## The RF Small Signal Line

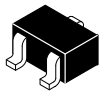
# NPN Silicon High-Frequency Transistor

**MRF577T1**

**LOW NOISE
HIGH FREQUENCY
TRANSISTOR**

Designed for low noise, wide dynamic range front end amplifiers at frequencies to 1.5 GHz. Specifically aimed at portable communication devices such as pagers and hand–held phones.

- Low Noise Figure
  NF = 1.5 dB (Typ) @ 1.0 GHz
- High Current Gain–Bandwidth Product ($f_\tau$ = 7.0 GHz Typ @ 6.0 V, 40 mA)
- Small, Surface–Mount Package (SC–70/SOT–323)
- Available in Tape and Reel Packaging.
  T1 Suffix = 3,000 Units per 8 mm, 7 inch Reel.



**CASE 419–02, STYLE 3
(SC–70/SOT–323)**

### MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Collector–Emitter Voltage | $V_{CEO}$ | 10 | Vdc |
| Collector–Base Voltage | $V_{CBO}$ | 20 | Vdc |
| Emitter–Base Voltage | $V_{EBO}$ | 3.0 | Vdc |
| Collector Current — Continuous | $I_C$ | 80 | mAdc |
| Total Device Dissipation @ $T_C$ = 75°C (1)<br>Derate above 75°C | $P_D$ | 232<br>3.1 | mW<br>mW/°C |
| Storage Temperature Range | $T_{stg}$ | – 55 to +150 | °C |
| Operating Temperature Range | $T_J$ | 150 | °C |

### THERMAL CHARACTERISTICS

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Thermal Resistance, Junction–to–Case (1) | $R_{\theta JC}$ | 323 | °C/W |

### DEVICE MARKING

MRF577T1 = D

(1) Case temperature measured on the collector lead immediately adjacent to body of package.



MOTOROLA

**ELECTRICAL CHARACTERISTICS** ($T_C$ = 25°C unless otherwise noted)

| Characteristic | | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Collector–Emitter Breakdown Voltage ($I_C$ = 1.0 mA, $I_B$ = 0 mA) | | $V_{(BR)CEO}$ | 10 | 12 | — | Vdc |
| Collector–Base Breakdown Voltage ($I_C$ = 0.1 mA, $I_E$ = 0) | | $V_{(BR)CBO}$ | 20 | — | — | Vdc |
| Emitter–Base Breakdown Voltage ($I_E$ = 50 μA, $I_C$ = 0) | | $V_{(BR)EBO}$ | 2.5 | — | — | Vdc |
| Collector Cutoff Current ($V_{CB}$ = 8.0 Vdc, $I_E$ = 0) | | $I_{CBO}$ | — | — | 10 | μA |
| **ON CHARACTERISTICS** | | | | | | |
| DC Current Gain ($V_{CE}$ = 10 Vdc, $I_C$ = 30 mA) | | $h_{FE}$ | 50 | — | 300 | — |
| **DYNAMIC CHARACTERISTICS** | | | | | | |
| Collector–Base Capacitance ($V_{CB}$ = 6.0 Vdc, $I_E$ = 0, f = 1.0 MHz) | | $C_{cb}$ | — | 0.85 | — | pF |
| Current–Gain Bandwidth Product ($V_{CE}$ = 6.0 Vdc, $I_E$ = 40 mA, f = 1.0 GHz) | | $f_\tau$ | — | 7.0 | — | GHz |
| **PERFORMANCE CHARACTERISTICS** | | | | | | |
| Noise Figure — Minimum ($V_{CE}$ = 6.0 Vdc, $I_C$ = 5.0 mA) Figure 1 | 500 MHz<br>1.0 GHz | $NF_{min}$ | —<br>— | 1.0<br>1.5 | —<br>— | dB |
| Associated Gain at Minimum Noise Figure ($V_{CE}$ = 6.0 Vdc, $I_C$ = 5.0 mA) Figure 1 | 500 MHz<br>1.0 GHz | $G_{NF}$ | —<br>— | 15<br>10 | —<br>— | dB |
| Maximum Unilateral Gain ($V_{CE}$ = 6.0 Vdc, $I_C$ = 40 mA, f = 1000 MHz) | | $G_{Umax}$ | — | 12 | — | dB |
| Insertion Gain ($V_{CE}$ = 6.0 Vdc, $I_C$ = 40 mA, f = 1000 MHz) | | $\lvert S_{21}{}^2 \rvert$ | — | 11 | — | dB |
| Noise Resistance ($V_{CE}$ = 6.0 Vdc, $I_C$ = 5.0 mA, f = 1000 MHz) | | $R_N$ | — | 6.0 | — | Ohms |

