BC847BVN

NPN/PNP general purpose transistor

20 May 2019 **Product data sheet**

1. General description

NPN/PNP transistor pair in a SOT666 plastic package.

2. Features and benefits

- 300 mW total power dissipation
- Very small 1.6 mm x 1.2 mm ultra thin package
- Excellent coplanarity due to straight leads
- Replaces two SC-75/SC-89 packaged transistors on same PCB area
- Reduced required PCB area
- Reduced pick and place costs.
- AEC-Q101 qualified

3. Applications

- General purpose switching and amplification
- Switch mode power supply complementary MOSFET driver
- Complementary driver for audio amplifiers.

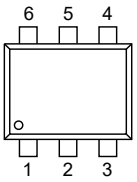
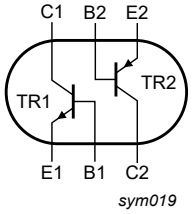
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per transistor; for the PNP transistor with negative polarity							
V_{CEO}	collector-emitter voltage	open base		-	-	45	V
I_C	collector current			-	-	100	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms		-	-	200	mA
h_{FE}	DC current gain	V_{CE} = 5 V; I_C = 2 mA		200	-	450	

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	E1	emitter TR1	 SOT666	
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
BC847BVN	SOT666	plastic, surface-mounted package; 6 leads; 0.5 mm pitch; 1.6 mm x 1.2 mm x 0.55 mm body	SOT666

7. Marking

Table 4. Marking codes

Type number	Marking code
BC847BVN	13

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; for the PNP transistor with negative polarity						
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 copper, tin-plated and standard footprint.

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] [2]	-	-	416	K/W

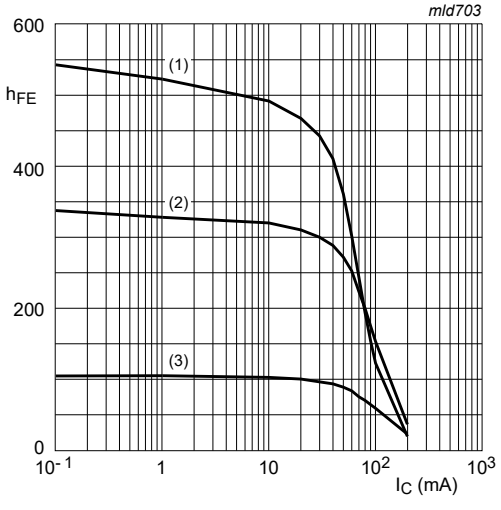
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[2] Reflow soldering is the only recommended soldering method.

10. Characteristics

Table 7. Characteristics

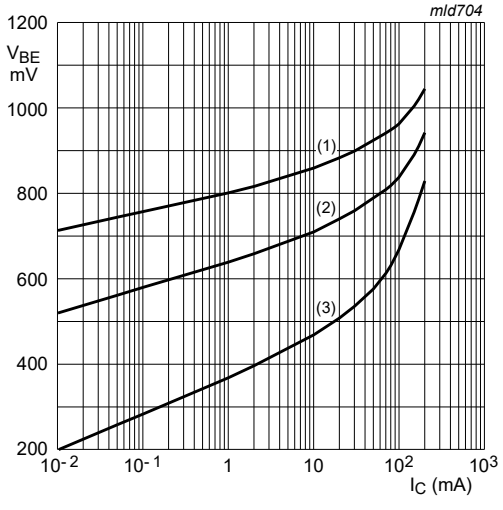
T_{amb} = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per transistor; for the PNP transistor with negative polarity							
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		200	-	450	
V_{CEsat}	collector-emitter saturation voltage	I_C = 10 mA; I_B = 0.5 mA; T_{amb} = 25 °C		-	-	100	mV
		I_C = 100 mA; I_B = 5 mA; Pulsed test: $t_p \leq$ 300 µs; $\delta \leq$ 0.02		-	-	300	mV
V_{BEsat}	base-emitter saturation voltage	I_C = 10 mA; I_B = 0.5 mA		-	755	-	mV
f_T	transition frequency	V_{CE} = 5 V; I_C = 10 mA; f = 100 MHz		100	-	-	MHz
NPN transistor							
V_{BE}	base-emitter voltage	V_{CE} = 5 V; I_C = 2 mA		580	655	700	mV
C_c	collector capacitance	V_{CB} = 10 V; I_E = 0 A; i_e = 0 A; f = 1 MHz		-	-	1.5	pF
C_e	emitter capacitance	V_{EB} = 500 mV; I_C = 0 A; i_c = 0 A; f = 1 MHz		-	11	-	pF
PNP transistor							
V_{BE}	base-emitter voltage	V_{CE} = -5 V; I_C = -2 mA		-600	-655	-750	mV
C_c	collector capacitance	V_{CB} = -10 V; I_E = 0 A; i_e = 0 A; f = 1 MHz; T_{amb} = 25 °C		-	-	2.2	pF
C_e	emitter capacitance	V_{EB} = -500 mV; I_C = 0 A; i_c = 0 A; f = 1 MHz		-	10	-	pF



