
2SC5628

Silicon NPN Epitaxial
High Frequency Amplifier / Oscillator

HITACHI

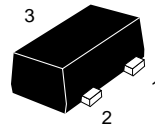
ADE-208-979A (Z)
2nd. Edition
April 2001

Features

- Super compact package;
(1.4 × 0.8 × 0.59mm)
- High power gain and low noise figure;
(PG = 9 dB, NF = 1.1 dB typ, at f = 900 Mhz, V_{CE} = 1 V)

Outline

MFPAK



1. Emitter
2. Base
3. Collector

Note: Marking is "XZ-".

2SC5628

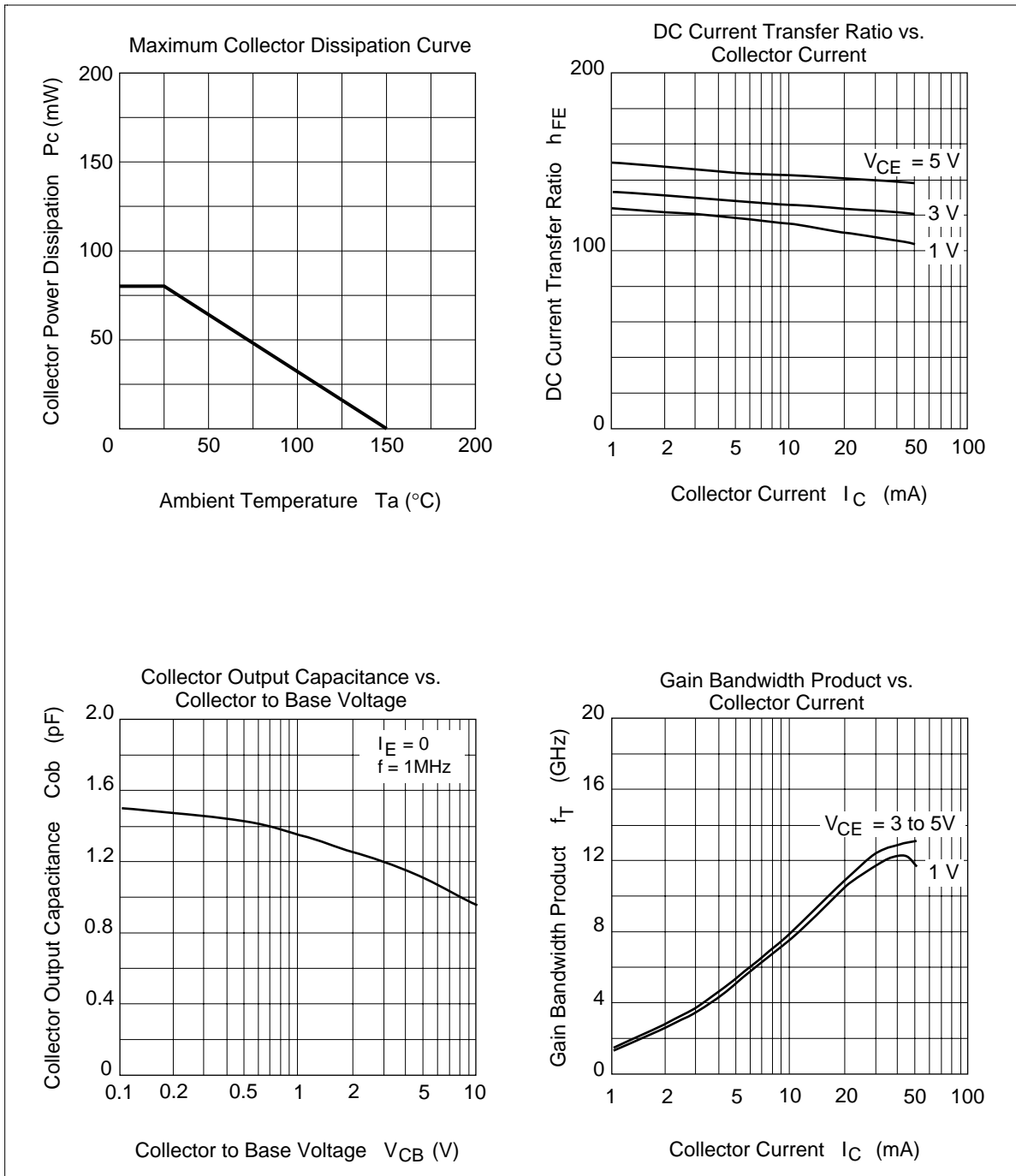
Absolute Maximum Ratings (Ta = 25°C)