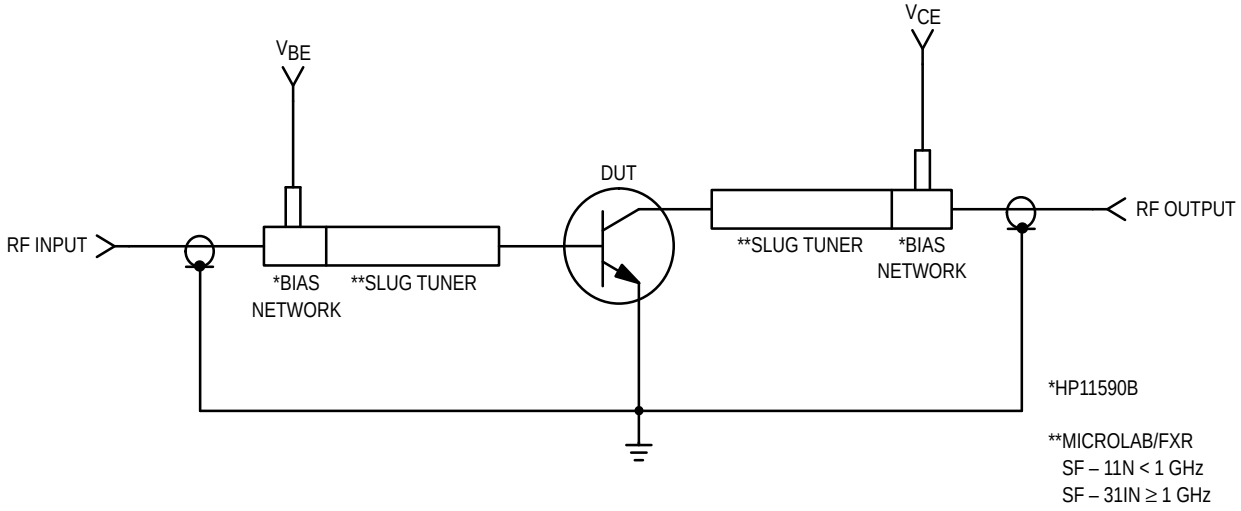



**Figure 1. Functional Circuit Schematic**

## TYPICAL CHARACTERISTICS

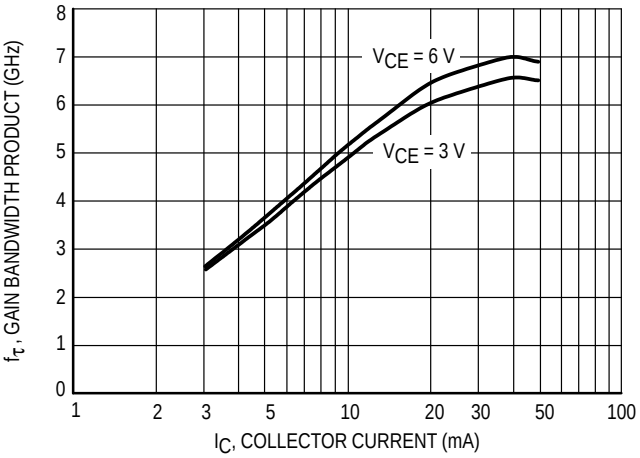



**Figure 2. $f_\tau$, Current–Gain Bandwidth Product versus Collector Current**

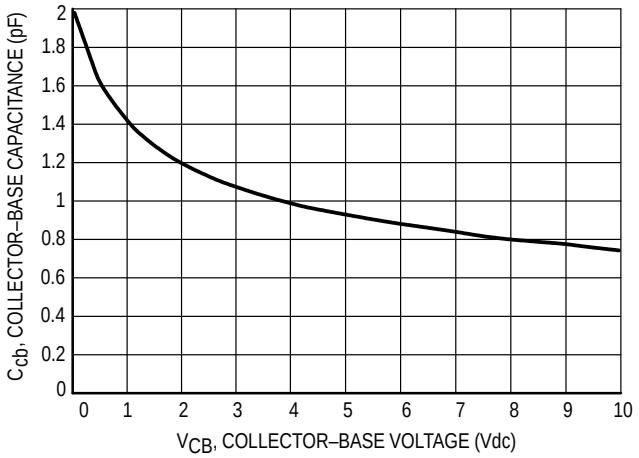



**Figure 3. Collector–Base Capacitance versus Voltage**

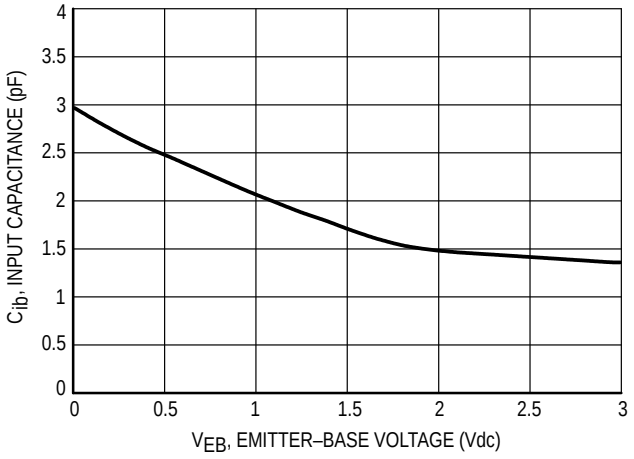



**Figure 4. Input Capacitance versus Emitter–Base Voltage**

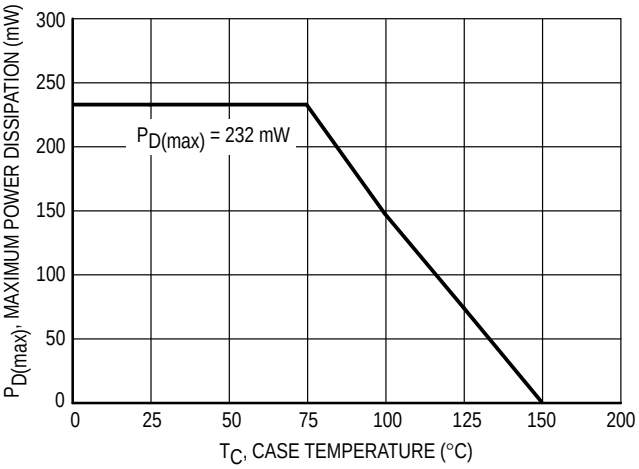



**Figure 5. Maximum Power Dissipation versus Collector Lead Temperature ($T_C$)**

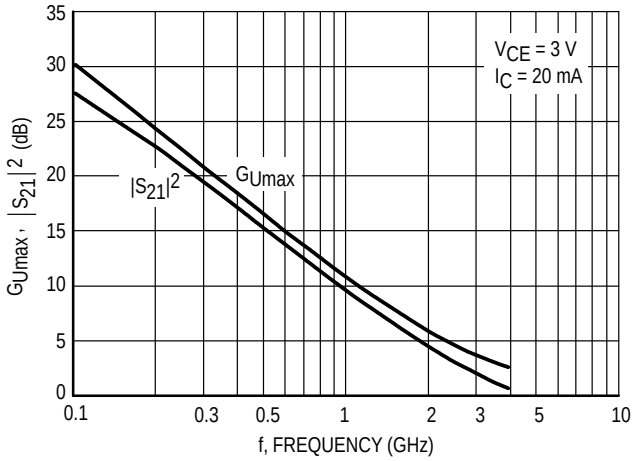



**Figure 6. Forward Insertion Gain and Maximum Unilateral Gain versus Frequency**

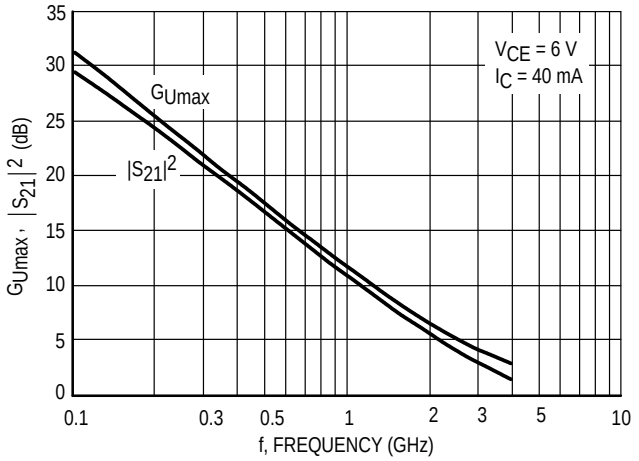



**Figure 7. Forward Insertion Gain and Maximum Unilateral Gain versus Frequency**

## TYPICAL CHARACTERISTICS

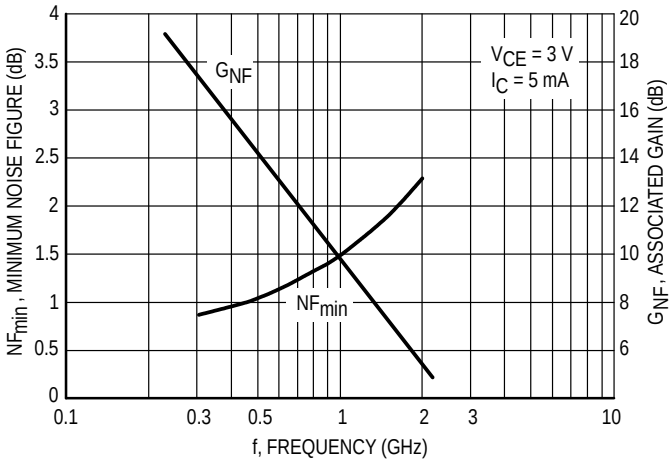



**Figure 8. Minimum Noise Figure and Associated Gain versus Frequency**

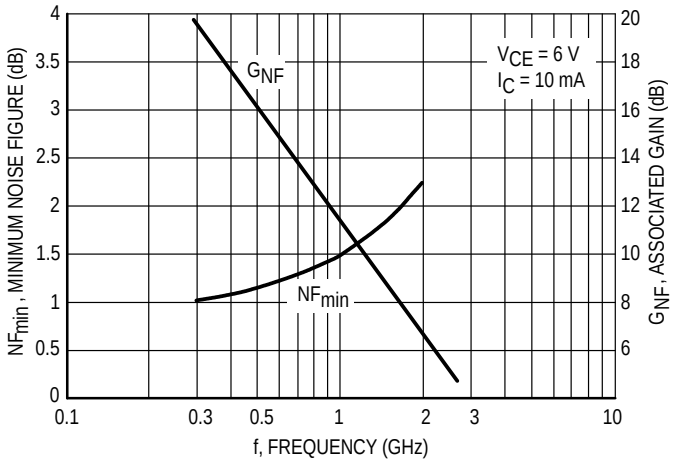



**Figure 9. Minimum Noise Figure and Associated Gain versus Frequency**

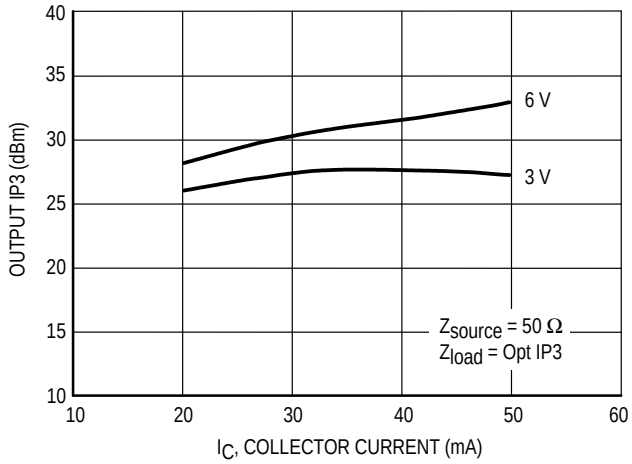



**Figure 10. Output Third Order Intercept Point versus Collector Current**

| $V_{CE}$ (Volts) | $I_C$ (mA) | f (MHz) | $NF_{min}$ (dB) | $\|\Gamma_o\|$ | $\angle\Gamma_o$ | $R_N$ |
