

NPN SiGe RF TRANSISTOR

Application

LNA and wide band amplifier up to GHz range

Features

o Low Noise Figure

NF = 1.0 dB Typ. @ f = 1 GHz, V_{CE} = 3V, I_C = 7mA

o High Power Gain

MAG = 15 dB Typ. @ f = 1 GHz, V_{CE} = 3V, I_C = 7mA

o High Transition Frequency

f_T = 9 GHz Typ. @ V_{CE} = 3 V, I_C = 30 mA

h_{FE} Classification

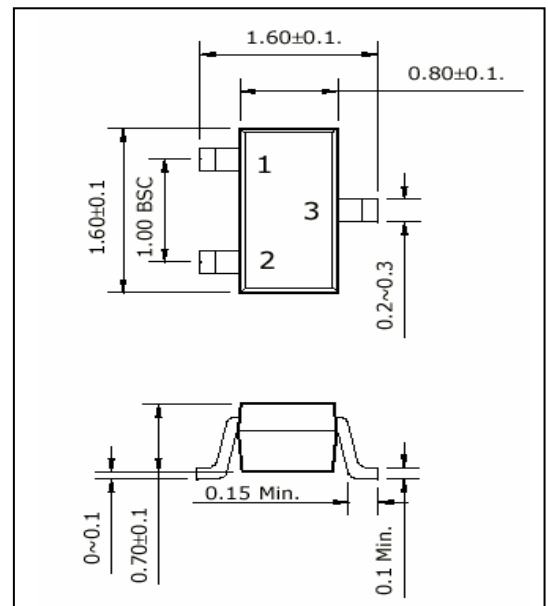
| | | |
|-----------------|------------|-----------|
| Marking | AB1 | AB2 |
| h _{FE} | 125 to 300 | 80 to 160 |

Absolute Maximum Ratings

| Symbol | Parameter | Ratings | Unit |
|------------------|----------------------------------------|-----------|------|
| V _{CBO} | Collector to Base Breakdown Voltage | 20 | V |
| V _{CEO} | Collector to Emitter Breakdown Voltage | 12 | V |
| V _{EBO} | Emitter to Base Breakdown Voltage | 2.5 | V |
| I _C | Collector Current (DC) | 100 | mA |
| P _T | Total Power Dissipation | 150 | mW |
| T _{STG} | Storage Temperature | -65 ~ 150 | °C |
| T _J | Operating Junction Temperature | 150 | °C |

Caution : ESD sensitive device

SOT 523 Unit in mm



Pin Configuration

| Pin No | Symbol | Description |
|--------|--------|-------------|
| 1 | B | Base |
| 2 | E | Emitter |
| 3 | C | Collector |

Available Package

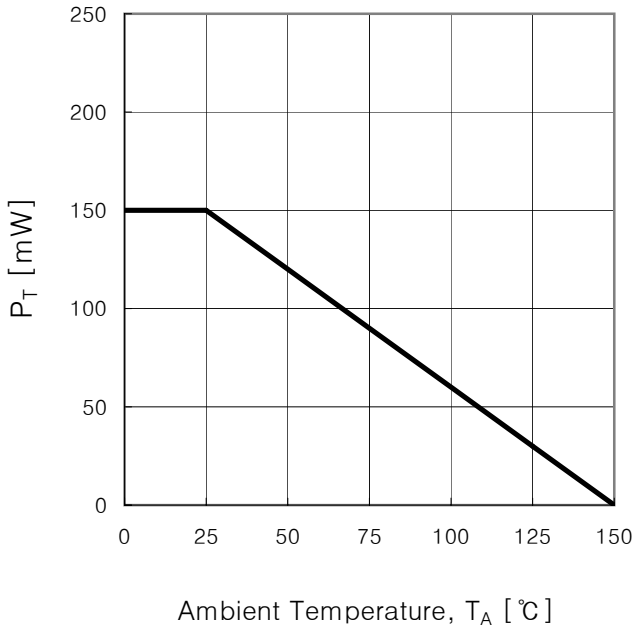
Unit : mm

| Product | Package | Dimension |
|----------|---------|------------------|
| THN6501S | SOT23 | 2.9 x 1.3, 1.2t |
| THN6501U | SOT323 | 2.0 x 1.25, 1.0t |
| THN6501Z | SOT343 | 2.0 x 1.25, 1.0t |
| THN6501E | SOT523 | 1.6 x 0.8, 0.8t |

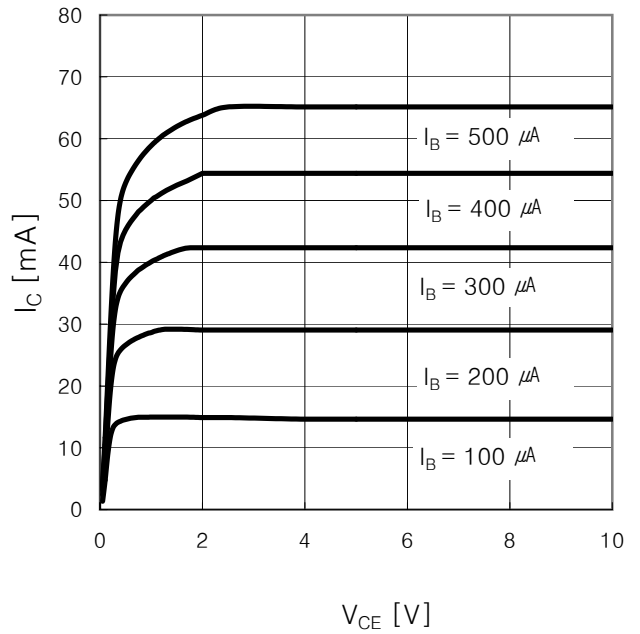
Electrical Characteristics ($T_A = 25\text{ }^\circ\text{C}$)

| Symbol | Parameter | Test Condition | Value | | | Unit |
|------------------|-------------------------------|-------------------------------------------------------------|-------|-------|------|---------------|
| | | | Min. | Typ. | Max. | |
| I_{CBO} | Collector Cut-off Current | $V_{CB} = 19\text{ V}, I_E = 0\text{ mA}$ | | | 0.5 | μA |
| I_{CEO} | | $V_{CE} = 12\text{ V}, I_B = 0\text{ mA}$ | | | 5 | μA |
| I_{EBO} | Emitter Cut-off Current | $V_{EB} = 1\text{ V}, I_C = 0\text{ mA}$ | | | 0.5 | μA |
| h_{FE} | DC Current Gain | $V_{CE} = 3\text{ V}, I_C = 15\text{ mA}$ | 80 | 150 | 300 | |
| f_T | Transition Frequency | $V_{CE} = 3\text{ V}, I_C = 30\text{ mA}$ | 8 | 9 | | GHz |
| C_{CB} | Collector to Base Capacitance | $V_{CB} = 10\text{ V}, f = 1\text{ MHz}$ | | 0.85 | | pF |
| $ S_{21} ^2$ | Insertion Power Gain | $V_{CE} = 3\text{ V}, I_C = 7\text{ mA}, f = 1\text{ GHz}$ | 8 | 9.5 | | dB |
| | | $V_{CE} = 3\text{ V}, I_C = 15\text{ mA}, f = 1\text{ GHz}$ | 9 | 11 | | |
| MAG | Maximum Available Gain | $V_{CE} = 3\text{ V}, I_C = 7\text{ mA}, f = 1\text{ GHz}$ | 12.5 | 14.5 | | dB |
| | | $V_{CE} = 3\text{ V}, I_C = 15\text{ mA}, f = 1\text{ GHz}$ | 13 | 15 | | |
| NFmin | Minimum Noise Figure | $V_{CE} = 3\text{ V}, I_C = 7\text{ mA}, f = 1\text{ GHz}$ | | 1.0 | | dB |
| rn | Noise Resistance | $V_{CE} = 3\text{ V}, I_C = 7\text{ mA}, f = 1\text{ GHz}$ | | 0.049 | | Ω |
| G_A | Associated Gain | $V_{CE} = 3\text{ V}, I_C = 7\text{ mA}, f = 1\text{ GHz}$ | 10 | 12 | | dB |
| | | $V_{CE} = 3\text{ V}, I_C = 15\text{ mA}, f = 1\text{ GHz}$ | 10 | 12.5 | | |
| OIP ₃ | Output 3rd Order Intercept | $V_{CE} = 6\text{ V}, I_C = 15\text{ mA}, f = 1\text{ GHz}$ | | 27 | | dBm |

