

# **BC807-25HR Datasheet**



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DiGi Electronics Part Number BC807-25HR-DG

Manufacturer Nexperia USA Inc.

Manufacturer Product Number BC807-25HR

Description BC807-25H/SOT23/TO-236AB

**Detailed Description** Bipolar (BJT) Transistor PNP 45 V 500 mA 80MHz 32

0 mW Surface Mount TO-236AB



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RFQ Email: Info@DiGi-Electronics.com

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# **Purchase and inquiry**

Manufacturer Product Number:	Manufacturer:
BC807-25HR	Nexperia USA Inc.
Series:	Product Status:
-	Active
Transistor Type:	Current - Collector (Ic) (Max):
PNP	500 mA
Voltage - Collector Emitter Breakdown (Max):	Vce Saturation (Max) @ lb, lc:
45 V	700mV @ 50mA, 500mA
Current - Collector Cutoff (Max):	DC Current Gain (hFE) (Min) @ Ic, Vce:
100nA (ICBO)	160 @ 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**

8541.21.0095

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



# **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	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	Тур	Max	Unit
$V_{CEO}$	collector-emitter voltage	open base		-	-	-45	V
I <sub>C</sub>	collector current			-	-	-500	mA
I <sub>CM</sub>	peak collector current	single pulse; t <sub>p</sub> ≤ 1 ms		-	-	-1	А
h <sub>FE</sub>	DC current gain	$V_{CE} = -1 \text{ V; } I_{C} = -100 \text{ mA}$					
	BC807-16H		[1]	100	-	250	
	BC807-25H		[1]	160	-	400	
	BC807-40H		[1]	250	-	600	

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



# 2. Pinning information

#### **Table 3. Pinning**

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

# 3. Ordering information

#### **Table 4. Ordering information**

Type number	Package	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]	65%
BC807-25H	[1]	6T%
BC807-40H	[1]	6U%

[1] % = placeholder for manufacturing site code

## 5. Limiting values

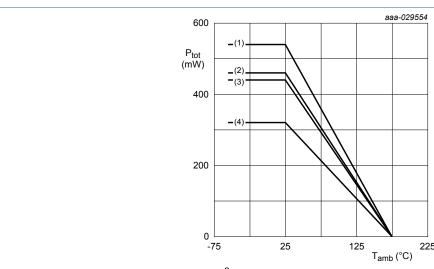
#### **Table 6. Limiting values**

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

T<sub>amb</sub> = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Conditions		Max	Unit
V <sub>CBO</sub>	collector-base voltage	open emitter	open emitter		-50	V
V <sub>CEO</sub>	collector-emitter voltage	open base		-	-45	V
V <sub>EBO</sub>	emitter-base voltage	open collector		-	-7	V
I <sub>C</sub>	collector current			-	-500	mA
I <sub>CM</sub>	peak collector current	single pulse; t <sub>p</sub> ≤ 1 ms	single pulse; t <sub>p</sub> ≤ 1 ms		-1	Α
I <sub>BM</sub>	peak base current	single pulse; t <sub>p</sub> ≤ 1 ms	single pulse; t <sub>p</sub> ≤ 1 ms		-200	mA
P <sub>tot</sub> total power dissipation	T <sub>amb</sub> ≤ 25 °C	[1]	-	320	mW	
			[2]	-	440	mW
			[3]	-	460	mW
			[4]	-	540	mW
Tj	junction temperature			-	175	°C
T <sub>amb</sub>	ambient temperature			-55	175	°C
T <sub>stg</sub>	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<sup>2</sup>.
- [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.<sup>2</sup>



- 1. FR4 PCB; 4-layer copper, 1cm<sup>2</sup>
- 2. FR4 PCB; 4-layer copper, standard footprint
- 3. FR4 PCB; single-sided copper, 1cm<sup>2</sup>
- 4. FR4 PCB; single-sided copper, standard footprint

