

65 V, 100 mA NPN/PNP general-purpose double transistor6 May 2021Product data sheet

1. General description

NPN/PNP general-purpose double transistor in a very small SOT363 (SC-88) Surface-Mounted Device (SMD) plastic package.

NPN/NPN complement: BC846BSH-Q

PNP/PNP complement: BC856BSH-Q

2. Features and benefits

- Low collector capacitance
- Low collector-emitter saturation voltage
- Closely matched current gain
- Reduces number of components and board space
- No mutual interference between the transistors
- High-temperature applications up to 175 °C
- · Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

· General-purpose switching and amplification

4. Quick reference data

Table 1. Quick	reference data					
Symbol	Parameter	Conditions	Min	Тур	Мах	Unit
Per transistor	; for the PNP transistor	with negative polarity			·	
V _{CEO}	collector-emitter voltage	open base	-	-	65	V
I _C	collector current		-	-	100	mA
h _{FE}	DC current gain	$V_{CE} = 5 \text{ V}; \text{ I}_{C} = 2 \text{ mA}; \text{ T}_{amb} = 25 \text{ °C}$	200	300	450	

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5. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	E1	emitter TR1	□6 □5 □4	C1 B2 E2
2	B1	base TR1		
3	C2	collector TR2	0	
4	E2	emitter TR2		
5	B2	base TR2	TSSOP6 (SOT363)	 E1 B1 C2
6	C1	collector TR1		sym139

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BC846BPNH-Q		plastic, surface-mounted package; 6 leads; 0.65 mm pitch; 2.1 mm x 1.25 mm x 0.95 mm body	SOT363

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
BC846BPNH-Q	7H%

[1] % = placeholder for manufacturing site code

8. Limiting values

Table 5. Limiting values

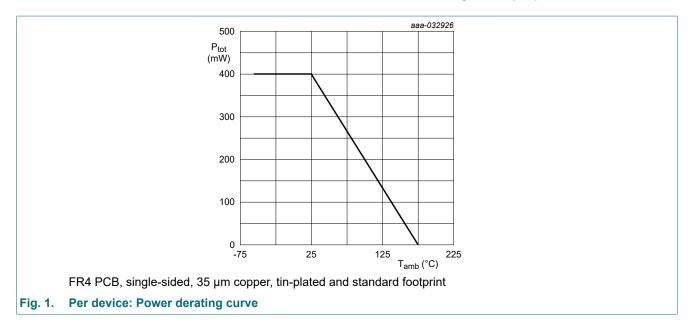
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Мах	Unit
Per transist	or; for the PNP transistor wit	h negative polarity	1			
V _{CBO}	collector-base voltage	open emitter		-	80	V
V _{CEO}	collector-emitter voltage	open base		-	65	V
V _{EBO}	emitter-base voltage	open collector		-	7	V
I _C	collector current			-	100	mA
I _{CM}	peak collector current	single pulse; t _p ≤ 1 ms		-	200	mA
I _{BM}	peak base current			-	200	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	270	mW
Per device			1	I		
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	400	mW
Tj	junction temperature			-	175	°C
T _{amb}	ambient temperature			-55	175	°C
T _{stg}	storage temperature			-65	175	°C

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided, 35 µm copper, tin-plated and standard footprint.

BC846BPNH-Q

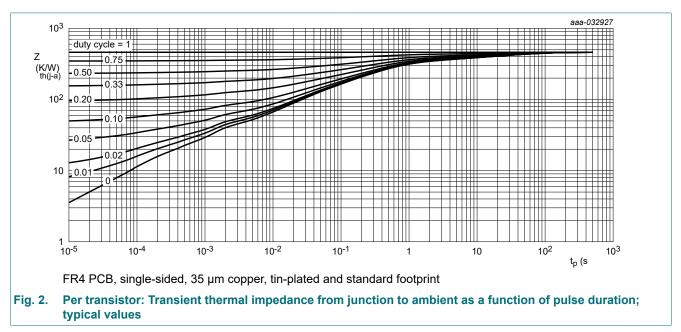
65 V, 100 mA NPN/PNP general-purpose double transistor



9. Thermal characteristics

Table 6. Ther	mal characteristics						
Symbol	Parameter	Conditions		Min	Тур	Max	Unit
Per transisto	or		l				
R _{th(j-a)}	thermal resistance from junction to ambient	in free air	[1]	-	-	556	K/W
R _{th(j-sp)}	thermal resistance from junction to solder point			-	-	170	K/W
Per device				_			
R _{th(j-a)}	thermal resistance from junction to ambient	in free air	[1]	-	-	375	K/W

[1] Device mounted on an FR4 PCB, single-sided, 35 µm copper, tin-plated and standard footprint.

