# 电子元器件系列

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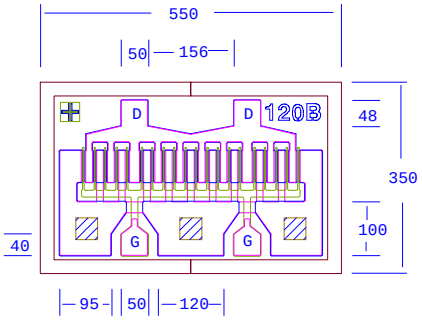
# EFA120B/EFA120BV

## DATA SHEET

## Low Distortion GaAs Power FET

- **+28.0dBm TYPICAL OUTPUT POWER**
- **9.5dB TYPICAL POWER GAIN FOR EFA120B AND 11.5dB FOR EFA120BV AT 12GHz**
- **0.3 X 1200 MICRON RECESSED "MUSHROOM" GATE**
- **$Si_3N_4$ PASSIVATION**
- **ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY**
- **EFA120BV WITH VIA HOLE SOURCE GROUNDING**
- **Idss SORTED IN 20mA PER BIN RANGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | EFA120B | | | EFA120BV | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $P_{1dB}$ | Output Power at 1dB Compression f=12GHz<br>Vds=8V, Ids=50% Idss f=18GHz | 26.0 | 28.0<br>28.0 | | 26.0 | 28.0<br>28.0 | | dBm |
| $G_{1dB}$ | Gain at 1dB Compression f=12GHz<br>Vds=8V, Ids=50% Idss f=18GHz | 8.0 | 9.5<br>7.0 | | 10.0 | 11.5<br>9.0 | | dB |
| PAE | Gain at 1dB Compression<br>Vds=8V, Ids=50% Idss f=12GHz | | 34 | | | 36 | | % |
| Idss | Saturated Drain Current Vds=3V, Vgs=0V | 200 | 340 | 440 | 200 | 340 | 440 | mA |
| Gm | Transconductance Vds=3V, Vgs=0V | 140 | 180 | | 140 | 180 | | mS |
| Vp | Pinch-off Voltage Vds=3V, Ids=3.0mA | | -2.0 | -3.5 | | -2.0 | -3.5 | V |
| BVgd | Drain Breakdown Voltage Igd=1.2mA | -12 | -15 | | -12 | -15 | | V |
| BVgs | Source Breakdown Voltage Igs=1.2mA | -7 | -14 | | -7 | -14 | | V |
| Rth | Thermal Resistance (Au-Sn Eutectic Attach) | | 40 | | | 30 | | $^{o}$C/W |

## MAXIMUM RATINGS AT 25$^{O}$C

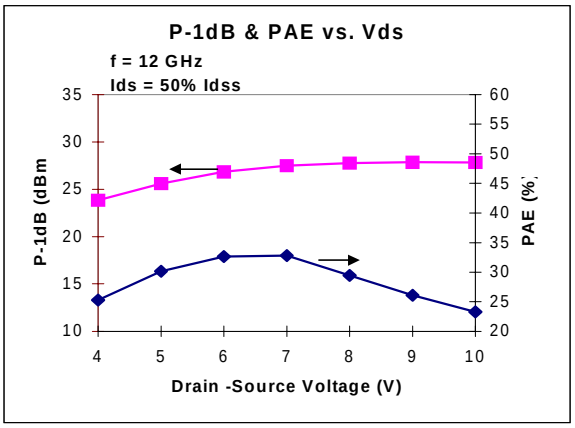
| SYMBOLS | PARAMETERS | EFA120B | | EFA120BV | |
|---|---|---|---|---|---|
| | | ABSOLUTE[1] | CONTINUOUS[2] | ABSOLUTE[1] | CONTINUOUS[2] |
| Vds | Drain-Source Voltage | 12V | 8V | 12V | 8V |
| Vgs | Gate-Source Voltage | -8V | -4V | -8V | -4V |
| Ids | Drain Current | Idss | 355mA | Idss | Idss |
| Igsf | Forward Gate Current | 30mA | 5mA | 30mA | 5mA |
| Pin | Input Power | 26dBm | @ 3dB Compression | 26dBm | @ 3dB Compression |
| Tch | Channel Temperature | 175$^{o}$C | 150$^{o}$C | 175$^{o}$C | 150$^{o}$C |
| Tstg | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C | -65/175$^{o}$C | -65/150$^{o}$C |
| Pt | Total Power Dissipation | 3.4W | 2.8W | 4.5W | 3.8W |

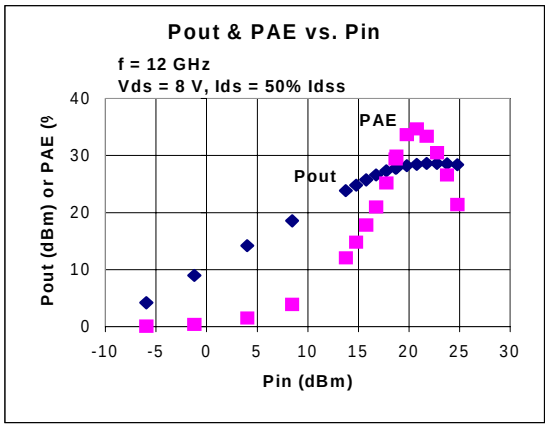
# EFA120B/EFA120BV

## DATA SHEET

## Low Distortion GaAs Power FET

**EFA120B**




**S-PARAMETERS**

**EFA120B 8V, 1/2 Idss**

| FREQ | --- S11 --- | | --- S21 --- | | --- S12 --- | | --- S22 --- | |
|---|---|---|---|---|---|---|---|---|
| (GHz) | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 1.0 | 0.950 | -67.1 | 8.659 | 139.4 | 0.034 | 55.2 | 0.254 | -47.4 |
| 2.0 | 0.911 | -106.2 | 6.163 | 114.7 | 0.047 | 36.7 | 0.222 | -79.6 |
| 4.0 | 0.881 | -138.8 | 3.609 | 89.3 | 0.054 | 21.6 | 0.212 | -106.1 |
| 6.0 | 0.875 | -153.5 | 2.524 | 72.4 | 0.053 | 17.5 | 0.251 | -118.6 |
| 8.0 | 0.873 | -163.0 | 1.949 | 58.5 | 0.052 | 14.4 | 0.307 | -126.7 |
| 10.0 | 0.871 | -170.7 | 1.573 | 46.1 | 0.047 | 13.8 | 0.370 | -134.4 |
| 12.0 | 0.878 | -180.0 | 1.320 | 32.9 | 0.047 | 12.5 | 0.446 | -143.0 |
| 14.0 | 0.883 | 173.1 | 1.105 | 20.5 | 0.045 | 13.1 | 0.521 | -152.2 |
| 16.0 | 0.888 | 165.7 | 0.921 | 7.9 | 0.045 | 12.7 | 0.583 | -162.2 |
| 18.0 | 0.909 | 162.3 | 0.775 | -2.9 | 0.046 | 11.8 | 0.637 | -172.1 |
| 20.0 | 0.916 | 159.4 | 0.648 | -14.2 | 0.049 | 12.9 | 0.685 | 177.4 |
| 22.0 | 0.914 | 160.6 | 0.543 | -21.8 | 0.054 | 15.6 | 0.715 | 167.3 |
| 24.0 | 0.933 | 161.0 | 0.483 | -28.9 | 0.061 | 20.2 | 0.740 | 158.7 |
| 26.0 | 0.923 | 160.0 | 0.419 | -34.4 | 0.072 | 24.4 | 0.758 | 152.4 |

**EFA120BV 8V, 1/2 Idss**

| FREQ | --- S11 --- | | --- S21 --- | | --- S12 --- | | --- S22 --- | |
|---|---|---|---|---|---|---|---|---|
| (GHz) | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 1.0 | 0.937 | -64.1 | 10.367 | 141.1 | 0.031 | 55.1 | 0.290 | -50.6 |
| 2.0 | 0.907 | -103.9 | 7.564 | 117.0 | 0.046 | 34.4 | 0.274 | -82.9 |
| 4.0 | 0.887 | -140.6 | 4.476 | 90.1 | 0.052 | 14.6 | 0.284 | -110.6 |
| 6.0 | 0.888 | -157.4 | 3.096 | 72.9 | 0.051 | 5.1 | 0.327 | -122.1 |
| 8.0 | 0.892 | -167.0 | 2.337 | 59.4 | 0.050 | -0.3 | 0.378 | -129.3 |
| 10.0 | 0.897 | -173.6 | 1.864 | 47.5 | 0.048 | -7.0 | 0.432 | -135.5 |
| 12.0 | 0.904 | -179.8 | 1.553 | 35.8 | 0.046 | -11.6 | 0.483 | -142.6 |
| 14.0 | 0.906 | 174.0 | 1.317 | 24.2 | 0.044 | -15.6 | 0.527 | -150.2 |
| 16.0 | 0.911 | 167.5 | 1.134 | 12.0 | 0.044 | -21.1 | 0.572 | -159.1 |
| 18.0 | 0.917 | 160.9 | 0.975 | -0.1 | 0.044 | -25.1 | 0.618 | -168.5 |
| 20.0 | 0.922 | 155.1 | 0.837 | -11.7 | 0.041 | -30.2 | 0.667 | -177.5 |
| 22.0 | 0.936 | 154.0 | 0.702 | -21.1 | 0.039 | -31.4 | 0.723 | 173.1 |
| 24.0 | 0.941 | 152.0 | 0.603 | -29.3 | 0.037 | -31.3 | 0.774 | 167.9 |
| 26.0 | 0.934 | 149.5 | 0.530 | -36.6 | 0.034 | -24.8 | 0.818 | 165.6 |

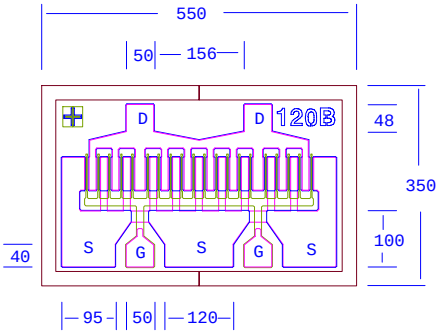
Note: The data included 0.7 mils diameter Au bonding wires; 2 gate wires, 15 mils each; 2 drain wires, 20 mils each; 6 source wires, 7 mils each; no source wires for EFA120BV.

