

DATA SHEET

NEC

NPN SILICON RF TWIN TRANSISTOR μ PA892TD

NPN SILICON RF TRANSISTOR (WITH 2 ELEMENTS) IN A 6-PIN LEAD-LESS MINIMOLD

FEATURES

- Ideal for low noise · high-gain amplification and oscillation at 3 GHz or over
NF = 1.1 dB TYP. @ $V_{CE} = 2$ V, $I_C = 5$ mA, $f = 2$ GHz
- Maximum available power gain: MAG = 12.5 dB TYP. @ $V_{CE} = 2$ V, $I_C = 20$ mA, $f = 2$ GHz
- High f_T : $f_T = 21.0$ GHz TYP. @ $V_{CE} = 2$ V, $I_C = 20$ mA, $f = 2$ GHz
- 6-pin lead-less minimold package
- Built-in 2 transistors ($2 \times 2SC5668$)

BUILT-IN TRANSISTORS

| | |
|---|---------|
| | Q1, Q2 |
| 3-pin thin-type ultra super minimold part No. | 2SC5668 |

ORDERING INFORMATION

| Part Number | Quantity | Supplying Form |
|------------------|-------------------|---|
| μ PA892TD | 50 pcs (Non reel) | • 8 mm wide embossed taping |
| μ PA892TD-T3 | 10 kpcs/reel | • Pin 1 (Q1 Collector), Pin 6 (Q1 Base) face the perforation side of the tape |

Remark To order evaluation samples, consult your NEC sales representative.
Unit sample quantity is 50 pcs.

Because this product uses high-frequency technology, avoid excessive static electricity, etc.

The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.
Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

ABSOLUTE MAXIMUM RATINGS (T_A = +25°C)

| Parameter | Symbol | Ratings | Unit |
|------------------------------|----------------------------------|---------------------------------------|------|
| Collector to Base Voltage | V _{CB0} | 15 | V |
| Collector to Emitter Voltage | V _{CEO} | 3.3 | V |
| Emitter to Base Voltage | V _{EBO} | 1.5 | V |
| Collector Current | I _c | 35 | mA |
| Total Power Dissipation | P _{tot} ^{Note} | 115 in 1 element 210 in 2 elements | mW |
| Junction Temperature | T _j | 150 | °C |
| Storage Temperature | T _{stg} | -65 to +150 | °C |

Note Mounted on 1.08 cm² × 1.0 mm (t) glass epoxy substrate

ELECTRICAL CHARACTERISTICS (T_A = +25°C)

| Parameter | Symbol | Test Conditions | MIN. | TYP. | MAX. | Unit |
|------------------------------|-----------------------------------|---|------|------|------|------|
| Collector Cut-off Current | I _{CB0} | V _{CB} = 5 V, I _E = 0 mA | - | - | 100 | nA |
| Emitter Cut-off Current | I _{EBO} | V _{BE} = 1 V, I _c = 0 mA | - | - | 100 | nA |
| DC Current Gain | h _{FE} ^{Note 1} | V _{CE} = 2 V, I _c = 5 mA | 50 | 70 | 100 | - |
| Gain Bandwidth Product | f _T | V _{CE} = 2 V, I _c = 20 mA, f = 2 GHz | 18.0 | 21.0 | - | GHz |
| Insertion Power Gain (1) | S _{21e} ² | V _{CE} = 1 V, I _c = 10 mA, f = 2 GHz | 9.0 | 11.0 | - | dB |
| Insertion Power Gain (2) | S _{21e} ² | V _{CE} = 2 V, I _c = 20 mA, f = 2 GHz | 9.5 | 11.5 | - | dB |
| Noise Figure | NF | V _{CE} = 2 V, I _c = 5 mA, f = 2 GHz, Z _S = Z _{opt} | - | 1.1 | 1.5 | dB |
| Reverse Transfer Capacitance | C _{re} ^{Note 2} | V _{CB} = 2 V, I _E = 0 mA, f = 1 MHz | - | 0.24 | 0.3 | pF |
| Maximum Available Power Gain | MAG ^{Note 3} | V _{CE} = 2 V, I _c = 20 mA, f = 2 GHz | - | 12.5 | - | dB |
| Maximum Stable Power Gain | MSG ^{Note 4} | V _{CE} = 2 V, I _c = 20 mA, f = 2 GHz | - | 13.5 | - | dB |

Notes 1. Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%

2. Collector to base capacitance measured using capacitance meter (self-balancing bridge method) when the emitter is connected to the guard pin

$$3. \text{ MAG} = \left| \frac{S_{21}}{S_{12}} \right| (k - \sqrt{k^2 - 1})$$

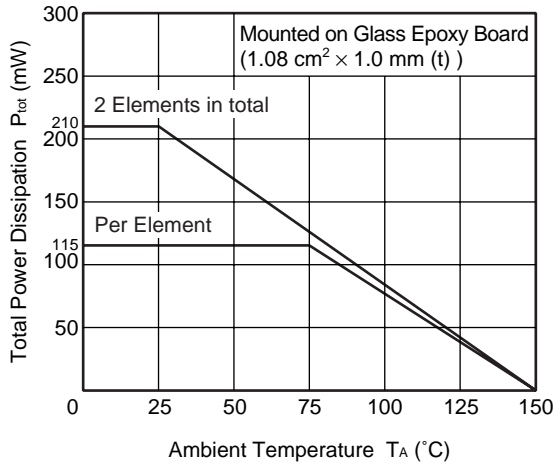
$$4. \text{ MSG} = \left| \frac{S_{21}}{S_{12}} \right|$$

h_{FE} CLASSIFICATION

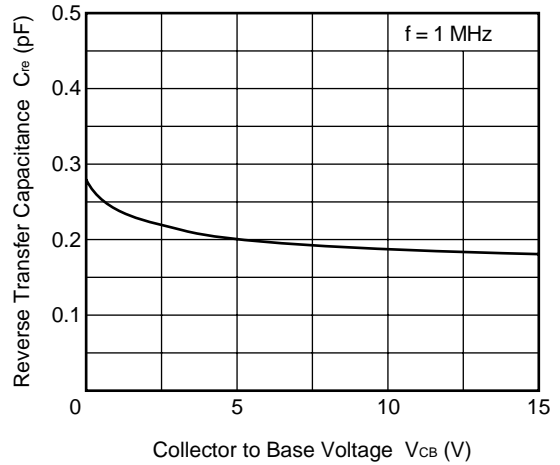
| | |
|-----------------------|-----------|
| Rank | FB |
| Marking | kN |
| h _{FE} Value | 50 to 100 |

TYPICAL CHARACTERISTICS (Unless otherwise specified, $T_A = +25^\circ\text{C}$)

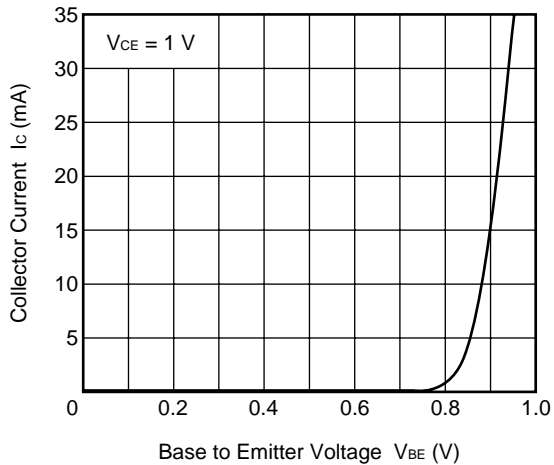
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



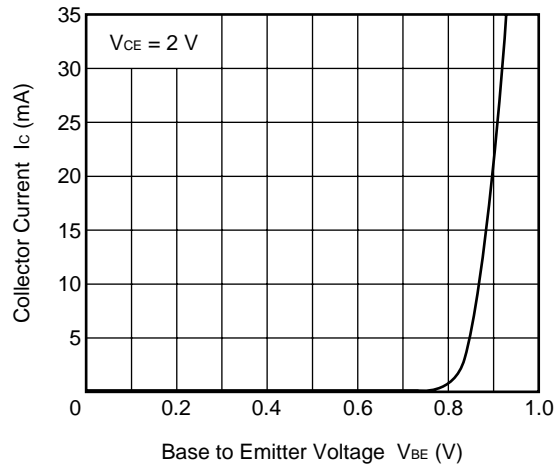
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



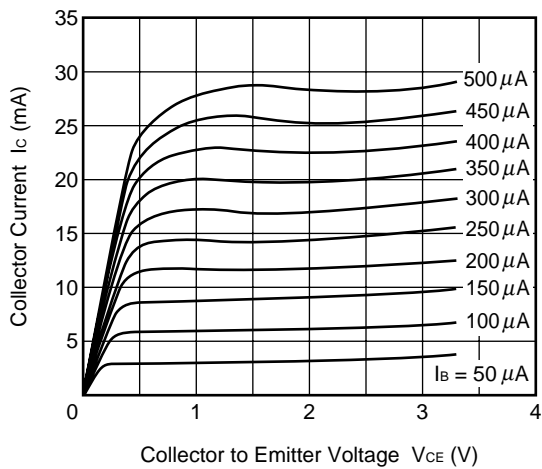
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



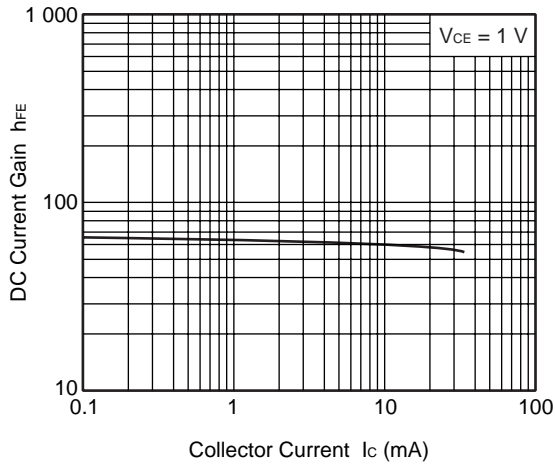
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



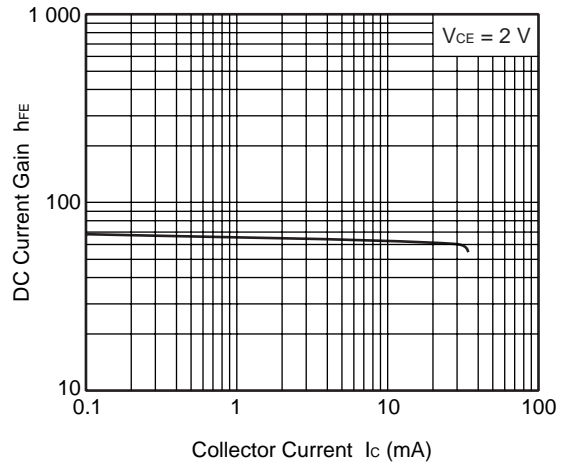
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



