

NPN シリコン RF トランジスタ

高周波低雑音増幅用

フラットリード 3 ピン薄型超小型ミニモールド

特 徴

低電圧動作，低位相雑音

OSC 用途に最適

フラットリード 3 ピン薄型超小型ミニモールド・パッケージ

オーダ情報

| オーダ名称 | 包装個数 | 包装形態 |
|------------|------------|----------------------|
| 2SC5676 | 50 個 (バラ品) | ・ 8 mm 幅エンボス式テーピング |
| 2SC5676-T1 | 3 k 個/リール | ・ 3 ピン (コレクタ) が送り穴方向 |

備考 評価用サンプルのオーダについては，販売員にお問い合わせください。

50 個単位で対応いたします。

絶対最大定格 (TA = +25°C)

| 項 目 | 略 号 | 定 格 | 単 位 |
|--------------|--------------------|--------------|-----|
| コレクタ・ベース間電圧 | V _{CB0} | 9 | V |
| コレクタ・エミッタ間電圧 | V _{CEO} | 5.5 | V |
| エミッタ・ベース間電圧 | V _{EB0} | 1.5 | V |
| コレクタ電流 | I _c | 100 | mA |
| 全損失 | P _{tot} 注 | 200 | mW |
| ジャンクション温度 | T _j | 150 | °C |
| 保存温度 | T _{stg} | - 65 ~ + 150 | °C |

注 1.08 cm² × 1.0 mm (t) のガラス・エポキシ基板実装時

本製品は高周波プロセスを用いていますので，静電気などの過大入力にご注意ください。

本資料の内容は，予告なく変更することがありますので，最新のものであることをご確認の上ご使用ください。

電気的特性 (TA = +25°C)

| 項目 | 略号 | 条件 | MIN. | TYP. | MAX. | 単位 |
|-----------|---------------------------------|------------------------------------------------------------------------------------------------|------|------|------|-----|
| DC 特性 | | | | | | |
| コレクタシャ断電流 | ICBO | V _{CB} = 5 V, I _E = 0 mA | – | – | 200 | nA |
| エミッタシャ断電流 | IEBO | V _{BE} = 1 V, I _C = 0 mA | – | – | 200 | nA |
| 直流電流増幅率 | h _{FE} ^{注1} | V _{CE} = 1 V, I _C = 10 mA | 100 | – | 160 | – |
| RF 特性 | | | | | | |
| 利得帯域幅積 | f _T | V _{CE} = 1 V, I _C = 10 mA, f = 2 GHz | 4.0 | 5.5 | – | GHz |
| 順方向伝達利得 | S _{21e} ² | V _{CE} = 1 V, I _C = 10 mA, f = 2 GHz | 2.5 | 4.0 | – | dB |
| 雑音指数 | NF | V _{CE} = 1 V, I _C = 10 mA, f = 2 GHz, Z _S = Z _{opt} | – | 1.8 | 3.0 | dB |
| 帰還容量 | C _{re} ^{注2} | V _{CB} = 0.5 V, I _E = 0 mA, f = 1 MHz | – | 0.9 | 1.2 | pF |

注 1. パルス測定 : PW ≤ 350 μs , Duty Cycle ≤ 2%

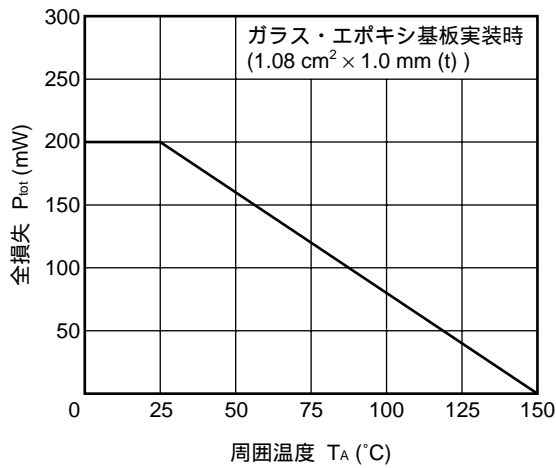
- 容量メータ (自動平衡ブリッジ法) によって測定したエミッタを, ガード端子に接続した際のコレクタ・ベース間容量

h_{FE} 規格区分

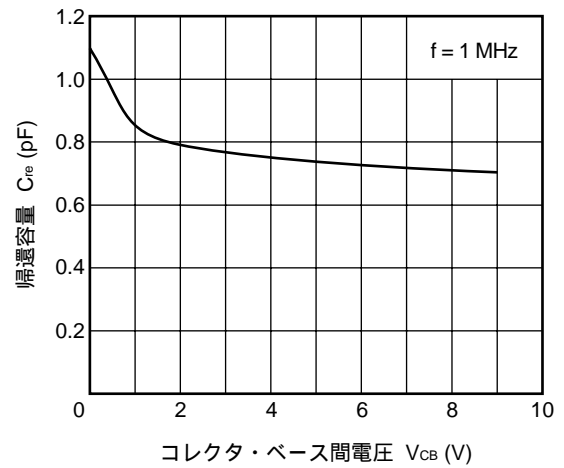
| | |
|-------------------|-----------|
| 規格区分 | FB |
| 捺印 | UC |
| h _{FE} 値 | 100 ~ 160 |

特性曲線 (特に指定のないかぎり, $T_A = +25^\circ\text{C}$)

