

< Power GaAs HEMT >

# MGF4841CL

Micro-X type plastic package

## DESCRIPTION

The MGF4841CL power InGaAs HEMT (High Electron Mobility Transistor) is designed for use in K band amplifiers.

The MGF4841CL is designed for automotive application and AEC-Q101 qualified.

## FEATURES

High gain and High Pout,sat

G<sub>lp</sub>=8.5dB, Pout,sat=11.5dBm (Typ.) @ f=24.3GHz

## APPLICATION

K band low noise amplifiers

## QUALITY GRADE

GG

## RECOMMENDED BIAS CONDITIONS

V<sub>DS</sub>=1.5V , V<sub>GS</sub>=0V

## ORDERING INFORMATION

Tape & reel 4,000pcs/reel

## RoHS COMPLIANT

MGF4841CL is a RoHS compliant product. RoHS compliance is indicated by the letter "G" after the Lot Marking.

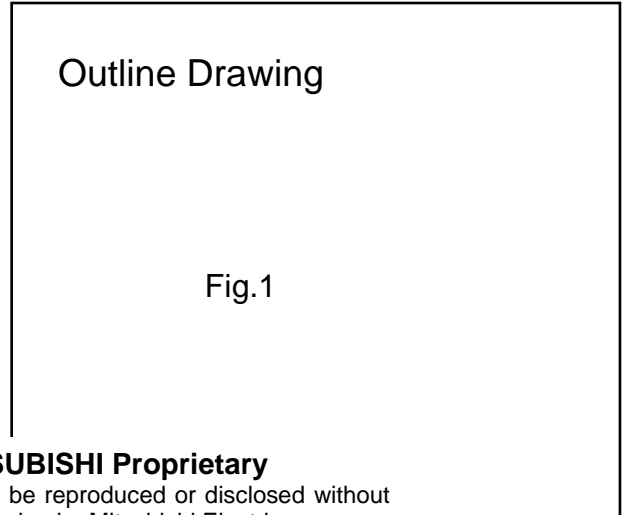
## ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Symbol	Parameter	Ratings	Unit
V <sub>GDO</sub>	Gate to drain voltage	-4	V
V <sub>GSO</sub>	Gate to source voltage	-4	V
I <sub>D</sub>	Drain current	I <sub>DSS</sub>	mA
P <sub>T</sub>	Total power dissipation	130	mW
T <sub>ch</sub>	Channel temperature	125	°C
T <sub>stg</sub>	Storage temperature	-55 to +125	°C

## ELECTRICAL CHARACTERISTICS (Ta=25°C)

Symbol	Parameter	Test conditions	Limits			Unit
			MIN.	TYP.	MAX	
V <sub>(BR)GDO</sub>	Gate to drain breakdown voltage	I <sub>G</sub> =-10μA	-4	--	--	V
I <sub>DSS</sub>	Saturated drain current	V <sub>GS</sub> =0V, V <sub>DS</sub> =2.5V	30	--	80	mA
V <sub>GS(off)</sub>	Gate to source cut-off voltage	V <sub>DS</sub> =2.5V, I <sub>D</sub> =500μA	-0.1	--	-2.0	V
Pout,sat	Saturation Output Power	V <sub>DS</sub> =1.5V, V <sub>GS</sub> =0V f=24.3GHz, P <sub>in</sub> =7dBm	10.0	11.5	--	dBm
P1dB	Output Power at 1dB gain compression	V <sub>DS</sub> =1.5V, V <sub>GS</sub> =0V f=24.3GHz	5.5	7.6	--	dBm
G <sub>lp</sub>	Linear power gain	V <sub>DS</sub> =1.5V, V <sub>GS</sub> =0V f=24.3GHz, P <sub>in</sub> =-10dBm	6.0	8.5	--	dB

