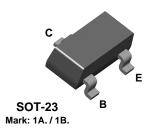
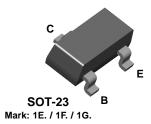


# **BC846A BC846B**

# **BC847A BC847B BC847C**





# **NPN General Purpose Amplifier**

This device is designed for low noise, high gain, general purpose amplifier applications at collector currents from 1.0  $\mu A$  to 50 mA. Sourced from Process 07.

#### **Absolute Maximum Ratings\*** TA = 25°C unless otherwise noted

Symbol	Paramete	er	Value	Units		
V <sub>CEO</sub>	Collector-Emitter Voltage	BC846 series BC847 series	65 45	V V		
V <sub>CES</sub>	Collector-Base Voltage	BC846 series BC847 series	80 50	V V		
$V_{EBO}$	Emitter-Base Voltage		6.0	V		
Ic	Collector Current - Continuous		100	mA		
T <sub>J</sub> , T <sub>stg</sub>	Operating and Storage Junction Tempo	erature Range	-55 to +150	°C		

<sup>\*</sup>These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

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** TA = 25°C unless otherwise noted

Symbol	Characteristic	Max	Units
		*BC846 / BC847	
P <sub>D</sub>	Total Device Dissipation	325	mW
	Derate above 25°C	2.8	mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	°C/W

<sup>\*</sup>Device mounted on FR-4 PCB 40 mm X 40 mm X 1.5 mm.

(continued)

Electrical Chara	

TA = 25°C unless otherwise noted

Symbol	Parameter	Test Condition	Min	Max	Units	
OFF CHAI	RACTERISTICS					
V <sub>(BR)CEO</sub>	Collector-Emitter Breakdown	$I_C = 10 \text{ mA}, I_B = 0$ 84	6A / B	65		V
	Voltage	84	7A / B	45		
V <sub>(BR)CES</sub>	Collector-Base Breakdown Voltage	$I_C = 10  \mu A, I_E = 0$ 84	6A / B	80		V
		84	7A / B	50		
V <sub>(BR)EBO</sub>	Emitter-Base Breakdown Voltage	$I_E = 10  \mu A,  I_C = 0$		6.0		V
I <sub>CBO</sub>	Collector-Cutoff Current	V <sub>CB</sub> = 30 V			15	nA
		$V_{CB} = 30 \text{ V}, T_A = 150^{\circ}\text{C}$		5.0	μΑ	

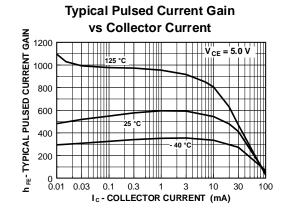
#### **ON CHARACTERISTICS**

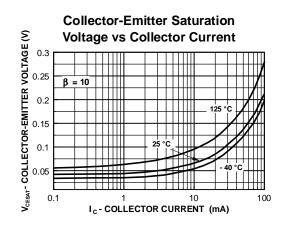
h <sub>FE</sub>	DC Current Gain	$I_C = 2.0 \text{ mA}, V_{CE} = 5.0 \text{ V}$			
		846A / 847A	110	220	
		846B / 847B	200	450	
		847C	420	800	
V <sub>CE(sat)</sub>	Collector-Emitter Saturation Voltage	$I_C = 10 \text{ mA}, I_B = 0.5 \text{ mA}$		0.25	V
(,		$I_C = 100 \text{ mA}, I_B = 5.0 \text{ mA}$		0.6	V
V <sub>BE(on)</sub>	Base-Emitter On Voltage	$I_C = 2.0 \text{ mA}, V_{CE} = 5.0 \text{ V}$	0.58	0.70	V
	_	$I_C = 10 \text{ mA}, V_{CE} = 5.0 \text{ V}$		0.77	V

#### SMALL SIGNAL CHARACTERISTICS

f <sub>T</sub>	Current Gain - Bandwidth Product	$I_C = 10 \text{ mA}, V_{CE} = 5.0,$ f = 100 MHz	100		MHz
C <sub>obo</sub>	Output Capacitance	V <sub>CB</sub> = 10 V, f = 1.0 MHz		4.5	pF
NF	Noise Figure	$I_C = 0.2 \text{ mA}, V_{CE} = 5.0,$ $R_S = 2.0 \text{ k}\Omega, f = 1.0 \text{ kHz},$ BW = 200  Hz		10	dB

