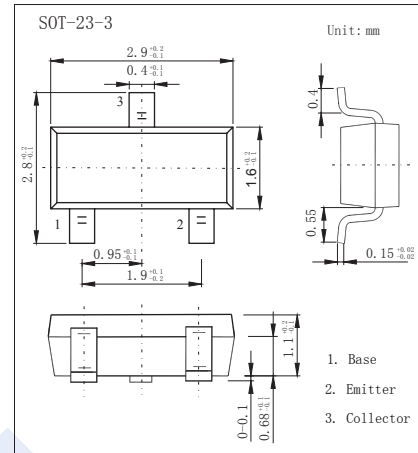


NPN Transistors

2SC2223-HF

■ Features

- Collector Current Capability $I_C=20\text{mA}$
- Collector Emitter Voltage $V_{CE0}=20\text{V}$
- Pb-Free Package May be Available. The G-Suffix Denotes a Pb-Free Lead Finish



■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

| Parameter | Symbol | Rating | Unit |
|--------------------------------|-----------|------------|------------------|
| Collector - Base Voltage | V_{CBO} | 30 | V |
| Collector - Emitter Voltage | V_{CEO} | 20 | |
| Emitter - Base Voltage | V_{EBO} | 4 | |
| Collector Current - Continuous | I_C | 20 | mA |
| Collector Power Dissipation | P_C | 150 | mW |
| Junction Temperature | T_J | 125 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{stg} | -55 to 125 | |

■ Electrical Characteristics $T_a = 25^\circ\text{C}$

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|--------------------------------------|---------------|---|-----|------|-----|------|
| Collector-base breakdown voltage | V_{CBO} | $I_C = 100 \mu\text{A}, I_E = 0$ | 30 | | | V |
| Collector-emitter breakdown voltage | V_{CEO} | $I_C = 1 \text{ mA}, I_B = 0$ | 20 | | | |
| Emitter - base breakdown voltage | V_{EBO} | $I_E = 100 \mu\text{A}, I_C = 0$ | 4 | | | |
| Collector-base cut-off current | I_{CBO} | $V_{CB} = 25 \text{ V}, I_E = 0$ | | | 100 | nA |
| Emitter cut-off current | I_{EBO} | $V_{EB} = 3 \text{ V}, I_C = 0$ | | | 100 | |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C = 10 \text{ mA}, I_B = 1 \text{ mA}$ | | | 0.3 | V |
| Base - emitter saturation voltage | $V_{BE(sat)}$ | $I_C = 10 \text{ mA}, I_B = 1 \text{ mA}$ | | | 1.2 | |
| Base - emitter voltage | V_{BE} | $V_{CE} = 6 \text{ V}, I_C = 1 \text{ mA}$ | | 0.72 | | |
| DC current gain | h_{FE} | $V_{CE} = 6 \text{ V}, I_C = 1 \text{ mA}$ | 40 | | 180 | |
| Noise Figure | NF | $V_{CE} = 6 \text{ V}, I_E = -1 \text{ mA}, R_G = 50 \Omega, f = 100 \text{ MHz}$ | | 3 | | dB |
| Collector output capacitance | C_{ob} | $V_{CB} = 6 \text{ V}, I_E = 0, f = 1 \text{ MHz}$ | | 1 | | pF |
| Collector to base time constant | $C_{crb/b}$ | $V_{CE} = 6 \text{ V}, I_E = -1 \text{ mA}, f = 31.9 \text{ MHz}$ | | 12 | | pS |
| Transition frequency | f_T | $V_{CE} = 6 \text{ V}, I_E = -1 \text{ mA}$ | 400 | 600 | | MHz |

