

# BC640-016G

## High Current Transistors

### PNP Silicon

#### Features

- This is a Pb-Free Device

#### MAXIMUM RATINGS

| Rating   | Symbol         | Value       | Unit                       |
|--|----------------|-------------|----------------------------|
| Collector-Emitter Voltage  | $V_{CEO}$      | -80         | Vdc                        |
| Collector-Base Voltage   | $V_{CBO}$      | -80         | Vdc                        |
| Emitter-Base Voltage   | $V_{EBO}$      | -5.0        | Vdc                        |
| Collector Current - Continuous   | $I_C$          | -0.5        | Adc                        |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 625<br>5.0  | mW<br>mW/ $^\circ\text{C}$ |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 1.5<br>12   | W<br>mW/ $^\circ\text{C}$  |
| Operating and Storage Junction<br>Temperature Range                                    | $T_J, T_{stg}$ | -55 to +150 | $^\circ\text{C}$           |

#### THERMAL CHARACTERISTICS

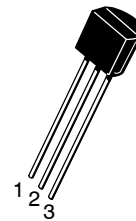
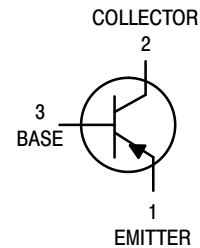
| Characteristic                          | Symbol          | Max  | Unit                      |
|---|-----------------|------|---------------------------|
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 200  | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction-to-Case    | $R_{\theta JC}$ | 83.3 | $^\circ\text{C}/\text{W}$ |

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.



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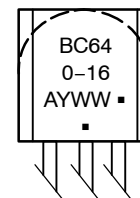
<http://onsemi.com>



TO-92  
CASE 29  
STYLE 14

STRAIGHT LEAD  
BULK PACK

#### MARKING DIAGRAMS



A = Assembly Location  
Y = Year  
WW = Work Week  
▪ = Pb-Free Package  
(Note: Microdot may be in either location)

#### ORDERING INFORMATION

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

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

## BC640-016G

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

| Characteristic   | Symbol        | Min  | Typ | Max         | Unit                |
|--|---------------|------|-----|-------------|---------------------|
| <b>OFF CHARACTERISTICS</b>   |               |      |     |             |                     |
| Collector – Emitter Breakdown Voltage<br>( $I_C = -10\text{ mA}$ , $I_B = 0$ )   | $V_{(BR)CEO}$ | -80  | -   | -           | Vdc                 |
| Collector – Base Breakdown Voltage<br>( $I_C = -100\text{ }\mu\text{A}$ , $I_E = 0$ )  | $V_{(BR)CBO}$ | -80  | -   | -           | Vdc                 |
| Emitter – Base Breakdown Voltage<br>( $I_E = -10\text{ }\mu\text{A}$ , $I_C = 0$ )   | $V_{(BR)EBO}$ | -5.0 | -   | -           | Vdc                 |
| Collector Cutoff Current<br>( $V_{CB} = -30\text{ Vdc}$ , $I_E = 0$ )<br>( $V_{CB} = -30\text{ Vdc}$ , $I_E = 0$ , $T_A = 125^\circ\text{C}$ ) | $I_{CBO}$     | -    | -   | -100<br>-10 | nA<br>$\mu\text{A}$ |

### ON CHARACTERISTICS (Note 1)

|  |               |                 |             |               |     |
|--|---------------|-----------------|-------------|---------------|-----|
| DC Current Gain<br>( $I_C = -5.0\text{ mA}$ , $V_{CE} = -2.0\text{ Vdc}$ )<br>( $I_C = -150\text{ mA}$ , $V_{CE} = -2.0\text{ Vdc}$ )<br>( $I_C = -500\text{ mA}$ , $V_{CE} = -2.0\text{ V}$ ) | $h_{FE}$      | 25<br>100<br>25 | -<br>-<br>- | -<br>250<br>- | -   |
| Collector – Emitter Saturation Voltage<br>( $I_C = -500\text{ mA}$ , $I_B = -50\text{ mA}$ )   | $V_{CE(sat)}$ | -               | -0.25       | -0.5          | Vdc |
| Base – Emitter On Voltage<br>( $I_C = -500\text{ mA}$ , $V_{CE} = -2.0\text{ Vdc}$ )   | $V_{BE(on)}$  | -               | -           | -1.0          | Vdc |

