



# BC807QCH-Q series

45 V, 500 mA PNP general-purpose transistors

Rev. 1 — 25 January 2022

Product data sheet

## 1. General description

PNP general-purpose transistor in an ultra small DFN1412D-3 (SOT8009) leadless Surface-Mounted Device (SMD) plastic package with side-wettable flanks.

Table 1. Product overview

Type number	Package			NPN complement
	Name	JEDEC	Version	
BC807-16QCH-Q	DFN1412D-3	MO-340CA	SOT8009	BC817-16QCH-Q
BC807-25QCH-Q				BC817-25QCH-Q
BC807-40QCH-Q				BC817-40QCH-Q

## 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
- 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
- Space restricted applications

## 4. Quick reference data

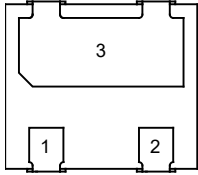
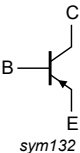
Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{CEO}$	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					
	BC807-16QCH-Q	$V_{CE} = -1\text{ V}$ ; $I_C = -100\text{ mA}$ $T_{amb} = 25\text{ °C}$ [1]	100	-	250	
	BC807-25QCH-Q		160	-	400	
	BC807-40QCH-Q		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>Transparent top view <b>DFN1412D-3</b> <b>(SOT8009)</b></p>	 <p>sym132</p>
2	E	emitter		
3	C	collector		

## 6. Ordering information

Table 4. Ordering information

Type number	Package		Version
	Name	Description	
BC807-16QCH-Q	DFN1412D-3	DFN1412D-3: plastic thermal enhanced ultra thin small outline package; no leads; 3 terminals; body: 1.4 x 1.2 x 0.5 mm	SOT8009 (MO-340CA)
BC807-25QCH-Q			
BC807-40QCH-Q			

