
2SC5080

Silicon NPN Epitaxial

HITACHI

Application

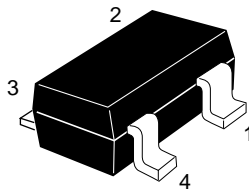
VHF / UHF wide band amplifier

Features

- High gain bandwidth product
 $f_T = 13.5 \text{ GHz Typ}$
- High gain, low noise figure
 $PG = 18 \text{ dB Typ}$, $NF = 1.1 \text{ dB Typ}$ at $f = 900 \text{ MHz}$

Outline

MPAK-4



1. Collector
2. Emitter
3. Base
4. Emitter

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

| Item | Symbol | Rated | Unit |
|------------------------------|------------------|-------------|------------------|
| Collector to base voltage | V_{CBO} | 15 | V |
| Collector to emitter voltage | V_{CEO} | 8 | 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 | $^\circ\text{C}$ |
| Storage temperature | T_{stg} | -55 to +150 | $^\circ\text{C}$ |

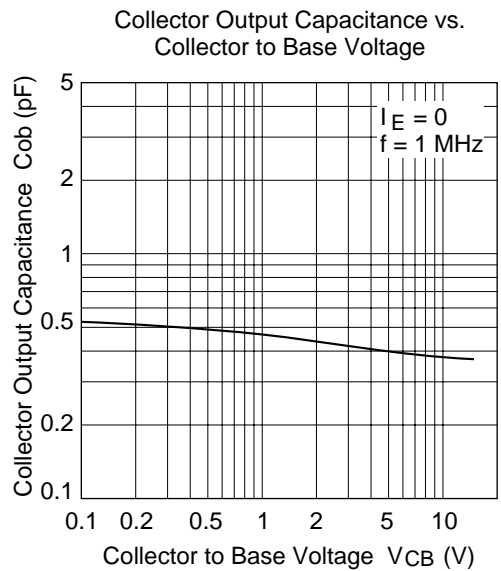
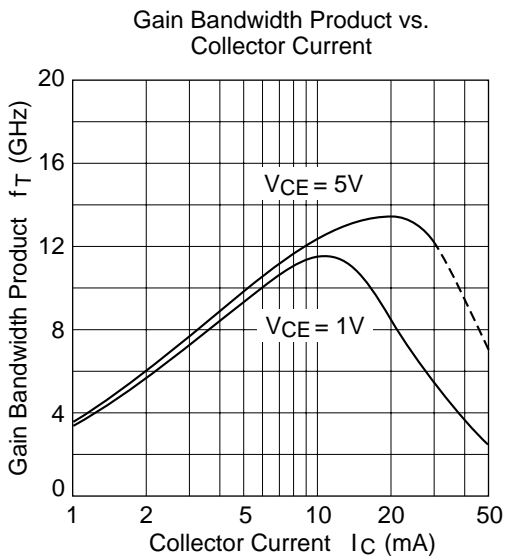
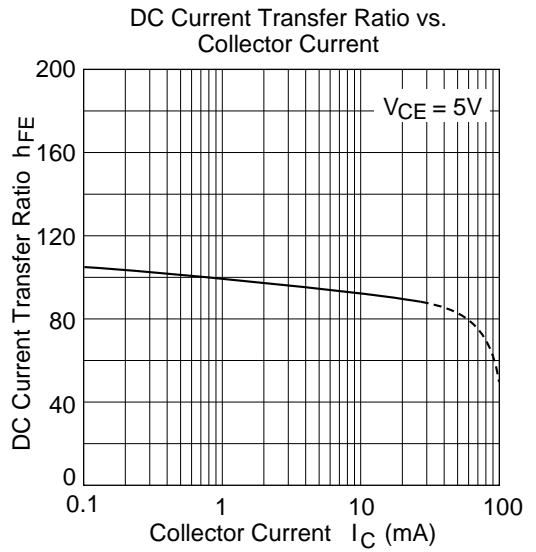
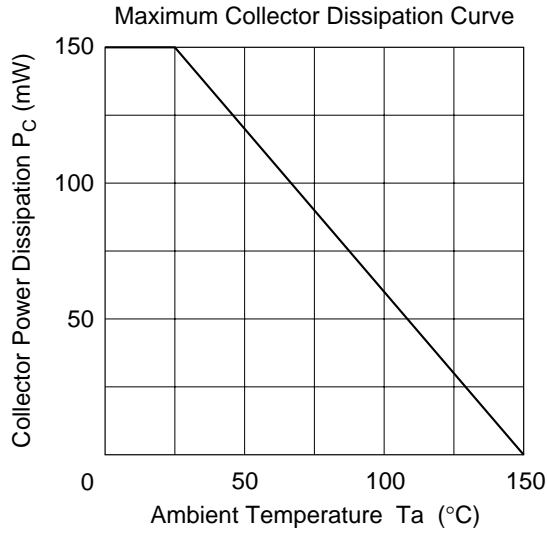
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

