

NPN SiGe RF POWER TRANSISTOR

DESCRIPTION

The THN5601SF is a low cost, NPN medium power SiGe HBT(Hetero-Junction Bipolar Transistor) encapsulated in a plastic SOT-23F SMD package.

The THN5601SF can be used as a driver device or an output device, depending on the specific application.

FEATURES

- o 4.8 Volt operation
- o P1dB 26dBm @f=900MHz
- o Power gain 9.0 dB @f=900MHz

APPLICATIONS

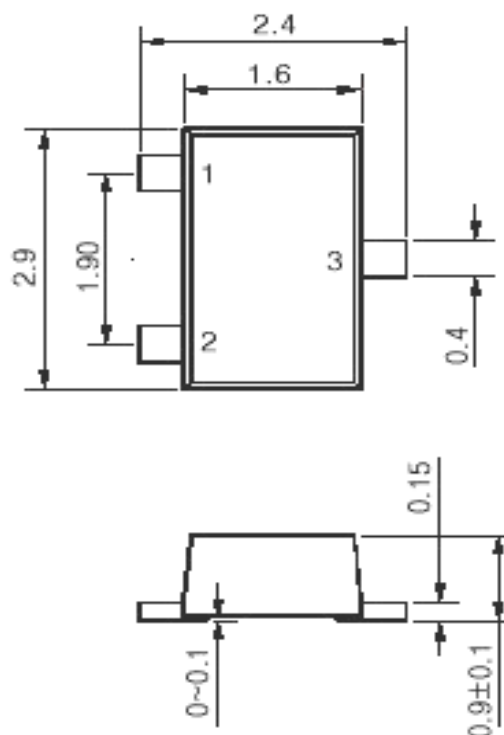
- o Hand-help radio equipment in common emitter class-AB operation in 900MHz communication band.

MARKING : AM1

MAXIMUM RATINGS

SYMBOL	PARAMETER	CONDITION	VALUE	UNIT
V _{CB0}	Collector-Base Voltage	Open Emitter	20	V
V _{CE0}	Collector-Emitter Voltage	Open Base	8	V
V _{EB0}	Emitter-Base Voltage	Open Collector	2.5	V
I _c	Collector Current (DC)		250	mA
P _T	Total Power Dissipation	T _s = 60	800	mW
T _{STG}	Storage Temperature		-65 ~ 150	
T _J	Operating Junction Temperature		150	

SOT-23F



Unit : mm

PIN CONFIGURATION

PIN NO	SYMBOL	DESCRIPTION
1	b	base
2	e	emitter
3	c	collector

☐ THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITION	VALUE	Unit
R _{th j-s}	thermal resistance from junction to soldering point	T _s =70 °C; note1	250	K/W

* Note 1. T_s is temperature at the soldering point of the collector pin.

☐ QUICK REFERENCE DATA

Mode of Operation	f [MHz]	V _{CE} [V]	P _L [dBm]	G _P [dB]	η _c [%]
CW, class-AB	900	4.8(I _{cq} =5mA)	26	≥ 8.0	≥ 50

☐ DC CHARACTERISTICS

T_j=25 °C unless otherwise specified

SYMBOL	PARAMETER	CONDITION	MIN.	MAX.	UNIT
BV _{CBO}	collector-base breakdown voltage	open emitter	20		V
BV _{CEO}	collector-emitter breakdown voltage	open base	8		V
BV _{EBO}	emitter-base breakdown voltage	open collector	2.5		V
I _s	collector leakage current		10		μA
h _{FE}	DC current gain		60	200	
f _T	transition frequency	V _{ce} =4.8V, I _{cc} =200mA, f=500MHz	7		GHz
C _{CB}	collector capacitance	V _{cb} =10V, f=1MHz		3	pF

□ DC CHARACTERISTICS

$T_j=25$ unless otherwise specified

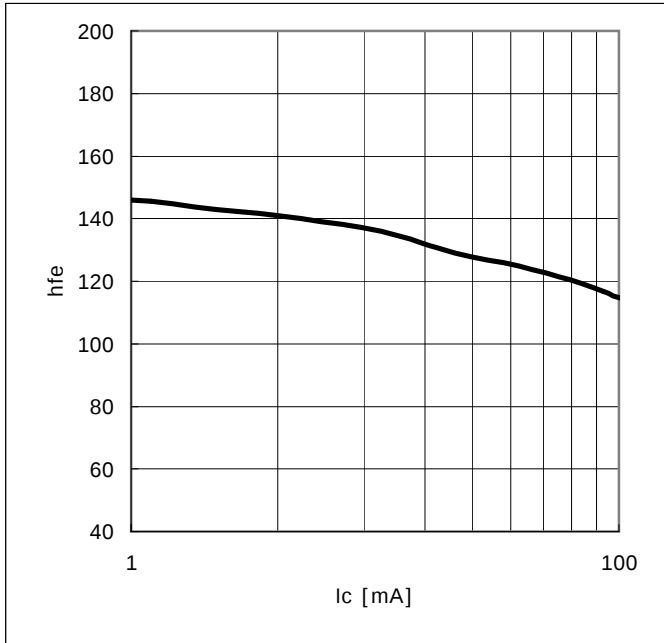


Fig 1. DC Current gain v.s Collector current ($V_{ce}=4.8V$)

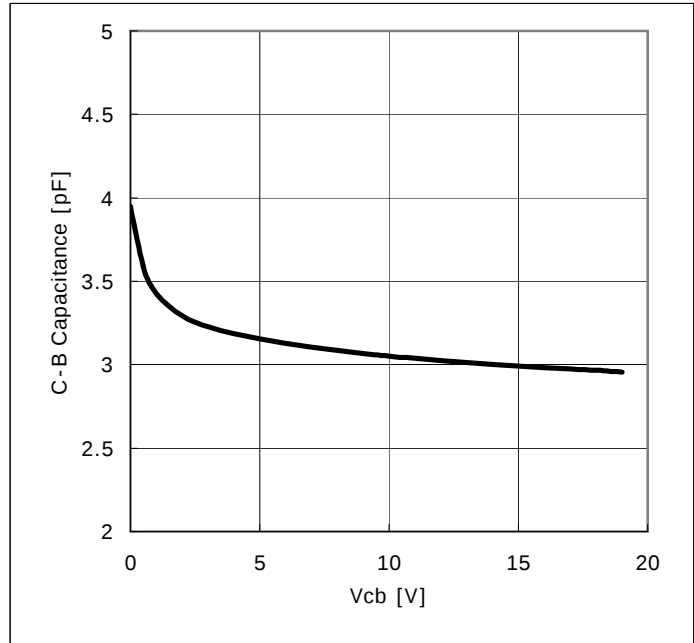


Fig 2. Collector-base capacitance v.s Collector-base voltage ($f=1MHz$)

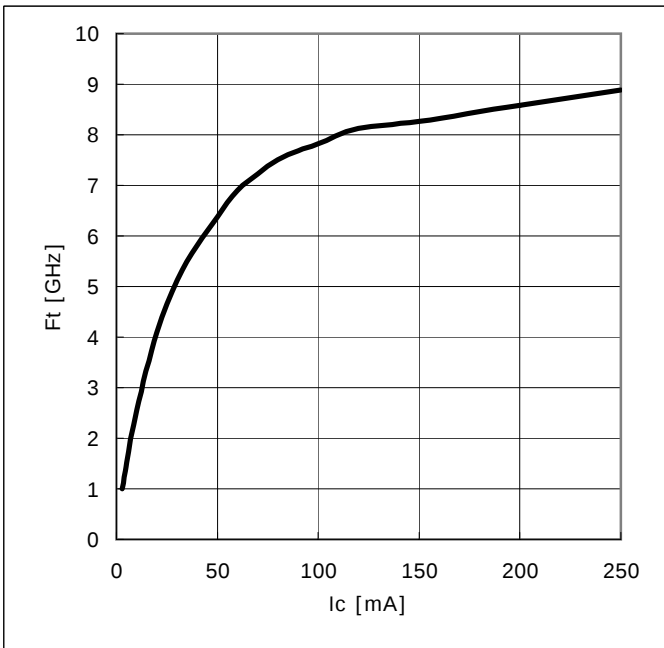


Fig 3. F_t v.s I_{cc} , I_b ($V_{ce}=4.8V$, $f=500MHz$)