## 7. Marking

Table 5. Marking

Type number	Marking code
BC807-16QCH-Q	8S
BC807-25QCH-Q	8T
BC807-40QCH-Q	8U

## 8. Limiting values

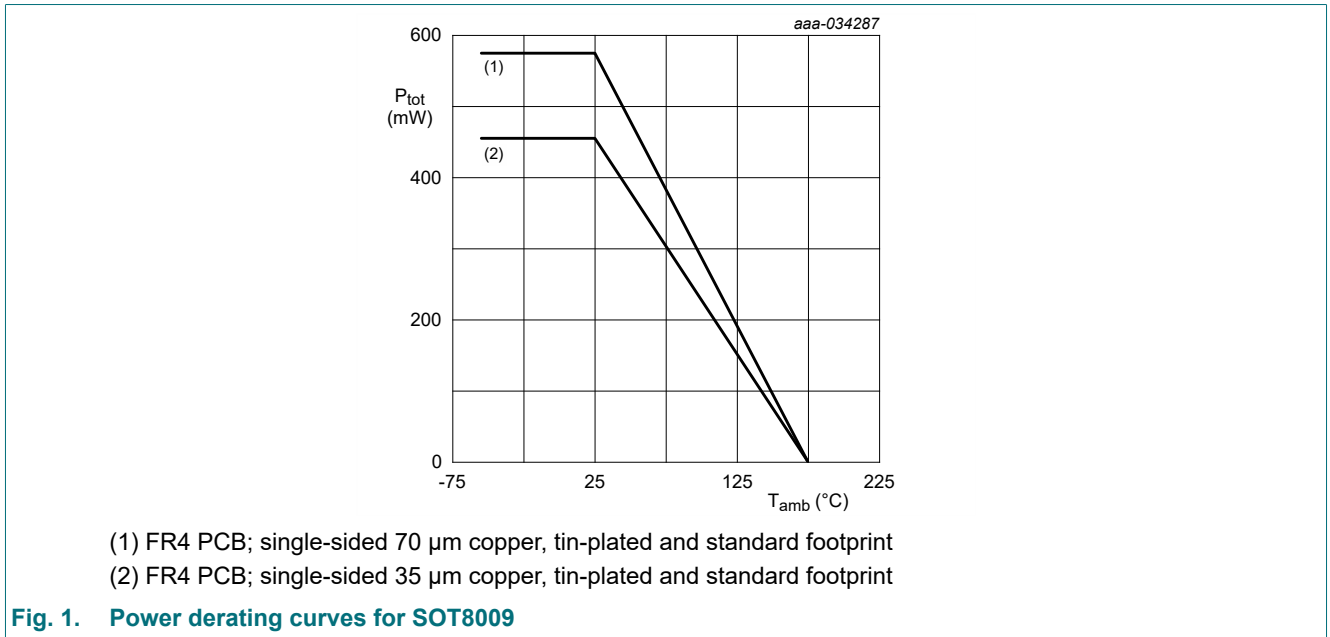
**Table 6. Limiting values**

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]	455	mW
			[2]	575	mW
$T_j$	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 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]	-	-	329	K/W
			[2]	-	-	261	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.