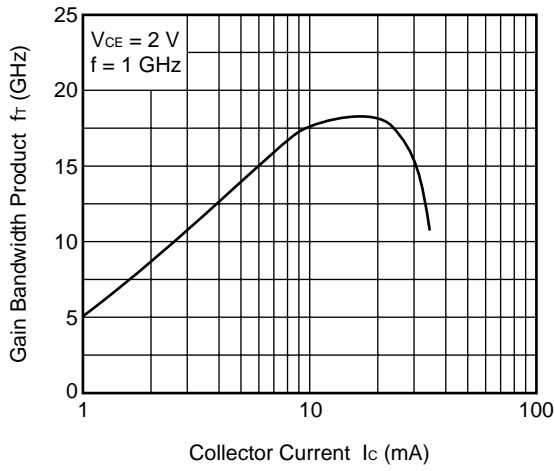
DC CURRENT GAIN vs.
COLLECTOR CURRENT



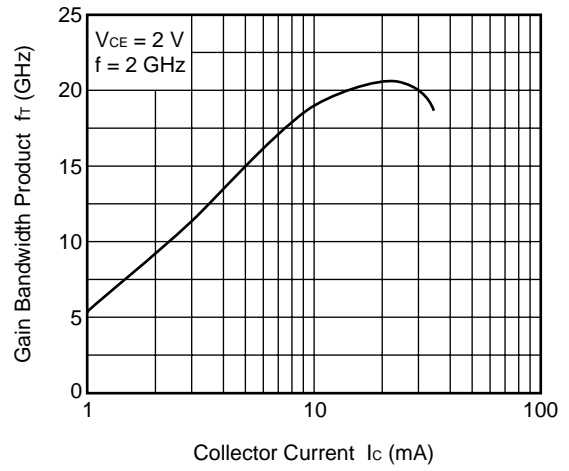
DC CURRENT GAIN vs.
COLLECTOR CURRENT



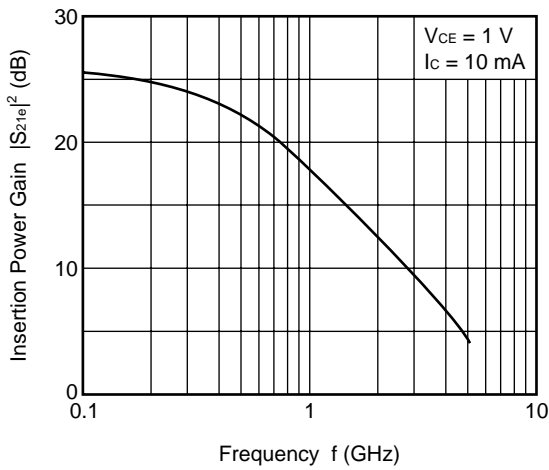
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



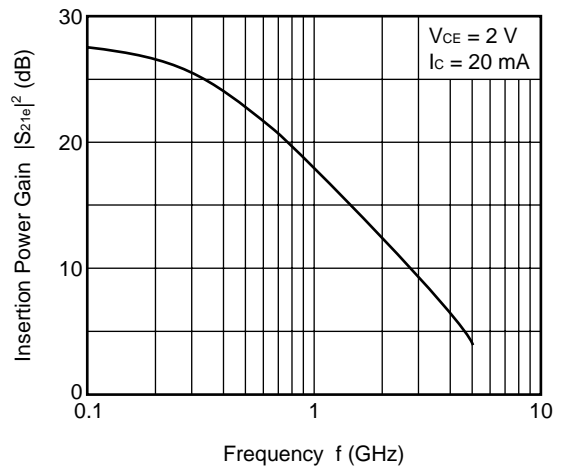
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



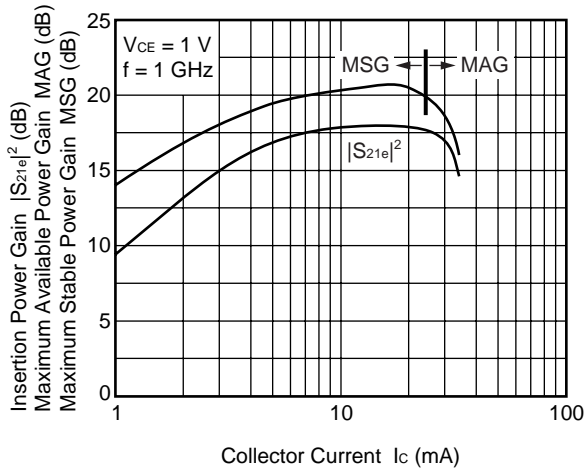
INSERTION POWER GAIN vs. FREQUENCY



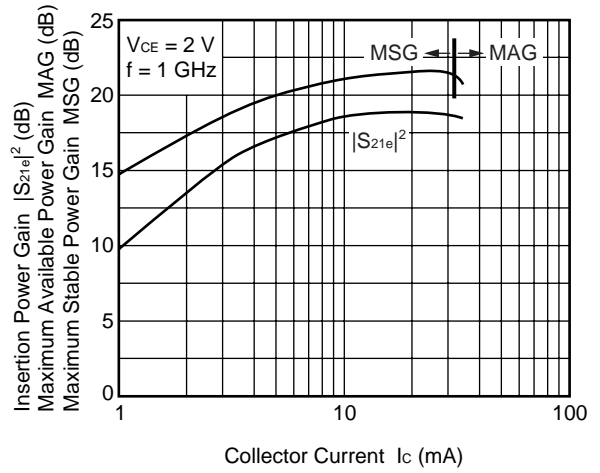
INSERTION POWER GAIN vs. FREQUENCY



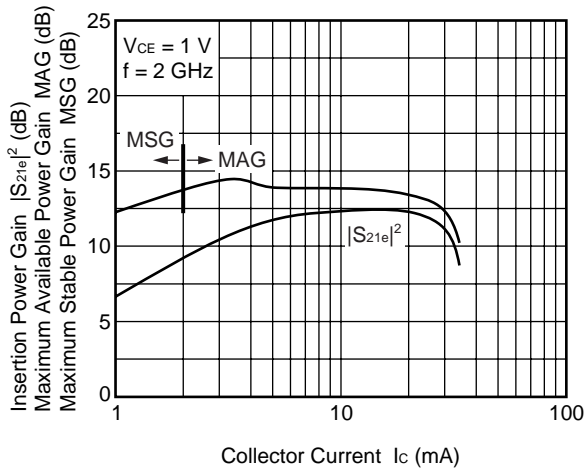
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



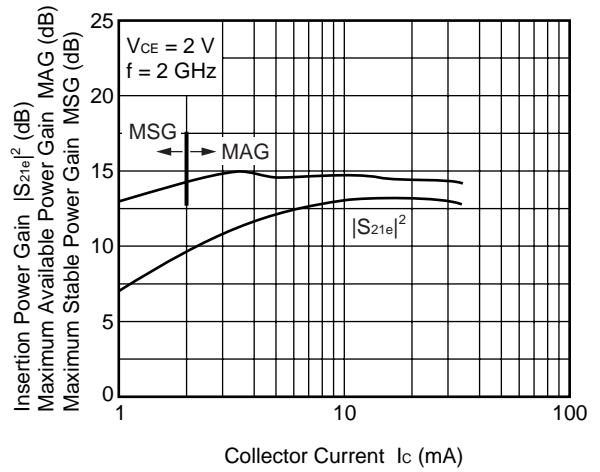
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



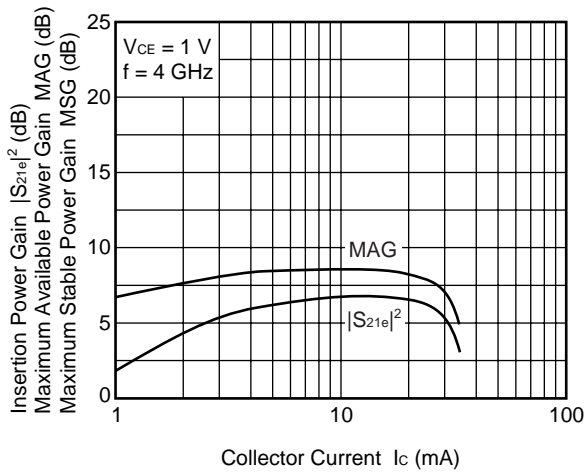
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



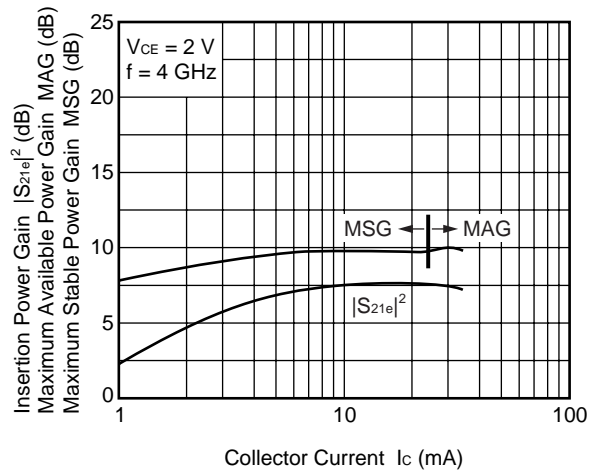
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



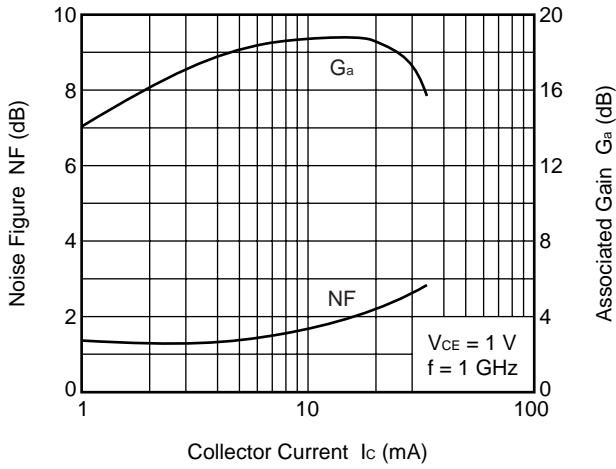
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



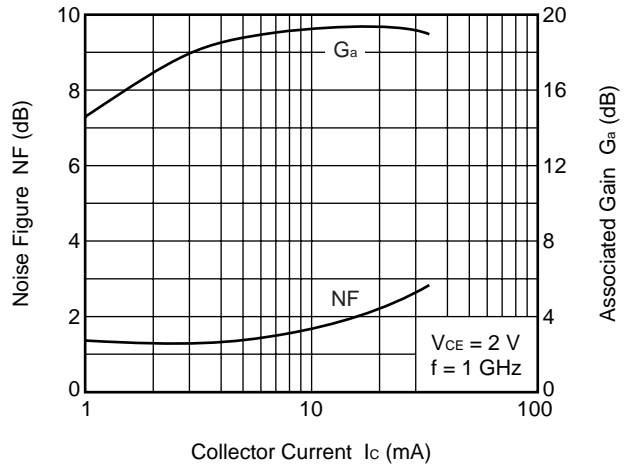
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



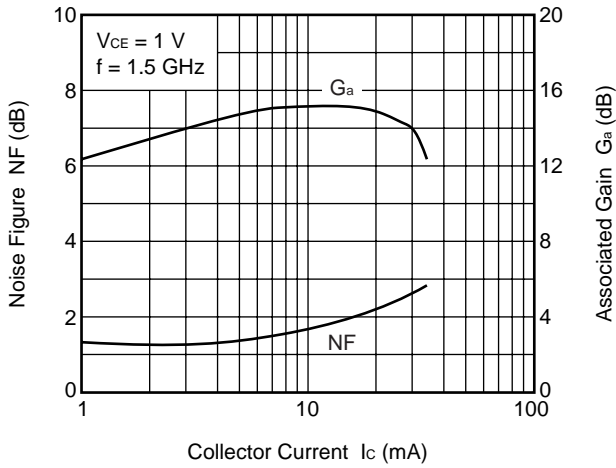
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



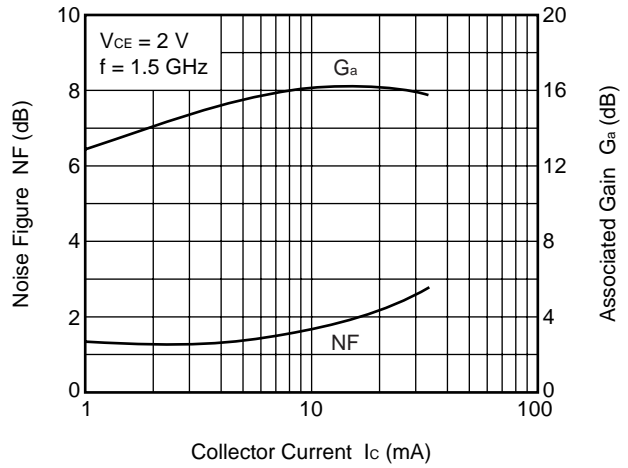
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