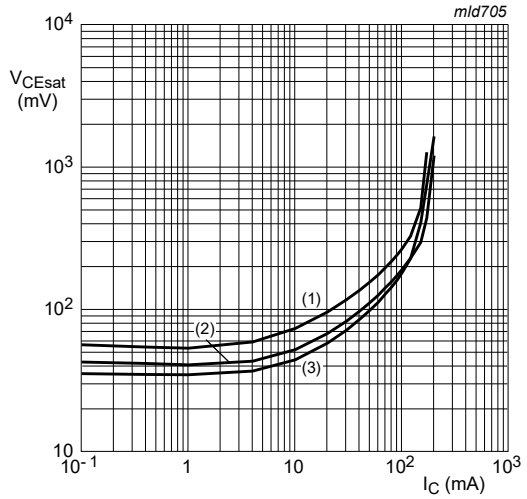
V_{CE} = 5 V
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = −55 °C

Fig. 1. NPN TR1: DC current gain as a function of collector current; typical values



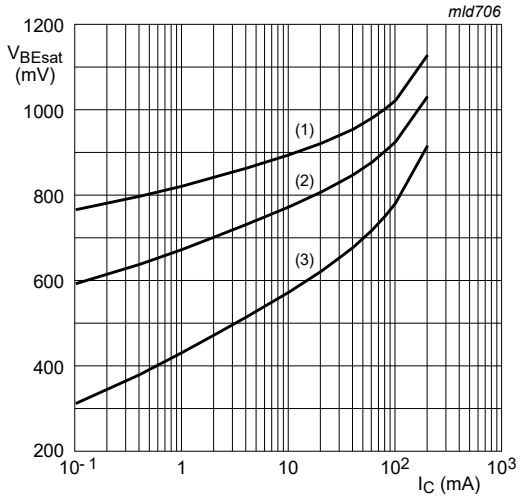
V_{CE} = 5 V
(1) T_{amb} = −55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

Fig. 2. NPN TR1: Base-emitter voltage as a function of collector current; typical values



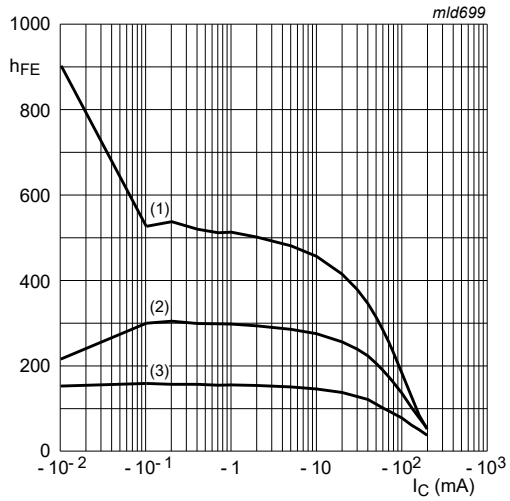
I_C/I_B = 20
(1) T_{amb} = 150°C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

Fig. 3. NPN TR1: Collector-emitter saturation voltage as a function of collector current; typical values



