



# 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.

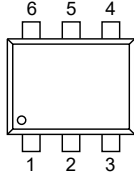
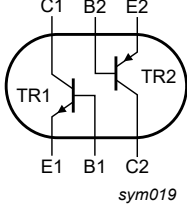
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per transistor; for the PNP transistor with negative polarity</b>						
$V_{CE0}$	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	 <p><b>SOT666</b></p>	 <p><i>sym019</i></p>
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
<b>Per transistor; for the PNP transistor with negative polarity</b>						
$V_{CBO}$	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
<b>Per device</b>						
$P_{tot}$	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
<b>Per transistor</b>							
$R_{th(j-a)}$	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.

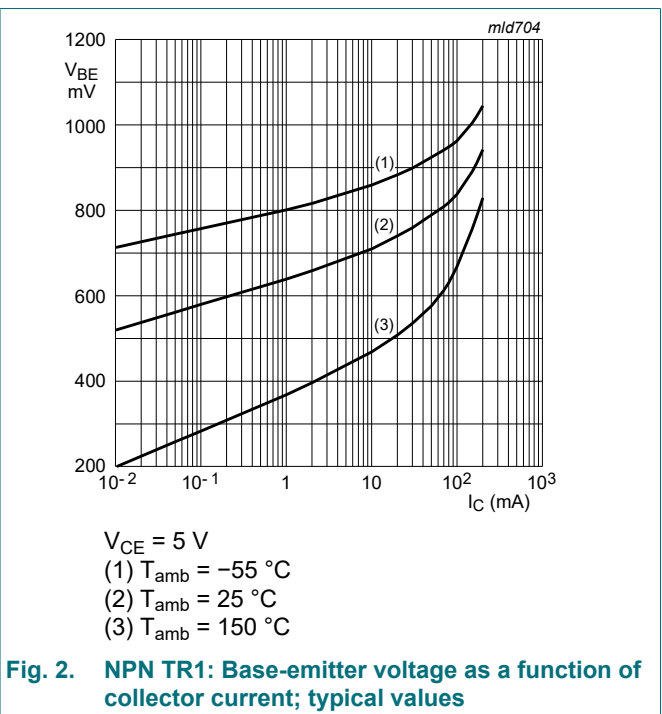
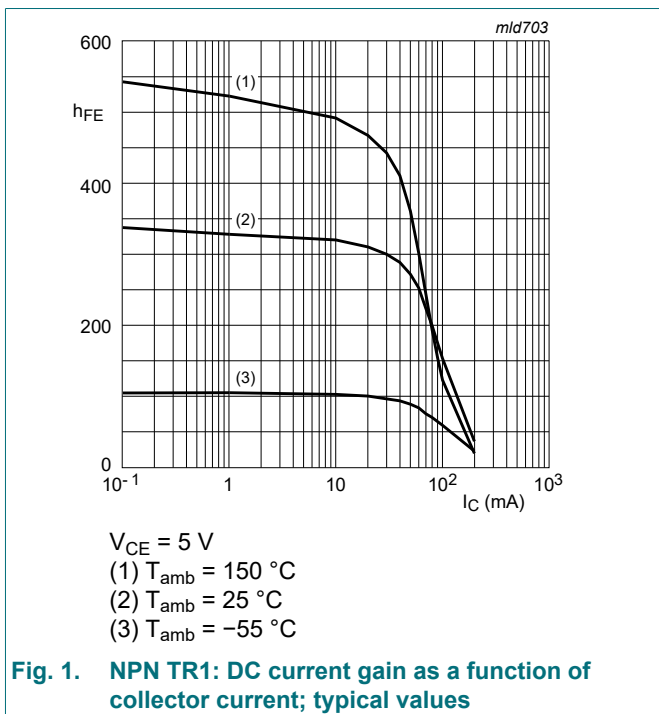
[2] Reflow soldering is the only recommended soldering method.

