



BC847BVN

45 V, 100 mA NPN/PNP general purpose transistor

27 December 2022

Product data sheet

1. General description

NPN/PNP transistor in a SOT666 ultra small Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- 300 mW total power dissipation
- Very small 1.6 mm x 1.2 mm ultra thin package
- Replaces two SC-75/SC-89 packaged transistors on same PCB area
- Reduced required PCB area
- Reduced pick and place costs

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; $T_{amb} = 25$ °C	200	-	450	

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	E1	emitter TR1	SOT666	sym019
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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor; for the PNP transistor with negative polarity						
I_{CBO}	collector-base cut-off current	$V_{CB} = 30 \text{ V}; I_E = 0 \text{ A}; T_{amb} = 25 \text{ }^{\circ}\text{C}$	-	-	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	$V_{EB} = 5 \text{ V}; I_C = 0 \text{ A}; T_{amb} = 25 \text{ }^{\circ}\text{C}$	-	-	100	nA
h_{FE}	DC current gain	$V_{CE} = 5 \text{ V}; I_C = 2 \text{ mA}; T_{amb} = 25 \text{ }^{\circ}\text{C}$	200	-	450	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 10 \text{ mA}; I_B = 0.5 \text{ mA}; T_{amb} = 25 \text{ }^{\circ}\text{C}$	-	-	100	mV
		$I_C = 100 \text{ mA}; I_B = 5 \text{ mA}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02; T_{amb} = 25 \text{ }^{\circ}\text{C}$	-	-	300	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = 10 \text{ mA}; I_B = 0.5 \text{ mA}; T_{amb} = 25 \text{ }^{\circ}\text{C}$	-	755	-	mV
f_T	transition frequency	$V_{CE} = 5 \text{ V}; I_C = 10 \text{ mA}; f = 100 \text{ MHz}; T_{amb} = 25 \text{ }^{\circ}\text{C}$	100	-	-	MHz
NPN transistor						
V_{BE}	base-emitter voltage	$V_{CE} = 5 \text{ V}; I_C = 2 \text{ mA}; T_{amb} = 25 \text{ }^{\circ}\text{C}$	580	655	700	mV
C_c	collector capacitance	$V_{CB} = 10 \text{ V}; I_E = 0 \text{ A}; i_e = 0 \text{ A}; f = 1 \text{ MHz}; T_{amb} = 25 \text{ }^{\circ}\text{C}$	-	-	1.5	pF
C_e	emitter capacitance	$V_{EB} = 500 \text{ mV}; I_C = 0 \text{ A}; i_c = 0 \text{ A}; f = 1 \text{ MHz}; T_{amb} = 25 \text{ }^{\circ}\text{C}$	-	11	-	pF
PNP transistor						
V_{BE}	base-emitter voltage	$V_{CE} = -5 \text{ V}; I_C = -2 \text{ mA}; T_{amb} = 25 \text{ }^{\circ}\text{C}$	-600	-655	-750	mV
C_c	collector capacitance	$V_{CB} = -10 \text{ V}; I_E = 0 \text{ A}; i_e = 0 \text{ A}; f = 1 \text{ MHz}; T_{amb} = 25 \text{ }^{\circ}\text{C}$	-	-	2.2	pF
C_e	emitter capacitance	$V_{EB} = -500 \text{ mV}; I_C = 0 \text{ A}; i_c = 0 \text{ A}; f = 1 \text{ MHz}; T_{amb} = 25 \text{ }^{\circ}\text{C}$	-	10	-	pF