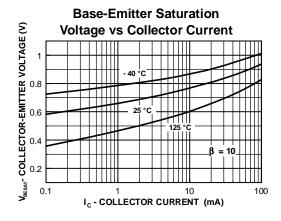
# **Typical Characteristics**

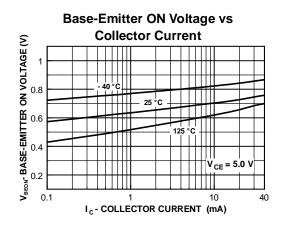




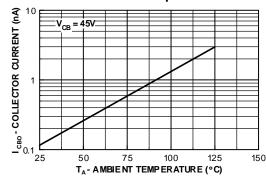
(continued)

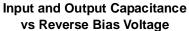
## **Typical Characteristics**

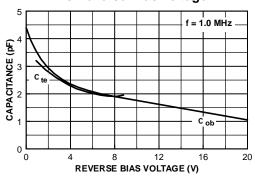




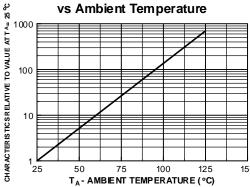
# Collector-Cutoff Current vs Ambient Temperature



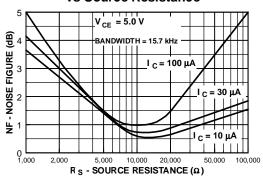




# Normalized Collect or-Cutoff Current vs Ambient Temperature

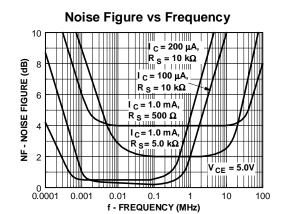


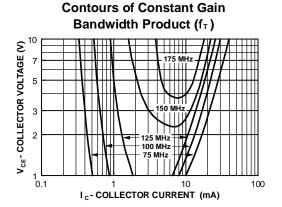
# Wideband Noise Frequency vs Source Resistance

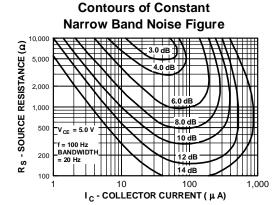


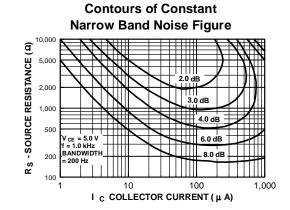
(continued)

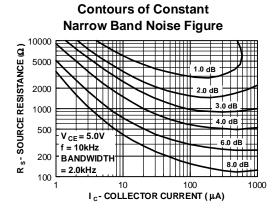
## Typical Characteristics (continued)

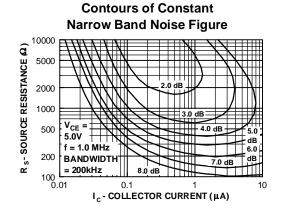








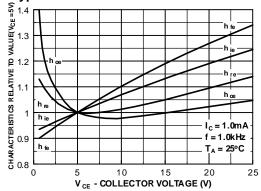




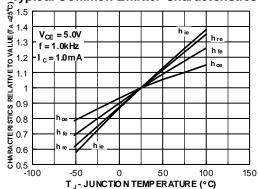
(continued)

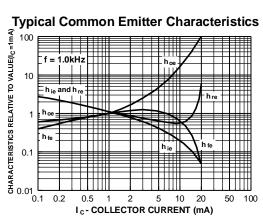
# **Typical Common Emitter Characteristics** (f = 1.0 kHz)

