AUK Semiconductor

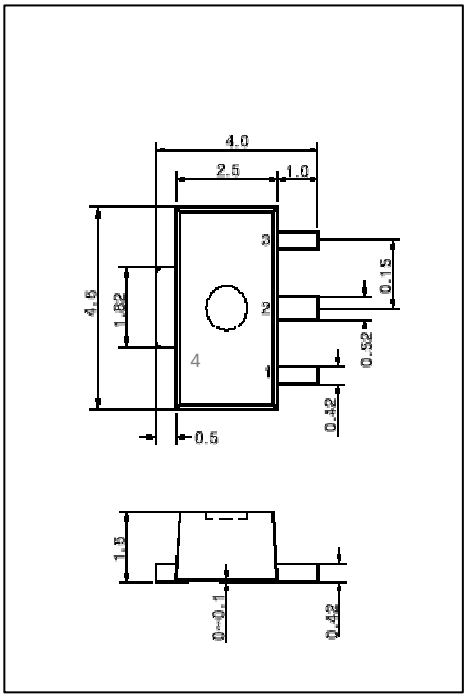
THN6501F

SiGe NPN Transistor

☐ Application

LNA and wide band amplifier up to GHz range

SOT−89 Unit in mm



☐ Features

o Low Noise Figure

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

o High Gain

MAG = 11.5 dB at f = 1 GHz, V_{CE} = 10 V, I_C = 20 mA

o High Transition Frequency

f_T = 7 GHz at f = 1 GHz, V_{CE} = 10 V, I_C = 30 mA

☐ h_{FE} Classification

Marking	AB1	AB2
h_{FE}	125 to 300	80 to 160

Pin Configuration

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

☐ Absolute Maximum Ratings

Symbol	Parameter	Ratings	Unit
V_{CBO}	Collector to Base Breakdown Voltage	25	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	400	mW
T_{STG}	Storage Temperature	-65 ~ 150	℃
T_J	Operating Junction Temperature	150	℃

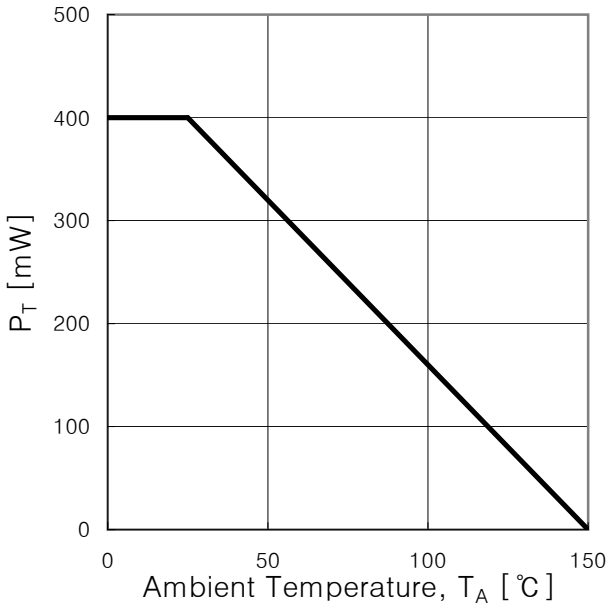
☐ Electrical Characteristics (T_A = 25 ℃)

Symbol	Parameter	Test Condition	Value			Unit
			Min.	Typ.	Max.	
I_{CBO}	Collector Cut-off Current	V_{CB} = 10V, I_E = 0 mA			0.5	uA
I_{CEO}		V_{CE} = 12uA, I_B = 0 mA			5	uA
I_{EBO}	Emitter Cut-off Current	V_{EB} = 1V, I_C = 0 mA			0.5	uA
h_{FE}	DC Current Gain	V_{CE} = 3V, Ic = 7mA	80	-	300	
f_T	Transition Frequency	V_{CE} = 10V, Ic = 20mA		6.7		GHz
C_{CB}	Collector to Base Capacitance	V_{CB} = 10V, f = 1MHz		1.02		pF

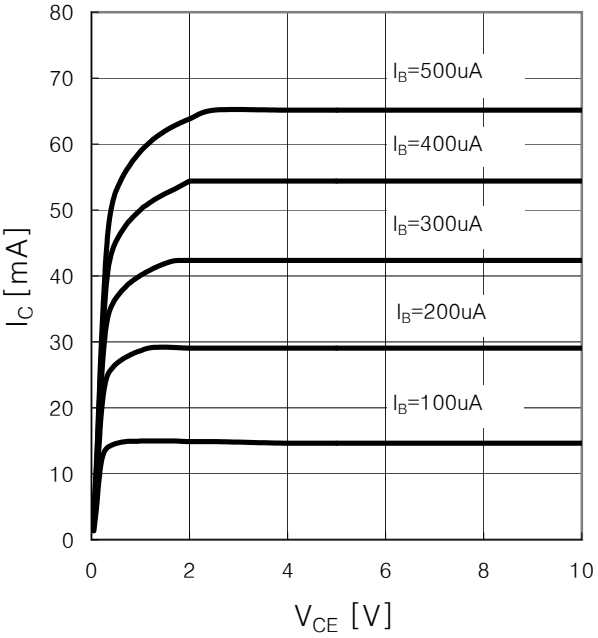
☐ Performance Characteristics

Symbol	Parameter	Test Condition	Value			Unit
			Min.	Typ.	Max.	
$\|S_{21}\|^2$	Insertion Power Gain	V_{CE} = 3 V, I_C = 20 mA, f = 1 GHz		9.5		dB
		V_{CE} = 10 V, I_C = 20 mA, f = 1 GHz		9.8		
MAG	Maximum Available Gain	V_{CE} = 3 V, I_C = 20 mA, f = 1 GHz		11.0		dB
		V_{CE} = 10 V, I_C = 20 mA, f = 1 GHz		11.5		
NFmin	Minimum Noise Figure	V_{CE} = 3 V, I_C = 7 mA, f = 1 GHz		1.0		dB
rn	Noise Resistance	V_{CE} = 3 V, I_C = 7 mA, f = 1 GHz		0.056		Ω

