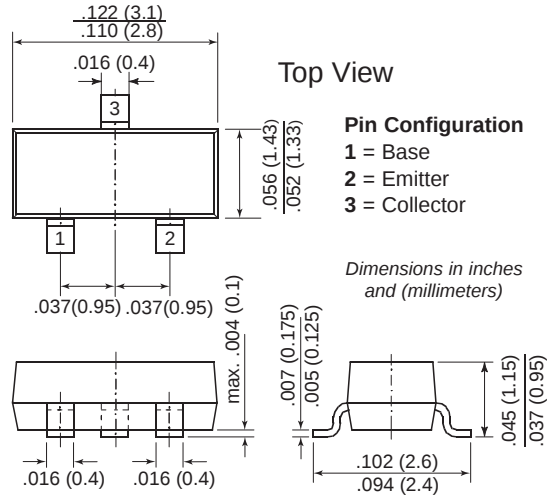


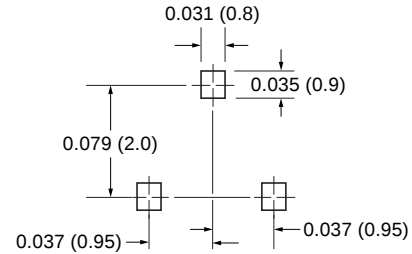


Small Signal Transistors (NPN)

TO-236AB (SOT-23)



Mounting Pad Layout



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

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. 0.008g**Packaging Codes/Options:**

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

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

Maximum Ratings and Thermal Characteristics (T_A = 25°C unless otherwise noted)

Parameter		Symbol	Value	Unit
Collector-Base Voltage	BC846 BC847 BC848, BC849	V _{CBO}	80 50 30	V
Collector-Emitter Voltage	BC846 BC847 BC848, BC849	V _{CES}	80 50 30	V
Collector-Emitter Voltage	BC846 BC847 BC848, BC849	V _{CEO}	65 45 30	V
Emitter-Base Voltage	BC846, BC847 BC848, BC849	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°C		P _{tot}	310 ⁽¹⁾	mW
Thermal Resistance Junction to Ambient Air		R _{θJA}	450 ⁽¹⁾	°C/W
Thermal Resistance Junction to Substrate Backside		R _{θSB}	320 ⁽¹⁾	°C/W
Junction Temperature		T _j	150	°C
Storage Temperature Range		T _s	-65 to +150	°C

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

Electrical Characteristics ($T_J = 25^\circ\text{C}$ 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	$k\Omega$
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}	$V_{CE} = 5V, I_C = 2mA$ $f = 1kHz$	—	$1.5 \cdot 10^{-4}$	—	—
B			—	$2 \cdot 10^{-4}$	—	—
C			—	$3 \cdot 10^{-4}$	—	—
DC Current Gain						
Current Gain Group A	h_{FE}	$V_{CE} = 5V, I_C = 10\mu A$	—	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 —	mV
Collector-Base Cutoff Current	I_{CBO}	$V_{CB} = 30V$ $V_{CB} = 30V, T_J = 150^\circ C$	— —	— —	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	$V_{CE} = 5V, I_C = 200\mu A$ $R_G = 2k\Omega, f = 1kHz, \Delta f = 200Hz$	—	2	10	dB
BC849			—	1.2	4	dB
BC849		$V_{CE} = 5V, I_C = 200\mu A$ $R_G = 2k\Omega, f = 30...15000Hz$	—	1.4	4	dB

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

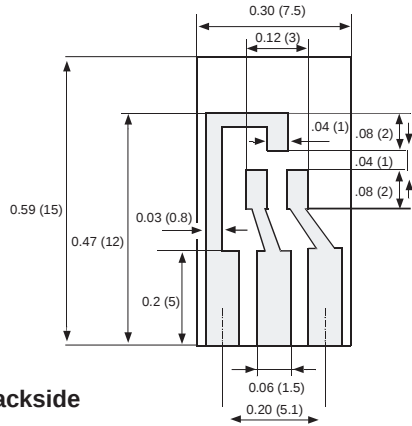


Layout for R_{θJA} test

Thickness:

