MHz
C_c	collector capacitance	$V_{CB} = 10\text{ V}$; $I_E = i_e = 0\text{ A}$; $f = 1\text{ MHz}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$		-	3	-	pF
C_e	emitter capacitance	$V_{EB} = 0.5\text{ V}$; $I_C = i_c = 0\text{ A}$; $f = 1\text{ MHz}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$					
	BC817K-16H			-	44	-	pF
	BC817K-25H			-	39	-	pF
	BC817K-40H			-	39	-	pF

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



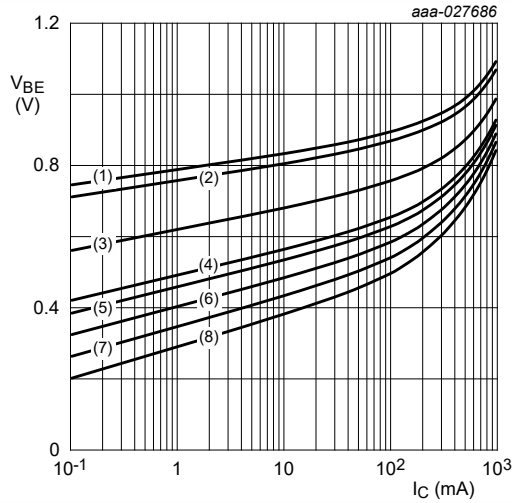
$V_{CE} = 1\text{ V}$
(1) $T_{amb} = 175\text{ °C}$
(2) $T_{amb} = 150\text{ °C}$
(3) $T_{amb} = 125\text{ °C}$
(4) $T_{amb} = 100\text{ °C}$
(5) $T_{amb} = 85\text{ °C}$
(6) $T_{amb} = 25\text{ °C}$
(7) $T_{amb} = -40\text{ °C}$
(8) $T_{amb} = -55\text{ °C}$

Fig. 7. BC817K-16H: DC current gain as a function of collector current; typical values



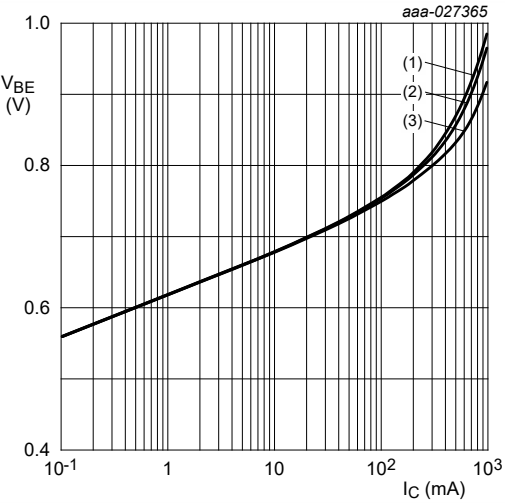
$T_{amb} = 25\text{ °C}$
(1) $V_{CE} = 5\text{ V}$
(2) $V_{CE} = 2\text{ V}$
(3) $V_{CE} = 1\text{ V}$

Fig. 8. BC817K-16H: DC current gain as a function of collector current; typical values



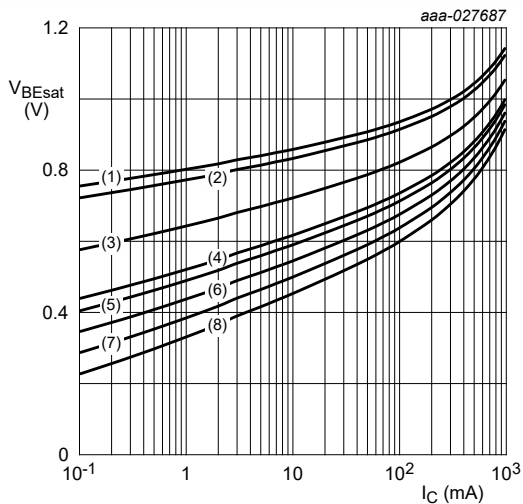
$V_{CE} = 1\text{ V}$
(1) $T_{amb} = -55\text{ °C}$
(2) $T_{amb} = -40\text{ °C}$
(3) $T_{amb} = 25\text{ °C}$
(4) $T_{amb} = 85\text{ °C}$
(5) $T_{amb} = 100\text{ °C}$
(6) $T_{amb} = 125\text{ °C}$
(7) $T_{amb} = 150\text{ °C}$
(8) $T_{amb} = 175\text{ °C}$

Fig. 9. BC817K-16H: Base-emitter voltage as a function of collector current; typical values



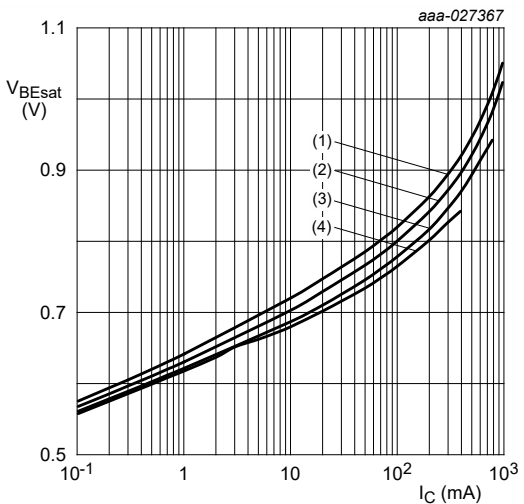
$T_{amb} = 25\text{ °C}$
(1) $V_{CE} = 1\text{ V}$
(2) $V_{CE} = 2\text{ V}$
(3) $V_{CE} = 5\text{ V}$

Fig. 10. BC817K-16H: Base-emitter voltage as a function of collector current; typical values



