

DESCRIPTION

The MGF0906A and MGF0907A GaAs FETs, with N-channel Schottky gates, are designed for use in UHF band amplifiers.

FEATURES

- Class A operation
- High output power @ 2.3 GHz
 MGF0906A: $P_{1dB} = 37 \text{ dB (TYP)}$
 MGF0907A: $P_{1dB} = 40 \text{ dB (TYP)}$
- High power gain @ 2.3 GHz
 MGF0906A: $G_{LP} = 11 \text{ dB (TYP)}$
 MGF0907A: $G_{LP} = 10 \text{ dB (TYP)}$

- High power added efficiency @ 2.3 GHz, P_{1dB}
 MGF0906A: $\eta_{add} = 40\% \text{ (TYP)}$
 MGF0907A: $\eta_{add} = 37\% \text{ (TYP)}$

- Available in ceramic-lid package (MGF0906/0907B)

APPLICATION

- UHF band power amplifiers

QUALITY GRADE

- IG

RECOMMENDED BIAS CONDITIONS

- $V_{DS} = 10V$, $I_D = 0.6 \times I_{DSS}$

ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

SYMBOL	PARAMETER	TYPE	RATINGS	UNIT
V_{GDO}	Gate to drain voltage		-15	
V_{GSO}	Gate to source voltage		-15	
I_D	Drain current	MGF0906A MGF0907A	3 4	A
I_{GR}	Reverse gate current	MGF0906A MGF0907A	-10 -20	μA
I_{GF}	Forward gate current	MGF0906A MGF0907A	21 42	mA
P_T	Total power dissipation (1)	MGF0906A MGF0907A	23 37.5	W
T_{ch}	Channel temperature		175	$^\circ\text{C}$
T_{stg}	Storage temperature		-65 ~ +175	$^\circ\text{C}$
$R_{th(ch-c)}$	Thermal resistance (2)	MGF0906A MGF0907A	6.5 4.0	$^\circ\text{C/W}$

Notes: (1) $T_C = 25^\circ\text{C}$ (2) Channel to case

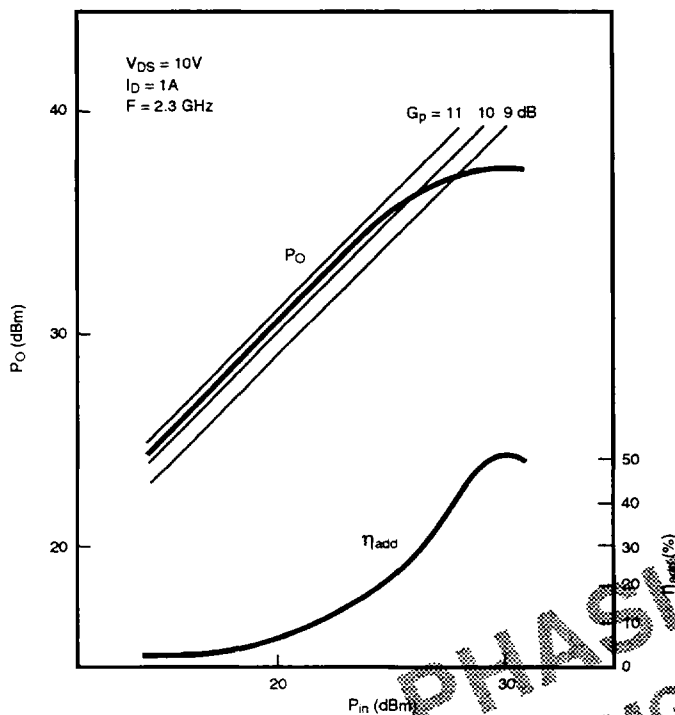
ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

