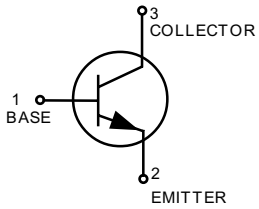
General Purpose Transistors

NPN Silicon

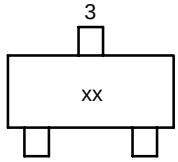
LBC846ALT1 Series

- Moisture Sensitivity Level: 1
- ESD Rating – Human Body Model: >4000 V
  – Machine Model: >400 V
- Pb-Free Packages are Available

SOT–23



MARKING DIAGRAM



xx= Device Marking
(See Table Below)

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°C Derate above 25°C	P_D	225 1.8	mW mW/°C
Thermal Resistance, Junction to Ambient (Note 1.)	$R_{\theta JA}$	556	°C/W
Total Device Dissipation Alumina Substrate (Note 2.) T_A = 25°C Derate above 25°C	P_D	300 2.4	mW mW/°C
Thermal Resistance, Junction to Ambient (Note 2.)	$R_{\theta JA}$	417	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	–55 to +150	°C

1. FR–5 = 1.0 x 0.75 x 0.062 in
2. Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.

DEVICE MARKING AND ORDERING INFORMATION

Device	Marking	Package	Shipping
LBC846ALT1	1A	SOT-23	3000/Tape&Reel
LBC846ALT1G	1A (Pb-Free)	SOT-23	3000/Tape&Reel
LBC846BLT1	1B	SOT-23	3000/Tape&Reel
LBC846BLT1G	1B (Pb-Free)	SOT-23	3000/Tape&Reel
LBC847ALT1	1E	SOT-23	3000/Tape&Reel
LBC847ALT1G	1E (Pb-Free)	SOT-23	3000/Tape&Reel
LBC847BLT1	1F	SOT-23	3000/Tape&Reel
LBC847BLT1G	1F (Pb-Free)	SOT-23	3000/Tape&Reel
LBC847CLT1	1G	SOT-23	3000/Tape&Reel
LBC847CLT1G	1G (Pb-Free)	SOT-23	3000/Tape&Reel
LBC848ALT1	1J	SOT-23	3000/Tape&Reel
LBC848ALT1G	1J (Pb-Free)	SOT-23	3000/Tape&Reel
LBC848BLT1	1K	SOT-23	3000/Tape&Reel
LBC848BLT1G	1K (Pb-Free)	SOT-23	3000/Tape&Reel
LBC848CLT1	1L	SOT-23	3000/Tape&Reel
LBC848CLT1G	1L (Pb-Free)	SOT-23	3000/Tape&Reel
LBC849BLT1	2B	SOT-23	3000/Tape&Reel
LBC849BLT1G	2B (Pb-Free)	SOT-23	3000/Tape&Reel
LBC849CLT1	2C	SOT-23	3000/Tape&Reel
LBC849CLT1G	2C (Pb-Free)	SOT-23	3000/Tape&Reel
LBC850BLT1	2F	SOT-23	3000/Tape&Reel
LBC850BLT1G	2F (Pb-Free)	SOT-23	3000/Tape&Reel
LBC850CLT1	2G	SOT-23	3000/Tape&Reel
LBC850CLT1G	2G (Pb-Free)	SOT-23	3000/Tape&Reel

LBC846ALT1 Series

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector–Emitter Breakdown Voltage (I_C = 10 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 μA, 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 μA)	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 μA)	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 V) (V_{CB} = 30 V, T_A = 150°C)		I_{CBO}	– –	– –	15 5.0	nA μA
ON CHARACTERISTICS						
DC Current Gain (I_C = 10 μA, V_{CE} = 5.0 V)	LBC846A, LBC847A, LBC848A LBC846B, LBC847B, LBC848B LBC847C, LBC848C	h_{FE}	– – –	90 150 270	– – –	–
(I_C = 2.0 mA, V_{CE} = 5.0 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 mA, I_B = 0.5 mA) (I_C = 100 mA, I_B = 5.0 mA)		$V_{CE(sat)}$	– –	– –	0.25 0.6	V
Base–Emitter Saturation Voltage (I_C = 10 mA, I_B = 0.5 mA) (I_C = 100 mA, I_B = 5.0 mA)		$V_{BE(sat)}$	– –	0.7 0.9	– –	V
Base–Emitter Voltage (I_C = 2.0 mA, V_{CE} = 5.0 V) (I_C = 10 mA, V_{CE} = 5.0 V)		$V_{BE(on)}$	580 –	660 –	700 770	mV
SMALL–SIGNAL CHARACTERISTICS						
Current–Gain – Bandwidth Product (I_C = 10 mA, V_{CE} = 5.0 Vdc, f = 100 MHz)		f_T	100	–	–	MHz
Output Capacitance (V_{CB} = 10 V, f = 1.0 MHz)		C_{obo}	–	–	4.5	pF
Noise Figure (I_C = 0.2 mA, (V_{CE} = 5.0 Vdc, R_S = 2.0 kΩ f = 1.0 kHz, BW = 200 Hz)	LBC846A,B, LBC847A,B,C, LBC848A,B,C LBC849B,C, LBC850B,C	NF	– –	– –	10 4.0	dB

