

# FMM5815GJ-1

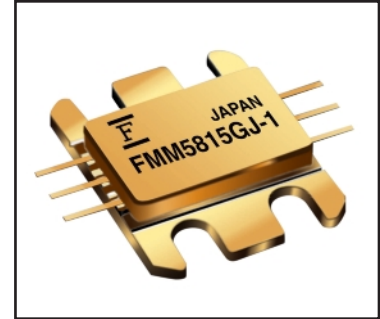
17.7-19.7GHz Power Amplifier MMIC

## FEATURES

- High Output Power:  $P_{1dB} = 31\text{dBm}$  (Typ.)
- High Gain:  $G_{1dB} = 20\text{dB}$  (Typ.)
- High PAE:  $\eta_{add} = 25\%$  (Typ.)
- Impedance Matched  $Z_{in}/Z_{out} = 50\Omega$
- 0.25 $\mu\text{m}$  PHEMT Technology

## DESCRIPTION

The FMM5815GJ is a packaged, high-gain, high linearity, amplifier designed for operation in the 17.7-19.7GHz frequency range. This amplifier has an input and output designed for use in 50 $\Omega$  systems. This device is well suited for point-to-point communication applications.



## ABSOLUTE MAXIMUM RATING (Ambient Temperature $T_a=25^\circ\text{C}$ )

Item	Symbol	Condition	Rating	Unit
Drain-Source Voltage	$V_{DD}$		10	V
Gate-Source Voltage	$V_{GG}$		-7.0	V
Input Power	$P_{in}$		22	dBm
Storage Temperature	$T_{stg}$		-55 to +125	$^\circ\text{C}$
Operating Case Temperature	$T_{op}$		-40 to +85	$^\circ\text{C}$

Fujitsu recommends the following conditions for the long term reliable operation of GaAs FETs:

1. The drain-source operating voltage ( $V_{DD}$ ) should not exceed 6 volts.

## ELECTRICAL CHARACTERISTICS (Ambient Temperature $T_c=25^\circ\text{C}$ )

Item	Symbol	Conditions	Limits			Unit
			Min.	Typ.	Max.	
Frequency Range	f	$V_{DD} = 6\text{V}$ $V_{GG} = -5\text{V}$ $f = 17.7 \sim 19.7\text{GHz}$ $I_{DD} = 600\text{mA}$ (Typ.) $Z_S = Z_L = 50\Omega$	17.7	-	19.7	GHz
Output Power at 1 dB G.C.P.	$P_{1dB}$		29	31	-	dBm
Power Gain at 1 dB G.C.P.	$G_{1dB}$		18	20	23	dB
Drain Current at 1 dB G.C.P.	$I_{ddrf}$		-	800	950	mA
Gate Current at 1 dB G.C.P.	$I_{ggrf}$		-	-12	-15	mA
Power-Added Efficiency at 1 dB G.C.P.	$\eta_{add}$		-	25	-	%
Input Return Loss	RLin		-	-10	-	dB
Output Return Loss	RLout		-	-6	-	dB
3rd Order Intermodulation Distortion	IM3		$\Delta f = 10\text{MHz}$ , 2-Tone Test, $P_{out} = 20\text{dBm}$ S.C.L.	-30	-35	-

