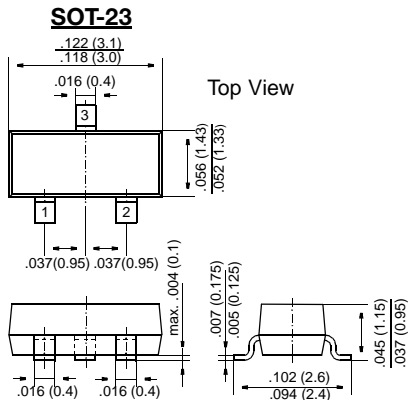


BC846 THRU BC849

Small Signal Transistors (NPN)



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	Type	Marking
BC846A	1A	BC848A	1J
B	1B	B	1K
BC847A	1E	C	1L
B	1F	BC849B	2B
C	1G	C	2C

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Ratings at 25 °C ambient temperature unless otherwise specified

	Symbol	Value	Unit
Collector-Base Voltage	BC846 BC847 BC848, BC849	V_{CB0} V_{CB0} V_{CB0}	V V V
Collector-Emitter Voltage	BC846 BC847 BC848, BC849	V_{CES} V_{CES} V_{CES}	V V V
Collector-Emitter Voltage	BC846 BC847 BC848, BC849	V_{CEO} V_{CEO} V_{CEO}	V V V
Emitter-Base Voltage	BC846, BC847 BC848, BC849	V_{EBO} V_{EBO}	V 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 $T_{SB} = 50\text{ °C}$	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

BC846 THRU BC849

ELECTRICAL CHARACTERISTICS

Ratings at 25 °C ambient temperature unless otherwise specified

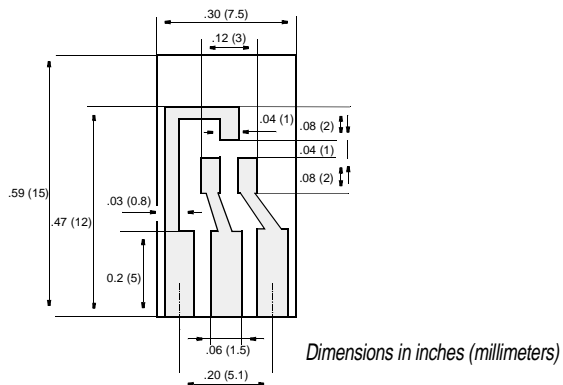
	Symbol	Min.	Typ.	Max.	Unit	
h-Parameters at $V_{CE} = 5\text{ V}$, $I_C = 2\text{ mA}$, $f = 1\text{ kHz}$, Small Signal Current Gain						
Current Gain Group	A	h_{fe}	220	–	–	
	B	h_{fe}	330	–	–	
	C	h_{fe}	600	–	–	
Input Impedance	A	h_{ie}	1.6	2.7	4.5	$k\Omega$
	B	h_{ie}	3.2	4.5	8.5	$k\Omega$
	C	h_{ie}	6	8.7	15	$k\Omega$
Output Admittance	A	h_{oe}	–	18	30	μS
	B	h_{oe}	–	30	60	μS
	C	h_{oe}	–	60	110	μS
Reverse Voltage Transfer Ratio	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 $V_{CE} = 5\text{ V}$, $I_C = 10\text{ }\mu A$						
Current Gain Group	A	h_{FE}	–	90	–	–
	B	h_{FE}	–	150	–	–
	C	h_{FE}	–	270	–	–
at $V_{CE} = 5\text{ V}$, $I_C = 2\text{ mA}$						
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 $I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$ at $I_C = 100\text{ mA}$, $I_B = 5\text{ mA}$						
V_{CEsat}		–	90	250	mV	
		–	200	600	mV	
Base Saturation Voltage at $I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$ at $I_C = 100\text{ mA}$, $I_B = 5\text{ mA}$						
V_{BEsat}		–	700	–	mV	
		–	900	–	mV	
Base-Emitter Voltage at $V_{CE} = 5\text{ V}$, $I_C = 2\text{ mA}$ at $V_{CE} = 5\text{ V}$, $I_C = 10\text{ mA}$						
V_{BE}		580	660	700	mV	
		–	–	720	mV	
Collector-Emitter Cutoff Current						
at $V_{CE} = 80\text{ V}$	BC846	–	0.2	15	nA	
at $V_{CE} = 50\text{ V}$	BC847	–	0.2	15	nA	
at $V_{CE} = 30\text{ V}$	BC848, BC849	–	0.2	15	nA	
at $V_{CE} = 80\text{ V}$, $T_j = 125\text{ }^\circ C$	BC846	–	–	4	μA	
at $V_{CE} = 50\text{ V}$, $T_j = 125\text{ }^\circ C$	BC847	–	–	4	μA	
at $V_{CE} = 30\text{ V}$, $T_j = 125\text{ }^\circ C$	BC848, BC849	–	–	4	μA	
Gain-Bandwidth Product at $V_{CE} = 5\text{ V}$, $I_C = 10\text{ mA}$, $f = 100\text{ MHz}$	f_T	–	300	–	MHz	
1) Device on fiberglass substrate, see layout						

