

# BC636, BC636-16, BC638, BC640, BC640-16

## High Current Transistors

PNP Silicon



ON Semiconductor

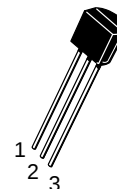
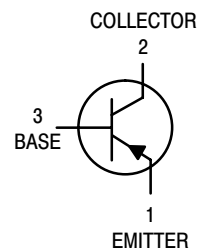
<http://onsemi.com>

### MAXIMUM RATINGS

| Rating                                                                                    | Symbol         | Value             | Unit                          |
|-------------------------------------------------------------------------------------------|----------------|-------------------|-------------------------------|
| Collector-Emitter Voltage<br>BC636<br>BC638<br>BC640                                      | $V_{CEO}$      | -45<br>-60<br>-80 | Vdc                           |
| Collector-Base Voltage<br>BC636<br>BC638<br>BC640                                         | $V_{CBO}$      | -45<br>-60<br>-80 | Vdc                           |
| Emitter-Base Voltage                                                                      | $V_{EBO}$      | -5.0              | Vdc                           |
| Collector Current — Continuous                                                            | $I_C$          | -0.5              | Adc                           |
| Total Device Dissipation<br>@ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 625<br>5.0        | mW<br>mW/ $^\circ\text{C}$    |
| Total Device Dissipation<br>@ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 1.5<br>12         | Watts<br>mW/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range                                       | $T_J, T_{stg}$ | -55 to<br>+150    | $^\circ\text{C}$              |

### THERMAL CHARACTERISTICS

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



CASE 29  
TO-92  
STYLE 14

### ORDERING INFORMATION

| Device      | Package | Shipping       |
|-------------|---------|----------------|
| BC636       | TO-92   | 5000 Units/Box |
| BC636ZL1    | TO-92   | 2000/Ammo Pack |
| BC636-16ZL1 | TO-92   | 2000/Ammo Pack |
| BC638       | TO-92   | 5000 Units/Box |
| BC638ZL1    | TO-92   | 2000/Ammo Pack |
| BC640       | TO-92   | 5000 Units/Box |
| BC640ZL1    | TO-92   | 2000/Ammo Pack |
| BC640-16    | TO-92   | 5000 Units/Box |

# BC636, BC636–16, BC638, BC640, BC640–16

## 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 <sub>dc</sub> , I <sub>B</sub> = 0)                                                                              | BC636<br>BC638<br>BC640 | V <sub>(BR)CEO</sub> | –45<br>–60<br>–80 | —<br>—<br>— | —<br>—<br>— | V <sub>dc</sub>                      |
| Collector–Base Breakdown Voltage<br>(I <sub>C</sub> = –100 μA <sub>dc</sub> , I <sub>E</sub> = 0)                                                                                | BC636<br>BC638<br>BC640 | V <sub>(BR)CBO</sub> | –45<br>–60<br>–80 | —<br>—<br>— | —<br>—<br>— | V <sub>dc</sub>                      |
| Emitter–Base Breakdown Voltage<br>(I <sub>E</sub> = –10 μA <sub>dc</sub> , I <sub>C</sub> = 0)                                                                                   |                         | V <sub>(BR)EBO</sub> | –5.0              | —           | —           | V <sub>dc</sub>                      |
| Collector Cutoff Current<br>(V <sub>CB</sub> = –30 V <sub>dc</sub> , I <sub>E</sub> = 0)<br>(V <sub>CB</sub> = –30 V <sub>dc</sub> , I <sub>E</sub> = 0, T <sub>A</sub> = 125°C) |                         | I <sub>CBO</sub>     | —<br>—            | —<br>—      | –100<br>–10 | nA <sub>dc</sub><br>μA <sub>dc</sub> |

