



BC856W-Q; BC857W-Q; BC858W-Q

65 V, 100 mA PNP general-purpose transistors

Rev. 2 — 10 July 2023

Product data sheet

1. General description

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

Table 1. Product overview

Type number	Package		NPN complement
	Nexperia	JEDEC	
BC856W-Q	SOT323	SC-70	BC846W-Q
BC856AW-Q			BC846AW-Q
BC856BW-Q			BC846BW-Q
BC857W-Q			BC847W-Q
BC857AW-Q			BC847AW-Q
BC857BW-Q			BC847BW-Q
BC857CW-Q			BC847CW-Q
BC858W-Q			BC848W-Q

2. Features and benefits

- Low current (max. 100 mA)
- Low voltage (max. 65 V)
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- General-purpose switching and amplification

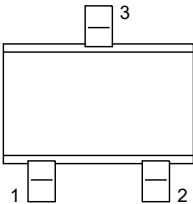
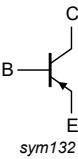
4. Quick reference data

Table 2. Quick reference data
T_{amb} = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{CEO}	collector-emitter voltage	open base				
	BC856W-Q		-	-	-65	V
	BC857W-Q		-	-	-45	V
	BC858W-Q		-	-	-30	V
I _C	collector current		-	-	-100	mA
I _{CM}	peak collector current		-	-	-200	mA
h _{FE}	DC current gain	V _{CE} = 5 V; I _C = 2 mA				
	BC856W-Q		125	-	475	
	BC857W-Q; BC858W-Q		125	-	800	
	BC856AW-Q; BC857AW-Q		125	-	250	
	BC856BW-Q; BC857BW-Q		220	-	475	
	BC857CW-Q		420	-	800	

5. Pinning information

Table 3. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base		 sym132
2	E	emitter		
3	C	collector		

6. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
BC856W-Q	SC-70	plastic surface-mounted package; 3 leads	SOT323
BC856AW-Q			
BC856BW-Q			
BC857W-Q			
BC857AW-Q			
BC857BW-Q			
BC857CW-Q			
BC858W-Q			

7. Marking

Table 5. Marking codes

Type number		Marking code
BC856W-Q	[1]	3D%
BC856AW-Q	[1]	3A%
BC856BW-Q	[1]	3B%
BC857W-Q	[1]	3H%
BC857AW-Q	[1]	3E%
BC857BW-Q	[1]	3F%
BC857CW-Q	[1]	3G%
BC858W-Q	[1]	3M%

[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			
	BC856W-Q		-	-80	V
	BC857W-Q		-	-50	V
	BC858W-Q		-	-30	V
V _{CEO}	collector-emitter voltage	open base			
	BC856W-Q		-	-65	V
	BC857W-Q		-	-45	V
	BC858W-Q		-	-30	V
V _{EBO}	emitter-base voltage	open collector	-	-5	V
I _C	collector current		-	-100	mA
I _{CM}	peak collector current		-	-200	mA
I _{BM}	peak base current		-	-200	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

