



BCM857BS-Q

PNP/PNP matched double transistor

26 September 2024

Product data sheet

1. General description

PNP/PNP matched double transistor in a very small Surface-Mounted Device (SMD) SOT363 (SC-88) plastic package. The transistors are fully isolated internally.

2. Features and benefits

- Current gain matching
- Base-emitter voltage matching
- Drop-in replacement for standard double transistors
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- Current mirror
- Differential amplifier

4. Quick reference data

Table 1. Quick reference data

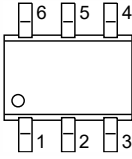
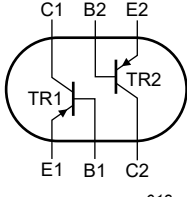
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per transistor							
V_{CE0}	collector-emitter voltage	open base		-	-	-45	V
I_C	collector current			-	-	-100	mA
h_{FE}	DC current gain	$V_{CE} = -5\text{ V}$; $I_C = -10\text{ }\mu\text{A}$; $T_{amb} = 25\text{ }^\circ\text{C}$		-	250	-	
Per device							
h_{FE1}/h_{FE2}	DC current gain matching	$V_{CE} = -5\text{ V}$; $I_C = -2\text{ mA}$; $T_{amb} = 25\text{ }^\circ\text{C}$	[1]	0.9	1	-	
$V_{BE1}-V_{BE2}$	base-emitter voltage matching		[2]	-	-	2	mV

[1] The smaller of the two values is taken as the numerator.

[2] The smaller of the two values is subtracted from the larger value.

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	E1	emitter TR1	 TSSOP6 (SOT363)	 sym018
2	B1	base TR1		
3	C2	collector TR2		
4	E2	emitter TR2		
5	B2	base TR2		
6	C1	collector TR1		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BCM857BS-Q	TSSOP6	plastic, surface-mounted package; 6 leads; 0.65 mm pitch; 2.1 mm x 1.25 mm x 0.95 mm body	SOT363

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
BCM857BS-Q	A9%

[1] % = placeholder for manufacturing site code

8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
Per transistor						
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			-	-100	mA
I _{CM}	peak collector current	t _p ≤ 1 ms; single pulse		-	-200	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	200	mW
Per device						
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	300	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 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per transistor							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	625	K/W
Per device							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	416	K/W

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

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per transistor							
I _{CBO}	collector-base cut-off current	V _{CB} = -30 V; I _E = 0 A; T _{amb} = 25 °C		-	-	-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; T _{amb} = 25 °C		-	-	-100	nA
h _{FE}	DC current gain	V _{CE} = -5 V; I _C = -10 μA; T _{amb} = 25 °C		-	250	-	
		V _{CE} = -5 V; I _C = -2 mA; T _{amb} = 25 °C		200	290	450	
V _{CEsat}	collector-emitter saturation voltage	I _C = -10 mA; I _B = -0.5 mA; T _{amb} = 25 °C		-	-50	-200	mV
		I _C = -100 mA; I _B = -5 mA; T _{amb} = 25 °C		-	-200	-400	mV
V _{BEsat}	base-emitter saturation voltage	I _C = -10 mA; I _B = -0.5 mA; T _{amb} = 25 °C	[1]	-	-760	-	mV
		I _C = -100 mA; I _B = -5 mA; T _{amb} = 25 °C	[1]	-	-920	-	mV
V _{BE}	base-emitter voltage	V _{CE} = -5 V; I _C = -2 mA; T _{amb} = 25 °C	[2]	-600	-650	-700	mV
		V _{CE} = -5 V; I _C = -10 mA; T _{amb} = 25 °C	[2]	-	-	-760	mV
C _c	collector capacitance	V _{CB} = -10 V; I _E = 0 A; i _e = 0 A; f = 1 MHz; T _{amb} = 25 °C		-	-	2.2	pF
C _e	emitter capacitance	V _{EB} = -0.5 V; I _C = 0 A; i _c = 0 A; f = 1 MHz; T _{amb} = 25 °C		-	10	-	pF
f _T	transition frequency	V _{CE} = -5 V; I _C = -10 mA; f = 100 MHz; T _{amb} = 25 °C		100	175	-	MHz
NF	noise figure	V _{CE} = -5 V; I _C = -0.2 mA; R _S = 2 kΩ; f = 10 kHz to 15.7 kHz		-	1.6	-	dB
		V _{CE} = -5 V; I _C = -0.2 mA; f = 1 kHz; B = 200 Hz		-	3.1	-	dB
Per device							
h _{FE1} /h _{FE2}	DC current gain matching	V _{CE} = -5 V; I _C = -2 mA; T _{amb} = 25 °C	[3]	0.9	1	-	
V _{BE1} -V _{BE2}	base-emitter voltage matching		[4]	-	-	2	mV

