



# BCV47

NPN Darlington transistor

21 August 2019

Product data sheet

## 1. General description

NPN Darlington transistor in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

PNP complement: BCV46

## 2. Features and benefits

- Medium current of 500 mA
- Low voltage of 60 V
- High DC current gain of minimum 2000
- AEC-Q101 qualified

## 3. Applications

- Pre-amplifier input amplification

## 4. Quick reference data

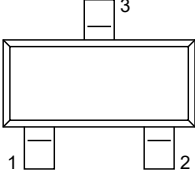
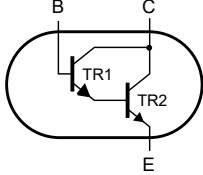
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{CBO}$	collector-base voltage	open emitter	-	-	80	V
$V_{CES}$	collector-emitter voltage	base short-circuited to emitter	-	-	60	V
$I_C$	collector current		-	-	500	mA
$I_{CM}$	peak collector current		-	-	800	mA
$h_{FE}$	DC current gain	$V_{CE} = 5\text{ V}; I_C = 100\text{ mA}; T_{amb} = 25\text{ °C}$	[1]	10000	-	-

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

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 <p style="text-align: center;">SOT23</p>	 <p style="text-align: center;">aaa-029089</p>
2	E	emitter		
3	C	collector		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BCV47	SOT23	plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body	SOT23

## 7. Marking

Table 4. Marking codes

Type number	Marking code <sup>[1]</sup>
BCV47	FG%

[1] % = placeholder for manufacturing site code

## 8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CBO}$	collector-base voltage	open emitter	-	80	V
$V_{CES}$	collector-emitter voltage	base short-circuited to emitter	-	60	V
$V_{EBO}$	emitter-base voltage	open collector	-	10	V
$I_C$	collector current		-	500	mA
$I_{CM}$	peak collector current		-	800	mA
$I_{BM}$	peak base current	single pulse; $t_p \leq 1$ ms	-	100	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25$ °C	[1]	250	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 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
$R_{th(j-a)}$	thermal resistance from junction to ambient		[1]	-	-	500	K/W

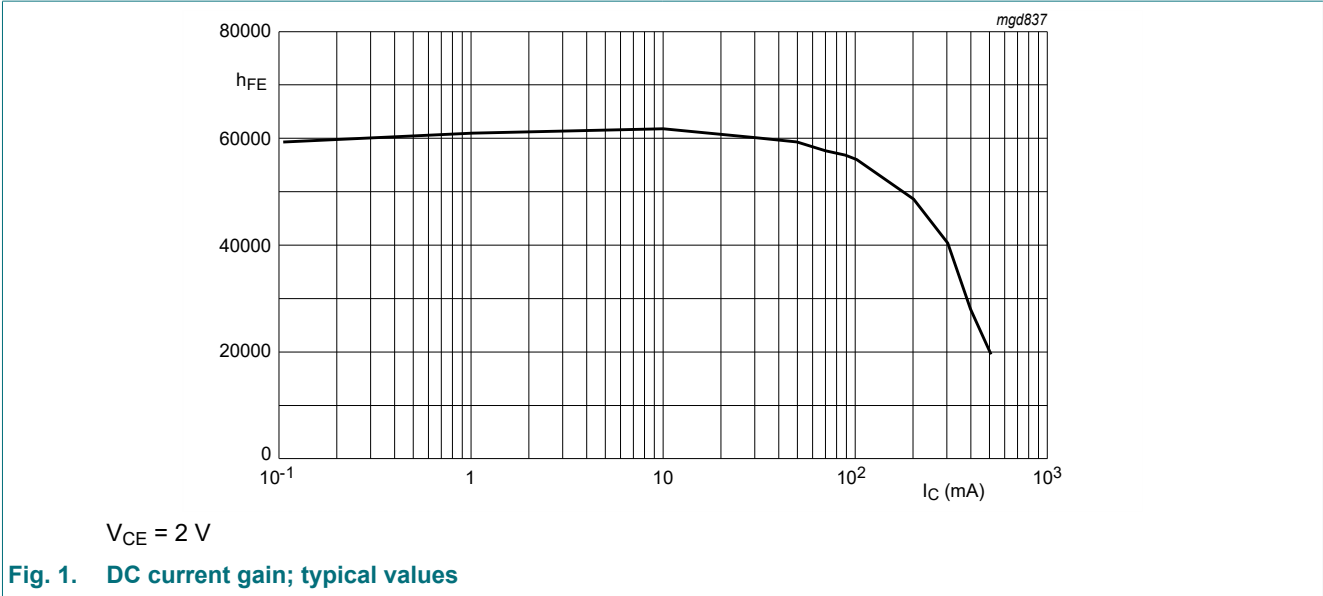
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