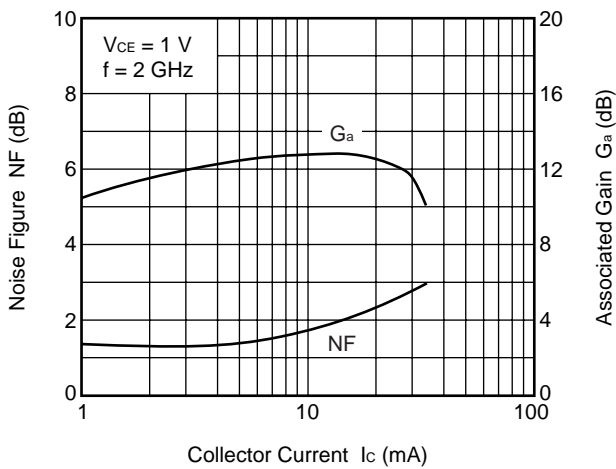
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



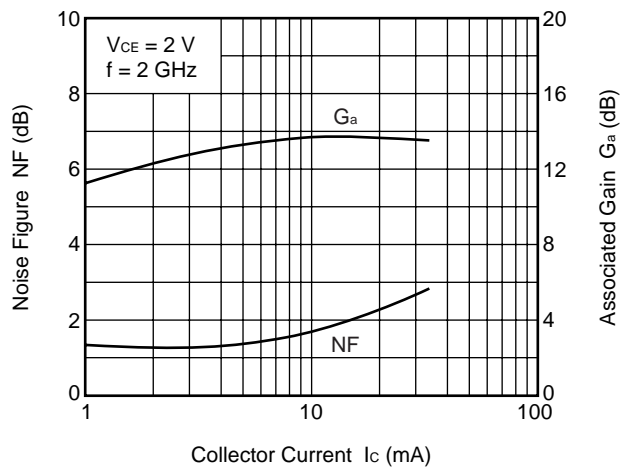
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



Remark The graphs indicate nominal characteristics.

S-PARAMETERS

Note When $K \geq 1$, the MAG (Maximum Available Gain) is used. $MAG = \left| \frac{S_{21}}{S_{12}} \right| (K - \sqrt{K^2 - 1})$

When $K < 1$, the MSG (Maximum Stable Gain) is used. $MSG = \left| \frac{S_{21}}{S_{12}} \right|$

$V_{CE} = 1\text{ V}$, $I_c = 1\text{ mA}$, $Z_o = 50\ \Omega$

| Frequency (GHz) | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | | K | MAG/MSG (dB) | Note |
|--------------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-------|-----------------|------|
| | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | | | |
| 0.1 | 0.953 | -5.4 | 3.383 | 174.6 | 0.015 | 82.4 | 1.001 | -3.5 | 0.090 | 23.64 | |
| 0.2 | 0.941 | -10.7 | 3.363 | 170.1 | 0.029 | 82.2 | 0.991 | -7.7 | 0.047 | 20.70 | |
| 0.3 | 0.933 | -16.5 | 3.345 | 164.0 | 0.043 | 77.3 | 0.984 | -11.7 | 0.094 | 18.93 | |
| 0.4 | 0.916 | -22.3 | 3.315 | 157.8 | 0.057 | 73.2 | 0.969 | -15.8 | 0.133 | 17.67 | |
| 0.5 | 0.901 | -27.5 | 3.304 | 152.8 | 0.070 | 69.1 | 0.956 | -20.1 | 0.158 | 16.74 | |
| 0.6 | 0.879 | -33.9 | 3.262 | 146.7 | 0.082 | 65.0 | 0.932 | -24.4 | 0.189 | 16.02 | |
| 0.7 | 0.853 | -39.4 | 3.204 | 141.4 | 0.093 | 60.8 | 0.910 | -28.7 | 0.224 | 15.39 | |
| 0.8 | 0.824 | -45.3 | 3.134 | 135.9 | 0.102 | 56.8 | 0.883 | -33.2 | 0.256 | 14.87 | |
| 0.9 | 0.794 | -51.2 | 3.062 | 130.4 | 0.111 | 53.0 | 0.860 | -37.4 | 0.288 | 14.42 | |
| 1.0 | 0.761 | -56.8 | 2.991 | 125.2 | 0.117 | 49.2 | 0.831 | -41.7 | 0.329 | 14.07 | |
| 1.1 | 0.731 | -62.7 | 2.916 | 120.1 | 0.123 | 45.6 | 0.808 | -45.9 | 0.361 | 13.75 | |
| 1.2 | 0.702 | -68.5 | 2.817 | 115.2 | 0.127 | 42.3 | 0.783 | -49.7 | 0.399 | 13.47 | |
| 1.3 | 0.674 | -74.4 | 2.735 | 110.6 | 0.130 | 39.1 | 0.762 | -53.6 | 0.429 | 13.22 | |
| 1.4 | 0.651 | -80.1 | 2.638 | 106.0 | 0.133 | 36.5 | 0.741 | -57.2 | 0.465 | 12.99 | |
| 1.5 | 0.628 | -85.6 | 2.552 | 101.7 | 0.133 | 34.0 | 0.725 | -60.5 | 0.499 | 12.82 | |
| 1.6 | 0.609 | -91.0 | 2.469 | 97.5 | 0.134 | 31.6 | 0.705 | -63.8 | 0.540 | 12.66 | |
| 1.7 | 0.591 | -96.4 | 2.373 | 93.7 | 0.133 | 29.6 | 0.693 | -66.7 | 0.578 | 12.51 | |
| 1.8 | 0.576 | -101.4 | 2.282 | 89.9 | 0.131 | 28.0 | 0.676 | -69.4 | 0.630 | 12.39 | |
| 1.9 | 0.560 | -106.4 | 2.205 | 86.6 | 0.130 | 26.6 | 0.668 | -71.9 | 0.671 | 12.30 | |
| 2.0 | 0.551 | -111.0 | 2.128 | 82.8 | 0.127 | 25.8 | 0.652 | -74.2 | 0.731 | 12.24 | |
| 2.1 | 0.541 | -115.6 | 2.066 | 79.9 | 0.124 | 25.5 | 0.645 | -76.6 | 0.770 | 12.20 | |
| 2.2 | 0.529 | -120.1 | 1.989 | 76.7 | 0.121 | 25.3 | 0.632 | -78.9 | 0.844 | 12.15 | |
| 2.3 | 0.521 | -124.6 | 1.927 | 73.8 | 0.118 | 25.7 | 0.628 | -81.1 | 0.895 | 12.13 | |
| 2.4 | 0.517 | -128.6 | 1.871 | 70.6 | 0.115 | 26.2 | 0.617 | -83.3 | 0.966 | 12.12 | |
| 2.5 | 0.510 | -133.1 | 1.821 | 67.8 | 0.111 | 27.5 | 0.612 | -85.6 | 1.025 | 11.17 | |
| 2.6 | 0.507 | -137.1 | 1.761 | 65.3 | 0.108 | 28.7 | 0.604 | -88.0 | 1.108 | 10.13 | |
| 2.7 | 0.504 | -140.9 | 1.712 | 62.6 | 0.105 | 30.7 | 0.599 | -90.5 | 1.173 | 9.60 | |
| 2.8 | 0.500 | -144.7 | 1.657 | 60.1 | 0.103 | 32.9 | 0.594 | -92.6 | 1.251 | 9.05 | |
| 2.9 | 0.497 | -148.1 | 1.609 | 56.8 | 0.102 | 35.3 | 0.585 | -95.1 | 1.325 | 8.56 | |
| 3.0 | 0.492 | -152.5 | 1.567 | 54.2 | 0.101 | 38.7 | 0.577 | -98.2 | 1.400 | 8.13 | |
| 4.0 | 0.505 | 167.7 | 1.242 | 30.0 | 0.163 | 64.8 | 0.593 | -127.0 | 1.118 | 6.74 | |
| 5.0 | 0.536 | 124.0 | 0.896 | 9.2 | 0.293 | 51.7 | 0.660 | -155.1 | 0.910 | 4.85 | |

V_{CE} = 1 V, I_C = 3 mA, Z_o = 50 Ω

| Frequency (GHz) | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | | K | MAG/MSG (dB) |
|--------------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-------|-----------------|
| | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | | |
| 0.1 | 0.857 | -9.2 | 8.768 | 172.2 | 0.013 | 79.0 | 0.989 | -5.9 | 0.138 | 28.41 |
| 0.2 | 0.838 | -17.5 | 8.546 | 164.3 | 0.027 | 79.0 | 0.966 | -12.4 | 0.113 | 24.96 |
| 0.3 | 0.802 | -26.4 | 8.303 | 156.0 | 0.040 | 73.5 | 0.937 | -18.4 | 0.175 | 23.22 |
| 0.4 | 0.761 | -34.7 | 7.969 | 147.8 | 0.051 | 68.7 | 0.897 | -24.5 | 0.236 | 21.92 |
| 0.5 | 0.727 | -42.5 | 7.672 | 141.1 | 0.061 | 64.3 | 0.858 | -30.1 | 0.280 | 21.01 |
| 0.6 | 0.678 | -50.7 | 7.286 | 133.8 | 0.069 | 60.3 | 0.807 | -35.5 | 0.341 | 20.21 |
| 0.7 | 0.629 | -57.9 | 6.893 | 127.8 | 0.076 | 56.7 | 0.762 | -40.4 | 0.398 | 19.55 |
| 0.8 | 0.583 | -65.4 | 6.487 | 121.9 | 0.082 | 53.8 | 0.715 | -45.0 | 0.453 | 18.99 |
| 0.9 | 0.542 | -72.4 | 6.110 | 116.3 | 0.087 | 51.3 | 0.675 | -49.4 | 0.506 | 18.47 |
| 1.0 | 0.501 | -79.3 | 5.766 | 111.4 | 0.090 | 49.4 | 0.635 | -53.5 | 0.562 | 18.07 |
| 1.1 | 0.467 | -86.2 | 5.442 | 106.8 | 0.093 | 47.6 | 0.604 | -57.4 | 0.611 | 17.66 |
| 1.2 | 0.437 | -92.9 | 5.110 | 102.4 | 0.096 | 46.3 | 0.572 | -60.7 | 0.667 | 17.28 |
| 1.3 | 0.413 | -99.7 | 4.838 | 98.6 | 0.098 | 45.5 | 0.548 | -64.1 | 0.710 | 16.95 |
| 1.4 | 0.394 | -106.1 | 4.565 | 94.8 | 0.100 | 44.8 | 0.526 | -67.3 | 0.757 | 16.61 |
| 1.5 | 0.377 | -111.9 | 4.330 | 91.3 | 0.101 | 44.5 | 0.509 | -70.0 | 0.803 | 16.32 |
| 1.6 | 0.363 | -117.9 | 4.124 | 88.0 | 0.103 | 44.1 | 0.492 | -72.8 | 0.847 | 16.04 |
| 1.7 | 0.353 | -123.3 | 3.911 | 85.0 | 0.104 | 44.4 | 0.480 | -75.1 | 0.887 | 15.75 |
| 1.8 | 0.344 | -128.7 | 3.717 | 81.9 | 0.105 | 44.8 | 0.466 | -77.2 | 0.934 | 15.48 |
| 1.9 | 0.339 | -133.6 | 3.551 | 79.3 | 0.107 | 45.1 | 0.459 | -79.2 | 0.965 | 15.21 |
| 2.0 | 0.335 | -137.9 | 3.392 | 76.3 | 0.109 | 46.0 | 0.446 | -80.9 | 1.007 | 14.42 |
| 2.1 | 0.331 | -142.3 | 3.271 | 74.1 | 0.110 | 47.1 | 0.441 | -82.7 | 1.033 | 13.61 |
| 2.2 | 0.328 | -146.4 | 3.130 | 71.7 | 0.113 | 47.8 | 0.430 | -84.4 | 1.070 | 12.83 |
| 2.3 | 0.327 | -150.7 | 3.012 | 69.4 | 0.115 | 48.8 | 0.427 | -86.1 | 1.090 | 12.36 |
| 2.4 | 0.326 | -153.8 | 2.907 | 66.9 | 0.117 | 49.8 | 0.418 | -87.7 | 1.116 | 11.87 |
| 2.5 | 0.326 | -158.0 | 2.810 | 64.7 | 0.120 | 50.8 | 0.414 | -89.5 | 1.132 | 11.49 |
| 2.6 | 0.328 | -161.1 | 2.713 | 62.8 | 0.122 | 51.7 | 0.407 | -91.5 | 1.156 | 11.07 |
| 2.7 | 0.329 | -164.5 | 2.624 | 60.5 | 0.125 | 52.7 | 0.404 | -93.6 | 1.167 | 10.73 |
| 2.8 | 0.329 | -168.0 | 2.529 | 58.6 | 0.129 | 53.4 | 0.400 | -95.4 | 1.185 | 10.32 |
| 2.9 | 0.328 | -170.9 | 2.449 | 56.0 | 0.134 | 53.8 | 0.395 | -97.9 | 1.190 | 9.98 |
| 3.0 | 0.330 | -174.6 | 2.381 | 53.7 | 0.139 | 54.9 | 0.390 | -100.4 | 1.192 | 9.70 |
| 4.0 | 0.377 | -151.8 | 1.849 | 32.8 | 0.204 | 58.2 | 0.427 | -127.8 | 1.055 | 8.14 |
| 5.0 | 0.443 | 117.2 | 1.375 | 12.7 | 0.296 | 45.6 | 0.522 | -153.3 | 0.940 | 6.67 |

