



BC856BS

65 V, 100 mA PNP/PNP general-purpose transistor

Rev. 01 — 11 August 2009

Product data sheet

1. Product profile

1.1 General description

PNP/PNP general-purpose transistor pair in a very small Surface-Mounted Device (SMD) plastic package.

Table 1. Product overview

Type number	Package		NPN/PNP complement	NPN/PNP complement
	NXP	JEITA		
BC856BS	SOT363	SC-88	BC846BS	BC846BPN

1.2 Features

- Low collector capacitance
- Low collector-emitter saturation voltage
- Closely matched current gain
- Reduces number of components and board space
- No mutual interference between the transistors
- AEC-Q101 qualified

1.3 Applications

- General-purpose switching and amplification

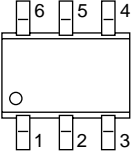
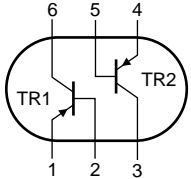
1.4 Quick reference data

Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor						
V_{CEO}	collector-emitter voltage	open base	-	-	-65	V
I_C	collector current		-	-	-100	mA
h_{FE}	DC current gain	$V_{CE} = -5\text{ V};$ $I_C = -2\text{ mA}$	200	290	450	

2. Pinning information

Table 3. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	emitter TR1		
2	base TR1		
3	collector TR2		
4	emitter TR2		
5	base TR2		
6	collector TR1		

sym018

3. Ordering information

Table 4. Ordering information

Type number	Package		Version
	Name	Description	
BC856BS	SC-88	plastic surface-mounted package; 6 leads	SOT363

4. Marking

Table 5. Marking codes

Type number	Marking code ^[1]
BC856BS	*E6

- [1] * = -: made in Hong Kong
 * = p: made in Hong Kong
 * = t: made in Malaysia
 * = W: made in China

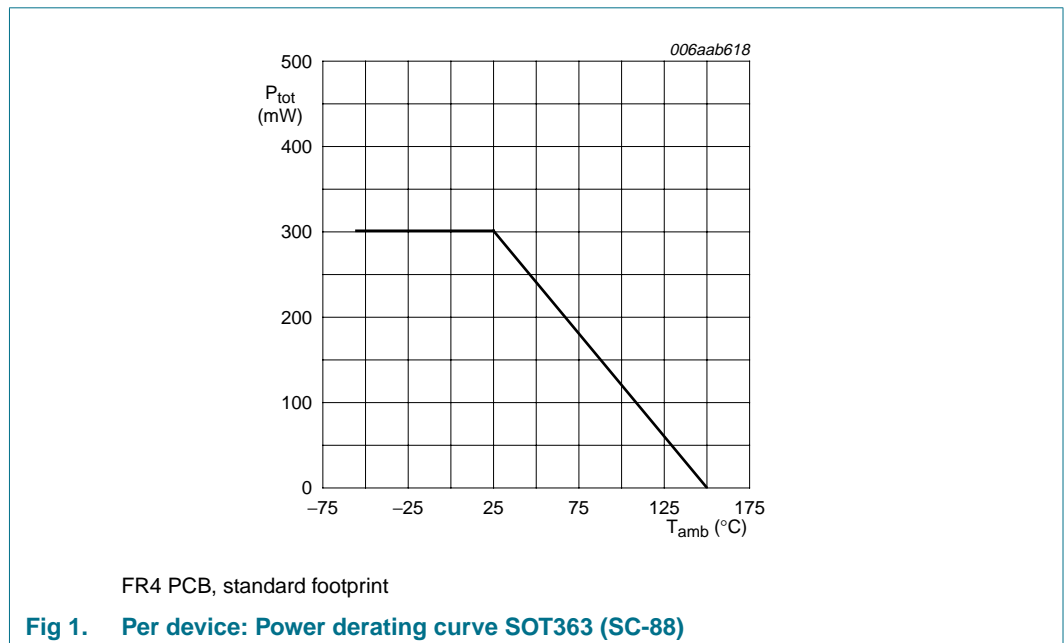
5. Limiting values

Table 6. 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	-	-80	V
V_{CEO}	collector-emitter voltage	open base	-	-65	V
V_{EBO}	emitter-base voltage	open collector	-	-6	V
I_C	collector current		-	-100	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms	-	-200	mA
I_{BM}	peak base current	single pulse; $t_p \leq 1$ ms	-	-200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	200	mW
Per device					
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	300	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 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

