



BC817 series

45 V, 500 mA NPN general-purpose transistors

Rev. 8 — 1 July 2022

Product data sheet

1. General description

NPN general-purpose transistor in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

Table 1. Product overview

Type number	Package			PNP complement
	Nexperia	JEDEC	JEITA	
BC817	SOT23	TO-236AB	-	BC807
BC817-16				BC807-16
BC817-25				BC807-25
BC817-40				BC807-40

2. Features and benefits

- High current
- Three current gain selections

3. Applications

- General-purpose switching and amplification

4. Quick reference data

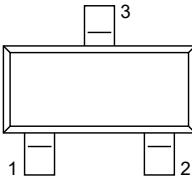
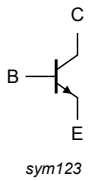
Table 2. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CE0}	collector-emitter voltage	open base; $T_{amb} = 25\text{ °C}$		-	-	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						
	BC817	$V_{CE} = 1\text{ V}$; $I_C = 100\text{ mA}$ $T_{amb} = 25\text{ °C}$	[1]	100	-	600	
	BC817-16		[1]	100	-	250	
	BC817-25		[1]	160	-	400	
	BC817-40		[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		 sym123
2	E	emitter		
3	C	collector		

6. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
BC817	TO-236AB	Plastic surface-mounted package; 3 leads	SOT23
BC817-16			
BC817-25			
BC817-40			

7. Marking

Table 5. Marking

Type number	Marking code[1]
BC817	6D%
BC817-16	6A%
BC817-25	6B%
BC817-40	6C%

[1] % = placeholder for manufacturing site code

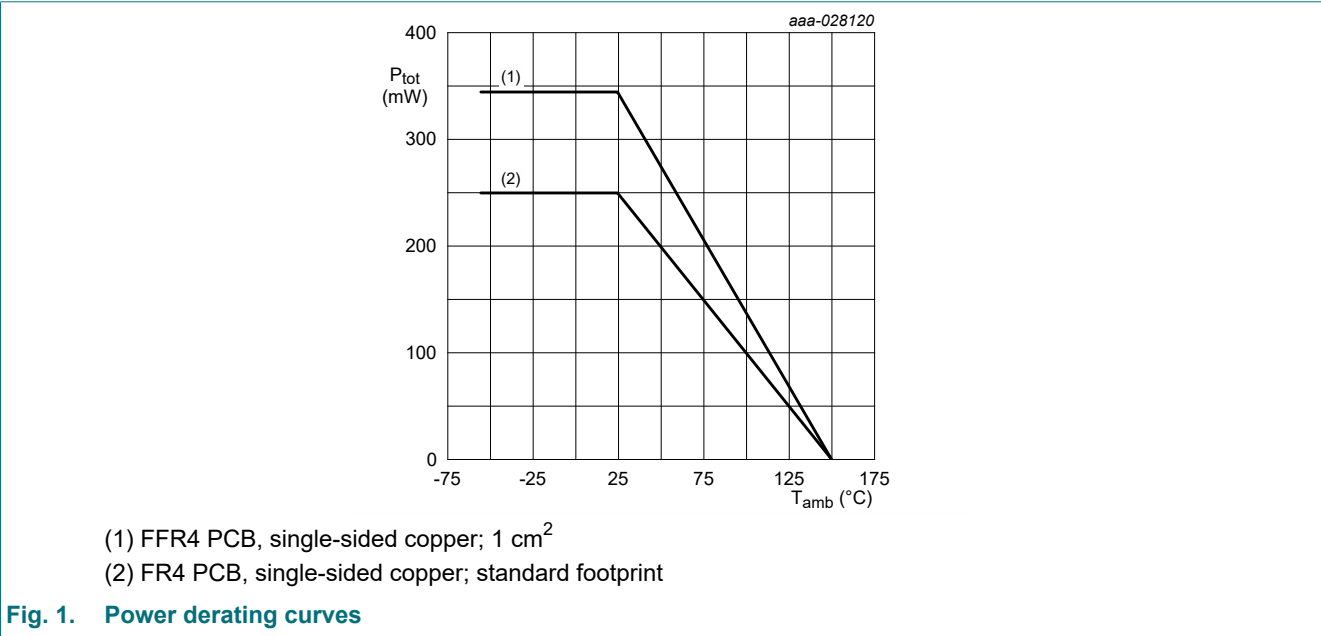
8. Limiting values

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; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	50	V
V_{CEO}	collector-emitter voltage	open base; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	45	V
V_{EBO}	emitter-base voltage	open collector; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	5	V
I_C	collector current	$T_{amb} = 25\text{ }^{\circ}\text{C}$	-	500	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1\text{ ms}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	1	A
I_{BM}	peak base current	single pulse; $t_p \leq 1\text{ ms}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	-	200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ }^{\circ}\text{C}$ [1]	-	250	mW
		[2]	-		
		[3] [2]	-	345	mW
T_j	junction temperature		-	150	$^{\circ}\text{C}$
T_{amb}	ambient temperature		-65	150	$^{\circ}\text{C}$
T_{stg}	storage temperature		-65	150	$^{\circ}\text{C}$