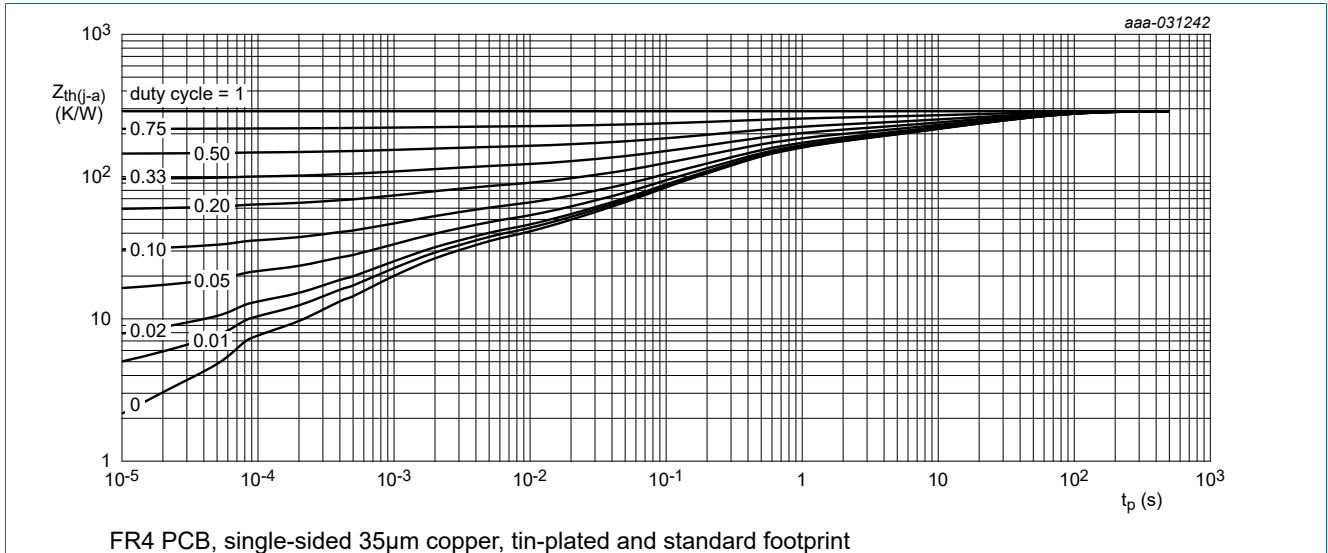


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

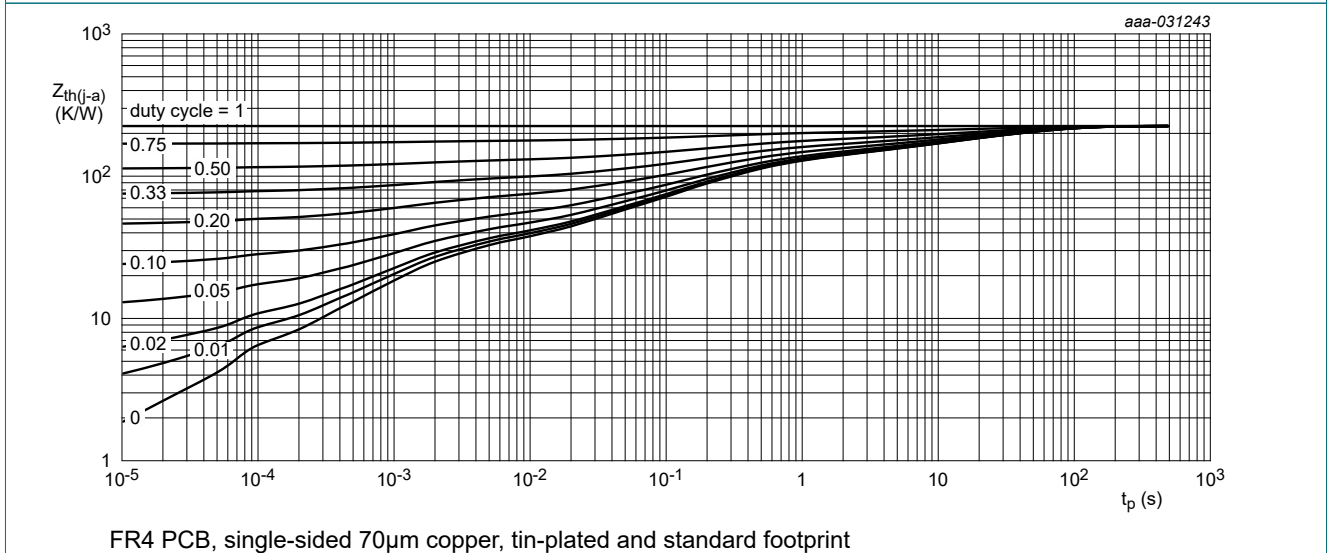


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

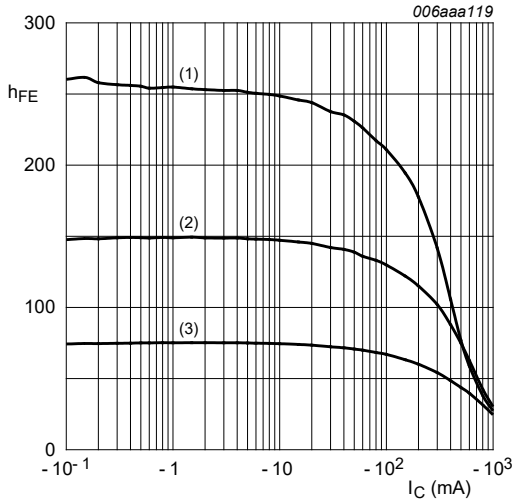
## 10. Characteristics

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						
	BC807-16QCH-Q	$V_{CE} = -1 \text{ V}; I_C = -100 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1]	100	-	250	
	BC807-25QCH-Q			160	-	400	
	BC807-40QCH-Q			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	$V_{CB} = -10 \text{ V}; I_E = I_C = 0 \text{ A}; f = 1 \text{ MHz}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	5	-	pF	

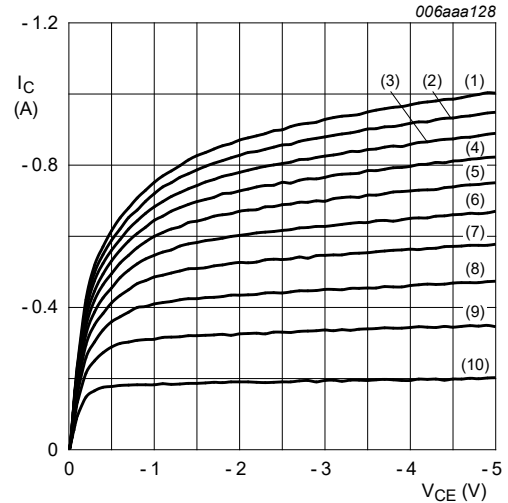
[1] pulsed;  $t_p \leq 300 \mu\text{s}$ ;  $\delta \leq 0.02$

