# BC447, BC449, BC449A

# High Voltage Transistors

## PNP Silicon

ON Semiconductor™

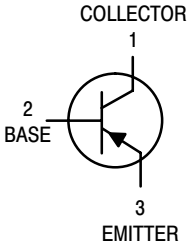
http://onsemi.com

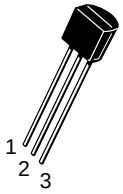
### MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Emitter Voltage<br>BC447<br>BC449, BC449A | $V_{CEO}$ | <br>80<br>100 | Vdc |
| Collector-Base Voltage<br>BC447<br>BC449, BC449A | $V_{CBO}$ | <br>80<br>100 | Vdc |
| Emitter-Base Voltage | $V_{EBO}$ | 5.0 | Vdc |
| Collector Current – Continuous | $I_C$ | 300 | mAdc |
| Total Device Dissipation<br>@ $T_A$ = 25°C<br>Derate above 25°C | $P_D$ | <br>625<br>5.0 | <br>mW<br>mW/°C |
| Total Device Dissipation<br>@ $T_C$ = 25°C<br>Derate above 25°C | $P_D$ | <br>1.5<br>12 | <br>Watts<br>mW/°C |
| Operating and Storage Junction Temperature Range | $T_J$, $T_{stg}$ | –55 to +150 | °C |
| Moisture Sensitivity Level (MSL)<br>Electrostatic Discharge (ESD) | MSL: 1<br>NA | | |

### THERMAL CHARACTERISTICS

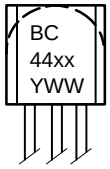
| Characteristic | Symbol | Max | Unit |
|---|---|---|---|
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 200 | °C/W |
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 83.3 | °C/W |




**CASE 29**
**TO–92**
**STYLE 17**

### MARKING DIAGRAM




BC44xx = Specific Device Code
xx = 7, 9 or 9A
Y = Year
WW = Work Week

### ORDERING INFORMATION

| Device | Package | Shipping |
|---|---|---|
| BC447 | TO–92 | 5000 Units/Box |
| BC449 | TO–92 | 5000 Units/Box |
| BC449A | TO–92 | 5000 Units/Box |

**ELECTRICAL CHARACTERISTICS** ($T_A$ = 25°C unless otherwise noted)

| Characteristic | | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Collector–Emitter Breakdown Voltage (Note 1.) | | $V_{(BR)CEO}$ | | | | Vdc |
| ($I_C$ = 1.0 mAdc, $I_B$ = 0) | BC447 | | 80 | – | – | |
| | BC449, BC449A | | 100 | – | – | |
| Collector–Base Breakdown Voltage | | $V_{(BR)CBO}$ | | | | Vdc |
| ($I_C$ = 100 μAdc, $I_E$ = 0) | BC447 | | 80 | – | – | |
| | BC449, BC449A | | 100 | – | – | |
| Emitter–Base Breakdown Voltage | | $V_{(BR)EBO}$ | | | | Vdc |
| ($I_E$ = 10 μAdc, $I_C$ = 0) | | | 5.0 | – | – | |
| Collector Cutoff Current | | $I_{CBO}$ | | | | nAdc |
| ($V_{CB}$ = 60 Vdc, $I_E$ = 0) | BC447 | | – | – | 100 | |
| ($V_{CB}$ = 80 Vdc, $I_E$ = 0) | BC449, BC449A | | – | – | 100 | |
| **ON CHARACTERISTICS** (Note 1.) | | | | | | |
| DC Current Gain | | $h_{FE}$ | | | | – |
| ($I_C$ = 2.0 mAdc, $V_{CE}$ = 5.0 Vdc) | BC447, BC449 | | 50 | – | 460 | |
| | BC449A | | 120 | – | 220 | |
| ($I_C$ = 10 mAdc, $V_{CE}$ = 5.0 Vdc) | BC447, BC449 | | 50 | – | – | |
| | BC449A | | 100 | – | – | |
| ($I_C$ = 100 mAdc, $V_{CE}$ = 5.0 Vdc) | BC447, BC449 | | 50 | – | – | |
| | BC449A | | 60 | – | – | |
| Collector–Emitter Saturation Voltage | | $V_{CE(sat)}$ | | | | Vdc |
| ($I_C$ = 100 mAdc, $I_B$ = 10 mAdc) | | | – | 0.125 | 0.25 | |
| Base–Emitter Saturation Voltage | | $V_{BE(sat)}$ | | | | Vdc |
| ($I_C$ = 100 mAdc, $I_B$ = 10 mAdc) | | | – | 0.85 | – | |
| Base–Emitter On Voltage | | $V_{BE(on)}$ | | | | Vdc |
| ($I_C$ = 2.0 mAdc, $V_{CE}$ = 5.0 Vdc) | | | 0.55 | – | 0.7 | |
| ($I_C$ = 100 mAdc, $V_{CE}$ = 5.0 Vdc) (Note 1.) | | | – | 0.76 | 1.2 | |
| **DYNAMIC CHARACTERISTICS** | | | | | | |
| Current–Gain – Bandwidth Product | | $f_T$ | | | | MHz |
| ($I_C$ = 50 mAdc, $V_{CE}$ = 5.0 Vdc, f = 100 MHz) | | | 100 | 200 | – | |