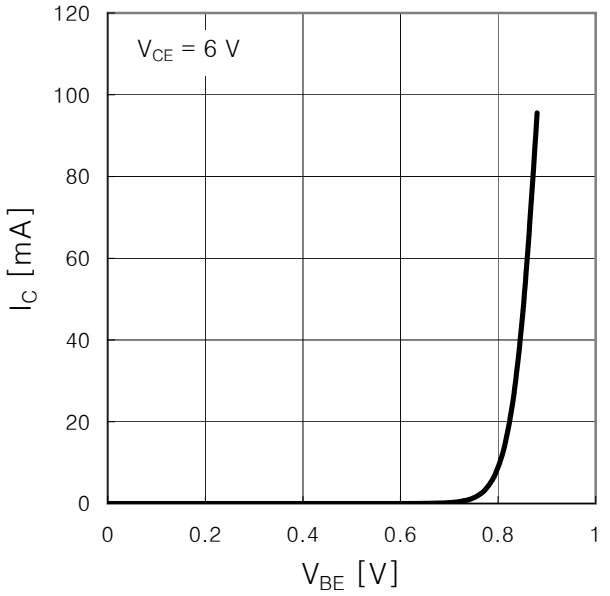
Total Power Dissipation P_T vs. T_A



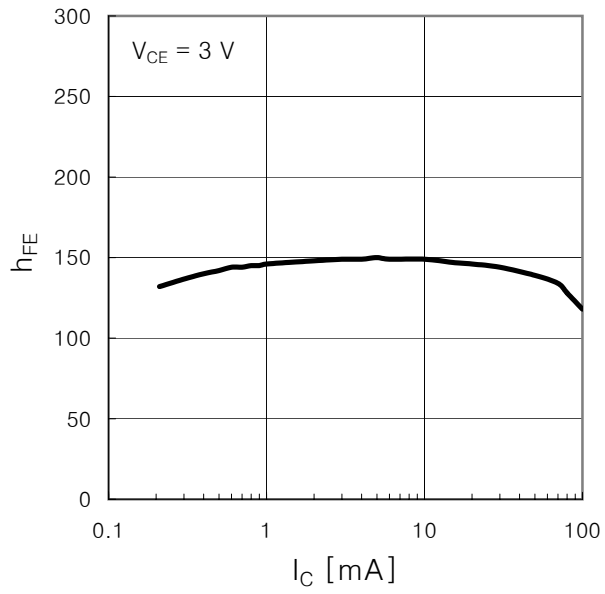
I_C vs. V_{CE}



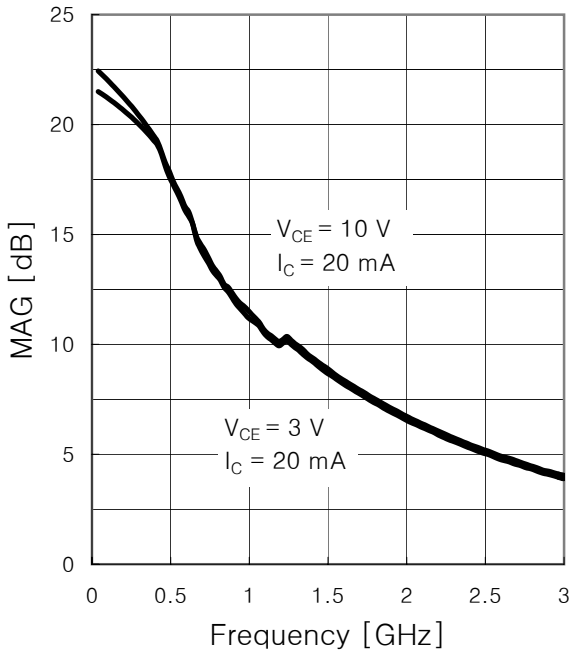
I_C vs. V_{BE}



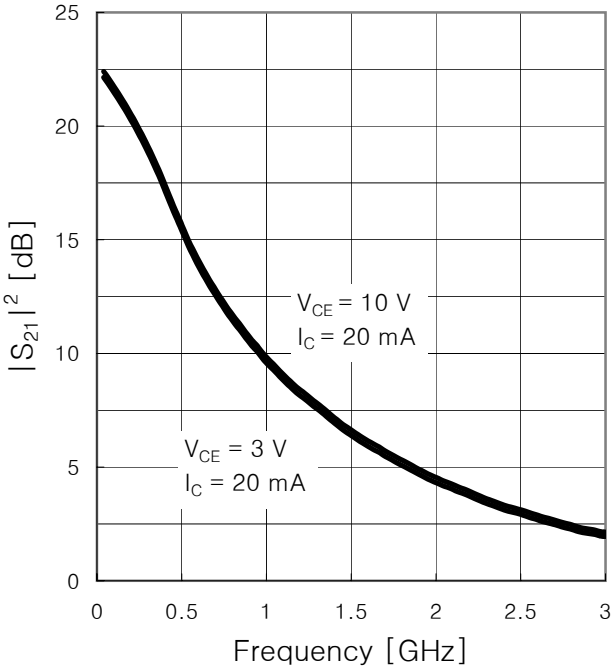
h_{FE} vs. I_C



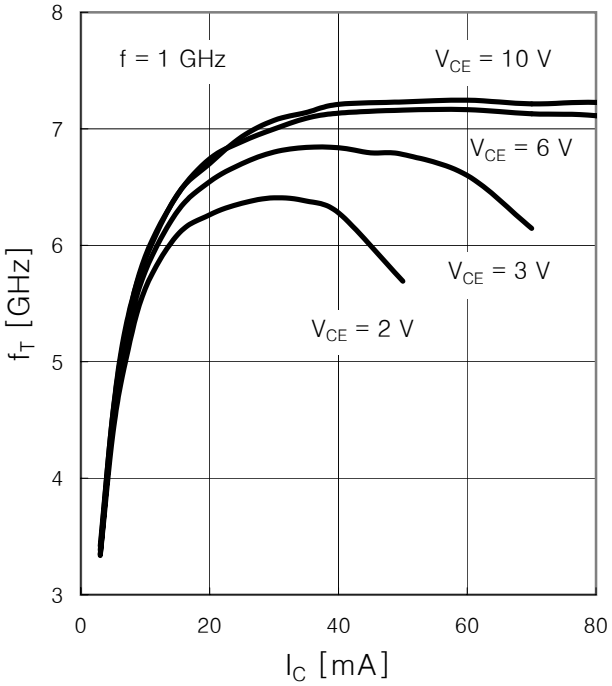
Maximum Available Gain, MAG vs. Frequency



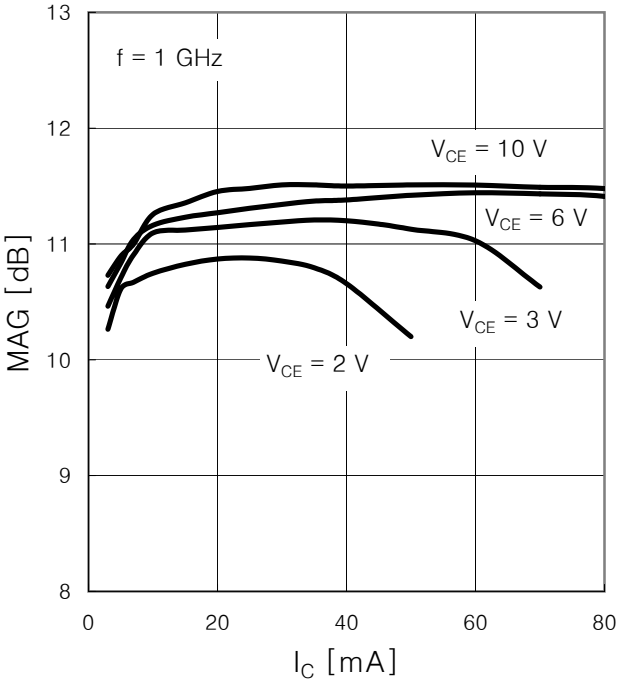
Insertion Power Gain, $|S_{21}|^2$ vs. Frequency



