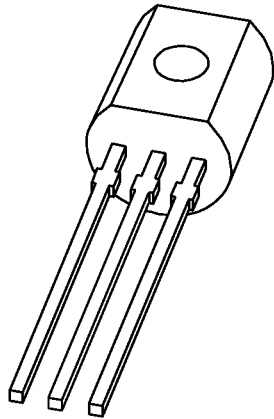


# DATA SHEET



## **BC546; BC547; BC548** NPN general purpose transistors

Product specification  
Supersedes data of September 1994  
File under Discrete Semiconductors, SC04

1997 Mar 04

## NPN general purpose transistors

## BC546; BC547; BC548

## FEATURES

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

## APPLICATIONS

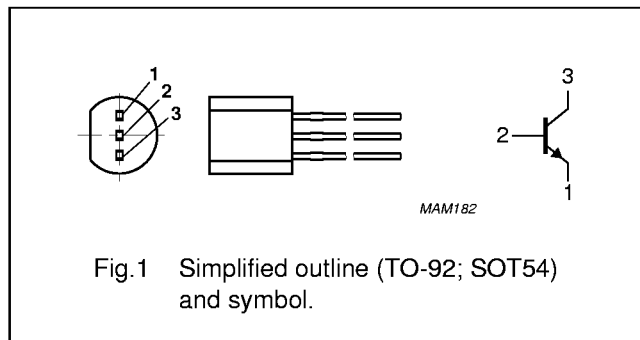
- General purpose switching and amplification.

## DESCRIPTION

NPN transistor in a TO-92; SOT54 plastic package.  
PNP complements: BC556, BC557 and BC558.

## PINNING

PIN	DESCRIPTION
1	emitter
2	base
3	collector



## QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter			
	BC546		–	80	V
	BC547		–	50	V
	BC548		–	30	V
$V_{CEO}$	collector-emitter voltage	open base			
	BC546		–	65	V
	BC547		–	45	V
	BC548		–	30	V
$I_{CM}$	peak collector current		–	200	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ }^{\circ}\text{C}$	–	500	mW
$h_{FE}$	DC current gain	$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}$			
	BC546		110	450	
	BC547		110	800	
	BC548		110	800	
$f_T$	transition frequency	$I_C = 10\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}$	100	–	MHz

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**LIMITING VALUES**

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter			
	BC546		–	80	V
	BC547		–	50	V
	BC548		–	30	V
$V_{CEO}$	collector-emitter voltage	open base			
	BC546		–	65	V
	BC547		–	45	V
	BC548		–	30	V
$V_{EBO}$	emitter-base voltage	open collector			
	BC546		–	6	V
	BC547		–	6	V
	BC548		–	5	V
$I_C$	collector current (DC)		–	100	mA
$I_{CM}$	peak collector current		–	200	mA
$I_{BM}$	peak base current		–	200	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$ ; note 1	–	500	mW
$T_{stg}$	storage temperature		–65	+150	°C
$T_j$	junction temperature		–	150	°C
$T_{amb}$	operating ambient temperature		–65	+150	°C

**Note**

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

**THERMAL CHARACTERISTICS**

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{thj-a}$	thermal resistance from junction to ambient	note 1	0.25	K/mW

