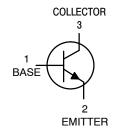


## **General Purpose Transistors**

**NPN Silicon** 

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





SOT-23 CASE 318 STYLE 6

#### **Features**

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

#### **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	Ic	500	mAdc

#### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board, (Note 1) T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub>	225 1.8	mW mW/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	556	°C/W
Total Device Dissipation Alumina Substrate, (Note 2)  T <sub>A</sub> = 25°C  Derate above 25°C	P <sub>D</sub>	300 2.4	mW mW/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	417	°C/W
Junction and Storage Temperature	T <sub>J</sub> , T <sub>stg</sub>	-65 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

- 1.  $FR-5 = 1.0 \times 0.75 \times 0.062$  in.
- 2. Alumina =  $0.4 \times 0.3 \times 0.024$  in 99.5% alumina.

#### **MARKING DIAGRAM**



6x = Device Codex = 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.

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

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

Characteristic	Symbol	Min	Тур	Max	Unit
OFF CHARACTERISTICS					
Collector – Emitter Breakdown Voltage (I <sub>C</sub> = 10 mA)	V <sub>(BR)CEO</sub>	45	_	_	V
Collector – Emitter Breakdown Voltage $(V_{EB}=0,I_{C}=10\mu\text{A})$	V <sub>(BR)CES</sub>	50	-	-	V
Emitter – Base Breakdown Voltage (I <sub>E</sub> = 1.0 μA)	V <sub>(BR)EBO</sub>	5.0	_	-	V
Collector Cutoff Current (V <sub>CB</sub> = 20 V) (V <sub>CB</sub> = 20 V, T <sub>A</sub> = 150°C)	Ісво	- -	_ 	100 5.0	nA μA
ON CHARACTERISTICS					
DC Current Gain $ (I_C = 100 \text{ mA}, \text{ V}_{CE} = 1.0 \text{ V}) \\ & \text{BC817-16}, \text{SBC817-16} \\ & \text{BC817-25}, \text{SBC817-25} \\ & \text{BC817-40}, \text{SBC817-40} \\ & \text{(I}_C = 500 \text{ mA}, \text{V}_{CE} = 1.0 \text{ V}) \\ \end{cases} $	h <sub>FE</sub>	100 160 250 40	- - -	250 400 600 –	=
Collector – Emitter Saturation Voltage (I <sub>C</sub> = 500 mA, I <sub>B</sub> = 50 mA)	V <sub>CE(sat)</sub>	-	-	0.7	V
Base – Emitter On Voltage (I <sub>C</sub> = 500 mA, V <sub>CE</sub> = 1.0 V)	V <sub>BE(on)</sub>	_	-	1.2	V
SMALL-SIGNAL CHARACTERISTICS					
Current – Gain – Bandwidth Product (I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 5.0 Vdc, f = 100 MHz)	f <sub>T</sub>	100	_	_	MHz
Output Capacitance (V <sub>CB</sub> = 10 V, f = 1.0 MHz)	C <sub>obo</sub>	-	10	_	pF

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

#### **ORDERING INFORMATION**

Device	Specific Marking	Package	Shipping <sup>†</sup>	
BC817-16LT1G			0000 /Table & Bard	
NSVBC817-16LT1G		SOT-23	3000 / Tape & Reel	
BC817-16LT3G	6A	(Pb-Free)	10.000 /Taxa 8 Paul	
SBC817-16LT3G			10,000 / Tape & Reel	
BC817-25LT1G		SOT-23 (Pb-Free)	3000 / Tape & Reel	
SBC817-25LT1G	20			
BC817-25LT3G	6B		40.000 /Taba 0 Bad	
SBC817-25LT3G			10,000 / Tape & Reel	
BC817-40LT1G		SOT-23	3000 / Tape & Reel	
SBC817-40LT1G				
BC817-40LT3G	6C	(Pb-Free)	40.000 /Taba 0 Bash	
SBC817-40LT3G			10,000 / Tape & Reel	