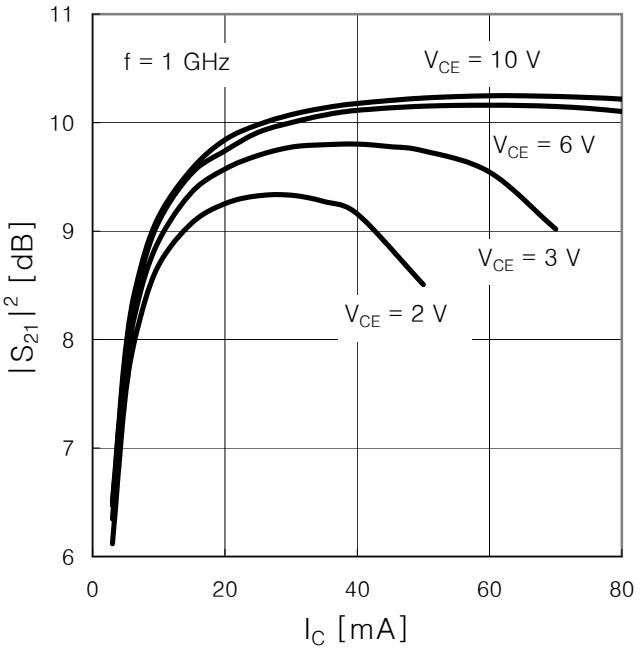
Transition Frequency : f_T vs. I_C



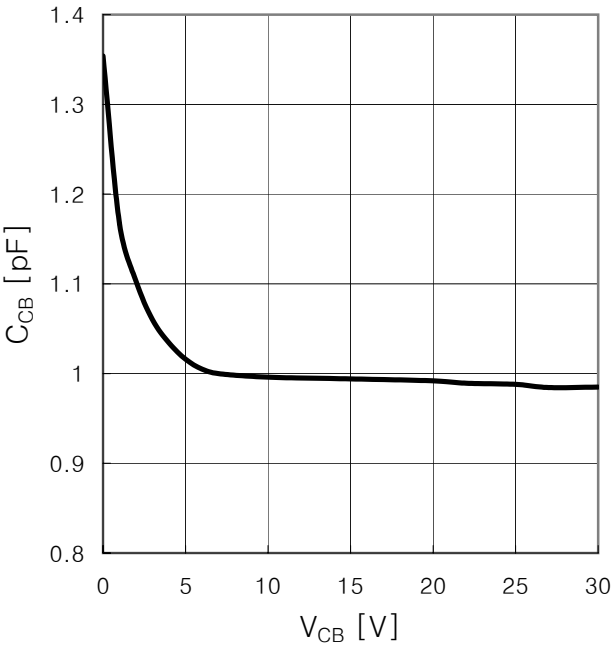
Maximum Available Gain, MAG vs. I_C



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

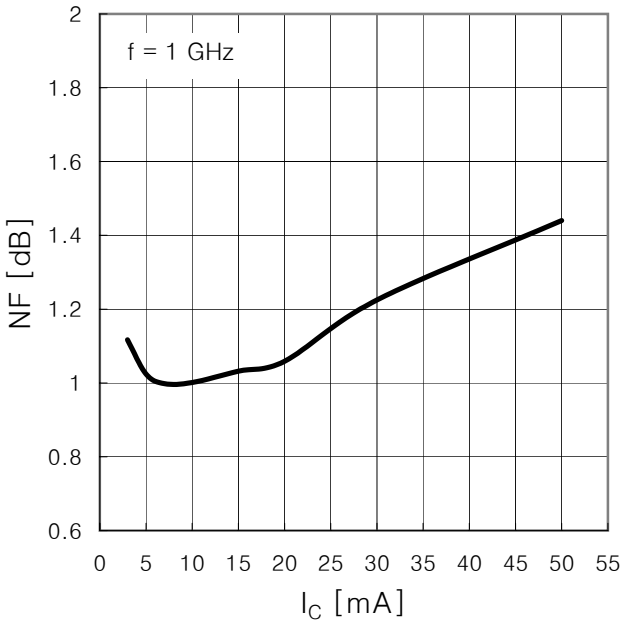


C_{CB} vs. V_{CB}



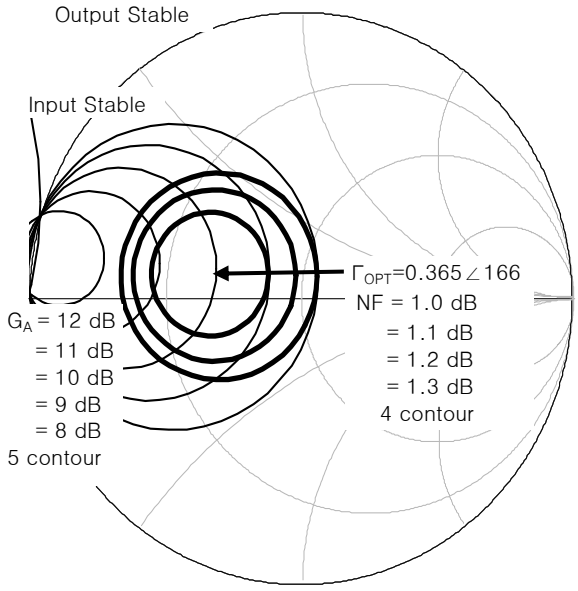
NF vs. I_C

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



☐ Common Emitter S-Parameter Data

V_{CE} = 3 V, I_C = 3 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.535 / -126.860	4.623 / 90.242	0.113 / 30.098	0.519 / -78.672
600.0MHz	0.481 / -155.932	3.291 / 70.909	0.119 / 28.282	0.461 / -93.816
800.0MHz	0.466 / -178.376	2.553 / 55.086	0.128 / 29.366	0.441 / -105.650
1.000GHz	0.460 / 162.621	2.077 / 41.312	0.141 / 33.454	0.450 / -116.866
1.200GHz	0.467 / 146.363	1.755 / 29.743	0.162 / 36.049	0.473 / -124.201
1.400GHz	0.483 / 130.558	1.525 / 18.158	0.193 / 36.242	0.502 / -134.740
1.600GHz	0.499 / 116.523	1.345 / 8.371	0.229 / 34.529	0.525 / -143.454
1.800GHz	0.513 / 103.047	1.210 / -0.630	0.269 / 30.485	0.548 / -151.312
2.000GHz	0.529 / 91.064	1.097 / -8.614	0.311 / 25.926	0.564 / -159.943
2.200GHz	0.542 / 79.057	1.013 / -15.861	0.356 / 20.068	0.578 / -168.554
2.400GHz	0.546 / 68.412	0.942 / -22.032	0.402 / 13.954	0.590 / -176.882
2.600GHz	0.553 / 57.864	0.895 / -28.440	0.446 / 6.798	0.590 / 174.361
2.800GHz	0.555 / 47.549	0.857 / -33.831	0.487 / -0.571	0.585 / 167.815
3.000GHz	0.551 / 38.457	0.834 / -38.865	0.532 / -7.519	0.582 / 159.070

V_{CE} = 3 V, I_C = 5 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.451 / -142.730	5.604 / 85.545	0.096 / 37.506	0.409 / -89.423
600.0MHz	0.415 / -169.845	3.899 / 68.616	0.115 / 38.908	0.366 / -103.101
800.0MHz	0.408 / 169.574	2.998 / 54.558	0.135 / 39.697	0.358 / -113.965
1.000GHz	0.406 / 152.142	2.428 / 42.074	0.160 / 39.915	0.372 / -124.317
1.200GHz	0.410 / 137.227	2.056 / 31.273	0.188 / 38.780	0.395 / -129.827
1.400GHz	0.424 / 122.642	1.789 / 20.294	0.219 / 35.383	0.424 / -139.357
1.600GHz	0.438 / 109.793	1.584 / 10.754	0.253 / 31.265	0.446 / -146.987
1.800GHz	0.451 / 97.484	1.431 / 1.720	0.290 / 26.587	0.469 / -153.773
2.000GHz	0.463 / 86.932	1.303 / -6.584	0.326 / 21.455	0.487 / -161.488
2.200GHz	0.476 / 76.002	1.206 / -14.380	0.363 / 15.736	0.503 / -169.191
2.400GHz	0.482 / 66.321	1.122 / -21.313	0.402 / 9.754	0.514 / -176.850
2.600GHz	0.486 / 56.561	1.063 / -28.641	0.441 / 3.044	0.520 / 175.191
2.800GHz	0.494 / 47.072	1.010 / -34.827	0.479 / -3.511	0.518 / 169.157
3.000GHz	0.491 / 38.962	0.974 / -40.535	0.516 / -10.137	0.518 / 160.952

