

MGFC42V4450

4.4~5.0GHz BAND 16W INTERNALLY MATCHED GaAs FET

DESCRIPTION

The MGFC42V4450 is an internally impedance-matched GaAs power FET especially designed for use in 4.4~5.0 GHz band amplifiers. The hermetically sealed metal-ceramic package guarantees high reliability.

FEATURES

- Class A operation
- Internally matched to 50Ω system
- High output power
 $P_{1dB} = 18\text{ W (TYP) @ } 4.4\sim 5.0\text{ GHz}$
- High power gain
 $G_{LP} = 10\text{ dB (TYP) @ } 4.4\sim 5.0\text{ GHz}$
- High power added efficiency
 $\eta_{add} = 32\% \text{ (TYP) @ } 4.4\sim 5.0\text{ GHz, } P_{1dB}$
- Hermetically sealed metal-ceramic package
- Low distortion [Item: -51]
 $IM3 = -45\text{ dBc (TYP) @ } P_o = 31\text{ (dBm) S.C.L.}$

APPLICATION

Item-01: 4.4~5.0 GHz band power amplifiers.
Item-51: Digital radio communication

QUALITY GRADE

- IG

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

Symbol	Parameter	Ratings	Unit
V_{GDO}	Gate to drain voltage	-15	V
V_{GSO}	Gate to source voltage	-15	V
I_D	Drain current	12	A
I_{GR}	Reverse gate current	-40	mA
I_{GF}	Forward gate current	+84	mA
P_T	Total power dissipation *1	78.9	W
T_{ch}	Channel temperature	175	$^\circ\text{C}$
T_{stg}	Storage temperature	-65 ~ +175	$^\circ\text{C}$

*1: $T_C = 25^\circ\text{C}$

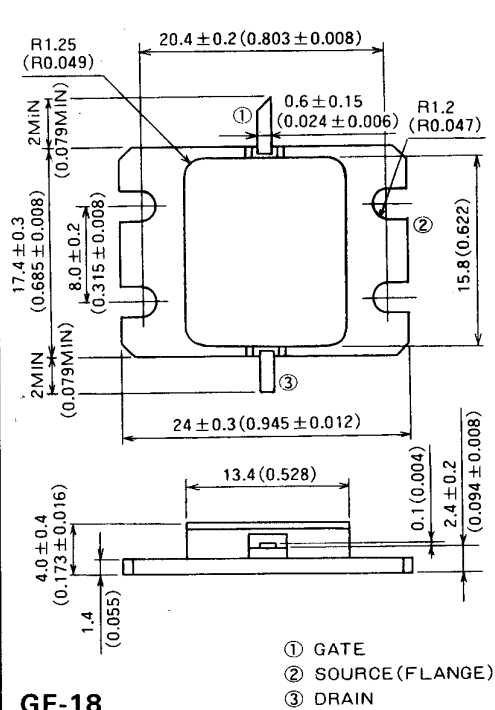
ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I_{DSS}	Saturated drain current	$V_{DS} = 3\text{ V, } V_{GS} = 0\text{ V}$	—	9	12	A
g_m	Transconductance	$V_{DS} = 3\text{ V, } I_D = 4.4\text{ A}$	—	4	—	S
$V_{GS(off)}$	Gate to source cut-off voltage	$V_{DS} = 3\text{ V, } I_D = 80\text{ mA}$	-2	-3	-4	V
P_{1dB}	Output power at 1dB gain compression	$V_{DS} = 10\text{ V, } I_D = 4.5\text{ A, } f = 3.7\sim 4.2\text{ GHz}$	41.5	42.5	—	dBm
G_{LP}	Linear power gain		9	10	—	dB
I_D	Drain current		—	5.4	—	A
η_{add}	Power added efficiency		—	32	—	%
IM_3	3rd order IM distortion *1		-42	-45	—	dBc
$R_{th(ch-o)}$	Thermal resistance *2	ΔV_f method	—	—	1.9	$^\circ\text{C/W}$

*1: Item-51, 2-tone test $P_o = 31\text{ dBm}$ Single Carrier Level $f = 5.0\text{ GHz}$ $\Delta f = 10\text{ MHz}$.