Fig. 1. Power derating curves

**Nexperia** 

**BC807H series** 

#### 45 V, 500 mA PNP general-purpose transistors

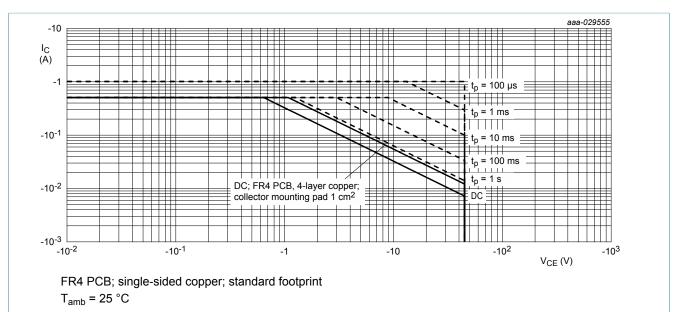


Fig. 2. Safe operating area; junction to ambient; continous and peak collector currents as a funtion of collecoremitter voltage

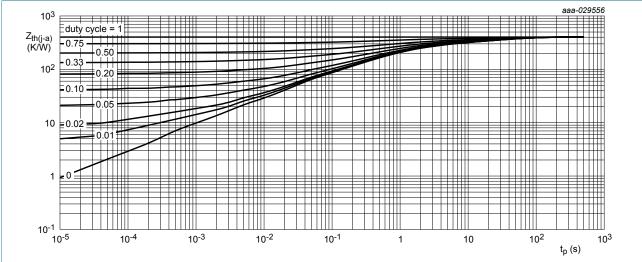
#### 6. Thermal characteristics

#### **Table 7. Thermal characteristics**

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

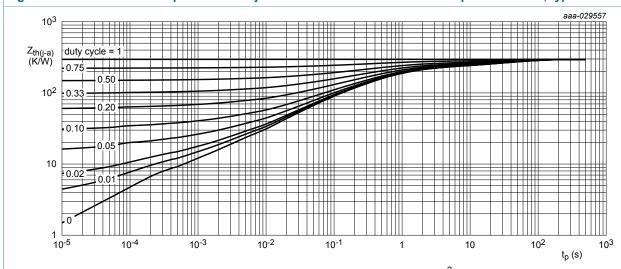
Symbol	Parameter	Conditions		Min	Тур	Max	Unit
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient	in free air	[1]	-	-	470	K/W
			[2]			340	K/W
			[3]			325	K/W
			[4]	-	-	280	K/W
R <sub>(j-sp)</sub>	thermal resistance from junction to solder point			-	-	110	K/W

- [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<sup>2</sup>.
- [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<sup>2</sup>.



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



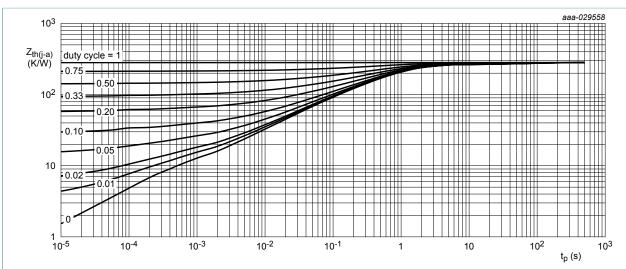
FR4 PCB; single-sided copper; tin-plated; mounting pad for collector 1 cm<sup>2</sup>

