



**THE DATASHEET OF
BC857BS,135**





BC857BS

PNP general purpose double transistor

1 July 2022

Product data sheet

1. General description

PNP general-purpose double transistor in a very small SOT363 (SC-88) Surface-Mounted Device (SMD) plastic package. NPN complement: BC847BS.

2. Features and benefits

- Low collector capacitance
- Low collector-emitter saturation voltage
- Closely matched current gain
- Reduces number of components and boardspace
- No mutual interference between the transistors

3. Applications

- General purpose switching and amplification.

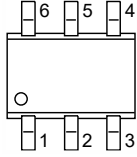
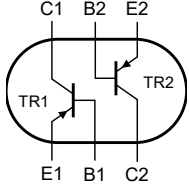
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor						
V_{CEO}	collector-emitter voltage	open base	-	-	-45	V
I_C	collector current		-	-	-100	mA
h_{FE}	DC current gain	$V_{CE} = -5\text{ V}; I_C = -2\text{ mA}; T_{amb} = 25\text{ °C}$	200	-	450	

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	E1	emitter TR1	 <p>TSSOP6 (SOT363)</p>	 <p><i>sym138</i></p>
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
BC857BS	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]
BC857BS	3F%

[1] % = placeholder for manufacturing site code

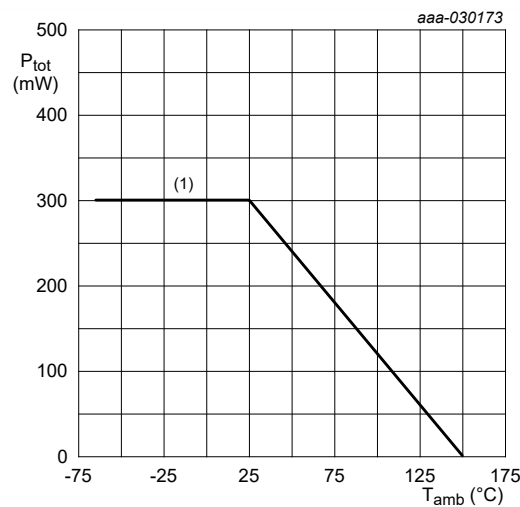
8. Limiting values

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	single pulse; $t_p \leq 1$ ms	-	-200	mA
I_{BM}	peak base current		-	-200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	200	mW
T_j	junction temperature		-	150	°C
T_{amb}	ambient temperature		-65	150	°C
T_{stg}	storage temperature		-65	150	°C
Per device					
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	300	mW

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



(1) FR4 PCB, single-sided, 35 μ m copper, tin-plated and standard footprint

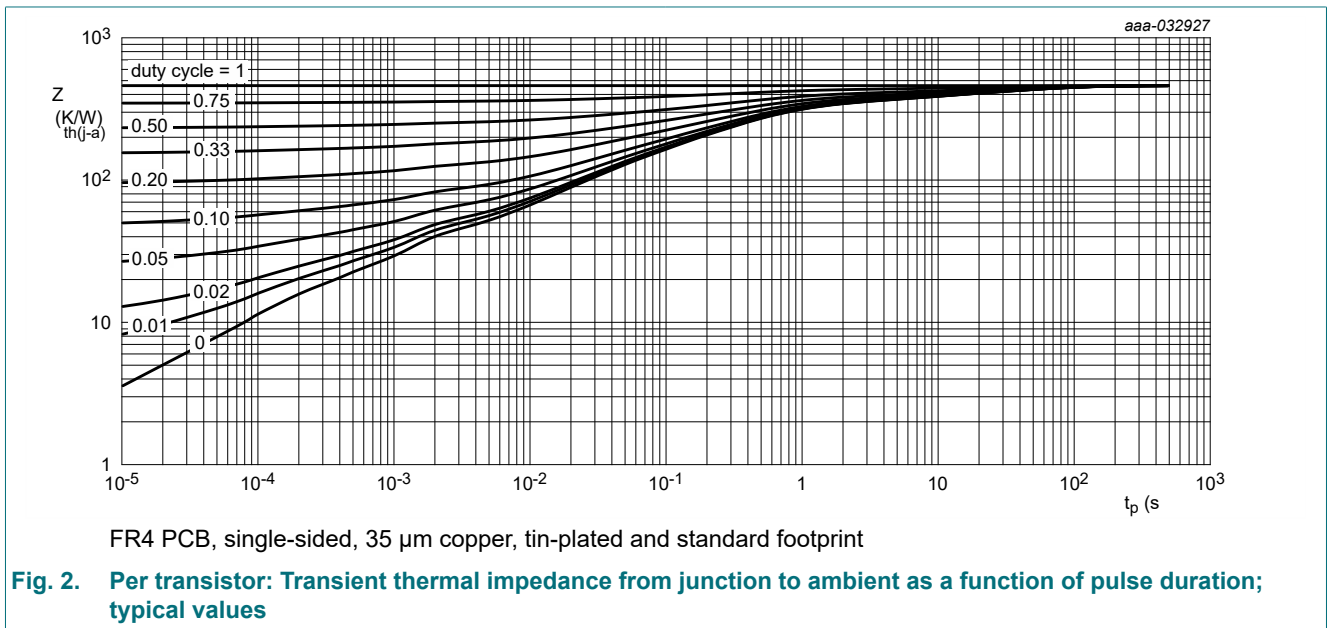
Fig. 1. Per device: Power derating curves