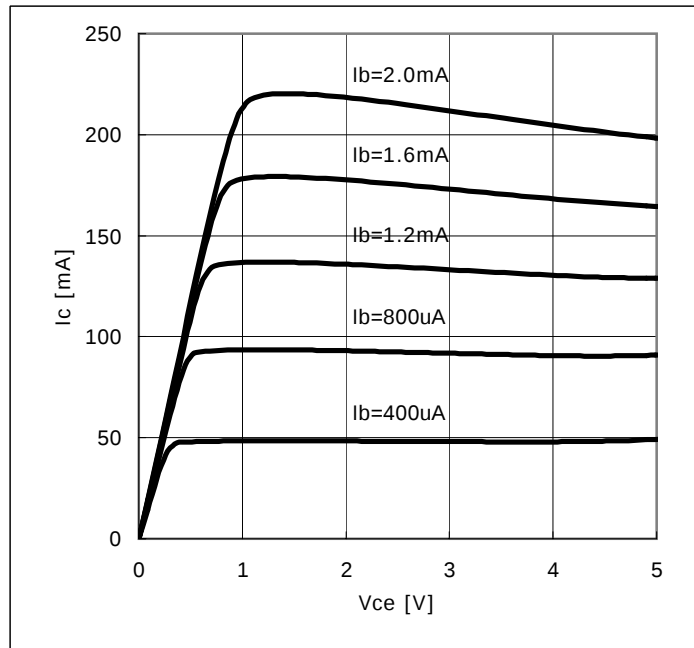


Fig 4. V_{ce} v.s I_c

□ APPLICATION INFORMATION (I)

RF performance at $T_s \leq 60$ in common emitter test circuit

Mode of Operation	f [MHz]	V _{CE} [V]	P _L [dBm]	G _p [dB]	η_c [%]
CW, class-AB	900	4.8 (I _{cq} =5mA)	26	Typ 9.0	50

Note2: When the RF output Power Auto Tunning System is Used

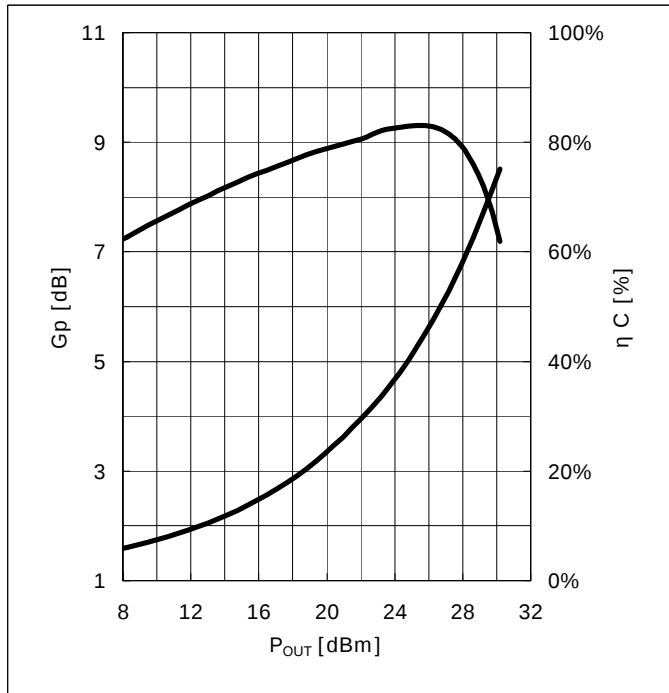


Fig 5. Pin vs G_p, η_c (V_{ce}=4.8V, I_{cq}=5mA, 900MHz)

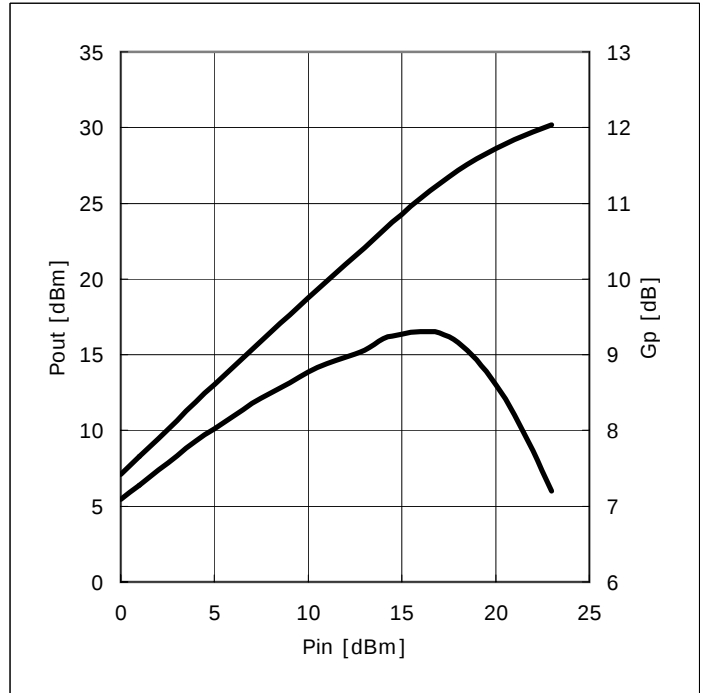
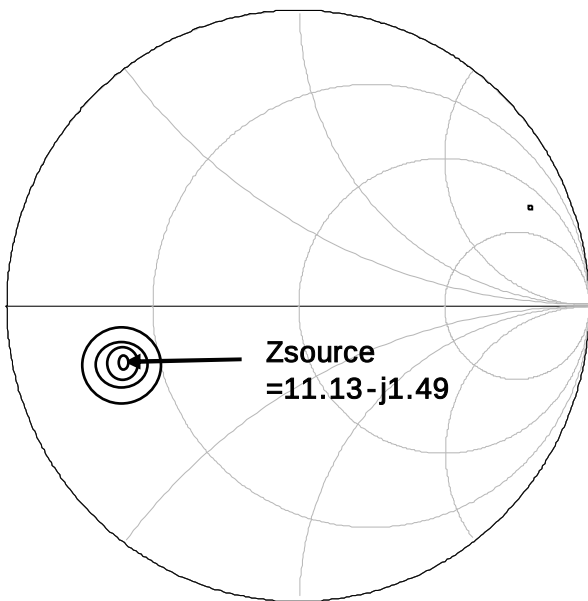
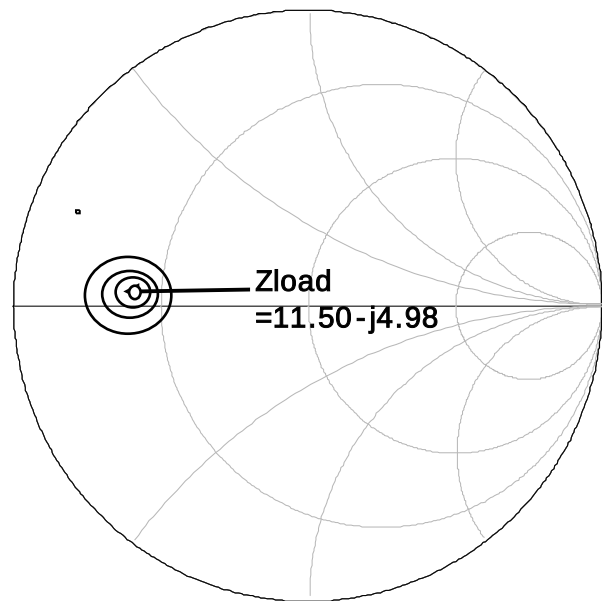


Fig 6. Pin vs P_{out}, G_p (V_{ce}=4.8V, I_{cq}=5mA, 900MHz)



V_{ce} = 4.8V, I_{cq} = 5mA, P_L = 26dBm, 900MHz
Fig 7. Input impedance as function of frequency



V_{ce} = 4.8V, I_{cq} = 5mA, P_L = 26dBm, 900MHz
Fig 8. Output impedance as function of frequency

□ APPLICATION INFORMATION (II)

RF performance at $T_s \leq 60$ in common emitter test circuit

Mode of Operation	f [MHz]	V _{CE} [V]	P _L [dBm]	G _p [dB]	η_c [%]
CW, class-A	900	4.8 (I _{cq} =95mA)	26	Typ 9.5	40