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

**Nexperia** 

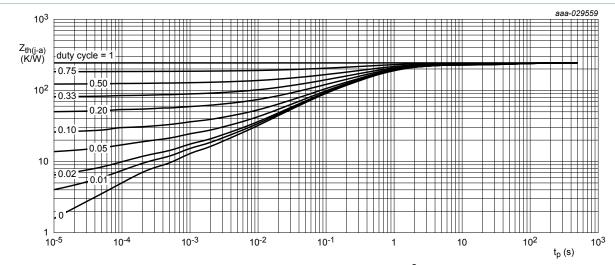
### **BC807H series**

#### 45 V, 500 mA PNP general-purpose transistors



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<sup>2</sup>

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

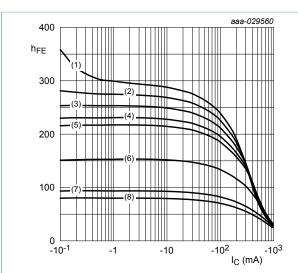
### 7. Characteristics

#### **Table 8. Characteristics**

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

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
$V_{(BR)CBO}$	collector-base breakdown voltage	I <sub>C</sub> = -100 μA; I <sub>E</sub> = 0 A		-50	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	I <sub>C</sub> = -10 mA; I <sub>B</sub> = 0 A		-45	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	I <sub>E</sub> = -100 μA; I <sub>C</sub> = 0 A	E = -100 μA; I <sub>C</sub> = 0 A			-	V
I <sub>CBO</sub>	collector-base	V <sub>CB</sub> = -25 V; I <sub>E</sub> = 0 A		-	-	-100	nA
	cut-off current	$V_{CB} = -25 \text{ V}; I_E = 0 \text{ A}; T_j = 150 ^{\circ}\text{C}$		-	-	-5	μΑ
I <sub>EBO</sub>	emitter-base cut-off current	$V_{EB} = -5 \text{ V}; I_C = 0 \text{ A}$	/ <sub>EB</sub> = -5 V; I <sub>C</sub> = 0 A		-	-100	nA
h <sub>FE</sub>	DC current gain						
BC807-16H BC807-25H BC807-40H	$V_{CE} = -1 \text{ V}; I_{C} = -100 \text{ mA}$	[1]	100	-	250		
	BC807-25H		[1]	160	-	400	
	BC807-40H		[1]	250	-	600	
	DC current gain	V <sub>CE</sub> = -1 V; I <sub>C</sub> = -500 mA	[1]	40	-	-	
V <sub>CEsat</sub>	collector-emitter saturation voltage	$I_C = -500 \text{ mA}; I_B = -50 \text{ mA}$	[1]	-	-	-700	mV
V <sub>BEsat</sub>	base-emitter saturation voltage	$I_C = -500 \text{ mA}; I_B = -50 \text{ mA}$	[1]			-1.2	V
$V_{BE}$	base-emitter voltage	$V_{CE} = -1 \text{ V; } I_{C} = -500 \text{ mA}$	[1]	-	-	-1.2	V
f <sub>T</sub>	transition frequency	$V_{CE}$ = -5 V; $I_{C}$ = -10 mA; f = 100 MHz		80	-	-	MHz
C <sub>c</sub>	collector capacitance	$V_{CB} = -10 \text{ V}; I_E = i_e = 0 \text{ A}; f = 1 \text{ MHz}$		-	7	-	pF
Ce	emitter capacitance	$V_{EB} = -0.5 \text{ V}; I_C = I_c = 0 \text{ A}; f = 1 \text{ MHz}$					
	BC807-16H				50		pf
	BC807-25H				45		pF
	BC807-40H				37		pF

