NEC

# NPN SILICON TRANSISTOR

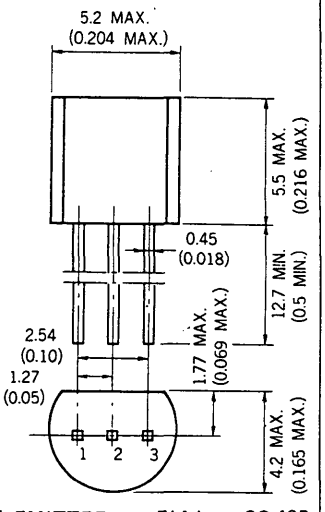
# 2SC1674

**DESCRIPTION** The 2SC1674 is designed for use in FM RF amplifier and local oscillator of FM tuner.

**FEATURES**

- High gain bandwidth product ($f_T$ = 600 MHz TYP.)
- Small output capacitance ($C_{ob}$ = 1.0 pF TYP.)
- Low noise figure (NF = 3.0 dB TYP. @100 MHz)

**PACKAGE DIMENSIONS**
in millimeters (inches)




1. EMITTER
2. COLLECTOR
3. BASE

EIAJ : SC-43B
JEDEC : TO-92
IEC : PA33

**ABSOLUTE MAXIMUM RATINGS**

Maximum Temperatures
- Storage Temperature . . . . . −55 to +125 °C
- Junction Temperature . . . . . +125 °C Maximum

Maximum Power Dissipation (Ta = 25 °C)
- Total Power Dissipation . . . . . 250 mW

Maximum Voltages and Currents (Ta = 25 °C)
- $V_{CBO}$ Collector to Base Voltage . . . . . 30 V
- $V_{CEO}$ Collector to Emitter Voltage . . . . 20 V
- $V_{EBO}$ Emitter to Base Voltage . . . . . 4.0 V
- $I_C$ Collector Current . . . . . 20 mA
- $I_B$ Base Current . . . . . 20 mA

**ELECTRICAL CHARACTERISTICS (Ta = 25 °C)**

| SYMBOL | CHARACTERISTIC | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS |
|---|---|---|---|---|---|---|
| $h_{FE}$ | DC Current Gain | 40 | 90 | 180 | – | $V_{CE}$ = 6.0 V, $I_C$ = 1.0 mA |
| $C_{ob}$ | Output Capacitance | | 1.0 | 1.3 | pF | $V_{CB}$ = 6.0 V, $I_E$ = 0, f = 1.0 MHz |
| NF | Noise Figure | | 3.0 | 5.0 | dB | $V_{CE}$ = 6.0 V, $I_E$ = −1.0 mA, $R_G$ = 50 Ω, f = 100 MHz See test circuit |
| $f_T$ | Gain Bandwidth Product | 400 | 600 | | MHz | $V_{CE}$ = 6.0 V, $I_E$ = −1.0 mA |
| $G_{pe}$ | Power Gain | 18 | 22 | | dB | $V_{CE}$ = 6.0 V, $I_E$ = −1.0 mA, $R_G$ = 50 Ω, f = 100 MHz See test circuit |
| $C_c$·rb'b | Collector to Base Time Constant | | 12 | 15 | ps | $V_{CE}$ = 6.0 V, $I_E$ = −1.0 mA, f = 31.9 MHz |
| $I_{CBO}$ | Collector Cutoff Current | | | 100 | nA | $V_{CB}$ = 30 V, $I_E$ = 0 |
| $I_{EBO}$ | Emitter Cutoff Current | | | 100 | nA | $V_{EB}$ = 3.0 V, $I_C$ = 0 |
| $V_{BE}$ | Base to Emitter Voltage | | 0.72 | | V | $V_{CE}$ = 6.0 V, $I_C$ = 1.0 mA |
| $V_{CE(sat)}$ | Collector Saturation Voltage | | 0.1 | 0.3 | V | $I_C$ = 10 mA, $I_B$ = 1.0 mA |

