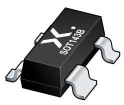

BCM61B

NPN/NPN matched double transistor

Rev. 02 — 28 August 2009 Product data sheet

1. Product profile

1.1 General description

NPN/NPN matched double transistor in a SOT143B small Surface-Mounted Device (SMD) plastic package. Matched version of BCV61.

PNP/PNP equivalent: BCM62B

1.2 Features

- Current gain matching

1.3 Applications

- Current mirror
- Differential amplifier

1.4 Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor TR1						
V_{CEO}	collector-emitter voltage	open base	-	-	45	V
h_{FE}	DC current gain	V_{CE} = 5 V; I_C = 2 mA	200	290	450	
Per transistor						
I_C	collector current		-	-	100	mA
Per device						
I_{C1}/I_{E2}	current matching	V_{CE1} = 5 V; I_{E2} = –0.5 mA; T_{amb} ≤ 25 °C [1]	0.92	1.02	1.12	

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

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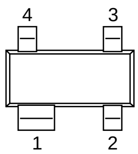
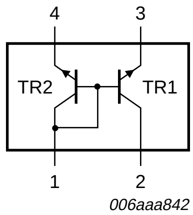
2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Symbol
1	collector TR2, base TR1 and TR2		
2	collector TR1		
3	emitter TR1		
4	emitter TR2		

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BCM61B	-	plastic surface-mounted package; 4 leads	SOT143B

4. Marking

Table 4. Marking codes

Type number	Marking code[1]
BCM61B	*AC

[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 TR1						
V_{CBO}	collector-base voltage	open emitter		-	50	V
V_{CEO}	collector-emitter voltage	open base		-	45	V
Per transistor						
V_{EBS}	emitter-base voltage	V_{CB} = 0 V		-	6	V
I_C	collector current			-	100	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms		-	200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	220	mW
Per device						
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	390	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 PCB, single-sided copper, tin-plated and standard footprint.

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
Per device							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	321	K/W

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

7. Characteristics

Table 7. Characteristics
T_{amb} = 25 °C unless otherwise specified

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per transistor TR1							
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 = 10 μA		-	250	-	
		V_{CE} = 5 V; I_C = 100 μA		100	-	-	
		V_{CE} = 5 V; I_C = 2 mA		200	290	450	
V_{CEsat}	collector-emitter saturation voltage	I_C = 10 mA; I_B = 0.5 mA		-	50	200	mV
		I_C = 100 mA; I_B = 5 mA		-	200	400	mV
V_{BEsat}	base-emitter saturation voltage	I_C = 10 mA; I_B = 0.5 mA	[1]	-	760	-	mV
		I_C = 100 mA; I_B = 5 mA	[1]	-	910	-	mV
V_{BE}	base-emitter voltage	V_{CE} = 5 V; I_C = 2 mA	[2]	610	660	710	mV
		V_{CE} = 5 V; I_C = 10 mA	[2]	-	-	770	mV
C_c	collector capacitance	V_{CB} = 10 V; I_E = i_e = 0 A; f = 1 MHz		-	-	1.5	pF
C_e	emitter capacitance	V_{EB} = 0.5 V; I_C = i_c = 0 A; f = 1 MHz		-	11	-	pF
f_T	transition frequency	V_{CE} = 5 V; I_C = 10 mA; f = 100 MHz		100	250	-	MHz
NF	noise figure	V_{CE} = 5 V; I_C = 0.2 mA; R_S = 2 kΩ; f = 10 Hz to 15.7 kHz		-	2.8	-	dB
		V_{CE} = 5 V; I_C = 0.2 mA; R_S = 2 kΩ; f = 1 kHz; B = 200 Hz		-	3.3	-	dB

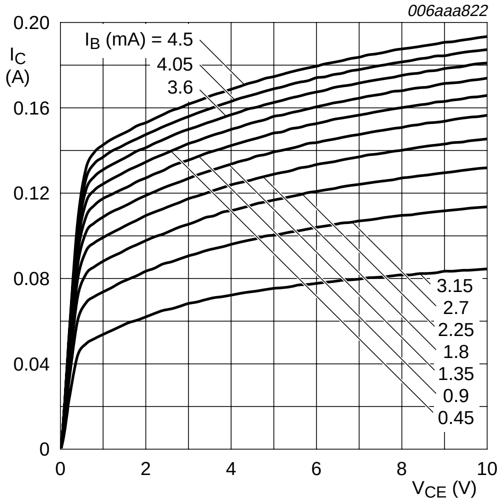
Table 7. Characteristics *...continued*
T_{amb} = 25 °C unless otherwise specified

