

# General Purpose Transistors

## NPN Silicon

- Moisture Sensitivity Level: 1
- ESD Rating – Human Body Model: >4000 V  
– Machine Model: >400 V
- We declare that the material of product compliance with RoHS requirements.

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage LBC846 LBC847, LBC850 LBC848, LBC849	$V_{CEO}$	65 45 30	Vdc
Collector–Base Voltage LBC846 LBC847, LBC850 LBC848, LBC849	$V_{CBO}$	80 50 30	Vdc
Emitter–Base Voltage LBC846 LBC847, LBC850 LBC848, LBC849	$V_{EBO}$	6.0 6.0 5.0	Vdc
Collector Current – Continuous	$I_C$	100	mAdc

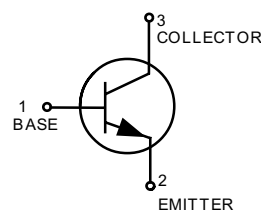
### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR–5 Board (Note 1.) $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	150 2.4	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 1.)	$R_{\theta JA}$	833	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	$T_J, T_{stg}$	–55 to +150	$^\circ\text{C}$

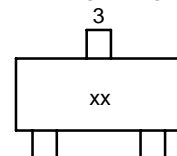
### LBC846AWT1G Series



SOT–323 /SC–70



### MARKING DIAGRAM



xx= Device Marking  
(See Table Below)

**LBC846AWT1G Series****DEVICE MARKING AND ORDERING INFORMATION**

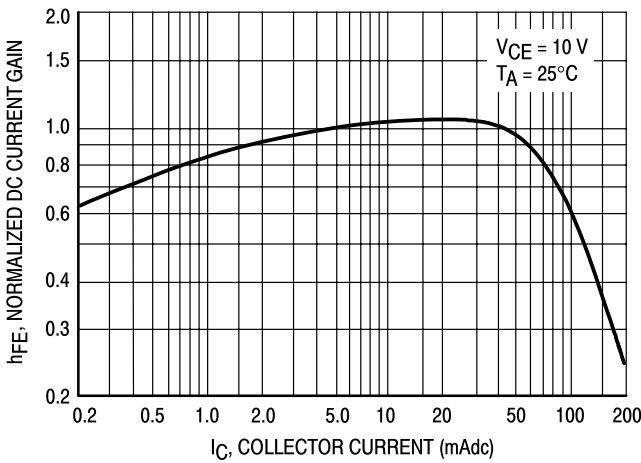
Device	Marking	Package	Shipping
LBC846AWT1G	1A	SC-70	3000/Tape&Reel
LBC846AWT3G	1A	SC-70	10000/Tape&Reel
LBC846BWT1G	1B	SC-70	3000/Tape&Reel
LBC846BWT3G	1B	SC-70	10000/Tape&Reel
LBC847AWT1G	1E	SC-70	3000/Tape&Reel
LBC847AWT3G	1E	SC-70	10000/Tape&Reel
LBC847BWT1G	1F	SC-70	3000/Tape&Reel
LBC847BWT3G	1F	SC-70	10000/Tape&Reel
LBC847CWT1G	1G	SC-70	3000/Tape&Reel
LBC847CWT3G	1G	SC-70	10000/Tape&Reel
LBC848AWT1G	1J	SC-70	3000/Tape&Reel
LBC848AWT3G	1J	SC-70	10000/Tape&Reel
LBC848BWT1G	1K	SC-70	3000/Tape&Reel
LBC848BWT3G	1K	SC-70	10000/Tape&Reel
LBC848CWT1G	1L	SC-70	3000/Tape&Reel
LBC848CWT3G	1L	SC-70	10000/Tape&Reel
LBC849BWT1G	2B	SC-70	3000/Tape&Reel
LBC849BWT3G	2B	SC-70	10000/Tape&Reel
LBC849CWT1G	2C	SC-70	3000/Tape&Reel
LBC849CWT3G	2C	SC-70	10000/Tape&Reel
LBC850BWT1G	2F	SC-70	3000/Tape&Reel
LBC850BWT3G	2F	SC-70	10000/Tape&Reel
LBC850CWT1G	2G	SC-70	3000/Tape&Reel
LBC850CWT3G	2G	SC-70	10000/Tape&Reel