### DYNAMIC CHARACTERISTICS

|   |          |   |     |   |     |
|---|----------|---|-----|---|-----|
| Current Gain – Bandwidth Product<br>( $I_C = -50\text{ mA}$ , $V_{CE} = -2.0\text{ Vdc}$ , $f = 100\text{ MHz}$ ) | $f_T$    | - | 150 | - | MHz |
| Output Capacitance<br>( $V_{CB} = -10\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )                            | $C_{ob}$ | - | 9.0 | - | pF  |
| Input Capacitance<br>( $V_{EB} = -0.5\text{ Vdc}$ , $I_C = 0$ , $f = 1.0\text{ MHz}$ )                            | $C_{ib}$ | - | 110 | - | pF  |

1. Pulse Test: Pulse Width  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle 2.0%.

### ORDERING INFORMATION

| Device     | Package            | Shipping          |
|------------|--------------------|-------------------|
| BC640-016G | TO-92<br>(Pb-Free) | 5000 Units / Bulk |

# BC640-016G

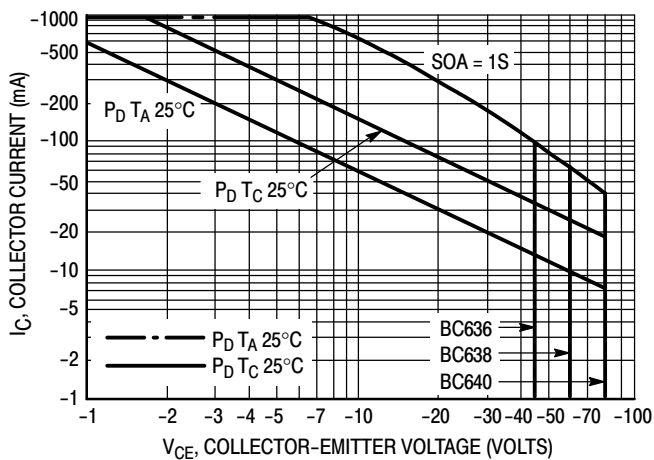


Figure 1. Active Region Safe Operating Area

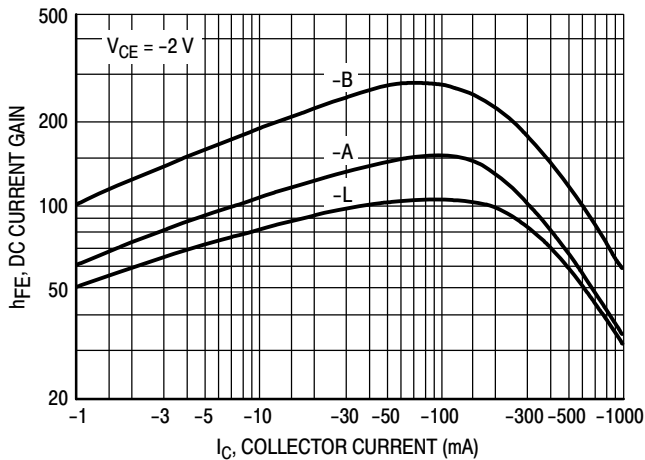


Figure 2. DC Current Gain

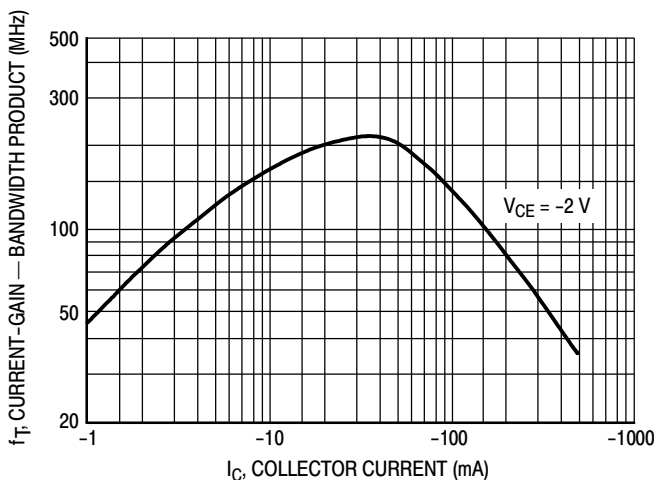


Figure 3. Current Gain Bandwidth Product

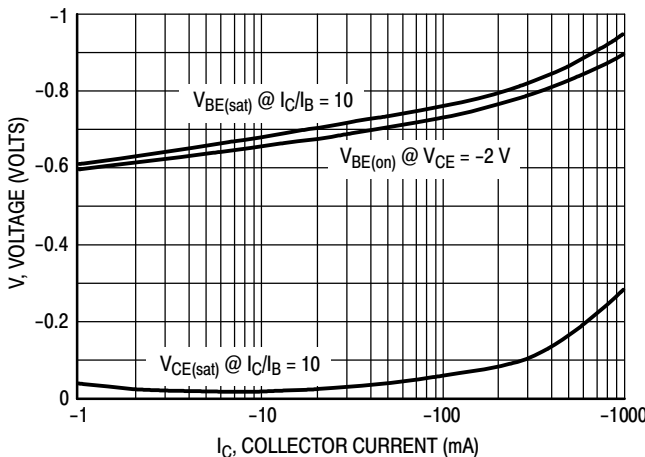


Figure 4. "Saturation" and "On" Voltages

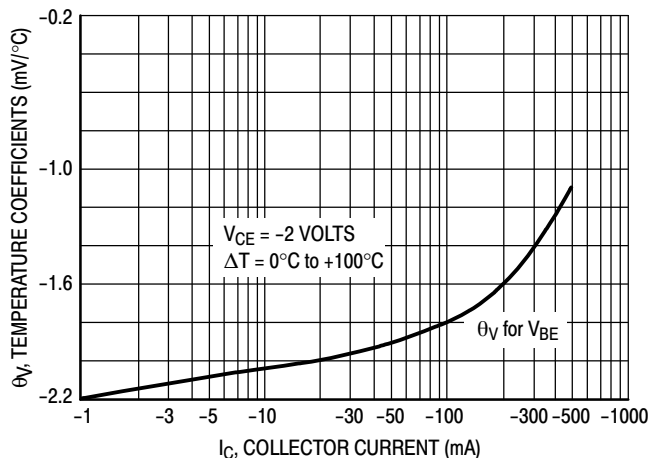
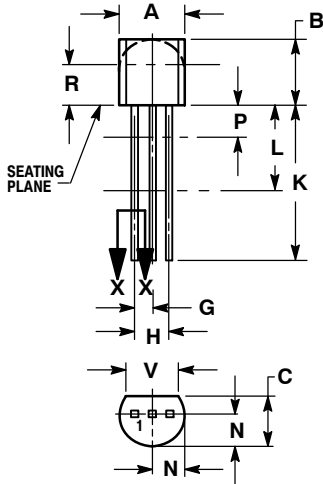


Figure 5. Temperature Coefficients

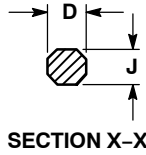
# BC640-016G

## PACKAGE DIMENSIONS

TO-92 (TO-226)  
CASE 29-11  
ISSUE AN



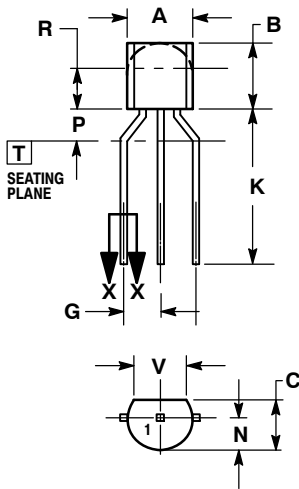
