

# 45 V, 0.5 A, General Purpose NPN Transistor

## BC817-40W

onsemi's BC817-40W is a General Purpose NPN Transistor that is housed in the SC-70/SOT-323 package.

### Features

- NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- This Device is Pb-Free, Halogen Free/BFR Free and is RoHS Compliant

### MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

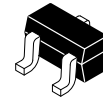
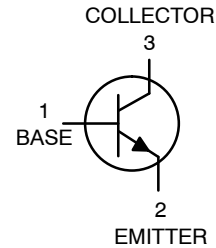
| Rating                         | Symbol    | Value | Unit |
|--------------------------------|-----------|-------|------|
| Collector – Emitter Voltage    | $V_{CEO}$ | 45    | V    |
| Collector – Base Voltage       | $V_{CBO}$ | 50    | V    |
| Emitter – Base Voltage         | $V_{EBO}$ | 5.0  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

### THERMAL CHARACTERISTICS

| Characteristic                                   | Symbol          | Max         | Unit                      |
|--------------------------------------------------|-----------------|-------------|---------------------------|
| Total Device Dissipation (Note 1)                | $P_D$           | 460         | mW                        |
| Thermal Resistance, Junction-to-Ambient (Note 1) | $R_{\theta JA}$ | 272         | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range           | $T_J, T_{stg}$  | -55 to +150 | $^\circ\text{C}$          |

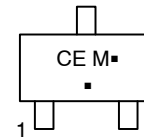
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. FR-4 Board, 1 oz. Cu, 100 mm<sup>2</sup>.



SC-70  
CASE 419  
STYLE 3

### MARKING DIAGRAM



CE = Specific Device Code  
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 on page 2 of this data sheet.

# BC817-40W

## ORDERING INFORMATION

| Device                                                                     | Marking | Package                      | Shipping <sup>†</sup> |
|----------------------------------------------------------------------------|---------|------------------------------|-----------------------|
| BC817-40WT1G<br>BC817-40WT1G-NC<br>NSVBC817-40WT1G*<br>NSVBC817-40WT1G-NC* | CE      | SC-70 (SOT-323)<br>(Pb-Free) | 3,000 / Tape & Reel   |

† 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](#).

\* S, V and NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

### OFF CHARACTERISTICS

|                                                                                                           |                      |     |   |            |          |
|-----------------------------------------------------------------------------------------------------------|----------------------|-----|---|------------|----------|
| Collector - Emitter Breakdown Voltage<br>(I <sub>C</sub> = 10 mA)                                         | V <sub>(VR)CEO</sub> | 45  | - | -          | V        |
| Collector - Emitter Breakdown Voltage<br>(V <sub>EB</sub> = 0 V, I <sub>C</sub> = 10 μA)                  | V <sub>(VR)CES</sub> | 50  | - | -          | V        |
| Emitter - Base Breakdown Voltage<br>(I <sub>E</sub> = 1.0 μA)                                             | V <sub>(VR)EBO</sub> | 5.0 | - | -          | V        |
| Collector Cutoff Current<br>(V <sub>CB</sub> = 20 V)<br>(V <sub>CB</sub> = 20 V, T <sub>A</sub> = 150 °C) | I <sub>CBO</sub>     | -   | - | 100<br>5.0 | nA<br>μA |

### ON CHARACTERISTICS

|                                                                                                                                      |                      |           |        |          |   |
|--------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------|--------|----------|---|
| DC Current Gain (Note 2)<br>(I <sub>C</sub> = 100 mA, V <sub>CE</sub> = 1.0 V)<br>(I <sub>C</sub> = 500 mA, V <sub>CE</sub> = 1.0 V) | h <sub>FE</sub>      | 250<br>40 | -<br>- | 600<br>- | - |
| Collector - Emitter Saturation Voltage (Note 2)<br>(I <sub>C</sub> = 500 mA, I <sub>B</sub> = 50 mA)                                 | V <sub>CE(sat)</sub> | -         | -      | 0.7      | V |
| Base - Emitter On Voltage (Note 2)<br>(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<br>(I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 5.0 V, f = 100 MHz) | f <sub>T</sub>   | 100 | -  | - | MHz |
| Output Capacitance<br>(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.