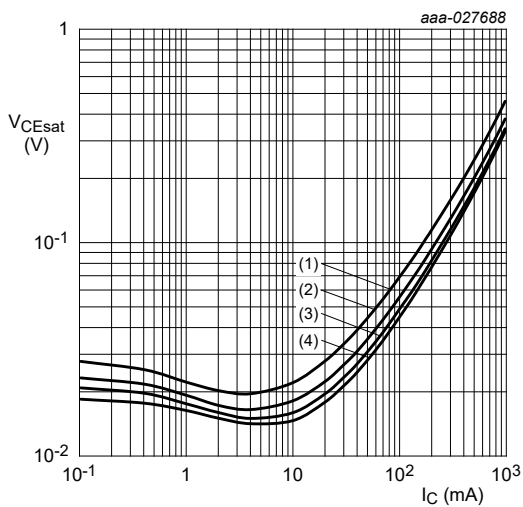
$I_C/I_B = 10$
(1) $T_{amb} = -55\text{ °C}$
(2) $T_{amb} = -40\text{ °C}$
(3) $T_{amb} = 25\text{ °C}$
(4) $T_{amb} = 85\text{ °C}$
(5) $T_{amb} = 100\text{ °C}$
(6) $T_{amb} = 125\text{ °C}$
(7) $T_{amb} = 150\text{ °C}$
(8) $T_{amb} = 175\text{ °C}$

Fig. 11. BC817K-16H: Base-emitter saturation voltage as a function of collector current; typical values



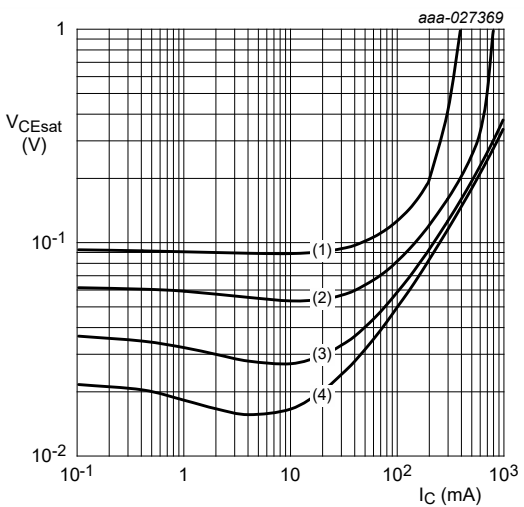
$T_{amb} = 25\text{ °C}$
(1) $I_C/I_B = 10$
(2) $I_C/I_B = 20$
(3) $I_C/I_B = 50$
(4) $I_C/I_B = 100$

Fig. 12. BC817K-16H: 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. 13. BC817K-16H: 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. 14. BC817K-16H: Collector-emitter saturation voltage as a function of collector current; typical values

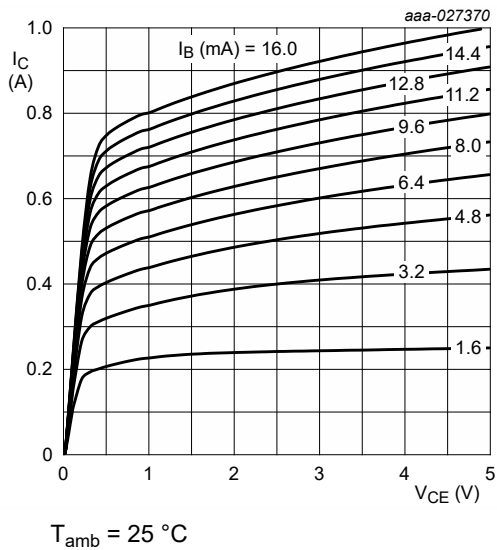


Fig. 15. BC817K-16H: Collector current as a function of collector-emitter voltage; typical values

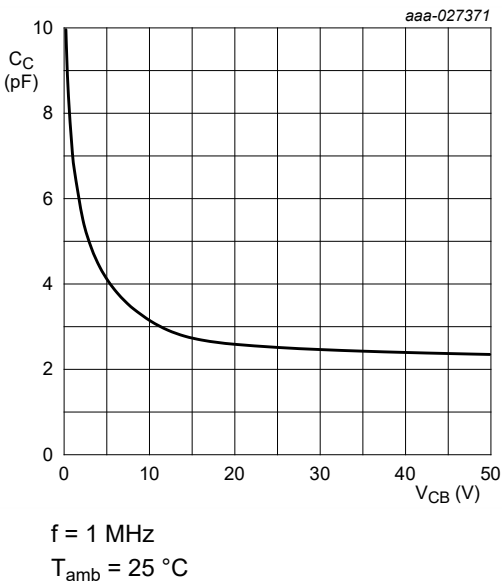


Fig. 16. BC817K-16H: Collector capacitance as a function of collector-base voltage; typical values

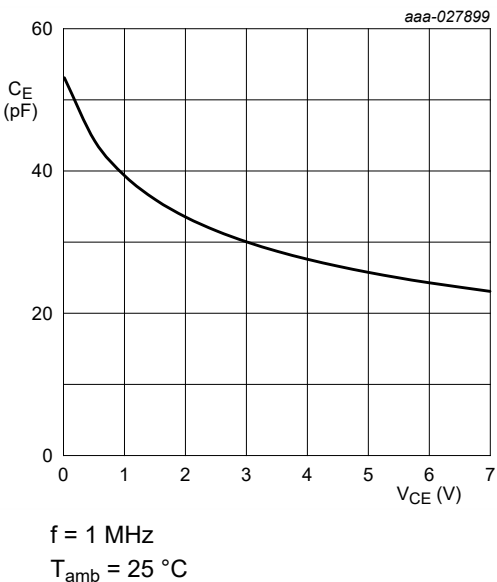


Fig. 17. BC817K-16H: Emitter capacitance as a function of emitter-base voltage; typical values