BC846 THRU BC849

ELECTRICAL CHARACTERISTICS

Ratings at 25 °C ambient temperature unless otherwise specified

	Symbol	Min.	Typ.	Max.	Unit
Collector-Base Capacitance at $V_{CB} = 10 \text{ V}$, $f = 1 \text{ MHz}$	C_{CBO}	–	3.5	6	pF
Emitter-Base Capacitance at $V_{EB} = 0.5 \text{ V}$, $f = 1 \text{ MHz}$	C_{EBO}	–	9	–	pF
Noise Figure at $V_{CE} = 5 \text{ V}$, $I_C = 200 \mu\text{A}$, $R_G = 2 \text{ k}\Omega$, $f = 1 \text{ kHz}$, $\Delta f = 200 \text{ Hz}$ BC846, BC847, BC848	F	–	2	10	dB
	F	–	1.2	4	dB
at $V_{CE} = 5 \text{ V}$, $I_C = 200 \mu\text{A}$, $R_G = 2 \text{ k}\Omega$, $f = 30 \dots 15000 \text{ Hz}$ BC849	F	–	1.4	4	dB



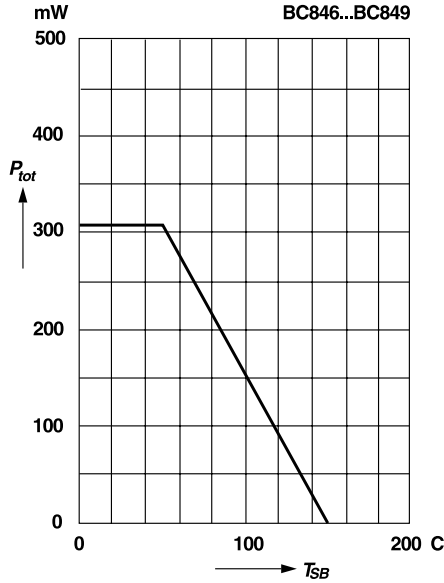
Layout for R_{thJA} test

Thickness: Fiberglass 0.059 in (1.5 mm)

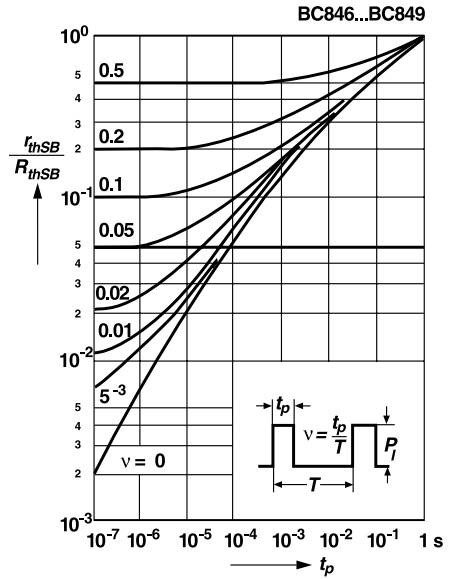
Copper leads 0.012 in (0.3 mm)