### ON CHARACTERISTICS (1)

|                                                                                                                                                                                             |                                                 |                      |                                          |                                 |                                           |                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|----------------------|------------------------------------------|---------------------------------|-------------------------------------------|-----------------|
| DC Current Gain<br>(I <sub>C</sub> = –5.0 mA <sub>dc</sub> , V <sub>CE</sub> = –2.0 V <sub>dc</sub> )<br>(I <sub>C</sub> = –150 mA <sub>dc</sub> , V <sub>CE</sub> = –2.0 V <sub>dc</sub> ) | BC636<br>BC636–16<br>BC638<br>BC640<br>BC640–16 | h <sub>FE</sub>      | 25<br>40<br>100<br>40<br>40<br>100<br>25 | —<br>—<br>—<br>—<br>—<br>—<br>— | —<br>250<br>250<br>160<br>160<br>250<br>— | —               |
| Collector–Emitter Saturation Voltage<br>(I <sub>C</sub> = –500 mA <sub>dc</sub> , I <sub>B</sub> = –50 mA <sub>dc</sub> )                                                                   |                                                 | V <sub>CE(sat)</sub> | —<br>—                                   | –0.25<br>–0.5                   | –0.5<br>—                                 | V <sub>dc</sub> |
| Base–Emitter On Voltage<br>(I <sub>C</sub> = –500 mA <sub>dc</sub> , V <sub>CE</sub> = –2.0 V <sub>dc</sub> )                                                                               |                                                 | V <sub>BE(on)</sub>  | —                                        | —                               | –1.0                                      | V <sub>dc</sub> |

### DYNAMIC CHARACTERISTICS

|                                                                                                                                    |  |                 |   |     |   |     |
|------------------------------------------------------------------------------------------------------------------------------------|--|-----------------|---|-----|---|-----|
| Current–Gain — Bandwidth Product<br>(I <sub>C</sub> = –50 mA <sub>dc</sub> , V <sub>CE</sub> = –2.0 V <sub>dc</sub> , f = 100 MHz) |  | f <sub>T</sub>  | — | 150 | — | MHz |
| Output Capacitance<br>(V <sub>CB</sub> = –10 V <sub>dc</sub> , I <sub>E</sub> = 0, f = 1.0 MHz)                                    |  | C <sub>ob</sub> | — | 9.0 | — | pF  |
| Input Capacitance<br>(V <sub>EB</sub> = –0.5 V <sub>dc</sub> , I <sub>C</sub> = 0, f = 1.0 MHz)                                    |  | C <sub>ib</sub> | — | 110 | — | pF  |

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle 2.0%.