- [1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
- [2] Valid for all available selection groups.
- [3] Device mounted on an FR4 PCB, single-sided copper, tin-plated; mounting pad for collector 1 cm².



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	[1]	-	-	500	K/W
			[2]	-	-	500	K/W
			[3]	-	-	362	K/W
			[2]	-	-	362	K/W

- [1] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided copper; tin-plated and standard footprint.
[2] Valid for all available selection groups.
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated; mounting pad for collector 1 cm².

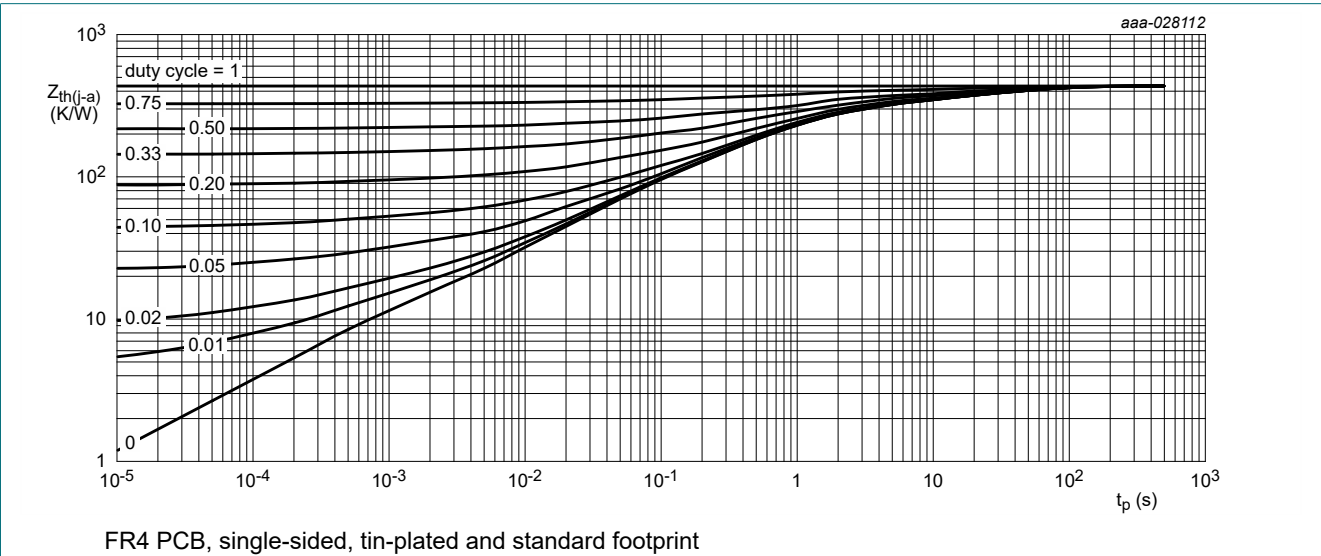


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

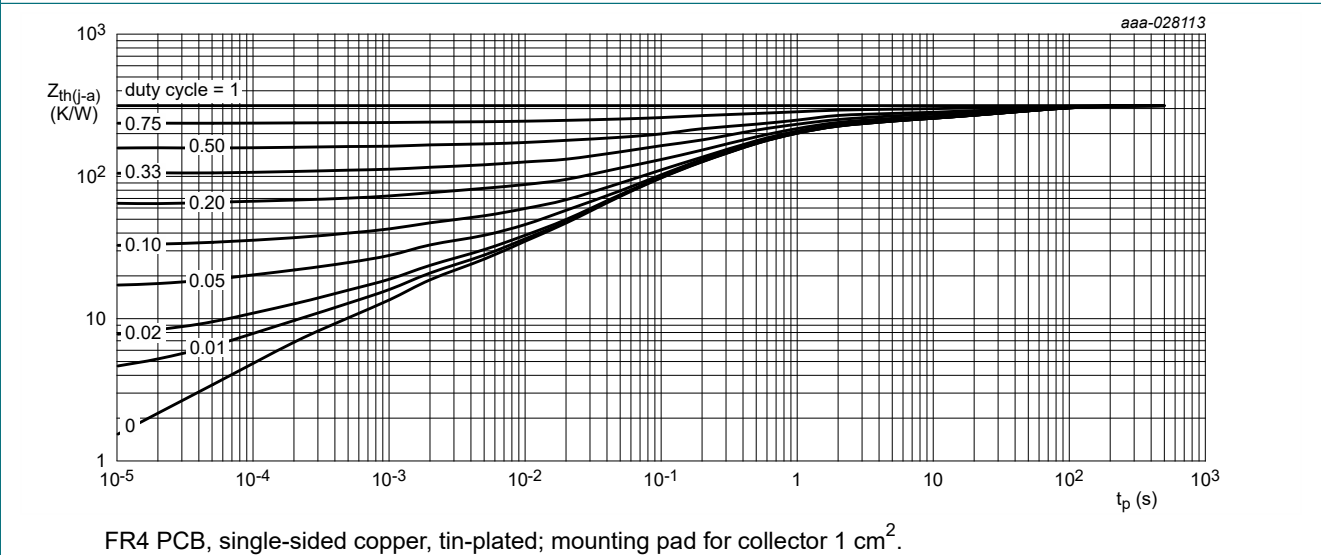


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

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	$I_C = 10\text{ mA}$; $I_E = 0\text{ A}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$		45	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	$I_E = 100\text{ }\mu\text{A}$; $I_C = 0\text{ A}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$		5	-	-	V