SYMBOL	PARAMETER	TEST CONDITIONS	TYPE	LIMITS			UNIT
				MIN	TYP	MAX	
I_{DSS}	Saturated drain current	$V_{DS} = 3V$, $V_{GS} = 0V$	MGF0906A MGF0907A	— —	2.0 5	3.0 7.0	A
g_m	Transconductance	$V_{DS} = 3V$, $I_D = 1.1 \text{ mA}$ $V_{DS} = 3V$, $I_D = 2.2 \text{ mA}$	MGF0906A MGF0907A	— —	1.0 2.0	— —	S
$V_{GS(off)}$	Gate to source cutoff voltage	$V_{DS} = 3V$, $I_D = 10 \text{ mA}$ $V_{DS} = 3V$, $I_D = 20 \text{ mA}$	MGF0906A MGF0907A	-1 —	-3 2.0	-4.5 —	V
P_{1dB}	Output power at 1 dB gain compression	$V_{DS} = 10V$, $I_D = 1.2 \text{ A}$, $f = 2.3 \text{ GHz}$ $V_{DS} = 10V$, $I_D = 2.4 \text{ A}$, $f = 2.3 \text{ GHz}$	MGF0906A MGF0907A	36.5 38.5	37 40	— —	dBm
G_{LP}	Linear power gain	$V_{DS} = 10V$, $I_D = 1.2 \text{ A}$, $f = 2.3 \text{ GHz}$ $V_{DS} = 10V$, $I_D = 2.4 \text{ A}$, $f = 2.3 \text{ GHz}$	MGF0906A MGF0907A	10 9	11 10	— —	dB
η_{add}	Power added efficiency	$V_{DS} = 10V$, $I_D = 1.2 \text{ A}$, $f = 2.3 \text{ GHz}$ $V_{DS} = 10V$, $I_D = 2.4 \text{ A}$, $f = 2.3 \text{ GHz}$	MGF0906A MGF0907A	— —	40 38	— —	%

TYPICAL CHARACTERISTICS

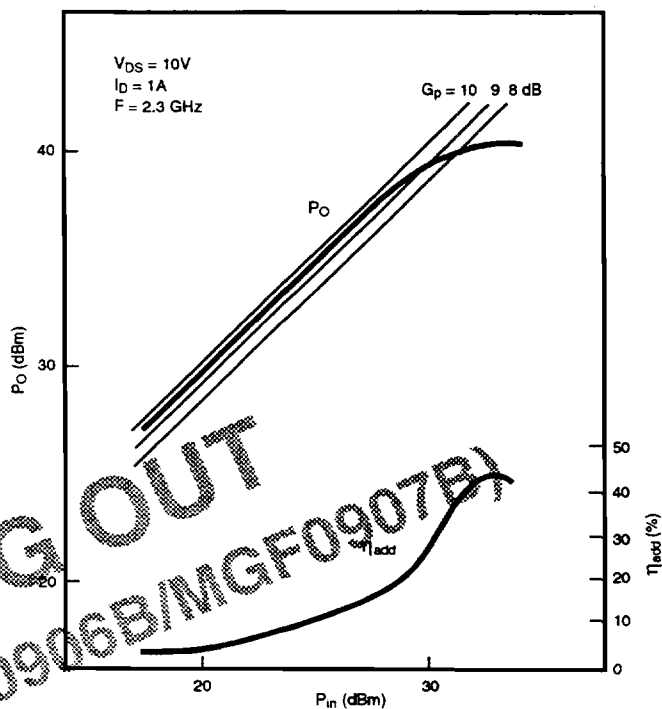
MGF0906A

P_O, η_{add} vs P_{in}

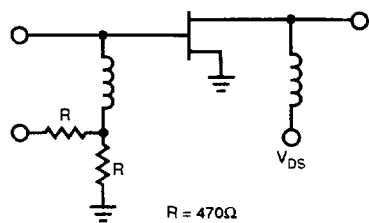


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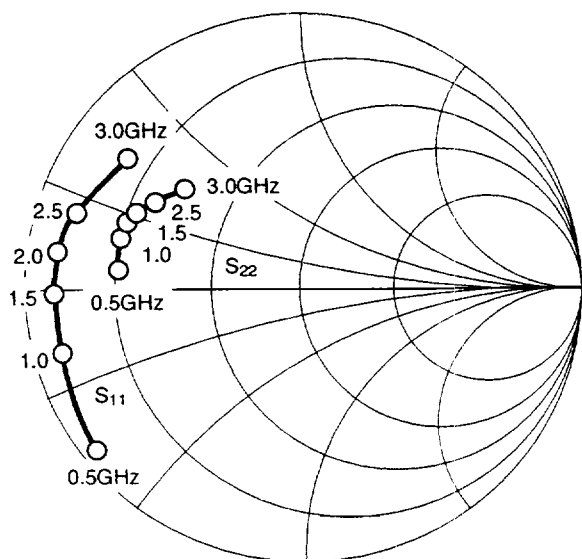
P_O, η_{add} vs P_{in}



