

2SC5218

Silicon NPN Epitaxial

HITACHI

ADE-208-279A (Z)
2nd. Edition
Mar. 2001

Application

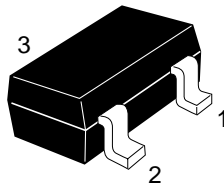
VHF / UHF wide band amplifier

Features

- High gain bandwidth product
 $f_T = 9 \text{ GHz typ}$
- High gain, low noise figure
 $PG = 13.0 \text{ dB typ}$, $NF = 1.2 \text{ dB typ}$ at $f = 900 \text{ MHz}$

Outline

MPAK



1. Emitter
2. Base
3. Collector

Note: Marking is "YK-".

Attention: This device is very sensitive to electro static discharge.
It is recommended to adopt appropriate cautions when handling this transistor.

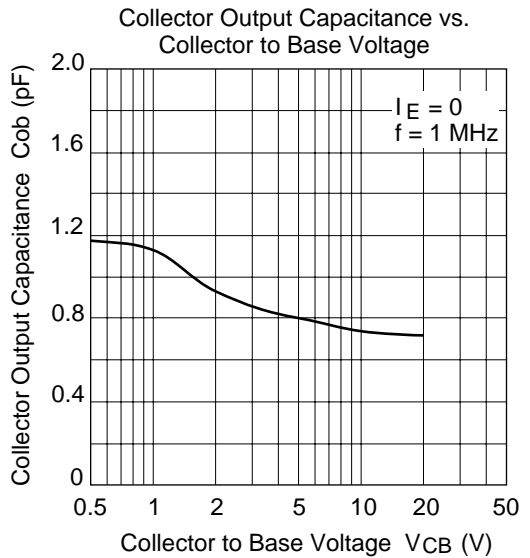
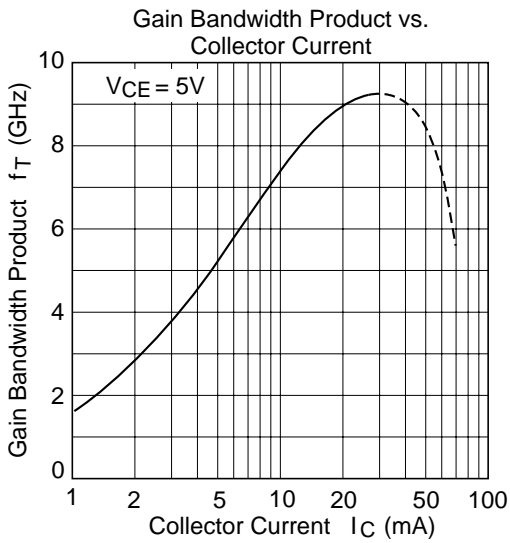
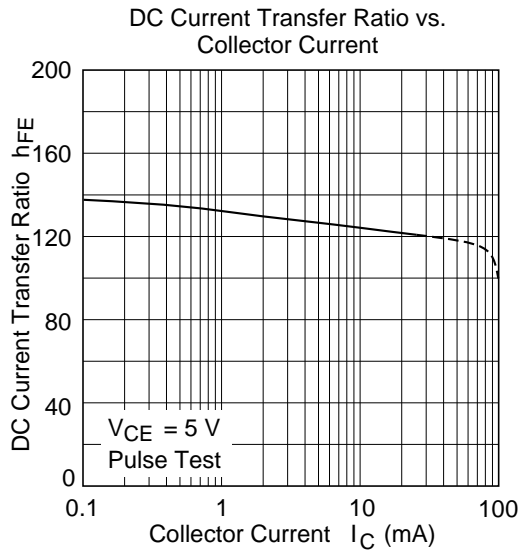
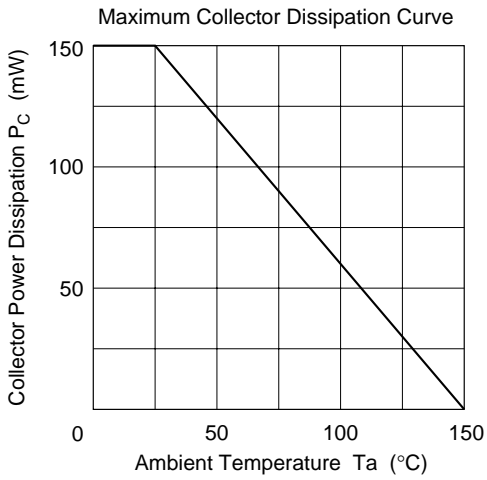
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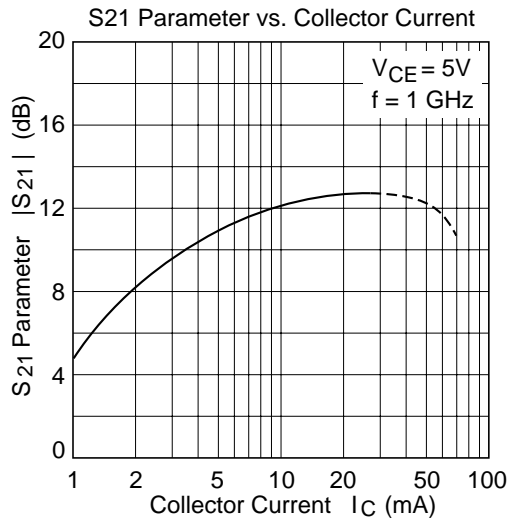
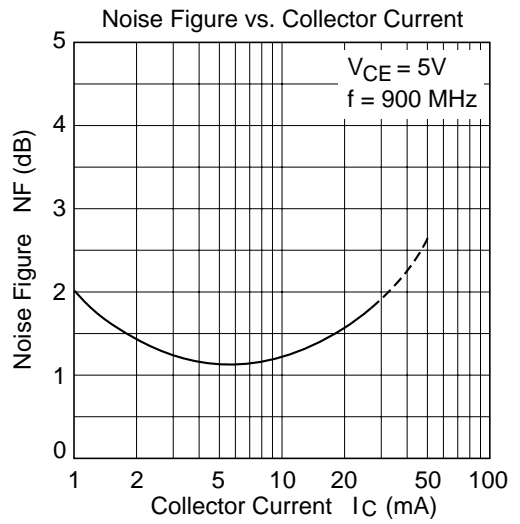
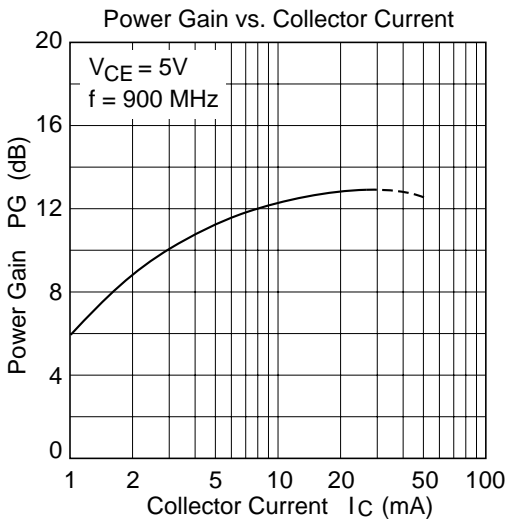
Absolute Maximum Ratings (Ta = 25°C)