I_{CBO}	collector-base cut-off current	$V_{CB} = 20\text{ V}$; $I_E = 0\text{ A}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	100	nA
		$V_{CB} = 20\text{ V}$; $I_E = 0\text{ A}$; $T_j = 150\text{ }^{\circ}\text{C}$		-	-	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						
	BC817	$V_{CE} = 1\text{ V}$; $I_C = 100\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	[1]	100	-	600	
	BC817-16		[1]	100	-	250	
	BC817-25		[1]	160	-	400	
	BC817-40		[1]	250	-	600	
h_{FE}	DC current gain	$V_{CE} = 1\text{ V}$; $I_C = 500\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	[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_{BE}	base-emitter voltage	$V_{CE} = 1\text{ V}$; $I_C = 500\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$	[1] [2]	-	-	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

[1] pulsed; $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$
[2] V_{BE} decreases by about 2 mV/K with increasing temperature.

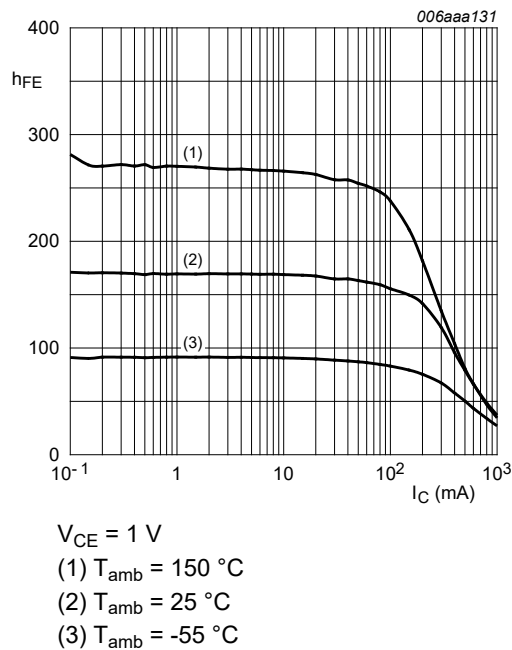


Fig. 4. BC817-16: DC current gain as a function of collector current; typical values

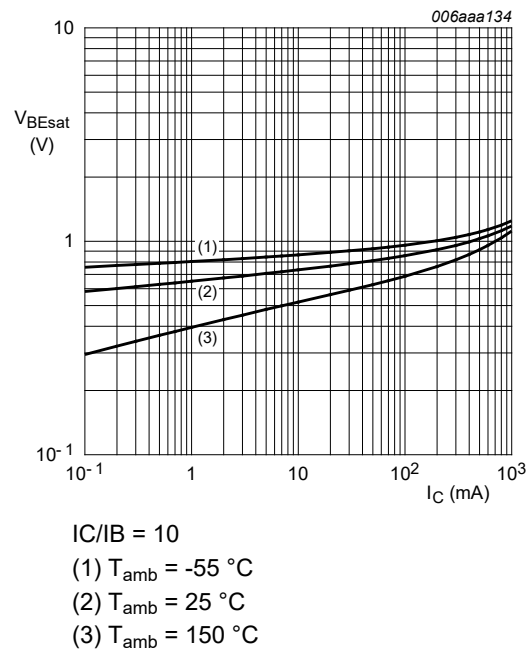


Fig. 5. BC817-16: Base-emitter saturation voltage as a function of collector current; typical values

