FAIRCHILD
SEMICONDUCTOR ™

BC847S

E2
B2
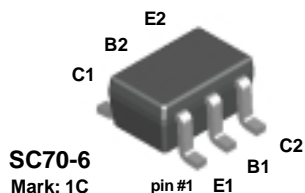**C1**

SC70-6
Mark: 1C

pin #1 **E1**

C2
B1

NOTE: The pinouts are symmetrical; pin 1 and pin 4 are interchangeable. Units inside the carrier can be of either orientation and will not affect the functionality of the device.

NPN Multi-Chip General Purpose Amplifier

This device is designed for general purpose amplifier applications at collector currents to 200 mA. Sourced from Process 07.

Absolute Maximum Ratings* $T_A = 25°C$ unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	45	V
V_{CES}	Collector-Base Voltage	50	V
V_{CBO}	Collector-Base Voltage	50	V
V_{EBO}	Emitter-Base Voltage	6.0	V
I_C	Collector Current - Continuous	200	mA
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:
1) These ratings are based on a maximum junction temperature of 150 degrees C.
2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics $T_A = 25°C$ unless otherwise noted

Symbol	Characteristic	Max	Units
		BC847S	
P_D	Total Device Dissipation Derate above 25°C	300 2.4	mW mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	415	°C/W

NPN Multi-Chip General Purpose Amplifier
(continued)

Electrical Characteristics $T_A = 25°C$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	$I_C = 10$ mA, $I_B = 0$	45			V
$V_{(BR)CES}$	Collector-Base Breakdown Voltage	$I_C = 10$ µA, $I_E = 0$	50			V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 10$ µA, $I_E = 0$	50			V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10$ µA, $I_C = 0$	6.0			V
I_{CBO}	Collector-Cutoff Current	$V_{CB} = 30$ V, $I_E = 0$ $V_{CB} = 30$ V, $I_E = 0$, $T_A = 150°C$			15 5.0	nA µA
ON CHARACTERISTICS						
h_{FE}	DC Current Gain	$I_C = 2.0$ mA, $V_{CE} = 5.0$ V	110		630	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 10$ mA, $I_B = 0.5$ mA $I_C = 100$ mA, $I_B = 5.0$ mA			0.25 0.65	V V
$V_{BE(on)}$	Base-Emitter ON Voltage	$I_C = 2.0$ mA, $V_{CE} = 5.0$ V $I_C = 10$ mA, $V_{CE} = 5.0$ V	0.58		0.7 0.77	V V
SMALL SIGNAL CHARACTERISTICS						
f_T	Current Gain - Bandwidth Product	$I_C = 20$ mA, $V_{CE} = 5.0$, $f = 100$ mHz		200		MHz
C_{obo}	Output Capacitance	$V_{CB} = 10$ V, $f = 1.0$ MHz		2.0		pF

Typical Characteristics

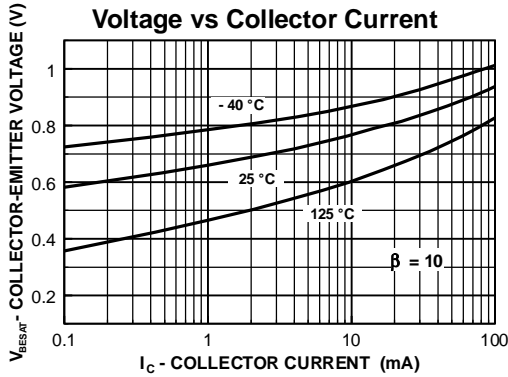**Typical Pulsed Current Gain vs Collector Current**
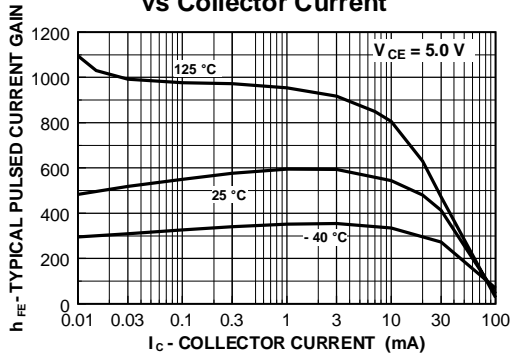
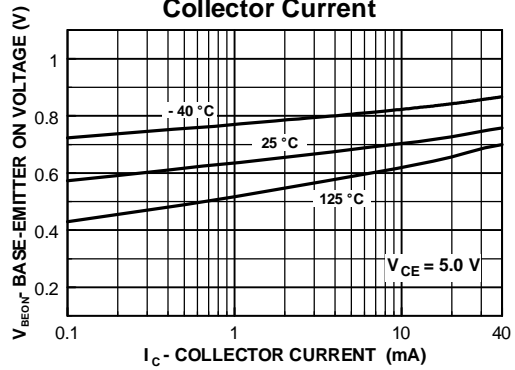**Collector-Emitter Saturation Voltage vs Collector Current**
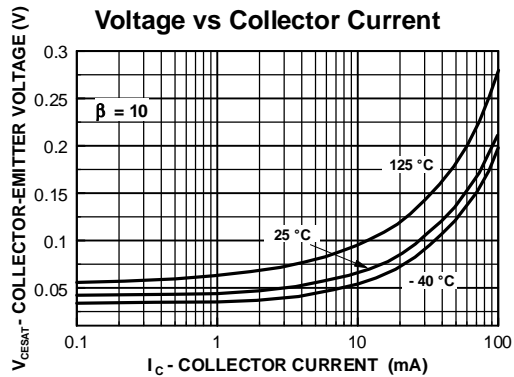
Typical Characteristics