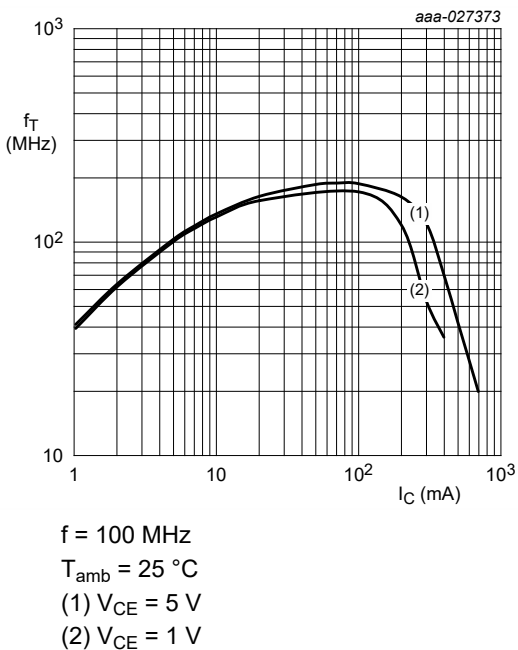
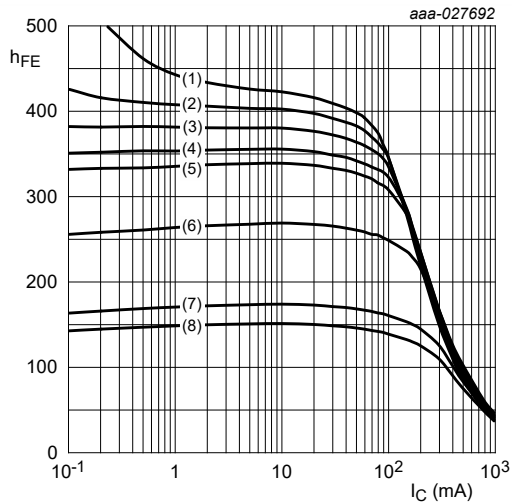


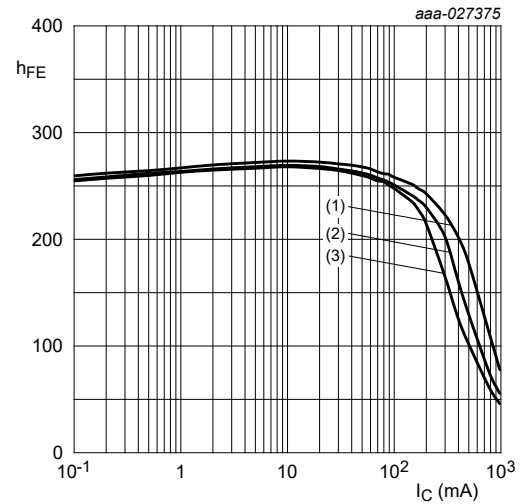
Fig. 18. BC817K-16H: Transition frequency as a function of collector current; typical values



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

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

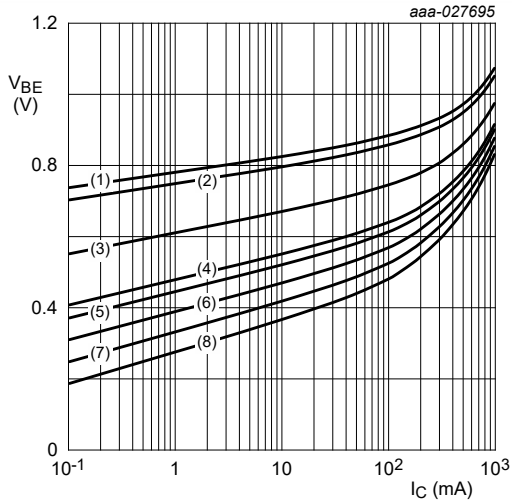
Fig. 19. BC817K-25H: DC current gain as a function of collector current; typical values



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

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

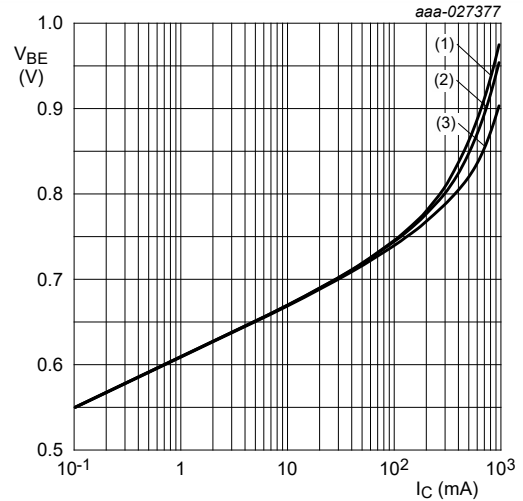
Fig. 20. BC817K-25H: DC current gain as a function of collector current; typical values



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

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

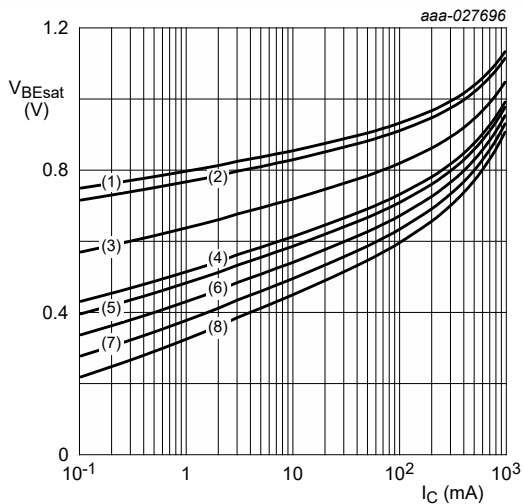
Fig. 21. BC817K-25H: Base-emitter voltage as a function of collector current; typical values



