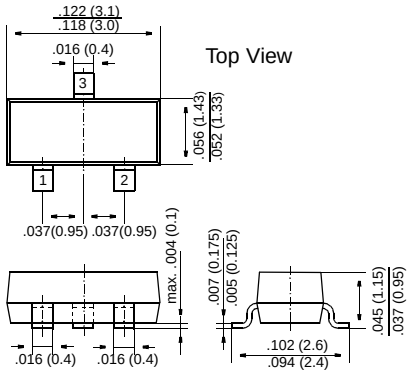
BC846 THRU BC849

Small Signal Transistors (NPN)

SOT-23



Pin configuration
1 = Base, 2 = Emitter, 3 = Collector.

FEATURES

- NPN Silicon Epitaxial Planar Transistors for switching and AF amplifier applications.
- Especially suited for automatic insertion in thick- and thin-film circuits.
- These transistors are subdivided into three groups A, B and C according to their current gain. The type BC846 is available in groups A and B, however, the types BC847 and BC848 can be supplied in all three groups. The BC849 is a low noise type available in groups B and C. As complementary types, the PNP transistors BC856...BC859 are recommended.

MECHANICAL DATA

Case: SOT-23 Plastic Package
Weight: approx. 0.008 g
Marking code

Type	Marking
BC846A	1A
B	1B
BC847A	1E
B	1F
C	1G

Type	Marking
BC848A	1J
B	1K
C	1L
BC849B	2B
C	2C

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Ratings at 25 °C ambient temperature unless otherwise specified

		Symbol	Value	Unit
Collector-Base Voltage	**BC846**	V_{CBO}	80	V
	BC847	V_{CBO}	50	V
	BC848, BC849	V_{CBO}	30	V
Collector-Emitter Voltage	**BC846**	V_{CES}	80	V
	BC847	V_{CES}	50	V
	BC848, BC849	V_{CES}	30	V
Collector-Emitter Voltage	**BC846**	V_{CEO}	65	V
	BC847	V_{CEO}	45	V
	BC848, BC849	V_{CEO}	30	V
Emitter-Base Voltage	**BC846, BC847**	V_{EBO}	6	V
	BC848, BC849	V_{EBO}	5	V
Collector Current		I_C	100	mA
Peak Collector Current		I_{CM}	200	mA
Peak Base Current		I_{BM}	200	mA
Peak Emitter Current		$-I_{EM}$	200	mA
Power Dissipation at T_{SB} = 50 °C		P_{tot}	310[1)]	mW
Junction Temperature		T_j	150	°C
Storage Temperature Range		T_S	−65 to +150	°C