**Note**

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

## NPN general purpose transistors

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**CHARACTERISTICS**

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

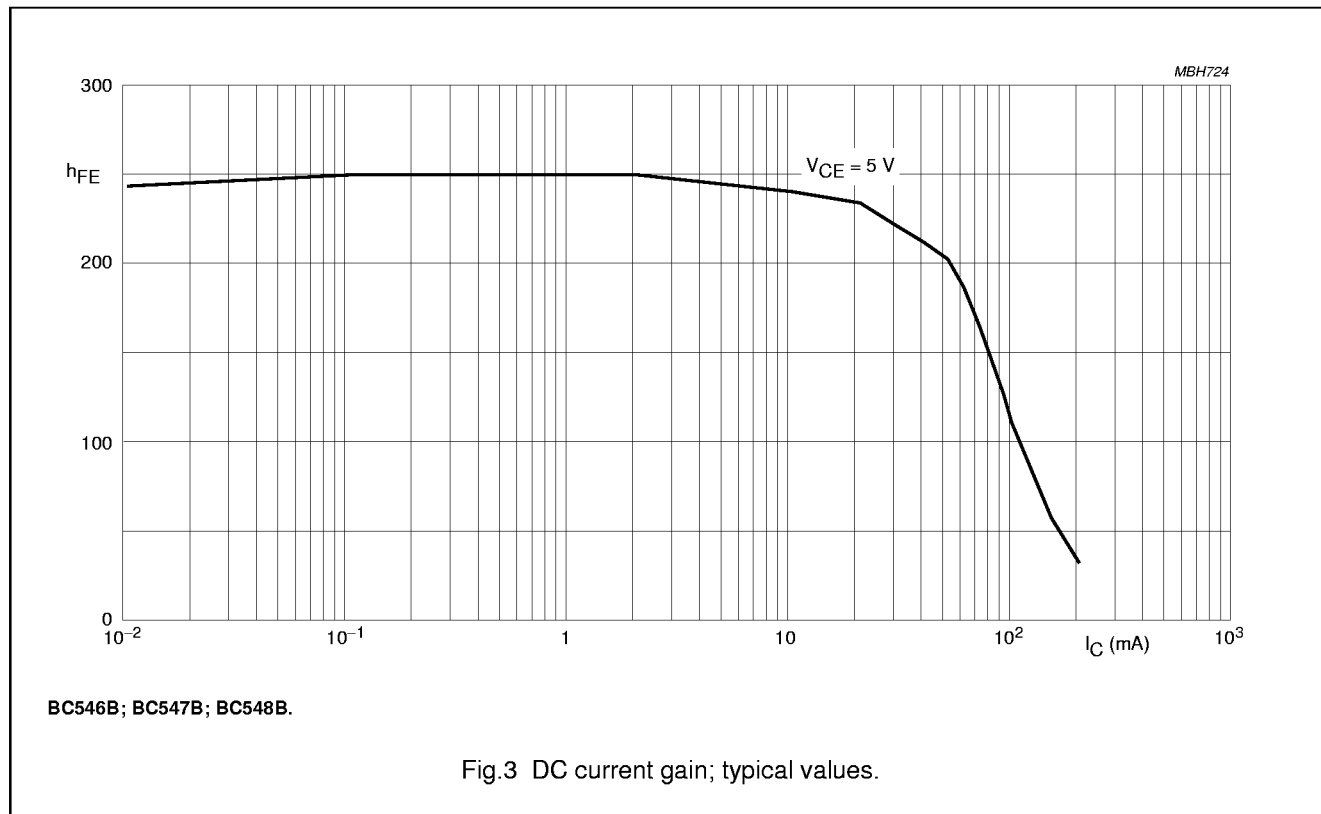
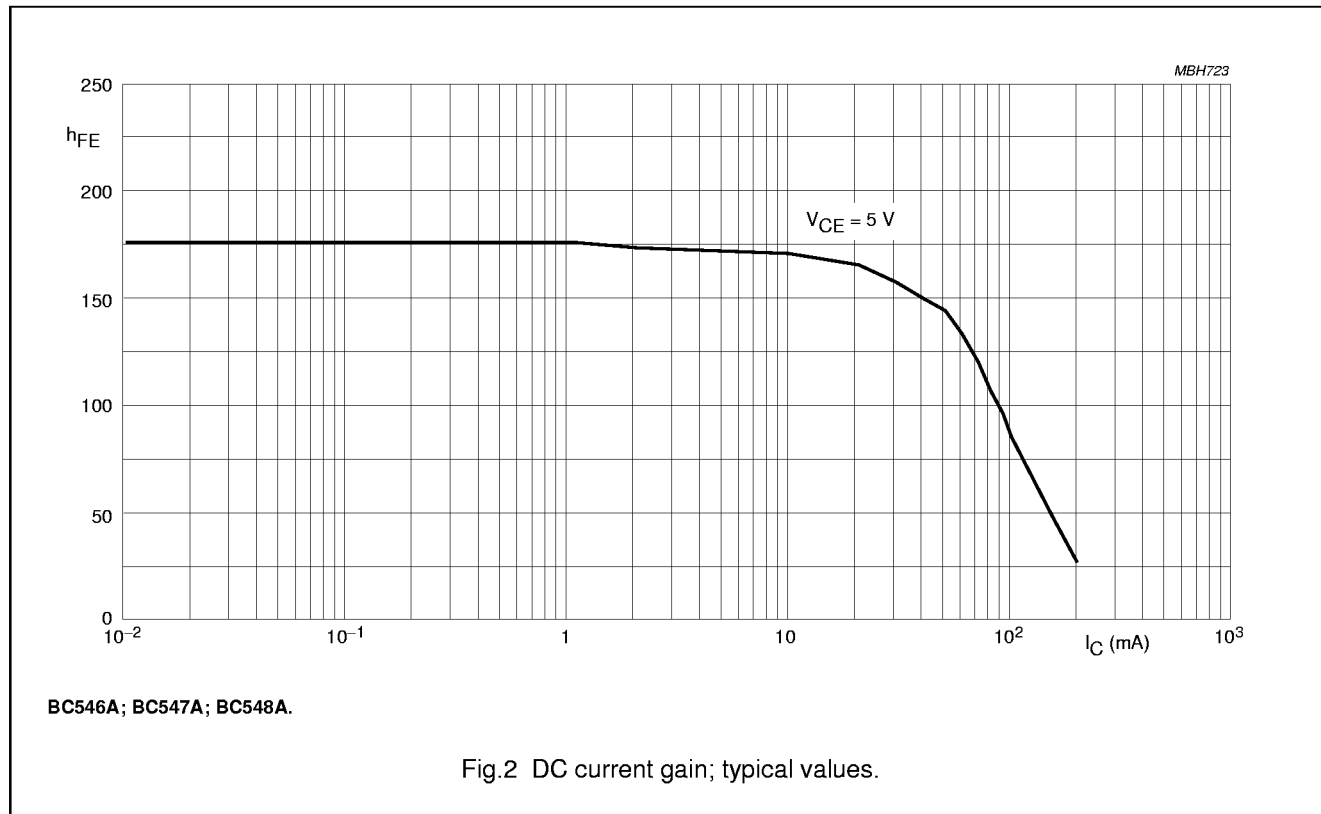
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{CBO}$	collector cut-off current	$I_E = 0; V_{CB} = 30\text{ V}$	–	–	15	nA
		$I_E = 0; V_{CB} = 30\text{ V}; T_j = 150\text{ °C}$	–	–	5	$\mu\text{A}$
$I_{EBO}$	emitter cut-off current	$I_C = 0; V_{EB} = 5\text{ V}$	–	–	100	nA
$h_{FE}$	DC current gain BC546A; BC547A; BC548A BC546B; BC547B; BC548B BC547C; BC548C	$I_C = 10\text{ }\mu\text{A}; V_{CE} = 5\text{ V};$ see Figs 2, 3 and 4	–	90	–	
			–	150	–	
			–	270	–	
$h_{FE}$	DC current gain BC546A; BC547A; BC548A BC546B; BC547B; BC548B BC547C; BC548C BC547; BC548 BC546	$I_C = 2\text{ mA}; V_{CE} = 5\text{ V};$ see Figs 2, 3 and 4	110	180	220	
			200	290	450	
			420	520	800	
			110	–	800	
			110	–	450	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 0.5\text{ mA}$	–	90	250	mV
		$I_C = 100\text{ mA}; I_B = 5\text{ mA}$	–	200	600	mV
$V_{BEsat}$	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
$V_{BE}$	base-emitter voltage	$I_C = 2\text{ mA}; V_{CE} = 5\text{ V};$ note 2	580	660	700	mV
		$I_C = 10\text{ mA}; V_{CE} = 5\text{ V}$	–	–	770	mV
$C_c$	collector capacitance	$I_E = I_e = 0; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$	–	1.5	–	pF
$C_e$	emitter capacitance	$I_C = I_c = 0; V_{EB} = 0.5\text{ V}; f = 1\text{ MHz}$	–	11	–	pF
$f_T$	transition frequency	$I_C = 10\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}$	100	–	–	MHz
F	noise figure	$I_C = 200\text{ }\mu\text{A}; V_{CE} = 5\text{ V};$ $R_S = 2\text{ k}\Omega; f = 1\text{ kHz}; B = 200\text{ Hz}$	–	2	10	dB