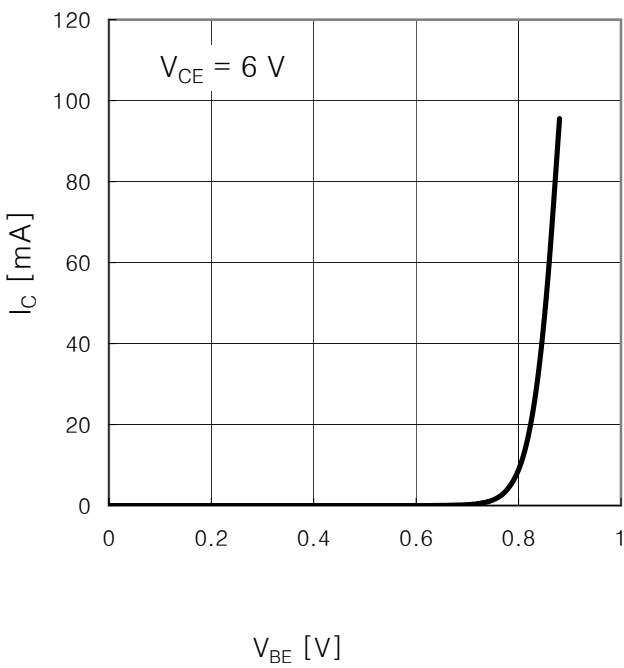
Total Power Dissipation, P_T vs. T_A



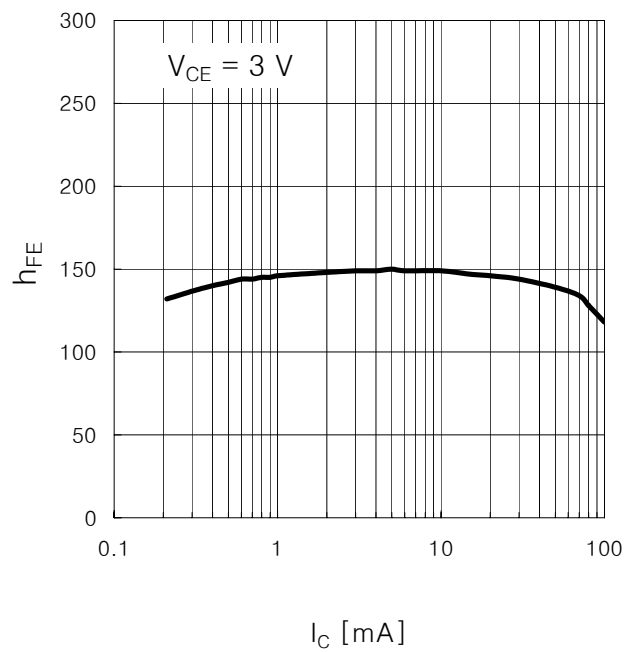
I_C vs. V_{CE}



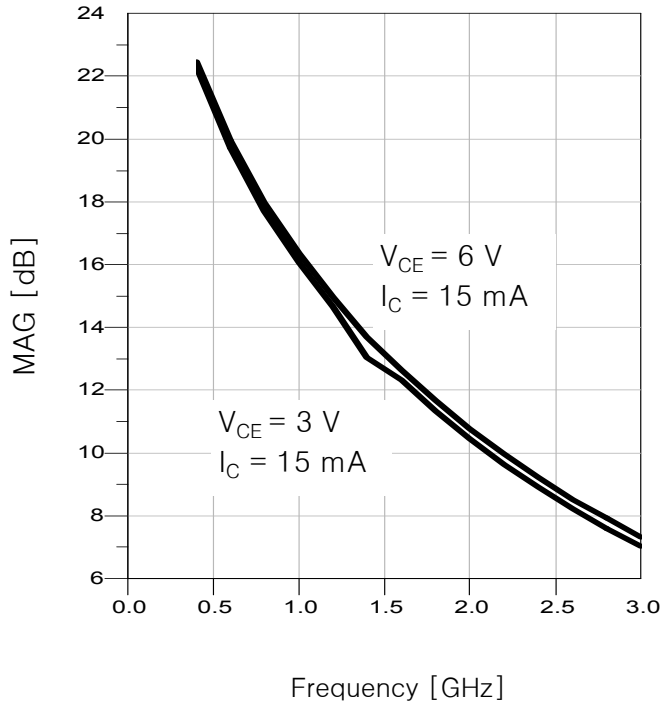
I_C vs. V_{BE}



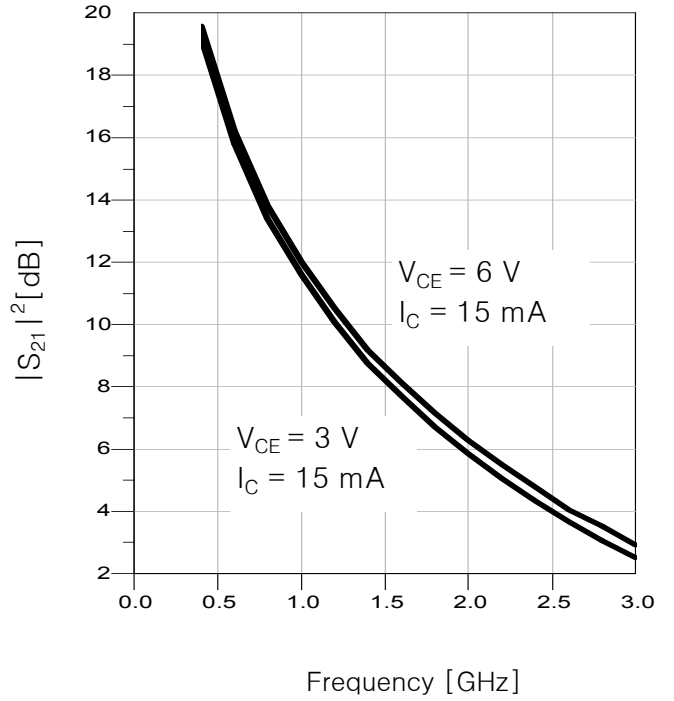
h_{FE} vs. I_C



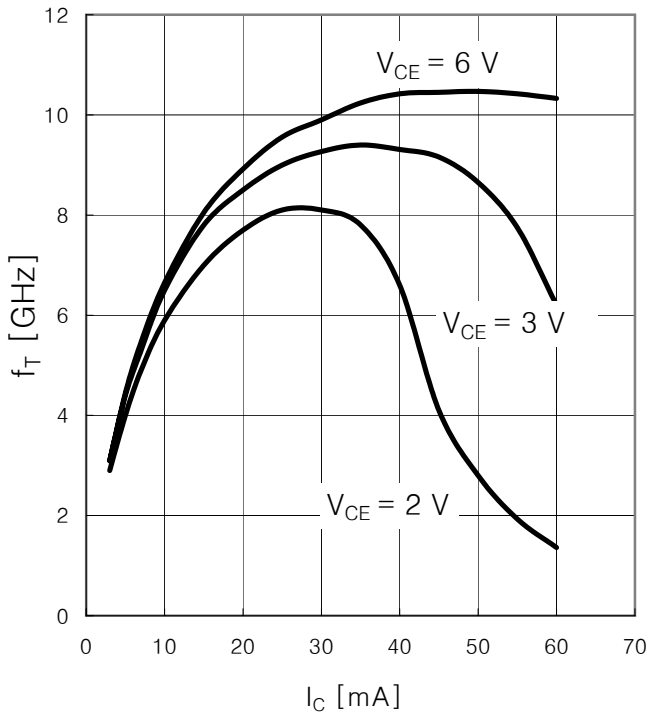
Maximum Available Gain, MAG vs. Frequency



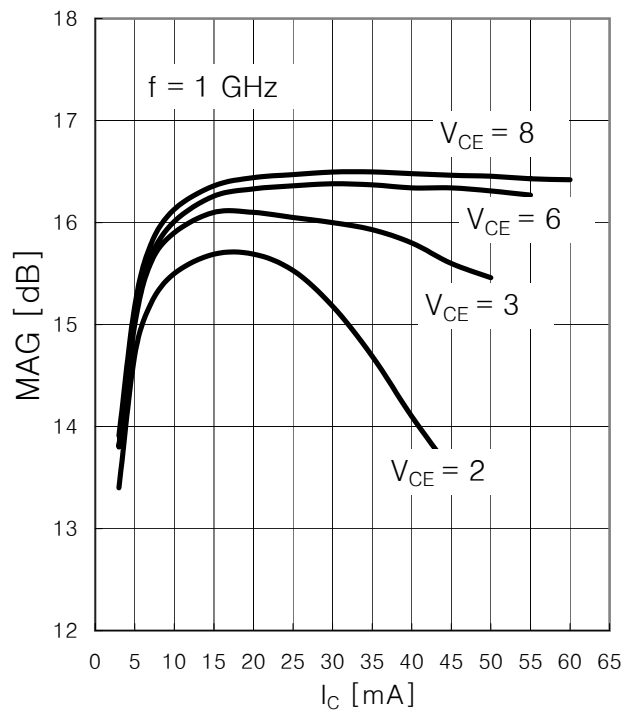
Insertion Power Gain, $|S_{21}|^2$ vs. Frequency



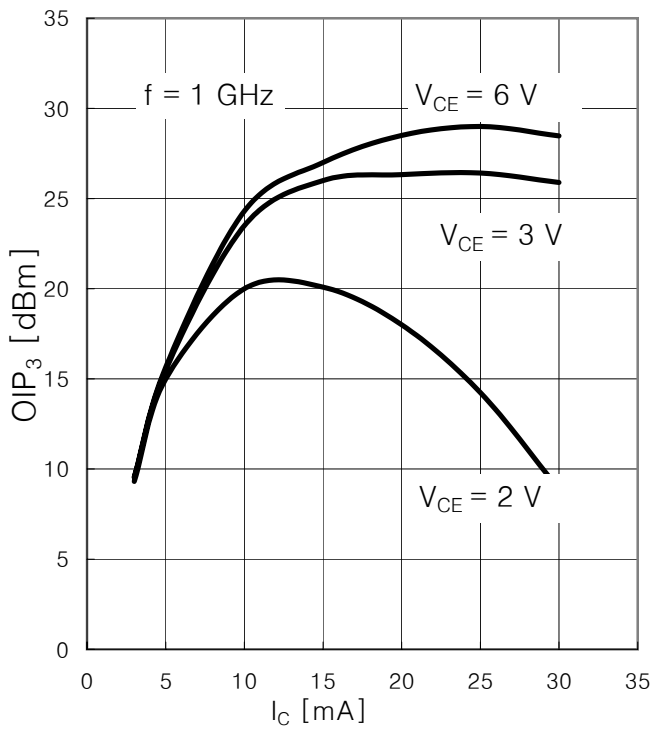
Transition Frequency, f_T vs. I_C



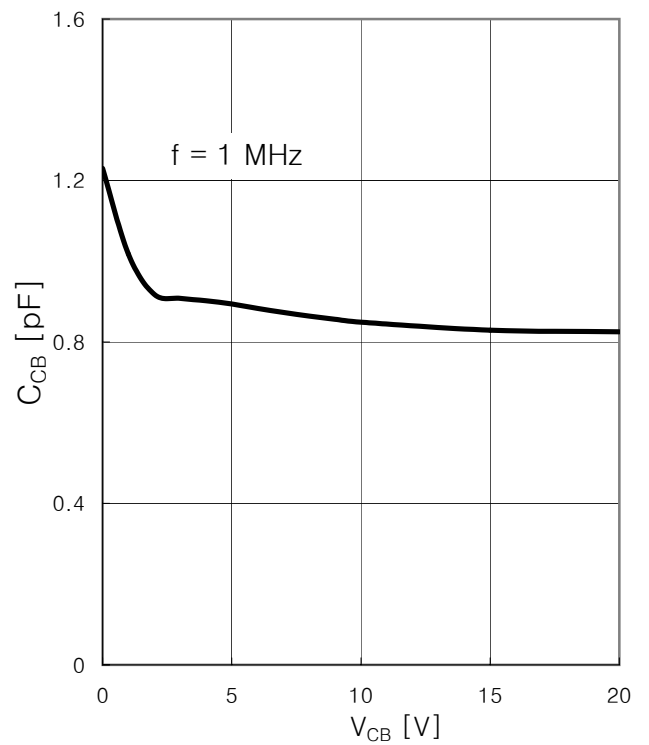
Maximum Available Gain, MAG vs. I_C



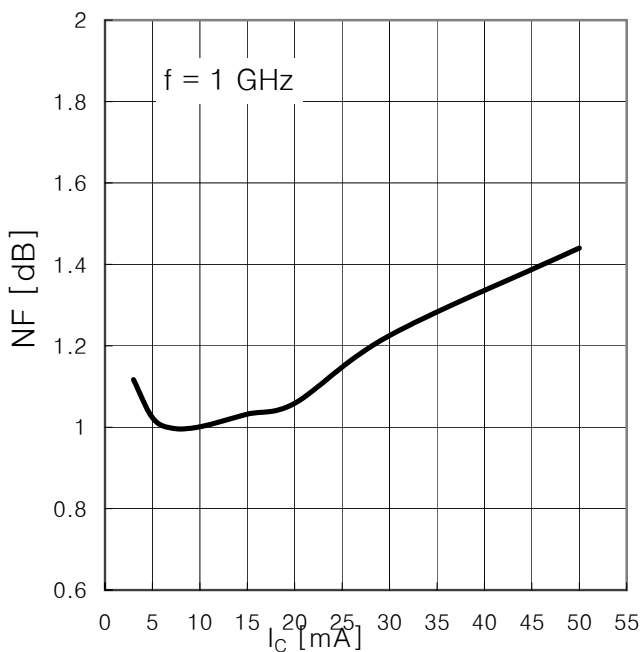
Output 3rd Order Intercept Point, OIP₃ vs. I_C
 (Z_S = Z_L = 50 Ω)



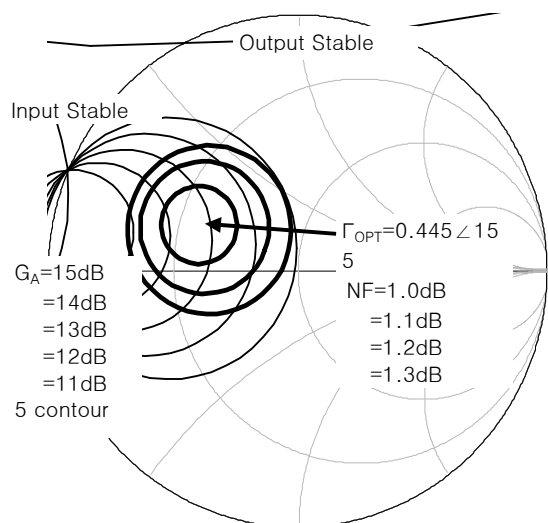
C_{CB} vs. V_{CB}



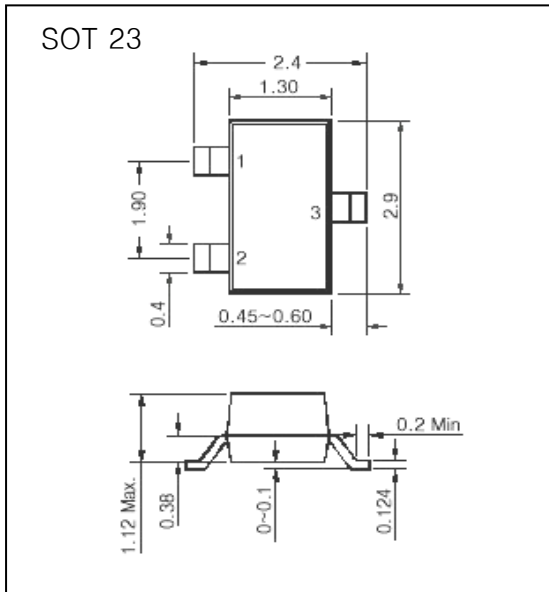
NF vs. I_C
 V_{CE} = 3 V, I_C = parameter, Z_S = Z_{Sopt}



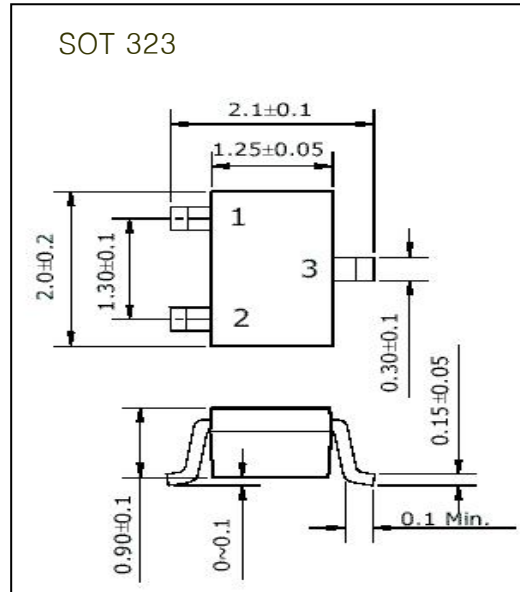
Noise Figure Contours & Constant Gain
 f = 1 GHz, V_{CE} = 3 V, I_C = 7 mA