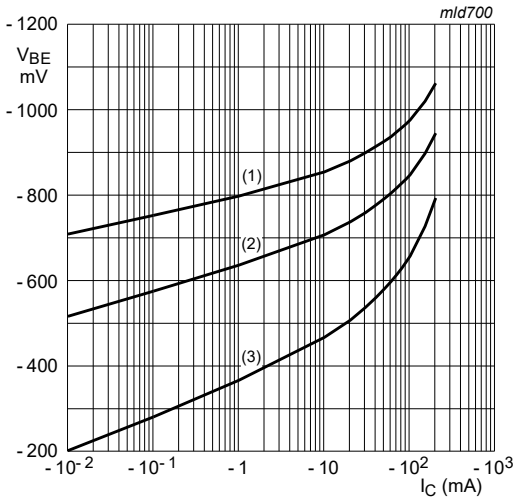
I_C/I_B = 20
(1) T_{amb} = −55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

Fig. 4. NPN TR1: Base-emitter saturation voltage as a function of collector current; typical values



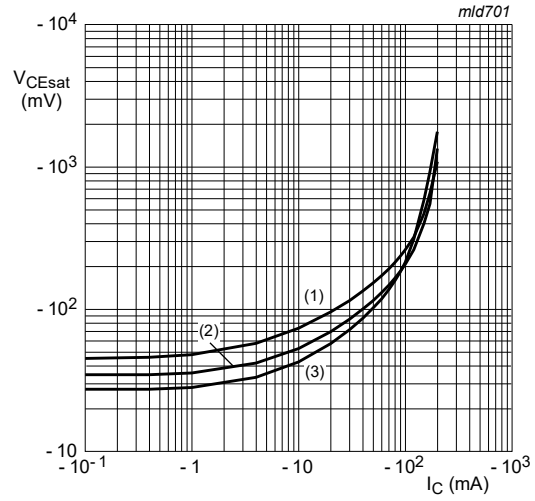
V_{CE} = -5 V
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = −55 °C

Fig. 5. PNP TR2: DC current gain as a function of collector current; typical values



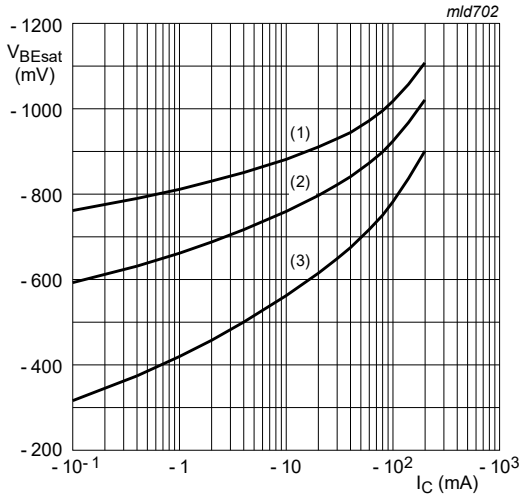
V_{CE} = -5 V
(1) T_{amb} = −55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

Fig. 6. PNP TR2: Base-emitter 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. 7. PNP TR2: Collector-emitter saturation 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. 8. PNP TR2: Base-emitter saturation voltage as a function of collector current; typical values