[1] V_{BEsat} decreases by about 1.7 mV/K with increasing temperature.

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

[3] The smaller of the two values is taken as the numerator.

[4] The smaller of the two values is subtracted from the larger value.

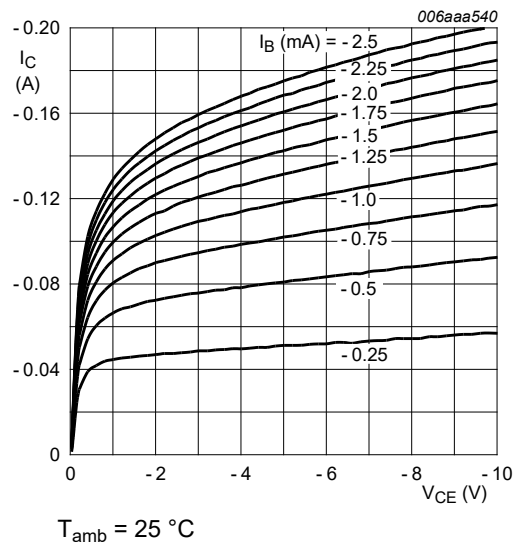


Fig. 1. Collector current as a function of collector-emitter voltage; typical values

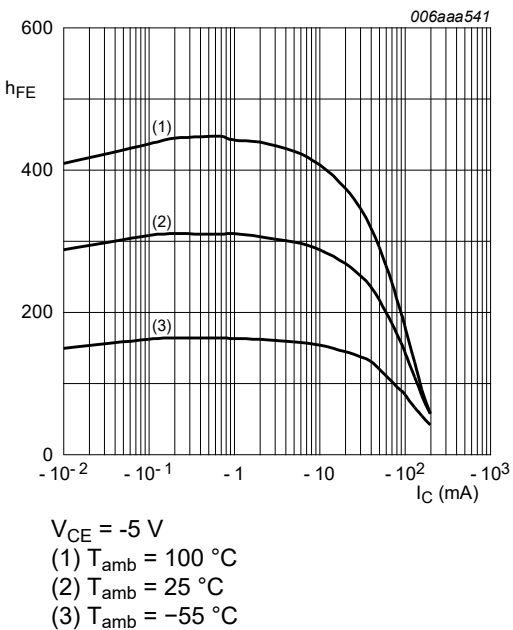


Fig. 2. DC current gain as a function of collector current; typical values

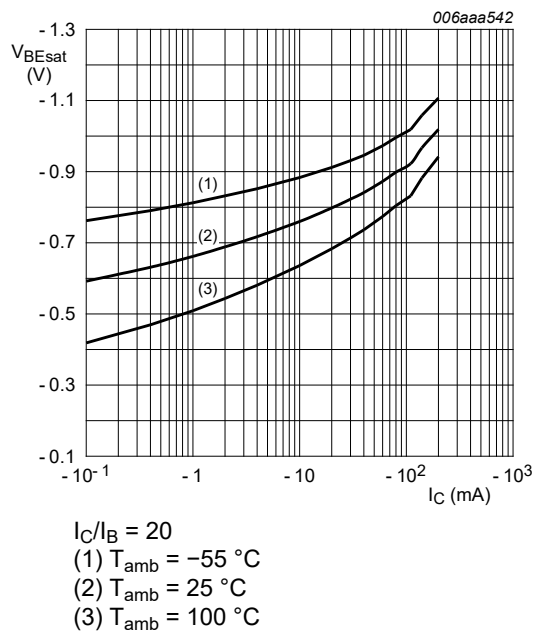


Fig. 3. Base-emitter saturation voltage as a function of collector current; typical values