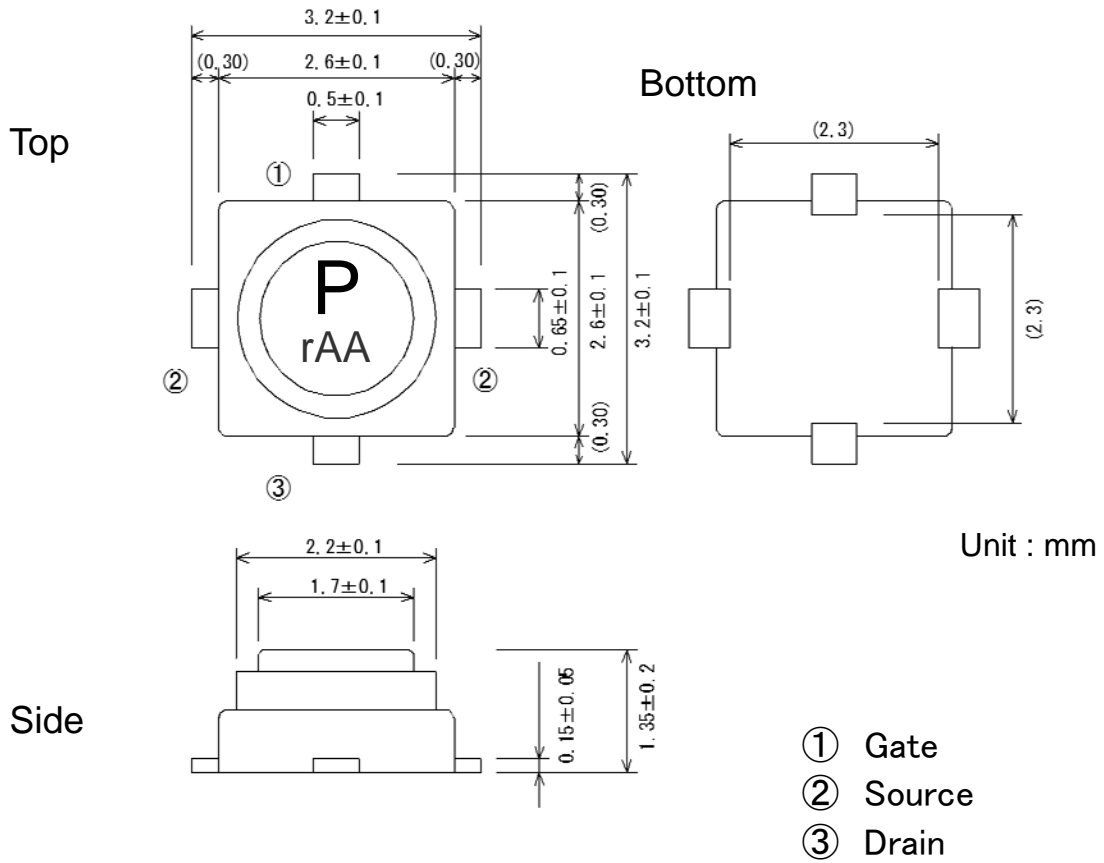
Note: Pout,sat, P1dB and G<sub>lp</sub> are tested with sampling inspection.



**MITSUBISHI Proprietary**

Not to be reproduced or disclosed without permission by Mitsubishi Electric

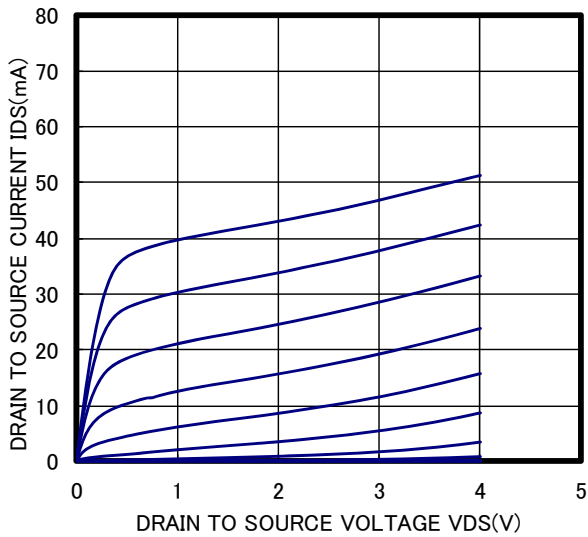
Fig.1



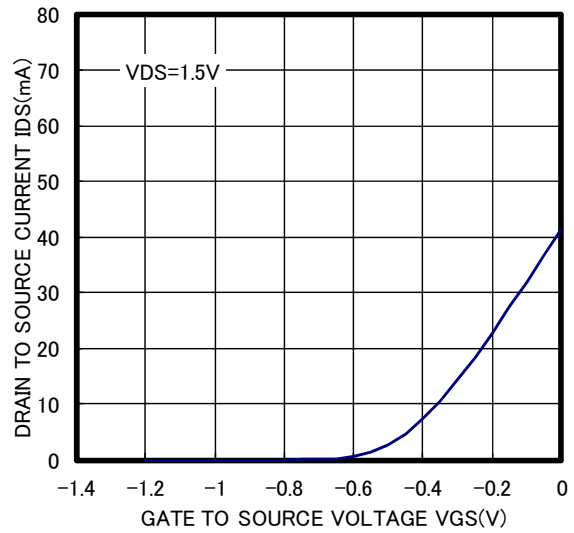
(GD-32)