V_{CE} = 3 V, I_C = 7 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.407 / -154.064	6.155 / 82.795	0.089 / 45.076	0.343 / -97.816
600.0MHz	0.386 / -178.966	4.236 / 67.305	0.114 / 45.946	0.316 / -110.797
800.0MHz	0.382 / 161.752	3.244 / 54.210	0.142 / 44.568	0.315 / -120.696
1.000GHz	0.383 / 145.455	2.625 / 42.451	0.172 / 42.935	0.332 / -130.055
1.200GHz	0.385 / 130.585	2.223 / 32.188	0.202 / 39.613	0.354 / -134.687
1.400GHz	0.399 / 117.209	1.934 / 21.544	0.235 / 34.968	0.384 / -143.255
1.600GHz	0.410 / 104.999	1.715 / 12.205	0.267 / 30.189	0.404 / -150.412
1.800GHz	0.421 / 93.233	1.554 / 3.306	0.303 / 24.860	0.426 / -156.539
2.000GHz	0.431 / 83.441	1.419 / -4.991	0.336 / 19.357	0.443 / -163.534
2.200GHz	0.442 / 72.959	1.318 / -12.906	0.371 / 13.692	0.458 / -170.757
2.400GHz	0.445 / 64.006	1.227 / -20.136	0.406 / 7.553	0.470 / -177.731
2.600GHz	0.452 / 55.347	1.163 / -27.574	0.442 / 0.934	0.476 / 174.582
2.800GHz	0.456 / 45.896	1.105 / -34.240	0.476 / -5.564	0.474 / 169.105
3.000GHz	0.455 / 37.914	1.065 / -40.404	0.508 / -12.014	0.479 / 161.420

V_{CE} = 3 V, I_C = 10 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.382 / -164.929	6.619 / 80.392	0.086 / 52.273	0.291 / -107.121
600.0MHz	0.367 / 172.127	4.521 / 66.190	0.119 / 50.620	0.275 / -119.159
800.0MHz	0.365 / 154.139	3.453 / 53.958	0.148 / 49.014	0.280 / -127.808
1.000GHz	0.367 / 139.294	2.789 / 42.804	0.185 / 45.069	0.300 / -136.635
1.200GHz	0.369 / 124.793	2.362 / 32.989	0.212 / 40.294	0.320 / -139.564
1.400GHz	0.379 / 112.077	2.058 / 22.677	0.249 / 34.873	0.352 / -148.091
1.600GHz	0.389 / 100.220	1.828 / 13.599	0.281 / 29.254	0.374 / -154.363
1.800GHz	0.397 / 89.130	1.659 / 4.806	0.313 / 23.444	0.393 / -159.932
2.000GHz	0.406 / 79.398	1.517 / -3.424	0.345 / 17.675	0.408 / -166.300
2.200GHz	0.415 / 69.683	1.410 / -11.307	0.380 / 11.440	0.421 / -173.057
2.400GHz	0.415 / 61.118	1.315 / -18.683	0.412 / 5.712	0.433 / -179.506
2.600GHz	0.421 / 52.855	1.248 / -26.222	0.444 / -0.915	0.438 / 173.164
2.800GHz	0.425 / 43.780	1.187 / -33.056	0.476 / -7.560	0.437 / 168.443
3.000GHz	0.425 / 36.753	1.143 / -39.624	0.508 / -13.734	0.439 / 161.050

V_{CE} = 3 V, I_C = 15 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.361 / -175.456	7.028 / 78.207	0.085 / 58.207	0.247 / -118.061
600.0MHz	0.356 / 163.903	4.775 / 65.242	0.120 / 56.273	0.246 / -128.219
800.0MHz	0.357 / 147.054	3.642 / 53.710	0.155 / 51.611	0.255 / -135.822
1.000GHz	0.358 / 133.033	2.937 / 43.159	0.191 / 46.651	0.276 / -143.406
1.200GHz	0.359 / 119.279	2.487 / 33.731	0.227 / 40.833	0.298 / -145.651
1.400GHz	0.370 / 106.737	2.167 / 23.697	0.259 / 34.447	0.326 / -153.422
1.600GHz	0.377 / 95.250	1.925 / 14.920	0.293 / 28.739	0.345 / -159.011
1.800GHz	0.381 / 84.471	1.749 / 6.255	0.326 / 22.410	0.366 / -163.722
2.000GHz	0.388 / 75.243	1.601 / -1.861	0.357 / 16.377	0.377 / -169.504
2.200GHz	0.394 / 65.811	1.491 / -9.736	0.388 / 9.790	0.390 / -175.982
2.400GHz	0.393 / 57.813	1.394 / -16.965	0.419 / 3.624	0.400 / 177.773
2.600GHz	0.396 / 49.584	1.323 / -24.750	0.449 / -2.748	0.405 / 170.931
2.800GHz	0.396 / 41.197	1.258 / -31.729	0.478 / -9.373	0.402 / 166.830
3.000GHz	0.395 / 34.664	1.216 / -38.324	0.508 / -15.442	0.404 / 159.682

V_{CE} = 3 V, I_C = 20 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.357 / 178.303	7.230 / 77.060	0.087 / 62.363	0.230 / -126.272
600.0MHz	0.351 / 159.117	4.901 / 64.668	0.125 / 57.526	0.230 / -134.981
800.0MHz	0.355 / 143.404	3.733 / 53.600	0.159 / 53.206	0.242 / -140.725
1.000GHz	0.356 / 129.543	3.010 / 43.304	0.196 / 47.521	0.266 / -148.123
1.200GHz	0.356 / 115.936	2.550 / 34.083	0.233 / 41.820	0.287 / -149.581
1.400GHz	0.366 / 103.598	2.223 / 24.233	0.266 / 34.668	0.316 / -156.670
1.600GHz	0.371 / 92.279	1.974 / 15.625	0.300 / 28.355	0.333 / -161.725
1.800GHz	0.377 / 81.959	1.793 / 7.123	0.333 / 22.083	0.351 / -166.401
2.000GHz	0.381 / 72.953	1.644 / -0.911	0.364 / 15.501	0.364 / -172.140
2.200GHz	0.387 / 63.316	1.533 / -8.804	0.396 / 9.261	0.373 / -178.295
2.400GHz	0.383 / 55.716	1.432 / -16.063	0.424 / 2.965	0.384 / 175.812
2.600GHz	0.386 / 47.765	1.361 / -23.814	0.456 / -3.534	0.387 / 169.312
2.800GHz	0.385 / 39.617	1.297 / -30.894	0.480 / -10.291	0.384 / 165.038
3.000GHz	0.382 / 33.280	1.252 / -37.417	0.511 / -16.596	0.384 / 158.574

