

General Purpose Transistors

NPN Silicon

We declare that the material of product compliance with RoHS requirements.
S- Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

ORDERING INFORMATION (Pb-Free)

| Device | Package | Shipping |
|------------------------------|---------|-----------------|
| LBC846AWT1G S-LBC846AWT1G | SC-70 | 3000/Tape&Reel |
| LBC846AWT3G S-LBC846AWT3G | SC-70 | 10000/Tape&Reel |

MAXIMUM RATINGS

| Rating | Symbol | BC846 | BC847 | BC848 | Unit |
|--------------------------------|-----------|-------|-------|-------|------|
| Collector-Emitter Voltage | V_{CEO} | 65 | 45 | 30 | V |
| Collector-Base Voltage | V_{CBO} | 80 | 50 | 30 | V |
| Emitter-Base Voltage | V_{EBO} | 6.0 | 6.0 | 5.0 | V |
| Collector Current — Continuous | I_C | 100 | 100 | 100 | mAdc |

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|-----------------|-------------|------|
| Total Device Dissipation | P_D | 150 | mW |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 833 | °C/W |
| Junction and Storage Temperature | T_J, T_{stg} | -55 to +150 | °C |

DEVICE MARKING

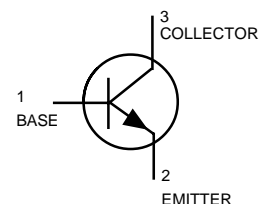
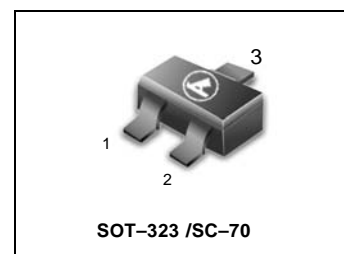
LBC846AWT1G = 1A; LBC846BWT1G = 1B; LBC847AWT1G = 1E; LBC847BWT1G = 1F;
LBC847CWT1G = 1G; LBC848AWT1G = 1J; LBC848BWT1G = 1K; LBC848CWT1G = 1L;

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|--|---------------|-----|-----|-----|---------------|
| OFF CHARACTERISTICS | | | | | |
| Collector-Emitter Breakdown Voltage ($I_C = 10\text{ mA}$) | LBC846 Series | 65 | — | — | v |
| | LBC847 Series | 45 | — | — | |
| | LBC848 Series | 30 | — | — | |
| Collector-Emitter Breakdown Voltage ($I_C = 10\ \mu\text{A}, V_{EB} = 0$) | LBC846 Series | 80 | — | — | v |
| | LBC847 Series | 50 | — | — | |
| | LBC848 Series | 30 | — | — | |
| Collector-Base Breakdown Voltage ($I_C = 10\ \mu\text{A}$) | LBC846 Series | 80 | — | — | v |
| | LBC847 Series | 50 | — | — | |
| | LBC848 Series | 30 | — | — | |
| Emitter-Base Breakdown Voltage ($I_E = 1.0\ \mu\text{A}$) | LBC846 Series | 6.0 | — | — | v |
| | LBC847 Series | 6.0 | — | — | |
| | LBC848 Series | 5.0 | — | — | |
| Collector Cutoff Current ($V_{CB} = 30\text{ V}$) ($V_{CB} = 30\text{ V}, T_A = 150^\circ\text{C}$) | I_{CBO} | — | — | 15 | nA |
| | | — | — | 5.0 | μA |

1.FR-5=1.0 x 0.75 x 0.062in

LBC846AWT1G,BWT1G
LBC847AWT1G,BWT1G
CWT1G
LBC848AWT1G,BWT1G
CWT1G
S-LBC846AWT1G,BWT1G
S-LBC847AWT1G,BWT1G
CWT1G
S-LBC848AWT1G,BWT1G
CWT1G



**LBC846AWT1G, BWT1G, LBC847AWT1G, BWT1G, CWT1G, LBC848AWT1G, BWT1G, CWT1G
S-LBC846AWT1G, BWT1G, S-LBC847AWT1G, BWT1G, CWT1G, S-LBC848AWT1G, BWT1G, CWT1G**

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|--|---------------|-----|------------|-------------|------|
| ON CHARACTERISTICS | | | | | |
| DC Current Gain ($I_C = 2.0\text{ mA}$, $V_{CE} = 5.0\text{ V}$) | h_{FE} | | | | |
| LBC846A, LBC847A, LBC848A | | 110 | 180 | 220 | |
| LBC846B, LBC847B, LBC848B | | 200 | 290 | 450 | |
| LBC847C, LBC848C | | 420 | 520 | 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 ($I_C = 0.2\text{ mA}$, $V_{CE} = 5.0\text{ Vdc}$, $R_S = 2.0\text{ k}\Omega$, $f = 1.0\text{ kHz}$, $BW = 200\text{ Hz}$) | NF | | | 10 4.0 | dB |
| | | LBC846A, LBC847A, LBC848A | | | |
| | | LBC846B, LBC847B, LBC848B | | | |
| | | LBC847C, LBC848C | | | |

