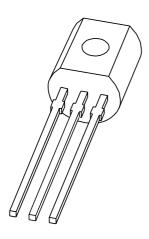
# **DISCRETE SEMICONDUCTORS**

# DATA SHEET



BC546; BC547 NPN general purpose transistors

Product specification Supersedes data of 1999 Apr 15

2004 Nov 25





# NPN general purpose transistors

BC546; BC547

### **FEATURES**

- Low current (max. 100 mA)
- Low voltage (max. 65 V).

### **APPLICATIONS**

• General purpose switching and amplification.

### **DESCRIPTION**

NPN transistor in a TO-92; SOT54 plastic package. PNP complements: BC556 and BC557.

### **PINNING**

PIN	DESCRIPTION
1	emitter
2	base
3	collector

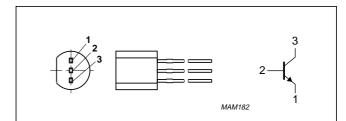


Fig.1 Simplified outline (TO-92; SOT54) and symbol.

### **ORDERING INFORMATION**

TYPE NUMBER		PACKAGE	
I TPE NUMBER	NAME	DESCRIPTION	VERSION
BC546A	SC-43A	plastic single-ended leaded (through hole) package; 3 leads	SOT54
BC546B			
BC547			
BC547B			
BC547C			

# NPN general purpose transistors

BC546; BC547

### **LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>CBO</sub>	collector-base voltage	open emitter			
	BC546A; BC546B		_	80	V
	BC547		_	50	V
V <sub>CEO</sub>	collector-emitter voltage	open base			
	BC546A; BC546B		_	65	V
	BC547; BC547B; BC547C		_	45	V
V <sub>EBO</sub>	emitter-base voltage	open collector			
	BC546A; BC546B		_	6	V
	BC547; BC547B; BC547C		_	6	V
I <sub>C</sub>	collector current (DC)		_	100	mA
I <sub>CM</sub>	peak collector current		_	200	mA
I <sub>BM</sub>	peak base current		_	200	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C; note 1	_	500	mW
T <sub>stg</sub>	storage temperature		-65	+150	°C
Tj	junction temperature		_	150	°C
T <sub>amb</sub>	ambient temperature		-65	+150	°C

### Note

### THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient	note 1	250	K/W

### Note

1. Transistor mounted on an FR4 printed-circuit board.

<sup>1.</sup> Transistor mounted on an FR4 printed-circuit board.

# NPN general purpose transistors

BC546; BC547

# **CHARACTERISTICS**

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

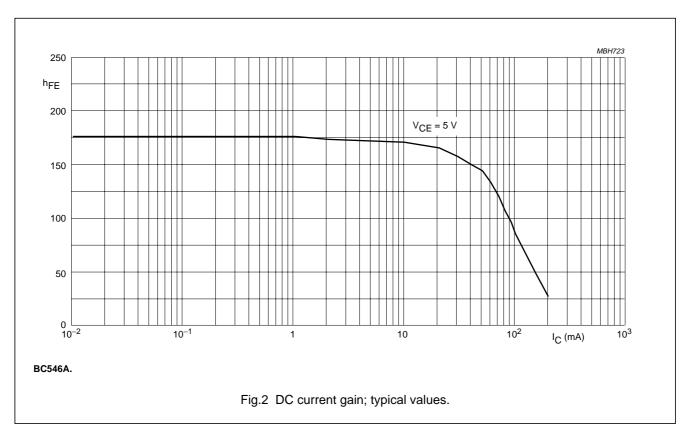
SYMBOL	PARAMETER	PARAMETER CONDITIONS				UNIT
I <sub>CBO</sub>	collector-base cut-off current	V <sub>CB</sub> = 30 V; I <sub>E</sub> = 0 A	_	-	15	nA
		V <sub>CB</sub> = 30 V; I <sub>E</sub> = 0 A; T <sub>j</sub> = 150 °C	_	_	5	μΑ
I <sub>EBO</sub>	emitter-base cut-off current	V <sub>EB</sub> = 5 V; I <sub>C</sub> = 0 A	_	_	100	nA
h <sub>FE</sub>	DC current gain BC546A BC546B; BC547B	$V_{CE}$ = 5 V; $I_{C}$ = 10 $\mu$ A; see Figs 2, 3 and 4	_	90 150		
	BC547C		_	270	_	
	DC current gain BC546A BC546B; BC547B	$V_{CE} = 5 \text{ V; } I_{C} = 2 \text{ mA;}$ see Figs 2, 3 and 4	110	180	220 450	
	BC547C BC547		420 110	520	800 800	
V <sub>CEsat</sub>	collector-emitter saturation	$I_{\rm C}$ = 10 mA; $I_{\rm B}$ = 0.5 mA	_	90	250	mV
▼ CESal	voltage	$I_C = 100 \text{ mA}; I_B = 5 \text{ mA}$	_	200	600	mV
V <sub>BEsat</sub>	base-emitter saturation voltage	$I_C = 10 \text{ mA}$ ; $I_B = 0.5 \text{ mA}$ ; note 1	_	700	_	mV
		$I_C = 100 \text{ mA}$ ; $I_B = 5 \text{ mA}$ ; note 1	_	900	_	mV
V <sub>BE</sub>	base-emitter voltage	V <sub>CE</sub> = 5 V; I <sub>C</sub> = 2 mA; note 2	580	660	700	mV
		V <sub>CE</sub> = 5 V; I <sub>C</sub> = 10 mA	_	_	770	mV
C <sub>c</sub>	collector capacitance	$V_{CB} = 10 \text{ V}; I_E = i_e = 0 \text{ A}; f = 1 \text{ MHz}$	_	1.5	_	pF
C <sub>e</sub>	emitter capacitance	$V_{EB} = 0.5 \text{ V}; I_C = I_c = 0 \text{ A};$ f = 1 MHz	_	11	_	pF
f <sub>T</sub>	transition frequency	V <sub>CE</sub> = 5 V; I <sub>C</sub> = 10mA; f = 100 MHz	100	_	_	MHz
F	noise figure	$V_{CE} = 5 \text{ V}; I_{C} = 200 \mu\text{A}; R_{S} = 2 k\Omega;$ f = 1 kHz; B = 200 Hz	_	2	10	dB

