

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

MITSUBISHI SEMICONDUCTOR <GaAs FET>

# MGFK38A3745

13.75 - 14.50GHz BAND 6W INTERNALLY MATCHED GaAs FET

## DESCRIPTION

The MGFK38A3745 is an internally impedance-matched GaAs power FET especially designed for use in 13.75 - 14.50 GHz band amplifiers. The hermetically sealed metal-ceramic package guarantees high reliability.

## FEATURES

- Class A operation
- Internally matched to 50(ohm) system
- High output power  
 $P_{1dB} = 6W$  (TYP.) @  $f=13.75 - 14.50$  GHz
- High power gain  
 $GLP = 8$  dB (TYP.) @  $f=13.75 - 14.50$  GHz
- High power added efficiency  
 $P.A.E. = 30\%$  (TYP.) @  $f=13.75 - 14.50$  GHz

## APPLICATION

13.75 - 14.50GHz band power amplifier

## QUALITY GRADE

IG

## RECOMMENDED BIAS CONDITIONS

- $V_{DS} = 10$  (V)
- $I_D = 1.5$  (A)
- $R_G = 100$  (ohm)

## ABSOLUTE MAXIMUM RATINGS

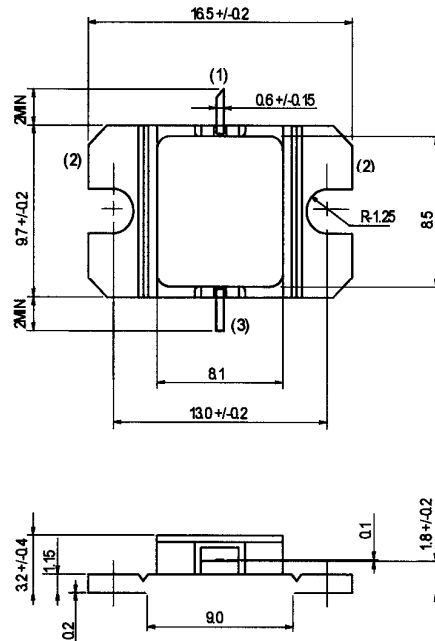
( $T_a = 25 \text{ deg.C}$ )

Symbol	Parameter	Ratings	Unit
V <sub>GD0</sub>	Gate to drain voltage	-15	V
V <sub>GS0</sub>	Gate to source voltage	-10	V
PT *1	Total power dissipation	37.5	W
T <sub>ch</sub>	Channel temperature	175	deg.C
T <sub>stg</sub>	Storage temperature	-65 / +175	deg.C

\*1 :  $T_c = 25 \text{ deg.C}$

## OUTLINE DRAWING

Unit : millimeters



GF-27

- (1) GATE
- (2) SOURCE (FLANGE)
- (3) DRAIN

< Keep safety first in your circuit designs! >

Mitsubishi Electric Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage. Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (1) placement of substitutive, auxiliary circuits, (2) use of non-flammable material or (3) prevention against any malfunction or mishap.

## ELECTRICAL CHARACTERISTICS

( $T_a = 25 \text{ deg.C}$ )

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
V <sub>GS(off)</sub>	Gate to source cut-off voltage	$V_{DS} = 3V, I_D = 21mA$	-1	-1.5	-4.5	V
P <sub>1dB</sub>	Output power	$V_{DS} = 10V, I_D(RF \text{ off}) = 1.5A, f = 13.75 - 14.50GHz$	37	38	-	dBm
GLP	Linear power gain		7	8	-	dB
I <sub>D</sub>	Drain current		-	1.8	-	A
P.A.E.	Power added efficiency		-	30	-	%
R <sub>th(ch-c)</sub> *3	Thermal resistance	delta Vf method	-	3.6	4	deg.C/W