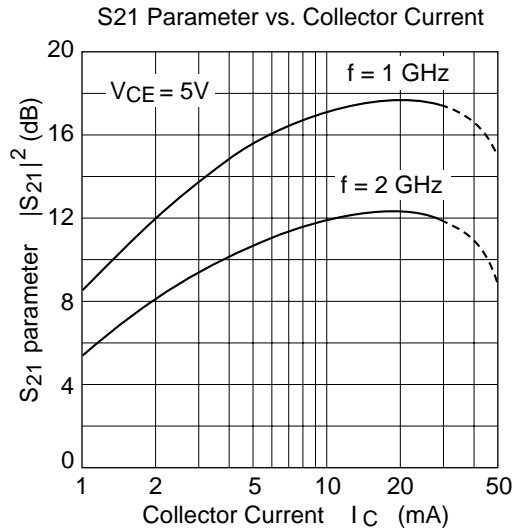
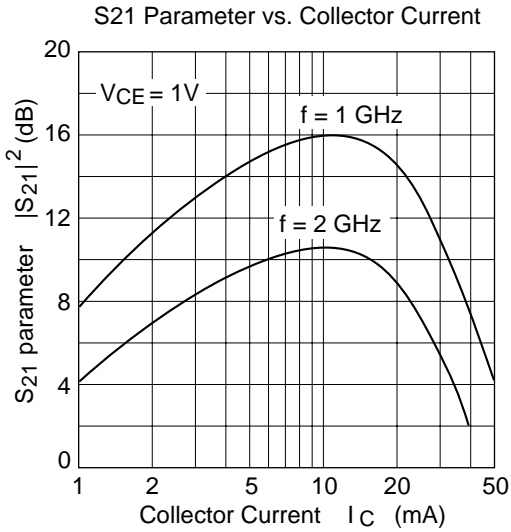
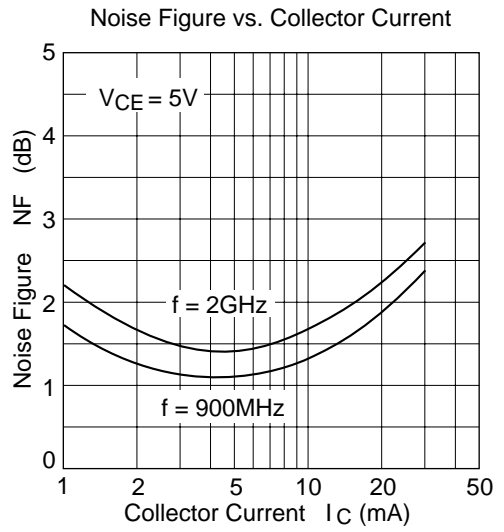
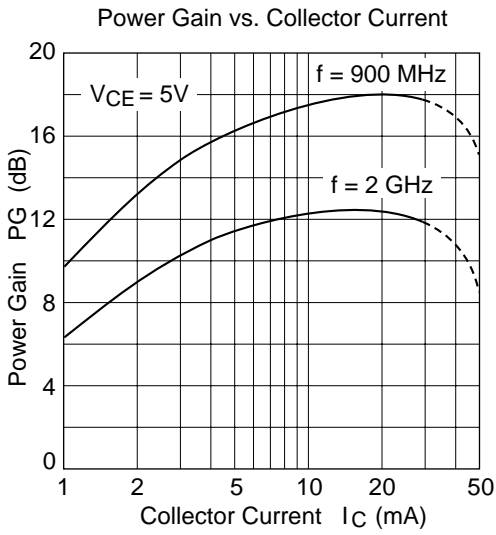
| Item | Symbol | Min | Typ | Max | Unit | Test conditions |
|-------------------------------------|-----------------------------|------|------|------|---------------|---|
| Collector to base breakdown voltage | $V_{(\text{BR})\text{CBO}}$ | 15 | — | — | V | $I_{\text{C}} = 10 \mu\text{A}$, $I_{\text{E}} = 0$ |
| Collector cutoff current | I_{CBO} | — | — | 1 | μA | $V_{\text{CB}} = 12 \text{ V}$, $I_{\text{E}} = 0$ |
| | I_{CEO} | — | — | 1 | mA | $V_{\text{CE}} = 8 \text{ V}$, $R_{\text{BE}} = \infty$ |
| Emitter cutoff current | I_{EBO} | — | — | 10 | μA | $V_{\text{EB}} = 1.5 \text{ V}$, $I_{\text{C}} = 0$ |
| DC current transfer ratio | h_{FE} | 50 | 90 | 160 | | $V_{\text{CE}} = 5 \text{ V}$, $I_{\text{C}} = 20 \text{ mA}$ |
| Collector output capacitance | C_{ob} | — | 0.4 | 0.75 | pF | $V_{\text{CB}} = 5 \text{ V}$, $I_{\text{E}} = 0$, $f = 1 \text{ MHz}$ |
| Gain bandwidth product | f_{T} | 10.5 | 13.5 | — | GHz | $V_{\text{CE}} = 5 \text{ V}$, $I_{\text{C}} = 20 \text{ mA}$ |
| Power gain | PG | 15 | 18 | — | dB | $V_{\text{CE}} = 5 \text{ V}$, $I_{\text{C}} = 20 \text{ mA}$, $f = 900 \text{ MHz}$ |
| Noise figure | NF | — | 1.1 | 2.0 | dB | $V_{\text{CE}} = 5 \text{ V}$, $I_{\text{C}} = 5 \text{ mA}$, $f = 900 \text{ MHz}$ |