V_{CE} = 3 V, I_C = 30 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.355 / 170.872	7.418 / 75.720	0.083 / 65.730	0.211 / -135.332
600.0MHz	0.352 / 154.095	5.020 / 64.034	0.124 / 60.456	0.218 / -141.809
800.0MHz	0.355 / 139.143	3.818 / 53.376	0.165 / 53.918	0.231 / -147.215
1.000GHz	0.357 / 125.600	3.081 / 43.395	0.203 / 48.839	0.257 / -153.811
1.200GHz	0.357 / 112.473	2.605 / 34.384	0.239 / 41.459	0.276 / -154.698
1.400GHz	0.366 / 100.592	2.272 / 24.768	0.274 / 34.692	0.306 / -160.803
1.600GHz	0.371 / 89.682	2.018 / 16.301	0.307 / 28.173	0.323 / -165.635
1.800GHz	0.375 / 78.965	1.836 / 7.873	0.340 / 21.572	0.338 / -169.784
2.000GHz	0.375 / 70.021	1.683 / -0.141	0.371 / 14.630	0.349 / -174.912
2.200GHz	0.381 / 61.030	1.570 / -7.908	0.401 / 8.240	0.360 / 178.887
2.400GHz	0.377 / 53.284	1.467 / -15.150	0.429 / 2.029	0.368 / 173.172
2.600GHz	0.378 / 45.304	1.396 / -22.881	0.460 / -4.846	0.371 / 166.904
2.800GHz	0.377 / 37.593	1.331 / -29.888	0.485 / -11.208	0.365 / 163.168
3.000GHz	0.371 / 30.935	1.286 / -36.488	0.514 / -17.672	0.364 / 156.408

V_{CE} = 3 V, I_C = 35 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.356 / 168.413	7.446 / 75.310	0.087 / 64.912	0.207 / -139.463
600.0MHz	0.355 / 152.550	5.038 / 63.806	0.129 / 61.179	0.217 / -144.596
800.0MHz	0.358 / 138.053	3.832 / 53.257	0.167 / 54.379	0.231 / -149.937
1.000GHz	0.360 / 124.582	3.089 / 43.375	0.204 / 48.249	0.257 / -155.307
1.200GHz	0.359 / 111.585	2.616 / 34.454	0.240 / 41.731	0.273 / -155.721
1.400GHz	0.368 / 99.695	2.279 / 24.866	0.277 / 34.427	0.302 / -161.848
1.600GHz	0.372 / 88.792	2.026 / 16.361	0.309 / 28.092	0.320 / -166.643
1.800GHz	0.376 / 78.248	1.842 / 8.008	0.341 / 21.151	0.336 / -170.802
2.000GHz	0.380 / 69.364	1.688 / 0.089	0.373 / 14.761	0.346 / -176.197
2.200GHz	0.381 / 60.378	1.576 / -7.741	0.402 / 8.093	0.354 / 177.716
2.400GHz	0.376 / 52.812	1.475 / -14.985	0.431 / 1.670	0.363 / 172.187
2.600GHz	0.378 / 44.813	1.401 / -22.778	0.463 / -5.094	0.365 / 166.004
2.800GHz	0.376 / 36.897	1.338 / -29.704	0.487 / -11.676	0.361 / 162.206
3.000GHz	0.368 / 30.597	1.291 / -36.439	0.513 / -18.119	0.358 / 155.668

V_{CE} = 6 V, I_C = 3 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.534 / -125.160	4.681 / 90.792	0.113 / 31.145	0.528 / -77.763
600.0MHz	0.476 / -154.708	3.337 / 71.370	0.120 / 28.752	0.467 / -92.675
800.0MHz	0.461 / -177.431	2.591 / 55.595	0.126 / 29.716	0.445 / -104.633
1.000GHz	0.457 / 163.585	2.106 / 41.832	0.138 / 34.400	0.456 / -115.992
1.200GHz	0.461 / 146.901	1.782 / 30.304	0.162 / 36.295	0.475 / -123.177
1.400GHz	0.475 / 131.011	1.546 / 18.626	0.189 / 36.292	0.505 / -133.804
1.600GHz	0.495 / 116.992	1.362 / 8.837	0.228 / 34.884	0.526 / -142.664
1.800GHz	0.511 / 103.234	1.224 / -0.180	0.269 / 31.412	0.550 / -150.554
2.000GHz	0.523 / 91.093	1.110 / -8.139	0.310 / 26.192	0.567 / -159.202
2.200GHz	0.537 / 79.457	1.025 / -15.397	0.354 / 20.590	0.580 / -167.703
2.400GHz	0.542 / 68.627	0.953 / -21.721	0.399 / 14.276	0.592 / -176.070
2.600GHz	0.547 / 57.925	0.905 / -28.079	0.444 / 7.106	0.594 / 175.220
2.800GHz	0.550 / 47.600	0.864 / -33.622	0.487 / -0.258	0.586 / 168.492
3.000GHz	0.547 / 38.471	0.841 / -38.525	0.531 / -7.266	0.585 / 159.774

V_{CE} = 6 V, I_C = 5 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.447 / -141.125	5.704 / 85.958	0.094 / 36.004	0.413 / -88.675
600.0MHz	0.409 / -168.815	3.966 / 69.035	0.115 / 39.303	0.366 / -102.567
800.0MHz	0.400 / 170.548	3.050 / 55.014	0.134 / 40.382	0.358 / -112.953
1.000GHz	0.398 / 152.880	2.473 / 42.552	0.159 / 39.939	0.371 / -122.988
1.200GHz	0.401 / 137.644	2.091 / 31.747	0.187 / 38.664	0.395 / -128.865
1.400GHz	0.416 / 122.964	1.820 / 20.733	0.219 / 35.372	0.422 / -138.612
1.600GHz	0.428 / 110.088	1.612 / 11.239	0.252 / 31.353	0.446 / -146.283
1.800GHz	0.443 / 97.865	1.456 / 2.162	0.287 / 27.089	0.469 / -152.988
2.000GHz	0.455 / 87.146	1.324 / -6.119	0.324 / 21.775	0.488 / -160.452
2.200GHz	0.467 / 76.053	1.228 / -13.908	0.362 / 15.874	0.502 / -168.374
2.400GHz	0.472 / 66.546	1.140 / -20.862	0.400 / 10.026	0.515 / -175.940
2.600GHz	0.483 / 56.808	1.079 / -28.136	0.438 / 3.704	0.520 / 175.852
2.800GHz	0.486 / 47.128	1.024 / -34.394	0.475 / -3.239	0.519 / 170.268
3.000GHz	0.486 / 38.620	0.989 / -40.284	0.513 / -9.833	0.520 / 162.145

V_{CE} = 6 V, I_C = 7 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.404 / -151.863	6.259 / 83.240	0.092 / 47.739	0.349 / -96.422
600.0MHz	0.379 / -177.820	4.310 / 67.716	0.111 / 45.984	0.319 / -109.584
800.0MHz	0.373 / 162.574	3.300 / 54.701	0.139 / 44.201	0.316 / -119.282
1.000GHz	0.373 / 146.131	2.670 / 42.898	0.171 / 42.937	0.332 / -128.719
1.200GHz	0.375 / 131.568	2.261 / 32.664	0.200 / 39.857	0.355 / -133.529
1.400GHz	0.389 / 117.563	1.967 / 21.995	0.231 / 35.155	0.384 / -142.263
1.600GHz	0.401 / 105.379	1.744 / 12.710	0.266 / 30.541	0.407 / -149.226
1.800GHz	0.411 / 93.586	1.579 / 3.776	0.299 / 25.021	0.429 / -155.534
2.000GHz	0.422 / 83.372	1.441 / -4.517	0.334 / 19.563	0.445 / -162.370
2.200GHz	0.434 / 73.136	1.336 / -12.419	0.368 / 13.662	0.460 / -169.893
2.400GHz	0.436 / 64.106	1.245 / -19.705	0.404 / 7.748	0.472 / -176.779
2.600GHz	0.445 / 55.111	1.179 / -27.104	0.438 / 1.458	0.477 / 175.633
2.800GHz	0.450 / 45.867	1.120 / -33.860	0.474 / -5.160	0.476 / 170.360
3.000GHz	0.448 / 38.245	1.078 / -39.925	0.509 / -11.633	0.481 / 162.610