<sup>†</sup>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

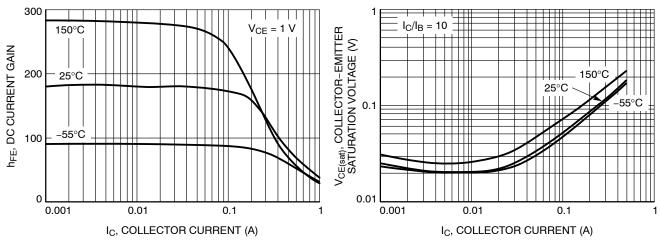


Figure 1. DC Current Gain vs. Collector Current

Figure 2. Collector Emitter Saturation Voltage vs. Collector Current

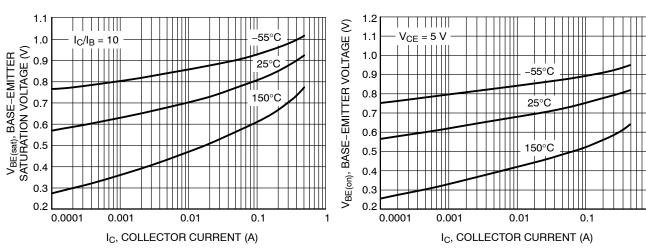


Figure 3. Base Emitter Saturation Voltage vs.
Collector Current

Figure 4. Base Emitter Voltage vs. Collector Current

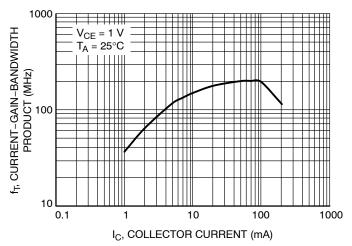
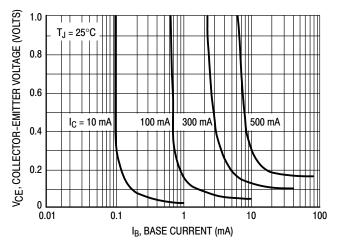


Figure 5. Current Gain Bandwidth Product vs. Collector Current

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



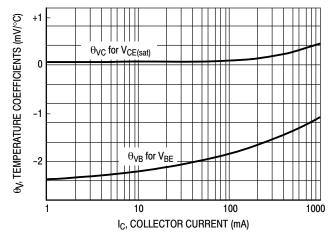


Figure 6. Saturation Region

Figure 7. Temperature Coefficients

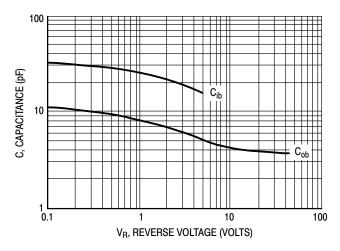


Figure 8. Capacitances

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

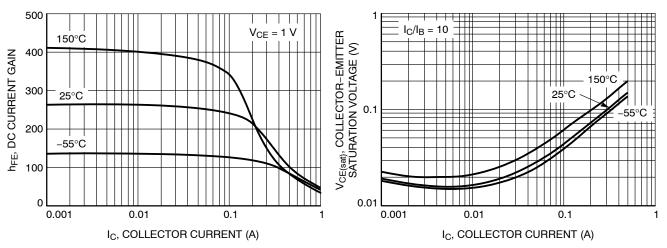


Figure 9. DC Current Gain vs. Collector Current

Figure 10. Collector Emitter Saturation Voltage vs. Collector Current

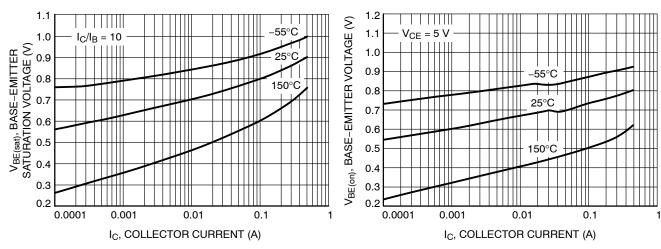


Figure 11. Base Emitter Saturation Voltage vs. Collector Current

Figure 12. Base Emitter Voltage vs. Collector Current

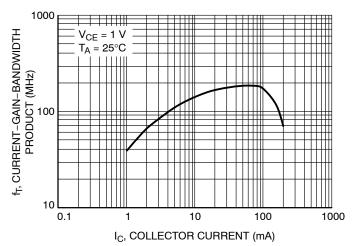
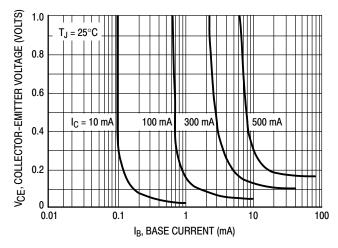