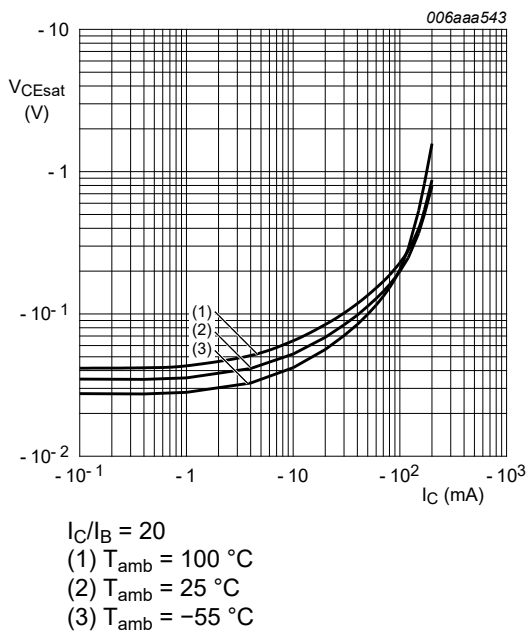
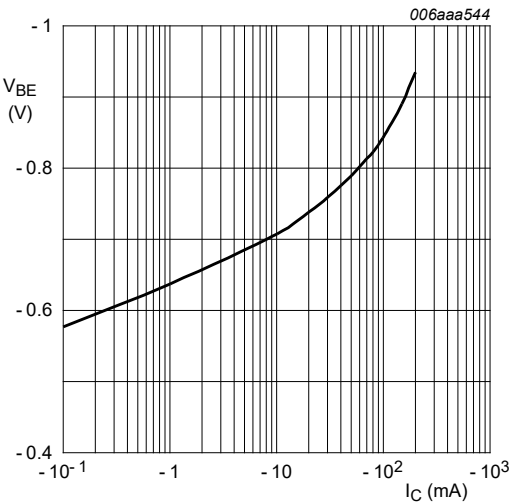
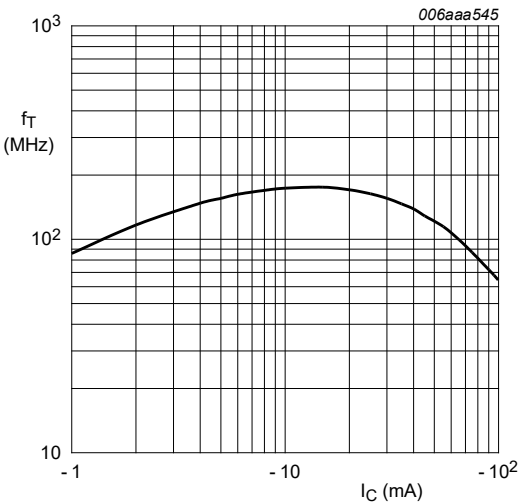


Fig. 4. Collector-emitter saturation voltage as a function of collector current; typical values