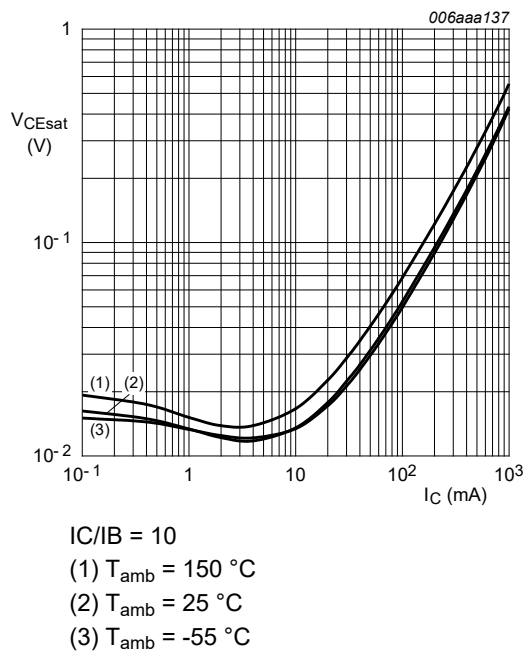


Fig. 6. BC817-16: Collector-emitter saturation voltage as a function of collector current; typical values

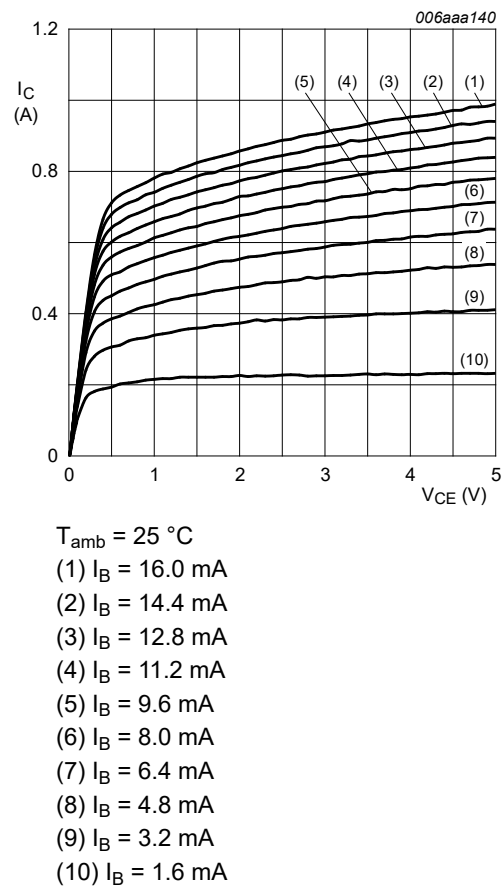


Fig. 7. BC817-16: Collector current as a function of collector-emitter voltage; typical values

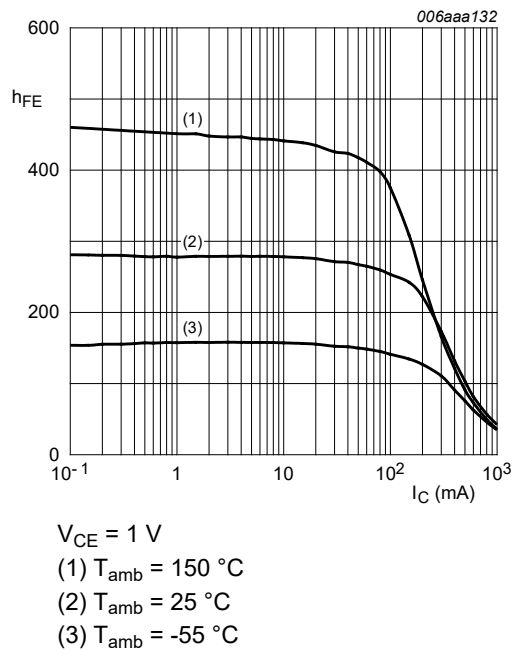


Fig. 8. BC817-25: DC current gain as a function of collector current; typical values