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



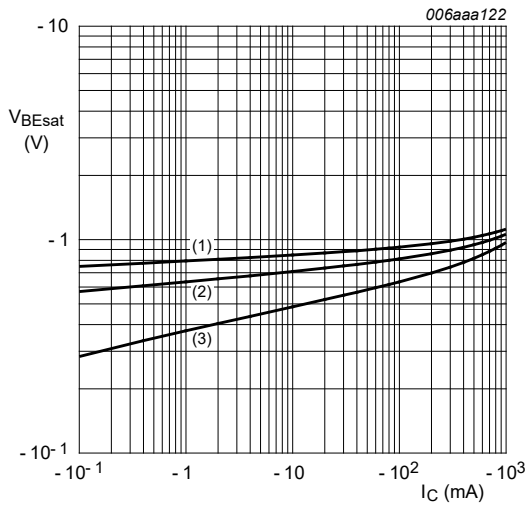
$V_{CE} = -1\text{ V}$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

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



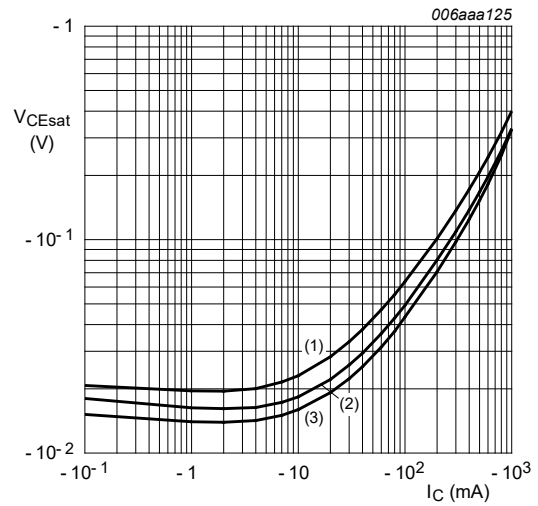
$T_{amb} = 25\text{ °C}$   
 (1)  $I_B = -16.0\text{ mA}$   
 (2)  $I_B = -14.4\text{ mA}$   
 (3)  $I_B = -12.8\text{ mA}$   
 (4)  $I_B = -11.2\text{ mA}$   
 (5)  $I_B = -9.6\text{ mA}$   
 (6)  $I_B = -8.0\text{ mA}$   
 (7)  $I_B = -6.4\text{ mA}$   
 (8)  $I_B = -4.8\text{ mA}$   
 (9)  $I_B =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

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



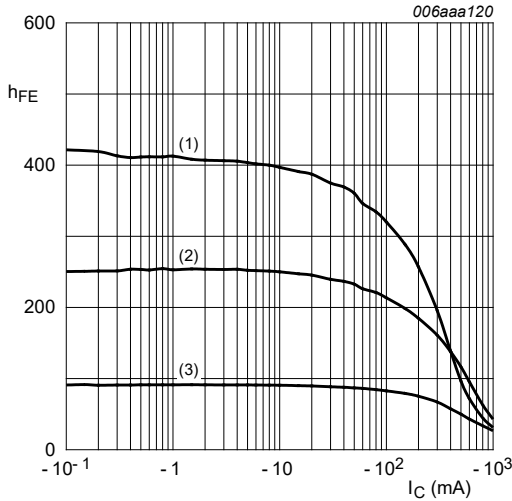
$I_C/I_B = 10$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 150\text{ °C}$

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



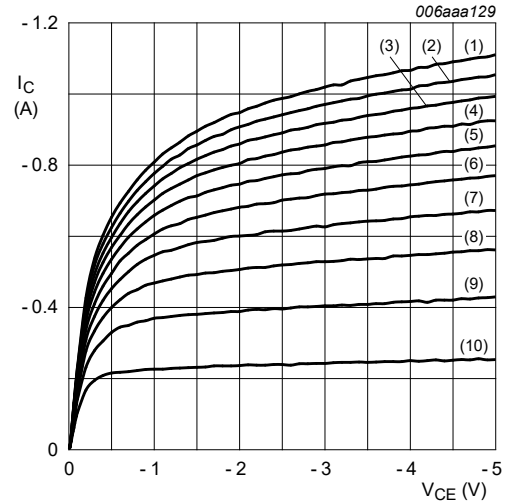
$I_C/I_B = 10$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