V_{CE} = 1 V, I_C = 5 mA, Z_o = 50 Ω

| Frequency (GHz) | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | | K | MAG/MSG (dB) |
|--------------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-------|-----------------|
| | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | | |
| 0.1 | 0.774 | -11.0 | 12.726 | 169.9 | 0.013 | 81.9 | 0.975 | -7.8 | 0.132 | 29.94 |
| 0.2 | 0.749 | -22.4 | 12.171 | 160.1 | 0.025 | 77.4 | 0.940 | -15.9 | 0.166 | 26.81 |
| 0.3 | 0.702 | -33.3 | 11.561 | 150.2 | 0.037 | 71.7 | 0.893 | -23.1 | 0.244 | 24.93 |
| 0.4 | 0.648 | -43.3 | 10.804 | 141.2 | 0.047 | 66.8 | 0.836 | -29.9 | 0.322 | 23.64 |
| 0.5 | 0.602 | -52.2 | 10.143 | 133.7 | 0.055 | 62.9 | 0.780 | -35.9 | 0.384 | 22.66 |
| 0.6 | 0.545 | -61.2 | 9.378 | 126.3 | 0.062 | 59.8 | 0.717 | -41.3 | 0.459 | 21.82 |
| 0.7 | 0.498 | -69.5 | 8.672 | 120.2 | 0.067 | 57.1 | 0.665 | -46.1 | 0.522 | 21.11 |
| 0.8 | 0.450 | -77.5 | 8.011 | 114.7 | 0.072 | 55.3 | 0.611 | -50.7 | 0.592 | 20.48 |
| 0.9 | 0.410 | -85.3 | 7.390 | 109.4 | 0.076 | 53.8 | 0.572 | -54.5 | 0.652 | 19.88 |
| 1.0 | 0.378 | -92.8 | 6.878 | 104.9 | 0.079 | 53.0 | 0.532 | -58.4 | 0.710 | 19.38 |
| 1.1 | 0.348 | -100.5 | 6.419 | 100.8 | 0.083 | 52.1 | 0.502 | -62.0 | 0.760 | 18.91 |
| 1.2 | 0.325 | -108.0 | 5.966 | 96.9 | 0.085 | 51.8 | 0.473 | -65.0 | 0.815 | 18.44 |
| 1.3 | 0.310 | -115.1 | 5.603 | 93.5 | 0.089 | 51.8 | 0.453 | -68.3 | 0.852 | 18.01 |
| 1.4 | 0.296 | -122.4 | 5.256 | 90.1 | 0.092 | 51.9 | 0.434 | -71.1 | 0.893 | 17.59 |
| 1.5 | 0.287 | -128.4 | 4.952 | 87.1 | 0.094 | 52.1 | 0.420 | -73.6 | 0.929 | 17.21 |
| 1.6 | 0.280 | -134.7 | 4.689 | 84.2 | 0.097 | 52.3 | 0.404 | -76.1 | 0.963 | 16.83 |
| 1.7 | 0.281 | -140.3 | 4.433 | 81.4 | 0.100 | 52.8 | 0.397 | -78.2 | 0.984 | 16.45 |
| 1.8 | 0.276 | -145.1 | 4.202 | 78.8 | 0.103 | 53.3 | 0.385 | -80.3 | 1.018 | 15.27 |
| 1.9 | 0.273 | -149.9 | 4.009 | 76.5 | 0.106 | 53.7 | 0.380 | -81.9 | 1.038 | 14.56 |
| 2.0 | 0.273 | -153.9 | 3.820 | 74.0 | 0.110 | 54.3 | 0.369 | -83.6 | 1.062 | 13.89 |
| 2.1 | 0.274 | -157.8 | 3.671 | 71.9 | 0.114 | 55.0 | 0.365 | -85.3 | 1.071 | 13.46 |
| 2.2 | 0.272 | -161.7 | 3.512 | 69.7 | 0.117 | 55.6 | 0.356 | -86.9 | 1.095 | 12.89 |
| 2.3 | 0.278 | -165.6 | 3.376 | 67.8 | 0.121 | 56.1 | 0.354 | -88.5 | 1.099 | 12.54 |
| 2.4 | 0.279 | -168.6 | 3.257 | 65.5 | 0.125 | 56.5 | 0.346 | -89.8 | 1.109 | 12.15 |
| 2.5 | 0.278 | -171.9 | 3.144 | 63.4 | 0.129 | 57.0 | 0.343 | -91.7 | 1.116 | 11.78 |
| 2.6 | 0.282 | -174.6 | 3.029 | 61.8 | 0.133 | 57.3 | 0.338 | -93.4 | 1.127 | 11.40 |
| 2.7 | 0.286 | -177.5 | 2.928 | 59.7 | 0.138 | 57.7 | 0.334 | -95.5 | 1.131 | 11.08 |
| 2.8 | 0.288 | 179.4 | 2.818 | 58.0 | 0.142 | 57.8 | 0.331 | -97.2 | 1.141 | 10.70 |
| 2.9 | 0.287 | 176.8 | 2.723 | 55.6 | 0.148 | 57.5 | 0.328 | -99.8 | 1.142 | 10.36 |
| 3.0 | 0.292 | 173.4 | 2.647 | 53.5 | 0.154 | 57.9 | 0.325 | -102.3 | 1.138 | 10.11 |
| 4.0 | 0.350 | 143.1 | 2.041 | 34.1 | 0.219 | 56.7 | 0.371 | -130.1 | 1.042 | 8.44 |
| 5.0 | 0.419 | 113.0 | 1.536 | 15.4 | 0.300 | 43.3 | 0.470 | -154.8 | 0.963 | 7.09 |

V_{CE} = 1 V, I_c = 7 mA, Z_o = 50 Ω

| Frequency (GHz) | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | | K | MAG/MSG (dB) |
|--------------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-------|-----------------|
| | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | | |
| 0.1 | 0.727 | -13.3 | 15.582 | 168.3 | 0.013 | 78.0 | 0.965 | -9.1 | 0.197 | 30.95 |
| 0.2 | 0.684 | -26.3 | 14.748 | 157.0 | 0.025 | 75.3 | 0.918 | -18.3 | 0.222 | 27.75 |
| 0.3 | 0.630 | -38.5 | 13.750 | 146.3 | 0.035 | 70.5 | 0.859 | -26.3 | 0.297 | 25.92 |
| 0.4 | 0.566 | -49.2 | 12.586 | 136.7 | 0.044 | 65.7 | 0.788 | -33.4 | 0.394 | 24.55 |
| 0.5 | 0.520 | -59.0 | 11.588 | 129.0 | 0.051 | 62.8 | 0.721 | -39.4 | 0.462 | 23.54 |
| 0.6 | 0.461 | -68.9 | 10.535 | 121.7 | 0.057 | 60.4 | 0.655 | -44.8 | 0.543 | 22.65 |
| 0.7 | 0.416 | -77.7 | 9.605 | 115.7 | 0.062 | 58.2 | 0.600 | -49.3 | 0.613 | 21.88 |
| 0.8 | 0.372 | -86.0 | 8.778 | 110.5 | 0.067 | 57.3 | 0.548 | -53.6 | 0.684 | 21.19 |
| 0.9 | 0.337 | -94.6 | 8.033 | 105.5 | 0.071 | 56.4 | 0.509 | -57.3 | 0.743 | 20.55 |
| 1.0 | 0.311 | -102.8 | 7.425 | 101.4 | 0.074 | 56.3 | 0.473 | -60.9 | 0.797 | 20.00 |
| 1.1 | 0.288 | -111.0 | 6.886 | 97.6 | 0.078 | 55.9 | 0.445 | -64.3 | 0.843 | 19.45 |
| 1.2 | 0.272 | -119.2 | 6.374 | 93.9 | 0.082 | 55.7 | 0.420 | -67.3 | 0.888 | 18.92 |
| 1.3 | 0.262 | -126.8 | 5.958 | 90.8 | 0.085 | 55.9 | 0.402 | -70.4 | 0.922 | 18.45 |
| 1.4 | 0.256 | -134.1 | 5.578 | 87.7 | 0.089 | 56.2 | 0.385 | -73.0 | 0.953 | 17.97 |
| 1.5 | 0.252 | -140.6 | 5.245 | 84.9 | 0.092 | 56.6 | 0.373 | -75.6 | 0.980 | 17.54 |
| 1.6 | 0.248 | -146.7 | 4.953 | 82.1 | 0.097 | 56.8 | 0.360 | -78.0 | 1.004 | 16.70 |
| 1.7 | 0.250 | -151.8 | 4.667 | 79.7 | 0.100 | 57.2 | 0.353 | -80.1 | 1.024 | 15.73 |
| 1.8 | 0.247 | -156.2 | 4.424 | 77.2 | 0.104 | 57.7 | 0.343 | -82.1 | 1.049 | 14.94 |
| 1.9 | 0.249 | -160.2 | 4.211 | 75.0 | 0.108 | 57.8 | 0.339 | -83.7 | 1.059 | 14.42 |
| 2.0 | 0.253 | -164.9 | 4.011 | 72.6 | 0.112 | 58.4 | 0.329 | -85.3 | 1.075 | 13.86 |
| 2.1 | 0.252 | -168.0 | 3.851 | 70.8 | 0.116 | 58.7 | 0.326 | -87.0 | 1.082 | 13.44 |
| 2.2 | 0.255 | -171.1 | 3.686 | 68.8 | 0.121 | 58.9 | 0.318 | -88.5 | 1.093 | 12.98 |
| 2.3 | 0.259 | -174.5 | 3.542 | 66.9 | 0.126 | 59.2 | 0.317 | -90.0 | 1.095 | 12.62 |
| 2.4 | 0.259 | -178.3 | 3.415 | 64.6 | 0.130 | 59.3 | 0.310 | -91.4 | 1.104 | 12.23 |
| 2.5 | 0.264 | 179.4 | 3.294 | 62.8 | 0.135 | 59.6 | 0.307 | -93.1 | 1.104 | 11.91 |
| 2.6 | 0.269 | 176.9 | 3.173 | 61.1 | 0.139 | 59.6 | 0.302 | -94.9 | 1.110 | 11.55 |
| 2.7 | 0.272 | 174.8 | 3.065 | 59.3 | 0.144 | 59.7 | 0.299 | -97.0 | 1.114 | 11.22 |
| 2.8 | 0.274 | 171.4 | 2.956 | 57.7 | 0.149 | 59.5 | 0.297 | -98.8 | 1.120 | 10.87 |
| 2.9 | 0.274 | 169.3 | 2.850 | 55.3 | 0.155 | 58.9 | 0.294 | -101.4 | 1.120 | 10.53 |
| 3.0 | 0.279 | 166.3 | 2.769 | 53.4 | 0.161 | 59.2 | 0.292 | -103.8 | 1.116 | 10.28 |
| 4.0 | 0.342 | 138.7 | 2.125 | 34.7 | 0.227 | 56.0 | 0.343 | -132.0 | 1.037 | 8.54 |
| 5.0 | 0.412 | 110.6 | 1.607 | 16.8 | 0.304 | 42.2 | 0.445 | -156.3 | 0.973 | 7.24 |

