



# BC807QB series

45 V, 500 mA PNP general-purpose transistors

Rev. 1 — 10 December 2020

Product data sheet

## 1. General description

PNP general-purpose transistor in an ultra small DFN1110D-3 (SOT8015) leadless Surface-Mounted Device (SMD) plastic package with side-wettable flanks.

Table 1. Product overview

Type number	Package			NPN complement
	Name	JEDEC	Version	
BC807-16QB	DFN1110D-3	MO340-BA	SOT8015	BC817-16QB
BC807-25QB				BC817-25QB
BC807-40QB				BC817-40QB

## 2. Features and benefits

- High power dissipation capability
- High current
- Three current gain selections
- Suitable for Automatic Optical Inspection (AOI) of solder joint
- Smaller footprint compared to conventional leaded SMD packages
- Low package height of 0.5 mm
- AEC-Q101 qualified

## 3. Applications

- General-purpose switching and amplification
- Space restricted applications

## 4. Quick reference data

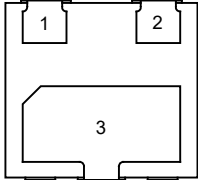
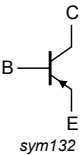
Table 2. Quick reference data

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					
	BC807-16QB	$V_{CE} = -1\text{ V}$ ; $I_C = -100\text{ mA}$ $T_{amb} = 25\text{ °C}$	[1]	100	-	250
	BC807-25QB		[1]	160	-	400
	BC807-40QB		[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	 <p>DFN1110D-3 (SOT8015)</p>	 <p>sym132</p>
2	E	emitter		
3	C	collector		

## 6. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
BC807-16QB	DFN1110D-3	DFN1110D-3: plastic thermal enhanced ultra thin small outline package; no leads; 3 terminals; body: 1.1 x 1.0 x 0.5 mm	SOT8015 (MO340-BA)
BC807-25QB			
BC807-40QB			