\*3 : Channel-case



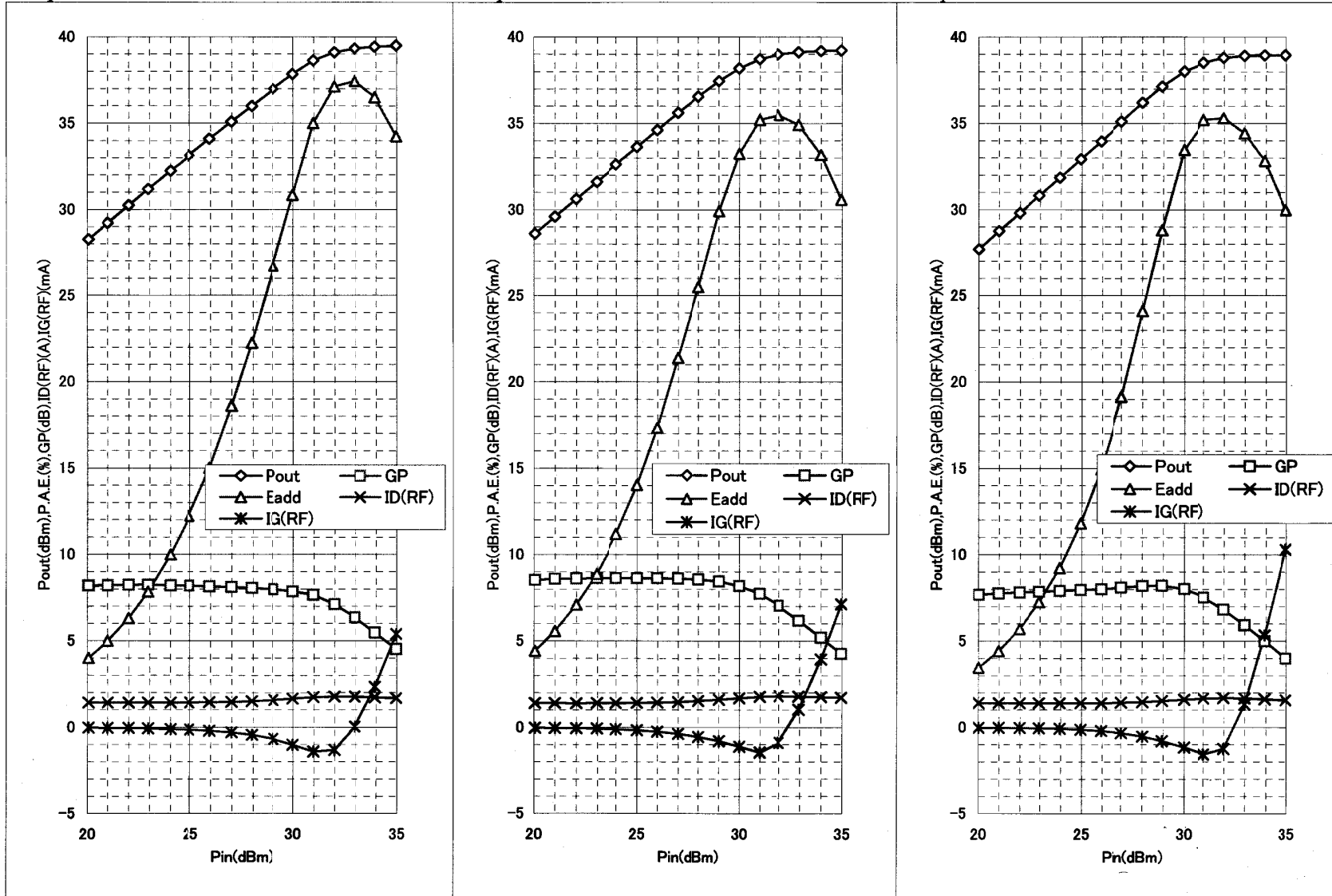
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ELECTRIC