|---|---|---|---|---|---|---|
| 3.0 | 3.0 | 300 | 0.81 | 0.44 | 57 | 10 |
| | | 500 | 1.05 | 0.43 | 88 | 9 |
| | | 900 | 1.51 | 0.46 | 138 | 6 |
| | | 1000 | 1.62 | 0.47 | 149 | 6 |
| | | 1500 | 2.11 | 0.56 | −173 | 4 |
| | | 2000 | 2.55 | 0.69 | −157 | 6 |
| | 5.0 | 300 | 0.86 | 0.33 | 58 | 8 |
| | | 500 | 1.03 | 0.34 | 88 | 8 |
| | | 900 | 1.40 | 0.40 | 139 | 6 |
| | | 1000 | 1.50 | 0.42 | 149 | 5 |
| | | 1500 | 1.89 | 0.52 | −173 | 4 |
| | | 2000 | 2.29 | 0.65 | −157 | 6 |
| 6.0 | 3.0 | 300 | 0.81 | 0.45 | 50 | 11 |
| | | 500 | 1.07 | 0.44 | 81 | 11 |
| | | 900 | 1.56 | 0.44 | 132 | 8 |
| | | 1000 | 1.70 | 0.45 | 142 | 7 |
| | | 1500 | 2.23 | 0.53 | −177 | 5 |
| | | 2000 | 2.72 | 0.67 | −158 | 6 |
| | 5.0 | 300 | 0.85 | 0.37 | 50 | 10 |
| | | 500 | 1.04 | 0.37 | 80 | 9 |
| | | 900 | 1.42 | 0.39 | 130 | 7 |
| | | 1000 | 1.52 | 0.40 | 141 | 6 |
| | | 1500 | 2.00 | 0.50 | −179 | 5 |
| | | 2000 | 2.43 | 0.65 | −159 | 6 |
| | 10 | 300 | 1.02 | 0.24 | 52 | 9 |
| | | 500 | 1.15 | 0.26 | 82 | 9 |
| | | 900 | 1.42 | 0.33 | 131 | 7 |
| | | 1000 | 1.50 | 0.35 | 142 | 6 |
| | | 1500 | 1.85 | 0.47 | −179 | 5 |
| | | 2000 | 2.25 | 0.61 | −159 | 5 |