LBC846A, LBC847A, LBC848A

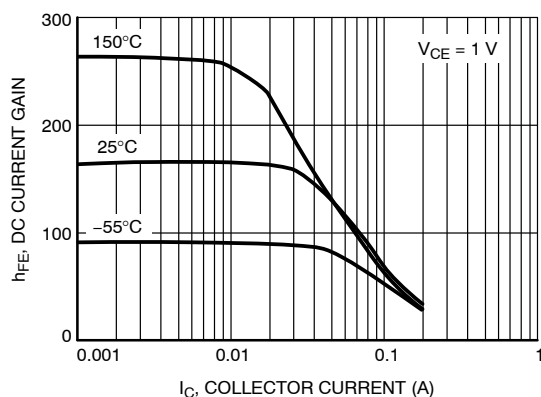


Figure 1. DC Current Gain vs. Collector Current

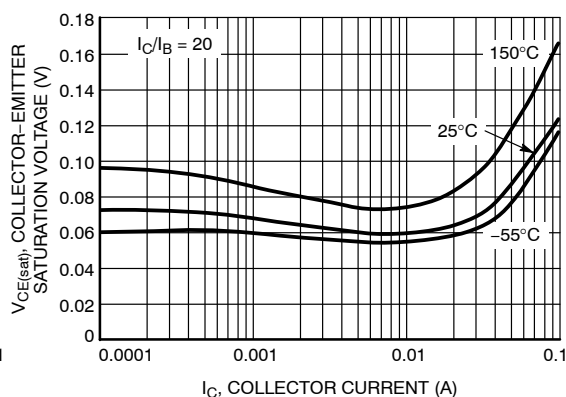


Figure 2. Collector Emitter Saturation Voltage vs. Collector Current

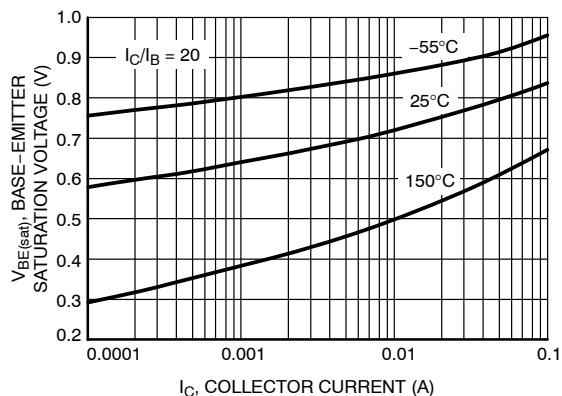


Figure 3. Base Emitter Saturation Voltage vs. Collector Current

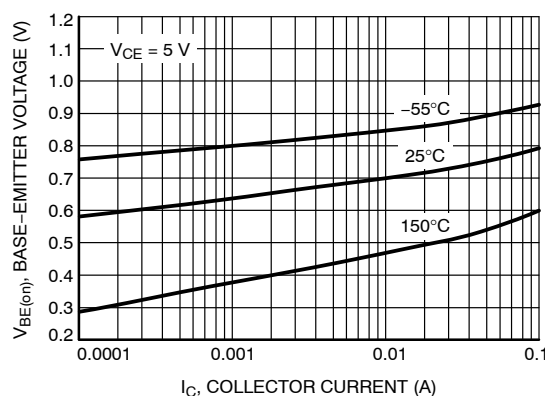


Figure 4. Base Emitter Voltage vs. Collector Current

LBC846A, LBC847A, LBC848A

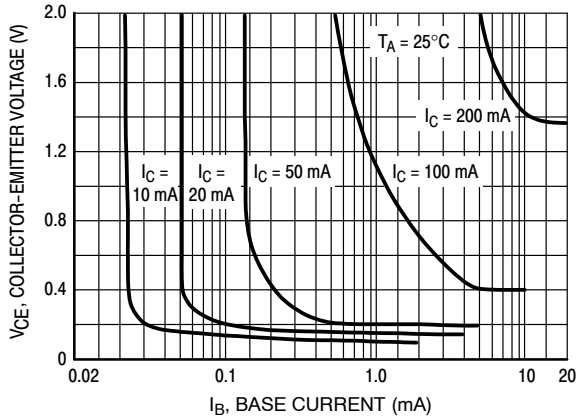


Figure 5. Collector Saturation Region

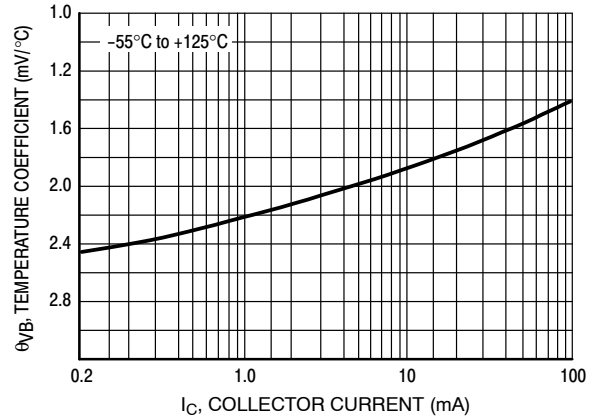