□ Dimensions of THN6501S in mm



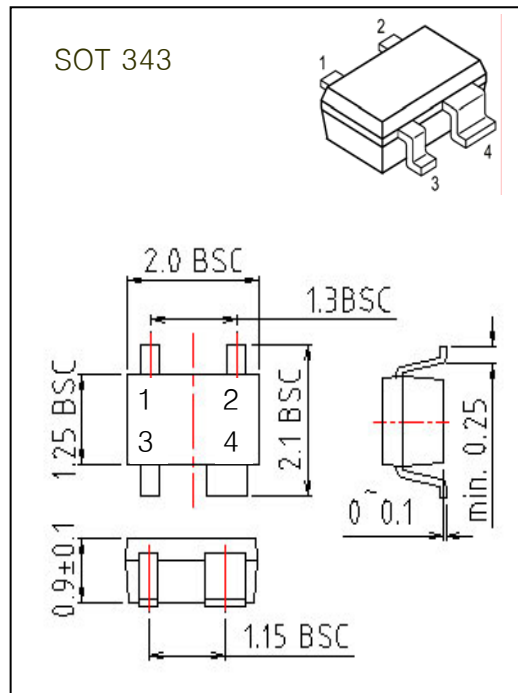
□ Dimensions of THN6501U in mm



Pin Configuration (SOT 23, SOT 323)

| Pin No | Symbol | Description |
|--------|--------|-------------|
| 1 | B | Base |
| 2 | E | Emitter |
| 3 | C | Collector |

□ Dimensions of THN6501Z in mm



Pin Configuration (SOT 343)

| Pin No | Symbol | Description |
|--------|--------|-------------|
| 1 | B | Base |
| 2, 3 | E | Emitter |
| 4 | C | Collector |

Common Emitter S-Parameter Data

 at $V_{CE} = 3\text{ V}$, $I_c = 3\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|-----------------|----------------|------------------|
| 400.0MHz | 0.714 / -115.452 | 5.565 / 107.076 | 0.108 / 31.648 | 0.582 / -64.908 |
| 600.0MHz | 0.690 / -138.684 | 4.020 / 91.928 | 0.113 / 24.085 | 0.484 / -77.742 |
| 800.0MHz | 0.666 / -152.914 | 3.117 / 80.397 | 0.112 / 21.299 | 0.445 / -87.476 |
| 1.000GHz | 0.682 / -164.364 | 2.551 / 70.634 | 0.107 / 21.803 | 0.432 / -95.539 |
| 1.200GHz | 0.689 / -169.057 | 2.155 / 63.476 | 0.103 / 25.432 | 0.424 / -103.228 |
| 1.400GHz | 0.698 / -175.650 | 1.853 / 56.729 | 0.101 / 31.155 | 0.437 / -109.983 |
| 1.600GHz | 0.708 / 177.882 | 1.628 / 49.986 | 0.102 / 38.737 | 0.454 / -116.920 |
| 1.800GHz | 0.722 / 172.343 | 1.449 / 44.131 | 0.109 / 46.385 | 0.476 / -123.483 |
| 2.000GHz | 0.730 / 167.346 | 1.300 / 38.478 | 0.120 / 53.134 | 0.501 / -129.766 |
| 2.200GHz | 0.738 / 162.750 | 1.171 / 33.644 | 0.137 / 57.979 | 0.526 / -135.822 |
| 2.400GHz | 0.755 / 157.300 | 1.064 / 29.264 | 0.156 / 61.027 | 0.553 / -141.065 |
| 2.600GHz | 0.768 / 152.736 | 0.968 / 25.179 | 0.178 / 62.241 | 0.576 / -146.526 |
| 2.800GHz | 0.779 / 148.445 | 0.899 / 21.783 | 0.201 / 62.451 | 0.604 / -151.541 |
| 3.000GHz | 0.785 / 142.738 | 0.829 / 18.837 | 0.225 / 61.842 | 0.630 / -155.871 |

 at $V_{CE} = 3\text{ V}$, $I_c = 5\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|-----------------|----------------|------------------|
| 400.0MHz | 0.657 / -132.394 | 6.948 / 101.846 | 0.087 / 32.734 | 0.471 / -79.552 |
| 600.0MHz | 0.645 / -151.156 | 4.872 / 88.860 | 0.091 / 30.079 | 0.387 / -92.997 |
| 800.0MHz | 0.639 / -164.080 | 3.738 / 79.025 | 0.093 / 31.498 | 0.358 / -102.662 |
| 1.000GHz | 0.652 / -172.711 | 3.043 / 70.561 | 0.096 / 34.927 | 0.352 / -110.068 |
| 1.200GHz | 0.664 / -176.640 | 2.564 / 64.414 | 0.100 / 39.863 | 0.345 / -117.108 |
| 1.400GHz | 0.663 / 177.624 | 2.207 / 58.324 | 0.106 / 44.983 | 0.358 / -122.783 |
| 1.600GHz | 0.679 / 172.827 | 1.946 / 52.178 | 0.115 / 49.654 | 0.375 / -128.454 |
| 1.800GHz | 0.697 / 167.713 | 1.738 / 47.052 | 0.128 / 53.639 | 0.397 / -133.775 |
| 2.000GHz | 0.698 / 163.448 | 1.565 / 41.476 | 0.142 / 56.603 | 0.421 / -138.819 |
| 2.200GHz | 0.704 / 158.860 | 1.422 / 36.811 | 0.159 / 58.720 | 0.446 / -143.704 |
| 2.400GHz | 0.718 / 154.220 | 1.294 / 32.575 | 0.177 / 59.803 | 0.472 / -147.816 |
| 2.600GHz | 0.731 / 150.120 | 1.186 / 28.342 | 0.197 / 59.879 | 0.496 / -152.247 |
| 2.800GHz | 0.748 / 145.931 | 1.101 / 24.732 | 0.217 / 59.588 | 0.524 / -156.315 |
| 3.000GHz | 0.751 / 140.712 | 1.026 / 21.629 | 0.238 / 58.773 | 0.552 / -159.854 |

 at $V_{CE} = 3\text{ V}$, $I_c = 7\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|----------------|----------------|------------------|
| 400.0MHz | 0.640 / -142.726 | 7.782 / 98.644 | 0.073 / 35.433 | 0.409 / -91.276 |
| 600.0MHz | 0.636 / -159.398 | 5.377 / 87.127 | 0.080 / 36.252 | 0.341 / -105.497 |
| 800.0MHz | 0.631 / -169.952 | 4.102 / 78.225 | 0.085 / 39.583 | 0.321 / -114.948 |
| 1.000GHz | 0.649 / -177.490 | 3.336 / 70.575 | 0.093 / 43.704 | 0.318 / -121.797 |
| 1.200GHz | 0.657 / 178.802 | 2.807 / 64.976 | 0.101 / 48.209 | 0.312 / -128.653 |
| 1.400GHz | 0.657 / 174.123 | 2.415 / 59.224 | 0.112 / 51.867 | 0.325 / -133.341 |
| 1.600GHz | 0.669 / 169.452 | 2.127 / 53.614 | 0.125 / 54.886 | 0.342 / -138.135 |
| 1.800GHz | 0.683 / 164.806 | 1.904 / 48.629 | 0.139 / 57.078 | 0.362 / -142.536 |
| 2.000GHz | 0.687 / 160.547 | 1.717 / 43.524 | 0.155 / 58.519 | 0.384 / -146.639 |
| 2.200GHz | 0.692 / 156.583 | 1.559 / 38.983 | 0.172 / 59.254 | 0.408 / -150.681 |
| 2.400GHz | 0.704 / 152.445 | 1.433 / 34.774 | 0.190 / 59.452 | 0.433 / -153.954 |
| 2.600GHz | 0.723 / 148.592 | 1.315 / 30.781 | 0.208 / 58.995 | 0.456 / -157.568 |
| 2.800GHz | 0.729 / 144.556 | 1.228 / 26.756 | 0.227 / 58.248 | 0.483 / -160.950 |
| 3.000GHz | 0.733 / 140.019 | 1.141 / 23.770 | 0.247 / 57.196 | 0.510 / -163.831 |

 at $V_{CE} = 3\text{ V}$, $I_c = 10\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|----------------|----------------|------------------|
| 400.0MHz | 0.619 / -152.597 | 8.509 / 95.545 | 0.062 / 39.919 | 0.361 / -105.116 |
| 600.0MHz | 0.629 / -166.837 | 5.819 / 85.370 | 0.071 / 43.878 | 0.312 / -119.401 |
| 800.0MHz | 0.624 / -176.127 | 4.421 / 77.569 | 0.081 / 48.151 | 0.300 / -128.393 |
| 1.000GHz | 0.644 / 177.554 | 3.582 / 70.305 | 0.092 / 51.905 | 0.301 / -134.549 |
| 1.200GHz | 0.648 / 174.442 | 3.021 / 65.300 | 0.105 / 55.345 | 0.296 / -141.051 |
| 1.400GHz | 0.655 / 170.794 | 2.594 / 60.198 | 0.119 / 57.471 | 0.308 / -144.844 |
| 1.600GHz | 0.660 / 166.141 | 2.291 / 54.879 | 0.134 / 58.937 | 0.324 / -148.753 |
| 1.800GHz | 0.671 / 161.753 | 2.050 / 50.135 | 0.150 / 59.734 | 0.342 / -152.194 |
| 2.000GHz | 0.679 / 158.164 | 1.854 / 45.271 | 0.166 / 60.062 | 0.362 / -155.441 |
| 2.200GHz | 0.680 / 154.148 | 1.688 / 40.871 | 0.184 / 59.835 | 0.384 / -158.610 |
| 2.400GHz | 0.693 / 150.142 | 1.551 / 36.926 | 0.201 / 59.334 | 0.407 / -161.094 |
| 2.600GHz | 0.710 / 146.244 | 1.433 / 32.962 | 0.219 / 58.383 | 0.427 / -163.962 |
| 2.800GHz | 0.717 / 142.621 | 1.337 / 29.094 | 0.237 / 57.282 | 0.452 / -166.624 |
| 3.000GHz | 0.725 / 137.991 | 1.245 / 25.829 | 0.256 / 56.034 | 0.477 / -168.805 |

at $V_{CE} = 3\text{ V}$, $I_c = 15\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|----------------|----------------|------------------|
| 400.0MHz | 0.615 / -162.748 | 9.116 / 92.686 | 0.054 / 46.995 | 0.331 / -120.522 |
| 600.0MHz | 0.631 / -173.478 | 6.171 / 83.868 | 0.066 / 52.300 | 0.301 / -133.988 |
| 800.0MHz | 0.628 / 179.045 | 4.677 / 76.744 | 0.079 / 56.373 | 0.297 / -141.838 |
| 1.000GHz | 0.632 / 172.562 | 3.797 / 70.166 | 0.094 / 59.031 | 0.299 / -147.023 |
| 1.200GHz | 0.649 / 171.133 | 3.189 / 65.625 | 0.109 / 60.996 | 0.296 / -153.245 |
| 1.400GHz | 0.652 / 167.208 | 2.740 / 60.893 | 0.125 / 61.912 | 0.308 / -156.221 |
| 1.600GHz | 0.658 / 163.492 | 2.424 / 55.954 | 0.142 / 62.099 | 0.321 / -159.336 |
| 1.800GHz | 0.674 / 158.923 | 2.167 / 51.405 | 0.159 / 61.907 | 0.337 / -162.072 |
| 2.000GHz | 0.671 / 155.577 | 1.964 / 46.771 | 0.177 / 61.310 | 0.355 / -164.600 |
| 2.200GHz | 0.675 / 152.239 | 1.788 / 42.492 | 0.194 / 60.406 | 0.373 / -167.026 |
| 2.400GHz | 0.689 / 147.949 | 1.647 / 38.688 | 0.212 / 59.359 | 0.393 / -168.800 |
| 2.600GHz | 0.698 / 144.470 | 1.524 / 35.088 | 0.230 / 57.911 | 0.411 / -170.960 |
| 2.800GHz | 0.706 / 141.024 | 1.420 / 31.228 | 0.247 / 56.516 | 0.434 / -173.016 |
| 3.000GHz | 0.714 / 136.683 | 1.335 / 28.032 | 0.265 / 55.051 | 0.456 / -174.663 |