V_{CE} = 6 V, I_C = 10 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.371 / -163.697	6.752 / 80.774	0.088 / 50.763	0.293 / -105.991
600.0MHz	0.357 / 173.311	4.615 / 66.607	0.117 / 50.650	0.275 / -117.428
800.0MHz	0.354 / 155.161	3.524 / 54.382	0.149 / 49.133	0.280 / -126.488
1.000GHz	0.357 / 139.594	2.846 / 43.262	0.180 / 45.105	0.300 / -134.729
1.200GHz	0.357 / 125.044	2.410 / 33.464	0.213 / 40.198	0.322 / -138.175
1.400GHz	0.367 / 111.846	2.099 / 23.117	0.246 / 34.896	0.350 / -146.567
1.600GHz	0.377 / 99.952	1.862 / 14.159	0.278 / 29.311	0.370 / -153.080
1.800GHz	0.387 / 88.939	1.690 / 5.373	0.311 / 23.550	0.393 / -158.552
2.000GHz	0.395 / 79.370	1.543 / -2.814	0.345 / 17.783	0.408 / -165.133
2.200GHz	0.405 / 69.463	1.435 / -10.793	0.377 / 11.721	0.422 / -171.673
2.400GHz	0.405 / 61.021	1.339 / -18.050	0.409 / 5.902	0.434 / -178.473
2.600GHz	0.413 / 52.345	1.268 / -25.800	0.443 / -0.775	0.439 / 174.575
2.800GHz	0.414 / 43.825	1.207 / -32.651	0.473 / -7.141	0.438 / 169.790
3.000GHz	0.414 / 36.612	1.160 / -39.060	0.505 / -13.661	0.440 / 162.373

V_{CE} = 6 V, I_C = 15 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.349 / -174.414	7.168 / 78.673	0.082 / 55.929	0.251 / -115.426
600.0MHz	0.341 / 164.791	4.873 / 65.638	0.119 / 55.086	0.246 / -126.025
800.0MHz	0.343 / 147.945	3.714 / 54.135	0.155 / 51.313	0.254 / -133.722
1.000GHz	0.343 / 133.317	2.997 / 43.576	0.189 / 46.591	0.276 / -141.623
1.200GHz	0.344 / 119.411	2.537 / 34.171	0.223 / 41.464	0.296 / -143.972
1.400GHz	0.356 / 106.841	2.209 / 24.158	0.258 / 35.025	0.327 / -151.506
1.600GHz	0.364 / 95.077	1.960 / 15.384	0.290 / 28.940	0.347 / -157.183
1.800GHz	0.369 / 84.206	1.780 / 6.791	0.322 / 22.565	0.365 / -162.047
2.000GHz	0.378 / 75.008	1.628 / -1.310	0.355 / 16.379	0.378 / -168.132
2.200GHz	0.383 / 65.609	1.519 / -9.123	0.386 / 10.140	0.391 / -174.742
2.400GHz	0.383 / 57.588	1.417 / -16.483	0.415 / 4.284	0.402 / 179.206
2.600GHz	0.387 / 49.344	1.345 / -24.214	0.446 / -2.427	0.405 / 172.299
2.800GHz	0.388 / 41.269	1.280 / -31.199	0.476 / -9.007	0.405 / 168.164
3.000GHz	0.385 / 34.236	1.234 / -37.739	0.505 / -15.411	0.406 / 161.329

V_{CE} = 6 V, I_C = 20 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.344 / 179.312	7.394 / 77.479	0.082 / 61.086	0.230 / -122.750
600.0MHz	0.338 / 159.981	5.018 / 65.082	0.120 / 57.418	0.230 / -131.771
800.0MHz	0.340 / 143.502	3.819 / 54.053	0.157 / 53.190	0.240 / -138.899
1.000GHz	0.340 / 129.263	3.079 / 43.802	0.195 / 47.638	0.265 / -146.264
1.200GHz	0.342 / 115.772	2.604 / 34.567	0.231 / 41.713	0.285 / -147.578
1.400GHz	0.351 / 103.711	2.271 / 24.775	0.263 / 34.807	0.314 / -154.734
1.600GHz	0.358 / 91.888	2.018 / 16.174	0.296 / 28.525	0.334 / -160.080
1.800GHz	0.363 / 81.308	1.831 / 7.641	0.329 / 22.212	0.351 / -164.774
2.000GHz	0.367 / 72.544	1.676 / -0.351	0.361 / 15.797	0.364 / -170.448
2.200GHz	0.373 / 63.148	1.563 / -8.240	0.391 / 9.404	0.375 / -176.682
2.400GHz	0.370 / 55.159	1.459 / -15.493	0.422 / 3.155	0.385 / 177.218
2.600GHz	0.375 / 46.971	1.386 / -23.200	0.452 / -3.312	0.388 / 170.832
2.800GHz	0.374 / 39.094	1.321 / -30.216	0.477 / -9.912	0.386 / 166.735
3.000GHz	0.371 / 32.407	1.272 / -36.902	0.507 / -16.268	0.387 / 160.275

V_{CE} = 6 V, I_C = 30 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.337 / 172.480	7.629 / 76.143	0.085 / 63.556	0.210 / -132.264
600.0MHz	0.333 / 154.031	5.167 / 64.490	0.123 / 60.261	0.217 / -138.672
800.0MHz	0.338 / 139.295	3.926 / 53.887	0.163 / 54.547	0.230 / -144.593
1.000GHz	0.339 / 125.346	3.164 / 43.934	0.200 / 48.437	0.255 / -151.135
1.200GHz	0.340 / 111.996	2.679 / 35.030	0.236 / 41.818	0.274 / -151.726
1.400GHz	0.349 / 99.869	2.331 / 25.421	0.271 / 34.729	0.302 / -158.734
1.600GHz	0.353 / 88.765	2.071 / 16.935	0.304 / 28.274	0.321 / -163.135
1.800GHz	0.359 / 78.267	1.882 / 8.572	0.336 / 21.643	0.339 / -167.842
2.000GHz	0.363 / 69.158	1.724 / 0.627	0.367 / 15.207	0.349 / -173.168
2.200GHz	0.364 / 60.078	1.608 / -7.223	0.397 / 8.625	0.360 / -179.275
2.400GHz	0.360 / 52.356	1.503 / -14.502	0.425 / 2.312	0.370 / 175.022
2.600GHz	0.362 / 44.589	1.426 / -22.261	0.456 / -4.413	0.370 / 168.908
2.800GHz	0.361 / 36.579	1.360 / -29.255	0.481 / -11.056	0.367 / 165.200
3.000GHz	0.357 / 30.718	1.313 / -35.924	0.509 / -17.263	0.367 / 158.656