RATINGS AND CHARACTERISTIC CURVES BC846 THRU BC849

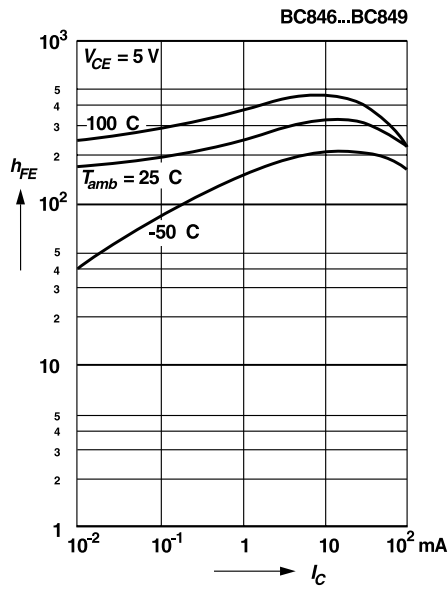
Admissible power dissipation versus temperature of substrate backside
 Device on fiberglass substrate, see layout



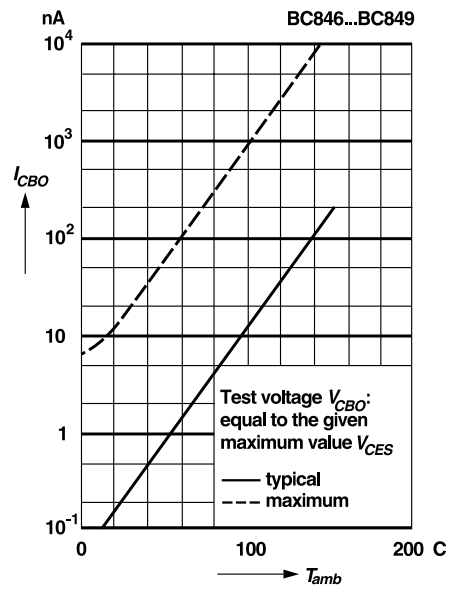
Pulse thermal resistance versus pulse duration (normalized)
 Device on fiberglass substrate, see layout



DC current gain versus collector current

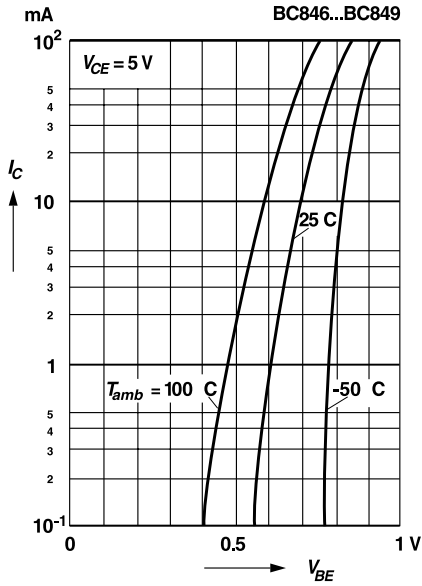


Collector-Base cutoff current versus ambient temperature

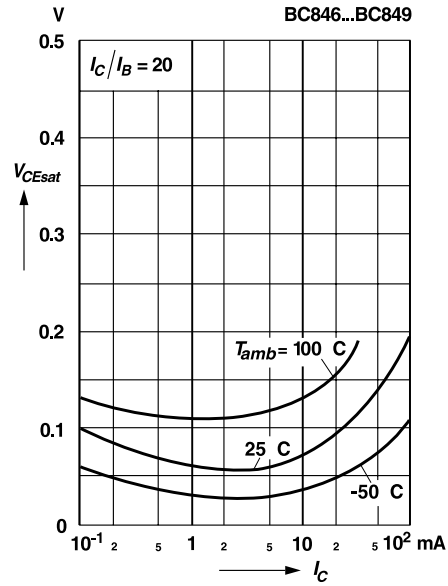


RATINGS AND CHARACTERISTIC CURVES BC846 THRU BC849

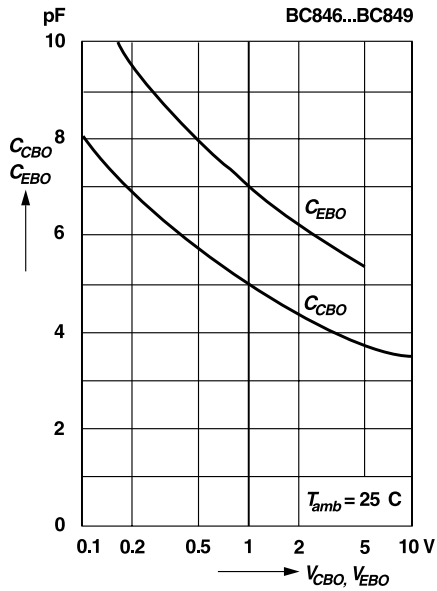
Collector current versus base-emitter voltage