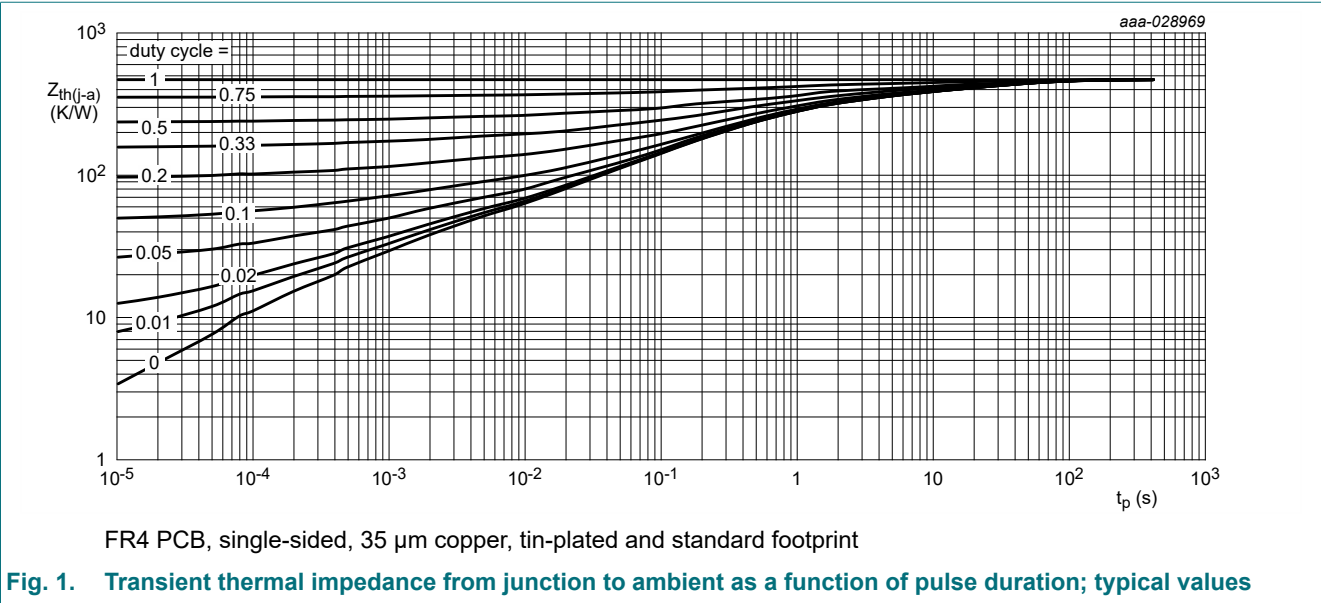
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided, 35 µm copper, tin-plated and standard footprint.

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; 35 µm copper; tin-plated and standard footprint.



10. Characteristics

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V _{(BR)CBO}	collector-base breakdown voltage						
	BC856W-Q	I _C = -100 μA; I _E = 0 A		-80	-	-	V
	BC857W-Q			-50	-	-	V
	BC858W-Q			-30	-	-	V
V _{(BR)CEO}	collector-emitter breakdown voltage						
	BC856W-Q	I _C = -2 mA; I _B = 0 A		-65	-	-	V
	BC857W-Q			-45	-	-	V
	BC858W-Q			-30	-	-	V
V _{(BR)EBO}	emitter-base breakdown voltage	I _C = 0 A; I _E = -100 μA		-5	-	-	V
I _{CBO}	collector-base cut-off current	V _{CB} = -30 V; I _E = 0 A		-	-1	-15	nA
		V _{CB} = -30 V; I _E = 0 A; T _j = 150 °C		-	-	-4	μA
I _{EBO}	emitter-base cut-off current	V _{EB} = -5 V; I _C = 0 A		-	-	-100	nA
h _{FE}	DC current gain						
	BC856W-Q	V _{CE} = -5 V; I _C = -2 mA		125	-	475	
	BC857W-Q BC858W-Q			125	-	800	
	BC856AW-Q BC857AW-Q			125	-	250	
	BC857BW-Q BC858BW-Q			220	-	475	
	BC857CW-Q			420	-	800	
	V _{CEsat}		collector-emitter saturation voltage	I _C = -10 mA; I _B = -0.5 mA		-	-75
I _C = -100 mA; I _B = -5 mA		[1]		-	-250	-600	mV
V _{BEsat}	base-emitter saturation voltage	I _C = -10 mA; I _B = -0.5 mA	[1]	-	-700	-	mV
		I _C = -100 mA; I _B = -5 mA	[1]	-	-850	-	mV
V _{BE}	base-emitter voltage	V _{CE} = -5 V; I _C = -2 mA		-600	-650	-750	mV
		V _{CE} = -5 V; I _C = -10 mA		-	-	-820	mV
C _c	collector capacitance	V _{CB} = -10 V; I _E = i _e = 0 A; f = 1 MHz		-	3	-	pF
C _e	collector capacitance	V _{EB} = -5 V; I _C = i _c = 0 A; f = 1 MHz		-	12	-	pF
f _T	transition frequency	V _{CE} = -5 V; I _C = -10 mA; f = 100 MHz		100	-	-	MHz
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; $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$

