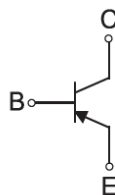
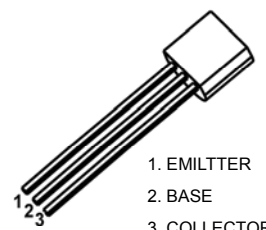


Features

- PNP silicon epitaxial planar transistor
- For switching and amplifier applications



Schematic Diagram



TO-92

- 1. EMITTER
- 2. BASE
- 3. COLLECTOR

Absolute Maximum Ratings

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

| Parameter | Symbol | Value | Unit |
|--------------------------------------|-----------|-------------|--------------------|
| Collector-Base Voltage | V_{CBO} | -40 | V |
| Collector-Emitter Voltage | V_{CEO} | -40 | V |
| Emitter-Base Voltage | V_{EBO} | -5 | V |
| Collector Current-Continuous | I_C | -0.2 | A |
| Collector Power Dissipation | P_C | 0.625 | W |
| Operating Junction Temperature Range | T_J | -55 to +150 | $^{\circ}\text{C}$ |
| Storage Temperature Range | T_{STG} | -55 to +150 | $^{\circ}\text{C}$ |

Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

| Parameter | Symbol | Test Conditions | Min | Max | Unit |
|--------------------------------------|---------------|--|-----|-------|---------------|
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | $I_C=-10\mu\text{A}, I_E=0$ | -40 | - | V |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C=-1\text{mA}, I_B=0$ | -40 | - | V |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | $I_E=-10\mu\text{A}, I_C=0$ | -5 | - | V |
| Collector Cut-Off Current | I_{CBO} | $V_{CB}=-40\text{V}, I_E=0$ | - | -0.1 | μA |
| Collector Cut-Off Current | I_{CEX} | $V_{CE}=-30\text{V}, V_{EB(off)}=-3\text{V}$ | - | -50 | nA |
| Emitter Cut-Off Current | I_{EBO} | $V_{EB}=-5\text{V}, I_C=0$ | - | -0.1 | μA |
| DC Current Gain | h_{FE1} | $V_{CE}=-1\text{V}, I_C=-10\text{mA}$ | 100 | 400 | - |
| | h_{FE2} | $V_{CE}=-1\text{V}, I_C=-50\text{mA}$ | 60 | - | |
| | h_{FE3} | $V_{CE}=-2\text{V}, I_C=-100\text{mA}$ | 30 | - | |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=-50\text{mA}, I_B=-5\text{mA}$ | - | -0.4 | V |
| Base-Emitter Saturation Voltage | $V_{BE(sat)}$ | $I_C=-50\text{mA}, I_B=-5\text{mA}$ | - | -0.95 | V |
| Transition Frequency | f_T | $V_{CE}=-20\text{V}, I_C=-10\text{mA}, f=100\text{MHz}$ | 250 | - | MHz |
| Delay Time | t_d | $V_{CC}=-3\text{V}, V_{BE}=-0.5\text{V}, I_C=-10\text{mA}, I_{B1}=-1\text{mA}$ | - | 35 | ns |
| Rise Time | t_r | | - | 25 | ns |
| Storage Time | t_s | $V_{CC}=-3\text{V}, I_C=-10\text{mA}, I_{B1}=I_{B2}=-1\text{mA}$ | - | 225 | ns |
| Fall Time | t_f | | - | 75 | ns |

Classification of h_{FE1}

| Rank | O | Y | G |
|-------|---------|---------|---------|
| Range | 100-200 | 200-300 | 300-400 |