## 7. Marking

Table 5. Marking

Type number	Marking code
BC807-16QB	A8
BC807-25QB	A9
BC807-40QB	B2

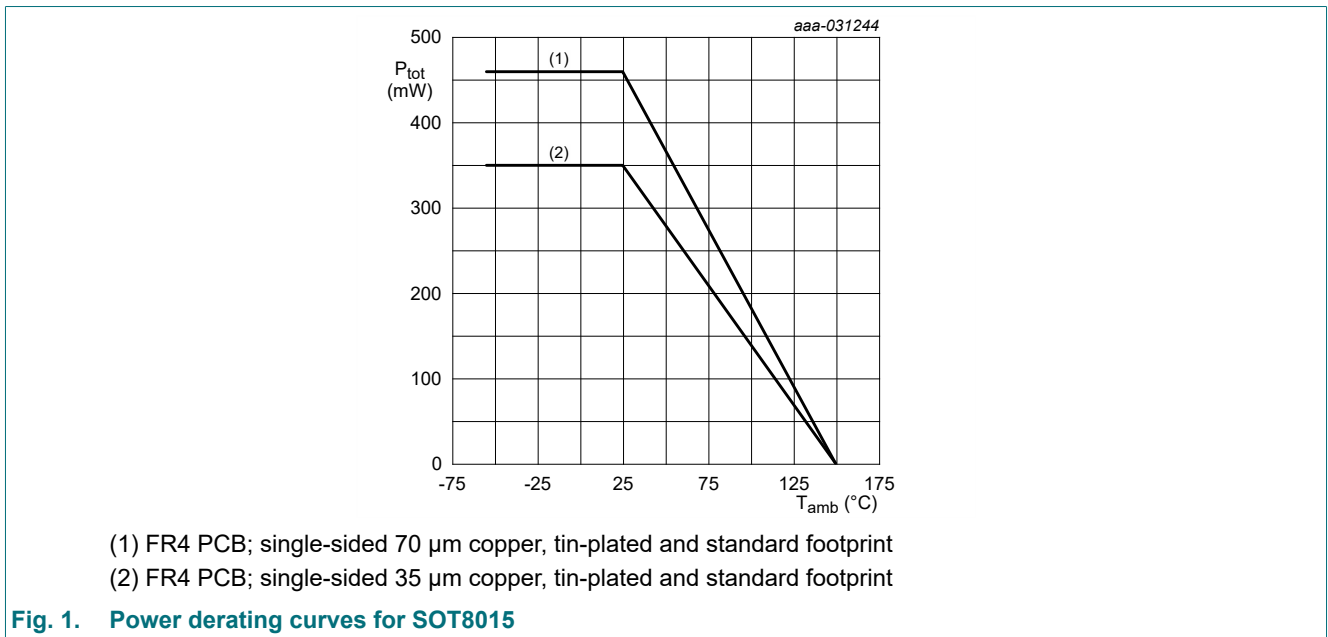
## 8. Limiting values

**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; $T_{amb} = 25\text{ °C}$	-	-50	V
$V_{CEO}$	collector-emitter voltage	open base; $T_{amb} = 25\text{ °C}$	-	-45	V
$V_{EBO}$	emitter-base voltage	open collector; $T_{amb} = 25\text{ °C}$	-	-5	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
$I_{BM}$	peak base current	single pulse; $t_p \leq 1\text{ ms}$ ; $T_{amb} = 25\text{ °C}$	-	-200	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[1]	350	mW
			[2]	460	mW
$T_j$	junction temperature		-	150	°C
$T_{amb}$	ambient temperature		-55	150	°C
$T_{stg}$	storage temperature		-65	150	°C

- [1] Device mounted on an FR4 PCB, single-sided 35  $\mu\text{m}$  copper, tin-plated and standard footprint.
- [2] Device mounted on an FR4 PCB, single-sided 70  $\mu\text{m}$  copper, tin-plated and standard footprint.



## 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; $T_{amb} = 25\text{ °C}$	[1]	-	-	358	K/W
			[2]	-	-	272	K/W

- [1] Device mounted on an FR4 PCB, single-sided 35  $\mu\text{m}$  copper, tin-plated and standard footprint.
- [2] Device mounted on an FR4 PCB, single-sided 70  $\mu\text{m}$  copper, tin-plated and standard footprint.