Figure 6. Base-Emitter Temperature Coefficient

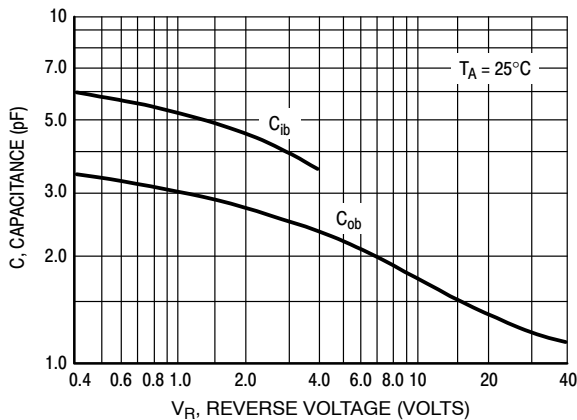


Figure 7. Capacitances

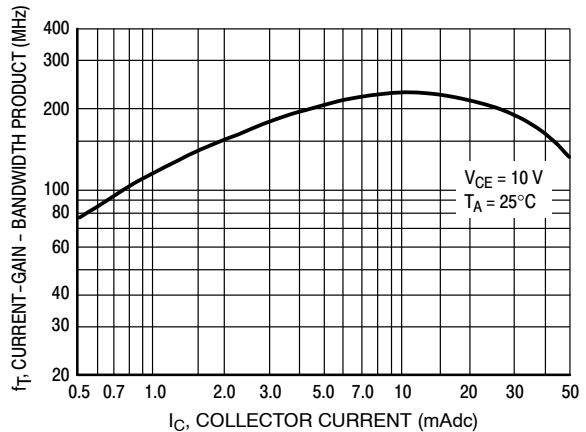


Figure 8. Current-Gain - Bandwidth Product

LBC846B

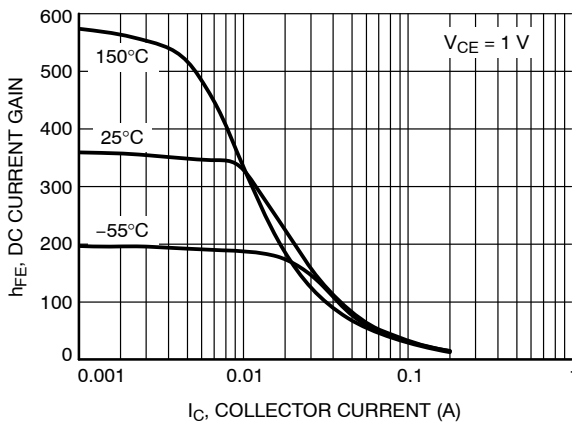


Figure 9. DC Current Gain vs. Collector Current

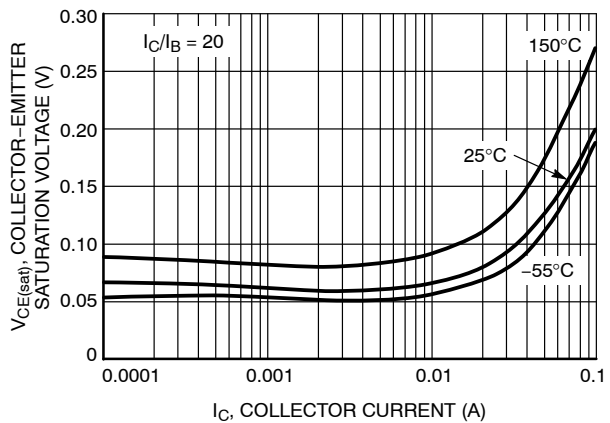


Figure 10. Collector Emitter Saturation Voltage vs. Collector Current

LBC846B

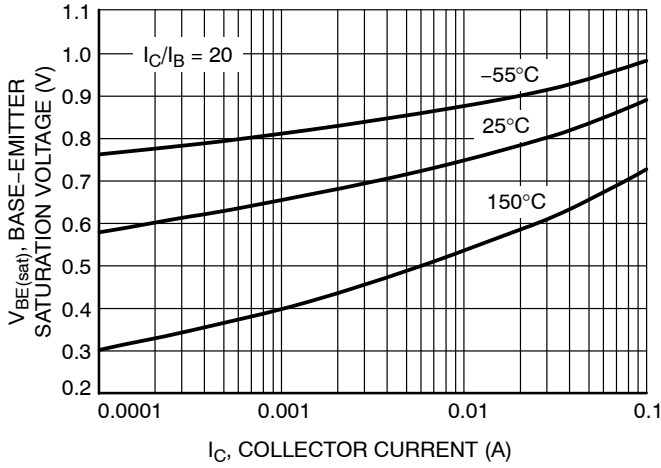


Figure 11. Base Emitter Saturation Voltage vs. Collector Current