[1)] Device on fiberglass substrate, see layout

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ELECTRICAL CHARACTERISTICS

Ratings at 25 °C ambient temperature unless otherwise specified

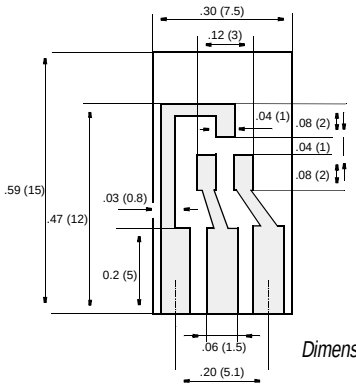
	Symbol	Min.	Typ.	Max.	Unit
h-Parameters at V_{CE} = 5 V, I_C = 2 mA, f = 1 kHz, Small Signal Current Gain					
Current Gain Group A	h_{fe}	–	220	–	–
B	h_{fe}	–	330	–	–
C	h_{fe}	–	600	–	–
Input Impedance **Current Gain Group A**	h_{ie}	1.6	2.7	4.5	kΩ
B	h_{ie}	3.2	4.5	8.5	kΩ
C	h_{ie}	6	8.7	15	kΩ
Output Admittance **Current Gain Group A**	h_{oe}	–	18	30	µS
B	h_{oe}	–	30	60	µS
C	h_{oe}	–	60	110	µS
Reverse Voltage Transfer Ratio					
Current Gain Group A	h_{re}	–	$1.5 \cdot 10^{-4}$	–	–
B	h_{re}	–	$2 \cdot 10^{-4}$	–	–
C	h_{re}	–	$3 \cdot 10^{-4}$	–	–
DC Current Gain at V_{CE} = 5 V, I_C = 10 µA					
Current Gain Group A	h_{FE}	–	90	–	–
B	h_{FE}	–	150	–	–
C	h_{FE}	–	270	–	–
at V_{CE} = 5 V, I_C = 2 mA					
Current Gain Group A	h_{FE}	110	180	220	–
B	h_{FE}	200	290	450	–
C	h_{FE}	420	520	800	–
Thermal Resistance Junction to Substrate Backside	R_{thSB}	–	–	320[1)]	K/W
Thermal Resistance Junction to Ambient Air	R_{thJA}	–	–	450[1)]	K/W
Collector Saturation Voltage					
at I_C = 10 mA, I_B = 0.5 mA	V_{CEsat}	–	90	250	mV
at I_C = 100 mA, I_B = 5 mA	V_{CEsat}	–	200	600	mV
Base Saturation Voltage					
at I_C = 10 mA, I_B = 0.5 mA	V_{BEsat}	–	700	–	mV
at I_C = 100 mA, I_B = 5 mA	V_{BEsat}	–	900	–	mV
Base-Emitter Voltage					
at V_{CE} = 5 V, I_C = 2 mA	V_{BE}	580	660	700	mV
at V_{CE} = 5 V, I_C = 10 mA	V_{BE}	–	–	720	mV
Collector-Emitter Cutoff Current					
at V_{CE} = 80 V **BC846**	I_{CES}	–	0.2	15	nA
at V_{CE} = 50 V **BC847**	I_{CES}	–	0.2	15	nA
at V_{CE} = 30 V **BC848, BC849**	I_{CES}	–	0.2	15	nA
at V_{CE} = 80 V, T_j = 125 °C **BC846**	I_{CES}	–	–	4	µA
at V_{CE} = 50 V, T_j = 125 °C **BC847**	I_{CES}	–	–	4	µA
at V_{CE} = 30 V, T_j = 125 °C **BC848, BC849**	I_{CES}	–	–	4	µA
Gain-Bandwidth Product at V_{CE} = 5 V, I_C = 10 mA, f = 100 MHz	f_T	–	300	–	MHz

[1)] Device on fiberglass substrate, see layout

ELECTRICAL CHARACTERISTICS

Ratings at 25 °C ambient temperature unless otherwise specified

	Symbol	Min.	Typ.	Max.	Unit
Collector-Base Capacitance at V_{CB} = 10 V, f = 1 MHz	C_{CBO}	–	3.5	6	pF
Emitter-Base Capacitance at V_{EB} = 0.5 V, f = 1 MHz	C_{EBO}	–	9	–	pF
Noise Figure at V_{CE} = 5 V, I_C = 200 µA, R_G = 2 kΩ, f = 1 kHz, Δf = 200 Hz **BC846, BC847, BC848**	F	–	2	10	dB
BC849	F	–	1.2	4	dB
at V_{CE} = 5 V, I_C = 200 µA, R_G = 2 kΩ, f = 30…15000 Hz **BC849**	F	–	1.4	4	dB



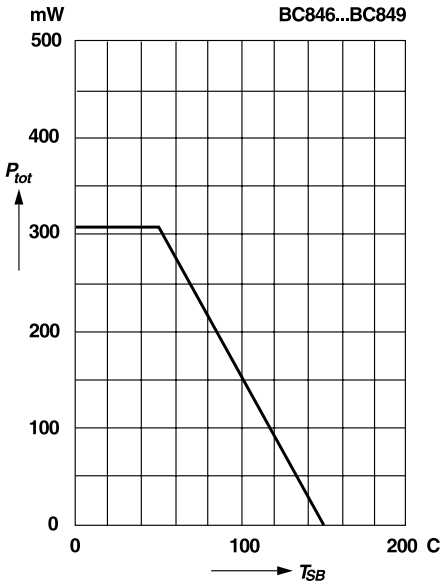
Dimensions in inches (millimeters)

Layout for R_{thJA} test
Thickness: Fiberglass 0.059 in (1.5 mm)
Copper leads 0.012 in (0.3 mm)

RATINGS AND CHARACTERISTIC CURVES BC846 THRU BC849

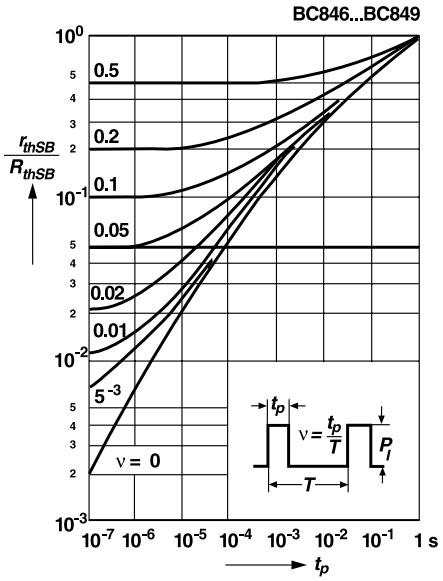
Admissible power dissipation versus temperature of substrate backside