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle 2%

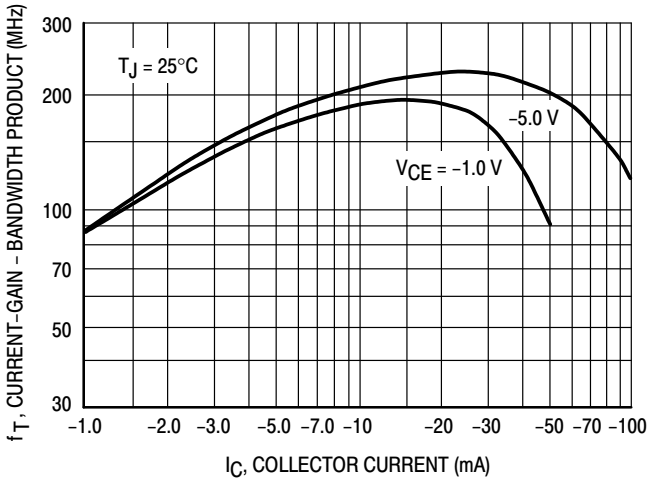



**Figure 1. Current−Gain — Bandwidth Product**

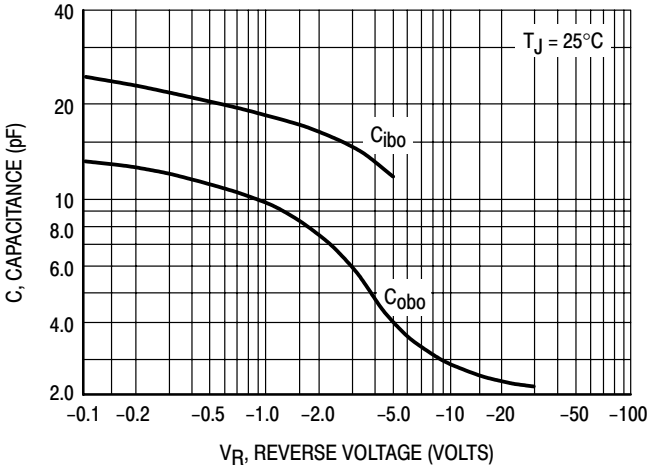



**Figure 2. Capacitance**

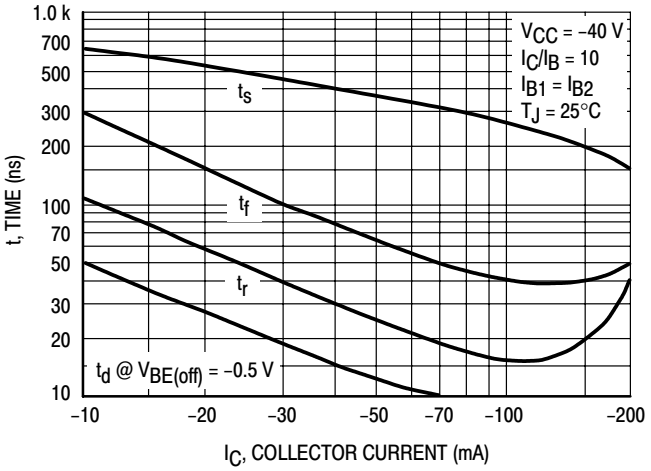



**Figure 3. Switching Times**

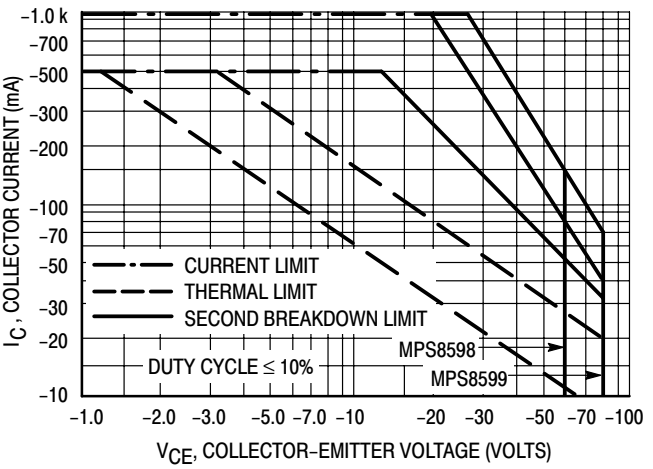



**Figure 4. Active−Region Safe Operating Area**

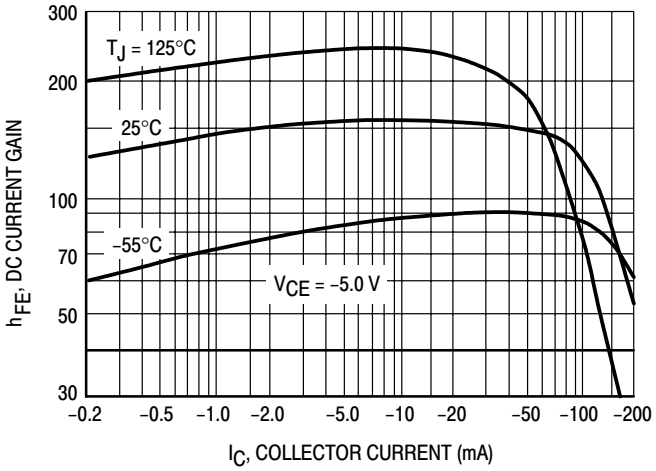