**Table 1. MRF577T1 Common Emitter Noise Parameters**

| $V_{CE}$ (Volts) | $I_C$ (mA) | f (GHz) | $S_{11}$ | | $S_{21}$ | | $S_{12}$ | | $S_{22}$ | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | $\|S_{11}\|$ | $\angle\phi$ | $\|S_{21}\|$ | $\angle\phi$ | $\|S_{12}\|$ | $\angle\phi$ | $\|S_{22}\|$ | $\angle\phi$ |
| 3.0 | 3.0 | 0.10 | 0.852 | −47 | 9.09 | 149 | 0.061 | 65 | 0.881 | −25 |
| | | 0.20 | 0.758 | −84 | 7.13 | 126 | 0.095 | 49 | 0.708 | −41 |
| | | 0.30 | 0.687 | −108 | 5.60 | 112 | 0.112 | 41 | 0.575 | −50 |
| | | 0.40 | 0.649 | −125 | 4.52 | 101 | 0.121 | 37 | 0.490 | −56 |
| | | 0.50 | 0.622 | −138 | 3.79 | 93 | 0.127 | 35 | 0.434 | −60 |
| | | 0.60 | 0.588 | −148 | 3.20 | 87 | 0.131 | 35 | 0.384 | −60 |
| | | 0.70 | 0.581 | −157 | 2.81 | 82 | 0.135 | 3 | 0.357 | −63 |
| | | 0.80 | 0.580 | −164 | 2.48 | 77 | 0.140 | 35 | 0.342 | −65 |
| | | 0.90 | 0.574 | −170 | 2.25 | 72 | 0.144 | 37 | 0.325 | −68 |
| | | 1.00 | 0.572 | −175 | 2.05 | 68 | 0.149 | 38 | 0.315 | −70 |
| | | 1.50 | 0.578 | 163 | 1.46 | 50 | 0.183 | 45 | 0.297 | −86 |
| | | 2.00 | 0.591 | 146 | 1.16 | 36 | 0.233 | 49 | 0.308 | −103 |
| | | 2.50 | 0.609 | 131 | 0.99 | 25 | 0.298 | 49 | 0.330 | −122 |
| | | 3.00 | 0.617 | 118 | 0.87 | 17 | 0.374 | 45 | 0.351 | −140 |
| | | 4.00 | 0.643 | 94 | 0.75 | 5 | 0.519 | 32 | 0.406 | −176 |
| | 5.0 | 0.10 | 0.770 | −60 | 13.16 | 141 | 0.055 | 61 | 0.807 | −35 |
| | | 0.20 | 0.666 | −99 | 9.41 | 119 | 0.080 | 47 | 0.587 | −54 |
| | | 0.30 | 0.607 | −123 | 7.02 | 106 | 0.092 | 43 | 0.450 | −64 |
| | | 0.40 | 0.580 | −138 | 5.52 | 97 | 0.101 | 42 | 0.371 | −70 |
| | | 0.50 | 0.562 | −149 | 4.54 | 90 | 0.109 | 42 | 0.322 | −75 |
| | | 0.60 | 0.536 | −159 | 3.83 | 85 | 0.117 | 44 | 0.273 | −75 |
| | | 0.70 | 0.533 | −166 | 3.33 | 80 | 0.124 | 45 | 0.249 | −78 |
| | | 0.80 | 0.534 | −172 | 2.94 | 76 | 0.133 | 46 | 0.235 | −81 |
| | | 0.90 | 0.531 | −177 | 2.65 | 71 | 0.142 | 47 | 0.222 | −84 |
| | | 1.00 | 0.530 | 178 | 2.41 | 68 | 0.152 | 48 | 0.213 | −87 |
| | | 1.50 | 0.539 | 159 | 1.71 | 52 | 0.204 | 50 | 0.199 | −102 |
| | | 2.00 | 0.551 | 144 | 1.36 | 38 | 0.262 | 49 | 0.212 | −119 |
| | | 2.50 | 0.568 | 130 | 1.15 | 27 | 0.324 | 46 | 0.237 | −136 |
| | | 3.00 | 0.578 | 118 | 1.02 | 18 | 0.390 | 42 | 0.260 | −152 |
| | | 4.00 | 0.614 | 96 | 0.86 | 3 | 0.513 | 29 | 0.326 | 177 |
| | 10 | 0.10 | 0.629 | −83 | 19.46 | 130 | 0.044 | 56 | 0.663 | −53 |
| | | 0.20 | 0.551 | −123 | 12.13 | 109 | 0.060 | 49 | 0.426 | −75 |
| | | 0.30 | 0.522 | −143 | 8.57 | 98 | 0.072 | 50 | 0.315 | −88 |
| | | 0.40 | 0.513 | −155 | 6.58 | 91 | 0.083 | 52 | 0.259 | −97 |
| | | 0.50 | 0.505 | −163 | 5.35 | 86 | 0.096 | 54 | 0.227 | −103 |
| | | 0.60 | 0.489 | −171 | 4.50 | 82 | 0.108 | 56 | 0.183 | −108 |
| | | 0.70 | 0.490 | −177 | 3.89 | 78 | 0.121 | 57 | 0.168 | −113 |
| | | 0.80 | 0.492 | 178 | 3.43 | 74 | 0.134 | 57 | 0.159 | −118 |
| | | 0.90 | 0.491 | 174 | 3.08 | 71 | 0.148 | 58 | 0.152 | −122 |
| | | 1.00 | 0.491 | 170 | 2.80 | 68 | 0.161 | 58 | 0.148 | −127 |
| | | 1.50 | 0.501 | 154 | 1.96 | 53 | 0.228 | 55 | 0.147 | −144 |
| | | 2.00 | 0.513 | 140 | 1.56 | 40 | 0.293 | 50 | 0.163 | −156 |
| | | 2.50 | 0.528 | 127 | 1.32 | 30 | 0.354 | 44 | 0.190 | −168 |
| | | 3.00 | 0.536 | 116 | 1.17 | 20 | 0.414 | 38 | 0.209 | −179 |
| | | 4.00 | 0.578 | 96 | 0.99 | 4 | 0.516 | 25 | 0.270 | 159 |
| | 20 | 0.10 | 0.509 | −111 | 24.53 | 119 | 0.034 | 56 | 0.513 | −72 |
| | | 0.20 | 0.485 | −144 | 13.84 | 102 | 0.048 | 58 | 0.319 | −99 |
| | | 0.30 | 0.478 | −159 | 9.51 | 93 | 0.062 | 61 | 0.249 | −115 |
| | | 0.40 | 0.478 | −167 | 7.22 | 88 | 0.077 | 63 | 0.220 | −125 |
| | | 0.50 | 0.476 | −173 | 5.84 | 83 | 0.093 | 64 | 0.203 | −133 |
| | | 0.60 | 0.466 | 179 | 4.90 | 80 | 0.108 | 65 | 0.173 | −142 |
| | | 0.70 | 0.469 | 175 | 4.23 | 76 | 0.124 | 65 | 0.168 | −147 |
| | | 0.80 | 0.471 | 171 | 3.73 | 73 | 0.139 | 64 | 0.166 | −152 |
| | | 0.90 | 0.472 | 168 | 3.34 | 70 | 0.155 | 64 | 0.164 | −157 |
| | | 1.00 | 0.472 | 165 | 3.03 | 67 | 0.170 | 63 | 0.164 | −160 |
| | | 1.50 | 0.482 | 150 | 2.12 | 54 | 0.244 | 57 | 0.171 | −174 |
| | | 2.00 | 0.493 | 138 | 1.68 | 42 | 0.313 | 50 | 0.188 | 177 |
| | | 2.50 | 0.507 | 125 | 1.42 | 32 | 0.375 | 44 | 0.211 | 168 |
| | | 3.00 | 0.514 | 115 | 1.26 | 22 | 0.432 | 36 | 0.226 | 159 |
| | | 4.00 | 0.555 | 96 | 1.06 | 6 | 0.525 | 23 | 0.274 | 143 |