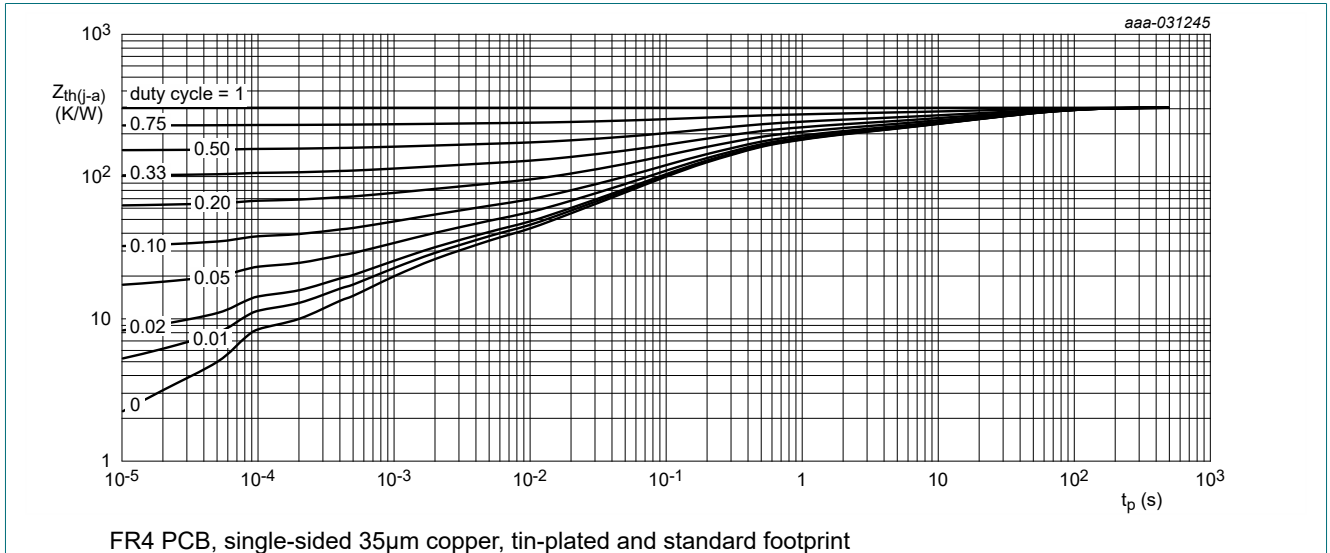


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

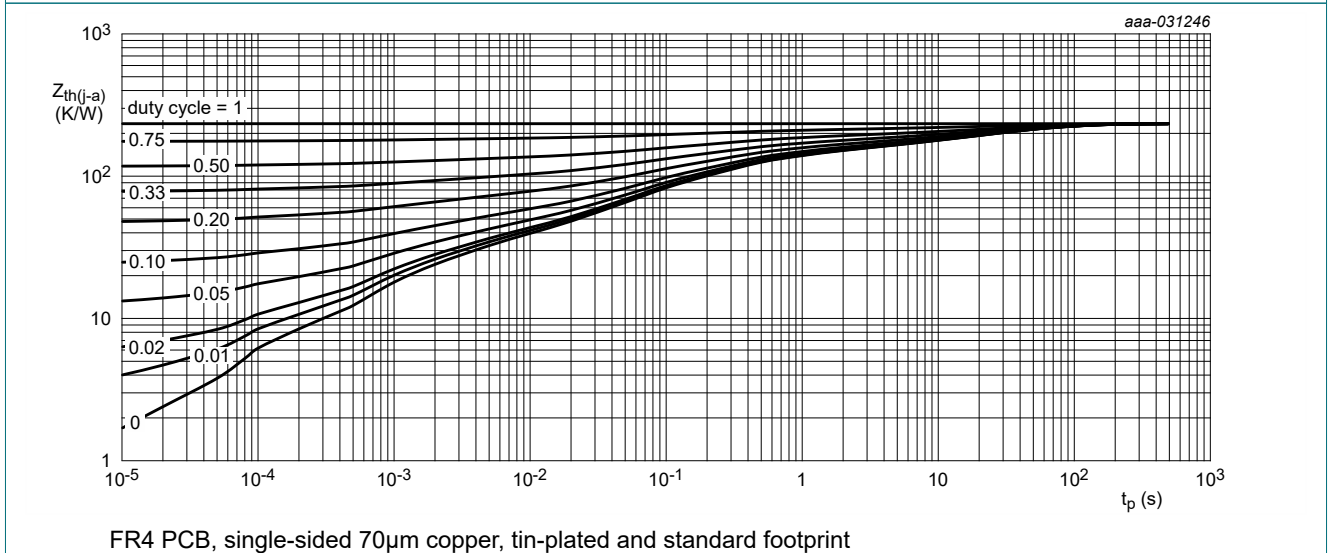


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

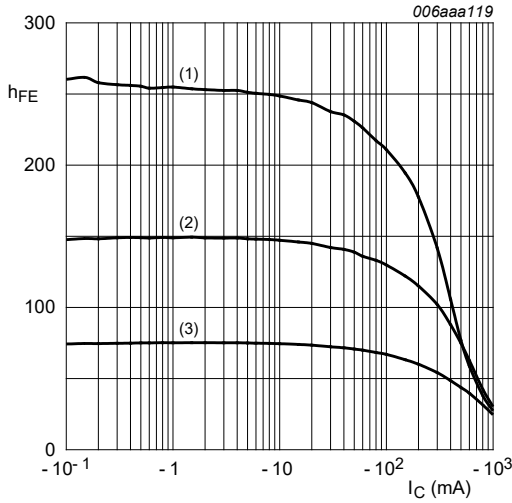
## 10. Characteristics

**Table 8. Characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = -100 \mu\text{A}$ ; $I_E = 0 \text{ A}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-50	-		V	
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = -10 \text{ mA}$ ; $I_E = 0 \text{ A}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-45	-		V	
$V_{(BR)EBO}$	emitter-base breakdown voltage	$I_E = -100 \mu\text{A}$ ; $I_C = 0 \text{ A}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-5	-		V	
$I_{CBO}$	collector-base cut-off current	$V_{CB} = -20 \text{ V}$ ; $I_E = 0 \text{ A}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	-100	nA	
		$V_{CB} = -20 \text{ V}$ ; $I_E = 0 \text{ A}$ ; $T_j = 150 \text{ }^\circ\text{C}$	-	-	-5	$\mu\text{A}$	
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = -5 \text{ V}$ ; $I_C = 0 \text{ A}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	-100	nA	
$h_{FE}$	DC current gain						
	BC807-16QB	$V_{CE} = -1 \text{ V}$ ; $I_C = -100 \text{ mA}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1]	100	-	250	
	BC807-25QB		[1]	160	-	400	
	BC807-40QB		[1]	250	-	600	
	$V_{CE} = -1 \text{ V}$ ; $I_C = -500 \text{ mA}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1]	40	-	-		
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = -500 \text{ mA}$ ; $I_B = -50 \text{ mA}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1]	-	-	-700	mV
$V_{BE}$	base-emitter voltage	$V_{CE} = -1 \text{ V}$ ; $I_C = -500 \text{ mA}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1] [2]	-	-	-1.2	V
$f_T$	transition frequency	$V_{CE} = -5 \text{ V}$ ; $I_C = -10 \text{ mA}$ ; $f = 100 \text{ MHz}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	80	-	-		MHz
$C_c$	collector capacitance	$V_{CB} = -10 \text{ V}$ ; $I_E = I_e = 0 \text{ A}$ ; $f = 1 \text{ MHz}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	5	-		pF

