



NPN Transistor Bare Die - BC546

Rev 1.0
08/01/19

General purpose medium power amplifier or switch in bare die form
Complement to PNP BC556

Features:

- Gain graded
- Low saturation voltage
- Well suited for amplifier applications
- High reliability gold back metal
- High reliability tested grades for Military + Space

Ordering Information:

The following part suffixes apply:

- No suffix - MIL-STD-750 /2072 Visual Inspection
- "H" - MIL-STD-750 /2072 Visual Inspection
+ MIL-STD-38534 Class H LAT
- "K" - MIL-STD-750 /2072 Visual Inspection
+ MIL-STD-38534 Class K LAT

LAT = Lot Acceptance Test.

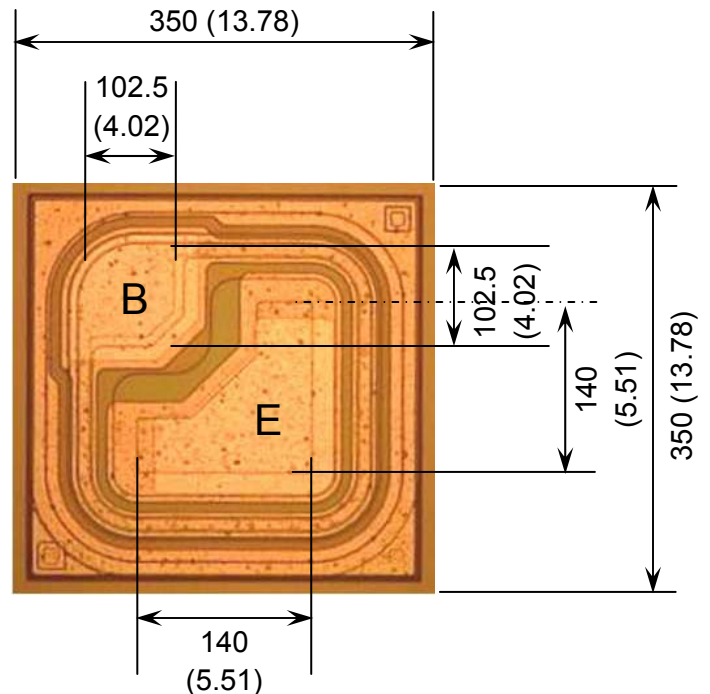
For further information on LAT process flows see below.

www.siliconsupplies.com/quality/bare-die-lot-qualification

Supply Formats:

- Default – Die in Waffle Pack (400 per tray capacity)
- Sawn Wafer on Tape – Specific request
- Unsawn Wafer – Specific request
- With additional electrical selection – Specific request
- Sawn as pairs or adjacent pair pick – Specific request

Die Dimensions in μm (mils)



E = EMITTER **B** = BASE

DIE BACK = COLLECTOR

Mechanical Specification

Die Size (Excluding Saw Street)	350 x 350 13.78 x 13.78	μm mils
Base Pad Size	102.5 x 102.5 4.02 x 4.02	μm mils
Emitter Pad Size	96 x 96 5.51 x 5.51	μm mils
Die Thickness	230 (± 15) 9.06 (± 0.59)	μm mils
Top Metal Composition	Al - 1.3 μm	
Back Metal Composition	AuAs - 0.9 μm	





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Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise stated

PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	V_{CB0}	80	V
Collector-Emitter Voltage	V_{CEO}	65	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current	I_C	100	mA
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to 150	$^\circ\text{C}$