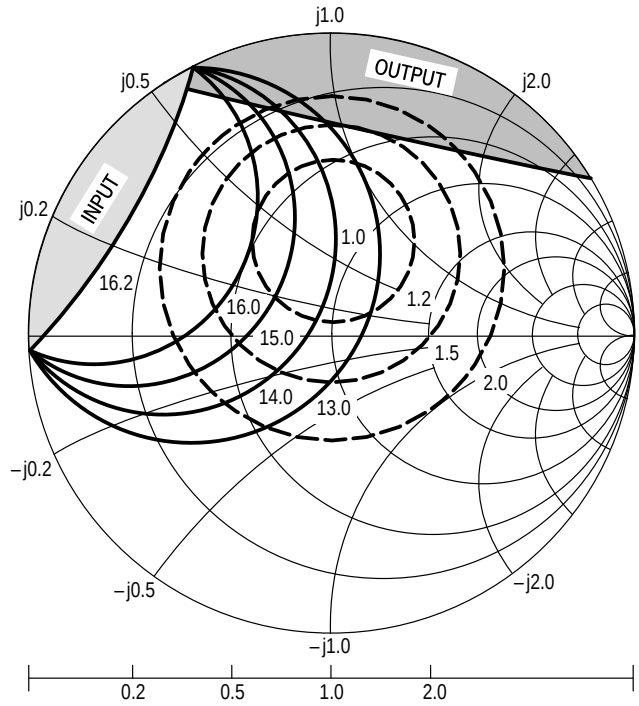
**Table 2. Common Emitter S–Parameters**