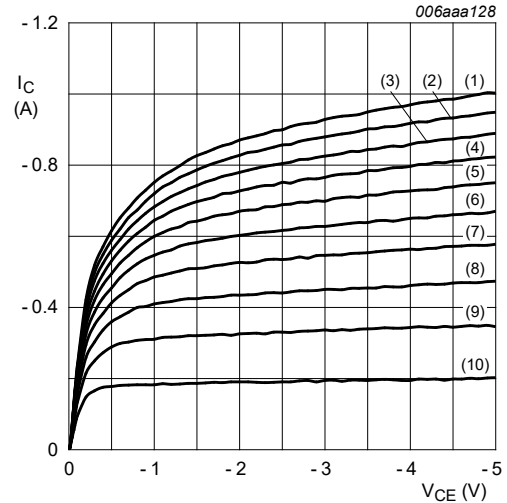
[1] pulsed;  $t_p \leq 300 \mu\text{s}$ ;  $\delta \leq 0.02$

[2]  $V_{BE}$  decreases by about 2 mV/K with increasing temperature.



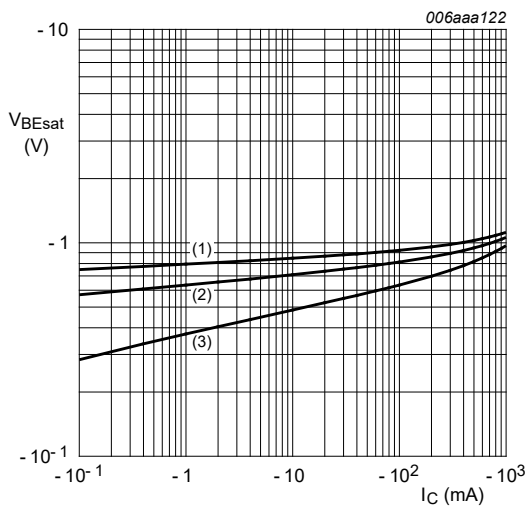
$V_{CE} = -1\text{ V}$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

Fig. 4. BC807-16QB: DC current gain as a function of collector current; typical values



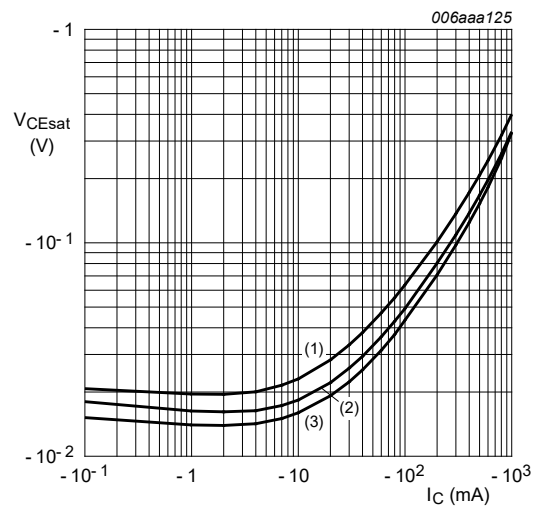
$T_{amb} = 25\text{ °C}$   
 (1)  $I_B = -16.0\text{ mA}$   
 (2)  $I_B = -14.4\text{ mA}$   
 (3)  $I_B = -12.8\text{ mA}$   
 (4)  $I_B = -11.2\text{ mA}$   
 (5)  $I_B = -9.6\text{ mA}$   
 (6)  $I_B = -8.0\text{ mA}$   
 (7)  $I_B = -6.4\text{ mA}$   
 (8)  $I_B = -4.8\text{ mA}$   
 (9)  $I_B = -3.2\text{ mA}$   
 (10)  $I_B = -1.6\text{ mA}$

Fig. 5. BC807-16QB: Collector current as a function of collector-emitter voltage; typical values



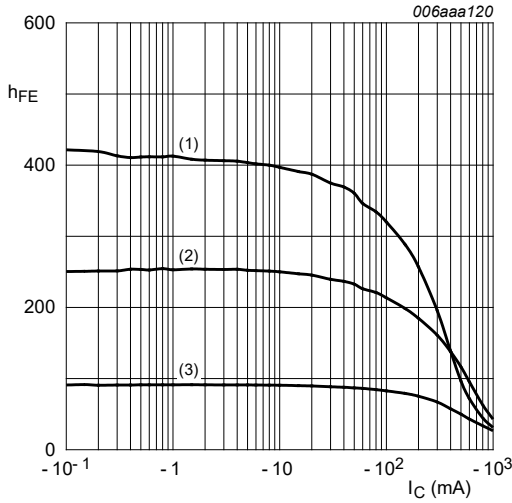
$I_C/I_B = 10$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 150\text{ °C}$