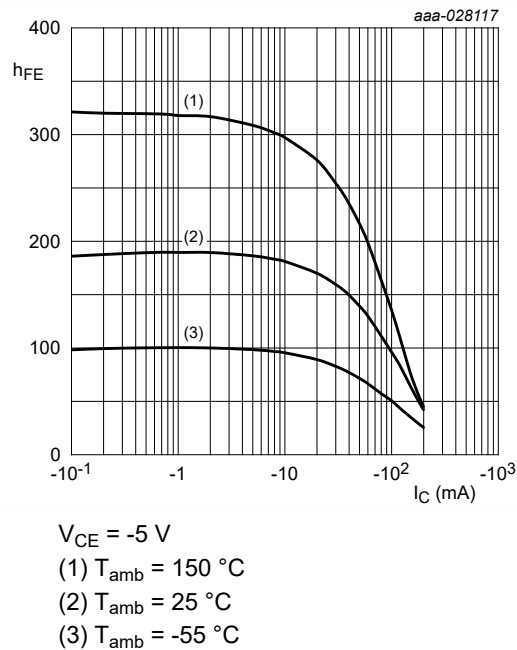


Fig. 2. BC856AW-Q; BC857AW-Q: DC current gain as a function of collector current; typical values

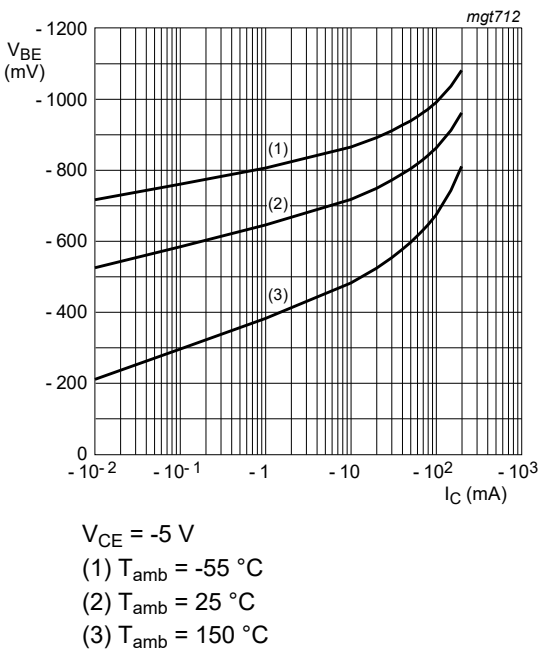


Fig. 3. BC856AW-Q; BC857AW-Q: Base-emitter voltage as a function of collector current; typical values

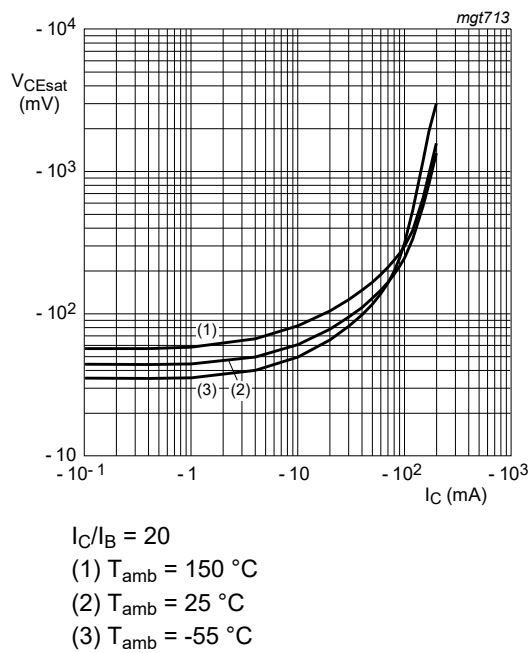


Fig. 4. BC856AW-Q; BC857AW-Q: Collector-emitter saturation voltage as a function of collector current; typical values

