



BC847xW series

45 V, 100 mA NPN general-purpose transistors

Rev. 13 — 1 July 2022

Product data sheet

1. General description

NPN general-purpose transistors in a very small SOT323 (SC-70) Surface-Mounted Device (SMD) plastic package.

Table 1. Product overview

Type number[1]	Package		PNP complement
	Nexperia	JEITA	
BC847W	SOT323	SC-70	BC857W
BC847AW			BC857AW
BC847BW			BC857BW
BC847CW			BC857CW

[1] Valid for all available selection groups.

2. Features and benefits

- General-purpose transistors
- SMD plastic packages
- Three different gain selections

3. Applications

- General-purpose switching and amplification

4. Quick reference data

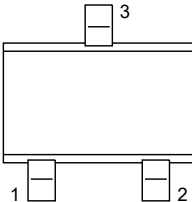
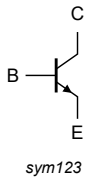
Table 2. Quick reference data

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base	-	-	45	V
I_C	collector current		-	-	100	mA
h_{FE}	DC current gain					
	BC847W	$V_{CE} = 5\text{ V};$ $I_C = 2\text{ mA}$	110	-	800	
	BC847AW		110	180	220	
	BC847BW		200	290	450	
	BC847CW		420	520	800	

5. Pinning information

Table 3. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base		
2	E	emitter		
3	C	collector		

6. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
BC847W	SC-70	plastic surface-mounted package; 3 leads	SOT323
BC847AW			
BC847BW			
BC847CW			

7. Marking

Table 5. Marking codes

Type number		Marking code
BC847W	[1]	1H%
BC847AW	[1]	1E%
BC847BW	[1]	1F%
BC847CW	[1]	1G%

[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	-	50	V
V _{CEO}	collector-emitter voltage	open base	-	45	V
V _{EBO}	emitter-base voltage	open collector	-	6	V
I _C	collector current		-	100	mA
I _{CM}	peak collector current	single pulse; t _p ≤ 1 ms	-	200	mA
I _{BM}	peak base current	single pulse; t _p ≤ 1 ms	-	100	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1] -	200	mW
T _j	junction temperature		-	150	°C
T _{amb}	ambient temperature		-65	150	°C
T _{stg}	storage temperature		-65	150	°C

[1] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided 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	[1] -	-	625	K/W