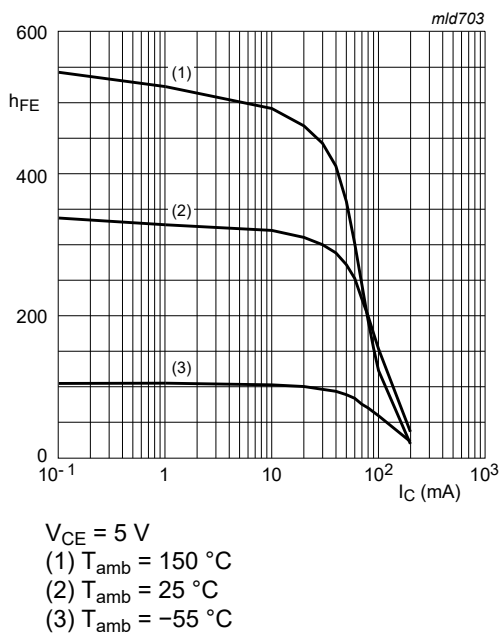


Fig. 1. NPN TR1: DC current gain as a function of collector current; typical values

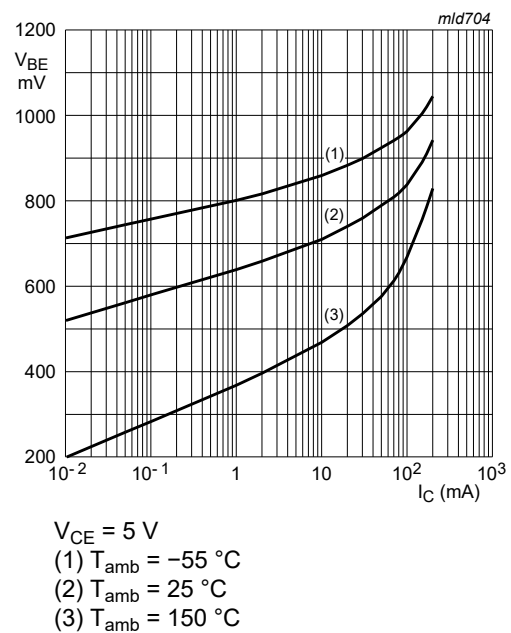


Fig. 2. NPN TR1: Base-emitter voltage as a function of collector current; typical values

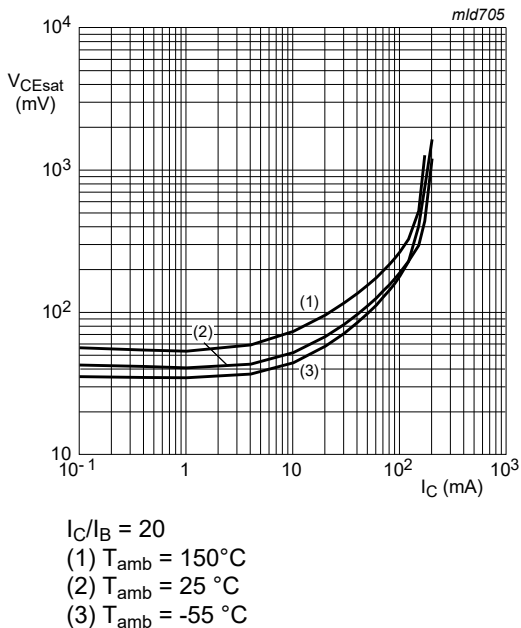


Fig. 3. NPN TR1: Collector-emitter saturation voltage as a function of collector current; typical values

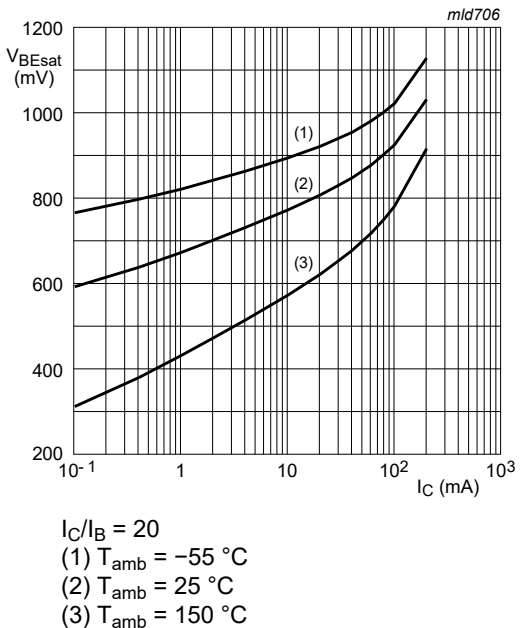


Fig. 4. NPN TR1: Base-emitter saturation voltage as a function of collector current; typical values

