

DESCRIPTION

The MGFC2400 series GaAs FETs are N-channel Schottky gate devices designed for high frequency, medium and high power applications.

These FETs feature source island via-hole structures and air bridge connection of gates and drains to minimize parasitics and enhance high frequency operation, as well as plated heat sinks to improve thermal dissipation characteristics.

These devices have output power ranging from 250mW* (-2407) to 1.6W* (-2445) and are well suited for operation through 20 GHz.

The MGF2400 series devices feature hermetically sealed, metal-ceramic flanged packages.

*Typical data at 12GHz

MGFC2430 FEATURES

- High output power
 $P_{1dB} = 1.1 \text{ W (TYP) @ 12 GHz}$
- High power gain
 $G_{LP} = 6 \text{ dB (TYP) @ 12 GHz}$
- High power added efficiency
 $\eta_{add} = 25\% \text{ (TYP) @ 12GHz, } P_{1dB}$

MGF2430A FEATURES

- High output power
 $P_{1dB} = 30.5 \text{ dBm (TYP) @ 14.5 GHz}$
- High power gain
 $G_{LP} = 6.5 \text{ dB (TYP) @ 14.5 GHz}$
- High power added efficiency
 $\eta_{add} = 27\% \text{ (TYP) @ 14.5 GHz, } P_{1dB}$

APPLICATION

- S to Ku band power amplifiers

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

Symbol	Parameter	Type	Ratings	Unit
V_{GDO}	Gate to drain voltage		-15	V
V_{GSO}	Gate to source voltage		-15	V
I_D	Drain current	MGFC2430	420	mA
		MGF2430A	400	
I_{GR}	Reverse gate current		-1.2	mA
I_{GF}	Forward gate current		5.0	mA
P_T	Total power dissipation		2.5	W
T_{ch}	Channel temperature		175	$^\circ\text{C}$
T_{stg}	Storage temperature	MGFC2430	-55 ~ + 175	$^\circ\text{C}$
		MGF2430A	-65 ~ + 175	
R_{th}	Thermal resistance	MGFC2430	31	$^\circ\text{C/W}$
		MGF2430A	60	

ELECTRICAL CHARACTERISTICS ($P_{OUT} = 800\text{mW}$) ($T_a = 25^\circ\text{C}$)

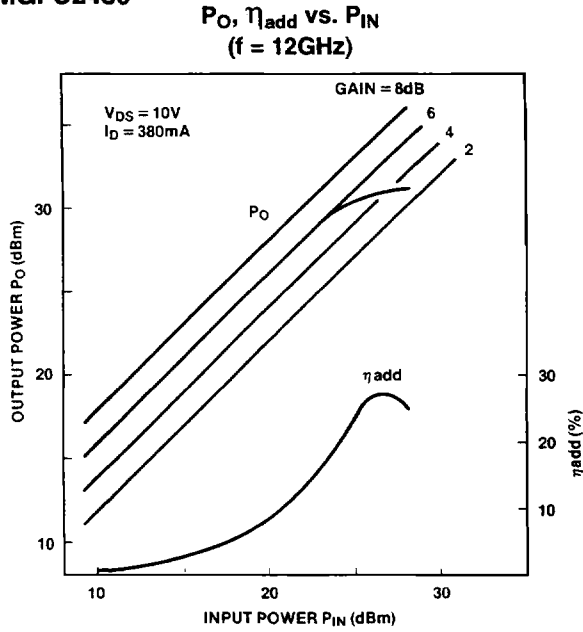
SYMBOL	PARAMETER	CONDITIONS	TYPE	LIMITS			UNIT
				MIN	TYP	MAX	
I_{DSS}	Saturated drain current	$V_{DS} = 3\text{V}, V_{GS} = 0\text{V}$	MGFC2430	550	700	900	mA
			MGF2430A	400	600	800	
$V_{GS(off)}$	Gate to source cut-off voltage	$V_{DS} = 3\text{V}, I_D = 1\text{mA}$	MGFC2430	-2	-3	-5	V
		$V_{DS} = 3\text{V}, I_D = 2\text{mA}$	MGF2430A	-1	-2.5	-4	
g_m	Transconductance	$V_{DS} = 3\text{V}, I_D = 350\text{mA}$	MGFC2430	200	300		mS
		$V_{DS} = 3\text{V}, I_D = 300\text{mA}$	MGF2430A	200	260		
P_{1dB}	Output power at 1 dB gain compression	$V_{DS} = 10\text{V}, I_D = 0.5 I_{DSS}, f = 12\text{GHz}$	MGFC2430	0.8	1.1		W
		$V_{DS} = 10\text{V}, I_D = 0.5 I_{DSS}, f = 14.5\text{GHz}, R_g = 110\Omega$	MGF2430A	29.0	30.5		
G_{LP}	Linear power gain	$V_{DS} = 10\text{V}, I_D = 0.5 I_{DSS}, f = 12\text{GHz}$	MGFC2430	5	6		dB
		$V_{DS} = 10\text{V}, I_D = 0.5 I_{DSS}, f = 14.5\text{GHz}, R_g = 110\Omega$	MGF2430A	5.5	6.5		
η_{add}	Power added efficiency at P_{1dB}	$V_{DS} = 10\text{V}, I_D = 0.5 I_{DSS}, f = 12\text{GHz}$	MGFC2430		25		%
		$V_{DS} = 10\text{V}, I_D = 0.5 I_{DSS}, f = 14.5\text{GHz}, R_g = 110\Omega$	MGF2430A		27		

