
2SC5141

Silicon NPN Epitaxial

HITACHI

ADE-208-228A (Z)
2nd. Edition
Mar. 2001

Application

VHF / UHF wide band amplifier

Features

- High gain bandwidth product
 $f_T = 5.8$ GHz typ
- High gain, low noise figure
PG = 13 dB typ, NF = 1.6 dB typ at $f = 900$ MHz

Outline

SMPAK



1. Emitter
2. Base
3. Collector

Note: Marking is "YN-".

Attention: This device is very sensitive to electro static discharge.

It is recommended to adopt appropriate cautions when handling this transistor.



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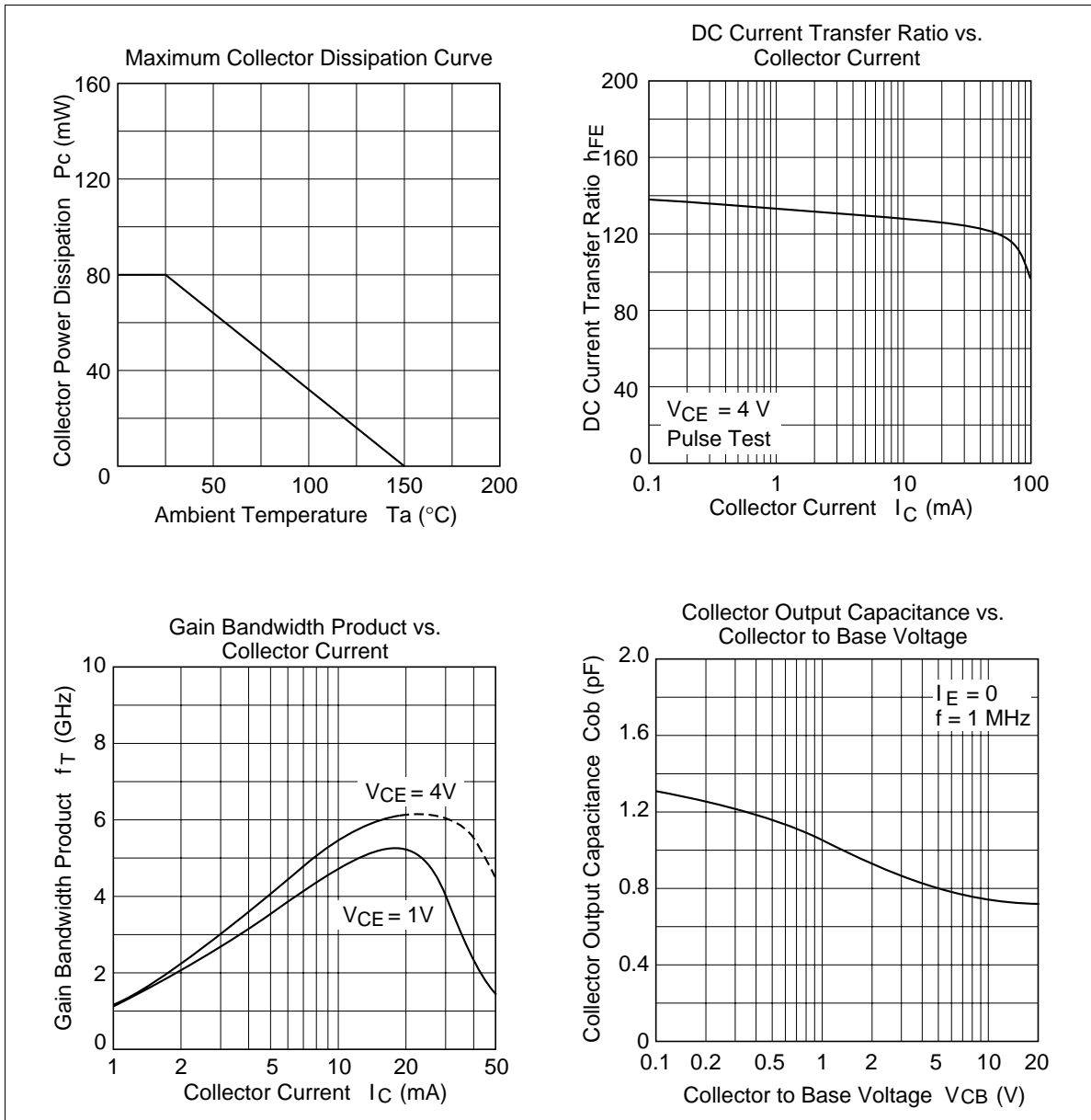
Absolute Maximum Ratings (Ta = 25°C)