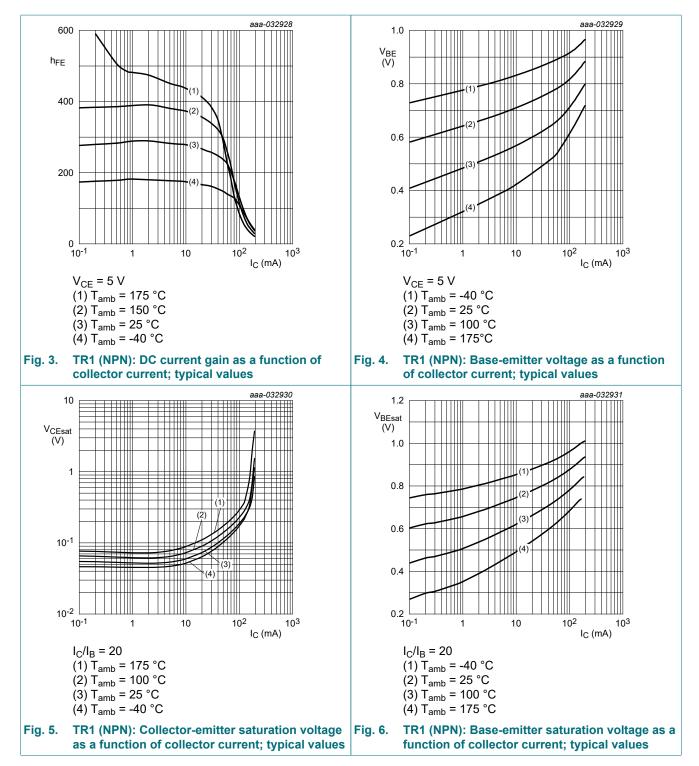


10. Characteristics

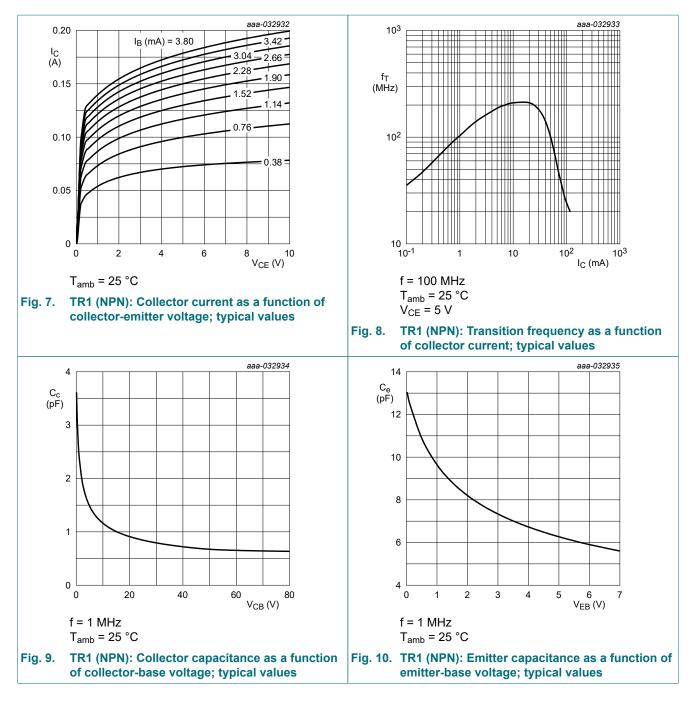
Symbol	Parameter	Conditions		Min	Тур	Max	Unit
Per transist	or; for the PNP transistor v	with negative polarity					
V _{(BR)CBO}	collector-base breakdown voltage	I_{C} = 100 µA; I_{E} = 0 A; T_{amb} = 25 °C		80	-	-	V
V _{(BR)CEO}	collector-emitter breakdown voltage	I _C = 2 mA; I _B = 0 A; T _{amb} = 25 °C		65	-	-	V
V _{(BR)EBO}	emitter-base breakdown voltage	I _C = 0 A; I _E = 100 μA; T _{amb} = 25 °C		7	-	-	V
I _{CBO}	collector-base cut-off	V _{CB} = 30 V; I _E = 0 A; T _{amb} = 25 °C		-	-	15	nA
	current	V _{CB} = 30 V; I _E = 0 A; T _j = 150 °C		-	-	5	μA
I _{EBO}	emitter-base cut-off current	V _{EB} = 7 V; I _C = 0 A; T _{amb} = 25 °C		-	-	100	nA
h _{FE}	DC current gain	V _{CE} = 5 V; I _C = 2 mA; T _{amb} = 25 °C		200	300	450	
V _{CEsat}	collector-emitter	I_{C} = 10 mA; I_{B} = 0.5 mA; T_{amb} = 25 °C		-	50	100	mV
	saturation voltage	I_C = 100 mA; I_B = 5 mA; pulsed; t_p ≤ 300 μs; δ ≤ 0.02; T_{amb} = 25 °C		-	200	300	mV
V _{BEsat}	base-emitter saturation	I_{C} = 10 mA; I_{B} = 0.5 mA; T_{amb} = 25 °C	[1]	-	750	850	mV
	voltage	I _C = 100 mA; I _B = 5 mA; T _{amb} = 25 °C		-	875	-	mV