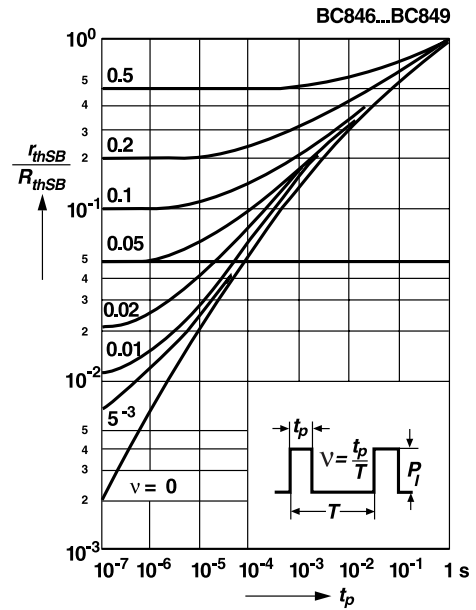
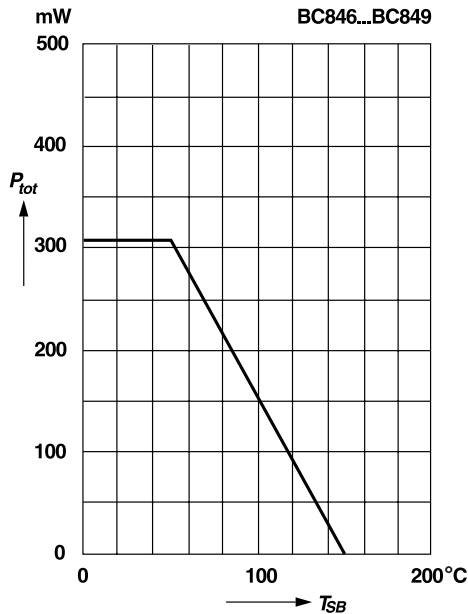
Fiberglass 0.059 in. (1.5 mm)

Copper leads 0.012 in. (0.3 mm)

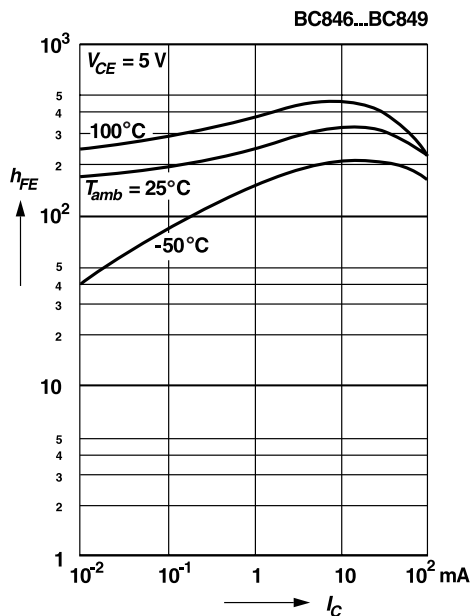


**Admissible power dissipation
versus temperature of substrate backside**
Device on fiberglass substrate, see layout

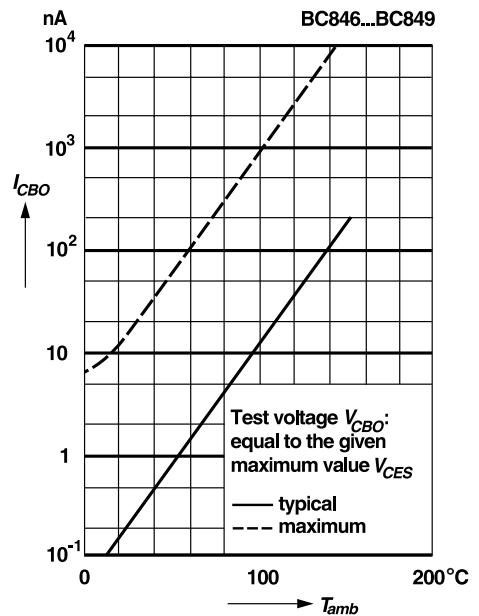
**Pulse thermal resistance
versus pulse duration (normalized)**
Device on fiberglass substrate, see layout