Typical Characteristic Curves

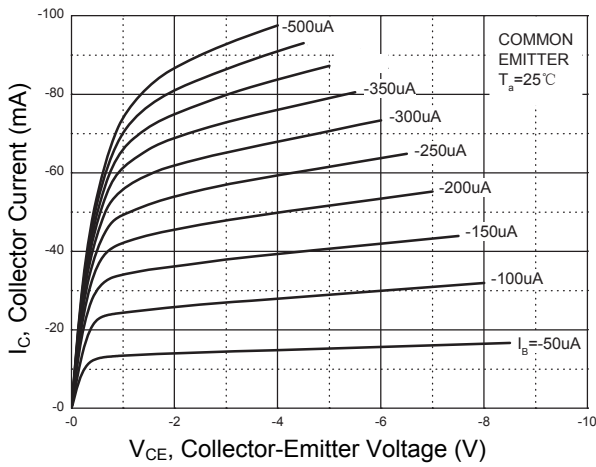


Figure 1. Static Characteristic

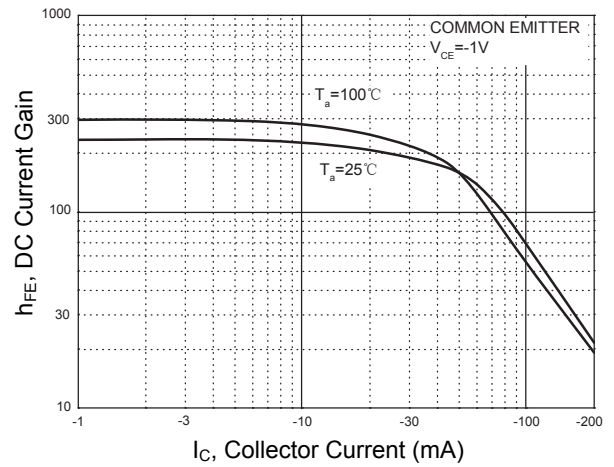


Figure 2. DC Current Gain vs. Collector Current

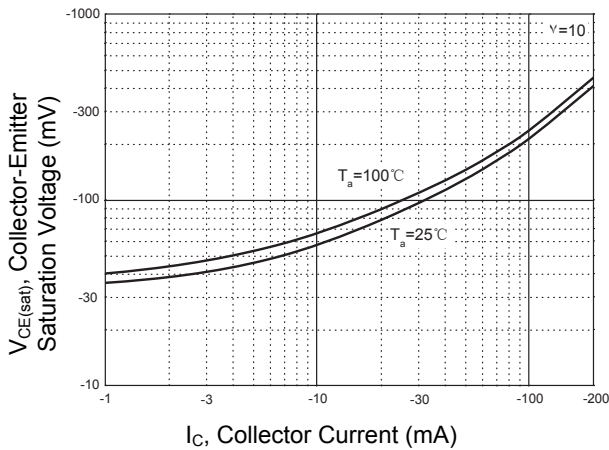


Figure 3. Collector-Emitter Saturation Voltage vs. Collector Current

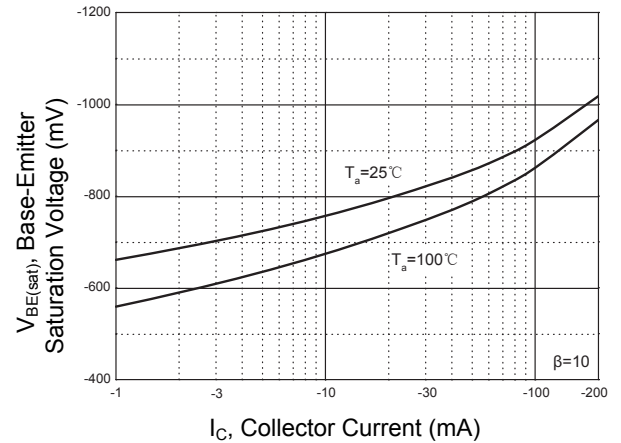


Figure 4. Base-Emitter Saturation Voltage vs. Collector Current

Typical Characteristic Curves

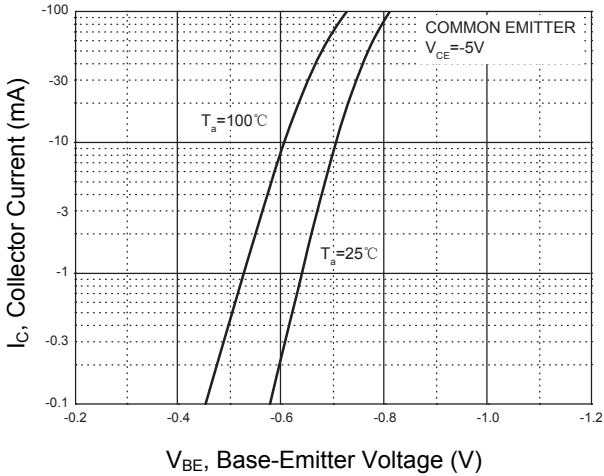


Figure 5. Collector Current vs. Base-Emitter Voltage

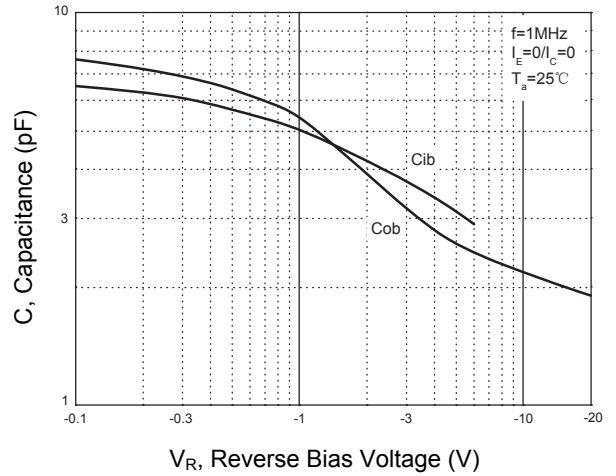


Figure 6. Capacitance vs. Reverse Bias Voltage

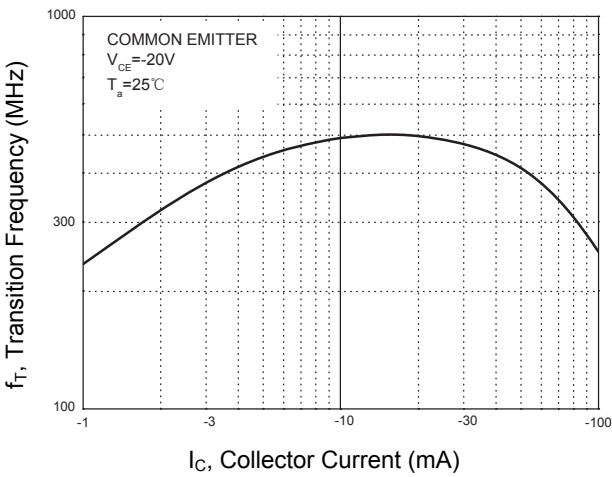


Figure 7. Frequency vs. Collector Current

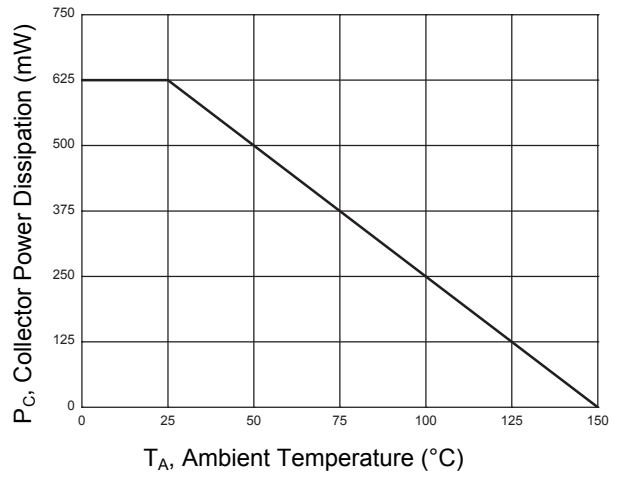