LBC847, LBC848, LBC849, LBC850

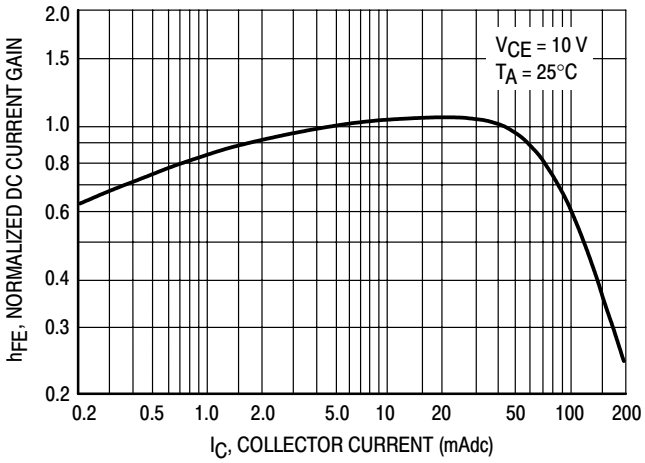


Figure 1. Normalized DC Current Gain

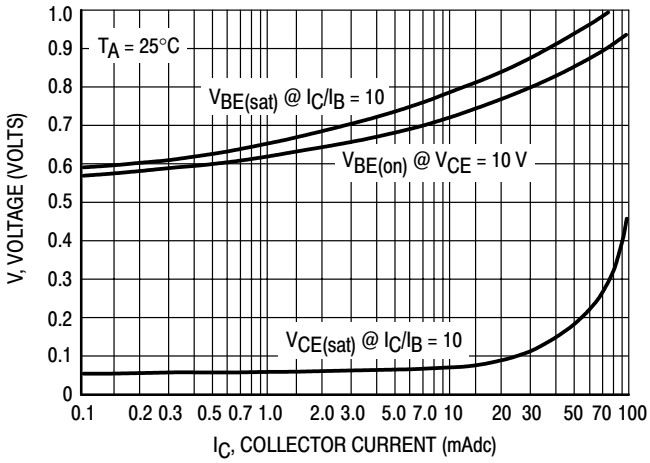


Figure 2. “Saturation” and “On” Voltages

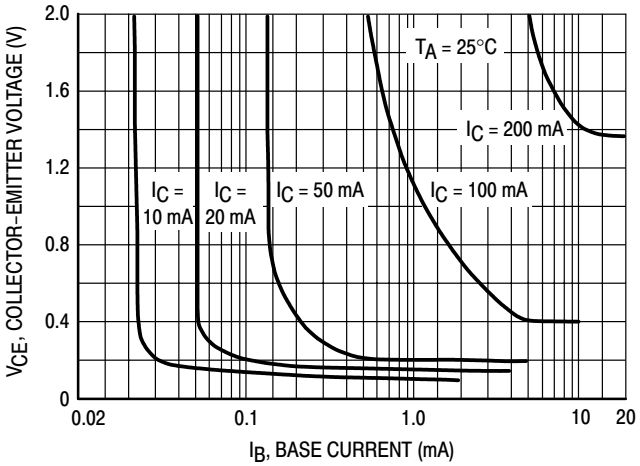


Figure 3. Collector Saturation Region

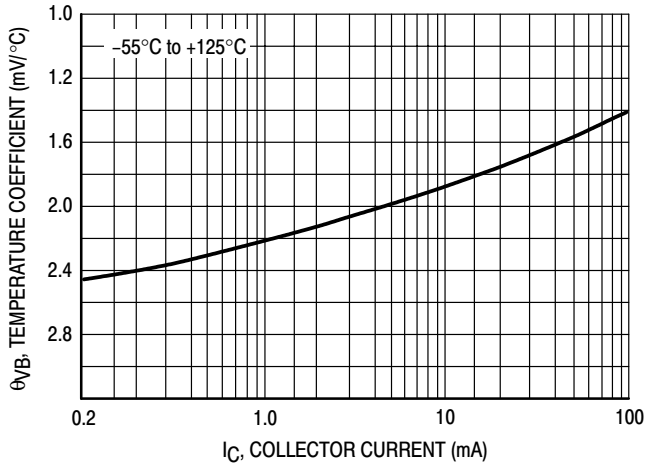


Figure 4. Base–Emitter Temperature Coefficient