 at $V_{CE} = 3\text{ V}$, $I_c = 20\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|----------------|----------------|------------------|
| 400.0MHz | 0.625 / -167.384 | 9.374 / 91.039 | 0.050 / 52.421 | 0.322 / -130.145 |
| 600.0MHz | 0.626 / -177.238 | 6.323 / 82.918 | 0.064 / 57.948 | 0.302 / -142.473 |
| 800.0MHz | 0.628 / 175.851 | 4.789 / 76.292 | 0.079 / 61.058 | 0.302 / -149.445 |
| 1.000GHz | 0.649 / 170.275 | 3.875 / 70.004 | 0.095 / 62.773 | 0.306 / -153.914 |
| 1.200GHz | 0.650 / 168.695 | 3.267 / 65.804 | 0.112 / 63.870 | 0.303 / -159.948 |
| 1.400GHz | 0.647 / 164.988 | 2.803 / 61.172 | 0.130 / 64.064 | 0.314 / -162.604 |
| 1.600GHz | 0.660 / 160.649 | 2.482 / 56.490 | 0.147 / 63.780 | 0.327 / -165.301 |
| 1.800GHz | 0.672 / 158.022 | 2.220 / 52.086 | 0.165 / 63.007 | 0.341 / -167.724 |
| 2.000GHz | 0.672 / 153.970 | 2.012 / 47.665 | 0.183 / 61.969 | 0.357 / -169.919 |
| 2.200GHz | 0.674 / 150.723 | 1.835 / 43.482 | 0.200 / 60.731 | 0.374 / -172.009 |
| 2.400GHz | 0.686 / 146.639 | 1.689 / 39.942 | 0.218 / 59.384 | 0.392 / -173.469 |
| 2.600GHz | 0.700 / 143.070 | 1.561 / 36.297 | 0.236 / 57.765 | 0.408 / -175.308 |
| 2.800GHz | 0.703 / 139.691 | 1.461 / 32.518 | 0.253 / 56.216 | 0.429 / -177.053 |
| 3.000GHz | 0.709 / 135.471 | 1.369 / 29.558 | 0.270 / 54.545 | 0.450 / -178.375 |

 at $V_{CE} = 3\text{ V}$, $I_c = 25\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|----------------|----------------|------------------|
| 400.0MHz | 0.631 / -171.125 | 9.479 / 89.941 | 0.047 / 56.410 | 0.321 / -136.761 |
| 600.0MHz | 0.635 / 179.816 | 6.379 / 82.297 | 0.063 / 61.653 | 0.307 / -148.114 |
| 800.0MHz | 0.637 / 174.058 | 4.829 / 75.999 | 0.080 / 64.045 | 0.309 / -154.342 |
| 1.000GHz | 0.647 / 168.505 | 3.905 / 70.096 | 0.097 / 65.199 | 0.313 / -158.358 |
| 1.200GHz | 0.654 / 167.362 | 3.288 / 65.832 | 0.114 / 65.704 | 0.311 / -164.259 |
| 1.400GHz | 0.655 / 163.635 | 2.824 / 61.336 | 0.132 / 65.517 | 0.321 / -166.614 |
| 1.600GHz | 0.665 / 160.444 | 2.498 / 56.751 | 0.150 / 64.723 | 0.333 / -169.129 |
| 1.800GHz | 0.675 / 156.527 | 2.240 / 52.402 | 0.168 / 63.679 | 0.347 / -171.352 |
| 2.000GHz | 0.673 / 152.920 | 2.030 / 48.148 | 0.186 / 62.423 | 0.361 / -173.364 |
| 2.200GHz | 0.679 / 149.548 | 1.853 / 44.022 | 0.205 / 60.959 | 0.377 / -175.285 |
| 2.400GHz | 0.688 / 145.976 | 1.704 / 40.475 | 0.222 / 59.449 | 0.394 / -176.578 |
| 2.600GHz | 0.701 / 142.287 | 1.578 / 36.751 | 0.239 / 57.668 | 0.409 / -178.209 |
| 2.800GHz | 0.703 / 139.247 | 1.476 / 33.083 | 0.257 / 56.011 | 0.429 / -179.780 |
| 3.000GHz | 0.708 / 134.720 | 1.390 / 29.925 | 0.274 / 54.281 | 0.449 / 179.032 |

 at $V_{CE} = 3\text{ V}$, $I_c = 30\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|----------------|----------------|------------------|
| 400.0MHz | 0.644 / -174.210 | 9.501 / 89.140 | 0.046 / 59.679 | 0.322 / -141.610 |
| 600.0MHz | 0.645 / 178.031 | 6.378 / 81.824 | 0.063 / 64.056 | 0.311 / -151.952 |
| 800.0MHz | 0.642 / 172.428 | 4.829 / 75.669 | 0.080 / 66.208 | 0.315 / -157.668 |
| 1.000GHz | 0.656 / 167.400 | 3.913 / 69.867 | 0.098 / 66.866 | 0.319 / -161.406 |
| 1.200GHz | 0.660 / 166.815 | 3.290 / 65.766 | 0.116 / 66.984 | 0.318 / -167.131 |
| 1.400GHz | 0.664 / 162.991 | 2.819 / 61.399 | 0.135 / 66.406 | 0.327 / -169.318 |
| 1.600GHz | 0.669 / 159.619 | 2.499 / 56.852 | 0.153 / 65.420 | 0.339 / -171.757 |
| 1.800GHz | 0.677 / 155.635 | 2.235 / 52.647 | 0.171 / 64.189 | 0.352 / -173.832 |
| 2.000GHz | 0.676 / 152.156 | 2.026 / 48.358 | 0.189 / 62.694 | 0.366 / -175.759 |
| 2.200GHz | 0.681 / 148.689 | 1.851 / 44.337 | 0.207 / 61.140 | 0.381 / -177.565 |
| 2.400GHz | 0.692 / 144.767 | 1.702 / 40.932 | 0.225 / 59.492 | 0.397 / -178.730 |
| 2.600GHz | 0.703 / 141.943 | 1.578 / 37.182 | 0.243 / 57.678 | 0.411 / 179.745 |
| 2.800GHz | 0.705 / 138.072 | 1.484 / 33.729 | 0.260 / 55.876 | 0.430 / 178.235 |
| 3.000GHz | 0.713 / 133.924 | 1.389 / 30.675 | 0.277 / 54.104 | 0.450 / 177.194 |

at $V_{CE} = 3\text{ V}$, $I_c = 35\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|----------------|----------------|------------------|
| 400.0MHz | 0.639 / -177.167 | 9.448 / 88.546 | 0.045 / 62.043 | 0.322 / -145.010 |
| 600.0MHz | 0.641 / 177.647 | 6.343 / 81.403 | 0.063 / 66.041 | 0.315 / -154.673 |
| 800.0MHz | 0.647 / 171.572 | 4.795 / 75.499 | 0.080 / 67.623 | 0.319 / -159.966 |
| 1.000GHz | 0.659 / 167.098 | 3.885 / 69.751 | 0.099 / 67.956 | 0.324 / -163.491 |
| 1.200GHz | 0.662 / 165.651 | 3.265 / 65.768 | 0.117 / 67.870 | 0.323 / -169.086 |
| 1.400GHz | 0.665 / 162.598 | 2.802 / 61.271 | 0.136 / 67.123 | 0.332 / -171.172 |
| 1.600GHz | 0.673 / 158.564 | 2.481 / 56.792 | 0.154 / 65.872 | 0.344 / -173.496 |
| 1.800GHz | 0.683 / 155.204 | 2.225 / 52.590 | 0.173 / 64.448 | 0.356 / -175.533 |
| 2.000GHz | 0.682 / 151.741 | 2.015 / 48.440 | 0.191 / 62.928 | 0.370 / -177.355 |
| 2.200GHz | 0.683 / 148.626 | 1.839 / 44.404 | 0.209 / 61.229 | 0.384 / -179.090 |
| 2.400GHz | 0.695 / 144.705 | 1.693 / 41.022 | 0.227 / 59.526 | 0.400 / 179.797 |
| 2.600GHz | 0.708 / 141.248 | 1.570 / 37.277 | 0.245 / 57.649 | 0.413 / 178.333 |
| 2.800GHz | 0.712 / 137.685 | 1.477 / 33.881 | 0.262 / 55.823 | 0.432 / 176.913 |
| 3.000GHz | 0.717 / 133.307 | 1.387 / 30.701 | 0.279 / 53.932 | 0.451 / 175.911 |

 at $V_{CE} = 3\text{ V}$, $I_c = 40\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|----------------|----------------|------------------|
| 400.0MHz | 0.647 / -176.721 | 9.343 / 87.936 | 0.044 / 64.009 | 0.323 / -147.831 |
| 600.0MHz | 0.660 / 176.185 | 6.256 / 81.014 | 0.063 / 67.634 | 0.318 / -156.762 |
| 800.0MHz | 0.655 / 170.669 | 4.737 / 75.094 | 0.081 / 68.784 | 0.323 / -161.712 |
| 1.000GHz | 0.667 / 166.738 | 3.835 / 69.381 | 0.099 / 68.885 | 0.327 / -164.978 |
| 1.200GHz | 0.664 / 164.962 | 3.225 / 65.524 | 0.118 / 68.525 | 0.327 / -170.499 |
| 1.400GHz | 0.673 / 161.792 | 2.767 / 61.179 | 0.137 / 67.551 | 0.336 / -172.514 |
| 1.600GHz | 0.681 / 158.044 | 2.452 / 56.677 | 0.155 / 66.309 | 0.347 / -174.752 |
| 1.800GHz | 0.691 / 154.987 | 2.193 / 52.574 | 0.174 / 64.735 | 0.359 / -176.659 |
| 2.000GHz | 0.686 / 151.485 | 1.993 / 48.398 | 0.193 / 63.127 | 0.373 / -178.491 |
| 2.200GHz | 0.688 / 147.693 | 1.819 / 44.519 | 0.211 / 61.375 | 0.388 / 179.806 |
| 2.400GHz | 0.703 / 144.043 | 1.673 / 40.979 | 0.229 / 59.606 | 0.403 / 178.747 |
| 2.600GHz | 0.715 / 140.603 | 1.551 / 37.373 | 0.247 / 57.717 | 0.416 / 177.321 |
| 2.800GHz | 0.714 / 137.419 | 1.458 / 33.908 | 0.264 / 55.786 | 0.434 / 175.948 |
| 3.000GHz | 0.721 / 132.914 | 1.372 / 30.866 | 0.281 / 53.903 | 0.452 / 174.986 |

 at $V_{CE} = 3\text{ V}$, $I_c = 45\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|----------------|----------------|------------------|
| 400.0MHz | 0.645 / -177.884 | 9.174 / 87.431 | 0.044 / 65.832 | 0.322 / -149.907 |
| 600.0MHz | 0.662 / 175.129 | 6.138 / 80.668 | 0.063 / 68.845 | 0.318 / -158.337 |
| 800.0MHz | 0.660 / 169.893 | 4.647 / 74.809 | 0.081 / 69.736 | 0.324 / -162.975 |
| 1.000GHz | 0.669 / 165.357 | 3.755 / 69.228 | 0.099 / 69.563 | 0.329 / -166.026 |
| 1.200GHz | 0.675 / 164.128 | 3.169 / 65.214 | 0.119 / 69.189 | 0.329 / -171.419 |
| 1.400GHz | 0.681 / 161.257 | 2.717 / 60.886 | 0.138 / 68.051 | 0.338 / -173.362 |
| 1.600GHz | 0.689 / 157.144 | 2.404 / 56.467 | 0.156 / 66.666 | 0.350 / -175.513 |
| 1.800GHz | 0.693 / 154.040 | 2.153 / 52.169 | 0.175 / 65.087 | 0.362 / -177.390 |
| 2.000GHz | 0.694 / 150.651 | 1.957 / 48.157 | 0.194 / 63.390 | 0.375 / -179.145 |
| 2.200GHz | 0.695 / 147.452 | 1.781 / 44.179 | 0.212 / 61.544 | 0.390 / 179.161 |
| 2.400GHz | 0.705 / 143.702 | 1.645 / 40.784 | 0.230 / 59.737 | 0.405 / 178.132 |
| 2.600GHz | 0.719 / 139.985 | 1.522 / 37.298 | 0.248 / 57.752 | 0.418 / 176.730 |
| 2.800GHz | 0.721 / 137.385 | 1.430 / 33.389 | 0.265 / 55.814 | 0.436 / 175.403 |
| 3.000GHz | 0.726 / 132.934 | 1.344 / 30.635 | 0.282 / 53.972 | 0.454 / 174.434 |

 at $V_{CE} = 3\text{ V}$, $I_c = 50\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|----------------|----------------|------------------|
| 400.0MHz | 0.657 / -179.992 | 8.867 / 86.887 | 0.044 / 66.788 | 0.320 / -151.726 |
| 600.0MHz | 0.673 / 174.587 | 5.945 / 80.227 | 0.062 / 69.811 | 0.317 / -159.550 |
| 800.0MHz | 0.669 / 169.247 | 4.496 / 74.456 | 0.081 / 70.382 | 0.323 / -163.818 |
| 1.000GHz | 0.689 / 164.927 | 3.630 / 68.571 | 0.100 / 70.187 | 0.329 / -166.689 |
| 1.200GHz | 0.687 / 163.595 | 3.057 / 64.665 | 0.119 / 69.616 | 0.329 / -171.911 |
| 1.400GHz | 0.693 / 160.408 | 2.627 / 60.473 | 0.138 / 68.468 | 0.339 / -173.697 |
| 1.600GHz | 0.697 / 157.432 | 2.321 / 55.982 | 0.157 / 67.030 | 0.350 / -175.790 |
| 1.800GHz | 0.707 / 153.479 | 2.084 / 51.815 | 0.176 / 65.397 | 0.363 / -177.644 |
| 2.000GHz | 0.704 / 149.945 | 1.889 / 47.628 | 0.195 / 63.661 | 0.377 / -179.374 |
| 2.200GHz | 0.705 / 146.846 | 1.728 / 43.599 | 0.213 / 61.807 | 0.391 / 179.004 |
| 2.400GHz | 0.713 / 143.094 | 1.592 / 40.330 | 0.231 / 59.930 | 0.407 / 177.995 |
| 2.600GHz | 0.723 / 139.903 | 1.473 / 36.663 | 0.249 / 57.879 | 0.420 / 176.573 |
| 2.800GHz | 0.726 / 136.624 | 1.384 / 33.239 | 0.266 / 55.918 | 0.438 / 175.242 |
| 3.000GHz | 0.731 / 132.389 | 1.297 / 30.176 | 0.283 / 54.009 | 0.457 / 174.298 |