Note3: When the RF output Power Auto Tuning System is Used

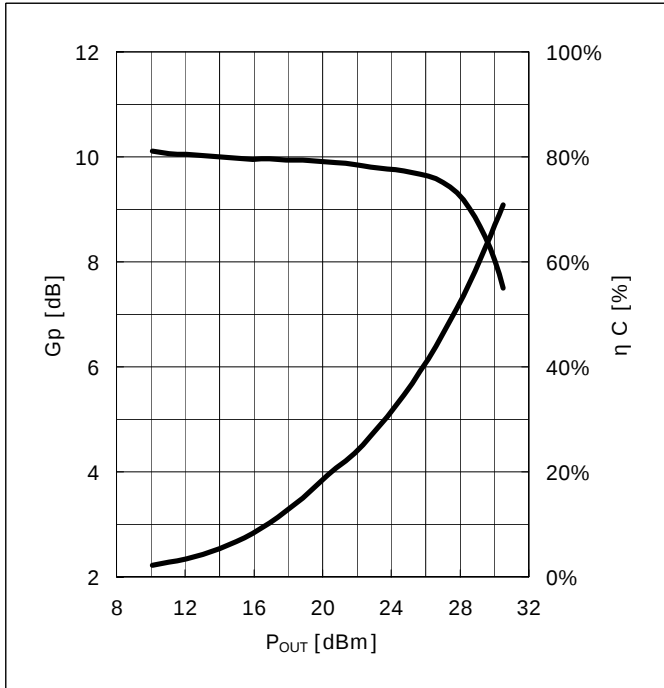


Fig 9. Pin vs Gp, η_c (V_{ce}=4.8V, I_{cq}=95mA, 900MHz)

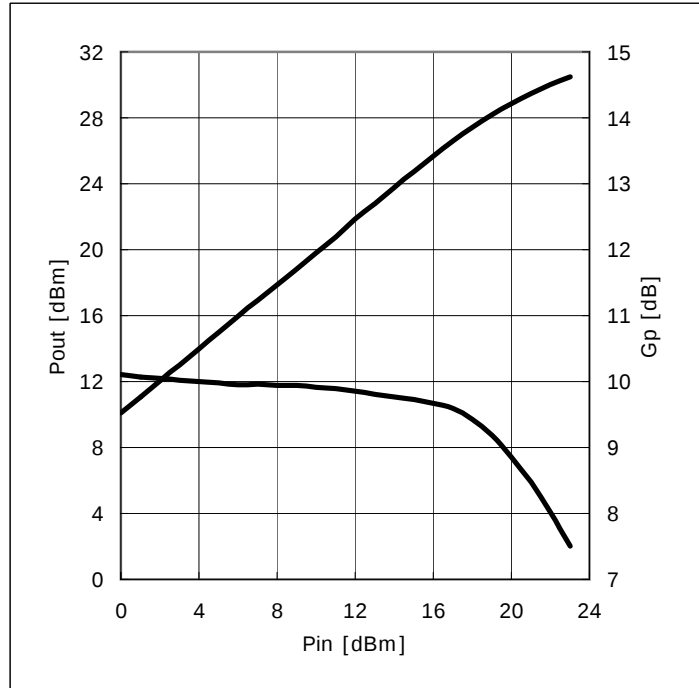
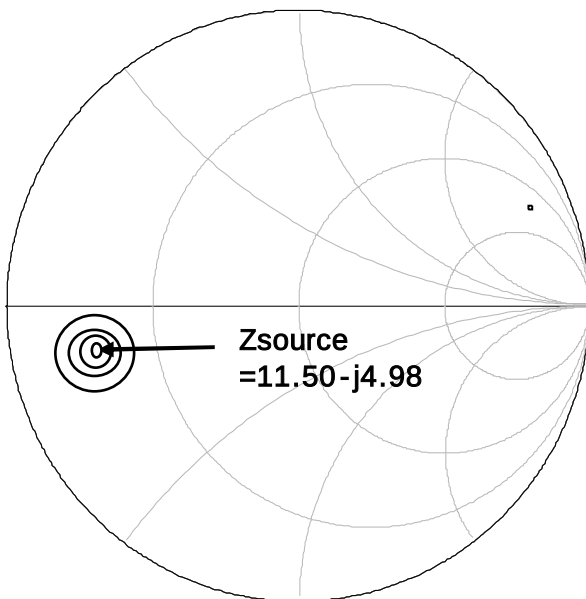
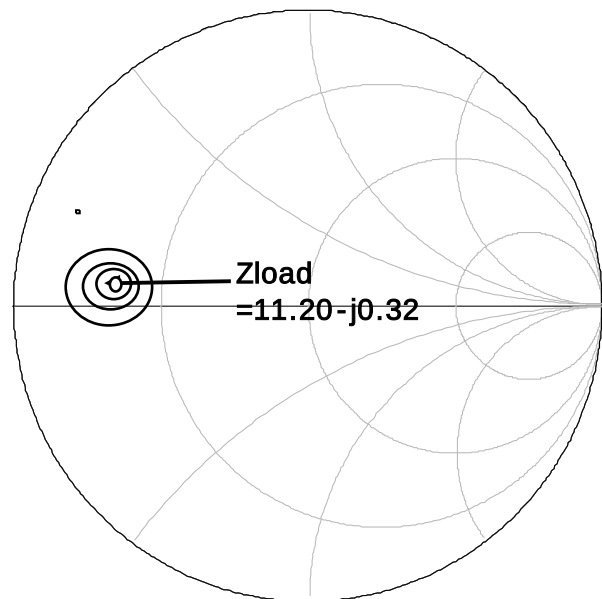


Fig 10. Pin vs Gp, η_c (V_{ce}=4.8V, I_{cq}=95mA, 900MHz)



V_{ce} = 4.8V, I_{cq} = 95mA, P_L = 26dBm, 900MHz
Fig 11. Input impedance as function of frequency



V_{ce} = 4.8V, I_{cq} = 95mA, P_L = 26dBm, 900MHz
Fig 12. Output impedance as function of frequency

□ APPLICATION INFORMATION (III)

RF performance at $T_s \leq 60$ in common emitter test circuit

Mode of Operation	f [MHz]	V _{CE} [V]	P _L [dBm]	G _p [dB]	η_c [%]
CW, class-AB	465	4.5 (I _{cq} =5mA)	27	Typ 13	60