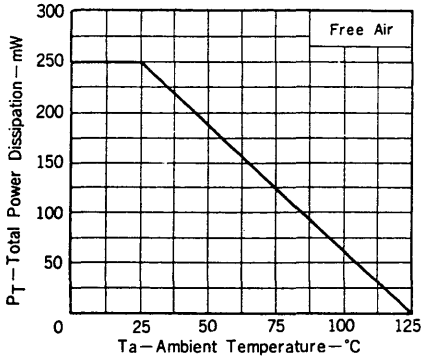
Classification of $h_{FE}$

| Rank | M | L | K |
|---|---|---|---|
| Range | 40 – 80 | 60 – 120 | 90 – 180 |

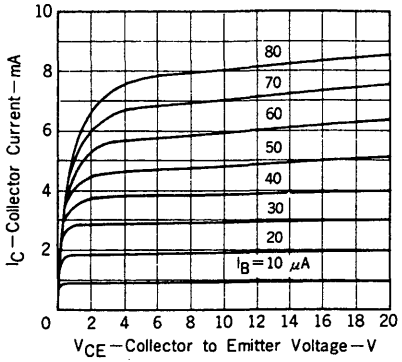
$h_{FE}$ Test Conditions : $V_{CE}$ = 6.0 V, $I_C$ = 1.0 mA

## TYPICAL CHARACTERISTICS (Ta = 25 °C unless otherwise noted)

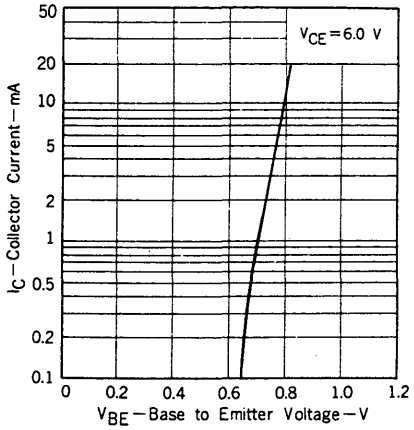
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