TYPICAL CHARACTERISTICS (Ta=25°C)

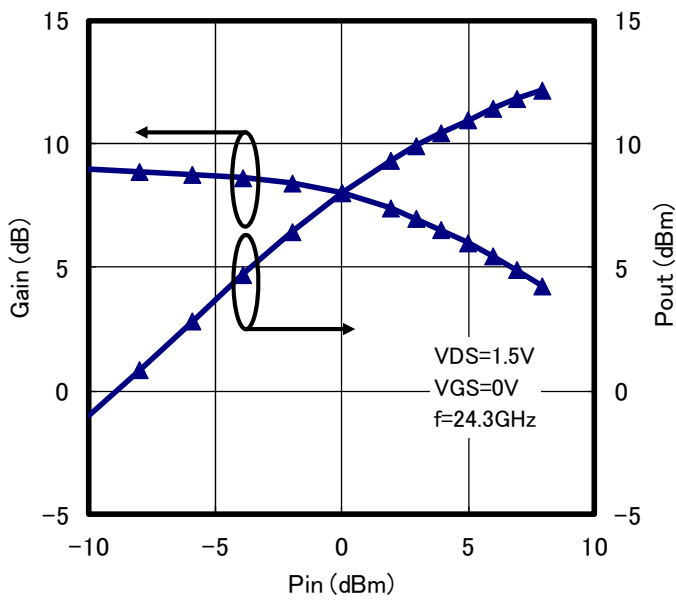
**ID vs. VDS**



**ID vs. VGS**

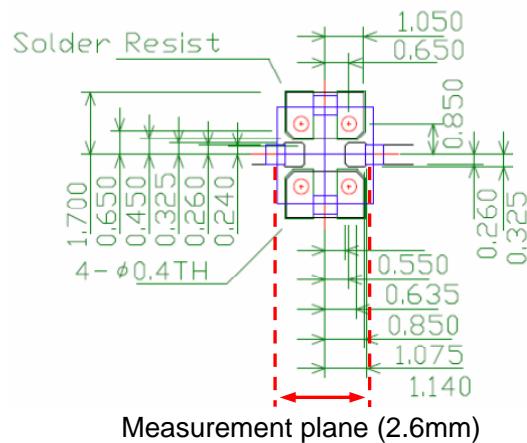


**Pin vs. Pout**



**S PARAMETERS** (VDS=1.5V, VGS=0V, Ta=room temperature)

Freq. (GHz)	S11		S21		S12		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
1	0.993	-17.7	6.972	161.6	0.011	77.3	0.528	-13.0
2	0.963	-35.0	6.742	144.4	0.022	66.1	0.518	-25.6
3	0.922	-51.5	6.436	127.9	0.031	56.1	0.503	-37.6
4	0.877	-66.7	6.101	112.6	0.040	46.8	0.498	-48.3
5	0.829	-81.5	5.799	97.7	0.048	37.7	0.485	-58.6
6	0.781	-95.8	5.503	83.2	0.055	29.2	0.471	-68.4
7	0.733	-109.8	5.222	69.1	0.061	20.8	0.456	-77.9
8	0.683	-123.4	4.957	55.3	0.067	11.9	0.439	-87.0
9	0.631	-136.1	4.698	42.3	0.072	3.8	0.421	-95.0
10	0.578	-148.3	4.485	29.9	0.076	-3.8	0.405	-101.9
11	0.534	-160.5	4.339	17.4	0.081	-11.1	0.393	-109.1
12	0.492	-173.4	4.223	4.8	0.086	-18.1	0.381	-116.8
13	0.453	171.5	4.120	-8.2	0.092	-26.3	0.363	-124.7
14	0.410	155.4	4.055	-21.1	0.096	-34.4	0.349	-131.7
15	0.371	136.0	3.996	-34.6	0.104	-42.7	0.328	-140.3
16	0.354	113.1	3.919	-48.9	0.110	-51.5	0.294	-151.8
17	0.353	87.9	3.838	-63.7	0.118	-60.6	0.248	-162.2
18	0.389	60.9	3.721	-78.7	0.127	-71.0	0.188	-174.3
19	0.450	36.1	3.586	-94.1	0.137	-82.4	0.107	171.6
20	0.531	14.7	3.428	-110.0	0.143	-96.0	0.017	130.5
21	0.623	-4.4	3.213	-126.4	0.143	-109.4	0.089	-22.8
22	0.695	-21.6	2.928	-142.3	0.142	-122.5	0.190	-37.0
23	0.768	-36.9	2.639	-157.6	0.139	-134.6	0.286	-48.8
24	0.820	-50.0	2.352	-172.2	0.131	-146.3	0.383	-59.8
25	0.851	-61.7	2.091	174.3	0.125	-156.9	0.465	-69.8
26	0.883	-72.9	1.835	161.5	0.117	-166.4	0.521	-80.1