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]	-	-	568	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

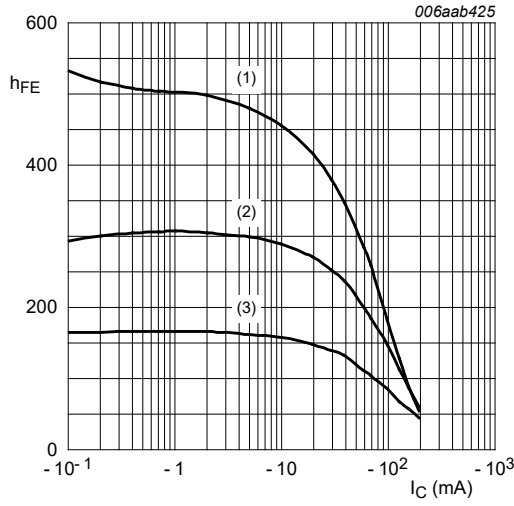
[1] Device mounted on an FR4 PCB, single-sided, 35 μ m copper, tin-plated and standard footprint.



10. Characteristics

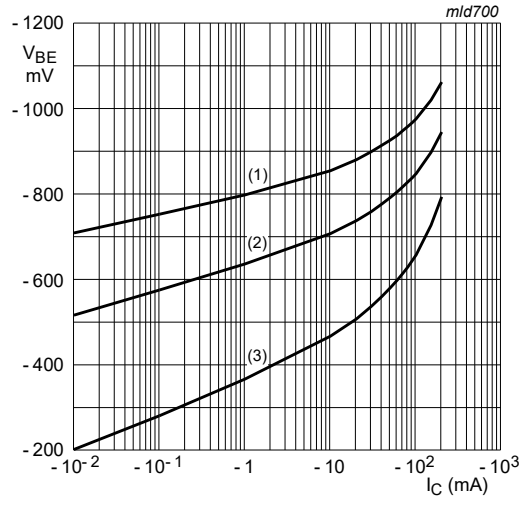
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor						
$V_{(BR)CBO}$	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	$I_C = -2 \text{ mA}; I_B = 0 \text{ A}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	45	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	$I_C = 0 \text{ A}; I_E = -100 \mu\text{A}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	5	-	-	V
I_{CBO}	collector-base cut-off current	$V_{CB} = -30 \text{ V}; I_E = 0 \text{ A}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	-15	nA
		$V_{CB} = -30 \text{ V}; I_E = 0 \text{ A}; T_j = 150 \text{ }^\circ\text{C}$	-	-	-5	μA
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	$V_{CE} = -5 \text{ V}; I_C = -2 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	200	-	450	
V_{CEsat}	collector-emitter saturation voltage	$I_C = -10 \text{ mA}; I_B = -0.5 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	-100	mV
		$I_C = -100 \text{ mA}; I_B = -5 \text{ mA}; \text{pulsed}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	-400	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = -10 \text{ mA}; I_B = -0.5 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-755	-	mV
V_{BE}	base-emitter voltage	$V_{CE} = -5 \text{ V}; I_C = 2 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-600	-655	-750	mV
C_c	collector capacitance	$V_{CB} = -10 \text{ V}; I_E = 0 \text{ A}; i_e = 0 \text{ A}; f = 1 \text{ MHz}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	2.2	pF
C_e	emitter capacitance	$V_{EB} = -0.5 \text{ V}; I_C = 0 \text{ A}; i_c = 0 \text{ A}; f = 1 \text{ MHz}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	10	-	pF
f_T	transition frequency	$V_{CE} = -5 \text{ V}; I_C = -10 \text{ mA}; f = 100 \text{ MHz}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	100	-	-	MHz
NF	noise figure	$V_{CE} = -5 \text{ V}; I_C = -0.2 \text{ mA}; R_S = 2 \text{ k}\Omega; f = 1 \text{ kHz}; B = 200 \text{ Hz}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	2	-	dB



