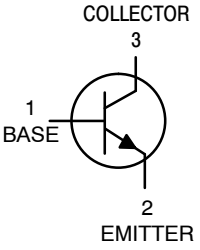
# BC817-16L, SBC817-16L, BC817-25L, SBC817-25L, BC817-40L, SBC817-40L

# General Purpose Transistors

## NPN Silicon

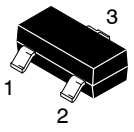
**ON Semiconductor®**

**http://onsemi.com**




### Features

- AEC−Q101 Qualified and PPAP Capable
- S Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant




**SOT−23**
**CASE 318**
**STYLE 6**

### MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Collector − Emitter Voltage | $V_{CEO}$ | 45 | V |
| Collector − Base Voltage | $V_{CBO}$ | 50 | V |
| Emitter − Base Voltage | $V_{EBO}$ | 5.0 | V |
| Collector Current − Continuous | $I_C$ | 500 | mAdc |

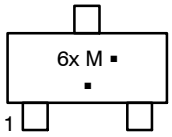
### THERMAL CHARACTERISTICS

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

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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.

### MARKING DIAGRAM




6x = Device Code
x = A, B, or C
M = Date Code*
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*Date Code orientation and/or overbar may vary depending upon manufacturing location.

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

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**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) | | $V_{(BR)CEO}$ | 45 | − | − | V |
| Collector − Emitter Breakdown Voltage ($V_{EB}$ = 0, $I_C$ = 10 μA) | | $V_{(BR)CES}$ | 50 | − | − | V |
| Emitter − Base Breakdown Voltage ($I_E$ = 1.0 μA) | | $V_{(BR)EBO}$ | 5.0 | − | − | V |
| Collector Cutoff Current | | $I_{CBO}$ | | | | |
| ($V_{CB}$ = 20 V) | | | − | − | 100 | nA |
| ($V_{CB}$ = 20 V, $T_A$ = 150°C) | | | − | − | 5.0 | μA |
| **ON CHARACTERISTICS** | | | | | | |
| DC Current Gain | | $h_{FE}$ | | | | − |
| ($I_C$ = 100 mA, $V_{CE}$ = 1.0 V) | BC817−16, SBC817−16 | | 100 | − | 250 | |
| | BC817−25, SBC817−25 | | 160 | − | 400 | |
| | BC817−40, SBC817−40 | | 250 | − | 600 | |
| ($I_C$ = 500 mA, $V_{CE}$ = 1.0 V) | | | 40 | − | − | |
| Collector − Emitter Saturation Voltage ($I_C$ = 500 mA, $I_B$ = 50 mA) | | $V_{CE(sat)}$ | − | − | 0.7 | V |
| Base − Emitter On Voltage ($I_C$ = 500 mA, $V_{CE}$ = 1.0 V) | | $V_{BE(on)}$ | − | − | 1.2 | V |
| **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) | | $C_{obo}$ | − | 10 | − | pF |

**ORDERING INFORMATION**

| Device | Specific Marking | Package | Shipping† |
|---|---|---|---|
| BC817−16LT1G | 6A | SOT−23 (Pb−Free) | 3000 / Tape & Reel |
| BC817−16LT3G | | | 10,000 / Tape & Reel |
| SBC817−16LT3 | | | |
| BC817−25LT1G | 6B | SOT−23 (Pb−Free) | 3000 / Tape & Reel |
| SBC817−25LT1G | | | |
| BC817−25LT3G | | | 10,000 / Tape & Reel |
| SBC817−25LT3G | | | |
| BC817−40LT1G | 6C | SOT−23 (Pb−Free) | 3000 / Tape & Reel |
| SBC817−40LT1G | | | |
| BC817−40LT3G | | | 10,000 / Tape & Reel |
| SBC817−40LT3G | | | |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