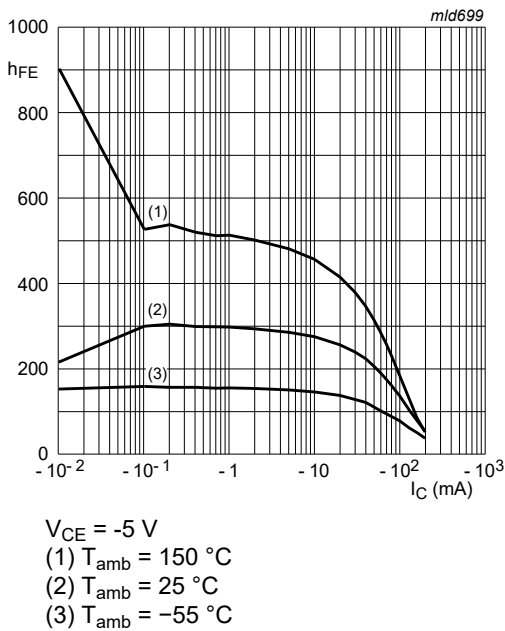


Fig. 5. PNP TR2: DC current gain as a function of collector current; typical values

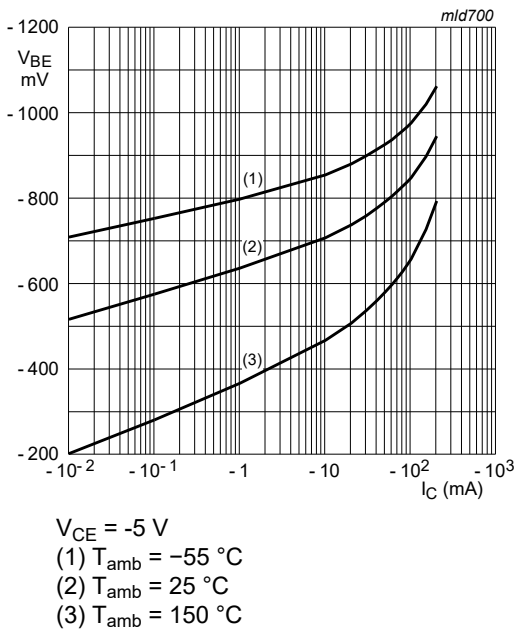
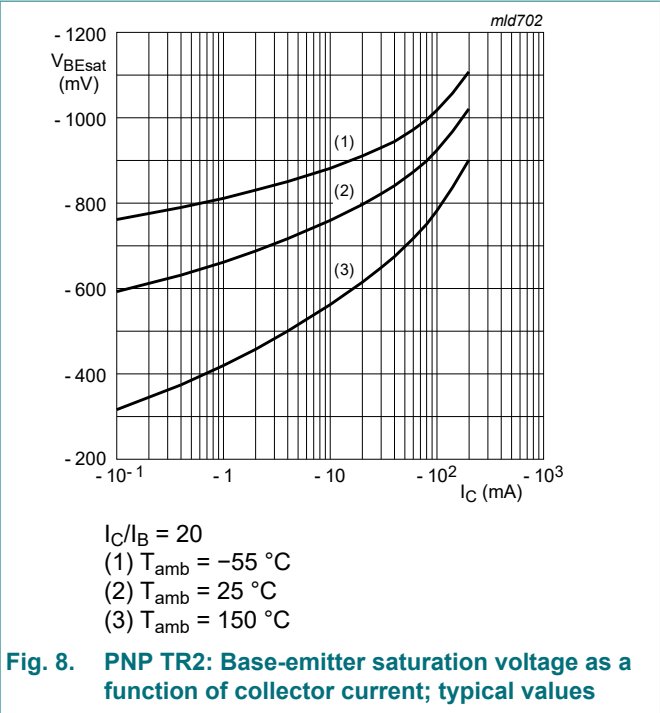
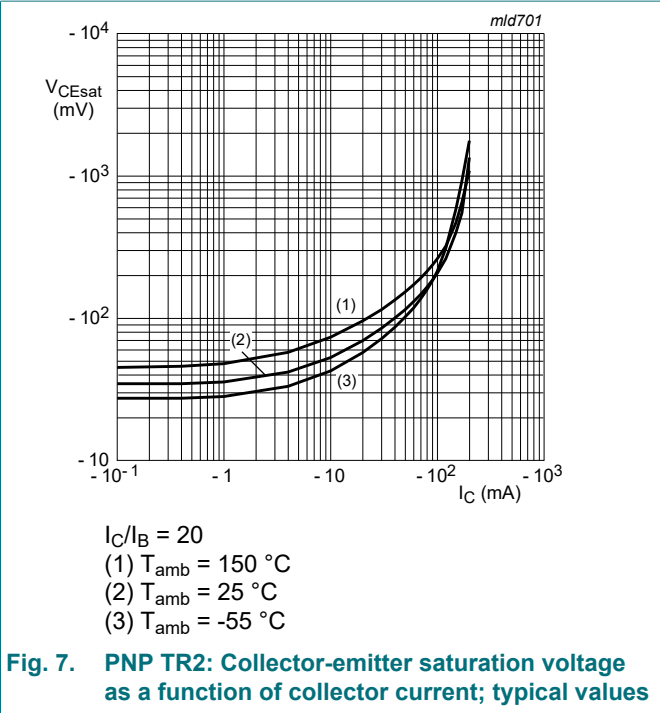
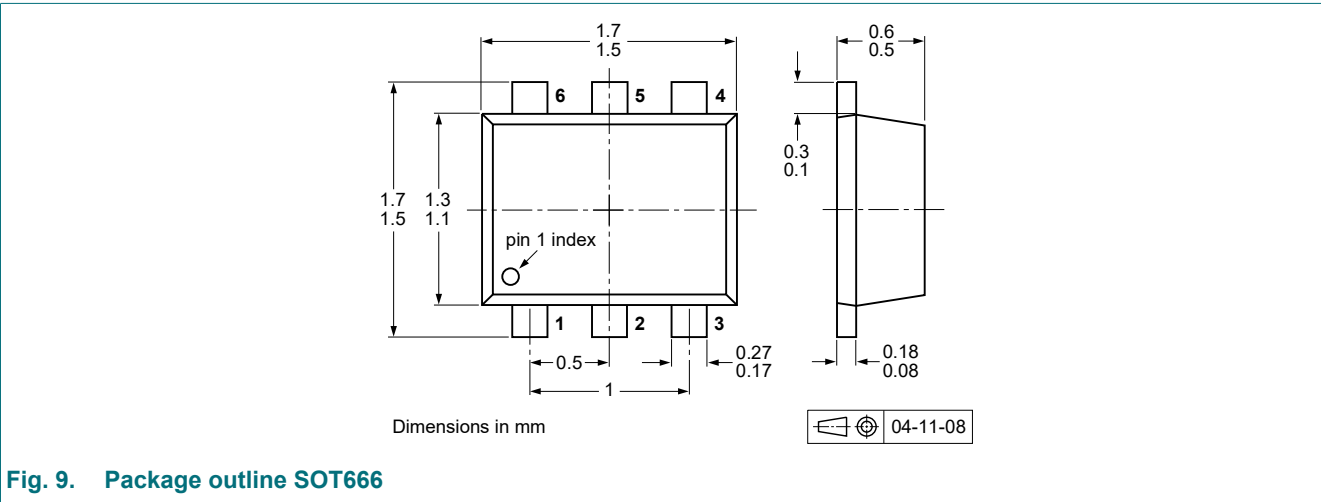


