

Transistors

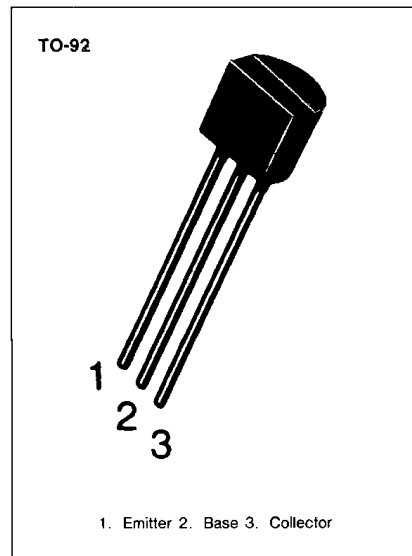
2N4402

GENERAL PURPOSE TRANSISTOR

- Collector-Emitter Voltage: $V_{CE0} = 40V$
- Collector Dissipation: $P_c (\text{max}) = 625mW$

ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ C$)

| Characteristic | Symbol | Rating | Unit |
|---------------------------|-----------|-----------|------------|
| Collector-Base Voltage | V_{CBO} | -40 | V |
| Collector-Emitter Voltage | V_{CEO} | -40 | V |
| Emitter-Base Voltage | V_{EBO} | -5 | V |
| Collector Current | I_c | -600 | mA |
| Collector Dissipation | P_c | 625 | mW |
| Junction Temperature | T_j | 150 | $^\circ C$ |
| Storage Temperature | T_{stg} | -55 ~ 150 | $^\circ C$ |



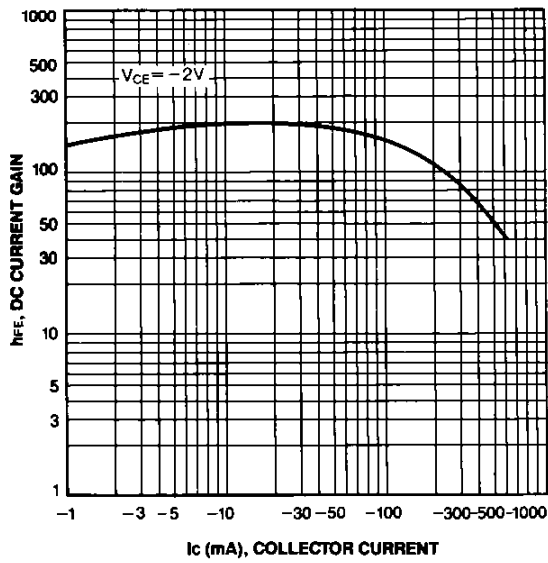
ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ C$)

| Characteristic | Symbol | Test Conditions | Min | Typ | Max | Unit |
|--|-----------------------|---|-------|-----|---------------|--------|
| Collector-Base Breakdown Voltage | BV_{CBO} | $I_c = -100\mu A, I_E = 0$ | -40 | | | V |
| * Collector-Emitter Breakdown Voltage | BV_{CEO} | $I_c = -1mA, I_B = 0$ | -40 | | | V |
| Emitter-Base Breakdown Voltage | BV_{EBO} | $I_E = -100\mu A, I_c = 0$ | -5 | | | V |
| Collector Cut-off Current | I_{CEX} | $V_{CE} = -35V, V_{EB} = -0.4V$ | | | -100 | nA |
| Base Cut-off Current | I_{BEV} | $V_{CE} = -35V, V_{EB} = -0.4V$ | | | -100 | nA |
| * DC Current Gain | h_{FE} | $V_{CE} = -1V, I_c = -0.1mA$ $V_{CE} = -1V, I_c = -1mA$ | | 30 | | |
| | | $V_{CE} = -1V, I_c = -10mA$ | | 50 | | |
| | | * $V_{CE} = -2V, I_c = -150mA$ | 50 | | 150 | |
| | | | 100 | | 300 | |
| | | * $V_{CE} = -2V, I_c = -500mA$ | 20 | | | |
| * Collector-Emitter Saturation Voltage | $V_{CE} (\text{sat})$ | $I_c = -150mA, I_B = -15mA$ $I_c = -500mA, I_B = -50mA$ | | | -0.4 -0.75 | V V |
| * Base-Emitter Saturation Voltage | $V_{BE} (\text{sat})$ | $I_c = -150mA, I_B = -15mA$ $I_c = -500mA, I_B = -50mA$ | -0.75 | | -0.95 -1.3 | V V |
| Collector-Base Capacitance | C_{CB} | $V_{CB} = -10V, I_E = 0, f = 140KHz$ | | | 8.5 | pF |
| Current Gain Bandwidth Product | f_T | $V_{CE} = -10V, I_c = -20mA$ $f = 100MHz$ | 150 | | | MHz |
| Turn On Time | t_{ON} | $V_{CC} = -30V, V_{BE} = -2V$ $I_c = -150mA, I_{B1} = -15mA$ | | | 35 | ns |
| Turn Off Time | t_{OFF} | $V_{CC} = -30V, I_c = -150mA$ $I_{B1} = I_{B2} = -15mA$ | | | 255 | ns |

