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	Тур	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 ≤ 1 ms		-	-	-1	Α
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; $t_p \le 300 \ \mu s; \ \delta \le 0.02$

2 Pinning information

Table 3. Pinning

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	В	base		
2	E	emitter	3	C I
3	С	collector	1 2	BE sym132

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						

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

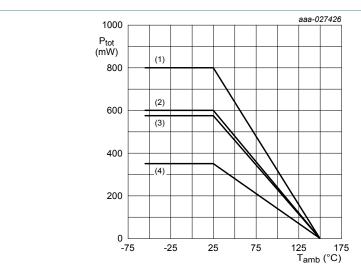
Limiting values

Table 6. Limiting values

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

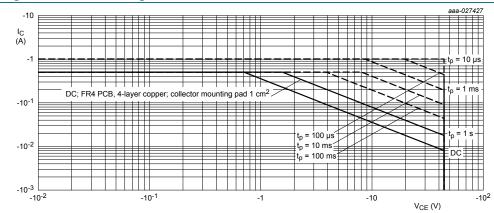
Symbol	Parameter	Conditions		Min	Max	Unit
V_{CBO}	collector-base voltage	open emitter		-	-50	V
V_{CEO}	collector-emitter voltage	open base		-	-45	V
V_{EBO}	emitter-base voltage	open collector		-	-5	V
I _C	collector current			-	-500	mA
I _{CM}	peak collector current	single pulse; t _p ≤ 1 ms		-	-1	Α
I _{BM}	peak base current	single pulse; t _p ≤ 1 ms		-	-200	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	350	mW
			[2]	-	575	mW
			[3]	-	600	mW
			[4]	-	800	mW
Tj	junction temperature			-	150	°C
T _{amb}	ambient temperature			-55	150	°C
T _{stg}	storage temperature			-65	150	°C

Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided copper; tin-plated and standard footprint.
 Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided copper; tin-plated; mounting pad for collector 1 cm².
 Device mounted on an FR4 Printed-Circuit-Board (PCB); 4-layer copper; tin-plated and standard footprint.
 Device mounted on an FR4 Printed-Circuit-Board (PCB); 4-layer copper; tin-plated; mounting pad for collector 1 cm².



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

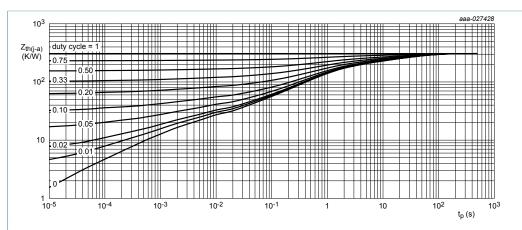
Thermal characteristics

Table 7. Thermal characteristics

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
R _{th(j-a)}		[1]	-	-	358	K/W	
	to ambient	[2]	[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

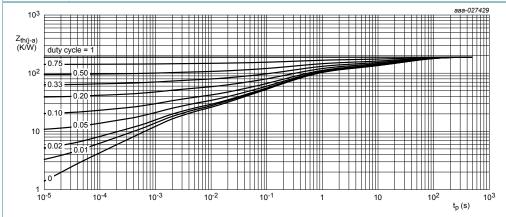
- Device mounted on an FR4 PCB; single-sided copper; tin-plated and standard footprint.
- Device mounted on an FR4 PCB; single-sided copper; tin-plated and standard footprint.

 Device mounted on an FR4 PCB; 4-layer copper; tin-plated and standard footprint.
- 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

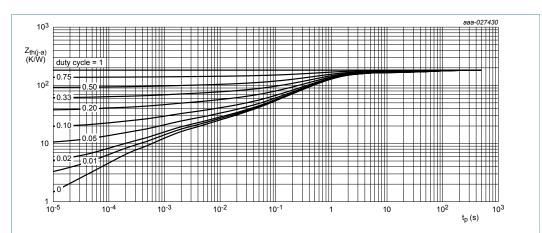
Figure 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