| $V_{CE}$ (Volts) | $I_C$ (mA) | f (GHz) | $S_{11}$ | | $S_{21}$ | | $S_{12}$ | | $S_{22}$ | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | $\|S_{11}\|$ | $\angle\phi$ | $\|S_{21}\|$ | $\angle\phi$ | $\|S_{12}\|$ | $\angle\phi$ | $\|S_{22}\|$ | $\angle\phi$ |
| 3.0 | 40 | 0.10 | 0.457 | −136 | 27.07 | 111 | 0.027 | 61 | 0.401 | −90 |
| | | 0.20 | 0.465 | −159 | 14.51 | 97 | 0.042 | 66 | 0.268 | −119 |
| | | 0.30 | 0.467 | −169 | 9.85 | 90 | 0.059 | 69 | 0.230 | −135 |
| | | 0.40 | 0.471 | −175 | 7.44 | 85 | 0.076 | 70 | 0.217 | −144 |
| | | 0.50 | 0.470 | −180 | 6.00 | 82 | 0.093 | 70 | 0.209 | −151 |
| | | 0.60 | 0.464 | 174 | 5.04 | 79 | 0.110 | 70 | 0.189 | −160 |
| | | 0.70 | 0.467 | 170 | 4.34 | 75 | 0.127 | 69 | 0.188 | −164 |
| | | 0.80 | 0.469 | 167 | 3.83 | 72 | 0.143 | 68 | 0.189 | −168 |
| | | 0.90 | 0.469 | 164 | 3.42 | 70 | 0.159 | 67 | 0.189 | −171 |
| | | 1.00 | 0.470 | 161 | 3.11 | 67 | 0.176 | 65 | 0.191 | −174 |
| | | 1.50 | 0.480 | 148 | 2.17 | 54 | 0.253 | 58 | 0.200 | 174 |
| | | 2.00 | 0.490 | 136 | 1.71 | 42 | 0.323 | 51 | 0.215 | 166 |
| | | 2.50 | 0.504 | 124 | 1.45 | 32 | 0.386 | 43 | 0.237 | 159 |
| | | 3.00 | 0.510 | 114 | 1.29 | 23 | 0.443 | 36 | 0.249 | 150 |
| | | 4.00 | 0.549 | 95 | 1.09 | 6 | 0.532 | 22 | 0.291 | 136 |
| 6.0 | 3.0 | 0.10 | 0.872 | −42 | 9.23 | 151 | 0.049 | 68 | 0.903 | −20 |
| | | 0.20 | 0.776 | −76 | 7.48 | 130 | 0.079 | 53 | 0.757 | −33 |
| | | 0.30 | 0.695 | −100 | 6.01 | 115 | 0.095 | 45 | 0.635 | −40 |
| | | 0.40 | 0.647 | −117 | 4.91 | 105 | 0.104 | 40 | 0.555 | −45 |
| | | 0.50 | 0.612 | −131 | 4.14 | 97 | 0.110 | 38 | 0.500 | −47 |
| | | 0.60 | 0.572 | −141 | 3.51 | 90 | 0.114 | 38 | 0.454 | −47 |
| | | 0.70 | 0.56 | −151 | 3.09 | 85 | 0.118 | 38 | 0.427 | −49 |
| | | 0.80 | 0.558 | −158 | 2.72 | 80 | 0.123 | 38 | 0.412 | −50 |
| | | 0.90 | 0.549 | −165 | 2.48 | 75 | 0.127 | 40 | 0.395 | −52 |
| | | 1.00 | 0.544 | −171 | 2.26 | 71 | 0.132 | 42 | 0.384 | −54 |
| | | 1.50 | 0.548 | 167 | 1.60 | 53 | 0.163 | 49 | 0.360 | −66 |
| | | 2.00 | 0.562 | 149 | 1.27 | 39 | 0.209 | 54 | 0.360 | −82 |
| | | 2.50 | 0.581 | 133 | 1.06 | 27 | 0.271 | 54 | 0.366 | −99 |
| | | 3.00 | 0.593 | 120 | 0.93 | 18 | 0.346 | 51 | 0.375 | −117 |
| | | 4.00 | 0.628 | 96 | 0.77 | 6 | 0.498 | 38 | 0.405 | −155 |
| | 5.0 | 0.10 | 0.797 | −52 | 13.58 | 145 | 0.045 | 64 | 0.840 | −28 |
| | | 0.20 | 0.678 | −89 | 10.10 | 122 | 0.068 | 51 | 0.642 | −43 |
| | | 0.30 | 0.601 | −113 | 7.68 | 109 | 0.080 | 46 | 0.509 | −50 |
| | | 0.40 | 0.562 | −130 | 6.10 | 100 | 0.089 | 45 | 0.430 | −54 |
| | | 0.50 | 0.537 | −141 | 5.05 | 93 | 0.096 | 45 | 0.380 | −56 |
| | | 0.60 | 0.505 | −152 | 4.25 | 87 | 0.103 | 46 | 0.335 | −55 |
| | | 0.70 | 0.499 | −160 | 3.71 | 82 | 0.110 | 47 | 0.311 | −56 |
| | | 0.80 | 0.498 | −166 | 3.27 | 78 | 0.118 | 48 | 0.296 | −58 |
| | | 0.90 | 0.492 | −172 | 2.95 | 74 | 0.127 | 50 | 0.282 | −59 |
| | | 1.00 | 0.49 | −177 | 2.68 | 70 | 0.135 | 51 | 0.272 | −61 |
| | | 1.50 | 0.498 | 163 | 1.89 | 54 | 0.183 | 53 | 0.249 | −72 |
| | | 2.00 | 0.512 | 147 | 1.49 | 40 | 0.237 | 53 | 0.249 | −87 |
| | | 2.50 | 0.533 | 132 | 1.25 | 29 | 0.295 | 51 | 0.256 | −105 |
| | | 3.00 | 0.547 | 120 | 1.10 | 19 | 0.359 | 46 | 0.266 | −121 |
| | | 4.00 | 0.594 | 98 | 0.90 | 4 | 0.488 | 34 | 0.309 | −158 |
| | 10 | 0.100 | 0.658 | −71 | 20.57 | 134 | 0.038 | 60 | 0.710 | −42 |
| | | 0.200 | 0.542 | −111 | 13.36 | 112 | 0.053 | 52 | 0.473 | −58 |
| | | 0.300 | 0.492 | −132 | 9.57 | 101 | 0.065 | 52 | 0.353 | −65 |
| | | 0.400 | 0.472 | −146 | 7.39 | 94 | 0.075 | 54 | 0.288 | −70 |
| | | 0.500 | 0.46 | −155 | 6.02 | 88 | 0.086 | 56 | 0.250 | −72 |
| | | 0.600 | 0.438 | −164 | 5.06 | 84 | 0.097 | 58 | 0.207 | −70 |
| | | 0.700 | 0.437 | −171 | 4.38 | 80 | 0.109 | 59 | 0.189 | −72 |
| | | 0.800 | 0.438 | −176 | 3.86 | 76 | 0.120 | 59 | 0.176 | −74 |
| | | 0.900 | 0.437 | 179 | 3.46 | 73 | 0.132 | 59 | 0.166 | −76 |
| | | 1.000 | 0.437 | 175 | 3.14 | 69 | 0.144 | 59 | 0.158 | −78 |
| | | 1.500 | 0.448 | 158 | 2.19 | 55 | 0.205 | 57 | 0.140 | −91 |
| | | 2.000 | 0.463 | 144 | 1.73 | 42 | 0.265 | 53 | 0.143 | −107 |
| | | 2.500 | 0.482 | 130 | 1.45 | 31 | 0.323 | 48 | 0.155 | −126 |
| | | 3.000 | 0.496 | 119 | 1.28 | 21 | 0.381 | 42 | 0.165 | −141 |
| | | 4.000 | 0.549 | 99 | 1.05 | 5 | 0.488 | 30 | 0.216 | −173 |