2. Pulse Condition: Pulse Width = 300 μsec, Duty Cycle ≤ 2%



## TYPICAL CHARACTERISTICS

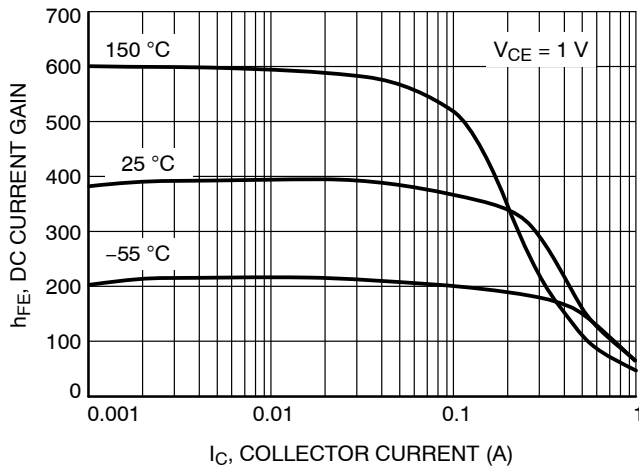


Figure 1. DC Current Gain vs. Collector Current

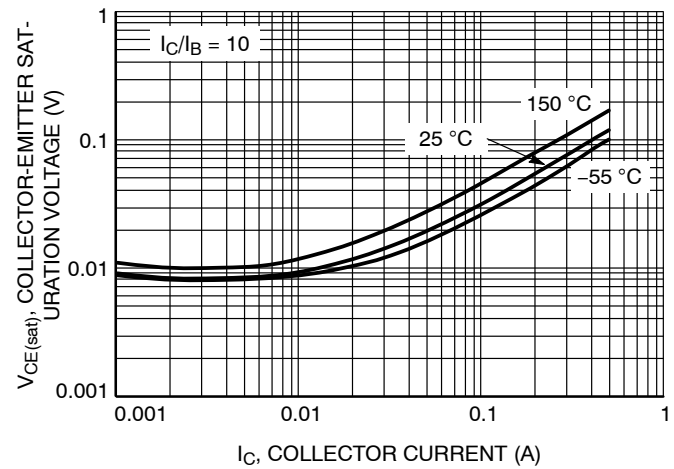


Figure 2. Collector Emitter Saturation Voltage vs. Collector Current

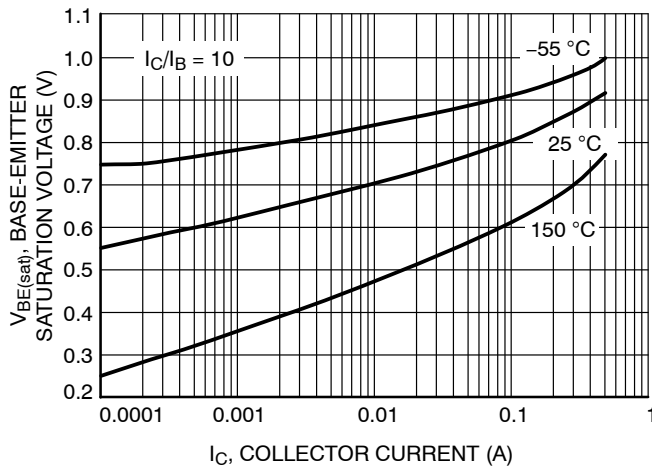


Figure 3. Base Emitter Saturation Voltage vs. Collector Current

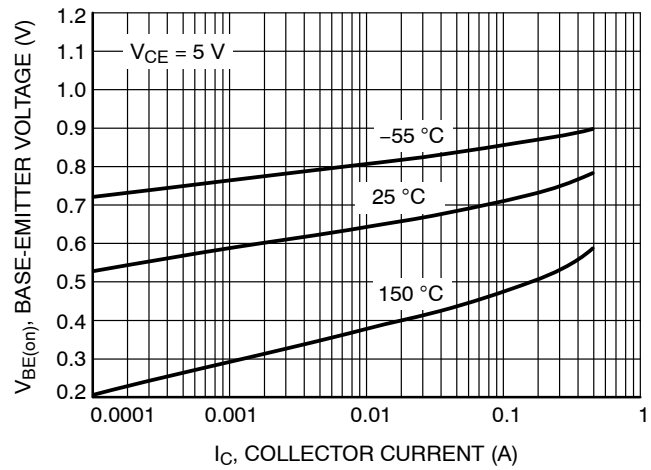


Figure 4. Base Emitter Voltage vs. Collector Current

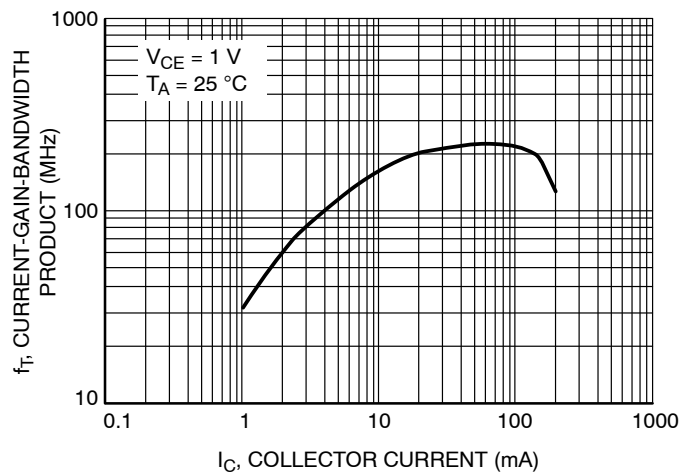


Figure 5. Current Gain Bandwidth Product vs. Collector Current

TYPICAL CHARACTERISTICS (continued)