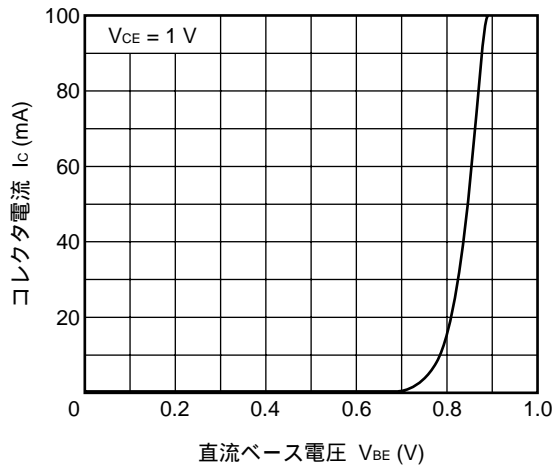
全損失 vs. 周囲温度



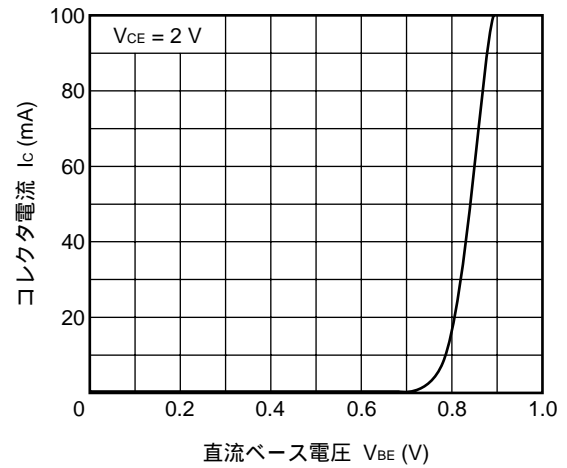
帰還容量 vs. コレクタ・ベース間電圧



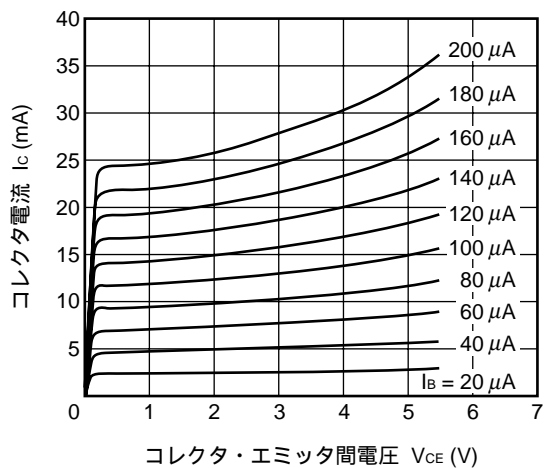
コレクタ電流 vs. 直流ベース電圧



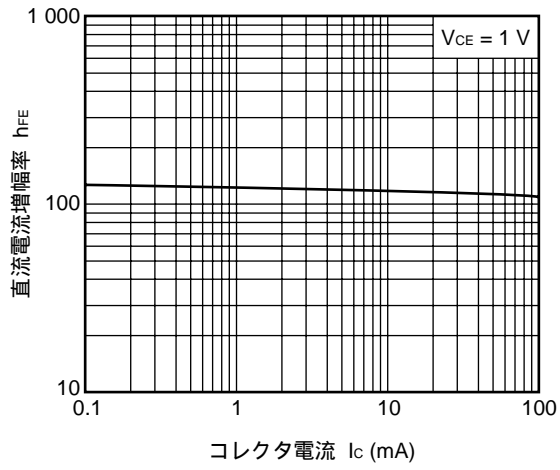
コレクタ電流 vs. 直流ベース電圧



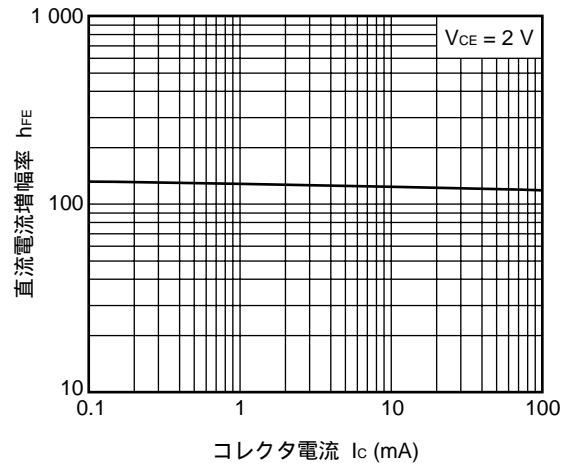
コレクタ電流 vs. コレクタ・エミッタ間電圧

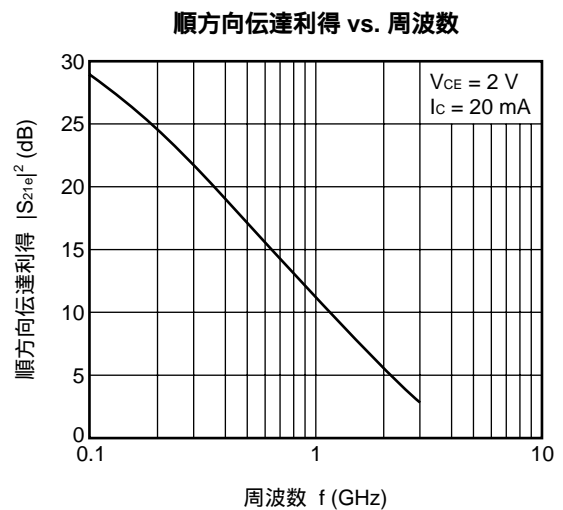
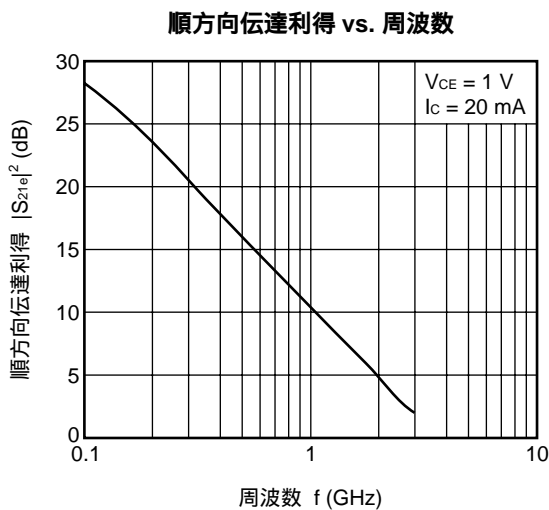
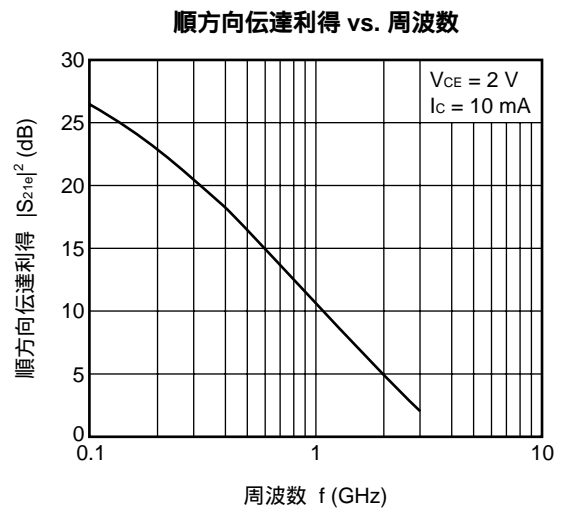
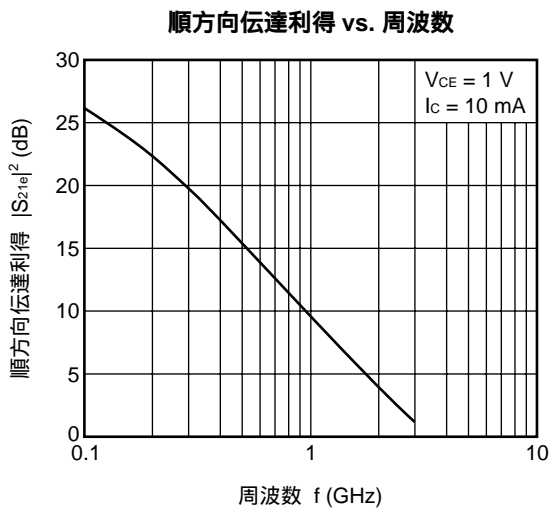
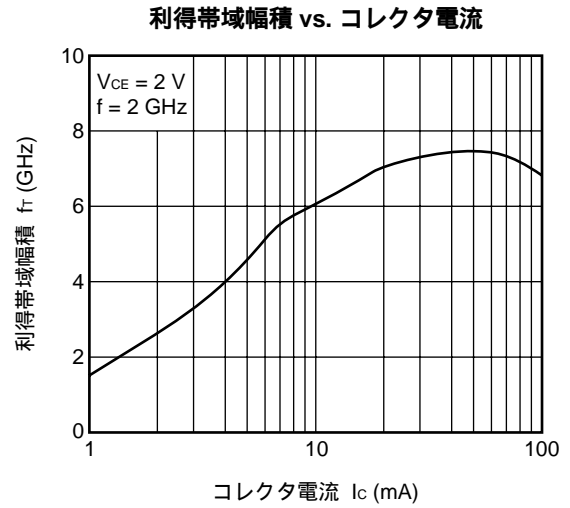
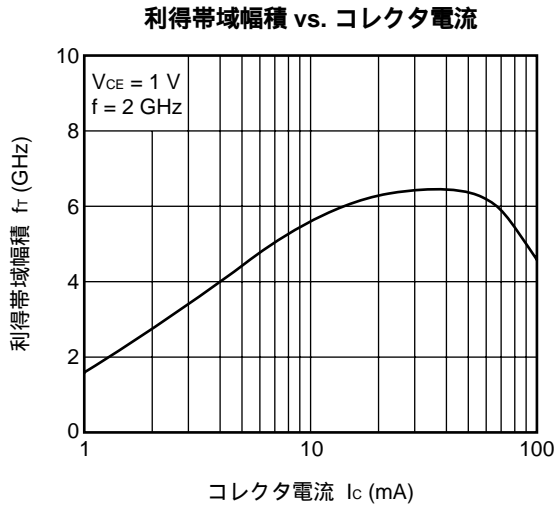