STRAIGHT LEAD  
BULK PACK



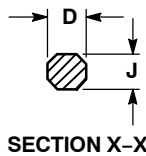
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

| DIM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN    | MAX   | MIN         | MAX   |
| A   | 0.175  | 0.205 | 4.45        | 5.20  |
| B   | 0.170  | 0.210 | 4.32        | 5.33  |
| C   | 0.125  | 0.165 | 3.18        | 4.19  |
| D   | 0.016  | 0.021 | 0.407       | 0.533 |
| G   | 0.045  | 0.055 | 1.15        | 1.39  |
| H   | 0.095  | 0.105 | 2.42        | 2.66  |
| J   | 0.015  | 0.020 | 0.39        | 0.50  |
| K   | 0.500  | ---   | 12.70       | ---   |
| L   | 0.250  | ---   | 6.35        | ---   |
| N   | 0.080  | 0.105 | 2.04        | 2.66  |
| P   | ---    | 0.100 | ---         | 2.54  |
| R   | 0.115  | ---   | 2.93        | ---   |
| V   | 0.135  | ---   | 3.43        | ---   |



BENT LEAD  
TAPE & REEL  
AMMO PACK



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

| DIM | MILLIMETERS |      |
|-----|-------------|------|
|     | MIN         | MAX  |
| A   | 4.45        | 5.20 |
| B   | 4.32        | 5.33 |
| C   | 3.18        | 4.19 |
| D   | 0.40        | 0.54 |
| G   | 2.40        | 2.80 |
| J   | 0.39        | 0.50 |
| K   | 12.70       | ---  |
| N   | 2.04        | 2.66 |
| P   | 1.50        | 4.00 |
| R   | 2.93        | ---  |
| V   | 3.43        | ---  |

STYLE 14:

1. EMITTER
2. COLLECTOR
3. BASE

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