

Silicon NPN planar RF transistor

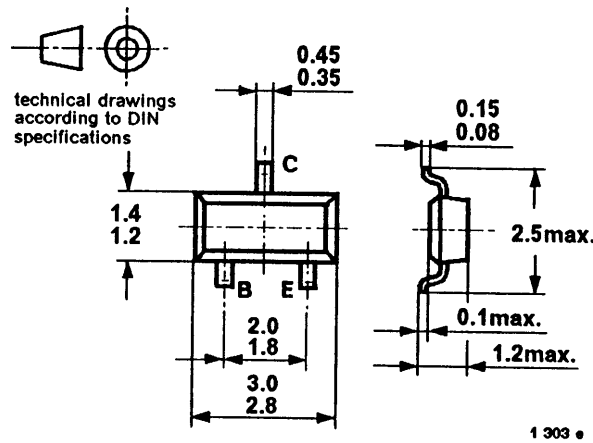
Applications

Wide band amplifier up to GHz range.

Features

- High power gain
- Low noise figure
- High transition frequency

Dimensions in mm



Marking: P2

Plastic case (SOT 23)

Absolute Maximum Ratings

| Parameters | Symbol | Value | Unit |
|---|-----------|-------------|------------------|
| Collector-base voltage | V_{CBO} | 20 | V |
| Collector-emitter voltage | V_{CEO} | 15 | V |
| Emitter-base voltage | V_{EBO} | 2 | V |
| Collector current | I_C | 30 | mA |
| Total power dissipation $T_{amb} \leq 60^\circ\text{C}$ | P_{tot} | 200 | mW |
| Junction temperature | T_j | 150 | $^\circ\text{C}$ |
| Storage temperature range | T_{stg} | -65 to +150 | $^\circ\text{C}$ |

Maximum Thermal Resistance

| Parameters | Symbol | Maximum | Unit |
|--|------------|---------|------|
| Junction ambient on glass fibre printed board (25 x 20 x 1.5) mm ³ plated with 35 μm Cu | R_{thJA} | 450 | K/W |

Electrical DC Characteristics

 $T_{amb} = 25^{\circ}\text{C}$

| Parameters / Test Conditions | Symbol | Min. | Typ. | Max. | Unit |
|---|--------------------|------|------|------|------|
| Collector-base cut-off current $V_{CB} = 10\text{ V}, I_E = 0\text{ A}$ | I_{CBO} | | | 50 | nA |
| Collector-base breakdown voltage $I_C = 10\text{ }\mu\text{A}$ | $V_{(BR)CBO}$ | 20 | | | V |
| Collector-emitter breakdown voltage $I_C = 2\text{ mA}, I_B = 0\text{ A}$ | $V_{(BR)CEO}^{1)}$ | 15 | | | V |
| Emitter-base breakdown voltage $I_E = 10\text{ }\mu\text{A}$ | $V_{(BR)EBO}$ | 2 | | | V |
| DC forward current transfer ratio $V_{CE} = 10\text{ V}, I_C = 14\text{ mA}$ | h_{FE} | 65 | 100 | 150 | |