## TYPICAL CHARACTERISTICS − BC817−16L, SBC817−16L

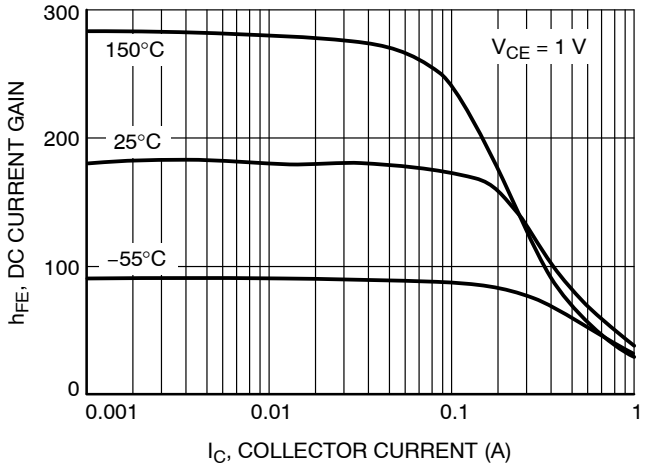



**Figure 1. DC Current Gain vs. Collector Current**

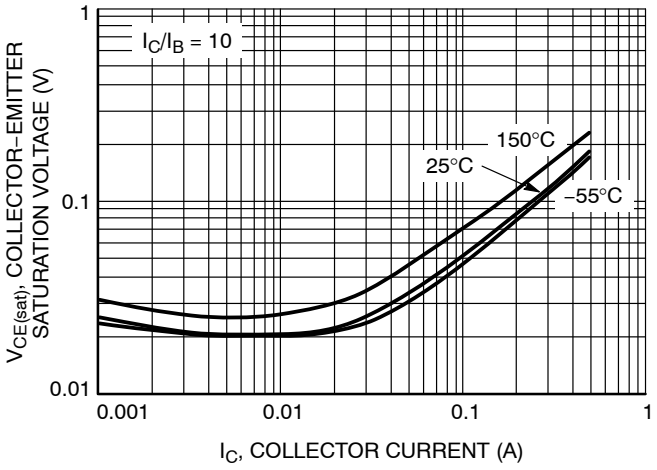



**Figure 2. Collector Emitter Saturation Voltage vs. Collector Current**

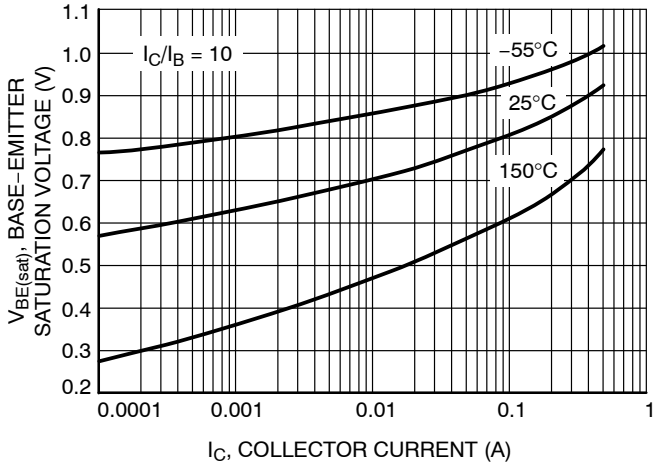



**Figure 3. Base Emitter Saturation Voltage vs. Collector Current**

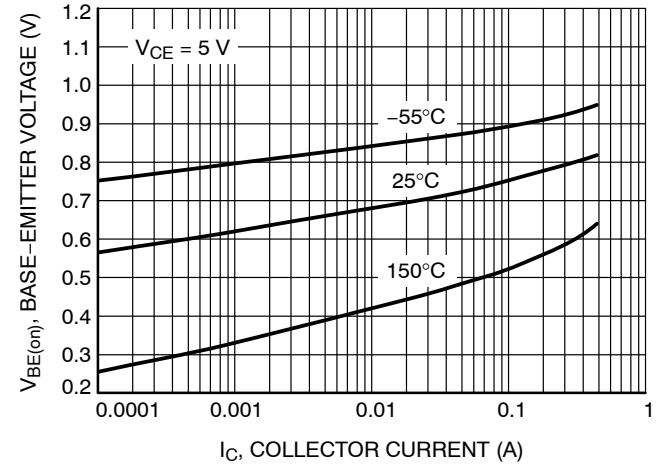



**Figure 4. Base Emitter Voltage vs. Collector Current**

## TYPICAL CHARACTERISTICS − BC817−16L, SBC817−16L

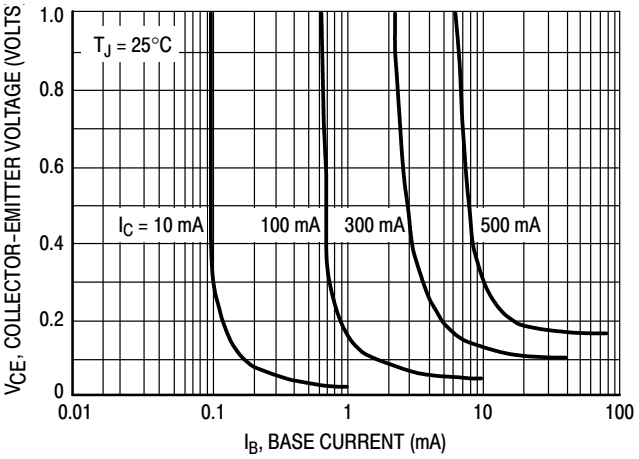