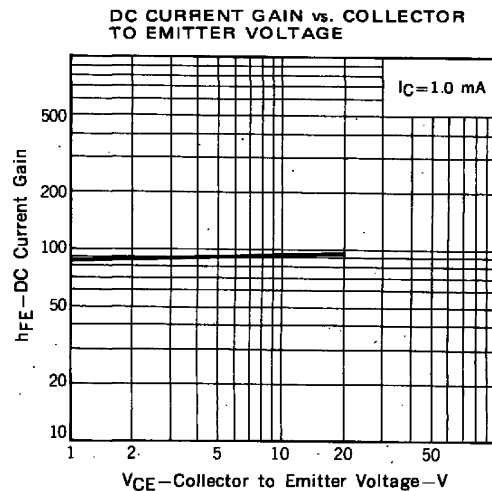
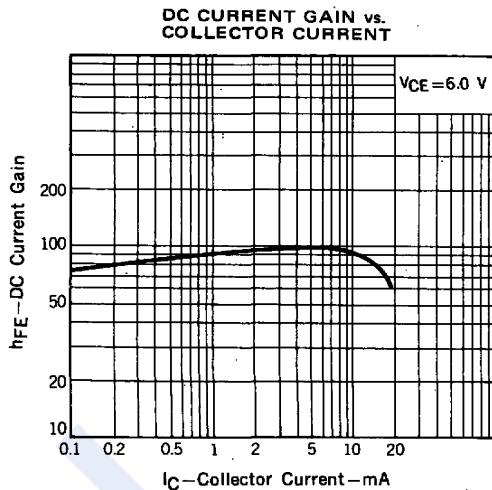
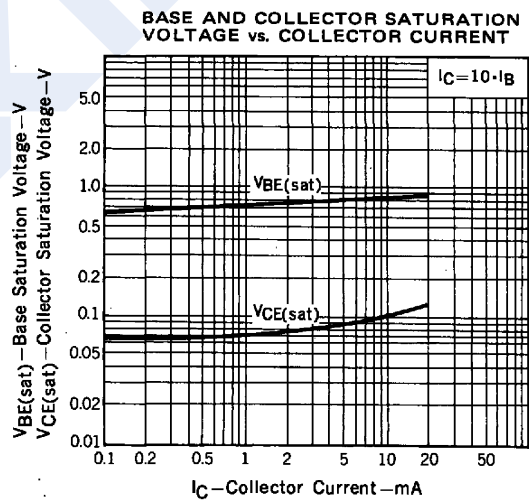
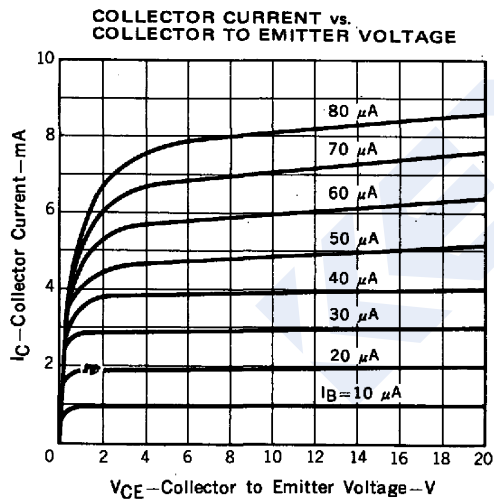
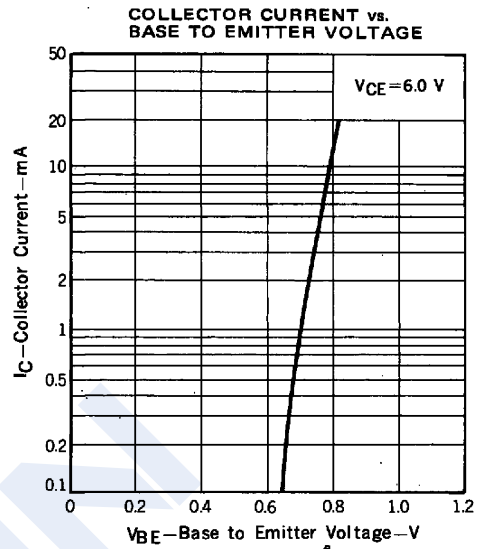
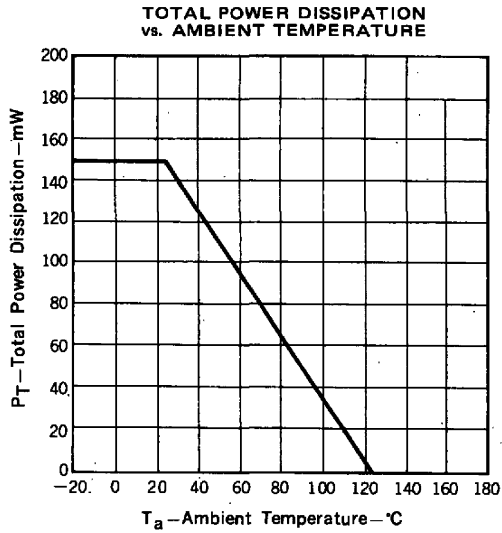
■ Classification of h_{FE}

| Type | 2SC2223-F12-HF | 2SC2223-F13-HF | 2SC2223-F14-HF |
|---------|------------------|------------------|------------------|
| Range | 40-80 | 60-120 | 90-180 |
| Marking | F12 _F | F13 _F | F14 _F |