Typical Common Emitter Characteristics



### Typical Common Emitter Characteristics



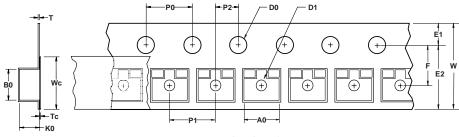




# SOT-23 Tape and Reel Data, continued

### **SOT-23 Embossed Carrier Tape**

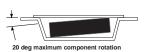
Configuration: Figure 3.0



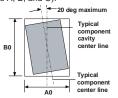
User Direction of Feed	

	Dimensions are in millimeter													
Pkg type	Α0	В0	w	D0	D1	E1	E2	F	P1	P0	K0	Т	Wc	Тс
<b>SOT-23</b> (8mm)	3.15 +/-0.10	2.77 +/-0.10	8.0 +/-0.3	1.55 +/-0.05	1.125 +/-0.125	1.75 +/-0.10	6.25 min	3.50 +/-0.05	4.0 +/-0.1	4.0 +/-0.1	1.30 +/-0.10	0.228 +/-0.013	5.2 +/-0.3	0.06 +/-0.02

Notes: A0, B0, and K0 dimensions are determined with respect to the EIA/Jedec RS-481 rotational and lateral movement requirements (see sketches A, B, and C).



Sketch A (Side or Front Sectional View)
Component Rotation

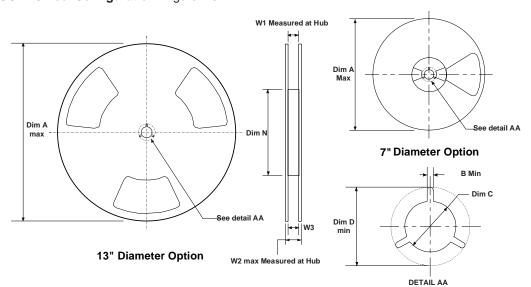


Sketch B (Top View)
Component Rotation



Sketch C (Top View)
Component lateral movement

#### SOT-23 Reel Configuration: Figure 4.0



	Dimensions are in inches and millimeters											
Tape Size	Reel Option	Dim A Dim B Dim C Dim D		Dim N	Dim W1	Dim W2	Dim W3 (LSL-USL)					
8mm	7" Dia	7.00 177.8	0.059 1.5	512 +0.020/-0.008 13 +0.5/-0.2	0.795 20.2	2.165 55	0.331 +0.059/-0.000 8.4 +1.5/0	0.567 14.4	0.311 - 0.429 7.9 - 10.9			
8mm	13" Dia	13.00 330	0.059 1.5	512 +0.020/-0.008 13 +0.5/-0.2	0.795 20.2	4.00 100	0.331 +0.059/-0.000 8.4 +1.5/0	0.567 14.4	0.311 - 0.429 7.9 - 10.9			



# SOT-23 (FS PKG Code 49)

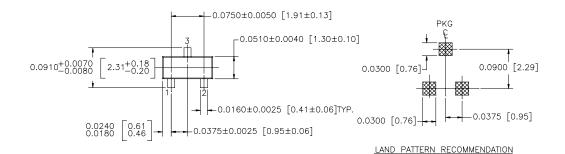


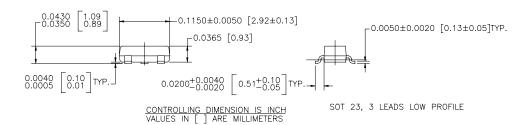


Scale 1:1 on letter size paper

Dimensions shown below are in: inches [millimeters]

Part Weight per unit (gram): 0.0082





NOTE: UNLESS OTHERWISE SPECIFIED

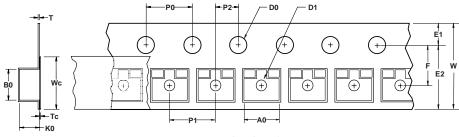
- 1. STANDARD LEAD FINISH 150 MICROINCHES / 3.81 MICROMETERS MINIMUM TIN / LEAD (SOLDER) ON ALLOY 42
- 2. REFERENCE JEDEC REGISTRATION TO-236, VARIATION AB, ISSUE G, DATED JUL 1993