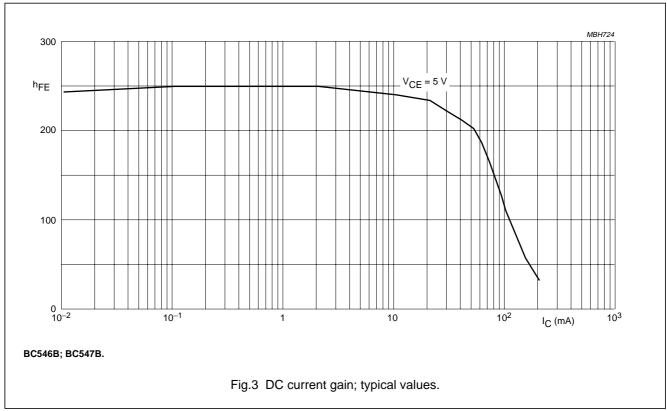
### Notes

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

# NPN general purpose transistors

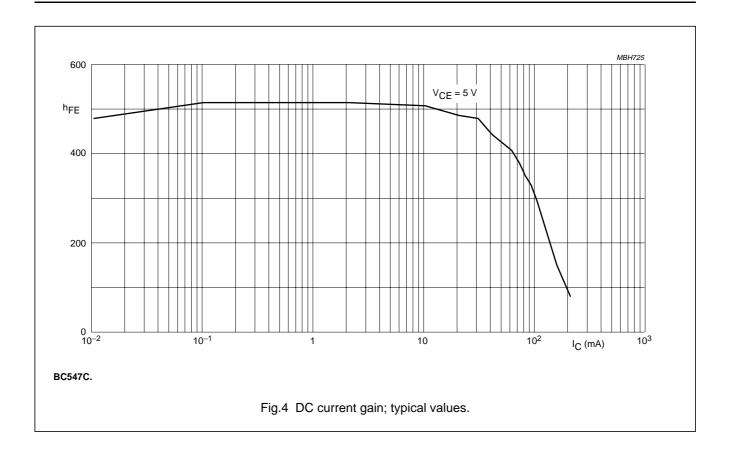
BC546; BC547





# NPN general purpose transistors

BC546; BC547



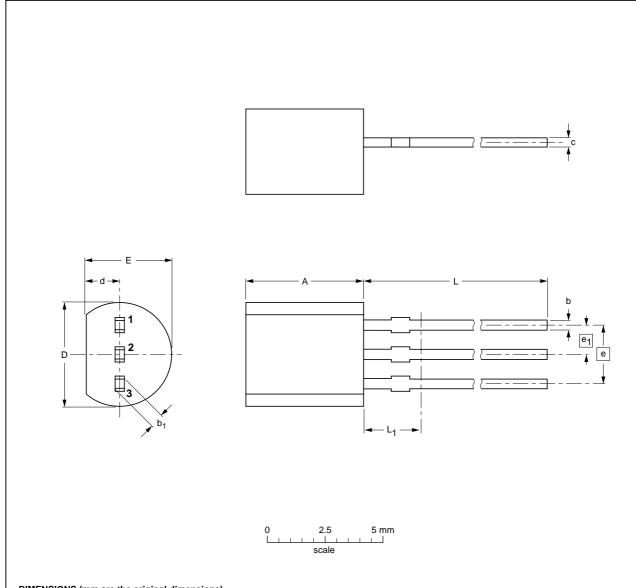
# NPN general purpose transistors

BC546; BC547

# **PACKAGE OUTLINE**

# Plastic single-ended leaded (through hole) package; 3 leads

SOT54



### DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b <sub>1</sub>	С	D	d	E	е	e <sub>1</sub>	L	L <sub>1</sub> <sup>(1)</sup> max.	
mm	5.2 5.0	0.48 0.40	0.66 0.55	0.45 0.38	4.8 4.4	1.7 1.4	4.2 3.6	2.54	1.27	14.5 12.7	2.5	

#### Note

1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

OUTLINE		REFER	EUROPEAN	ISSUE DATE		
VERSION	IEC	JEDEC	JEITA		PROJECTION	ISSUE DATE
SOT54		TO-92	SC-43A			<del>04-06-28</del> 04-11-16

# NPN general purpose transistors

BC546; BC547

#### **DATA SHEET STATUS**

LEVEL	DATA SHEET STATUS <sup>(1)</sup>	PRODUCT STATUS(2)(3)	DEFINITION
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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