直流電流増幅率 vs. コレクタ電流

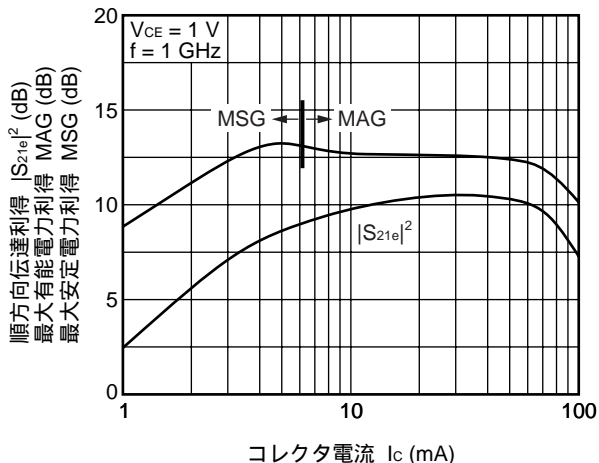


直流電流増幅率 vs. コレクタ電流

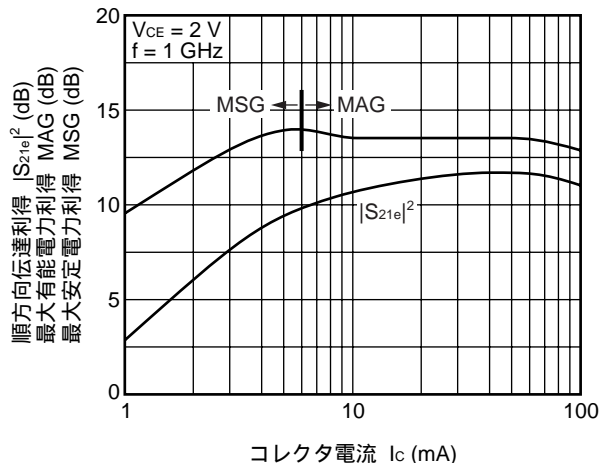




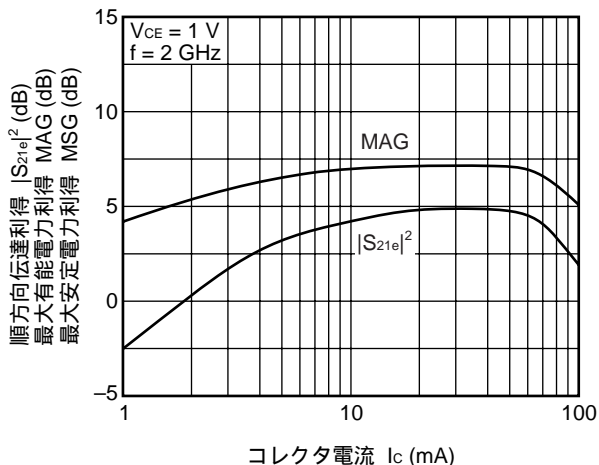
順方向伝達利得, MAG, MSG
vs. コレクタ電流



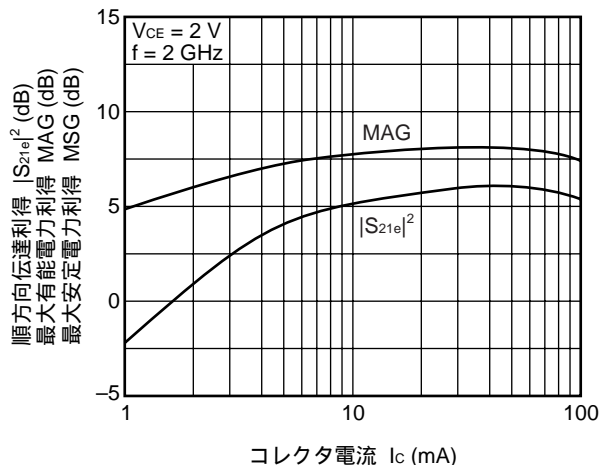
順方向伝達利得, MAG, MSG
vs. コレクタ電流



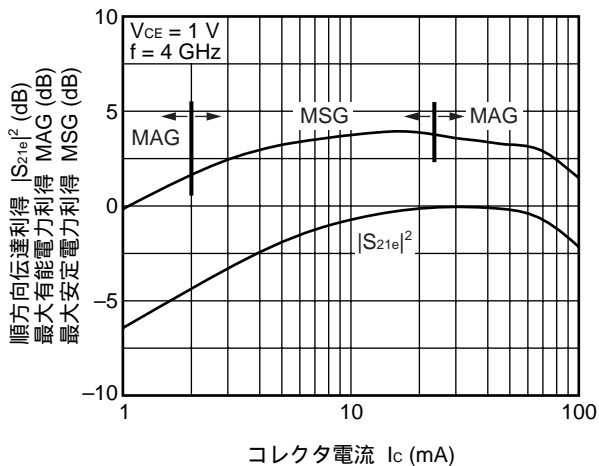
順方向伝達利得, MAG, MSG
vs. コレクタ電流



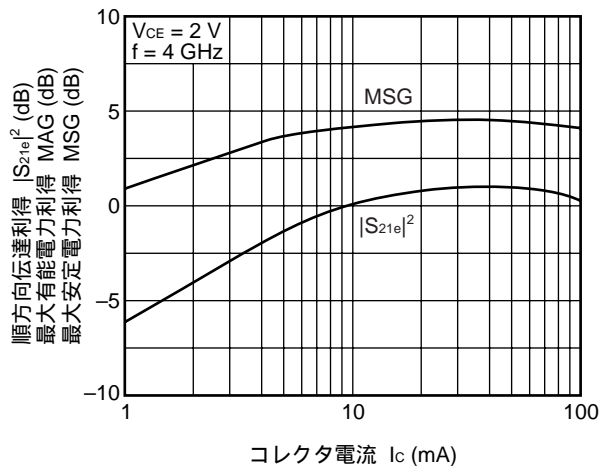
順方向伝達利得, MAG, MSG
vs. コレクタ電流



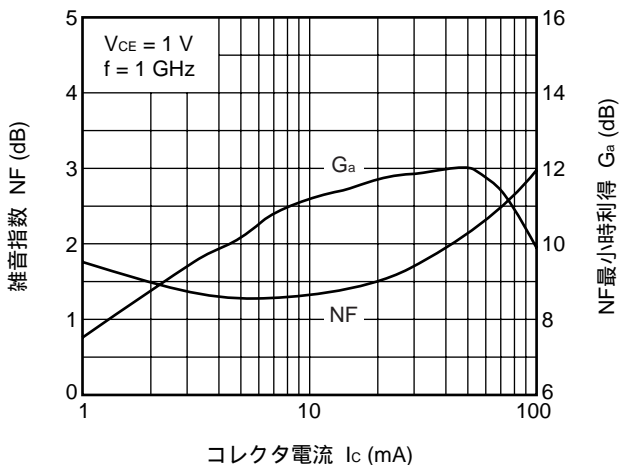
順方向伝達利得, MAG, MSG
vs. コレクタ電流



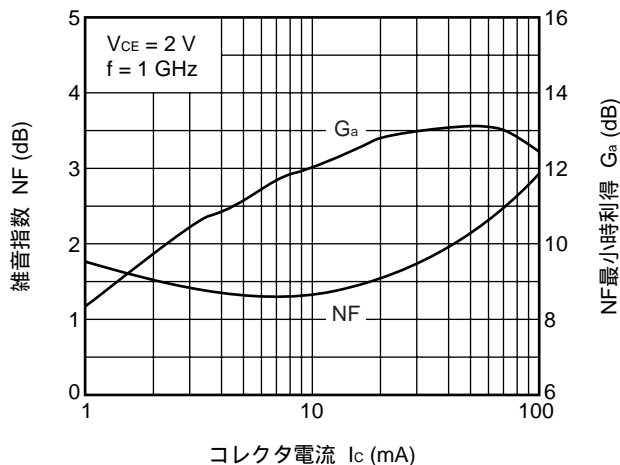
順方向伝達利得, MAG, MSG
vs. コレクタ電流



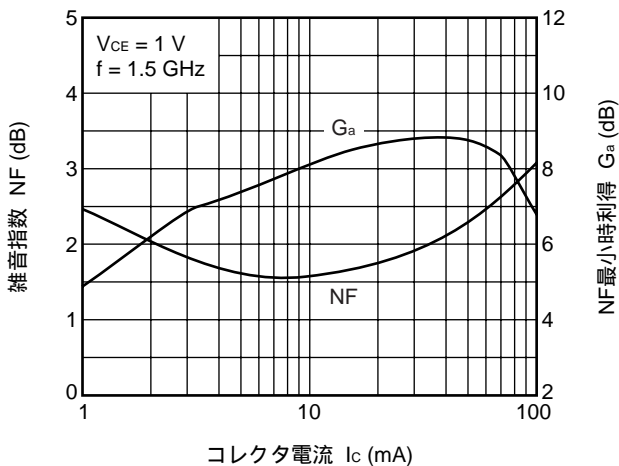
雑音指数, NF最小時利得 vs. コレクタ電流



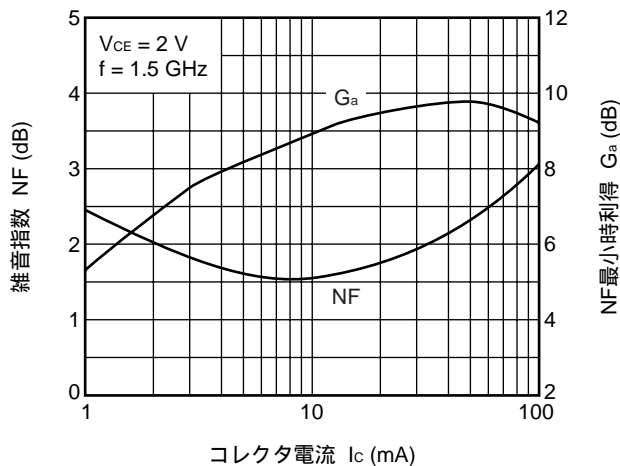
雑音指数, NF最小時利得 vs. コレクタ電流



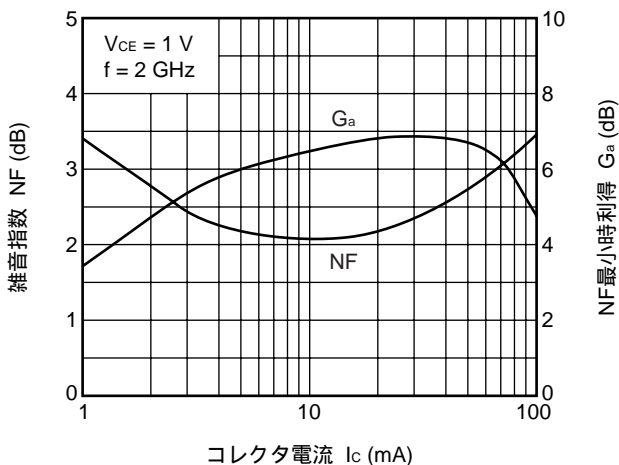
雑音指数, NF最小時利得 vs. コレクタ電流



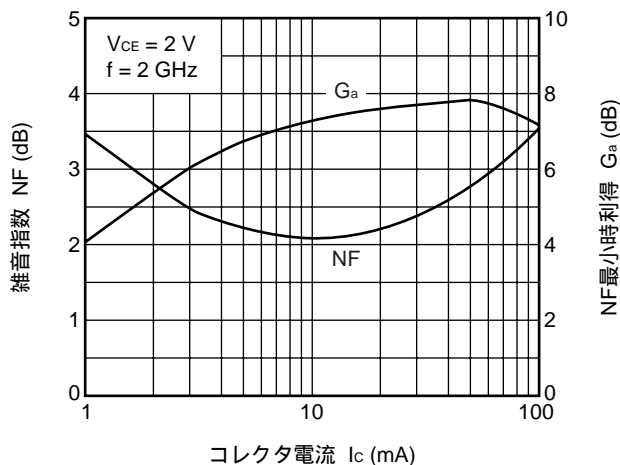
雑音指数, NF最小時利得 vs. コレクタ電流



雑音指数, NF最小時利得 vs. コレクタ電流



雑音指数, NF最小時利得 vs. コレクタ電流



備考 グラフ中の値は参考値を示します。

S パラメータ

注 $K \geq 1$ の場合は MAG (Maximum Available Gain)。 $MAG = \left| \frac{S_{21}}{S_{12}} \right| (K - \sqrt{K^2 - 1})$

$K < 1$ の場合は MSG (Maximum Stable Gain)。 $MSG = \left| \frac{S_{21}}{S_{12}} \right|$

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

| Frequency (GHz) | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | | K | MAG/MSG ^注 (dB) |
|--------------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-------|------------------------------|
| | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | | |
| 0.1 | 0.959 | -27.4 | 3.408 | 161.7 | 0.061 | 75.6 | 0.974 | -10.8 | 0.025 | 17.46 |
| 0.2 | 0.907 | -53.4 | 3.215 | 143.7 | 0.110 | 60.1 | 0.908 | -20.2 | 0.116 | 14.66 |
| 0.3 | 0.857 | -74.4 | 2.826 | 129.2 | 0.145 | 47.8 | 0.833 | -27.3 | 0.195 | 12.91 |
| 0.4 | 0.820 | -92.3 | 2.488 | 117.6 | 0.166 | 38.9 | 0.765 | -32.7 | 0.245 | 11.77 |
| 0.5 | 0.792 | -107.1 | 2.203 | 107.3 | 0.178 | 31.6 | 0.709 | -36.9 | 0.307 | 10.91 |
| 0.6 | 0.769 | -119.3 | 1.945 | 98.5 | 0.184 | 26.0 | 0.663 | -40.3 | 0.373 | 10.23 |
| 0.7 | 0.757 | -129.7 | 1.741 | 91.3 | 0.187 | 21.7 | 0.631 | -43.4 | 0.427 | 9.70 |
| 0.8 | 0.745 | -138.2 | 1.576 | 84.7 | 0.185 | 18.2 | 0.603 | -46.2 | 0.497 | 9.29 |
| 0.9 | 0.737 | -145.6 | 1.437 | 79.2 | 0.182 | 15.6 | 0.584 | -49.3 | 0.561 | 8.98 |
| 1.0 | 0.738 | -152.4 | 1.331 | 73.8 | 0.177 | 13.6 | 0.568 | -52.4 | 0.615 | 8.76 |
| 1.1 | 0.733 | -157.8 | 1.228 | 69.0 | 0.171 | 12.2 | 0.555 | -55.7 | 0.699 | 8.57 |
| 1.2 | 0.731 | -163.0 | 1.148 | 64.5 | 0.163 | 11.5 | 0.542 | -59.3 | 0.783 | 8.48 |
| 1.3 | 0.733 | -167.7 | 1.076 | 60.7 | 0.156 | 11.6 | 0.538 | -63.1 | 0.849 | 8.39 |
| 1.4 | 0.733 | -171.9 | 1.012 | 56.7 | 0.148 | 12.1 | 0.530 | -67.0 | 0.945 | 8.34 |
| 1.5 | 0.736 | -175.8 | 0.955 | 53.3 | 0.141 | 13.9 | 0.527 | -71.2 | 1.030 | 7.27 |
| 1.6 | 0.734 | -179.4 | 0.906 | 50.0 | 0.133 | 16.4 | 0.525 | -75.6 | 1.141 | 6.03 |
| 1.7 | 0.741 | 177.2 | 0.859 | 47.2 | 0.128 | 19.8 | 0.524 | -80.0 | 1.210 | 5.51 |
| 1.8 | 0.743 | 173.8 | 0.827 | 44.2 | 0.123 | 24.2 | 0.523 | -84.6 | 1.286 | 5.06 |
| 1.9 | 0.745 | 170.1 | 0.786 | 41.2 | 0.120 | 29.2 | 0.523 | -89.4 | 1.372 | 4.51 |
| 2.0 | 0.752 | 167.3 | 0.752 | 38.7 | 0.121 | 35.3 | 0.525 | -94.0 | 1.386 | 4.25 |
| 2.1 | 0.756 | 164.1 | 0.719 | 36.4 | 0.123 | 41.1 | 0.528 | -98.8 | 1.399 | 3.91 |
| 2.2 | 0.758 | 161.3 | 0.689 | 34.4 | 0.129 | 46.7 | 0.533 | -103.8 | 1.383 | 3.58 |
| 2.3 | 0.766 | 158.8 | 0.661 | 32.6 | 0.138 | 51.9 | 0.537 | -108.6 | 1.323 | 3.41 |
| 2.4 | 0.770 | 156.2 | 0.638 | 31.5 | 0.149 | 55.9 | 0.541 | -113.4 | 1.268 | 3.22 |
| 2.5 | 0.776 | 153.8 | 0.612 | 30.0 | 0.161 | 59.0 | 0.546 | -118.4 | 1.213 | 3.01 |
| 2.6 | 0.781 | 151.7 | 0.589 | 28.6 | 0.175 | 61.4 | 0.554 | -123.5 | 1.161 | 2.84 |
| 2.7 | 0.783 | 149.6 | 0.571 | 28.0 | 0.190 | 62.8 | 0.561 | -128.5 | 1.123 | 2.66 |
| 2.8 | 0.785 | 147.9 | 0.553 | 27.4 | 0.205 | 63.8 | 0.569 | -133.1 | 1.100 | 2.39 |
| 2.9 | 0.792 | 145.7 | 0.546 | 26.6 | 0.221 | 64.0 | 0.575 | -137.5 | 1.032 | 2.83 |
| 3.0 | 0.795 | 144.0 | 0.530 | 27.1 | 0.237 | 64.1 | 0.577 | -142.2 | 1.035 | 2.34 |
| 4.0 | 0.784 | 129.6 | 0.480 | 26.6 | 0.396 | 52.2 | 0.654 | 176.5 | 1.021 | -0.05 |
| 5.0 | 0.783 | 119.3 | 0.495 | 25.6 | 0.467 | 38.9 | 0.702 | 149.8 | 1.040 | -0.98 |

