# TYPE 2N119

## N-P-N GROWN JUNCTION SILICON TRANSISTOR

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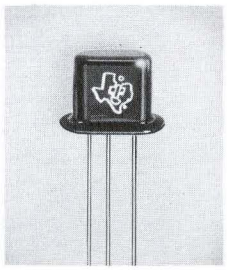
BULLETIN NO. DL-S 899 MARCH, 1958
REPLACES BULLETIN NO. DL-S 680 JANUARY, 1957



## 36 to 86 beta spread

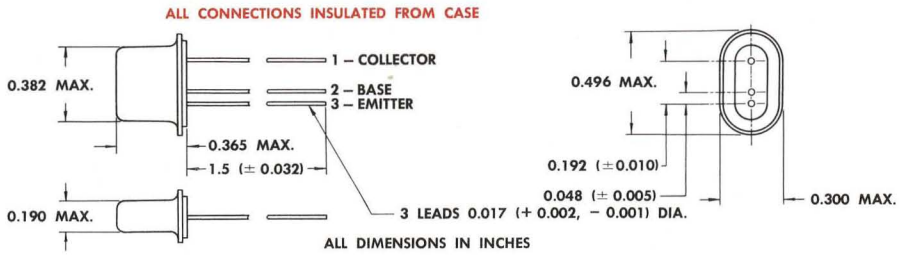
## Specifically designed for high gain at high temperatures

### qualification testing

All units are heat cycled from −65°C to + 175°C. This test consists of fourteen cycles, four at 95% relative humidity (from −65°C to + 75°C). Also, the hermetic seal is checked by pressure testing. All units are completely tested for design characteristics and undergo a rigorous tumble test to check for mechanical reliability. These units are designed to meet the requirements of MIL-T-19500/35.

### mechanical data

Welded case with glass-to-metal hermetic seal between case and leads. Approximate weight is 1.7 grams.




### absolute maximum ratings at 25°C ambient [except where advanced temperatures are indicated]

| | |
|---|---|
| Collector Voltage Referred to Base | 45 V |
| Emitter Voltage Referred to Base | 1 V |
| Collector Current | 25 mA |
| Emitter Current | −25 mA |
| Collector Dissipation | 150 mW |
| at 100°C | 100 mW |
| at 150°C | 50 mW |

### junction temperature

| | |
|---|---|
| Maximum Range | −65°C to +175°C |

### common base design characteristics at $T_j$ = 25°C [except where advanced temperatures are indicated]

| | | test conditions | | min. | design center | max. | unit |
|---|---|---|---|---|---|---|---|
| $BV_{CBO}$ | Collector Breakdown Voltage | $I_C = 50\mu A$ | $I_E = 0$ | 45 | — | — | Volt |
| $I_{CBO}$ | Collector Cutoff Current | $V_{CB} = 30V$ | $I_E = 0$ | — | — | 2 | $\mu A$ |
| | at 100° C | $V_{CB} = 5V$ | $I_E = 0$ | — | — | 10 | $\mu A$ |
| | at 150° C | $V_{CB} = 5V$ | $I_E = 0$ | — | — | 50 | $\mu A$ |
| $h_{ib}$ | Input Impedance | $V_{CB} = 5V$ | $I_E = -1mA$ | 30 | 42 | 80 | Ohm |
| $h_{ob}$ | Output Admittance | $V_{CB} = 5V$ | $I_E = -1mA$ | 0.0 | 0.4 | 1.2 | $\mu$mho |
| $h_{rb}$ | Feedback Voltage Ratio | $V_{CB} = 5V$ | $I_E = -1mA$ | 50 | 400 | 1000 | $X10^{-6}$ |
| $h_{fb}$ | Current Transfer Ratio | $V_{CB} = 5V$ | $I_E = -1mA$ | −0.9735 | −0.98 | −0.989 | — |
| $PG_e$ | Power Gain*† | $V_{CE} = 20V$ | $I_E = -2mA$ | — | 42 | — | db |
| NF | Noise Figure*‡ | $V_{CE} = 5V$ | $I_E = -1mA$ | — | 20 | — | db |
| $f_{\alpha b}$ | Frequency Cutoff | $V_{CB} = 5V$ | $I_E = -1mA$ | — | 6 | — | mc |
| $C_{ob}$ | Output Capacitance (1mc) | $V_{CB} = 5V$ | $I_E = -1mA$ | — | 7 | — | $\mu\mu f$ |
| $R_{cs}$ | Saturation Resistance* | $I_B = 2.2mA$ | $I_C = 5mA$ | — | 100 | 200 | Ohm |

