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 disssipation characteristics.

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

*Typical data at 12GHz

FEATURES

- High output power
  P_{1dB} = 1.6W (TYP) @ 12 GHz
- High power gain
  G_{LP} = 5 dB (TYP) @ 12 GHz
- High power added efficiency
  η_{add} = 18% (TYP) @ 12 GHz

APPLICATION

- S to Ku band power amplifiers

ABSOLUTE MAXIMUM RATINGS (T_a = 25°C)

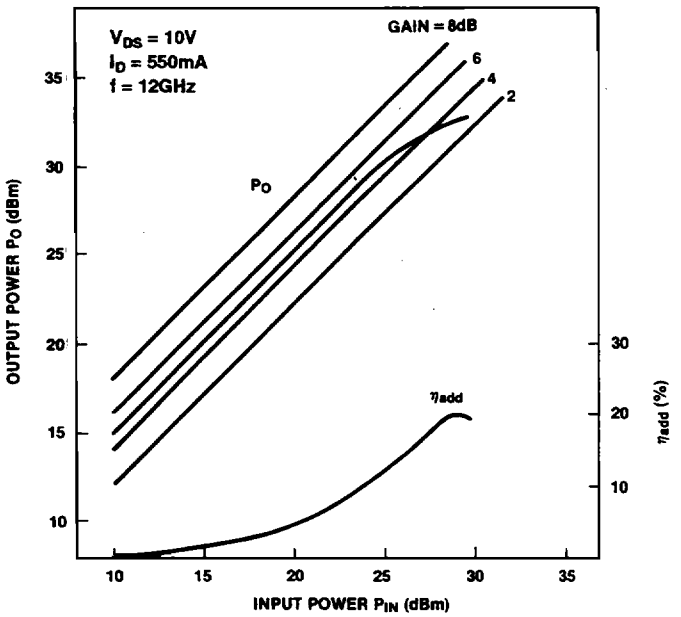
SYMBOL	PARAMETER	RATING	UNIT
V_{GDO}	Gate to drain voltage	−15	V
V_{GSO}	Gate to source voltage	−15	V
I_D	Drain current	1400	mA
I_{GR}	Reverse gate current	−3.6	mA
I_{GF}	Forward gate current	15.0	mA
P_T	Total power dissipation	10.0	W
T_{ch}	Channel temperature	175	°C
T_{stg}	Storage temperature	−55~+175	°C
R_{th}	Thermal resistance	11	°C/W

ELECTRICAL CHARACTERISTICS (T_a = 25°C)

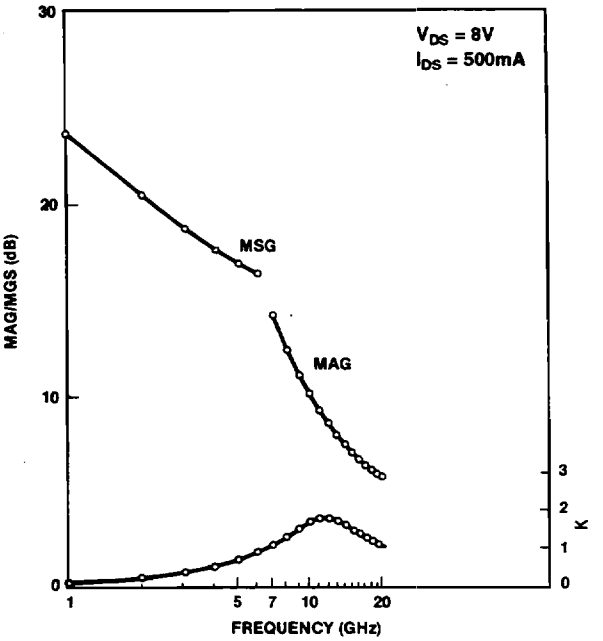
SYMBOL	PARAMETER	CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
I_{DSS}	Saturated drain current	V_{DS} = 3V, V_{GS} = 0V	850	1100	1400	mA
$V_{GS(off)}$	Gate to source cut-off voltage	V_{DS} = 3V, I_D = 1mA	−2	−3	−5	V
g_m	Transconductance	V_{DS} = 3V, I_D = 550mA	250	350		mS
P_{1dB}	Output power at 1dB gain compression	V_{DS} = 10V, I_D = 0.5 I_{DSS}, f = 12GHz	1.2	1.6		W
G_{LP}	Linear power gain		4.5	5		dB
η_{add}	Power added efficiency			18		%

TYPICAL CHARACTERISTICS ($T_a = 25°C$)