V_{CE} = 1 V, I_c = 10 mA, Z_o = 50 Ω

| Frequency (GHz) | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | | K | MAG/MSG (dB) |
|--------------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-------|-----------------|
| | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | | |
| 0.1 | 0.646 | -16.0 | 18.824 | 166.4 | 0.012 | 76.8 | 0.951 | -10.6 | 0.239 | 32.05 |
| 0.2 | 0.606 | -30.7 | 17.451 | 153.6 | 0.024 | 75.2 | 0.889 | -21.0 | 0.270 | 28.59 |
| 0.3 | 0.544 | -44.8 | 15.874 | 142.0 | 0.034 | 69.3 | 0.814 | -29.7 | 0.369 | 26.73 |
| 0.4 | 0.478 | -56.4 | 14.222 | 132.1 | 0.041 | 65.7 | 0.733 | -36.9 | 0.471 | 25.40 |
| 0.5 | 0.431 | -67.2 | 12.822 | 124.3 | 0.048 | 62.9 | 0.660 | -42.8 | 0.551 | 24.30 |
| 0.6 | 0.377 | -77.6 | 11.486 | 117.2 | 0.053 | 61.8 | 0.591 | -47.9 | 0.635 | 23.34 |
| 0.7 | 0.337 | -87.0 | 10.362 | 111.6 | 0.058 | 60.3 | 0.537 | -52.3 | 0.706 | 22.52 |
| 0.8 | 0.302 | -96.6 | 9.372 | 106.6 | 0.063 | 59.9 | 0.487 | -56.1 | 0.773 | 21.76 |
| 0.9 | 0.276 | -106.0 | 8.524 | 102.0 | 0.067 | 59.4 | 0.451 | -59.9 | 0.826 | 21.05 |
| 1.0 | 0.255 | -115.1 | 7.812 | 98.2 | 0.071 | 59.7 | 0.417 | -63.2 | 0.876 | 20.41 |
| 1.1 | 0.242 | -123.9 | 7.220 | 94.6 | 0.075 | 59.6 | 0.393 | -66.3 | 0.912 | 19.81 |
| 1.2 | 0.231 | -132.7 | 6.654 | 91.4 | 0.079 | 59.8 | 0.371 | -69.3 | 0.952 | 19.23 |
| 1.3 | 0.231 | -140.9 | 6.207 | 88.4 | 0.084 | 60.0 | 0.355 | -72.3 | 0.974 | 18.70 |
| 1.4 | 0.227 | -147.4 | 5.809 | 85.6 | 0.088 | 60.2 | 0.341 | -75.1 | 0.999 | 18.20 |
| 1.5 | 0.230 | -153.4 | 5.436 | 82.9 | 0.092 | 60.6 | 0.331 | -77.4 | 1.018 | 16.89 |
| 1.6 | 0.232 | -159.0 | 5.132 | 80.4 | 0.097 | 60.7 | 0.320 | -80.0 | 1.035 | 16.12 |
| 1.7 | 0.235 | -163.8 | 4.838 | 78.1 | 0.101 | 60.8 | 0.315 | -81.9 | 1.047 | 15.47 |
| 1.8 | 0.235 | -168.1 | 4.581 | 75.7 | 0.106 | 61.1 | 0.306 | -84.0 | 1.065 | 14.82 |
| 1.9 | 0.238 | -171.7 | 4.355 | 73.7 | 0.110 | 61.2 | 0.303 | -85.5 | 1.071 | 14.34 |
| 2.0 | 0.243 | -175.6 | 4.149 | 71.4 | 0.115 | 61.3 | 0.294 | -87.2 | 1.082 | 13.83 |
| 2.1 | 0.246 | 178.7 | 3.807 | 67.7 | 0.125 | 61.4 | 0.286 | -90.3 | 1.093 | 12.99 |
| 2.2 | 0.252 | 176.2 | 3.656 | 66.0 | 0.130 | 61.7 | 0.285 | -91.8 | 1.091 | 12.65 |
| 2.3 | 0.254 | 173.3 | 3.520 | 63.9 | 0.135 | 61.5 | 0.279 | -93.2 | 1.096 | 12.28 |
| 2.4 | 0.257 | 170.8 | 3.396 | 62.0 | 0.140 | 61.5 | 0.277 | -95.0 | 1.095 | 11.96 |
| 2.5 | 0.265 | 168.6 | 3.275 | 60.5 | 0.145 | 61.4 | 0.272 | -96.7 | 1.099 | 11.63 |
| 2.6 | 0.267 | 166.7 | 3.161 | 58.7 | 0.150 | 61.2 | 0.270 | -98.9 | 1.101 | 11.30 |
| 2.7 | 0.269 | 164.2 | 3.042 | 57.2 | 0.155 | 60.8 | 0.267 | -100.7 | 1.106 | 10.94 |
| 2.8 | 0.272 | 162.1 | 2.930 | 54.9 | 0.162 | 60.0 | 0.266 | -103.5 | 1.104 | 10.61 |
| 2.9 | 0.276 | 159.4 | 2.850 | 53.1 | 0.168 | 59.9 | 0.264 | -105.9 | 1.099 | 10.37 |
| 3.0 | 0.342 | 134.3 | 2.180 | 35.1 | 0.234 | 55.3 | 0.321 | -134.4 | 1.034 | 8.57 |
| 4.0 | 0.412 | 108.3 | 1.649 | 17.7 | 0.306 | 41.2 | 0.424 | -158.3 | 0.984 | 7.32 |
| 5.0 | | | | | | | | | | |

V_{CE} = 1 V, I_c = 20 mA, Z_o = 50 Ω

| Frequency (GHz) | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | | K | MAG/MSG (dB) |
|--------------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-------|-----------------|
| | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | | |
| 0.1 | 0.506 | -23.6 | 23.959 | 162.4 | 0.012 | 74.9 | 0.905 | -13.8 | 0.342 | 33.06 |
| 0.2 | 0.450 | -42.2 | 21.326 | 146.8 | 0.023 | 72.7 | 0.815 | -26.3 | 0.405 | 29.75 |
| 0.3 | 0.385 | -60.6 | 18.512 | 134.2 | 0.030 | 68.3 | 0.716 | -35.7 | 0.518 | 27.87 |
| 0.4 | 0.336 | -75.8 | 15.934 | 124.0 | 0.037 | 65.8 | 0.622 | -43.0 | 0.624 | 26.32 |
| 0.5 | 0.301 | -89.1 | 13.930 | 116.5 | 0.043 | 64.8 | 0.547 | -48.4 | 0.708 | 25.10 |
| 0.6 | 0.266 | -102.2 | 12.194 | 109.9 | 0.049 | 64.4 | 0.481 | -52.9 | 0.789 | 24.00 |
| 0.7 | 0.245 | -114.0 | 10.795 | 104.9 | 0.054 | 64.1 | 0.432 | -56.6 | 0.850 | 23.03 |
| 0.8 | 0.229 | -125.1 | 9.658 | 100.4 | 0.058 | 64.2 | 0.389 | -60.2 | 0.907 | 22.18 |
| 0.9 | 0.222 | -135.3 | 8.698 | 96.5 | 0.064 | 64.4 | 0.358 | -63.5 | 0.946 | 21.36 |
| 1.0 | 0.218 | -145.3 | 7.928 | 93.0 | 0.068 | 64.8 | 0.331 | -66.8 | 0.983 | 20.65 |
| 1.1 | 0.218 | -153.8 | 7.277 | 89.9 | 0.073 | 64.8 | 0.313 | -70.0 | 1.006 | 19.47 |
| 1.2 | 0.223 | -161.4 | 6.685 | 87.0 | 0.078 | 65.0 | 0.296 | -73.0 | 1.030 | 18.25 |
| 1.3 | 0.230 | -167.1 | 6.210 | 84.3 | 0.083 | 65.1 | 0.285 | -76.1 | 1.043 | 17.45 |
| 1.4 | 0.236 | -173.1 | 5.793 | 81.8 | 0.089 | 65.1 | 0.275 | -78.9 | 1.056 | 16.71 |
| 1.5 | 0.241 | -177.0 | 5.423 | 79.3 | 0.094 | 65.3 | 0.269 | -81.4 | 1.066 | 16.06 |
| 1.6 | 0.247 | 178.9 | 5.101 | 77.0 | 0.099 | 65.1 | 0.262 | -84.0 | 1.075 | 15.45 |
| 1.7 | 0.255 | 176.0 | 4.805 | 75.0 | 0.104 | 65.0 | 0.260 | -86.1 | 1.080 | 14.92 |
| 1.8 | 0.257 | 172.7 | 4.532 | 72.9 | 0.109 | 65.1 | 0.253 | -88.3 | 1.092 | 14.33 |
| 1.9 | 0.262 | 170.4 | 4.313 | 71.0 | 0.115 | 64.8 | 0.253 | -89.8 | 1.090 | 13.92 |
| 2.0 | 0.266 | 167.9 | 4.107 | 68.8 | 0.120 | 64.8 | 0.246 | -91.7 | 1.096 | 13.45 |
| 2.1 | 0.272 | 166.2 | 3.939 | 67.1 | 0.126 | 64.8 | 0.245 | -93.2 | 1.092 | 13.11 |
| 2.2 | 0.273 | 163.4 | 3.762 | 65.4 | 0.131 | 64.3 | 0.240 | -94.9 | 1.099 | 12.66 |
| 2.3 | 0.279 | 162.1 | 3.614 | 63.7 | 0.137 | 64.0 | 0.240 | -96.4 | 1.094 | 12.35 |
| 2.4 | 0.285 | 159.9 | 3.478 | 61.8 | 0.143 | 63.7 | 0.236 | -97.9 | 1.092 | 12.02 |
| 2.5 | 0.289 | 158.2 | 3.355 | 60.1 | 0.148 | 63.3 | 0.235 | -99.7 | 1.090 | 11.71 |
| 2.6 | 0.291 | 156.5 | 3.230 | 58.6 | 0.154 | 62.9 | 0.231 | -101.7 | 1.094 | 11.36 |
| 2.7 | 0.296 | 155.0 | 3.117 | 56.8 | 0.160 | 62.5 | 0.230 | -104.0 | 1.092 | 11.06 |
| 2.8 | 0.300 | 152.8 | 3.004 | 55.5 | 0.165 | 61.9 | 0.229 | -106.0 | 1.095 | 10.72 |
| 2.9 | 0.301 | 151.4 | 2.893 | 53.3 | 0.172 | 60.9 | 0.229 | -109.1 | 1.093 | 10.39 |
| 3.0 | 0.307 | 148.7 | 2.808 | 51.5 | 0.179 | 60.6 | 0.228 | -111.6 | 1.088 | 10.15 |
| 4.0 | 0.375 | 127.5 | 2.139 | 34.1 | 0.244 | 54.3 | 0.297 | -140.5 | 1.034 | 8.30 |
| 5.0 | 0.439 | 103.8 | 1.610 | 17.6 | 0.313 | 39.4 | 0.403 | -163.3 | 1.002 | 6.86 |