*Common Emitter †$R_g$ = 1k; $R_L$ = 20k ‡Conventional Noise—Compared to 1000 ohm resistor, 1000 cps and 1 cycle band width

LICENSED UNDER BELL SYSTEM PATENTS

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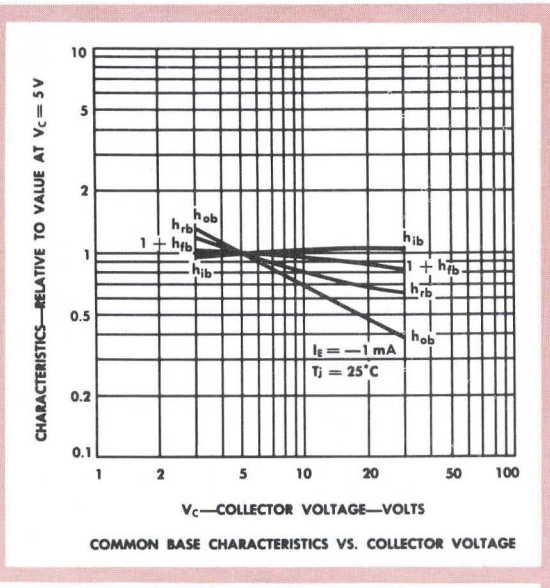
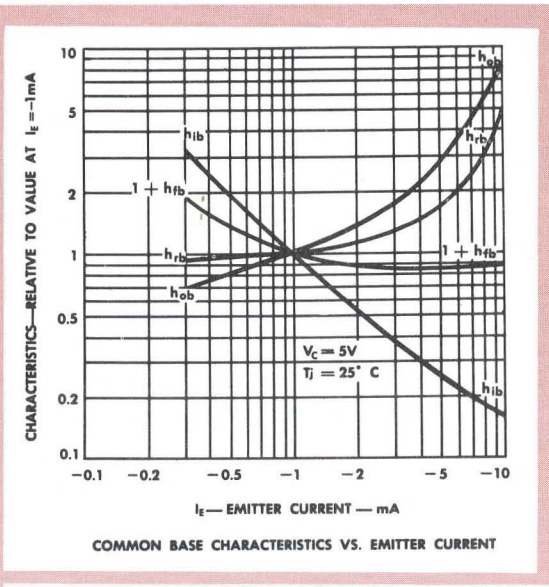
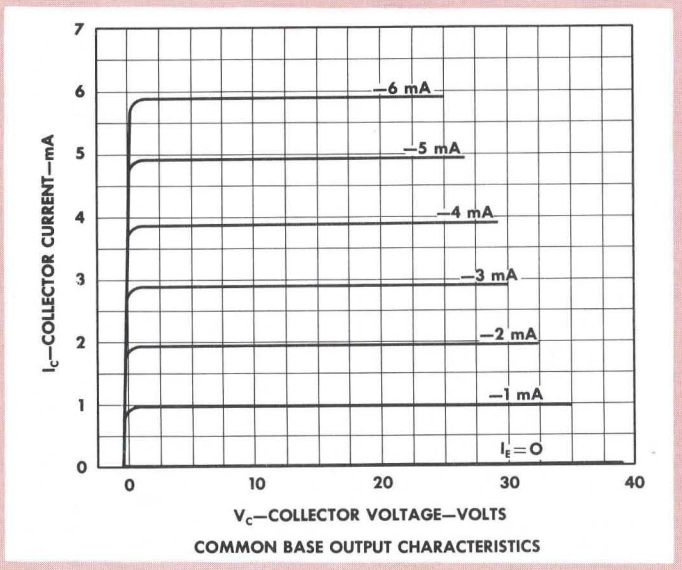
## TYPICAL CHARACTERISTICS