<sup>[1]</sup> 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 °C

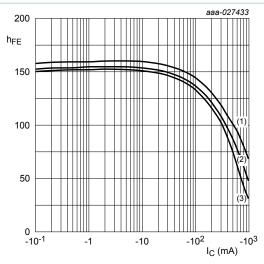
(3) 
$$T_{amb}$$
 = 125 °C

(4) 
$$T_{amb}$$
 = 100 °C

(5) 
$$T_{amb}$$
 = 85 °C

(6) 
$$T_{amb}$$
 = 25 °C

$$(7) T_{amb} = -40 °C$$



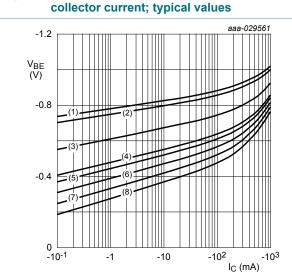
$$T_{amb} = 25 \, ^{\circ}C$$

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

(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





(1) 
$$T_{amb} = -55$$
 °C

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

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

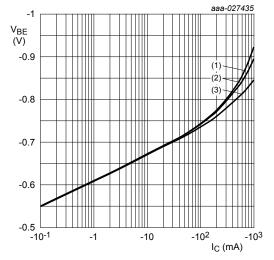
(4) 
$$T_{amb} = 85 \, ^{\circ}C$$

(5) 
$$T_{amb}$$
 = 100 °C

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

$$(7) T_{amb} = 150 °C$$

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



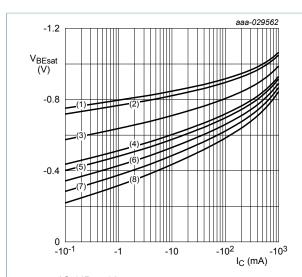
(1) 
$$V_{CE} = -1 V$$

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

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

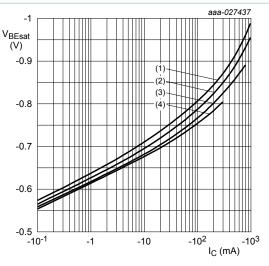
Fig. 10. BC807-16H: Base-emitter voltage as a function of collector current; typical values

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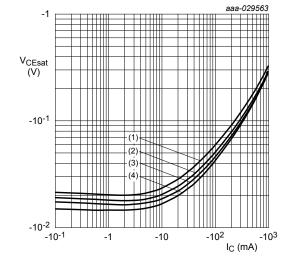
- IC / IB = 10
- (1)  $T_{amb} = -55 \, ^{\circ}C$
- (2)  $T_{amb} = -40 \, ^{\circ}C$
- (3)  $T_{amb}$  = 25 °C
- (4)  $T_{amb}$  = 85 °C
- (5)  $T_{amb} = 100 \, ^{\circ}C$
- (6)  $T_{amb} = 125 \, ^{\circ}C$
- (7)  $T_{amb} = 150 \, ^{\circ}C$
- (8)  $T_{amb}$  = 175 °C

Fig. 11. BC807-16H: Base-emitter saturation voltage as a function of collector current; typical values



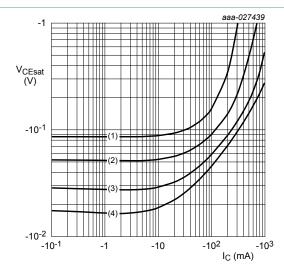
- $T_{amb} = 25 \, ^{\circ}C$
- (1) IC / IB = 10
- (2) IC / IB = 20
- (3) IC / IB = 50
- (4) IC / IB = 100

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



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

Fig. 13. BC807-16H: Collector-emitter saturation voltage Fig. 14. BC807-16H: Collector-emitter saturation voltage as a function of collector current; typical values



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

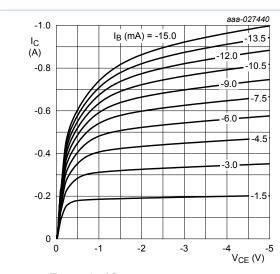
(1) IC / IB = 100

(2) IC / IB = 50

(3) IC / IB = 20

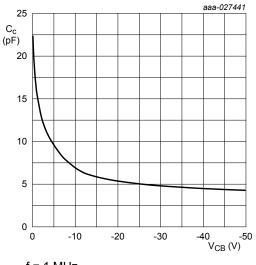
(4) IC / IB = 10

as a function of collector current; typical values



 $T_{amb}$  = 25 °C

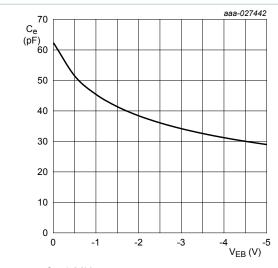
Fig. 15. BC807-16H: Collector current as a function of collector-emitter voltage; typical values



f = 1 MHz

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

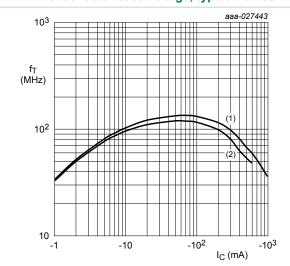
Fig. 16. BC807-16H: Collector capacitance as a function of collector-base voltage; typical values