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

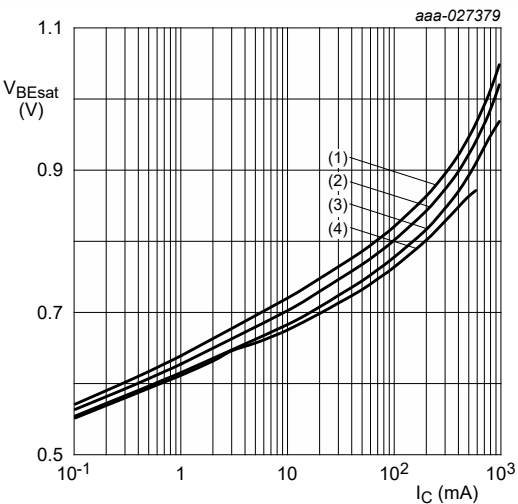
- (1) $V_{CE} = 1 \text{ V}$
- (2) $V_{CE} = 2 \text{ V}$
- (3) $V_{CE} = 5 \text{ V}$

Fig. 22. BC817K-25H: Base-emitter voltage as a function of collector current; typical values



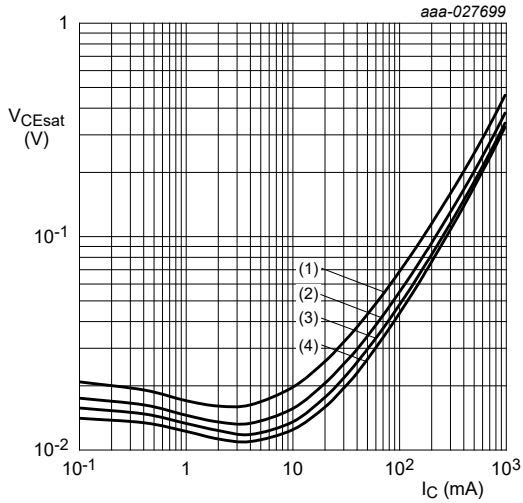
- $I_C/I_B = 10$
- (1) $T_{amb} = -55\text{ }^{\circ}\text{C}$
 - (2) $T_{amb} = -40\text{ }^{\circ}\text{C}$
 - (3) $T_{amb} = 25\text{ }^{\circ}\text{C}$
 - (4) $T_{amb} = 85\text{ }^{\circ}\text{C}$
 - (5) $T_{amb} = 100\text{ }^{\circ}\text{C}$
 - (6) $T_{amb} = 125\text{ }^{\circ}\text{C}$
 - (7) $T_{amb} = 150\text{ }^{\circ}\text{C}$
 - (8) $T_{amb} = 175\text{ }^{\circ}\text{C}$

Fig. 23. BC817K-25H: Base-emitter saturation voltage as a function of collector current; typical values



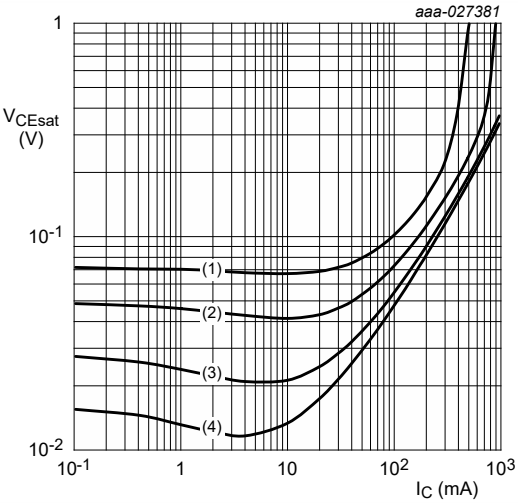
- $T_{amb} = 25\text{ }^{\circ}\text{C}$
- (1) $I_C/I_B = 10$
 - (2) $I_C/I_B = 20$
 - (3) $I_C/I_B = 50$
 - (4) $I_C/I_B = 100$

Fig. 24. BC817K-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. BC817K-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. BC817K-25H: Collector-emitter saturation voltage as a function of collector current; typical values

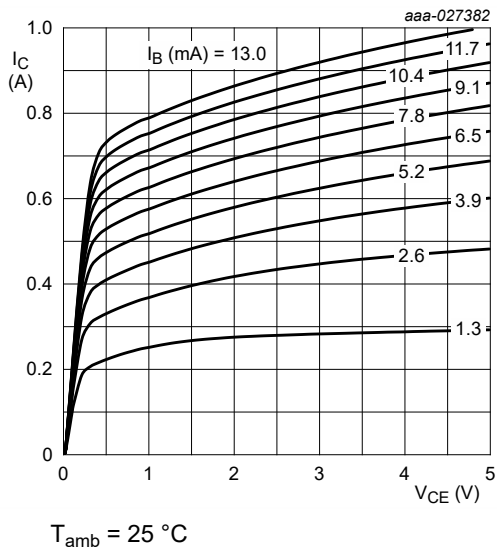


Fig. 27. BC817K-25H: Collector current as a function of collector-emitter voltage; typical values

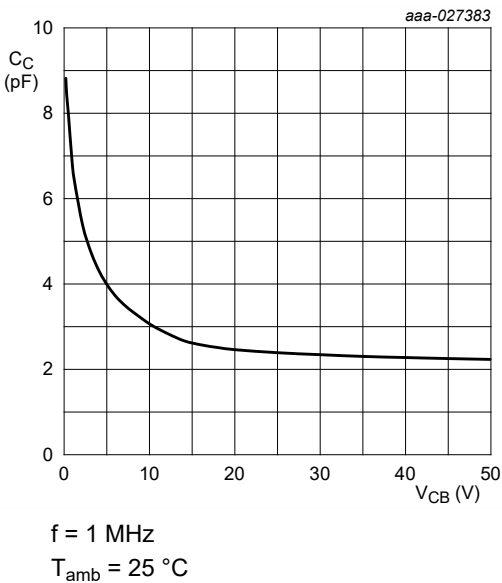


Fig. 28. BC817K-25H: Collector capacitance as a function of collector-base voltage; typical values