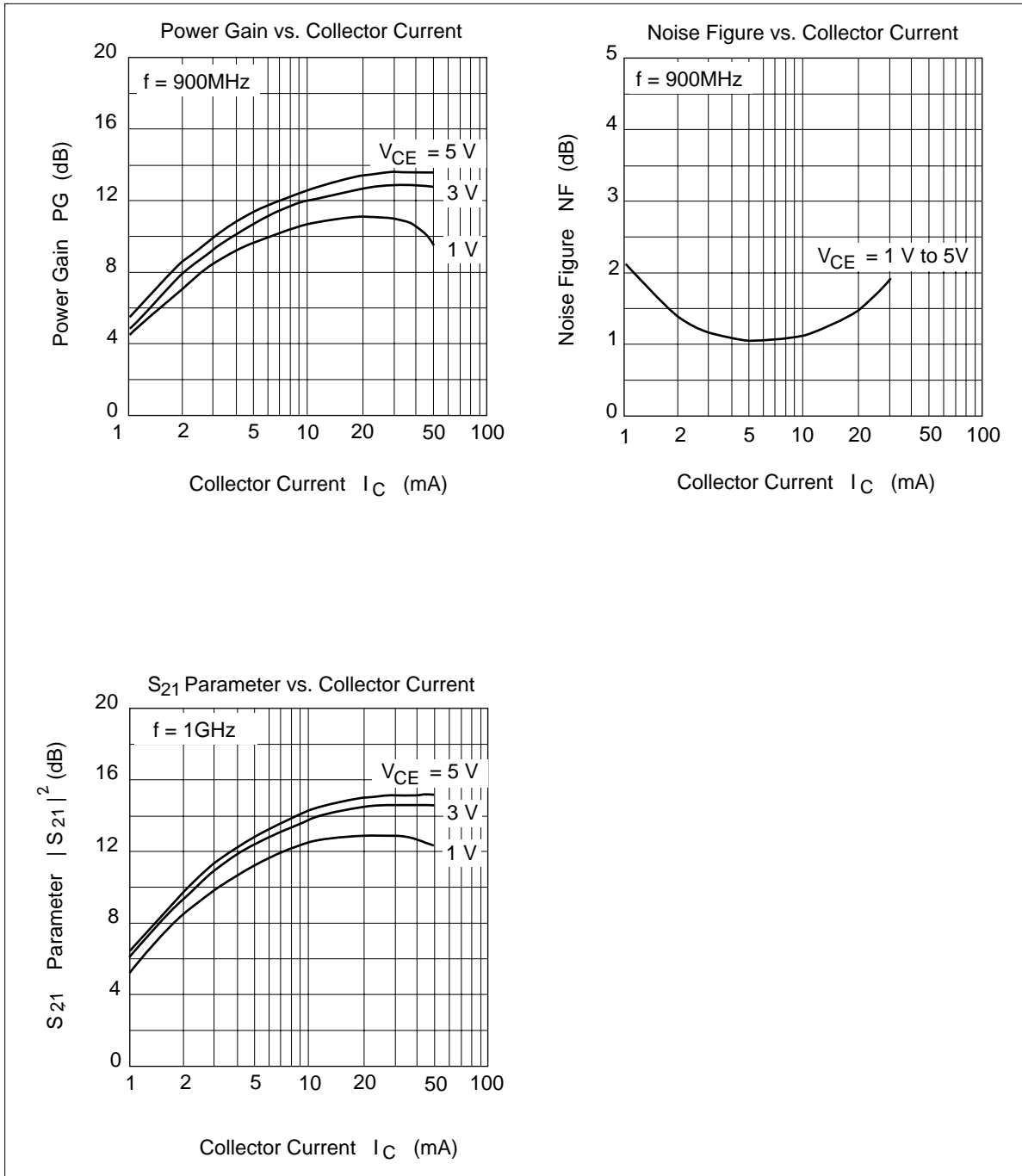
| Item | Symbol | Ratings | Unit |
|------------------------------|-----------|-------------|------|
| Collector to base voltage | V_{CBO} | 15 | V |
| Collector to emitter voltage | V_{CEO} | 8 | V |
| Emitter to base voltage | V_{EBO} | 1.5 | V |
| Collector current | I_C | 50 | mA |
| Collector power dissipation | P_c | 80 | mW |
| Junction temperature | T_j | 150 | °C |
| Storage temperature | T_{stg} | -55 to +150 | °C |