Note: Marking is "ZD-".

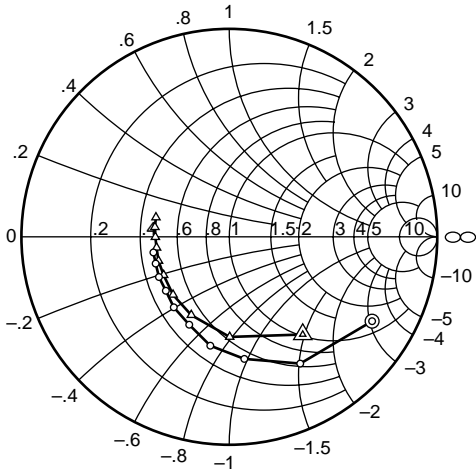
Attention: This device is very sensitive to electro static discharge.

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



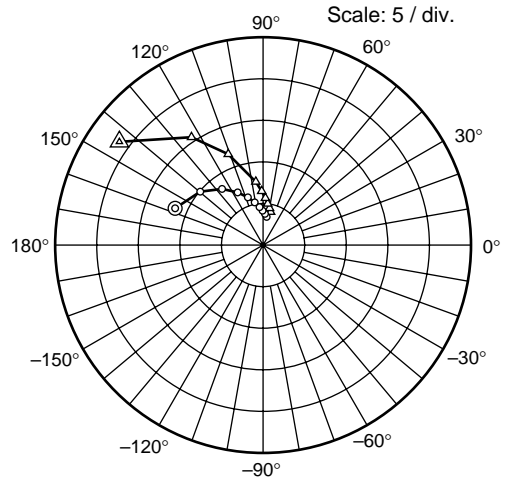


S11 Parameter vs. Frequency



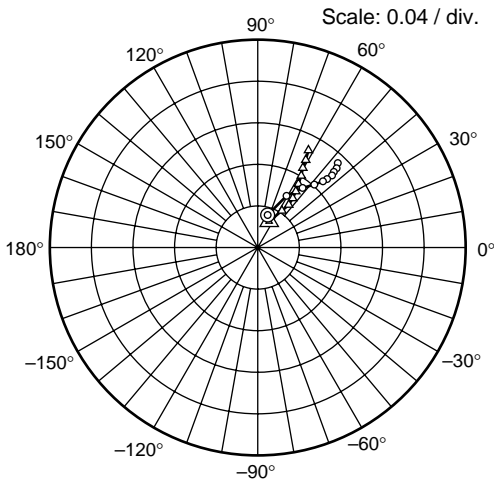
Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 △ — △ ($I_C = 20\text{ mA}$)

S21 Parameter vs. Frequency



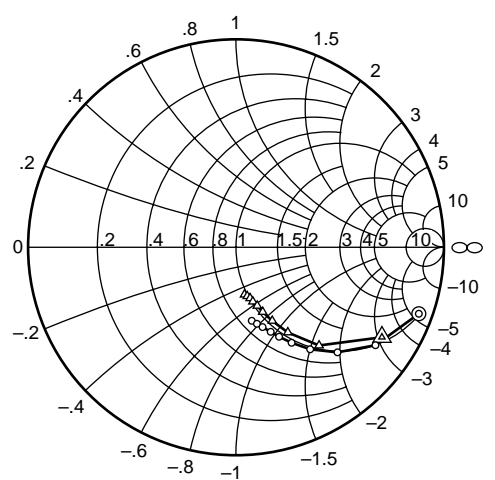
Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 △ — △ ($I_C = 20\text{ mA}$)