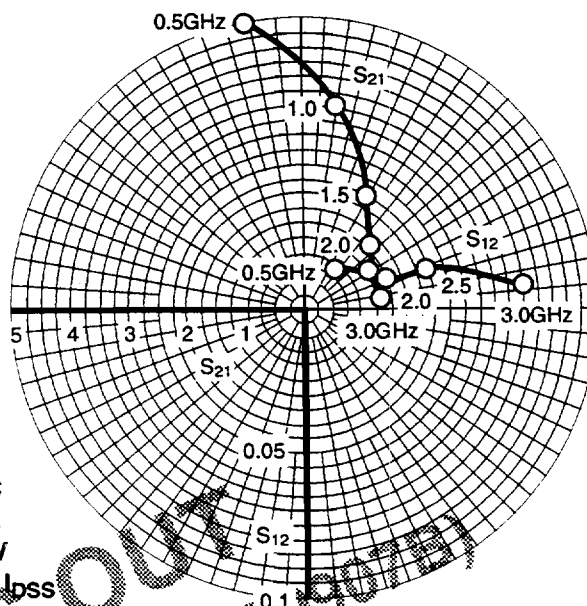
BIAS CIRCUIT



S₁₁, S₂₂ vs f



S₁₂, S₂₁ vs f

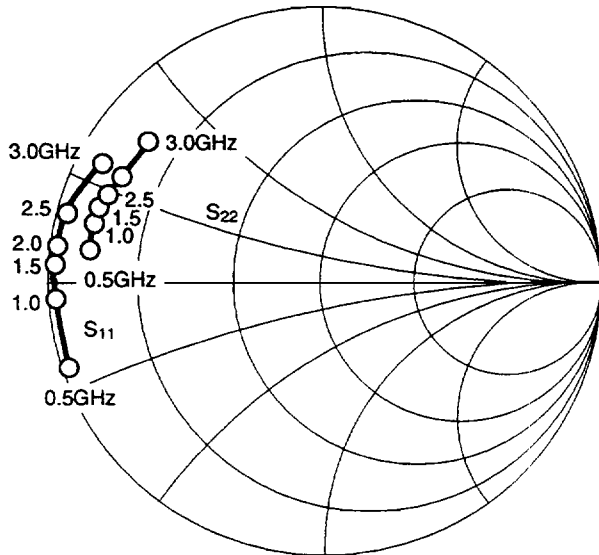


$T_a = 25^\circ\text{C}$
 $Z_0 = 50\ \Omega$
 $V_{DS} = 10\text{V}$
 $I_D = 0.5 \times I_{DSS}$

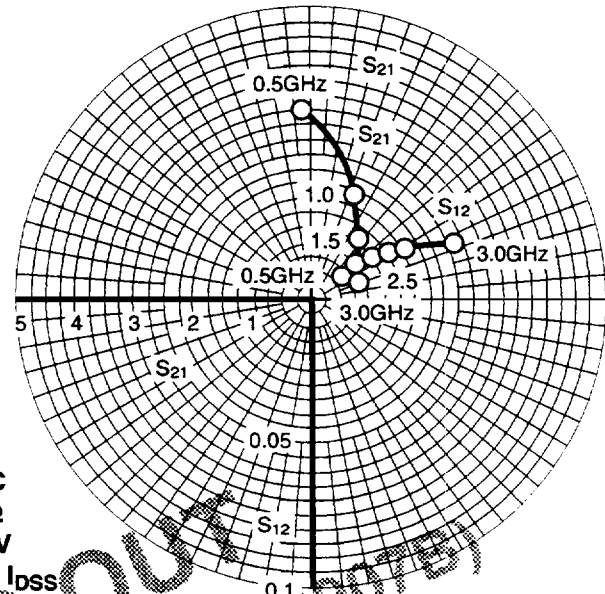
MGF0906A S PARAMETERS ($T_a = 25^\circ\text{C}$, $V_{DS} = 10\text{V}$, $I_D = 1.2\text{A}$)

