

General Purpose Transistors

NPN Silicon

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

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

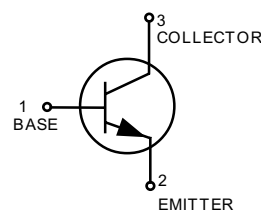
Characteristic	Symbol	Max	Unit
Total Device Dissipation FR–5 Board (Note 1.) $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	225 1.8	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 1.)	$R_{\theta JA}$	556	$^\circ\text{C/W}$
Total Device Dissipation Alumina Substrate (Note 2.) $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	300 2.4	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 2.)	$R_{\theta JA}$	417	$^\circ\text{C/W}$
Junction and Storage Temperature Range	T_J, T_{stg}	–55 to +150	$^\circ\text{C}$

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.

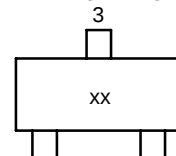
LBC846ALT1 Series



SOT–23



MARKING DIAGRAM



xx= Device Marking
(See Table Below)

LBC846ALT1 Series

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 ($T_A = 25^\circ\text{C}$ 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 ($I_C = 10\text{ }\mu\text{A}$, $V_{CE} = 5.0\text{ V}$)	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

SMALL–SIGNAL CHARACTERISTICS

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

LBC846ALT1 Series

LBC847, LBC848, LBC849, LBC850

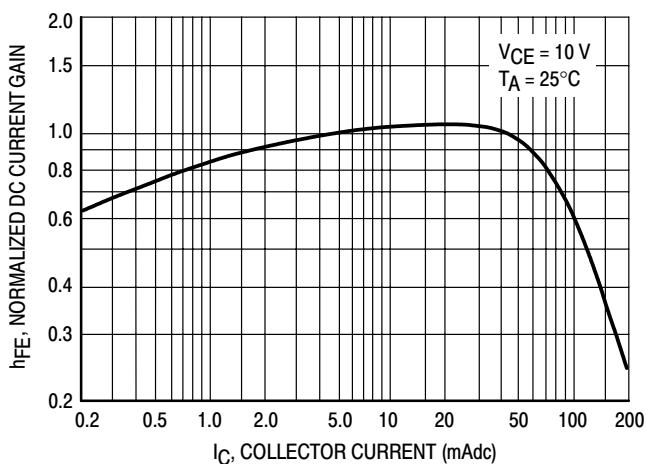


Figure 1. Normalized DC Current Gain

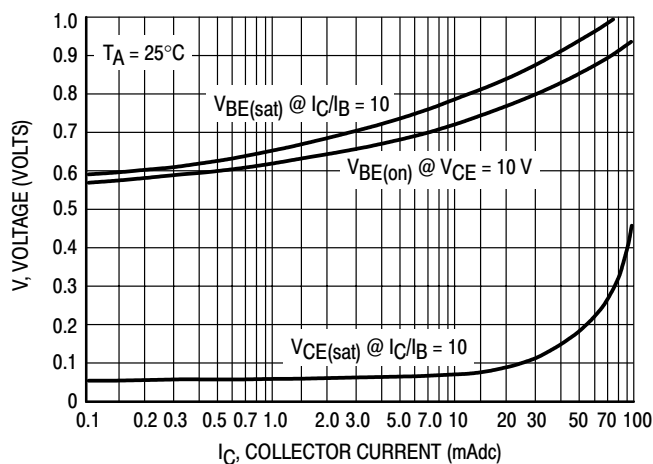


Figure 2. "Saturation" and "On" Voltages

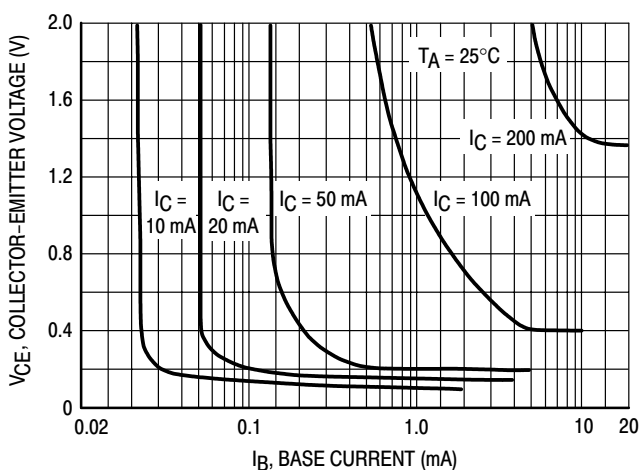


Figure 3. Collector Saturation Region

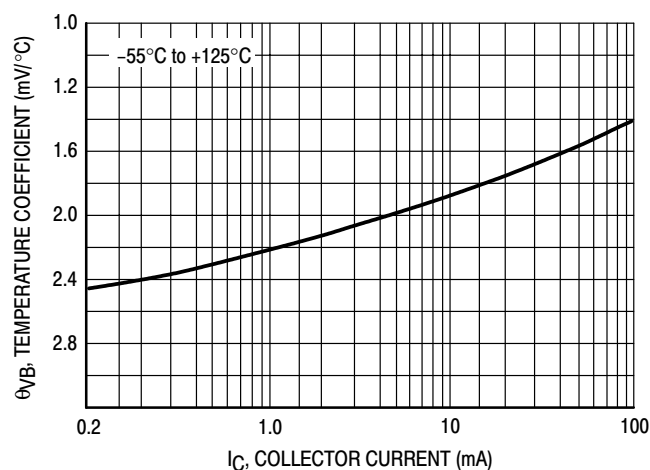


Figure 4. Base-Emitter Temperature Coefficient

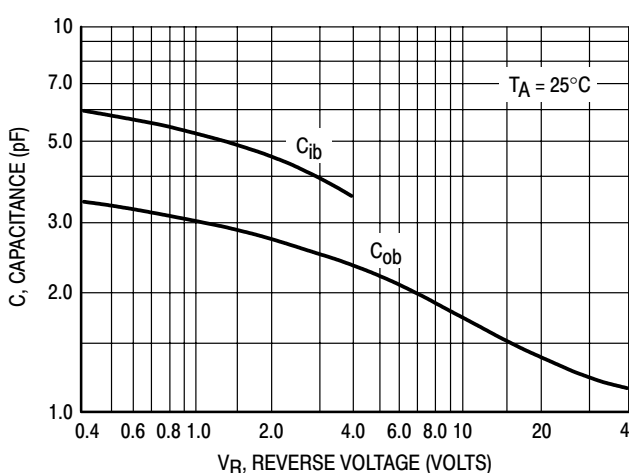


Figure 5. Capacitances

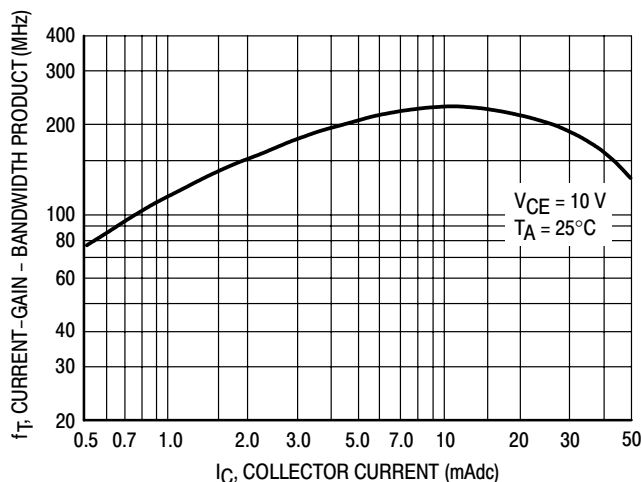


Figure 6. Current-Gain - Bandwidth Product