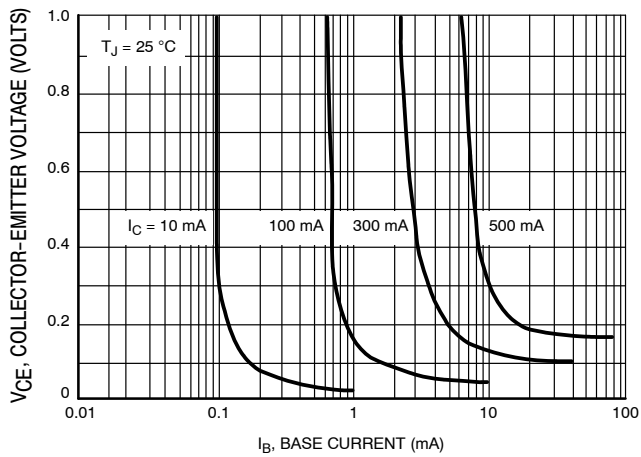


Figure 6. Saturation Region

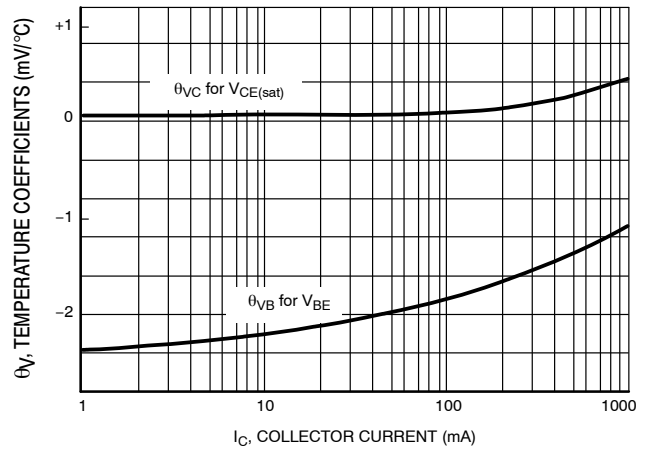


Figure 7. Temperature Coefficients

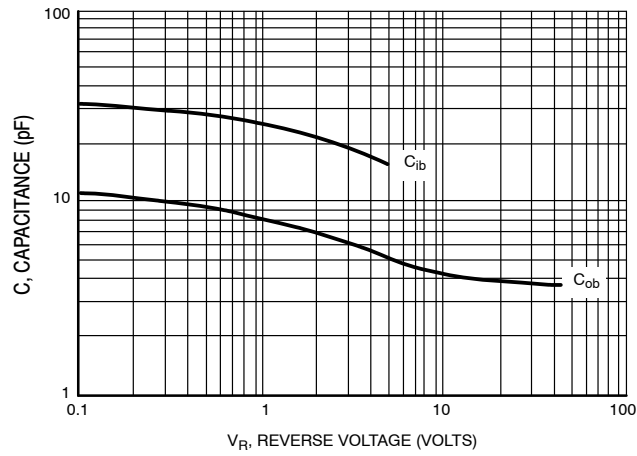


Figure 8. Capacitances

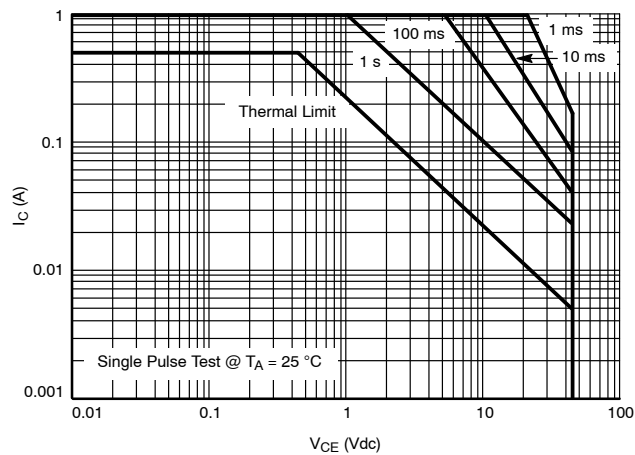


Figure 9. Safe Operating Area

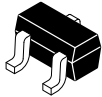
## BC817-40W

### REVISION HISTORY

| Revision | Description of Changes           | Date      |
|----------|----------------------------------|-----------|
| 4        | Added "-NC" OPNs to order table. | 10/2/2026 |

This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.

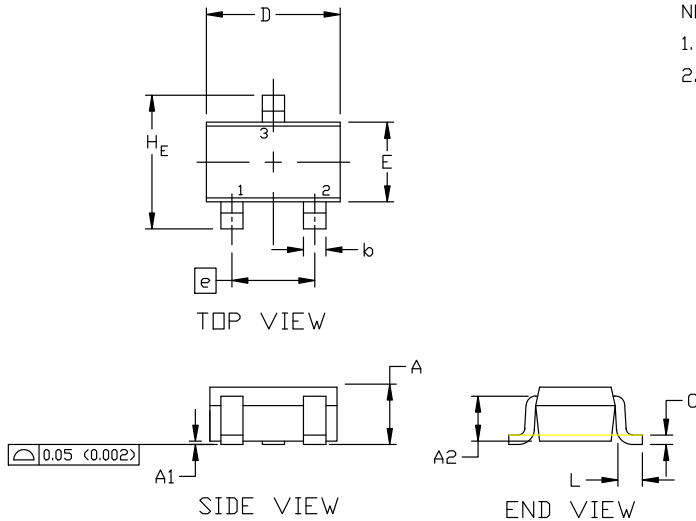




SCALE 4:1

SC-70 (SOT-323)  
CASE 419  
ISSUE R

DATE 11 OCT 2022

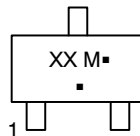


NOTES:

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

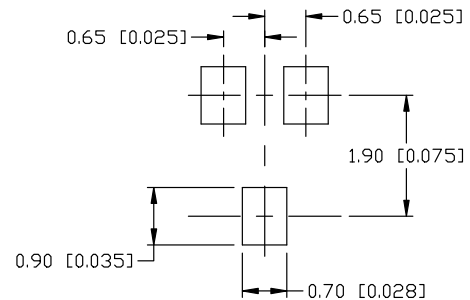
| DIM            | MILLIMETERS |      |      | INCHES    |       |       |
|----------------|-------------|------|------|-----------|-------|-------|
|                | MIN.        | NOM. | MAX. | MIN.      | NOM.  | MAX.  |
| A              | 0.80        | 0.90 | 1.00 | 0.032     | 0.035 | 0.040 |
| A1             | 0.00        | 0.05 | 0.10 | 0.000     | 0.002 | 0.004 |
| A2             | 0.70 REF    |      |      | 0.028 BSC |       |       |
| 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        | 2.00 | 2.20 | 0.071     | 0.080 | 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              | 0.20        | 0.38 | 0.56 | 0.008     | 0.015 | 0.022 |
| H <sub>E</sub> | 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. Some products may not follow the Generic Marking.



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

SOLDERING FOOTPRINT

STYLE 1:  
CANCELLED

STYLE 2:  
PIN 1. ANODE  
2. N.C.  
3. CATHODE

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

STYLE 4:  
PIN 1. CATHODE  
2. CATHODE  
3. ANODE

STYLE 5:  
PIN 1. ANODE  
2. ANODE  
3. CATHODE

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

STYLE 7:  
PIN 1. BASE  
2. EMITTER  
3. COLLECTOR

STYLE 8:  
PIN 1. GATE  
2. SOURCE  
3. DRAIN

STYLE 9:  
PIN 1. ANODE  
2. CATHODE  
3. CATHODE-ANODE

STYLE 10:  
PIN 1. CATHODE  
2. ANODE  
3. ANODE-CATHODE

STYLE 11:  
PIN 1. CATHODE  
2. CATHODE  
3. CATHODE

|                  |                 |                                                                                                                                                                                  |
|------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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| DESCRIPTION:     | SC-70 (SOT-323) | PAGE 1 OF 1                                                                                                                                                                      |

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