Electrical Characteristics $T_A = 25^\circ\text{C}$ unless otherwise stated

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT	
OFF CHARACTERISTICS							
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 50\mu\text{A}, I_E = 0$	50	-	-	V	
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 1\text{mA}, I_B = 0$	45	-	-	V	
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 50\mu\text{A}, I_C = 0$	6	-	-	V	
Collector Cut-off Current	I_{CBO}	$V_{CB} = 30\text{V}, I_E = 0$	-	-	15	nA	
ON CHARACTERISTICS							
Forward-Current Transfer Ratio ¹	h_{FE}	BC546	$V_{CE} = 5\text{V}, I_C = 2\text{mA}$	110	-	800	-
		BC546A		110	-	220	-
		BC546B		200	290	450	-
		BC546C		420	-	800	-
	BC546A	$V_{CE} = 5\text{V}, I_C = 10\mu\text{A}$	-	90	-	-	
		$V_{CE} = 5\text{V}, I_C = 100\text{mA}$	-	120	-	-	
		BC546B	$V_{CE} = 5\text{V}, I_C = 10\mu\text{A}$	-	150	-	-
		BC546B	$V_{CE} = 5\text{V}, I_C = 100\text{mA}$	-	180	-	-
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$	-	90	250	mV	
		$I_C = 100\text{mA}, I_B = 5\text{mA}$	-	200	600	mV	
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$	-	700	-	mV	
		$I_C = 100\text{mA}, I_B = 5\text{mA}$	-	900	-	mV	
Base-Emitter On Voltage	$V_{BE(on)}$	$I_C = 2\text{mA}, V_{CE} = 5\text{V}$	580	660	700	mV	
		$I_C = 10\text{mA}, V_{CE} = 5\text{V}$	-	-	720	mV	
SMALL SIGNAL CHARACTERISTICS²							
Transition Frequency ³	f_T	$V_{CE} = 5\text{V}, I_C = 10\text{mA}, f = 100\text{MHz}$	150	300	-	MHz	
Small-Signal Current Gain	h_{fe}	BC546	$V_{CE} = 5\text{V}, I_C = 2\text{mA}, f = 1\text{kHz}$	125	-	900	
		BC546A		125	220	260	
		BC546B		240	330	500	
Output Capacitance	C_{obo}	$V_{CB} = 10\text{V}, I_E = 0, f = 1\text{MHz}$	-	3.5	6	pF	
Input Capacitance	C_{ibo}	$V_{BE} = 10\text{V}, I_C = 0, f = 1\text{MHz}$	-	9	-	pF	
Noise Figure	NF	$V_{CE} = 5\text{V}, I_C = 200\mu\text{A}, f = 1\text{kHz}, R_G = 2\text{k}\Omega$	-	2	10	dB	

Note 1: Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

Note 2: Not production testing in die form. Characterized by chip design and tested in package

Note 3: f_T is defined as the frequency at which $|h_{fe}|$ extrapolates to unity.





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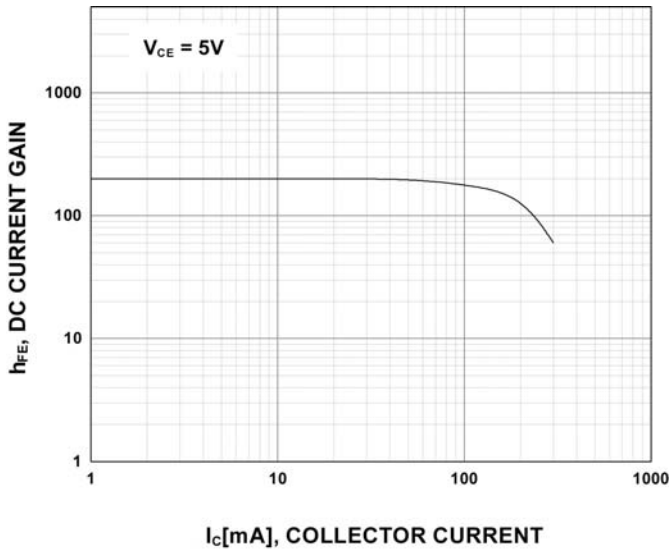


Figure 1 – DC Current Gain

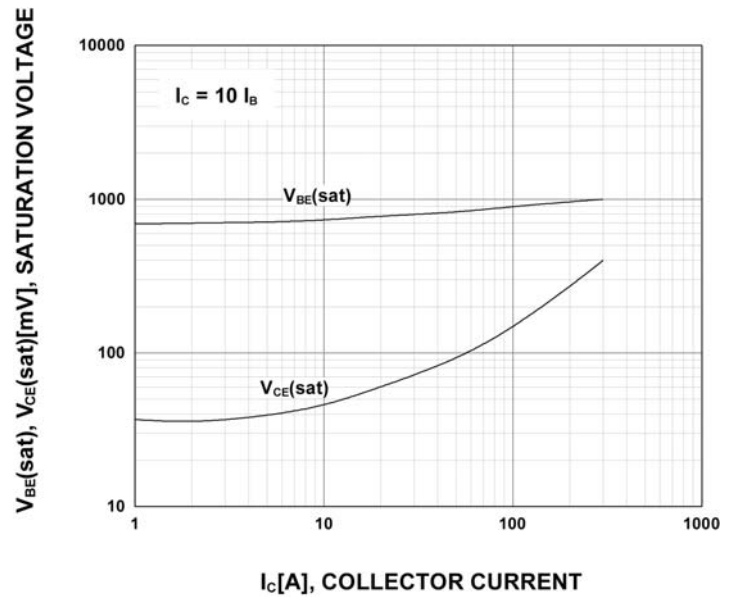


Figure 3 – Base-Emitter Saturation Voltage versus Collector-Emmitter Saturation Voltage