**Figure 5. Saturation Region**

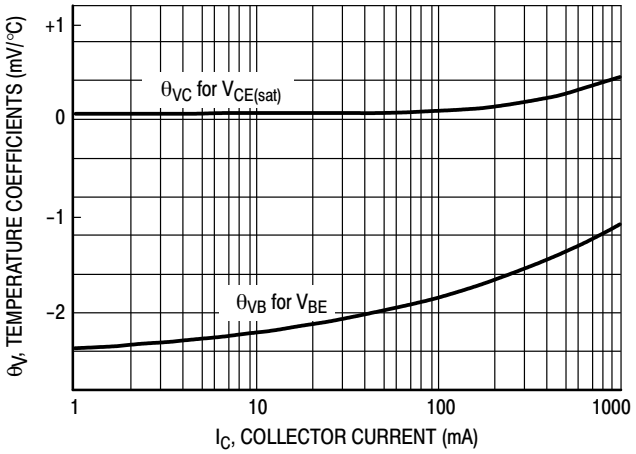



**Figure 6. Temperature Coefficients**

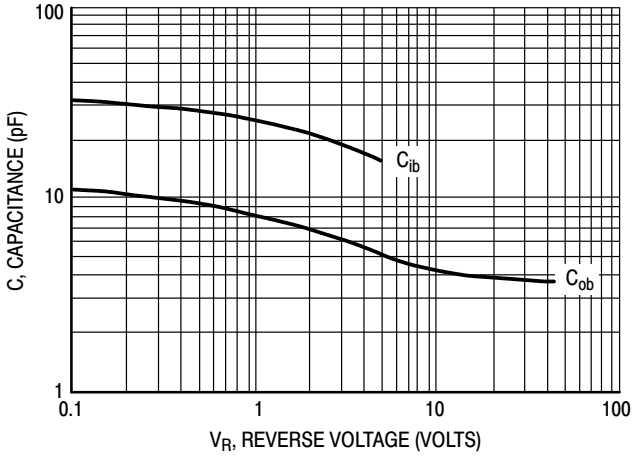



**Figure 7. Capacitances**

## TYPICAL CHARACTERISTICS − BC817−25L, SBC817−25L

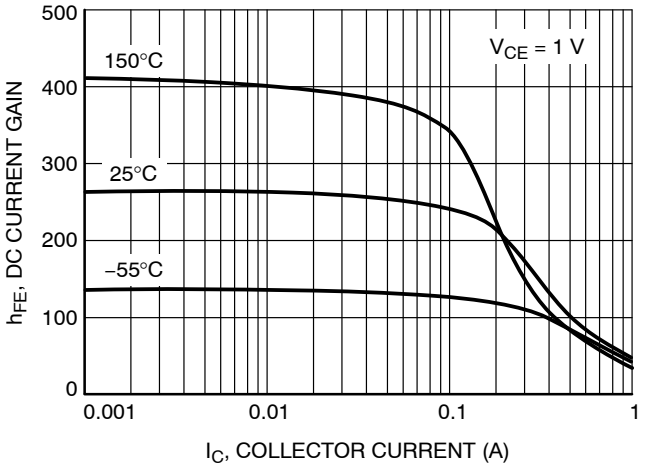



**Figure 8. DC Current Gain vs. Collector Current**

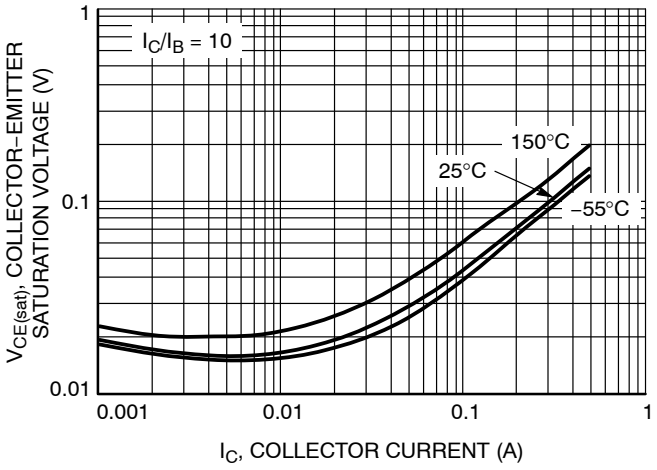



**Figure 9. Collector Emitter Saturation Voltage vs. Collector Current**

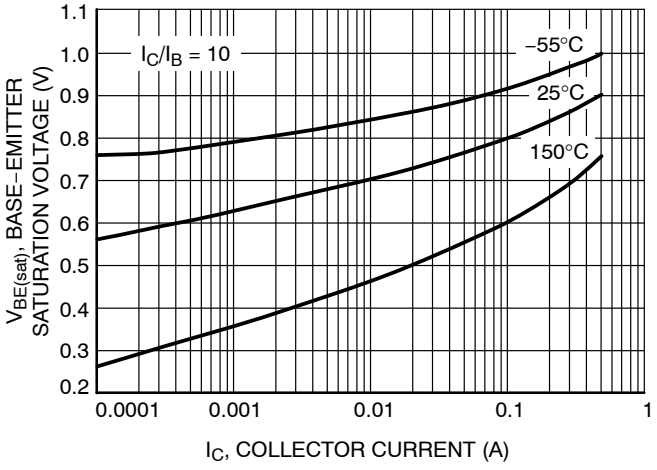



**Figure 10. Base Emitter Saturation Voltage vs. Collector Current**

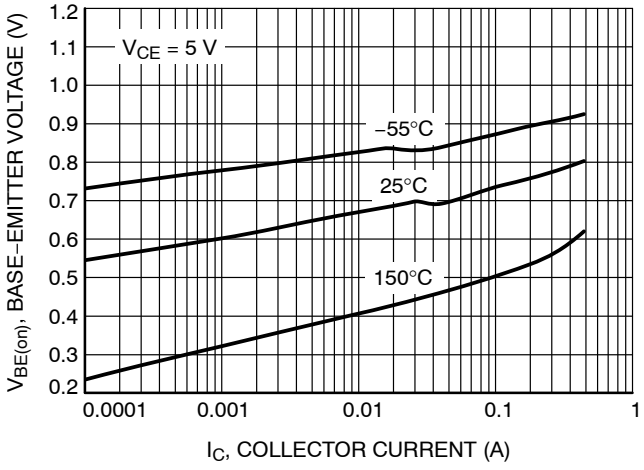