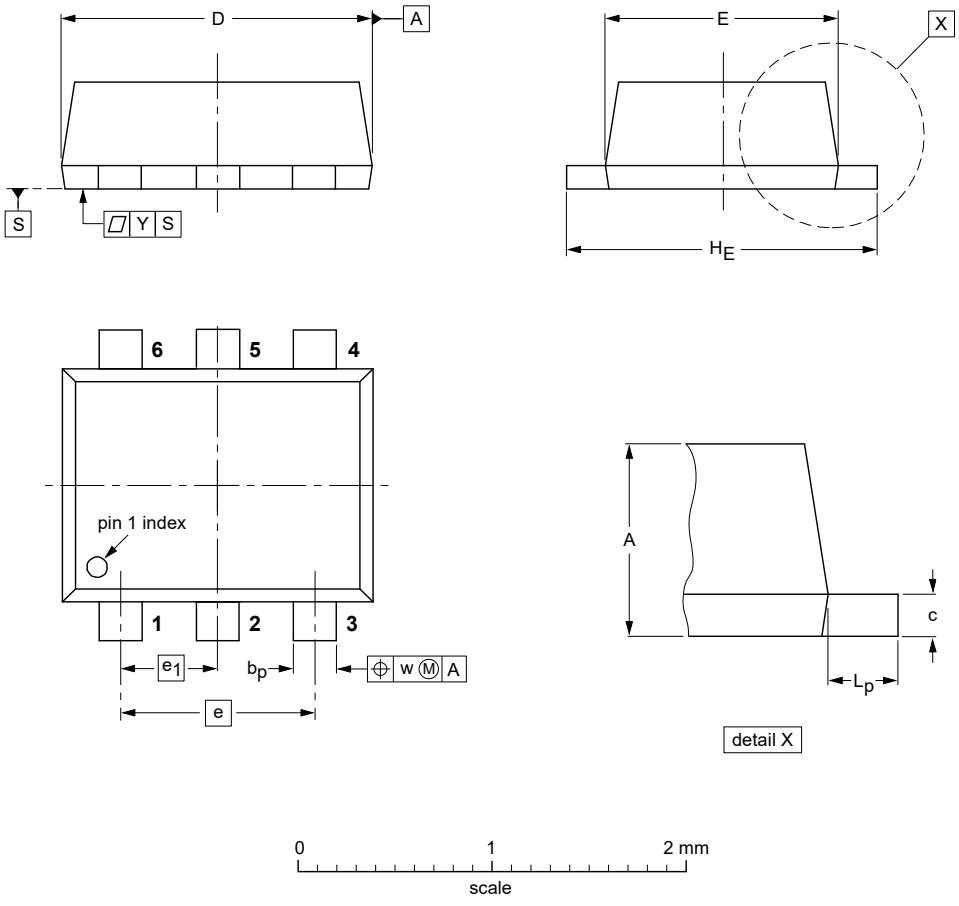
11. Test information

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.

12. Package outline

Plastic surface-mounted package; 6 leads **SOT666**



DIMENSIONS (mm are the original dimensions)

UNIT	A	b_p	c	D	E	e	e_1	H_E	L_p	w	y
mm	0.6 0.5	0.27 0.17	0.18 0.08	1.7 1.5	1.3 1.1	1.0	0.5	1.7 1.5	0.3 0.1	0.1	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT666						~~04-11-08~~ 06-03-16

Fig. 9. Package outline SOT666

13. Soldering

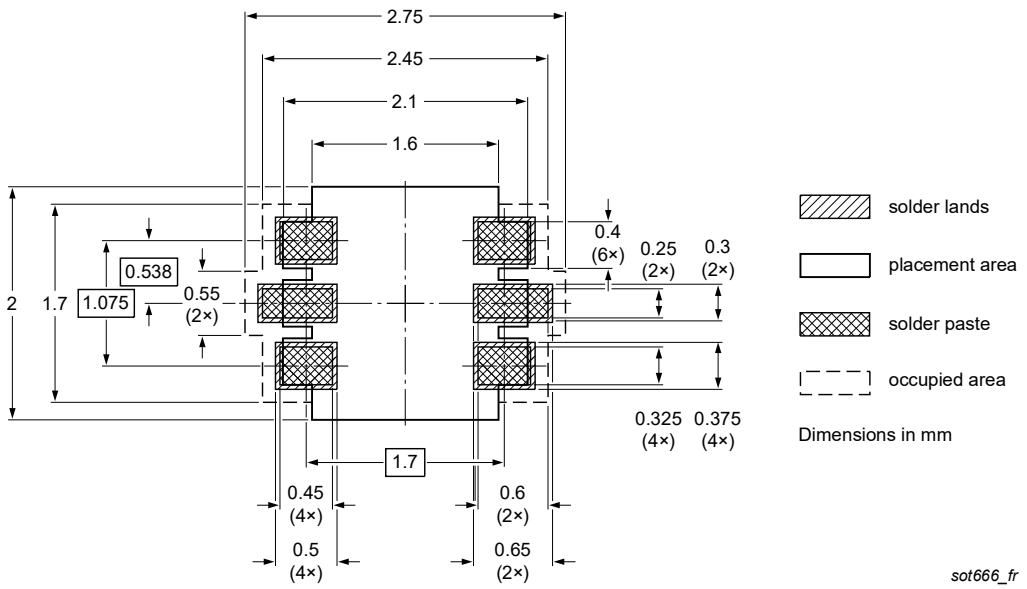


Fig. 10. Reflow soldering footprint for SOT666

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BC847BVN v.3	20190520	Product data sheet	-	BC847BVN v.2
Modifications:	• 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.			
BC847BVN v.2	20011107	Product data sheet	-	BC847BVN v.1
BC847BVN v.1	20010830	Product data sheet	-	-

15. 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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Date of release: 20 May 2019