BC807H-Q series

45 V, 500 mA PNP general-purpose transistors

Rev. 1 — 18 October 2023

Product data sheet

1. General description

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

Table 1. Product overview

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

2. Features and benefits

- · Three current gain selections
- High-temperature applications up to 175 °C
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

· General-purpose switching and amplification

4. Quick reference data

Table 2. Quick reference data

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
V_{CEO}	collector-emitter voltage	open base		-	-	-45	V
I _C	collector current	T _{amb} = 25 °C		-	-	-500	mA
I _{CM}	peak collector current	single pulse; t _p ≤ 1 ms; T _{amb} = 25 °C		-	-	-1	Α
h _{FE}	DC current gain				•		
	BC807-16H-Q	V _{CE} = -1 V; I _C = -100 mA;	[1]	100	-	250	
	BC807-25H-Q	T _{amb} = 25 °C	[1]	160	-	400	
	BC807-40H-Q		[1]	250	-	600	

[1] pulsed; $t_p \le 300 \ \mu s$; $\delta \le 0.02$



5. Pinning information

Table 3. Pinning

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	В	base	3	C
2	E	emitter		B—
3	С	collector]	, h
				E sym132
			1	·
			SOT23	

6. Ordering information

Table 4. Ordering information

Type number	Package	ckage				
	Name	Description	Version			
BC807-16H-Q	SOT23	plastic, surface-mounted package; 3 leads	SOT23			
BC807-25H-Q	-					
BC807-40H-Q						

7. Marking

Table 5. Marking

Table of Marking					
Type number		Marking code [1]			
BC807-16H-Q	[1]	6S%			
BC807-25H-Q	[1]	6T%			
BC807-40H-Q	[1]	6U%			

[1] % = placeholder for manufacturing site code

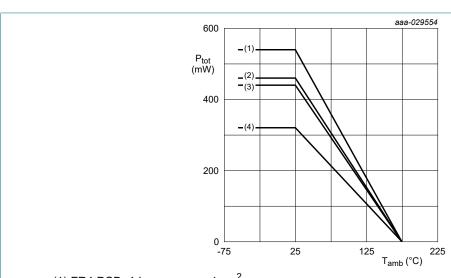
8. Limiting values

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 °C		-	-50	V
V _{CEO}	collector-emitter voltage	open base; T _{amb} = 25 °C		-	-45	V
V_{EBO}	emitter-base voltage	open collector; T _{amb} = 25 °C	open collector; T _{amb} = 25 °C		-7	V
I _C	collector current	T _{amb} = 25 °C	T _{amb} = 25 °C		-500	mA
I _{CM}	peak collector current	single pulse; t _p ≤ 1 ms; T _{amb} = 25	single pulse; t _p ≤ 1 ms; T _{amb} = 25 °C		-1	А
I _{BM}	peak base current	single pulse; t _p ≤ 1 ms; T _{amb} = 25	single pulse; t _p ≤ 1 ms; T _{amb} = 25 °C		-200	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C; T _{amb} = 25 °C	[1]	-	320	mW
			[2]	-	440	mW
			[3]	-	460	mW
			[4]	-	540	mW
Tj	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 Printed-Circuit-Board (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) FFR4 PCB; 4-layer copper; standard footprint
- (3) FR4 PCB; single-sided copper, 1 cm²
- (4) FFR4 PCB; single-sided copper; standard footprint

Fig. 1. Power derating curves

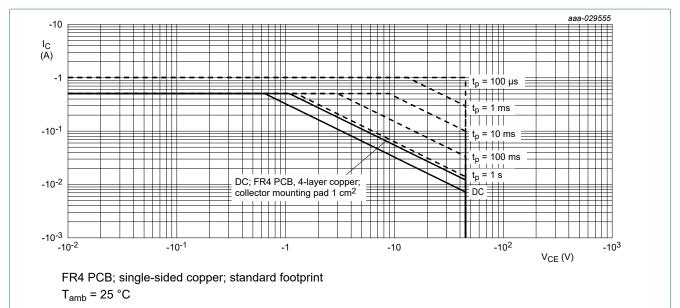


Fig. 2. Safe operating area; junction to ambient; continous and peak collector currents as a funtion of collectoremitter voltage