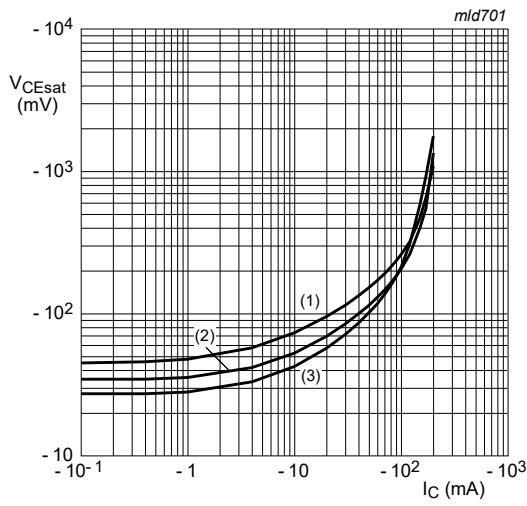
$V_{CE} = -5 \text{ V}$
 (1) $T_{amb} = 150 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = -55 \text{ }^\circ\text{C}$

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



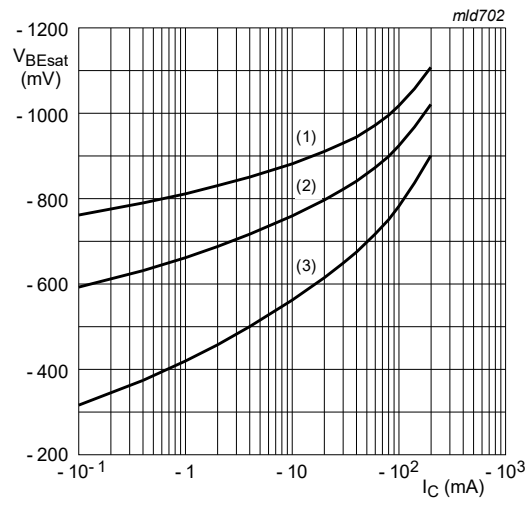
$V_{CE} = -5 \text{ V}$
 (1) $T_{amb} = -55 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = 150 \text{ }^\circ\text{C}$

Fig. 4. PNP TR2: Base-emitter voltage as a function of collector current; typical values



$I_C/I_B = 20$
 (1) $T_{amb} = 150 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = -55 \text{ }^\circ\text{C}$

Fig. 5. PNP TR2: Collector-emitter saturation voltage as a function of collector current; typical values



$I_C/I_B = 20$
 (1) $T_{amb} = -55 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = 150 \text{ }^\circ\text{C}$

Fig. 6. PNP TR2: Base-emitter saturation voltage as a function of collector current; typical values

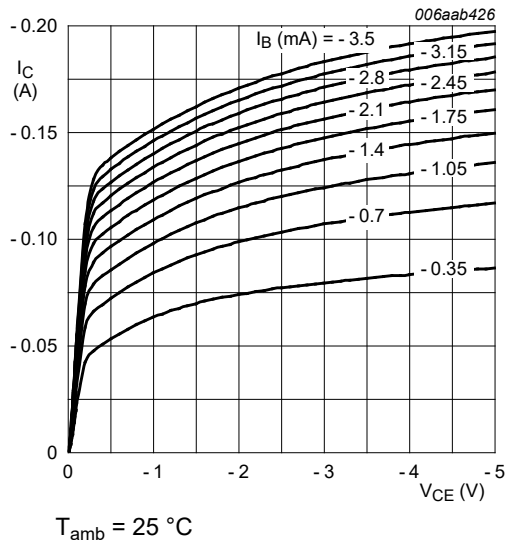


Fig. 7. PNP transistor: Collector current as a function of collector-emitter voltage; typical values

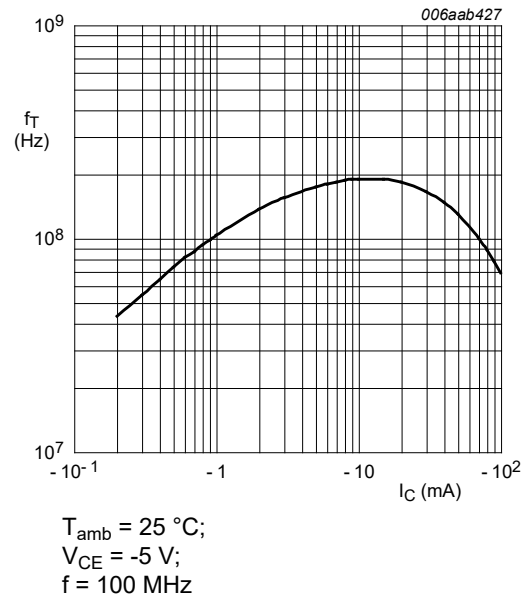


Fig. 8. PNP transistor: Transition frequency as a function of collector current; typical values