# SOT-23 Tape and Reel Data, continued

### **SOT-23 Embossed Carrier Tape**

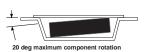
Configuration: Figure 3.0



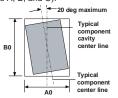
User Direction of Feed	

	Dimensions are in millimeter													
Pkg type	Α0	В0	w	D0	D1	E1	E2	F	P1	P0	K0	Т	Wc	Тс
<b>SOT-23</b> (8mm)	3.15 +/-0.10	2.77 +/-0.10	8.0 +/-0.3	1.55 +/-0.05	1.125 +/-0.125	1.75 +/-0.10	6.25 min	3.50 +/-0.05	4.0 +/-0.1	4.0 +/-0.1	1.30 +/-0.10	0.228 +/-0.013	5.2 +/-0.3	0.06 +/-0.02

Notes: A0, B0, and K0 dimensions are determined with respect to the EIA/Jedec RS-481 rotational and lateral movement requirements (see sketches A, B, and C).



Sketch A (Side or Front Sectional View)
Component Rotation

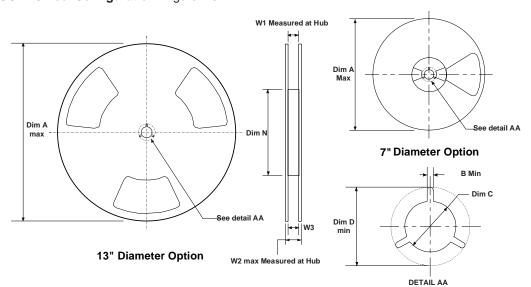


Sketch B (Top View)
Component Rotation



Sketch C (Top View)
Component lateral movement

#### SOT-23 Reel Configuration: Figure 4.0



	Dimensions are in inches and millimeters											
Tape Size	Reel Option	Dim A Dim B Dim C Dim D		Dim N	Dim W1	Dim W2	Dim W3 (LSL-USL)					
8mm	7" Dia	7.00 177.8	0.059 1.5	512 +0.020/-0.008 13 +0.5/-0.2	0.795 20.2	2.165 55	0.331 +0.059/-0.000 8.4 +1.5/0	0.567 14.4	0.311 - 0.429 7.9 - 10.9			
8mm	13" Dia	13.00 330	0.059 1.5	512 +0.020/-0.008 13 +0.5/-0.2	0.795 20.2	4.00 100	0.331 +0.059/-0.000 8.4 +1.5/0	0.567 14.4	0.311 - 0.429 7.9 - 10.9			



# SOT-23 (FS PKG Code 49)

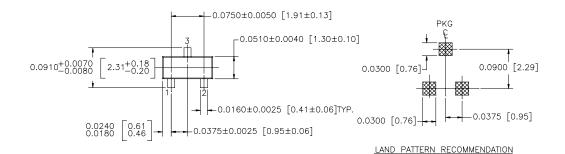


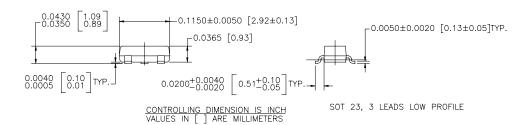


Scale 1:1 on letter size paper

Dimensions shown below are in: inches [millimeters]

Part Weight per unit (gram): 0.0082





NOTE: UNLESS OTHERWISE SPECIFIED

- 1. STANDARD LEAD FINISH 150 MICROINCHES / 3.81 MICROMETERS MINIMUM TIN / LEAD (SOLDER) ON ALLOY 42
- 2. REFERENCE JEDEC REGISTRATION TO-236, VARIATION AB, ISSUE G, DATED JUL 1993

#### **TRADEMARKS**

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

 $ACEx^{TM}$ FASTr™ PowerTrench® SyncFET™ Bottomless™ QFET™ TinyLogic™ GlobalOptoisolator™ QSTM UHC™ CoolFET™ GTO™ **VCX**<sup>TM</sup>  $CROSSVOLT^{TM}$ QT Optoelectronics™ HiSeC™

DOME™ ISOPLANAR™ Quiet Series™

#### **DISCLAIMER**

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

#### LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

- 1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.
- 2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

#### PRODUCT STATUS DEFINITIONS

#### **Definition of Terms**

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.