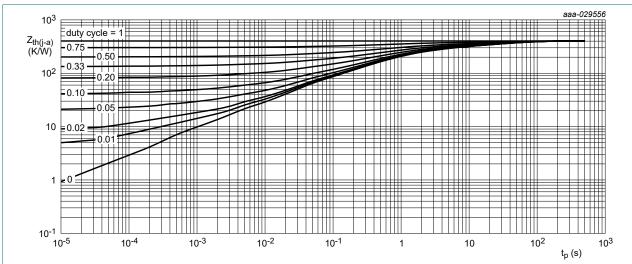
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9. Thermal characteristics

Table 7. Thermal characteristics

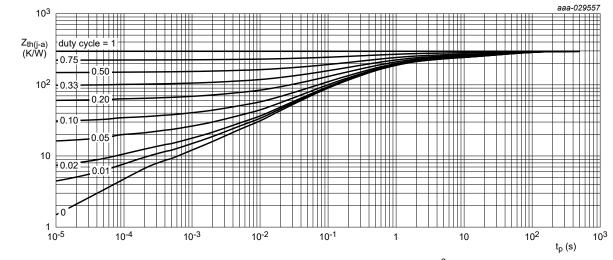
Symbol	Parameter	Conditions		Min	Тур	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air;	[1]	-	-	470	K/W
		T _{amb} = 25 °C	[2]	-	-	340	K/W
			[3]	-	-	325	K/W
			[4]	-	-	280	K/W
R _{th(j-sp)}	thermal resistance from junction to solder point			-	-	110	K/W

- [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.



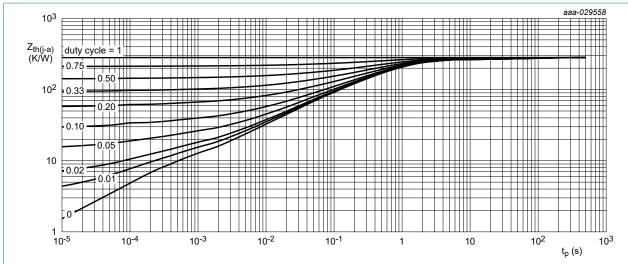
FR4 PCB; single-sided copper; tin-plated and standard footprint

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



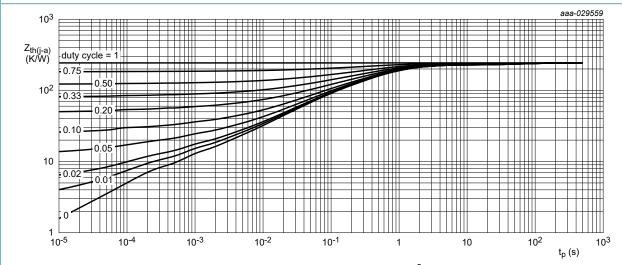
FR4 PCB; single-sided copper; tin-plated; mounting pad for collector 1 cm²

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

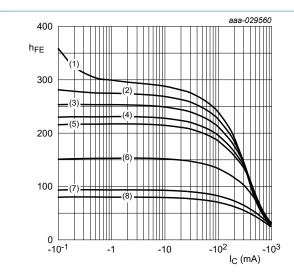
Fig. 6. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 8. Characteristics

