

BCM847BS

NPN matched double transistor; $\Delta h_{FE} = 10\%$

Rev. 02 — 6 April 2005

Product data sheet

1. Product profile

1.1 General description

NPN matched double transistor in a SOT363 (SC-88) SMD plastic package. Matched version of BC847BS. The transistors are fully isolated internally.

PNP equivalent: BCM857BS.

1.2 Features

- Current gain matching
- Base-emitter voltage matching

1.3 Applications

- Current mirror
- Differential amplifier

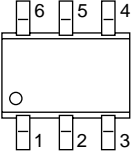
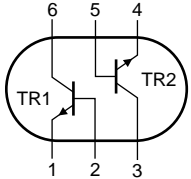
1.4 Quick reference data

Table 1: Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base	-	-	45	V
I_C	collector current		-	-	100	mA
h_{FE}	DC current gain	$V_{CE} = 5\text{ V};$ $I_C = 2\text{ mA}$	200	290	450	
Δh_{FE}	h_{FE} matching	$V_{CE} = 5\text{ V};$ $I_C = 2\text{ mA}$	-	-	10	%
ΔV_{BE}	V_{BE} matching	$V_{CE} = 5\text{ V};$ $I_C = 2\text{ mA}$	-	-	2	mV

2. Pinning information

Table 2: Pinning

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

sym020

3. Ordering information

Table 3: Ordering information

Type number	Package		Version
	Name	Description	
BCM847BS	SC-88	plastic surface mounted package; 6 leads	SOT363

4. Marking

Table 4: Marking codes

Type number	Marking code ^[1]
BCM847BS	M1*

- [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	-	50	V
V_{CEO}	collector-emitter voltage	open base	-	45	V
V_{EBO}	emitter-base voltage	open collector	-	6	V
I_C	collector current (DC)		-	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	-	200	mW
T_{stg}	storage temperature		-65	+150	°C
T_j	junction temperature		-	150	°C
T_{amb}	ambient 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 copper, tin-plated and standard footprint.

6. Thermal characteristics

Table 6: Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
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

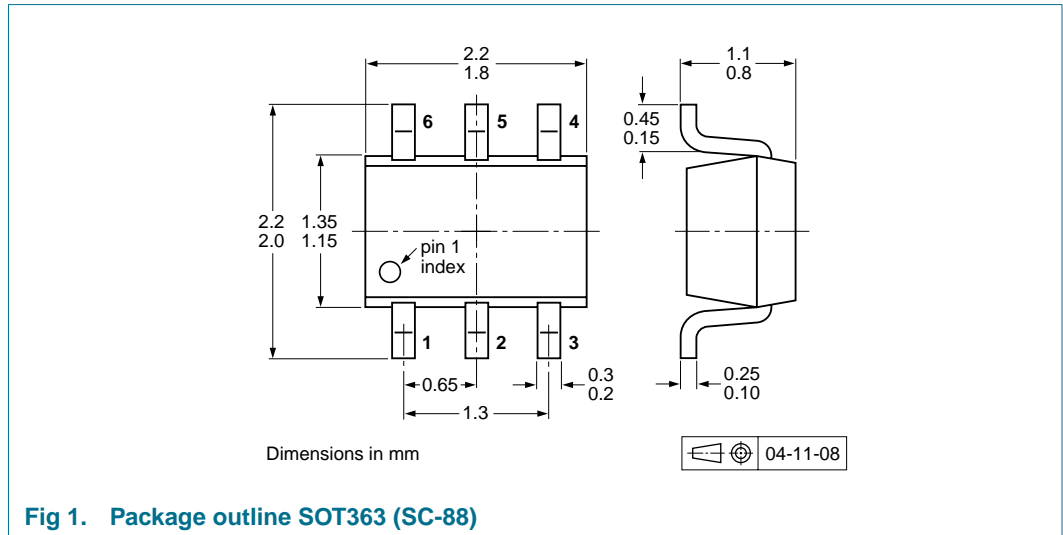
Table 7: Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor						
I_{CBO}	collector-base cut-off current	$V_{CB} = 30\text{ V}; I_E = 0\text{ A}$	-	-	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	$V_{EB} = 5\text{ V}; I_C = 0\text{ A}$	-	-	100	nA
h_{FE}	DC current gain	$V_{CE} = 5\text{ V}; I_C = 10\text{ }\mu\text{A}$	-	250	-	
		$V_{CE} = 5\text{ V}; I_C = 2\text{ mA}$	200	290	450	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 0.5\text{ mA}$	-	50	200	mV
		$I_C = 100\text{ mA}; I_B = 5\text{ mA}$	[1]	200	400	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 0.5\text{ mA}$	-	760	-	mV
		$I_C = 100\text{ mA}; I_B = 5\text{ mA}$	-	910	-	mV
V_{BE}	base-emitter voltage	$V_{CE} = 5\text{ V}; I_C = 2\text{ mA}$	610	660	710	mV
		$V_{CE} = 5\text{ V}; I_C = 10\text{ mA}$	-	-	770	mV
C_c	collector capacitance	$V_{CB} = 10\text{ V}; I_E = i_e = 0\text{ A}; f = 1\text{ MHz}$	-	-	1.5	pF
C_e	emitter capacitance	$V_{EB} = 0.5\text{ V}; I_C = i_c = 0\text{ A}; f = 1\text{ MHz}$	-	11	-	pF
f_T	transition frequency	$V_{CE} = 5\text{ V}; I_C = 10\text{ mA}; f = 100\text{ MHz}$	100	250	-	MHz
Per device						
Δh_{FE}	DC current gain matching	$V_{CE} = 5\text{ V}; I_C = 2\text{ mA}$	-	-	10	%
ΔV_{BE}	base-emitter voltage matching	$V_{CE} = 5\text{ V}; I_C = 2\text{ mA}$	-	-	2	mV

[1] Pulse test: $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02$.

8. Package outline



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
BCM847BS	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

10. Revision history

Table 9: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
BCM847BS_2	20050406	Product data sheet	-	9397 750 14722	BCM847BS_1
Modifications:	<ul style="list-style-type: none">• Table 7 Revaluation of data according to the latest control samples• Table 7 I_{CBO} unit for conditions $V_{CB} = 30\text{ V}$; $I_E = 0\text{ A}$; $T_j = 150\text{ °C}$ amended to μA				
BCM847BS_1	20040914	Product data sheet	-	9397 750 13711	-

11. Data sheet status

Level	Data sheet status ^[1]	Product status ^[2] ^[3]	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
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[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

12. Definitions

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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