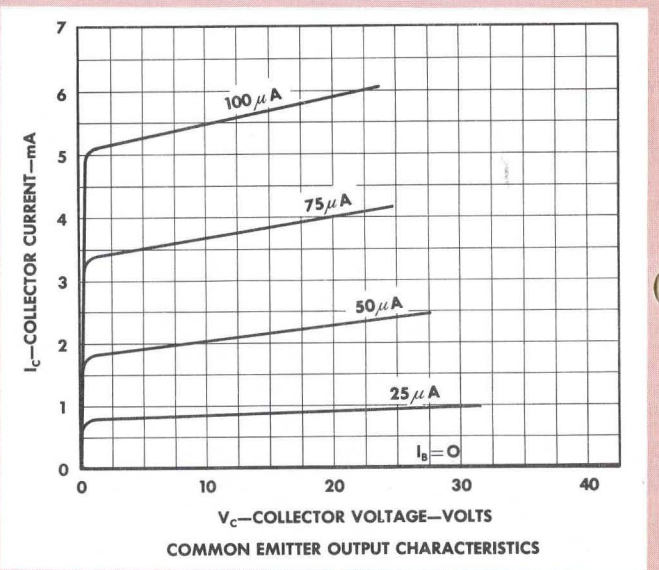

COMMON BASE CHARACTERISTICS VS. COLLECTOR VOLTAGE



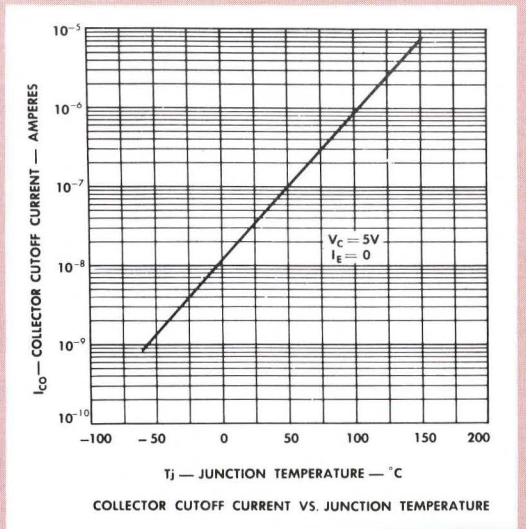

COMMON BASE CHARACTERISTICS VS. EMITTER CURRENT



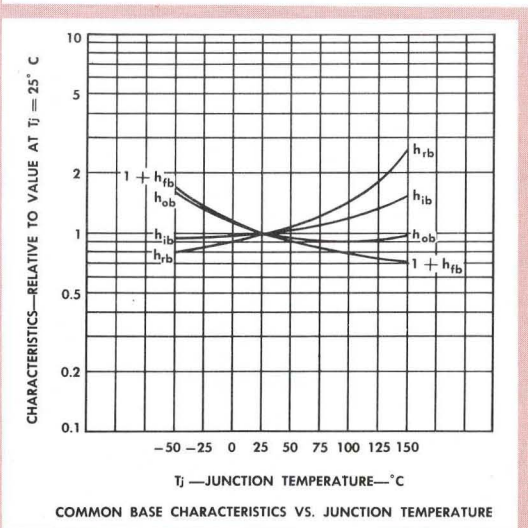

COMMON BASE OUTPUT CHARACTERISTICS




COMMON EMITTER OUTPUT CHARACTERISTICS




COLLECTOR CUTOFF CURRENT VS. JUNCTION TEMPERATURE




COMMON BASE CHARACTERISTICS VS. JUNCTION TEMPERATURE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