ELECTRICAL CHARACTERISTICS ($P_{OUT} = 630\text{mW}$) ($T_a = 25^\circ\text{C}$)

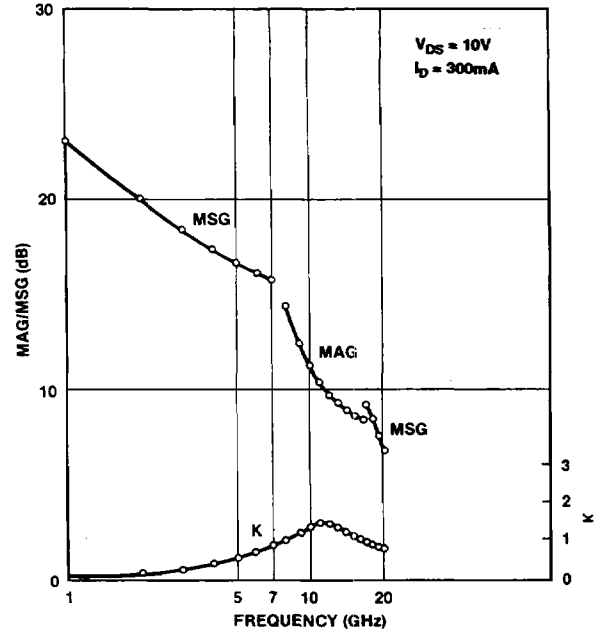
SYMBOL	PARAMETER	CONDITIONS	TYPE	LIMITS			UNIT
				MIN	TYP	MAX	
I_{DSS}	Saturated drain current	$V_{DS} = 3\text{V}, V_{GS} = 0\text{V}$	MGF2430A	---	600	1200	mA
$V_{GS(off)}$	Gate to source cut-off voltage	$V_{DS} = 3\text{V}, I_D = 2\text{mA}$	MGF2430A	---	-2.5	-5.0	V
g_m	Transconductance	$V_{DS} = 3\text{V}, I_D = 300\text{mA}$	MGF2430A	---	260	---	mS
P_{1dB}	Output power at 1 dB gain compression	$V_{DS} = 10\text{V}, I_D = 300\text{mA}, f = 14.5\text{GHz}, R_g = 110\Omega$	MGF2430A	28.0	30.5	---	dBm
G_{LP}	Linear power gain	$V_{DS} = 10\text{V}, I_D = 300\text{mA}, f = 14.5\text{GHz}, R_g = 110\Omega$	MGF2430A	4.0	6.0	---	dB
η_{add}	Power added efficiency at P_{1dB}	$V_{DS} = 10\text{V}, I_D = 300\text{mA}, f = 14.5\text{GHz}, R_g = 110\Omega$	MGF2430A	---	25	---	%