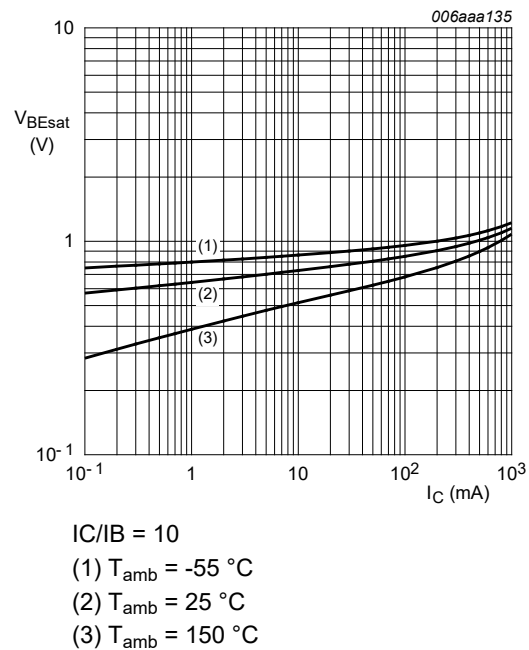


Fig. 9. BC817-25: Base-emitter saturation voltage as a function of collector current; typical values

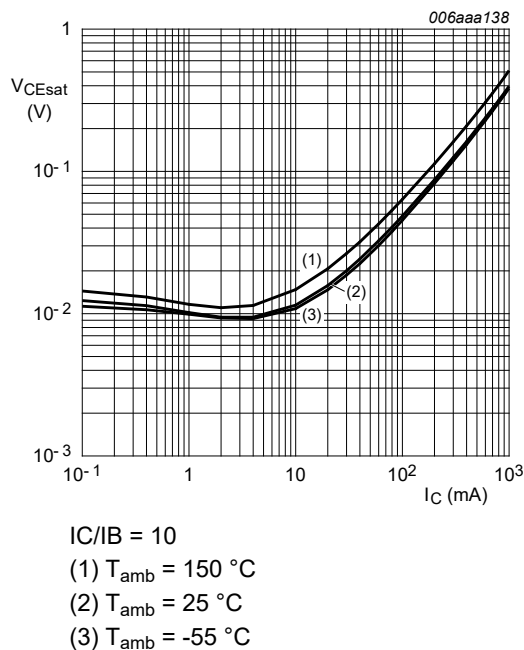


Fig. 10. BC817-25: Collector-emitter saturation voltage as a function of collector current; typical values

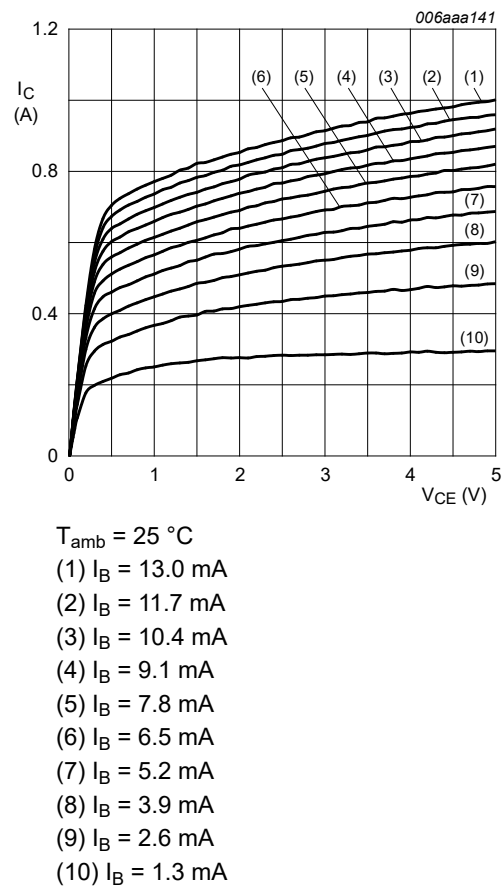


Fig. 11. BC817-25: Collector current as a function of collector-emitter voltage; typical values

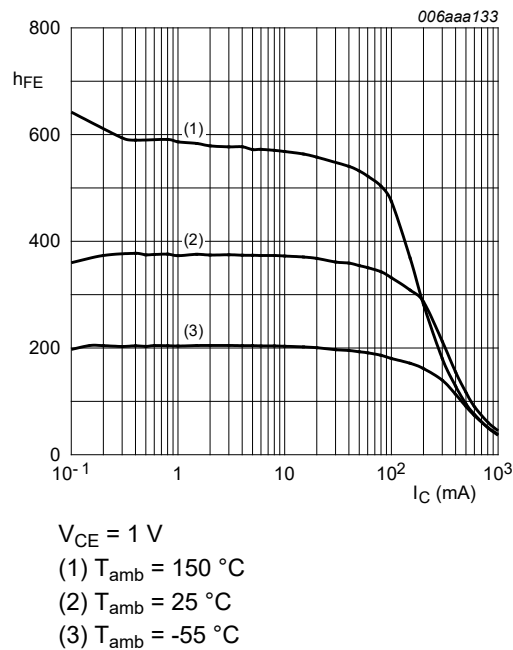


Fig. 12. BC817-40: DC current gain as a function of collector current; typical values