# BC636, BC636-16, BC638, BC640, BC640-16

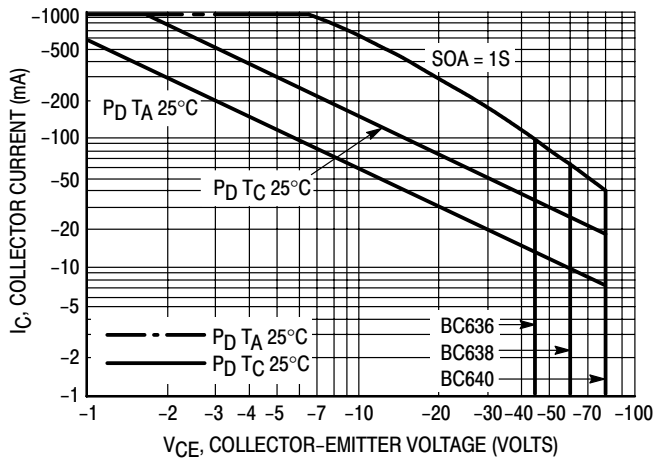


Figure 1. Active Region Safe Operating Area

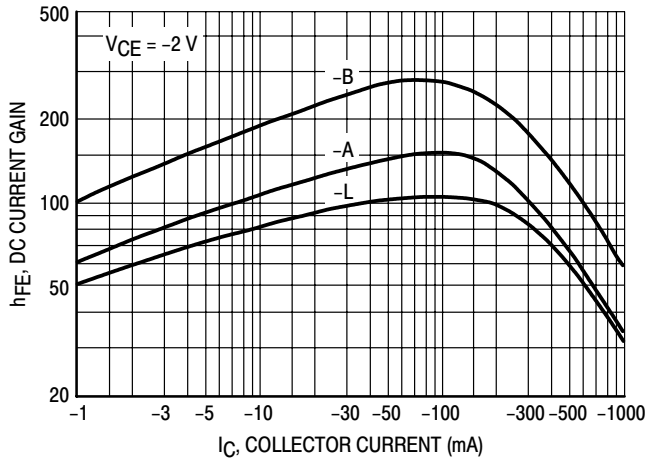


Figure 2. DC Current Gain

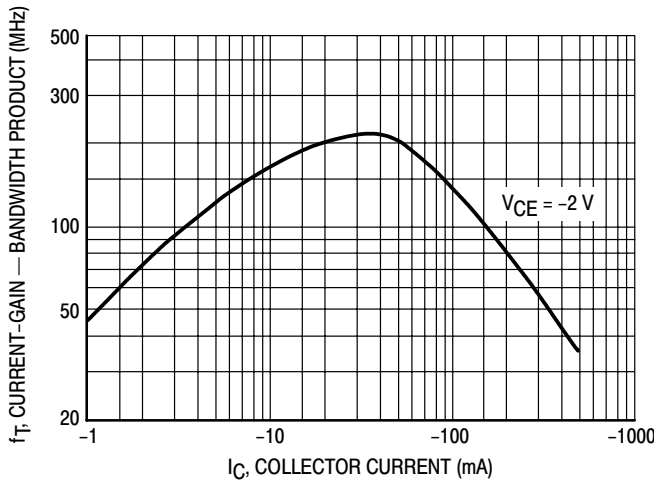


Figure 3. Current Gain Bandwidth Product

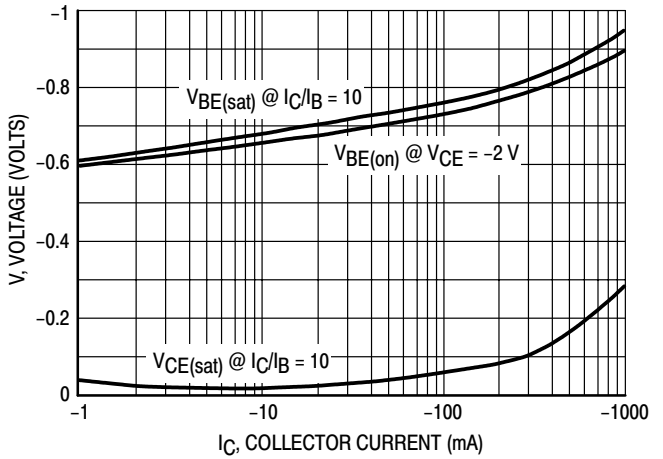


Figure 4. "Saturation" and "On" Voltages

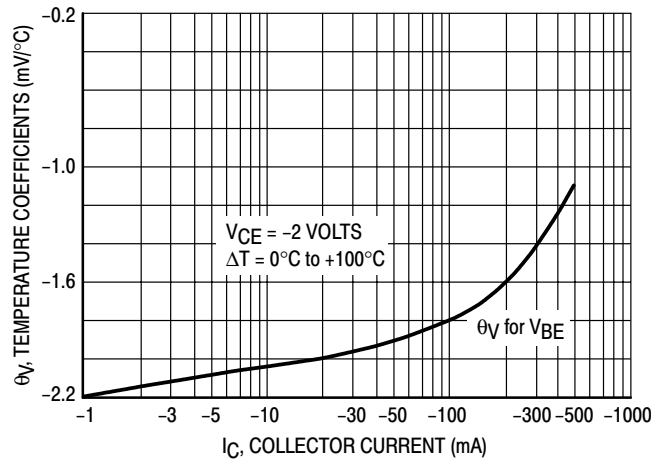
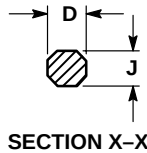
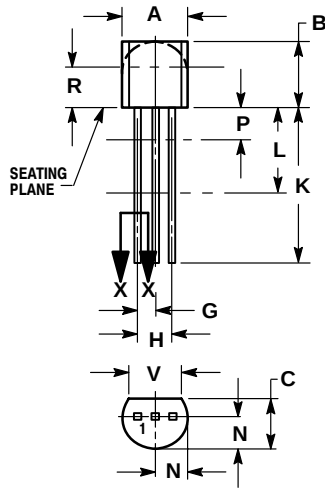


Figure 5. Temperature Coefficients

# BC636, BC636-16, BC638, BC640, BC640-16

## PACKAGE DIMENSIONS

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



### 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 |
| E   | 0.045  | 0.055 | 1.15        | 1.39  |
| F   | 0.095  | 0.105 | 2.42        | 2.66  |
| G   | 0.015  | 0.020 | 0.39        | 0.50  |
| H   | 0.500  | ---   | 12.70       | ---   |
| I   | 0.250  | ---   | 6.35        | ---   |
| J   | 0.080  | 0.105 | 2.04        | 2.66  |
| K   | ---    | 0.100 | ---         | 2.54  |
| L   | 0.115  | ---   | 2.93        | ---   |
| M   | 0.135  | ---   | 3.43        | ---   |

### STYLE 14:

1. EMITTER
2. COLLECTOR
3. BASE

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