V_{CE} = 2 V, I_c = 1 mA, Z_o = 50 Ω

| Frequency (GHz) | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | | K | MAG/MSG (dB) |
|--------------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-------|-----------------|
| | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | | |
| 0.1 | 0.952 | -5.9 | 3.448 | 175.1 | 0.013 | 81.8 | 1.001 | -3.3 | 0.085 | 24.24 |
| 0.2 | 0.947 | -10.0 | 3.410 | 170.6 | 0.025 | 83.1 | 0.993 | -7.1 | 0.040 | 21.38 |
| 0.3 | 0.936 | -15.5 | 3.399 | 164.7 | 0.037 | 78.0 | 0.985 | -10.8 | 0.093 | 19.59 |
| 0.4 | 0.920 | -20.8 | 3.369 | 158.7 | 0.049 | 74.3 | 0.972 | -14.7 | 0.132 | 18.37 |
| 0.5 | 0.909 | -25.9 | 3.360 | 154.1 | 0.061 | 70.4 | 0.960 | -18.7 | 0.149 | 17.44 |
| 0.6 | 0.885 | -31.7 | 3.322 | 148.1 | 0.071 | 66.5 | 0.938 | -22.7 | 0.188 | 16.70 |
| 0.7 | 0.860 | -36.7 | 3.273 | 143.0 | 0.081 | 62.5 | 0.920 | -26.7 | 0.222 | 16.07 |
| 0.8 | 0.833 | -42.4 | 3.207 | 137.7 | 0.089 | 58.5 | 0.894 | -30.9 | 0.257 | 15.55 |
| 0.9 | 0.803 | -48.0 | 3.140 | 132.3 | 0.097 | 55.0 | 0.873 | -34.9 | 0.289 | 15.11 |
| 1.0 | 0.772 | -53.4 | 3.074 | 127.2 | 0.102 | 51.2 | 0.845 | -39.0 | 0.331 | 14.78 |
| 1.1 | 0.743 | -59.0 | 3.007 | 122.3 | 0.108 | 47.9 | 0.823 | -43.0 | 0.361 | 14.46 |
| 1.2 | 0.714 | -64.7 | 2.913 | 117.4 | 0.111 | 44.8 | 0.799 | -46.6 | 0.401 | 14.19 |
| 1.3 | 0.685 | -70.2 | 2.829 | 112.9 | 0.114 | 41.8 | 0.780 | -50.3 | 0.434 | 13.94 |
| 1.4 | 0.662 | -75.7 | 2.738 | 108.4 | 0.116 | 39.2 | 0.759 | -53.7 | 0.471 | 13.71 |
| 1.5 | 0.640 | -81.1 | 2.653 | 104.1 | 0.117 | 36.8 | 0.744 | -57.0 | 0.506 | 13.55 |
| 1.6 | 0.619 | -86.2 | 2.571 | 100.1 | 0.117 | 34.5 | 0.724 | -60.2 | 0.552 | 13.40 |
| 1.7 | 0.599 | -91.3 | 2.477 | 96.2 | 0.116 | 32.8 | 0.713 | -63.1 | 0.592 | 13.28 |
| 1.8 | 0.582 | -96.3 | 2.385 | 92.4 | 0.115 | 31.5 | 0.695 | -65.7 | 0.649 | 13.16 |
| 1.9 | 0.566 | -101.4 | 2.306 | 89.1 | 0.114 | 30.3 | 0.688 | -68.2 | 0.689 | 13.08 |
| 2.0 | 0.554 | -106.0 | 2.225 | 85.4 | 0.111 | 29.9 | 0.672 | -70.5 | 0.757 | 13.02 |
| 2.1 | 0.542 | -110.2 | 2.166 | 82.4 | 0.109 | 29.8 | 0.665 | -72.8 | 0.803 | 13.00 |
| 2.2 | 0.528 | -114.7 | 2.083 | 79.3 | 0.106 | 30.2 | 0.654 | -74.9 | 0.880 | 12.95 |
| 2.3 | 0.520 | -119.1 | 2.023 | 76.3 | 0.103 | 31.0 | 0.648 | -77.1 | 0.933 | 12.94 |
| 2.4 | 0.515 | -123.5 | 1.964 | 73.1 | 0.100 | 32.1 | 0.636 | -79.1 | 1.010 | 12.31 |
| 2.5 | 0.506 | -127.5 | 1.913 | 70.3 | 0.097 | 33.8 | 0.632 | -81.4 | 1.074 | 11.27 |
| 2.6 | 0.503 | -131.8 | 1.850 | 67.9 | 0.094 | 35.6 | 0.624 | -83.8 | 1.158 | 10.52 |
| 2.7 | 0.499 | -135.5 | 1.802 | 64.9 | 0.093 | 38.4 | 0.619 | -86.2 | 1.219 | 10.07 |
| 2.8 | 0.493 | -139.4 | 1.741 | 62.4 | 0.091 | 41.3 | 0.613 | -88.2 | 1.297 | 9.53 |
| 2.9 | 0.489 | -143.0 | 1.694 | 59.3 | 0.092 | 44.5 | 0.604 | -90.7 | 1.362 | 9.08 |
| 3.0 | 0.484 | -147.1 | 1.654 | 56.5 | 0.092 | 48.3 | 0.596 | -93.7 | 1.415 | 8.70 |
| 4.0 | 0.486 | 171.8 | 1.320 | 32.2 | 0.167 | 71.6 | 0.607 | -122.2 | 1.032 | 7.88 |
| 5.0 | 0.514 | 126.9 | 0.950 | 10.5 | 0.301 | 55.4 | 0.673 | -151.1 | 0.846 | 4.99 |

V_{CE} = 2 V, I_c = 3 mA, Z_o = 50 Ω

| Frequency (GHz) | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | | K | MAG/MSG (dB) |
|--------------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-------|-----------------|
| | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | | |
| 0.1 | 0.849 | -8.1 | 8.766 | 172.7 | 0.013 | 81.5 | 0.991 | -5.2 | 0.115 | 28.45 |
| 0.2 | 0.848 | -15.9 | 8.544 | 165.2 | 0.024 | 79.7 | 0.971 | -11.1 | 0.113 | 25.55 |
| 0.3 | 0.813 | -23.7 | 8.340 | 157.3 | 0.034 | 75.3 | 0.947 | -16.5 | 0.168 | 23.83 |
| 0.4 | 0.776 | -31.4 | 8.038 | 149.5 | 0.045 | 70.3 | 0.911 | -21.9 | 0.236 | 22.56 |
| 0.5 | 0.747 | -38.3 | 7.789 | 143.1 | 0.053 | 66.3 | 0.875 | -27.1 | 0.277 | 21.63 |
| 0.6 | 0.696 | -45.9 | 7.422 | 136.0 | 0.061 | 62.5 | 0.829 | -32.0 | 0.339 | 20.84 |
| 0.7 | 0.654 | -52.6 | 7.059 | 130.1 | 0.068 | 59.1 | 0.787 | -36.4 | 0.394 | 20.18 |
| 0.8 | 0.606 | -59.1 | 6.676 | 124.4 | 0.073 | 56.3 | 0.743 | -40.9 | 0.451 | 19.63 |
| 0.9 | 0.563 | -65.6 | 6.326 | 118.9 | 0.077 | 54.0 | 0.706 | -44.9 | 0.504 | 19.12 |
| 1.0 | 0.523 | -71.8 | 5.997 | 113.9 | 0.081 | 52.1 | 0.667 | -48.7 | 0.560 | 18.72 |
| 1.1 | 0.484 | -78.5 | 5.680 | 109.4 | 0.084 | 50.3 | 0.635 | -52.3 | 0.610 | 18.32 |
| 1.2 | 0.450 | -84.4 | 5.350 | 104.9 | 0.086 | 49.2 | 0.605 | -55.4 | 0.669 | 17.94 |
| 1.3 | 0.424 | -90.6 | 5.074 | 101.0 | 0.088 | 48.4 | 0.581 | -58.8 | 0.713 | 17.61 |
| 1.4 | 0.401 | -96.5 | 4.800 | 97.3 | 0.090 | 47.9 | 0.559 | -61.6 | 0.762 | 17.28 |
| 1.5 | 0.384 | -102.1 | 4.564 | 93.8 | 0.091 | 47.6 | 0.542 | -64.2 | 0.803 | 16.98 |
| 1.6 | 0.365 | -108.0 | 4.348 | 90.3 | 0.093 | 47.4 | 0.523 | -66.8 | 0.851 | 16.70 |
| 1.7 | 0.353 | -113.0 | 4.131 | 87.3 | 0.094 | 47.8 | 0.513 | -68.9 | 0.891 | 16.42 |
| 1.8 | 0.344 | -117.9 | 3.933 | 84.3 | 0.096 | 48.2 | 0.497 | -70.9 | 0.937 | 16.14 |
| 1.9 | 0.332 | -123.2 | 3.763 | 81.6 | 0.097 | 48.7 | 0.490 | -72.8 | 0.971 | 15.87 |
| 2.0 | 0.325 | -127.6 | 3.597 | 78.7 | 0.099 | 49.7 | 0.477 | -74.5 | 1.016 | 14.85 |
| 2.1 | 0.321 | -131.8 | 3.464 | 76.5 | 0.101 | 51.0 | 0.472 | -76.2 | 1.038 | 14.18 |
| 2.2 | 0.317 | -136.1 | 3.324 | 73.9 | 0.103 | 51.8 | 0.462 | -77.9 | 1.071 | 13.48 |
| 2.3 | 0.312 | -140.2 | 3.202 | 71.7 | 0.105 | 53.1 | 0.458 | -79.3 | 1.091 | 13.00 |
| 2.4 | 0.309 | -144.0 | 3.094 | 69.1 | 0.108 | 54.1 | 0.449 | -80.9 | 1.116 | 12.52 |
| 2.5 | 0.308 | -148.2 | 2.989 | 66.9 | 0.110 | 55.4 | 0.445 | -82.6 | 1.132 | 12.13 |
| 2.6 | 0.308 | -151.4 | 2.886 | 64.9 | 0.113 | 56.4 | 0.437 | -84.5 | 1.152 | 11.71 |
| 2.7 | 0.309 | -155.2 | 2.795 | 62.7 | 0.116 | 57.5 | 0.433 | -86.3 | 1.162 | 11.38 |
| 2.8 | 0.307 | -158.8 | 2.695 | 60.8 | 0.120 | 58.5 | 0.429 | -88.1 | 1.174 | 10.99 |
| 2.9 | 0.302 | -161.8 | 2.607 | 58.1 | 0.125 | 58.9 | 0.423 | -90.4 | 1.184 | 10.61 |
| 3.0 | 0.306 | -165.4 | 2.540 | 55.8 | 0.129 | 60.0 | 0.419 | -92.8 | 1.177 | 10.38 |
| 4.0 | 0.345 | 158.2 | 1.983 | 35.0 | 0.199 | 63.4 | 0.447 | -119.8 | 1.013 | 9.27 |
| 5.0 | 0.411 | 121.8 | 1.483 | 14.2 | 0.296 | 50.0 | 0.544 | -146.7 | 0.882 | 7.00 |