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

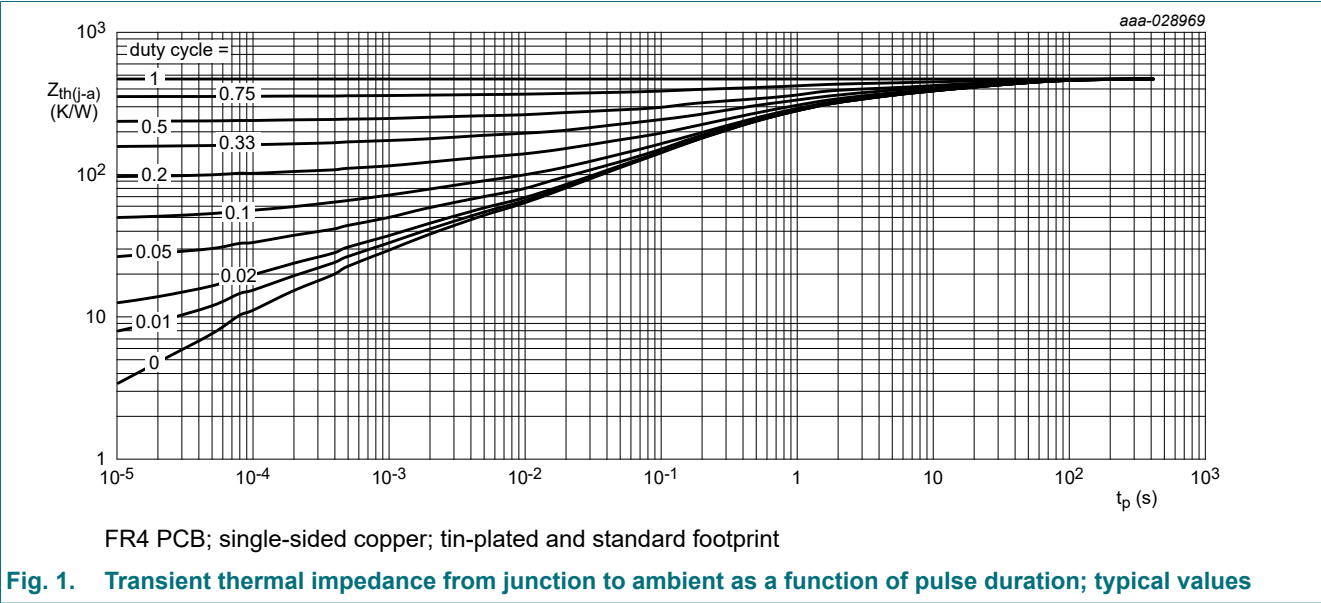


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 8. Characteristics
 $T_{amb} = 25\text{ °C}$ unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V _{(BR)CBO}	collector-base breakdown voltage	I _C = 100 μA; I _E = 0 A		50	-	-	V
V _{(BR)CES}	collector-emitter breakdown voltage	I _C = 2 mA; V _{BE} = 0 A		45	-	-	V
V _{(BR)EBO}	emitter-base breakdown voltage	I _C = 0 A; I _E = 100 μA		6	-	-	V
I _{CBO}	collector-base cut-off current	V _{CB} = 30 V; I _E = 0 A		-	-	15	nA
		V _{CB} = 30 V; I _E = 0 A; T _j = 150 °C		-	-	5	μA
I _{EBO}	emitter-base cut-off current	V _{EB} = 5 V; I _C = 0 A		-	-	100	nA
h _{FE}	DC current gain						
	BC847AW	V _{CE} = 5 V; I _C = 10 μA		-	170	-	
	BC847BW			-	280	-	
	BC847CW			-	420	-	
	BC847W	V _{CE} = 5 V; I _C = 2 mA		110	-	800	
	BC847AW			110	180	220	
	BC847BW			200	290	450	
	BC847CW			420	520	800	
V _{CEsat}	collector-emitter saturation voltage	I _C = 10 mA; I _B = 0.5 mA		-	90	200	mV
		I _C = 100 mA; I _B = 5 mA	[1]	-	200	400	mV
V _{BEsat}	base-emitter saturation voltage	I _C = 10 mA; I _B = 0.5 mA	[2]	-	700	-	mV
		I _C = 100 mA; I _B = 5 mA	[2]	-	900	-	mV
V _{BE}	base-emitter voltage	V _{CE} = 5 V; I _C = 2 mA	[2]	580	660	700	mV
		V _{CE} = 5 V; I _C = 10 mA		-	-	770	mV
f _T	transition frequency	V _{CE} = 5 V; I _C = 10 mA; f = 100 MHz		100	-	-	MHz
C _c	collector capacitance	V _{CB} = 10 V; I _E = i _e = 0 A; f = 1 MHz		-	-	1.5	pF
C _e	emitter capacitance	V _{EB} = 0.5 V; I _C = i _c = 0 A; f = 1 MHz		-	11	-	pF
NF	noise figure	I _C = 200 μA; V _{CE} = 5 V; R _S = 2 kΩ; f = 1 kHz; B = 200Hz		-	2	10	dB

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

[2] V_{BE} decreases by approximately 2 mV/K with increasing temperature

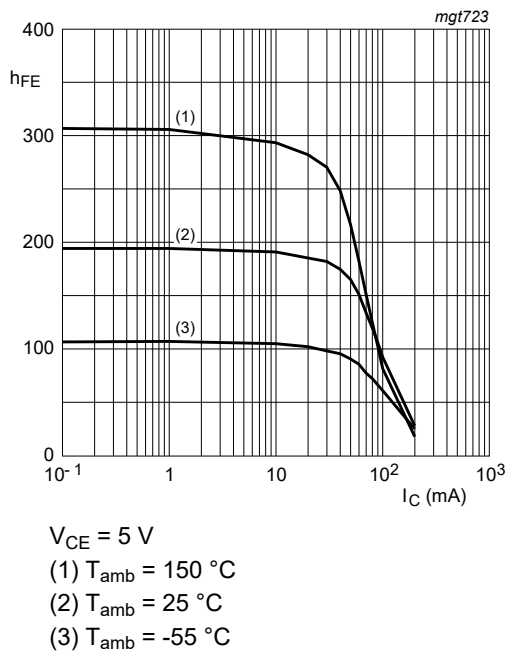


Fig. 2. BC847AW: DC current gain as a function of collector current; typical values

