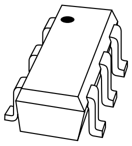


BC856S

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

Rev. 02 — 19 February 2009 | Product data sheet

1. Product profile

1.1 General description

PNP/PNP general-purpose transistor pair in a very small SOT363 (SC-88) Surface-Mounted Device (SMD) plastic package.

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

1.3 Applications

- General-purpose switching and amplification

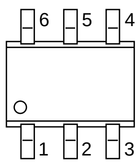
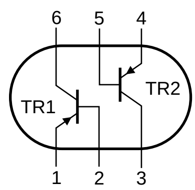
1.4 Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor						
V_{CEO}	collector-emitter voltage	open base	-	-	–65	V
I_C	collector current		-	-	–100	mA
h_{FE}	DC current gain	V_{CE} = –5 V; I_C = –2 mA	110	-	-	

2. Pinning information

Table 2. 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

founded by Philips

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BC856S	SC-88	plastic surface-mounted package; 6 leads	SOT363

4. Marking

Table 4. Marking codes

Type number	Marking code[1]
BC856S	5F*

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

5. Limiting values

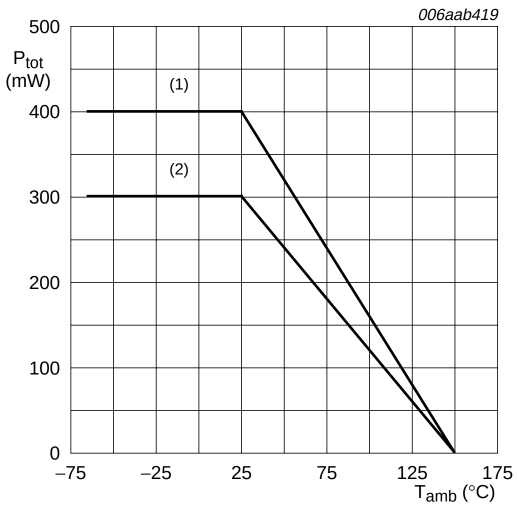
Table 5. Limiting values

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		-	–80	V
V_{CEO}	collector-emitter voltage	open base		-	–65	V
V_{EBO}	emitter-base voltage	open collector		-	–5	V
I_C	collector current			-	–100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	220	mW
			[2]	-	250	mW
Per device						
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	300	mW
			[2]	-	400	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.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm^2.



(1) FR4 PCB, mounting pad for collector 1 cm^2

(2) FR4 PCB, standard footprint

Fig 1. Per device: Power derating curves SOT363 (SC-88)

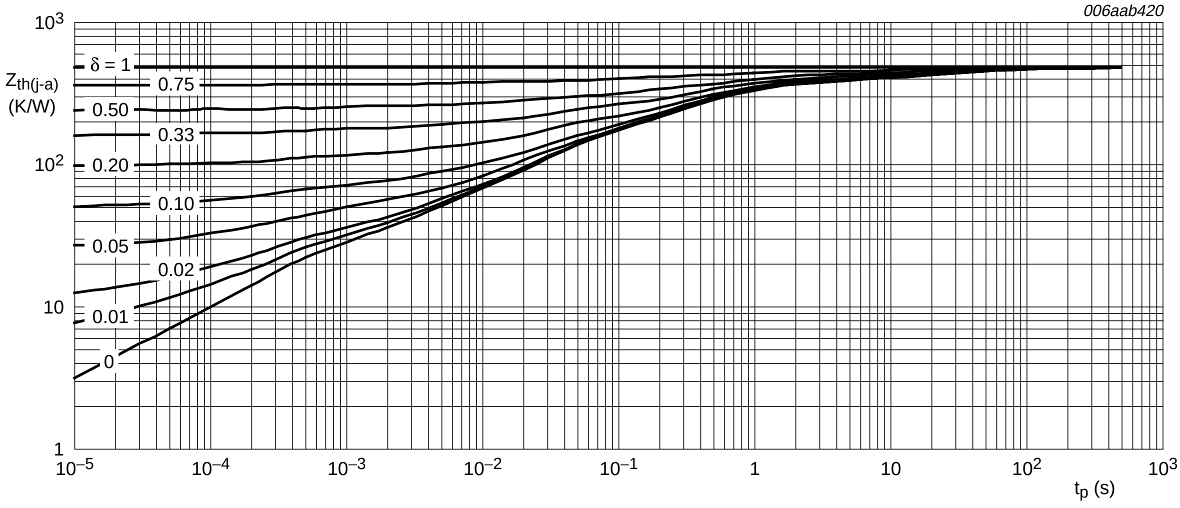
6. Thermal characteristics

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
			[2]	-	-	500	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
			[2]	-	-	313	K/W

