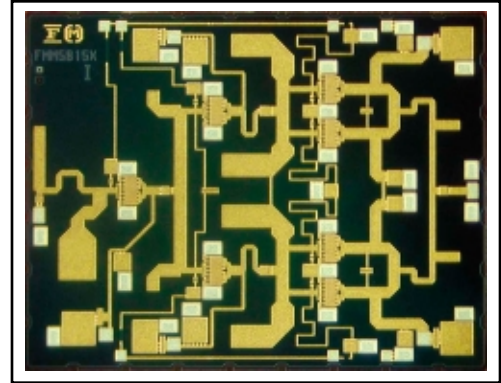


### FEATURES

- High Output Power:  $P_{1dB} = 31dBm$  (Typ.)
- High Gain:  $G_{1dB} = 21dB$  (Typ.)
- High PAE:  $\eta_{add} = 30\%$  (Typ.)
- Impedance Matched  $Z_{in}/Z_{out} = 50\Omega$
- 0.25 $\mu m$  PHEMT Technology

### DESCRIPTION

The FMM5815X is a high-gain, high linearity, 3-stage MMIC amplifier designed for operation in the 17.5-20.0 GHz 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 $T_a=25^\circ C$ )

| Item                           | Symbol    | Condition | Rating      | Unit       |
|--------------------------------|-----------|-----------|-------------|------------|
| Drain Voltage                  | $V_{DD}$  |           | 10          | V          |
| Gate Voltage                   | $V_{GG}$  |           | -3.0        | V          |
| Input Power                    | $P_{in}$  |           | 22          | dBm        |
| Storage Temperature            | $T_{stg}$ |           | -65 to +175 | $^\circ C$ |
| Operating Backside Temperature | $T_{op}$  |           | -65 to +85  | $^\circ C$ |

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.
2. The forward and reverse gate currents should not exceed 4 and -0.39 mA respectively.
3. This product should be hermetically packaged

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

| Item                                 | Symbol       | Conditions                                                         | Limits      |      |      | Unit |
|--------------------------------------|--------------|--------------------------------------------------------------------|-------------|------|------|------|
|                                      |              |                                                                    | Min.        | Typ. | Max. |      |
| Frequency Range                      | f            |                                                                    | 17.5 - 20.0 |      |      | GHz  |
| Output Power at 1 dB G.C.P.          | $P_{1dB}$    |                                                                    | 29.5        | 31   | -    | dBm  |
| Power Gain at 1 dB G.C.P.            | $G_{1dB}$    |                                                                    | 19          | 21   | 24   | dB   |
| Drain Current                        | $I_{ddrf}$   | $V_{DD} = 6V$<br>$I_{DD} = 600mA$ (Typ.)<br>$Z_S = Z_L = 50\Omega$ | -           | 700  | 950  | mA   |
| Power-Added Efficiency               | $\eta_{add}$ |                                                                    | -           | 30   | -    | %    |
| Input Return Loss                    | $R_{Lin}$    |                                                                    | -           | -12  | -    | dB   |
| Output Return Loss                   | $R_{Lout}$   |                                                                    | -           | -8   | -    | dB   |
| 3rd Order Intermodulation Distortion | $IM_3$       | $\Delta f = 10MHz$ , 2-Tone Test,<br>$P_{out} = 20dBm$ S.C.L.      | -37.0       | -40  | -    | dBc  |