Electrical Characteristics (Ta = 25°C)

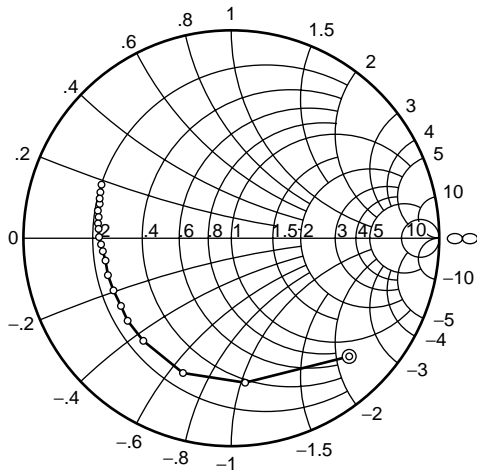
| Item | Symbol | Min | Typ | Max | Unit | Test Conditions |
|-------------------------------------|---------------|-----|------|------|---------|--|
| Collector to base breakdown voltage | $V_{(BR)CBO}$ | 15 | — | — | V | $I_C = 10\mu A, I_E = 0$ |
| Collector cutoff current | I_{CBO} | — | — | 1 | μA | $V_{CB} = 12V, I_E = 0$ |
| Collector cutoff current | I_{CEO} | — | — | 1 | mA | $V_{CE} = 8V, R_{BE} = \infty$ |
| Emitter cutoff current | I_{EBO} | — | — | 10 | μA | $V_{EB} = 1.5V, I_C = 0$ |
| DC current transfer ratio | h_{FE} | 50 | 100 | 160 | V | $V_{CE} = 1V, I_C = 5mA$ |
| Collector output capacitance | C_{ob} | — | 0.55 | 0.85 | pF | $V_{CB} = 1V, I_E = 0$ $f = 1MHz$ |
| Gain bandwidth product | f_T | 6 | 9 | — | GHz | $V_{CE} = 1V, I_C = 5mA$ |
| Power gain | PG | 11 | 14 | — | dB | $V_{CE} = 1V, I_C = 5mA$ $f = 900MHz$ |
| Noise figure | NF | — | 1.1 | 2.0 | dB | $V_{CE} = 1V, I_C = 5mA$ $f = 900MHz$ |

Main Characteristics





S11 Parameter vs. Frequency

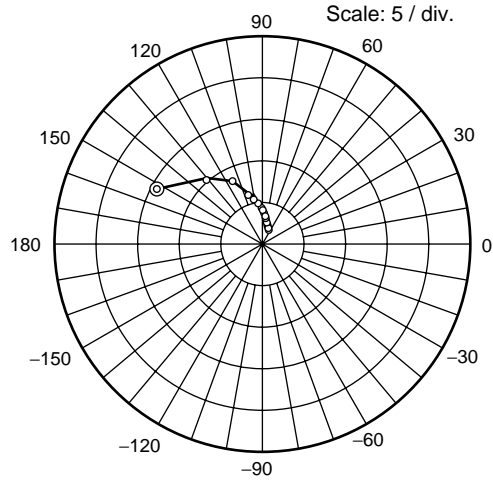


Condition : $V_{CE} = 1\text{ V}$, $I_C = 5\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S21 Parameter vs. Frequency

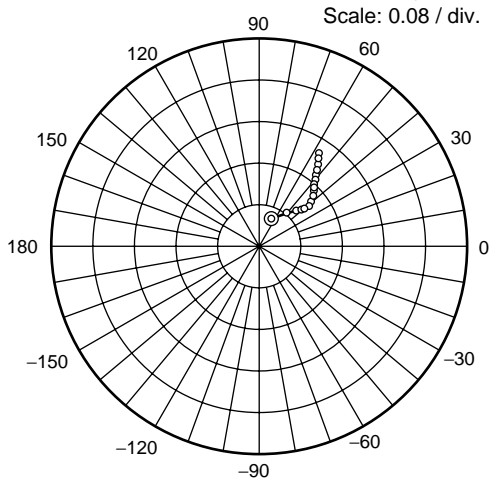


Condition : $V_{CE} = 1\text{ V}$, $I_C = 5\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S12 Parameter vs. Frequency