# EFC120B

## PRELIMINARY DATA SHEET

## Low Distortion GaAs Power FET

- **+28.0dBm TYPICAL OUTPUT POWER**
- **9.5dB TYPICAL POWER GAIN AT 12GHz**
- **HIGH BVgd FOR 10V BIAS**
- **0.3 X 1200 MICRON RECESSED "MUSHROOM" GATE**
- **$Si_3N_4$ PASSIVATION**
- **ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY**
- **Idss SORTED IN 20mA PER BIN RANGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 °C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **$P_{1dB}$** | Output Power at 1dB Compression<br>Vds=10V, Ids=50% Idss | f=12GHz<br>f=18GHz | 26.0 | 28.0<br>28.0 | | dBm |
| **$G_{1dB}$** | Gain at 1dB Compression<br>Vds=10V, Ids=50% Idss | f=12GHz<br>f=18GHz | 7.5 | 9.5<br>7.0 | | dB |
| **PAE** | Power Added Efficiency at 1dB Compression<br>Vds=10V, Ids=50% Idss | f=12GHz | | 33 | | % |
| **Idss** | Saturated Drain Current Vds=3V, Vgs=0V | | 160 | 260 | 360 | mA |
| **Gm** | Transconductance Vds=3V, Vgs=0V | | 100 | 140 | | mS |
| **Vp** | Pinch-off Voltage Vds=3V, Ids=3.0 mA | | | -2.5 | -4.0 | V |
| **BVgd** | Drain Breakdown Voltage Igd=1.2mA | | -15 | -20 | | V |
| **BVgs** | Source Breakdown Voltage Igs=1.2mA | | -10 | -17 | | V |
| **Rth** | Thermal Resistance (Au-Sn Eutectic Attach) | | | 40 | | °C/W |

## MAXIMUM RATINGS AT 25°C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| **Vds** | Drain-Source Voltage | 14V | 10V |
| **Vgs** | Gate-Source Voltage | -8V | -4.5V |
| **Ids** | Drain Current | Idss | 285mA |
| **Igsf** | Forward Gate Current | 30mA | 5mA |
| **Pin** | Input Power | 26dBm | @ 3dB Compression |
| **Tch** | Channel Temperature | 175°C | 150°C |
| **Tstg** | Storage Temperature | -65/175°C | -65/150°C |
| **Pt** | Total Power Dissipation | 3.4W | 2.8W |

# EFC120B

**PRELIMINARY DATA SHEET**

**Low Distortion GaAs Power FET**

## S-PARAMETERS

**10V, 1/2 Idss**

| Freq GHz | S11 Mag | S11 Ang | S21 Mag | S21 Ang | S12 Mag | S12 Ang | S22 Mag | S22 Ang |
|---|---|---|---|---|---|---|---|---|
| 1.000 | 0.970 | -47.8 | 6.538 | 148.7 | 0.034 | 62.7 | 0.293 | -35.9 |
| 2.000 | 0.928 | -83.3 | 5.302 | 125.7 | 0.056 | 44.8 | 0.284 | -63.5 |
| 3.000 | 0.899 | -108.1 | 4.250 | 108.6 | 0.067 | 31.7 | 0.281 | -83.1 |
| 4.000 | 0.884 | -125.3 | 3.482 | 95.4 | 0.072 | 22.4 | 0.290 | -95.4 |
| 5.000 | 0.876 | -138.0 | 2.884 | 84.1 | 0.073 | 15.7 | 0.296 | -107.6 |
| 6.000 | 0.868 | -147.5 | 2.462 | 74.5 | 0.073 | 11.0 | 0.323 | -114.8 |
| 7.000 | 0.871 | -155.2 | 2.141 | 66.3 | 0.073 | 6.4 | 0.354 | -119.3 |
| 8.000 | 0.866 | -161.2 | 1.889 | 58.7 | 0.072 | 3.1 | 0.384 | -123.7 |
| 9.000 | 0.868 | -166.6 | 1.681 | 51.6 | 0.070 | 0.3 | 0.415 | -127.2 |
| 10.000 | 0.871 | -171.5 | 1.516 | 44.7 | 0.068 | -2.2 | 0.445 | -130.5 |
| 11.000 | 0.874 | -176.7 | 1.380 | 38.1 | 0.066 | -4.5 | 0.475 | -134.0 |
| 12.000 | 0.878 | 179.1 | 1.263 | 31.7 | 0.064 | -6.4 | 0.507 | -137.2 |
| 13.000 | 0.878 | 175.3 | 1.159 | 25.4 | 0.063 | -8.0 | 0.532 | -140.6 |
| 14.000 | 0.884 | 172.1 | 1.074 | 19.5 | 0.062 | -8.3 | 0.561 | -144.4 |
| 15.000 | 0.885 | 168.4 | 0.992 | 13.5 | 0.060 | -9.9 | 0.581 | -148.3 |
| 16.000 | 0.890 | 164.3 | 0.926 | 6.6 | 0.059 | -11.4 | 0.599 | -152.8 |
| 17.000 | 0.890 | 160.9 | 0.862 | 0.5 | 0.059 | -13.3 | 0.621 | -158.4 |
| 18.000 | 0.895 | 158.2 | 0.807 | -5.3 | 0.059 | -14.0 | 0.644 | -163.6 |
| 19.000 | 0.898 | 155.5 | 0.754 | -11.4 | 0.058 | -14.0 | 0.662 | -168.7 |
| 20.000 | 0.905 | 152.1 | 0.703 | -17.3 | 0.058 | -13.8 | 0.676 | -173.6 |
| 21.000 | 0.911 | 143.9 | 0.647 | -23.3 | 0.056 | -14.3 | 0.699 | -172.1 |
| 22.000 | 0.912 | 141.1 | 0.595 | -28.0 | 0.056 | -13.1 | 0.713 | -177.2 |
| 23.000 | 0.922 | 139.7 | 0.549 | -33.2 | 0.055 | -13.0 | 0.748 | 178.7 |
| 24.000 | 0.919 | 138.2 | 0.505 | -36.9 | 0.054 | -10.6 | 0.765 | 176.4 |
| 25.000 | 0.923 | 137.3 | 0.460 | -40.3 | 0.054 | -6.3 | 0.787 | 173.6 |
| 26.000 | 0.930 | 135.8 | 0.442 | -44.3 | 0.056 | -3.4 | 0.799 | 171.0 |

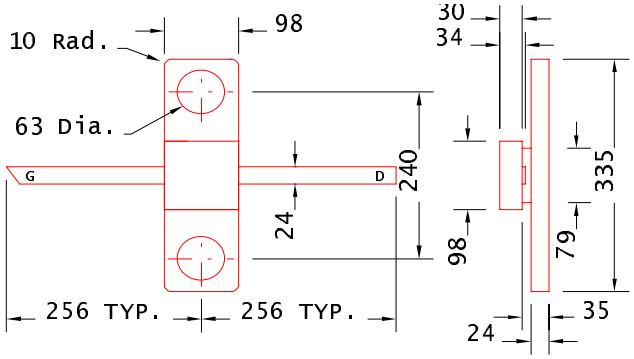
**Note: The data included 0.7 mils diameter Au bonding wires:**
**2 gate wires, 15 mils each; 2 drain wires, 20 mils each; 6 source wires, 7 mils each.**

# EFA120B-100F

## DATA SHEET

## Low Distortion GaAs Power FET

- **HERMETIC 100mil CERAMIC FLANGE PACKAGE**
- **+28.0dBm TYPICAL OUTPUT POWER**
- **9.0dB TYPICAL POWER GAIN AT 8GHz**
- **0.3 X 1200 MICRON RECESSED "MUSHROOM" GATE**
- **$Si_3N_4$ PASSIVATION**
- **ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY**




All Dimensions In mils

## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **$P_{1dB}$** | Output Power at 1dB Compression<br>Vds=8V, Ids=50% Idss | f = 8GHz<br>f = 12GHz | <br>26.0 | 28.0<br>28.0 | | dBm |
| **$G_{1dB}$** | Gain at 1dB Compression<br>Vds=8V, Ids=50% Idss | f = 8GHz<br>f = 12GHz | <br>4.0 | 9.0<br>6.0 | | dB |
| **PAE** | Gain at 1dB Compression<br>Vds=8V, Ids=50% Idss | <br>f = 12GHz | | 30 | | % |
| **Idss** | Saturated Drain Current Vds=3V, Vgs=0V | | 200 | 340 | 440 | mA |
| **Gm** | Transconductance Vds=3V, Vgs=0V | | 140 | 180 | | mS |
| **Vp** | Pinch-off Voltage Vds=3V, Ids=3.0mA | | | -2.0 | -3.5 | V |
| **BVgd** | Drain Breakdown Voltage Igd=1.2mA | | -12 | -15 | | V |
| **BVgs** | Source Breakdown Voltage Igs=1.2mA | | -7 | -14 | | V |
| **Rth** | Thermal Resistance | | | 43* | | $^{o}$C/W |