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



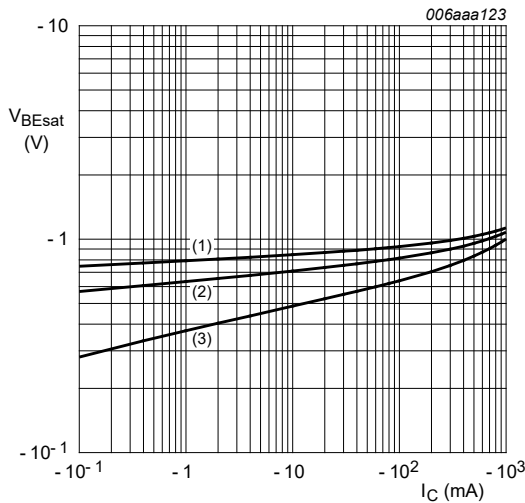
$V_{CE} = -1\text{ V}$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

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



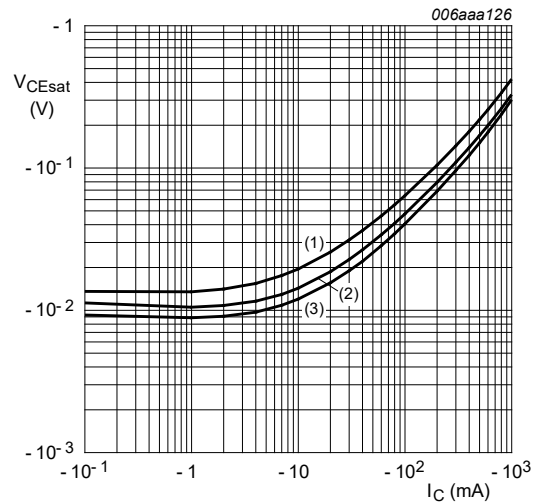
$T_{amb} = 25\text{ °C}$   
 (1)  $I_B = -13.0\text{ mA}$   
 (2)  $I_B = -11.7\text{ mA}$   
 (3)  $I_B = -10.4\text{ mA}$   
 (4)  $I_B = -9.1\text{ mA}$   
 (5)  $I_B = -7.8\text{ mA}$   
 (6)  $I_B = -6.5\text{ mA}$   
 (7)  $I_B = -5.2\text{ mA}$   
 (8)  $I_B = -3.9\text{ mA}$   
 (9)  $I_B = -2.6\text{ mA}$   
 (10)  $I_B = -1.3\text{ mA}$

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



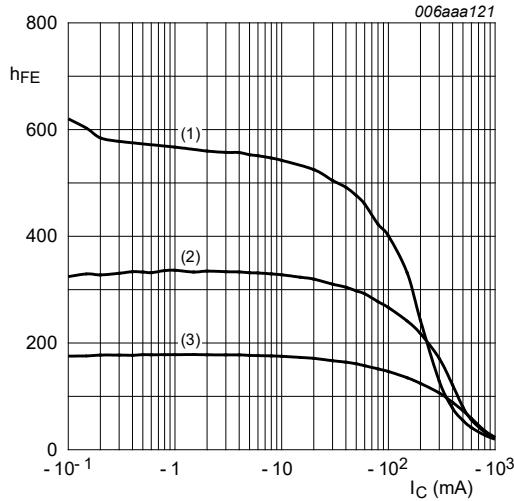
$I_C/I_B = 10$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 150\text{ °C}$