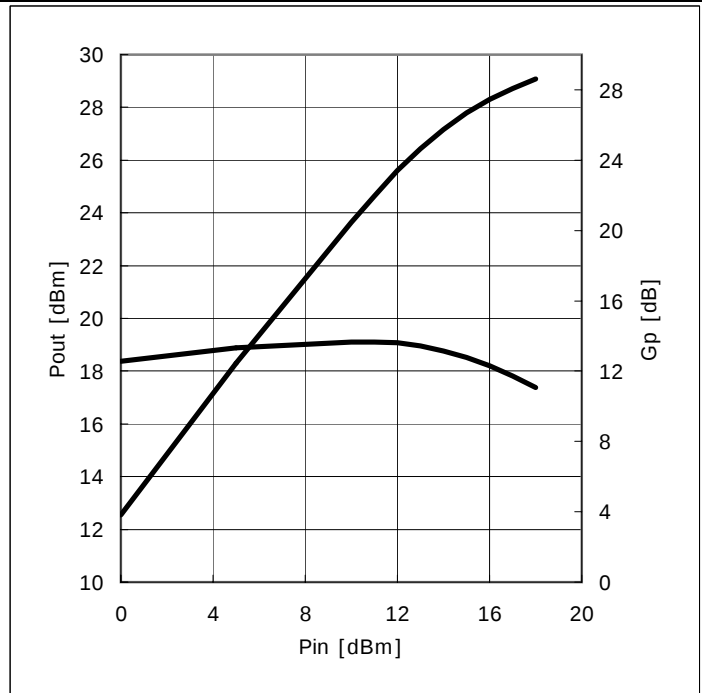
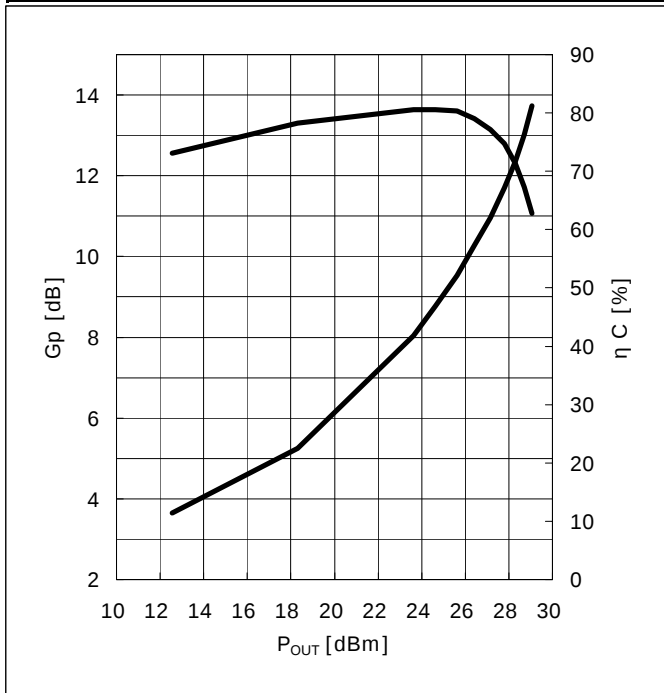
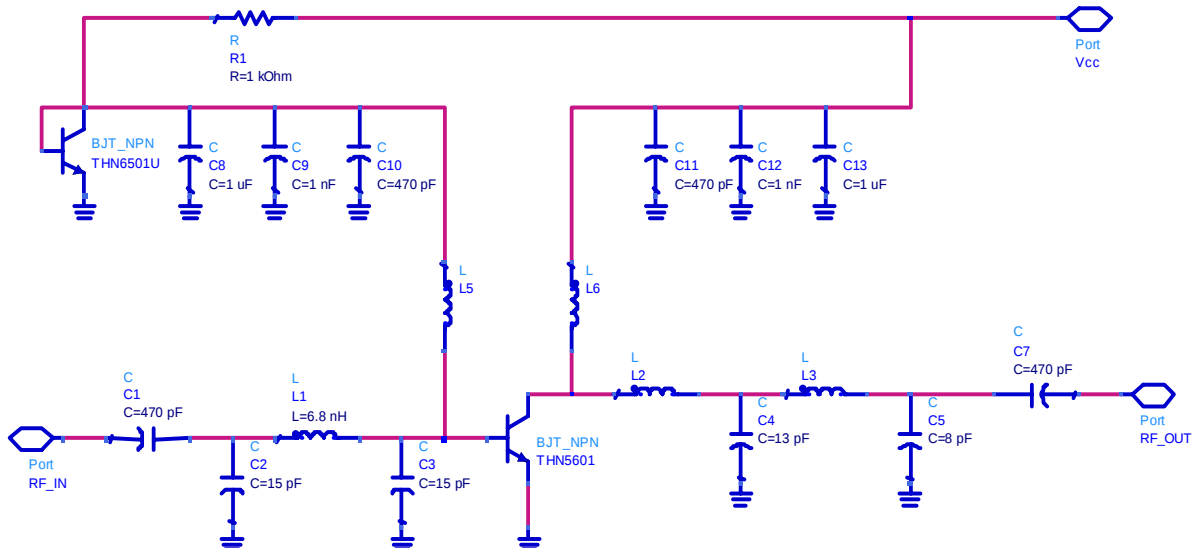


Fig 13. POUT vs Gp, η_c (V_{ce}=4.5V, I_{cq}=5mA, 465MHz) Fig 14. Pin vs Gp, POUT (V_{ce}=4.5V, I_{cq}=5mA, 465MHz)



Note : L5 and L6 are 8Turn/2.0mm, Air Coil Inductors.

L2 is 2 turn/1.0mm, Air Coil Inductors.

L3 is 5 turn/1.0mm, Air Coil Inductors.

C1 ~ C13, L1 : 1608 size

Fig 15. Freq = 465MHZ Test Schematic

THN5601SF Typical Scattering Parameters, Common Emitter, $Z_o = 50\Omega$

Vce = 4.8V, Ic = 3mA, Tc = 25

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
500.0MHz	0.828 / -167.639	1.681 / 66.971	0.133 / 3.003	0.430 / -109.456
700.0MHz	0.802 / -177.399	1.167 / 53.056	0.115 / 1.142	0.492 / -123.810
900.0MHz	0.814 / 175.099	0.894 / 41.858	0.099 / 6.153	0.558 / -134.021
1.100GHz	0.823 / 168.232	0.712 / 33.611	0.088 / 19.549	0.608 / -141.747
1.300GHz	0.841 / 162.029	0.594 / 27.109	0.093 / 33.607	0.669 / -149.372
1.500GHz	0.848 / 155.903	0.502 / 23.132	0.111 / 46.079	0.707 / -156.231
1.700GHz	0.855 / 150.220	0.438 / 21.055	0.135 / 52.012	0.746 / -162.577
1.900GHz	0.859 / 144.979	0.395 / 20.326	0.164 / 54.260	0.771 / -168.415
2.100GHz	0.864 / 140.157	0.366 / 21.200	0.193 / 53.963	0.791 / -173.641
2.300GHz	0.858 / 134.883	0.350 / 22.293	0.218 / 52.964	0.809 / -177.960
2.500GHz	0.861 / 130.178	0.346 / 23.548	0.247 / 51.050	0.823 / 177.233
2.700GHz	0.859 / 125.750	0.344 / 24.424	0.272 / 48.372	0.821 / 173.696
2.900GHz	0.844 / 121.321	0.350 / 25.635	0.294 / 45.594	0.832 / 170.662
3.000GHz	0.849 / 119.655	0.356 / 25.710	0.306 / 44.473	0.836 / 168.371

Vce = 4.8V, Ic = 5mA, Tc = 25

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
500.0MHz	0.813 / -172.966	2.115 / 70.244	0.113 / 12.963	0.389 / -132.952
700.0MHz	0.787 / 178.375	1.486 / 58.467	0.106 / 15.650	0.443 / -143.359
900.0MHz	0.793 / 171.710	1.149 / 48.426	0.100 / 22.478	0.498 / -149.237
1.100GHz	0.800 / 165.556	0.932 / 40.281	0.104 / 31.352	0.539 / -153.600
1.300GHz	0.816 / 160.020	0.790 / 33.302	0.116 / 38.911	0.592 / -158.303
1.500GHz	0.821 / 154.418	0.675 / 28.046	0.131 / 44.622	0.631 / -163.151
1.700GHz	0.828 / 149.140	0.595 / 24.278	0.152 / 48.713	0.671 / -167.722
1.900GHz	0.835 / 144.300	0.533 / 21.371	0.175 / 49.928	0.698 / -172.218
2.100GHz	0.840 / 139.615	0.488 / 19.881	0.199 / 50.128	0.725 / -176.518
2.300GHz	0.835 / 134.640	0.454 / 18.924	0.224 / 49.266	0.748 / 179.935
2.500GHz	0.842 / 130.105	0.434 / 18.726	0.251 / 47.419	0.765 / 175.764
2.700GHz	0.842 / 125.855	0.417 / 18.764	0.272 / 45.737	0.771 / 172.709
2.900GHz	0.830 / 121.468	0.410 / 19.137	0.294 / 43.542	0.786 / 169.776
3.000GHz	0.833 / 119.764	0.409 / 18.860	0.305 / 42.696	0.793 / 167.663

Vce = 4.8V, Ic = 10mA, Tc = 25

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
500.0MHz	0.816 / -179.572	2.608 / 73.510	0.091 / 27.831	0.443 / -158.935
700.0MHz	0.781 / 173.396	1.847 / 63.995	0.100 / 32.653	0.491 / -166.270
900.0MHz	0.784 / 167.517	1.445 / 55.680	0.112 / 37.185	0.516 / -169.738
1.100GHz	0.782 / 161.834	1.193 / 48.327	0.125 / 42.124	0.533 / -171.927
1.300GHz	0.793 / 156.788	1.026 / 41.748	0.141 / 45.060	0.563 / -173.895
1.500GHz	0.794 / 151.742	0.894 / 36.040	0.159 / 46.303	0.587 / -176.500
1.700GHz	0.799 / 146.759	0.800 / 31.299	0.177 / 47.028	0.616 / -178.964
1.900GHz	0.803 / 142.577	0.723 / 26.953	0.198 / 46.914	0.633 / 178.401
2.100GHz	0.808 / 138.339	0.667 / 23.744	0.219 / 46.133	0.656 / 175.673
2.300GHz	0.804 / 133.545	0.616 / 20.931	0.239 / 45.110	0.677 / 173.525
2.500GHz	0.812 / 129.493	0.583 / 18.808	0.258 / 43.599	0.694 / 170.425
2.700GHz	0.810 / 125.366	0.552 / 16.882	0.279 / 41.981	0.701 / 168.435
2.900GHz	0.801 / 121.239	0.528 / 15.876	0.299 / 40.119	0.718 / 166.377
3.000GHz	0.807 / 119.517	0.522 / 15.198	0.308 / 39.039	0.727 / 164.620