***Overall Rth depends on case mounting.**

## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| **Vds** | Drain-Source Voltage | 12V | 8V |
| **Vgs** | Gate-Source Voltage | -8V | -4V |
| **Ids** | Drain Current | Idss | 315mA |
| **Igsf** | Forward Gate Current | 30mA | 5mA |
| **Pin** | Input Power | 26dBm | @ 3dB Compression |
| **Tch** | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| **Tstg** | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| **Pt** | Total Power Dissipation | 3.2W | 2.7W |

# EFA120B-100F

**DATA SHEET**

## Low Distortion GaAs Power FET

### S-PARAMETERS

**8V, 1/2 Idss**

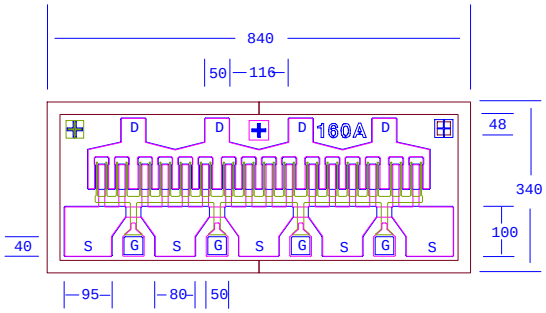
| FREQ | --- S11 --- | | --- S21 --- | | --- S12 --- | | --- S22 --- | |
|---|---|---|---|---|---|---|---|---|
| (GHz) | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 1.0 | 0.960 | -62.2 | 7.670 | 137.4 | 0.028 | 52.9 | 0.458 | -46.5 |
| 2.0 | 0.884 | -102.4 | 5.782 | 106.2 | 0.038 | 34.8 | 0.397 | -69.5 |
| 3.0 | 0.841 | -126.9 | 4.474 | 83.8 | 0.043 | 27.0 | 0.375 | -85.2 |
| 4.0 | 0.812 | -148.4 | 3.697 | 64.4 | 0.047 | 20.8 | 0.376 | -97.4 |
| 5.0 | 0.790 | -168.3 | 3.179 | 46.1 | 0.050 | 15.7 | 0.370 | -107.9 |
| 6.0 | 0.774 | 178.5 | 2.801 | 29.3 | 0.054 | 10.8 | 0.342 | -125.3 |
| 7.0 | 0.759 | 163.9 | 2.490 | 12.5 | 0.059 | 5.2 | 0.347 | -144.3 |
| 8.0 | 0.746 | 149.9 | 2.220 | -3.8 | 0.063 | -0.7 | 0.371 | -162.5 |
| 9.0 | 0.758 | 128.8 | 1.951 | -20.5 | 0.068 | -6.2 | 0.391 | -166.2 |
| 10.0 | 0.777 | 114.8 | 1.754 | -35.9 | 0.074 | -14.2 | 0.383 | -175.9 |
| 11.0 | 0.768 | 109.9 | 1.668 | -51.1 | 0.086 | -22.8 | 0.388 | 159.4 |
| 12.0 | 0.740 | 102.0 | 1.596 | -66.9 | 0.099 | -32.3 | 0.418 | 142.6 |
| 13.0 | 0.740 | 85.1 | 1.485 | -82.4 | 0.114 | -41.9 | 0.395 | 137.7 |
| 14.0 | 0.753 | 69.4 | 1.405 | -98.6 | 0.132 | -54.5 | 0.343 | 122.3 |
| 15.0 | 0.737 | 57.8 | 1.342 | -117.8 | 0.156 | -69.8 | 0.382 | 92.6 |
| 16.0 | 0.718 | 45.9 | 1.274 | -136.3 | 0.187 | -84.3 | 0.411 | 75.2 |
| 17.0 | 0.722 | 34.0 | 1.245 | -152.8 | 0.232 | -98.1 | 0.356 | 68.9 |
| 18.0 | 0.703 | 22.0 | 1.211 | -171.5 | 0.295 | -114.7 | 0.310 | 53.3 |
| 19.0 | 0.657 | 10.6 | 1.164 | 168.6 | 0.379 | -134.5 | 0.319 | 39.7 |
| 20.0 | 0.717 | -1.0 | 1.174 | 147.8 | 0.514 | -158.6 | 0.270 | 39.6 |

# EFA160A

## DATA SHEET

## Low Distortion GaAs Power FET

- **+29.0dBm TYPICAL OUTPUT POWER**
- **9.0dB TYPICAL POWER GAIN AT 12GHz**
- **0.3 X 1600 MICRON RECESSED "MUSHROOM" GATE**
- **$Si_3N_4$ PASSIVATION**
- **ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY**
- **Idss SORTED IN 30mA PER BIN RANGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| **$P_{1dB}$** | Output Power at 1dB Compression f=12GHz<br>Vds=8V, Ids=50% Idss f=18GHz | 27.0 | 29.0<br>29.0 | | dBm |
| **$G_{1dB}$** | Gain at 1dB Compression f=12GHz<br>Vds=8V, Ids=50% Idss f=18GHz | 7.0 | 9.0<br>6.5 | | dB |
| **PAE** | Gain at 1dB Compression<br>Vds=8V, Ids=50% Idss f=12GHz | | 34 | | % |
| **Idss** | Saturated Drain Current Vds=3V, Vgs=0V | 260 | 420 | 600 | mA |
| **Gm** | Transconductance Vds=3V, Vgs=0V | 180 | 240 | | mS |
| **Vp** | Pinch-off Voltage Vds=3V, Ids=4.0mA | | -2.0 | -3.5 | V |
| **BVgd** | Drain Breakdown Voltage Igd=1.6mA | -12 | -15 | | V |
| **BVgs** | Source Breakdown Voltage Igs=1.6mA | -7 | -14 | | V |
| **Rth** | Thermal Resistance (Au-Sn Eutectic Attach) | | 30 | | $^{o}$C/W |

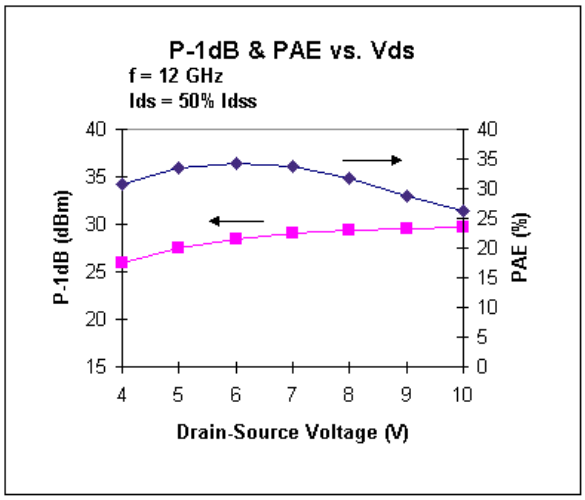
## MAXIMUM RATINGS AT 25$^{O}$C

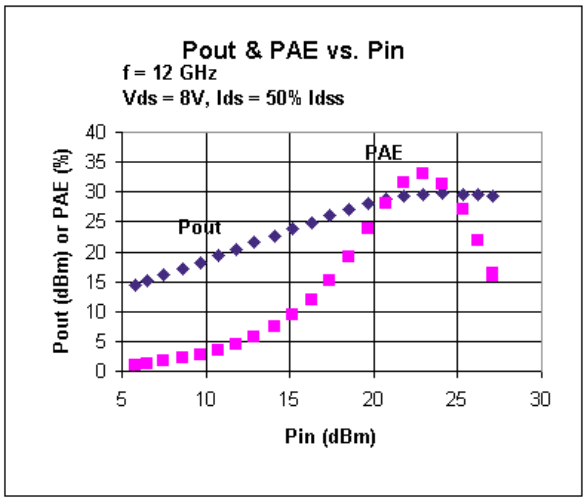
| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| **Vds** | Drain-Source Voltage | 12V | 8V |
| **Vgs** | Gate-Source Voltage | -8V | -4V |
| **Ids** | Drain Current | Idss | 475mA |
| **Igsf** | Forward Gate Current | 40mA | 7mA |
| **Pin** | Input Power | 28dBm | @ 3dB Compression |
| **Tch** | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| **Tstg** | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| **Pt** | Total Power Dissipation | 4.5W | 3.8W |