| Item | Symbol | Ratings | Unit |
|------------------------------|-----------|-------------|------|
| Collector to base voltage | V_{CBO} | 20 | V |
| Collector to emitter voltage | V_{CEO} | 12 | V |
| Emitter to base voltage | V_{EBO} | 2 | V |
| Collector current | I_C | 50 | mA |
| Collector power dissipation | P_C | 80 | mW |
| Junction temperature | T_j | 150 | °C |
| Storage temperature | T_{stg} | -55 to +150 | °C |

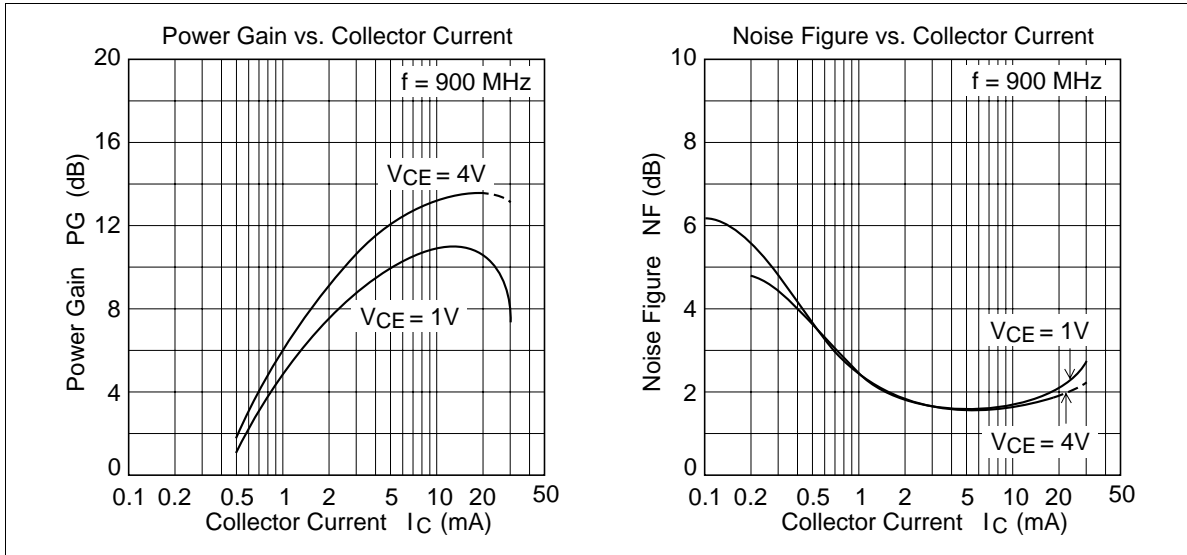
Electrical Characteristics (Ta = 25°C)

| Item | Symbol | Min | Typ | Max | Unit | Test conditions |
|-------------------------------------|---------------|-----|------|-----|---------|-----------------------------------------------|
| Collector to base breakdown voltage | $V_{(BR)CBO}$ | 20 | — | — | V | $I_C = 10 \mu A, I_E = 0$ |
| Collector cutoff current | I_{CBO} | — | — | 1 | μA | $V_{CB} = 15 V, I_E = 0$ |
| | I_{CEO} | — | — | 1 | mA | $V_{CE} = 12 V, R_{BE} = \infty$ |
| Emitter cutoff current | I_{EBO} | — | — | 10 | μA | $V_{EB} = 2 V, I_C = 0$ |
| DC current transfer ratio | h_{FE} | 50 | 120 | 250 | | $V_{CE} = 4 V, I_C = 20 mA$ |
| Collector output capacitance | C_{ob} | — | 0.8 | 1.4 | pF | $V_{CB} = 5 V, I_E = 0,$ $f = 1 MHz$ |
| Gain bandwidth product | f_T | 4.0 | 5.8 | — | GHz | $V_{CE} = 4 V, I_C = 20 mA$ |
| Power gain | PG | 9.5 | 13.0 | — | dB | $V_{CE} = 4 V, I_C = 20 mA,$ $f = 900 MHz$ |
| Noise figure | NF | — | 1.6 | 3.0 | dB | $V_{CE} = 4 V, I_C = 5 mA,$ $f = 900 MHz$ |