Typical Performance

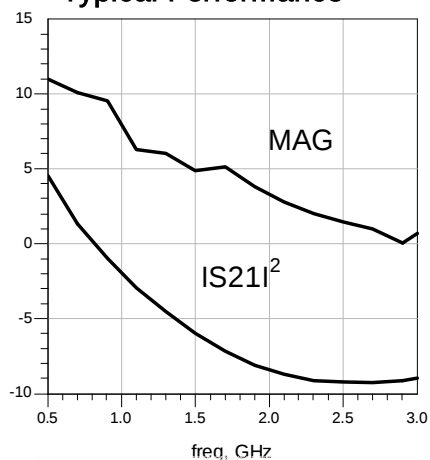


Figure16. Insertion Power Gain, MAG, and MSG vs Frequency.
Vce=4.8V. Ic = 3mA

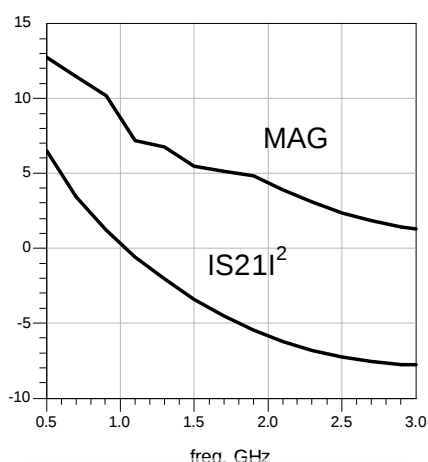


Figure17. Insertion Power Gain, MAG, and MSG vs Frequency.
Vce=4.8V. Ic = 5mA

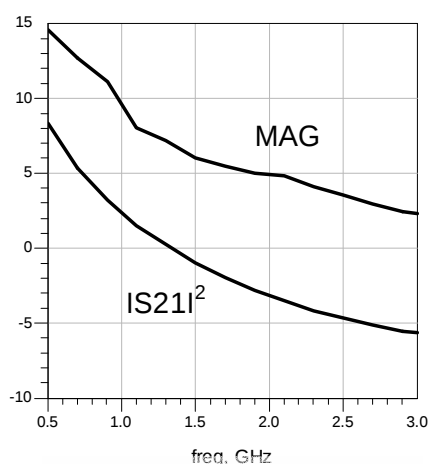


Figure18. Insertion Power Gain, MAG, and MSG vs Frequency.
Vce=4.8V. Ic = 10mA

THN5601SF Typical Scattering Parameters, Common Emitter, $Z_o = 50\Omega$

$V_{ce} = 4.8V$, $I_c = 20mA$, $T_c = 25$

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
500.0MHz	0.823 / 176.187	2.969 / 75.840	0.084 / 42.748	0.537 / -172.302
700.0MHz	0.785 / 169.667	2.110 / 68.107	0.100 / 47.287	0.583 / -178.504
900.0MHz	0.785 / 164.239	1.663 / 60.912	0.121 / 49.275	0.594 / 177.960
1.100GHz	0.780 / 158.837	1.383 / 54.663	0.139 / 50.059	0.594 / 175.846
1.300GHz	0.788 / 153.967	1.200 / 48.645	0.161 / 49.288	0.609 / 173.934
1.500GHz	0.784 / 149.055	1.059 / 43.350	0.180 / 48.447	0.617 / 172.014
1.700GHz	0.786 / 144.376	0.958 / 38.595	0.200 / 47.722	0.632 / 170.151
1.900GHz	0.788 / 140.205	0.876 / 34.100	0.220 / 46.533	0.634 / 167.948
2.100GHz	0.789 / 136.286	0.815 / 30.364	0.239 / 44.996	0.646 / 166.110
2.300GHz	0.782 / 131.704	0.760 / 26.732	0.258 / 42.982	0.657 / 164.756
2.500GHz	0.790 / 127.903	0.724 / 23.501	0.279 / 41.137	0.666 / 162.495
2.700GHz	0.787 / 123.974	0.686 / 20.649	0.294 / 39.242	0.667 / 161.233
2.900GHz	0.778 / 120.114	0.657 / 18.582	0.313 / 37.612	0.678 / 159.833
3.000GHz	0.782 / 118.468	0.650 / 17.366	0.322 / 36.425	0.685 / 158.531

$V_{ce} = 4.8V$, $I_c = 30mA$, $T_c = 25$

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
500.0MHz	0.827 / 174.382	3.114 / 76.768	0.083 / 49.423	0.585 / -176.148
700.0MHz	0.789 / 168.320	2.218 / 69.811	0.100 / 52.705	0.632 / 177.804
900.0MHz	0.787 / 163.044	1.750 / 63.246	0.124 / 52.864	0.640 / 174.393
1.100GHz	0.784 / 157.393	1.460 / 57.399	0.146 / 53.668	0.636 / 171.887
1.300GHz	0.787 / 152.707	1.270 / 51.705	0.168 / 51.882	0.644 / 169.849
1.500GHz	0.784 / 147.720	1.124 / 46.763	0.189 / 50.911	0.647 / 167.618
1.700GHz	0.782 / 143.154	1.021 / 42.203	0.210 / 49.026	0.657 / 165.993
1.900GHz	0.782 / 139.160	0.938 / 37.759	0.231 / 46.904	0.655 / 163.549
2.100GHz	0.783 / 135.125	0.878 / 33.963	0.251 / 44.974	0.660 / 161.717
2.300GHz	0.775 / 130.673	0.822 / 30.265	0.268 / 42.761	0.668 / 160.436
2.500GHz	0.779 / 126.862	0.785 / 26.775	0.287 / 40.256	0.672 / 158.259
2.700GHz	0.779 / 123.207	0.746 / 23.735	0.305 / 38.703	0.668 / 157.180
2.900GHz	0.767 / 119.245	0.715 / 21.294	0.321 / 36.471	0.678 / 156.105
3.000GHz	0.771 / 117.634	0.709 / 20.006	0.329 / 35.149	0.681 / 154.929

$V_{ce} = 4.8V$, $I_c = 40mA$, $T_c = 25$

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
500.0MHz	0.830 / 173.325	3.192 / 77.333	0.080 / 53.071	0.612 / -177.924
700.0MHz	0.792 / 167.545	2.274 / 70.719	0.102 / 55.844	0.660 / 176.382
900.0MHz	0.791 / 162.232	1.793 / 64.416	0.124 / 56.538	0.668 / 172.875
1.100GHz	0.785 / 156.710	1.498 / 58.861	0.149 / 55.316	0.663 / 170.133
1.300GHz	0.789 / 152.003	1.304 / 53.413	0.172 / 53.022	0.669 / 167.864
1.500GHz	0.783 / 147.224	1.156 / 48.633	0.193 / 51.230	0.668 / 165.698
1.700GHz	0.783 / 142.457	1.053 / 44.105	0.214 / 49.433	0.676 / 163.678
1.900GHz	0.782 / 138.413	0.969 / 39.741	0.236 / 47.485	0.672 / 161.501
2.100GHz	0.782 / 134.586	0.908 / 36.045	0.255 / 45.093	0.675 / 159.508
2.300GHz	0.774 / 130.034	0.853 / 32.346	0.274 / 42.835	0.680 / 158.208
2.500GHz	0.777 / 126.018	0.818 / 28.819	0.296 / 40.553	0.683 / 156.054
2.700GHz	0.774 / 122.378	0.779 / 25.616	0.309 / 38.530	0.675 / 154.888
2.900GHz	0.762 / 118.535	0.747 / 23.063	0.327 / 36.266	0.683 / 153.644
3.000GHz	0.765 / 116.902	0.741 / 21.698	0.333 / 35.272	0.684 / 152.550

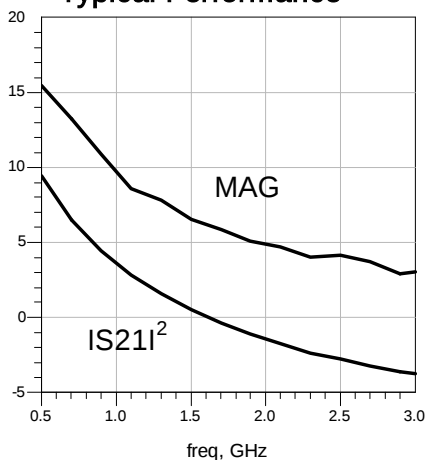
Typical Performance


Figure19. Insertion Power Gain, MAG, and MSG vs Frequency.
 $V_{ce}=4.8V$, $I_c = 20mA$