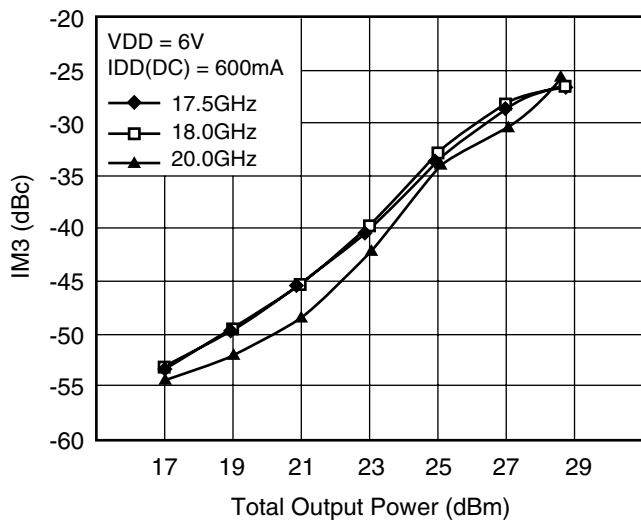
Note 1: RF parameter sample size 10pcs. Criteria (accept/reject)=(0/1)

Note 2: Electrical Characteristic is specified on RF-probe measurements

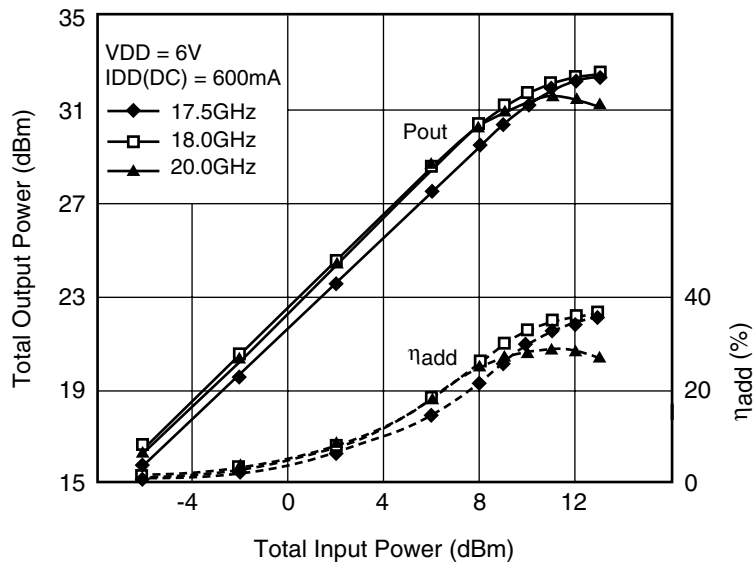
G.C.P.: Gain Compression Point

S.C.L.: Single Carrier Level

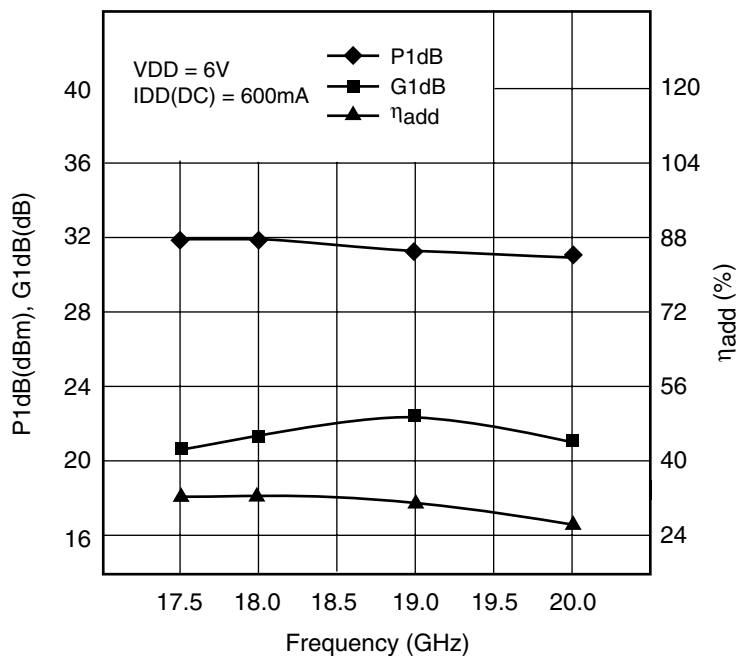
### IM3 vs. OUTPUT POWER



### OUTPUT POWER vs. INPUT POWER



### P1dB & G1dB vs. FREQUENCY



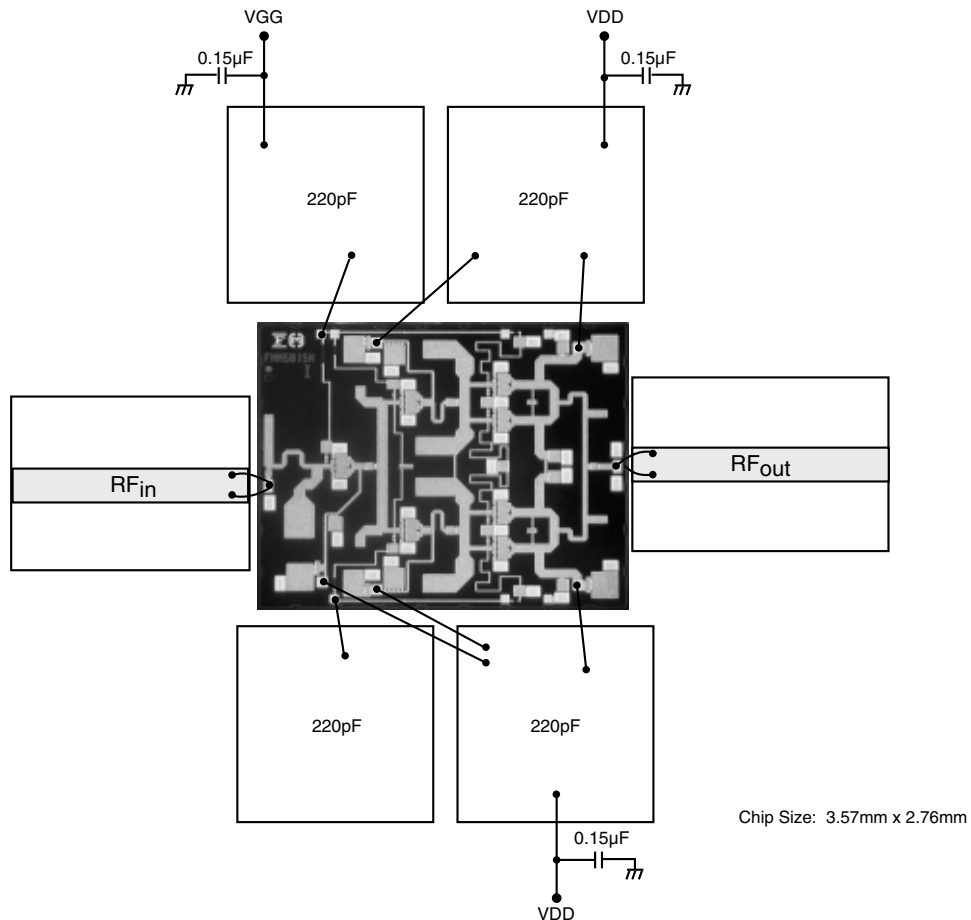
## S-PARAMETERS

$V_{DD} = 6V$ ,  $I_{DS} = 600mA$

| FREQUENCY<br>(MHZ) | S11  |        | S21    |        | S12  |        | S22  |        |
|--------------------|------|--------|--------|--------|------|--------|------|--------|
|                    | MAG  | ANG    | MAG    | ANG    | MAG  | ANG    | MAG  | ANG    |
| 16500              | .357 | 47.0   | 10.785 | -44.4  | .004 | -51.8  | .110 | -20.6  |
| 17000              | .385 | 19.3   | 12.059 | -80.4  | .005 | -42.8  | .111 | -93.5  |
| 17500              | .443 | -10.5  | 13.360 | -117.3 | .005 | -62.5  | .169 | -134.6 |
| 18000              | .512 | -39.3  | 14.483 | -156.9 | .007 | -83.0  | .205 | -166.6 |
| 18500              | .566 | -66.7  | 14.782 | 161.9  | .007 | -95.1  | .220 | 164.9  |
| 19000              | .572 | -92.9  | 14.585 | 120.3  | .005 | -112.5 | .178 | 137.0  |
| 19500              | .538 | -117.9 | 13.693 | 78.7   | .005 | -142.9 | .121 | 108.3  |
| 20000              | .459 | -144.7 | 13.188 | 37.1   | .003 | 94.6   | .051 | 53.6   |
| 20500              | .346 | 165.1  | 12.600 | -10.4  | .005 | 33.8   | .044 | 19.8   |
| 21000              | .307 | 74.2   | 11.066 | -65.4  | .006 | -10.5  | .080 | 11.4   |