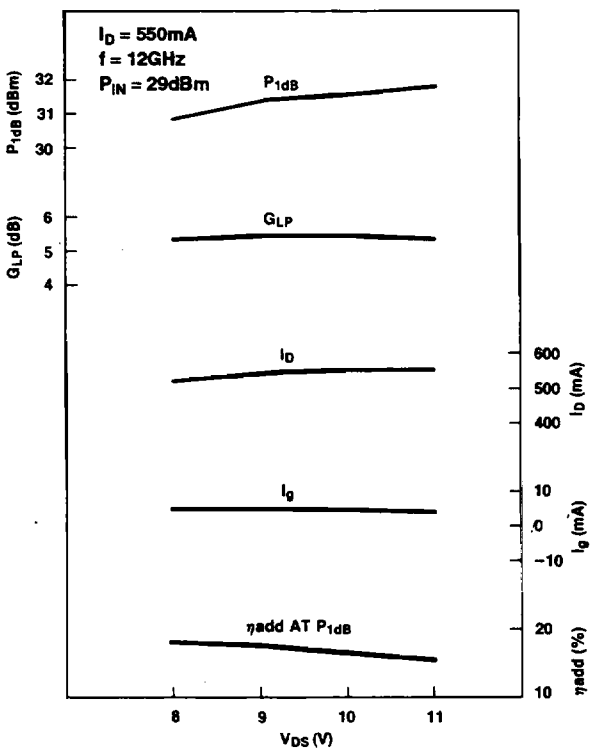
P_O, η_{add} vs. P_{IN}

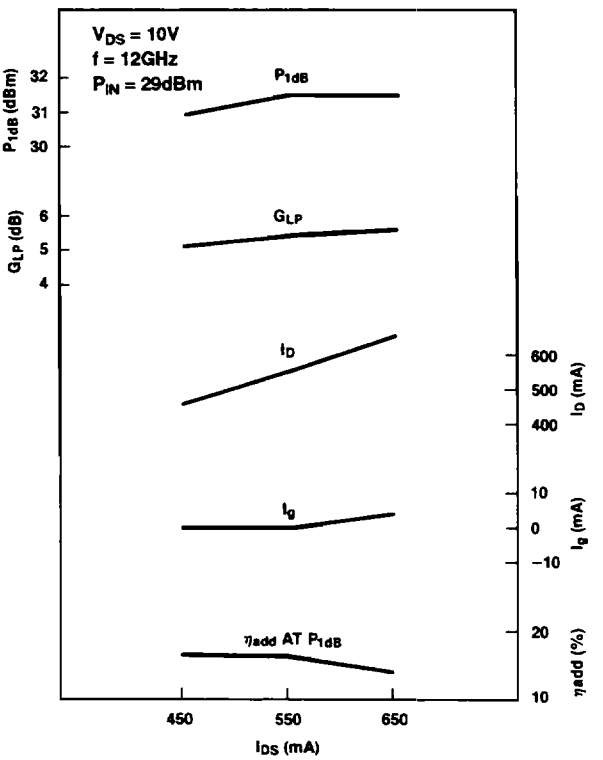


VIA HOLE CHIP Wgt = 4500μm



EFFECTS OF BIAS CHANGES ON ELECTRICAL PERFORMANCE





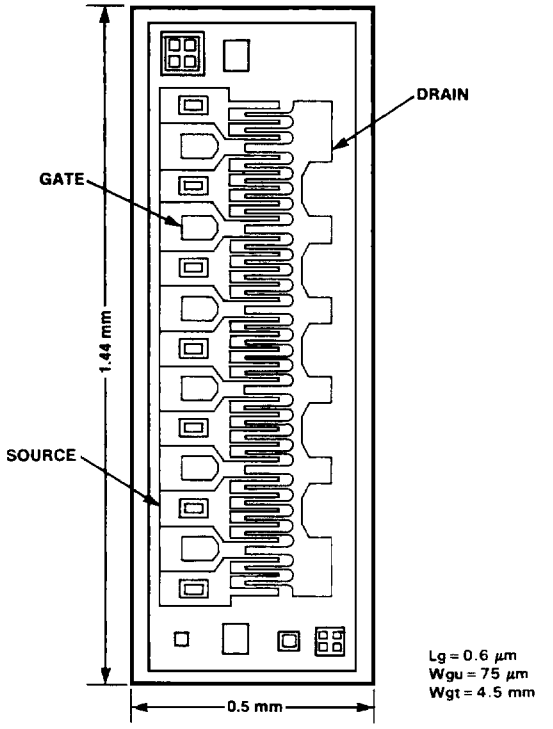
MGFC2445 VIA-HOLE CHIP S PARAMATERS (V_{DS} = 8V, I_{DS} = 500mA)