- Recommended foot pattern;  
 RO4350B/ROGERS(er=3.48, t=0.254mm)

**Note:**

We are ready to provide nonlinear model for ADS and MWO users. If you are interested, please contact our sales offices.

< Power GaAs HEMT >  
**MGF4841CL**  
 Micro-X type plastic package

(Reference)

Flow	Item	Comment
	Wafer Process	
	Wafer Test (DC)	100% Test
	Visual Inspection	
	Chip Separation	
	Die / Wire bonding	
	Internal Visual Inspection	
	Sealing	
	Separation	
	DC Test, Marking	100% Test, Ta=25deg.C
	RF Test (1)	S-parameter, Sampling Test, Ta=25deg.C
	RF Test (2)	Glp, Pout,sat, P1dB, Sampling Test, Ta=25deeg.C
	QAT	
	Taping, Shipping	

### **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 (i) placement of substitutive, auxiliary circuits, (ii) use of non-flammable material or (iii) prevention against any malfunction or mishap.

### **Notes regarding these materials**

- These materials are intended as a reference to assist our customers in the selection of the Mitsubishi semiconductor product best suited to the customer's application; they do not convey any license under any intellectual property rights, or any other rights, belonging to Mitsubishi Electric Corporation or a third party.
- Mitsubishi Electric Corporation assumes no responsibility for any damage, or infringement of any third-party's rights, originating in the use of any product data, diagrams, charts, programs, algorithms, or circuit application examples contained in these materials.
- All information contained in these materials, including product data, diagrams, charts, programs and algorithms represents information on products at the time of publication of these materials, and are subject to change by Mitsubishi Electric Corporation without notice due to product improvements or other reasons. It is therefore recommended that customers contact Mitsubishi Electric Corporation or an authorized Mitsubishi Semiconductor product distributor for the latest product information before purchasing a product listed herein.  
The information described here may contain technical inaccuracies or typographical errors.  
Mitsubishi Electric Corporation assumes no responsibility for any damage, liability, or other loss rising from these inaccuracies or errors.  
Please also pay attention to information published by Mitsubishi Electric Corporation by various means, including the Mitsubishi Semiconductor home page (<http://www.mitsubishielectric.com/>).
- When using any or all of the information contained in these materials, including product data, diagrams, charts, programs, and algorithms, please be sure to evaluate all information as a total system before making a final decision on the applicability of the information and products. Mitsubishi Electric Corporation assumes no responsibility for any damage, liability or other loss resulting from the information contained herein.
- Mitsubishi Electric Corporation semiconductors are not designed or manufactured for use in a device or system that is used under circumstances in which human life is potentially at stake. Please contact Mitsubishi Electric Corporation or an authorized Mitsubishi Semiconductor product distributor when considering the use of a product contained herein for any specific purposes, such as apparatus or systems for transportation, vehicular, medical, aerospace, nuclear, or undersea repeater use.
- The prior written approval of Mitsubishi Electric Corporation is necessary to reprint or reproduce in whole or in part these materials.
- If these products or technologies are subject to the Japanese export control restrictions, they must be exported under a license from the Japanese government and cannot be imported into a country other than the approved destination.  
Any diversion or re-export contrary to the export control laws and regulations of Japan and/or the country of destination is prohibited.
- Please contact Mitsubishi Electric Corporation or an authorized Mitsubishi Semiconductor product distributor for further details on these materials or the products contained therein.