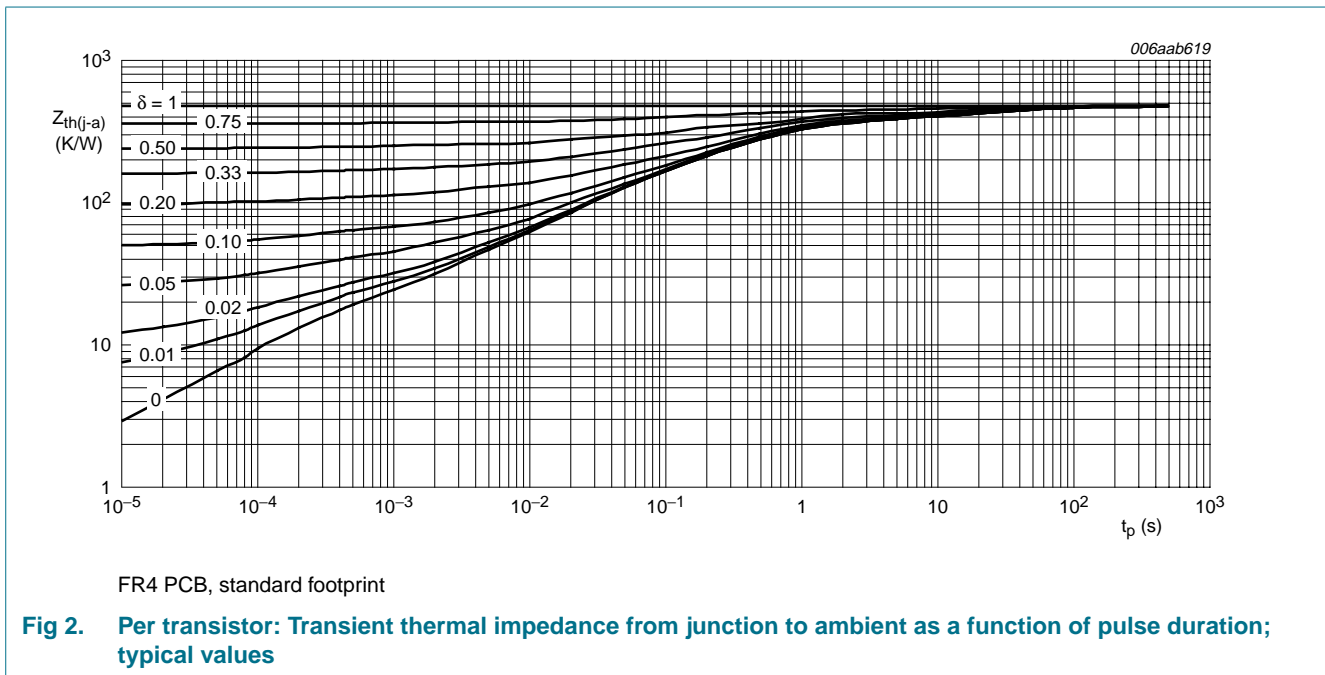


6. Thermal characteristics

Table 7. 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
$R_{th(j-sp)}$	thermal resistance from junction to solder point		-	-	230	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.