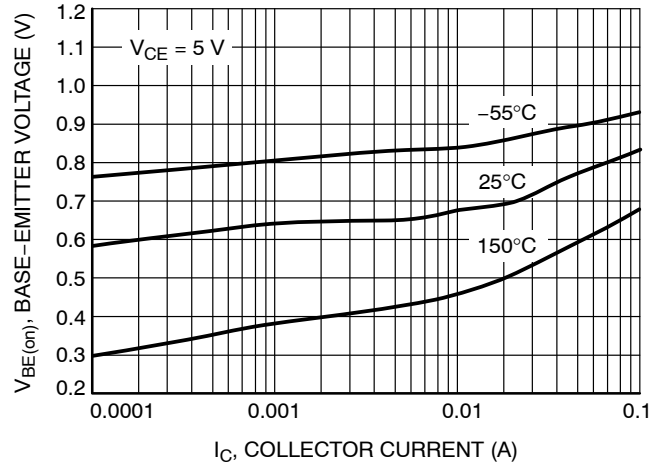


Figure 12. Base Emitter Voltage vs. Collector Current

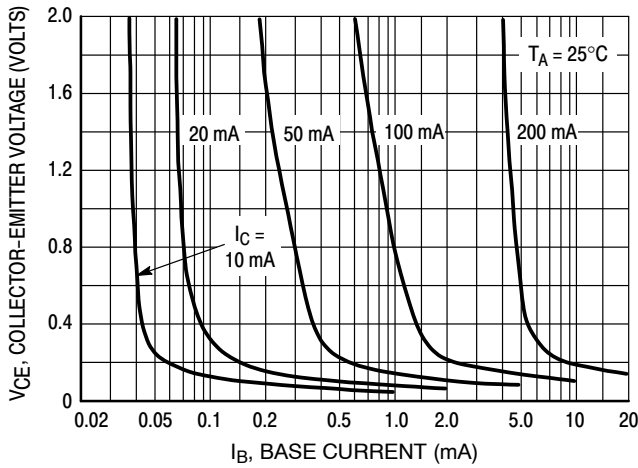


Figure 13. Collector Saturation Region

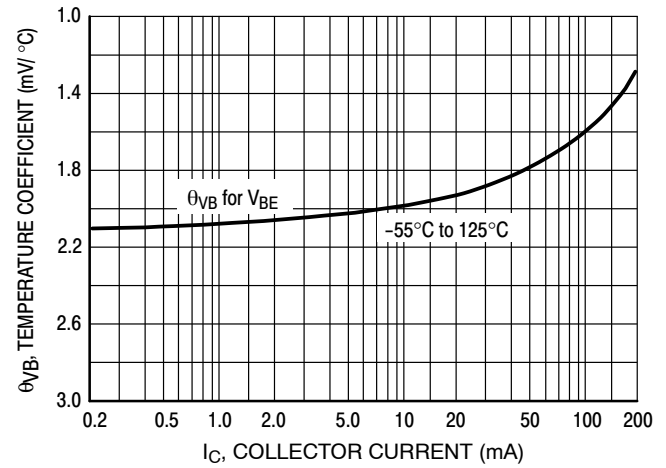


Figure 14. Base-Emitter Temperature Coefficient

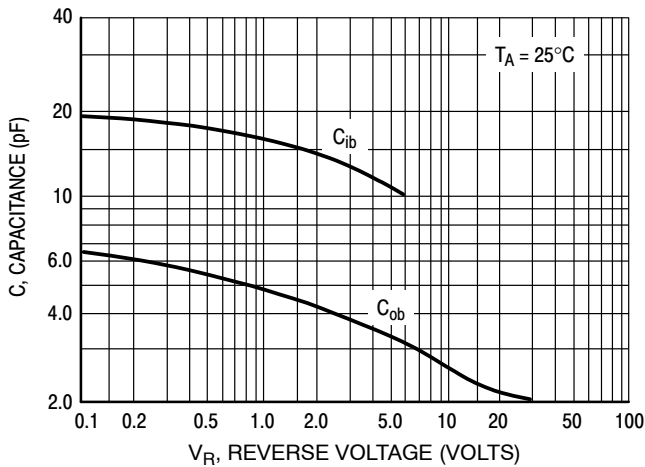


Figure 15. Capacitance

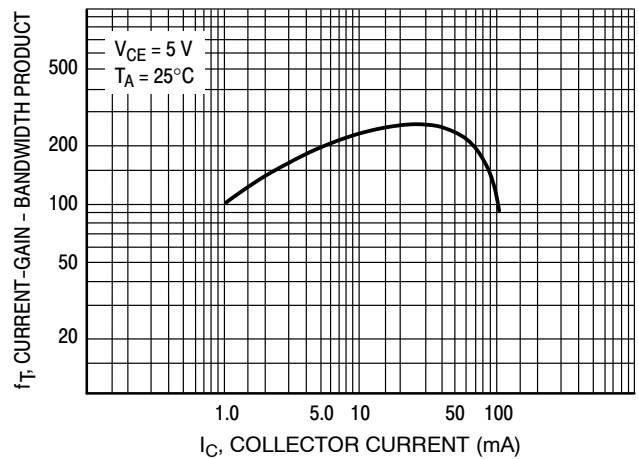


Figure 16. Current-Gain - Bandwidth Product

LBC846AWT1G, BWT1G, LBC847AWT1G, BWT1G, CWT1G, LBC848AWT1G, BWT1G, CWT1G
 S-LBC846AWT1G, BWT1G, S-LBC847AWT1G, BWT1G, CWT1G, S-LBC848AWT1G, BWT1G, CWT1G