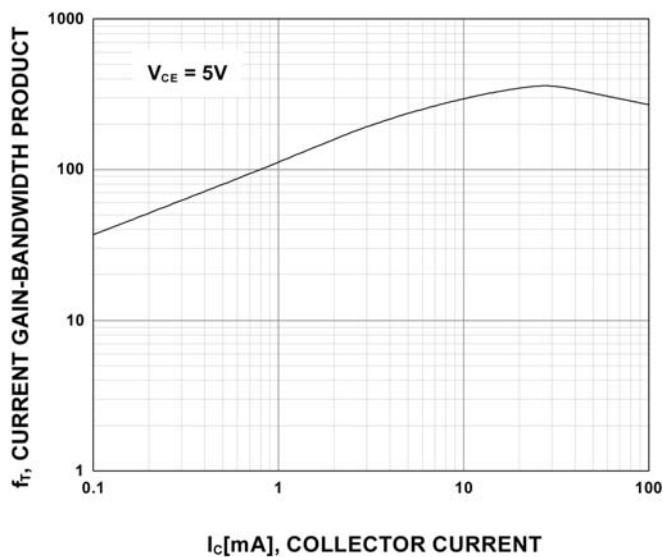


Figure 3 – Current Gain Bandwidth Product

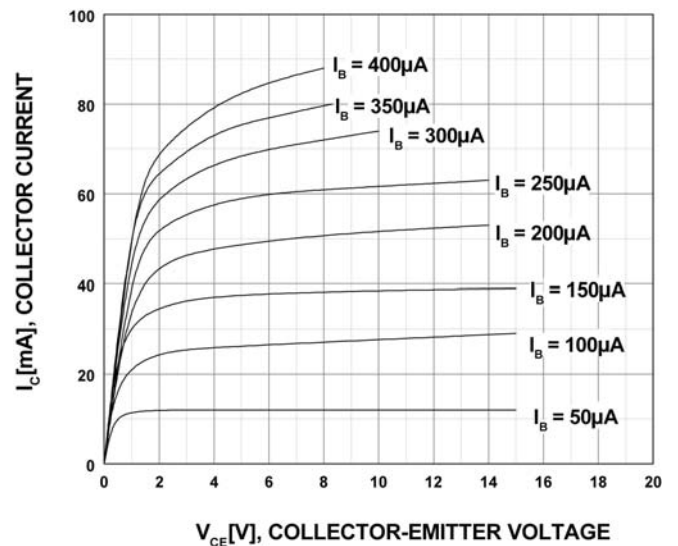


Figure 4 – Static Characteristics





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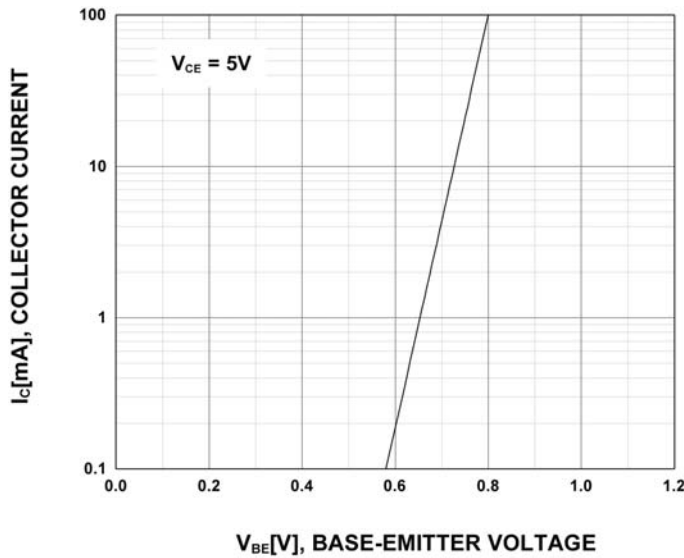


Figure 5 – Transfer Characteristic

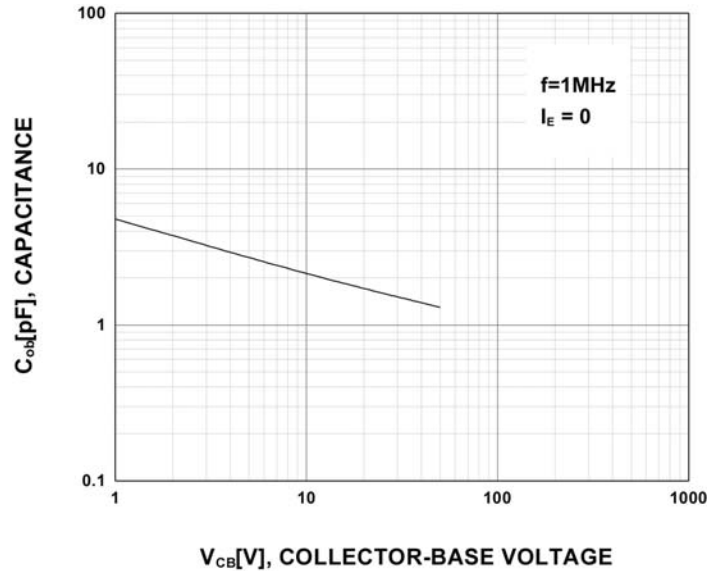


Figure 6 – Output Capacitance

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