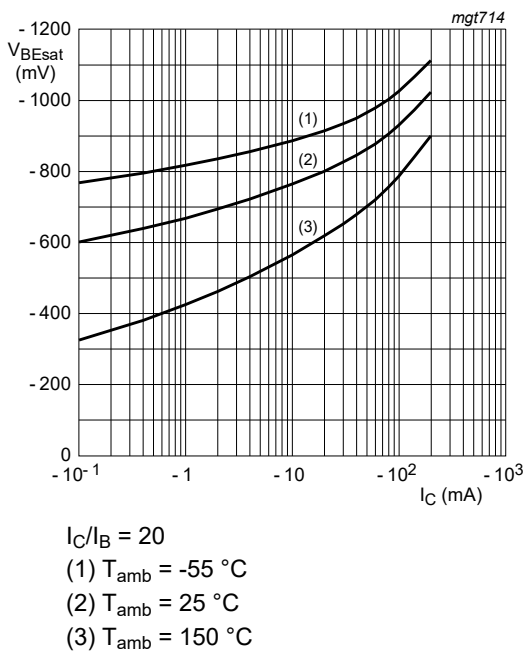


Fig. 5. BC856AW-Q; BC857AW-Q: Base-emitter saturation voltage as a function of collector current; typical values

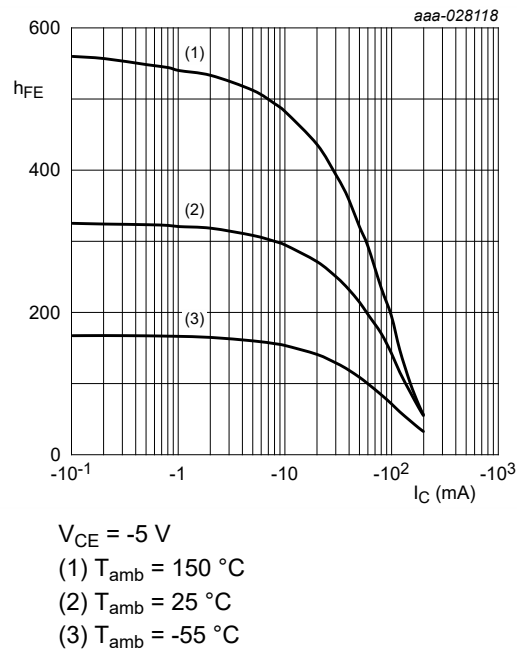


Fig. 6. BC856BW-Q; BC857BW-Q; BC858BW-Q: DC current gain as a function of collector current; typical values

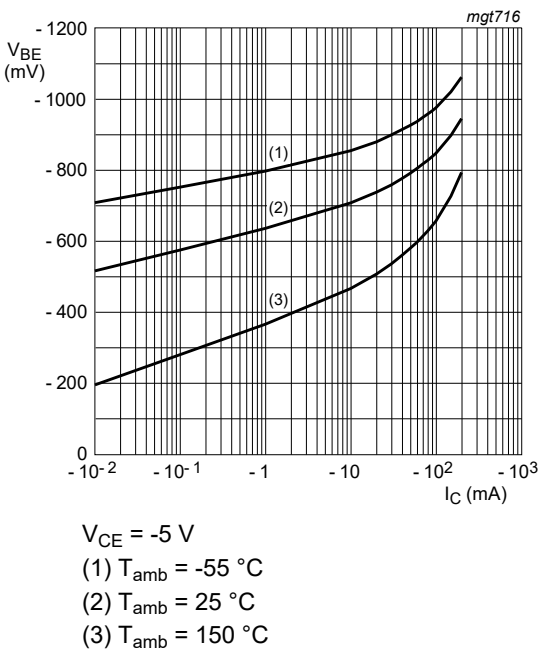


Fig. 7. BC856BW-Q; BC857BW-Q; BC858BW-Q: Base-emitter voltage as a function of collector current; typical values