V_{CE} = 6 V, I_C = 40 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.336 / 168.094	7.736 / 75.485	0.085 / 65.637	0.202 / -137.204
600.0MHz	0.336 / 151.685	5.227 / 64.161	0.126 / 61.392	0.212 / -142.696
800.0MHz	0.339 / 136.964	3.973 / 53.722	0.165 / 55.711	0.225 / -148.097
1.000GHz	0.341 / 123.673	3.204 / 43.941	0.202 / 49.011	0.252 / -153.229
1.200GHz	0.342 / 110.010	2.710 / 35.139	0.239 / 41.861	0.270 / -154.286
1.400GHz	0.348 / 98.103	2.358 / 25.655	0.274 / 34.758	0.297 / -160.320
1.600GHz	0.353 / 87.045	2.095 / 17.260	0.309 / 28.074	0.316 / -165.342
1.800GHz	0.356 / 76.626	1.903 / 8.946	0.338 / 21.563	0.333 / -169.509
2.000GHz	0.360 / 67.733	1.746 / 1.046	0.371 / 14.994	0.342 / -174.738
2.200GHz	0.362 / 58.450	1.628 / -6.738	0.400 / 8.275	0.353 / 179.328
2.400GHz	0.357 / 51.029	1.521 / -14.010	0.429 / 1.786	0.360 / 173.682
2.600GHz	0.358 / 42.956	1.446 / -21.669	0.457 / -4.952	0.363 / 167.454
2.800GHz	0.355 / 35.060	1.378 / -28.682	0.486 / -11.408	0.359 / 163.872
3.000GHz	0.350 / 28.959	1.331 / -35.402	0.510 / -17.889	0.357 / 157.326

V_{CE} = 10 V, I_C = 3 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.544 / -123.893	4.692 / 91.091	0.111 / 32.141	0.533 / -76.685
600.0MHz	0.481 / -153.638	3.345 / 71.619	0.119 / 28.385	0.470 / -92.348
800.0MHz	0.461 / -176.459	2.598 / 55.740	0.125 / 29.614	0.449 / -104.053
1.000GHz	0.457 / 164.247	2.114 / 41.937	0.139 / 32.758	0.458 / -115.144
1.200GHz	0.460 / 147.460	1.786 / 30.296	0.159 / 36.300	0.477 / -122.573
1.400GHz	0.475 / 131.571	1.550 / 18.682	0.188 / 36.686	0.509 / -133.214
1.600GHz	0.492 / 117.294	1.366 / 8.935	0.225 / 34.424	0.529 / -142.113
1.800GHz	0.506 / 103.821	1.228 / -0.085	0.266 / 31.587	0.551 / -150.004
2.000GHz	0.522 / 91.627	1.113 / -8.150	0.307 / 26.689	0.570 / -158.533
2.200GHz	0.535 / 79.537	1.026 / -15.416	0.353 / 20.848	0.584 / -167.363
2.400GHz	0.541 / 68.622	0.954 / -21.728	0.399 / 14.556	0.593 / -175.559
2.600GHz	0.549 / 57.948	0.904 / -28.085	0.442 / 7.372	0.597 / 175.456
2.800GHz	0.551 / 47.657	0.865 / -33.505	0.486 / 0.191	0.589 / 168.859
3.000GHz	0.546 / 38.286	0.843 / -38.492	0.527 / -7.136	0.588 / 160.332

V_{CE} = 10 V, I_C = 5 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.445 / -140.228	5.737 / 86.169	0.095 / 37.498	0.415 / -87.460
600.0MHz	0.407 / -167.718	3.991 / 69.179	0.112 / 40.347	0.372 / -101.615
800.0MHz	0.396 / 171.355	3.070 / 55.128	0.134 / 40.019	0.360 / -111.788
1.000GHz	0.395 / 153.641	2.489 / 42.634	0.157 / 40.256	0.374 / -121.912
1.200GHz	0.398 / 138.260	2.103 / 31.855	0.186 / 38.821	0.395 / -128.009
1.400GHz	0.411 / 123.499	1.830 / 20.855	0.217 / 35.277	0.426 / -137.802
1.600GHz	0.425 / 110.493	1.620 / 11.290	0.249 / 31.819	0.448 / -145.217
1.800GHz	0.439 / 98.287	1.463 / 2.269	0.284 / 27.165	0.472 / -152.178
2.000GHz	0.452 / 87.085	1.331 / -6.024	0.322 / 21.926	0.490 / -159.830
2.200GHz	0.465 / 76.217	1.231 / -13.851	0.360 / 16.271	0.505 / -167.704
2.400GHz	0.472 / 66.409	1.145 / -20.820	0.398 / 10.466	0.518 / -175.388
2.600GHz	0.481 / 56.976	1.082 / -28.053	0.437 / 3.635	0.524 / 176.683
2.800GHz	0.484 / 47.122	1.026 / -34.466	0.477 / -3.000	0.521 / 170.751
3.000GHz	0.482 / 38.755	0.993 / -40.269	0.513 / -9.502	0.523 / 162.548

V_{CE} = 10 V, I_C = 7 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.402 / -150.929	6.318 / 83.334	0.091 / 45.708	0.353 / -95.633
600.0MHz	0.373 / -176.724	4.348 / 67.865	0.112 / 45.208	0.320 / -108.409
800.0MHz	0.369 / 163.436	3.328 / 54.791	0.139 / 45.203	0.315 / -118.017
1.000GHz	0.369 / 146.589	2.691 / 42.993	0.167 / 43.128	0.334 / -127.723
1.200GHz	0.370 / 131.416	2.279 / 32.728	0.201 / 39.629	0.354 / -132.410
1.400GHz	0.382 / 117.814	1.985 / 22.120	0.232 / 35.284	0.384 / -141.616
1.600GHz	0.394 / 105.171	1.759 / 12.841	0.266 / 30.264	0.407 / -148.447
1.800GHz	0.406 / 93.700	1.591 / 3.892	0.297 / 25.074	0.428 / -154.436
2.000GHz	0.418 / 83.400	1.451 / -4.336	0.332 / 19.634	0.445 / -161.700
2.200GHz	0.428 / 73.233	1.348 / -12.256	0.366 / 13.861	0.459 / -169.166
2.400GHz	0.432 / 64.142	1.252 / -19.584	0.402 / 8.073	0.473 / -176.085
2.600GHz	0.442 / 55.114	1.186 / -26.967	0.438 / 1.338	0.478 / 176.083
2.800GHz	0.442 / 45.944	1.125 / -33.651	0.471 / -4.894	0.479 / 170.801
3.000GHz	0.446 / 38.144	1.083 / -39.966	0.505 / -11.399	0.481 / 163.358

V_{CE} = 10 V, I_C = 10 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.367 / -161.609	6.785 / 81.036	0.083 / 51.674	0.296 / -103.867
600.0MHz	0.351 / 174.229	4.641 / 66.796	0.117 / 50.745	0.279 / -115.907
800.0MHz	0.349 / 155.923	3.543 / 54.516	0.147 / 48.257	0.281 / -124.584
1.000GHz	0.352 / 139.886	2.862 / 43.393	0.180 / 44.419	0.300 / -133.211
1.200GHz	0.352 / 125.732	2.422 / 33.530	0.211 / 40.354	0.324 / -137.341
1.400GHz	0.362 / 112.540	2.109 / 23.199	0.244 / 34.959	0.353 / -145.489
1.600GHz	0.374 / 100.562	1.870 / 14.212	0.275 / 29.496	0.373 / -151.977
1.800GHz	0.382 / 89.134	1.696 / 5.360	0.309 / 23.802	0.395 / -157.554
2.000GHz	0.391 / 79.388	1.549 / -2.850	0.342 / 18.145	0.410 / -164.067
2.200GHz	0.399 / 69.673	1.440 / -10.784	0.373 / 11.973	0.424 / -170.921
2.400GHz	0.402 / 61.027	1.342 / -18.053	0.407 / 6.144	0.437 / -177.567
2.600GHz	0.410 / 52.508	1.272 / -25.693	0.439 / -0.355	0.442 / 175.133
2.800GHz	0.410 / 44.001	1.208 / -32.697	0.471 / -6.766	0.440 / 170.333
3.000GHz	0.413 / 36.566	1.166 / -38.970	0.503 / -13.325	0.443 / 163.067