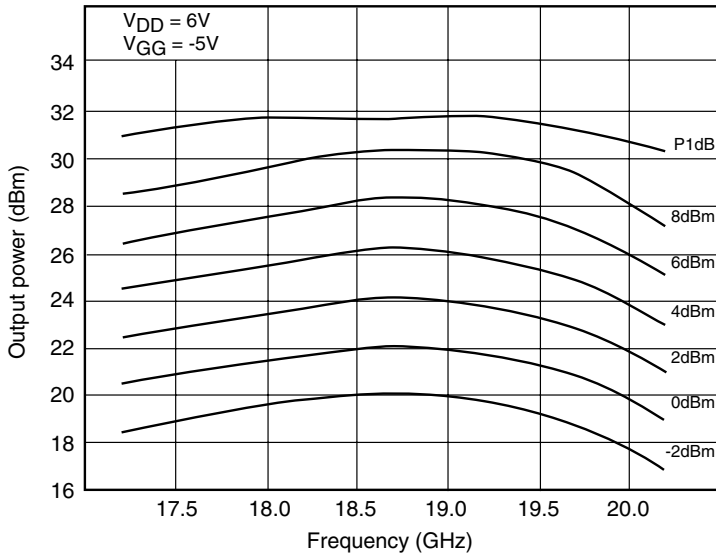
CASE STYLE: GJ

G.C.P.: Gain Compression Point, S.C.L.: Single Carrier Level

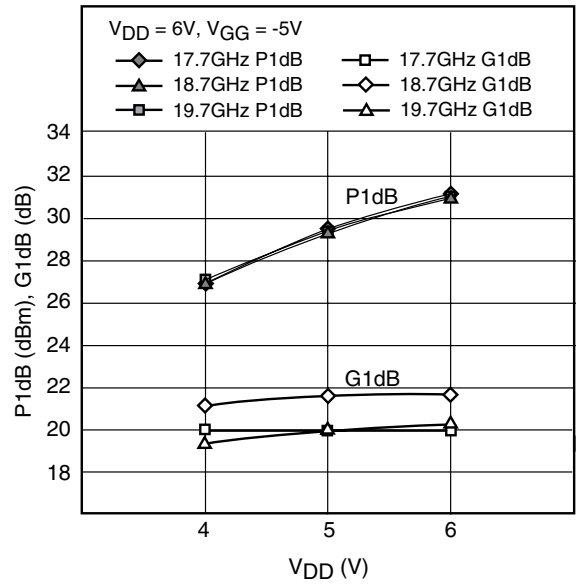
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17.7-19.7GHz Power Amplifier MMIC