 $1) \frac{t_p}{T} = 0.01, t_p = 0.3\text{ ms}$

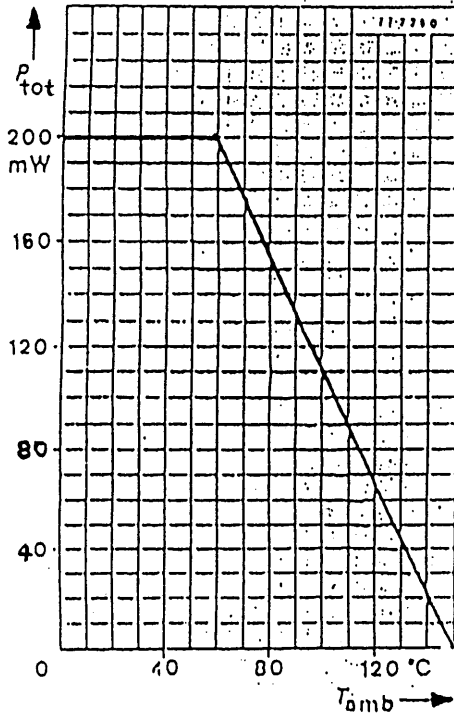
Electrical AC Characteristics

 $T_{amb} = 25^{\circ}\text{C}$

| Parameters / Test Conditions | Symbol | Min. | Typ. | Max. | Unit |
|--|-------------|------|------|------|------|
| Transition frequency $V_{CE} = 10\text{ V}, f = 500\text{ MHz}, I_C = 14\text{ mA}$ | f_T | 5.0 | 6.0 | | GHz |
| Collector-base capacitance $V_{CB} = 10\text{ V}, f = 1\text{ MHz}$ | C_{cb} | | 0.3 | | pF |
| Collector-emitter capacitance $V_{CE} = 10\text{ V}, f = 1\text{ MHz}$ | C_{ce} | | 0.15 | | pF |
| Emitter-base capacitance $V_{EB} = 0.5\text{ V}, f = 1\text{ MHz}$ | C_{eb} | | 0.65 | 0.9 | pF |
| Noise figure $V_{CE} = 10\text{ V}, I_C = 2\text{ mA}, R_s = 50\text{ }\Omega, f = 800\text{ MHz}$ | F | | 1.8 | | dB |
| Power gain $V_{CE} = 10\text{ V}, R_s = 50\text{ }\Omega, R_L = R_{Lopt}, I_C = 14\text{ mA}, f = 800\text{ MHz}$ | G_{pe} | | 16 | | dB |
| Linear output voltage – two tone intermodulation test $V_{CE} = 10\text{ V}, I_C = 14\text{ mA}, d_{IM} = 60\text{ dB}, f_1 = 806\text{ MHz}, f_2 = 810\text{ MHz}, R_s = R_L = 50\text{ }\Omega$ | $V_1 = V_2$ | | 120 | | mV |
| Third order intercept point $V_{CE} = 10\text{ V}, I_C = 14\text{ mA}, f = 800\text{ MHz}$ | IP_3 | | 24 | | dBm |

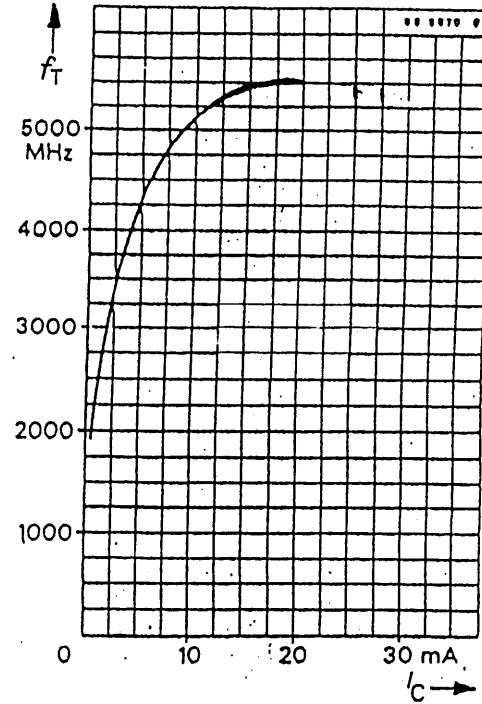
Total power dissipation

$$P_{tot} = f(T_{amb})$$



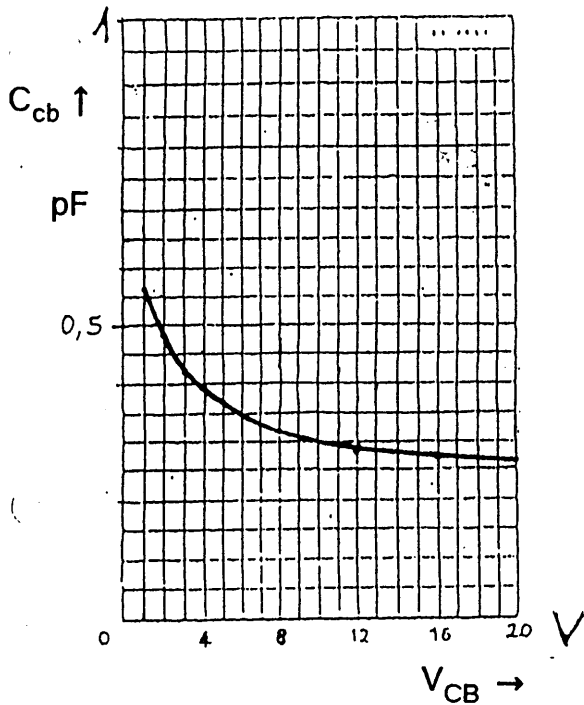
Transition frequency

$$f_T = f(I_C); f = 500\text{MHz}, V_{CE} = 10\text{V}$$



Collector-base capacitance

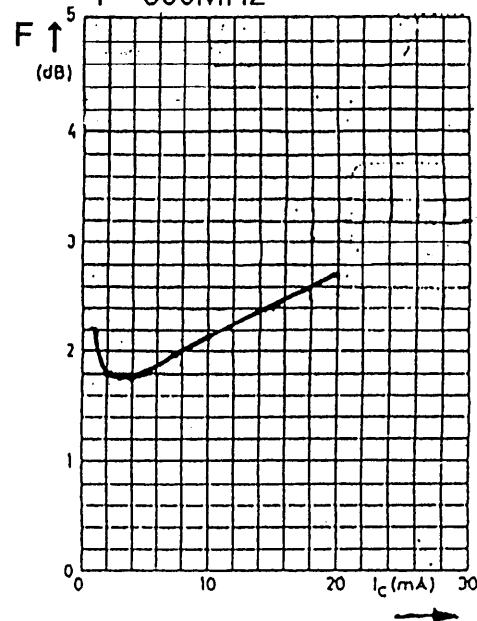
$$C_{cb} = f(V_{CB}), f = 1\text{MHz}$$



Noise figure

$$F = f(I_C); V_{CE} = 10\text{V}, R_S = 50\Omega$$

$$f = 800\text{MHz}$$



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