# EFA160A

## DATA SHEET

## Low Distortion GaAs Power FET




### S-PARAMETERS

**8V, 1/2 Idss**

| FREQ | --- S11 --- | | --- S21 --- | | --- S12 --- | | --- S22 --- | |
|---|---|---|---|---|---|---|---|---|
| (GHz) | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 1.0 | 0.936 | -81.9 | 9.025 | 133.3 | 0.035 | 48.7 | 0.221 | -106.2 |
| 2.0 | 0.911 | -119.8 | 5.964 | 108.8 | 0.047 | 27.7 | 0.285 | -132.0 |
| 3.0 | 0.903 | -138.7 | 4.275 | 94.5 | 0.050 | 18.4 | 0.319 | -141.6 |
| 4.0 | 0.903 | -149.8 | 3.297 | 84.3 | 0.050 | 13.0 | 0.347 | -145.0 |
| 5.0 | 0.900 | -157.8 | 2.644 | 75.5 | 0.049 | 9.3 | 0.382 | -147.5 |
| 6.0 | 0.903 | -162.4 | 2.207 | 68.6 | 0.048 | 6.4 | 0.413 | -148.0 |
| 7.0 | 0.905 | -165.8 | 1.884 | 62.3 | 0.047 | 5.6 | 0.445 | -148.7 |
| 8.0 | 0.908 | -168.0 | 1.640 | 56.4 | 0.046 | 3.6 | 0.476 | -149.5 |
| 9.0 | 0.913 | -170.0 | 1.451 | 51.2 | 0.044 | 3.1 | 0.510 | -150.4 |
| 10.0 | 0.914 | -171.8 | 1.297 | 46.2 | 0.042 | 3.9 | 0.536 | -151.0 |
| 11.0 | 0.918 | -173.7 | 1.172 | 41.0 | 0.041 | 3.2 | 0.563 | -152.2 |
| 12.0 | 0.920 | -175.2 | 1.067 | 36.1 | 0.039 | 2.6 | 0.592 | -153.8 |
| 13.0 | 0.924 | -177.4 | 0.977 | 31.0 | 0.038 | 2.9 | 0.612 | -155.2 |
| 14.0 | 0.925 | -179.9 | 0.901 | 25.9 | 0.038 | 1.8 | 0.635 | -157.2 |
| 15.0 | 0.925 | 177.5 | 0.836 | 20.8 | 0.038 | 1.6 | 0.653 | -159.4 |
| 16.0 | 0.929 | 174.2 | 0.775 | 15.4 | 0.038 | 0.7 | 0.675 | -161.8 |
| 17.0 | 0.927 | 171.0 | 0.721 | 10.0 | 0.037 | 1.5 | 0.688 | -164.7 |
| 18.0 | 0.928 | 167.6 | 0.670 | 4.6 | 0.037 | 2.2 | 0.706 | -167.7 |
| 19.0 | 0.927 | 164.8 | 0.626 | -0.6 | 0.037 | 1.4 | 0.721 | -171.1 |
| 20.0 | 0.931 | 162.1 | 0.580 | -5.4 | 0.037 | 1.0 | 0.738 | -174.6 |
| 21.0 | 0.945 | 162.3 | 0.502 | -9.7 | 0.036 | 2.4 | 0.771 | -178.4 |
| 22.0 | 0.951 | 161.1 | 0.469 | -13.0 | 0.033 | 2.9 | 0.786 | 178.6 |
| 23.0 | 0.960 | 159.9 | 0.433 | -16.9 | 0.035 | 5.0 | 0.803 | 176.2 |
| 24.0 | 0.961 | 159.6 | 0.409 | -20.1 | 0.037 | 8.9 | 0.821 | 174.3 |
| 25.0 | 0.973 | 159.3 | 0.391 | -22.7 | 0.037 | 10.9 | 0.831 | 172.5 |
| 26.0 | 0.969 | 159.6 | 0.368 | -24.8 | 0.039 | 10.8 | 0.849 | 170.6 |

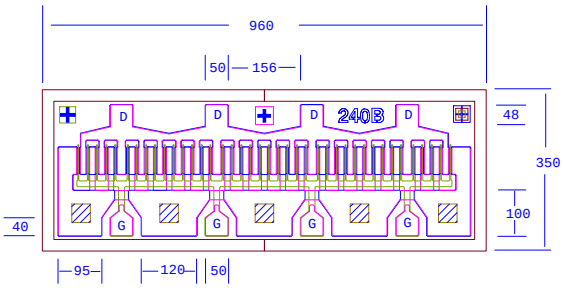
Note: The data included 0.7 mils diameter Au bonding wires:
4 gate wires, 15 mils each; 4 drain wires, 20 mils each; 10 source wires, 7 mils each.

# EFA240B/EFA240BV

## DATA SHEET

## Low Distortion GaAs Power FET

- **+31.0dBm TYPICAL OUTPUT POWER**
- **8.5dB TYPICAL POWER GAIN FOR EFA240B AND 10.5dB FOR EFA240BV AT 12GHz**
- **0.3 X 2400 MICRON RECESSED "MUSHROOM" GATE**
- **$Si_3N_4$ PASSIVATION**
- **ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY**
- **EFA240BV WITH VIA HOLE SOURCE GROUNDING**
- **Idss SORTED IN 40mA PER BIN RANGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | EFA240B | | | EFA240BV | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $P_{1dB}$ | Output Power at 1dB Compression f=12GHz<br>Vds=8V, Ids=50% Idss f=18GHz | 29.0 | 31.0<br>31.0 | | 29.0 | 31.0<br>31.0 | | dBm |
| $G_{1dB}$ | Gain at 1dB Compression f=12GHz<br>Vds=8V, Ids=50% Idss f=18GHz | 7.0 | 8.5<br>6.0 | | 9.0 | 10.5<br>8.0 | | dB |
| PAE | Gain at 1dB Compression<br>Vds=8V, Ids=50% Idss f=12GHz | | 33 | | | 35 | | % |
| Idss | Saturated Drain Current Vds=3V, Vgs=0V | 400 | 680 | 880 | 400 | 680 | 880 | mA |
| Gm | Transconductance Vds=3V, Vgs=0V | 280 | 360 | | 280 | 360 | | mS |
| Vp | Pinch-off Voltage Vds=3V, Ids=6 mA | | -2.0 | -3.5 | | -2.0 | -3.5 | V |
| BVgd | Drain Breakdown Voltage Igd=2.4mA | -12 | -15 | | -12 | -15 | | V |
| BVgs | Source Breakdown Voltage Igs=2.4mA | -7 | -14 | | -7 | -14 | | V |
| Rth | Thermal Resistance (Au-Sn Eutectic Attach) | | 20 | | | 15 | | $^{o}$C/W |

## MAXIMUM RATINGS AT 25$^{O}$C

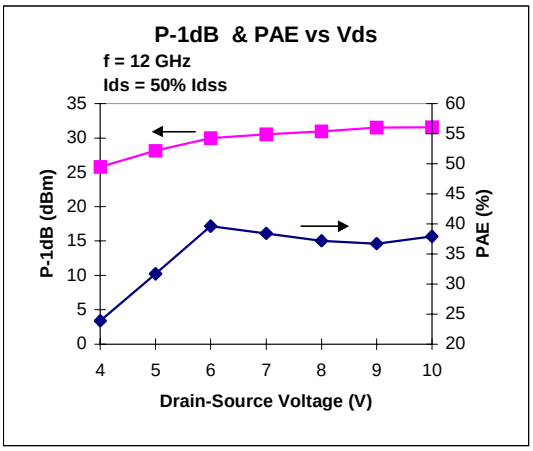
| SYMBOLS | PARAMETERS | EFA240B | | EFA240BV | |
|---|---|---|---|---|---|
| | | ABSOLUTE[1] | CONTINUOUS[2] | ABSOLUTE[1] | CONTINUOUS[2] |
| Vds | Drain-Source Voltage | 12V | 8V | 12V | 8V |
| Vgs | Gate-Source Voltage | -8V | -4V | -8V | -4V |
| Ids | Drain Current | Idss | 710mA | Idss | Idss |
| Igsf | Forward Gate Current | 60mA | 10mA | 60mA | 10mA |
| Pin | Input Power | 29dBm | @ 3dB Compression | 29dBm | @ 3dB Compression |
| Tch | Channel Temperature | 175$^{o}$C | 150$^{o}$C | 175$^{o}$C | 150$^{o}$C |
| Tstg | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C | -65/175$^{o}$C | -65/150$^{o}$C |
| Pt | Total Power Dissipation | 6.8W | 5.7W | 9.1W | 7.6W |

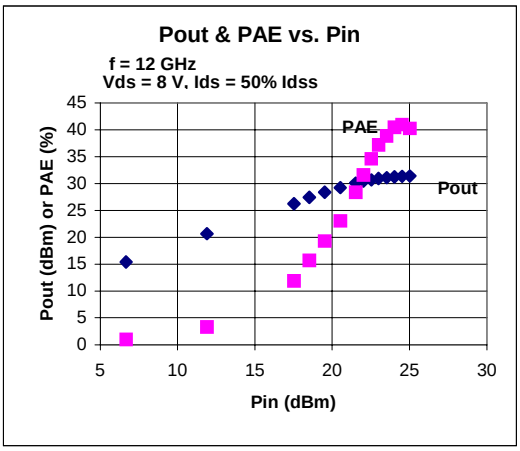
# EFA240B/EFA240BV

## DATA SHEET

## Low Distortion GaAs Power FET

**EFA240B**




### S-PARAMETERS

**EFA240B 8V, 1/2 Idss**

| FREQ | --- S11 --- | | --- S21 --- | | --- S12 --- | | --- S22 --- | |
|---|---|---|---|---|---|---|---|---|
| (GHz) | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 1.0 | 0.924 | -109.6 | 8.554 | 117.9 | 0.035 | 34.7 | 0.345 | -151.2 |
| 2.0 | 0.910 | -140.4 | 4.879 | 97.0 | 0.039 | 20.8 | 0.407 | -161.6 |
| 4.0 | 0.905 | -157.4 | 2.561 | 77.8 | 0.039 | 14.8 | 0.447 | -166.5 |
| 6.0 | 0.904 | -163.9 | 1.717 | 64.0 | 0.037 | 16.1 | 0.492 | -165.7 |
| 8.0 | 0.907 | -168.2 | 1.295 | 52.5 | 0.036 | 17.7 | 0.541 | -163.7 |
| 10.0 | 0.909 | -171.9 | 1.020 | 42.7 | 0.032 | 22.5 | 0.594 | -162.2 |
| 12.0 | 0.917 | -177.5 | 0.835 | 32.1 | 0.031 | 24.8 | 0.653 | -162.4 |
| 14.0 | 0.924 | 179.1 | 0.688 | 22.4 | 0.030 | 25.9 | 0.706 | -165.7 |
| 16.0 | 0.927 | 174.9 | 0.569 | 11.6 | 0.032 | 23.2 | 0.741 | -171.9 |
| 18.0 | 0.944 | 174.3 | 0.474 | 2.4 | 0.033 | 22.4 | 0.778 | -179.5 |
| 20.0 | 0.953 | 173.2 | 0.395 | -7.7 | 0.035 | 24.0 | 0.813 | 171.7 |
| 22.0 | 0.942 | 175.2 | 0.326 | -13.6 | 0.040 | 24.7 | 0.830 | 164.7 |
| 24.0 | 0.960 | 177.3 | 0.290 | -17.6 | 0.044 | 30.3 | 0.848 | 160.2 |
| 26.0 | 0.951 | 177.1 | 0.257 | -19.2 | 0.053 | 39.2 | 0.846 | 160.0 |