Fig. 6. BC807-16QB: Base-emitter saturation voltage as a function of collector current; typical values



$I_C/I_B = 10$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

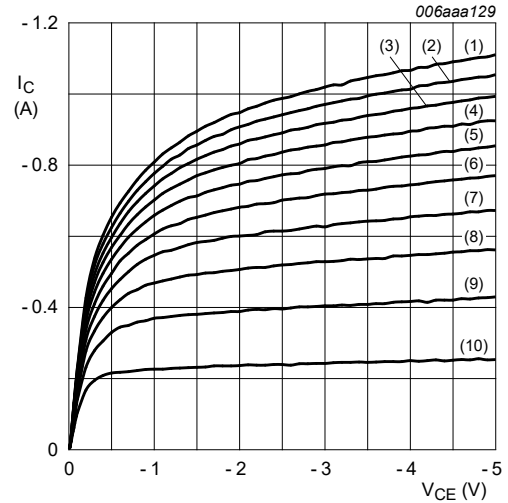
Fig. 7. BC807-16QB: Collector-emitter saturation voltage as a function of collector current; typical values



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

- (1)  $T_{amb} = 150\text{ }^{\circ}\text{C}$
- (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$
- (3)  $T_{amb} = -55\text{ }^{\circ}\text{C}$

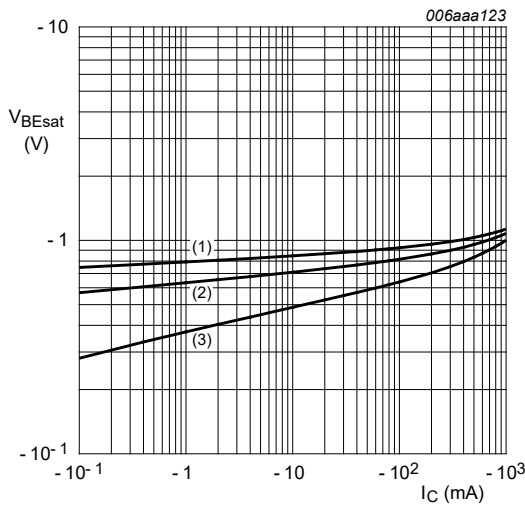
**Fig. 8. BC807-25QB: DC current gain as a function of collector current; typical values**



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

- (1)  $I_B = -13.0\text{ mA}$
- (2)  $I_B = -11.7\text{ mA}$
- (3)  $I_B = -10.4\text{ mA}$
- (4)  $I_B = -9.1\text{ mA}$
- (5)  $I_B = -7.8\text{ mA}$
- (6)  $I_B = -6.5\text{ mA}$
- (7)  $I_B = -5.2\text{ mA}$
- (8)  $I_B = -3.9\text{ mA}$
- (9)  $I_B = -2.6\text{ mA}$
- (10)  $I_B = -1.3\text{ mA}$

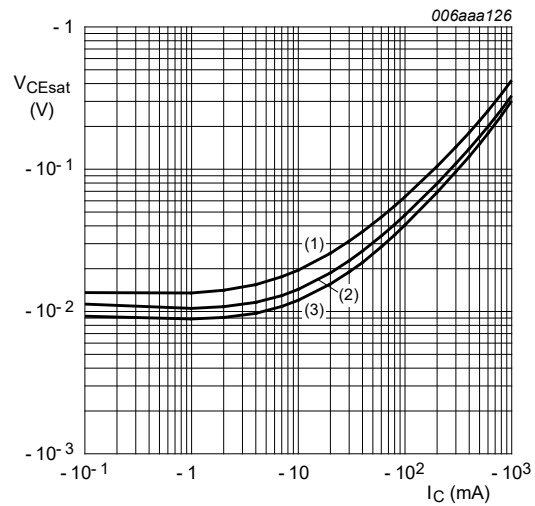
**Fig. 9. BC807-25QB: Collector current as a function of collector-emitter voltage; typical values**



$I_C/I_B = 10$

- (1)  $T_{amb} = -55\text{ }^{\circ}\text{C}$
- (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$
- (3)  $T_{amb} = 150\text{ }^{\circ}\text{C}$

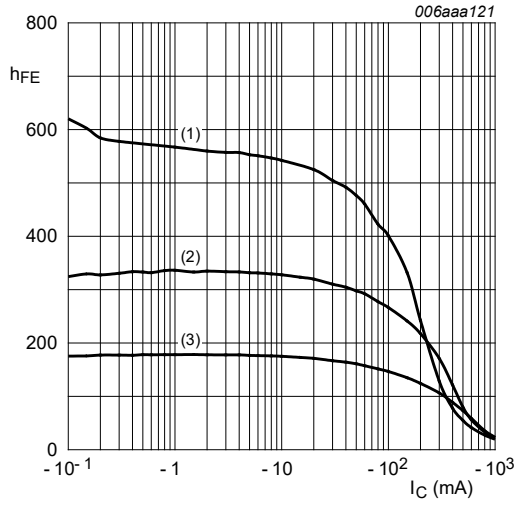
**Fig. 10. BC807-25QB: Base-emitter saturation voltage as a function of collector current; typical values**