**Notes**

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

# NPN general purpose transistors

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NPN general purpose transistors

BC546; BC547; BC548

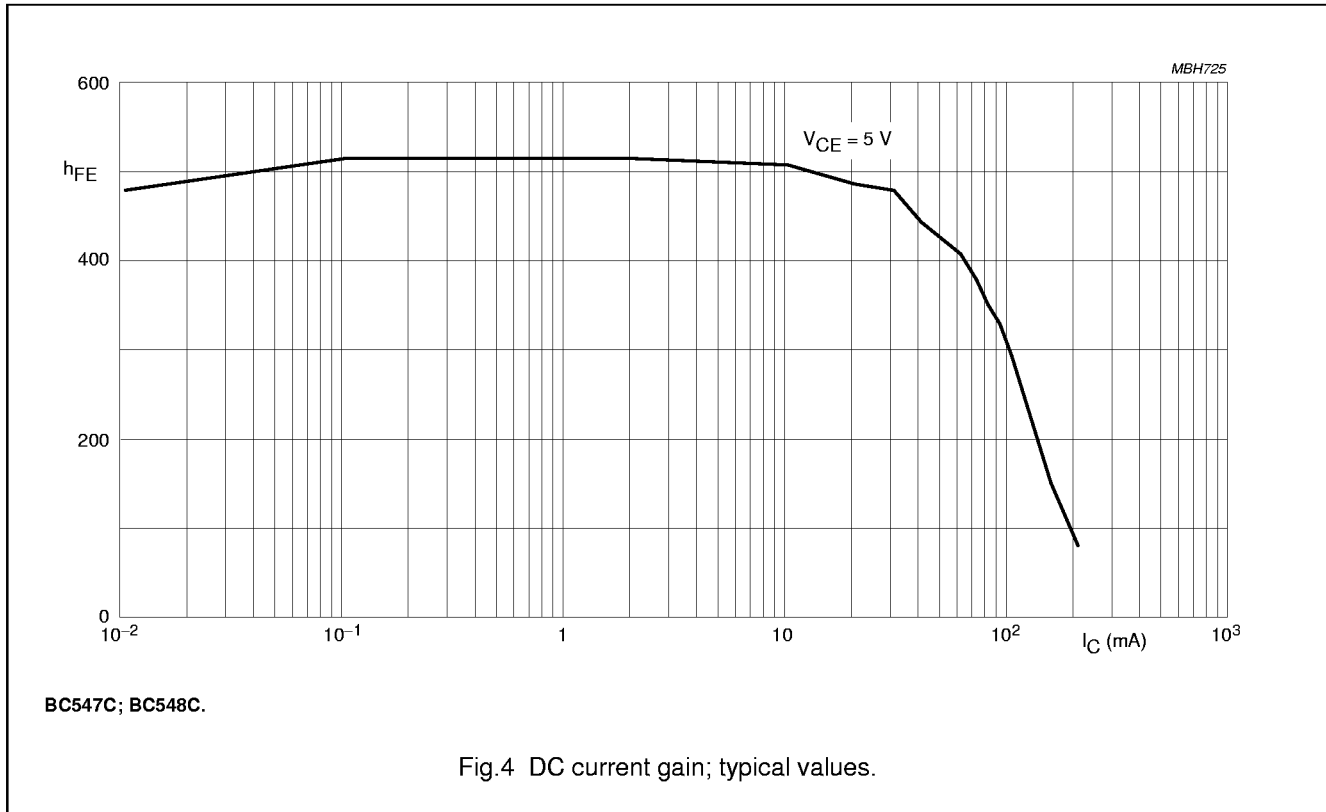


Fig.4 DC current gain; typical values.

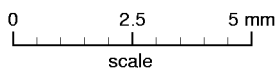
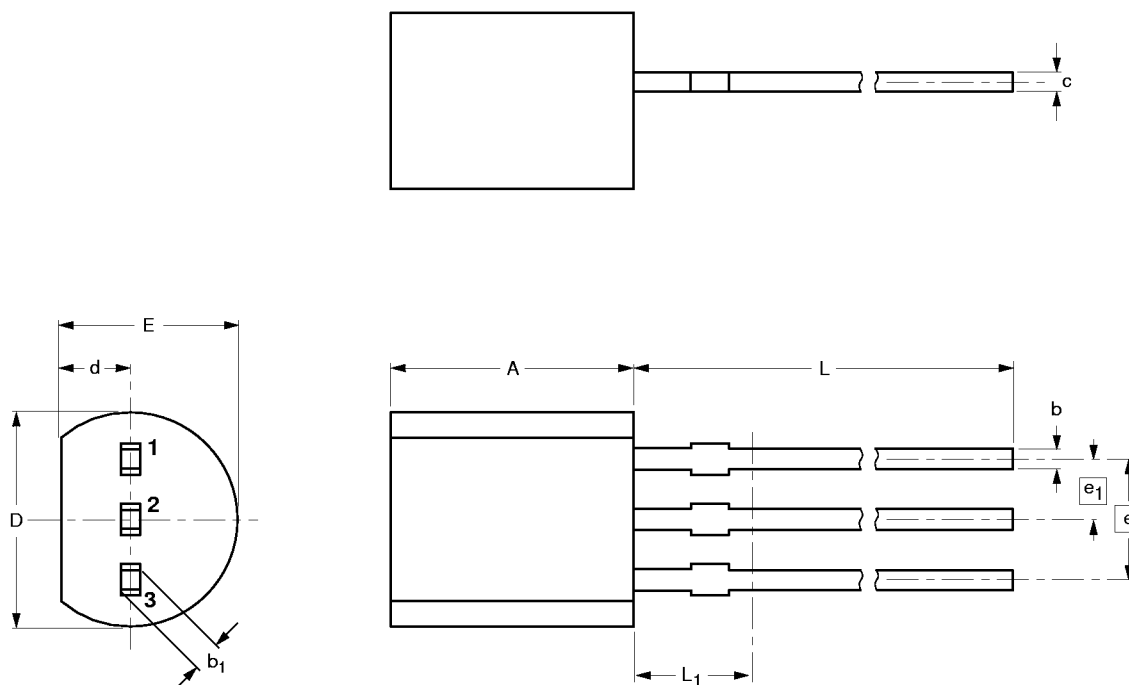
NPN general purpose transistors

BC546; BC547; BC548

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>	c	D	d	E	e	e <sub>1</sub>	L	L <sub>1</sub> <sup>(1)</sup>
mm	5.2	0.48	0.66	0.45	4.8	1.7	4.2	2.54	1.27	14.5	2.5
	5.0	0.40	0.56	0.40	4.4	1.4	3.6				

Note

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

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ		
SOT54		TO-92	SC-43		97-02-28