

MGFK35M4045

FOR MICROWAVE POWER AMPLIFIERS
INTERNALLY MATCHED

91D 10148 DT-39-09

PRELIMINARY

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

6249829 MITSUBISHI (DISCRETE SC)

DESCRIPTION

The MGFK35M4045 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

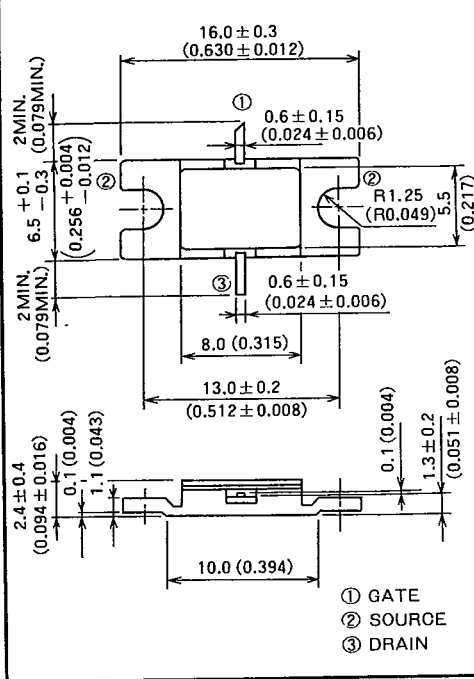
- Internally impedance matched
- Flip-chip mounted
- High output power
 $P_{1dB} = 3.5 \text{ W (TYP.) @ } f = 14 \sim 14.5 \text{ GHz}$
- High linear power gain
 $G_{LP} = 6 \text{ dB (TYP.) @ } f = 14 \sim 14.5 \text{ GHz}$
- High power added efficiency
 $\eta_{add} = 20\% \text{ (TYP.) @ } f = 14 \sim 14.5 \text{ GHz}$

QUALITY GRADE

- IG

OUTLINE DRAWING

Unit: millimeters (inches)



ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

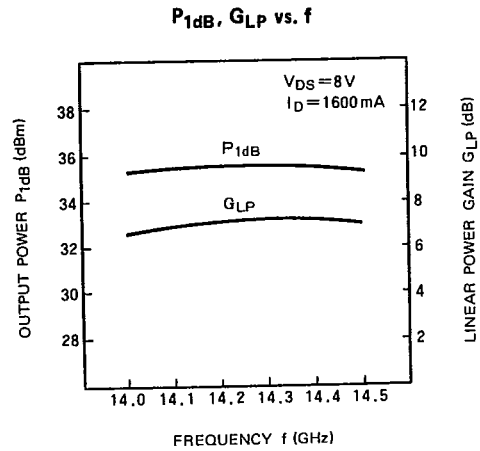
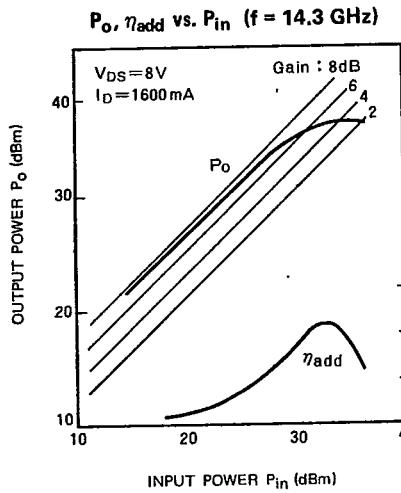
Symbol	Parameter	Rating	Unit
V _{GDO}	Gate to drain voltage	-14	V
V _{GSO}	Gate to source voltage	-14	V
I _D	Drain current	4500	mA
I _{GR}	Reverse gate current	-12.0	mA
I _{GF}	Forward gate current	24.0	mA
P _T	Total power dissipation	30	W
T _{ch}	Channel temperature	175	°C
T _{stg}	Storage temperature	-55 ~ +150	°C
R _{th(ch-c)}	Thermal resistance	5	°C/W