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = -100 \ \mu A; I_E = 0 \ A; T_{amb} = 25 \ ^{\circ}C$		-50	-		V
V _{(BR)CEO}	collector-emitter breakdown voltage	$I_C = -10 \text{ mA}; I_B = 0 \text{ A}; T_{amb} = 25 \text{ °C}$		-45	-		V
V _{(BR)EBO}	emitter-base breakdown voltage	$I_E = -100 \ \mu A; I_C = 0 \ A; T_{amb} = 25 \ ^{\circ}C$		-7	-		V
I _{CBO}	collector-base	V _{CB} = -25 V; I _E = 0 A; T _{amb} = 25 °C		-	-	-100	nA
	cut-off current	V _{CB} = -25 V; I _E = 0 A; T _j = 150 °C		-	-	-5	μΑ
I _{EBO}	emitter-base cut-off current	$V_{EB} = -5 \text{ V}; I_C = 0 \text{ A}; T_{amb} = 25 \text{ °C}$		-	-	-100	nA
h _{FE}	DC current gain				'	'	
	BC807-16H-Q	V _{CE} = -1 V; I _C = -100 mA; T _{amb} = 25 °C	[1]	100	-	250	
	BC807-25H-Q		[1]	160	-	400	
BC807-40H-Q	BC807-40H-Q		[1]	250	-	600	
	DC current gain	V _{CE} = -1 V; I _C = -500 mA; T _{amb} = 25 °C	[1]	40	-	-	
V _{CEsat}	collector-emitter saturation voltage	I_C = -500 mA; I_B = -50 mA; T_{amb} = 25 °C	[1]	-	-	-700	mV
V _{BEsat}	base-emitter saturation voltage	I_C = -500 mA; I_B = -50 mA; T_{amb} = 25 °C	[1]	-	-	-1.2	V
V_{BE}	base-emitter voltage	V _{CE} = -1 V; I _C = -500 mA; T _{amb} = 25 °C	[1]	-	-	-1.2	V
f _T	transition frequency	V_{CE} = -5 V; I_{C} = -10 mA; f = 100 MHz; T_{amb} = 25 °C		80	-	-	MHz
C _c	collector capacitance	V_{CB} = -10 V; I_{E} = i_{e} = 0 A; f = 1 MHz; T_{amb} = 25 °C		-	7	-	pF
C _e	emitter capacitance	$V_{EB} = -0.5 \text{ V}; I_C = i_c = 0 \text{ A}; f = 1 \text{ MHz};$					
	BC807-16H-Q	T _{amb} = 25 °C		-	50	-	pF
	BC807-25H-Q			-	45	-	pF
	BC807-40H-Q			-	37	-	pF