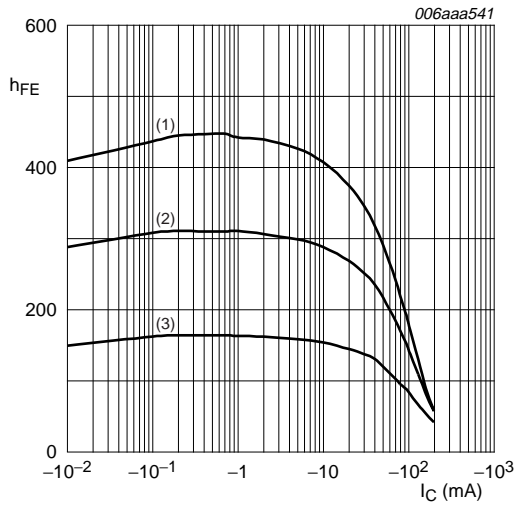


7. Characteristics

Table 8. Characteristics

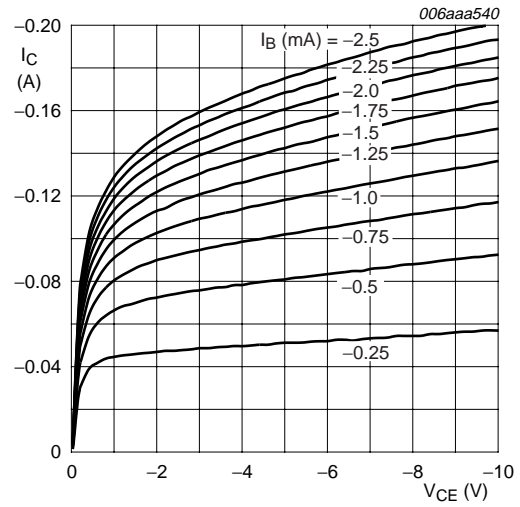
T_{amb} = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor						
I _{CBO}	collector-base cut-off current	V _{CB} = -50 V; I _E = 0 A	-	-	-15	nA
		V _{CB} = -30 V; I _E = 0 A;	-	-	-5	μA
		T _j = 150 °C				
I _{EBO}	emitter-base cut-off current	V _{EB} = -6 V; I _C = 0 A	-	-	-100	nA
h _{FE}	DC current gain	V _{CE} = -5 V				
		I _C = -10 μA	-	270	-	
		I _C = -2 mA	200	290	450	
V _{CEsat}	collector-emitter saturation voltage	I _C = -10 mA;	-	-55	-100	mV
		I _B = -0.5 mA				
V _{BEsat}	base-emitter saturation voltage	I _C = -10 mA;	-	-755	-850	mV
		I _B = -0.5 mA				
V _{BE}	base-emitter voltage	V _{CE} = -5 V				
		I _C = -2 mA	-600	-650	-750	mV
		I _C = -10 mA	-	-	-820	mV
C _c	collector capacitance	V _{CB} = -10 V; I _E = i _e = 0 A;	-	2.3	-	pF
		f = 1 MHz				
C _e	emitter capacitance	V _{EB} = -0.5 V;	-	10	-	pF
		I _C = i _c = 0 A; f = 1 MHz				
f _T	transition frequency	V _{CE} = -5 V; I _C = -10 mA;	100	-	-	MHz
		f = 100 MHz				
NF	noise figure	V _{CE} = -5 V; I _C = -0.2 mA;	-	1.6	-	dB
		R _S = 2 kΩ;				
		f = 10 Hz to 15.7 kHz				
		V _{CE} = -5 V; I _C = -0.2 mA;	-	2.9	-	dB
		R _S = 2 kΩ; f = 1 kHz;				
		B = 200 Hz				



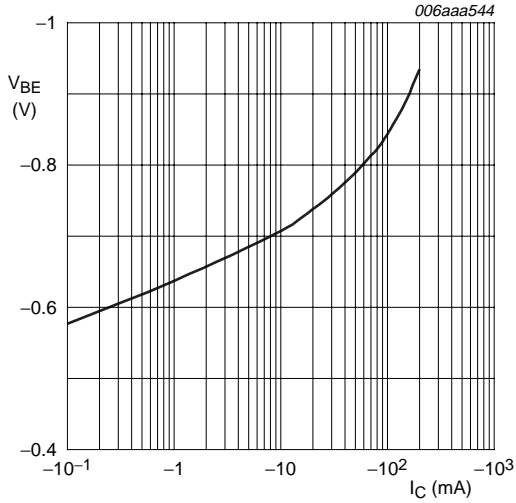
$V_{CE} = -5\text{ V}$
 (1) $T_{amb} = 100\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = -55\text{ °C}$