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

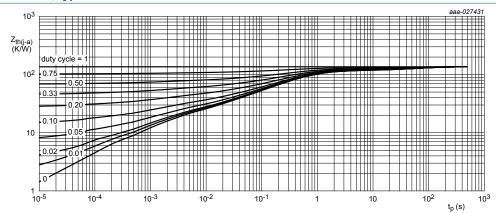
Figure 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

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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 cm²

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

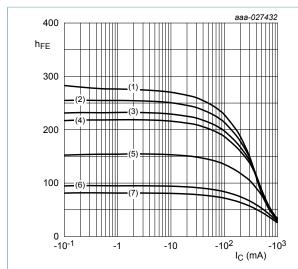
7 Characteristics

Table 8. Characteristics

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

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
V _{(BR)CBO}	collector-base breakdown voltage	$I_C = -100 \ \mu A; I_E = 0 \ A$		-50	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = -10 \text{ mA}; I_B = 0 \text{ A}$		-45	-	-	V
V _{(BR)EBO}	emitter-base breakdown voltage	$I_E = -100 \ \mu A; I_C = 0 \ A$		-5	-	-	V
I _{CBO}	collector-base	V _{CB} = -25 V; I _E = 0 A		-	-	-100	nA
	cut-off current	V _{CB} = -25 V; I _E = 0 A; T _j = 150 °C		-	-	-5	μA
I _{EBO}	emitter-base cut-off current	$V_{EB} = -5 \text{ V}; I_C = 0 \text{ A}$		-	-	-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	$I_C = -500 \text{ mA}; I_B = -50 \text{ mA}$	[1]	-	-	-700	mV
V_{BEsat}	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 V; I_{C} = -500 mA	[1]	-	-	-1.2	V
f _T	transition frequency	$V_{CE} = -5 \text{ V}; I_{C} = -10 \text{ mA}; f = 100 \text{ MHz}$		80	-	-	MHz
C _c	collector capacitance	$V_{CB} = -10 \text{ V}; I_E = I_e = 0 \text{ A}; f = 1 \text{ MHz}$		-	7	-	pF
C _e	emitter capacitance	$V_{EB} = -0.5 \text{ V}; I_C = I_C = 0 \text{ A}; f = 1 \text{ MHz}$					
	BC807K-16			-	50	-	pF
	BC807K-25			-	45	-	pF
	BC807K-40			-	37	-	pF