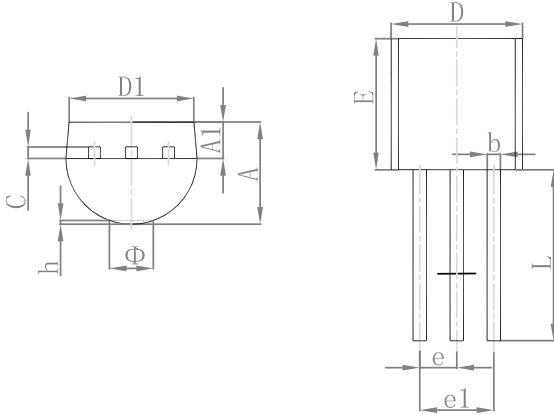


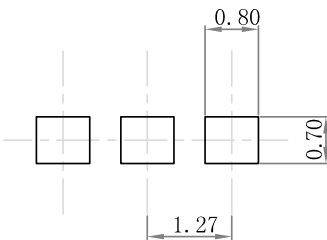
Figure 8. Power Dissipation vs. Ambient Temperature

Package Outline Dimensions (TO-92)



| Symbol | Dimensions in Millimeters | | Dimensions in Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 3.300 | 3.700 | 0.130 | 0.146 |
| A1 | 1.100 | 1.400 | 0.043 | 0.055 |
| b | 0.380 | 0.550 | 0.015 | 0.022 |
| c | 0.360 | 0.510 | 0.014 | 0.020 |
| D | 4.300 | 4.700 | 0.169 | 0.185 |
| D1 | 3.430 | - | 0.135 | - |
| E | 4.300 | 4.700 | 0.169 | 0.185 |
| e | 1.270 TYP | | 0.050 TYP | |
| e1 | 2.440 | 2.640 | 0.096 | 0.104 |
| L | 14.100 | 14.500 | 0.555 | 0.571 |
| Φ | - | 1.600 | - | 0.063 |
| h | 0.000 | 0.380 | 0.000 | 0.015 |

Recommended Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.