V_{CE} = 2 V, I_c = 5 mA, Z_o = 50 Ω

| Frequency (GHz) | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | | K | MAG/MSG (dB) |
|--------------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-------|-----------------|
| | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | | |
| 0.1 | 0.793 | -9.6 | 12.650 | 170.5 | 0.011 | 79.8 | 0.981 | -6.7 | 0.164 | 30.67 |
| 0.2 | 0.766 | -19.3 | 12.156 | 161.4 | 0.022 | 79.4 | 0.950 | -13.9 | 0.159 | 27.36 |
| 0.3 | 0.721 | -29.4 | 11.624 | 152.1 | 0.032 | 72.6 | 0.910 | -20.3 | 0.248 | 25.54 |
| 0.4 | 0.671 | -38.1 | 10.959 | 143.3 | 0.041 | 69.0 | 0.859 | -26.4 | 0.317 | 24.26 |
| 0.5 | 0.627 | -46.2 | 10.354 | 136.2 | 0.049 | 65.0 | 0.807 | -31.7 | 0.382 | 23.29 |
| 0.6 | 0.572 | -54.3 | 9.653 | 128.9 | 0.055 | 62.3 | 0.749 | -36.7 | 0.453 | 22.44 |
| 0.7 | 0.523 | -61.3 | 8.978 | 122.9 | 0.060 | 59.6 | 0.699 | -41.1 | 0.519 | 21.73 |
| 0.8 | 0.474 | -68.5 | 8.329 | 117.3 | 0.065 | 57.9 | 0.649 | -45.3 | 0.585 | 21.10 |
| 0.9 | 0.431 | -75.4 | 7.741 | 112.2 | 0.069 | 56.4 | 0.609 | -48.9 | 0.645 | 20.53 |
| 1.0 | 0.394 | -82.0 | 7.228 | 107.6 | 0.072 | 55.8 | 0.570 | -52.4 | 0.704 | 20.02 |
| 1.1 | 0.361 | -88.6 | 6.768 | 103.4 | 0.075 | 54.9 | 0.541 | -55.6 | 0.756 | 19.56 |
| 1.2 | 0.332 | -95.5 | 6.313 | 99.6 | 0.078 | 54.6 | 0.512 | -58.5 | 0.809 | 19.09 |
| 1.3 | 0.311 | -102.2 | 5.929 | 96.0 | 0.081 | 54.6 | 0.491 | -61.4 | 0.850 | 18.67 |
| 1.4 | 0.296 | -108.6 | 5.585 | 92.7 | 0.084 | 54.7 | 0.472 | -63.9 | 0.887 | 18.25 |
| 1.5 | 0.283 | -115.0 | 5.284 | 89.4 | 0.086 | 55.0 | 0.457 | -66.2 | 0.922 | 17.88 |
| 1.6 | 0.271 | -120.7 | 4.996 | 86.5 | 0.089 | 55.1 | 0.440 | -68.5 | 0.958 | 17.50 |
| 1.7 | 0.265 | -126.1 | 4.727 | 83.9 | 0.092 | 55.8 | 0.432 | -70.5 | 0.985 | 17.12 |
| 1.8 | 0.257 | -131.4 | 4.482 | 81.2 | 0.095 | 56.2 | 0.420 | -72.3 | 1.017 | 15.95 |
| 1.9 | 0.253 | -136.5 | 4.279 | 78.8 | 0.098 | 56.8 | 0.414 | -73.9 | 1.034 | 15.28 |
| 2.0 | 0.250 | -141.1 | 4.082 | 76.1 | 0.101 | 57.7 | 0.403 | -75.4 | 1.060 | 14.57 |
| 2.1 | 0.248 | -145.3 | 3.927 | 74.1 | 0.104 | 58.4 | 0.399 | -77.0 | 1.070 | 14.14 |
| 2.2 | 0.245 | -149.4 | 3.759 | 71.9 | 0.108 | 58.9 | 0.390 | -78.4 | 1.089 | 13.60 |
| 2.3 | 0.246 | -153.4 | 3.615 | 69.9 | 0.112 | 59.7 | 0.388 | -79.8 | 1.096 | 13.21 |
| 2.4 | 0.245 | -156.6 | 3.490 | 67.6 | 0.116 | 60.1 | 0.380 | -81.1 | 1.106 | 12.81 |
| 2.5 | 0.246 | -160.7 | 3.369 | 65.7 | 0.120 | 60.7 | 0.376 | -82.7 | 1.110 | 12.47 |
| 2.6 | 0.248 | -163.8 | 3.248 | 63.9 | 0.123 | 61.2 | 0.370 | -84.3 | 1.122 | 12.08 |
| 2.7 | 0.252 | -166.3 | 3.139 | 61.9 | 0.128 | 61.8 | 0.367 | -86.1 | 1.121 | 11.78 |
| 2.8 | 0.253 | -170.0 | 3.024 | 60.2 | 0.132 | 61.8 | 0.364 | -87.7 | 1.129 | 11.41 |
| 2.9 | 0.252 | -173.2 | 2.926 | 57.7 | 0.138 | 61.7 | 0.359 | -90.1 | 1.129 | 11.09 |
| 3.0 | 0.255 | -176.5 | 2.849 | 55.5 | 0.144 | 62.2 | 0.356 | -92.4 | 1.121 | 10.86 |
| 4.0 | 0.307 | 150.1 | 2.206 | 36.5 | 0.212 | 61.4 | 0.390 | -119.9 | 1.010 | 9.56 |
| 5.0 | 0.380 | 117.6 | 1.674 | 17.1 | 0.297 | 47.7 | 0.490 | -146.3 | 0.913 | 7.50 |

V_{CE} = 2 V, I_c = 7 mA, Z_o = 50 Ω

| Frequency (GHz) | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | | K | MAG/MSG (dB) |
|--------------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-------|-----------------|
| | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | | |
| 0.1 | 0.738 | -11.4 | 15.535 | 169.0 | 0.012 | 79.1 | 0.972 | -7.8 | 0.195 | 31.23 |
| 0.2 | 0.703 | -22.4 | 14.745 | 158.5 | 0.021 | 77.8 | 0.932 | -15.8 | 0.211 | 28.37 |
| 0.3 | 0.653 | -33.3 | 13.867 | 148.5 | 0.031 | 72.3 | 0.881 | -22.9 | 0.295 | 26.48 |
| 0.4 | 0.597 | -42.8 | 12.835 | 139.1 | 0.039 | 68.3 | 0.818 | -29.3 | 0.382 | 25.19 |
| 0.5 | 0.547 | -51.3 | 11.917 | 131.7 | 0.046 | 65.1 | 0.757 | -34.7 | 0.454 | 24.18 |
| 0.6 | 0.489 | -59.8 | 10.929 | 124.4 | 0.051 | 62.9 | 0.695 | -39.6 | 0.533 | 23.29 |
| 0.7 | 0.441 | -67.4 | 10.045 | 118.5 | 0.056 | 60.7 | 0.642 | -43.6 | 0.604 | 22.53 |
| 0.8 | 0.393 | -74.4 | 9.212 | 113.2 | 0.060 | 59.8 | 0.591 | -47.5 | 0.677 | 21.86 |
| 0.9 | 0.355 | -81.6 | 8.480 | 108.3 | 0.064 | 59.0 | 0.552 | -50.8 | 0.733 | 21.20 |
| 1.0 | 0.322 | -88.7 | 7.861 | 104.1 | 0.068 | 58.7 | 0.514 | -53.9 | 0.791 | 20.66 |
| 1.1 | 0.293 | -96.0 | 7.320 | 100.2 | 0.071 | 58.3 | 0.487 | -57.0 | 0.836 | 20.12 |
| 1.2 | 0.268 | -103.3 | 6.790 | 96.5 | 0.075 | 58.5 | 0.460 | -59.7 | 0.884 | 19.60 |
| 1.3 | 0.253 | -110.7 | 6.360 | 93.3 | 0.078 | 58.6 | 0.441 | -62.3 | 0.918 | 19.13 |
| 1.4 | 0.241 | -117.7 | 5.971 | 90.1 | 0.082 | 59.0 | 0.424 | -64.8 | 0.947 | 18.64 |
| 1.5 | 0.232 | -124.4 | 5.621 | 87.3 | 0.085 | 59.3 | 0.411 | -67.0 | 0.976 | 18.23 |
| 1.6 | 0.225 | -130.9 | 5.316 | 84.6 | 0.088 | 59.6 | 0.398 | -69.2 | 0.999 | 17.79 |
| 1.7 | 0.224 | -136.4 | 5.019 | 82.1 | 0.092 | 60.1 | 0.391 | -71.0 | 1.017 | 16.57 |
| 1.8 | 0.218 | -141.5 | 4.759 | 79.4 | 0.095 | 60.5 | 0.379 | -72.8 | 1.043 | 15.71 |
| 1.9 | 0.215 | -146.3 | 4.532 | 77.3 | 0.100 | 60.7 | 0.375 | -74.3 | 1.053 | 15.17 |
| 2.0 | 0.216 | -150.8 | 4.321 | 74.8 | 0.103 | 61.4 | 0.364 | -75.7 | 1.070 | 14.59 |
| 2.1 | 0.218 | -155.1 | 4.150 | 73.0 | 0.107 | 61.9 | 0.361 | -77.2 | 1.074 | 14.21 |
| 2.2 | 0.216 | -158.7 | 3.975 | 70.9 | 0.111 | 62.1 | 0.354 | -78.6 | 1.087 | 13.72 |
| 2.3 | 0.217 | -162.6 | 3.822 | 69.0 | 0.116 | 62.6 | 0.352 | -79.9 | 1.090 | 13.35 |
| 2.4 | 0.218 | -165.3 | 3.679 | 66.9 | 0.121 | 62.7 | 0.344 | -81.0 | 1.096 | 12.95 |
| 2.5 | 0.222 | -169.1 | 3.551 | 65.0 | 0.125 | 63.1 | 0.342 | -82.7 | 1.097 | 12.64 |
| 2.6 | 0.224 | -172.1 | 3.422 | 63.3 | 0.129 | 63.1 | 0.336 | -84.2 | 1.104 | 12.26 |
| 2.7 | 0.228 | -174.8 | 3.303 | 61.4 | 0.134 | 63.3 | 0.333 | -86.0 | 1.106 | 11.94 |
| 2.8 | 0.228 | -177.7 | 3.188 | 59.8 | 0.139 | 63.2 | 0.330 | -87.6 | 1.109 | 11.60 |
| 2.9 | 0.231 | 179.4 | 3.077 | 57.4 | 0.145 | 62.7 | 0.326 | -90.0 | 1.107 | 11.28 |
| 3.0 | 0.232 | 176.0 | 2.996 | 55.4 | 0.151 | 63.0 | 0.323 | -92.2 | 1.102 | 11.03 |
| 4.0 | 0.293 | 145.1 | 2.313 | 37.1 | 0.218 | 60.3 | 0.361 | -120.4 | 1.009 | 9.68 |
| 5.0 | 0.367 | 115.1 | 1.758 | 18.5 | 0.299 | 46.6 | 0.464 | -146.6 | 0.928 | 7.69 |