^[1] pulsed; $t_p \le 300 \ \mu s$; $\delta \le 0.02$



$$V_{CE} = -1 V$$

(1)
$$T_{amb} = 175 \, ^{\circ}C$$

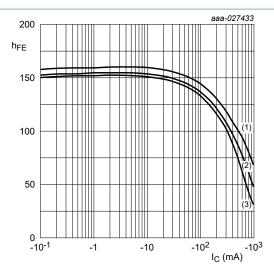
(2)
$$T_{amb} = 150 \, ^{\circ}C$$

(3)
$$T_{amb} = 125 \, ^{\circ}C$$

(4)
$$T_{amb} = 100 \, ^{\circ}C$$

(7)
$$T_{amb} = -40 \, ^{\circ}C$$

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



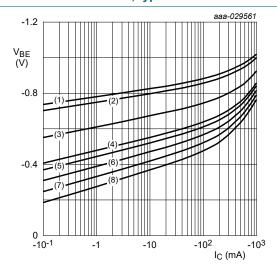
$$T_{amb}$$
 = 25 °C

$$(1) V_{CE} = -5 V$$

(2)
$$V_{CE} = -2 V$$

(3)
$$V_{CE} = -1 V$$

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



$$V_{CE} = -1 V$$

(1)
$$T_{amb} = -55 \, ^{\circ}C$$

(2)
$$T_{amb} = -40 \, ^{\circ}C$$

(3)
$$T_{amb} = 25 \, ^{\circ}C$$

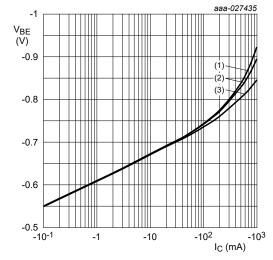
(4)
$$T_{amb} = 85 \, ^{\circ}C$$

(5)
$$T_{amb} = 100 \, ^{\circ}C$$

$$(7) T_{amb} = 150 °C$$

(8)
$$T_{amb} = 175 \, ^{\circ}C$$

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



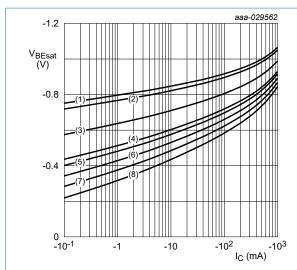
$$(1) V_{CE} = -1 V$$

(2)
$$V_{CE} = -2 V$$

(3)
$$V_{CE} = -5 V$$

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

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IC/IB = 10

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

(2) $T_{amb} = -40 \, ^{\circ}C$

(3) $T_{amb} = 25 \, ^{\circ}C$

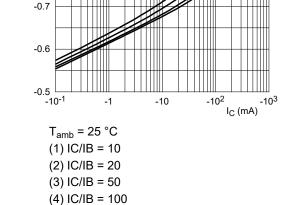
(4) T_{amb} = 85 °C

(5) $T_{amb} = 100 \, ^{\circ}C$

(6) T_{amb} = 125 °C

 $(7) T_{amb} = 150 °C$

(8) $T_{amb} = 175 \, ^{\circ}C$



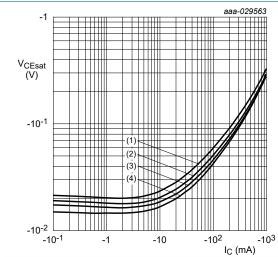
 $\mathsf{V}_{\mathsf{BEsat}}$

(V) -0.9

-0.8

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





 $I_{\rm C}/I_{\rm B} = 10$

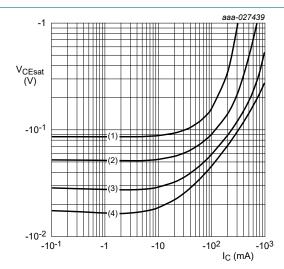
(1) $T_{amb} = 175 \, ^{\circ}C$

(2) T_{amb} = 85 °C

(3) T_{amb} = 25 °C

(4) $T_{amb} = -40 \, ^{\circ}C$

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



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

(1) IC/IB = 100

(2) IC/IB = 50

(3) IC/IB = 20

(4) IC/IB = 10

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

Product data sheet

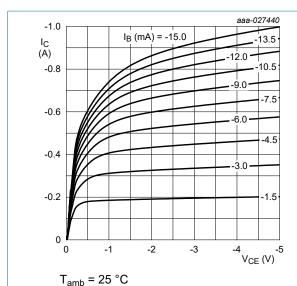
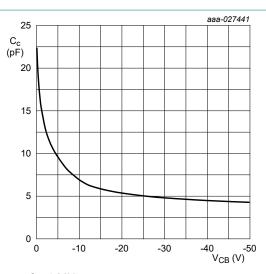
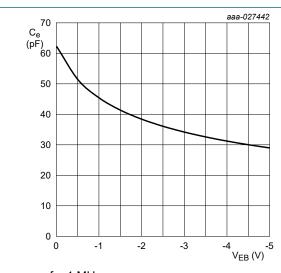


Fig. 15. BC807-16H-Q: Collector current as a function of collector-emitter voltage; typical values



