

PRELIMINARY

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

MITSUBISHI SEMICONDUCTOR <GaAs FET>

MGFK39V4045

14.0~14.5GHz BAND 8W INTERNALLY MATCHED GaAs FET

DESCRIPTION

The MGFK39V4045 is an internally impedance matched GaAs power FET especially designed for use in 14.0~14.5 GHz band amplifiers. The hermetically sealed metal-ceramic package guarantees high reliability.

FEATURES

- Internally impedance matched
- High output power
 $P_{1dB} = 8\text{ W (TYP.) @ } f = 14.0\text{~}14.5\text{ GHz}$
- High linear power gain
 $G_{LP} = 6\text{ dB (TYP.) @ } f = 14.0\text{~}14.5\text{ GHz}$
- High power added efficiency
 $\eta_{add} = 20\% \text{ (TYP.) @ } f = 14.0\text{~}14.5\text{ GHz, } P_{1dB}$

APPLICATION

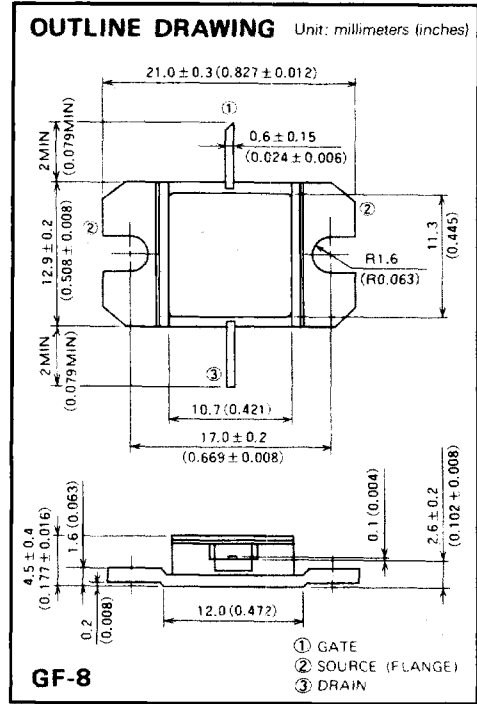
For use in 14.0~14.5 GHz band amplifiers

QUALITY GRADE

- IG

RECOMMENDED BIAS CONDITIONS

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



ABSOLUTE MAXIMUM RATINGS (Ta = 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	5.6	A
I_{GR}	Reverse gate current	-18	mA
I_{GF}	Forward gate current	36	mA
P_T	Total power dissipation *1	42.8	W
T_{ch}	Channel temperature	175	°C
T_{stg}	Storage temperature	-65 ~ +175	°C

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

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I_{DSS}	Saturated drain current	$V_{DS} = 3\text{ V, } V_{GS} = 0\text{ V}$		4.0	6.0	A
g_m	Transconductance	$V_{DS} = 3\text{ V, } I_D = 2.2\text{ A}$	—	2.0	—	S
$V_{GS(off)}$	Gate to source cut-off voltage	$V_{DS} = 3\text{ V, } I_D = 20\text{ mA}$	-2	-3	-5	V
P_{1dB}	Output power at 1dB gain compression	$V_{DS} = 10\text{ V, } I_D \approx 2.4\text{ A, } f = 14.0\text{~}14.5\text{ GHz}$	37.5	39	—	dBm
G_{LP}	Linear power gain		5.0	6.0	—	dB
η_{add}	Power added efficiency		—	20	—	%
$R_{th(ch-c)}$	Thermal resistance *1	ΔV_f method	—	—	3.5	°C/W

*1: Channel to case

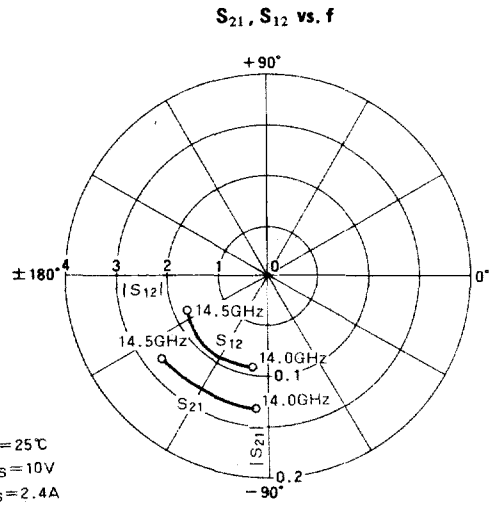
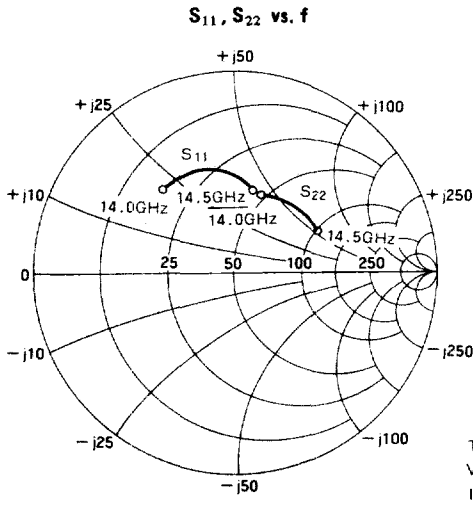
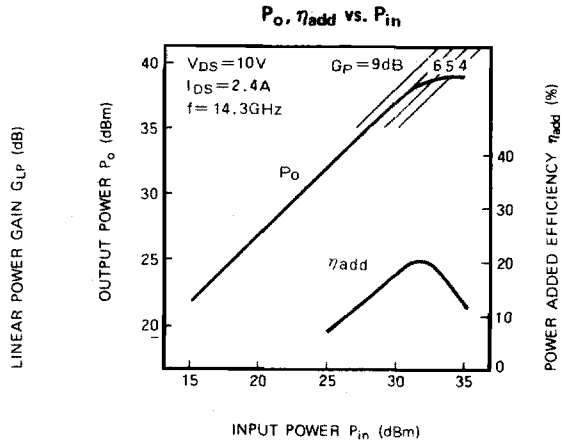
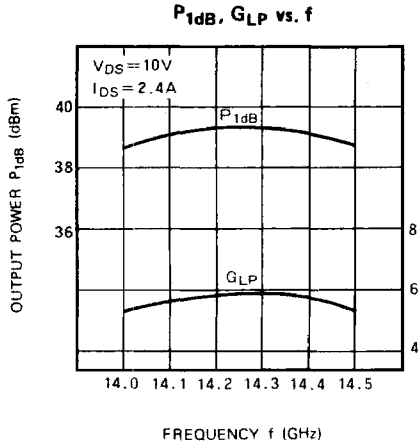


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TYPICAL CHARACTERISTICS (Ta = 25°C)



S PARAMETERS (Ta = 25°C, VDS = 10V, IDS = 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.)
14.0	0.540	127.9	1.334	-96.1	0.092	-108.9	0.409	69.0
14.1	0.534	117.0	1.329	-105.8	0.092	-121.6	0.423	60.4
14.2	0.534	106.1	1.311	-115.3	0.092	-133.1	0.429	52.1
14.3	0.515	94.7	1.298	-124.6	0.092	-142.2	0.446	43.6
14.4	0.469	82.7	1.303	-133.5	0.092	-150.8	0.452	34.6
14.5	0.392	70.9	1.321	-143.0	0.090	-156.7	0.445	25.9