| Item | Symbol | Ratings | Unit |
|------------------------------|-----------|-------------|------|
| Collector to base voltage | V_{CBO} | 15 | V |
| Collector to emitter voltage | V_{CEO} | 9 | V |
| Emitter to base voltage | V_{EBO} | 1.5 | V |
| Collector current | I_C | 50 | mA |
| Collector power dissipation | P_C | 150 | mW |
| Junction temperature | T_j | 150 | °C |
| Storage temperature | T_{stg} | -55 to +150 | °C |

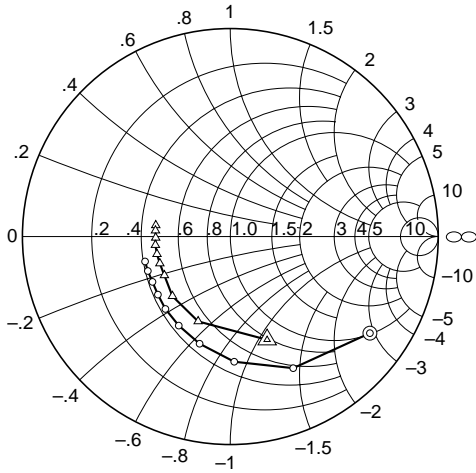
Electrical Characteristics (Ta = 25°C)