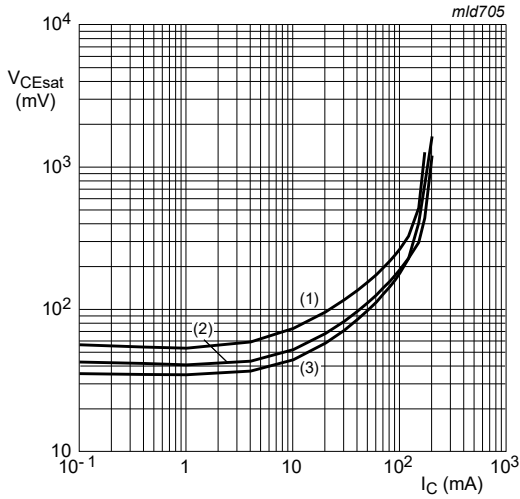
## 10. Characteristics

**Table 7. Characteristics**

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

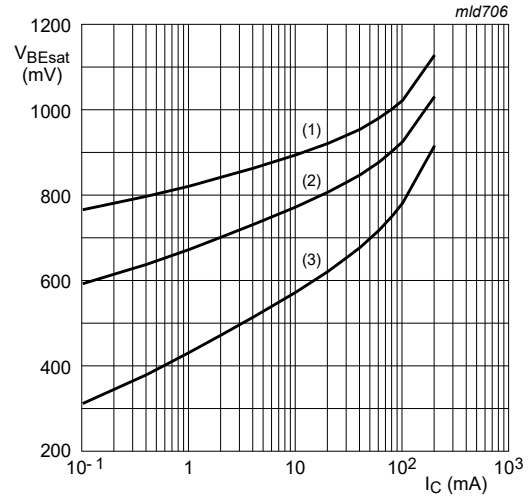
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per transistor; for the PNP transistor with negative polarity</b>						
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 30\text{ V}; I_E = 0\text{ A}$	-	-	15	nA
		$V_{CB} = 30\text{ V}; I_E = 0\text{ A}; T_J = 150\text{ °C}$	-	-	5	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0\text{ A}$	-	-	100	nA
$h_{FE}$	DC current gain	$V_{CE} = 5\text{ V}; I_C = 2\text{ mA}$	200	-	450	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 0.5\text{ mA}; T_{amb} = 25\text{ °C}$	-	-	100	mV
		$I_C = 100\text{ mA}; I_B = 5\text{ mA}; \text{ Pulsed test: } t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02$	-	-	300	mV
$V_{BEsat}$	base-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 0.5\text{ mA}$	-	755	-	mV
$f_T$	transition frequency	$V_{CE} = 5\text{ V}; I_C = 10\text{ mA}; f = 100\text{ MHz}$	100	-	-	MHz
<b>NPN transistor</b>						
$V_{BE}$	base-emitter voltage	$V_{CE} = 5\text{ V}; I_C = 2\text{ mA}$	580	655	700	mV
$C_c$	collector capacitance	$V_{CB} = 10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}$	-	-	1.5	pF
$C_e$	emitter capacitance	$V_{EB} = 500\text{ mV}; I_C = 0\text{ A}; i_c = 0\text{ A}; f = 1\text{ MHz}$	-	11	-	pF
<b>PNP transistor</b>						
$V_{BE}$	base-emitter voltage	$V_{CE} = -5\text{ V}; I_C = -2\text{ mA}$	-600	-655	-750	mV
$C_c$	collector capacitance	$V_{CB} = -10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ °C}$	-	-	2.2	pF
$C_e$	emitter capacitance	$V_{EB} = -500\text{ mV}; I_C = 0\text{ A}; i_c = 0\text{ A}; f = 1\text{ MHz}$	-	10	-	pF





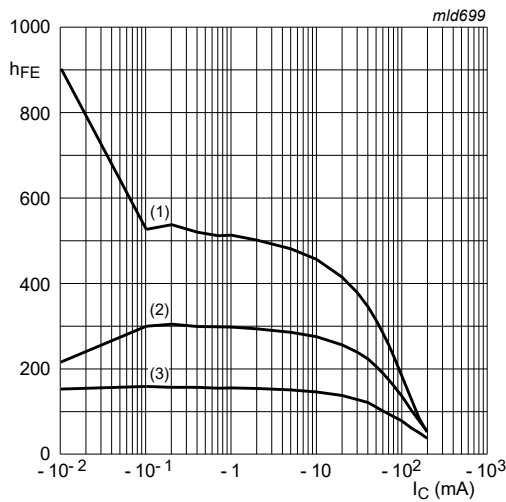
$I_C/I_B = 20$   
 (1)  $T_{amb} = 150\text{ }^\circ\text{C}$   
 (2)  $T_{amb} = 25\text{ }^\circ\text{C}$   
 (3)  $T_{amb} = -55\text{ }^\circ\text{C}$