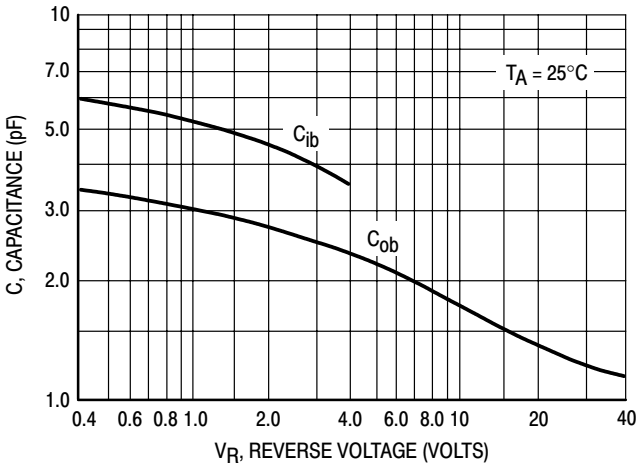


Figure 5. Capacitances

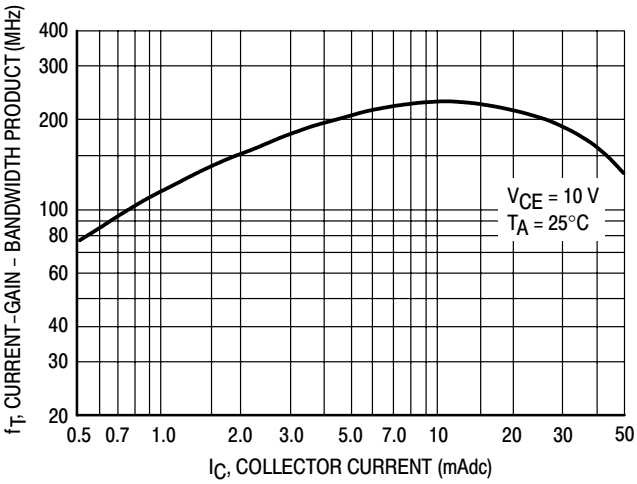


Figure 6. Current–Gain – Bandwidth Product

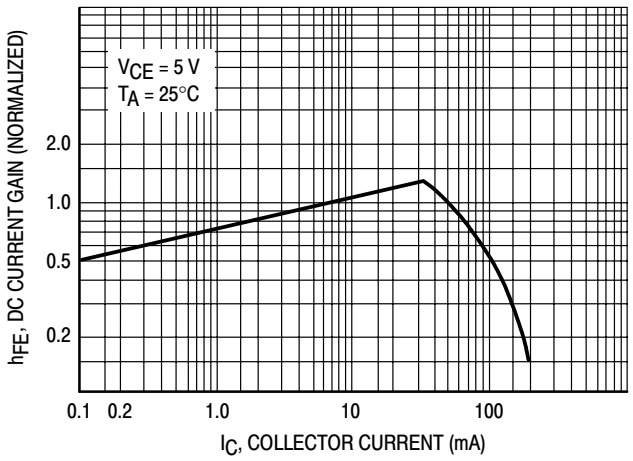


Figure 7. DC Current Gain

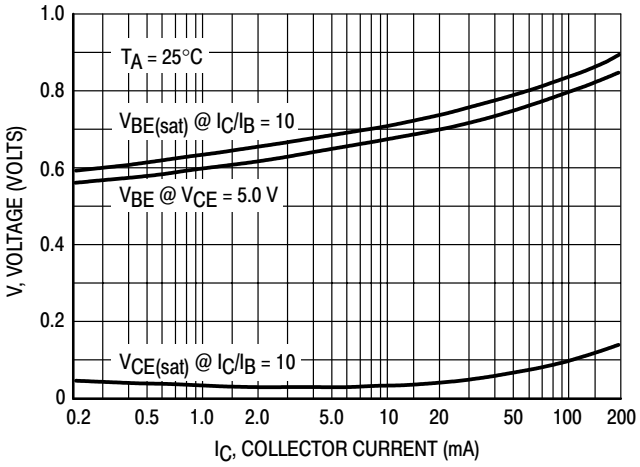


Figure 8. “On” Voltage

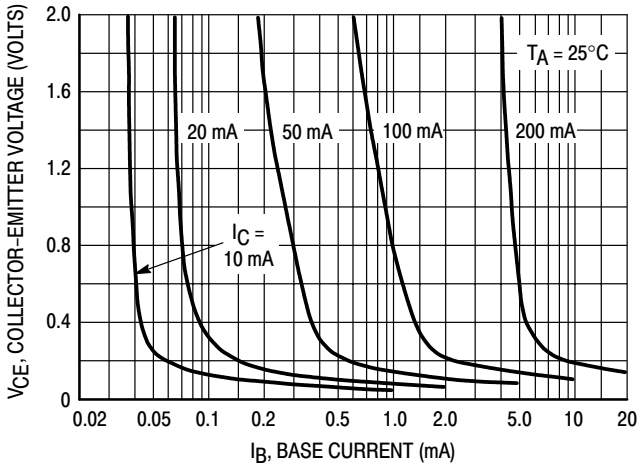


Figure 9. Collector Saturation Region

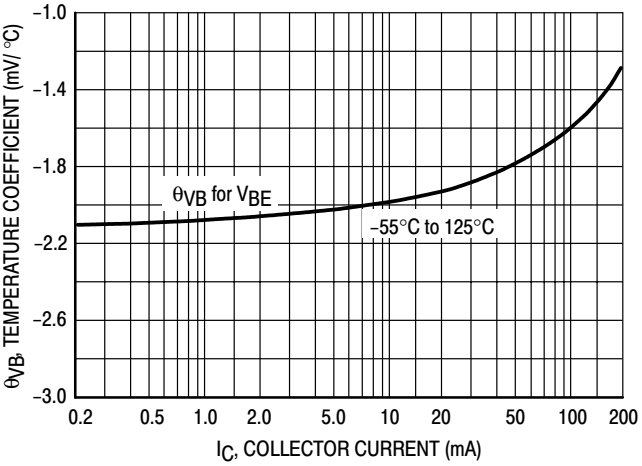