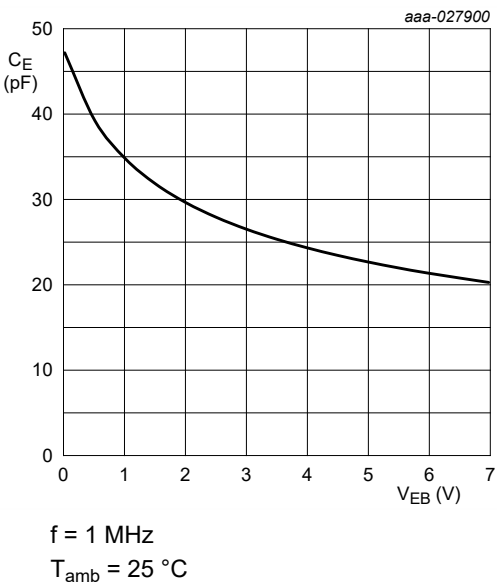


Fig. 29. BC817K-25H: Emitter capacitance as a function of emitter-base voltage; typical values

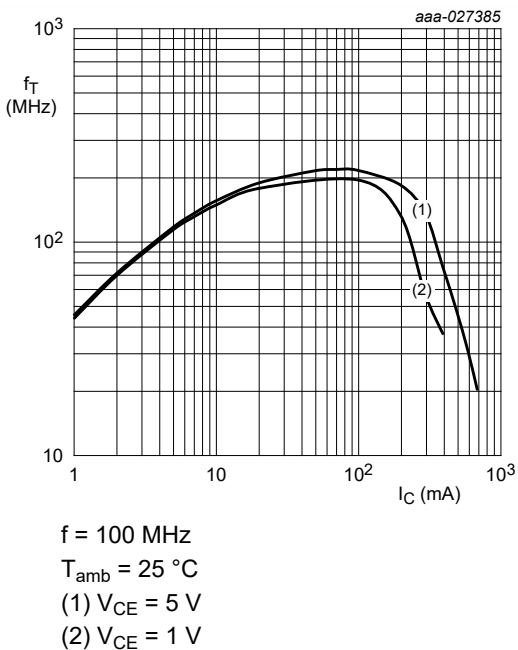


Fig. 30. BC817K-25H: Transition frequency as a function of collector current; typical values

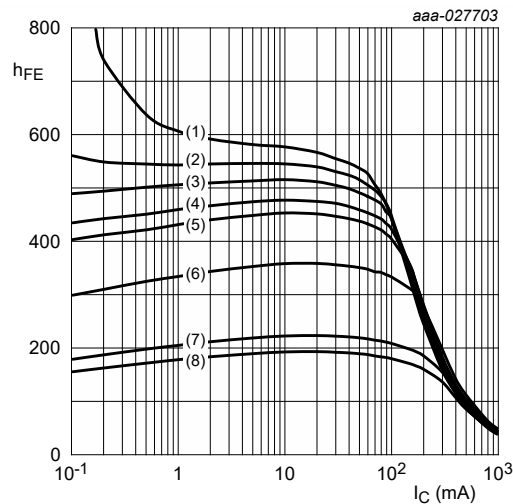


Fig. 31. BC817K-40H: DC current gain as a function of collector current; typical values

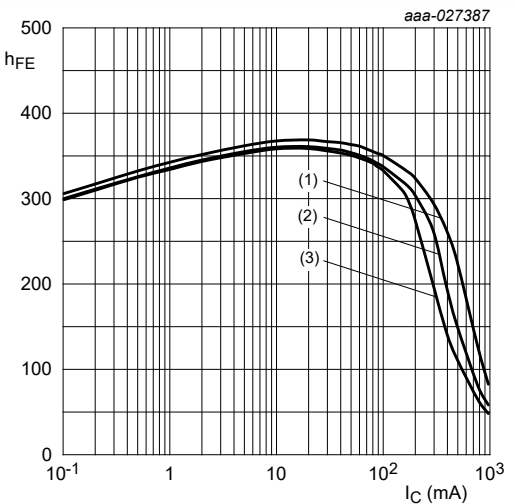


Fig. 32. BC817K-40H: DC current gain as a function of collector current; typical values

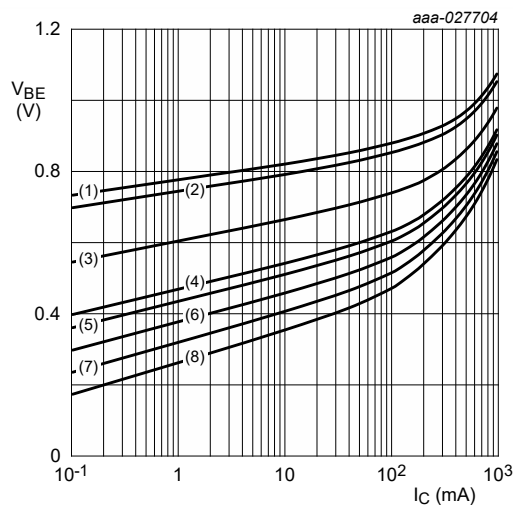


Fig. 33. BC817K-40H: Base-emitter voltage as a function of collector current; typical values

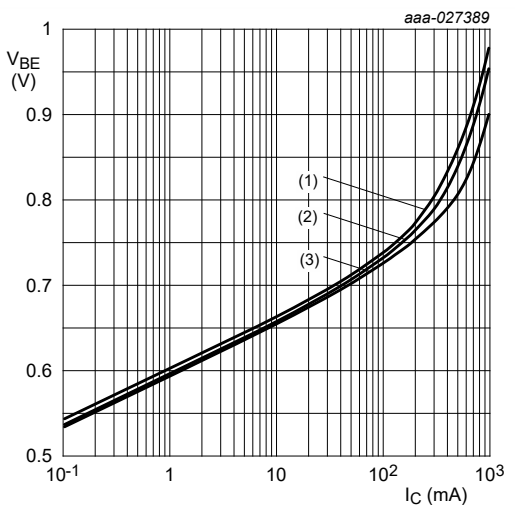


Fig. 34. BC817K-40H: Base-emitter voltage as a function of collector current; typical values