**LBC846AWT1G Series**
**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

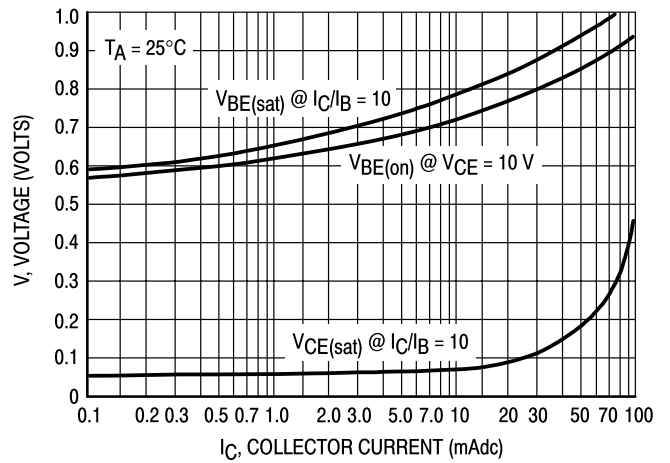
Characteristic	Symbol	Min	Typ	Max	Unit	
<b>OFF CHARACTERISTICS</b>						
Collector–Emitter Breakdown Voltage ( $I_C = 10\text{ mA}$ )	LBC846A,B LBC847A,B,C, LBC850B,C LBC848A,B,C, LBC849B,C	$V_{(BR)CEO}$	65 45 30	– – –	– – –	V
Collector–Emitter Breakdown Voltage ( $I_C = 10\ \mu\text{A}$ , $V_{EB} = 0$ )	LBC846A,B LBC847A,B,C, LBC850B,C LBC848A,B,C, LBC849B,C	$V_{(BR)CES}$	80 50 30	– – –	– – –	V
Collector–Base Breakdown Voltage ( $I_C = 10\ \mu\text{A}$ )	LBC846A,B LBC847A,B,C, LBC850B,C LBC848A,B,C, LBC849B,C	$V_{(BR)CBO}$	80 50 30	– – –	– – –	V
Emitter–Base Breakdown Voltage ( $I_E = 1.0\ \mu\text{A}$ )	LBC846A,B LBC847A,B,C, LBC850B,C LBC848A,B,C, LBC849B,C	$V_{(BR)EBO}$	6.0 6.0 5.0	– – –	– – –	V
Collector Cutoff Current ( $V_{CB} = 30\text{ V}$ ) ( $V_{CB} = 30\text{ V}$ , $T_A = 150^\circ\text{C}$ )		$I_{CBO}$	– –	– –	15 5.0	nA $\mu\text{A}$
<b>ON CHARACTERISTICS</b>						
DC Current Gain ( $I_C = 10\ \mu\text{A}$ , $V_{CE} = 5.0\text{ V}$ )	LBC846A, LBC847A, LBC848A LBC846B, LBC847B, LBC848B LBC847C, LBC848C	$h_{FE}$	– – –	90 150 270	– – –	–
( $I_C = 2.0\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ )	LBC846A, LBC847A, LBC848A LBC846B, LBC847B, LBC848B, LBC849B, LBC850B LBC847C, LBC848C, LBC849C, LBC850C		110 200 420	180 290 520	220 450 800	
Collector–Emitter Saturation Voltage ( $I_C = 10\text{ mA}$ , $I_B = 0.5\text{ mA}$ ) ( $I_C = 100\text{ mA}$ , $I_B = 5.0\text{ mA}$ )		$V_{CE(sat)}$	– –	– –	0.25 0.6	V
Base–Emitter Saturation Voltage ( $I_C = 10\text{ mA}$ , $I_B = 0.5\text{ mA}$ ) ( $I_C = 100\text{ mA}$ , $I_B = 5.0\text{ mA}$ )		$V_{BE(sat)}$	– –	0.7 0.9	– –	V
Base–Emitter Voltage ( $I_C = 2.0\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ ) ( $I_C = 10\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ )		$V_{BE(on)}$	580 –	660 –	700 770	mV
<b>SMALL–SIGNAL CHARACTERISTICS</b>						
Current–Gain – Bandwidth Product ( $I_C = 10\text{ mA}$ , $V_{CE} = 5.0\text{ Vdc}$ , $f = 100\text{ MHz}$ )		$f_T$	100	–	–	MHz
Output Capacitance ( $V_{CB} = 10\text{ V}$ , $f = 1.0\text{ MHz}$ )		$C_{obo}$	–	–	4.5	pF
Noise Figure ( $I_C = 0.2\text{ mA}$ , $V_{CE} = 5.0\text{ Vdc}$ , $R_S = 2.0\text{ k}\Omega$ , $f = 1.0\text{ kHz}$ , $BW = 200\text{ Hz}$ )	LBC846A,B, LBC847A,B,C, LBC848A,B,C LBC849B,C, LBC850B,C	NF	– –	– –	10 4.0	dB