S12 Parameter vs. Frequency



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

S22 Parameter vs. Frequency



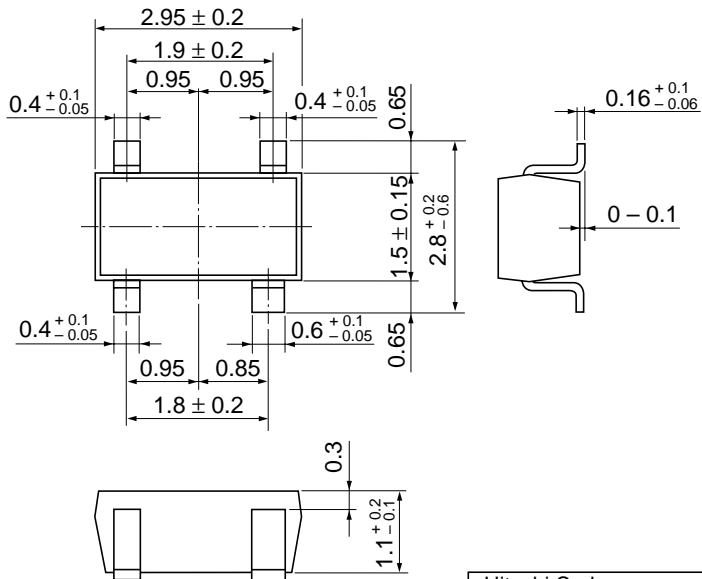
Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 △ — △ ($I_C = 20\text{ mA}$)

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

| Freq. (MHz) | S11 | | S21 | | S12 | | S22 | |
|----------------|-------|--------|-------|-------|--------|------|-------|-------|
| | MAG. | ANG. | MAG. | ANG. | MAG. | ANG. | MAG. | ANG. |
| 200 | 0.798 | -30.8 | 11.47 | 157.3 | 0.0329 | 73.0 | 0.936 | -20.0 |
| 400 | 0.699 | -60.8 | 9.88 | 139.6 | 0.0570 | 60.8 | 0.820 | -35.1 |
| 600 | 0.592 | -83.0 | 8.35 | 126.1 | 0.0718 | 53.0 | 0.703 | -46.0 |
| 800 | 0.532 | -99.9 | 7.03 | 115.7 | 0.0817 | 48.0 | 0.607 | -54.0 |
| 1000 | 0.465 | -114.5 | 6.02 | 107.6 | 0.0891 | 45.4 | 0.532 | -59.8 |
| 1200 | 0.432 | -128.2 | 5.23 | 101.0 | 0.0939 | 44.6 | 0.478 | -64.3 |
| 1400 | 0.401 | -139.6 | 4.58 | 95.2 | 0.0993 | 44.1 | 0.440 | -67.7 |
| 1600 | 0.390 | -150.2 | 4.14 | 90.7 | 0.103 | 44.8 | 0.405 | -71.6 |
| 1800 | 0.373 | -160.5 | 3.76 | 86.4 | 0.108 | 45.1 | 0.382 | -74.7 |
| 2000 | 0.373 | -168.3 | 3.42 | 82.6 | 0.112 | 46.5 | 0.362 | -77.9 |

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

| Freq. (MHz) | S11 | | S21 | | S12 | | S22 | |
|----------------|-------|--------|-------|-------|--------|------|-------|-------|
| | MAG. | ANG. | MAG. | ANG. | MAG. | ANG. | MAG. | ANG. |
| 200 | 0.588 | -53.1 | 21.24 | 144.3 | 0.0275 | 66.3 | 0.826 | -31.8 |
| 400 | 0.482 | -89.8 | 15.59 | 123.6 | 0.0423 | 56.6 | 0.619 | -49.8 |
| 600 | 0.419 | -115.9 | 11.75 | 111.0 | 0.0507 | 53.9 | 0.480 | -58.7 |
| 800 | 0.389 | -134.1 | 9.29 | 102.4 | 0.0581 | 54.5 | 0.395 | -63.8 |
| 1000 | 0.366 | -149.7 | 7.64 | 96.5 | 0.0652 | 55.8 | 0.337 | -67.6 |
| 1200 | 0.365 | -161.9 | 6.47 | 91.4 | 0.0726 | 57.3 | 0.300 | -70.1 |
| 1400 | 0.354 | -171.4 | 5.63 | 97.1 | 0.0806 | 58.7 | 0.274 | -72.8 |
| 1600 | 0.356 | -179.7 | 4.98 | 83.5 | 0.0877 | 60.4 | 0.255 | -74.6 |
| 1800 | 0.361 | 172.7 | 4.48 | 79.9 | 0.0959 | 61.2 | 0.242 | -77.1 |
| 2000 | 0.365 | 165.3 | 4.06 | 77.0 | 0.105 | 62.4 | 0.232 | -79.9 |



| | |
|--------------------------|----------|
| Hitachi Code | MPAK-4 |
| JEDEC | — |
| EIAJ | Conforms |
| Weight (reference value) | 0.013 g |

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