NPN Transistors

2SC2223-HF

■ Typical Characteristics

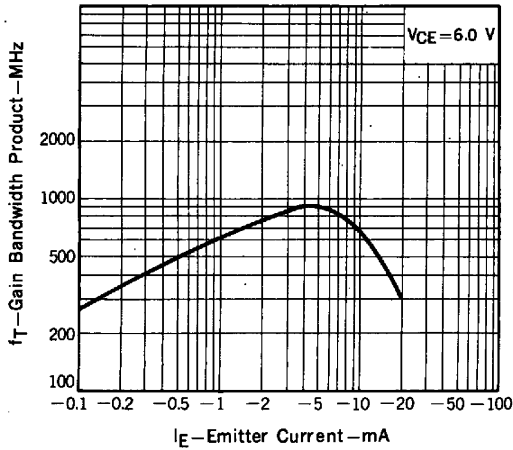


NPN Transistors

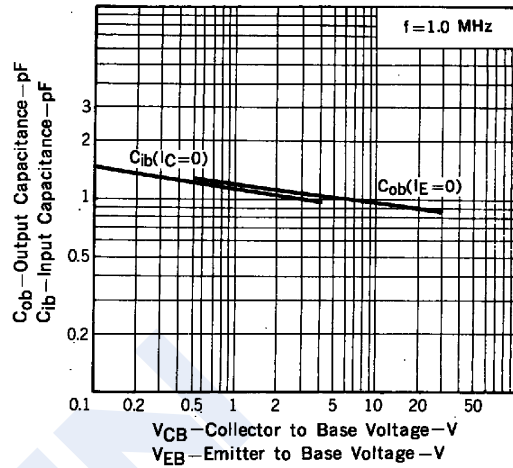
2SC2223-HF

■ Typical Characteristics

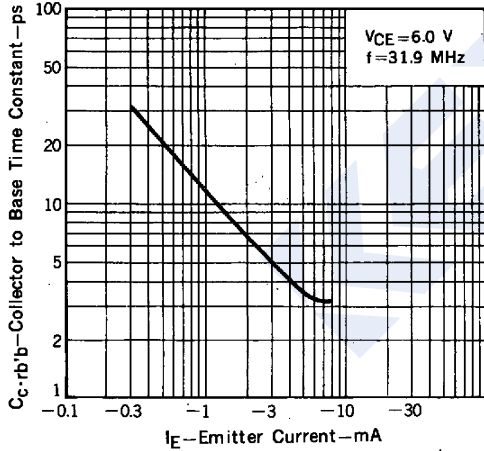
GAIN BANDWIDTH PRODUCT vs. EMITTER CURRENT



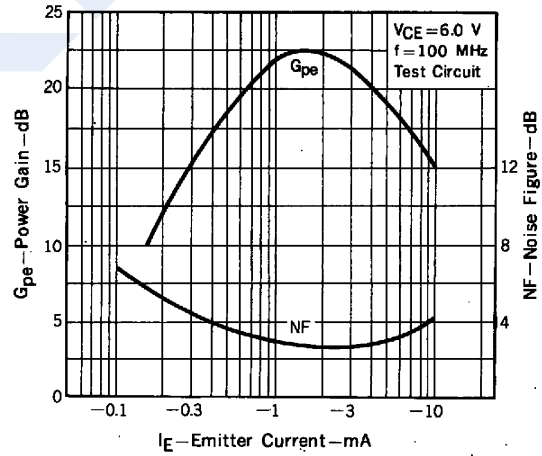
INPUT CAPACITANCE vs. EMITTER TO BASE VOLTAGE, OUTPUT CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



COLLECTOR TO BASE TIME CONSTANT vs. EMITTER CURRENT



POWER GAIN, NOISE FIGURE vs. EMITTER CURRENT



100 MHz G_{pe} , NF TEST CIRCUIT