**LBC846AWT1G Series**

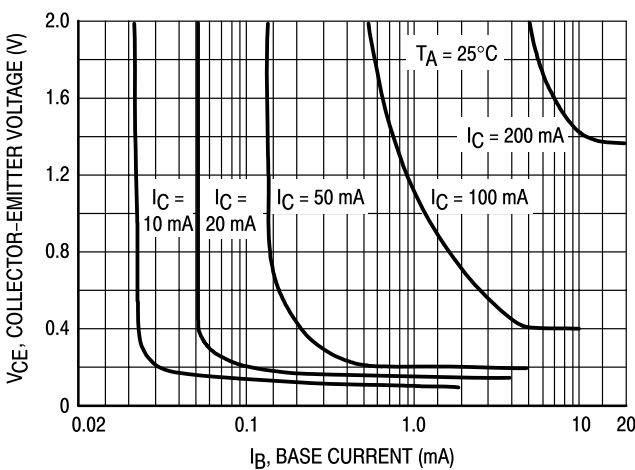
**LBC847, LBC848, LBC849, LBC850**



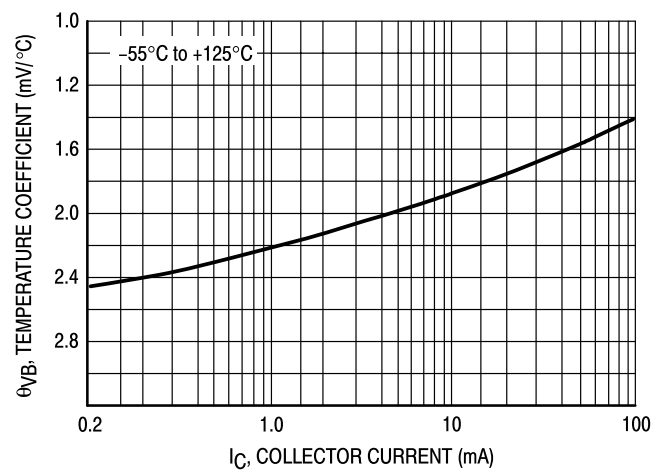
**Figure 1. Normalized DC Current Gain**



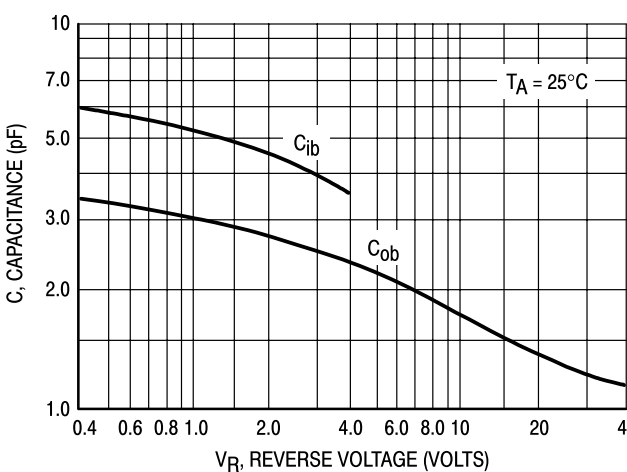
**Figure 2. "Saturation" and "On" Voltages**



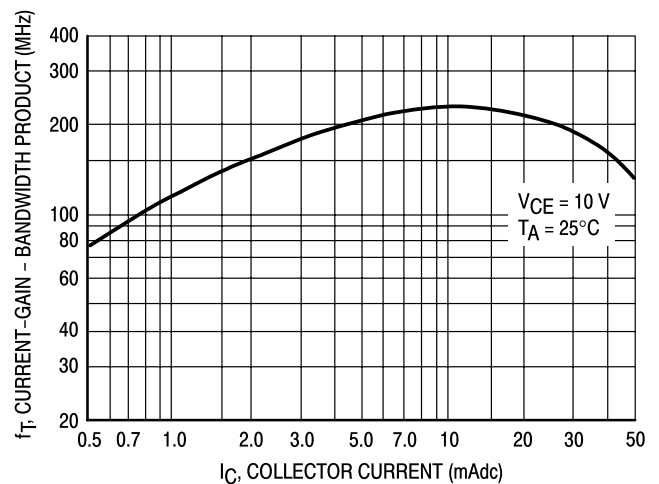
**Figure 3. Collector Saturation Region**