Base-Emitter Saturation Voltage vs Collector Current

V_{BESAT} - COLLECTOR-EMITTER VOLTAGE (V)

I_C - COLLECTOR CURRENT (mA)

- 40 °C
25 °C
125 °C
β = 10

Base-Emitter ON Voltage vs Collector Current

V_{BEON} - BASE-EMITTER ON VOLTAGE (V)

I_C - COLLECTOR CURRENT (mA)

- 40 °C
25 °C
125 °C
V_{CE} = 5.0 V

Collector-Cutoff Current vs Ambient Temperature

I_{CBO} - COLLECTOR CURRENT (nA)

T_A - AMBIENT TEMPERATURE (°C)

V_{CB} = 45V
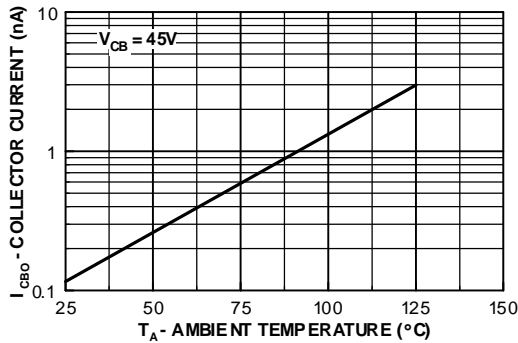
Input and Output Capacitance vs Reverse Bias Voltage

CAPACITANCE (pF)

REVERSE BIAS VOLTAGE (V)

f = 1.0 MHz
C_{te}
C_{ob}
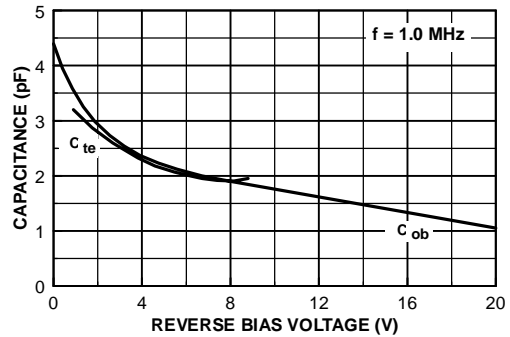
Contours of Constant Gain Bandwidth Product (f_T)

V_{CE} - COLLECTOR VOLTAGE (V)

I_C - COLLECTOR CURRENT (mA)

175 MHz
150 MHz
125 MHz
100 MHz
75 MHz
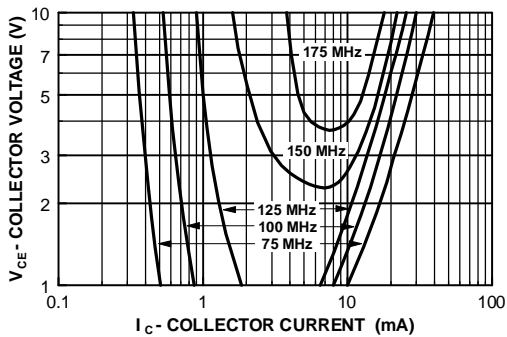
Normalized Collector-Cutoff Current vs Ambient Temperature