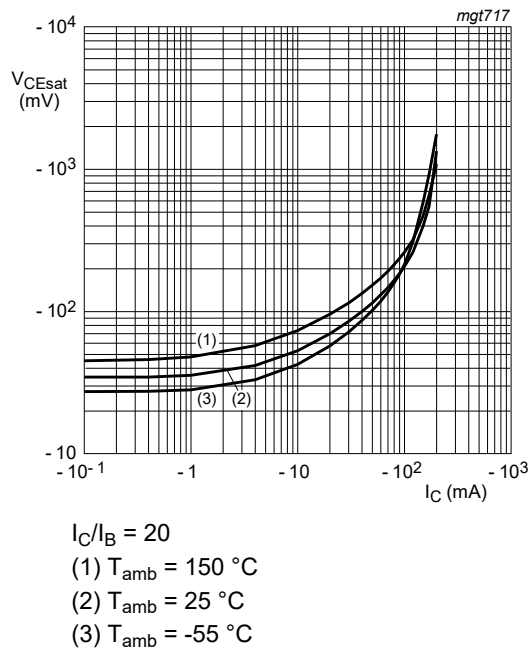


Fig. 8. BC856BW-Q; BC857BW-Q; BC858BW-Q: Collector-emitter saturation voltage as a function of collector current; typical values

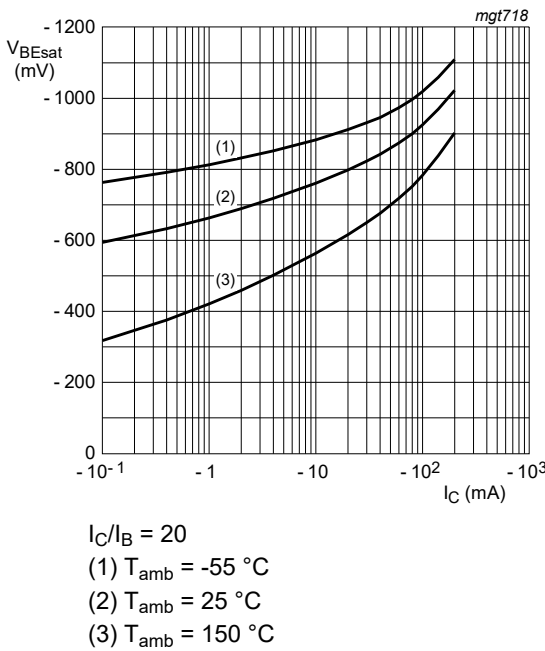


Fig. 9. BC856BW-Q; BC857BW-Q; BC858BW-Q: Base-emitter saturation voltage as a function of collector current; typical values

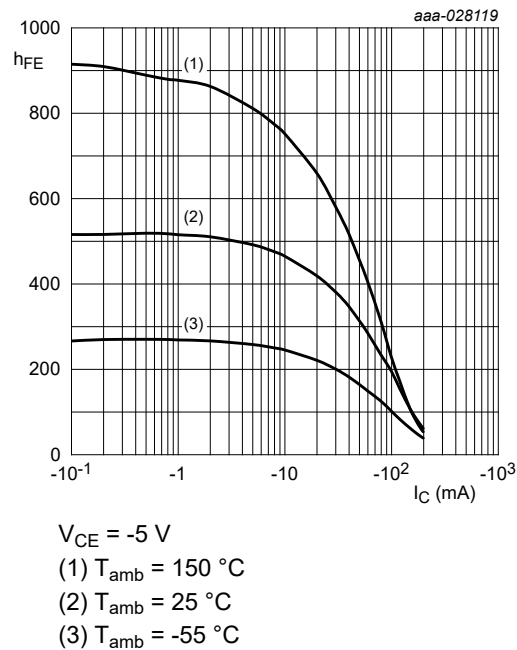


Fig. 10. BC857CW-Q: DC current gain as a function of collector current; typical values