**Figure 4. Base-Emitter Temperature Coefficient**



**Figure 5. Capacitances**



**Figure 6. Current-Gain - Bandwidth Product**

LBC846AWT1G Series

LBC846

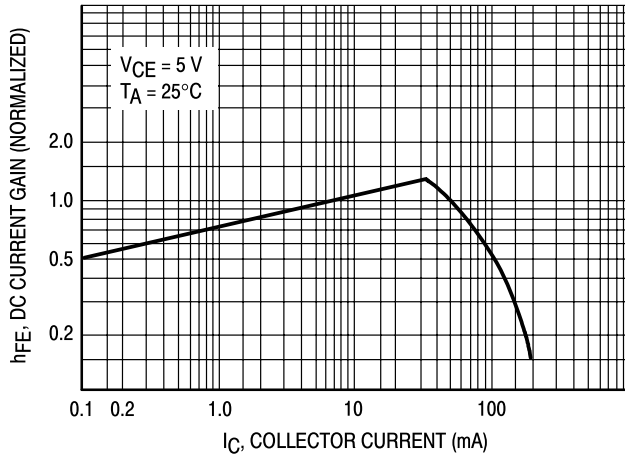


Figure 7. DC Current Gain

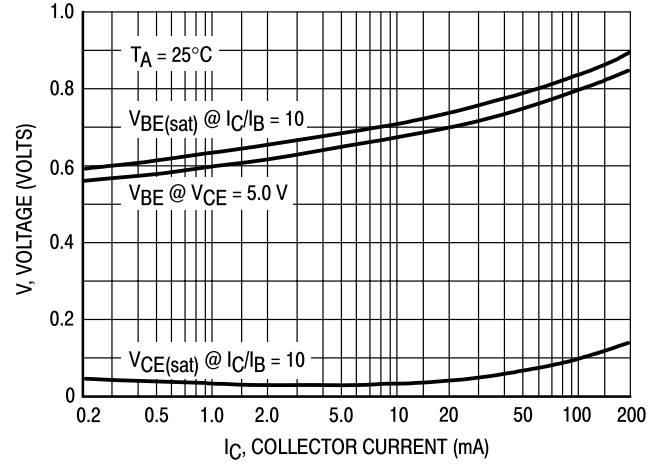


Figure 8. "On" Voltage

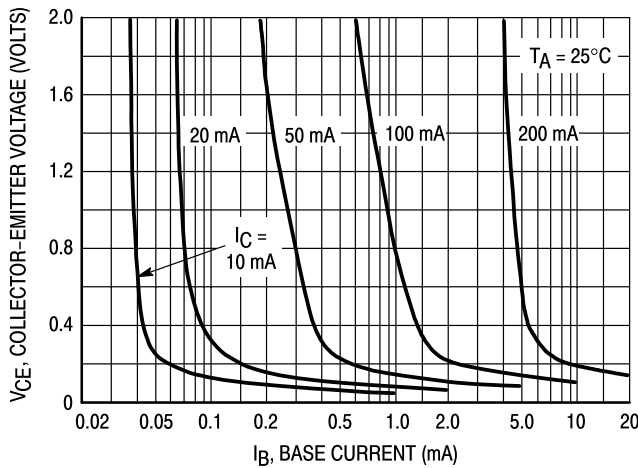


Figure 9. Collector Saturation Region

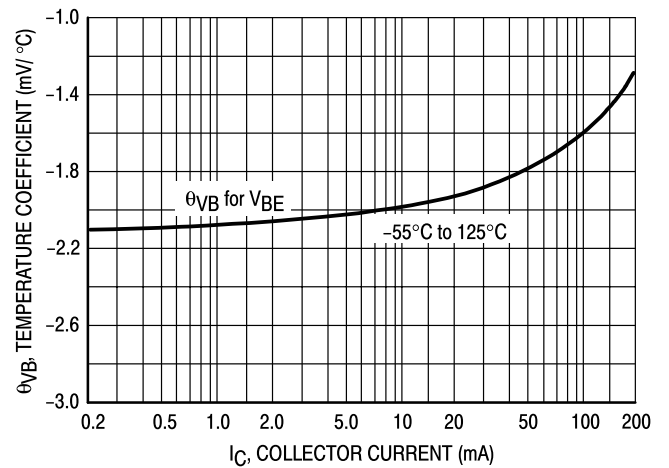


Figure 10. Base-Emitter Temperature Coefficient

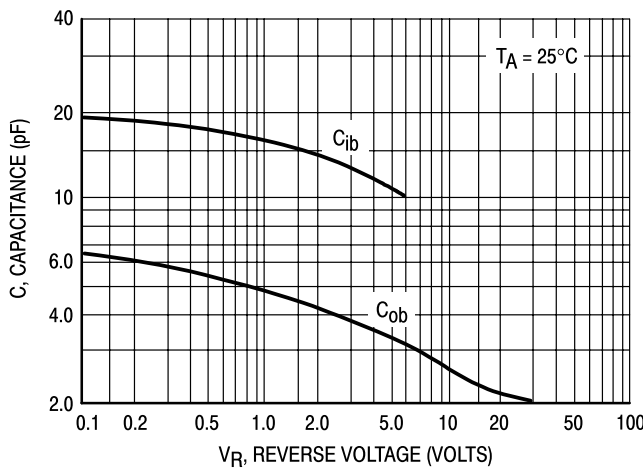


Figure 11. Capacitance