$I_C/I_B = 10$

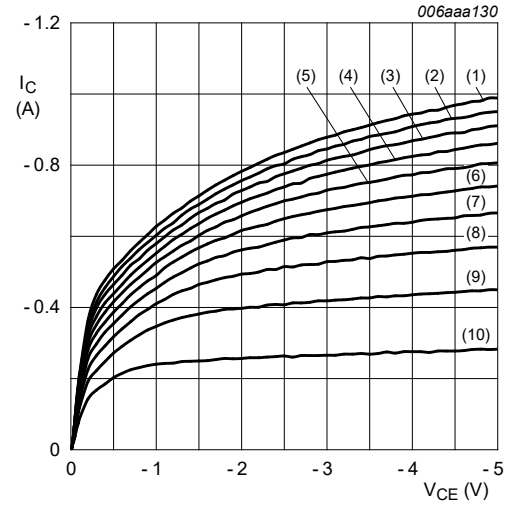
- (1)  $T_{amb} = 150\text{ }^{\circ}\text{C}$
- (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$
- (3)  $T_{amb} = -55\text{ }^{\circ}\text{C}$

**Fig. 11. BC807-25QB: Collector-emitter saturation voltage as a function of collector current; typical values**



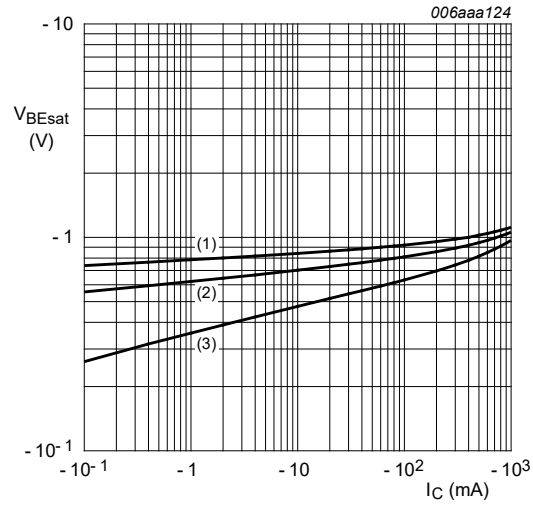
$V_{CE} = -1\text{ V}$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

Fig. 12. BC807-40QB: DC current gain as a function of collector current; typical values



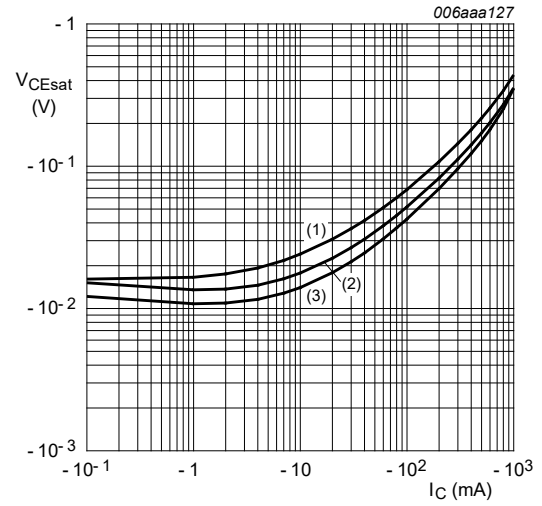
$T_{amb} = 25\text{ °C}$   
 (1)  $I_B = -12.0\text{ mA}$   
 (2)  $I_B = -10.8\text{ mA}$   
 (3)  $I_B = -9.6\text{ mA}$   
 (4)  $I_B = -8.4\text{ mA}$   
 (5)  $I_B = -7.2\text{ mA}$   
 (6)  $I_B = -6.0\text{ mA}$   
 (7)  $I_B = -4.8\text{ mA}$   
 (8)  $I_B = -3.6\text{ mA}$   
 (9)  $I_B = -2.4\text{ mA}$   
 (10)  $I_B = -1.2\text{ mA}$

Fig. 13. BC807-40QB: Collector current as a function of collector-emitter voltage; typical values



$I_C/I_B = 10$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 150\text{ °C}$

Fig. 14. BC807-40QB: Base-emitter saturation voltage as a function of collector current; typical values