**Figure 11. Base Emitter Voltage vs. Collector Current**

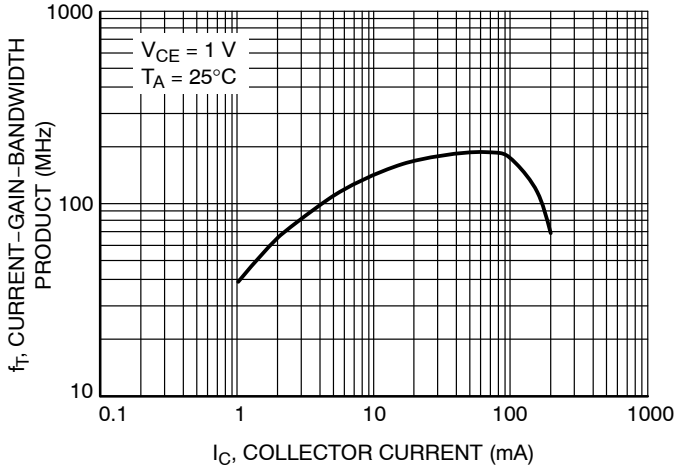



**Figure 12. Current Gain Bandwidth Product vs. Collector Current**

## TYPICAL CHARACTERISTICS − BC817−25L, SBC81725L

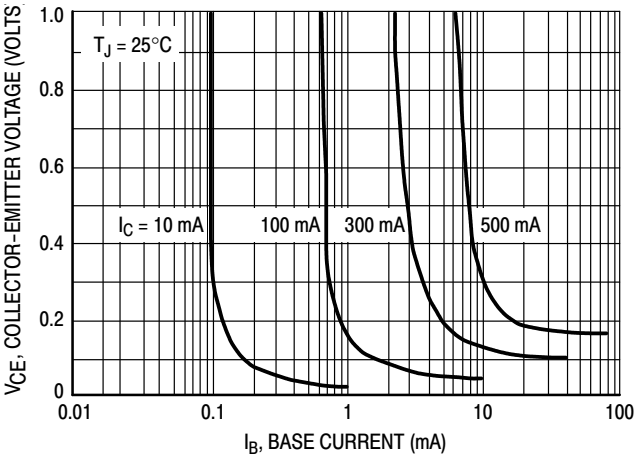



**Figure 13. Saturation Region**

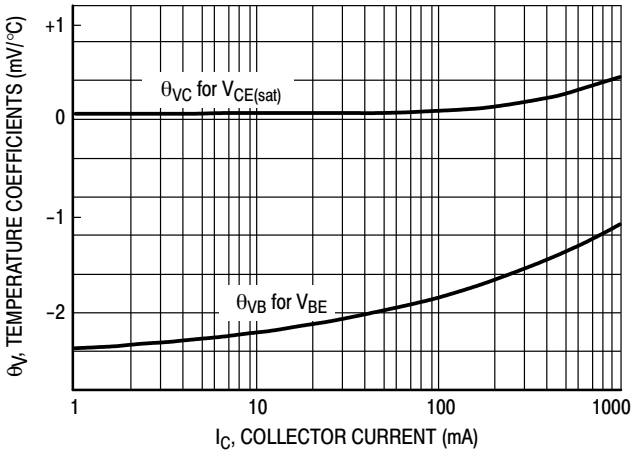



**Figure 14. Temperature Coefficients**

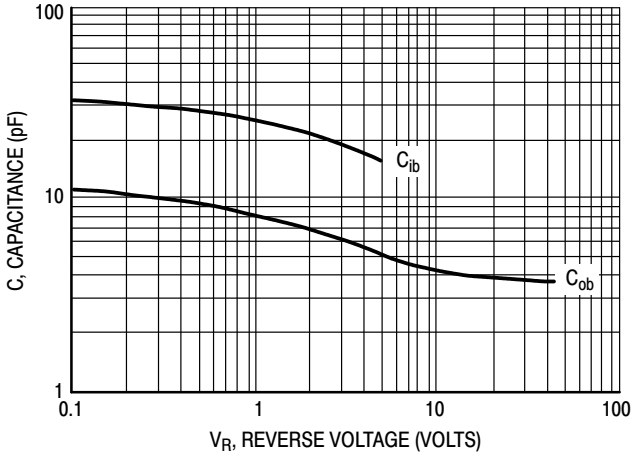



**Figure 15. Capacitances**

## TYPICAL CHARACTERISTICS − BC817−40L, SBC817−40L

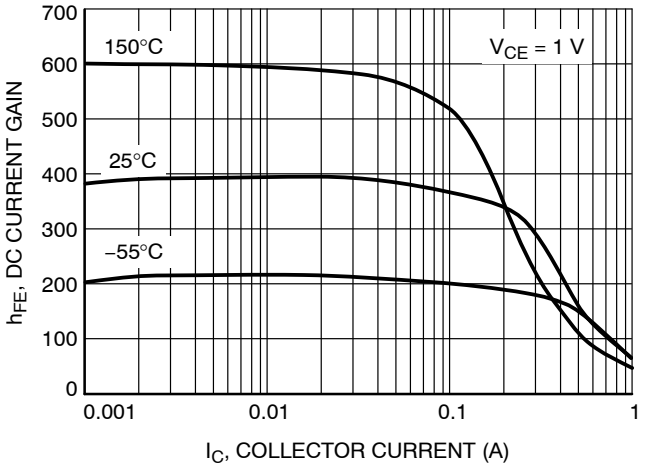



**Figure 16. DC Current Gain vs. Collector Current**

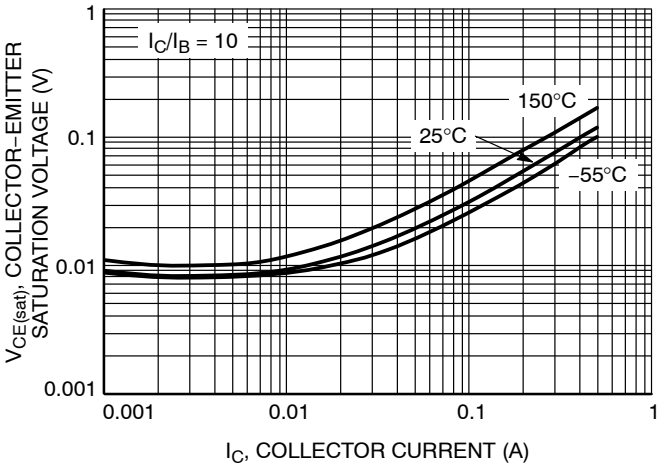