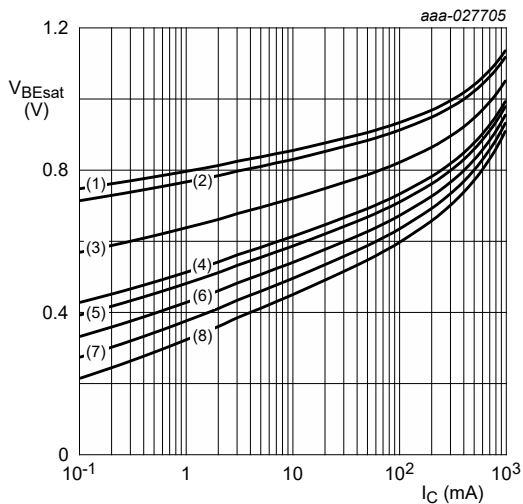


Fig. 35. BC817K-40H: Base-emitter saturation voltage as a function of collector current; typical values

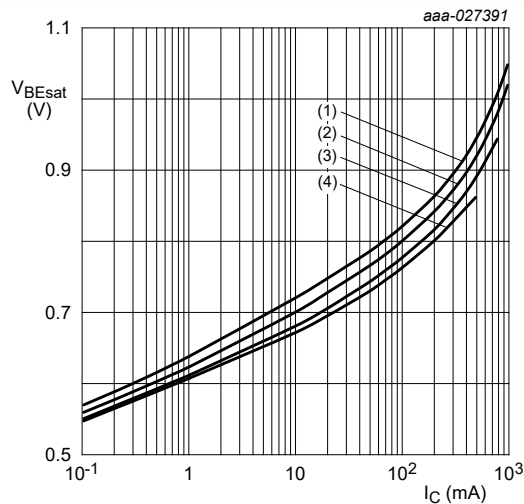


Fig. 36. BC817K-40H: Base-emitter saturation voltage as a function of collector current; typical values

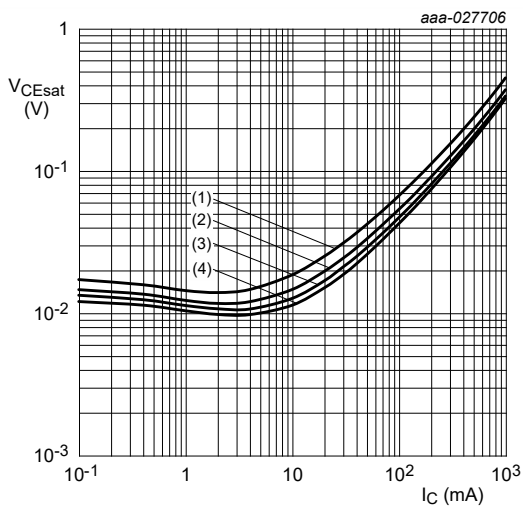


Fig. 37. BC817K-40H: Collector-emitter saturation voltage as a function of collector current; typical values

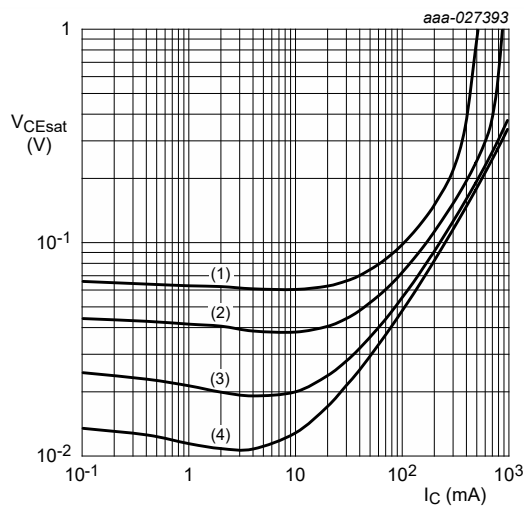


Fig. 38. BC817K-40H: Collector-emitter saturation voltage as a function of collector current; typical values

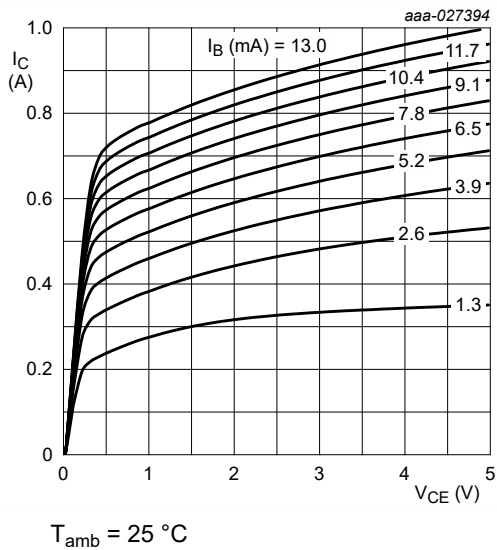


Fig. 39. BC817K-40H: Collector current as a function of collector-emitter voltage; typical values

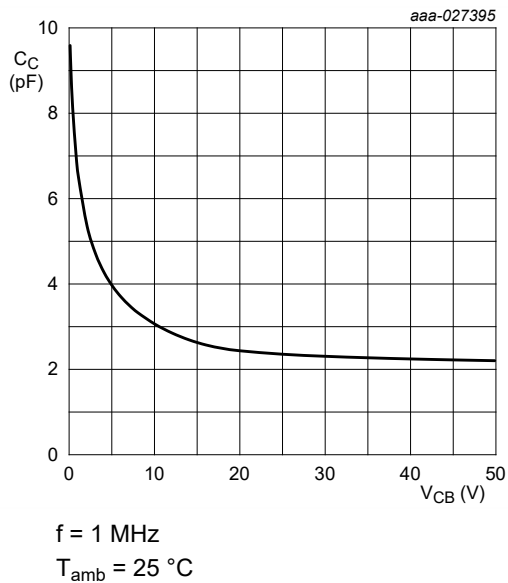


Fig. 40. BC817K-40H: Collector capacitance as a function of collector-base voltage; typical values