$I_C/I_B = 10$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

Fig. 15. BC807-40QB: Collector-emitter saturation voltage as a function of collector current; typical values



## 11. Test information

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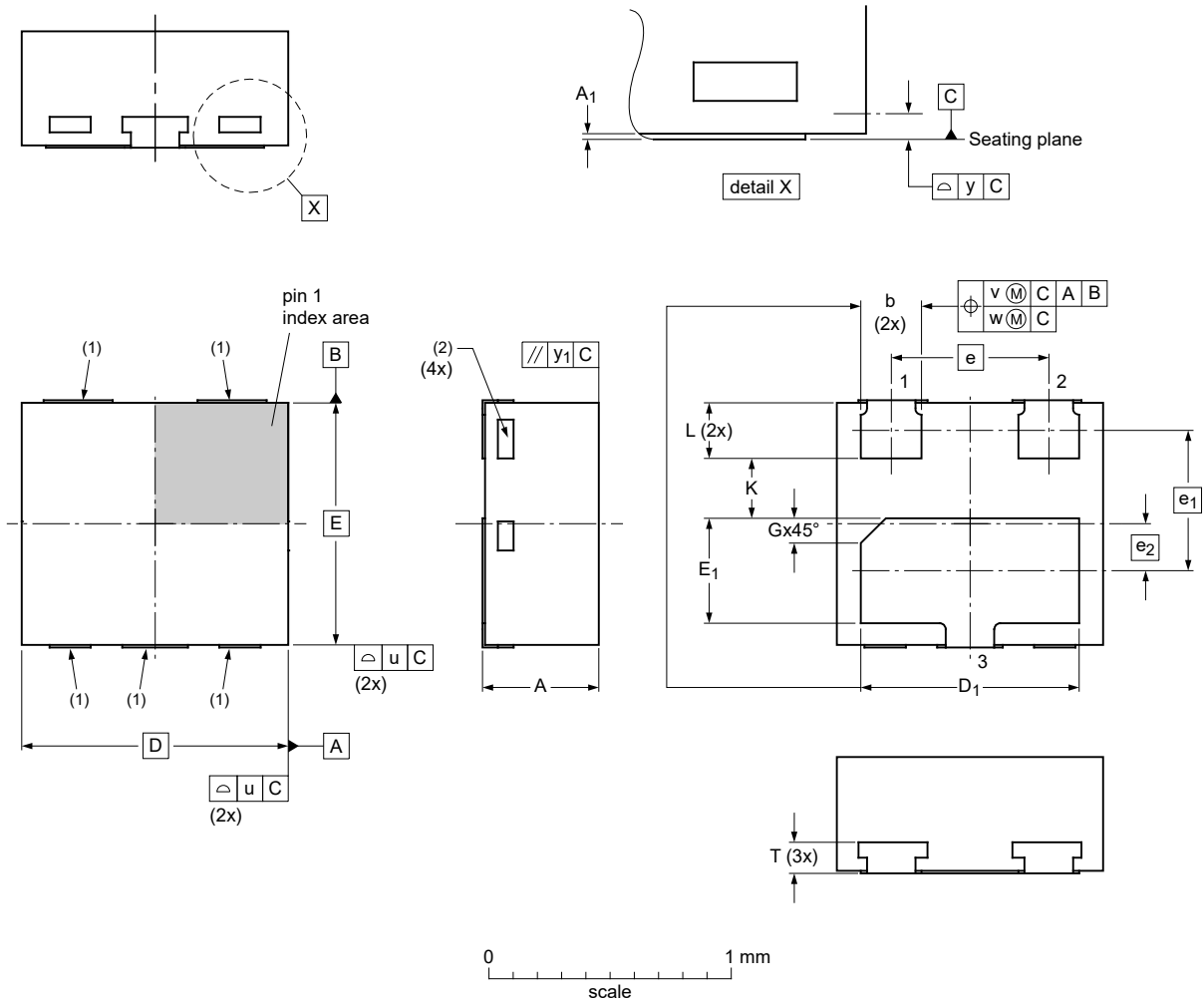
### 11.1. Quality information

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

DFN1110D-3: plastic, leadless extremely thin small outline package with side-wettable flanks (SWF); 3 terminals; 0.65 mm pitch; 1.1 mm x 1 mm x 0.48 mm body

SOT8015



Dimensions (mm are the original dimensions)

Unit	A	A <sub>1</sub>	b	D	D <sub>1</sub>	E	E <sub>1</sub>	e	e <sub>1</sub>	e <sub>2</sub>	G	K	L	T	u	v	w	y	y <sub>1</sub>
max	0.50	0.040	0.30		0.95		0.48						0.27	0.22					
nom	0.47	0.020	0.25	1.1	0.90	1	0.43	0.65	0.58	0.19	0.09 (ref)		0.23	0.16	0.05	0.1	0.05	0.05	0.05
min	0.44	0.005	0.22		0.87		0.40					0.2	0.20	0.10					