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per transistor TR2							
V_{EBS}	emitter-base voltage	V_{CB} = 0 V; I_E = −250 mA		-	-	−1.8	V
		V_{CB} = 0 V; I_E = −10 µA		−400	-	-	mV
Per device							
I_{C1}/I_{E2}	current matching	V_{CE1} = 5 V; I_{E2} = −0.5 mA; $T_{amb} \leq 25$ °C	[3]	0.92	1.02	1.12	
		V_{CE1} = 5 V; I_{E2} = −0.5 mA; $T_{amb} \leq 150$ °C	[3]	0.93	-	1.13	
		V_{CE1} = 3 V; I_{E2} = −0.5 mA; $T_{amb} \leq 25$ °C	[3]	0.91	1.01	1.11	
		V_{CE1} = 1 V; I_{E2} = −0.5 mA; $T_{amb} \leq 25$ °C	[3]	0.9	1	1.1	

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

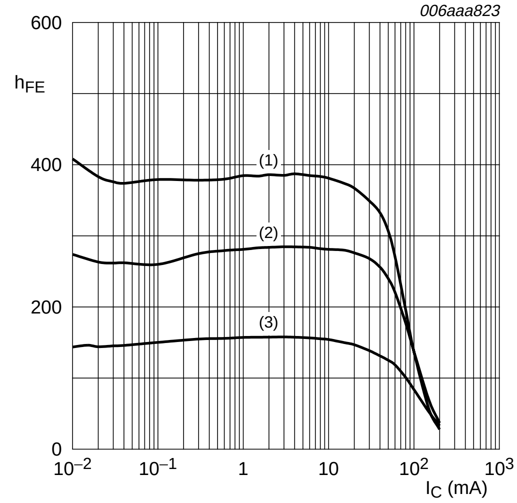
[2] V_{BE} decreases by about 2 mV/K with increasing temperature.