V _{BE}	base-emitter voltage	V_{CE} = 5 V; I _C = 2 mA; T _{amb} = 25 °C	[2]	600	655	700	mV
		V _{CE} = 5 V; I _C = 10 mA; T _{amb} = 25 °C	[2]	-	705	770	mV
f _T	transition frequency	V _{CE} = 5 V; I _C = 10 mA; f = 100 MHz; T _{amb} = 25 °C		100	-	-	MHz
NF	noise figure	V _{CE} = 5 V; I _C = 0.2 mA; R _S = 2 kΩ; f = 10 Hz to 15.7 kHz; T _{amb} = 25 °C		-	1.7	-	dB
TR1 (NPN)	L						
C _c	collector capacitance	V_{CB} = 10 V; I _E = 0 A; i _e = 0 A; f = 1 MHz; T _{amb} = 25 °C		-	1.2	-	pF
C _e	emitter capacitance	V _{EB} = 0.5 V; I _C = 0 A; i _c = 0 A; f = 1 MHz; T _{amb} = 25 °C		-	11	-	pF
NF	noise figure	V _{CE} = 5 V; I _C = 0.2 mA; R _S = 2 kΩ; f = 1 kHz; B = 200 Hz; T _{amb} = 25 °C		-	3.1	-	dB
TR2 (PNP)							
C _c	collector capacitance	V _{CB} = -10 V; I _E = 0 A; i _e = 0 A; f = 1 MHz; T _{amb} = 25 °C		-	1.8	-	pF
C _e	emitter capacitance	V _{EB} = -0.5 V; I _C = 0 A; i _c = 0 A; f = 1 MHz; T _{amb} = 25 °C		-	8.5	-	pF
NF	noise figure	V _{CE} = -5 V; I _C = -0.2 mA; R _S = 2 kΩ; f = 1 kHz; B = 200 Hz; T _{amb} = 25 °C		-	3.3	-	dB

V_{BEsat} decreases by about 1.7 mV/K with increasing temperature.
V_{BE} decreases by about 2 mV/K with increasing temperature.