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



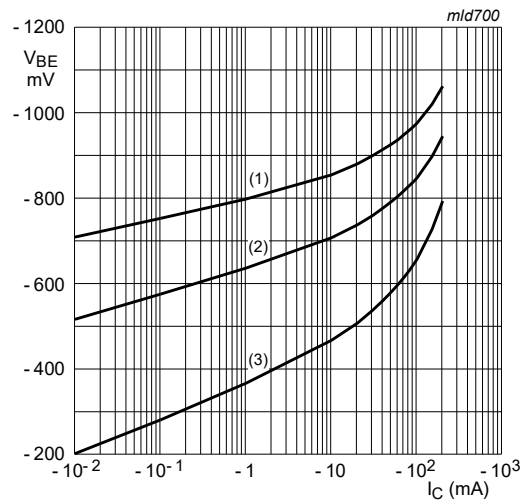
$I_C/I_B = 20$   
 (1)  $T_{amb} = -55\text{ }^\circ\text{C}$   
 (2)  $T_{amb} = 25\text{ }^\circ\text{C}$   
 (3)  $T_{amb} = 150\text{ }^\circ\text{C}$

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



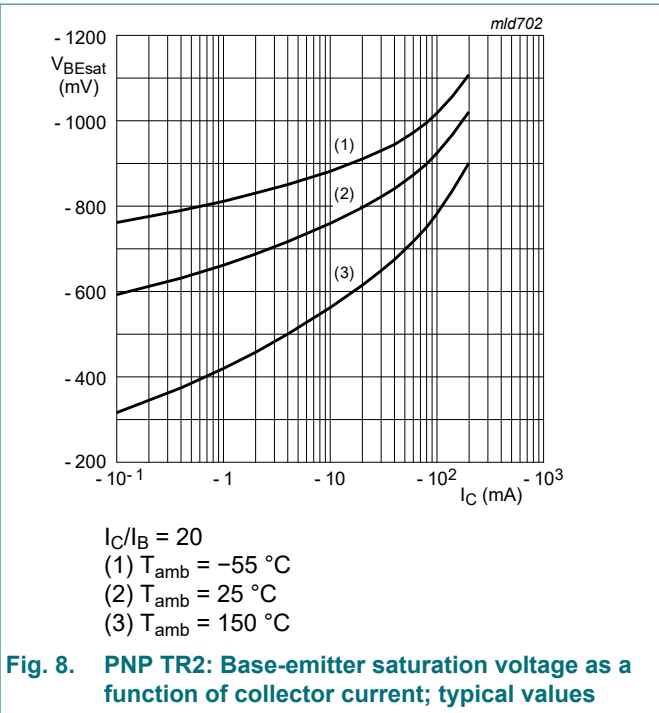
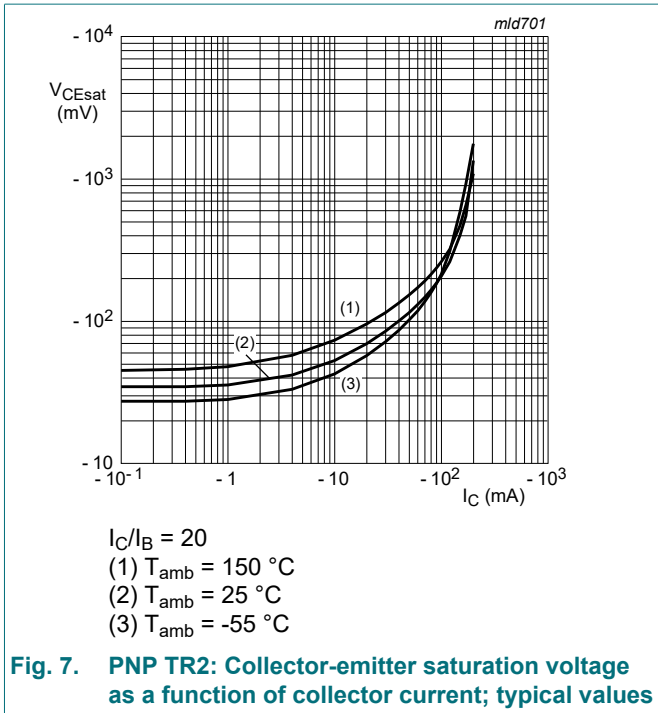
$V_{CE} = -5\text{ V}$   
 (1)  $T_{amb} = 150\text{ }^\circ\text{C}$   
 (2)  $T_{amb} = 25\text{ }^\circ\text{C}$   
 (3)  $T_{amb} = -55\text{ }^\circ\text{C}$