f = 1 MHz

T<sub>amb</sub> = 25 °C

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



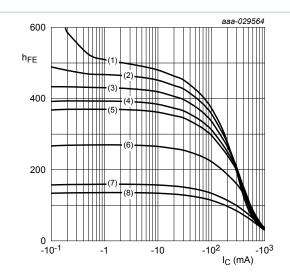
f = 1 MHz

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

(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

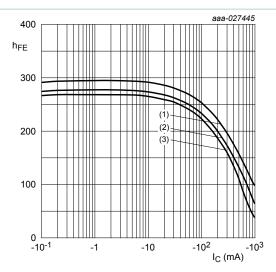
(5) 
$$T_{amb}$$
 = 85 °C

(6) 
$$T_{amb}$$
 = 25 °C

$$(7) T_{amb} = -40 °C$$

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





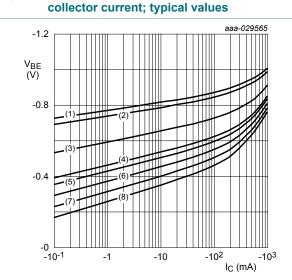
$$T_{amb}$$
 = 25 °C

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

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

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

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





(1) 
$$T_{amb} = -55$$
 °C

(2) 
$$T_{amb}$$
 = -40 °C

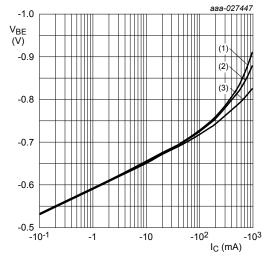
(3) 
$$T_{amb} = 25 \, ^{\circ}C$$

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

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

$$(7) T_{amb} = 150 °C$$

Fig. 21. BC807-25H: 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. 22. BC807-25H: Base-emitter voltage as a function of collector current; typical values

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-1.0  $V_{\mathsf{BEsat}}$ 

-0.8

-0.7

-0.6

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

(1) IC / IB = 10

(2) IC / IB = 20

(3) IC / IB = 50

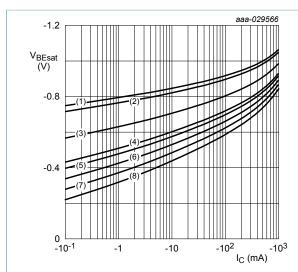
(V) -0.9

#### 45 V, 500 mA PNP general-purpose transistors

-10<sup>2</sup>

 $-10^{3}$ 

I<sub>C</sub> (mA)

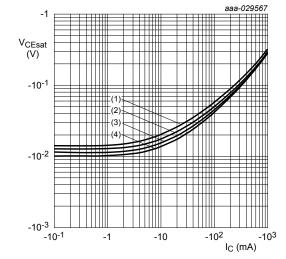


- IC / IB = 10
- (1)  $T_{amb} = -55 \, ^{\circ}C$
- (2)  $T_{amb} = -40 \, ^{\circ}C$
- (3)  $T_{amb}$  = 25 °C
- (4)  $T_{amb}$  = 85 °C
- (5)  $T_{amb} = 100 \, ^{\circ}C$
- (6)  $T_{amb} = 125 \, ^{\circ}C$
- (7)  $T_{amb} = 150 \, ^{\circ}C$
- (8)  $T_{amb}$  = 175 °C



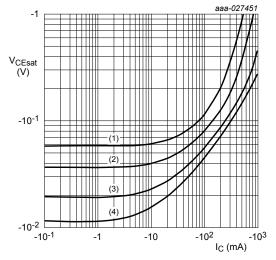
-10





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

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

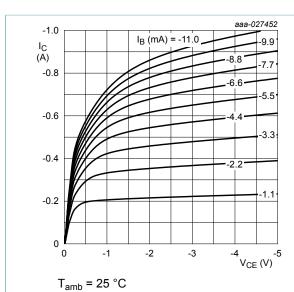
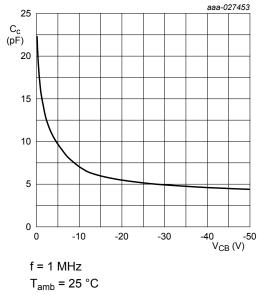