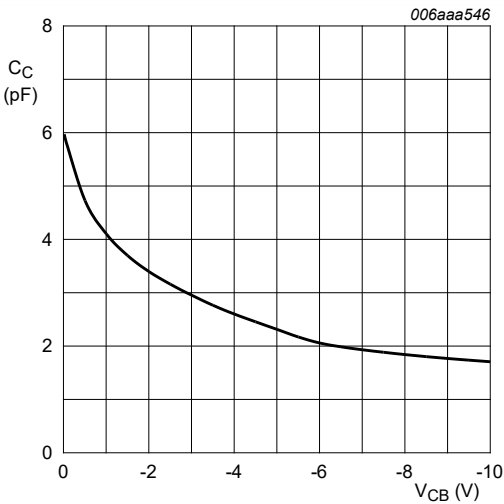
$V_{CE} = -5$ V; $T_{amb} = 25$ °C

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



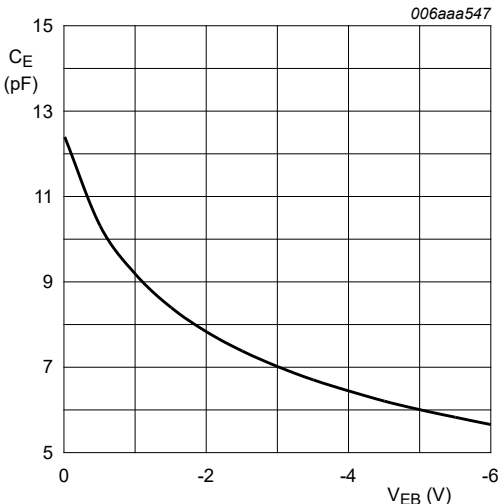
$V_{CE} = -5$ V; $T_{amb} = 25$ °C

Fig. 6. Transition frequency as a function of collector current; typical values



$f = 1$ MHz; $T_{amb} = 25$ °C

Fig. 7. Collector capacitance as a function of collector-base voltage; typical values



$f = 1$ MHz; $T_{amb} = 25$ °C

Fig. 8. Emitter capacitance as a function of emitter-base voltage; typical values

