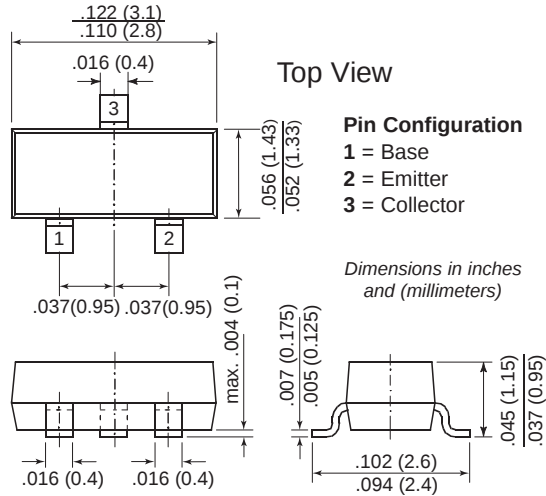
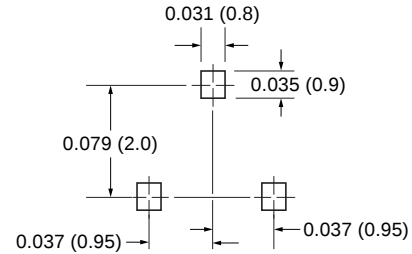


**Small Signal Transistors (NPN)****TO-236AB (SOT-23)****Mechanical Data****Case:** SOT-23 Plastic Package**Weight:** approx. 0.008g**Packaging Codes/Options:**

E8/10K per 13" reel (8mm tape), 30K/box

E9/3K per 7" reel (8mm tape), 30K/box

Mounting Pad Layout

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

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.

Maximum Ratings and Thermal Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-Base Voltage	V_{CB0}	80 50 30	V
Collector-Emitter Voltage	V_{CES}	80 50 30	V
Collector-Emitter Voltage	V_{CEO}	65 45 30	V
Emitter-Base Voltage	V_{EBO}	6 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 $T_{SB} = 50^\circ\text{C}$	P_{tot}	310 ⁽¹⁾	mW
Thermal Resistance Junction to Ambient Air	$R_{\theta JA}$	450 ⁽¹⁾	$^\circ\text{C/W}$
Thermal Resistance Junction to Substrate Backside	$R_{\theta SB}$	320 ⁽¹⁾	$^\circ\text{C/W}$
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature Range	T_s	-65 to +150	$^\circ\text{C}$

Note: (1) Device on fiberglass substrate, see layout on third page.

Electrical Characteristics (T_J = 25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Small Signal Current Gain						
Current Gain Group A	h _{fe}	V _{CE} = 5V, I _C = 2mA f = 1kHz	—	220	—	—
B			—	330	—	—
C			—	600	—	—
Input Impedance						
Current Gain Group A	h _{ie}	V _{CE} = 5V, I _C = 2mA f = 1kHz	1.6	2.7	4.5	kΩ
B			3.2	4.5	8.5	
C			6.0	8.7	15.0	
Output Admittance						
Current Gain Group A	h _{oe}	V _{CE} = 5V, I _C = 2mA f = 1kHz	—	18	30	μS
B			—	30	60	
C			—	60	110	
Reverse Voltage Transfer Ratio						
Current Gain Group A	h _{re}	V _{CE} = 5V, I _C = 2mA f = 1kHz	—	1.5 · 10 ⁻⁴	—	—
B			—	2 · 10 ⁻⁴	—	—
C			—	3 · 10 ⁻⁴	—	—
DC Current Gain						
Current Gain Group A	h _{FE}	V _{CE} = 5V, I _C = 10μA	—	90	—	—
B			—	150	—	—
C			—	270	—	—
Current Gain Group A	h _{FE}	V _{CE} = 5V, I _C = 2mA	110	180	220	—
B			200	290	450	—
C			420	520	800	—
Collector Saturation Voltage	V _{CEsat}	I _C = 10mA, I _B = 0.5mA I _C = 100mA, I _B = 5mA	— —	90 200	250 600	mV
Base Saturation Voltage	V _{BEsat}	I _C = 10mA, I _B = 0.5mA I _C = 100mA, I _B = 5mA	— —	700 900	— —	mV
Base-Emitter Voltage V _{BEon}		V _{CE} = 5V, I _C = 2mA 580 V _{CE} = 5V, I _C = 10mA	660 —	700 —	770 770	mV
Collector-Base Cutoff Current	I _{CBO}	V _{CB} = 30V V _{CB} = 30V, T _J = 150°C	— —	— —	15 5	nA μA
Gain-Bandwidth Product	f _T	V _{CE} = 5V, I _C = 10mA f = 100MHz	—	300	—	MHz
Collector-Base Capacitance	C _{CBO}	V _{CB} = 10V, f = 1MHz	—	3.5	6	pF
Emitter-Base Capacitance	C _{EBO}	V _{EB} = 0.5V, f = 1MHz	—	9	—	pF
Noise Figure						
BC846, BC847, BC848	F	V _{CE} = 5V, I _C = 200μA	—	2	10	dB
BC849		R _G = 2kΩ, f = 1kHz, Δf = 200Hz	—	1.2	4	dB
BC849		V _{CE} = 5V, I _C = 200μA R _G = 2kΩ, f = 30...15000Hz	—	1.4	4	dB