11. Package outline

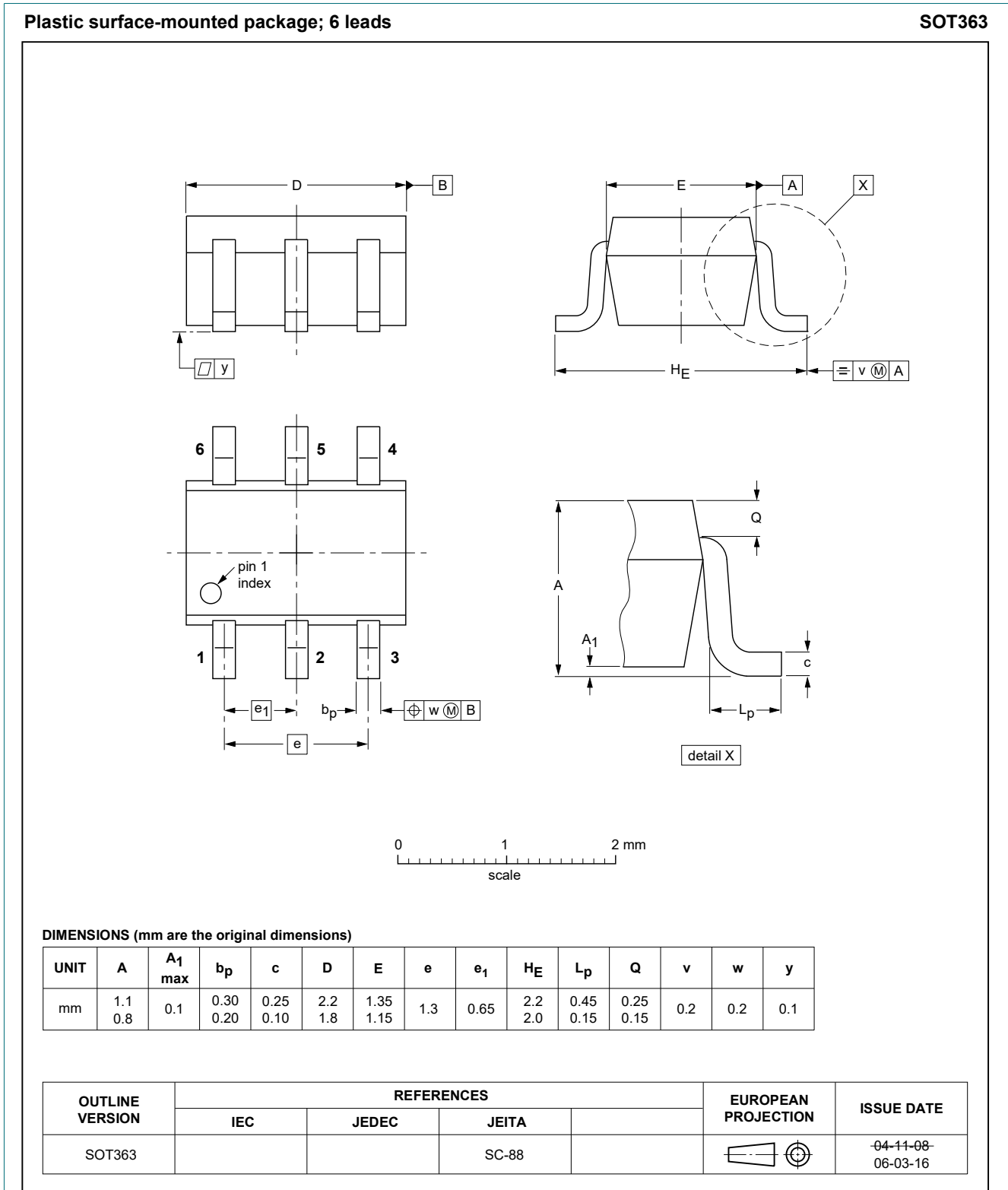


Fig. 9. Package outline TSSOP6 (SOT363)

