

DESCRIPTION

Devices in this family are constructed using the MGFC-2116 GaAs FET die. These devices are N-channel Schottky gate type and are suitable for amplifier and oscillator applications.

MGF-2116 features hermetically sealed metal ceramic packages with flange mounts for improved thermal dissipation characteristics.

FEATURES

- High output power
 $P_{1dB} = 0.4W$ (TYP) @ $f = 12$ GHz
- High linear power gain
 $P_{LP} = 7$ dB (TYP) @ $f = 12$ GHz
- High power added efficiency
 $\eta_{add} = 20\%$ (TYP) @ $f = 12$ GHz, P_{1dB}

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

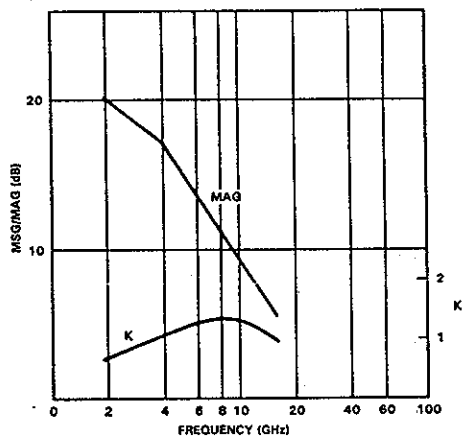
SYMBOL	PARAMETER	RATING	UNIT
V_{GDO}	Gate to drain voltage	- 11	V
V_{GSO}	Gate to source voltage	- 11	V
I_D	Drain current	550	mA
I_{GR}	Reverse gate current	- 1.2	mA
I_{GF}	Forward gate current	4.0	mA
P_T	Total power dissipation	3.65	W
T_{ch}	Channel temperature	175	$^\circ C$
T_{stg}	Storage temperature	- 55 ~ + 175	$^\circ C$
$R_{th(ch-c)}$	Thermal resistance	41	$^\circ C/W$

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

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
I_{DSS}	Saturated drain current	$V_{DS} = 3V, V_{GS} = 0V$	300	430	550	mA
$V_{GS(off)}$	Gate to source cut-off voltage	$V_{DS} = 3V, I_D = 1$ mA	- 2		- 7	V
g_m	Transconductance	$V_{DS} = 3V, I_D = 200$ mA	125	175		mS
P_{1dB}	Output power at 1dB gain compression	$V_{DS} = 7V, I_D = 200$ mA, $f = 12$ GHz	0.35	0.4		W
G_{LP}	Linear power gain		6	7		dB
η_{add}	Power added efficiency			20		%

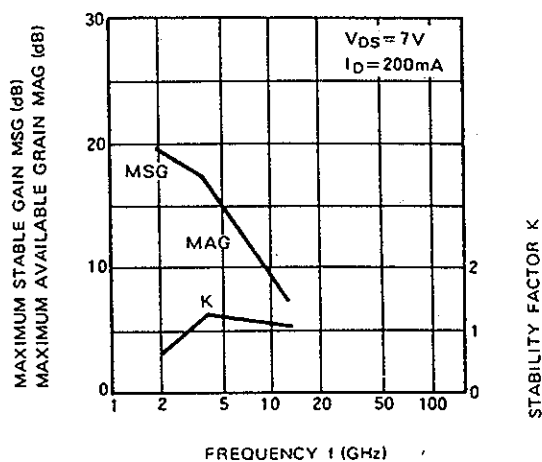
TYPICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

MGFC-2116



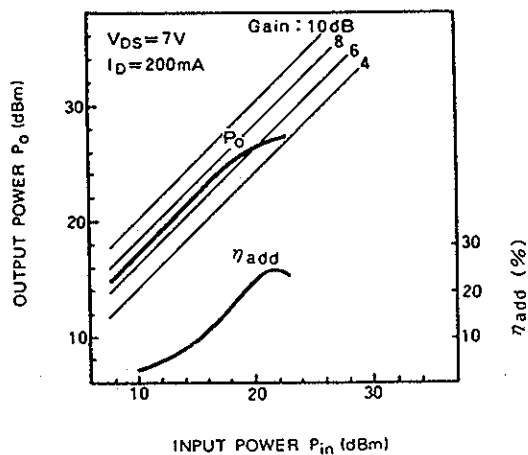
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MSG, MAG, & K vs. f