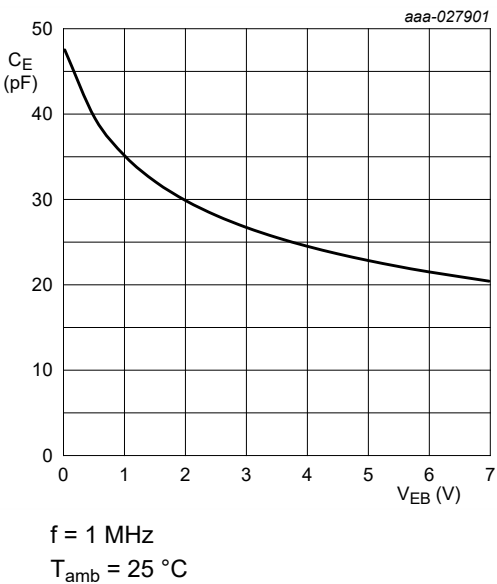


Fig. 41. BC817K-40H: Emitter capacitance as a function of emitter-base voltage; typical values

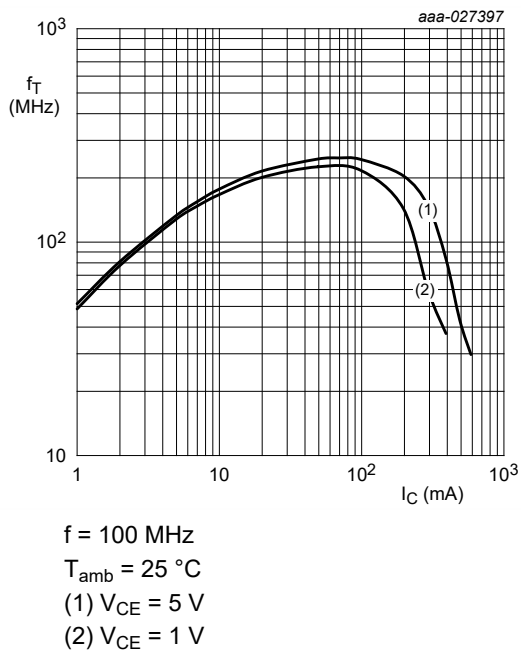


Fig. 42. BC817K-40H: Transition frequency as a function of collector current; typical values