12. Soldering

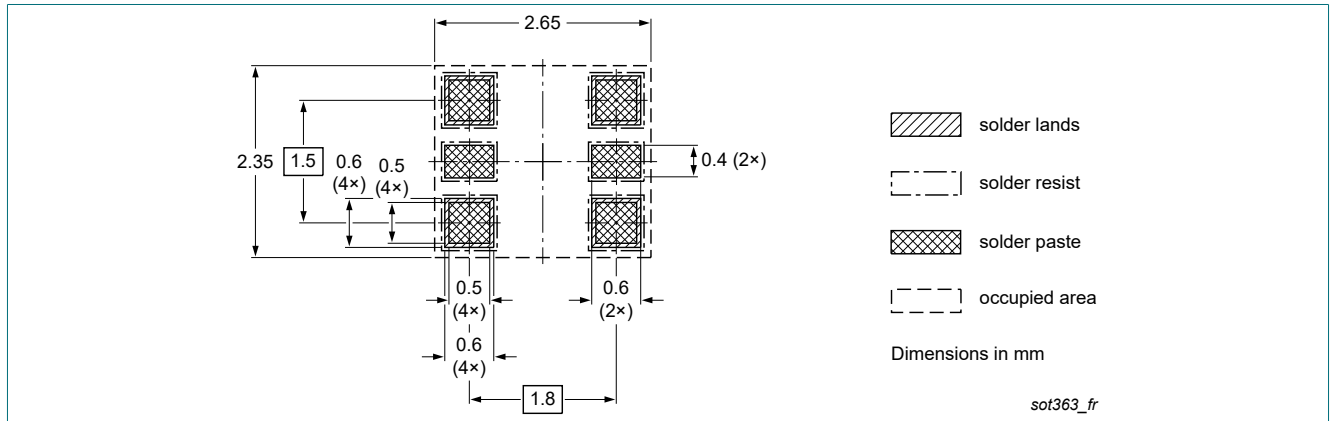


Fig. 10. Reflow soldering footprint for TSSOP6 (SOT363)

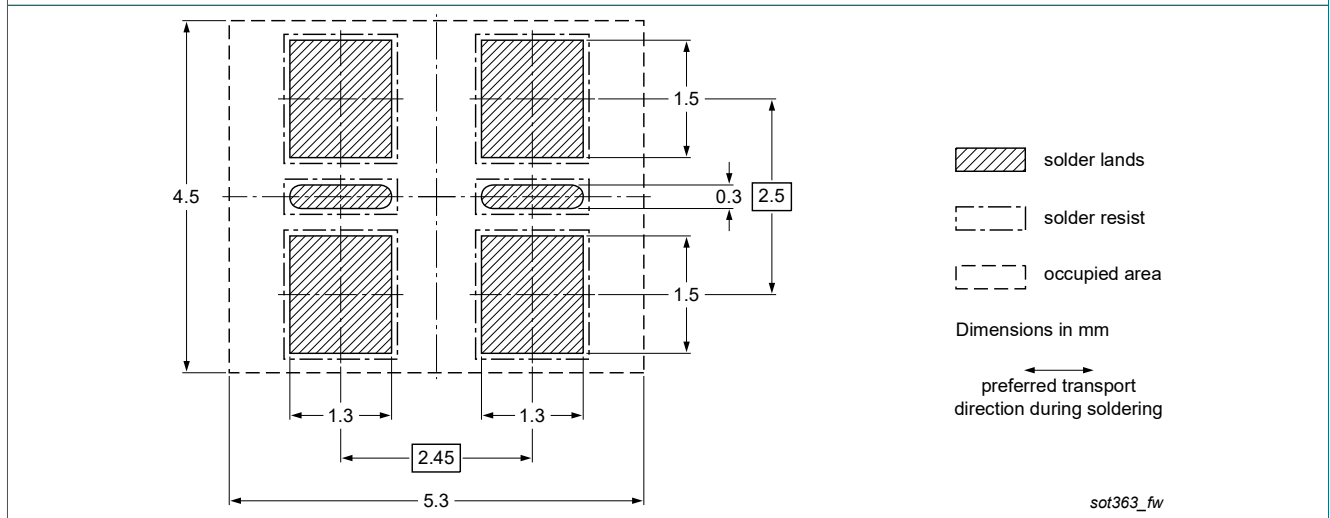


Fig. 11. Wave soldering footprint for TSSOP6 (SOT363)

13. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BC857BS v.3	20220701	Product data sheet	-	BC857BS v.2
Modifications:	<ul style="list-style-type: none"> The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. Legal texts have been adapted to the new company name where appropriate. Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s). 			
BC857BS v.2	19990426	Product data sheet	-	BC857BS v.1
BC857BS v.1	19970709	Product specification	-	-

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".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at <https://www.nexperia.com>.

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