[Download S-Parameters, click here](#)

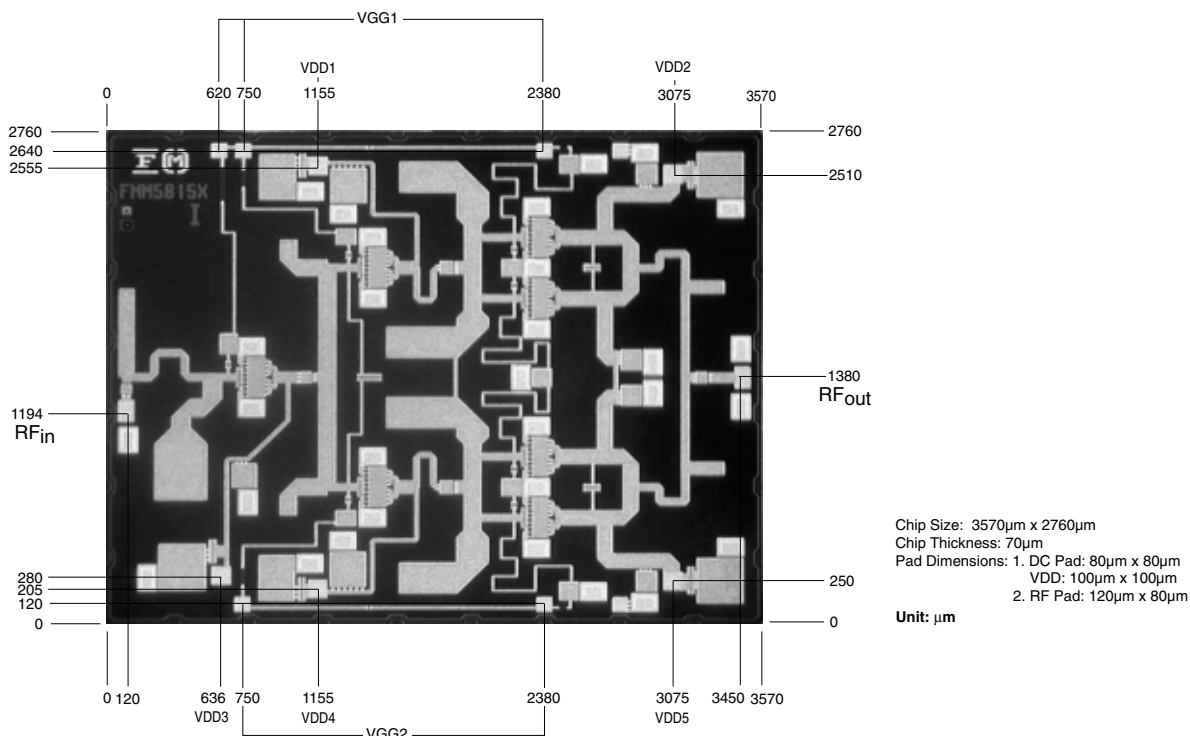
## ASSEMBLY DRAWING



# FMM5815X

17.5-20GHz Power Amplifier MMIC

## CHIP OUTLINE



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- Observe government laws and company regulations when discarding this product. This product must be discarded in accordance with methods specified by applicable hazardous waste procedures.

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Printed in U.S.A. FCSI0601M200