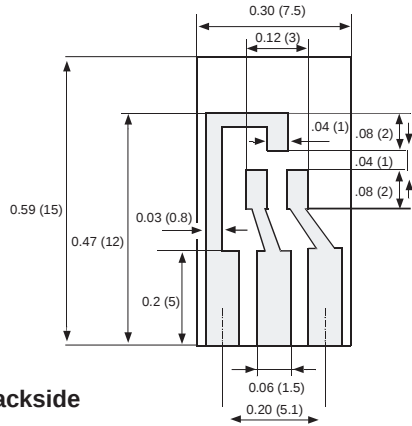
Note: (1) Device on fiberglass substrate, see layout on next page

Layout for R_{θJA} test

Thickness:

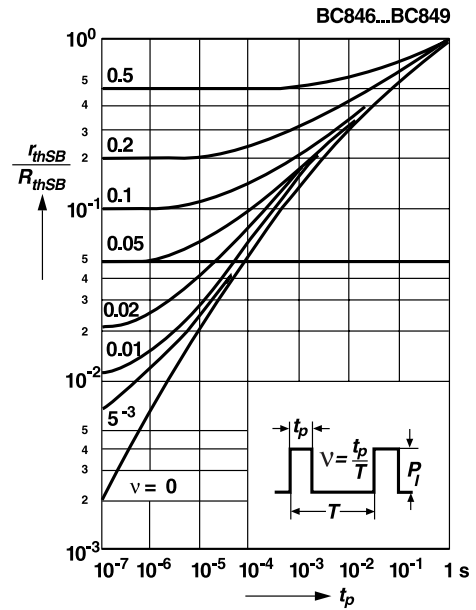
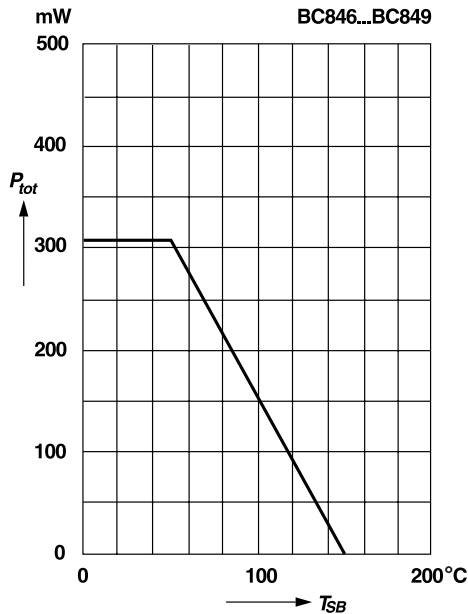
Fiberglass 0.059 in. (1.5 mm)

Copper leads 0.012 in. (0.3 mm)