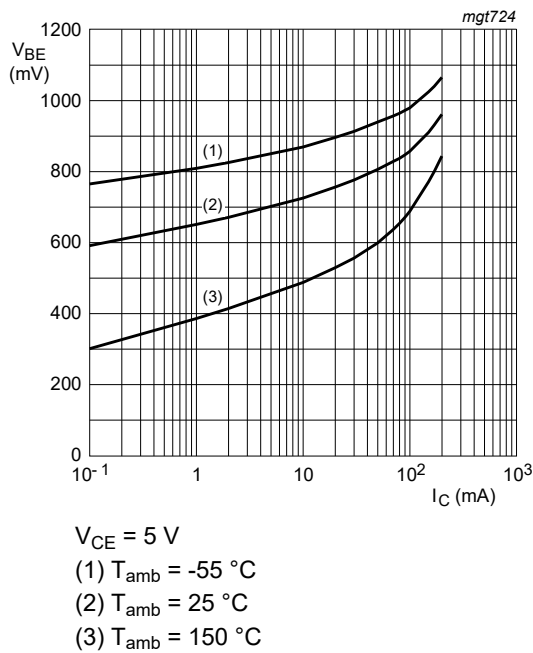


Fig. 3. BC847AW: Base-emitter voltage as a function of collector current; typical values

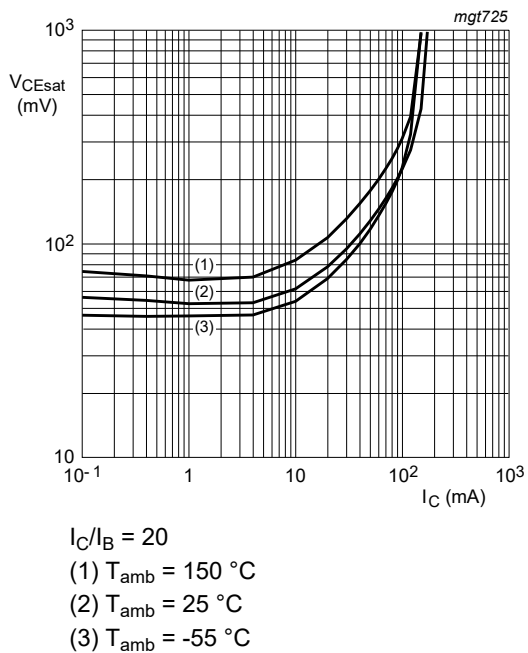


Fig. 4. BC847AW: Collector-emitter saturation voltage as a function of collector current; typical values

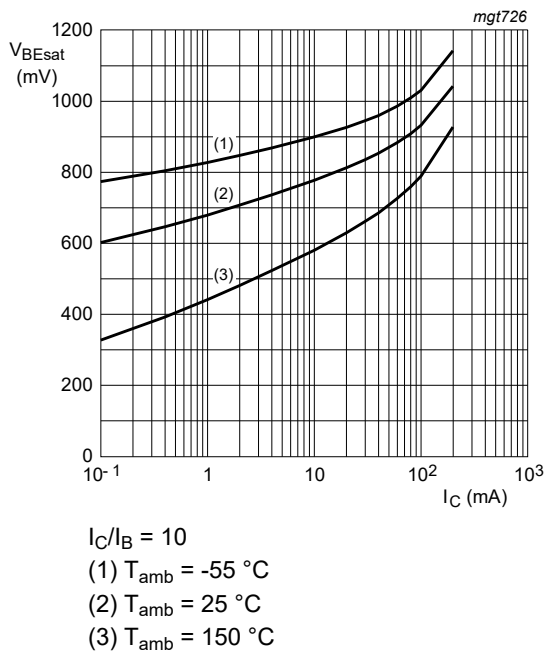


Fig. 5. BC847AW: Base-emitter saturation voltage as a function of collector current; typical values