at $V_{CE} = 6\text{ V}$, $I_c = 3\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|-----------------|----------------|------------------|
| 400.0MHz | 0.705 / -114.047 | 5.588 / 108.671 | 0.108 / 32.686 | 0.597 / -63.363 |
| 600.0MHz | 0.676 / -136.609 | 4.066 / 93.342 | 0.114 / 24.720 | 0.495 / -76.268 |
| 800.0MHz | 0.664 / -151.819 | 3.153 / 81.670 | 0.112 / 21.629 | 0.453 / -86.100 |
| 1.000GHz | 0.680 / -162.270 | 2.594 / 71.885 | 0.108 / 21.848 | 0.438 / -94.218 |
| 1.200GHz | 0.684 / -168.216 | 2.185 / 64.761 | 0.103 / 25.417 | 0.429 / -101.790 |
| 1.400GHz | 0.692 / -174.658 | 1.877 / 57.971 | 0.101 / 30.937 | 0.439 / -108.610 |
| 1.600GHz | 0.705 / 179.192 | 1.655 / 51.115 | 0.102 / 38.342 | 0.455 / -115.639 |
| 1.800GHz | 0.719 / 173.524 | 1.475 / 45.369 | 0.108 / 45.948 | 0.477 / -122.166 |
| 2.000GHz | 0.724 / 168.488 | 1.322 / 39.667 | 0.119 / 52.808 | 0.500 / -128.550 |
| 2.200GHz | 0.729 / 163.484 | 1.195 / 34.656 | 0.135 / 57.833 | 0.525 / -134.639 |
| 2.400GHz | 0.749 / 158.244 | 1.083 / 30.570 | 0.154 / 61.000 | 0.550 / -139.917 |
| 2.600GHz | 0.768 / 153.476 | 0.990 / 26.359 | 0.176 / 62.436 | 0.573 / -145.394 |
| 2.800GHz | 0.776 / 148.575 | 0.915 / 23.011 | 0.199 / 62.687 | 0.600 / -150.418 |
| 3.000GHz | 0.783 / 143.249 | 0.840 / 20.449 | 0.223 / 62.158 | 0.627 / -154.788 |

 at $V_{CE} = 6\text{ V}$, $I_c = 5\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|-----------------|----------------|------------------|
| 400.0MHz | 0.649 / -130.737 | 7.063 / 103.248 | 0.087 / 33.791 | 0.484 / -77.980 |
| 600.0MHz | 0.638 / -149.996 | 4.976 / 90.157 | 0.091 / 30.686 | 0.397 / -91.478 |
| 800.0MHz | 0.636 / -162.200 | 3.823 / 80.336 | 0.094 / 31.823 | 0.365 / -101.349 |
| 1.000GHz | 0.649 / -171.694 | 3.117 / 71.717 | 0.096 / 35.061 | 0.355 / -108.791 |
| 1.200GHz | 0.656 / -176.244 | 2.629 / 65.629 | 0.100 / 39.914 | 0.346 / -115.959 |
| 1.400GHz | 0.658 / 178.980 | 2.259 / 59.495 | 0.107 / 44.794 | 0.358 / -121.650 |
| 1.600GHz | 0.670 / 173.195 | 1.990 / 53.570 | 0.115 / 49.512 | 0.374 / -127.450 |
| 1.800GHz | 0.684 / 168.821 | 1.780 / 48.255 | 0.127 / 53.455 | 0.394 / -132.801 |
| 2.000GHz | 0.691 / 164.188 | 1.606 / 42.903 | 0.141 / 56.476 | 0.418 / -137.841 |
| 2.200GHz | 0.699 / 159.546 | 1.453 / 38.186 | 0.158 / 58.586 | 0.442 / -142.749 |
| 2.400GHz | 0.713 / 155.080 | 1.328 / 33.903 | 0.175 / 59.732 | 0.467 / -146.936 |
| 2.600GHz | 0.724 / 150.817 | 1.218 / 29.824 | 0.195 / 59.969 | 0.491 / -151.313 |
| 2.800GHz | 0.738 / 146.358 | 1.133 / 25.911 | 0.215 / 59.706 | 0.519 / -155.400 |
| 3.000GHz | 0.743 / 141.880 | 1.050 / 22.760 | 0.236 / 58.929 | 0.546 / -158.917 |

 at $V_{CE} = 6\text{ V}$, $I_c = 7\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|-----------------|----------------|------------------|
| 400.0MHz | 0.628 / -140.044 | 7.904 / 100.263 | 0.074 / 35.856 | 0.426 / -88.687 |
| 600.0MHz | 0.631 / -157.001 | 5.495 / 88.429 | 0.080 / 36.312 | 0.352 / -102.995 |
| 800.0MHz | 0.619 / -168.740 | 4.193 / 79.573 | 0.086 / 39.337 | 0.328 / -112.668 |
| 1.000GHz | 0.639 / -176.854 | 3.416 / 71.720 | 0.093 / 43.421 | 0.322 / -119.785 |
| 1.200GHz | 0.641 / -179.381 | 2.875 / 66.030 | 0.101 / 47.818 | 0.314 / -126.689 |
| 1.400GHz | 0.650 / 174.791 | 2.466 / 60.408 | 0.112 / 51.521 | 0.326 / -131.657 |
| 1.600GHz | 0.654 / 170.087 | 2.183 / 54.783 | 0.124 / 54.597 | 0.341 / -136.651 |
| 1.800GHz | 0.672 / 165.665 | 1.948 / 49.799 | 0.138 / 56.718 | 0.360 / -141.077 |
| 2.000GHz | 0.678 / 161.505 | 1.760 / 44.727 | 0.154 / 58.329 | 0.382 / -145.323 |
| 2.200GHz | 0.683 / 157.580 | 1.599 / 39.981 | 0.170 / 59.128 | 0.405 / -149.400 |
| 2.400GHz | 0.696 / 153.068 | 1.465 / 35.888 | 0.188 / 59.442 | 0.429 / -152.812 |
| 2.600GHz | 0.711 / 148.608 | 1.351 / 31.772 | 0.206 / 59.054 | 0.451 / -156.390 |
| 2.800GHz | 0.722 / 145.409 | 1.254 / 27.891 | 0.225 / 58.397 | 0.478 / -159.836 |
| 3.000GHz | 0.732 / 140.213 | 1.167 / 25.010 | 0.244 / 57.483 | 0.504 / -162.765 |

 at $V_{CE} = 6\text{ V}$, $I_c = 10\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|----------------|----------------|------------------|
| 400.0MHz | 0.618 / -150.356 | 8.714 / 97.133 | 0.063 / 40.459 | 0.377 / -101.358 |
| 600.0MHz | 0.619 / -164.923 | 5.964 / 86.783 | 0.072 / 43.746 | 0.321 / -116.003 |
| 800.0MHz | 0.616 / -174.746 | 4.542 / 78.728 | 0.081 / 47.798 | 0.305 / -125.502 |
| 1.000GHz | 0.631 / 178.982 | 3.683 / 71.585 | 0.092 / 51.581 | 0.303 / -131.951 |
| 1.200GHz | 0.644 / 176.246 | 3.108 / 66.568 | 0.105 / 54.717 | 0.296 / -138.724 |
| 1.400GHz | 0.644 / 171.855 | 2.664 / 61.334 | 0.118 / 57.121 | 0.308 / -142.827 |
| 1.600GHz | 0.650 / 167.108 | 2.351 / 56.026 | 0.132 / 58.668 | 0.322 / -146.936 |
| 1.800GHz | 0.663 / 163.036 | 2.109 / 51.172 | 0.148 / 59.562 | 0.339 / -150.570 |
| 2.000GHz | 0.664 / 158.917 | 1.905 / 46.389 | 0.165 / 59.954 | 0.359 / -153.917 |
| 2.200GHz | 0.670 / 155.118 | 1.738 / 42.067 | 0.182 / 59.803 | 0.380 / -157.214 |
| 2.400GHz | 0.683 / 150.631 | 1.592 / 38.124 | 0.199 / 59.369 | 0.402 / -159.801 |
| 2.600GHz | 0.698 / 147.091 | 1.470 / 34.049 | 0.217 / 58.503 | 0.422 / -162.666 |
| 2.800GHz | 0.702 / 143.654 | 1.369 / 30.292 | 0.235 / 57.416 | 0.447 / -165.406 |
| 3.000GHz | 0.711 / 139.180 | 1.282 / 27.166 | 0.253 / 56.206 | 0.471 / -167.680 |

at $V_{CE} = 6\text{ V}$, $I_c = 15\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|----------------|----------------|------------------|
| 400.0MHz | 0.602 / -160.189 | 9.397 / 94.432 | 0.054 / 47.189 | 0.344 / -115.170 |
| 600.0MHz | 0.616 / -171.421 | 6.387 / 85.316 | 0.066 / 52.126 | 0.306 / -129.457 |
| 800.0MHz | 0.609 / -179.592 | 4.846 / 78.083 | 0.079 / 55.942 | 0.298 / -138.065 |
| 1.000GHz | 0.623 / 174.242 | 3.932 / 71.473 | 0.093 / 58.559 | 0.299 / -143.768 |
| 1.200GHz | 0.635 / 172.495 | 3.311 / 66.881 | 0.108 / 60.658 | 0.294 / -150.309 |
| 1.400GHz | 0.639 / 168.661 | 2.836 / 62.024 | 0.124 / 61.602 | 0.304 / -153.679 |
| 1.600GHz | 0.643 / 164.403 | 2.511 / 57.100 | 0.140 / 61.984 | 0.317 / -157.078 |
| 1.800GHz | 0.659 / 160.101 | 2.249 / 52.503 | 0.158 / 61.781 | 0.332 / -160.001 |
| 2.000GHz | 0.656 / 156.661 | 2.035 / 47.928 | 0.175 / 61.335 | 0.349 / -162.671 |
| 2.200GHz | 0.661 / 152.987 | 1.853 / 43.736 | 0.192 / 60.486 | 0.367 / -165.266 |
| 2.400GHz | 0.674 / 148.934 | 1.708 / 40.041 | 0.209 / 59.477 | 0.387 / -167.134 |
| 2.600GHz | 0.690 / 145.476 | 1.574 / 36.260 | 0.227 / 58.174 | 0.404 / -169.361 |
| 2.800GHz | 0.696 / 141.949 | 1.477 / 32.316 | 0.244 / 56.754 | 0.426 / -171.494 |
| 3.000GHz | 0.701 / 137.332 | 1.380 / 29.188 | 0.262 / 55.277 | 0.449 / -173.171 |

 at $V_{CE} = 6\text{ V}$, $I_c = 20\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|----------------|----------------|------------------|
| 400.0MHz | 0.599 / -165.093 | 9.772 / 92.896 | 0.050 / 52.426 | 0.332 / -123.767 |
| 600.0MHz | 0.613 / -175.348 | 6.613 / 84.407 | 0.064 / 57.548 | 0.304 / -137.259 |
| 800.0MHz | 0.611 / 177.314 | 5.010 / 77.647 | 0.079 / 60.580 | 0.300 / -145.151 |
| 1.000GHz | 0.627 / 171.942 | 4.059 / 71.403 | 0.094 / 62.685 | 0.302 / -150.251 |
| 1.200GHz | 0.628 / 170.249 | 3.415 / 67.035 | 0.111 / 63.702 | 0.297 / -156.652 |
| 1.400GHz | 0.638 / 166.304 | 2.930 / 62.446 | 0.128 / 64.026 | 0.307 / -159.655 |
| 1.600GHz | 0.643 / 162.392 | 2.591 / 57.678 | 0.145 / 63.714 | 0.319 / -162.667 |
| 1.800GHz | 0.658 / 158.828 | 2.324 / 53.286 | 0.162 / 63.021 | 0.333 / -165.293 |
| 2.000GHz | 0.651 / 155.018 | 2.108 / 48.864 | 0.180 / 62.063 | 0.349 / -167.648 |
| 2.200GHz | 0.658 / 151.632 | 1.917 / 44.590 | 0.198 / 60.861 | 0.365 / -169.904 |
| 2.400GHz | 0.669 / 147.743 | 1.764 / 41.091 | 0.215 / 59.593 | 0.383 / -171.442 |
| 2.600GHz | 0.683 / 144.206 | 1.634 / 37.389 | 0.232 / 58.005 | 0.399 / -173.355 |
| 2.800GHz | 0.689 / 140.559 | 1.530 / 33.525 | 0.250 / 56.515 | 0.420 / -175.215 |
| 3.000GHz | 0.695 / 136.894 | 1.437 / 30.429 | 0.267 / 54.910 | 0.441 / -176.582 |