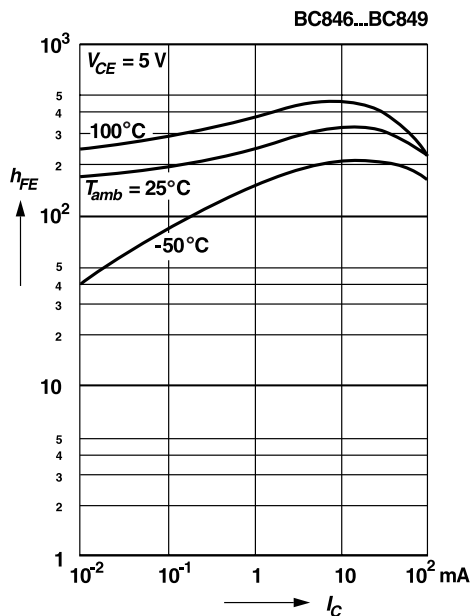


**Admissible power dissipation
versus temperature of substrate backside**
Device on fiberglass substrate, see layout

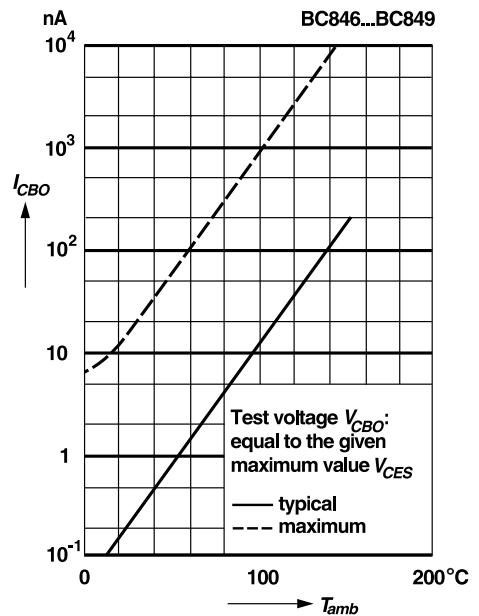
**Pulse thermal resistance
versus pulse duration (normalized)**
Device on fiberglass substrate, see layout



DC current gain versus collector current



**Collector-Base cutoff current versus
ambient temperature**



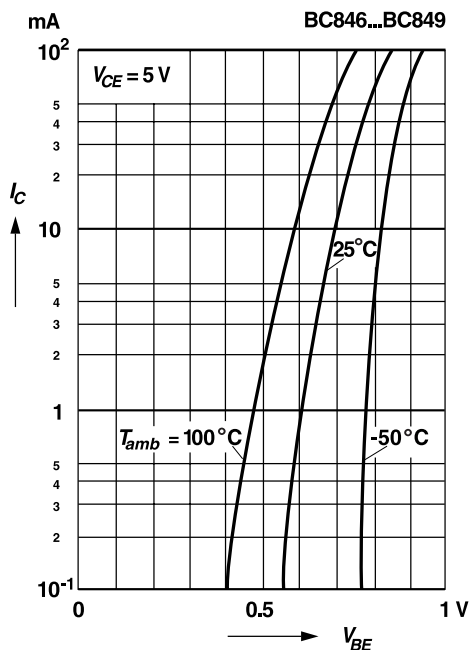
BC846 thru BC849

Vishay Semiconductors
formerly General Semiconductor

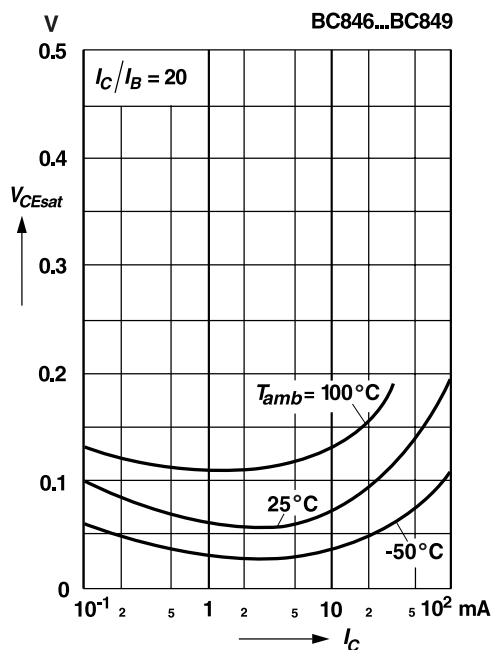


Ratings and Characteristic Curves ($T_A = 25^\circ\text{C}$ unless otherwise noted)

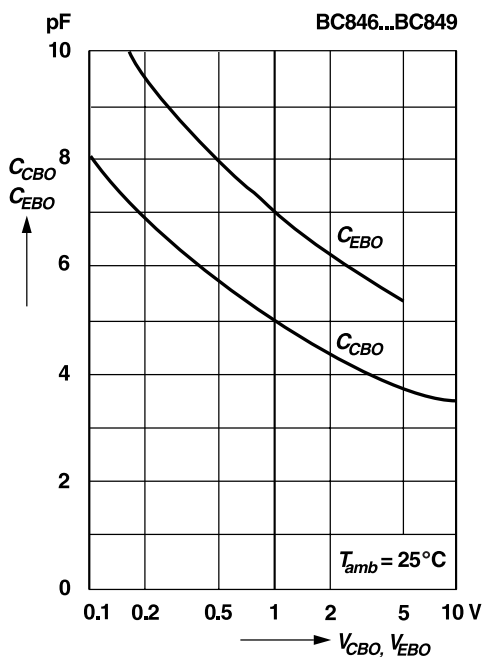
Collector current versus
base-emitter voltage