LBC847B, LBC848B

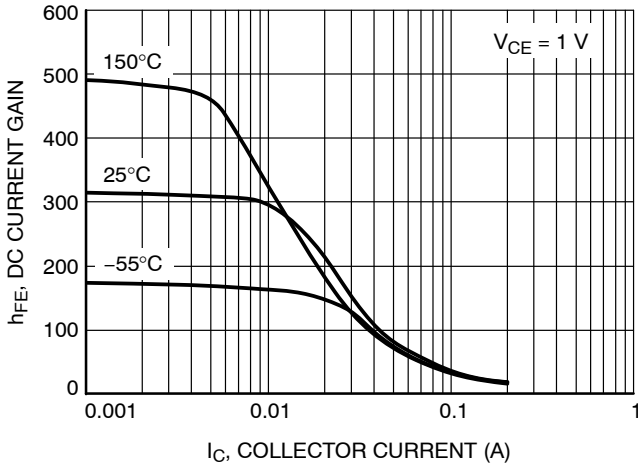


Figure 17. DC Current Gain vs. Collector Current

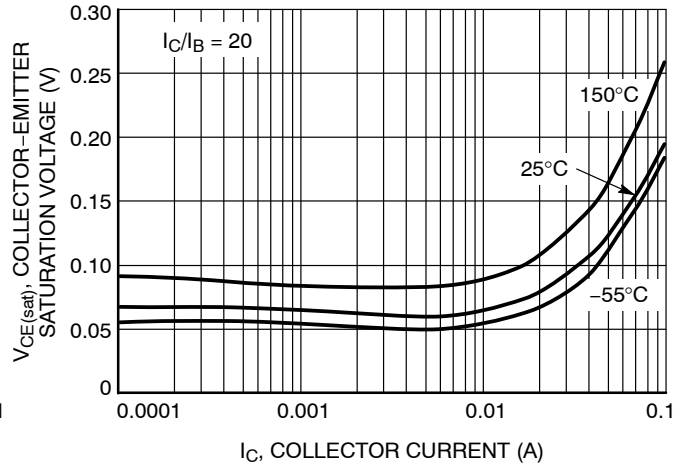


Figure 18. Collector Emitter Saturation Voltage vs. Collector Current

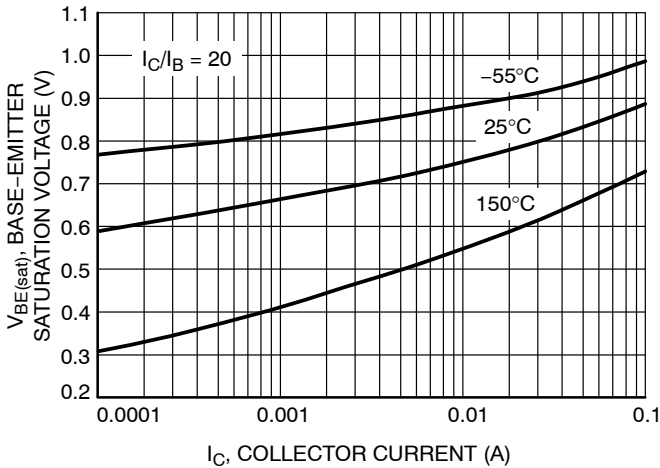


Figure 19. Base Emitter Saturation Voltage vs. Collector Current

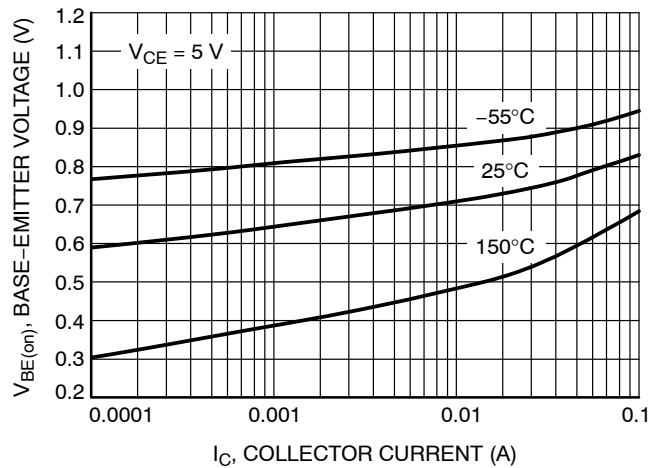


Figure 20. Base Emitter Voltage vs. Collector Current

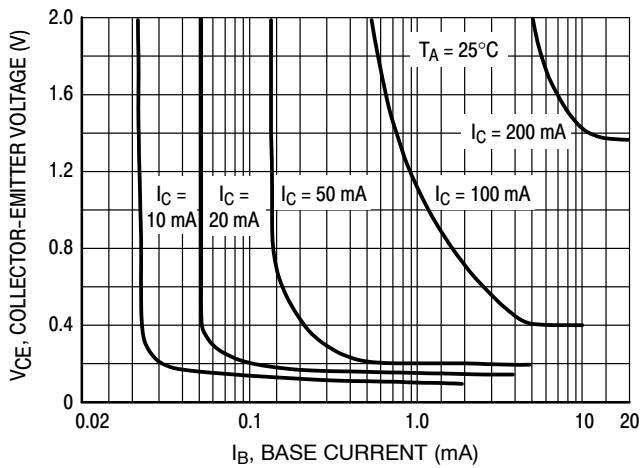


Figure 21. Collector Saturation Region

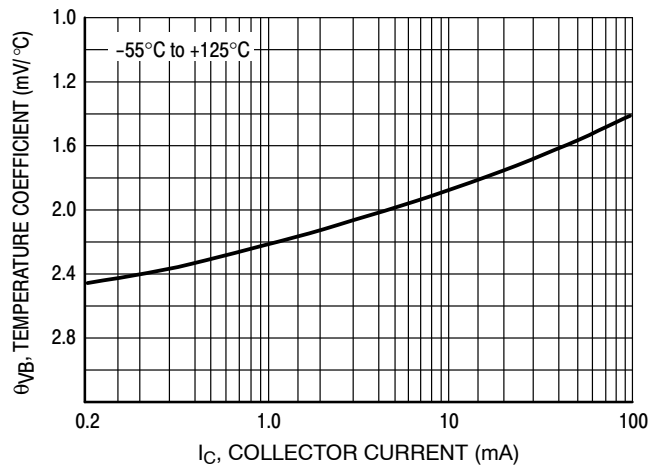