Figure 13. Current Gain Bandwidth Product vs. Collector Current

## TYPICAL CHARACTERISTICS - BC817-25L, SBC81725L



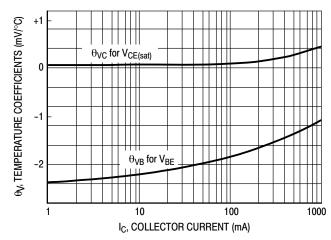


Figure 14. Saturation Region

Figure 15. Temperature Coefficients

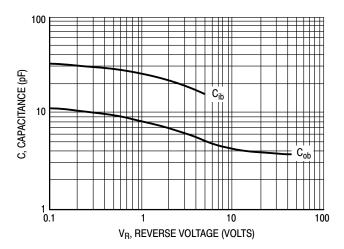


Figure 16. Capacitances

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

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

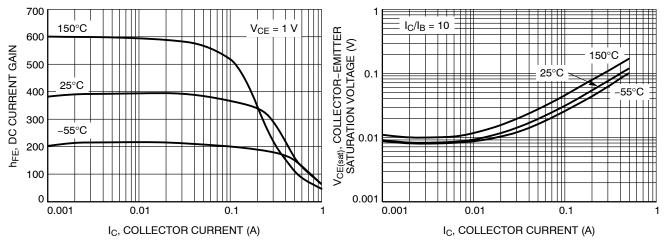


Figure 17. DC Current Gain vs. Collector Current

Figure 18. Collector Emitter Saturation Voltage vs. Collector Current

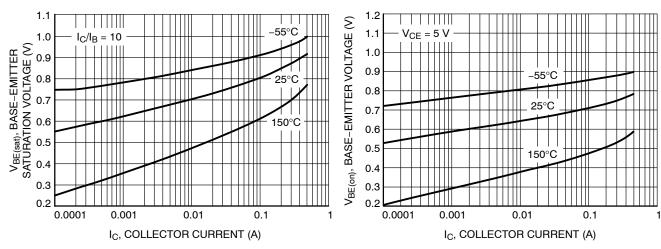


Figure 19. Base Emitter Saturation Voltage vs. Collector Current

Figure 20. Base Emitter Voltage vs. Collector Current

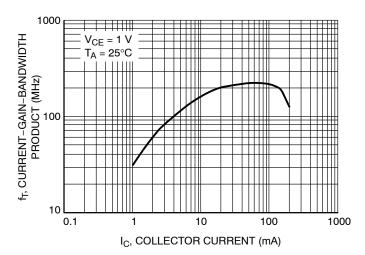
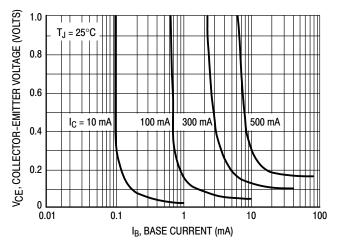