f (GHz)	S ₁₁		S ₁₂		S ₂₁		S ₂₂		K	Max Gain (dB)
	Magn	Angle (deg)	Magn	Angle (deg)	Magn	Angle (deg)	Magn	Angle (deg)		
0.5	0.922	-139.9	0.016	51.5	4.997	104.1	0.673	174.9	0.869	24.95
0.6	0.913	-146.2	0.019	44.9	4.570	97.5	0.674	172.5	0.837	23.81
0.7	0.906	-151.8	0.022	39.3	4.176	91.5	0.676	170.4	0.807	22.78
0.8	0.900	-156.3	0.023	34.6	3.815	85.9	0.677	168.6	0.826	22.13
0.9	0.896	-161.2	0.025	30.7	3.484	80.9	0.679	167.0	0.819	21.44
1.0	0.894	-165.0	0.026	27.7	3.182	76.2	0.680	165.7	0.834	20.88
1.1	0.892	-168.4	0.026	25.2	2.909	72.2	0.680	164.5	0.883	20.49
1.2	0.891	-171.4	0.027	23.4	2.662	68.3	0.681	163.5	0.906	19.94
1.3	0.891	-174.0	0.027	22.1	2.440	64.8	0.681	162.6	0.959	19.56
1.4	0.891	-176.3	0.027	21.3	2.242	61.6	0.680	161.8	1.024	18.24
1.5	0.892	-178.3	0.027	20.9	2.067	58.7	0.679	161.1	1.086	17.05
1.6	0.892	-179.9	0.027	20.7	1.913	55.9	0.678	160.5	1.160	16.08
1.7	0.892	-178.2	0.028	20.8	1.779	53.2	0.676	159.8	1.202	15.31
1.8	0.892	-176.6	0.028	21.0	1.664	50.7	0.673	159.2	1.285	14.53
1.9	0.891	-175.1	0.029	21.3	1.565	48.2	0.670	158.6	1.334	13.86
2.0	0.890	-173.6	0.030	21.6	1.482	45.8	0.666	157.9	1.384	13.24
2.1	0.887	-172.0	0.031	21.9	1.414	43.4	0.661	157.1	1.455	12.59
2.2	0.883	-170.2	0.033	21.9	1.359	40.8	0.655	156.3	1.487	12.02
2.3	0.877	-168.3	0.035	21.8	1.315	38.2	0.649	155.3	1.538	11.42
2.4	0.870	-166.2	0.038	21.3	1.282	35.4	0.642	154.1	1.553	10.90
2.5	0.861	-163.8	0.042	20.5	1.258	32.5	0.633	152.8	1.554	10.38
2.6	0.850	-161.1	0.046	19.2	1.241	29.3	0.624	151.3	1.569	9.87
2.7	0.837	-157.9	0.051	17.4	1.231	25.8	0.614	149.5	1.569	9.39
2.8	0.821	-154.4	0.057	15.0	1.226	22.0	0.602	147.5	1.566	8.90
2.9	0.803	-150.3	0.064	11.9	1.224	17.9	0.589	145.1	1.556	8.43
3.0	0.781	-145.6	0.072	8.0	1.224	13.4	0.576	142.5	1.549	7.94

S₁₁, S₂₂ vs f



S₂₁, S₁₂ vs f



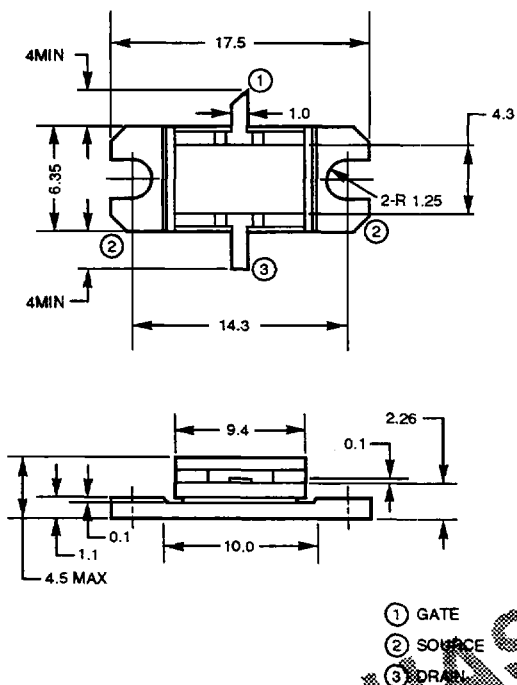
$T_a = 25^\circ\text{C}$
 $Z_o = 50\ \Omega$
 $V_{DS} = 10\text{V}$
 $I_D = 0.5 \times I_{DSS}$

