## TO-92 Plastic-Encapsulate Transistors

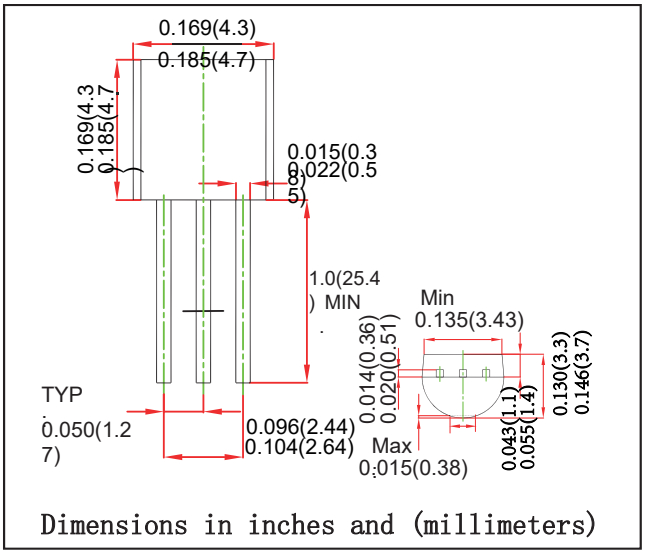
### FEATURES

●Amplifier dissipation NPN Silicon

### MECHANICAL DATA

●Case style:TO-92 molded plastic

●Mounting position:any




## MAXIMUM RATINGS AND CHARACTERISTICS

@ 25°C Ambient Temperature (unless otherwise noted)

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $V_{CEO}$ | Collector-Emitter Voltage | BC237 | 45 | V |
| | | BC238/239 | 25 | |
| $V_{EBO}$ | Emitter-Base Voltage | BC237 | 6 | V |
| | | BC238/239 | 5 | |
| $I_C$ | Collector Current -Continuous | | 0.1 | A |
| $P_C$ | Collector Power Dissipation | | 350 | mW |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | | 357 | ℃/W |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | | 125 | ℃/W |
| $T_j$ | Junction Temperature | | 150 | ℃ |
| $T_{stg}$ | Storage Temperature | | -55~150 | ℃ |

## ELECTRICAL CHARACTERISTICS $T_a$=25℃ unless otherwise specified

| Parameter | Symbol | Test conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Collector-base breakdown voltage** | $V_{(BR)CBO}$ | $I_C$=100μA, $I_E$=0 BC237 | 50 | | | V |
| | | BC238/239 | 30 | | | |
| **Collector-emitter breakdown voltage** | $V_{(BR)CEO}$ | $I_C$=2mA, $I_B$=0 BC237 | 45 | | | V |
| | | BC238/239 | 25 | | | |
| **Emitter-base breakdown voltage** | $V_{(BR)EBO}$ | $I_E$=100μA, $I_C$=0 BC237 | 6 | | | V |
| | | BC238/239 | 5 | | | |
| **Collector cut-off current** | $I_{CBO}$ | $V_{CE}$=50V, $V_{BE}$=0 BC237 | | | 15 | nA |
| | | $V_{CB}$=30V,$I_E$=0 BC238/239 | | | | |
| **DC current gain** | $h_{FE(1)}$ | $V_{CE}$=5V, $I_C$=10μA BC237A | | 90 | | |
| | | BC237B/238B | | 150 | | |
| | | BC237C/238C/239C | | 270 | | |
| | $h_{FE(2)}$ | $V_{CE}$=5V, $I_C$=2mA BC237 | 120 | | 800 | |
| | | BC239 | 120 | | 800 | |
| | | BC237A | 120 | | 220 | |
| | | BC237B/238B | 200 | | 460 | |
| | | BC237C/238C/239C | 380 | | 800 | |
| | $h_{FE(3)}$ | $V_{CE}$=5V, $I_C$=100mA BC237A | | 120 | | |
| | | BC237B/238B | | 180 | | |
| | | BC237C/238C/239C | | 300 | | |
| **Collector-emitter saturation voltage** | $V_{CE(sat)}$ | $I_C$=10mA, $I_B$=0.5mA BC237/238/239 | | | 0.2 | V |
| | | $I_C$=100mA, $I_B$=5mA BC237/239 | | | 0.6 | |
| | | BC238 | | | 0.8 | |
| **Base-emitter saturation voltage** | $V_{BE(sat)}$ | $I_C$=10mA,$I_B$=0.5mA | | | 0.83 | V |
| | | $I_C$=100mA,$I_B$=5mA | | | 1.05 | |
| **Base-emitter voltage** | $V_{BE}$ | $V_{CE}$=5V, $I_C$=0.1mA | | 0.5 | | V |
| | | $V_{CE}$=5V, $I_C$=2mA | 0.55 | | 0.7 | |
| | | $V_{CE}$=5V, $I_C$=100mA | | 0.83 | | |
| **Transition frequency** | $f_T$ | $V_{CE}$=3V,$I_C$=0.5mA,f=100MHz BC237 | | 100 | | MHz |
| | | BC238 | | 120 | | |
| | | BC239 | | 140 | | |
| | | $V_{CE}$=5V,$I_C$=10mA,f=100MHz BC237 | 150 | 200 | | |
| | | BC238 | 150 | 240 | | |
| | | BC239 | 150 | 280 | | |
| **Collector output capacitance** | $C_{ob}$ | $V_{CB}$=10V, $I_E$=0, f=1MHz | | | 4.5 | pF |
| **Emitter-base capacitance** | $C_{ib}$ | $V_{EB}$=0.5V, $I_C$=0, f=1MHz | | 8 | | Pf |
| **Noise figure** | NF | $V_{CE}$=5V, $I_c$=0.2mA, | | | | dB |
| | | f=1kHZ, Rs=2KΩ BC239 | | 2 | 4 | |
| | | $V_{CE}$=5V, $I_c$=0.2mA, | | | | |
| | | f=1kHZ, Rs=2KΩ, Δf=200Hz BC237 | | 2 | 10 | |
| | | BC238 | | 2 | 10 | |
| | | BC239 | | 2 | 4 | |