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



 V_{CE} = -1 V

(1) T_{amb} = 150 °C

(2) T_{amb} = 125 °C

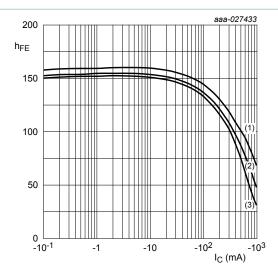
(3) T_{amb} = 100 °C

(4) T_{amb} = 85 °C

(5) T_{amb} = 25 °C

(6) T_{amb} = -40 °C





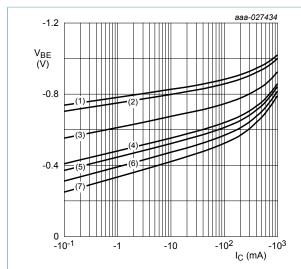
T_{amb} = 25 °C

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

(3) T_{amb} = 25 °C

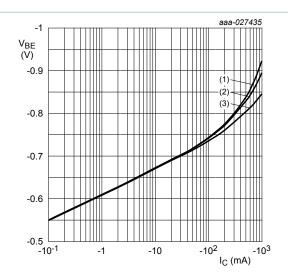
(4) $T_{amb} = 85 \,^{\circ}C$

(5) T_{amb} = 100 °C

(6) T_{amb} = 125 °C

 $(7) T_{amb} = 150 °C$





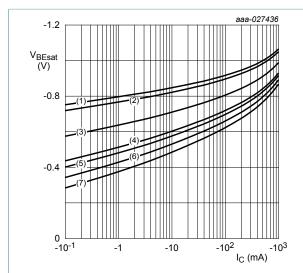
 T_{amb} = 25 °C

(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



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

(1)
$$T_{amb} = -55$$
 °C

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

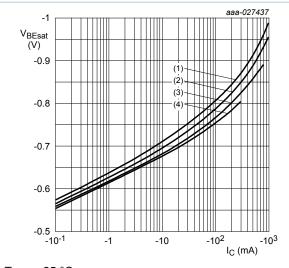
(3)
$$T_{amb} = 25 \, ^{\circ}C$$

(4)
$$T_{amb}$$
 = 85 °C

(5)
$$T_{amb}$$
 = 100 °C

(6)
$$T_{amb}$$
 = 125 °C

$$(7) T_{amb} = 150 °C$$



T_{amb} = 25 °C

(1)
$$I_C/I_B = 10$$

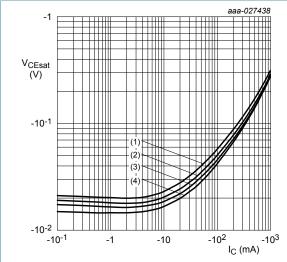
(2)
$$I_C/I_B = 20$$

(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





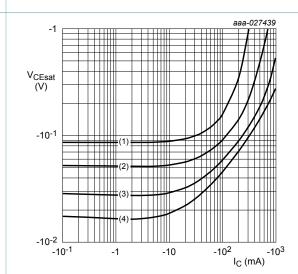
 $I_{\rm C}/I_{\rm B} = 10$

(2)
$$T_{amb} = 85 \, ^{\circ}C$$

(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



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

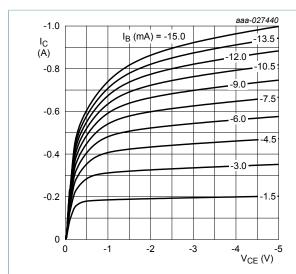
(1)
$$I_C/I_B = 100$$

(2)
$$I_C/I_B = 50$$

(3)
$$I_C/I_B = 20$$

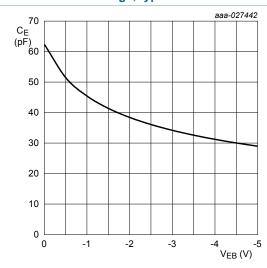
(4)
$$I_C/I_B = 10$$

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



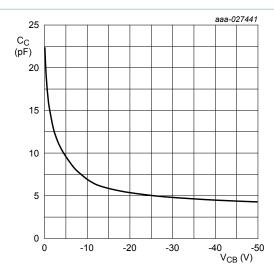
 $T_{amb} = 25 \, ^{\circ}C$

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



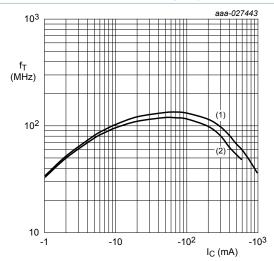
 $f = 1 \text{ MHz}; T_{amb} = 25 \text{ }^{\circ}\text{C}$