**Table 2. Common Emitter S–Parameters (continued)**

| $V_{CE}$ (Volts) | $I_C$ (mA) | f (GHz) | $S_{11}$ | | $S_{21}$ | | $S_{12}$ | | $S_{22}$ | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | $\|S_{11}\|$ | $\angle\phi$ | $\|S_{21}\|$ | $\angle\phi$ | $\|S_{12}\|$ | $\angle\phi$ | $\|S_{22}\|$ | $\angle\phi$ |
| 6.0 | 20 | 0.10 | 0.521 | −94 | 26.70 | 123 | 0.030 | 59 | 0.555 | −56 |
| | | 0.20 | 0.448 | −131 | 15.53 | 104 | 0.043 | 58 | 0.335 | −74 |
| | | 0.30 | 0.426 | −149 | 10.76 | 96 | 0.056 | 62 | 0.243 | −82 |
| | | 0.40 | 0.42 | −159 | 8.19 | 90 | 0.070 | 64 | 0.199 | −88 |
| | | 0.50 | 0.415 | −166 | 6.63 | 85 | 0.083 | 65 | 0.172 | −92 |
| | | 0.60 | 0.401 | −175 | 5.56 | 82 | 0.097 | 66 | 0.132 | −93 |
| | | 0.70 | 0.403 | −180 | 4.80 | 78 | 0.111 | 66 | 0.121 | −96 |
| | | 0.80 | 0.405 | 176 | 4.23 | 75 | 0.125 | 65 | 0.112 | −100 |
| | | 0.90 | 0.405 | 173 | 3.78 | 72 | 0.139 | 65 | 0.106 | −104 |
| | | 1.00 | 0.406 | 169 | 3.43 | 69 | 0.153 | 64 | 0.101 | −107 |
| | | 1.50 | 0.42 | 154 | 2.38 | 56 | 0.220 | 59 | 0.094 | −125 |
| | | 2.00 | 0.434 | 141 | 1.87 | 44 | 0.284 | 53 | 0.105 | −141 |
| | | 2.50 | 0.454 | 128 | 1.57 | 33 | 0.343 | 47 | 0.125 | −157 |
| | | 3.00 | 0.466 | 118 | 1.39 | 23 | 0.399 | 40 | 0.137 | −169 |
| | | 4.00 | 0.52 | 99 | 1.15 | 6 | 0.495 | 28 | 0.189 | 167 |
| | 40 | 0.10 | 0.438 | −116 | 30.08 | 114 | 0.025 | 61 | 0.423 | −68 |
| | | 0.20 | 0.407 | −147 | 16.43 | 99 | 0.039 | 65 | 0.245 | −86 |
| | | 0.30 | 0.400 | −160 | 11.20 | 92 | 0.053 | 68 | 0.179 | −96 |
| | | 0.40 | 0.400 | −168 | 8.48 | 87 | 0.068 | 70 | 0.152 | −103 |
| | | 0.50 | 0.398 | −173 | 6.84 | 83 | 0.083 | 70 | 0.135 | −108 |
| | | 0.60 | 0.389 | 179 | 5.74 | 80 | 0.098 | 70 | 0.100 | −113 |
| | | 0.70 | 0.392 | 175 | 4.95 | 77 | 0.113 | 69 | 0.094 | −117 |
| | | 0.80 | 0.395 | 172 | 4.35 | 74 | 0.128 | 69 | 0.090 | −123 |
| | | 0.90 | 0.396 | 169 | 3.89 | 71 | 0.143 | 68 | 0.087 | −127 |
| | | 1.00 | 0.397 | 165 | 3.53 | 68 | 0.157 | 67 | 0.085 | −131 |
| | | 1.50 | 0.411 | 152 | 2.44 | 55 | 0.227 | 60 | 0.088 | −149 |
| | | 2.00 | 0.426 | 139 | 1.92 | 44 | 0.293 | 53 | 0.103 | −161 |
| | | 2.50 | 0.446 | 127 | 1.61 | 33 | 0.352 | 47 | 0.126 | −173 |
| | | 3.00 | 0.459 | 117 | 1.42 | 24 | 0.408 | 40 | 0.139 | 176 |
| | | 4.00 | 0.512 | 99 | 1.17 | 7 | 0.500 | 27 | 0.190 | 156 |

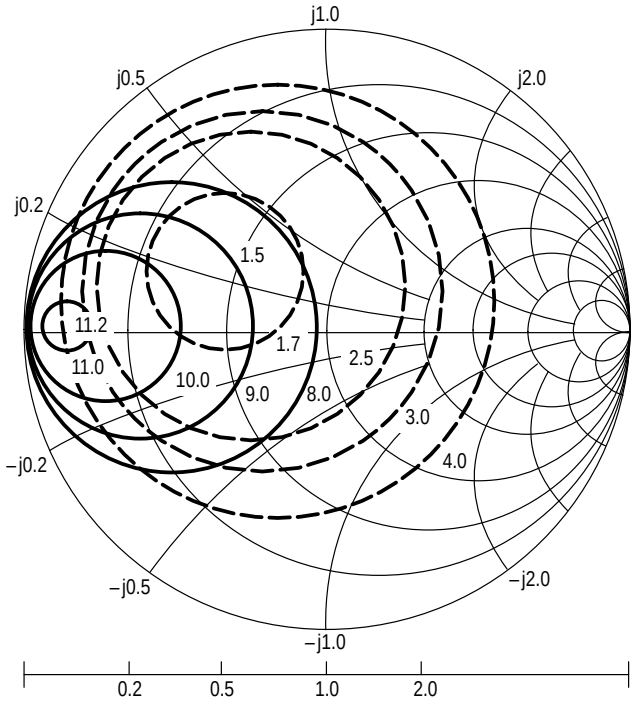
**Table 2. Common Emitter S–Parameters (continued)**