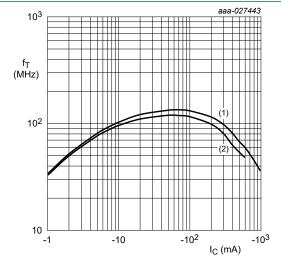
f = 1 MHz T_{amb} = 25 °C

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



f = 1 MHzT_{amb} = 25 °C

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



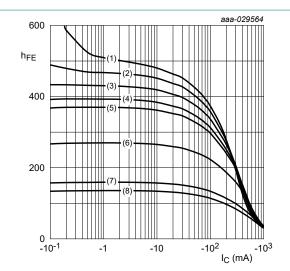
f = 1 MHz

T_{amb} = 25 °C

(1) $V_{CE} = -5 V$

(2) $V_{CE} = -1 V$

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



 $V_{CE} = -1 V$

(1) $T_{amb} = 175 \, ^{\circ}C$

(2) T_{amb} = 150 °C

(3) T_{amb} = 125 °C

(4) $T_{amb} = 100 \, ^{\circ}C$

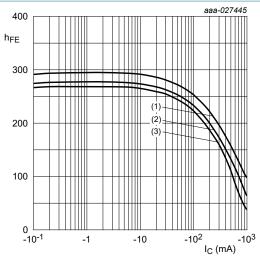
(5) $T_{amb} = 85 \, ^{\circ}C$

(6) T_{amb} = 25 °C

(7) $T_{amb} = -40 \, ^{\circ}C$

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





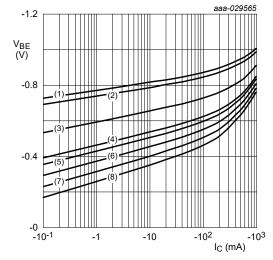
T_{amb} = 25 °C

(1) $V_{CE} = -5 V$

(2) $V_{CE} = -2 V$

(3) $V_{CE} = -1 V$

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



 $V_{CE} = -1 V$

(1) $T_{amb} = -55$ °C

(2) $T_{amb} = -40 \, ^{\circ}C$

(3) T_{amb} = 25 °C

(4) T_{amb} = 85 °C

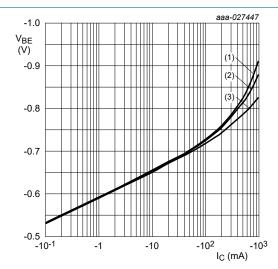
(5) $T_{amb} = 100 \, ^{\circ}C$

 $(6) T_{amb} = 100 C$ $(6) T_{amb} = 125 °C$

(0) Tamb = 123 0

(7) $T_{amb} = 150 \, ^{\circ}C$ (8) $T_{amb} = 175 \, ^{\circ}C$

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



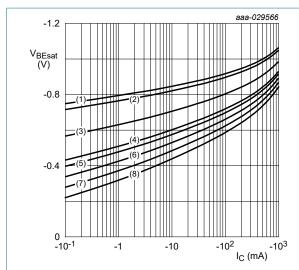
T_{amb} = 25 °C

 $(1) V_{CE} = -1 V$

(2) $V_{CE} = -2 V$

(3) $V_{CE} = -5 V$

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



IC/IB = 10

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

(2) $T_{amb} = -40 \, ^{\circ}C$

(3) $T_{amb} = 25 \, ^{\circ}C$

(4) T_{amb} = 85 °C

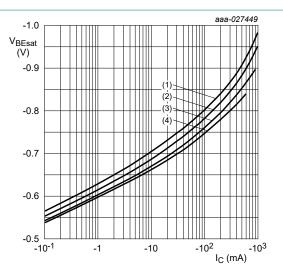
(5) $T_{amb} = 100 \, ^{\circ}C$

(6) $T_{amb} = 125 \, ^{\circ}C$

 $(7) T_{amb} = 150 °C$

(8) T_{amb} = 175 °C





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

(1) IC/IB = 10

(2) IC/IB = 20

(3) IC/IB = 50

(4) IC/IB = 100

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

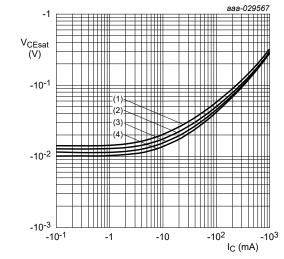


Fig. 23. BC807-25H-Q: Base-emitter saturation voltage

as a function of collector current; typical values

 $I_{\rm C}/I_{\rm B} = 10$

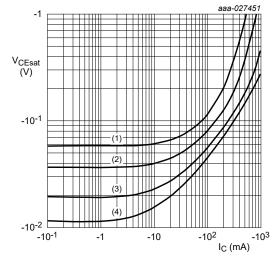
(1) $T_{amb} = 175 \, ^{\circ}C$

(2) T_{amb} = 85 °C

(3) T_{amb} = 25 °C

(4) $T_{amb} = -40 \, ^{\circ}C$

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

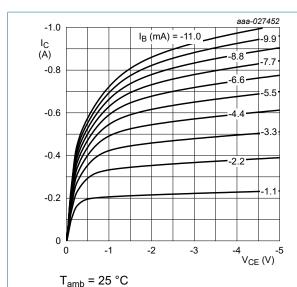
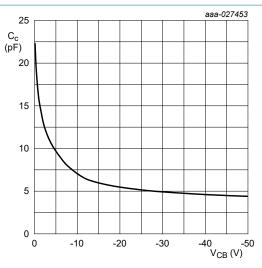
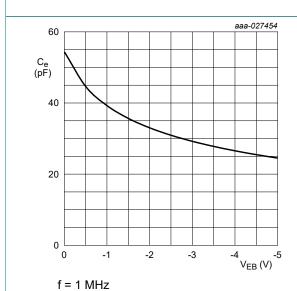


Fig. 27. BC807-25H-Q: Collector current as a function of collector-emitter voltage; typical values