Figure 10. Base–Emitter Temperature Coefficient

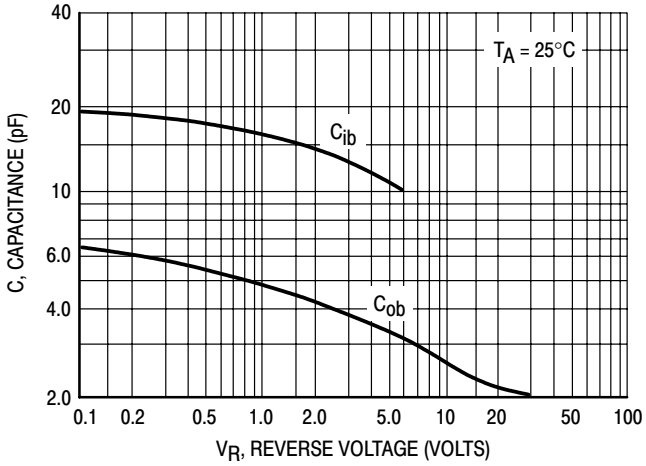


Figure 11. Capacitance

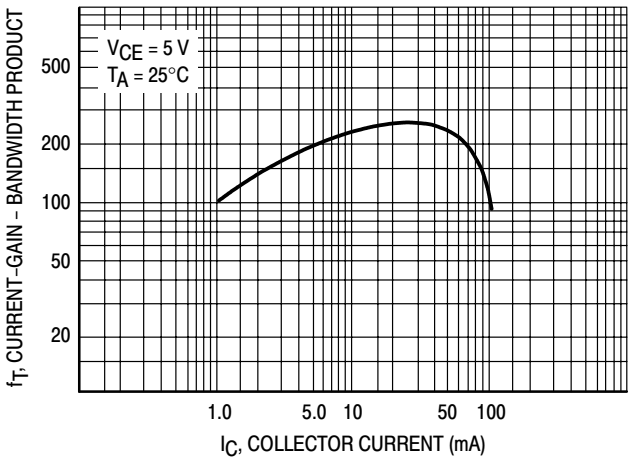
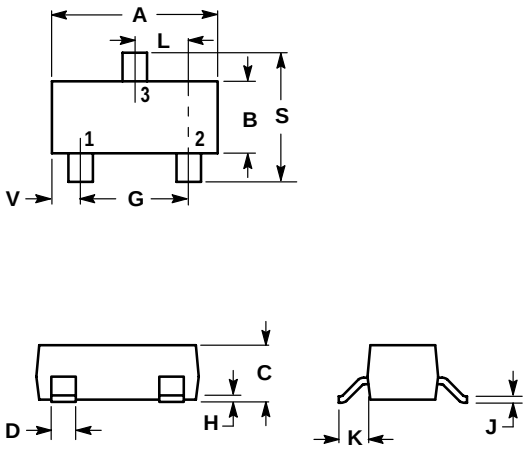


Figure 12. Current–Gain – Bandwidth Product

SOT-23



NOTES:

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

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60