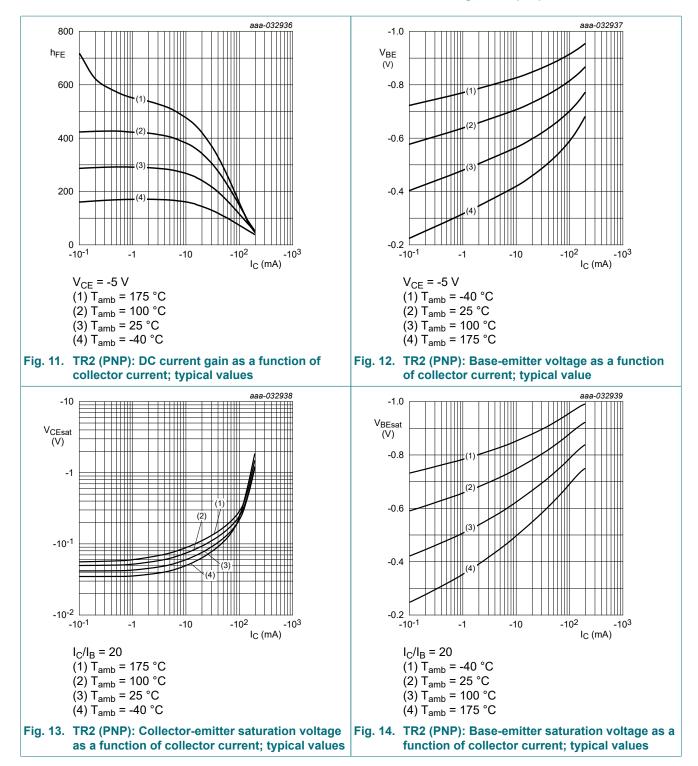
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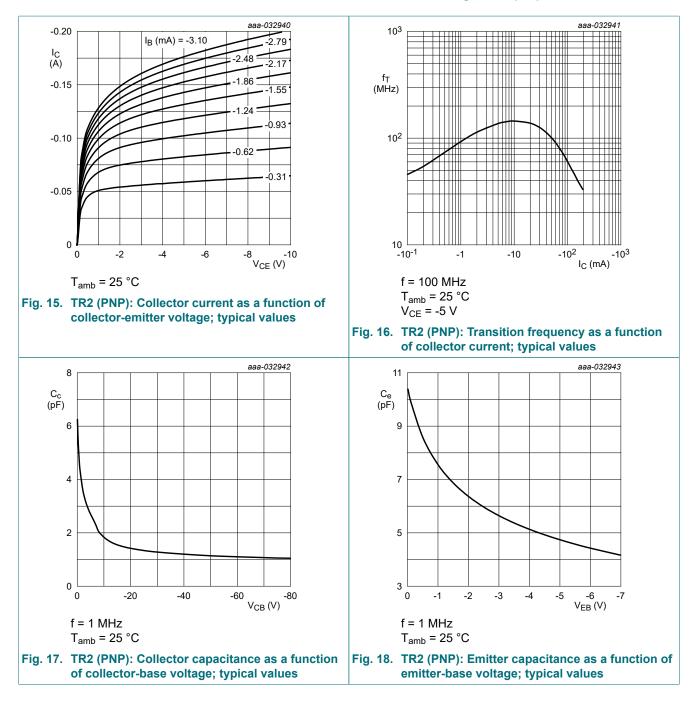
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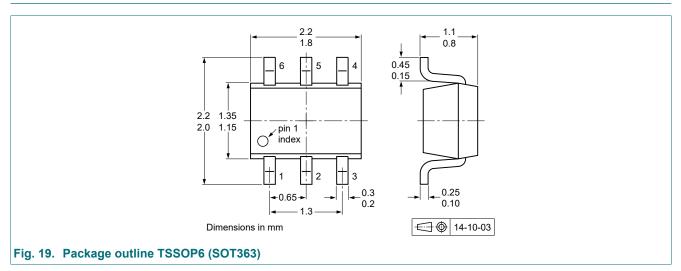


11. Test information

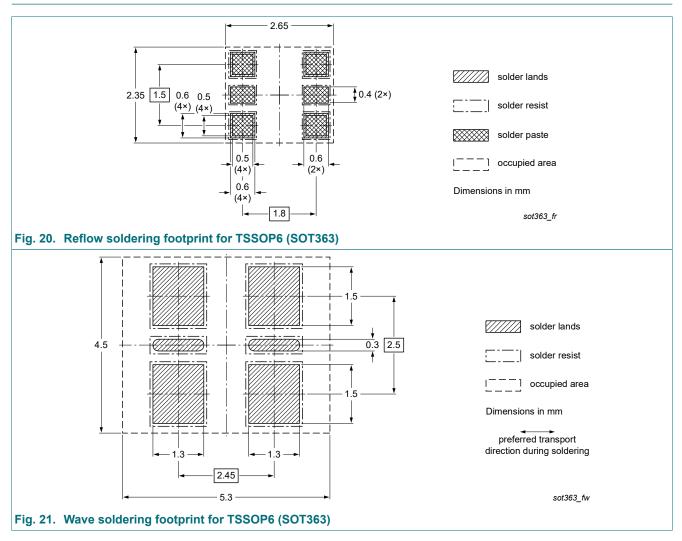
Quality information

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



14. Revision history

Table 8. Revision history						
Data sheet ID	Release date	Data sheet status	Change notice	Supersedes		
BC846BPNH-Q v.1	20210506	Product data sheet	-	-		

BC846BPNH-Q

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.

 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 <u>https://www.nexperia.com</u>.

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Contents

1.	General description	1
2.	Features and benefits	1
3.	Applications	1
4.	Quick reference data	1
5.	Pinning information	2
6.	Ordering information	2
7.	Marking	2
8.	Limiting values	2
9.	Thermal characteristics	3
10.	Characteristics	4
11.	Test information	8
12.	Package outline	9
	Soldering	
14.	Revision history	.10
	Legal information	

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