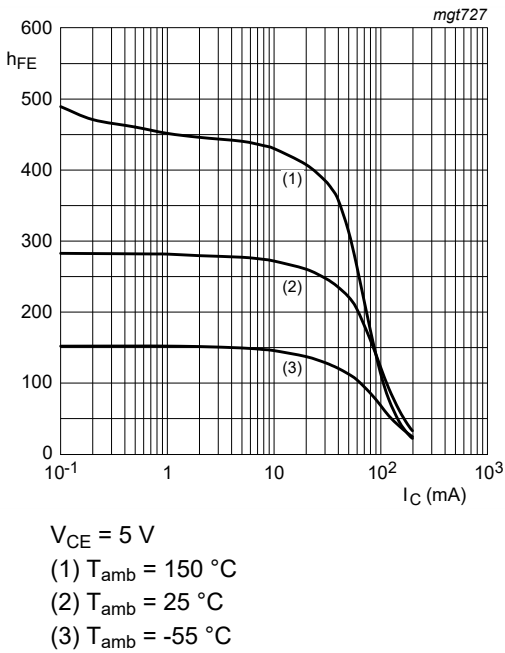


Fig. 6. BC847BW: DC current gain as a function of collector current; typical values

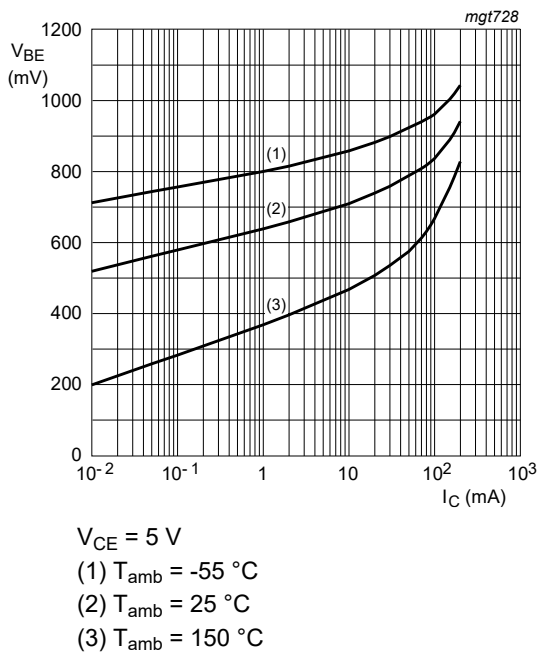


Fig. 7. BC847BW: Base-emitter voltage as a function of collector current; typical values

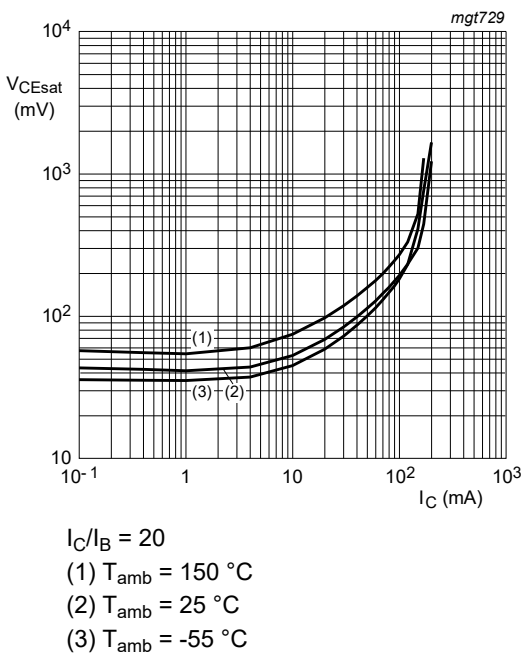


Fig. 8. BC847BW: Collector-emitter saturation voltage as a function of collector current; typical values

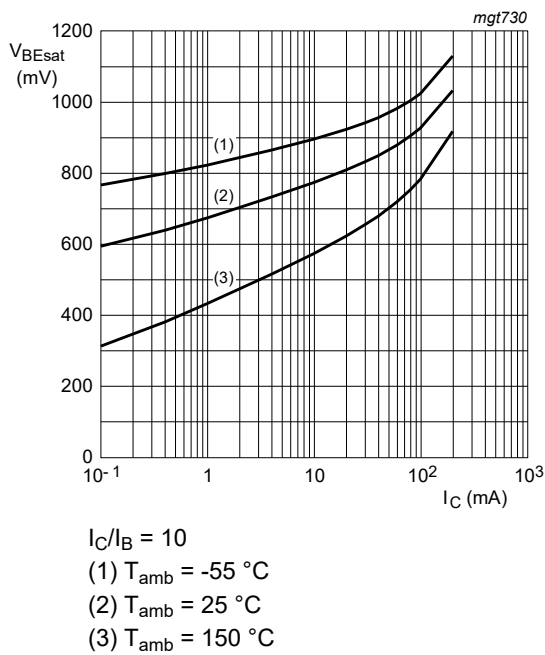


Fig. 9. BC847BW: Base-emitter saturation voltage as a function of collector current; typical values