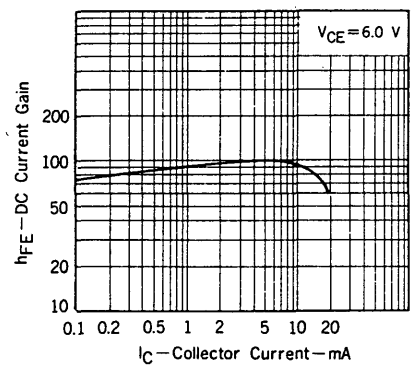

COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



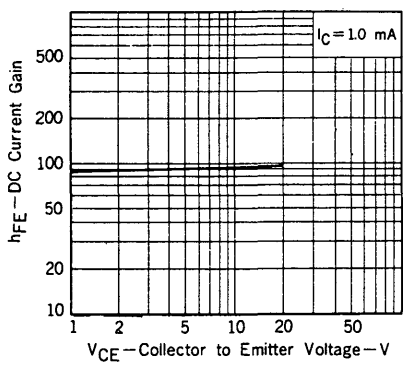

COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



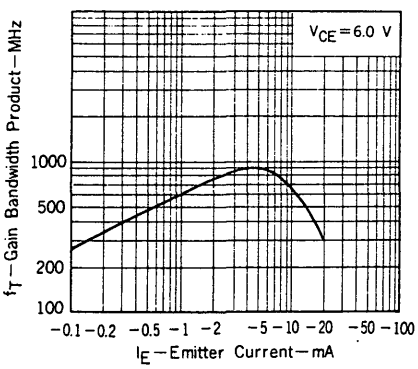

DC CURRENT GAIN vs. COLLECTOR CURRENT



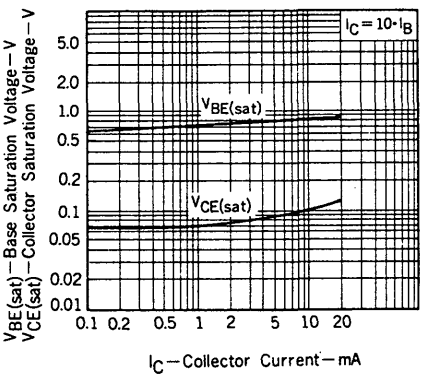

DC CURRENT GAIN vs. COLLECTOR TO EMITTER VOLTAGE



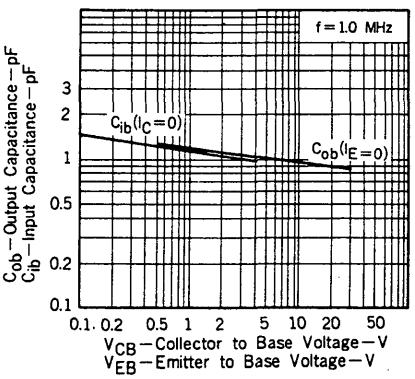

GAIN BANDWIDTH PRODUCT vs. EMITTER CURRENT



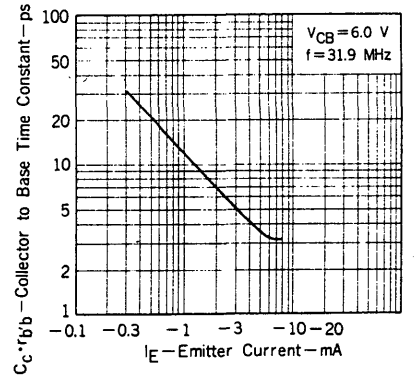

BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



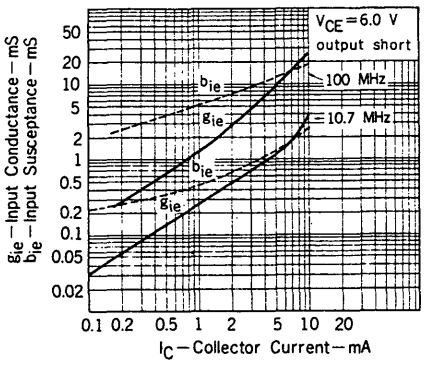

INPUT CAPACITANCE vs. EMITTER TO BASE VOLTAGE, OUTPUT CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