**EFA240BV 8V, 1/2 Idss**

| FREQ | --- S11 --- | | --- S21 --- | | --- S12 --- | | --- S22 --- | |
|---|---|---|---|---|---|---|---|---|
| (GHz) | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 1.0 | 0.907 | -109.0 | 9.976 | 119.2 | 0.033 | 33.9 | 0.356 | -145.6 |
| 2.0 | 0.905 | -142.3 | 5.784 | 97.9 | 0.038 | 17.7 | 0.425 | -157.1 |
| 4.0 | 0.907 | -163.3 | 2.990 | 77.1 | 0.038 | 5.5 | 0.471 | -161.2 |
| 6.0 | 0.915 | -171.5 | 1.961 | 63.2 | 0.035 | 1.4 | 0.520 | -161.0 |
| 8.0 | 0.923 | -175.8 | 1.431 | 51.7 | 0.032 | -1.2 | 0.574 | -161.2 |
| 10.0 | 0.933 | -178.0 | 1.106 | 41.8 | 0.029 | -2.4 | 0.627 | -162.0 |
| 12.0 | 0.940 | 180.0 | 0.887 | 32.4 | 0.027 | -3.0 | 0.677 | -163.9 |
| 14.0 | 0.941 | 177.8 | 0.731 | 23.3 | 0.025 | -5.5 | 0.721 | -166.5 |
| 16.0 | 0.947 | 175.1 | 0.616 | 14.1 | 0.024 | -8.8 | 0.756 | -169.8 |
| 18.0 | 0.949 | 171.5 | 0.531 | 4.7 | 0.025 | -11.9 | 0.791 | -173.7 |
| 20.0 | 0.954 | 167.9 | 0.459 | -4.5 | 0.024 | -13.0 | 0.818 | -177.9 |
| 22.0 | 0.967 | 167.2 | 0.389 | -12.4 | 0.023 | -12.5 | 0.848 | 175.9 |
| 24.0 | 0.970 | 165.3 | 0.335 | -19.6 | 0.024 | -11.2 | 0.873 | 172.2 |
| 26.0 | 0.971 | 163.3 | 0.292 | -25.8 | 0.024 | -0.7 | 0.900 | 170.7 |

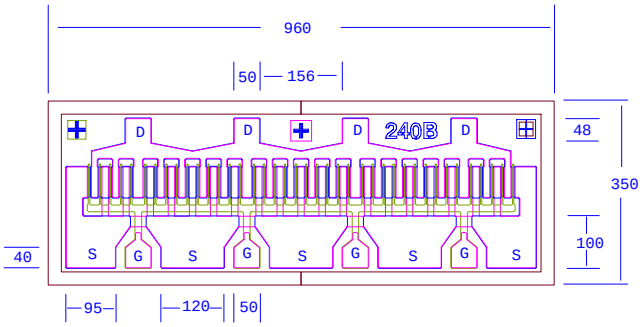
Note: The data included 0.7 mils diameter Au bonding wires; 4 gate wires, 15 mils each; 4 drain wires, 20 mils each; 10 source wires, 7 mils each; no source wires for EFA240BV.

# EFC240B

## PRELIMINARY DATA SHEET

## Low Distortion GaAs Power FET

- **+31.0dBm TYPICAL OUTPUT POWER**
- **8.5dB TYPICAL POWER GAIN AT 12GHz**
- **HIGH BVgd FOR 10V BIAS**
- **0.3 X 2400 MICRON RECESSED "MUSHROOM" GATE**
- **$Si_3N_4$ PASSIVATION**
- **ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY**
- **Idss SORTED IN 40mA PER BIN RANGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 °C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **$P_{1dB}$** | Output Power at 1dB Compression<br>Vds=10V, Ids=50% Idss | f=12GHz<br>f=18GHz | 29.0 | 31.0<br>31.0 | | dBm |
| **$G_{1dB}$** | Gain at 1dB Compression<br>Vds=10V, Ids=50% Idss | f=12GHz<br>f=18GHz | 7.0 | 8.5<br>6.0 | | dB |
| **PAE** | Power Added Efficiency at 1dB compression<br>Vds=10V, Ids=50% Idss | f=12GHz | | 33 | | % |
| **Idss** | Saturated Drain Current Vds=3V, Vgs=0V | | 320 | 520 | 720 | mA |
| **Gm** | Transconductance Vds=3V, Vgs=0V | | 200 | 280 | | mS |
| **Vp** | Pinch-off Voltage Vds=3V, Ids=6mA | | | -2.5 | -4.0 | V |
| **BVgd** | Drain Breakdown Voltage Igd=2.4mA | | -15 | -20 | | V |
| **BVgs** | Source Breakdown Voltage Igs=2.4mA | | -10 | -17 | | V |
| **Rth** | Thermal Resistance (Au-Sn Eutectic Attach) | | | 20 | | °C/W |

## MAXIMUM RATINGS AT 25°C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| **Vds** | Drain-Source Voltage | 14V | 10V |
| **Vgs** | Gate-Source Voltage | -8V | -4.5V |
| **Ids** | Drain Current | Idss | 570mA |
| **Igsf** | Forward Gate Current | 60mA | 10mA |
| **Pin** | Input Power | 29dBm | @ 3dB Compression |
| **Tch** | Channel Temperature | 175°C | 150°C |
| **Tstg** | Storage Temperature | -65/175°C | -65/150°C |
| **Pt** | Total Power Dissipation | 6.8 W | 5.7 W |

# EFC240B

**PRELIMINARY DATA SHEET**

## Low Distortion GaAs Power FET

### S-PARAMETERS
### 10V, 1/2 Idss

| Freq GHz | S11 Mag | S11 Ang | S21 Mag | S21 Ang | S12 Mag | S12 Ang | S22 Mag | S22 Ang |
|---|---|---|---|---|---|---|---|---|
| 1.000 | 0.944 | -86.7 | 7.064 | 130.8 | 0.041 | 41.9 | 0.296 | -132.9 |
| 2.000 | 0.915 | -125.9 | 4.551 | 104.6 | 0.052 | 22.7 | 0.374 | -146.8 |
| 3.000 | 0.907 | -144.8 | 3.217 | 89.3 | 0.055 | 13.2 | 0.409 | -152.2 |
| 4.000 | 0.907 | -155.6 | 2.450 | 78.1 | 0.054 | 6.7 | 0.433 | -154.1 |
| 5.000 | 0.912 | -161.6 | 1.929 | 69.0 | 0.052 | 2.7 | 0.460 | -157.6 |
| 6.000 | 0.911 | -166.1 | 1.596 | 60.9 | 0.050 | 0.1 | 0.487 | -158.3 |
| 7.000 | 0.920 | -169.0 | 1.362 | 54.1 | 0.049 | -2.2 | 0.512 | -159.2 |
| 8.000 | 0.915 | -171.1 | 1.181 | 47.7 | 0.047 | -3.4 | 0.549 | -161.0 |
| 9.000 | 0.919 | -173.3 | 1.040 | 41.7 | 0.045 | -4.5 | 0.586 | -161.9 |
| 10.000 | 0.922 | -176.1 | 0.922 | 35.7 | 0.041 | -5.2 | 0.620 | -162.0 |
| 11.000 | 0.925 | -179.2 | 0.826 | 30.0 | 0.041 | -6.2 | 0.647 | -162.2 |
| 12.000 | 0.932 | 178.8 | 0.747 | 24.7 | 0.039 | -7.5 | 0.673 | -163.2 |
| 13.000 | 0.933 | 177.0 | 0.681 | 19.1 | 0.037 | -7.5 | 0.690 | -165.6 |
| 14.000 | 0.939 | 175.4 | 0.622 | 13.8 | 0.035 | -7.7 | 0.716 | -168.5 |
| 15.000 | 0.941 | 172.9 | 0.569 | 8.5 | 0.035 | -7.0 | 0.739 | -170.1 |
| 16.000 | 0.945 | 170.6 | 0.522 | 3.0 | 0.035 | -6.4 | 0.752 | -172.8 |
| 17.000 | 0.946 | 169.7 | 0.483 | -2.1 | 0.035 | -7.5 | 0.764 | -177.3 |
| 18.000 | 0.952 | 170.3 | 0.452 | -7.0 | 0.034 | -6.2 | 0.776 | 176.4 |
| 19.000 | 0.955 | 170.4 | 0.421 | -12.7 | 0.034 | -6.5 | 0.791 | 169.8 |
| 20.000 | 0.955 | 168.7 | 0.387 | -18.0 | 0.035 | -3.8 | 0.813 | 164.9 |
| 21.000 | 0.954 | 160.5 | 0.359 | -23.1 | 0.034 | -5.3 | 0.835 | 168.3 |
| 22.000 | 0.948 | 158.1 | 0.327 | -26.7 | 0.035 | -2.1 | 0.847 | 166.2 |
| 23.000 | 0.958 | 157.0 | 0.303 | -30.7 | 0.035 | 0.6 | 0.870 | 163.7 |
| 24.000 | 0.956 | 156.1 | 0.275 | -33.9 | 0.036 | 2.9 | 0.876 | 162.1 |
| 25.000 | 0.961 | 155.3 | 0.251 | -36.4 | 0.038 | 7.7 | 0.887 | 160.5 |
| 26.000 | 0.954 | 153.5 | 0.232 | -39.0 | 0.036 | 10.4 | 0.897 | 160.1 |