## 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = 100 \mu\text{A}$ ; $I_E = 0 \text{ A}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$		80	-	-	V
$V_{(BR)CES}$	collector-emitter breakdown voltage	$I_C = 2 \text{ mA}$ ; $V_{BE} = 0 \text{ V}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$		60	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	$I_C = 0 \text{ A}$ ; $I_E = 100 \mu\text{A}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$		10	-	-	V
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 60 \text{ V}$ ; $I_E = 0 \text{ A}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$		-	-	100	nA
$I_{CES}$	collector-emitter cut-off current	$V_{CE} = 60 \text{ V}$ ; $V_{BE} = 0 \text{ V}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$		-	-	100	nA
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 10 \text{ V}$ ; $I_C = 0 \text{ A}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$		-	-	100	nA
$h_{FE}$	DC current gain	$V_{CE} = 5 \text{ V}$ ; $I_C = 1 \text{ mA}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$	[1]	2000	-	-	
		$V_{CE} = 5 \text{ V}$ ; $I_C = 10 \text{ mA}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$	[1]	4000	-	-	
		$V_{CE} = 5 \text{ V}$ ; $I_C = 100 \text{ mA}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$	[1]	10000	-	-	
		$V_{CE} = 5 \text{ V}$ ; $I_C = 500 \text{ mA}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$	[1]	2000	-	-	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 100 \text{ mA}$ ; $I_B = 1 \text{ mA}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$		-	-	1	V
$V_{BEsat}$	base-emitter saturation voltage	$I_C = 100 \text{ mA}$ ; $I_B = 0.1 \text{ mA}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$		-	-	1.5	V
$V_{BEon}$	base-emitter turn-on voltage	$I_C = 10 \text{ mA}$ ; $V_{CE} = 5 \text{ V}$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$		-	-	1.4	V