**Figure 17. Collector Emitter Saturation Voltage vs. Collector Current**

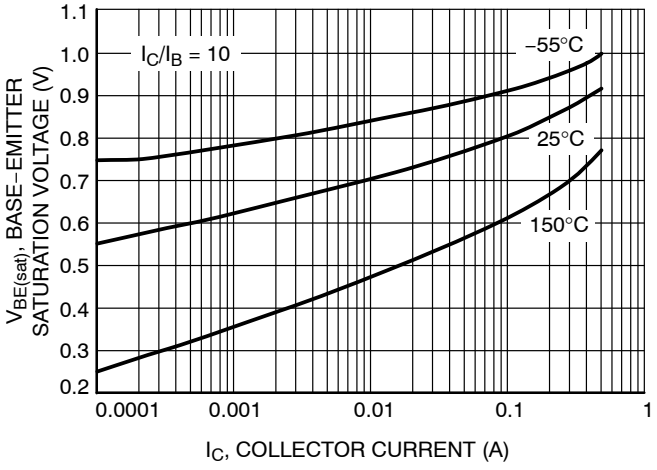



**Figure 18. Base Emitter Saturation Voltage vs. Collector Current**

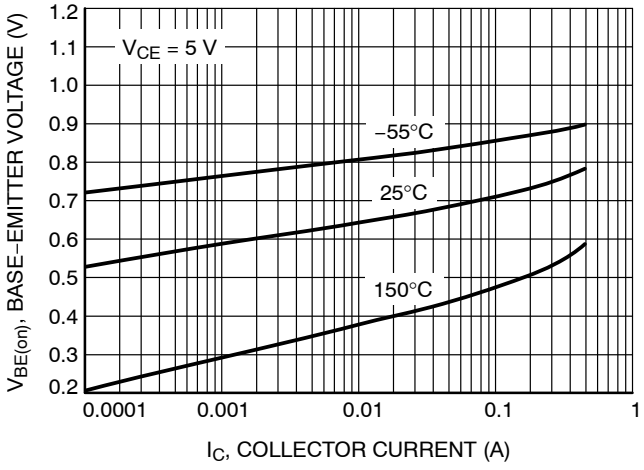



**Figure 19. Base Emitter Voltage vs. Collector Current**

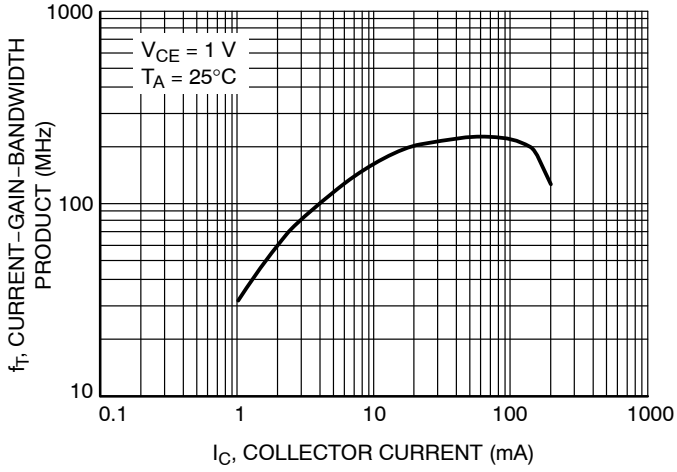



**Figure 20. Current Gain Bandwidth Product vs. Collector Current**

## TYPICAL CHARACTERISTICS − BC817−40L, SBC817−40L

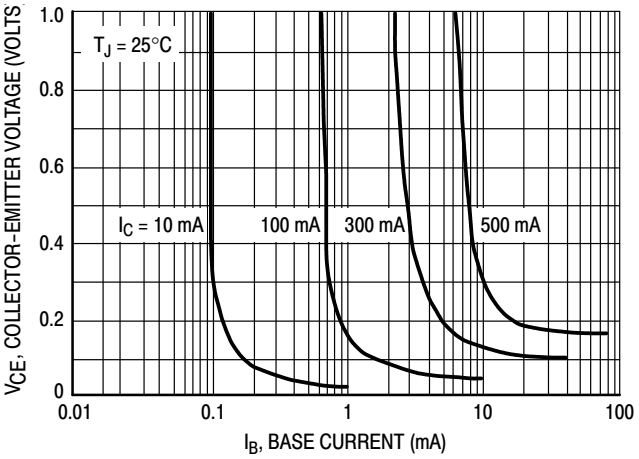



**Figure 21. Saturation Region**

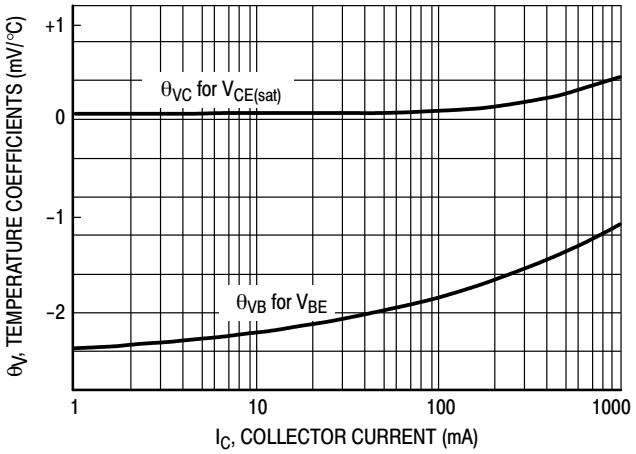