V_{CE} = 2 V, I_c = 10 mA, Z_o = 50 Ω

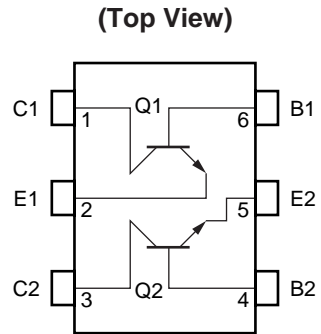
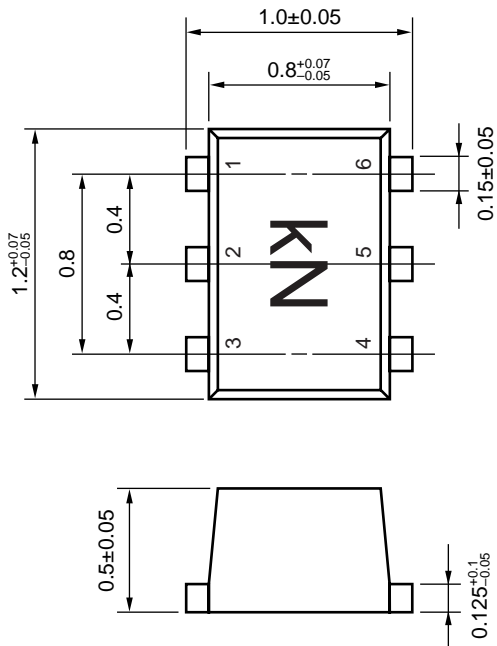
| Frequency (GHz) | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | | K | MAG/MSG (dB) |
|--------------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-------|-----------------|
| | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | | |
| 0.1 | 0.669 | -13.1 | 18.827 | 167.3 | 0.011 | 81.6 | 0.960 | -9.1 | 0.196 | 32.37 |
| 0.2 | 0.633 | -25.9 | 17.591 | 155.4 | 0.020 | 76.2 | 0.908 | -18.0 | 0.271 | 29.37 |
| 0.3 | 0.570 | -37.8 | 16.209 | 144.5 | 0.029 | 71.9 | 0.844 | -25.6 | 0.361 | 27.44 |
| 0.4 | 0.511 | -48.0 | 14.664 | 134.8 | 0.036 | 67.7 | 0.771 | -32.1 | 0.462 | 26.05 |
| 0.5 | 0.463 | -57.3 | 13.369 | 127.2 | 0.043 | 65.6 | 0.702 | -37.4 | 0.537 | 24.96 |
| 0.6 | 0.404 | -65.9 | 12.067 | 120.1 | 0.048 | 64.3 | 0.637 | -41.9 | 0.623 | 24.05 |
| 0.7 | 0.358 | -73.7 | 10.941 | 114.4 | 0.052 | 62.9 | 0.584 | -45.6 | 0.694 | 23.19 |
| 0.8 | 0.316 | -81.4 | 9.951 | 109.3 | 0.057 | 62.3 | 0.534 | -49.1 | 0.763 | 22.45 |
| 0.9 | 0.283 | -89.2 | 9.095 | 104.8 | 0.061 | 62.1 | 0.497 | -52.0 | 0.816 | 21.76 |
| 1.0 | 0.256 | -97.3 | 8.375 | 100.8 | 0.065 | 62.2 | 0.463 | -55.0 | 0.865 | 21.13 |
| 1.1 | 0.235 | -105.2 | 7.752 | 97.2 | 0.068 | 62.1 | 0.438 | -57.8 | 0.904 | 20.54 |
| 1.2 | 0.214 | -113.4 | 7.173 | 93.8 | 0.072 | 62.2 | 0.415 | -60.3 | 0.944 | 19.96 |
| 1.3 | 0.207 | -121.0 | 6.696 | 90.8 | 0.076 | 62.5 | 0.398 | -62.9 | 0.967 | 19.43 |
| 1.4 | 0.198 | -129.3 | 6.274 | 88.0 | 0.081 | 62.9 | 0.383 | -65.2 | 0.991 | 18.92 |
| 1.5 | 0.195 | -136.2 | 5.898 | 85.2 | 0.084 | 63.3 | 0.372 | -67.3 | 1.009 | 17.84 |
| 1.6 | 0.193 | -142.4 | 5.561 | 82.7 | 0.089 | 63.2 | 0.360 | -69.4 | 1.027 | 16.97 |
| 1.7 | 0.192 | -148.7 | 5.241 | 80.4 | 0.093 | 63.5 | 0.354 | -71.2 | 1.042 | 16.27 |
| 1.8 | 0.193 | -153.1 | 4.965 | 78.1 | 0.097 | 64.0 | 0.344 | -73.0 | 1.058 | 15.63 |
| 1.9 | 0.194 | -158.0 | 4.727 | 76.0 | 0.102 | 63.9 | 0.341 | -74.5 | 1.059 | 15.18 |
| 2.0 | 0.194 | -161.8 | 4.502 | 73.6 | 0.106 | 64.3 | 0.331 | -75.8 | 1.074 | 14.62 |
| 2.1 | 0.196 | -165.4 | 4.326 | 71.9 | 0.111 | 64.7 | 0.329 | -77.3 | 1.075 | 14.26 |
| 2.2 | 0.197 | -168.8 | 4.135 | 69.9 | 0.115 | 64.6 | 0.322 | -78.5 | 1.083 | 13.79 |
| 2.3 | 0.201 | -172.0 | 3.977 | 68.1 | 0.120 | 64.8 | 0.321 | -79.8 | 1.080 | 13.46 |
| 2.4 | 0.202 | -174.9 | 3.828 | 66.0 | 0.125 | 64.7 | 0.315 | -81.0 | 1.087 | 13.08 |
| 2.5 | 0.205 | -178.1 | 3.694 | 64.3 | 0.130 | 64.8 | 0.313 | -82.6 | 1.085 | 12.76 |
| 2.6 | 0.210 | 179.6 | 3.557 | 62.7 | 0.135 | 64.7 | 0.307 | -84.0 | 1.088 | 12.41 |
| 2.7 | 0.214 | 177.2 | 3.436 | 61.0 | 0.139 | 64.7 | 0.304 | -85.8 | 1.089 | 12.09 |
| 2.8 | 0.215 | 173.8 | 3.313 | 59.5 | 0.145 | 64.3 | 0.302 | -87.4 | 1.093 | 11.74 |
| 2.9 | 0.216 | 171.6 | 3.194 | 57.2 | 0.151 | 63.7 | 0.299 | -90.0 | 1.091 | 11.41 |
| 3.0 | 0.222 | 168.4 | 3.109 | 55.2 | 0.157 | 63.7 | 0.296 | -92.1 | 1.083 | 11.21 |
| 4.0 | 0.287 | 140.5 | 2.392 | 37.6 | 0.224 | 59.7 | 0.337 | -121.1 | 1.007 | 9.77 |
| 5.0 | 0.361 | 112.4 | 1.824 | 19.9 | 0.301 | 45.7 | 0.440 | -147.2 | 0.942 | 7.83 |

V_{CE} = 2 V, I_c = 20 mA, Z_o = 50 Ω

| Frequency (GHz) | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | | K | MAG/MSG (dB) |
|--------------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-------|-----------------|
| | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | | |
| 0.1 | 0.542 | -17.9 | 24.232 | 164.1 | 0.010 | 66.6 | 0.934 | -11.1 | 0.399 | 33.96 |
| 0.2 | 0.493 | -33.0 | 21.939 | 149.7 | 0.019 | 75.1 | 0.858 | -21.6 | 0.380 | 30.72 |
| 0.3 | 0.431 | -47.4 | 19.388 | 137.6 | 0.026 | 71.9 | 0.770 | -29.7 | 0.484 | 28.64 |
| 0.4 | 0.367 | -58.9 | 16.973 | 127.6 | 0.033 | 69.1 | 0.684 | -35.9 | 0.601 | 27.17 |
| 0.5 | 0.322 | -69.1 | 14.992 | 120.1 | 0.038 | 68.0 | 0.611 | -40.5 | 0.686 | 25.96 |
| 0.6 | 0.277 | -79.2 | 13.250 | 113.5 | 0.043 | 67.4 | 0.547 | -44.3 | 0.766 | 24.87 |
| 0.7 | 0.243 | -88.4 | 11.802 | 108.2 | 0.048 | 66.8 | 0.498 | -47.2 | 0.832 | 23.94 |
| 0.8 | 0.212 | -98.5 | 10.616 | 103.7 | 0.052 | 67.0 | 0.453 | -50.1 | 0.888 | 23.08 |
| 0.9 | 0.193 | -108.5 | 9.591 | 99.6 | 0.057 | 67.0 | 0.422 | -52.6 | 0.929 | 22.27 |
| 1.0 | 0.175 | -117.8 | 8.791 | 96.1 | 0.061 | 67.4 | 0.393 | -55.0 | 0.967 | 21.56 |
| 1.1 | 0.167 | -127.8 | 8.092 | 92.9 | 0.066 | 67.4 | 0.372 | -57.5 | 0.991 | 20.89 |
| 1.2 | 0.160 | -137.7 | 7.439 | 89.9 | 0.070 | 67.7 | 0.353 | -59.7 | 1.020 | 19.38 |
| 1.3 | 0.163 | -146.3 | 6.932 | 87.3 | 0.075 | 67.8 | 0.341 | -62.1 | 1.030 | 18.58 |
| 1.4 | 0.164 | -154.2 | 6.475 | 84.6 | 0.080 | 67.8 | 0.329 | -64.4 | 1.043 | 17.81 |
| 1.5 | 0.166 | -160.4 | 6.067 | 82.1 | 0.085 | 68.1 | 0.321 | -66.5 | 1.055 | 17.12 |
| 1.6 | 0.169 | -166.1 | 5.723 | 79.9 | 0.090 | 67.9 | 0.312 | -68.6 | 1.061 | 16.53 |
| 1.7 | 0.177 | -170.1 | 5.378 | 77.9 | 0.094 | 68.1 | 0.308 | -70.3 | 1.069 | 15.96 |
| 1.8 | 0.176 | -174.4 | 5.085 | 75.7 | 0.099 | 68.1 | 0.300 | -72.1 | 1.081 | 15.36 |
| 1.9 | 0.182 | -177.9 | 4.839 | 73.7 | 0.104 | 67.9 | 0.299 | -73.5 | 1.079 | 14.95 |
| 2.0 | 0.186 | 178.7 | 4.607 | 71.4 | 0.109 | 68.0 | 0.292 | -74.9 | 1.084 | 14.48 |
| 2.1 | 0.191 | 176.1 | 4.421 | 69.9 | 0.115 | 68.1 | 0.291 | -76.3 | 1.081 | 14.13 |
| 2.2 | 0.193 | 174.1 | 4.231 | 68.0 | 0.120 | 67.7 | 0.285 | -77.7 | 1.084 | 13.72 |
| 2.3 | 0.198 | 171.5 | 4.058 | 66.4 | 0.125 | 67.6 | 0.285 | -79.0 | 1.082 | 13.37 |
| 2.4 | 0.202 | 169.2 | 3.910 | 64.5 | 0.130 | 67.3 | 0.280 | -80.1 | 1.081 | 13.04 |
| 2.5 | 0.206 | 167.6 | 3.768 | 62.7 | 0.135 | 67.1 | 0.279 | -81.8 | 1.079 | 12.73 |
| 2.6 | 0.211 | 165.4 | 3.629 | 61.4 | 0.141 | 66.7 | 0.274 | -83.1 | 1.080 | 12.39 |
| 2.7 | 0.214 | 164.0 | 3.510 | 59.5 | 0.146 | 66.4 | 0.272 | -85.1 | 1.077 | 12.11 |
| 2.8 | 0.219 | 160.9 | 3.380 | 58.2 | 0.151 | 65.8 | 0.270 | -86.7 | 1.080 | 11.76 |
| 2.9 | 0.219 | 159.3 | 3.258 | 56.1 | 0.158 | 64.9 | 0.268 | -89.5 | 1.079 | 11.43 |
| 3.0 | 0.225 | 156.6 | 3.168 | 54.3 | 0.165 | 64.7 | 0.267 | -91.7 | 1.071 | 11.22 |
| 4.0 | 0.295 | 133.2 | 2.424 | 37.3 | 0.232 | 59.2 | 0.313 | -122.2 | 1.007 | 9.68 |
| 5.0 | 0.367 | 108.4 | 1.848 | 20.3 | 0.305 | 44.6 | 0.417 | -148.7 | 0.956 | 7.82 |

PACKAGE DIMENSIONS

6-PIN LEAD-LESS MINIMOLD (UNIT: mm)



PIN CONNECTIONS

- 1. Collector (Q1)
- 2. Emitter (Q1)
- 3. Collector (Q2)
- 4. Base (Q2)
- 5. Emitter (Q2)
- 6. Base (Q1)

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