V_{CE} = 10 V, I_C = 15 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.343 / -172.670	7.219 / 78.868	0.085 / 55.749	0.252 / -114.495
600.0MHz	0.338 / 165.720	4.907 / 65.783	0.119 / 54.862	0.247 / -124.825
800.0MHz	0.337 / 148.210	3.742 / 54.307	0.154 / 51.302	0.254 / -132.134
1.000GHz	0.340 / 133.832	3.018 / 43.695	0.189 / 46.298	0.276 / -140.383
1.200GHz	0.339 / 119.542	2.555 / 34.291	0.221 / 41.120	0.297 / -142.774
1.400GHz	0.349 / 106.933	2.224 / 24.291	0.256 / 35.153	0.326 / -150.489
1.600GHz	0.358 / 95.253	1.974 / 15.550	0.287 / 28.724	0.348 / -156.206
1.800GHz	0.367 / 84.357	1.790 / 6.876	0.320 / 22.876	0.366 / -161.300
2.000GHz	0.372 / 74.898	1.639 / -1.186	0.352 / 16.716	0.381 / -167.342
2.200GHz	0.379 / 65.507	1.525 / -9.147	0.383 / 10.328	0.393 / -173.753
2.400GHz	0.378 / 57.593	1.423 / -16.419	0.414 / 4.356	0.404 / -179.978
2.600GHz	0.382 / 49.201	1.351 / -24.192	0.445 / -2.163	0.408 / 173.417
2.800GHz	0.383 / 40.937	1.284 / -31.175	0.473 / -8.839	0.406 / 169.086
3.000GHz	0.382 / 34.382	1.239 / -37.699	0.504 / -15.126	0.408 / 161.898

V_{CE} = 10 V, I_C = 20 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.335 / -179.603	7.456 / 77.700	0.085 / 59.595	0.228 / -121.232
600.0MHz	0.331 / 160.672	5.059 / 65.252	0.124 / 56.921	0.228 / -130.192
800.0MHz	0.333 / 144.382	3.851 / 54.158	0.156 / 53.010	0.241 / -137.251
1.000GHz	0.335 / 130.305	3.105 / 43.887	0.194 / 47.012	0.263 / -144.215
1.200GHz	0.334 / 116.133	2.626 / 34.687	0.229 / 41.623	0.285 / -146.515
1.400GHz	0.344 / 103.368	2.287 / 24.856	0.263 / 35.175	0.315 / -153.719
1.600GHz	0.350 / 92.090	2.029 / 16.234	0.296 / 28.587	0.334 / -159.178
1.800GHz	0.356 / 81.179	1.842 / 7.753	0.327 / 22.272	0.352 / -163.799
2.000GHz	0.363 / 72.079	1.687 / -0.301	0.358 / 15.868	0.364 / -169.286
2.200GHz	0.367 / 62.735	1.571 / -8.148	0.390 / 9.441	0.375 / -175.621
2.400GHz	0.367 / 55.056	1.468 / -15.418	0.418 / 3.239	0.386 / 178.506
2.600GHz	0.370 / 46.966	1.394 / -23.205	0.450 / -3.198	0.389 / 172.002
2.800GHz	0.369 / 38.882	1.328 / -30.105	0.477 / -9.606	0.386 / 167.431
3.000GHz	0.367 / 32.654	1.279 / -36.877	0.504 / -16.029	0.388 / 161.061

V_{CE} = 10 V, I_C = 30 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.330 / 173.269	7.688 / 76.429	0.084 / 63.943	0.209 / -130.446
600.0MHz	0.328 / 154.825	5.201 / 64.708	0.125 / 60.421	0.217 / -137.373
800.0MHz	0.331 / 139.710	3.955 / 54.031	0.161 / 53.836	0.227 / -143.228
1.000GHz	0.332 / 125.566	3.189 / 44.077	0.197 / 48.445	0.254 / -149.198
1.200GHz	0.330 / 111.943	2.696 / 35.096	0.235 / 41.951	0.274 / -150.274
1.400GHz	0.340 / 99.788	2.349 / 25.473	0.269 / 35.441	0.301 / -157.042
1.600GHz	0.349 / 88.489	2.085 / 17.024	0.302 / 28.290	0.321 / -161.932
1.800GHz	0.353 / 77.962	1.893 / 8.580	0.334 / 21.771	0.338 / -166.258
2.000GHz	0.357 / 68.924	1.734 / 0.637	0.366 / 15.154	0.350 / -171.832
2.200GHz	0.360 / 59.969	1.616 / -7.133	0.394 / 8.600	0.361 / -177.981
2.400GHz	0.357 / 52.211	1.510 / -14.444	0.423 / 2.428	0.369 / 176.265
2.600GHz	0.359 / 44.654	1.436 / -22.141	0.453 / -4.225	0.373 / 169.921
2.800GHz	0.358 / 36.599	1.367 / -29.269	0.478 / -10.595	0.369 / 165.689
3.000GHz	0.352 / 30.345	1.319 / -35.928	0.506 / -17.219	0.368 / 160.007

V_{CE} = 10 V, I_C = 40 mA

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
400.0MHz	0.327 / 169.026	7.790 / 75.782	0.084 / 67.889	0.201 / -134.849
600.0MHz	0.328 / 152.199	5.268 / 64.352	0.126 / 61.150	0.211 / -140.247
800.0MHz	0.331 / 137.166	4.006 / 53.913	0.165 / 55.275	0.223 / -146.107
1.000GHz	0.331 / 123.905	3.227 / 44.081	0.201 / 48.335	0.250 / -152.147
1.200GHz	0.332 / 109.933	2.729 / 35.257	0.238 / 42.316	0.268 / -152.175
1.400GHz	0.340 / 98.069	2.376 / 25.665	0.271 / 34.979	0.297 / -159.080
1.600GHz	0.346 / 86.738	2.111 / 17.327	0.306 / 28.350	0.315 / -163.714
1.800GHz	0.351 / 76.507	1.916 / 8.965	0.337 / 21.491	0.332 / -167.866
2.000GHz	0.355 / 67.417	1.755 / 1.078	0.368 / 15.151	0.343 / -173.396
2.200GHz	0.356 / 58.292	1.636 / -6.689	0.398 / 8.240	0.354 / -179.310
2.400GHz	0.351 / 50.629	1.530 / -13.944	0.426 / 1.817	0.362 / 174.916
2.600GHz	0.353 / 42.996	1.453 / -21.695	0.455 / -5.103	0.364 / 168.816
2.800GHz	0.352 / 35.096	1.385 / -28.796	0.480 / -11.601	0.360 / 165.107
3.000GHz	0.347 / 28.464	1.337 / -35.388	0.509 / -17.574	0.360 / 158.727