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

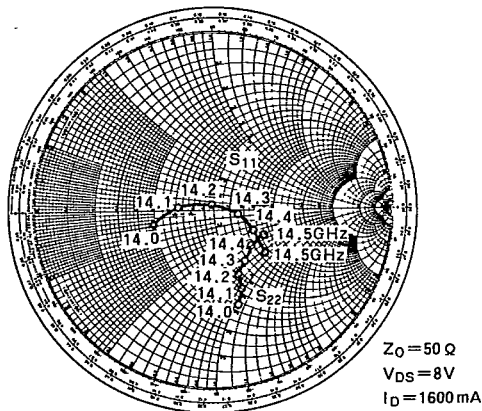
Symbol	Parameter	Conditions	Limits			Unit
			Min	Typ	Max	
I _{DSS}	Saturated drain current	V _{DS} = 3V, V _{GS} = 0V	2500	3300	4500	mA
V _{GS}	Gate to source cut-off voltage	V _{DS} = 3V, I _D = 1mA	-2		-5	V
g _m	Transconductance	V _{DS} = 3V, I _D = 1600mA	800	1200		mS
P _{1dB}	Output power at 1 dB gain compression	V _{DS} = 8V, I _D = 1600mA f = 14.0 ~ 14.5 GHz	2.8	3.5		W
G _{LP}	Linear power gain		5.0	6.0		dB
η _{add}	Power added efficiency			20		%

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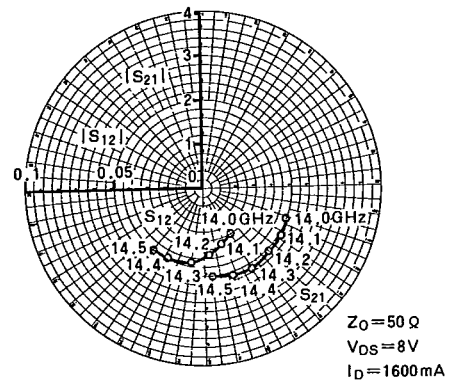
TYPICAL CHARACTERISTICS (Ta=25°C)



S₁₁, S₂₂ vs. f



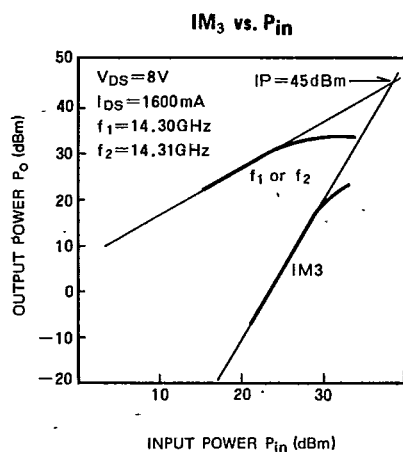
S₁₂, S₂₁ vs. f



S PARAMETERS (Ta=25°C, V_{DS}=8V, I_D=1600mA)

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	0.358	-165	0.061	-61	1.983	-21	0.549	-76
14.1	0.201	176	0.067	-72	2.032	-33	0.472	-70
14.2	0.035	93	0.078	-86	2.085	-46	0.391	-69
14.3	0.136	-12	0.084	-99	2.123	-60	0.334	-60
14.4	0.239	-33	0.088	-119	2.078	-73	0.297	-46
14.5	0.382	-41	0.090	-130	2.026	-85	0.303	-29

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HANDLING PRECAUTIONS

1. Check of Electrical Characteristics

(1) Measurement of DC Characteristics by Curve Tracer
Many curve tracers, if not properly grounded, exhibit a high leakage current from the high-voltage transformer, which can be a prime cause of failure or degradation of the FET. Measurement of the DC characteristics using a curve tracer is therefore not recommended. However, when tests using a curve tracer are required, first of all, check that the curve tracer is grounded to earth.

(2) Measurement of RF Characteristics
Before measurement, check that the measuring instruments are grounded to earth. Many instruments to measure RF characteristics such as RF power meters, network analyzers and so on, if not properly grounded to earth, sometimes allow a high AC leakage of up to several tens volts, which can be a cause of failure or degradation of the FET.

2. Installation of GaAs FET

When GaAs FET is soldered on a microstrip circuit, the following should be attended to,

- (1) Properly ground the soldering iron to earth.
Leakage current from the soldering iron could cause failure or degradation of the FET.
- (2) Solder the FET as promptly as possible at a low temperature. For a criterion, soldering in less than 8 seconds at a temperature of less than 250°C is recommended for each soldering process.

3. Bias Procedure and Conditions

When GaAs FET is biased, the following procedure is recommended.

- (1) Slowly adjust the gate to source voltage, V_{GS} , to about -1V.
 - (2) Gradually increase the drain to source voltage, V_{DS} , from zero to a desired value.
 - (3) Adjust the drain current, I_D , to a desired value by controlling the gate to source voltage, V_{GS} .
- When bias is released, the reverse procedure is recommended.

Be careful that the FET is not operated under conditions exceeding absolute maximum ratings.

4. Guaranteed Characteristics

All the graphic characteristics illustrated in this catalog are typical examples. The characteristics of individual devices as specified in the tables of absolute maximum ratings and electrical characteristics are guaranteed under the specified conditions.