Fig 3. Per transistor: DC current gain as a function of collector current; typical values



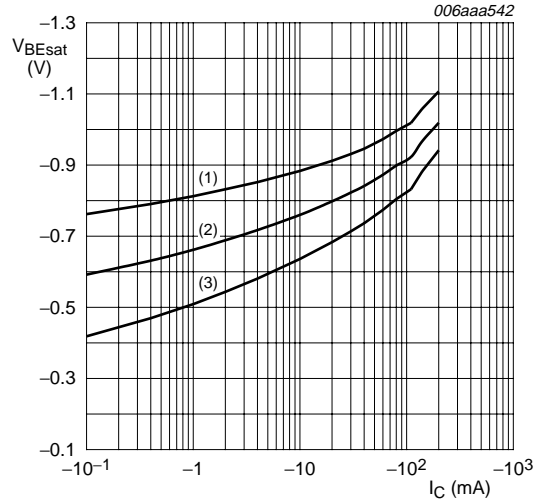
$T_{amb} = 25\text{ °C}$

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



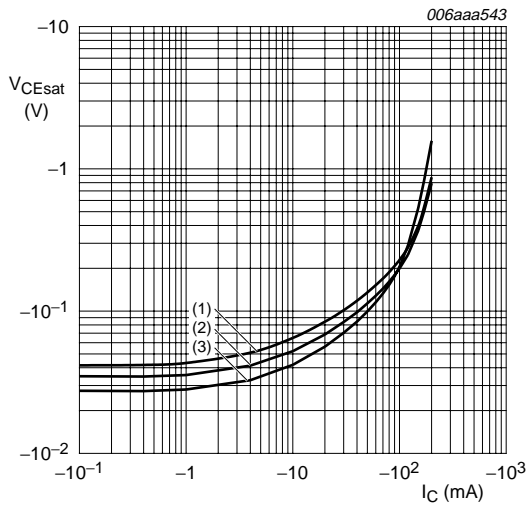
$V_{CE} = -5\text{ V}; T_{amb} = 25\text{ °C}$

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



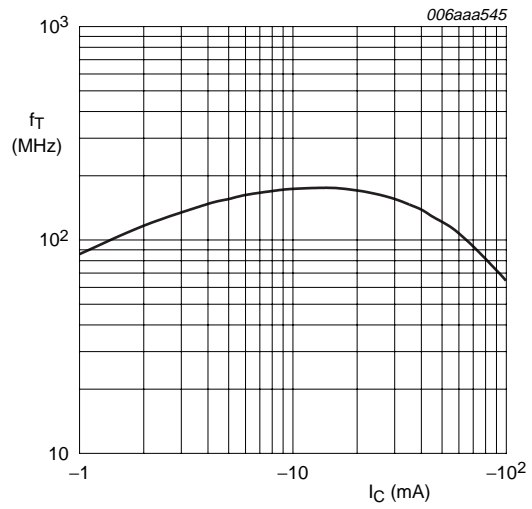
$I_C/I_B = 20$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 100\text{ °C}$

Fig 6. Per transistor: Base-emitter saturation voltage as a function of collector current; typical values



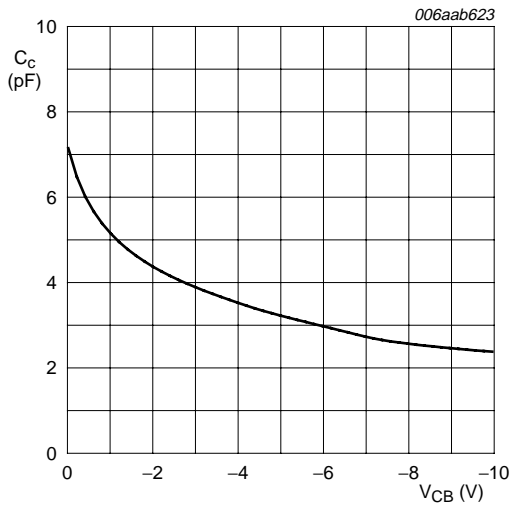
$I_C/I_B = 20$
 (1) $T_{amb} = 100\text{ }^\circ\text{C}$
 (2) $T_{amb} = 25\text{ }^\circ\text{C}$
 (3) $T_{amb} = -55\text{ }^\circ\text{C}$