| Item | Symbol | Min | Typ | Max | Unit | Test conditions |
|-------------------------------------|---------------|-----|-----|-----|---------|---|
| Collector to base breakdown voltage | $V_{(BR)CBO}$ | 15 | — | — | V | $I_C = 10 \mu A, I_E = 0$ |
| Collector cutoff current | I_{CBO} | — | — | 1 | μA | $V_{CB} = 12 V, I_E = 0$ |
| | I_{CEO} | — | — | 1 | mA | $V_{CE} = 9 V, R_{BE} = \infty$ |
| Emitter cutoff current | I_{EBO} | — | — | 10 | μA | $V_{EB} = 1.5 V, I_C = 0$ |
| DC current transfer ratio | h_{FE} | 50 | 120 | 250 | | $V_{CE} = 5 V, I_C = 20 mA$ |
| 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 | 6.0 | 9.0 | — | GHz | $V_{CE} = 5 V, I_C = 20 mA$ |
| Power gain | PG | 10 | 13 | — | dB | $V_{CE} = 5 V, I_C = 20 mA,$ $f = 900 MHz$ |
| Noise figure | NF | — | 1.2 | 2.5 | dB | $V_{CE} = 5 V, I_C = 5 mA,$ $f = 900 MHz$ |



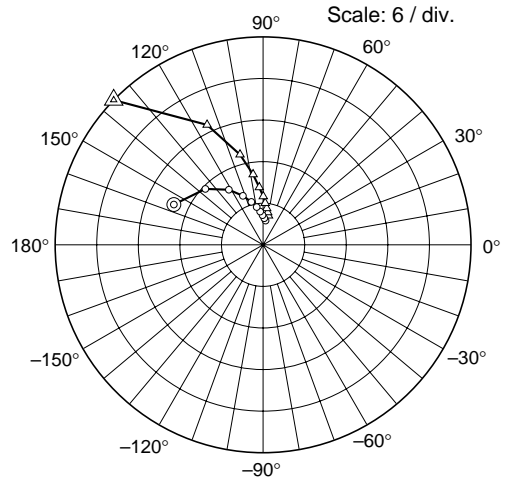


S11 Parameter vs. Frequency



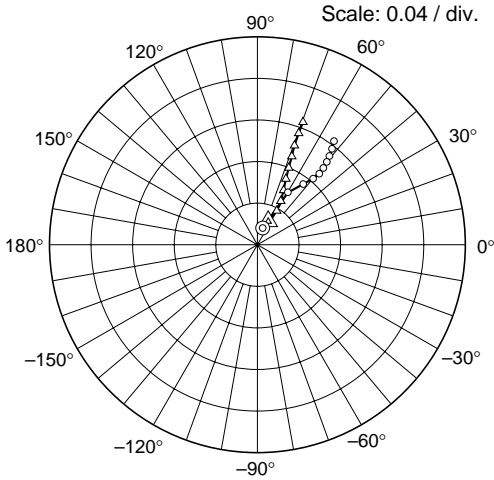
Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
 100 to 1000 MHz (100 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 △ — △ ($I_C = 20\text{ mA}$)

S21 Parameter vs. Frequency



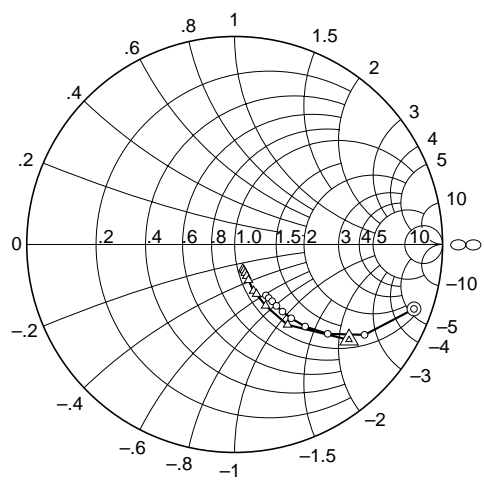
Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
 100 to 1000 MHz (100 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 △ — △ ($I_C = 20\text{ mA}$)

S12 Parameter vs. Frequency



Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
 100 to 1000 MHz (100 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 △ — △ ($I_C = 20\text{ mA}$)

S22 Parameter vs. Frequency



Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
 100 to 1000 MHz (100 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 △ — △ ($I_C = 20\text{ mA}$)

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S Parameter ($V_{CE} = 5 \text{ V}$, $I_C = 5 \text{ mA}$, $Z_O = 50 \Omega$)