LBC846

LBC846ALT1 Series

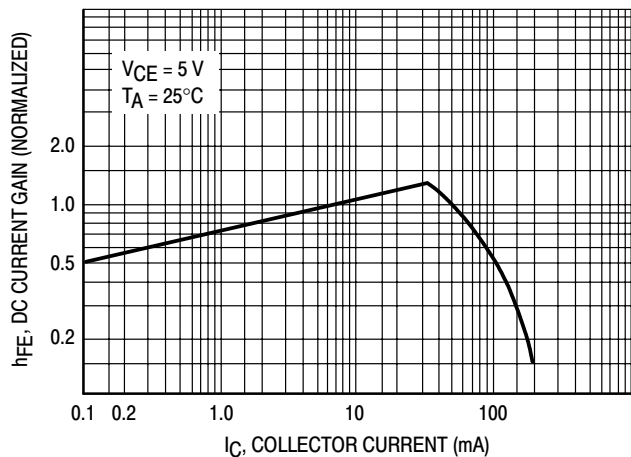


Figure 7. DC Current Gain

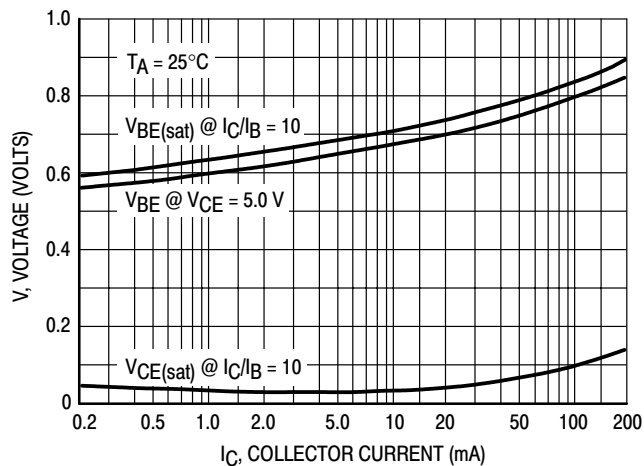


Figure 8. "On" Voltage

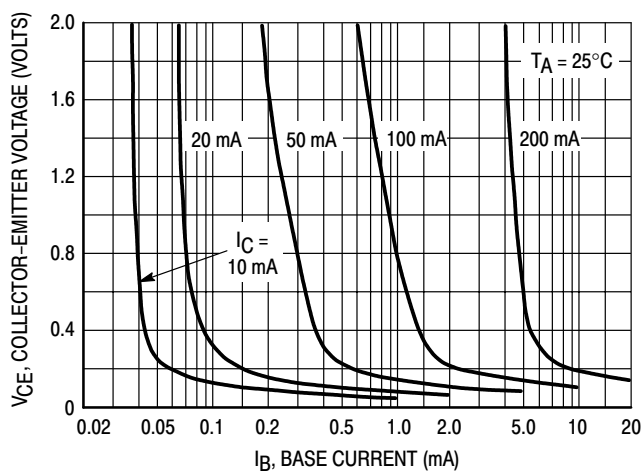


Figure 9. Collector Saturation Region

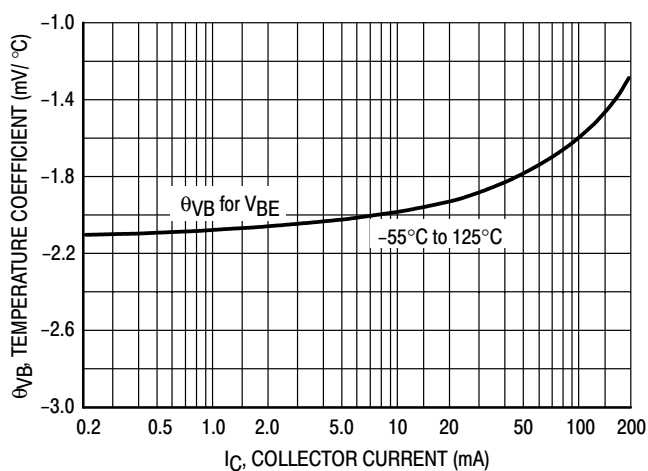


Figure 10. Base-Emitter Temperature Coefficient

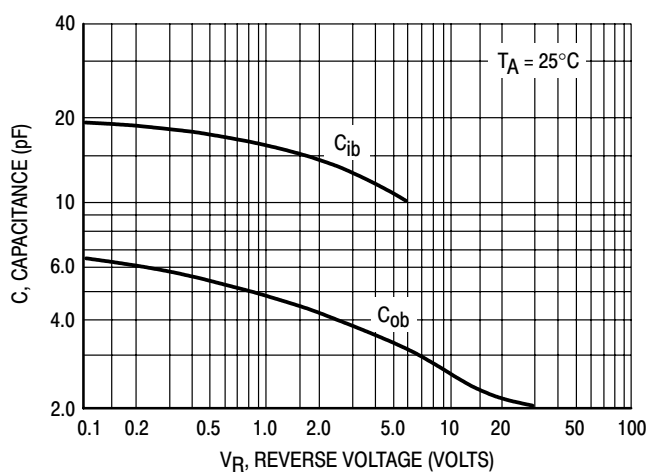


Figure 11. Capacitance

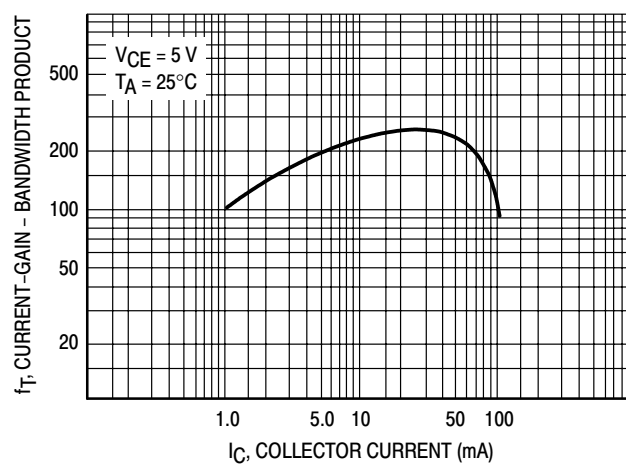
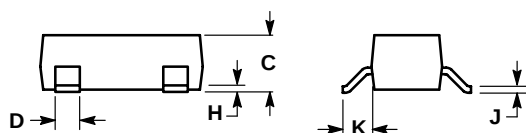
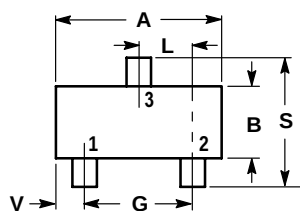


Figure 12. Current-Gain - Bandwidth Product

LBC846ALT1 Series

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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
E	0.0701	0.0807	1.78	2.04
F	0.0005	0.0040	0.013	0.100
G	0.0034	0.0070	0.085	0.177
H	0.0140	0.0285	0.35	0.69
I	0.0350	0.0401	0.89	1.02
J	0.0830	0.1039	2.10	2.64
K	0.0177	0.0236	0.45	0.60