Device on fiberglass substrate, see layout

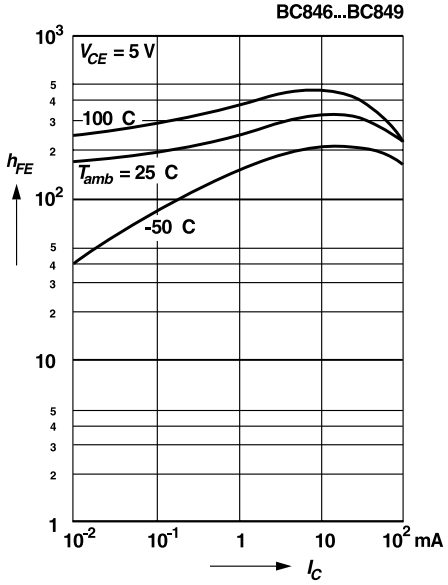


Pulse thermal resistance versus pulse duration (normalized)

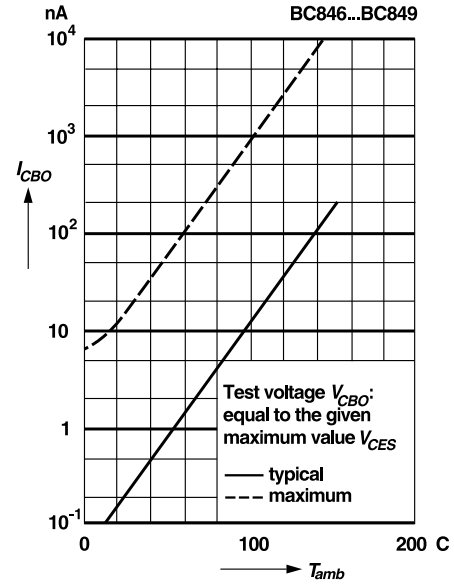
Device on fiberglass substrate, see layout



DC current gain versus collector current



Collector-Base cutoff current versus ambient temperature



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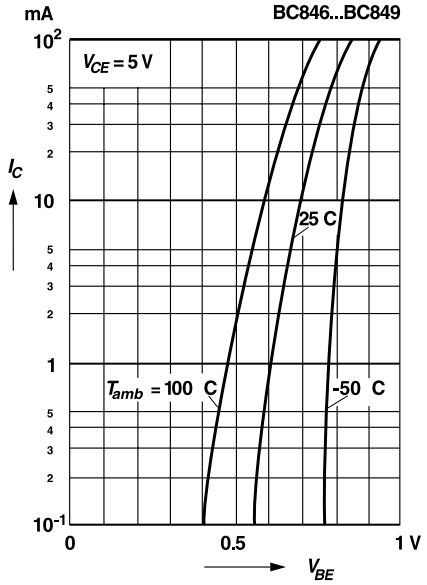
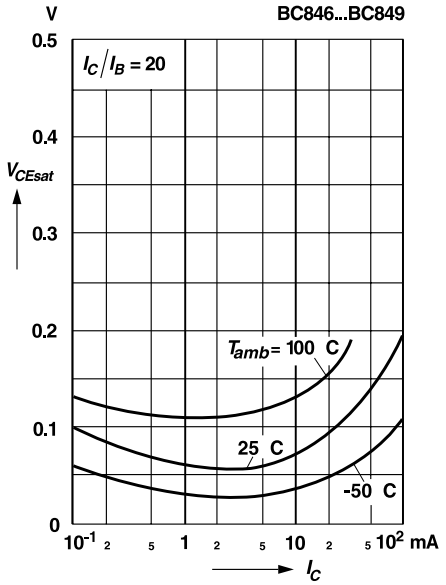
RATINGS AND CHARACTERISTIC CURVES BC846 THRU BC849