Aug.'03

# Ku-band 6W Power GaAs FET MGFK38A3745

Aug.' 03

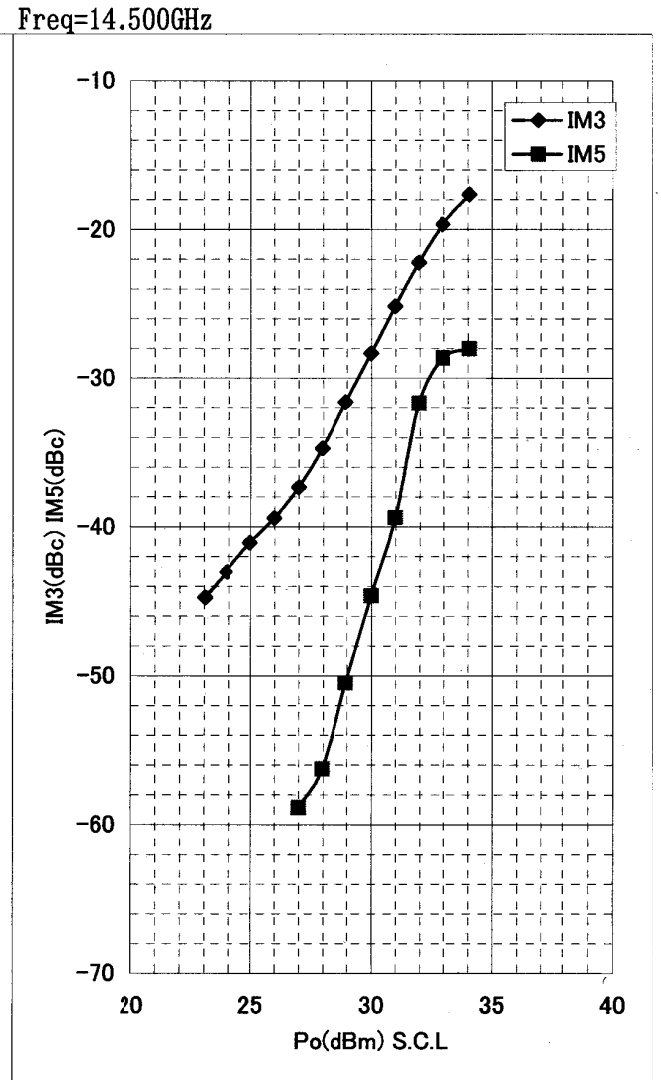
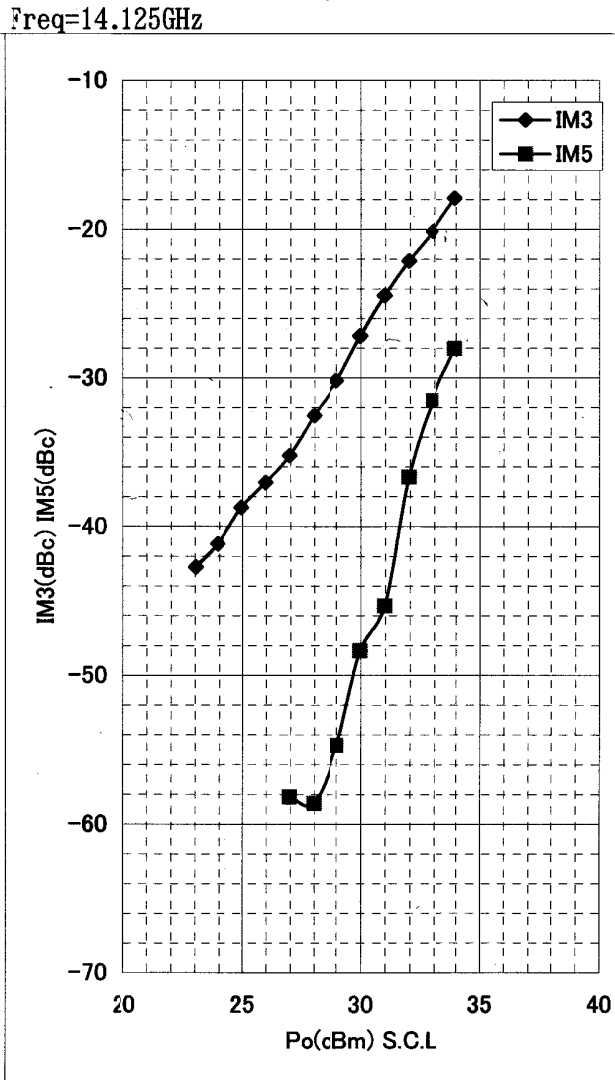
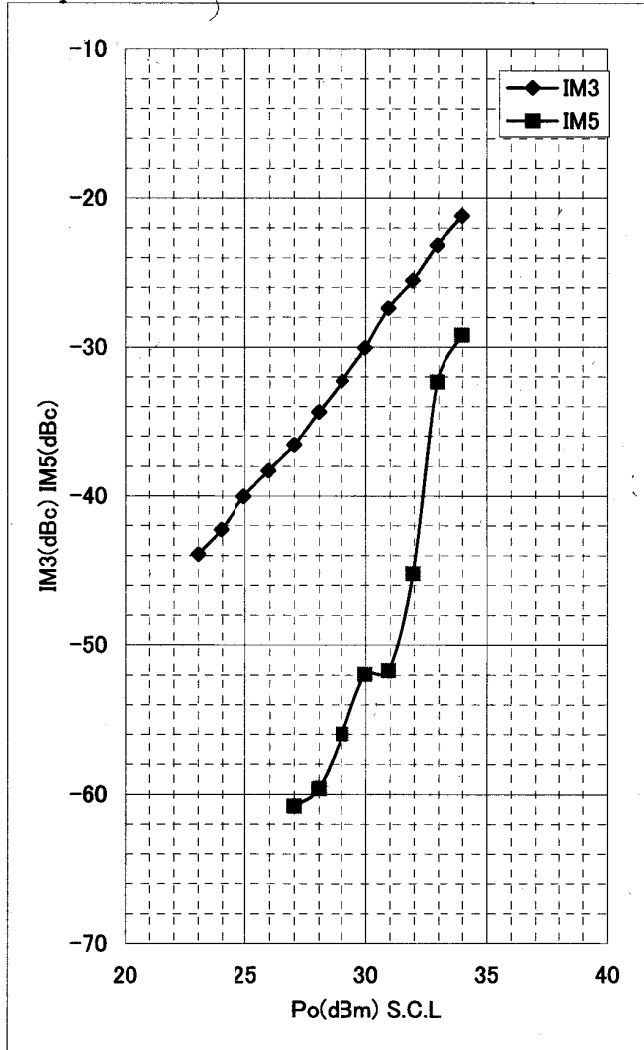
OUTPUT POWER & POWER ADDED EFFICIENCY & LINEAR POWER GAIN vs. INPUT POWER' (VDS=10V, Idq=1.5A, Rg=100ohm, Ta=25deg.C)  
 Freq=13.75GHz                      Freq=14.125GHz                      Freq=14.500GHz



