N – Channel FET Transistor

MGFK25M4045

FET Transistor

14V / 400mA

DATASHEET

OEM –Mitsubishi

Source: Mitsubishi Databook 1989

Datasheet Rev. 1.0 – 04/19 – data without warranty / liability

MITSUBISHI SEMICONDUCTOR <GaAs FET>

MGFK25M4045

FOR MICROWAVE POWER AMPLIFIERS
INTERNALLY MATCHED

DESCRIPTION

The MGFK25M4045 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
- Flip-chip mounted
- High output power
  P_{1dB} = 0.3 W (TYP.) @ f = 14 ~ 14.5 GHz
- High linear power gain
  G_{LP} = 8 dB (TYP.) @ f = 14 ~ 14.5 GHz
- High power added efficiency
  η_{add} = 25% (TYP.) @ f = 14 ~ 14.5 GHz, P_{1dB}

APPLICATION

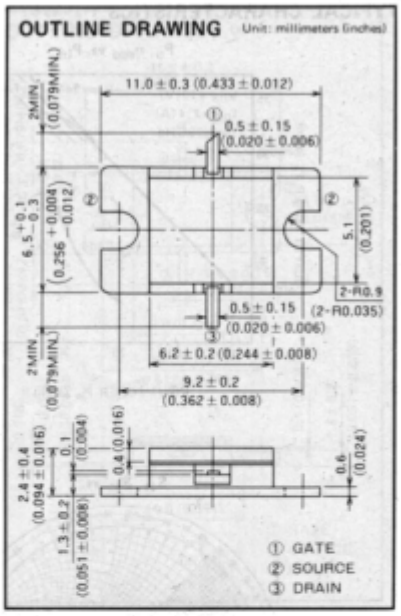
For use in 14.0 ~ 14.5 GHz-band amplifiers.

QUALITY GRADE

- IG

OUTLINE DRAWING

Unit: millimeters (inches)



ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Symbol	Parameter	Ratings	Unit
V_{GDO}	Gate to drain voltage	−14	V
V_{GSO}	Gate to source voltage	−14	V
I_D	Drain current	400	mA
I_{GR}	Reverse gate current	−1.0	mA
I_{GF}	Forward gate current	2.0	mA
P_T	Total power dissipation	3.7	W
T_{ch}	Channel temperature	175	°C
T_{stg}	Storage temperature	−55 ~ +150	°C
$R_{th(ch-c)}$	Thermal resistance	40	°C/W

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I_{DSS}	Saturated drain current	V_{DS} = 3V, V_{GS} = 0V	200	300	400	mA
$V_{GS(off)}$	Gate to source cut-off voltage	V_{DS} = 3V, I_D = 1mA	−2		−5	V
g_m	Transconductance	V_{DS} = 3V, I_D = 150mA	70	100		mS
P_{1dB}	Output power at 1dB gain compression	V_{DS} = 8V, I_D = 150mA, f = 14.0 ~ 14.5GHz	0.2	0.3		W
G_{LP}	Linear power gain		7.0	8.0		dB
η_{add}	Power added efficiency			25		%

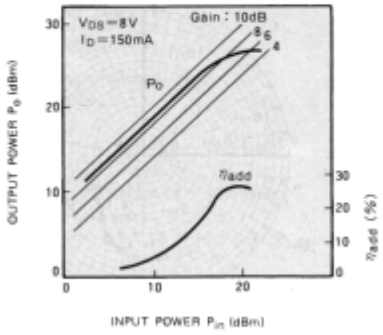
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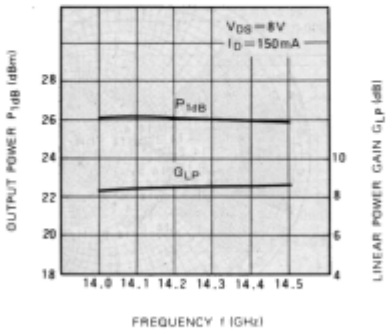
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TYPICAL CHARACTERISTICS (T_a = 25°C)

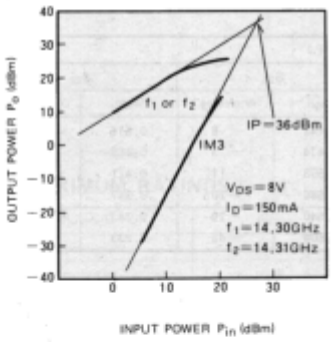
P_o, η_{add} vs. P_{in}
(f = 14.3 GHz)



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



IM_3 vs. P_{in}

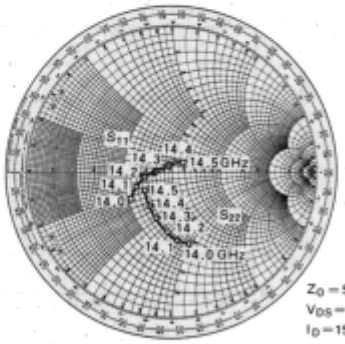


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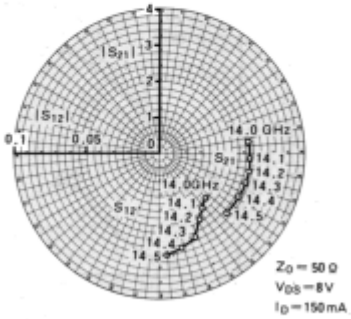
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S_{11}, S_{22} vs. f



S_{12}, S_{21} vs. f



S PARAMETERS (T_a=25°C, V_{DS}=8V, I_D=150mA)

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.)
14.0	0.348	−146	0.088	−43	2.442	8	0.516	− 77
14.1	0.265	−158	0.097	−52	2.474	− 3	0.469	− 85
14.2	0.199	−168	0.108	−58	2.503	−11	0.421	− 94
14.3	0.120	179	0.127	−66	2.586	−20	0.347	−107
14.4	0.064	122	0.132	−76	2.540	−29	0.283	−122
14.5	0.110	45	0.140	−85	2.504	−42	0.233	−144