$V_{CE} = 1\text{ V}$, $I_c = 3\text{ mA}$, $Z_o = 50\ \Omega$

| 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 | 0.869 | -41.8 | 9.136 | 152.7 | 0.056 | 69.1 | 0.907 | -22.3 | 0.081 | 22.15 |
| 0.2 | 0.783 | -77.5 | 7.629 | 131.3 | 0.090 | 51.3 | 0.744 | -38.3 | 0.192 | 19.27 |
| 0.3 | 0.720 | -102.1 | 6.084 | 117.1 | 0.108 | 41.4 | 0.606 | -48.0 | 0.289 | 17.49 |
| 0.4 | 0.686 | -119.8 | 4.986 | 107.0 | 0.118 | 35.9 | 0.507 | -54.1 | 0.375 | 16.27 |
| 0.5 | 0.662 | -133.3 | 4.186 | 98.6 | 0.123 | 32.8 | 0.437 | -58.1 | 0.469 | 15.33 |
| 0.6 | 0.650 | -143.0 | 3.577 | 92.1 | 0.126 | 31.3 | 0.386 | -61.2 | 0.559 | 14.53 |
| 0.7 | 0.645 | -151.2 | 3.116 | 86.7 | 0.129 | 30.7 | 0.349 | -63.9 | 0.641 | 13.85 |
| 0.8 | 0.641 | -157.5 | 2.768 | 82.0 | 0.130 | 31.0 | 0.322 | -66.6 | 0.724 | 13.29 |
| 0.9 | 0.640 | -163.4 | 2.494 | 77.7 | 0.131 | 31.6 | 0.301 | -69.3 | 0.802 | 12.79 |
| 1.0 | 0.642 | -168.4 | 2.280 | 73.8 | 0.133 | 32.8 | 0.285 | -72.3 | 0.865 | 12.35 |
| 1.1 | 0.642 | -172.5 | 2.089 | 70.2 | 0.135 | 34.2 | 0.273 | -75.5 | 0.934 | 11.91 |
| 1.2 | 0.642 | -176.0 | 1.936 | 66.6 | 0.137 | 35.8 | 0.262 | -79.1 | 0.998 | 11.52 |
| 1.3 | 0.645 | -179.7 | 1.803 | 63.6 | 0.140 | 37.6 | 0.256 | -82.9 | 1.044 | 9.83 |
| 1.4 | 0.649 | 177.2 | 1.686 | 60.3 | 0.143 | 39.5 | 0.251 | -87.1 | 1.087 | 8.93 |
| 1.5 | 0.648 | 174.0 | 1.582 | 57.4 | 0.147 | 41.5 | 0.249 | -91.4 | 1.134 | 8.11 |
| 1.6 | 0.652 | 171.3 | 1.504 | 54.6 | 0.151 | 43.3 | 0.248 | -96.0 | 1.150 | 7.62 |
| 1.7 | 0.659 | 168.6 | 1.424 | 52.0 | 0.157 | 45.1 | 0.249 | -100.7 | 1.157 | 7.18 |
| 1.8 | 0.661 | 166.2 | 1.364 | 49.3 | 0.163 | 46.8 | 0.251 | -105.6 | 1.165 | 6.77 |
| 1.9 | 0.660 | 163.3 | 1.300 | 46.7 | 0.169 | 48.2 | 0.254 | -110.4 | 1.185 | 6.25 |
| 2.0 | 0.670 | 160.7 | 1.245 | 44.0 | 0.176 | 49.5 | 0.258 | -115.3 | 1.166 | 6.03 |
| 2.1 | 0.675 | 158.5 | 1.193 | 41.7 | 0.184 | 50.7 | 0.264 | -120.0 | 1.162 | 5.69 |
| 2.2 | 0.682 | 156.3 | 1.143 | 39.5 | 0.192 | 51.6 | 0.270 | -124.9 | 1.145 | 5.43 |
| 2.3 | 0.689 | 154.6 | 1.101 | 37.3 | 0.201 | 52.7 | 0.278 | -129.5 | 1.125 | 5.24 |
| 2.4 | 0.694 | 152.3 | 1.062 | 35.6 | 0.210 | 53.3 | 0.286 | -133.8 | 1.111 | 5.01 |
| 2.5 | 0.701 | 150.5 | 1.022 | 33.7 | 0.220 | 53.9 | 0.295 | -138.4 | 1.095 | 4.81 |
| 2.6 | 0.706 | 148.9 | 0.985 | 31.6 | 0.229 | 54.5 | 0.306 | -142.6 | 1.082 | 4.58 |
| 2.7 | 0.711 | 147.2 | 0.954 | 29.9 | 0.239 | 54.7 | 0.316 | -146.9 | 1.066 | 4.44 |
| 2.8 | 0.714 | 146.0 | 0.920 | 28.5 | 0.249 | 55.0 | 0.328 | -150.7 | 1.061 | 4.16 |
| 2.9 | 0.725 | 144.1 | 0.905 | 26.7 | 0.260 | 54.9 | 0.338 | -154.1 | 1.020 | 4.56 |
| 3.0 | 0.728 | 143.0 | 0.878 | 26.0 | 0.270 | 54.9 | 0.346 | -158.1 | 1.018 | 4.30 |
| 4.0 | 0.749 | 130.9 | 0.686 | 16.2 | 0.386 | 47.2 | 0.477 | 169.4 | 0.968 | 2.50 |
| 5.0 | 0.770 | 120.8 | 0.592 | 13.3 | 0.453 | 37.4 | 0.587 | 147.3 | 0.990 | 1.16 |

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 | 0.792 | -54.3 | 13.464 | 145.9 | 0.052 | 63.2 | 0.839 | -31.9 | 0.143 | 24.16 |
| 0.2 | 0.700 | -94.8 | 10.258 | 123.3 | 0.076 | 47.5 | 0.624 | -51.6 | 0.269 | 21.30 |
| 0.3 | 0.644 | -118.9 | 7.718 | 110.2 | 0.088 | 41.0 | 0.476 | -62.5 | 0.401 | 19.42 |
| 0.4 | 0.624 | -134.5 | 6.132 | 101.3 | 0.095 | 38.4 | 0.381 | -69.8 | 0.511 | 18.10 |
| 0.5 | 0.611 | -146.1 | 5.061 | 94.3 | 0.100 | 38.0 | 0.316 | -74.9 | 0.618 | 17.04 |
| 0.6 | 0.606 | -154.5 | 4.274 | 88.9 | 0.105 | 38.8 | 0.272 | -79.2 | 0.714 | 16.10 |
| 0.7 | 0.604 | -161.4 | 3.697 | 84.1 | 0.110 | 39.8 | 0.240 | -83.2 | 0.796 | 15.26 |
| 0.8 | 0.605 | -166.6 | 3.270 | 80.2 | 0.115 | 41.2 | 0.216 | -87.3 | 0.866 | 14.54 |
| 0.9 | 0.604 | -171.1 | 2.935 | 76.5 | 0.120 | 42.9 | 0.198 | -91.4 | 0.933 | 13.89 |
| 1.0 | 0.610 | -175.5 | 2.670 | 73.1 | 0.126 | 44.3 | 0.186 | -95.7 | 0.972 | 13.28 |
| 1.1 | 0.610 | -178.9 | 2.442 | 69.9 | 0.132 | 45.8 | 0.176 | -100.1 | 1.019 | 11.83 |
| 1.2 | 0.615 | 177.7 | 2.258 | 66.6 | 0.138 | 47.0 | 0.170 | -105.1 | 1.047 | 10.82 |
| 1.3 | 0.615 | 174.9 | 2.098 | 63.9 | 0.144 | 48.3 | 0.166 | -109.8 | 1.080 | 9.90 |
| 1.4 | 0.619 | 172.1 | 1.960 | 61.0 | 0.152 | 49.5 | 0.165 | -114.9 | 1.096 | 9.22 |
| 1.5 | 0.622 | 169.7 | 1.840 | 58.5 | 0.159 | 50.5 | 0.166 | -119.9 | 1.111 | 8.60 |
| 1.6 | 0.625 | 167.1 | 1.747 | 56.0 | 0.167 | 51.3 | 0.168 | -124.8 | 1.117 | 8.11 |
| 1.7 | 0.629 | 165.2 | 1.653 | 53.5 | 0.175 | 52.0 | 0.173 | -129.6 | 1.118 | 7.65 |
| 1.8 | 0.633 | 162.6 | 1.578 | 51.1 | 0.183 | 52.3 | 0.178 | -134.5 | 1.118 | 7.25 |
| 1.9 | 0.633 | 159.9 | 1.506 | 48.5 | 0.192 | 52.7 | 0.185 | -138.9 | 1.127 | 6.79 |
| 2.0 | 0.640 | 158.0 | 1.439 | 46.1 | 0.200 | 52.9 | 0.192 | -143.1 | 1.119 | 6.47 |
| 2.1 | 0.649 | 155.8 | 1.378 | 43.8 | 0.208 | 53.1 | 0.200 | -147.3 | 1.108 | 6.21 |
| 2.2 | 0.654 | 153.9 | 1.322 | 41.7 | 0.217 | 53.0 | 0.210 | -151.4 | 1.101 | 5.91 |
| 2.3 | 0.662 | 152.4 | 1.273 | 39.8 | 0.226 | 53.2 | 0.219 | -155.1 | 1.088 | 5.70 |
| 2.4 | 0.664 | 150.5 | 1.228 | 38.1 | 0.235 | 53.1 | 0.228 | -158.6 | 1.085 | 5.39 |
| 2.5 | 0.673 | 148.8 | 1.185 | 36.0 | 0.244 | 53.0 | 0.239 | -162.2 | 1.070 | 5.25 |
| 2.6 | 0.680 | 147.2 | 1.141 | 34.1 | 0.253 | 53.0 | 0.250 | -165.2 | 1.061 | 5.03 |
| 2.7 | 0.685 | 145.7 | 1.107 | 32.3 | 0.262 | 52.8 | 0.261 | -168.5 | 1.053 | 4.86 |
| 2.8 | 0.689 | 144.7 | 1.072 | 30.6 | 0.270 | 52.7 | 0.272 | -171.2 | 1.048 | 4.64 |
| 2.9 | 0.700 | 142.8 | 1.054 | 28.8 | 0.280 | 52.3 | 0.283 | -173.8 | 1.017 | 4.97 |
| 3.0 | 0.701 | 142.1 | 1.020 | 28.1 | 0.289 | 52.1 | 0.290 | -176.8 | 1.024 | 4.53 |
| 4.0 | 0.729 | 131.0 | 0.804 | 16.0 | 0.387 | 44.4 | 0.419 | 159.7 | 0.972 | 3.18 |
| 5.0 | 0.758 | 121.3 | 0.673 | 11.0 | 0.447 | 36.1 | 0.532 | 142.9 | 0.979 | 1.78 |

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 | 0.723 | -64.4 | 16.730 | 140.5 | 0.048 | 59.7 | 0.780 | -39.6 | 0.198 | 25.47 |
| 0.2 | 0.645 | -107.6 | 11.875 | 117.9 | 0.067 | 46.2 | 0.542 | -61.6 | 0.345 | 22.49 |
| 0.3 | 0.605 | -129.7 | 8.651 | 106.0 | 0.076 | 42.6 | 0.399 | -74.1 | 0.495 | 20.55 |
| 0.4 | 0.593 | -143.9 | 6.770 | 98.1 | 0.083 | 42.5 | 0.313 | -82.8 | 0.617 | 19.12 |
| 0.5 | 0.585 | -154.0 | 5.534 | 91.7 | 0.089 | 43.4 | 0.258 | -89.7 | 0.726 | 17.93 |
| 0.6 | 0.586 | -161.3 | 4.656 | 86.9 | 0.096 | 44.9 | 0.220 | -95.9 | 0.811 | 16.86 |
| 0.7 | 0.585 | -167.3 | 4.014 | 82.7 | 0.103 | 46.5 | 0.194 | -101.9 | 0.883 | 15.91 |
| 0.8 | 0.585 | -171.8 | 3.543 | 79.1 | 0.110 | 48.2 | 0.176 | -107.9 | 0.945 | 15.09 |
| 0.9 | 0.588 | -175.7 | 3.173 | 75.8 | 0.117 | 49.8 | 0.163 | -113.7 | 0.988 | 14.32 |
| 1.0 | 0.593 | -179.3 | 2.881 | 72.6 | 0.125 | 51.0 | 0.155 | -119.6 | 1.015 | 12.86 |
| 1.1 | 0.595 | 177.4 | 2.637 | 69.6 | 0.133 | 52.1 | 0.149 | -125.1 | 1.043 | 11.70 |
| 1.2 | 0.597 | 174.6 | 2.433 | 66.6 | 0.142 | 52.9 | 0.147 | -130.8 | 1.065 | 10.79 |
| 1.3 | 0.600 | 172.0 | 2.257 | 64.1 | 0.150 | 53.6 | 0.147 | -136.2 | 1.081 | 10.03 |
| 1.4 | 0.605 | 169.6 | 2.107 | 61.3 | 0.159 | 54.2 | 0.149 | -141.4 | 1.089 | 9.41 |
| 1.5 | 0.607 | 167.1 | 1.981 | 59.0 | 0.168 | 54.7 | 0.153 | -145.9 | 1.098 | 8.82 |
| 1.6 | 0.611 | 164.9 | 1.877 | 56.5 | 0.177 | 54.9 | 0.158 | -150.0 | 1.096 | 8.37 |
| 1.7 | 0.615 | 162.8 | 1.774 | 54.2 | 0.186 | 55.0 | 0.165 | -153.9 | 1.099 | 7.87 |
| 1.8 | 0.621 | 160.8 | 1.697 | 51.9 | 0.195 | 54.9 | 0.173 | -157.8 | 1.091 | 7.55 |
| 1.9 | 0.622 | 158.3 | 1.618 | 49.4 | 0.204 | 54.7 | 0.181 | -161.1 | 1.095 | 7.11 |
| 2.0 | 0.628 | 156.3 | 1.543 | 47.1 | 0.213 | 54.5 | 0.189 | -164.3 | 1.093 | 6.74 |
| 2.1 | 0.635 | 154.3 | 1.478 | 44.9 | 0.222 | 54.2 | 0.198 | -167.5 | 1.087 | 6.44 |
| 2.2 | 0.640 | 152.4 | 1.418 | 43.0 | 0.231 | 53.7 | 0.208 | -170.7 | 1.084 | 6.12 |
| 2.3 | 0.648 | 150.9 | 1.366 | 41.0 | 0.240 | 53.5 | 0.218 | -173.4 | 1.071 | 5.93 |
| 2.4 | 0.654 | 149.2 | 1.317 | 39.3 | 0.249 | 53.2 | 0.227 | -176.0 | 1.064 | 5.69 |
| 2.5 | 0.661 | 147.7 | 1.271 | 37.4 | 0.258 | 52.6 | 0.238 | -178.7 | 1.056 | 5.47 |
| 2.6 | 0.666 | 146.2 | 1.226 | 35.7 | 0.267 | 52.4 | 0.248 | 179.1 | 1.051 | 5.24 |
| 2.7 | 0.671 | 144.8 | 1.189 | 33.8 | 0.275 | 52.0 | 0.259 | 176.5 | 1.048 | 5.03 |
| 2.8 | 0.677 | 144.0 | 1.148 | 32.2 | 0.283 | 51.7 | 0.269 | 174.4 | 1.042 | 4.83 |
| 2.9 | 0.686 | 142.2 | 1.132 | 30.4 | 0.292 | 51.2 | 0.279 | 172.6 | 1.018 | 5.06 |
| 3.0 | 0.688 | 141.4 | 1.099 | 29.5 | 0.300 | 50.9 | 0.286 | 170.0 | 1.022 | 4.73 |
| 4.0 | 0.717 | 131.0 | 0.866 | 17.1 | 0.389 | 42.9 | 0.402 | 152.2 | 0.983 | 3.47 |
| 5.0 | 0.751 | 121.7 | 0.724 | 10.5 | 0.444 | 35.2 | 0.510 | 138.6 | 0.979 | 2.12 |