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

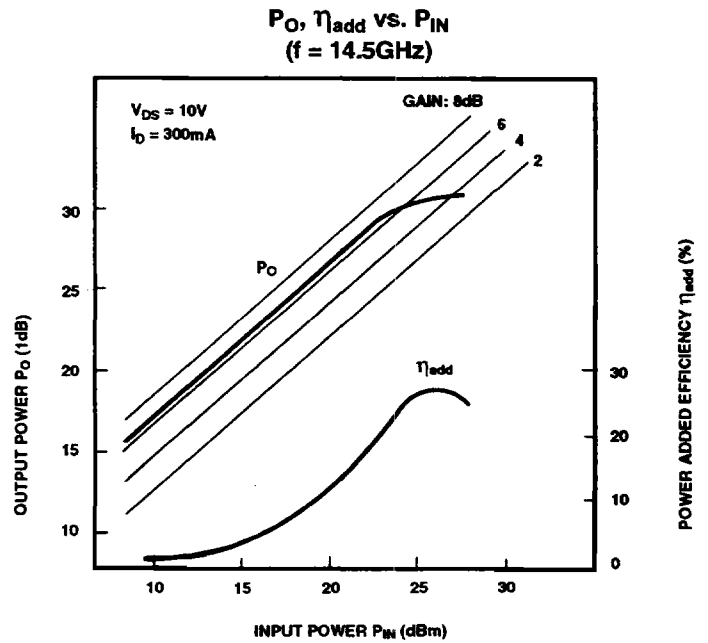
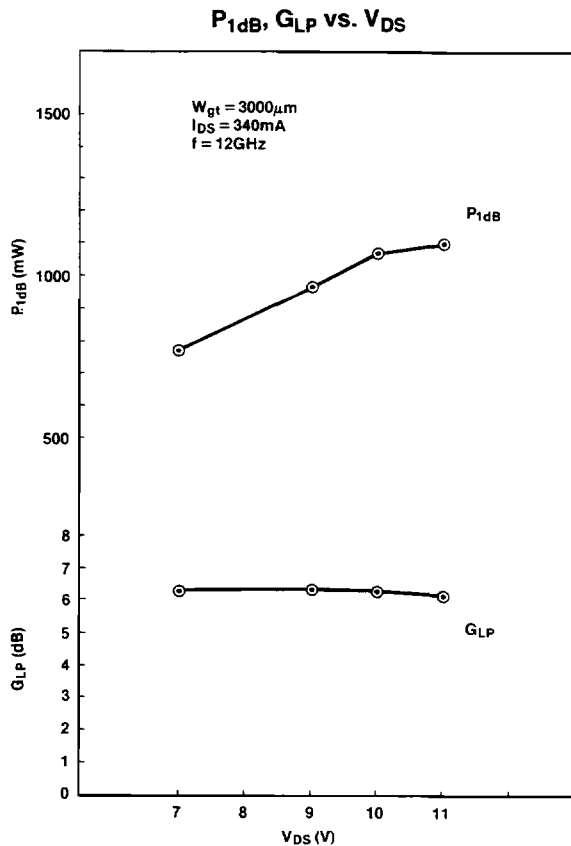
MGFC2430