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



 $f = 1 \text{ MHz}; T_{amb} = 25 \text{ }^{\circ}\text{C}$

function of collector-base voltage; typical values

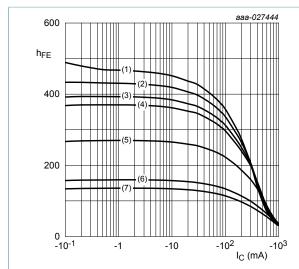


 $f = 100 \text{ MHz}; T_{amb} = 25 ^{\circ}\text{C}$

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

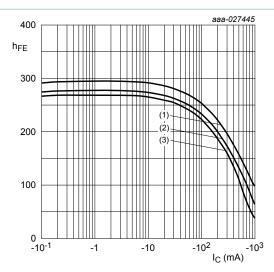
(3)
$$T_{amb}$$
 = 100 °C

(5)
$$T_{amb}$$
 = 25 °C

(6)
$$T_{amb} = -40 \, ^{\circ}C$$

(7) $T_{amb} = -55$ °C

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



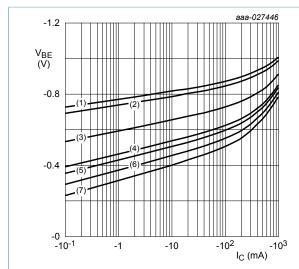
 $T_{amb} = 25 \, ^{\circ}C$

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

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

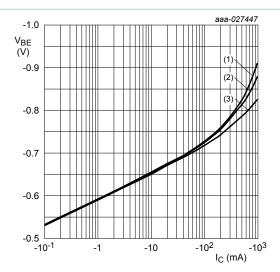
(4) $T_{amb} = 85 \, ^{\circ}C$

(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



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

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

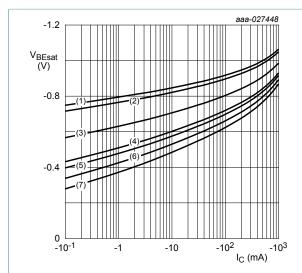
(2) $V_{CE} = -2 V$

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

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

aaa-027449

45 V, 500 mA PNP general-purpose transistors



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

(1)
$$T_{amb} = -55$$
 °C

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

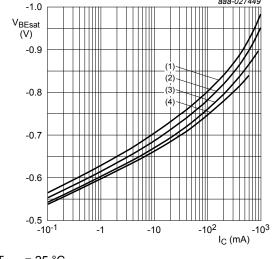
(3)
$$T_{amb} = 25 \, ^{\circ}C$$

(4)
$$T_{amb}$$
 = 85 °C

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

(6)
$$T_{amb}$$
 = 125 °C

$$(7) T_{amb} = 150 °C$$



T_{amb} = 25 °C

(1)
$$I_C/I_B = 10$$

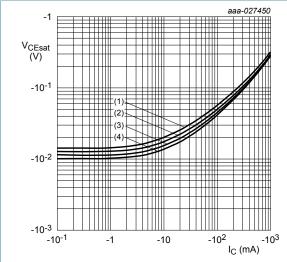
(2)
$$I_C/I_B = 20$$

(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





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

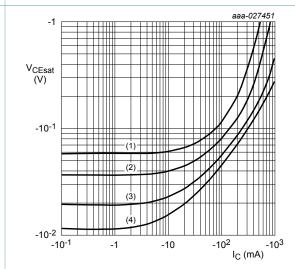
$$(1) T_{amb} = 150 °C$$

(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



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

$$(1) I_{\rm C}/I_{\rm B} = 100$$

(2)
$$I_C/I_B = 50$$

(3)
$$I_C/I_B = 20$$

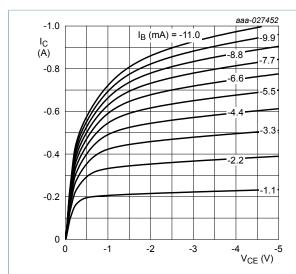
(4)
$$I_C/I_B = 10$$

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

BC807K_SER

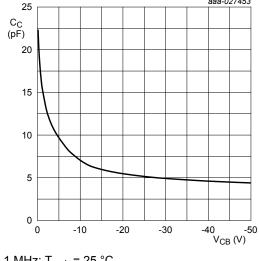
aaa-027453

45 V, 500 mA PNP general-purpose transistors



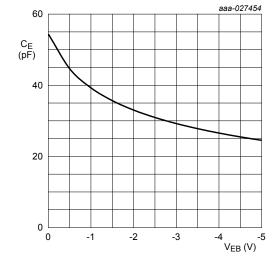
 $T_{amb} = 25 \, ^{\circ}C$

Figure 27. BC807K-25: Collector current as a function of Figure 28. BC807K-25: Collector capacitance as a collector-emitter voltage; typical values