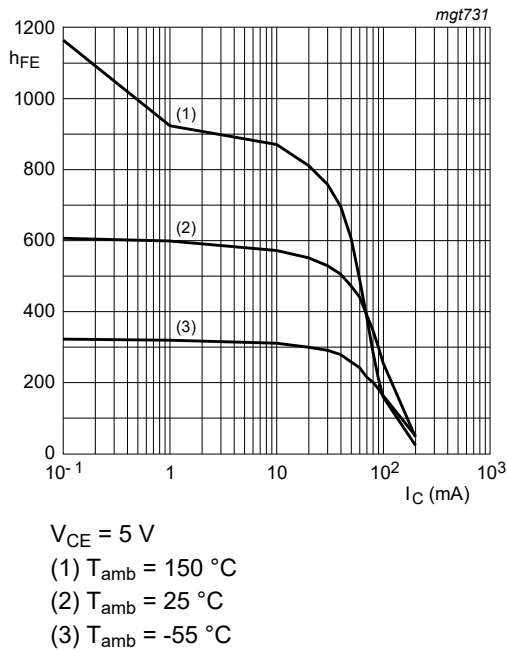


Fig. 10. BC847CW: DC current gain as a function of collector current; typical values

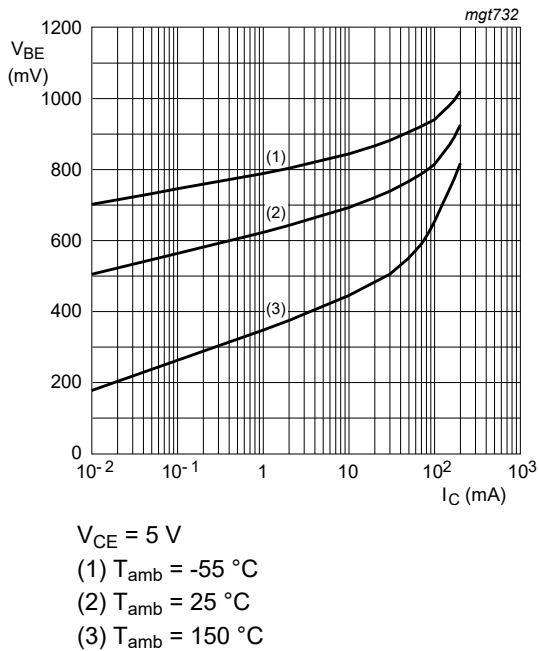


Fig. 11. BC847CW: Base-emitter voltage as a function of collector current; typical values

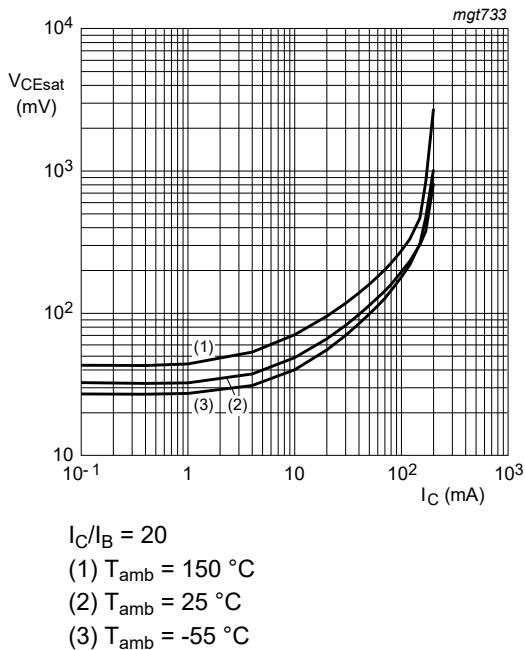


Fig. 12. BC847CW: Collector-emitter saturation voltage as a function of collector current; typical values