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



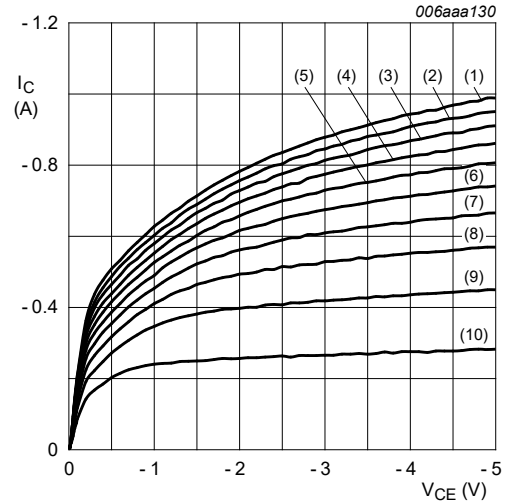
$I_C/I_B = 10$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

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



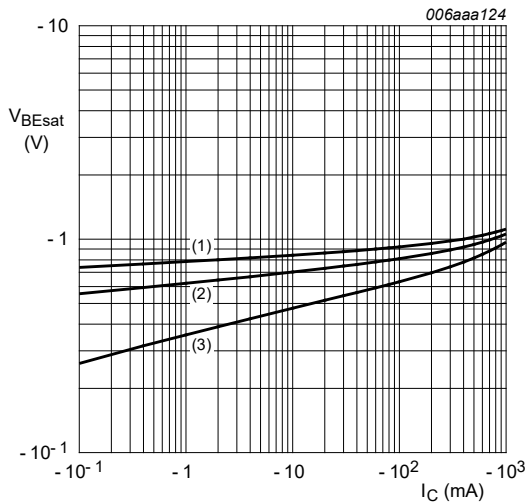
$V_{CE} = -1\text{ V}$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

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



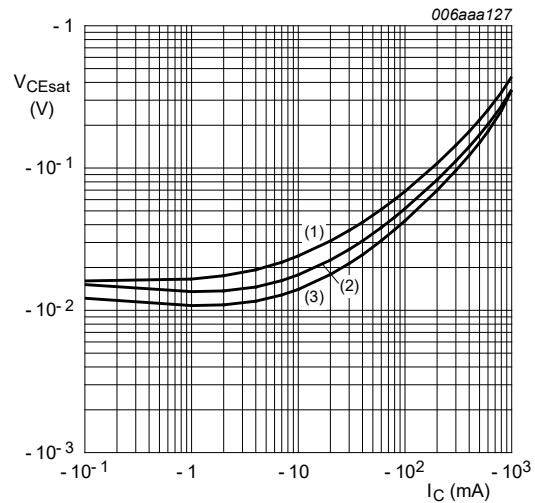
$T_{amb} = 25\text{ °C}$   
 (1)  $I_B = -12.0\text{ mA}$   
 (2)  $I_B = -10.8\text{ mA}$   
 (3)  $I_B = -9.6\text{ mA}$   
 (4)  $I_B = -8.4\text{ mA}$   
 (5)  $I_B = -7.2\text{ mA}$   
 (6)  $I_B = -6.0\text{ mA}$   
 (7)  $I_B = -4.8\text{ mA}$   
 (8)  $I_B = -3.6\text{ mA}$   
 (9)  $I_B = -2.4\text{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