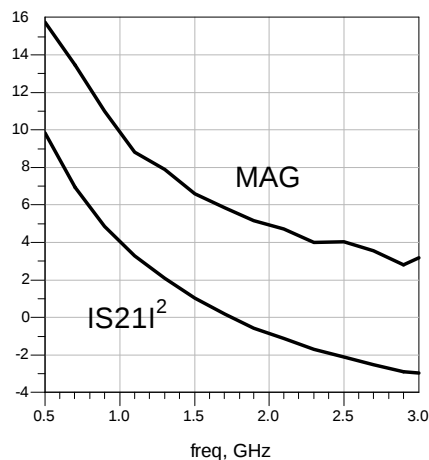


Figure20. Insertion Power Gain, MAG, and MSG vs Frequency.
 $V_{ce}=4.8V$, $I_c = 30mA$

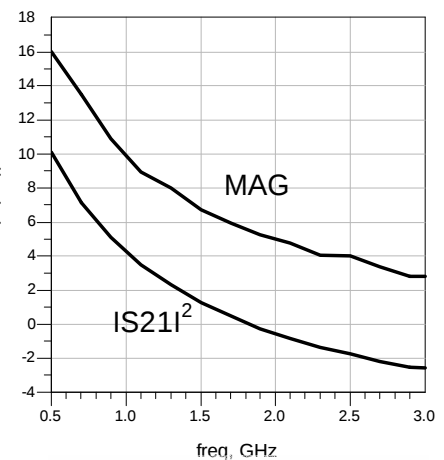


Figure21. Insertion Power Gain, MAG, and MSG vs Frequency.
 $V_{ce}=4.8V$, $I_c = 40mA$

THN5601SF Typical Scattering Parameters, Common Emitter, $Z_o = 50\Omega$

$V_{ce} = 4.8V$, $I_c = 50mA$, $T_c = 25$

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
500.0MHz	0.833 / 172.822	3.238 / 77.634	0.079 / 56.294	0.631 / -179.041
700.0MHz	0.795 / 167.006	2.307 / 71.298	0.104 / 57.275	0.679 / 175.398
900.0MHz	0.789 / 161.645	1.822 / 65.246	0.126 / 57.058	0.686 / 171.824
1.100GHz	0.787 / 156.318	1.521 / 59.887	0.148 / 55.646	0.679 / 168.956
1.300GHz	0.789 / 151.615	1.326 / 54.579	0.176 / 54.032	0.685 / 166.787
1.500GHz	0.786 / 146.725	1.177 / 49.885	0.196 / 52.263	0.685 / 164.543
1.700GHz	0.784 / 142.038	1.073 / 45.502	0.218 / 50.176	0.690 / 162.610
1.900GHz	0.783 / 137.962	0.989 / 41.183	0.240 / 47.420	0.685 / 160.232
2.100GHz	0.781 / 134.104	0.927 / 37.502	0.261 / 45.361	0.687 / 158.250
2.300GHz	0.772 / 129.613	0.871 / 33.769	0.279 / 42.829	0.691 / 156.813
2.500GHz	0.777 / 125.863	0.837 / 30.332	0.297 / 40.518	0.692 / 154.518
2.700GHz	0.774 / 121.956	0.797 / 27.000	0.314 / 38.167	0.682 / 153.535
2.900GHz	0.760 / 118.186	0.766 / 24.427	0.330 / 35.949	0.689 / 152.320
3.000GHz	0.762 / 116.615	0.762 / 23.157	0.338 / 34.721	0.689 / 151.041

$V_{ce} = 4.8V$, $I_c = 60mA$, $T_c = 25$

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
500.0MHz	0.836 / 172.403	3.271 / 77.862	0.081 / 58.119	0.646 / -179.829
700.0MHz	0.796 / 166.652	2.327 / 71.729	0.105 / 58.470	0.693 / 174.860
900.0MHz	0.794 / 161.463	1.839 / 65.768	0.127 / 57.345	0.699 / 170.996
1.100GHz	0.788 / 156.128	1.537 / 60.529	0.152 / 57.134	0.691 / 168.420
1.300GHz	0.790 / 151.293	1.342 / 55.305	0.177 / 54.368	0.697 / 166.109
1.500GHz	0.786 / 146.434	1.191 / 50.682	0.198 / 52.480	0.695 / 163.871
1.700GHz	0.784 / 141.746	1.084 / 46.414	0.220 / 50.415	0.702 / 161.747
1.900GHz	0.781 / 137.643	1.002 / 42.100	0.242 / 47.687	0.695 / 159.359
2.100GHz	0.780 / 133.798	0.939 / 38.432	0.261 / 45.484	0.696 / 157.276
2.300GHz	0.773 / 129.269	0.885 / 34.752	0.282 / 43.019	0.698 / 155.855
2.500GHz	0.775 / 125.425	0.848 / 31.227	0.300 / 40.297	0.697 / 153.698
2.700GHz	0.772 / 121.642	0.812 / 28.053	0.317 / 38.001	0.690 / 152.484
2.900GHz	0.759 / 118.018	0.780 / 25.431	0.334 / 35.609	0.694 / 151.288
3.000GHz	0.763 / 116.176	0.772 / 23.910	0.343 / 34.481	0.696 / 150.251

$V_{ce} = 4.8V$, $I_c = 70mA$, $T_c = 25$

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
500.0MHz	0.837 / 172.052	3.290 / 78.081	0.080 / 59.586	0.654 / 179.941
700.0MHz	0.796 / 166.435	2.344 / 72.015	0.103 / 59.960	0.704 / 174.473
900.0MHz	0.795 / 161.281	1.852 / 66.185	0.125 / 58.453	0.706 / 170.833
1.100GHz	0.790 / 155.713	1.546 / 61.002	0.152 / 57.354	0.701 / 167.970
1.300GHz	0.791 / 151.036	1.350 / 55.864	0.179 / 54.011	0.706 / 165.684
1.500GHz	0.786 / 146.200	1.199 / 51.293	0.201 / 52.908	0.703 / 163.325
1.700GHz	0.784 / 141.458	1.093 / 47.065	0.221 / 50.343	0.708 / 161.233
1.900GHz	0.781 / 137.390	1.010 / 42.872	0.242 / 48.024	0.702 / 158.728
2.100GHz	0.781 / 133.517	0.947 / 39.250	0.264 / 45.468	0.703 / 156.659
2.300GHz	0.773 / 129.026	0.892 / 35.529	0.283 / 42.932	0.705 / 155.319
2.500GHz	0.775 / 125.325	0.857 / 31.951	0.300 / 40.421	0.705 / 152.975
2.700GHz	0.771 / 121.340	0.819 / 28.752	0.319 / 37.777	0.695 / 151.668
2.900GHz	0.757 / 117.545	0.788 / 26.076	0.335 / 35.688	0.700 / 150.670
3.000GHz	0.759 / 115.965	0.782 / 24.645	0.344 / 34.580	0.702 / 149.490

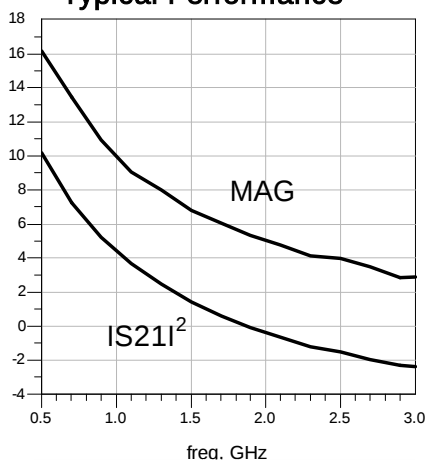
Typical Performance


Figure22. Insertion Power Gain, MAG, and MSG vs Frequency.
 $V_{ce}=4.8V$, $I_c = 50mA$