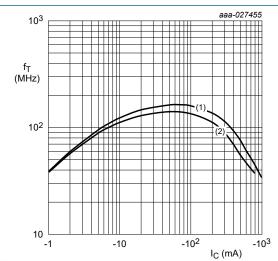
f = 1 MHz $T_{amb} = 25 °C$

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



T_{amb} = 25 °C Fig. 29. BC807-25H-Q: Emitter capacitance as a function

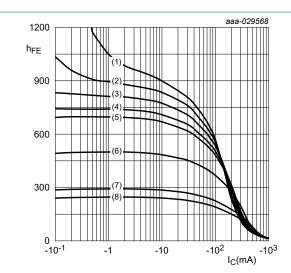
of emitter-base voltage; typical values



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

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

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 $V_{CE} = -1 V$

(1) $T_{amb} = 175 \, ^{\circ}C$

(2) $T_{amb} = 150 \, ^{\circ}C$

(3) T_{amb} = 125 °C

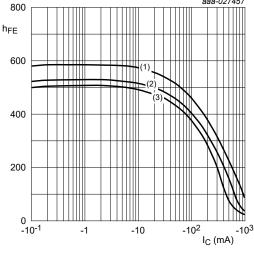
(4) T_{amb} = 100 °C

 $(5) T_{amb} = 85 °C$

(6) T_{amb} = 25 °C

(7) $T_{amb} = -40 \, ^{\circ}C$

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



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

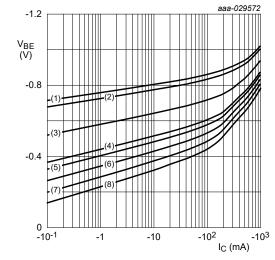
(1) $V_{CE} = -5 V$

(2) $V_{CE} = -2 V$

(3) $V_{CE} = -1 V$

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





 $V_{CE} = -1 V$

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

(2) $T_{amb} = -40 \, ^{\circ}C$

(3) $T_{amb} = 25 \, ^{\circ}C$

(4) $T_{amb} = 85 \, ^{\circ}C$

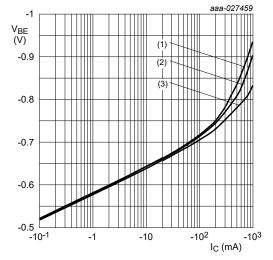
(5) $T_{amb} = 100 \, ^{\circ}C$

(6) $T_{amb} = 125 \, ^{\circ}C$

 $(7) T_{amb} = 150 °C$

(8) $T_{amb} = 175 \, ^{\circ}C$

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



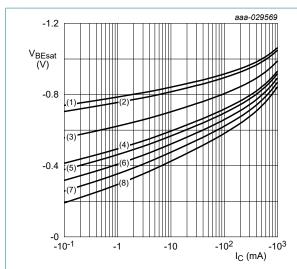
T_{amb} = 25 °C

(1) $V_{CE} = -1 V$

(2) $V_{CE} = -2 V$

(3) $V_{CE} = -5 V$

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



IC/IB = 10

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

(2) $T_{amb} = -40 \, ^{\circ}C$

(3) $T_{amb} = 25 \, ^{\circ}C$

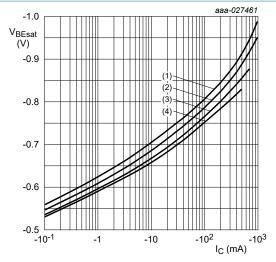
(4) T_{amb} = 85 °C

(5) $T_{amb} = 100 \, ^{\circ}C$

(6) T_{amb} = 125 °C

 $(7) T_{amb} = 150 °C$

(8) T_{amb} = 175 °C



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

(1) IC/IB = 10

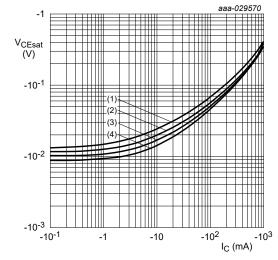
(2) IC/IB = 20

(3) IC/IB = 50

(4) IC/IB = 100

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





 $I_{\rm C}/I_{\rm B} = 10$

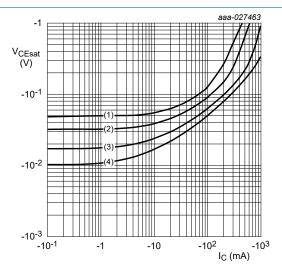
(1) $T_{amb} = 175 \, ^{\circ}C$

(2) T_{amb} = 85 °C

(3) $T_{amb} = 25 \, ^{\circ}C$

(4) $T_{amb} = -40 \, ^{\circ}C$

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



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

(1) IC/IB = 100

(2) IC/IB = 50

(3) IC/IB = 20

(4) IC/IB = 10

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

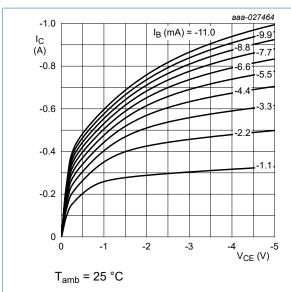
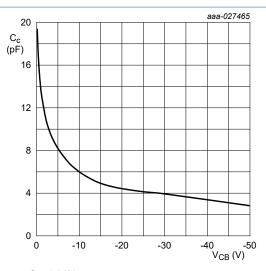