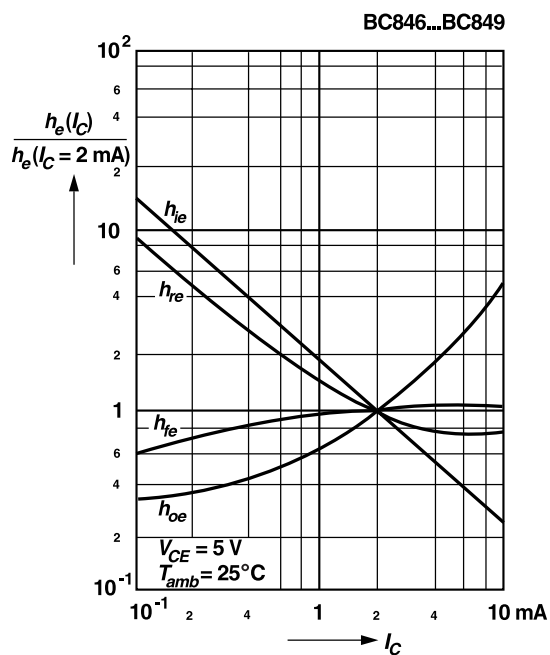
Collector saturation voltage
versus collector current



Collector base capacitance,
Emitter base capacitance
versus reverse bias voltage



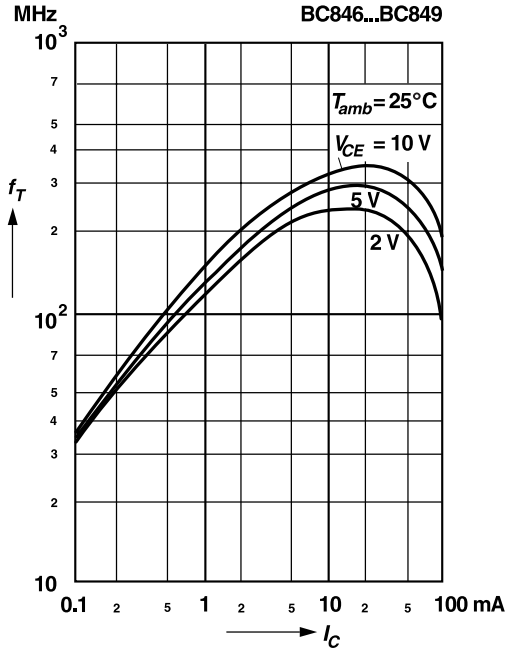
Relative h-parameters
versus collector current



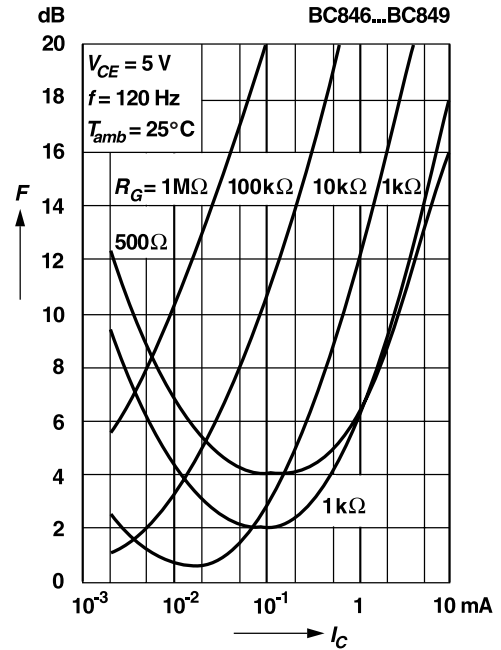


**Ratings and
Characteristic Curves** ($T_A = 25^\circ\text{C}$ unless otherwise noted)

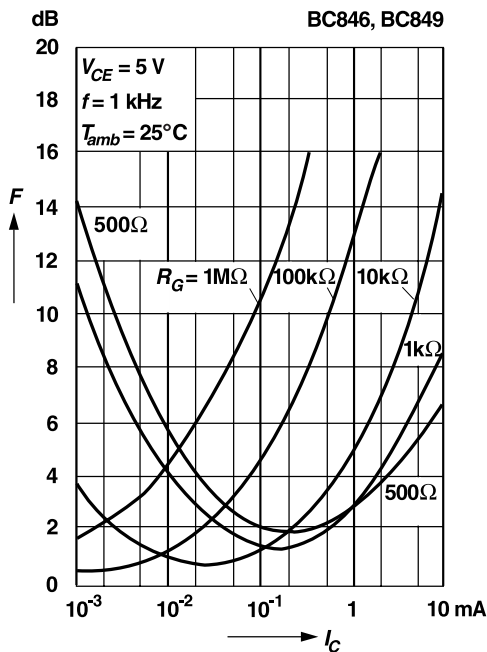
**Gain-bandwidth product
versus collector current**



**Noise figure
versus collector current**



**Noise figure
versus collector current**



**Noise figure
versus collector emitter voltage**