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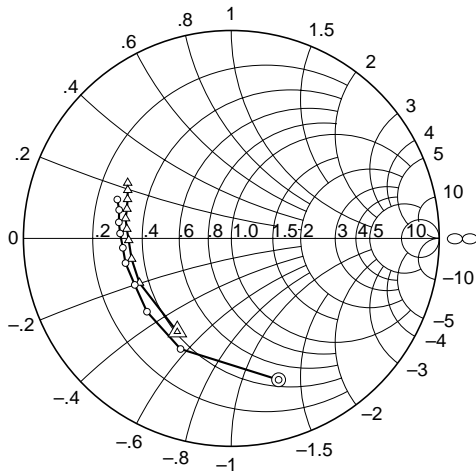


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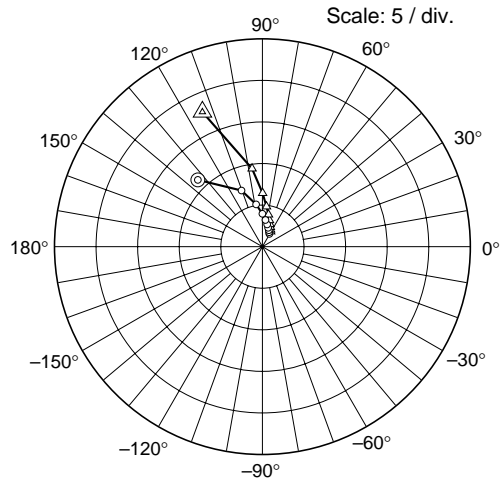
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S11 Parameter vs. Frequency



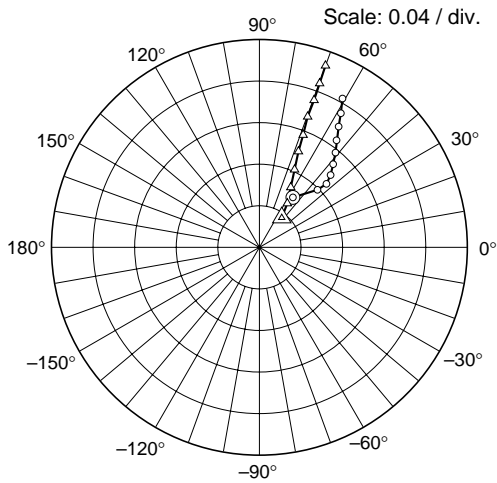
Condition: $V_{CE} = 4\text{ V}$, $Z_o = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 △ — △ ($I_C = 20\text{ mA}$)

S21 Parameter vs. Frequency



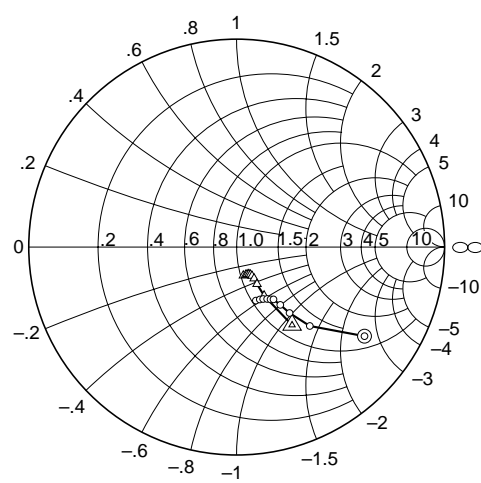
Condition: $V_{CE} = 4\text{ V}$, $Z_o = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 △ — △ ($I_C = 20\text{ mA}$)

S12 Parameter vs. Frequency



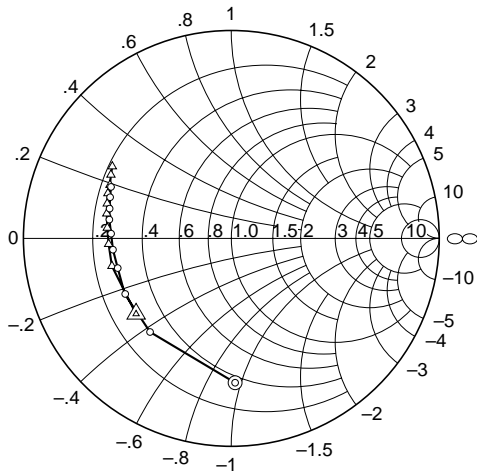
Condition: $V_{CE} = 4\text{ V}$, $Z_o = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 △ — △ ($I_C = 20\text{ mA}$)