Fig. 39. BC807-40H-Q: Collector current as a function of collector-emitter voltage; typical values



f = 1 MHz $T_{amb} = 25 °C$

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

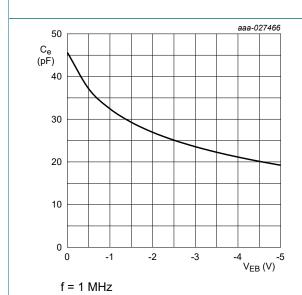
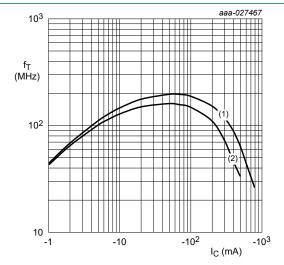


Fig. 41. BC807-40H-Q: Emitter capacitance as a function of emitter-base voltage; typical values



f = 1 MHz $T_{amb} = 25 \,^{\circ}C$ (1) $V_{CE} = -5 \,^{\circ}V$ (2) $V_{CE} = -1 \,^{\circ}V$

Fig. 42. BC807-40H-Q: Transition frequency as a function of collector current; typical values

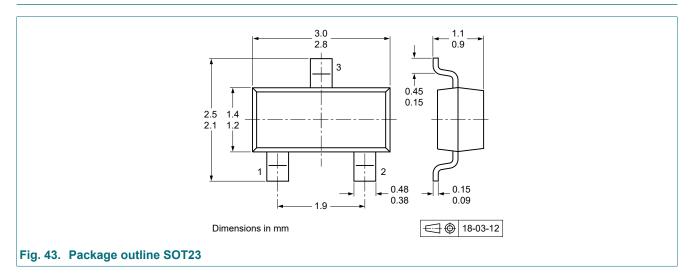
11. Test information

T_{amb} = 25 °C

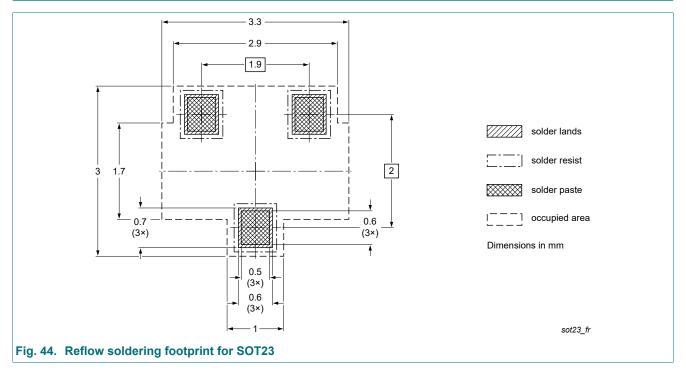
11.1. Quality information

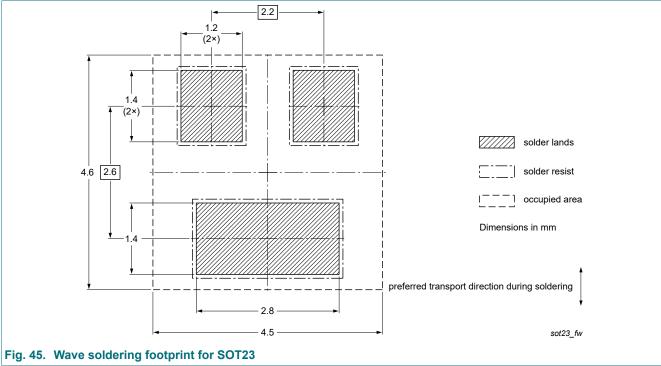
This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard *Q101 - Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

12. Package outline



13. Soldering





14. Revision history

Table 9. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BC807H-Q_SER v.1	20231018	Product data sheet	-	-

15. 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.

- 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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BC807H-Q_SER

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