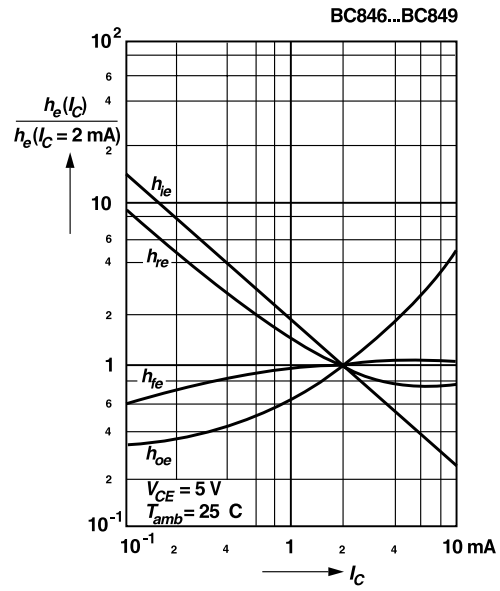
Collector saturation voltage versus collector current



Collector base capacitance, Emitter base capacitance versus reverse bias voltage

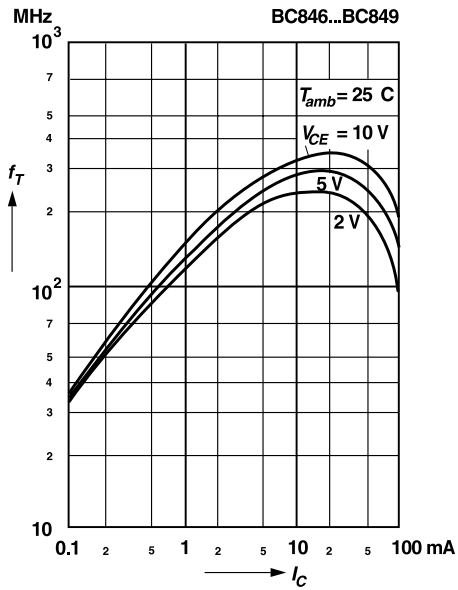


Relative h-parameters versus collector current

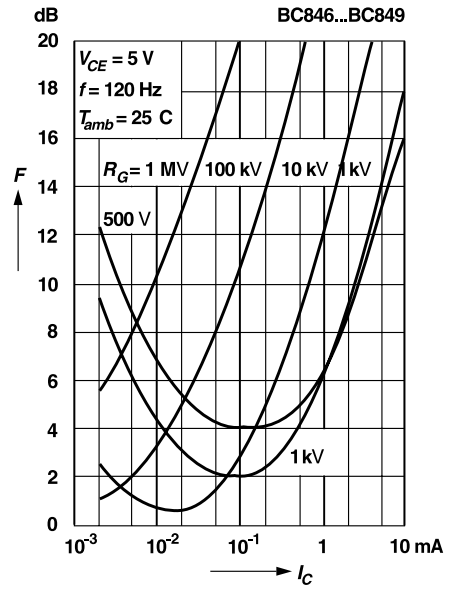


RATINGS AND CHARACTERISTIC CURVES BC846 THRU BC849

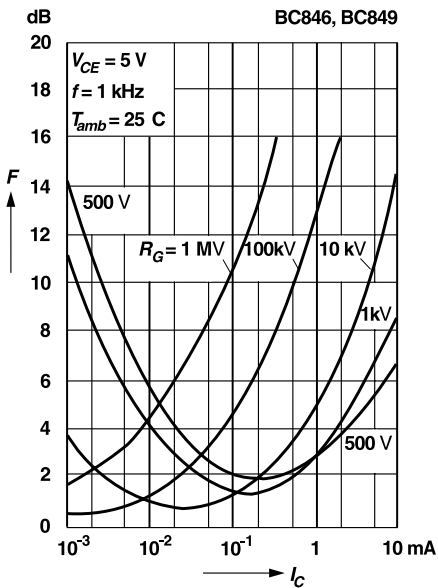
**Gain-bandwidth product
versus collector current**



**Noise figure
versus collector current**



**Noise figure
versus collector current**



**Noise figure
versus collector emitter voltage**