11. Application information

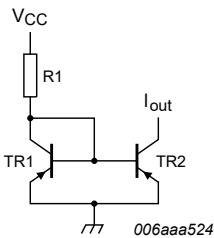


Fig. 9. Current mirror

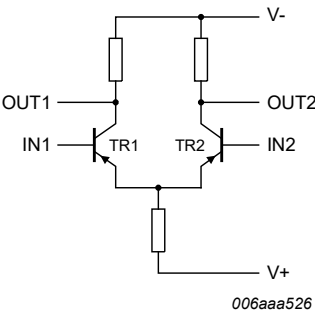


Fig. 10. Differential amplifier

12. Test information

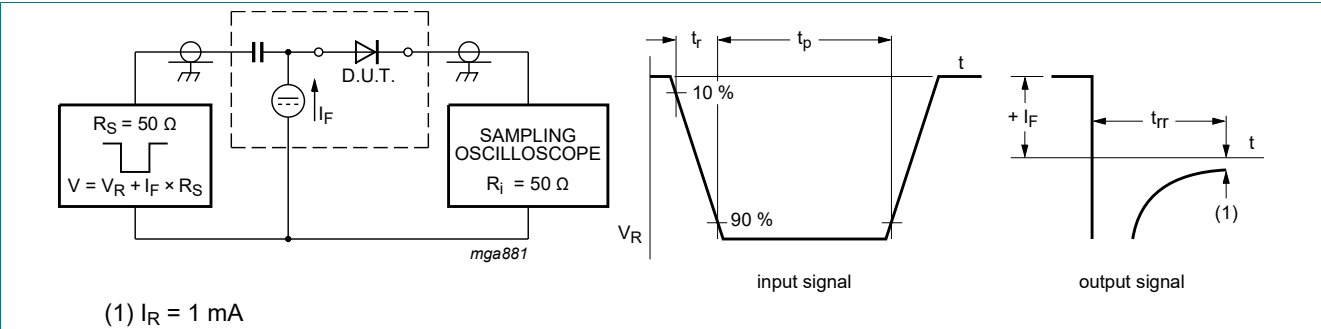


Fig. 11. Reverse recovery time test circuit and waveforms

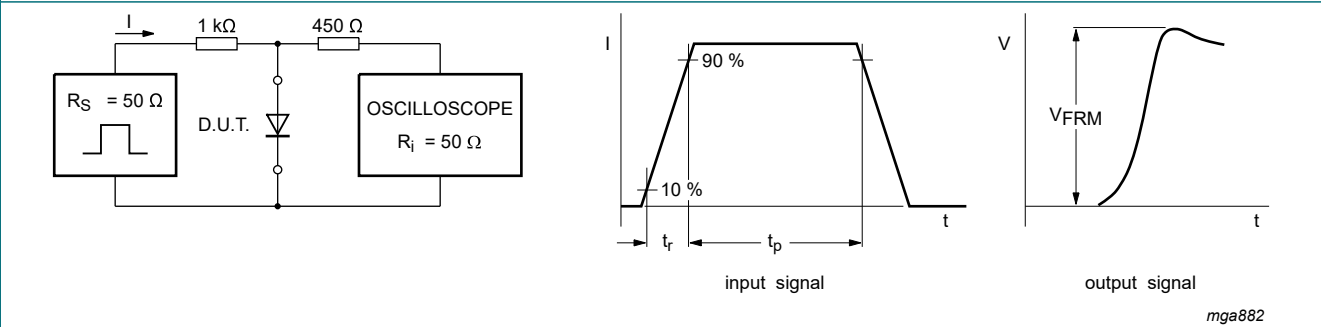


Fig. 12. Forward recovery voltage test circuit and waveforms

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.

13. Package outline

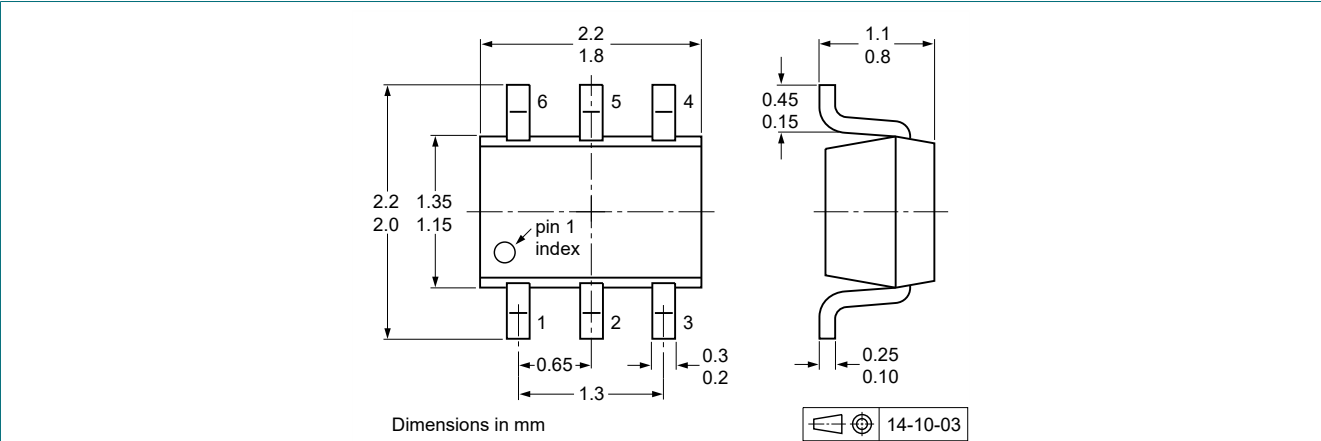


Fig. 13. Package outline TSSOP6 (SOT363)