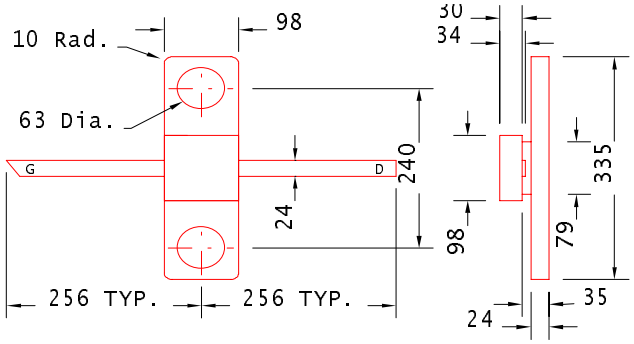
**Note: The data included 0.7 mils diameter Au bonding wires:**
**4 gate wires, 15 mils each; 4 drain wires, 20 mils each; 10 source wires, 7 mils each.**

# EFA240B-100F

## DATA SHEET

## Low Distortion GaAs Power FET

- **HERMETIC 100mil CERAMIC FLANGE PACKAGE**
- **+31.0dBm TYPICAL OUTPUT POWER**
- **7.0dB TYPICAL POWER GAIN AT 8GHz**
- **0.3 X 2400 MICRON RECESSED "MUSHROOM" GATE**
- **$Si_3N_4$ PASSIVATION**
- **ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| **$P_{1dB}$** | Output Power at 1dB Compression f=8GHz<br>Vds=8V, Ids=50% Idss | 29.0 | 31.0 | | dBm |
| **$G_{1dB}$** | Gain at 1dB Compression f=8GHz<br>Vds=8V, Ids=50% Idss | 5.5 | 7.0 | | dB |
| **PAE** | Power Added Efficiency at 1dB Compression f=8GHz<br>Vds=8V, Ids=50% Idss | | 30 | | % |
| **Idss** | Saturated Drain Current Vds=3V, Vgs=0V | 400 | 680 | 880 | mA |
| **Gm** | Transconductance Vds=3V, Vgs=0V | 280 | 360 | | mS |
| **Vp** | Pinch-off Voltage Vds=3V, Ids=6mA | | -2.0 | -3.5 | V |
| **BVgd** | Drain Breakdown Voltage Igd=2.4mA | -12 | -15 | | V |
| **BVgs** | Source Breakdown Voltage Igs=2.4mA | -7 | -14 | | V |
| **Rth** | Thermal Resistance | | 22* | | $^{o}$C/W |

*** Overall Rth depends on case mounting.**

## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| **Vds** | Drain-Source Voltage | 12V | 8V |
| **Vgs** | Gate-Source Voltage | -8V | -4V |
| **Ids** | Drain Current | Idss | 650mA |
| **Igsf** | Forward Gate Current | 60mA | 10mA |
| **Pin** | Input Power | 29dBm | @ 3dB Compression |
| **Tch** | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| **Tstg** | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| **Pt** | Total Power Dissipation | 6.3W | 5.2W |

# EFA240B-100F

**DATA SHEET**

## Low Distortion GaAs Power FET

### S-PARAMETERS

**8V, 1/2 Idss**

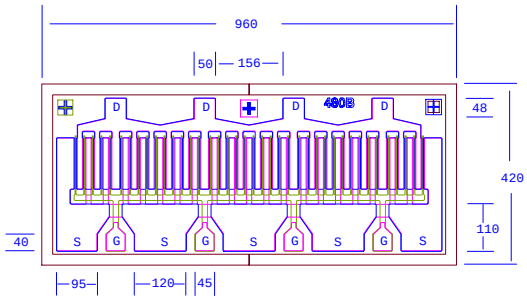
| FREQ | --- S11 --- | | --- S21 --- | | --- S12 --- | | --- S22 --- | |
|---|---|---|---|---|---|---|---|---|
| (GHz) | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 1.0 | 0.892 | -116.0 | 8.585 | 112.8 | 0.035 | 37.1 | 0.343 | -151.4 |
| 2.0 | 0.850 | -150.3 | 5.034 | 85.3 | 0.044 | 30.1 | 0.371 | -166.1 |
| 3.0 | 0.830 | -166.5 | 3.583 | 67.0 | 0.051 | 27.2 | 0.374 | -175.0 |
| 4.0 | 0.820 | 177.1 | 2.830 | 50.2 | 0.059 | 24.6 | 0.383 | 179.7 |
| 5.0 | 0.814 | 161.1 | 2.351 | 33.3 | 0.067 | 18.6 | 0.377 | 172.0 |
| 6.0 | 0.807 | 151.3 | 2.008 | 17.5 | 0.076 | 12.5 | 0.386 | 155.1 |
| 7.0 | 0.804 | 140.8 | 1.731 | 2.5 | 0.083 | 6.0 | 0.412 | 142.0 |
| 8.0 | 0.803 | 131.3 | 1.511 | -11.2 | 0.090 | 0.1 | 0.444 | 131.6 |
| 9.0 | 0.810 | 116.1 | 1.323 | -25.5 | 0.098 | -8.2 | 0.442 | 127.9 |
| 10.0 | 0.819 | 106.6 | 1.185 | -39.0 | 0.107 | -16.2 | 0.445 | 118.1 |
| 11.0 | 0.803 | 103.8 | 1.128 | -51.9 | 0.123 | -24.7 | 0.488 | 102.8 |
| 12.0 | 0.764 | 96.4 | 1.098 | -65.2 | 0.143 | -33.9 | 0.513 | 95.6 |
| 13.0 | 0.742 | 79.4 | 1.039 | -80.0 | 0.162 | -45.3 | 0.485 | 92.7 |
| 14.0 | 0.732 | 64.6 | 0.984 | -94.4 | 0.185 | -57.2 | 0.446 | 81.8 |
| 15.0 | 0.708 | 53.5 | 0.954 | -111.1 | 0.215 | -71.9 | 0.473 | 65.9 |
| 16.0 | 0.674 | 42.7 | 0.925 | -127.4 | 0.251 | -86.5 | 0.457 | 55.4 |
| 17.0 | 0.669 | 33.2 | 0.940 | -142.9 | 0.309 | -101.4 | 0.362 | 50.0 |
| 18.0 | 0.626 | 23.6 | 0.938 | -161.1 | 0.377 | -119.7 | 0.291 | 39.9 |
| 19.0 | 0.534 | 16.7 | 0.932 | 179.6 | 0.461 | -141.3 | 0.303 | 41.3 |
| 20.0 | 0.540 | 12.3 | 0.959 | 158.9 | 0.583 | -166.7 | 0.347 | 53.1 |

# EFA480B

## DATA SHEET

## Low Distortion GaAs Power FET

- **+34.0dBm TYPICAL OUTPUT POWER**
- **10.0dB TYPICAL POWER GAIN AT 8GHz**
- **0.5 X 4800 MICRON RECESSED "MUSHROOM" GATE**
- **$Si_3N_4$ PASSIVATION AND PLATED HEAT SINK**
- **ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY**
- **Idss SORTED IN 80mA PER BIN RANGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **$P_{1dB}$** | Output Power at 1dB Compression<br>Vds=8V, Ids=50% Idss | f = 8GHz<br>f =12GHz | <br>32.0 | 34.0<br>34.0 | | dBm |
| **$G_{1dB}$** | Gain at 1dB Compression<br>Vds=8V, Ids=50% Idss | f = 8GHz<br>f =12GHz | <br>4.0 | 10.0<br>6.0 | | dB |
| **PAE** | Gain at 1dB Compression<br>Vds=8V, Ids=50% Idss | <br>f =8GHz | | <br>35 | | % |
| **Idss** | Saturated Drain Current Vds=3V, Vgs=0V | | 800 | 1360 | 1760 | mA |
| **Gm** | Transconductance Vds=3V, Vgs=0V | | 560 | 720 | | mS |
| **Vp** | Pinch-off Voltage Vds=3V, Ids=10mA | | | -2.0 | -3.5 | V |
| **BVgd** | Drain Breakdown Voltage Igd=4.8mA | | -12 | -15 | | V |
| **BVgs** | Source Breakdown Voltage Igs=4.8mA | | -7 | -14 | | V |
| **Rth** | Thermal Resistance (Au-Sn Eutectic Attach) | | | 10 | | $^{o}$C/W |

## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE [1] | CONTINUOUS[2] |
|---|---|---|---|
| **Vds** | Drain-Source Voltage | 12V | 8V |
| **Vgs** | Gate-Source Voltage | -8V | -4V |
| **Ids** | Drain Current | Idss | 1.4A |
| **Igsf** | Forward Gate Current | 120mA | 20mA |
| **Pin** | Input Power | 32dBm | @3dB Compression |
| **Tch** | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| **Tstg** | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| **Pt** | Total Power Dissipation | 14 W | 11 W |