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 | 0.654 | -78.7 | 20.296 | 134.4 | 0.042 | 56.1 | 0.707 | -49.1 | 0.248 | 26.85 |
| 0.2 | 0.595 | -120.1 | 13.332 | 112.7 | 0.056 | 47.2 | 0.460 | -73.7 | 0.442 | 23.75 |
| 0.3 | 0.572 | -141.0 | 9.467 | 102.1 | 0.065 | 45.8 | 0.333 | -88.3 | 0.610 | 21.60 |
| 0.4 | 0.571 | -153.2 | 7.326 | 95.1 | 0.073 | 47.7 | 0.264 | -99.2 | 0.731 | 20.03 |
| 0.5 | 0.564 | -161.6 | 5.939 | 89.5 | 0.081 | 49.7 | 0.220 | -108.5 | 0.834 | 18.65 |
| 0.6 | 0.566 | -167.7 | 4.983 | 85.2 | 0.090 | 51.9 | 0.193 | -117.1 | 0.904 | 17.44 |
| 0.7 | 0.574 | -172.7 | 4.289 | 81.4 | 0.099 | 53.6 | 0.175 | -125.1 | 0.949 | 16.37 |
| 0.8 | 0.574 | -176.6 | 3.777 | 78.1 | 0.108 | 54.9 | 0.165 | -132.6 | 0.992 | 15.44 |
| 0.9 | 0.574 | 180.0 | 3.382 | 75.1 | 0.117 | 56.1 | 0.158 | -139.4 | 1.025 | 13.64 |
| 1.0 | 0.581 | 176.9 | 3.067 | 72.1 | 0.127 | 56.8 | 0.156 | -145.7 | 1.037 | 12.66 |
| 1.1 | 0.583 | 174.0 | 2.803 | 69.3 | 0.136 | 57.4 | 0.155 | -151.2 | 1.055 | 11.69 |
| 1.2 | 0.587 | 171.8 | 2.587 | 66.5 | 0.146 | 57.7 | 0.157 | -156.5 | 1.063 | 10.94 |
| 1.3 | 0.592 | 169.3 | 2.400 | 64.1 | 0.156 | 57.8 | 0.160 | -161.1 | 1.070 | 10.25 |
| 1.4 | 0.595 | 167.1 | 2.238 | 61.6 | 0.166 | 57.9 | 0.165 | -165.2 | 1.076 | 9.61 |
| 1.5 | 0.598 | 164.7 | 2.100 | 59.3 | 0.176 | 57.9 | 0.170 | -168.5 | 1.080 | 9.04 |
| 1.6 | 0.600 | 162.9 | 1.989 | 57.1 | 0.186 | 57.7 | 0.177 | -171.6 | 1.080 | 8.56 |
| 1.7 | 0.606 | 161.0 | 1.879 | 54.8 | 0.197 | 57.4 | 0.185 | -174.3 | 1.077 | 8.11 |
| 1.8 | 0.610 | 158.9 | 1.796 | 52.6 | 0.206 | 56.9 | 0.194 | -176.9 | 1.073 | 7.75 |
| 1.9 | 0.611 | 156.7 | 1.711 | 50.4 | 0.215 | 56.3 | 0.202 | -179.3 | 1.079 | 7.29 |
| 2.0 | 0.619 | 154.7 | 1.633 | 48.0 | 0.224 | 55.7 | 0.211 | 178.4 | 1.072 | 6.98 |
| 2.1 | 0.627 | 152.8 | 1.562 | 46.1 | 0.234 | 55.1 | 0.220 | 176.0 | 1.067 | 6.67 |
| 2.2 | 0.632 | 151.0 | 1.501 | 44.2 | 0.243 | 54.3 | 0.230 | 173.7 | 1.061 | 6.39 |
| 2.3 | 0.638 | 149.8 | 1.440 | 42.3 | 0.252 | 53.8 | 0.239 | 171.7 | 1.058 | 6.09 |
| 2.4 | 0.644 | 148.0 | 1.394 | 40.4 | 0.261 | 53.2 | 0.248 | 169.7 | 1.051 | 5.88 |
| 2.5 | 0.651 | 146.4 | 1.344 | 38.7 | 0.270 | 52.5 | 0.258 | 167.5 | 1.045 | 5.67 |
| 2.6 | 0.656 | 145.3 | 1.296 | 37.0 | 0.279 | 52.0 | 0.267 | 165.9 | 1.041 | 5.43 |
| 2.7 | 0.661 | 143.8 | 1.254 | 35.2 | 0.287 | 51.4 | 0.277 | 163.7 | 1.041 | 5.18 |
| 2.8 | 0.665 | 142.9 | 1.215 | 33.6 | 0.295 | 51.0 | 0.286 | 162.0 | 1.039 | 4.95 |
| 2.9 | 0.676 | 141.5 | 1.197 | 31.8 | 0.303 | 50.4 | 0.296 | 160.9 | 1.017 | 5.17 |
| 3.0 | 0.679 | 140.9 | 1.165 | 31.0 | 0.311 | 50.0 | 0.301 | 158.6 | 1.017 | 4.94 |
| 4.0 | 0.707 | 130.8 | 0.923 | 18.4 | 0.394 | 41.4 | 0.402 | 144.7 | 0.990 | 3.70 |
| 5.0 | 0.745 | 121.8 | 0.775 | 11.1 | 0.443 | 34.3 | 0.498 | 134.0 | 0.979 | 2.43 |

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 | 0.531 | -109.0 | 25.984 | 123.1 | 0.032 | 54.9 | 0.561 | -69.3 | 0.412 | 29.16 |
| 0.2 | 0.550 | -143.9 | 15.222 | 104.7 | 0.043 | 53.4 | 0.350 | -98.9 | 0.651 | 25.53 |
| 0.3 | 0.542 | -157.9 | 10.479 | 96.4 | 0.053 | 55.8 | 0.269 | -117.4 | 0.812 | 22.97 |
| 0.4 | 0.550 | -166.5 | 7.998 | 90.8 | 0.063 | 59.4 | 0.233 | -131.1 | 0.899 | 21.00 |
| 0.5 | 0.549 | -172.5 | 6.433 | 86.3 | 0.074 | 61.5 | 0.213 | -142.0 | 0.962 | 19.38 |
| 0.6 | 0.553 | -176.6 | 5.388 | 82.8 | 0.086 | 62.9 | 0.204 | -150.9 | 0.994 | 17.97 |
| 0.7 | 0.559 | 179.8 | 4.622 | 79.5 | 0.097 | 63.5 | 0.200 | -158.2 | 1.017 | 15.97 |
| 0.8 | 0.560 | 176.9 | 4.061 | 76.7 | 0.109 | 64.1 | 0.200 | -164.5 | 1.036 | 14.55 |
| 0.9 | 0.565 | 174.1 | 3.629 | 74.0 | 0.120 | 64.3 | 0.202 | -169.8 | 1.045 | 13.50 |
| 1.0 | 0.571 | 171.7 | 3.287 | 71.3 | 0.132 | 64.1 | 0.205 | -174.3 | 1.047 | 12.63 |
| 1.1 | 0.573 | 169.3 | 3.004 | 68.9 | 0.144 | 63.9 | 0.208 | -178.1 | 1.054 | 11.79 |
| 1.2 | 0.576 | 167.5 | 2.770 | 66.3 | 0.155 | 63.4 | 0.213 | 178.3 | 1.057 | 11.07 |
| 1.3 | 0.581 | 165.5 | 2.569 | 64.1 | 0.167 | 62.9 | 0.219 | 175.2 | 1.057 | 10.43 |
| 1.4 | 0.584 | 163.4 | 2.391 | 61.8 | 0.178 | 62.3 | 0.226 | 172.6 | 1.061 | 9.79 |
| 1.5 | 0.588 | 161.4 | 2.244 | 59.8 | 0.189 | 61.7 | 0.231 | 170.4 | 1.059 | 9.26 |
| 1.6 | 0.592 | 159.7 | 2.119 | 57.7 | 0.200 | 61.0 | 0.238 | 168.5 | 1.057 | 8.79 |
| 1.7 | 0.597 | 158.2 | 2.007 | 55.5 | 0.211 | 60.1 | 0.246 | 166.6 | 1.054 | 8.36 |
| 1.8 | 0.600 | 156.1 | 1.911 | 53.4 | 0.221 | 59.2 | 0.254 | 165.0 | 1.054 | 7.95 |
| 1.9 | 0.602 | 153.8 | 1.824 | 51.4 | 0.231 | 58.1 | 0.262 | 163.3 | 1.055 | 7.54 |
| 2.0 | 0.608 | 152.5 | 1.736 | 49.2 | 0.241 | 57.1 | 0.271 | 161.8 | 1.053 | 7.17 |
| 2.1 | 0.615 | 150.8 | 1.664 | 47.4 | 0.250 | 56.1 | 0.279 | 159.9 | 1.049 | 6.87 |
| 2.2 | 0.622 | 149.0 | 1.594 | 45.6 | 0.260 | 55.0 | 0.288 | 158.3 | 1.046 | 6.56 |
| 2.3 | 0.630 | 147.9 | 1.533 | 43.8 | 0.269 | 54.2 | 0.297 | 156.7 | 1.040 | 6.33 |
| 2.4 | 0.633 | 146.3 | 1.480 | 42.1 | 0.278 | 53.2 | 0.305 | 155.1 | 1.039 | 6.05 |
| 2.5 | 0.643 | 144.9 | 1.427 | 40.5 | 0.287 | 52.4 | 0.313 | 153.4 | 1.033 | 5.85 |
| 2.6 | 0.648 | 143.6 | 1.379 | 38.7 | 0.296 | 51.6 | 0.321 | 152.0 | 1.030 | 5.62 |
| 2.7 | 0.655 | 142.7 | 1.336 | 37.0 | 0.303 | 50.8 | 0.329 | 150.3 | 1.027 | 5.44 |
| 2.8 | 0.656 | 141.7 | 1.291 | 35.4 | 0.311 | 50.2 | 0.338 | 148.9 | 1.030 | 5.12 |
| 2.9 | 0.665 | 140.4 | 1.271 | 33.7 | 0.319 | 49.5 | 0.345 | 148.0 | 1.017 | 5.20 |
| 3.0 | 0.669 | 139.4 | 1.239 | 33.0 | 0.326 | 48.9 | 0.349 | 146.0 | 1.016 | 5.01 |
| 4.0 | 0.695 | 130.4 | 0.988 | 20.5 | 0.401 | 39.5 | 0.427 | 134.7 | 1.000 | 3.91 |
| 5.0 | 0.732 | 121.8 | 0.836 | 12.8 | 0.443 | 32.6 | 0.503 | 126.5 | 0.993 | 2.76 |