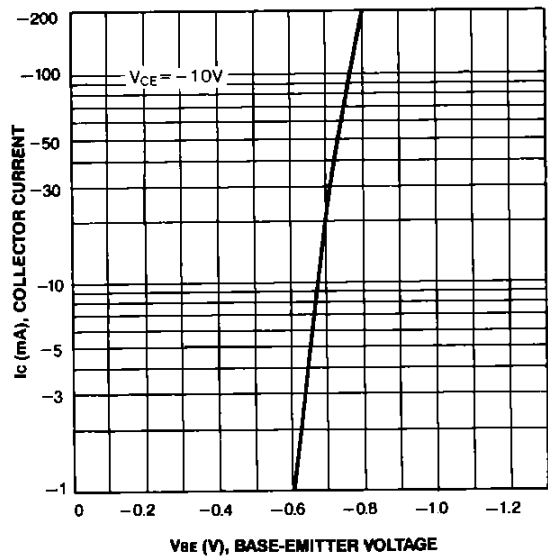
*Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$



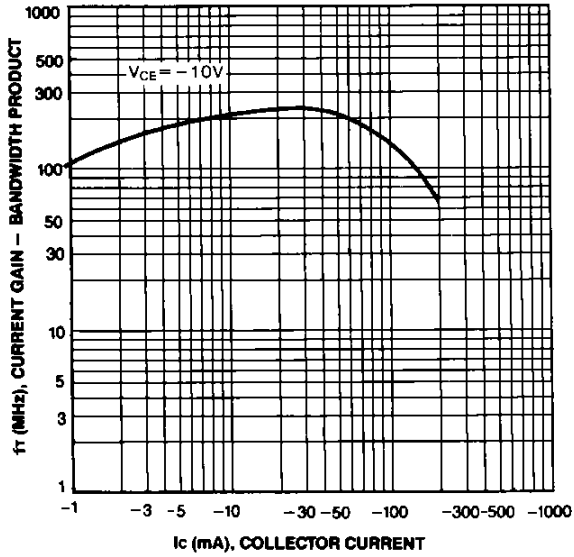
DC CURRENT GAIN



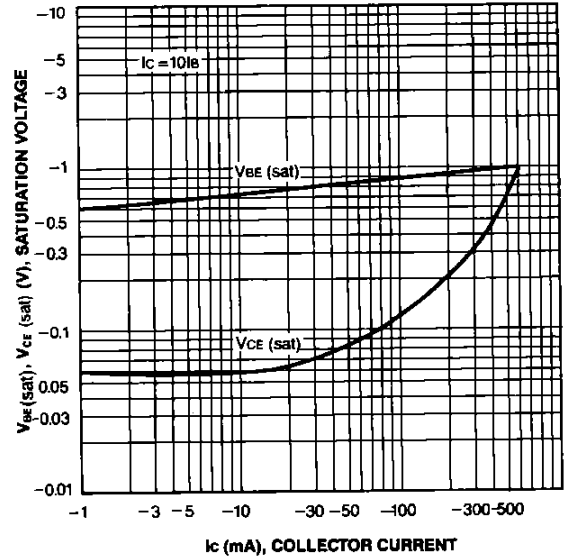
BASE-EMITTER ON VOLTAGE



CURRENT GAIN-BANDWIDTH PRODUCT



BASE-EMITTER SATURATION VOLTAGE COLLECTOR-EMITTER SATURATION VOLTAGE



COLLECTOR-BASE CAPACITANCE