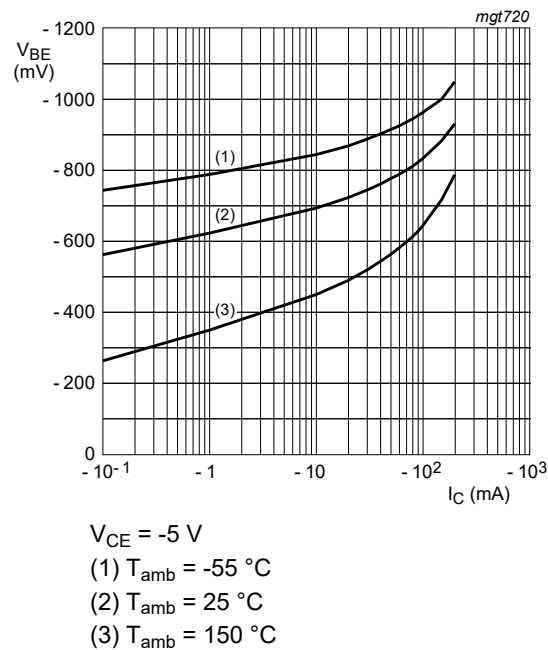


Fig. 11. BC857CW-Q: Base-emitter voltage as a function of collector current; typical values

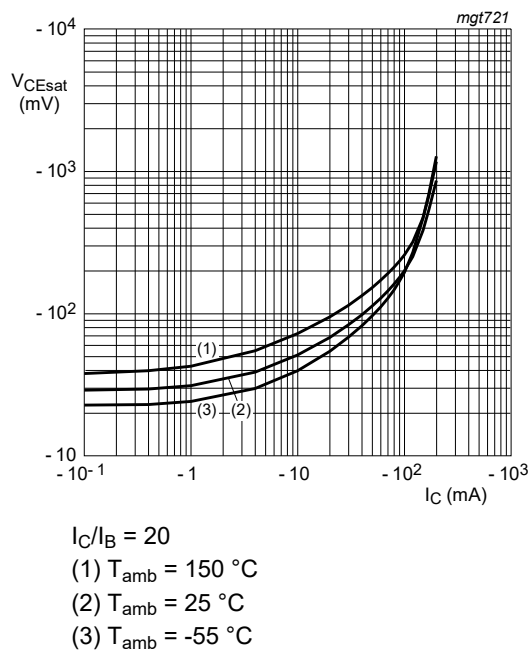


Fig. 12. BC857CW-Q: Collector-emitter saturation voltage as a function of collector current; typical values

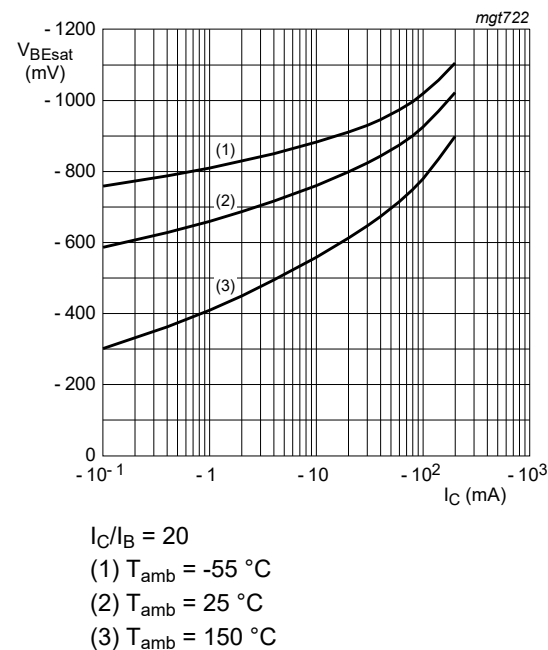


Fig. 13. BC857CW-Q: Base-emitter saturation voltage as a function of collector current; typical values