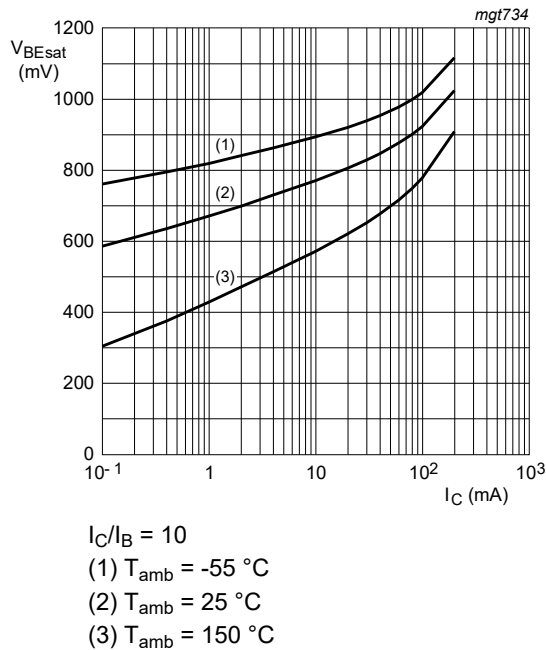


Fig. 13. BC847CW: Base-emitter saturation voltage as a function of collector current; typical values

11. Package outline

Table 9. Package outline

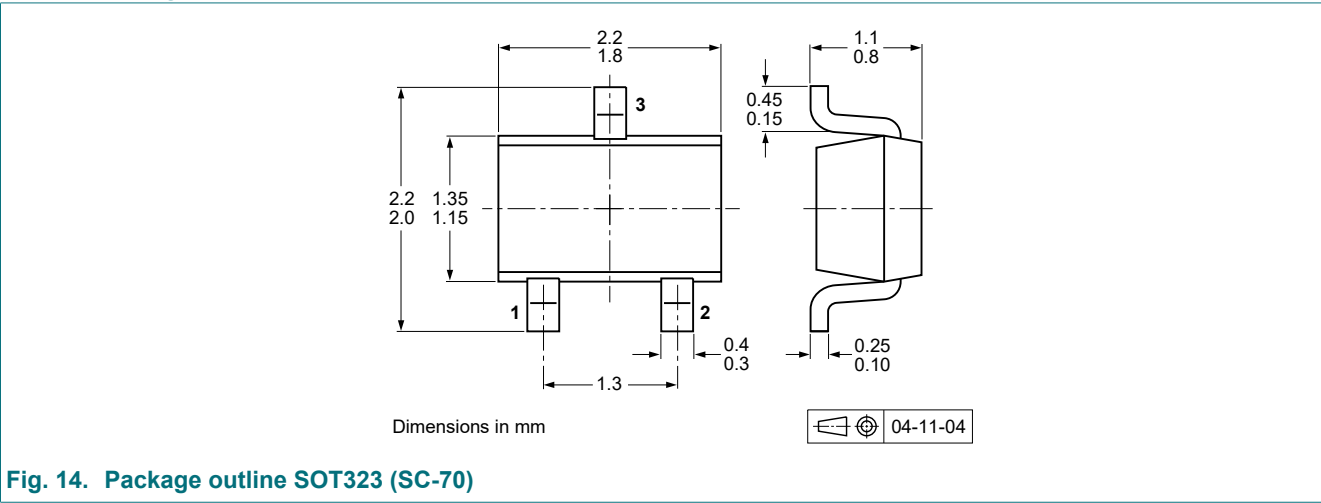


Fig. 14. Package outline SOT323 (SC-70)