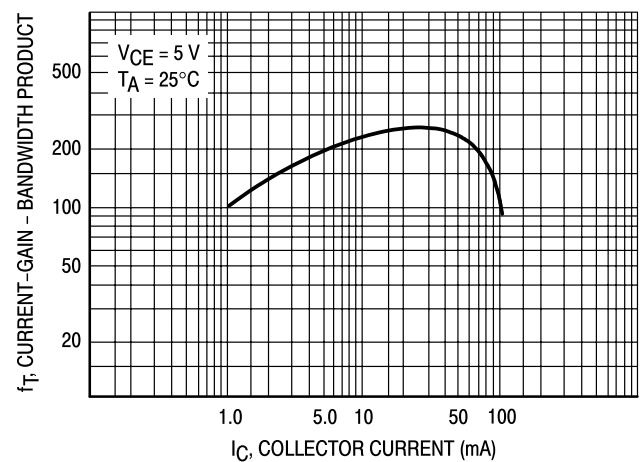


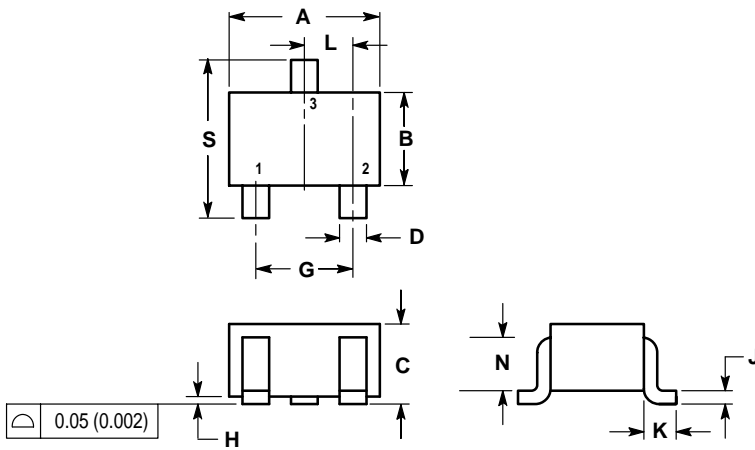
Figure 12. Current-Gain - Bandwidth Product

**LBC846AWT1G Series**

**SC-70 / SOT-323**

NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.071	0.087	1.80	2.20
B	0.045	0.053	1.15	1.35
C	0.032	0.040	0.80	1.00
D	0.012	0.016	0.30	0.40
G	0.047	0.055	1.20	1.40
H	0.000	0.004	0.00	0.10
J	0.004	0.010	0.10	0.25
K	0.017 REF		0.425 REF	
L	0.026 BSC		0.650 BSC	
N	0.028 REF		0.700 REF	
S	0.079	0.095	2.00	2.40

- PIN 1. BASE  
 2. EMITTER  
 3. COLLECTOR