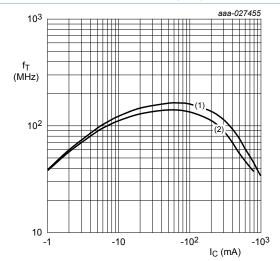
 $f = 1 \text{ MHz}; T_{amb} = 25 \text{ }^{\circ}\text{C}$

function of collector-base voltage; typical values



 $f = 1 \text{ MHz}; T_{amb} = 25 \text{ }^{\circ}\text{C}$

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

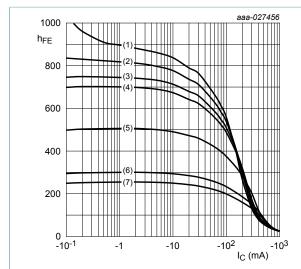


 $f = 100 \text{ MHz}; T_{amb} = 25 ^{\circ}\text{C}$

(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

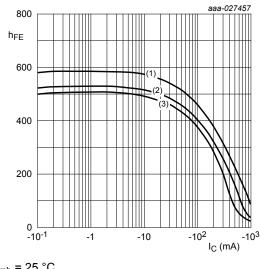
(3) T_{amb} = 100 °C

(4) T_{amb} = 85 °C

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

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

 $(7) T_{amb} = -55 °C$



 T_{amb} = 25 °C

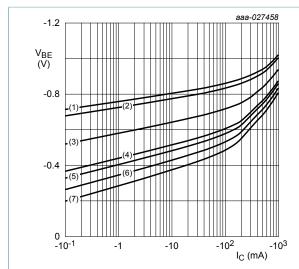
(1) $V_{CE} = -5 V$

(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

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



 $V_{CE} = -1 V$

(1) $T_{amb} = -55$ °C

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

(3) T_{amb} = 25 °C

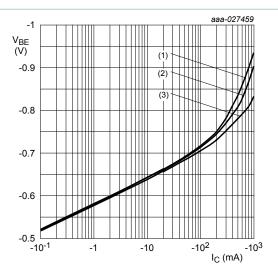
(4) T_{amb} = 85 °C

(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



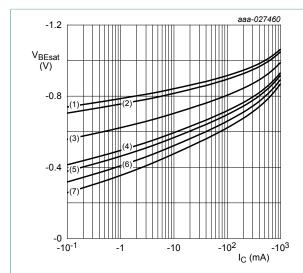
 $T_{amb} = 25 \, ^{\circ}C$

(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



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

(1)
$$T_{amb} = -55$$
 °C

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

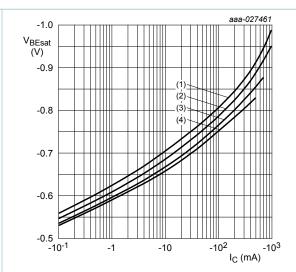
(3)
$$T_{amb} = 25 \, ^{\circ}C$$

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

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

$$(7) T_{amb} = 150 °C$$

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



T_{amb} = 25 °C

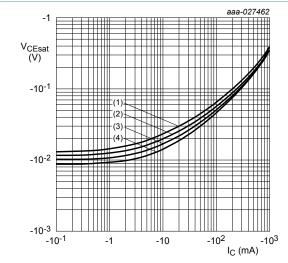
(1)
$$I_C/I_B = 10$$

(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



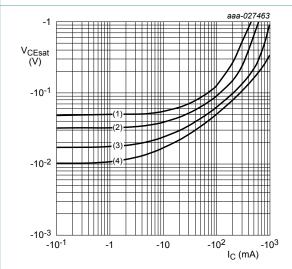
 $I_{\rm C}/I_{\rm B} = 10$

(2)
$$T_{amb} = 85 \, ^{\circ}C$$

(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



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

(1)
$$I_C/I_B = 100$$

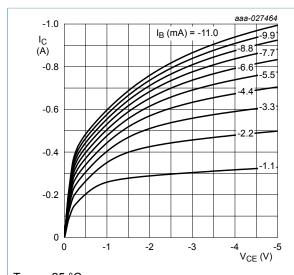
(2)
$$I_C/I_B = 50$$

(3)
$$I_C/I_B = 20$$

$$(4) I_{\rm C}/I_{\rm B} = 10$$

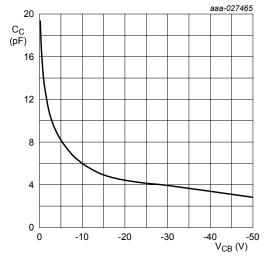
Figure 38. BC807K-40: Collector-emitter saturation voltage as a function of collector current; typical values