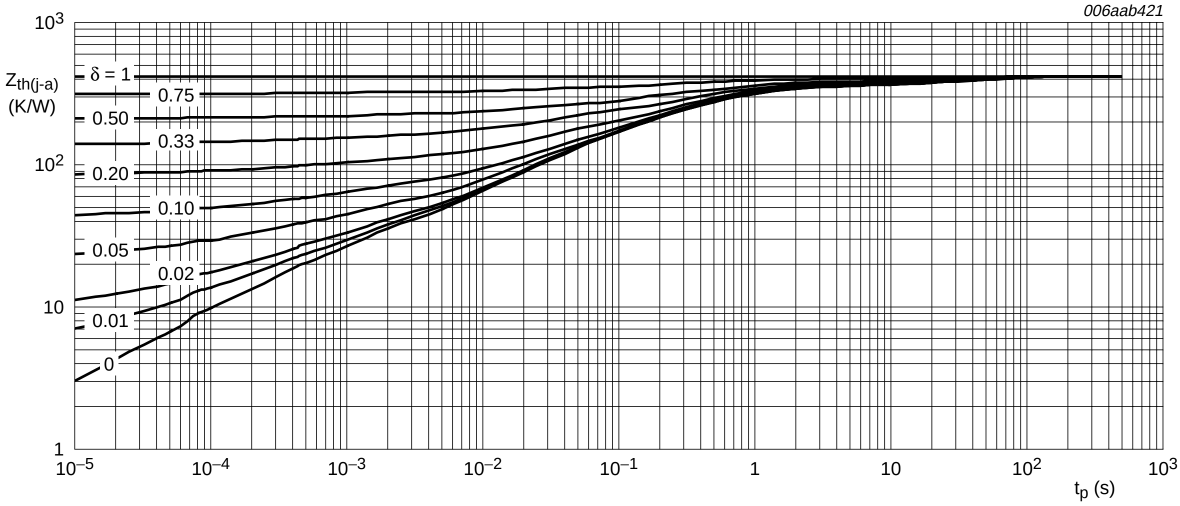
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm^2.



FR4 PCB, standard footprint

Fig 2. Per transistor: Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



FR4 PCB, mounting pad for collector 1 cm^2

Fig 3. Per transistor: Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

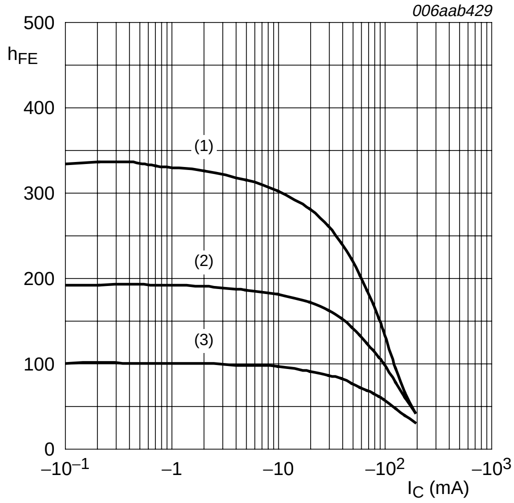
7. Characteristics

Table 7. 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} = –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	V_{CE} = –5 V; I_C = –2 mA		110	-	-	
V_{CEsat}	collector-emitter saturation voltage	I_C = –10 mA; I_B = –0.5 mA		-	-	–100	mV
		I_C = –100 mA; I_B = –5 mA	[1]	-	-	–300	mV
V_{BEsat}	base-emitter saturation voltage	I_C = –10 mA; I_B = –0.5 mA		-	700	-	mV
V_{BE}	base-emitter voltage	I_C = –2 mA; V_{CE} = –5 V		–600	–650	–750	mV
		I_C = –10 mA; V_{CE} = –5 V		-	-	–820	mV
C_c	collector capacitance	I_E = i_e = 0 A; V_{CB} = –10 V; f = 1 MHz		-	-	2.5	pF
f_T	transition frequency	I_C = –10 mA; V_{CE} = –5 V; f = 100 MHz		100	-	-	MHz

[1] Pulse test: $t_p \leq 300$ µs; $\delta \leq 0.02$.