 at $V_{CE} = 6\text{ V}$, $I_c = 25\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|----------------|----------------|------------------|
| 400.0MHz | 0.605 / -168.818 | 9.983 / 92.074 | 0.047 / 56.620 | 0.327 / -129.252 |
| 600.0MHz | 0.615 / -178.088 | 6.736 / 83.885 | 0.063 / 60.959 | 0.304 / -142.145 |
| 800.0MHz | 0.617 / 175.207 | 5.101 / 77.369 | 0.079 / 63.754 | 0.303 / -149.446 |
| 1.000GHz | 0.627 / 170.044 | 4.138 / 71.358 | 0.096 / 64.956 | 0.305 / -154.175 |
| 1.200GHz | 0.630 / 168.222 | 3.477 / 67.135 | 0.113 / 65.610 | 0.301 / -160.505 |
| 1.400GHz | 0.635 / 164.967 | 2.987 / 62.591 | 0.130 / 65.490 | 0.311 / -163.249 |
| 1.600GHz | 0.644 / 161.515 | 2.640 / 57.905 | 0.148 / 64.737 | 0.322 / -166.073 |
| 1.800GHz | 0.652 / 157.631 | 2.368 / 53.732 | 0.166 / 63.780 | 0.335 / -168.521 |
| 2.000GHz | 0.653 / 153.825 | 2.146 / 49.267 | 0.184 / 62.623 | 0.350 / -170.685 |
| 2.200GHz | 0.656 / 150.606 | 1.954 / 45.263 | 0.201 / 61.183 | 0.365 / -172.783 |
| 2.400GHz | 0.666 / 147.166 | 1.799 / 41.622 | 0.219 / 59.681 | 0.382 / -174.182 |
| 2.600GHz | 0.681 / 144.019 | 1.668 / 37.922 | 0.236 / 58.060 | 0.397 / -175.924 |
| 2.800GHz | 0.693 / 140.292 | 1.561 / 34.340 | 0.253 / 56.446 | 0.417 / -177.588 |
| 3.000GHz | 0.696 / 135.803 | 1.461 / 31.317 | 0.270 / 54.727 | 0.437 / -178.813 |

 at $V_{CE} = 6\text{ V}$, $I_c = 30\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|-----------------|----------------|------------------|
| 400.0MHz | 0.600 / -171.879 | 10.114 / 91.333 | 0.046 / 59.445 | 0.324 / -133.155 |
| 600.0MHz | 0.613 / -179.832 | 6.820 / 83.536 | 0.062 / 63.640 | 0.305 / -145.349 |
| 800.0MHz | 0.615 / 174.097 | 5.160 / 77.160 | 0.079 / 65.741 | 0.305 / -152.245 |
| 1.000GHz | 0.635 / 169.395 | 4.183 / 71.297 | 0.096 / 66.593 | 0.308 / -156.736 |
| 1.200GHz | 0.631 / 167.644 | 3.519 / 67.037 | 0.114 / 66.980 | 0.305 / -162.940 |
| 1.400GHz | 0.637 / 164.468 | 3.019 / 62.726 | 0.132 / 66.306 | 0.314 / -165.580 |
| 1.600GHz | 0.639 / 160.547 | 2.670 / 58.125 | 0.150 / 65.474 | 0.325 / -168.277 |
| 1.800GHz | 0.659 / 157.035 | 2.390 / 53.834 | 0.168 / 64.320 | 0.337 / -170.604 |
| 2.000GHz | 0.653 / 153.534 | 2.170 / 49.708 | 0.186 / 62.953 | 0.351 / -172.666 |
| 2.200GHz | 0.658 / 150.441 | 1.976 / 45.542 | 0.204 / 61.392 | 0.366 / -174.670 |
| 2.400GHz | 0.668 / 146.061 | 1.825 / 42.139 | 0.221 / 59.871 | 0.383 / -175.978 |
| 2.600GHz | 0.683 / 143.107 | 1.681 / 38.366 | 0.239 / 58.079 | 0.397 / -177.558 |
| 2.800GHz | 0.684 / 139.588 | 1.580 / 34.619 | 0.255 / 56.335 | 0.416 / -179.153 |
| 3.000GHz | 0.691 / 135.621 | 1.486 / 31.784 | 0.273 / 54.568 | 0.435 / 179.684 |

at $V_{CE} = 6\text{ V}$, $I_c = 40\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|-----------------|----------------|------------------|
| 400.0MHz | 0.612 / -174.794 | 10.229 / 90.367 | 0.045 / 63.768 | 0.320 / -138.041 |
| 600.0MHz | 0.625 / 178.281 | 6.880 / 82.909 | 0.062 / 66.953 | 0.306 / -149.304 |
| 800.0MHz | 0.622 / 172.334 | 5.210 / 76.749 | 0.079 / 68.594 | 0.308 / -155.634 |
| 1.000GHz | 0.628 / 167.842 | 4.214 / 71.064 | 0.097 / 68.859 | 0.311 / -159.675 |
| 1.200GHz | 0.630 / 166.111 | 3.553 / 67.118 | 0.116 / 68.646 | 0.308 / -165.748 |
| 1.400GHz | 0.641 / 163.512 | 3.039 / 62.668 | 0.134 / 67.671 | 0.317 / -168.249 |
| 1.600GHz | 0.646 / 159.468 | 2.693 / 58.144 | 0.152 / 66.536 | 0.328 / -170.768 |
| 1.800GHz | 0.659 / 155.902 | 2.411 / 54.102 | 0.171 / 65.133 | 0.340 / -172.935 |
| 2.000GHz | 0.657 / 152.849 | 2.186 / 49.696 | 0.189 / 63.511 | 0.353 / -174.953 |
| 2.200GHz | 0.661 / 149.393 | 1.998 / 45.840 | 0.207 / 61.811 | 0.368 / -176.811 |
| 2.400GHz | 0.669 / 145.588 | 1.840 / 42.251 | 0.224 / 60.103 | 0.383 / -177.993 |
| 2.600GHz | 0.683 / 142.191 | 1.703 / 38.668 | 0.242 / 58.234 | 0.396 / -179.510 |
| 2.800GHz | 0.690 / 138.906 | 1.598 / 35.079 | 0.259 / 56.443 | 0.415 / 179.013 |
| 3.000GHz | 0.692 / 134.426 | 1.495 / 32.184 | 0.276 / 54.524 | 0.433 / 178.008 |

 at $V_{CE} = 6\text{ V}$, $I_c = 50\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|-----------------|----------------|------------------|
| 400.0MHz | 0.618 / -176.740 | 10.217 / 89.718 | 0.043 / 66.447 | 0.316 / -140.863 |
| 600.0MHz | 0.623 / 176.573 | 6.863 / 82.421 | 0.061 / 69.331 | 0.305 / -151.390 |
| 800.0MHz | 0.622 / 171.216 | 5.194 / 76.505 | 0.079 / 70.351 | 0.307 / -157.337 |
| 1.000GHz | 0.635 / 166.797 | 4.202 / 70.809 | 0.098 / 70.004 | 0.311 / -161.113 |
| 1.200GHz | 0.641 / 165.456 | 3.538 / 66.887 | 0.117 / 69.715 | 0.309 / -167.056 |
| 1.400GHz | 0.643 / 162.520 | 3.032 / 62.550 | 0.135 / 68.553 | 0.318 / -169.425 |
| 1.600GHz | 0.651 / 158.799 | 2.683 / 58.134 | 0.154 / 67.247 | 0.328 / -171.852 |
| 1.800GHz | 0.658 / 155.102 | 2.404 / 53.980 | 0.172 / 65.637 | 0.340 / -173.965 |
| 2.000GHz | 0.662 / 152.050 | 2.181 / 49.818 | 0.191 / 63.962 | 0.354 / -175.859 |
| 2.200GHz | 0.662 / 148.969 | 1.989 / 45.783 | 0.209 / 62.151 | 0.368 / -177.666 |
| 2.400GHz | 0.673 / 145.237 | 1.833 / 42.230 | 0.226 / 60.355 | 0.383 / -178.806 |
| 2.600GHz | 0.690 / 141.458 | 1.695 / 38.725 | 0.244 / 58.460 | 0.396 / 179.713 |
| 2.800GHz | 0.686 / 138.500 | 1.591 / 34.988 | 0.260 / 56.530 | 0.414 / 178.279 |
| 3.000GHz | 0.697 / 134.216 | 1.492 / 31.920 | 0.278 / 54.656 | 0.432 / 177.295 |

 at $V_{CE} = 6\text{ V}$, $I_c = 60\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|-----------------|----------------|------------------|
| 400.0MHz | 0.626 / -179.134 | 10.093 / 89.155 | 0.043 / 68.447 | 0.310 / -142.464 |
| 600.0MHz | 0.635 / 175.612 | 6.775 / 82.149 | 0.061 / 71.167 | 0.301 / -152.491 |
| 800.0MHz | 0.631 / 170.143 | 5.124 / 76.129 | 0.080 / 71.483 | 0.304 / -158.035 |
| 1.000GHz | 0.646 / 165.894 | 4.145 / 70.461 | 0.098 / 71.241 | 0.308 / -161.642 |
| 1.200GHz | 0.653 / 165.059 | 3.489 / 66.387 | 0.117 / 70.477 | 0.307 / -167.499 |
| 1.400GHz | 0.649 / 161.964 | 2.992 / 62.160 | 0.136 / 69.326 | 0.316 / -169.696 |
| 1.600GHz | 0.654 / 158.469 | 2.654 / 57.792 | 0.154 / 67.834 | 0.327 / -172.040 |
| 1.800GHz | 0.671 / 155.013 | 2.373 / 53.584 | 0.173 / 66.134 | 0.339 / -174.067 |
| 2.000GHz | 0.665 / 151.373 | 2.150 / 49.417 | 0.191 / 64.401 | 0.352 / -175.923 |
| 2.200GHz | 0.664 / 148.413 | 1.961 / 45.352 | 0.210 / 62.512 | 0.367 / -177.698 |
| 2.400GHz | 0.681 / 144.380 | 1.809 / 41.993 | 0.227 / 60.688 | 0.382 / -178.836 |
| 2.600GHz | 0.690 / 141.593 | 1.674 / 38.097 | 0.245 / 58.712 | 0.395 / 179.710 |
| 2.800GHz | 0.699 / 138.080 | 1.569 / 34.671 | 0.261 / 56.788 | 0.414 / 178.284 |
| 3.000GHz | 0.704 / 133.754 | 1.475 / 31.428 | 0.279 / 54.827 | 0.432 / 177.311 |

 at $V_{CE} = 6\text{ V}$, $I_c = 70\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|----------------|----------------|------------------|
| 400.0MHz | 0.635 / -179.667 | 9.836 / 88.552 | 0.042 / 69.852 | 0.301 / -143.292 |
| 600.0MHz | 0.640 / 174.983 | 6.601 / 81.552 | 0.061 / 72.044 | 0.293 / -152.817 |
| 800.0MHz | 0.640 / 169.393 | 4.991 / 75.535 | 0.079 / 72.382 | 0.298 / -158.030 |
| 1.000GHz | 0.656 / 166.032 | 4.038 / 69.892 | 0.098 / 71.866 | 0.303 / -161.425 |
| 1.200GHz | 0.663 / 164.151 | 3.396 / 65.843 | 0.117 / 71.195 | 0.302 / -167.048 |
| 1.400GHz | 0.666 / 161.277 | 2.910 / 61.550 | 0.136 / 69.890 | 0.311 / -169.143 |
| 1.600GHz | 0.667 / 157.684 | 2.579 / 57.021 | 0.154 / 68.342 | 0.323 / -171.408 |
| 1.800GHz | 0.679 / 154.618 | 2.310 / 52.838 | 0.173 / 66.690 | 0.336 / -173.409 |
| 2.000GHz | 0.676 / 151.257 | 2.094 / 48.570 | 0.192 / 64.897 | 0.350 / -175.194 |
| 2.200GHz | 0.680 / 147.849 | 1.910 / 44.600 | 0.210 / 63.039 | 0.365 / -176.970 |
| 2.400GHz | 0.688 / 143.997 | 1.764 / 41.088 | 0.228 / 61.109 | 0.381 / -178.106 |
| 2.600GHz | 0.697 / 141.044 | 1.633 / 37.329 | 0.245 / 59.079 | 0.395 / -179.562 |
| 2.800GHz | 0.705 / 137.537 | 1.528 / 33.661 | 0.262 / 57.126 | 0.414 / 178.977 |
| 3.000GHz | 0.714 / 133.218 | 1.432 / 30.661 | 0.280 / 55.153 | 0.433 / 177.958 |