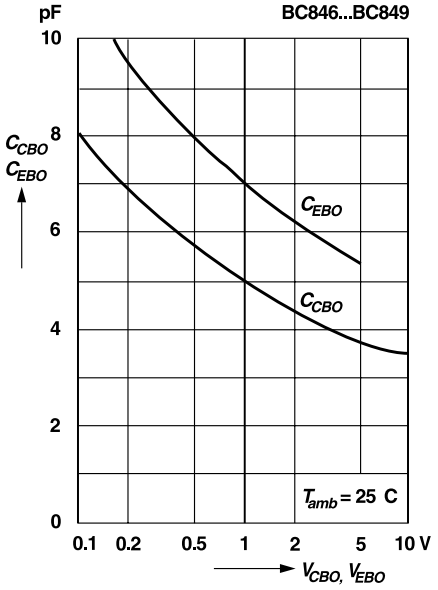
Collector current versus base-emitter voltage



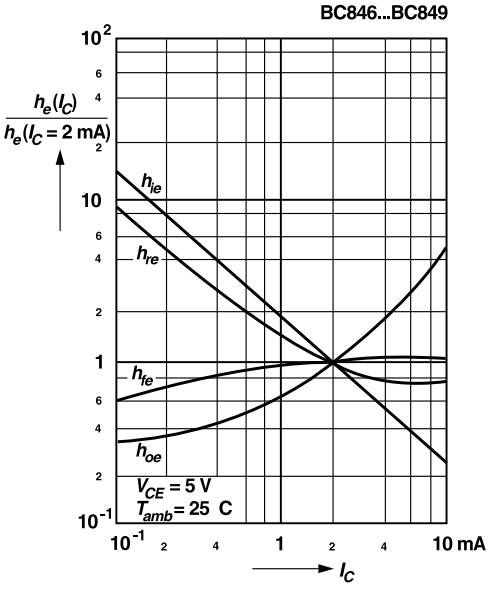
Collector saturation voltage versus collector current



Collector base capacitance, Emitter base capacitance versus reverse bias voltage



Relative h-parameters versus collector current



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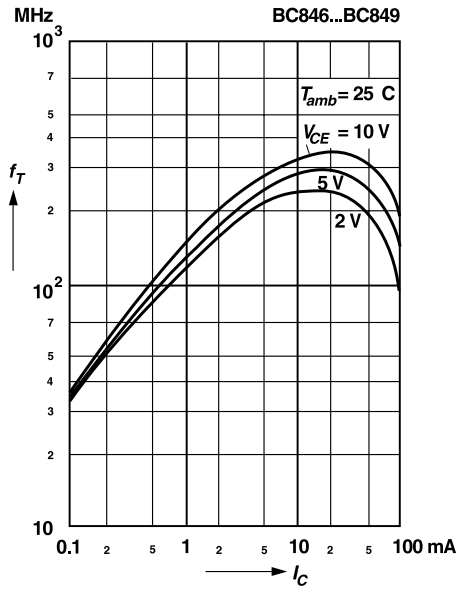
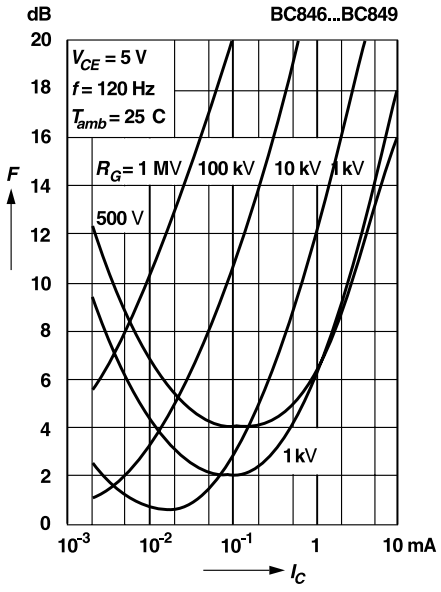
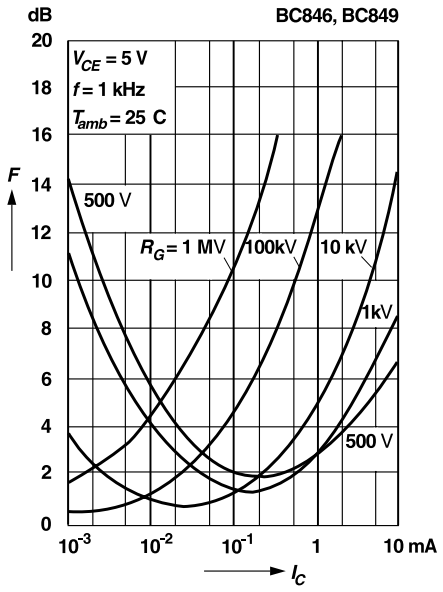
Gain-bandwidth product versus collector current



Noise figure versus collector current



Noise figure versus collector current



Noise figure versus collector emitter voltage