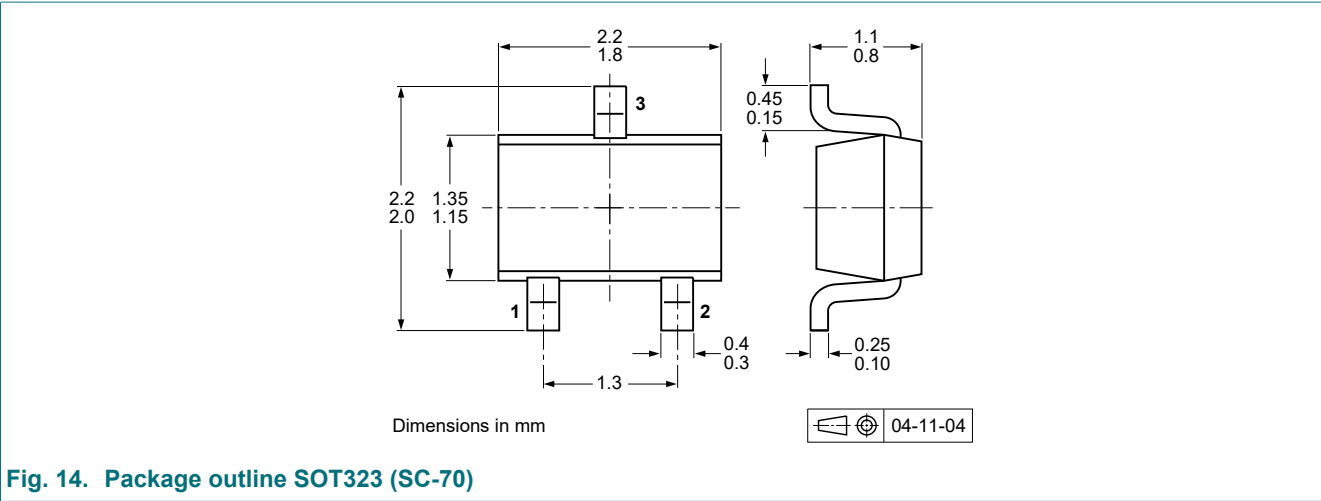
11. Test information

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

Table 9. Package outline



13. Soldering

Table 10. Soldering

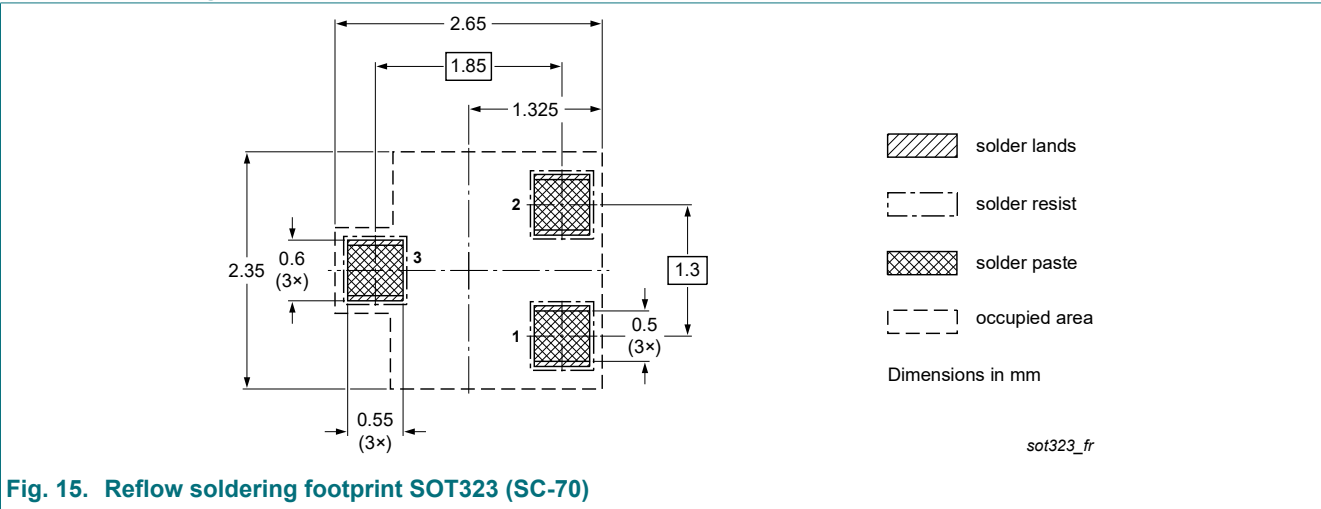


Fig. 15. Reflow soldering footprint SOT323 (SC-70)

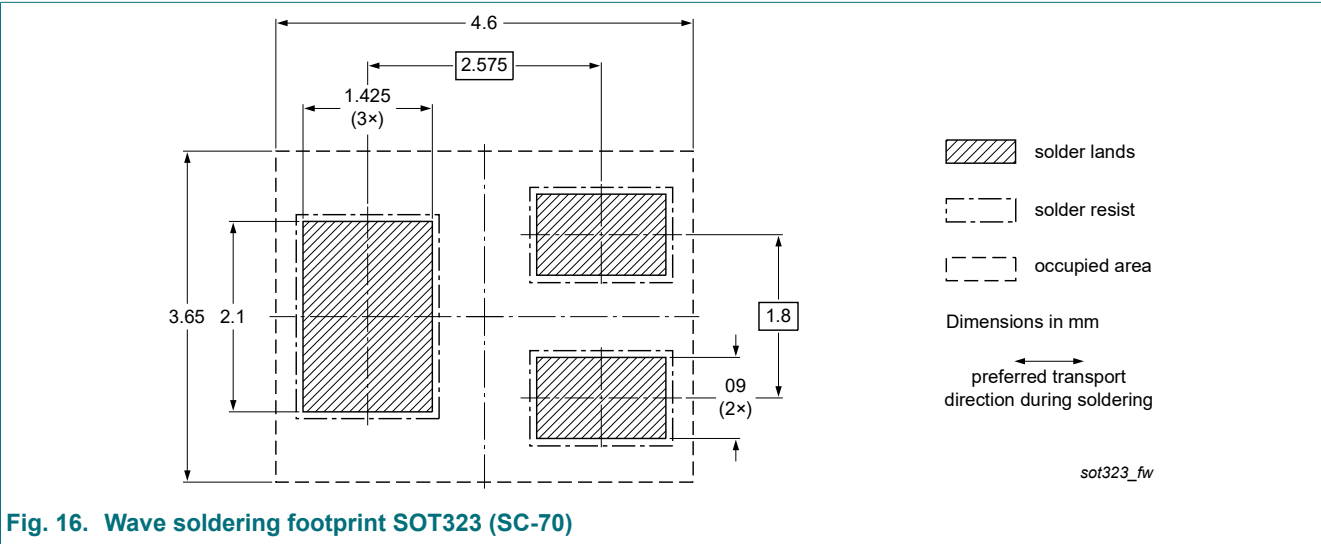


Fig. 16. Wave soldering footprint SOT323 (SC-70)

14. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BC856W-Q_BC857W-Q_BC858W-Q v.2	20230710	Product data sheet	-	-
Modifications:	• Quick reference data: typos corrected			
BC856W-Q_BC857W-Q_BC858W-Q v.1	20211203	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.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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