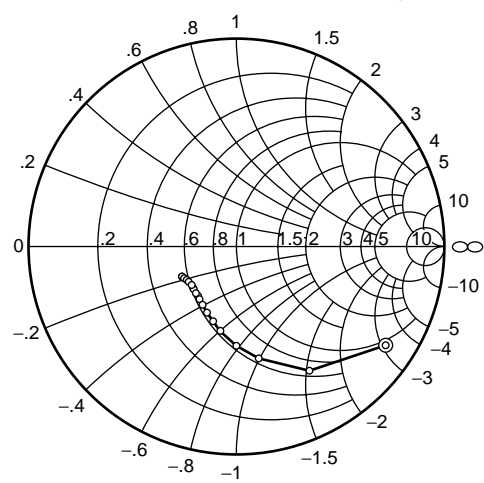


Condition : $V_{CE} = 1\text{ V}$, $I_C = 5\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S22 Parameter vs. Frequency

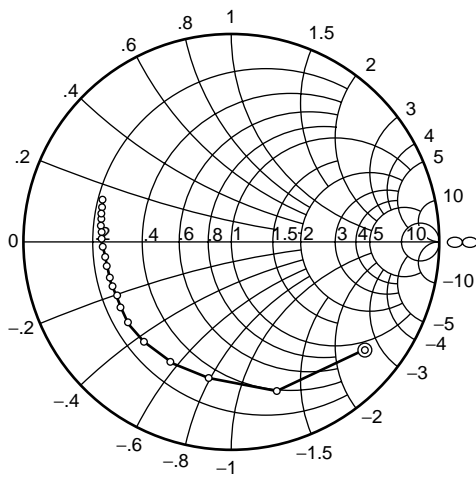


Condition : $V_{CE} = 1\text{ V}$, $I_C = 5\text{ mA}$

100 to 2000 MHz (100 MHz step)

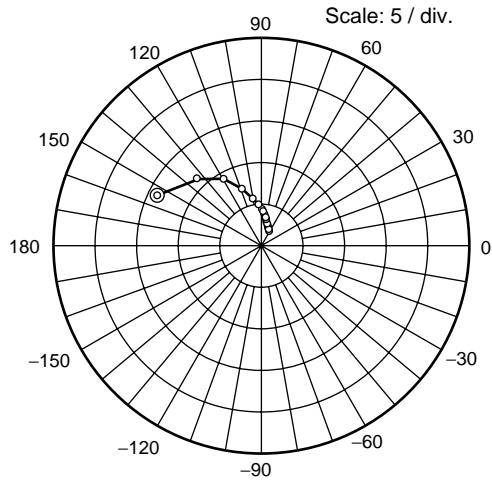
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S11 Parameter vs. Frequency



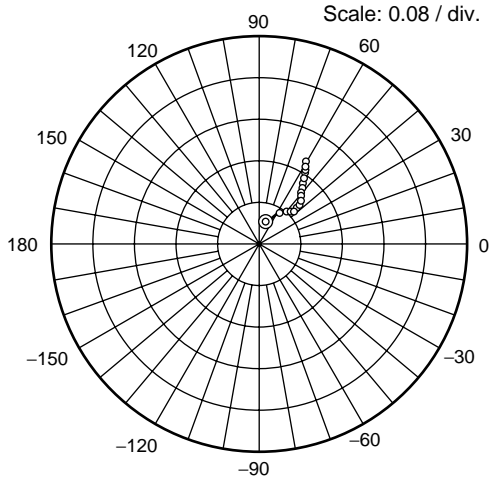
Condition : $V_{CE} = 3\text{ V}$, $I_C = 5\text{ mA}$
 100 to 2000 MHz (100 MHz step)
 ⊙—○