VIA HOLE CHIP Wgt = $3000\mu\text{m}$



MGF2430A

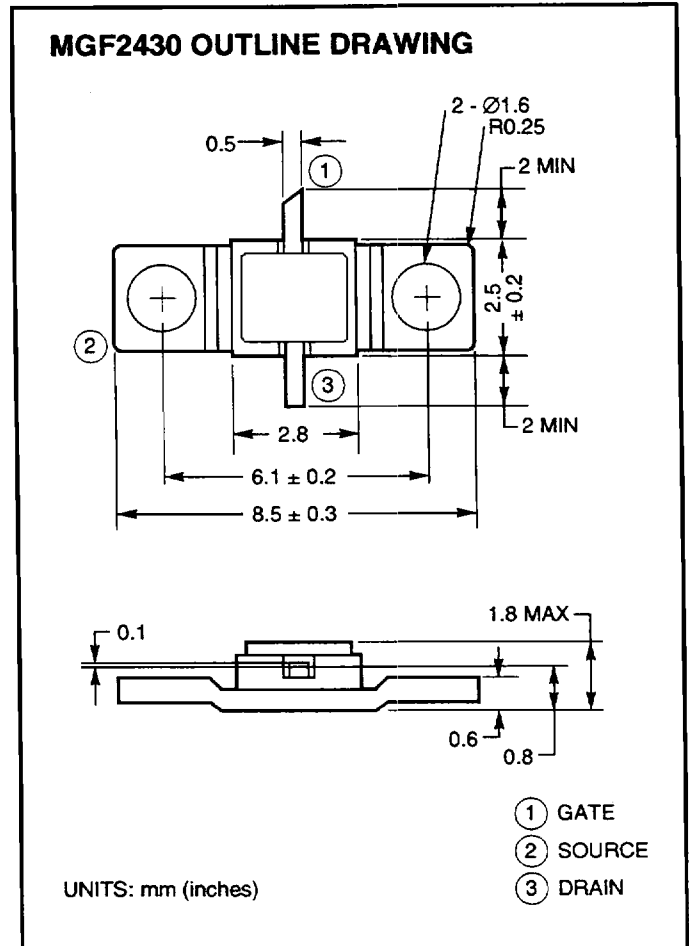
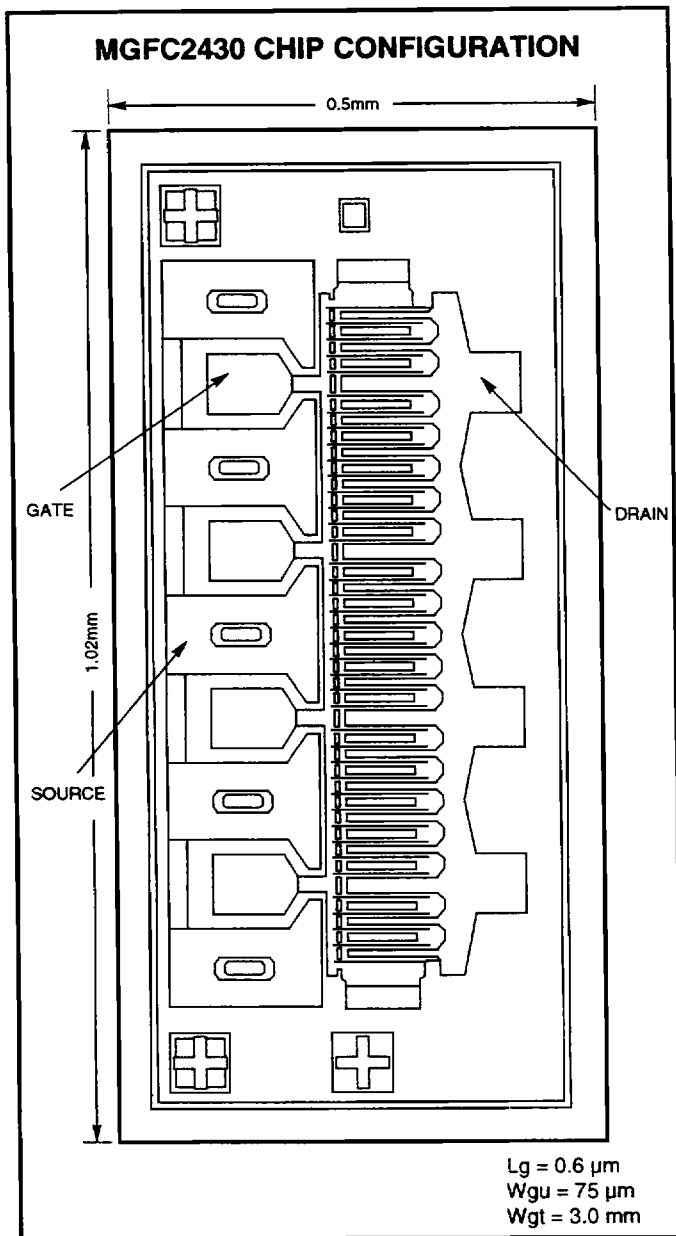