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



## 11. Test information

### 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

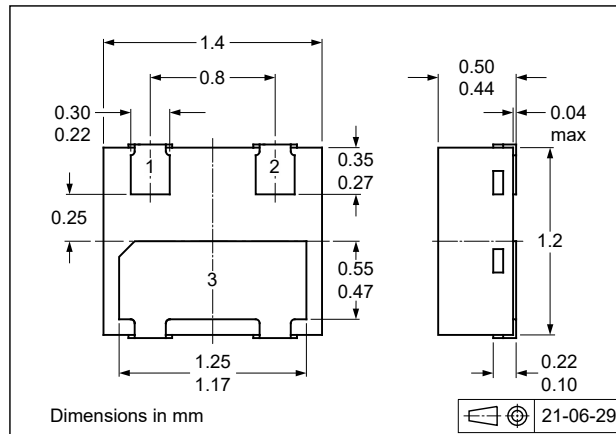
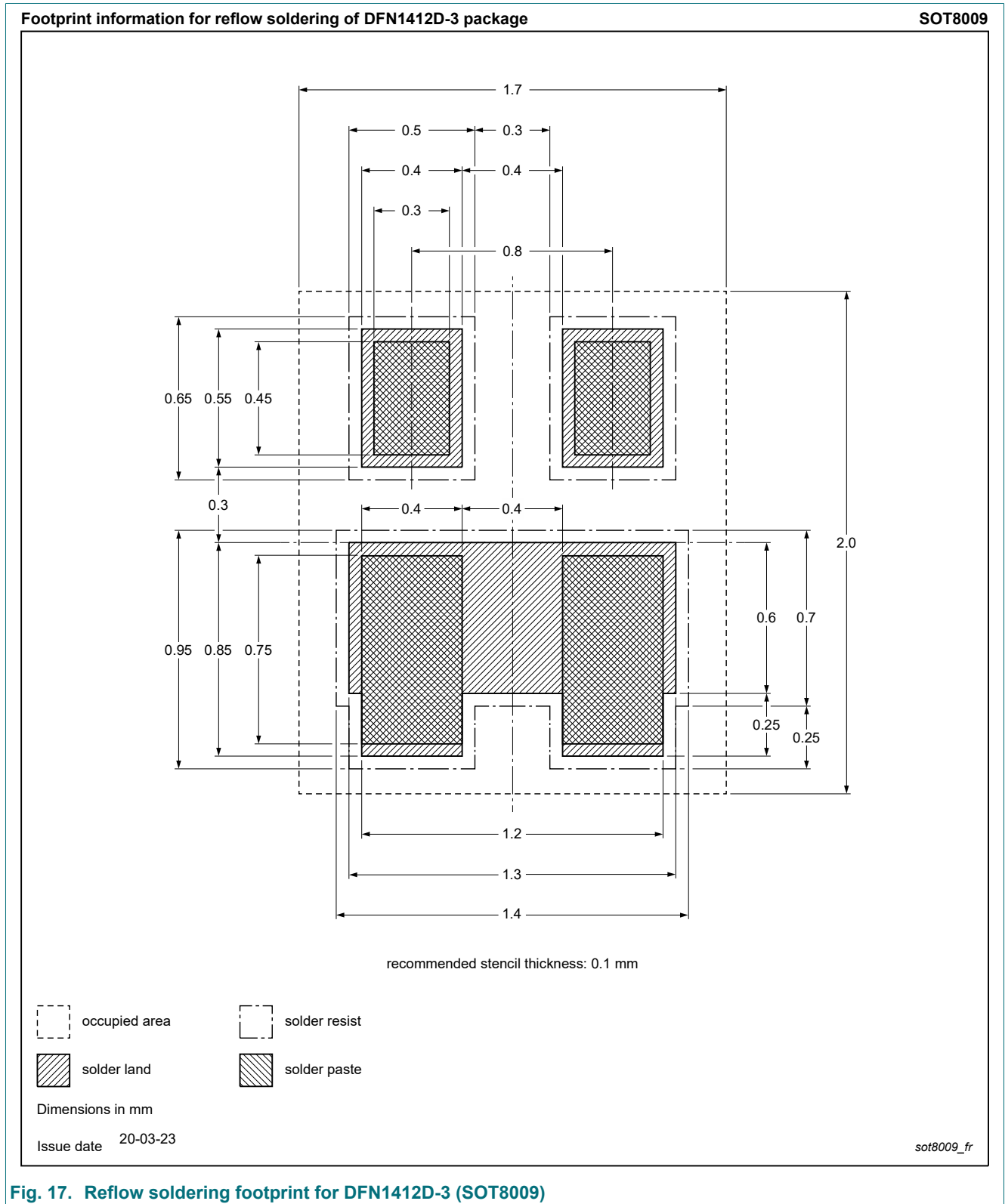


Fig. 16. Package outline DFN1412D-3 (SOT8009)

### 13. Soldering



**Fig. 17. Reflow soldering footprint for DFN1412D-3 (SOT8009)**

## 14. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BC807QCH-Q_SER v.1	20220125	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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Date of release: 25 January 2022

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