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

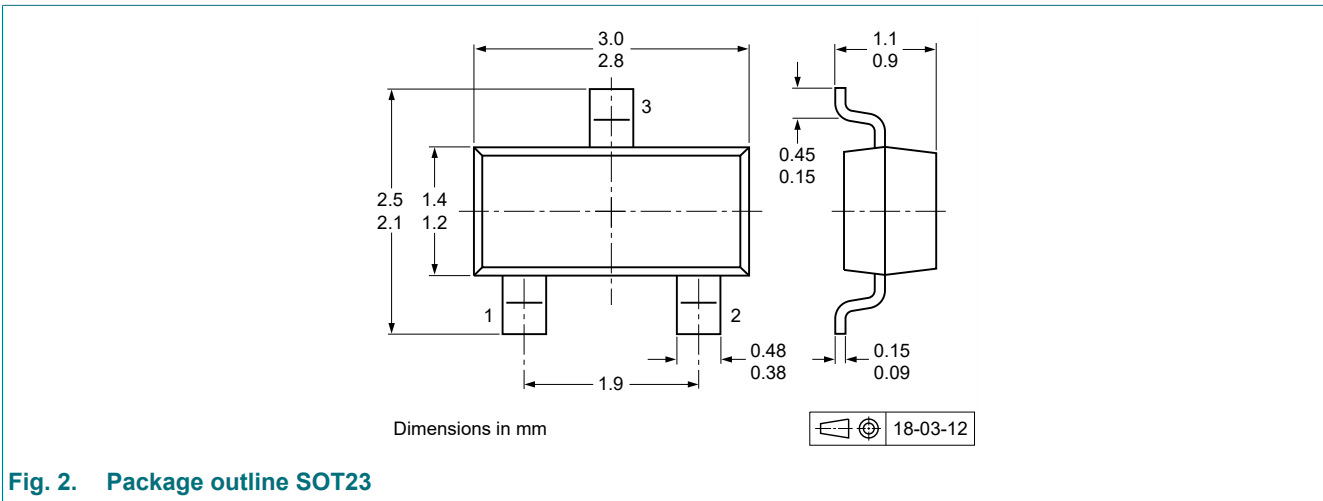


## 11. Test information

### 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



### 13. Soldering

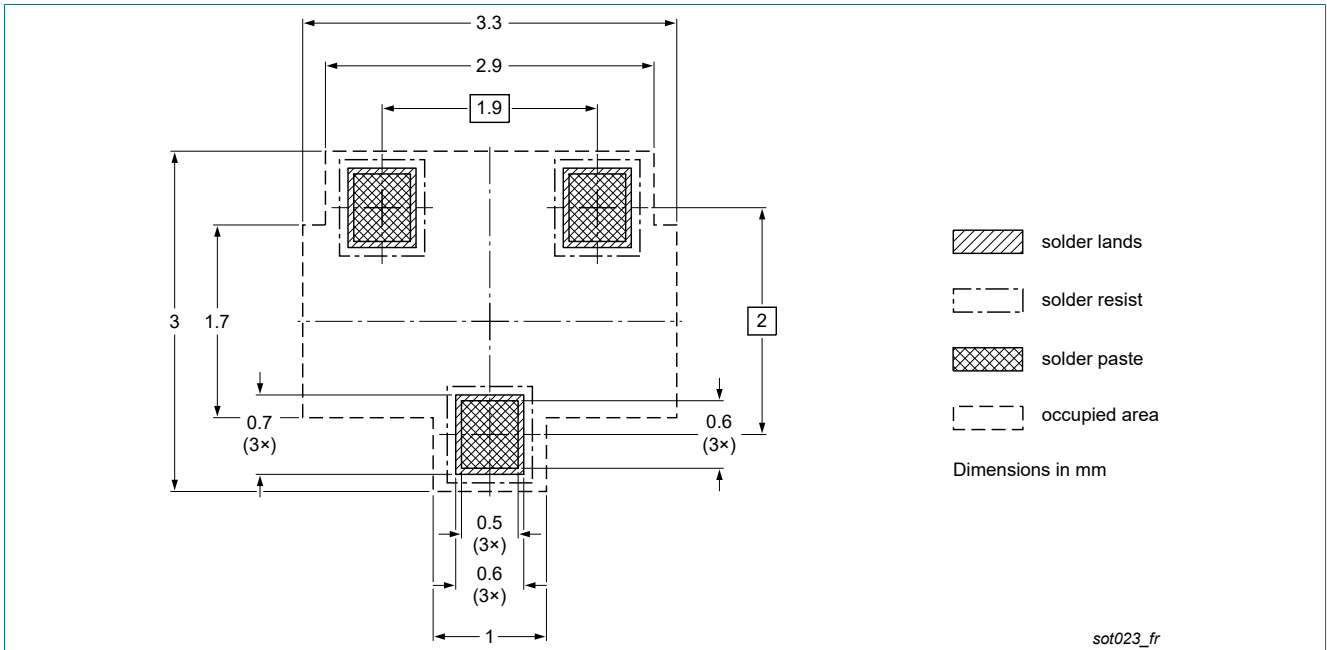


Fig. 3. Reflow soldering footprint for SOT23

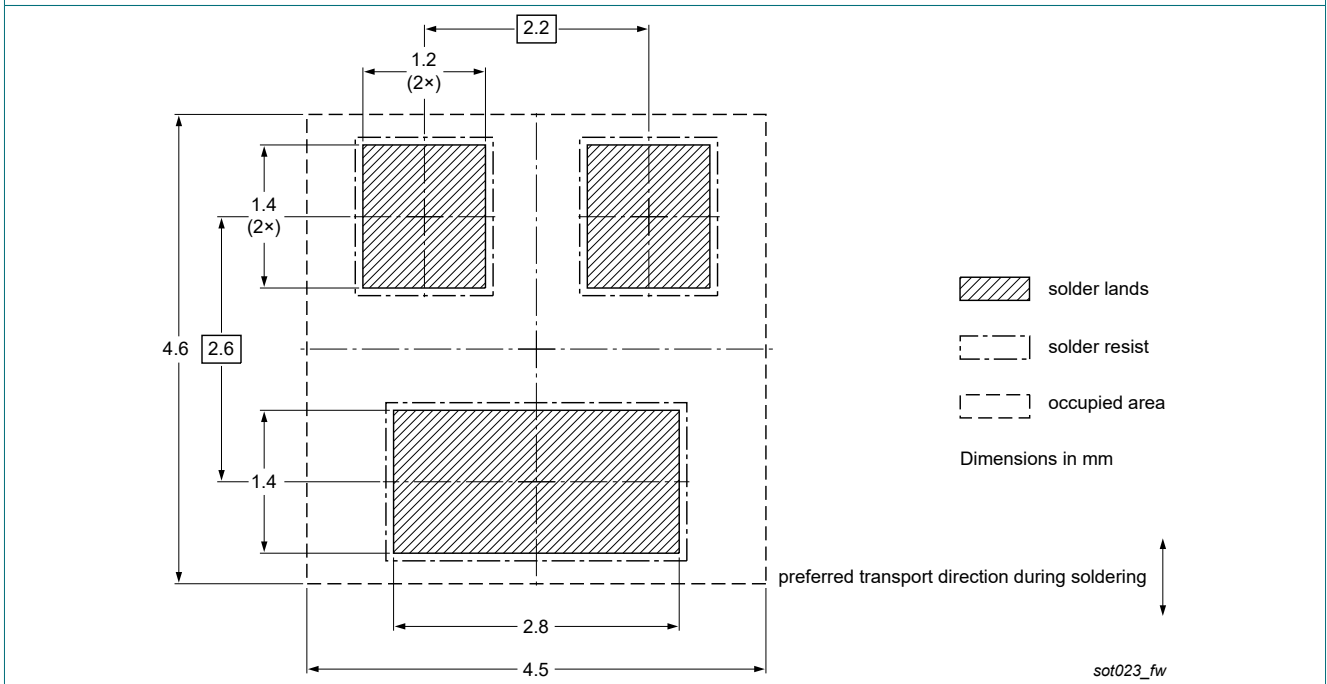


Fig. 4. Wave soldering footprint for SOT23

## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BCV47 v.3	20190821	Product data sheet	-	BCV27_BCV47 v.2
Modifications:	<ul style="list-style-type: none"> <li>• Family data sheet is transformed to two single data sheets.</li> <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> <li>• The product is AEC-Q101 qualified. Point added to sections "Features and benefits", "Test information" and Legal Information".</li> <li>• Characteristics: values for breakdown voltages and for DC current gain at <math>I_C = 500 \text{ mA}</math> added.</li> </ul>			
BCV27_BCV47 v.2	20040113	Product data sheet	-	BCV27_BCV47 v.1
BCV27_BCV47 v.1	19970408	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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