Note

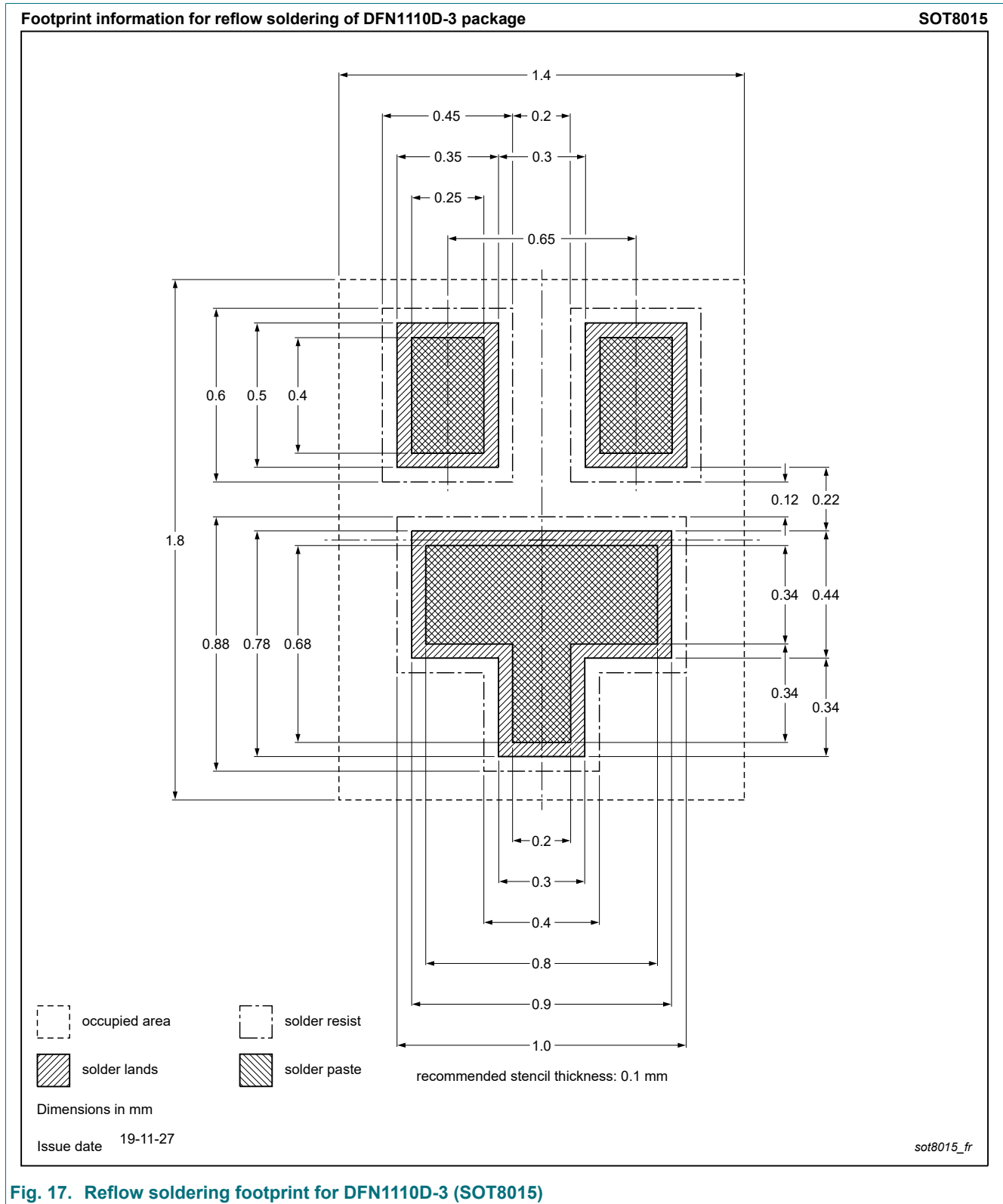
- 1. Side Wettable Flank, protrusion max. 0.02 mm.
  - 2. Visible depend upon used manufacturing technology.
- Dimension A and T are including plating thickness.

sot8015\_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT8015		MO-340BA				19-12-02 19-12-04

Fig. 16. Package outline DFN1110D-3 (SOT8015)

### 13. Soldering



**Fig. 17. Reflow soldering footprint for DFN1110D-3 (SOT8015)**

## 14. Revision history

**Table 9. Revision history**

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BC807QB_SER v.1	20201210	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.

- [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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