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 | 0.960 | -25.2 | 3.358 | 163.0 | 0.052 | 77.1 | 0.977 | -9.1 | 0.023 | 18.13 |
| 0.2 | 0.919 | -49.9 | 3.205 | 145.8 | 0.095 | 61.9 | 0.925 | -17.2 | 0.118 | 15.30 |
| 0.3 | 0.868 | -70.6 | 2.847 | 132.1 | 0.126 | 50.5 | 0.861 | -23.5 | 0.182 | 13.53 |
| 0.4 | 0.832 | -88.3 | 2.532 | 120.8 | 0.146 | 41.5 | 0.802 | -28.3 | 0.231 | 12.39 |
| 0.5 | 0.800 | -103.3 | 2.261 | 110.5 | 0.158 | 34.2 | 0.750 | -32.0 | 0.294 | 11.55 |
| 0.6 | 0.780 | -115.4 | 2.012 | 102.0 | 0.165 | 28.7 | 0.707 | -35.1 | 0.354 | 10.87 |
| 0.7 | 0.764 | -126.2 | 1.806 | 94.7 | 0.167 | 24.2 | 0.675 | -37.9 | 0.409 | 10.34 |
| 0.8 | 0.751 | -135.0 | 1.633 | 88.3 | 0.166 | 20.7 | 0.651 | -40.6 | 0.475 | 9.92 |
| 0.9 | 0.744 | -142.6 | 1.497 | 82.7 | 0.163 | 18.2 | 0.632 | -43.2 | 0.534 | 9.62 |
| 1.0 | 0.742 | -149.5 | 1.381 | 77.3 | 0.159 | 16.2 | 0.616 | -46.0 | 0.595 | 9.38 |
| 1.1 | 0.737 | -155.5 | 1.278 | 72.6 | 0.154 | 14.9 | 0.603 | -49.0 | 0.672 | 9.20 |
| 1.2 | 0.734 | -160.7 | 1.197 | 68.2 | 0.147 | 14.5 | 0.592 | -52.0 | 0.753 | 9.11 |
| 1.3 | 0.734 | -165.4 | 1.121 | 64.4 | 0.140 | 14.6 | 0.584 | -55.3 | 0.832 | 9.03 |
| 1.4 | 0.736 | -170.0 | 1.055 | 60.4 | 0.133 | 15.5 | 0.576 | -58.9 | 0.920 | 9.00 |
| 1.5 | 0.734 | -174.2 | 0.993 | 57.1 | 0.126 | 17.4 | 0.572 | -62.7 | 1.025 | 8.00 |
| 1.6 | 0.736 | -177.8 | 0.947 | 53.8 | 0.119 | 20.4 | 0.568 | -66.5 | 1.116 | 6.92 |
| 1.7 | 0.739 | 178.6 | 0.895 | 50.9 | 0.114 | 24.4 | 0.565 | -70.5 | 1.212 | 6.16 |
| 1.8 | 0.743 | 175.3 | 0.863 | 47.9 | 0.111 | 29.4 | 0.562 | -74.7 | 1.271 | 5.79 |
| 1.9 | 0.741 | 171.3 | 0.818 | 44.9 | 0.109 | 35.1 | 0.562 | -79.2 | 1.365 | 5.14 |
| 2.0 | 0.747 | 168.1 | 0.786 | 42.1 | 0.111 | 41.6 | 0.560 | -83.4 | 1.370 | 4.89 |
| 2.1 | 0.751 | 165.1 | 0.753 | 40.0 | 0.114 | 47.8 | 0.561 | -87.9 | 1.365 | 4.58 |
| 2.2 | 0.756 | 162.3 | 0.721 | 38.1 | 0.121 | 53.5 | 0.562 | -92.7 | 1.328 | 4.31 |
| 2.3 | 0.763 | 159.8 | 0.695 | 35.9 | 0.131 | 58.5 | 0.566 | -97.3 | 1.245 | 4.28 |
| 2.4 | 0.766 | 157.0 | 0.669 | 34.7 | 0.142 | 62.2 | 0.566 | -101.9 | 1.197 | 4.04 |
| 2.5 | 0.769 | 154.4 | 0.641 | 33.1 | 0.155 | 65.0 | 0.568 | -106.8 | 1.161 | 3.73 |
| 2.6 | 0.774 | 152.3 | 0.620 | 31.9 | 0.170 | 67.2 | 0.572 | -111.7 | 1.101 | 3.70 |
| 2.7 | 0.779 | 150.2 | 0.600 | 30.7 | 0.184 | 68.5 | 0.577 | -116.6 | 1.058 | 3.65 |
| 2.8 | 0.778 | 148.5 | 0.580 | 30.0 | 0.200 | 69.3 | 0.583 | -121.1 | 1.043 | 3.37 |
| 2.9 | 0.789 | 146.2 | 0.572 | 29.3 | 0.216 | 69.5 | 0.586 | -125.5 | 0.972 | 4.22 |
| 3.0 | 0.789 | 144.6 | 0.555 | 29.7 | 0.233 | 69.4 | 0.584 | -130.3 | 0.986 | 3.76 |
| 4.0 | 0.779 | 129.9 | 0.494 | 28.0 | 0.398 | 56.4 | 0.646 | -174.1 | 0.996 | 0.94 |
| 5.0 | 0.776 | 119.6 | 0.504 | 26.8 | 0.475 | 41.8 | 0.692 | 156.2 | 1.031 | -0.82 |

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 | 0.875 | -38.1 | 9.058 | 155.0 | 0.048 | 70.1 | 0.925 | -18.6 | 0.090 | 22.76 |
| 0.2 | 0.793 | -71.2 | 7.796 | 134.4 | 0.080 | 54.3 | 0.783 | -32.2 | 0.193 | 19.90 |
| 0.3 | 0.726 | -95.0 | 6.315 | 120.3 | 0.097 | 44.2 | 0.656 | -40.5 | 0.287 | 18.13 |
| 0.4 | 0.690 | -113.5 | 5.250 | 110.1 | 0.107 | 38.4 | 0.561 | -45.6 | 0.364 | 16.92 |
| 0.5 | 0.662 | -127.4 | 4.444 | 101.6 | 0.112 | 35.1 | 0.493 | -48.7 | 0.455 | 15.99 |
| 0.6 | 0.647 | -138.0 | 3.808 | 95.0 | 0.115 | 33.4 | 0.442 | -50.9 | 0.542 | 15.19 |
| 0.7 | 0.638 | -146.7 | 3.336 | 89.4 | 0.118 | 32.7 | 0.405 | -52.8 | 0.624 | 14.52 |
| 0.8 | 0.631 | -153.5 | 2.963 | 84.6 | 0.119 | 32.9 | 0.377 | -54.7 | 0.712 | 13.96 |
| 0.9 | 0.631 | -159.7 | 2.674 | 80.4 | 0.120 | 33.7 | 0.356 | -56.5 | 0.783 | 13.47 |
| 1.0 | 0.632 | -164.9 | 2.443 | 76.3 | 0.122 | 34.9 | 0.339 | -58.7 | 0.848 | 13.02 |
| 1.1 | 0.630 | -169.4 | 2.240 | 72.7 | 0.124 | 36.2 | 0.325 | -61.0 | 0.920 | 12.58 |
| 1.2 | 0.630 | -173.2 | 2.073 | 69.2 | 0.125 | 38.0 | 0.313 | -63.8 | 0.989 | 12.20 |
| 1.3 | 0.632 | -176.9 | 1.930 | 66.2 | 0.128 | 40.0 | 0.305 | -66.7 | 1.037 | 10.61 |
| 1.4 | 0.634 | 179.6 | 1.808 | 62.9 | 0.131 | 42.0 | 0.297 | -70.1 | 1.084 | 9.64 |
| 1.5 | 0.637 | 176.4 | 1.699 | 60.0 | 0.134 | 44.3 | 0.292 | -73.7 | 1.120 | 8.91 |
| 1.6 | 0.639 | 173.4 | 1.614 | 57.2 | 0.139 | 46.3 | 0.288 | -77.6 | 1.140 | 8.38 |
| 1.7 | 0.645 | 170.8 | 1.527 | 54.7 | 0.144 | 48.4 | 0.285 | -81.7 | 1.148 | 7.91 |
| 1.8 | 0.648 | 168.1 | 1.460 | 51.9 | 0.150 | 50.2 | 0.283 | -86.1 | 1.155 | 7.50 |
| 1.9 | 0.648 | 165.0 | 1.389 | 49.1 | 0.156 | 51.6 | 0.283 | -90.6 | 1.172 | 6.97 |
| 2.0 | 0.655 | 162.7 | 1.327 | 46.6 | 0.164 | 53.3 | 0.283 | -95.1 | 1.161 | 6.65 |
| 2.1 | 0.661 | 160.1 | 1.277 | 44.2 | 0.171 | 54.7 | 0.285 | -99.7 | 1.147 | 6.41 |
| 2.2 | 0.669 | 158.0 | 1.226 | 41.9 | 0.179 | 55.7 | 0.287 | -104.6 | 1.126 | 6.19 |
| 2.3 | 0.677 | 156.2 | 1.179 | 39.8 | 0.188 | 56.9 | 0.291 | -109.3 | 1.100 | 6.04 |
| 2.4 | 0.681 | 154.0 | 1.136 | 37.9 | 0.198 | 57.6 | 0.295 | -113.9 | 1.085 | 5.81 |
| 2.5 | 0.689 | 152.0 | 1.094 | 35.9 | 0.207 | 58.1 | 0.300 | -118.7 | 1.067 | 5.64 |
| 2.6 | 0.694 | 150.4 | 1.054 | 34.0 | 0.217 | 58.8 | 0.308 | -123.5 | 1.053 | 5.46 |
| 2.7 | 0.698 | 148.6 | 1.021 | 32.2 | 0.227 | 59.1 | 0.315 | -128.1 | 1.038 | 5.33 |
| 2.8 | 0.705 | 147.3 | 0.984 | 30.5 | 0.237 | 59.4 | 0.323 | -132.3 | 1.023 | 5.26 |
| 2.9 | 0.712 | 145.4 | 0.967 | 28.8 | 0.248 | 59.3 | 0.330 | -136.3 | 0.990 | 5.90 |
| 3.0 | 0.718 | 144.3 | 0.934 | 28.1 | 0.259 | 59.4 | 0.335 | -141.0 | 0.983 | 5.56 |
| 4.0 | 0.741 | 131.8 | 0.728 | 17.2 | 0.382 | 51.5 | 0.454 | -179.2 | 0.931 | 2.80 |
| 5.0 | 0.765 | 121.4 | 0.618 | 13.8 | 0.457 | 40.6 | 0.566 | 154.8 | 0.964 | 1.31 |