Figure 22. Base-Emitter Temperature Coefficient

LBC847B, LBC848B

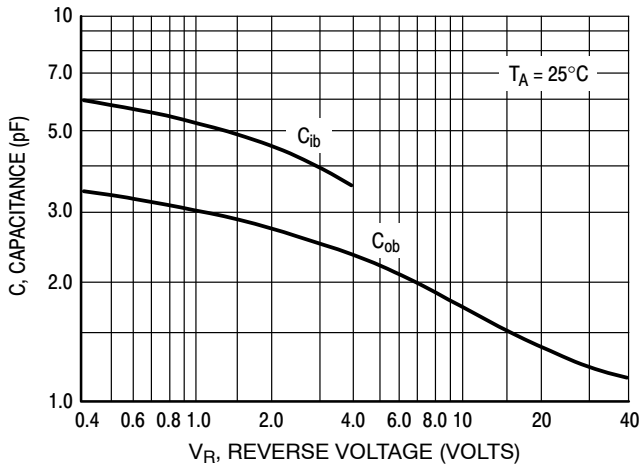


Figure 23. Capacitances

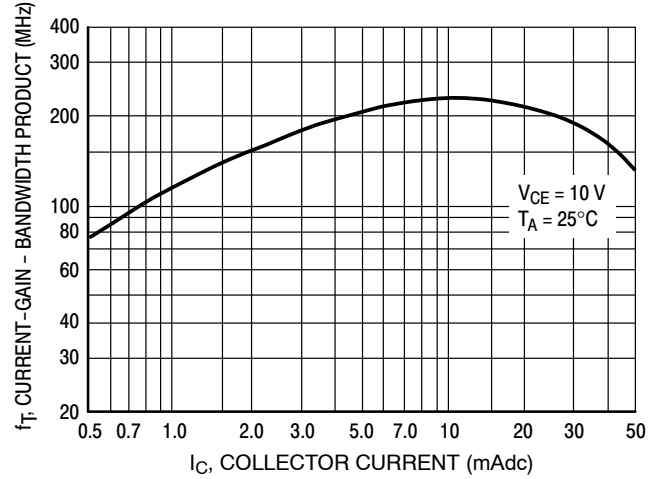


Figure 24. Current-Gain - Bandwidth Product

LBC847C, LBC848C, LBC849C, LBC850C

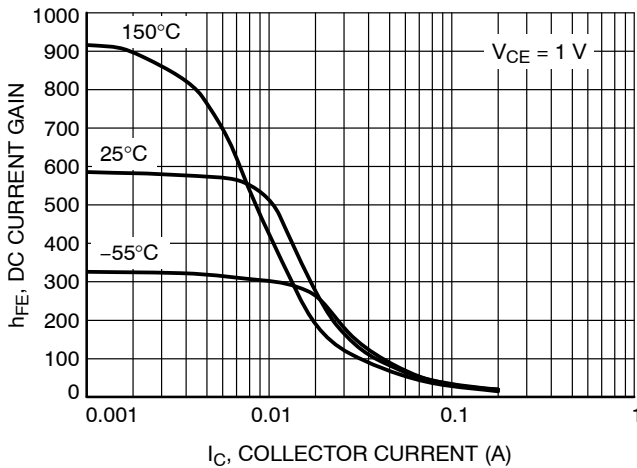


Figure 25. DC Current Gain vs. Collector Current

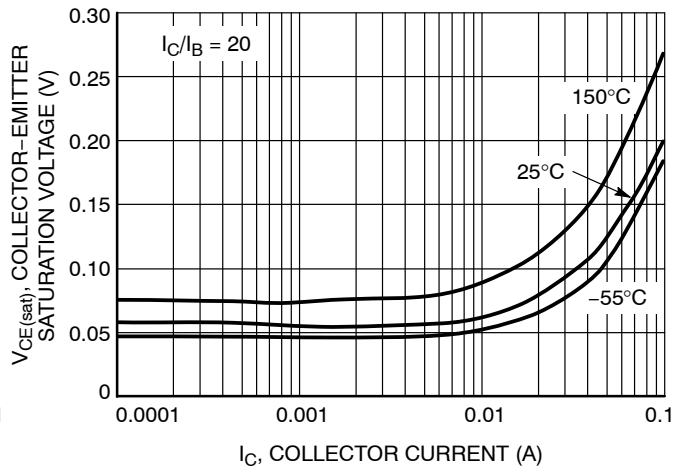


Figure 26. Collector Emitter Saturation Voltage vs. Collector Current

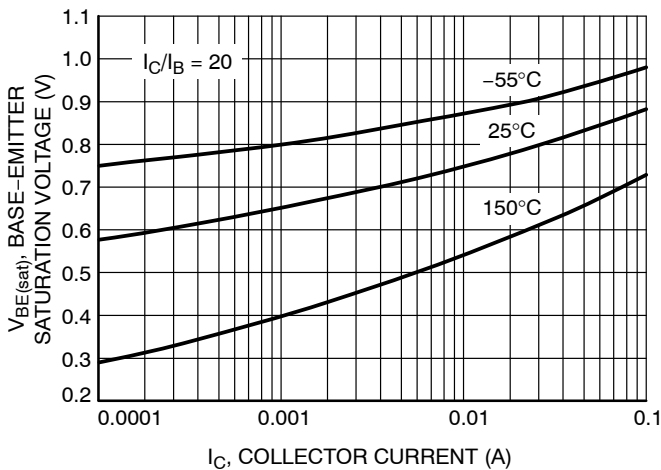


Figure 27. Base Emitter Saturation Voltage vs. Collector Current

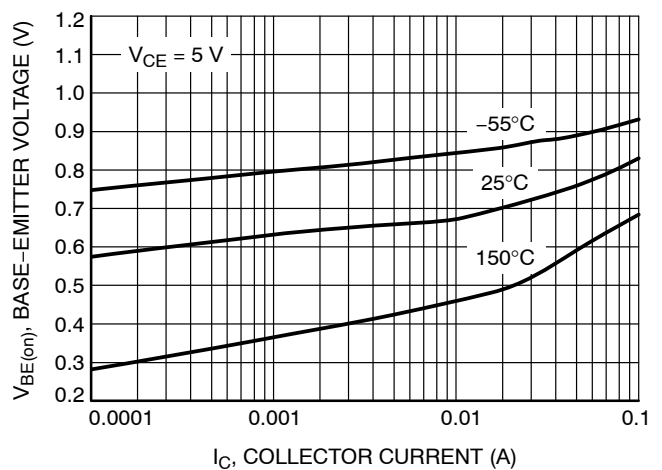