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	−161	6.216	89	0.028	3	0.279	−135	0.128		23.46
2	0.947	−173	3.058	73	0.027	−9	0.353	−137	0.260		20.53
3	0.950	−178	1.959	61	0.025	−16	0.440	−140	0.398		18.88
4	0.953	179	1.394	50	0.023	−21	0.521	−143	0.547		17.80
5	0.957	176	1.052	41	0.021	−25	0.592	−148	0.710		17.04
6	0.960	173	0.824	33	0.018	−27	0.651	−152	0.891		16.49
7	0.963	171	0.663	25	0.016	−26	0.699	−157	1.090	14.26	
8	0.965	168	0.546	18	0.014	−24	0.738	−161	1.303	12.46	
9	0.967	166	0.458	12	0.013	−19	0.770	−165	1.512	11.23	
10	0.968	164	0.390	7	0.012	−13	0.795	−168	1.683	10.25	
11	0.969	162	0.337	1	0.012	−5	0.816	−172	1.779	9.43	
12	0.970	160	0.294	−3	0.012	3	0.833	−175	1.782	8.74	
13	0.970	158	0.260	−8	0.013	10	0.847	−178	1.710	8.14	
14	0.971	156	0.232	−12	0.014	15	0.858	179	1.597	7.62	
15	0.971	154	0.209	−16	0.016	19	0.867	177	1.474	7.17	
16	0.970	152	0.190	−19	0.018	21	0.875	174	1.359	6.78	
17	0.970	150	0.174	−23	0.020	21	0.881	171	1.258	6.45	
18	0.969	148	0.161	−26	0.022	21	0.886	169	1.173	6.18	
19	0.969	146	0.150	−29	0.024	21	0.890	167	1.103	5.99	
20	0.968	145	0.140	−32	0.027	19	0.893	165	1.047	5.91	

MGF2445 S PARAMATERS (V_{DS} = 10V, I_D = 550mA)

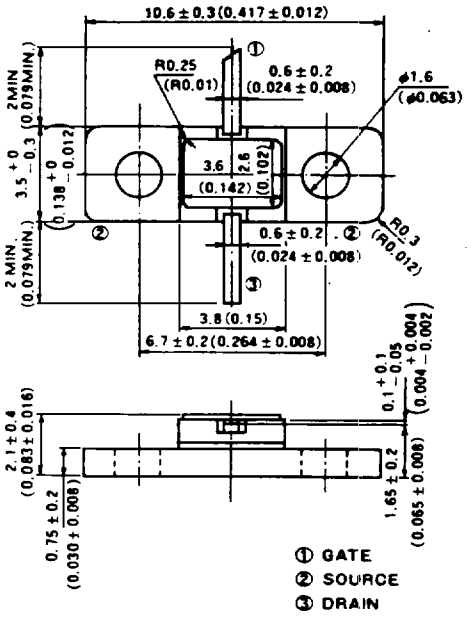
f (GHz)	S PARAMETERS (TYP)							
	S_{11}		S_{12}		S_{21}		S_{22}	
	MAG.	ANGLE (deg)	MAG	ANGLE (deg)	MAG	ANGLE (deg)	MAG	ANGLE (deg)
2	0.905	−153.0	0.036	0.0	2.300	66.0	0.390	−160.0
4	0.900	−179.0	0.038	−12.0	1.390	42.0	0.540	−173.5
6	0.900	161.0	0.042	−21.0	0.890	16.0	0.665	166.5
8	0.920	139.0	0.049	−28.0	0.580	−19.0	0.745	148.0
10	0.920	124.0	0.058	−31.0	0.400	−50.0	0.840	129.5
12	0.925	106.0	0.068	−32.0	0.380	−72.0	0.880	110.0
14	0.940	90.0	0.078	−32.0	0.370	−92.0	0.920	87.0

MGFC2445 CHIP CONFIGURATION



MGF2445 OUTLING DRAWING

Unit: mm (inches)



ORDERING INFORMATION

Part Number	Grade	Tested at	P_{1dB} (mW)	Notes
MGFC2445-T02	B	12 GHz, sample	1200	
MGFC2445-T03	C	12 GHz, sample	1200	
MGF2445-11	Industrial	12 GHz, 100% RF	1200	