Fig. 27. BC807-25H: Collector current as a function of collector-emitter voltage; typical values



T<sub>amb</sub> = 25 °C Fig. 28. BC807-25H: Collector capacitance as a function

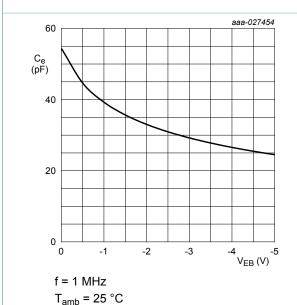
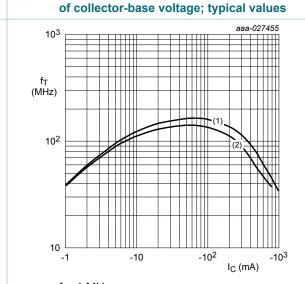
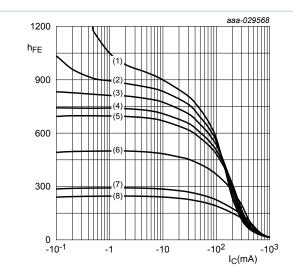


Fig. 29. BC807-25H: Emitter capacitance as a function of emitter-base voltage; typical values



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

Fig. 30. BC807-25H: 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

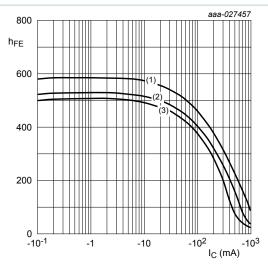
(3) 
$$T_{amb}$$
 = 125 °C

(4) 
$$T_{amb}$$
 = 100 °C

(6) 
$$T_{amb} = 25 \, ^{\circ}C$$

$$(7) T_{amb} = -40 °C$$

(8) T<sub>amb</sub> = -55 °C Fig. 31. BC807-40H: DC current gain as a function of



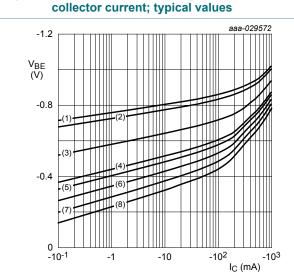
$$T_{amb} = 25 \, ^{\circ}C$$

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

(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

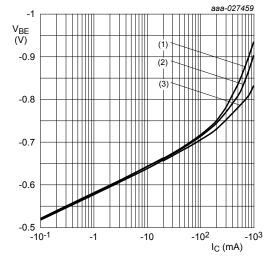
(4) 
$$T_{amb} = 85 \, ^{\circ}C$$

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

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

$$(7) T_{amb} = 150 °C$$

Fig. 33. BC807-40H: 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. 34. BC807-40H: Base-emitter voltage as a function of collector current; typical values

-1.0  $V_{\mathsf{BEsat}}$ 

-0.8

-0.7

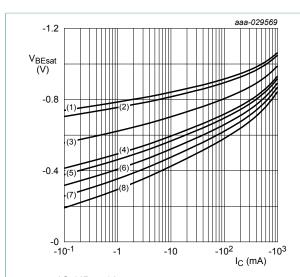
-0.6

(V) -0.9

 $-10^{3}$ 

I<sub>C</sub> (mA)

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

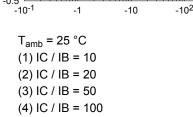
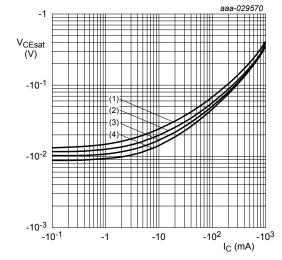


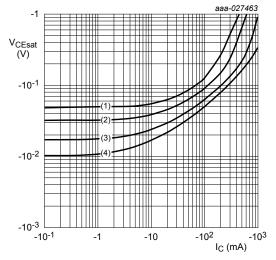
Fig. 36. BC807-40H: Base-emitter saturation voltage as a function of collector current; typical values