MGF0907A S PARAMETERS ($T_a = 25^\circ\text{C}$, $V_{DS} = 10\text{V}$, $I_D = 2.4\text{A}$)

f (GHz)	S ₁₁		S ₁₂		S ₂₁		S ₂₂		K	Max Gain (dB)
	Magn	Angle (deg)	Magn	Angle (deg)	Magn	Angle (deg)	Magn	Angle (deg)		
0.5	0.947	-162.1	0.010	45.8	3.089	96.7	0.823	171.6	1.086	23.11
0.6	0.943	-165.6	0.012	44.1	2.793	90.8	0.822	170.1	1.055	22.24
0.7	0.939	-168.7	0.014	42.7	2.524	85.5	0.822	168.7	1.038	21.37
0.8	0.936	-171.4	0.016	41.5	2.281	80.7	0.821	167.5	1.024	20.59
0.9	0.934	-174.5	0.017	40.5	2.062	76.4	0.821	166.4	1.043	19.57
1.0	0.932	-175.9	0.018	39.7	1.865	72.7	0.820	165.5	1.072	18.52
1.1	0.931	-177.7	0.019	39.0	1.691	69.3	0.819	164.7	1.095	17.62
1.2	0.930	-179.3	0.020	38.4	1.537	66.4	0.818	164.0	1.124	16.72
1.3	0.929	-179.3	0.021	37.9	1.401	63.7	0.817	163.3	1.157	15.84
1.4	0.929	-178.1	0.021	37.5	1.284	61.4	0.816	162.7	1.219	15.04
1.5	0.928	-177.0	0.022	37.2	1.183	59.3	0.815	162.1	1.257	14.26
1.6	0.928	-176.0	0.022	36.9	1.096	57.4	0.813	161.5	1.328	13.55
1.7	0.927	-175.1	0.023	36.6	1.024	55.6	0.811	160.8	1.367	12.87
1.8	0.927	-174.2	0.023	36.3	0.964	54.0	0.810	160.2	1.430	12.33
1.9	0.926	-173.3	0.024	35.9	0.915	52.4	0.808	159.4	1.461	11.79
2.0	0.925	-172.3	0.025	35.5	0.875	50.9	0.806	158.6	1.488	11.31
2.1	0.923	-171.2	0.026	35.0	0.844	49.3	0.803	157.7	1.527	10.83
2.2	0.921	-170.0	0.027	34.4	0.820	47.6	0.801	156.7	1.555	10.44
2.3	0.919	-168.6	0.028	33.7	0.801	45.8	0.798	155.5	1.584	10.07
2.4	0.916	-167.1	0.030	32.8	0.787	43.9	0.796	154.1	1.574	9.73
2.5	0.912	-165.3	0.032	31.8	0.776	41.7	0.792	152.6	1.587	9.35
2.6	0.907	-163.3	0.035	30.6	0.767	39.2	0.789	150.9	1.570	8.97
2.7	0.902	-160.9	0.037	29.1	0.757	36.5	0.786	148.9	1.594	8.58
2.8	0.895	-158.3	0.040	27.4	0.747	33.4	0.782	146.6	1.614	8.12
2.9	0.887	-155.2	0.044	25.4	0.735	29.9	0.778	144.1	1.620	7.61
3.0	0.879	-151.7	0.048	23.1	0.719	26.0	0.774	141.4	1.636	7.09

OUTLINE DRAWING

Units (mm)



ORDERING INFORMATION

Part Number	Grade	Tested at	P _{1dB}	Notes
MGF0906A-01	Industrial	2.3 GHz, 100% RF	37 dBm	Metal Package
MGF0907A-01	Industrial	2.3 GHz, 100% RF	40 dBm	Metal Package