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 | 0.788 | -50.0 | 13.704 | 148.5 | 0.044 | 66.6 | 0.867 | -26.7 | 0.125 | 24.95 |
| 0.2 | 0.709 | -87.1 | 10.767 | 126.5 | 0.068 | 51.1 | 0.670 | -43.4 | 0.261 | 21.98 |
| 0.3 | 0.640 | -111.7 | 8.250 | 113.1 | 0.080 | 43.6 | 0.523 | -52.5 | 0.396 | 20.12 |
| 0.4 | 0.618 | -128.2 | 6.620 | 104.1 | 0.087 | 41.0 | 0.427 | -57.6 | 0.497 | 18.82 |
| 0.5 | 0.599 | -140.8 | 5.486 | 96.8 | 0.092 | 40.3 | 0.360 | -60.8 | 0.604 | 17.76 |
| 0.6 | 0.589 | -149.4 | 4.652 | 91.2 | 0.097 | 40.7 | 0.313 | -63.3 | 0.703 | 16.83 |
| 0.7 | 0.585 | -157.0 | 4.030 | 86.4 | 0.102 | 41.7 | 0.280 | -65.3 | 0.785 | 15.99 |
| 0.8 | 0.583 | -162.8 | 3.563 | 82.5 | 0.106 | 43.2 | 0.254 | -67.3 | 0.860 | 15.28 |
| 0.9 | 0.583 | -167.6 | 3.204 | 78.7 | 0.111 | 44.8 | 0.234 | -69.6 | 0.922 | 14.62 |
| 1.0 | 0.587 | -172.2 | 2.915 | 75.2 | 0.116 | 46.4 | 0.218 | -72.1 | 0.964 | 14.00 |
| 1.1 | 0.589 | -176.0 | 2.669 | 72.0 | 0.121 | 47.8 | 0.206 | -74.8 | 1.008 | 12.89 |
| 1.2 | 0.591 | -179.1 | 2.466 | 68.9 | 0.127 | 49.3 | 0.196 | -78.1 | 1.042 | 11.63 |
| 1.3 | 0.592 | 177.7 | 2.289 | 66.2 | 0.134 | 50.7 | 0.188 | -81.6 | 1.070 | 10.71 |
| 1.4 | 0.596 | 174.9 | 2.138 | 63.3 | 0.140 | 51.8 | 0.182 | -85.7 | 1.090 | 9.99 |
| 1.5 | 0.597 | 172.0 | 2.008 | 60.8 | 0.148 | 53.1 | 0.179 | -89.9 | 1.109 | 9.33 |
| 1.6 | 0.602 | 169.5 | 1.902 | 58.2 | 0.155 | 54.0 | 0.176 | -94.6 | 1.111 | 8.86 |
| 1.7 | 0.608 | 167.1 | 1.803 | 55.9 | 0.163 | 54.8 | 0.176 | -99.4 | 1.108 | 8.44 |
| 1.8 | 0.612 | 164.6 | 1.722 | 53.2 | 0.171 | 55.4 | 0.177 | -104.8 | 1.106 | 8.05 |
| 1.9 | 0.612 | 162.0 | 1.640 | 50.8 | 0.179 | 55.8 | 0.178 | -109.8 | 1.114 | 7.57 |
| 2.0 | 0.620 | 159.9 | 1.563 | 48.4 | 0.187 | 56.3 | 0.181 | -114.9 | 1.106 | 7.23 |
| 2.1 | 0.625 | 157.7 | 1.500 | 46.0 | 0.196 | 56.5 | 0.184 | -120.1 | 1.102 | 6.91 |
| 2.2 | 0.632 | 155.8 | 1.439 | 44.0 | 0.204 | 56.4 | 0.190 | -125.3 | 1.089 | 6.66 |
| 2.3 | 0.642 | 154.2 | 1.385 | 41.9 | 0.213 | 56.7 | 0.196 | -130.0 | 1.069 | 6.51 |
| 2.4 | 0.647 | 152.1 | 1.337 | 40.1 | 0.223 | 56.7 | 0.202 | -134.6 | 1.063 | 6.26 |
| 2.5 | 0.656 | 150.4 | 1.290 | 38.1 | 0.231 | 56.5 | 0.209 | -139.2 | 1.047 | 6.14 |
| 2.6 | 0.659 | 148.8 | 1.242 | 36.1 | 0.240 | 56.6 | 0.218 | -143.4 | 1.046 | 5.82 |
| 2.7 | 0.669 | 147.4 | 1.203 | 34.4 | 0.249 | 56.4 | 0.227 | -147.7 | 1.028 | 5.82 |
| 2.8 | 0.672 | 146.2 | 1.163 | 32.7 | 0.258 | 56.5 | 0.236 | -151.3 | 1.025 | 5.56 |
| 2.9 | 0.680 | 144.7 | 1.143 | 30.9 | 0.267 | 56.1 | 0.245 | -154.8 | 1.000 | 6.30 |
| 3.0 | 0.686 | 143.6 | 1.107 | 30.1 | 0.277 | 55.9 | 0.252 | -158.9 | 0.996 | 6.02 |
| 4.0 | 0.718 | 132.4 | 0.865 | 17.1 | 0.380 | 48.5 | 0.378 | 171.1 | 0.940 | 3.57 |
| 5.0 | 0.753 | 122.4 | 0.711 | 11.0 | 0.448 | 39.4 | 0.501 | 150.5 | 0.946 | 2.01 |

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 | 0.737 | -59.3 | 17.355 | 143.4 | 0.041 | 62.9 | 0.813 | -33.3 | 0.174 | 26.29 |
| 0.2 | 0.642 | -99.2 | 12.698 | 121.0 | 0.060 | 49.6 | 0.584 | -52.2 | 0.340 | 23.27 |
| 0.3 | 0.590 | -123.0 | 9.423 | 108.6 | 0.069 | 45.0 | 0.437 | -61.7 | 0.491 | 21.33 |
| 0.4 | 0.572 | -138.0 | 7.414 | 100.4 | 0.076 | 44.8 | 0.346 | -67.5 | 0.612 | 19.90 |
| 0.5 | 0.563 | -149.1 | 6.089 | 93.9 | 0.082 | 45.4 | 0.286 | -71.4 | 0.716 | 18.70 |
| 0.6 | 0.558 | -156.9 | 5.136 | 88.9 | 0.088 | 46.9 | 0.244 | -74.5 | 0.806 | 17.65 |
| 0.7 | 0.559 | -163.5 | 4.432 | 84.7 | 0.095 | 48.5 | 0.213 | -77.6 | 0.874 | 16.69 |
| 0.8 | 0.557 | -168.4 | 3.912 | 81.1 | 0.101 | 50.2 | 0.190 | -80.8 | 0.937 | 15.87 |
| 0.9 | 0.561 | -172.7 | 3.509 | 77.7 | 0.109 | 51.8 | 0.173 | -84.0 | 0.976 | 15.09 |
| 1.0 | 0.566 | -176.6 | 3.184 | 74.6 | 0.116 | 53.1 | 0.159 | -87.7 | 1.006 | 13.91 |
| 1.1 | 0.567 | -179.7 | 2.909 | 71.6 | 0.123 | 54.2 | 0.149 | -91.5 | 1.037 | 12.55 |
| 1.2 | 0.568 | 177.3 | 2.686 | 68.7 | 0.131 | 55.2 | 0.141 | -96.1 | 1.060 | 11.61 |
| 1.3 | 0.572 | 174.6 | 2.493 | 66.3 | 0.139 | 55.9 | 0.135 | -101.0 | 1.073 | 10.88 |
| 1.4 | 0.578 | 171.8 | 2.325 | 63.5 | 0.148 | 56.6 | 0.131 | -106.3 | 1.080 | 10.25 |
| 1.5 | 0.577 | 169.2 | 2.181 | 61.2 | 0.156 | 57.2 | 0.130 | -111.4 | 1.094 | 9.58 |
| 1.6 | 0.580 | 166.9 | 2.068 | 58.7 | 0.165 | 57.5 | 0.131 | -116.8 | 1.094 | 9.10 |
| 1.7 | 0.589 | 165.0 | 1.955 | 56.5 | 0.174 | 57.7 | 0.133 | -122.1 | 1.086 | 8.70 |
| 1.8 | 0.592 | 162.6 | 1.869 | 54.0 | 0.183 | 57.7 | 0.137 | -127.8 | 1.084 | 8.32 |
| 1.9 | 0.594 | 159.9 | 1.779 | 51.6 | 0.192 | 57.6 | 0.142 | -132.8 | 1.088 | 7.86 |
| 2.0 | 0.600 | 158.3 | 1.697 | 49.2 | 0.201 | 57.5 | 0.147 | -137.6 | 1.084 | 7.51 |
| 2.1 | 0.609 | 156.5 | 1.625 | 47.1 | 0.209 | 57.3 | 0.154 | -142.6 | 1.074 | 7.24 |
| 2.2 | 0.614 | 154.4 | 1.557 | 45.1 | 0.218 | 56.8 | 0.161 | -147.2 | 1.071 | 6.90 |
| 2.3 | 0.625 | 153.0 | 1.499 | 43.3 | 0.228 | 56.7 | 0.169 | -151.5 | 1.053 | 6.78 |
| 2.4 | 0.628 | 151.0 | 1.449 | 41.5 | 0.236 | 56.3 | 0.177 | -155.5 | 1.051 | 6.50 |
| 2.5 | 0.636 | 149.3 | 1.395 | 39.6 | 0.245 | 55.9 | 0.185 | -159.3 | 1.045 | 6.26 |
| 2.6 | 0.642 | 148.0 | 1.347 | 37.6 | 0.253 | 55.7 | 0.195 | -162.5 | 1.038 | 6.06 |
| 2.7 | 0.649 | 146.7 | 1.302 | 35.8 | 0.262 | 55.3 | 0.204 | -166.0 | 1.030 | 5.91 |
| 2.8 | 0.654 | 145.6 | 1.259 | 34.1 | 0.270 | 55.1 | 0.214 | -169.0 | 1.027 | 5.67 |
| 2.9 | 0.663 | 144.1 | 1.238 | 32.4 | 0.279 | 54.6 | 0.223 | -171.7 | 1.005 | 6.05 |
| 3.0 | 0.667 | 142.9 | 1.202 | 31.3 | 0.288 | 54.3 | 0.230 | -174.9 | 1.004 | 5.83 |
| 4.0 | 0.702 | 132.6 | 0.943 | 18.1 | 0.381 | 46.5 | 0.351 | 162.2 | 0.955 | 3.93 |
| 5.0 | 0.744 | 122.9 | 0.777 | 10.7 | 0.443 | 38.3 | 0.470 | 145.8 | 0.947 | 2.44 |