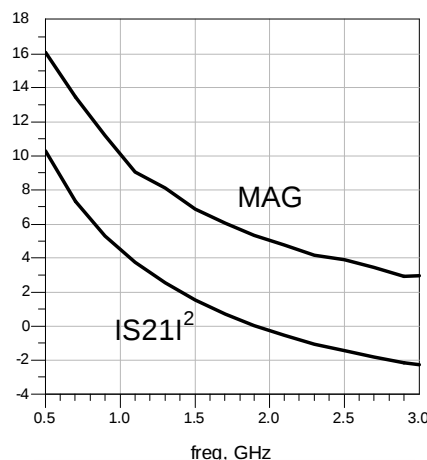


Figure23. Insertion Power Gain, MAG, and MSG vs Frequency.
 $V_{ce}=4.8V$, $I_c = 60mA$

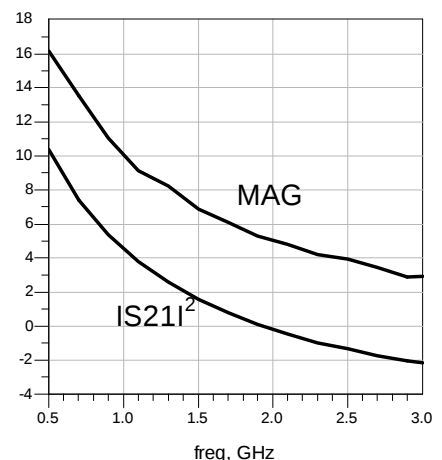


Figure24. Insertion Power Gain, MAG, and MSG vs Frequency.
 $V_{ce}=4.8V$, $I_c = 70mA$

THN5601SF Typical Scattering Parameters, Common Emitter, $Z_o = 50\Omega$

$V_{ce} = 4.8V$, $I_c = 80mA$, $T_c = 25$

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
500.0MHz	0.836 / 171.841	3.303 / 78.149	0.081 / 60.328	0.661 / 179.614
700.0MHz	0.796 / 166.353	2.353 / 72.198	0.102 / 60.227	0.711 / 174.259
900.0MHz	0.796 / 160.987	1.860 / 66.429	0.128 / 58.418	0.719 / 170.329
1.100GHz	0.788 / 155.718	1.554 / 61.419	0.155 / 57.563	0.710 / 167.652
1.300GHz	0.793 / 150.895	1.357 / 56.248	0.179 / 55.001	0.712 / 165.410
1.500GHz	0.786 / 145.947	1.206 / 51.758	0.201 / 53.296	0.710 / 162.995
1.700GHz	0.785 / 141.288	1.100 / 47.528	0.223 / 50.341	0.716 / 160.850
1.900GHz	0.783 / 137.204	1.015 / 43.370	0.245 / 47.829	0.708 / 158.278
2.100GHz	0.780 / 133.368	0.953 / 39.738	0.266 / 45.650	0.709 / 156.211
2.300GHz	0.771 / 128.864	0.898 / 36.098	0.283 / 43.018	0.709 / 154.810
2.500GHz	0.774 / 125.139	0.864 / 32.653	0.303 / 40.761	0.709 / 152.619
2.700GHz	0.772 / 121.250	0.825 / 29.323	0.320 / 38.243	0.698 / 151.232
2.900GHz	0.757 / 117.384	0.794 / 26.656	0.337 / 35.859	0.702 / 150.087
3.000GHz	0.760 / 115.810	0.788 / 25.254	0.346 / 34.694	0.704 / 148.894

$V_{ce} = 4.8V$, $I_c = 90mA$, $T_c = 25$

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
500.0MHz	0.843 / 171.623	3.313 / 78.262	0.083 / 59.709	0.669 / 179.218
700.0MHz	0.799 / 166.088	2.360 / 72.436	0.104 / 61.188	0.717 / 173.900
900.0MHz	0.796 / 160.880	1.865 / 66.708	0.129 / 60.548	0.721 / 170.039
1.100GHz	0.790 / 155.558	1.559 / 61.602	0.155 / 57.668	0.714 / 167.353
1.300GHz	0.793 / 150.747	1.362 / 56.621	0.180 / 55.417	0.717 / 165.007
1.500GHz	0.786 / 145.971	1.209 / 52.212	0.202 / 53.313	0.714 / 162.561
1.700GHz	0.784 / 141.162	1.104 / 47.937	0.225 / 50.410	0.721 / 160.444
1.900GHz	0.782 / 137.047	1.020 / 43.788	0.247 / 48.102	0.714 / 157.952
2.100GHz	0.782 / 133.132	0.958 / 40.201	0.266 / 45.476	0.712 / 155.912
2.300GHz	0.771 / 128.595	0.902 / 36.488	0.284 / 42.974	0.713 / 154.505
2.500GHz	0.773 / 124.934	0.868 / 33.105	0.306 / 40.255	0.714 / 152.235
2.700GHz	0.772 / 121.212	0.828 / 29.845	0.320 / 38.065	0.701 / 150.947
2.900GHz	0.756 / 117.156	0.798 / 27.175	0.338 / 35.676	0.706 / 149.668
3.000GHz	0.762 / 115.652	0.794 / 25.804	0.347 / 34.521	0.709 / 148.516

$V_{ce} = 4.8V$, $I_c = 100mA$, $T_c = 25$

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
500.0MHz	0.841 / 171.401	3.319 / 78.333	0.081 / 59.126	0.676 / 179.058
700.0MHz	0.800 / 165.977	2.365 / 72.557	0.106 / 60.999	0.722 / 173.767
900.0MHz	0.797 / 160.917	1.868 / 66.860	0.127 / 59.083	0.727 / 169.924
1.100GHz	0.791 / 155.508	1.562 / 61.871	0.157 / 57.766	0.719 / 167.111
1.300GHz	0.794 / 150.632	1.364 / 56.839	0.179 / 55.473	0.724 / 164.910
1.500GHz	0.787 / 145.862	1.212 / 52.501	0.202 / 53.300	0.720 / 162.472
1.700GHz	0.784 / 141.117	1.106 / 48.256	0.226 / 50.699	0.724 / 160.268
1.900GHz	0.783 / 136.956	1.023 / 44.126	0.247 / 48.407	0.717 / 157.763
2.100GHz	0.780 / 132.932	0.961 / 40.574	0.268 / 45.661	0.716 / 155.622
2.300GHz	0.771 / 128.621	0.906 / 36.860	0.287 / 42.871	0.717 / 154.136
2.500GHz	0.774 / 124.832	0.870 / 33.332	0.307 / 40.442	0.716 / 151.750
2.700GHz	0.771 / 120.770	0.833 / 30.046	0.322 / 38.242	0.706 / 150.500
2.900GHz	0.757 / 117.189	0.802 / 27.532	0.338 / 35.376	0.709 / 149.368
3.000GHz	0.759 / 115.545	0.797 / 26.089	0.349 / 34.642	0.708 / 148.148

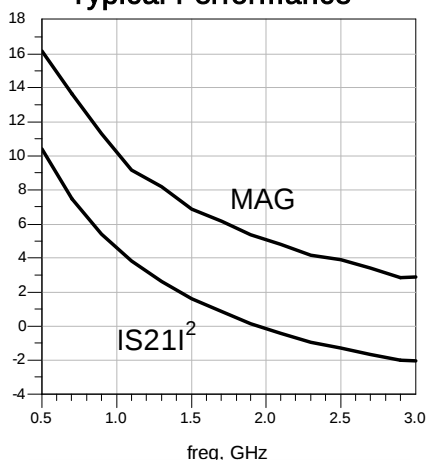
Typical Performance


Figure25. Insertion Power Gain, MAG, and MSG vs Frequency.
 $V_{ce}=4.8V$, $I_c = 80mA$

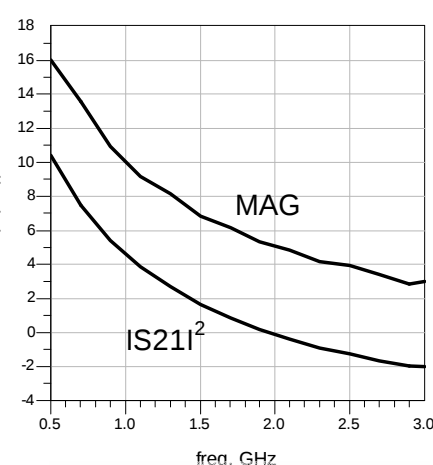


Figure26. Insertion Power Gain, MAG, and MSG vs Frequency.
 $V_{ce}=4.8V$, $I_c = 90mA$