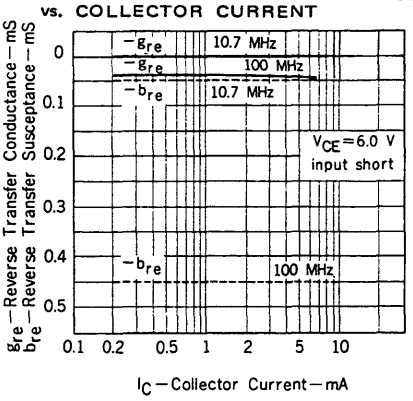

COLLECTOR TO BASE TIME CONSTANT vs. EMITTER CURRENT



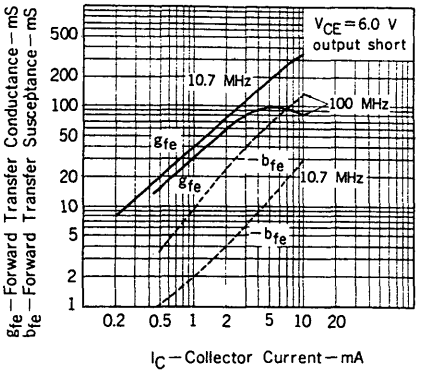
INPUT ADMITTANCE vs. COLLECTOR CURRENT



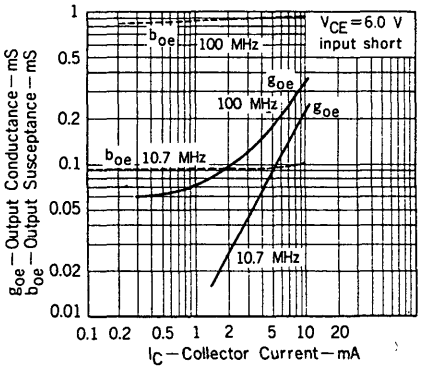

REVERSE TRANSFER ADMITTANCE vs. COLLECTOR CURRENT



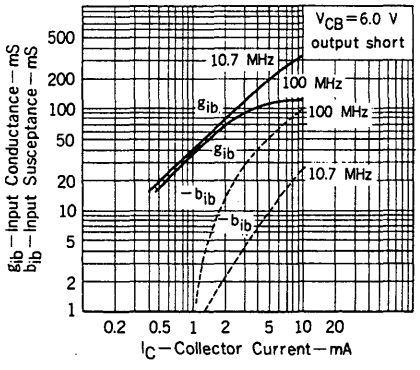

FORWARD TRANSFER ADMITTANCE vs. COLLECTOR CURRENT



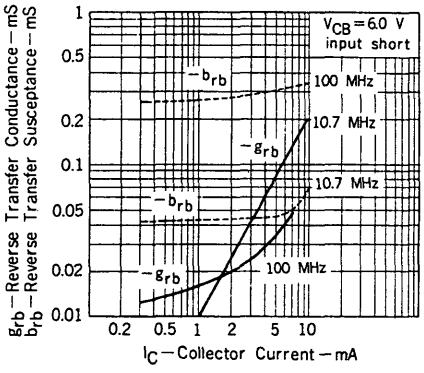

OUTPUT ADMITTANCE vs. COLLECTOR CURRENT



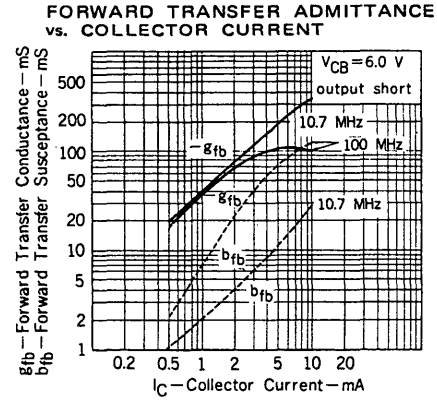

INPUT ADMITTANCE vs. COLLECTOR CURRENT



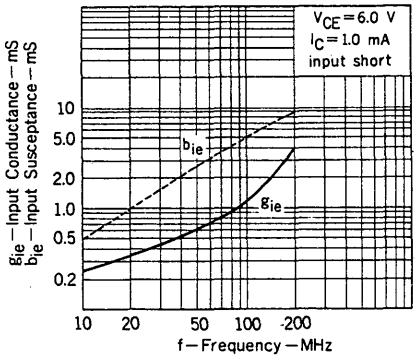

REVERSE TRANSFER ADMITTANCE vs. COLLECTOR CURRENT



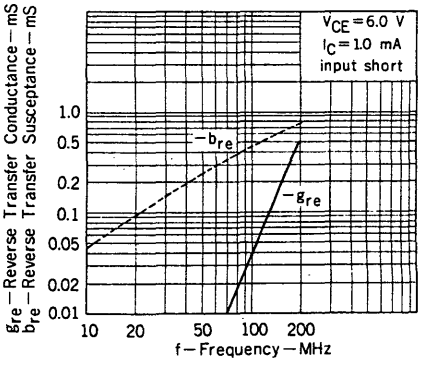

FORWARD TRANSFER ADMITTANCE vs. COLLECTOR CURRENT



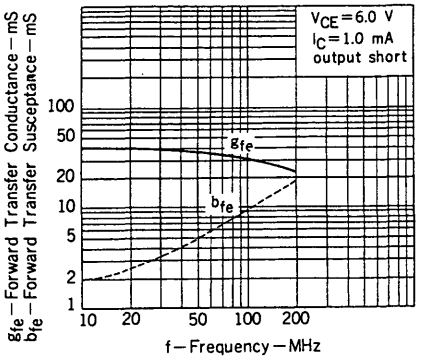

INPUT ADMITTANCE vs. FREQUENCY



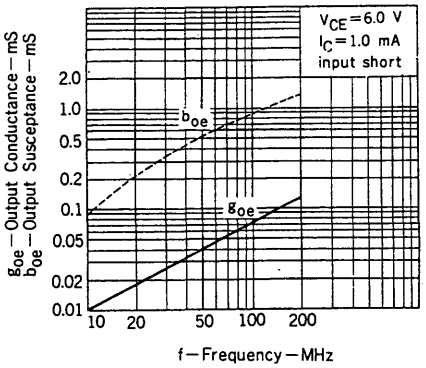

REVERSE TRANSFER ADMITTANCE vs. FREQUENCY



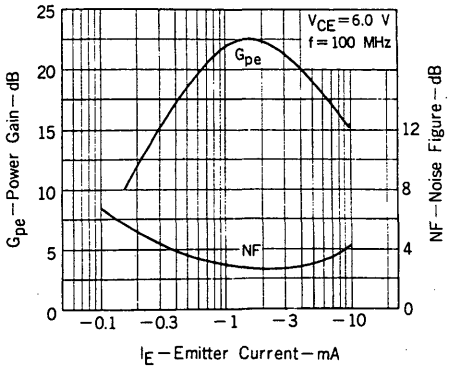
FORWARD TRANSFER ADMITTANCE vs. FREQUENCY




OUTPUT ADMITTANCE vs. FREQUENCY




POWER GAIN, NOISE FIGURE vs. EMITTER CURRENT




100 MHz $G_{pe}$, NF TEST CIRCUIT