Fig 7. Per transistor: Collector-emitter saturation voltage as a function of collector current; typical values



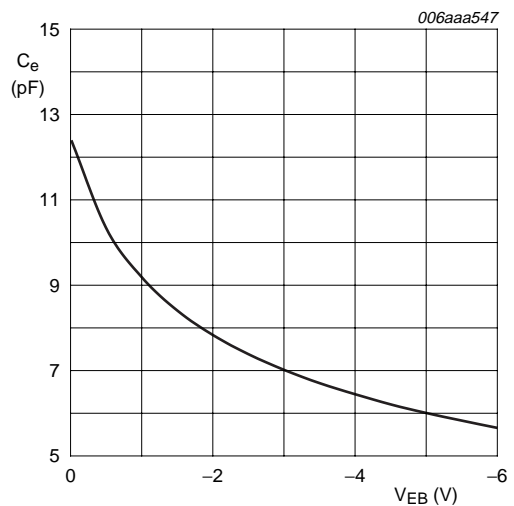
$V_{CE} = -5\text{ V}; T_{amb} = 25\text{ }^\circ\text{C}$

Fig 8. Per transistor: Transition frequency as a function of collector current; typical values



$f = 1\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}$

Fig 9. Per transistor: Collector capacitance as a function of collector-base voltage; typical values



$f = 1\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}$

Fig 10. Per transistor: Emitter capacitance as a function of emitter-base voltage; typical values

8. Test information

8.1 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.

9. Package outline

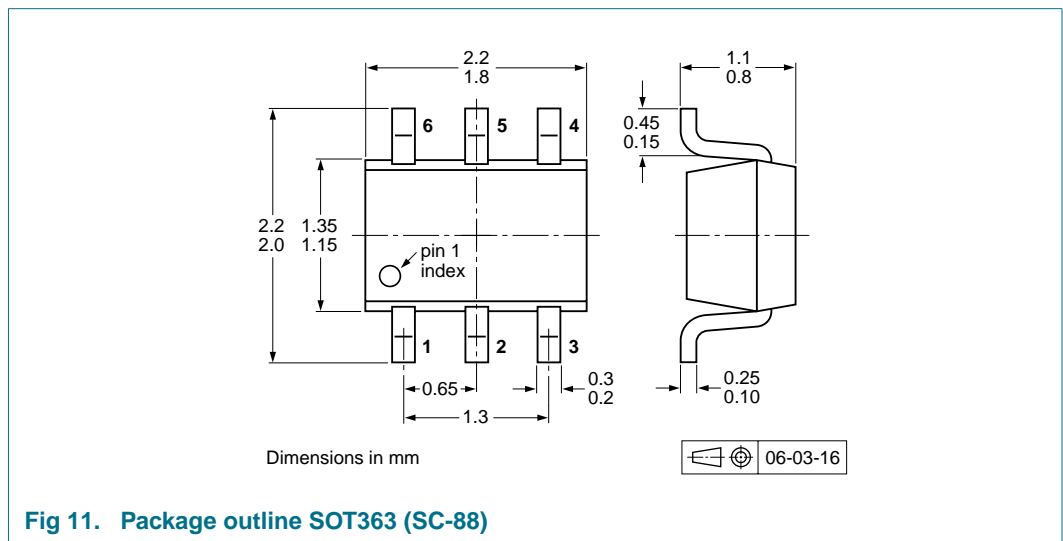


Fig 11. Package outline SOT363 (SC-88)

10. Packing information

Table 9. Packing methods

The indicated -xxx are the last three digits of the 12NC ordering code.^[1]

Type number	Package	Description	Packing quantity	
			3000	10000
BC856BS	SOT363	4 mm pitch, 8 mm tape and reel; T1	^[2] -115	-135
		4 mm pitch, 8 mm tape and reel; T2	^[3] -125	-165

[1] For further information and the availability of packing methods, see [Section 14](#).