# EFA480B

**DATA SHEET**

## Low Distortion GaAs Power FET

### S-PARAMETERS

**8V, 1/2 Idss**

| FREQ | --- S11 --- | | --- S21 --- | | --- S12 --- | | --- S22 --- | |
|---|---|---|---|---|---|---|---|---|
| (GHz) | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.500 | 0.944 | -115.5 | 11.585 | 117.1 | 0.019 | 33.5 | 0.384 | -159.9 |
| 1.000 | 0.929 | -145.4 | 6.478 | 98.5 | 0.021 | 21.3 | 0.425 | -165.4 |
| 1.500 | 0.926 | -157.1 | 4.413 | 88.9 | 0.021 | 18.2 | 0.440 | -166.5 |
| 2.000 | 0.925 | -163.3 | 3.326 | 81.9 | 0.021 | 17.7 | 0.453 | -166.2 |
| 2.500 | 0.925 | -167.2 | 2.659 | 76.0 | 0.021 | 18.5 | 0.465 | -165.6 |
| 3.000 | 0.925 | -169.9 | 2.208 | 70.8 | 0.021 | 20.0 | 0.479 | -164.8 |
| 3.500 | 0.925 | -171.9 | 1.883 | 65.9 | 0.021 | 22.0 | 0.494 | -164.1 |
| 4.000 | 0.926 | -173.6 | 1.636 | 61.3 | 0.021 | 24.4 | 0.510 | -163.6 |
| 4.500 | 0.927 | -174.9 | 1.443 | 57.0 | 0.022 | 27.0 | 0.526 | -163.2 |
| 5.000 | 0.928 | -176.1 | 1.287 | 52.7 | 0.022 | 29.8 | 0.543 | -162.9 |
| 5.500 | 0.928 | -177.1 | 1.158 | 48.6 | 0.022 | 32.8 | 0.561 | -162.9 |
| 6.000 | 0.929 | -178.0 | 1.050 | 44.7 | 0.022 | 35.9 | 0.579 | -162.9 |
| 6.500 | 0.930 | -178.9 | 0.958 | 40.8 | 0.023 | 39.0 | 0.596 | -163.1 |
| 7.000 | 0.931 | -179.7 | 0.878 | 37.1 | 0.023 | 42.0 | 0.613 | -163.5 |
| 7.500 | 0.932 | 179.6 | 0.809 | 33.5 | 0.024 | 45.0 | 0.630 | -163.9 |
| 8.000 | 0.933 | 178.9 | 0.747 | 30.0 | 0.025 | 47.8 | 0.647 | -164.5 |
| 8.500 | 0.934 | 178.3 | 0.693 | 26.6 | 0.026 | 50.4 | 0.663 | -165.1 |
| 9.000 | 0.935 | 177.6 | 0.644 | 23.4 | 0.027 | 52.9 | 0.679 | -165.7 |
| 9.500 | 0.936 | 177.0 | 0.600 | 20.2 | 0.028 | 55.1 | 0.694 | -166.5 |
| 10.000 | 0.937 | 176.4 | 0.561 | 17.1 | 0.030 | 57.1 | 0.708 | -167.3 |

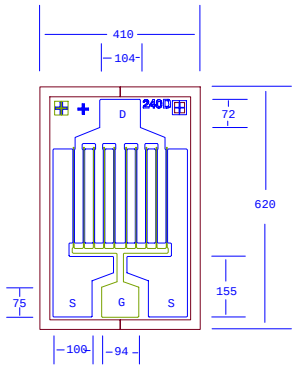
Note: The data included 0.7 mils diameter Au bonding wires:
4 gate wires, 20 mils each; 4 drain wires, 12 mils each; 10 source wires, 7 mils each.

# EFA240D

**DATA SHEET** **Rev.1**

## Low Distortion GaAs Power FET

- **+31.0dBm TYPICAL OUTPUT POWER**
- **18.5dB TYPICAL POWER GAIN AT 2GHz**
- **0.5 X 2400 MICRON RECESSED "MUSHROOM" GATE**
- **$Si_3N_4$ PASSIVATION AND PLATED HEAT SINK**
- **ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY**
- **Idss SORTED IN 40mA PER BIN RANGE**




### ELECTRICAL CHARACTERISTICS ($T_a$ = 25 °C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **$P_{1dB}$** | Output Power at 1dB Compression<br>Vds=8V, Ids=50% Idss | f= 2GHz<br>f= 4GHz | 29.0 | 31.0<br>31.0 | | dBm |
| **$G_{1dB}$** | Gain at 1dB Compression<br>Vds=8V, Ids=50% Idss | f= 2GHz<br>f= 4GHz | 16.0 | 18.5<br>13.5 | | dB |
| **PAE** | Power Added Efficiency at 1dB Compression<br>Vds=8V, Ids=50% Idss | f=2GHz | | 45 | | % |
| **Idss** | Saturated Drain Current Vds=3V, Vgs=0V | | 400 | 680 | 880 | mA |
| **Gm** | Transconductance Vds=3V, Vgs=0V | | 280 | 360 | | mS |
| **Vp** | Pinch-off Voltage Vds=3V, Ids=6mA | | | -2.0 | -3.5 | V |
| **BVgd** | Drain Breakdown Voltage Igd=2.4mA | | -12 | -15 | | V |
| **BVgs** | Source Breakdown Voltage Igs=2.4mA | | -7 | -14 | | V |
| **Rth** | Thermal Resistance (Au-Sn Eutectic Attach) | | | 23 | | °C/W |

### MAXIMUM RATINGS AT 25°C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| **Vds** | Drain-Source Voltage | 12V | 8V |
| **Vgs** | Gate-Source Voltage | -8V | -4V |
| **Ids** | Drain Current | Idss | 620mA |
| **Igsf** | Forward Gate Current | 60mA | 10mA |
| **Pin** | Input Power | 29dBm | @ 3dB Compression |
| **Tch** | Channel Temperature | 175°C | 150°C |
| **Tstg** | Storage Temperature | -65/175°C | -65/150°C |
| **Pt** | Total Power Dissipation | 6.0 W | 5.0 W |

# EFA240D

**DATA SHEET** **Rev.1**

## Low Distortion GaAs Power FET

### S-PARAMETERS

**8V, 1/2 Idss**

| FREQ | --- S11 --- | | --- S21 --- | | --- S12 --- | | --- S22 --- | |
|---|---|---|---|---|---|---|---|---|
| (GHz) | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.500 | 0.950 | -75.6 | 11.303 | 136.8 | 0.027 | 53.1 | 0.195 | -119.8 |
| 1.000 | 0.906 | -116.5 | 7.670 | 113.0 | 0.036 | 35.5 | 0.264 | -142.3 |
| 1.500 | 0.888 | -138.2 | 5.566 | 99.1 | 0.040 | 27.9 | 0.290 | -152.3 |
| 2.000 | 0.880 | -151.5 | 4.317 | 89.4 | 0.041 | 24.4 | 0.303 | -157.5 |
| 2.500 | 0.877 | -160.7 | 3.510 | 81.6 | 0.042 | 22.9 | 0.312 | -160.6 |
| 3.000 | 0.875 | -167.7 | 2.952 | 74.9 | 0.043 | 22.5 | 0.321 | -162.6 |
| 3.500 | 0.875 | -173.3 | 2.544 | 68.8 | 0.043 | 22.6 | 0.329 | -164.0 |
| 4.000 | 0.876 | -178.1 | 2.233 | 63.2 | 0.044 | 23.2 | 0.338 | -165.0 |
| 4.500 | 0.877 | 177.7 | 1.989 | 57.8 | 0.045 | 24.1 | 0.347 | -165.9 |
| 5.000 | 0.879 | 173.9 | 1.792 | 52.7 | 0.046 | 25.1 | 0.356 | -166.7 |
| 5.500 | 0.881 | 170.4 | 1.630 | 47.8 | 0.046 | 26.3 | 0.366 | -167.5 |
| 6.000 | 0.883 | 167.1 | 1.493 | 43.0 | 0.047 | 27.5 | 0.377 | -168.3 |
| 6.500 | 0.885 | 164.1 | 1.377 | 38.3 | 0.048 | 28.7 | 0.389 | -169.1 |
| 7.000 | 0.887 | 161.1 | 1.276 | 33.7 | 0.050 | 30.0 | 0.400 | -169.9 |
| 7.500 | 0.890 | 158.4 | 1.188 | 29.2 | 0.051 | 31.2 | 0.413 | -170.8 |
| 8.000 | 0.893 | 155.7 | 1.109 | 24.8 | 0.052 | 32.3 | 0.426 | -171.8 |
| 8.500 | 0.896 | 153.1 | 1.040 | 20.5 | 0.054 | 33.4 | 0.439 | -172.9 |
| 9.000 | 0.899 | 150.6 | 0.977 | 16.2 | 0.056 | 34.4 | 0.453 | -174.0 |
| 9.500 | 0.902 | 148.1 | 0.920 | 12.1 | 0.058 | 35.3 | 0.467 | -175.2 |
| 10.000 | 0.905 | 145.7 | 0.867 | 8.0 | 0.060 | 36.0 | 0.481 | -176.5 |

Note: The data included 0.7 mils diameter Au bonding wires:
1 gate wires, 20 mils each; 1 drain wires, 12 mils each; 4 source wires, 7 mils each.

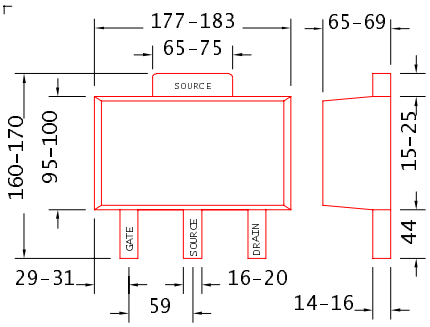
# EFA240D-SOT89

## DATA SHEET

## DC-4GHz Low Distortion GaAs Power FET

### Features

- **LOW COST SURFACE-MOUNT PLASTIC PACKAGE**
- **+31.0dBm TYPICAL OUTPUT POWER**
- **13.0dB TYPICAL POWER GAIN AT 2GHz**
- **0.7dB TYPICAL NOISE FIGURE AT 2GHz**
- **+48dBm TYPICAL OUTPUT 3rd ORDER INTERCEPT POINT AT 2GHz**
- **0.5 X 2400 MICRON RECESSED "MUSHROOM" GATE**
- **$Si_3N_4$ PASSIVATION**
- **ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY**




### Applications

- **Analog and Digital Wireless System**
- **HPA**

## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 °C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| **$P_{1dB}$** | Output Power at 1dB Compression f = 2GHz<br>Vds=7V, Ids=350mA | 29.5 | 31.0 | | dBm |
| **$G_{1dB}$** | Gain at 1dB Compression f = 2GHz<br>Vds=7V, Ids=350mA | 11.0 | 13.0 | | dB |
| **PAE** | Power Added Efficiency at 1dB Compression<br>Vds=7V, Ids=350mA f = 2GHz | | 45 | | % |
| **NF** | Noise Figure f = 2GHz<br>Vds=5V, Ids=150mA<br>Vds=5-7V, Ids=350mA | | 0.7<br>1.2 | | dB |
| **IP3** | Output 3rd Order Intercept Point f = 2GHz<br>Vds=5-7V, Ids=350mA<br>Vds=5V, Ids=150mA | | 48<br>36 | | dBm |
| **Idss** | Saturated Drain Current Vds=3V, Vgs=0V | 440 | 680 | 880 | mA |
| **Gm** | Transconductance Vds=3V, Vgs=0V | 280 | 360 | | mS |
| **Vp** | Pinch-off Voltage Vds=3V, Ids=6mA | | -2.0 | -3.5 | V |
| **BVgd** | Drain Breakdown Voltage Igd=2.4mA | -11 | -15 | | V |
| **BVgs** | Source Breakdown Voltage Igs=2.4mA | -7 | -14 | | V |
| **Rth** | Thermal Resistance | | 25* | | °C/W |

*Overall Rth depends on case mounting.