11. Package outline

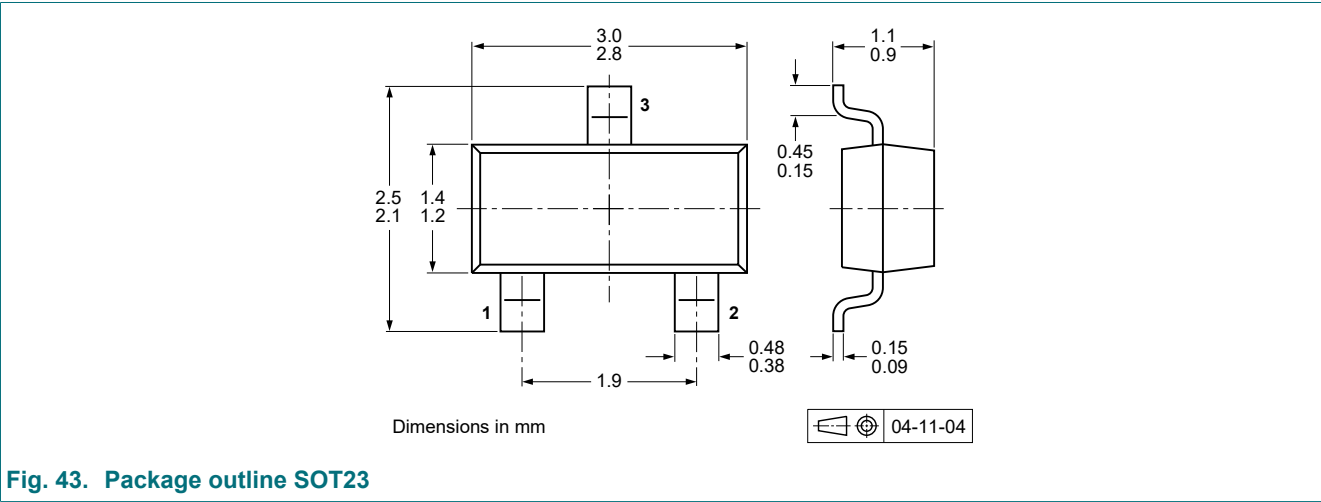


Fig. 43. Package outline SOT23

12. Soldering

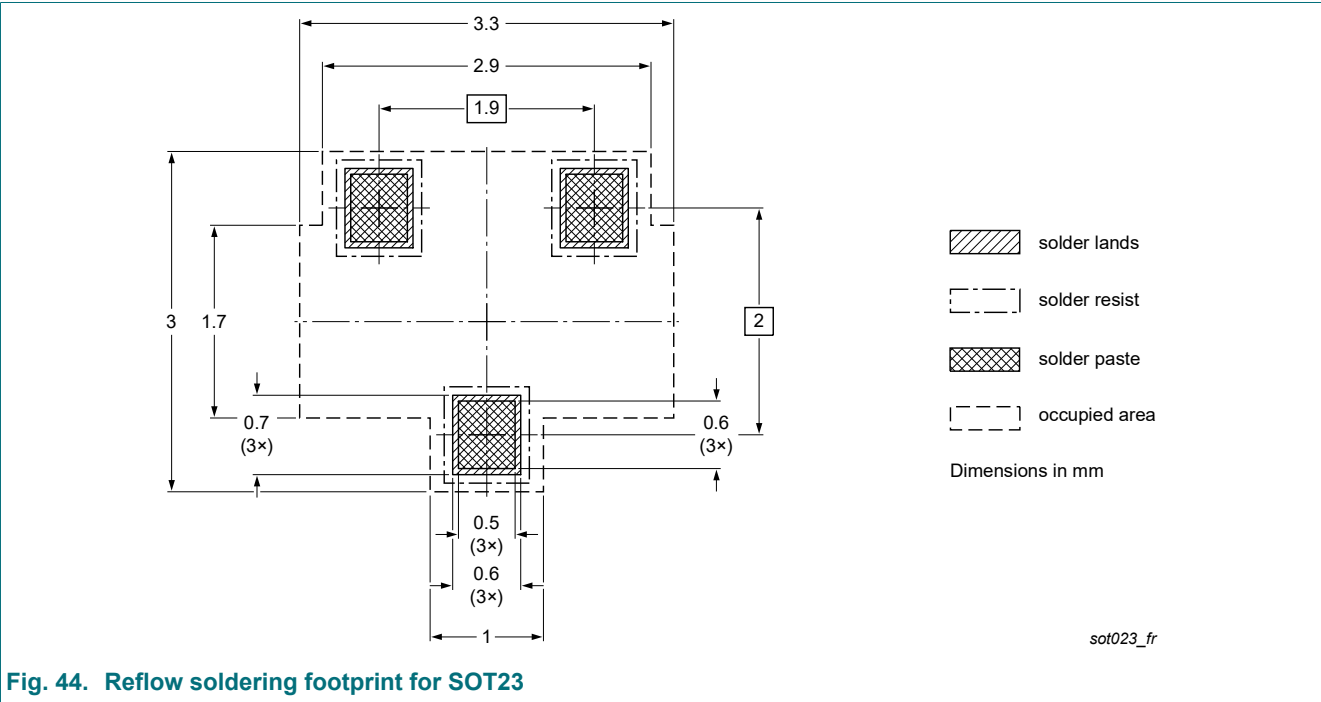


Fig. 44. Reflow soldering footprint for SOT23

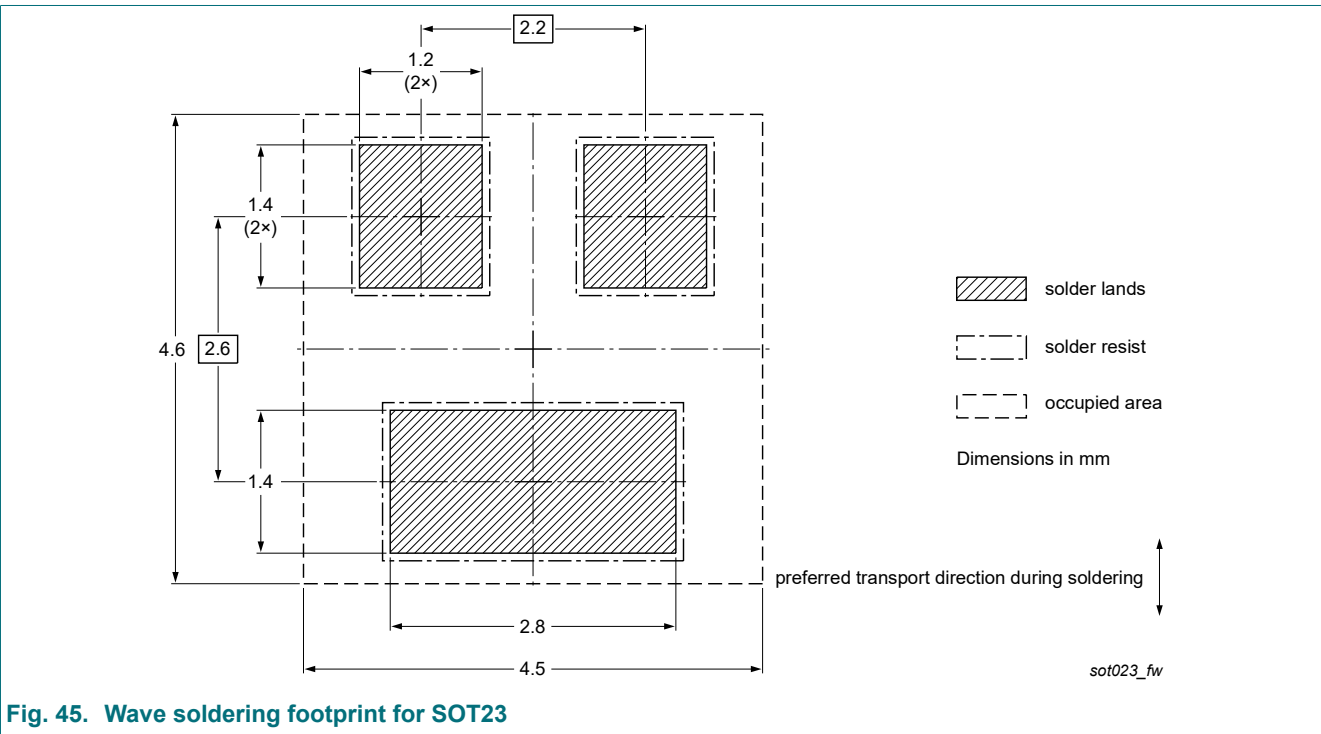


Fig. 45. Wave soldering footprint for SOT23

13. Revision history

Table 9. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BC817KH_SER v.2	20250930	Product data sheet	-	BC817KH_SER v.1
Modifications:	Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).			
BC817KH_SER v.1	20190305	Product data sheet	-	-

14. 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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