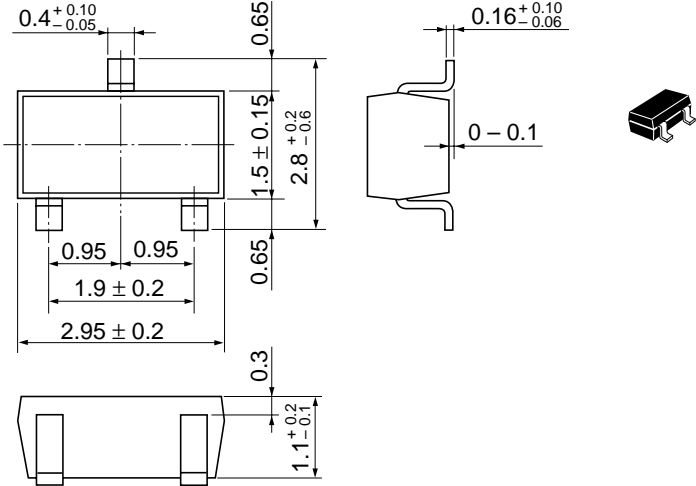
| Freq. (MHz) | S11 | | S21 | | S12 | | S22 | |
|----------------|-------|-------|------|------|-------|------|-------|-------|
| | MAG. | ANG. | MAG. | ANG. | MAG. | ANG. | MAG. | ANG. |
| 100 | 0.817 | -34.7 | 14.1 | 156 | 0.034 | 72.3 | 0.916 | -19.8 |
| 200 | 0.701 | -64.5 | 11.6 | 136 | 0.058 | 59.8 | 0.761 | -34.8 |
| 300 | 0.602 | -88.3 | 9.32 | 122 | 0.073 | 52.9 | 0.620 | -43.9 |
| 400 | 0.536 | -106 | 7.61 | 112 | 0.083 | 49.8 | 0.520 | -49.3 |
| 500 | 0.495 | -120 | 6.40 | 105 | 0.091 | 48.9 | 0.447 | -52.5 |
| 600 | 0.468 | -132 | 5.50 | 99.5 | 0.097 | 49.3 | 0.396 | -54.5 |
| 700 | 0.447 | -141 | 4.80 | 94.9 | 0.104 | 50.0 | 0.357 | -55.7 |
| 800 | 0.434 | -150 | 4.27 | 90.9 | 0.110 | 50.9 | 0.327 | -56.5 |
| 900 | 0.423 | -157 | 3.83 | 87.2 | 0.117 | 52.1 | 0.305 | -57.5 |
| 1000 | 0.428 | -164 | 3.50 | 83.9 | 0.124 | 53.3 | 0.287 | -58.4 |

S Parameter ($V_{CE} = 5 \text{ V}$, $I_C = 20 \text{ mA}$, $Z_O = 50 \Omega$)

| Freq. (MHz) | S11 | | S21 | | S12 | | S22 | |
|----------------|-------|-------|------|------|-------|------|-------|-------|
| | MAG. | ANG. | MAG. | ANG. | MAG. | ANG. | MAG. | ANG. |
| 100 | 0.529 | -70.4 | 29.9 | 136 | 0.025 | 64.9 | 0.716 | -39.8 |
| 200 | 0.427 | -111 | 19.0 | 115 | 0.038 | 60.3 | 0.462 | -56.6 |
| 300 | 0.386 | -134 | 13.4 | 104 | 0.048 | 61.8 | 0.330 | -63.2 |
| 400 | 0.370 | -150 | 10.2 | 98.0 | 0.058 | 64.3 | 0.260 | -66.2 |
| 500 | 0.366 | -159 | 8.28 | 93.7 | 0.069 | 66.6 | 0.214 | -67.8 |
| 600 | 0.367 | -167 | 6.96 | 89.7 | 0.080 | 67.8 | 0.184 | -68.8 |
| 700 | 0.364 | -174 | 6.01 | 87.0 | 0.091 | 68.7 | 0.162 | -69.1 |
| 800 | 0.360 | -179 | 5.28 | 84.2 | 0.102 | 69.5 | 0.146 | -69.7 |
| 900 | 0.362 | 176 | 4.71 | 81.7 | 0.115 | 69.4 | 0.133 | -70.4 |
| 1000 | 0.364 | 171 | 4.27 | 79.3 | 0.126 | 69.6 | 0.123 | -71.5 |

Package Dimensions

As of January, 2001
Unit: mm



| | |
|------------------------|----------|
| Hitachi Code | MPAK |
| JEDEC | — |
| EIAJ | Conforms |
| Mass (reference value) | 0.011 g |

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