DC current gain versus collector current



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



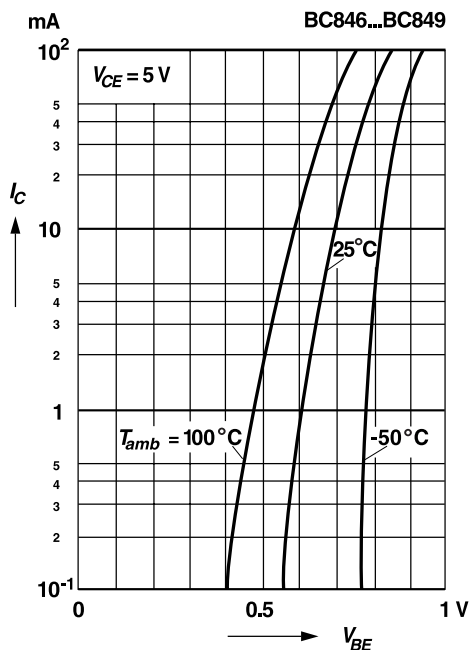
BC846 thru BC849

Vishay Semiconductors
formerly General Semiconductor

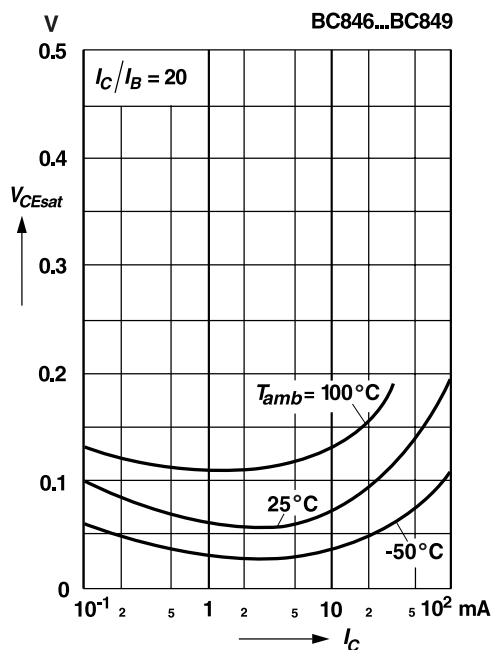


Ratings and Characteristic Curves ($T_A = 25^\circ\text{C}$ unless otherwise noted)

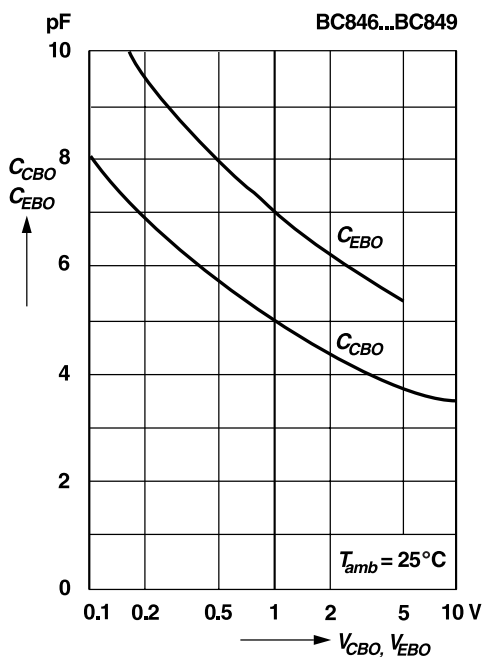
Collector current versus
base-emitter voltage



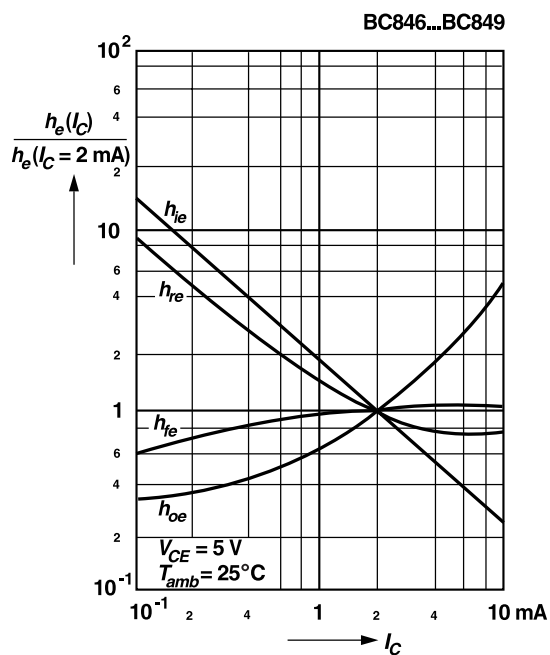
Collector saturation voltage
versus collector current