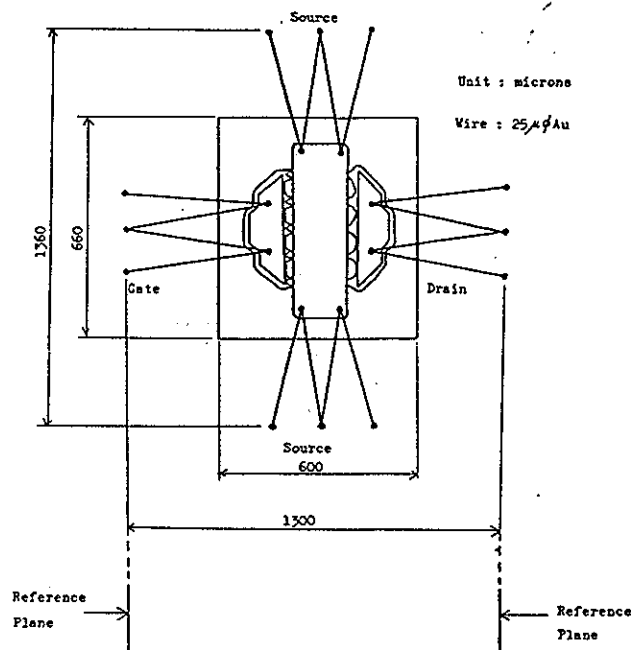


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P_o , η_{add} vs. P_{in}
($f = 12\text{GHz}$)

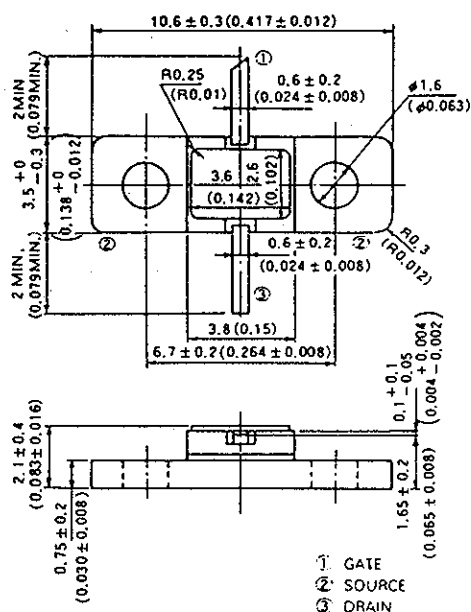


MGFC-2116 WIRE BONDING MANNER AND REFERENCE PLANE OF S-PARAMETERS



MGF-2116 OUTLINE DRAWING

Unit: millimeters (inches)



ORDERING INFORMATION

Part Number	Grade	Tested at	P _{1dB}	Notes
MGFC-2116-01	A	12 GHz	0.4W	Die
MGFC-2116-02	B	12 GHz	0.4W	Die
MGFC-2116-03	C	12 GHz	0.4W	Die
MGF-2116-01	IG	12 GHz	0.4W	Packaged

MGFC-2116 S-PARAMETERS ($T_a = 25^\circ\text{C}$, $V_{DS} = 7\text{V}$, $I_D = 200\text{ mA}$)

Frequency	11		12		21		22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
2.00	.843	-109.2	.042	32.3	4.30	101.2	.250	-88.0
4.00	.800	-136.2	.051	11.2	2.79	71.3	.330	-106.3
6.00	.773	-154.7	.055	15.1	2.10	46.6	.380	-118.3
8.00	.744	-174.8	.080	20.1	1.65	22.3	.400	-126.9
10.00	.720	165.7	.098	16.0	1.33	-2.3	.420	-138.0
12.00	.653	136.6	.120	7.3	1.20	-25.5	.501	-150.9
14.00	.612	93.4	.150	-7.3	1.00	-53.5	.600	-168.8
16.00	.594	32.9	.188	-35.2	0.891	-93.1	.610	169.4

MGF-2116 S-PARAMETERS ($T_a = 25^\circ\text{C}$, $V_{DS} = 7\text{V}$, $I_D = 200\text{ mA}$)

f (GHz)	S-Parameters (TYP.)							
	S ₁₁		S ₁₂		S ₂₁		S ₂₂	
	Magn.	Angle (deg.)	Magn.	Angle (deg.)	Magn.	Angle (deg.)	Magn.	Angle (deg.)
2	0.812	-121.4	0.059	19.1	3.78	91.3	0.340	-93.0
4	0.739	-172.8	0.055	-12.5	2.12	43.0	0.414	-130.3
6	0.776	160.7	0.061	-30.9	1.73	10.1	0.498	-153.6
8	0.823	122.2	0.068	-42.5	1.48	-29.8	0.523	179.1
10	0.798	80.0	0.078	-52.1	1.26	-63.4	0.520	154.1
12	0.731	37.2	0.096	-66.9	1.15	-109.3	0.519	129.7
14	0.667	-0.4	0.113	-79.2	1.13	-146.8	0.532	98.9