14. Soldering

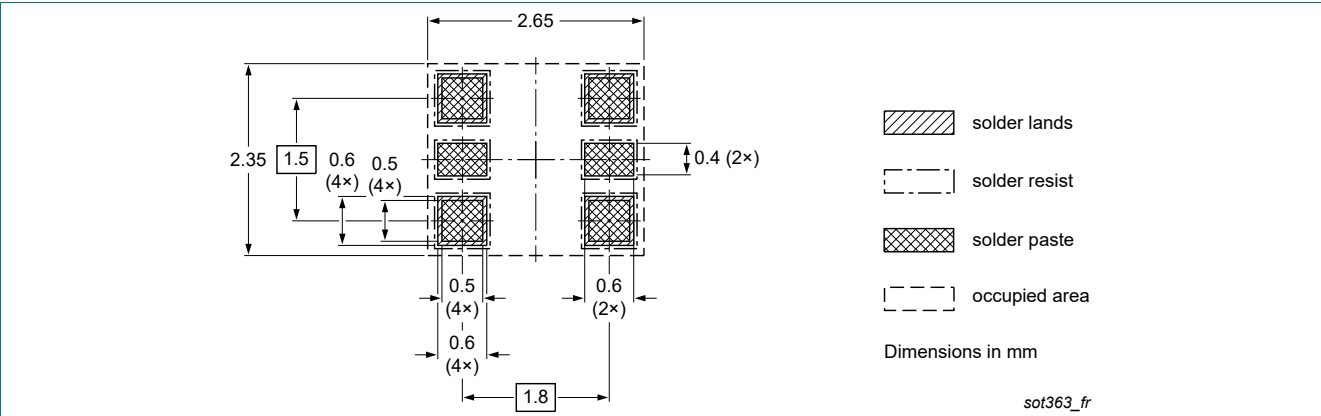


Fig. 14. Reflow soldering footprint for TSSOP6 (SOT363)

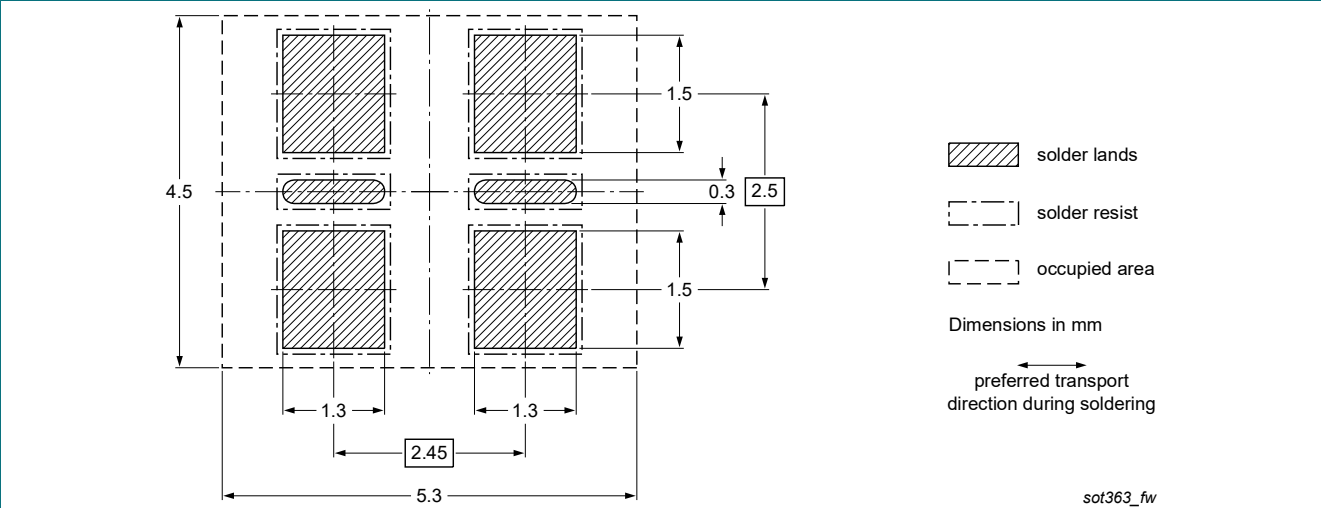


Fig. 15. Wave soldering footprint for TSSOP6 (SOT363)

15. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BCM857BS-Q v.1	20240926	Product data sheet	-	-

16. 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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