V_{CE} = 2 V, I_c = 10 mA, Z_o = 50 Ω

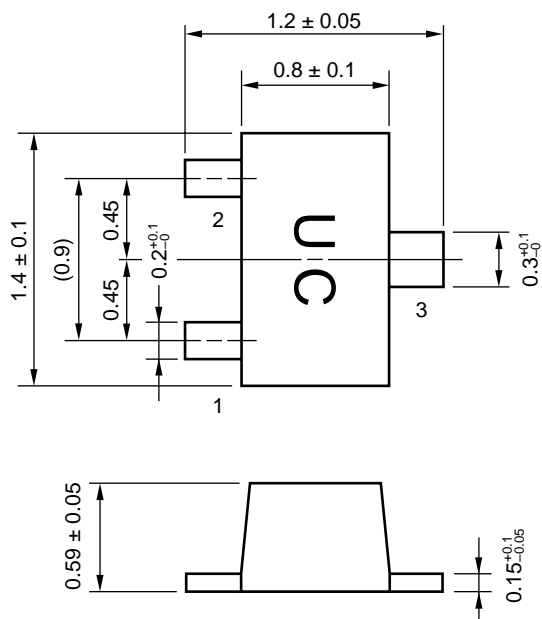
| Frequency (GHz) | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | | K | MAG/MSG (dB) |
|--------------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-------|-----------------|
| | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | MAG. | ANG. (deg.) | | |
| 0.1 | 0.653 | -70.4 | 21.298 | 137.6 | 0.038 | 59.7 | 0.745 | -41.3 | 0.254 | 27.52 |
| 0.2 | 0.584 | -111.9 | 14.486 | 115.6 | 0.052 | 50.0 | 0.497 | -61.8 | 0.435 | 24.48 |
| 0.3 | 0.549 | -133.8 | 10.409 | 104.6 | 0.060 | 48.2 | 0.359 | -72.4 | 0.602 | 22.39 |
| 0.4 | 0.541 | -147.3 | 8.116 | 97.2 | 0.067 | 49.5 | 0.279 | -79.5 | 0.723 | 20.81 |
| 0.5 | 0.533 | -156.9 | 6.594 | 91.6 | 0.075 | 51.6 | 0.227 | -85.0 | 0.823 | 19.43 |
| 0.6 | 0.534 | -163.7 | 5.535 | 87.1 | 0.083 | 53.5 | 0.191 | -90.1 | 0.893 | 18.23 |
| 0.7 | 0.538 | -168.9 | 4.771 | 83.2 | 0.092 | 55.2 | 0.166 | -95.2 | 0.942 | 17.16 |
| 0.8 | 0.537 | -172.9 | 4.201 | 80.0 | 0.100 | 56.6 | 0.147 | -100.5 | 0.986 | 16.23 |
| 0.9 | 0.540 | -176.9 | 3.761 | 77.0 | 0.109 | 57.9 | 0.134 | -106.0 | 1.016 | 14.61 |
| 1.0 | 0.546 | 179.8 | 3.410 | 74.0 | 0.118 | 58.7 | 0.124 | -111.8 | 1.032 | 13.53 |
| 1.1 | 0.548 | 176.7 | 3.117 | 71.2 | 0.127 | 59.3 | 0.117 | -117.6 | 1.049 | 12.54 |
| 1.2 | 0.554 | 174.0 | 2.875 | 68.5 | 0.136 | 59.7 | 0.114 | -123.7 | 1.057 | 11.79 |
| 1.3 | 0.556 | 171.8 | 2.665 | 66.2 | 0.146 | 60.0 | 0.112 | -129.9 | 1.067 | 11.04 |
| 1.4 | 0.560 | 169.5 | 2.487 | 63.6 | 0.155 | 60.0 | 0.113 | -135.9 | 1.071 | 10.42 |
| 1.5 | 0.561 | 167.1 | 2.330 | 61.4 | 0.165 | 60.2 | 0.115 | -141.0 | 1.080 | 9.79 |
| 1.6 | 0.566 | 165.0 | 2.206 | 59.2 | 0.174 | 60.0 | 0.120 | -145.9 | 1.075 | 9.35 |
| 1.7 | 0.572 | 163.0 | 2.085 | 56.9 | 0.184 | 59.8 | 0.125 | -150.5 | 1.072 | 8.90 |
| 1.8 | 0.576 | 160.9 | 1.991 | 54.6 | 0.194 | 59.3 | 0.132 | -154.9 | 1.068 | 8.53 |
| 1.9 | 0.578 | 158.3 | 1.894 | 52.4 | 0.203 | 58.8 | 0.139 | -159.0 | 1.072 | 8.06 |
| 2.0 | 0.583 | 156.7 | 1.805 | 50.2 | 0.212 | 58.3 | 0.147 | -162.6 | 1.071 | 7.68 |
| 2.1 | 0.592 | 154.8 | 1.732 | 48.2 | 0.221 | 57.9 | 0.155 | -166.3 | 1.062 | 7.42 |
| 2.2 | 0.600 | 152.9 | 1.658 | 46.2 | 0.230 | 57.1 | 0.164 | -169.7 | 1.057 | 7.12 |
| 2.3 | 0.608 | 151.7 | 1.597 | 44.3 | 0.239 | 56.7 | 0.173 | -172.8 | 1.047 | 6.92 |
| 2.4 | 0.613 | 149.9 | 1.539 | 42.7 | 0.248 | 56.1 | 0.182 | -175.6 | 1.044 | 6.63 |
| 2.5 | 0.622 | 148.4 | 1.482 | 40.8 | 0.257 | 55.4 | 0.191 | -178.5 | 1.037 | 6.44 |
| 2.6 | 0.629 | 147.3 | 1.434 | 39.0 | 0.265 | 55.0 | 0.200 | 179.3 | 1.030 | 6.27 |
| 2.7 | 0.634 | 145.8 | 1.386 | 37.0 | 0.273 | 54.5 | 0.209 | 176.6 | 1.029 | 6.01 |
| 2.8 | 0.639 | 144.8 | 1.340 | 35.5 | 0.281 | 54.1 | 0.218 | 174.4 | 1.026 | 5.78 |
| 2.9 | 0.650 | 143.3 | 1.319 | 33.8 | 0.290 | 53.6 | 0.228 | 172.5 | 1.006 | 6.12 |
| 3.0 | 0.653 | 142.5 | 1.280 | 32.9 | 0.298 | 53.1 | 0.235 | 169.8 | 1.008 | 5.80 |
| 4.0 | 0.688 | 132.6 | 1.006 | 19.4 | 0.384 | 44.9 | 0.344 | 153.1 | 0.971 | 4.18 |
| 5.0 | 0.734 | 123.3 | 0.832 | 11.1 | 0.439 | 37.1 | 0.453 | 140.5 | 0.954 | 2.78 |

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 | 0.525 | -97.5 | 28.158 | 126.6 | 0.028 | 58.5 | 0.598 | -58.1 | 0.393 | 29.97 |
| 0.2 | 0.506 | -135.7 | 17.032 | 107.1 | 0.039 | 55.5 | 0.361 | -82.0 | 0.647 | 26.37 |
| 0.3 | 0.499 | -152.4 | 11.795 | 98.3 | 0.049 | 57.5 | 0.257 | -96.4 | 0.803 | 23.80 |
| 0.4 | 0.501 | -162.3 | 9.012 | 92.6 | 0.059 | 60.9 | 0.203 | -107.4 | 0.895 | 21.84 |
| 0.5 | 0.505 | -168.5 | 7.269 | 88.0 | 0.069 | 62.8 | 0.171 | -117.4 | 0.951 | 20.21 |
| 0.6 | 0.508 | -173.5 | 6.090 | 84.4 | 0.080 | 64.2 | 0.152 | -126.8 | 0.986 | 18.82 |
| 0.7 | 0.513 | -177.1 | 5.210 | 81.1 | 0.091 | 64.9 | 0.141 | -135.6 | 1.011 | 16.94 |
| 0.8 | 0.515 | 179.5 | 4.595 | 78.4 | 0.101 | 65.5 | 0.134 | -143.7 | 1.029 | 15.52 |
| 0.9 | 0.518 | 176.7 | 4.105 | 75.7 | 0.112 | 65.9 | 0.132 | -150.9 | 1.040 | 14.41 |
| 1.0 | 0.527 | 174.0 | 3.717 | 73.1 | 0.123 | 65.7 | 0.132 | -157.4 | 1.040 | 13.56 |
| 1.1 | 0.527 | 171.8 | 3.394 | 70.7 | 0.134 | 65.5 | 0.133 | -162.9 | 1.050 | 12.67 |
| 1.2 | 0.531 | 169.9 | 3.127 | 68.2 | 0.145 | 65.2 | 0.136 | -168.0 | 1.052 | 11.95 |
| 1.3 | 0.534 | 167.6 | 2.894 | 66.1 | 0.156 | 64.8 | 0.141 | -172.5 | 1.056 | 11.24 |
| 1.4 | 0.541 | 165.7 | 2.702 | 63.6 | 0.166 | 64.2 | 0.147 | -176.2 | 1.053 | 10.69 |
| 1.5 | 0.545 | 163.5 | 2.530 | 61.6 | 0.177 | 63.7 | 0.152 | -179.0 | 1.054 | 10.12 |
| 1.6 | 0.548 | 161.9 | 2.390 | 59.6 | 0.188 | 63.0 | 0.159 | 178.4 | 1.052 | 9.64 |
| 1.7 | 0.553 | 160.2 | 2.261 | 57.6 | 0.199 | 62.2 | 0.166 | 176.1 | 1.050 | 9.19 |
| 1.8 | 0.558 | 158.4 | 2.153 | 55.4 | 0.209 | 61.4 | 0.175 | 174.0 | 1.047 | 8.81 |
| 1.9 | 0.560 | 156.0 | 2.053 | 53.3 | 0.218 | 60.4 | 0.183 | 171.9 | 1.049 | 8.38 |
| 2.0 | 0.568 | 154.4 | 1.954 | 51.4 | 0.228 | 59.5 | 0.192 | 169.9 | 1.046 | 8.02 |
| 2.1 | 0.576 | 152.5 | 1.874 | 49.4 | 0.237 | 58.5 | 0.201 | 167.8 | 1.041 | 7.74 |
| 2.2 | 0.582 | 151.2 | 1.790 | 47.7 | 0.246 | 57.5 | 0.210 | 165.8 | 1.041 | 7.37 |
| 2.3 | 0.592 | 149.9 | 1.724 | 45.8 | 0.256 | 56.7 | 0.219 | 164.0 | 1.033 | 7.18 |
| 2.4 | 0.597 | 148.3 | 1.663 | 44.2 | 0.265 | 55.9 | 0.228 | 162.2 | 1.029 | 6.92 |
| 2.5 | 0.606 | 147.0 | 1.603 | 42.4 | 0.273 | 55.0 | 0.237 | 160.3 | 1.026 | 6.70 |
| 2.6 | 0.613 | 145.8 | 1.543 | 40.7 | 0.282 | 54.3 | 0.245 | 158.8 | 1.023 | 6.46 |
| 2.7 | 0.617 | 144.5 | 1.494 | 38.9 | 0.289 | 53.5 | 0.254 | 156.9 | 1.024 | 6.19 |
| 2.8 | 0.622 | 143.8 | 1.447 | 37.5 | 0.298 | 52.9 | 0.262 | 155.2 | 1.022 | 5.96 |
| 2.9 | 0.632 | 142.4 | 1.419 | 35.6 | 0.306 | 52.3 | 0.270 | 154.2 | 1.008 | 6.11 |
| 3.0 | 0.637 | 141.5 | 1.383 | 34.8 | 0.313 | 51.7 | 0.276 | 152.0 | 1.007 | 5.92 |
| 4.0 | 0.671 | 132.3 | 1.090 | 21.7 | 0.391 | 42.6 | 0.363 | 140.2 | 0.988 | 4.45 |
| 5.0 | 0.719 | 123.6 | 0.913 | 13.2 | 0.439 | 35.4 | 0.451 | 131.6 | 0.970 | 3.18 |

外形図

フラットリード3ピン薄型超小型ミニモールド (単位: mm)



電極接続

- 1. エミッタ
- 2. ベース
- 3. コレクタ

〔メモ〕

〔メモ〕

〔メモ〕

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 特別水準：輸送機器（自動車、列車、船舶等）、交通用信号機器、防災／防犯装置、各種安全装置、生命維持を直接の目的としない医療機器
 特定水準：航空機器、航空宇宙機器、海底中継機器、原子力制御システム、生命維持のための医療機器、生命維持のための装置またはシステム等
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M7 98.8

— お問い合わせ先 —

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