**Figure 5. DC Current Gain**

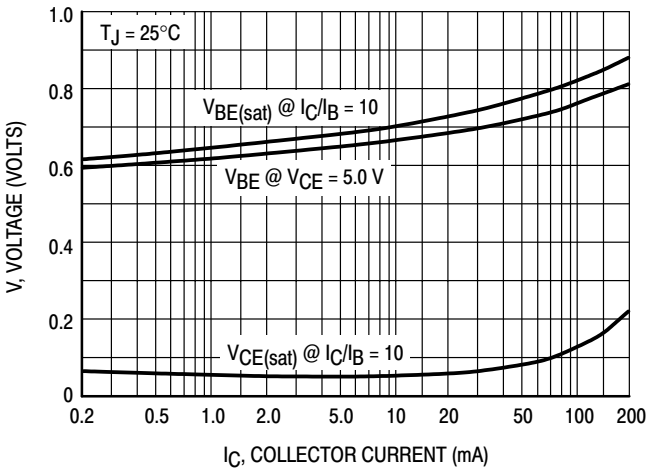



**Figure 6. “ON” Voltages**

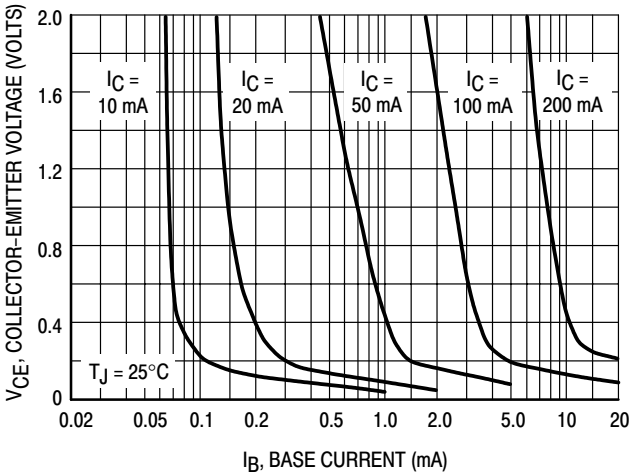



**Figure 7. Collector Saturation Region**

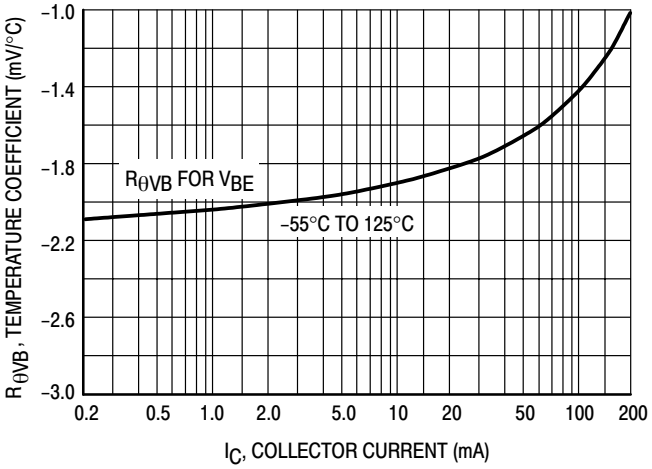



**Figure 8. Base−Emitter Temperature Coefficient**

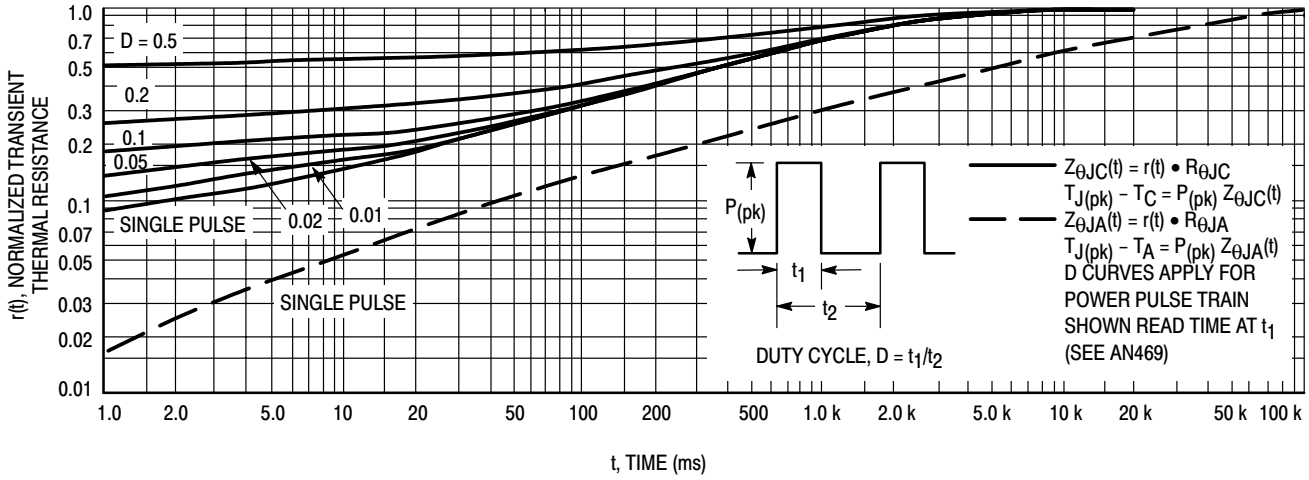
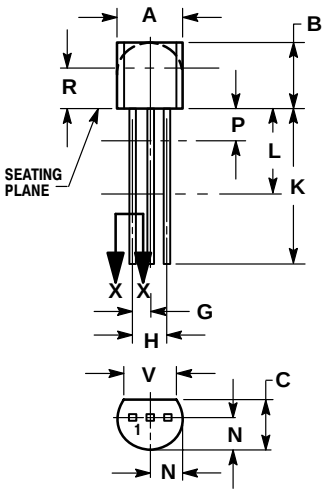
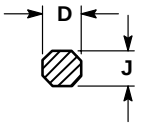



**Figure 9. Thermal Response**

## PACKAGE DIMENSIONS

**TO–92**
(TO–226)
CASE 29–11
ISSUE AL




**SECTION X–X**

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.

| | INCHES | | MILLIMETERS | |
|---|---|---|---|---|
| DIM | 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 | --- |

STYLE 17:
PIN 1. COLLECTOR
2. BASE
3. EMITTER

# Notes

# Notes

## PUBLICATION ORDERING INFORMATION

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