at $V_{CE} = 8\text{ V}$, $I_c = 3\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|-----------------|----------------|------------------|
| 400.0MHz | 0.713 / -113.258 | 5.671 / 108.784 | 0.107 / 32.859 | 0.600 / -62.001 |
| 600.0MHz | 0.684 / -135.865 | 4.124 / 93.513 | 0.113 / 25.014 | 0.497 / -74.497 |
| 800.0MHz | 0.668 / -150.863 | 3.204 / 81.896 | 0.111 / 21.824 | 0.454 / -84.019 |
| 1.000GHz | 0.679 / -162.200 | 2.637 / 72.146 | 0.107 / 22.054 | 0.438 / -92.115 |
| 1.200GHz | 0.682 / -167.702 | 2.226 / 65.001 | 0.103 / 25.363 | 0.428 / -99.457 |
| 1.400GHz | 0.691 / -174.836 | 1.910 / 58.249 | 0.101 / 30.883 | 0.437 / -106.325 |
| 1.600GHz | 0.703 / 179.221 | 1.682 / 51.651 | 0.101 / 38.053 | 0.453 / -113.272 |
| 1.800GHz | 0.718 / 173.502 | 1.503 / 45.851 | 0.107 / 46.004 | 0.473 / -119.908 |
| 2.000GHz | 0.724 / 168.379 | 1.348 / 40.181 | 0.118 / 52.830 | 0.497 / -126.247 |
| 2.200GHz | 0.732 / 163.450 | 1.219 / 35.083 | 0.133 / 57.903 | 0.520 / -132.426 |
| 2.400GHz | 0.747 / 158.120 | 1.102 / 30.800 | 0.153 / 61.219 | 0.546 / -137.748 |
| 2.600GHz | 0.761 / 153.823 | 1.008 / 26.718 | 0.174 / 62.639 | 0.568 / -143.358 |
| 2.800GHz | 0.774 / 148.943 | 0.933 / 22.978 | 0.197 / 63.057 | 0.595 / -148.467 |
| 3.000GHz | 0.783 / 143.773 | 0.861 / 20.235 | 0.221 / 62.622 | 0.622 / -152.918 |

 at $V_{CE} = 8\text{ V}$, $I_c = 5\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|-----------------|----------------|------------------|
| 400.0MHz | 0.657 / -129.276 | 7.139 / 103.613 | 0.086 / 33.667 | 0.489 / -75.713 |
| 600.0MHz | 0.644 / -149.218 | 5.028 / 90.415 | 0.091 / 30.489 | 0.399 / -88.879 |
| 800.0MHz | 0.635 / -161.886 | 3.868 / 80.525 | 0.093 / 31.497 | 0.365 / -98.390 |
| 1.000GHz | 0.647 / -170.750 | 3.156 / 71.803 | 0.096 / 34.645 | 0.354 / -105.897 |
| 1.200GHz | 0.651 / -175.598 | 2.664 / 65.792 | 0.099 / 39.321 | 0.344 / -112.910 |
| 1.400GHz | 0.665 / 178.995 | 2.285 / 59.792 | 0.105 / 44.338 | 0.356 / -118.608 |
| 1.600GHz | 0.670 / 173.787 | 2.023 / 53.642 | 0.114 / 49.164 | 0.371 / -124.626 |
| 1.800GHz | 0.690 / 168.772 | 1.803 / 48.295 | 0.125 / 53.198 | 0.391 / -129.987 |
| 2.000GHz | 0.687 / 164.169 | 1.627 / 43.156 | 0.139 / 56.564 | 0.413 / -135.287 |
| 2.200GHz | 0.700 / 159.952 | 1.475 / 38.301 | 0.155 / 58.706 | 0.437 / -140.304 |
| 2.400GHz | 0.712 / 154.924 | 1.347 / 34.053 | 0.173 / 59.992 | 0.463 / -144.511 |
| 2.600GHz | 0.728 / 150.923 | 1.234 / 30.023 | 0.193 / 60.258 | 0.486 / -149.076 |
| 2.800GHz | 0.742 / 146.900 | 1.146 / 25.961 | 0.212 / 60.076 | 0.514 / -153.311 |
| 3.000GHz | 0.749 / 141.801 | 1.063 / 22.577 | 0.233 / 59.369 | 0.542 / -156.917 |

 at $V_{CE} = 8\text{ V}$, $I_c = 7\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|-----------------|----------------|------------------|
| 400.0MHz | 0.618 / -138.774 | 8.064 / 100.244 | 0.073 / 35.965 | 0.423 / -87.076 |
| 600.0MHz | 0.628 / -156.843 | 5.589 / 88.488 | 0.080 / 36.325 | 0.348 / -100.841 |
| 800.0MHz | 0.622 / -168.070 | 4.272 / 79.594 | 0.085 / 39.441 | 0.322 / -110.481 |
| 1.000GHz | 0.636 / -176.103 | 3.482 / 71.759 | 0.092 / 43.442 | 0.316 / -117.523 |
| 1.200GHz | 0.647 / 179.594 | 2.928 / 66.252 | 0.100 / 47.924 | 0.307 / -124.433 |
| 1.400GHz | 0.648 / 175.088 | 2.513 / 60.658 | 0.111 / 51.544 | 0.318 / -129.332 |
| 1.600GHz | 0.658 / 170.569 | 2.219 / 55.023 | 0.123 / 54.618 | 0.334 / -134.364 |
| 1.800GHz | 0.674 / 165.650 | 1.990 / 50.002 | 0.137 / 56.841 | 0.352 / -138.935 |
| 2.000GHz | 0.672 / 161.647 | 1.795 / 44.942 | 0.152 / 58.440 | 0.374 / -143.224 |
| 2.200GHz | 0.680 / 157.788 | 1.628 / 40.192 | 0.168 / 59.316 | 0.396 / -147.424 |
| 2.400GHz | 0.697 / 153.160 | 1.493 / 36.210 | 0.186 / 59.648 | 0.421 / -150.863 |
| 2.600GHz | 0.713 / 149.142 | 1.370 / 32.056 | 0.204 / 59.272 | 0.443 / -154.593 |
| 2.800GHz | 0.722 / 145.142 | 1.283 / 28.119 | 0.223 / 58.648 | 0.470 / -158.133 |
| 3.000GHz | 0.723 / 140.352 | 1.194 / 24.812 | 0.242 / 57.635 | 0.496 / -161.101 |

 at $V_{CE} = 8\text{ V}$, $I_c = 10\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|----------------|----------------|------------------|
| 400.0MHz | 0.603 / -149.262 | 8.830 / 97.320 | 0.063 / 40.400 | 0.374 / -98.842 |
| 600.0MHz | 0.614 / -164.131 | 6.050 / 86.854 | 0.071 / 43.143 | 0.316 / -113.228 |
| 800.0MHz | 0.615 / -174.105 | 4.608 / 78.784 | 0.081 / 47.201 | 0.299 / -122.591 |
| 1.000GHz | 0.626 / 179.352 | 3.743 / 71.586 | 0.091 / 51.028 | 0.296 / -129.222 |
| 1.200GHz | 0.640 / 176.617 | 3.148 / 66.556 | 0.103 / 54.467 | 0.288 / -135.871 |
| 1.400GHz | 0.635 / 171.712 | 2.706 / 61.359 | 0.117 / 56.877 | 0.299 / -140.050 |
| 1.600GHz | 0.645 / 166.783 | 2.396 / 56.104 | 0.131 / 58.629 | 0.314 / -144.296 |
| 1.800GHz | 0.662 / 162.912 | 2.140 / 51.281 | 0.146 / 59.477 | 0.331 / -148.024 |
| 2.000GHz | 0.662 / 159.101 | 1.939 / 46.523 | 0.162 / 60.001 | 0.351 / -151.549 |
| 2.200GHz | 0.666 / 155.449 | 1.762 / 42.028 | 0.179 / 59.926 | 0.371 / -154.935 |
| 2.400GHz | 0.682 / 151.077 | 1.616 / 38.156 | 0.197 / 59.586 | 0.394 / -157.603 |
| 2.600GHz | 0.693 / 147.232 | 1.492 / 34.005 | 0.214 / 58.698 | 0.414 / -160.567 |
| 2.800GHz | 0.703 / 143.809 | 1.391 / 30.424 | 0.232 / 57.674 | 0.439 / -163.462 |
| 3.000GHz | 0.713 / 138.704 | 1.302 / 27.172 | 0.251 / 56.511 | 0.464 / -165.834 |

at $V_{CE} = 8\text{ V}$, $I_c = 15\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|----------------|----------------|------------------|
| 400.0MHz | 0.605 / -158.571 | 9.521 / 94.586 | 0.054 / 46.313 | 0.338 / -112.392 |
| 600.0MHz | 0.613 / -170.709 | 6.472 / 85.339 | 0.066 / 51.407 | 0.298 / -126.579 |
| 800.0MHz | 0.611 / -178.964 | 4.913 / 78.025 | 0.078 / 55.366 | 0.289 / -135.272 |
| 1.000GHz | 0.624 / 174.594 | 3.986 / 71.368 | 0.092 / 58.201 | 0.289 / -141.063 |
| 1.200GHz | 0.626 / 172.697 | 3.354 / 66.739 | 0.107 / 60.368 | 0.283 / -147.632 |
| 1.400GHz | 0.636 / 168.857 | 2.874 / 61.988 | 0.123 / 61.387 | 0.293 / -151.048 |
| 1.600GHz | 0.641 / 163.824 | 2.545 / 56.989 | 0.139 / 61.859 | 0.306 / -154.511 |
| 1.800GHz | 0.653 / 160.125 | 2.282 / 52.493 | 0.155 / 61.803 | 0.321 / -157.524 |
| 2.000GHz | 0.652 / 156.498 | 2.060 / 48.016 | 0.172 / 61.377 | 0.339 / -160.278 |
| 2.200GHz | 0.657 / 152.938 | 1.882 / 43.603 | 0.190 / 60.573 | 0.357 / -162.956 |
| 2.400GHz | 0.671 / 149.026 | 1.732 / 39.896 | 0.207 / 59.616 | 0.377 / -164.943 |
| 2.600GHz | 0.685 / 145.511 | 1.594 / 35.948 | 0.224 / 58.389 | 0.396 / -167.247 |
| 2.800GHz | 0.689 / 141.726 | 1.499 / 32.180 | 0.242 / 56.984 | 0.418 / -169.522 |
| 3.000GHz | 0.694 / 136.958 | 1.398 / 29.019 | 0.260 / 55.569 | 0.441 / -171.306 |

 at $V_{CE} = 8\text{ V}$, $I_c = 20\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|----------------|----------------|------------------|
| 400.0MHz | 0.600 / -164.771 | 9.887 / 92.981 | 0.050 / 51.526 | 0.324 / -120.833 |
| 600.0MHz | 0.606 / -174.493 | 6.700 / 84.402 | 0.063 / 56.665 | 0.293 / -134.462 |
| 800.0MHz | 0.609 / 177.766 | 5.076 / 77.620 | 0.078 / 60.139 | 0.288 / -142.495 |
| 1.000GHz | 0.619 / 171.398 | 4.111 / 71.335 | 0.093 / 62.117 | 0.290 / -147.630 |
| 1.200GHz | 0.624 / 170.456 | 3.463 / 66.924 | 0.110 / 63.389 | 0.285 / -154.109 |
| 1.400GHz | 0.635 / 166.689 | 2.969 / 62.299 | 0.126 / 63.795 | 0.295 / -157.143 |
| 1.600GHz | 0.638 / 162.514 | 2.626 / 57.465 | 0.143 / 63.624 | 0.307 / -160.218 |
| 1.800GHz | 0.649 / 158.975 | 2.353 / 53.213 | 0.160 / 62.996 | 0.321 / -162.846 |
| 2.000GHz | 0.647 / 155.352 | 2.133 / 48.711 | 0.178 / 62.146 | 0.337 / -165.304 |
| 2.200GHz | 0.656 / 151.651 | 1.946 / 44.554 | 0.195 / 61.035 | 0.354 / -167.634 |
| 2.400GHz | 0.669 / 147.734 | 1.789 / 40.771 | 0.213 / 59.812 | 0.373 / -169.260 |
| 2.600GHz | 0.684 / 143.921 | 1.657 / 37.209 | 0.230 / 58.296 | 0.389 / -171.272 |
| 2.800GHz | 0.685 / 140.690 | 1.551 / 33.373 | 0.247 / 56.728 | 0.411 / -173.196 |
| 3.000GHz | 0.690 / 136.426 | 1.457 / 30.230 | 0.264 / 55.175 | 0.432 / -174.705 |