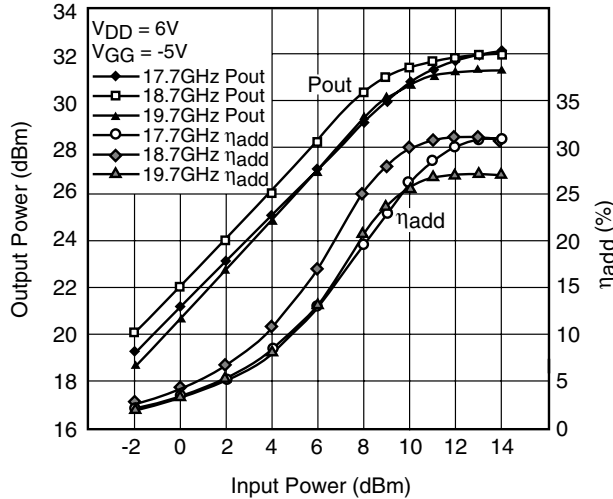
**OUTPUT POWER vs. FREQUENCY**



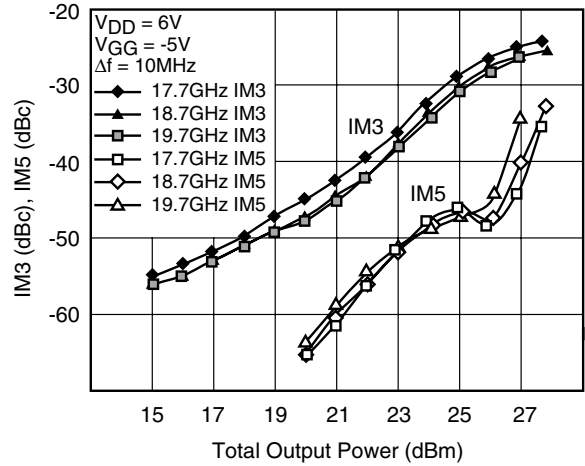
**P1dB, G1dB vs. VDD**



**OUTPUT POWER &  $\eta_{add}$  vs. INPUT POWER**



**IM3, IM5 vs. OUTPUT POWER**

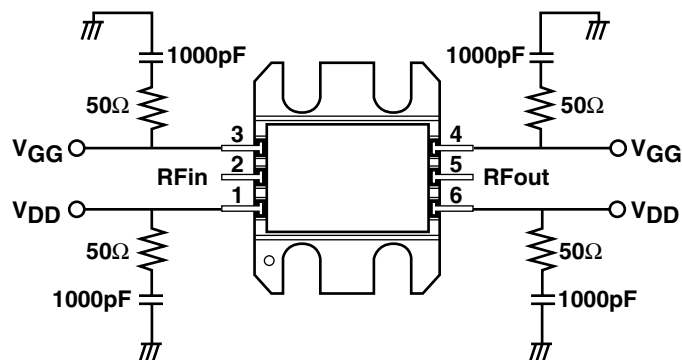


## S-PARAMETERS

$V_{DD} = 6V, V_{GG} = -5V$

FREQUENCY (MHZ)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
17200	.081	19.3	11.021	-38.3	.003	-44.6	.287	-63.7
17500	.180	-51.5	11.546	-94.5	.004	-83.3	.319	-105.9
17700	.245	-81.8	11.715	-132.5	.004	-105.2	.340	-135.6
17900	.302	-109.7	11.777	-170.0	.004	-135.1	.362	-165.2
18000	.325	-123.5	11.800	171.3	.004	-143.3	.369	-179.8
18200	.362	-150.8	11.806	134.1	.004	-176.7	.392	152.9
18400	.385	-179.4	11.909	97.1	.004	160.5	.408	127.2
18600	.399	150.9	12.029	59.7	.004	133.8	.418	103.2
18800	.401	117.4	12.277	21.3	.005	108.7	.415	80.2
19000	.398	80.6	12.279	-18.5	.005	81.8	.398	59.4
19200	.389	39.8	11.980	-59.5	.005	53.1	.366	41.2
19400	.389	-2.2	11.273	-99.4	.005	22.3	.331	26.5
19500	.393	-23.0	10.899	-119.4	.005	-1.8	.315	21.7
19700	.426	-62.2	10.202	-157.6	.004	-40.2	.293	14.7
20000	.472	-117.1	9.167	145.1	.002	-94.2	.315	0.5
20200	.475	-150.8	8.445	107.3	.001	-143.2	.315	-13.6

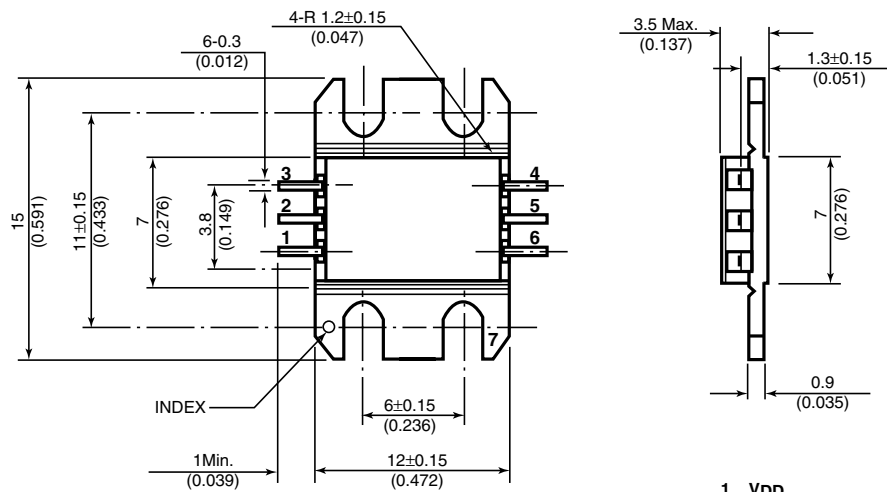
## RECOMMENDED BIAS CIRCUIT



Note 1: The R/C networks are recommended on the bias supply lines, close to the package, to prevent video oscillations which could damage the module.

Note 2: Bias point VDD can be connected at the input side or at the output:  
The two pins named VDD are internally connected. The same is true for VGG.

## Case Style "GJ" Metal-Ceramic Hermetic Package



1. VDD
2. RFin
3. VGG
4. VGG
5. RFout
6. VDD
7. GND (Body)

Unit: mm(inches)

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