MGFC2430 VIA-HOLE CHIP S PARAMATERS ($V_{DS} = 10V, I_{DS} = 300mA$)

FREQUENCY (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAXIMUM GAIN	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.		AVAILABLE	STABLE
1	0.946	-139	7.109	101	0.036	15	0.241	-112	0.097		22.97
2	0.942	-158	3.668	83	0.036	1	0.280	-126	0.197		20.04
3	0.943	-165	2.411	72	0.035	-6	0.341	-132	0.303		18.41
4	0.946	-169	1.761	62	0.032	-11	0.404	-137	0.417		17.35
5	0.949	-171	1.363	54	0.030	-14	0.464	-142	0.544		16.63
6	0.952	-173	1.095	47	0.027	-15	0.518	-148	0.689		16.13
7	0.956	-174	0.904	40	0.024	-14	0.564	-153	0.853		15.79
8	0.958	-175	0.761	34	0.021	-11	0.604	-159	1.037	14.38	
9	0.961	-176	0.652	28	0.019	-6	0.638	-164	1.226	12.47	
10	0.963	-176	0.567	23	0.018	3	0.666	-168	1.388	11.33	
11	0.964	-177	0.499	18	0.018	13	0.690	-173	1.476	10.47	
12	0.966	-178	0.445	14	0.018	23	0.710	-177	1.467	9.78	
13	0.967	-178	0.401	10	0.020	32	0.726	179	1.383	9.25	
14	0.967	-179	0.365	7	0.023	38	0.739	175	1.269	8.84	
15	0.967	-179	0.335	4	0.027	42	0.749	171	1.155	8.58	
16	0.967	-180	0.311	1	0.031	44	0.756	167	1.056	8.57	
17	0.966	180	0.292	-2	0.036	45	0.762	164	0.975		9.12
18	0.965	180	0.276	-5	0.041	46	0.765	160	0.911		8.28
19	0.963	179	0.263	-7	0.047	45	0.766	157	0.862		7.50
20	0.961	179	0.254	-10	0.053	44	0.765	154	0.827		6.77

MGF2430A S PARAMATERS ($T_a = 25^\circ C, V_{DS} = 10V, I_D = 300mA$)

f (GHz)	S Parameters (TYP.)								K	MSG/MAG
	S ₁₁		S ₁₂		S ₂₁		S ₂₂			
	Magn.	Angle (deg.)	Magn.	Angle (deg.)	Magn.	Angle (deg.)	Magn.	Angle (deg.)		
4	0.934	-153.0	0.030	18.0	1.641	57.0	0.513	-132.0	0.501	17.4
6	0.900	-168.0	0.035	19.0	1.109	34.0	0.620	-142.0	0.969	15.0
8	0.853	173.0	0.043	20.0	0.927	13.0	0.699	-161.5	0.811	13.3
10	0.813	153.0	0.052	18.5	0.830	-13.0	0.723	180.0	1.008	11.5
12	0.750	131.5	0.058	13.0	0.788	-41.0	0.754	162.0	1.331	7.9
14	0.790	105.0	0.083	-7.5	0.730	-69.0	0.783	146.0	1.108	7.4
16	0.530	61.0	0.153	-37.0	0.689	-104.0	0.836	132.0	0.681	6.5



ORDERING INFORMATION

Part Number	Grade	Tested at	P_{1dB} (mW)	Notes
MGFC2430-T02	B	12 GHz, sample	800	
MGFC2430-T03	C	12 GHz, sample	800	
MGF2430A-11	Industrial	14.5 GHz, 100% RF	800	
MGF2430A-02	Industrial	14.5 GHz, 100% RF	630	