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



$V_{CE} = -5\text{ V}$   
 (1)  $T_{amb} = -55\text{ }^\circ\text{C}$   
 (2)  $T_{amb} = 25\text{ }^\circ\text{C}$   
 (3)  $T_{amb} = 150\text{ }^\circ\text{C}$

**Fig. 6. PNP TR2: Base-emitter 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

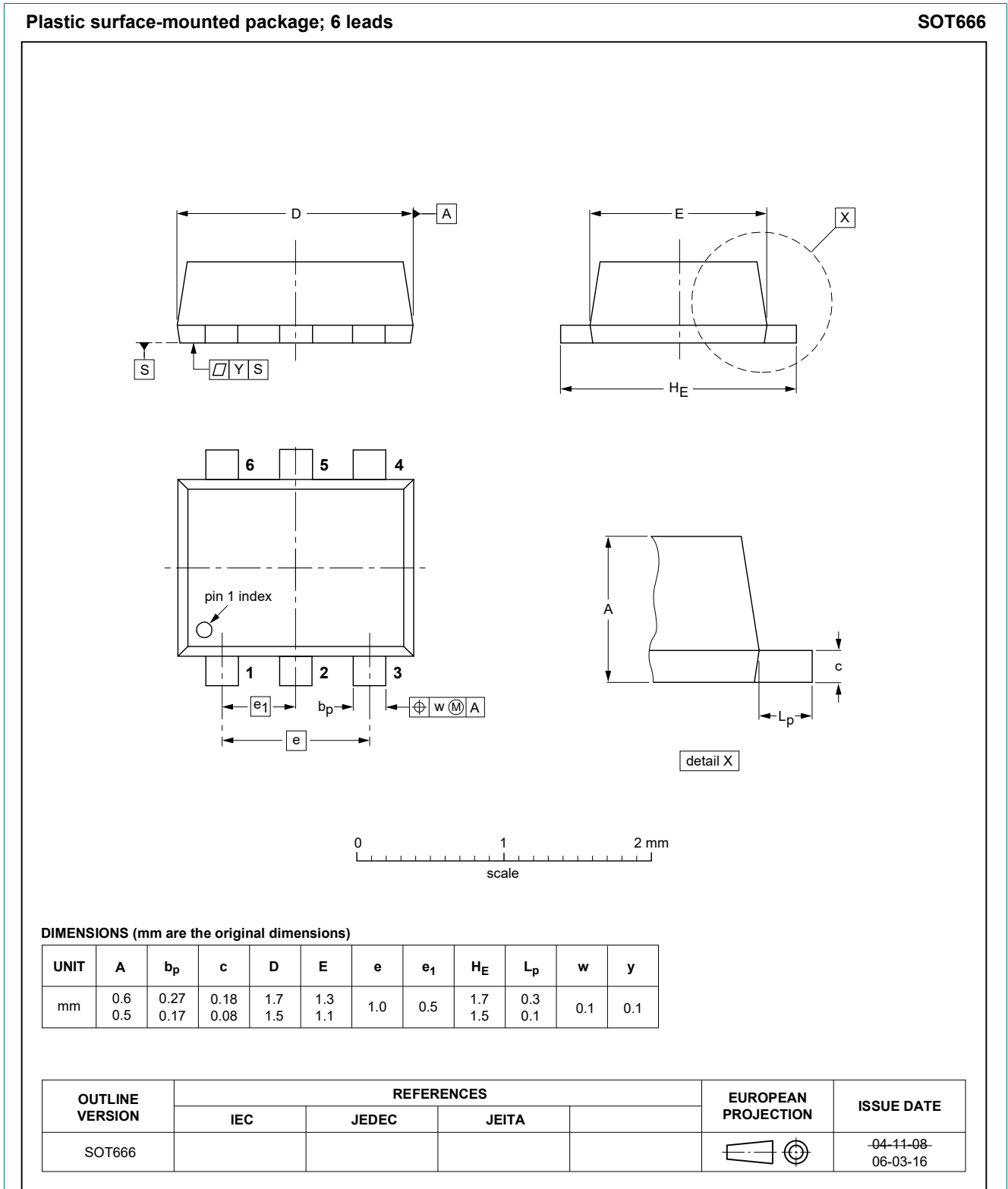


Fig. 9. Package outline SOT666

### 13. Soldering

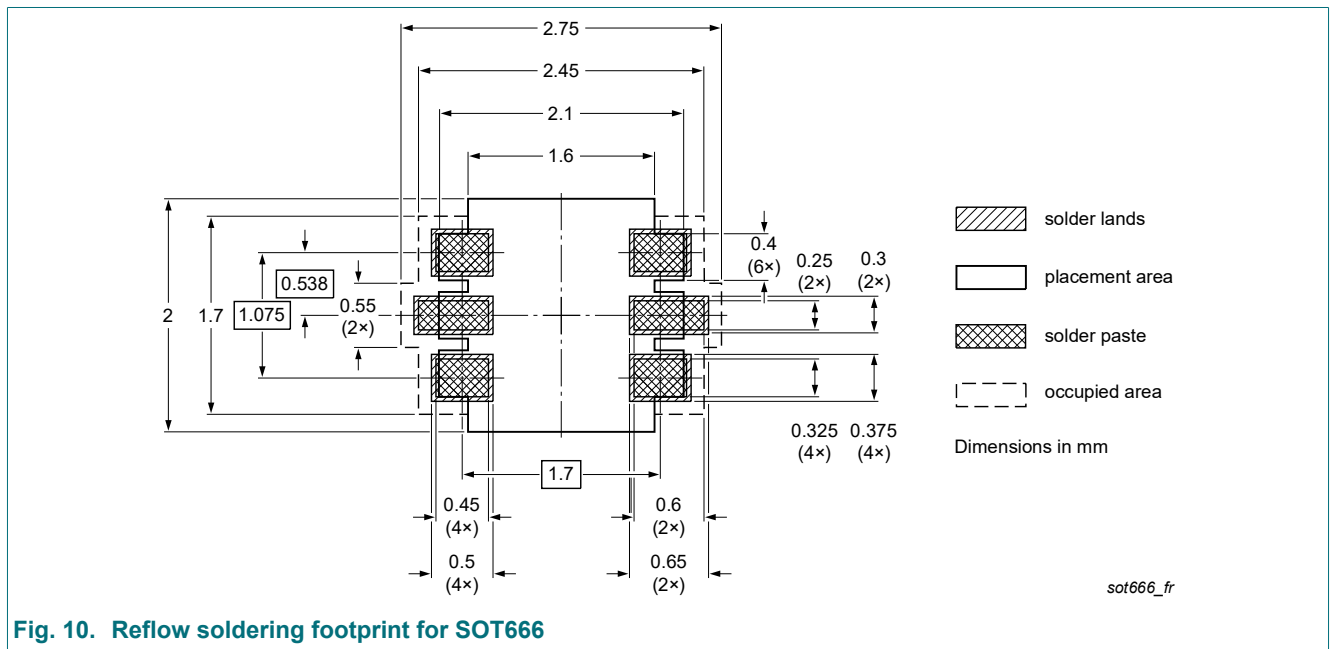


Fig. 10. Reflow soldering footprint for SOT666



## 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:	<ul style="list-style-type: none"><li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li><li>Legal texts have been adapted to the new company name where appropriate.</li></ul>			
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".
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