CHARACTERISTICS RELATIVE TO VALUE AT T $_A$= 25 °C

T_A - AMBIENT TEMPERATURE (°C)
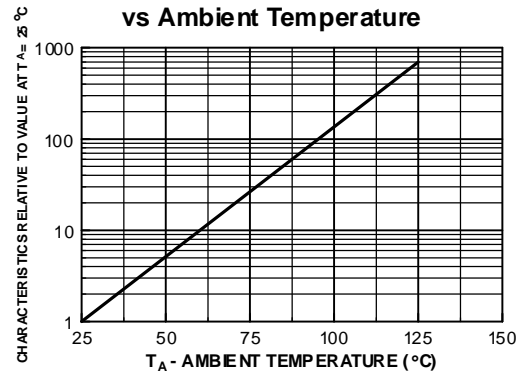
Typical Characteristics (continued)

Noise Figure vs Frequency

NF - NOISE FIGURE (dB)

$I_C = 200 \, \mu A$,
$R_S = 10 \, k\Omega$

$I_C = 100 \, \mu A$,
$R_S = 10 \, k\Omega$

$I_C = 1.0 \, mA$,
$R_S = 500 \, \Omega$

$I_C = 1.0 \, mA$,
$R_S = 5.0 \, k\Omega$

$V_{CE} = 5.0V$

f - FREQUENCY (MHz)

**Wideband Noise Frequency
vs Source Resistance**

NF - NOISE FIGURE (dB)

$V_{CE} = 5.0 \, V$

BANDWIDTH = 15.7 kHz

$I_C = 100 \, \mu A$

$I_C = 30 \, \mu A$

$I_C = 10 \, \mu A$

R_S - SOURCE RESISTANCE (Ω)

**Power Dissipation vs
Ambient Temperature**

P_D - POWER DISSIPATION (mW)

SC70-6

TEMPERATURE (ºC)
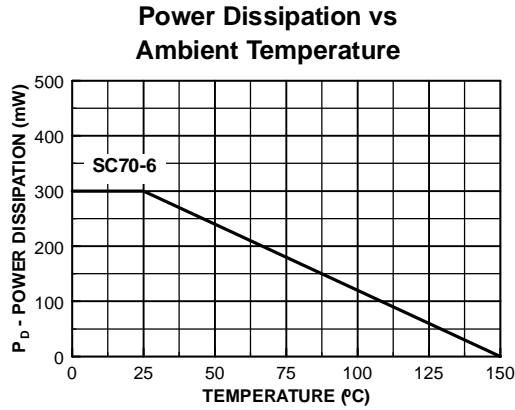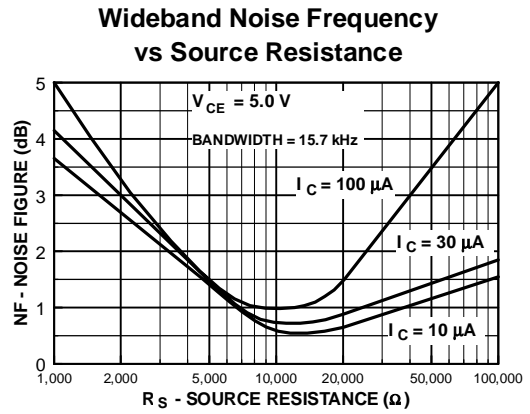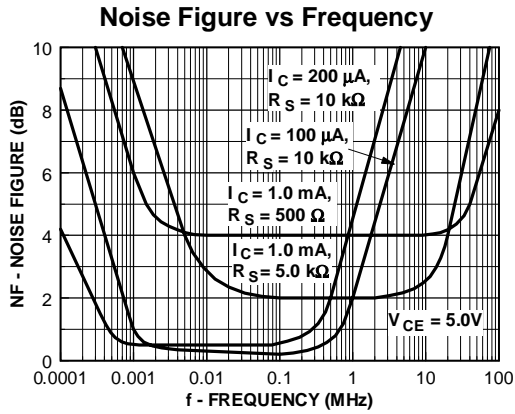
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