Collector base capacitance,
Emitter base capacitance
versus reverse bias voltage



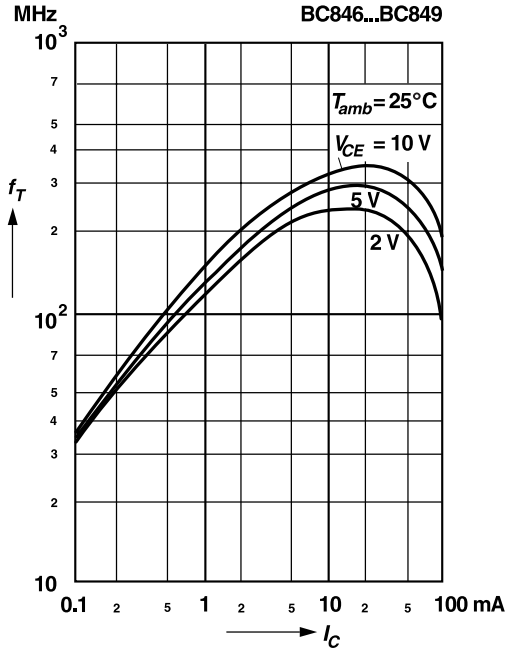
Relative h-parameters
versus collector current



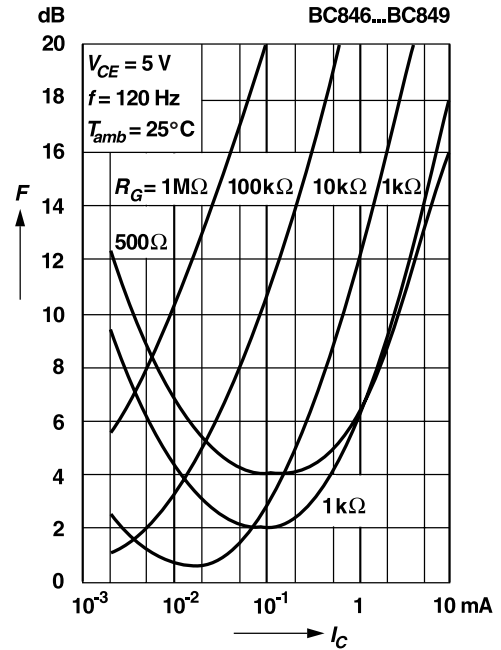


**Ratings and
Characteristic Curves** ($T_A = 25^\circ\text{C}$ unless otherwise noted)

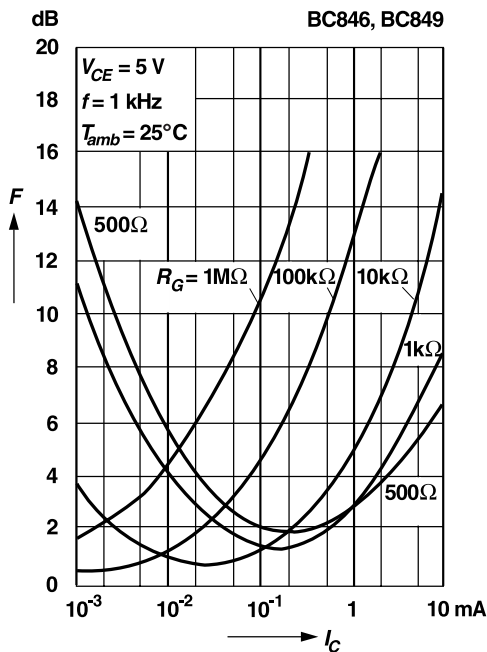
**Gain-bandwidth product
versus collector current**



**Noise figure
versus collector current**



**Noise figure
versus collector current**



**Noise figure
versus collector emitter voltage**