Figure 28. Base Emitter Voltage vs. Collector Current

LBC847C, LBC848C

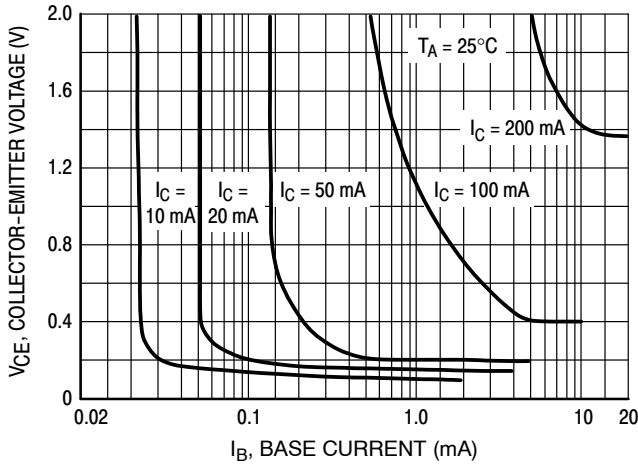


Figure 29. Collector Saturation Region

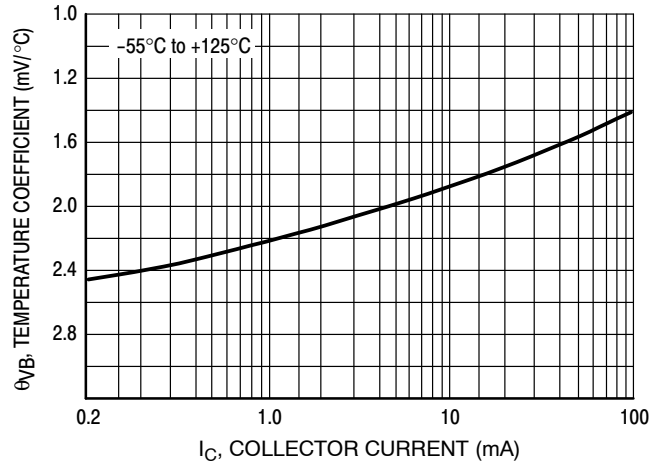


Figure 30. Base-Emitter Temperature Coefficient

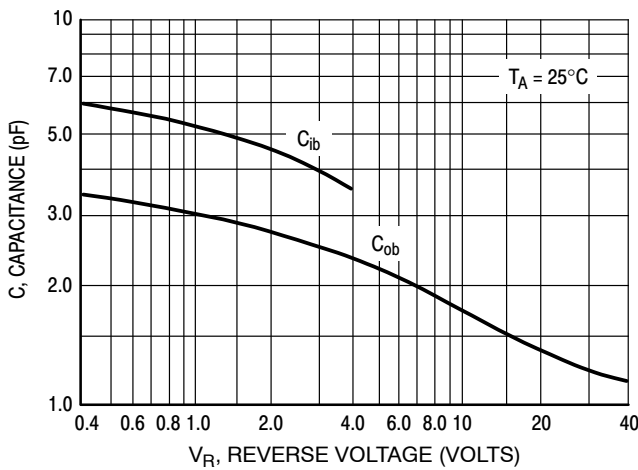


Figure 31. Capacitances

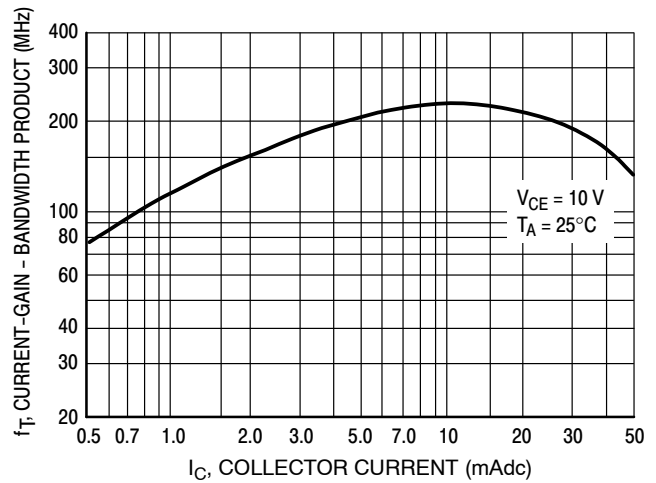


Figure 32. Current-Gain - Bandwidth Product

LBC846AWT1G, BWT1G, LBC847AWT1G, BWT1G, CWT1G, LBC848AWT1G, BWT1G, CWT1G
 S-LBC846AWT1G, BWT1G, S-LBC847AWT1G, BWT1G, CWT1G, S-LBC848AWT1G, BWT1G, CWT1G