Fig. 6. PNP TR2: Base-emitter voltage as a function of collector current; typical values



11. Package outline



12. Soldering

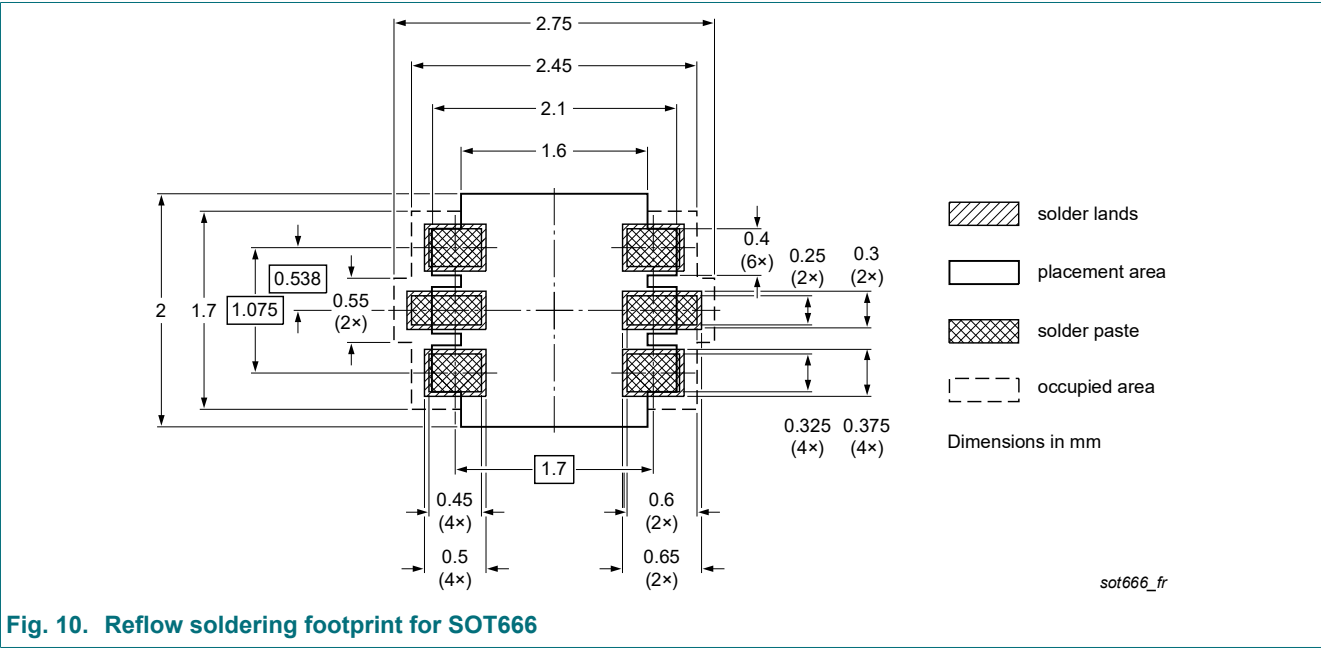


Fig. 10. Reflow soldering footprint for SOT666

13. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BC847BVN v.4	20221227	Product data sheet	-	BC847BVN v.3
Modifications:	• Product changed to non-automotive qualification			
BC847BVN v.3	20190520	Product data sheet	-	BC847BVN v.2
BC847BVN v.2	20011107	Product data sheet	-	BC847BVN v.1
BC847BVN v.1	20010830	Product data sheet	-	-

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".
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