Figure 21. Current Gain Bandwidth Product vs. Collector Current

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



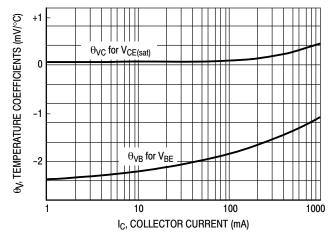


Figure 22. Saturation Region

Figure 23. Temperature Coefficients

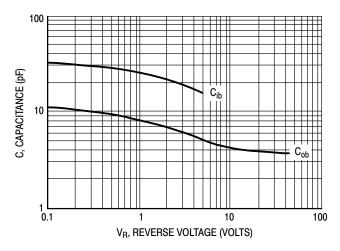


Figure 24. Capacitances

TYPICAL CHARACTERISTICS - BC817-16L, SBC817-16L, BC817-25L, SBC817-25L, BC817-40L, SBC817-40L

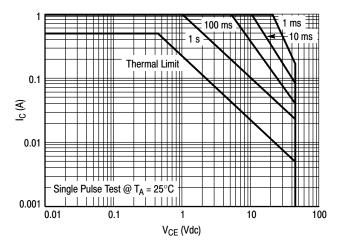


Figure 25. Safe Operating Area



SOT-23 (TO-236) CASE 318-08 **ISSUE AS** 

**DATE 30 JAN 2018** 

0.017

0.021

0.094

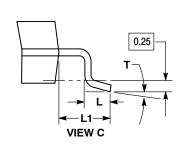
0.022

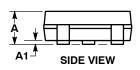
0.027

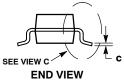
0.104

10°

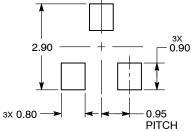
# SCALE 4:1 D Ε – 3X h **TOP VIEW**







#### **RECOMMENDED SOLDERING FOOTPRINT**



DIMENSIONS: MILLIMETERS

PIN 1. RETURN

3. INPUT

3. ANODE

STYLE 28: PIN 1. ANODE 2. ANODE

2. OUTPUT

#### NOTES:

0.43

0.54

2.40

0.30

0.35

2.10

0°

ΗE

- NOTES:
  1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
  2. CONTROLLING DIMENSION: MILLIMETERS.
  3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH.
  MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE 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
Α	0.89	1.00	1.11	0.035	0.039	0.044
A1	0.01	0.06	0.10	0.000	0.002	0.004
b	0.37	0.44	0.50	0.015	0.017	0.020
С	0.08	0.14	0.20	0.003	0.006	0.008
D	2.80	2.90	3.04	0.110	0.114	0.120
Е	1.20	1.30	1.40	0.047	0.051	0.055
9	1 78	1 90	2 04	0.070	0.075	0.080

0.55

0.69

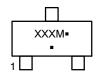
2.64

#### 10° 0° **GENERIC MARKING DIAGRAM\***

0.012

0.014

0.083



XXX = Specific Device Code

= Date Code

PIN 1. ANODE 2. CATHODE

3. GATE

= 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.

STYLE 1 THRU 5: CANCELLED	STYLE 6: PIN 1. BASE 2. EMITTER 3. COLLECTOR	STYLE 7: PIN 1. EMITTER 2. BASE 3. COLLECTOR	STYLE 8: PIN 1. ANODE 2. NO CONNECTION 3. CATHODE	N	
STYLE 9:	STYLE 10:	STYLE 11:	STYLE 12: PIN 1. CATHODE 2. CATHODE 3. ANODE	STYLE 13:	STYLE 14:
PIN 1. ANODE	PIN 1. DRAIN	PIN 1. ANODE		PIN 1. SOURCE	PIN 1. CATHODE
2. ANODE	2. SOURCE	2. CATHODE		2. DRAIN	2. GATE
3. CATHODE	3. GATE	3. CATHODE-ANODE		3. GATE	3. ANODE
STYLE 15:	STYLE 16:	STYLE 17:	STYLE 18:	STYLE 19:	STYLE 20:
PIN 1. GATE	PIN 1. ANODE	PIN 1. NO CONNECTION	PIN 1. NO CONNECTION	N PIN 1. CATHODE	PIN 1. CATHODE
2. CATHODE	2. CATHODE	2. ANODE	2. CATHODE	2. ANODE	2. ANODE
3. ANODE	3. CATHODE	3. CATHODE	3. ANODE	3. CATHODE-ANODE	3. GATE
STYLE 21:	STYLE 22:	STYLE 23:	STYLE 24:	STYLE 25:	STYLE 26:

PIN 1. ANODE

ANODE

CATHODE

DOCUMENT NUMBER:	98ASB42226B	Electronic versions are uncontrolled except when accessed directly from the Document Reposi Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.	
DESCRIPTION:	SOT-23 (TO-236)		PAGE 1 OF 1

PIN 1. GATE 2. DRAIN

3. SOURCE

ON Semiconductor and unare trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. ON Semiconductor does not convey any license under its patent rights nor the rights of others.

PIN 1. GATE

2. SOURCE

3. CATHODE

DRAIN

STYLE 27: PIN 1. CATHODE 2. CATHODE

PIN 1. CATHODE 2. ANODE

3. NO CONNECTION

onsemi, ONSEMI, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "onsemi" or its affiliates and/or subsidiaries in the United States and/or other countries. onsemi owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of onsemi's product/patent coverage may be accessed at <a href="www.onsemi.com/site/pdf/Patent-Marking.pdf">www.onsemi.com/site/pdf/Patent-Marking.pdf</a>. Onsemi reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and onsemi makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using onsemi products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications provided by onsemi. "Typical" parameters which may be provided in onsemi data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. onsemi does not convey any license under any of its intellectual property rights nor the rights of others. onsemi products are not designed, intended, or authorized for use as a critical component in life support systems or any EDA class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer pu

#### **PUBLICATION ORDERING INFORMATION**

LITERATURE FULFILLMENT:
Email Requests to: orderlit@onsemi.com

onsemi Website: www.onsemi.com

TECHNICAL SUPPORT North American Technical Support: Voice Mail: 1 800-282-9855 Toll Free USA/Canada Phone: 011 421 33 790 2910

Europe, Middle East and Africa Technical Support:

Phone: 00421 33 790 2910

For additional information, please contact your local Sales Representative