S22 Parameter vs. Frequency



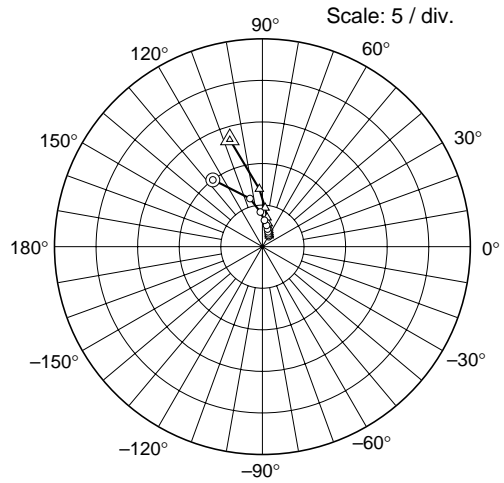
Condition: $V_{CE} = 4\text{ V}$, $Z_o = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 △ — △ ($I_C = 20\text{ mA}$)

S11 Parameter vs. Frequency



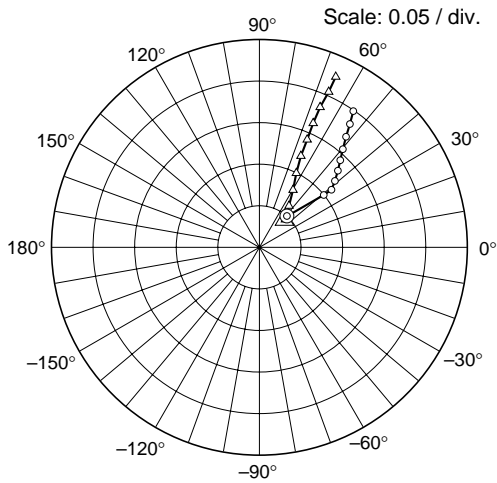
Condition: $V_{CE} = 1\text{ V}$, $Z_o = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 △ — △ ($I_C = 20\text{ mA}$)

S21 Parameter vs. Frequency



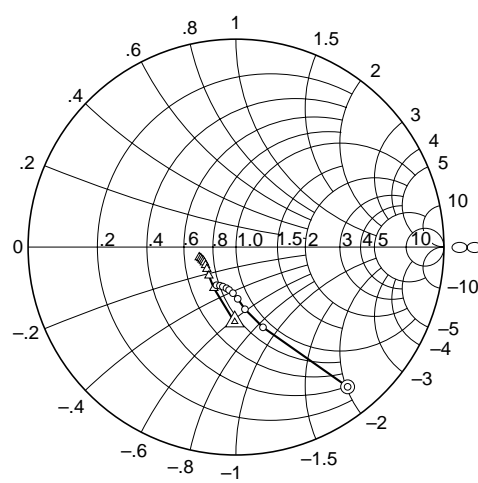
Condition: $V_{CE} = 1\text{ V}$, $Z_o = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
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S12 Parameter vs. Frequency



Condition: $V_{CE} = 1\text{ V}$, $Z_o = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 △ — △ ($I_C = 20\text{ mA}$)

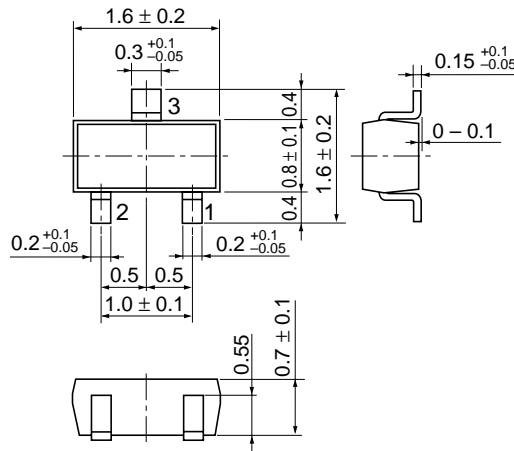
S22 Parameter vs. Frequency



Condition: $V_{CE} = 1\text{ V}$, $Z_o = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 △ — △ ($I_C = 20\text{ mA}$)

Package Dimensions

As of January, 2001
Unit: mm



| | |
|------------------------|----------|
| Hitachi Code | SMPAK |
| JEDEC | — |
| EIAJ | Conforms |
| Mass (reference value) | 0.003 g |

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