

MGFC39V3742A

PRELIMINARY
 Notice: This is not a final specification.
 Some parametric limits are subject to change.

3.7~4.2GHz BAND 8W INTERNALLY MATCHED GaAs FET

DESCRIPTION

The MGFC39V3742A is an internally impedance-matched GaAs power FET especially designed for use in 3.7 ~ 4.2 GHz band amplifiers. The hermetically sealed metal-ceramic package guarantees high reliability.

FEATURES

- Class A operation
- Internally matched to 50Ω system
- High output power
 $P_{1dB} = 8W$ (TYP) @ 3.7 ~ 4.2 GHz
- High power gain
 $G_{LP} = 10$ dB (TYP) @ 3.7 ~ 4.2 GHz
- High power added efficiency
 $\eta_{add} = 31\%$ (TYP) @ 3.7 ~ 4.2 GHz, P_{1dB}
- Hermetically sealed metal-ceramic package
- Low distortion [Item: -51]
 $IM_3 = -45$ dBc (TYP) @ $P_o = 28$ (dBm) S.C.L.

APPLICATION

- Item-01: 3.7 ~ 4.2 GHz band power amplifier
- Item-51: Digital radio communication

QUALITY GRADE

- IG

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

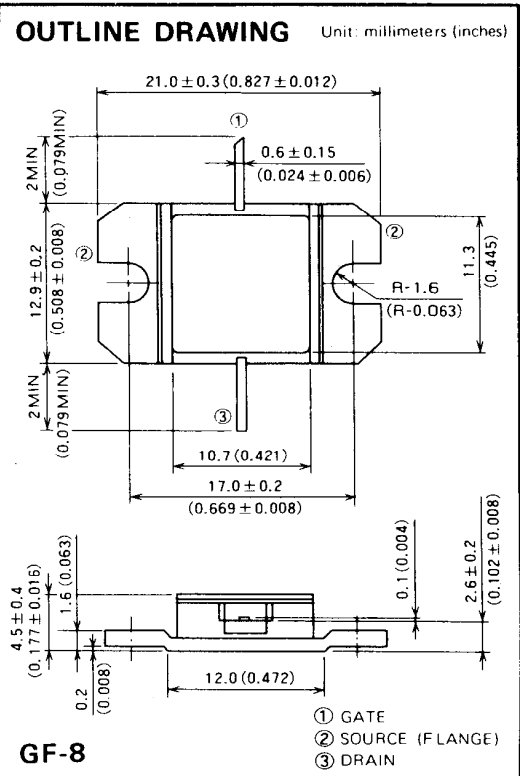
Symbol	Parameter	Ratings	Unit
V_{GD0}	Gate to drain voltage	-15	V
V_{GS0}	Gate to source voltage	-15	V
I_D	Drain current	7.5	A
I_{GR}	Reverse gate current	-20	mA
I_{GF}	Forward gate current	42	mA
P_T	Total power dissipation *1	42.8	W
T_{ch}	Channel temperature	175	°C
T_{stg}	Storage temperature	-65 ~ +175	°C

*1: $T_c = 25^\circ C$

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

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I_{DSS}	Saturated drain current	$V_{DS} = 3V, V_{GS} = 0V$	—	—	7.5	A
g_m	Transconductance	$V_{DS} = 3V, I_D = 2.2A$	—	2	—	S
$V_{GS(off)}$	Gate to source cut-off voltage	$V_{DS} = 3V, I_D = 20mA$	—	—	-4.5	V
P_{1dB}	Output power at 1dB gain compression	$V_{DS} = 10V, I_D = 2.4A, f = 3.7 \sim 4.2GHz$	38	39	—	dBm
G_{LP}	Linear power gain		9	10	—	dB
I_D	Drain current		—	—	3.0	A
η_{add}	Power added efficiency		—	31	—	%
* IM_3	3rd order IM distortion *1		-42	-45	—	dBc
$R_{th(ch-c)}$	Thermal resistance *2		ΔV_f method	—	—	3.5

*1: Item-51, 2-tone test $P_o = 28$ dBm Single Carrier Level $f = 4.2$ GHz $\Delta f = 10$ MHz *2: Channel to case



RECOMMENDED BIAS CONDITIONS

- $V_{DS} = 10V$
- $I_D = 2.4A$
- $R_g = 50\Omega$
- Refer to Bias Procedure

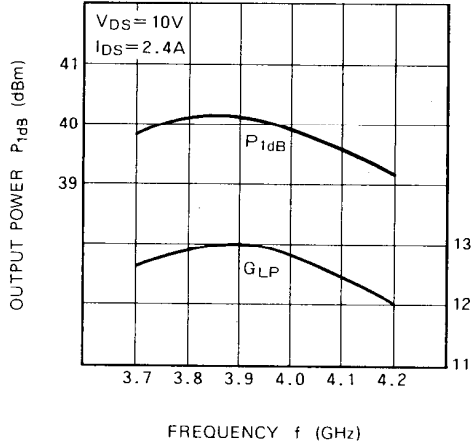
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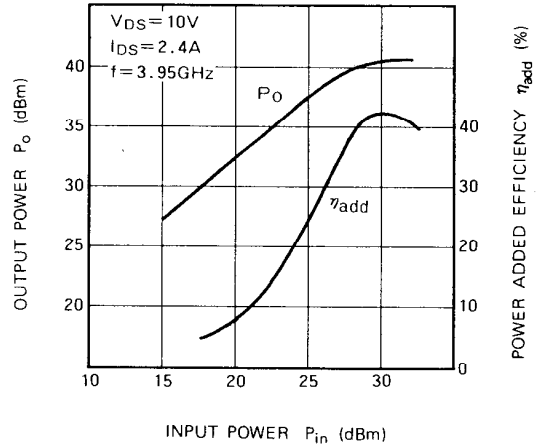
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TYPICAL CHARACTERISTICS

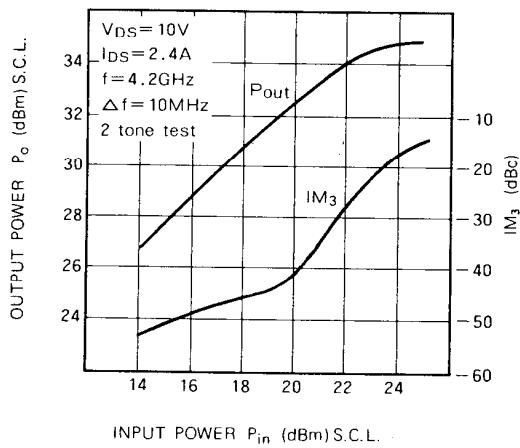
P_{1dB} , G_{LP} vs. f



P_o , η_{add} vs. P_{in}



P_o , IM_3 vs. P_{in}



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

f (GHz)	S Parameters (TYP.)							
	S_{11}		S_{21}		S_{12}		S_{22}	
	Magn.	Angle (deg.)	Magn.	Angle (deg.)	Magn.	Angle (deg.)	Magn.	Angle (deg.)
3.7	0.47	-180	4.295	26	0.069	-37	0.29	-124
3.8	0.48	162	4.426	3	0.072	-59	0.33	-154
3.9	0.44	136	4.472	-22	0.079	-82	0.37	-176
4.0	0.25	91	4.380	-48	0.084	-108	0.42	165
4.1	0.13	-55	4.181	-75	0.083	-136	0.46	141
4.2	0.34	-114	3.990	-103	0.078	-164	0.46	114