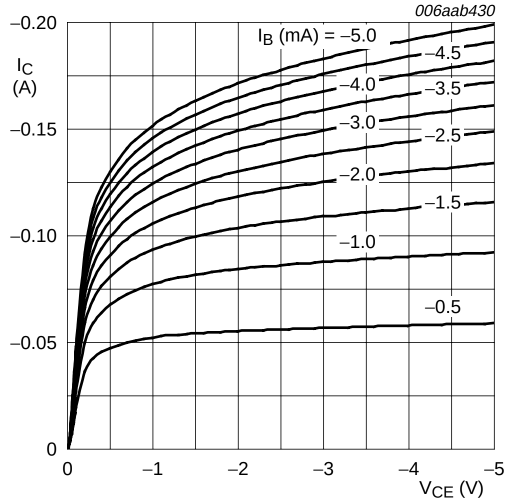
$V_{CE} = -5$ V

(1) $T_{amb} = 150$ °C

(2) $T_{amb} = 25$ °C

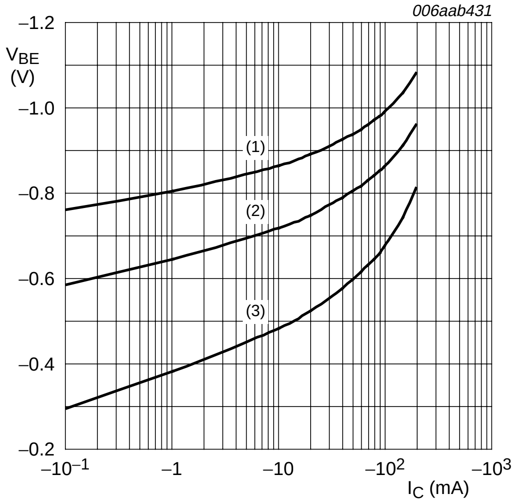
(3) $T_{amb} = -55$ °C

Fig 4. Per transistor: DC current gain as a function of collector current; typical values



$T_{amb} = 25$ °C

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



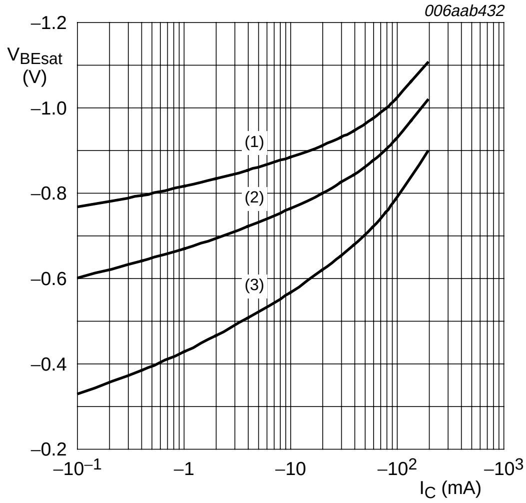
$V_{CE} = -5$ V

(1) $T_{amb} = -55$ °C

(2) $T_{amb} = 25$ °C

(3) $T_{amb} = 150$ °C

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



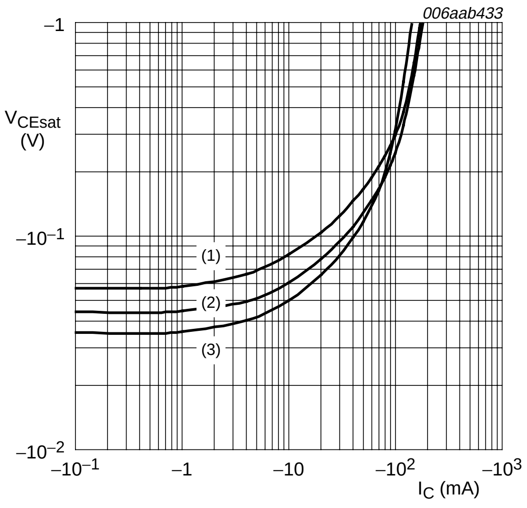
$I_C/I_B = 20$

(1) $T_{amb} = -55$ °C

(2) $T_{amb} = 25$ °C

(3) $T_{amb} = 150$ °C

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



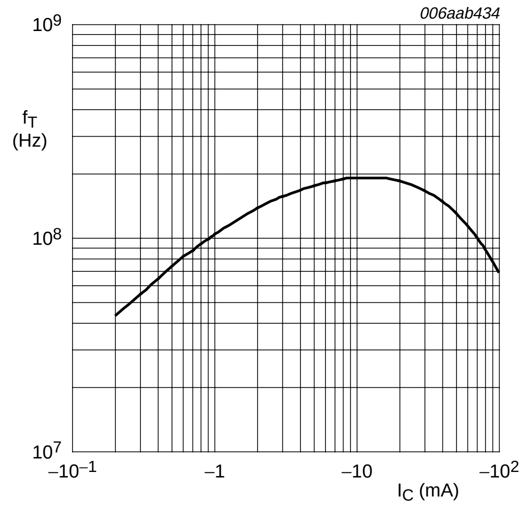
I_C/I_B = 20

(1) T_{amb} = 150 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = −55 °C

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



V_{CE} = −5 V; f = 1 MHz; T_{amb} = 25 °C

Fig 9. Per transistor: Transition frequency as a function of collector current; typical values