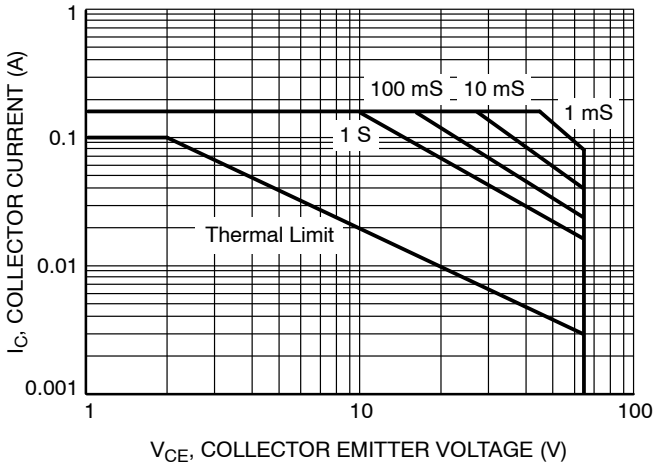


Figure 33. Safe Operating Area for LBC846A, LBC846B

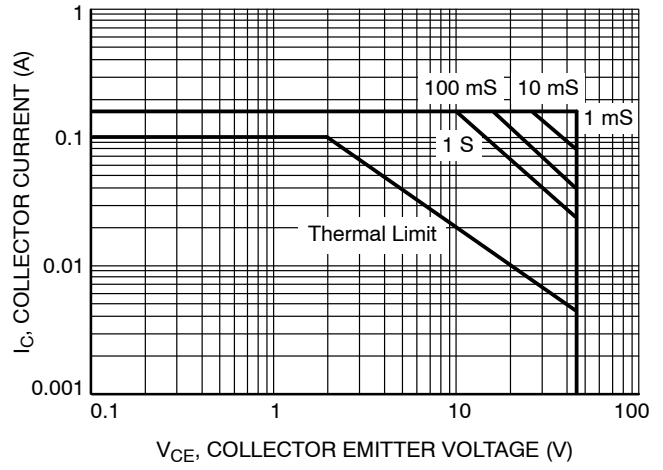


Figure 34. Safe Operating Area for LBC847A, LBC847B, LBC847C

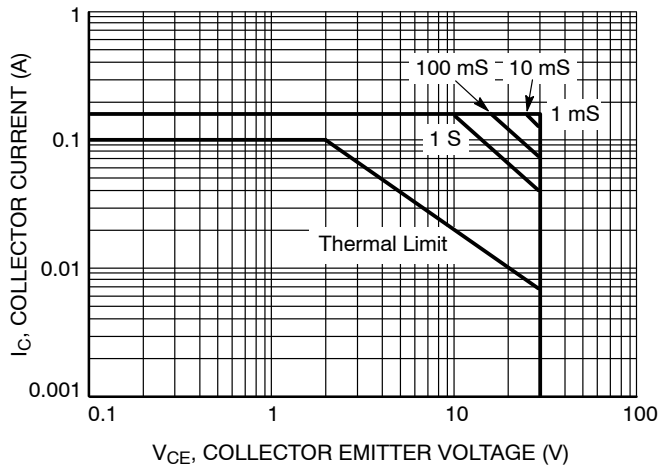
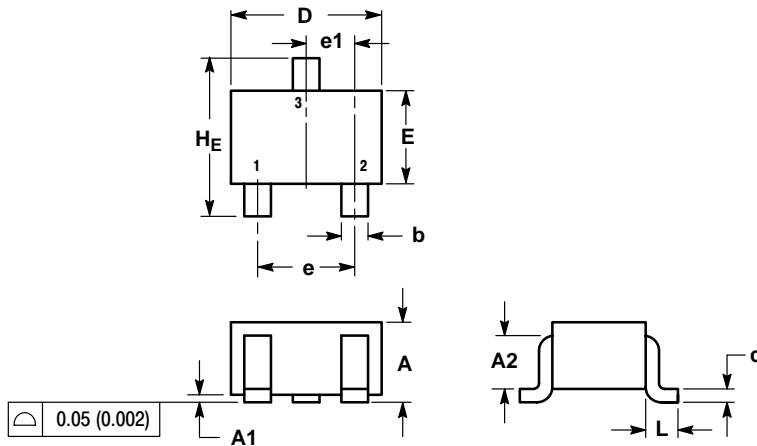


Figure 35. Safe Operating Area for LBC848A, LBC848B, LBC848C

LBC846AWT1G, BWT1G, LBC847AWT1G, BWT1G, CWT1G, LBC848AWT1G, BWT1G, CWT1G
 S-LBC846AWT1G, BWT1G, S-LBC847AWT1G, BWT1G, CWT1G, S-LBC848AWT1G, BWT1G, CWT1G

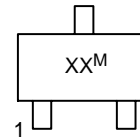
SC-70 / SOT-323



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

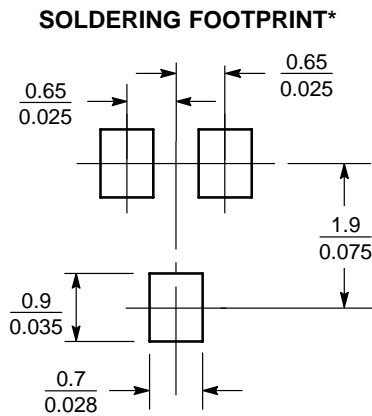
| DIM | MILLIMETERS | | | INCHES | | |
|-----|-------------|------|------|-----------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.80 | 0.90 | 1.00 | 0.032 | 0.035 | 0.040 |
| A1 | 0.00 | 0.05 | 0.10 | 0.000 | 0.002 | 0.004 |
| A2 | 0.7 REF | | | 0.028 REF | | |
| b | 0.30 | 0.35 | 0.40 | 0.012 | 0.014 | 0.016 |
| c | 0.10 | 0.18 | 0.25 | 0.004 | 0.007 | 0.010 |
| D | 1.80 | 2.10 | 2.20 | 0.071 | 0.083 | 0.087 |
| E | 1.15 | 1.24 | 1.35 | 0.045 | 0.049 | 0.053 |
| e | 1.20 | 1.30 | 1.40 | 0.047 | 0.051 | 0.055 |
| e1 | 0.65 BSC | | | 0.026 BSC | | |
| L | 0.425 REF | | | 0.017 REF | | |
| HE | 2.00 | 2.10 | 2.40 | 0.079 | 0.083 | 0.095 |

GENERIC MARKING DIAGRAM



XX = Specific Device Code
 M = Date Code
 ■ = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "■", may or may not be present.



SCALE 10:1 (mm/inches)