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

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

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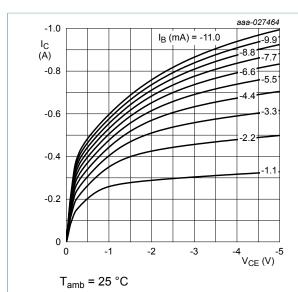


Fig. 39. BC807-40H: Collector current as a function of collector-emitter voltage; typical values

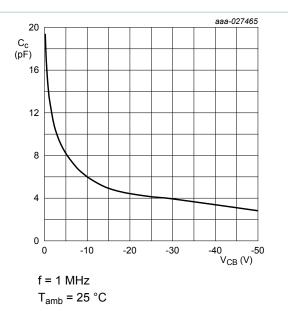


Fig. 40. BC807-40H: Collector capacitance as a function of collector-base voltage; typical values

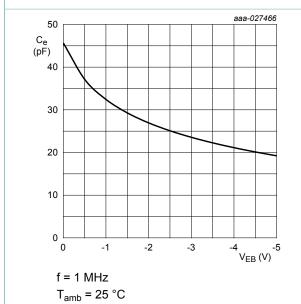
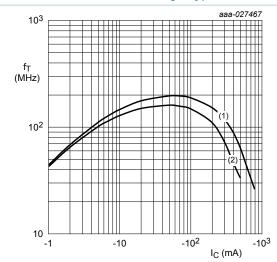


Fig. 41. BC807-40H: Emitter capacitance as a function of emitter-base voltage; typical values



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

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

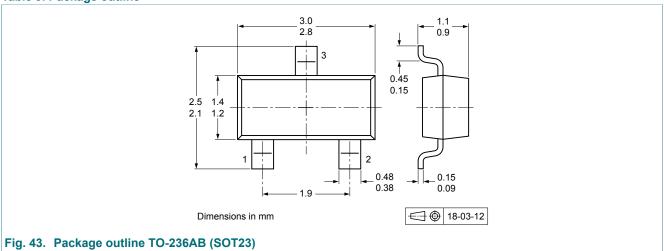
### 8. Test information

### 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

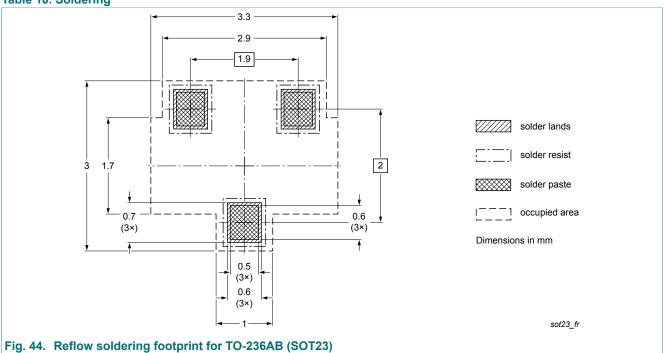
Table 9. Package outline

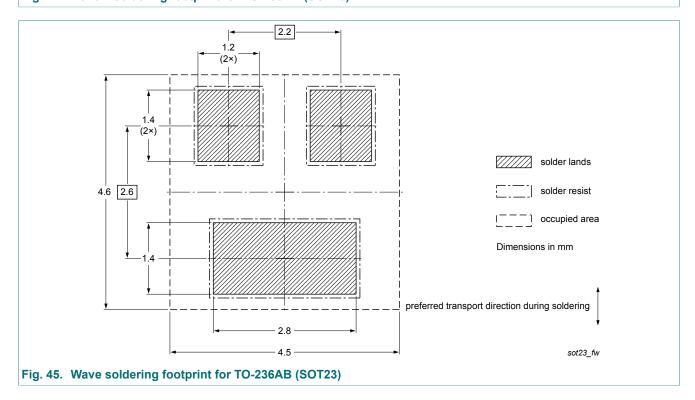


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# 10. Soldering







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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.

- 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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For more information, please visit: http://www.nexperia.com For sales office addresses, please send an email to: salesaddresses@nexperia.com Date of release: 5 March 2019

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