# Ku-band 6W Power GaAs FET MGFK38A3745

Aug.' 03

IM3 IM5 vs. OUTPUT POWER (VDS=10V, Idq=1.5A, Rg=100ohm, Ta=25deg.C, Δf=10MHz)  
 Freq=13.75GHz



## S PARAMETERES(T=25deg.C,VDS=10V,ID=1.5A)

Freq	S11		S21		S12		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
13.00	0.81	171.04	1.63	-76.74	0.02	-16.21	0.59	137.23
13.10	0.78	165.69	1.73	-83.87	0.02	-35.59	0.59	130.28
13.20	0.75	159.52	1.85	-91.37	0.03	-56.56	0.59	123.52
13.30	0.71	152.49	1.96	-99.00	0.03	-74.01	0.59	117.33
13.40	0.68	145.21	2.07	-107.14	0.04	-91.33	0.59	109.70
13.50	0.64	137.10	2.19	-115.49	0.04	-107.57	0.58	102.62
13.60	0.58	128.83	2.32	-124.10	0.05	-119.61	0.57	94.61
13.70	0.53	119.41	2.45	-133.09	0.06	-133.66	0.56	85.74
13.80	0.46	107.91	2.57	-142.78	0.07	-145.04	0.54	75.60
13.90	0.38	94.82	2.69	-153.07	0.08	-158.70	0.51	64.08
14.00	0.30	78.06	2.80	-163.74	0.09	-171.17	0.49	51.72
14.10	0.22	55.02	2.88	-174.75	0.10	175.35	0.46	36.88
14.20	0.15	18.65	2.95	173.32	0.11	160.97	0.42	19.98
14.30	0.14	-35.59	2.95	160.62	0.12	148.25	0.38	1.33
14.40	0.19	-79.67	2.88	148.21	0.12	134.98	0.36	-19.05
14.50	0.26	-104.31	2.75	136.23	0.12	122.82	0.34	-40.14
14.60	0.33	-120.66	2.57	125.07	0.11	111.99	0.32	-59.43
14.70	0.39	-132.01	2.40	115.11	0.11	102.41	0.31	-76.85
14.80	0.45	-141.21	2.23	105.99	0.11	93.61	0.33	-91.26
14.90	0.50	-148.69	2.08	97.52	0.10	85.62	0.34	-103.83
15.00	0.54	-155.43	1.94	89.56	0.10	77.89	0.36	-113.31

This S-Parameter data show measurements performed on each single-ended FET

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