 at $V_{CE} = 8\text{ V}$, $I_c = 25\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|-----------------|----------------|------------------|
| 400.0MHz | 0.605 / -167.685 | 10.102 / 91.989 | 0.047 / 55.077 | 0.317 / -126.261 |
| 600.0MHz | 0.605 / -177.024 | 6.826 / 83.971 | 0.062 / 60.172 | 0.292 / -139.243 |
| 800.0MHz | 0.608 / 175.758 | 5.169 / 77.397 | 0.078 / 63.082 | 0.290 / -146.702 |
| 1.000GHz | 0.625 / 170.385 | 4.186 / 71.268 | 0.094 / 64.398 | 0.292 / -151.555 |
| 1.200GHz | 0.627 / 169.386 | 3.522 / 66.892 | 0.111 / 65.261 | 0.288 / -157.877 |
| 1.400GHz | 0.630 / 164.893 | 3.019 / 62.481 | 0.129 / 65.164 | 0.298 / -160.694 |
| 1.600GHz | 0.640 / 161.800 | 2.675 / 57.741 | 0.146 / 64.661 | 0.309 / -163.578 |
| 1.800GHz | 0.656 / 158.124 | 2.394 / 53.527 | 0.163 / 63.736 | 0.323 / -166.029 |
| 2.000GHz | 0.649 / 154.235 | 2.175 / 49.082 | 0.181 / 62.698 | 0.338 / -168.268 |
| 2.200GHz | 0.655 / 150.753 | 1.977 / 45.074 | 0.199 / 61.362 | 0.354 / -170.415 |
| 2.400GHz | 0.666 / 147.155 | 1.822 / 41.369 | 0.216 / 59.954 | 0.372 / -171.884 |
| 2.600GHz | 0.681 / 143.396 | 1.682 / 37.704 | 0.233 / 58.358 | 0.387 / -173.739 |
| 2.800GHz | 0.684 / 140.267 | 1.581 / 33.997 | 0.250 / 56.662 | 0.407 / -175.485 |
| 3.000GHz | 0.691 / 136.060 | 1.485 / 30.981 | 0.268 / 55.005 | 0.428 / -176.840 |

 at $V_{CE} = 8\text{ V}$, $I_c = 30\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|-----------------|----------------|------------------|
| 400.0MHz | 0.586 / -171.048 | 10.226 / 91.439 | 0.046 / 58.106 | 0.313 / -129.926 |
| 600.0MHz | 0.610 / -179.484 | 6.897 / 83.514 | 0.062 / 62.953 | 0.292 / -142.387 |
| 800.0MHz | 0.608 / 174.636 | 5.225 / 77.103 | 0.078 / 65.156 | 0.292 / -149.482 |
| 1.000GHz | 0.626 / 169.803 | 4.231 / 71.114 | 0.095 / 66.120 | 0.294 / -154.063 |
| 1.200GHz | 0.630 / 168.018 | 3.557 / 66.955 | 0.112 / 66.538 | 0.291 / -160.365 |
| 1.400GHz | 0.637 / 164.562 | 3.053 / 62.523 | 0.130 / 66.225 | 0.300 / -162.980 |
| 1.600GHz | 0.635 / 160.456 | 2.702 / 57.961 | 0.148 / 65.476 | 0.311 / -165.660 |
| 1.800GHz | 0.653 / 157.221 | 2.423 / 53.692 | 0.166 / 64.390 | 0.324 / -168.096 |
| 2.000GHz | 0.651 / 153.876 | 2.191 / 49.298 | 0.183 / 63.070 | 0.339 / -170.201 |
| 2.200GHz | 0.651 / 150.636 | 1.999 / 45.343 | 0.201 / 61.565 | 0.354 / -172.224 |
| 2.400GHz | 0.668 / 146.295 | 1.841 / 41.792 | 0.219 / 60.126 | 0.371 / -173.605 |
| 2.600GHz | 0.679 / 143.299 | 1.701 / 38.107 | 0.236 / 58.397 | 0.386 / -175.334 |
| 2.800GHz | 0.682 / 140.005 | 1.598 / 34.331 | 0.253 / 56.628 | 0.406 / -176.999 |
| 3.000GHz | 0.688 / 136.281 | 1.501 / 31.122 | 0.270 / 54.968 | 0.425 / -178.218 |

at $V_{CE} = 8\text{ V}$, $I_c = 40\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|-----------------|----------------|------------------|
| 400.0MHz | 0.609 / -173.988 | 10.319 / 90.502 | 0.044 / 62.594 | 0.309 / -134.220 |
| 600.0MHz | 0.616 / 178.802 | 6.955 / 83.028 | 0.061 / 66.296 | 0.292 / -145.960 |
| 800.0MHz | 0.617 / 172.900 | 5.264 / 76.735 | 0.078 / 68.023 | 0.293 / -152.486 |
| 1.000GHz | 0.629 / 168.297 | 4.259 / 70.868 | 0.096 / 68.321 | 0.296 / -156.757 |
| 1.200GHz | 0.637 / 166.855 | 3.582 / 66.721 | 0.114 / 68.385 | 0.293 / -162.894 |
| 1.400GHz | 0.635 / 163.660 | 3.075 / 62.556 | 0.132 / 67.635 | 0.302 / -165.352 |
| 1.600GHz | 0.644 / 159.872 | 2.721 / 57.992 | 0.150 / 66.514 | 0.313 / -167.947 |
| 1.800GHz | 0.653 / 156.421 | 2.437 / 53.820 | 0.168 / 65.169 | 0.325 / -170.176 |
| 2.000GHz | 0.654 / 153.062 | 2.207 / 49.598 | 0.186 / 63.691 | 0.339 / -172.189 |
| 2.200GHz | 0.656 / 149.439 | 2.015 / 45.476 | 0.204 / 62.041 | 0.354 / -174.132 |
| 2.400GHz | 0.669 / 145.703 | 1.857 / 42.015 | 0.222 / 60.432 | 0.371 / -175.371 |
| 2.600GHz | 0.673 / 142.301 | 1.718 / 38.140 | 0.239 / 58.474 | 0.385 / -176.963 |
| 2.800GHz | 0.685 / 139.594 | 1.609 / 34.653 | 0.256 / 56.737 | 0.404 / -178.559 |
| 3.000GHz | 0.695 / 134.904 | 1.514 / 31.555 | 0.273 / 54.946 | 0.423 / -179.709 |

 at $V_{CE} = 8\text{ V}$, $I_c = 50\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|-----------------|----------------|------------------|
| 400.0MHz | 0.607 / -175.843 | 10.308 / 89.997 | 0.044 / 65.722 | 0.304 / -136.249 |
| 600.0MHz | 0.621 / 177.233 | 6.943 / 82.671 | 0.061 / 68.573 | 0.289 / -147.517 |
| 800.0MHz | 0.618 / 171.785 | 5.251 / 76.546 | 0.078 / 69.722 | 0.291 / -153.716 |
| 1.000GHz | 0.634 / 167.019 | 4.251 / 70.684 | 0.096 / 69.849 | 0.295 / -157.714 |
| 1.200GHz | 0.635 / 166.278 | 3.574 / 66.610 | 0.114 / 69.437 | 0.292 / -163.808 |
| 1.400GHz | 0.637 / 162.561 | 3.069 / 62.396 | 0.133 / 68.527 | 0.301 / -166.198 |
| 1.600GHz | 0.650 / 158.920 | 2.712 / 57.815 | 0.151 / 67.289 | 0.312 / -168.664 |
| 1.800GHz | 0.657 / 155.553 | 2.426 / 53.739 | 0.170 / 65.809 | 0.325 / -170.832 |
| 2.000GHz | 0.655 / 152.618 | 2.204 / 49.398 | 0.188 / 64.169 | 0.339 / -172.824 |
| 2.200GHz | 0.657 / 148.753 | 2.011 / 45.413 | 0.206 / 62.477 | 0.354 / -174.680 |
| 2.400GHz | 0.671 / 145.325 | 1.851 / 41.841 | 0.223 / 60.723 | 0.370 / -175.898 |
| 2.600GHz | 0.677 / 141.870 | 1.716 / 38.171 | 0.241 / 58.792 | 0.384 / -177.466 |
| 2.800GHz | 0.685 / 138.511 | 1.610 / 34.615 | 0.258 / 56.910 | 0.403 / -179.062 |
| 3.000GHz | 0.694 / 134.278 | 1.508 / 31.418 | 0.275 / 55.043 | 0.422 / 179.863 |

 at $V_{CE} = 8\text{ V}$, $I_c = 60\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|-----------------|----------------|------------------|
| 400.0MHz | 0.609 / -177.577 | 10.236 / 89.634 | 0.043 / 67.524 | 0.298 / -136.960 |
| 600.0MHz | 0.624 / 176.054 | 6.880 / 82.340 | 0.060 / 70.319 | 0.284 / -147.915 |
| 800.0MHz | 0.625 / 170.897 | 5.207 / 76.186 | 0.078 / 70.991 | 0.287 / -153.940 |
| 1.000GHz | 0.641 / 166.188 | 4.218 / 70.384 | 0.096 / 70.792 | 0.291 / -157.780 |
| 1.200GHz | 0.642 / 165.265 | 3.542 / 66.212 | 0.115 / 70.340 | 0.288 / -163.688 |
| 1.400GHz | 0.644 / 161.855 | 3.034 / 62.018 | 0.133 / 69.286 | 0.298 / -165.983 |
| 1.600GHz | 0.652 / 158.556 | 2.694 / 57.404 | 0.151 / 67.891 | 0.309 / -168.469 |
| 1.800GHz | 0.660 / 155.190 | 2.413 / 53.342 | 0.170 / 66.342 | 0.322 / -170.583 |
| 2.000GHz | 0.663 / 152.092 | 2.182 / 49.105 | 0.188 / 64.683 | 0.336 / -172.504 |
| 2.200GHz | 0.664 / 148.505 | 1.995 / 45.084 | 0.207 / 62.886 | 0.351 / -174.405 |
| 2.400GHz | 0.677 / 144.765 | 1.835 / 41.457 | 0.224 / 61.084 | 0.368 / -175.606 |
| 2.600GHz | 0.691 / 141.787 | 1.696 / 37.762 | 0.241 / 59.148 | 0.382 / -177.182 |
| 2.800GHz | 0.691 / 138.066 | 1.593 / 34.094 | 0.259 / 57.179 | 0.401 / -178.710 |
| 3.000GHz | 0.695 / 133.679 | 1.499 / 30.997 | 0.276 / 55.245 | 0.420 / -179.850 |

 at $V_{CE} = 8\text{ V}$, $I_c = 70\text{ mA}$

| freq | S(1,1) | S(2,1) | S(1,2) | S(2,2) |
|----------|------------------|-----------------|----------------|------------------|
| 400.0MHz | 0.613 / -179.201 | 10.087 / 89.259 | 0.042 / 69.079 | 0.288 / -136.751 |
| 600.0MHz | 0.631 / 174.771 | 6.773 / 81.904 | 0.060 / 71.257 | 0.275 / -147.398 |
| 800.0MHz | 0.631 / 169.440 | 5.128 / 75.857 | 0.078 / 72.140 | 0.278 / -153.200 |
| 1.000GHz | 0.645 / 165.629 | 4.149 / 69.972 | 0.096 / 71.712 | 0.283 / -156.868 |
| 1.200GHz | 0.656 / 165.321 | 3.491 / 65.850 | 0.114 / 71.069 | 0.281 / -162.678 |
| 1.400GHz | 0.651 / 161.862 | 2.996 / 61.524 | 0.133 / 69.940 | 0.291 / -164.907 |
| 1.600GHz | 0.661 / 158.607 | 2.650 / 56.942 | 0.151 / 68.518 | 0.303 / -167.266 |
| 1.800GHz | 0.669 / 154.655 | 2.376 / 52.802 | 0.170 / 66.973 | 0.317 / -169.368 |
| 2.000GHz | 0.664 / 151.676 | 2.156 / 48.512 | 0.188 / 65.248 | 0.331 / -171.282 |
| 2.200GHz | 0.670 / 148.424 | 1.962 / 44.507 | 0.207 / 63.399 | 0.347 / -173.140 |
| 2.400GHz | 0.685 / 144.377 | 1.810 / 40.896 | 0.224 / 61.633 | 0.364 / -174.400 |
| 2.600GHz | 0.692 / 141.046 | 1.676 / 37.101 | 0.242 / 59.608 | 0.379 / -176.000 |
| 2.800GHz | 0.699 / 138.017 | 1.565 / 33.446 | 0.259 / 57.640 | 0.399 / -177.610 |
| 3.000GHz | 0.702 / 133.651 | 1.474 / 30.425 | 0.277 / 55.702 | 0.419 / -178.804 |