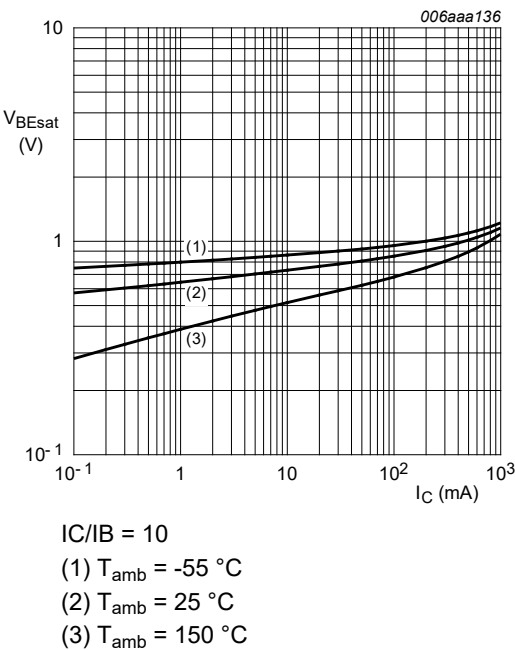


Fig. 13. BC817-40: Base-emitter saturation voltage as a function of collector current; typical values

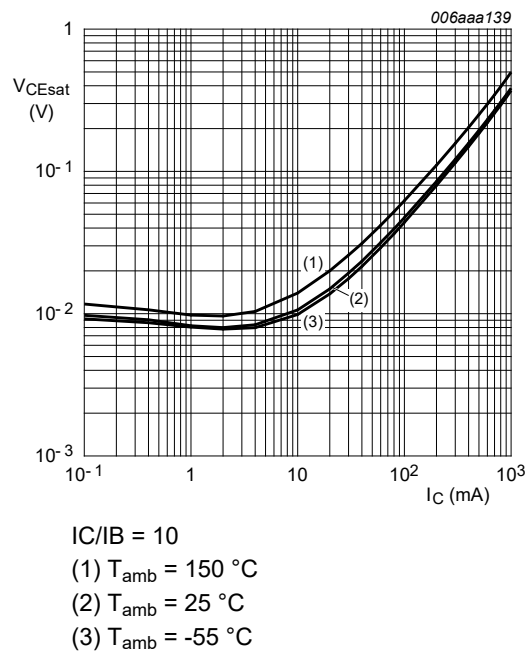


Fig. 14. BC817-40: Collector-emitter saturation voltage as a function of collector current; typical values