**Figure 22. Temperature Coefficients**

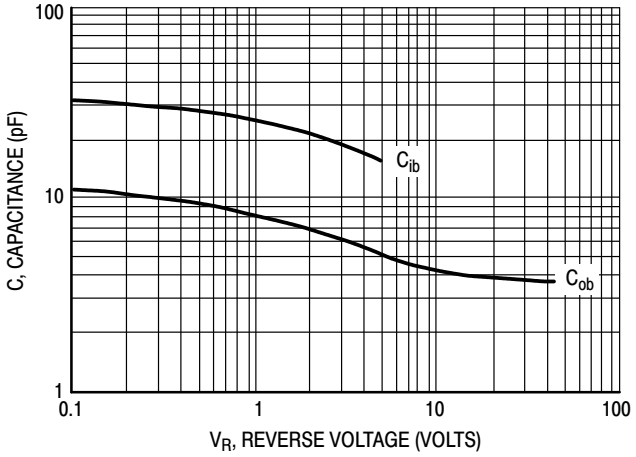



**Figure 23. Capacitances**

## TYPICAL CHARACTERISTICS − BC817−16L, SBC817−16L, BC817−25L, SBC817−25L, BC817−40L, SBC817−40L

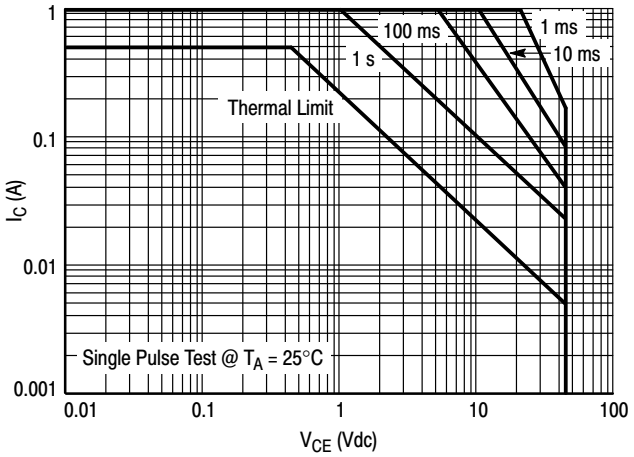
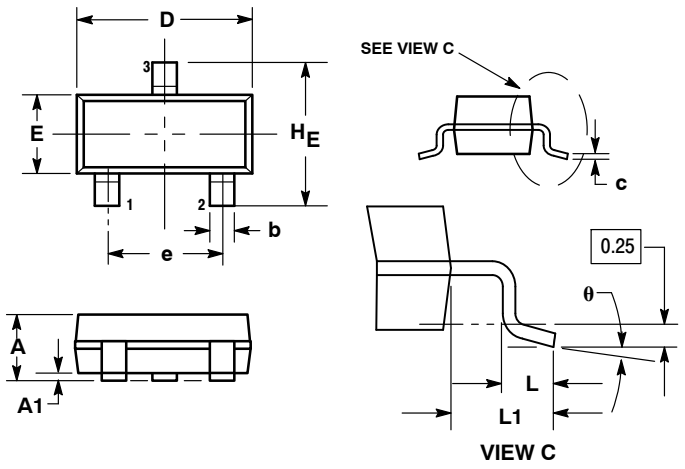



**Figure 24. Safe Operating Area**

## PACKAGE DIMENSIONS

**SOT−23 (TO−236)**
CASE 318−08
ISSUE AP

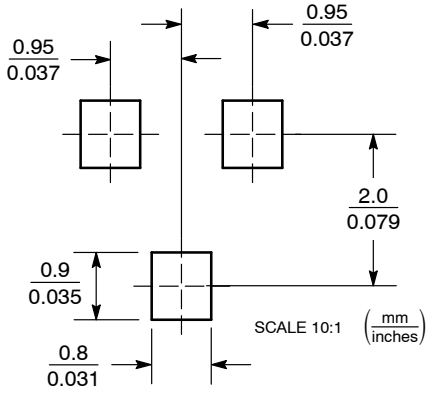



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

| | MILLIMETERS | | | INCHES | | |
|---|---|---|---|---|---|---|
| DIM | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.89 | 1.00 | 1.11 | 0.035 | 0.040 | 0.044 |
| A1 | 0.01 | 0.06 | 0.10 | 0.001 | 0.002 | 0.004 |
| b | 0.37 | 0.44 | 0.50 | 0.015 | 0.018 | 0.020 |
| c | 0.09 | 0.13 | 0.18 | 0.003 | 0.005 | 0.007 |
| D | 2.80 | 2.90 | 3.04 | 0.110 | 0.114 | 0.120 |
| E | 1.20 | 1.30 | 1.40 | 0.047 | 0.051 | 0.055 |
| e | 1.78 | 1.90 | 2.04 | 0.070 | 0.075 | 0.081 |
| L | 0.10 | 0.20 | 0.30 | 0.004 | 0.008 | 0.012 |
| L1 | 0.35 | 0.54 | 0.69 | 0.014 | 0.021 | 0.029 |
| $H_E$ | 2.10 | 2.40 | 2.64 | 0.083 | 0.094 | 0.104 |
| θ | 0° | −−− | 10° | 0° | −−− | 10° |

STYLE 6:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

### SOLDERING FOOTPRINT*




*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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**Fax**: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
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Phone: 81−3−5817−1050

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**BC817−16LT1/D**

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

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http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

**Офис по работе с юридическими лицами:**

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