*2: Channel to case

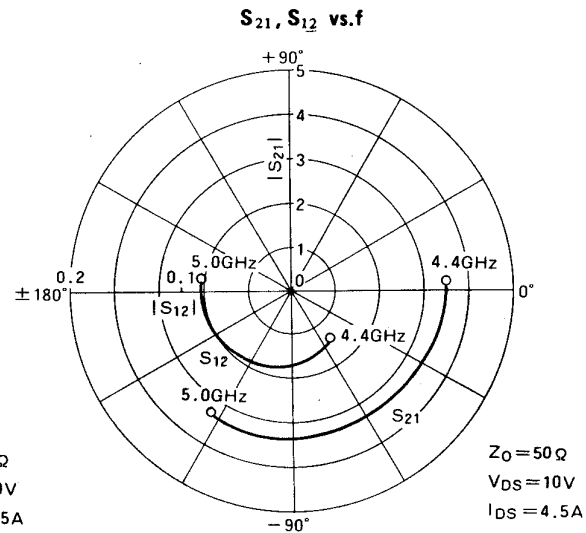
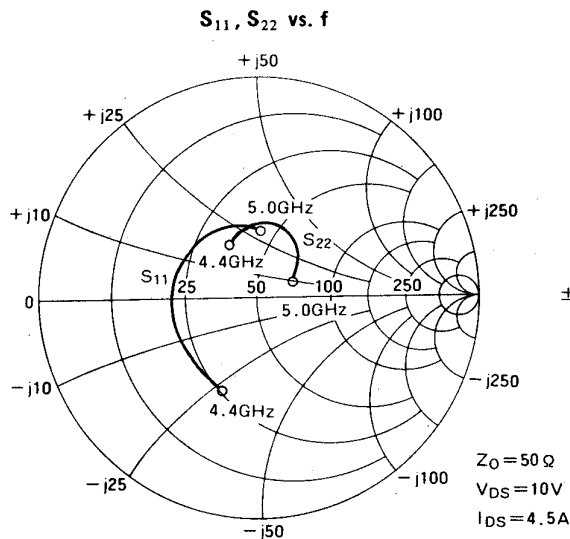
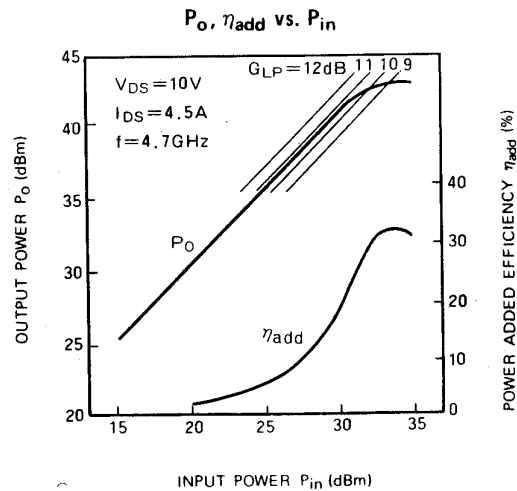
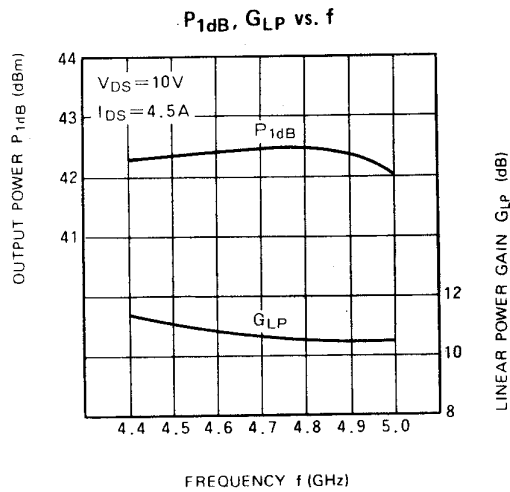
OUTLINE DRAWING Unit: millimeters (inches)



GF-18

RECOMMENDED BIAS CONDITIONS

- $V_{DS} = 10\text{ V}$
- $I_D = 4.5\text{ A}$
- $R_g = 25\Omega$
- Refer to Bias Procedure

MGFC42V4450**4.4~5.0GHz BAND 16W INTERNALLY MATCHED GaAs FET****TYPICAL CHARACTERISTICS** ($T_a=25^\circ\text{C}$)**S PARAMETERS** ($T_a=25^\circ\text{C}$, $V_{DS}=10\text{V}$, $I_{DS}=4.5\text{A}$)

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.)
4.4	0.46	-113	3.63	3	0.054	-49	0.31	121
4.5	0.41	-156	3.50	-20	0.063	-78	0.33	101
4.6	0.40	-179	3.45	-38	0.068	-93	0.33	90
4.7	0.38	154	3.42	-61	0.072	-123	0.33	79
4.8	0.37	135	3.38	-77	0.075	-140	0.31	71
4.9	0.33	109	3.34	-101	0.078	-167	0.25	51
5.0	0.29	89	3.27	-122	0.079	172	0.17	22