S21 Parameter vs. Frequency



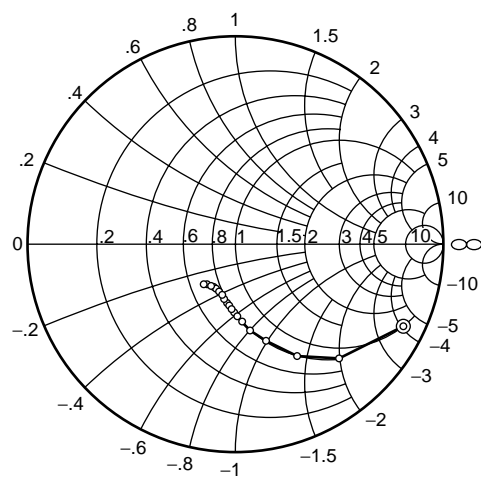
Condition : $V_{CE} = 3\text{ V}$, $I_C = 5\text{ mA}$
 100 to 2000 MHz (100 MHz step)
 ⊙—○

S12 Parameter vs. Frequency



Condition : $V_{CE} = 3\text{ V}$, $I_C = 5\text{ mA}$
 100 to 2000 MHz (100 MHz step)
 ⊙—○

S22 Parameter vs. Frequency



Condition : $V_{CE} = 3\text{ V}$, $I_C = 5\text{ mA}$
 100 to 2000 MHz (100 MHz step)
 ⊙—○

Sparameter ($V_{CE} = 1 \text{ V}$, $I_C = 5 \text{ mA}$, $Z_O = 50 \Omega$)

| f (MHz) | S11 | | S21 | | S12 | | S22 | |
|---------|-------|--------|-------|-------|--------|------|-------|--------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 100 | 0.815 | -46.1 | 13.63 | 152.2 | 0.0509 | 67.0 | 0.882 | -32.5 |
| 200 | 0.734 | -84.6 | 10.68 | 130.6 | 0.0834 | 51.0 | 0.695 | -58.5 |
| 300 | 0.692 | -111.2 | 8.23 | 116.8 | 0.0998 | 42.9 | 0.550 | -76.0 |
| 400 | 0.665 | -127.4 | 6.58 | 107.9 | 0.108 | 39.5 | 0.459 | -88.5 |
| 500 | 0.650 | -139.6 | 5.44 | 101.4 | 0.114 | 38.0 | 0.399 | -98.1 |
| 600 | 0.644 | -148.8 | 4.61 | 96.3 | 0.120 | 38.3 | 0.360 | -105.7 |
| 700 | 0.640 | -155.6 | 4.03 | 92.2 | 0.124 | 39.0 | 0.333 | -112.2 |
| 800 | 0.641 | -161.6 | 3.56 | 88.6 | 0.128 | 39.9 | 0.315 | -117.8 |
| 900 | 0.638 | -166.9 | 3.20 | 85.3 | 0.134 | 41.8 | 0.301 | -122.4 |
| 1000 | 0.638 | -171.6 | 2.90 | 82.2 | 0.138 | 43.5 | 0.292 | -126.7 |
| 1100 | 0.643 | -175.1 | 2.66 | 79.6 | 0.143 | 44.4 | 0.286 | -130.2 |
| 1200 | 0.643 | -178.5 | 2.46 | 77.2 | 0.149 | 46.2 | 0.280 | -133.6 |
| 1300 | 0.648 | 178.5 | 2.28 | 74.9 | 0.154 | 47.8 | 0.279 | -135.6 |
| 1400 | 0.651 | 175.4 | 2.15 | 72.8 | 0.161 | 49.1 | 0.278 | -138.6 |
| 1500 | 0.658 | 173.2 | 2.03 | 70.5 | 0.168 | 50.9 | 0.277 | -140.9 |
| 1600 | 0.663 | 170.0 | 1.92 | 68.5 | 0.174 | 51.8 | 0.279 | -143.3 |
| 1700 | 0.667 | 167.2 | 1.82 | 66.7 | 0.182 | 53.2 | 0.281 | -145.0 |
| 1800 | 0.669 | 165.0 | 1.74 | 64.4 | 0.189 | 54.6 | 0.282 | -147.1 |
| 1900 | 0.673 | 163.1 | 1.67 | 63.2 | 0.196 | 55.5 | 0.286 | -149.3 |
| 2000 | 0.682 | 161.0 | 1.60 | 61.4 | 0.204 | 56.4 | 0.289 | -150.6 |