## RATINGS AND CHARACTERISTIC CURVES

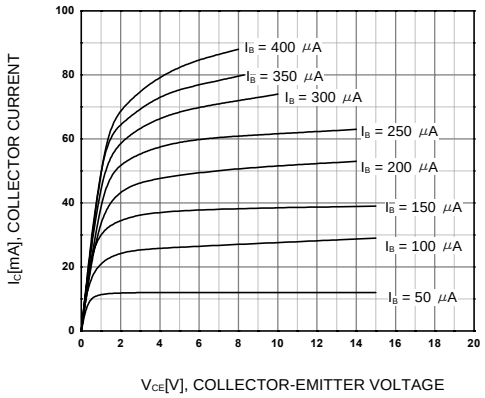



**Figure 1. Static Characteristic**

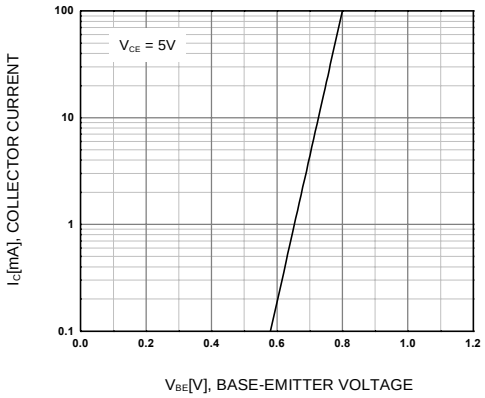



**Figure 2. Transfer Characteristic**

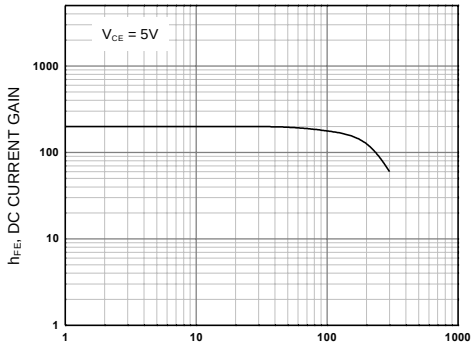



**Figure 3. DC current Gain**

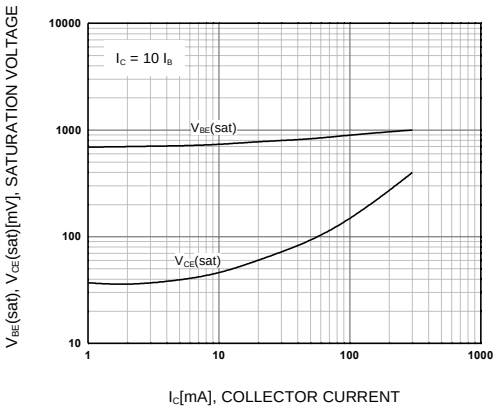



**Figure 4. Base-Emitter Saturation Voltage Collector-Emitter Saturation Voltage**

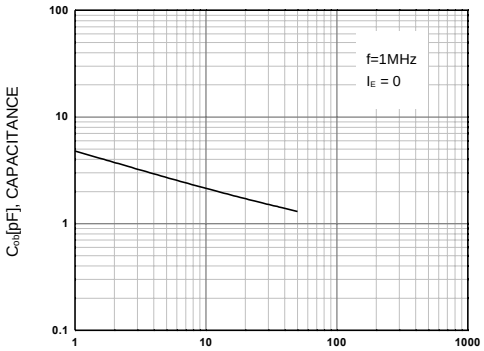



**Figure 5. Output Capacitance**

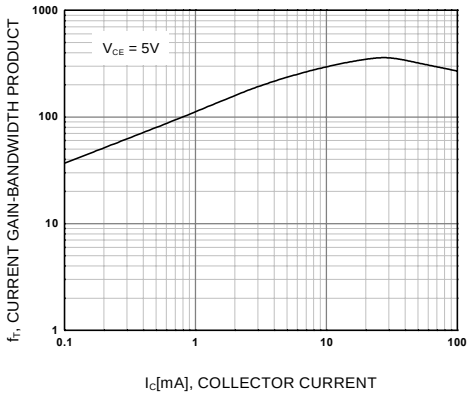



**Figure 6. Current Gain Bandwidth Product**