[2] T1: normal taping

[3] T2: reverse taping

11. Soldering

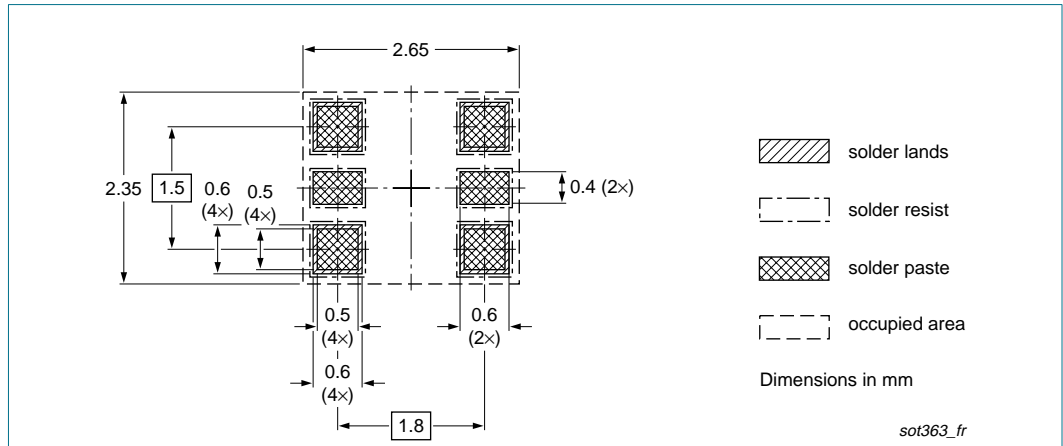


Fig 12. Reflow soldering footprint SOT363 (SC-88)

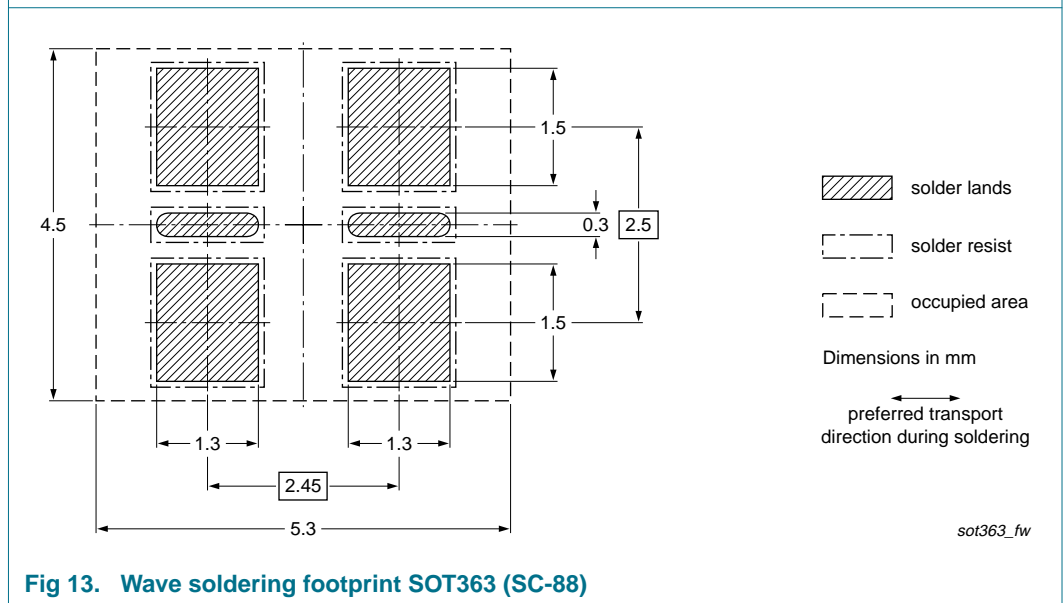


Fig 13. Wave soldering footprint SOT363 (SC-88)

12. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BC856BS_1	20090811	Product data sheet	-	-

13. Legal information

13.1 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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