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



T_{amb} = 25 °C

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



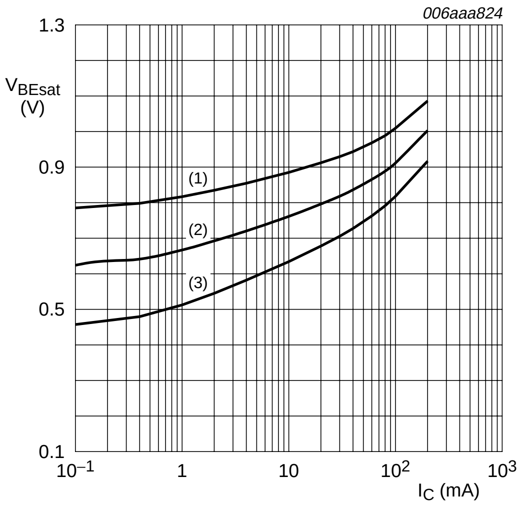
V_{CE} = 5 V

(1) T_{amb} = 100 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = −55 °C

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



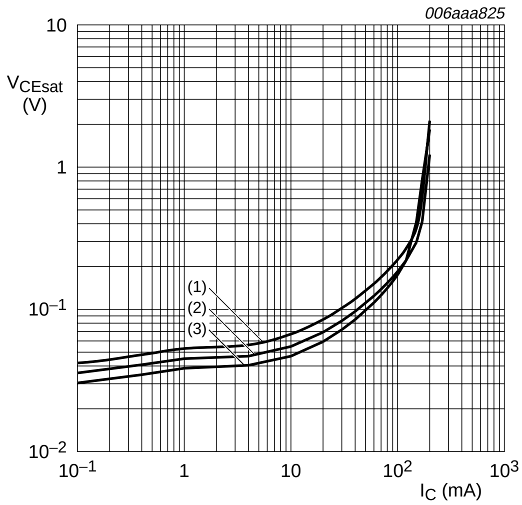
I_C/I_B = 20

(1) T_{amb} = −55 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = 100 °C

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



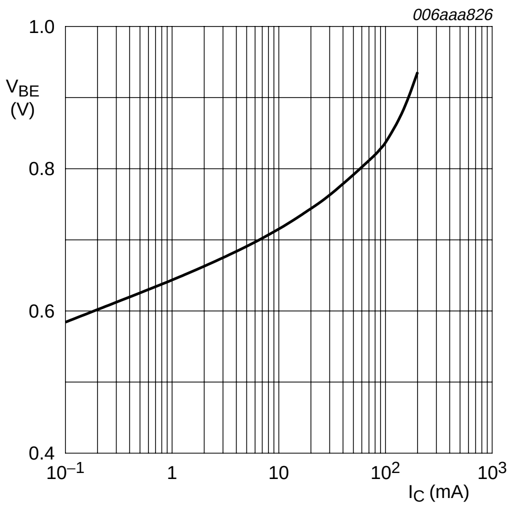
I_C/I_B = 20

(1) T_{amb} = 100 °C

(2) T_{amb} = 25 °C

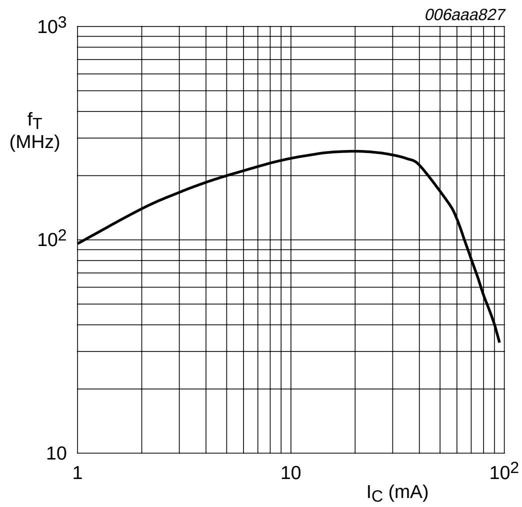
(3) T_{amb} = −55 °C

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



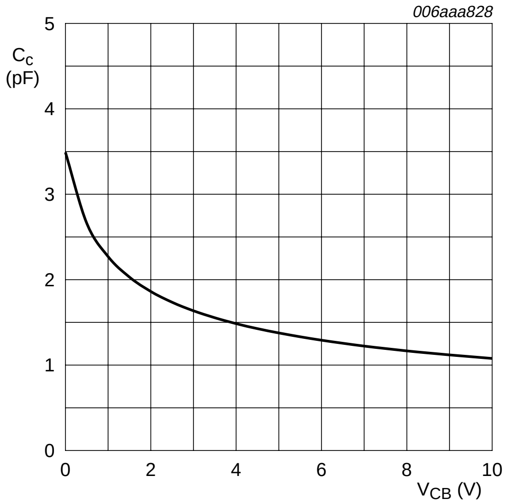
V_{CE} = 5 V; T_{amb} = 25 °C

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



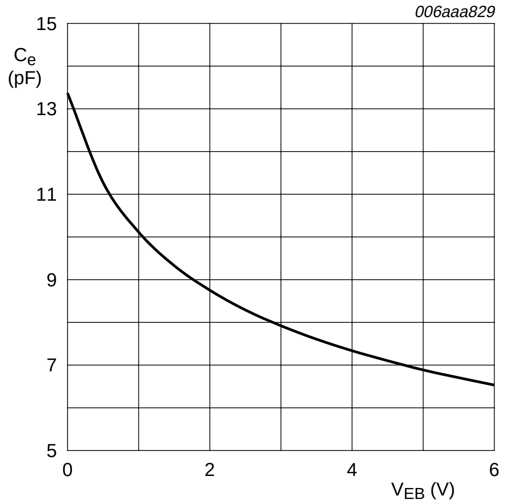
V_{CE} = 5 V; T_{amb} = 25 °C

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



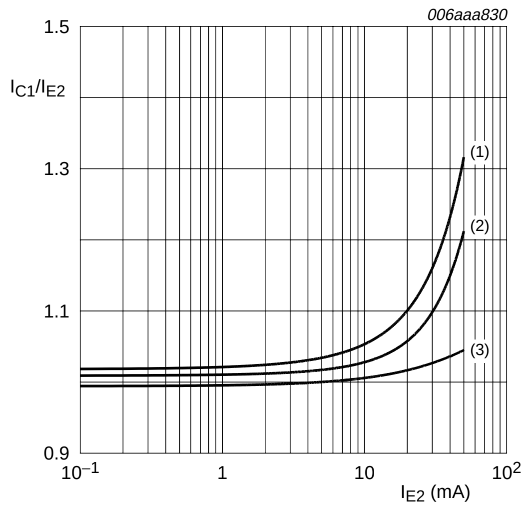
f = 1 MHz; T_{amb} = 25 °C

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



(1) V_{CE1} = 5 V

(2) V_{CE1} = 3 V