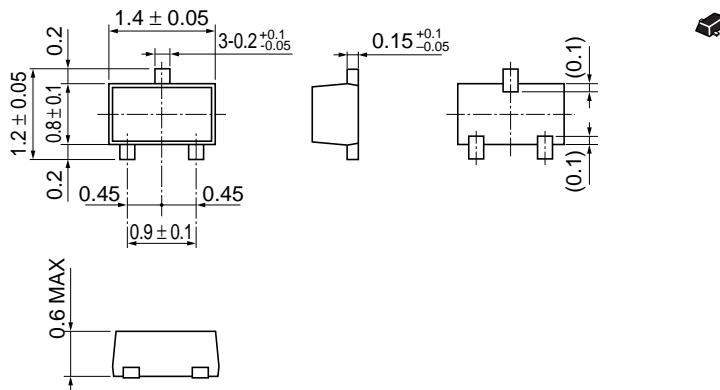
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Sparameter ($V_{CE} = 3 \text{ V}$, $I_C = 5 \text{ mA}$, $Z_O = 50 \ \Omega$)

| f (MHz) | S11 | | S21 | | S12 | | S22 | |
|---------|-------|--------|-------|-------|--------|------|-------|--------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 100 | 0.826 | -39.3 | 14.04 | 155.5 | 0.0412 | 69.9 | 0.906 | -25.8 |
| 200 | 0.746 | -74.6 | 11.47 | 134.9 | 0.0700 | 54.9 | 0.738 | -47.3 |
| 300 | 0.685 | -100.5 | 9.14 | 121.1 | 0.0864 | 46.7 | 0.591 | -61.9 |
| 400 | 0.646 | -117.4 | 7.41 | 111.9 | 0.0950 | 43.0 | 0.490 | -71.9 |
| 500 | 0.627 | -130.7 | 6.19 | 104.8 | 0.101 | 41.3 | 0.419 | -79.9 |
| 600 | 0.617 | -141.0 | 5.27 | 99.6 | 0.107 | 41.3 | 0.369 | -85.7 |
| 700 | 0.606 | -149.0 | 4.61 | 95.0 | 0.111 | 41.6 | 0.333 | -90.7 |
| 800 | 0.598 | -155.4 | 4.09 | 91.6 | 0.115 | 42.5 | 0.307 | -95.3 |
| 900 | 0.605 | -161.3 | 3.67 | 87.7 | 0.120 | 44.3 | 0.287 | -99.0 |
| 1000 | 0.604 | -166.1 | 3.35 | 84.7 | 0.124 | 45.6 | 0.273 | -102.6 |
| 1100 | 0.604 | -170.6 | 3.06 | 81.8 | 0.129 | 46.8 | 0.262 | -106.0 |
| 1200 | 0.607 | -174.2 | 2.83 | 79.5 | 0.134 | 49.0 | 0.253 | -108.8 |
| 1300 | 0.605 | -178.2 | 2.62 | 77.1 | 0.139 | 50.4 | 0.249 | -111.0 |
| 1400 | 0.608 | 178.9 | 2.47 | 74.9 | 0.145 | 51.9 | 0.245 | -114.3 |
| 1500 | 0.618 | 175.5 | 2.32 | 72.7 | 0.152 | 53.4 | 0.242 | -116.6 |
| 1600 | 0.622 | 172.4 | 2.19 | 70.7 | 0.157 | 54.8 | 0.241 | -118.9 |
| 1700 | 0.627 | 170.0 | 2.08 | 68.9 | 0.164 | 56.2 | 0.241 | -121.3 |
| 1800 | 0.629 | 166.9 | 1.99 | 66.7 | 0.171 | 57.6 | 0.242 | -123.4 |
| 1900 | 0.633 | 164.3 | 1.90 | 65.2 | 0.177 | 58.7 | 0.243 | -125.9 |
| 2000 | 0.641 | 162.3 | 1.82 | 63.4 | 0.186 | 59.5 | 0.245 | -127.7 |

Package Dimensions

Unit: mm



| | |
|------------------------|----------|
| Hitachi Code | MFPAK |
| JEDEC | — |
| EIAJ | — |
| Mass (reference value) | 0.0016 g |

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