12. Soldering

Table 10. Soldering

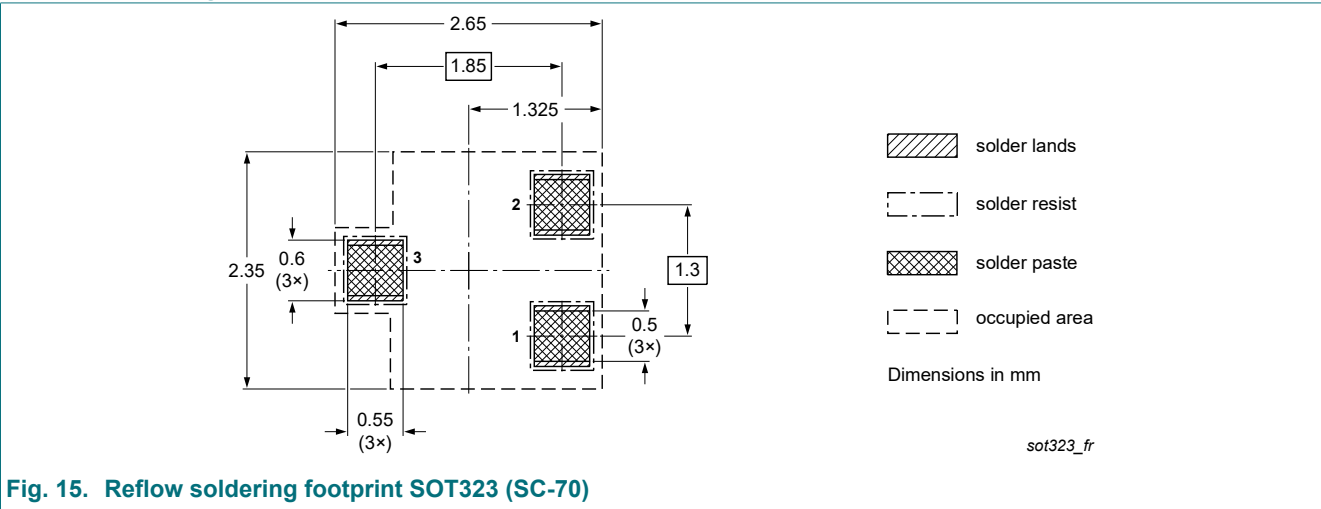


Fig. 15. Reflow soldering footprint SOT323 (SC-70)

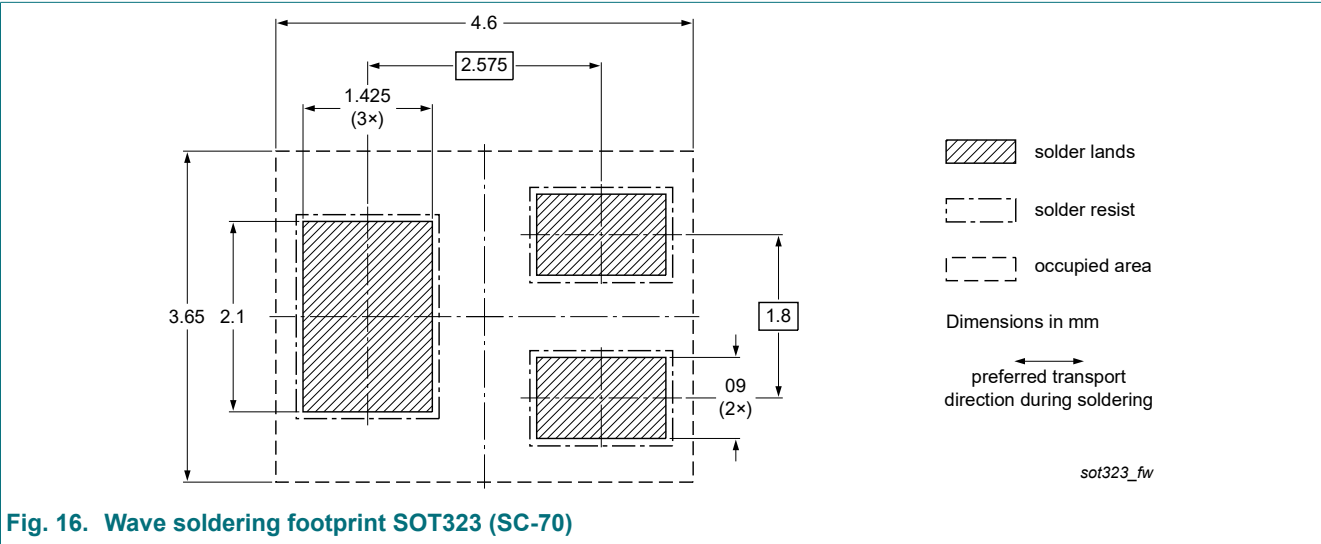


Fig. 16. Wave soldering footprint SOT323 (SC-70)

13. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BC847XW_SER v.13	20220701	Product data sheet	-	BC847_SER v.12
Modifications:	- Series data sheet reduced to 3 data sheets per package - Product changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).			
BC847_SER v.12	20191024	Product data sheet	-	BC847_SER v.11
BC847_SER v.11	20181205	Product data sheet	-	BC847_SER v.10
BC847_SER v.10	20180302	Product data sheet	-	BC847_SER v.9
BC847_SER v.9	20140923	Product data sheet	-	BC847_SER v.8
BC847_SER v.8	20120820	Product data sheet	-	BC847_BC547_SER v.7
BC847_BC547_SER v.7	20081210	Product data sheet	-	BC847_BC547_SER v.6
BC847_BC547_SER v.6	20050519	Product data sheet	-	-

14. 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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