BC807K_SER



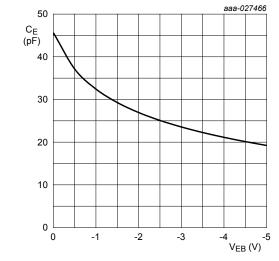
 $T_{amb} = 25 \, ^{\circ}C$

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



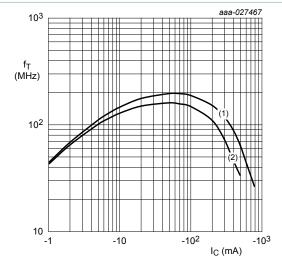
 $f = 1 \text{ MHz}; T_{amb} = 25 ^{\circ}\text{C}$

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



 $f = 100 \text{ MHz}; T_{amb} = 25 ^{\circ}\text{C}$

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

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

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

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.

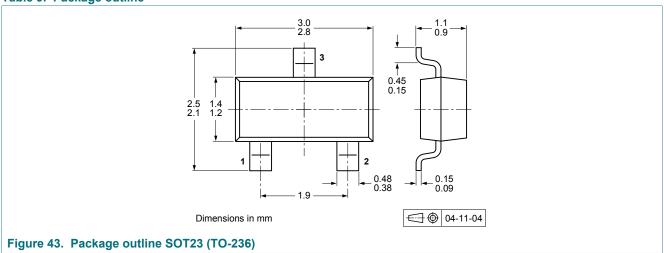
BC807K_SER

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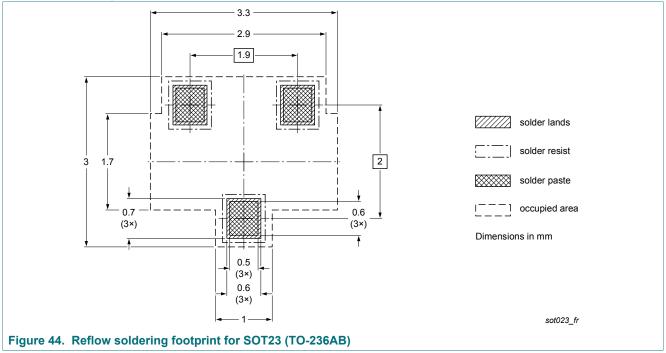
9 Package outline

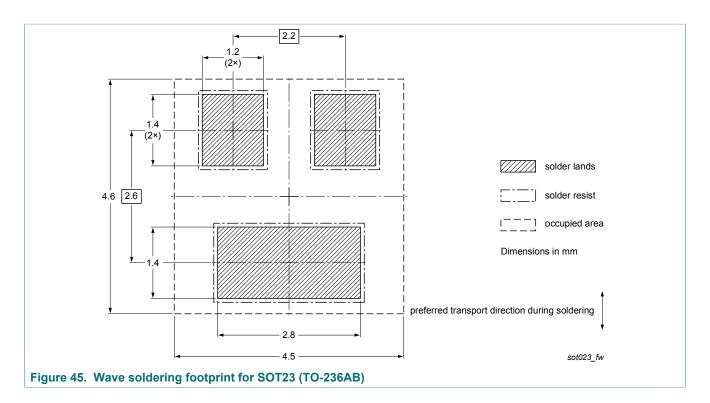
Table 9. Package outline



10 Soldering

Table 10. Soldering





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.

- Please consult the most recently issued document before initiating or completing a design.
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BC807K series

45 V, 500 mA PNP general-purpose transistors

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Офис по работе с юридическими лицами:

105318, г. Москва, ул. Щербаковская д. 3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru moschip.ru_6 moschip.ru_4 moschip.ru_9