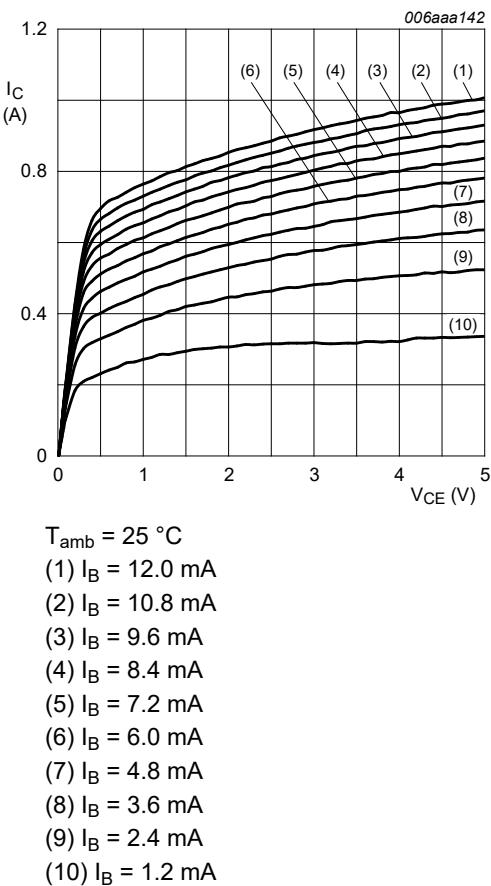
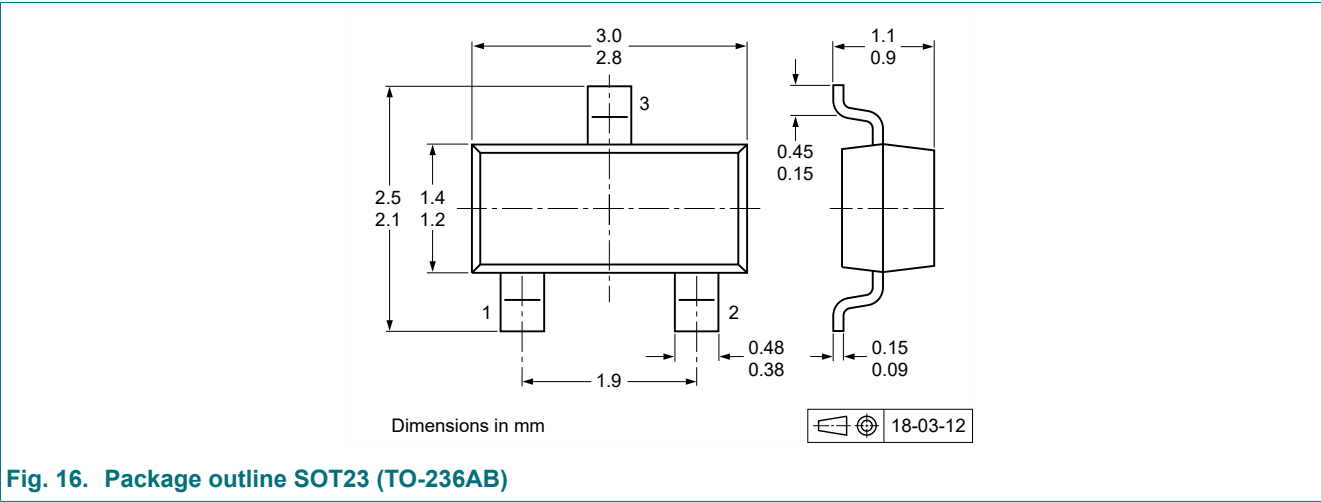
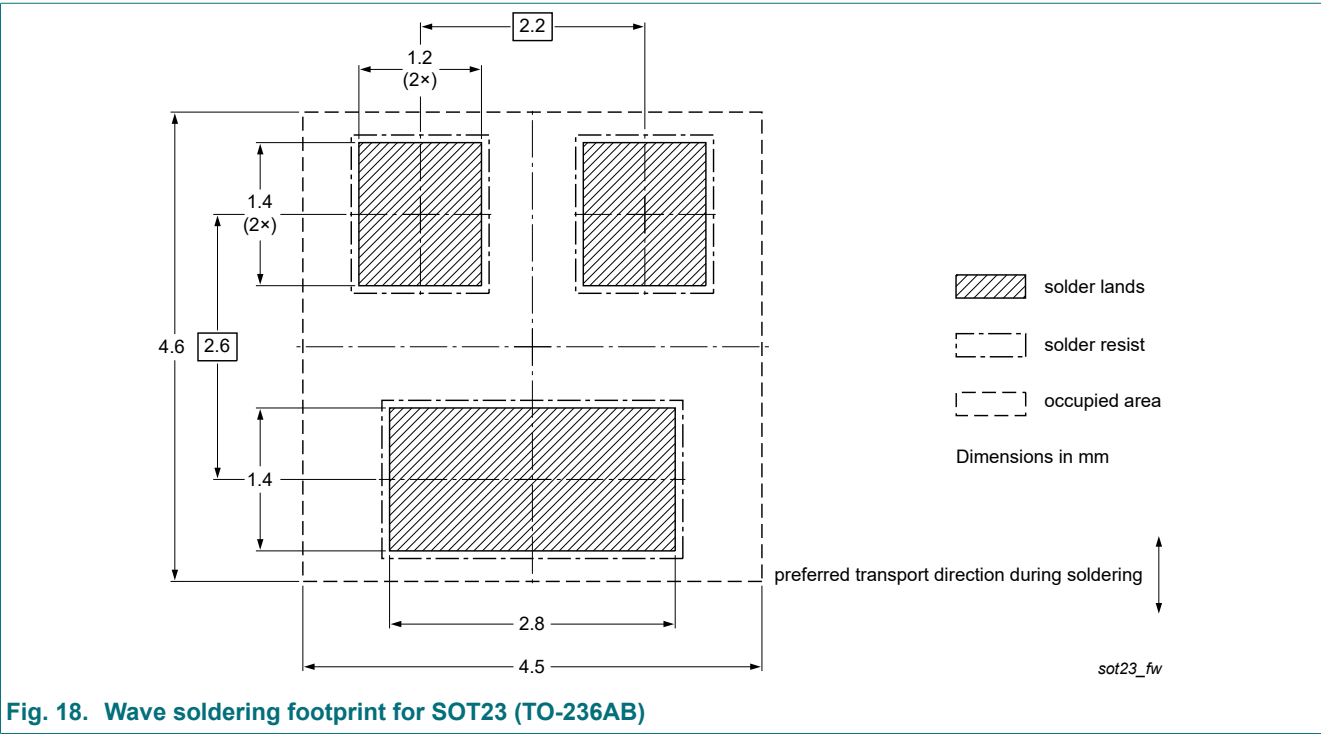
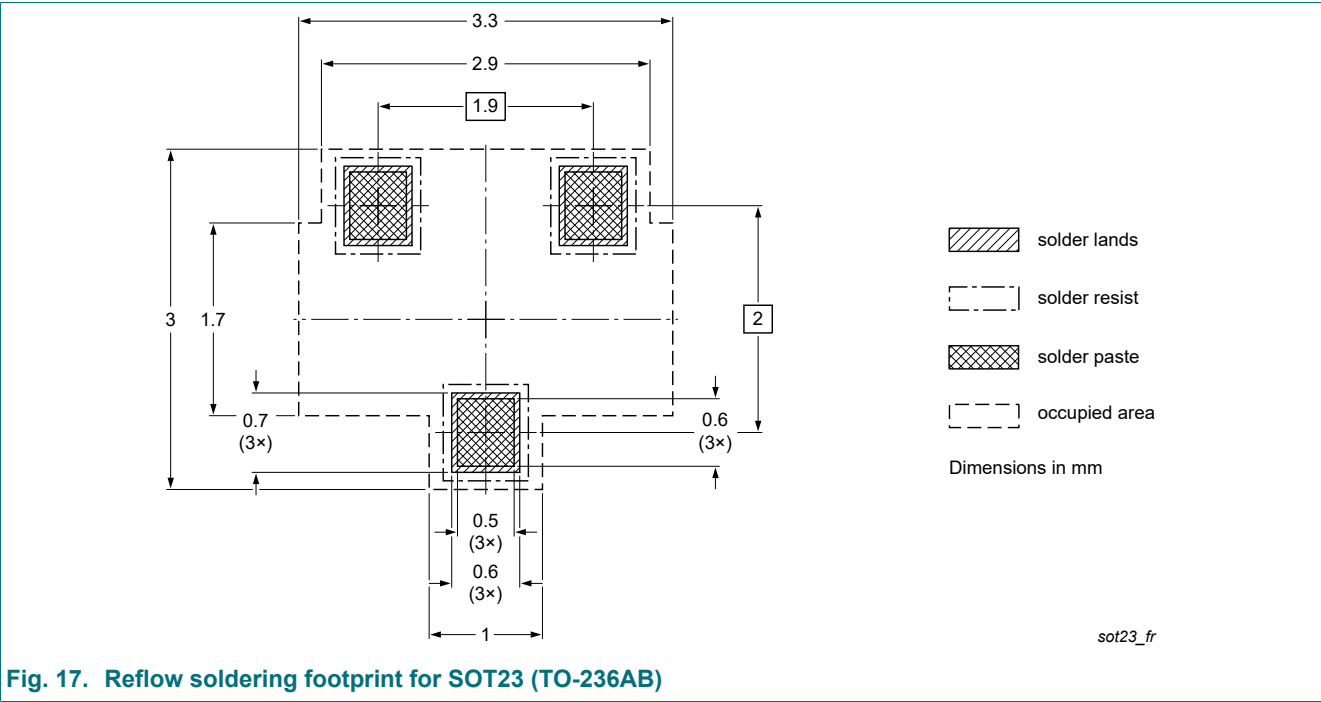


Fig. 15. BC817-40: Collector current as a function of collector-emitter voltage; typical values

11. Package outline



12. Soldering



13. Revision history

Table 9. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BC817_SER v.8	20220701	Product data sheet	-	BC817_SER v.7
Modifications:	<ul style="list-style-type: none"> Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s). 			
BC817_SER v.7	20180615	Product data sheet	-	BC817_BC817W_BC327 v.6
BC817_BC817W_BC337 v.6	20091117	Product data sheet	-	BC817_BC817W_BC337 v.5
BC817_BC817W_BC337 v.5	20050221	Product data sheet	CPCN200302007F CPCN200405006F	BC817 v.4 BC817W v.4 BC337 v.3
BC817 v.4	20040116	Product Specification	-	BC817 v.3
BC817W_SER v.4	19990518	Product Specification	-	BC817W_SER v.3
BC337 v.3	19990415	Product Specification	-	BC337_338_CNV v.2

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".
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