(3) V_{CE1} = 1 V

Fig 9. Current matching as a function of emitter current 2; typical values

8. Test information

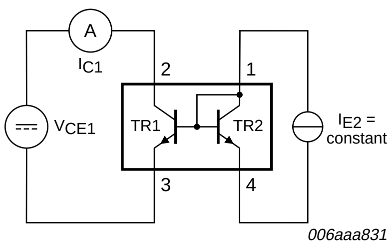


Fig 10. Test circuit current matching

9. Package outline

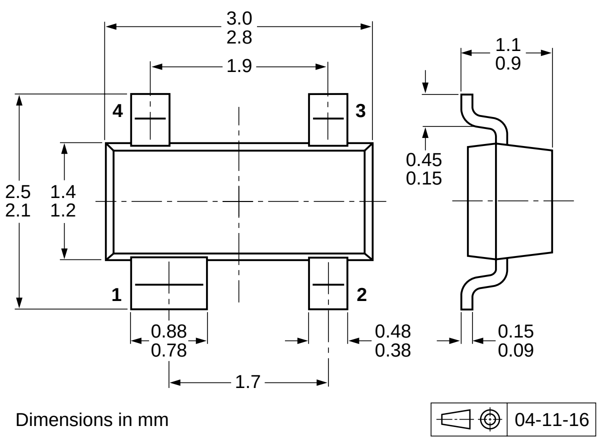
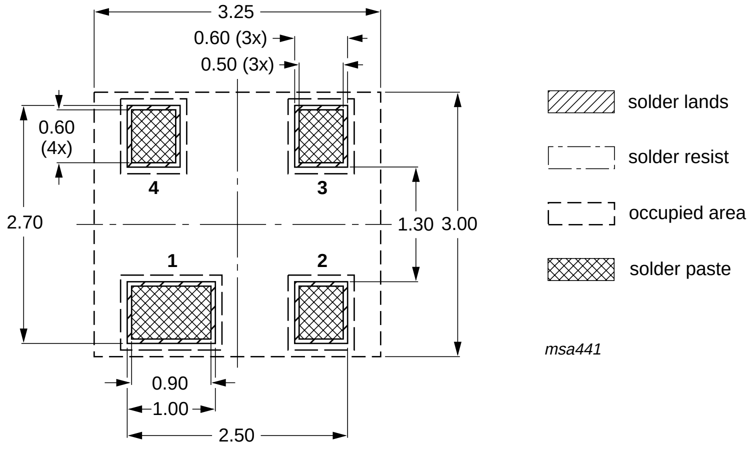


Fig 11. Package outline SOT143B

10. Packing information

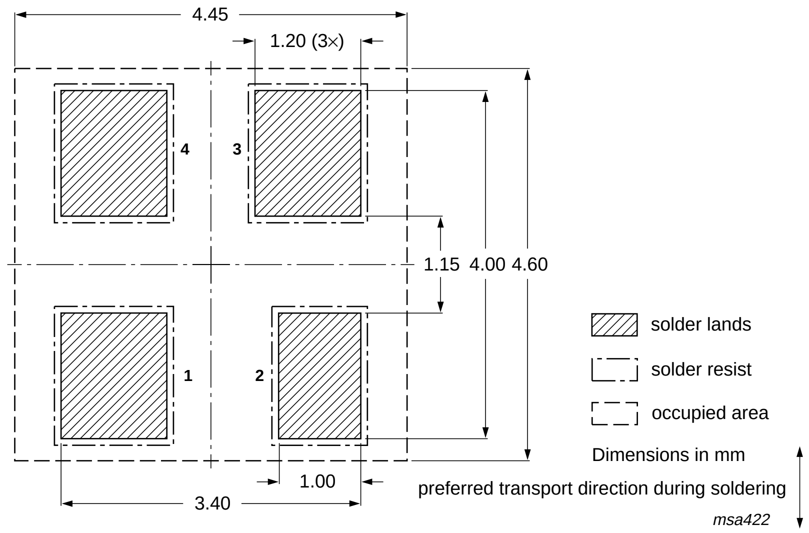
Please refer to packing information on www.nexperia.com.

11. Soldering



Dimensions in mm

Fig 12. Reflow soldering footprint SOT143B



Dimensions in mm

Fig 13. Wave soldering footprint SOT143B

12. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BCM61B_2	20090828	Product data sheet	-	BCM61B_1
Modifications:	• This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content. • Figure 13 "Wave soldering footprint SOT143B": updated			
BCM61B_1	20060919	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".

[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.nexperia.com.

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14. Contents

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Date of release: 28 August 2009
Document identifier: BCM61B