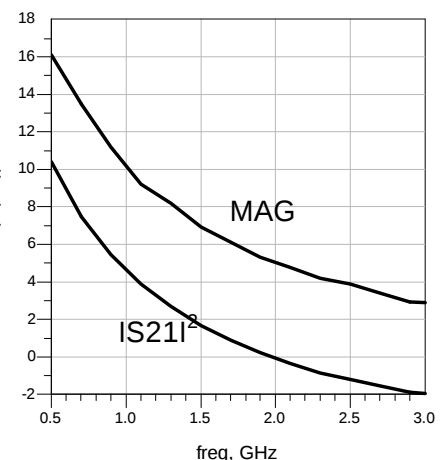


Figure27. Insertion Power Gain, MAG, and MSG vs Frequency.
 $V_{ce}=4.8V$, $I_c = 100mA$

THN5601SF Typical Scattering Parameters, Common Emitter, $Z_o = 50\Omega$

$V_{ce} = 4.8V$, $I_c = 120mA$, $T_c = 25$

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
500.0MHz	0.839 / 171.377	3.346 / 78.527	0.079 / 62.372	0.677 / 178.817
700.0MHz	0.800 / 165.825	2.384 / 72.791	0.104 / 61.624	0.729 / 173.721
900.0MHz	0.797 / 160.790	1.882 / 67.142	0.131 / 59.771	0.731 / 169.813
1.100GHz	0.789 / 155.427	1.574 / 62.169	0.155 / 58.592	0.723 / 166.954
1.300GHz	0.793 / 150.474	1.375 / 57.179	0.180 / 55.635	0.728 / 164.603
1.500GHz	0.787 / 145.706	1.220 / 52.872	0.203 / 53.291	0.725 / 162.101
1.700GHz	0.784 / 141.009	1.116 / 48.622	0.226 / 51.003	0.727 / 160.065
1.900GHz	0.782 / 136.847	1.030 / 44.496	0.248 / 48.202	0.721 / 157.546
2.100GHz	0.780 / 132.869	0.968 / 40.982	0.269 / 45.677	0.719 / 155.339
2.300GHz	0.772 / 128.330	0.912 / 37.267	0.288 / 42.926	0.721 / 153.842
2.500GHz	0.774 / 124.543	0.878 / 33.854	0.308 / 40.536	0.720 / 151.516
2.700GHz	0.769 / 120.674	0.840 / 30.668	0.325 / 38.103	0.709 / 150.088
2.900GHz	0.754 / 116.984	0.810 / 27.983	0.342 / 35.683	0.711 / 148.969
3.000GHz	0.758 / 115.326	0.802 / 26.470	0.349 / 34.449	0.712 / 147.772

$V_{ce} = 4.8V$, $I_c = 150mA$, $T_c = 25$

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
500.0MHz	0.841 / 171.094	3.352 / 78.664	0.081 / 60.551	0.686 / 178.488
700.0MHz	0.800 / 165.466	2.390 / 72.932	0.104 / 62.216	0.734 / 173.492
900.0MHz	0.797 / 160.520	1.885 / 67.373	0.129 / 60.520	0.739 / 169.581
1.100GHz	0.791 / 154.981	1.578 / 62.497	0.159 / 58.809	0.729 / 166.697
1.300GHz	0.793 / 150.319	1.378 / 57.596	0.182 / 56.075	0.735 / 164.280
1.500GHz	0.788 / 145.409	1.226 / 53.222	0.204 / 53.703	0.732 / 161.803
1.700GHz	0.784 / 140.748	1.118 / 49.073	0.227 / 51.266	0.734 / 159.799
1.900GHz	0.782 / 136.698	1.033 / 45.028	0.250 / 48.337	0.727 / 157.050
2.100GHz	0.780 / 132.643	0.971 / 41.410	0.270 / 45.709	0.726 / 155.030
2.300GHz	0.770 / 128.245	0.917 / 37.774	0.289 / 43.148	0.727 / 153.399
2.500GHz	0.772 / 124.389	0.882 / 34.283	0.308 / 40.234	0.723 / 151.088
2.700GHz	0.768 / 120.544	0.844 / 31.118	0.324 / 37.920	0.713 / 149.716
2.900GHz	0.753 / 116.648	0.813 / 28.503	0.340 / 35.221	0.716 / 148.478
3.000GHz	0.757 / 115.129	0.809 / 26.921	0.351 / 34.433	0.715 / 147.324

$V_{ce} = 4.8V$, $I_c = 200mA$, $T_c = 25$

freq	S(1,1)	S(2,1)	S(1,2)	S(2,2)
500.0MHz	0.843 / 170.511	3.346 / 78.748	0.079 / 61.529	0.695 / 178.449
700.0MHz	0.802 / 165.528	2.386 / 73.162	0.108 / 63.730	0.743 / 173.298
900.0MHz	0.801 / 160.156	1.886 / 67.570	0.130 / 61.207	0.745 / 169.280
1.100GHz	0.792 / 154.905	1.576 / 62.830	0.157 / 58.519	0.736 / 166.529
1.300GHz	0.793 / 150.021	1.380 / 57.815	0.181 / 55.981	0.744 / 163.975
1.500GHz	0.787 / 145.164	1.225 / 53.606	0.207 / 54.127	0.738 / 161.435
1.700GHz	0.787 / 140.560	1.119 / 49.500	0.230 / 51.454	0.742 / 159.349
1.900GHz	0.783 / 136.461	1.036 / 45.380	0.251 / 48.248	0.733 / 156.742
2.100GHz	0.780 / 132.472	0.974 / 41.916	0.270 / 45.907	0.732 / 154.518
2.300GHz	0.770 / 127.967	0.919 / 38.211	0.290 / 42.914	0.731 / 152.978
2.500GHz	0.770 / 124.120	0.884 / 34.866	0.310 / 40.521	0.729 / 150.624
2.700GHz	0.768 / 120.247	0.846 / 31.452	0.327 / 37.809	0.718 / 149.207
2.900GHz	0.755 / 116.416	0.817 / 28.879	0.344 / 35.171	0.720 / 147.865
3.000GHz	0.756 / 114.697	0.811 / 27.372	0.353 / 34.118	0.721 / 146.720

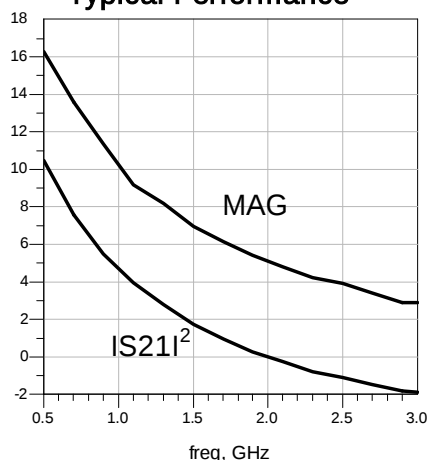
Typical Performance


Figure28. Insertion Power Gain, MAG, and MSG vs Frequency.
 $V_{ce}=4.8V$, $I_c = 120mA$

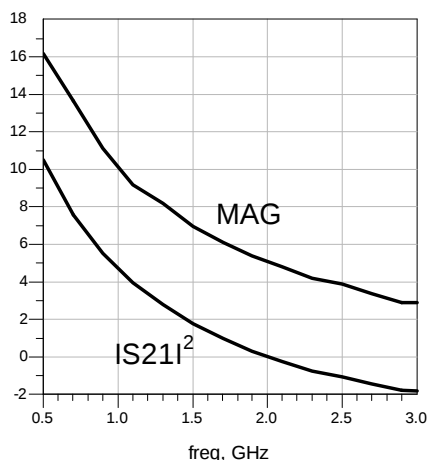


Figure29. Insertion Power Gain, MAG, and MSG vs Frequency.
 $V_{ce}=4.8V$, $I_c = 150mA$

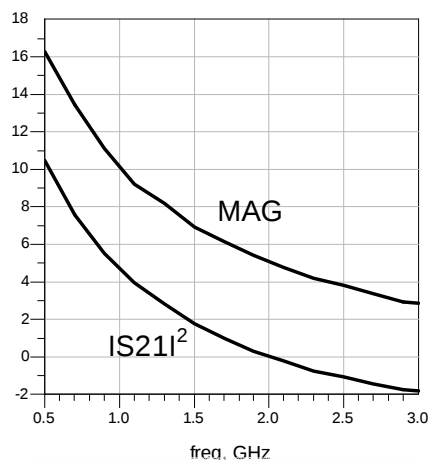


Figure30. Insertion Power Gain, MAG, and MSG vs Frequency.
 $V_{ce}=4.8V$, $I_c = 200mA$