$V_{CE}$ = 3.0 V
$I_C$ = 5.0 mA
— Potentially Unstable

| f (MHz) | NF OPT (dB) | ΓMS NF OPT | $R_N$ | K |
|---|---|---|---|---|
| 500 | 1.03 | 0.34 ∠ 88° | 8 | 0.69 |

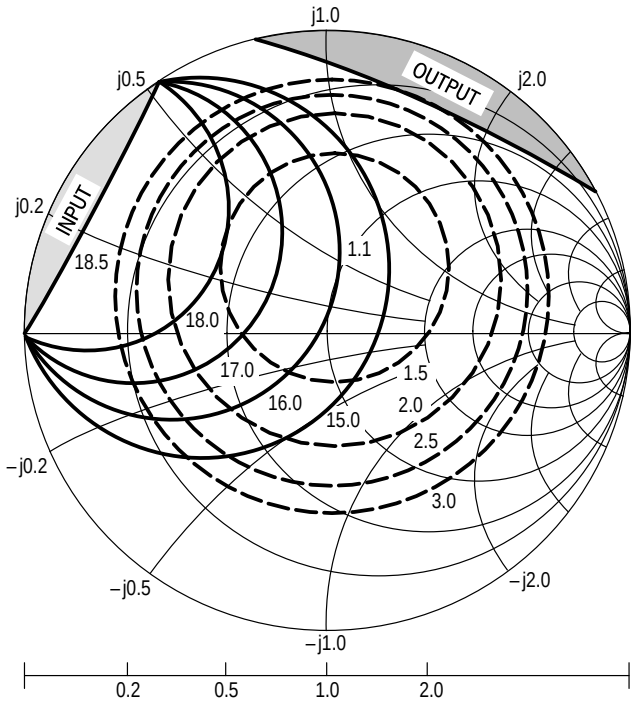
**Figure 11. MRF577T1 Constant Gain and Noise Figure Contours**




$V_{CE}$ = 3.0 V
$I_C$ = 5.0 mA

| f (MHz) | NF OPT (dB) | ΓMS NF OPT | $R_N$ | K |
|---|---|---|---|---|
| 1000 | 1.47 | 0.42 ∠ 149° | 5 | 1.02 |

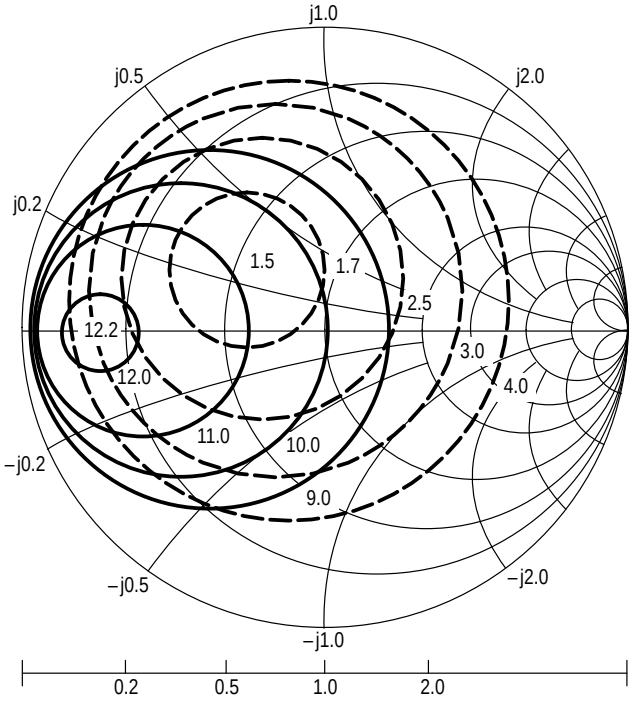
**Figure 12. MRF577T1 Constant Gain and Noise Figure Contours**




$V_{CE}$ = 6.0 V
$I_C$ = 10 mA
— Potentially Unstable

| f (MHz) | NF OPT (dB) | ΓMS NF OPT | $R_N$ | K |
|---|---|---|---|---|
| 500 | 1.15 | 0.26 ∠ 82° | 9 | 0.86 |

**Figure 13. MRF577T1 Constant Gain and Noise Figure Contours**

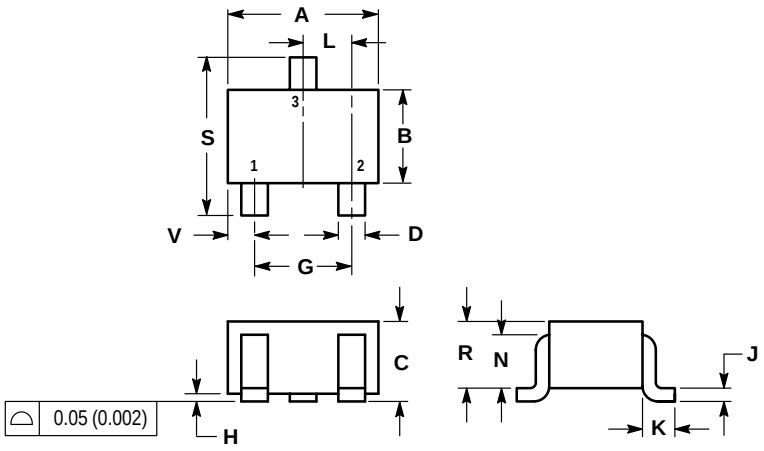



$V_{CE}$ = 6.0 V
$I_C$ = 10 mA

| f (MHz) | NF OPT (dB) | ΓMS NF OPT | $R_N$ | K |
|---|---|---|---|---|
| 1000 | 1.49 | 0.35 ∠ 142° | 6 | 1.04 |

**Figure 14. MRF577T1 Constant Gain and Noise Figure Contours**

## PACKAGE DIMENSIONS




NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

| | INCHES | | MILLIMETERS | |
|---|---|---|---|---|
| DIM | MIN | MAX | MIN | MAX |
| A | 0.071 | 0.087 | 1.80 | 2.20 |
| B | 0.045 | 0.053 | 1.15 | 1.35 |
| C | 0.035 | 0.049 | 0.90 | 1.25 |
| D | 0.012 | 0.016 | 0.30 | 0.40 |
| G | 0.047 | 0.055 | 1.20 | 1.40 |
| H | 0.000 | 0.004 | 0.00 | 0.10 |
| J | 0.004 | 0.010 | 0.10 | 0.25 |
| K | 0.017 REF | | 0.425 REF | |
| L | 0.026 BSC | | 0.650 BSC | |
| N | 0.028 REF | | 0.700 REF | |
| R | 0.031 | 0.039 | 0.80 | 1.00 |
| S | 0.079 | 0.087 | 2.00 | 2.20 |
| V | 0.012 | 0.016 | 0.30 | 0.40 |

STYLE 3:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

**CASE 419–02**
**ISSUE J**

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