8. Package outline

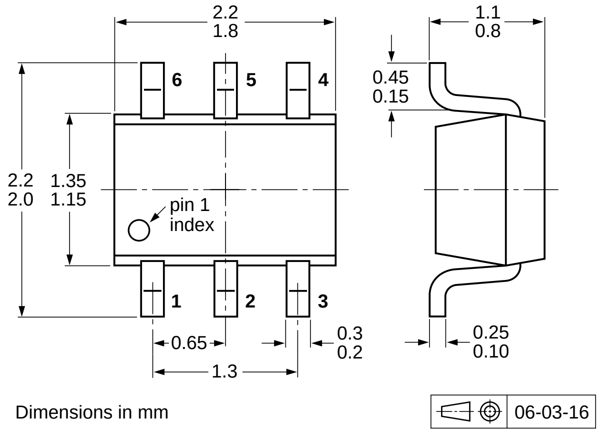


Fig 10. Package outline SOT363 (SC-88)

9. Packing information

Table 8. Packing methods

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

Type number	Package	Description		Packing quantity	
				3000	10000
BC856S	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 13.

[2] T1: normal taping

[3] T2: reverse taping

10. Soldering

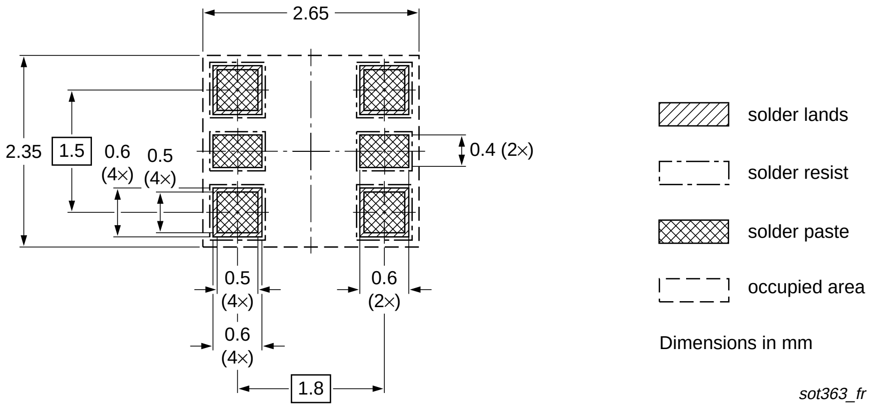


Fig 11. Reflow soldering footprint SOT363 (SC-88)

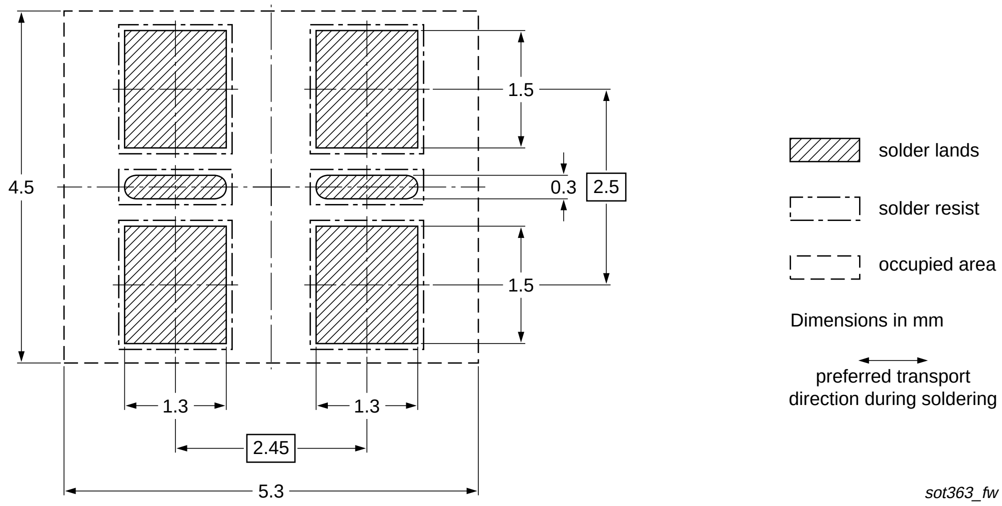


Fig 12. Wave soldering footprint SOT363 (SC-88)

11. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BC856S_2	20090219	Product data sheet	-	BC856S_1
Modifications:	• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. • Legal texts have been adapted to the new company name where appropriate. • Section 1.2 "Features": adapted • Section 4 "Marking": updated • Section 7 "Characteristics": enhanced • Section 9 "Packing information": added • Section 10 "Soldering": added • Section 12 "Legal information": updated			
BC856S_1	19990824	Product specification	-	-

12. Legal information

12.1 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".

[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 URL http://www.nxp.com.

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