## MAXIMUM RATINGS AT 25°C

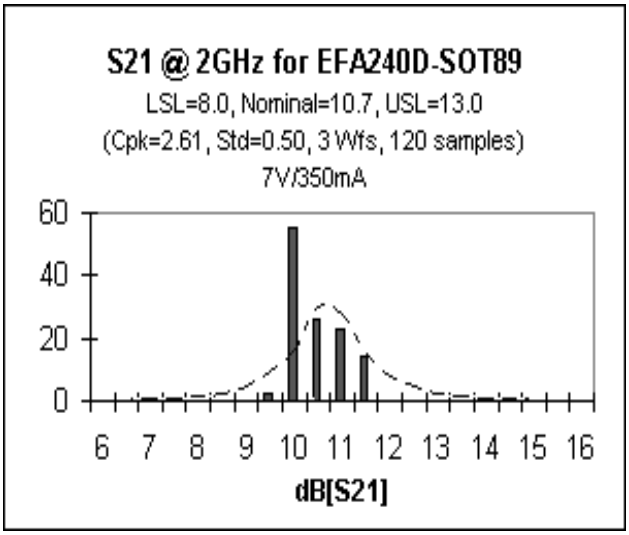
| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| **Vds** | Drain-Source Voltage | 12V | 7V |
| **Vgs** | Gate-Source Voltage | -8V | -4V |
| **Ids** | Drain Current | Idss | 660mA |
| **Igsf** | Forward Gate Current | 60mA | 10mA |
| **Pin** | Input Power | 29dBm | @ 3dB Compression |
| **Tch** | Channel Temperature | 175°C | 150°C |
| **Tstg** | Storage Temperature | -65/175°C | -65/150°C |
| **Pt** | Total Power Dissipation | 5.5 W | 4.6 W |

# EFA240D-SOT89

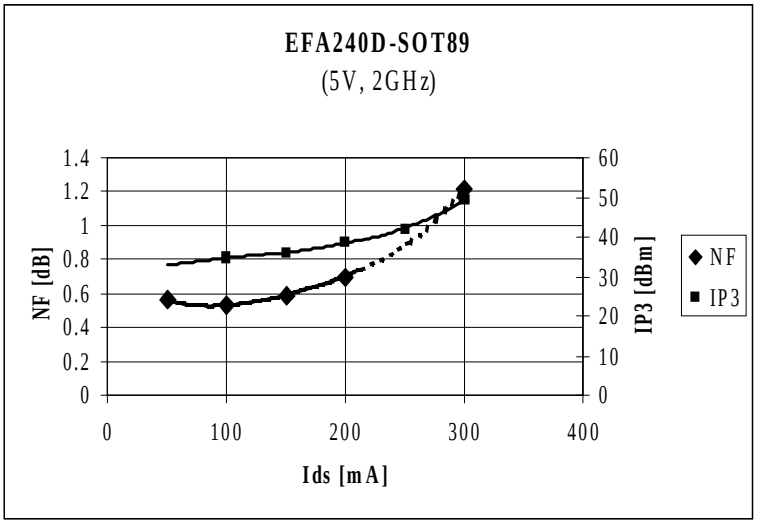
## DATA SHEET
## DC-4GHz Low Distortion GaAs Power FET

### Typical Performance

**S21 Distribution**




**Noise Figure & IP3**




### S-PARAMETERS

**5V, 150mA**

| FREQ | --- S11 --- | | --- S21 --- | | --- S12 --- | | --- S22 --- | |
|---|---|---|---|---|---|---|---|---|
| (GHz) | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.1 | 0.980 | -29.5 | 15.580 | 162.1 | 0.009 | 50.3 | 0.273 | -165.8 |
| 0.2 | 0.964 | -56.5 | 14.250 | 147.1 | 0.024 | 61.6 | 0.348 | -155.7 |
| 0.3 | 0.942 | -78.3 | 12.624 | 134.2 | 0.029 | 51.8 | 0.407 | -157.6 |
| 0.4 | 0.923 | -96.1 | 11.069 | 123.8 | 0.035 | 43.6 | 0.459 | -161.2 |
| 0.5 | 0.907 | -110.1 | 9.717 | 115.0 | 0.039 | 38.2 | 0.494 | -165.6 |
| 1.0 | 0.870 | -152.5 | 5.742 | 86.6 | 0.048 | 23.1 | 0.547 | -179.8 |
| 1.5 | 0.765 | -170.0 | 4.782 | 72.1 | 0.064 | 19.6 | 0.439 | 166.2 |
| 2.0 | 0.750 | 169.6 | 3.721 | 55.6 | 0.072 | 13.1 | 0.445 | 154.7 |
| 2.5 | 0.735 | 152.7 | 3.092 | 40.9 | 0.080 | 6.1 | 0.435 | 144.6 |
| 3.0 | 0.723 | 137.1 | 2.697 | 26.0 | 0.090 | -1.9 | 0.420 | 133.7 |
| 3.5 | 0.722 | 119.8 | 2.411 | 10.4 | 0.101 | -10.8 | 0.399 | 120.3 |
| 4.0 | 0.721 | 101.3 | 2.140 | -6.9 | 0.110 | -22.6 | 0.401 | 101.6 |
| 4.5 | 0.744 | 82.8 | 1.849 | -23.5 | 0.113 | -33.8 | 0.433 | 81.3 |
| 5.0 | 0.781 | 66.2 | 1.577 | -38.8 | 0.113 | -45.0 | 0.495 | 65.4 |
| 5.5 | 0.812 | 52.3 | 1.353 | -52.7 | 0.110 | -55.3 | 0.550 | 54.0 |
| 6.0 | 0.830 | 40.0 | 1.174 | -65.7 | 0.109 | -64.7 | 0.582 | 44.3 |

**7V, 350mA**

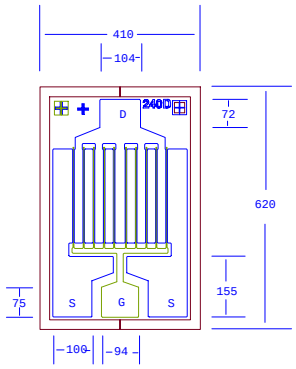
| FREQ | --- S11 --- | | --- S21 --- | | --- S12 --- | | --- S22 --- | |
|---|---|---|---|---|---|---|---|---|
| (GHz) | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.1 | 0.970 | -32.8 | 17.023 | 161.5 | 0.019 | 75.7 | 0.148 | -137.8 |
| 0.2 | 0.952 | -58.4 | 15.321 | 145.4 | 0.023 | 58.2 | 0.241 | -133.9 |
| 0.3 | 0.927 | -80.6 | 13.396 | 132.4 | 0.030 | 49.9 | 0.312 | -140.8 |
| 0.4 | 0.911 | -98.4 | 11.673 | 121.9 | 0.034 | 41.9 | 0.362 | -147.9 |
| 0.5 | 0.896 | -112. | 10.188 | 113.2 | 0.039 | 36.0 | 0.395 | -154.6 |
| 1.0 | 0.861 | -154.0 | 5.962 | 84.6 | 0.047 | 19.8 | 0.442 | -171.7 |
| 1.5 | 0.760 | -171.3 | 4.853 | 70.1 | 0.060 | 16.8 | 0.319 | 177.2 |
| 2.0 | 0.748 | 168.6 | 3.767 | 53.3 | 0.066 | 10.5 | 0.326 | 165.5 |
| 2.5 | 0.735 | 152.1 | 3.119 | 38.2 | 0.072 | 4.7 | 0.318 | 156.6 |
| 3.0 | 0.724 | 136.7 | 2.707 | 23.3 | 0.080 | -1.6 | 0.303 | 147.2 |
| 3.5 | 0.725 | 119.5 | 2.413 | 7.7 | 0.089 | -9.6 | 0.281 | 135.1 |
| 4.0 | 0.724 | 101.0 | 2.147 | -9.5 | 0.096 | -19.9 | 0.274 | 115.1 |
| 4.5 | 0.746 | 82.6 | 1.863 | -26.3 | 0.100 | -30.0 | 0.299 | 91.3 |
| 5.0 | 0.785 | 66.1 | 1.605 | -42.2 | 0.102 | -40.0 | 0.364 | 73.1 |
| 5.5 | 0.817 | 52.3 | 1.388 | -56.5 | 0.102 | -49.7 | 0.428 | 61.2 |
| 6.0 | 0.835 | 40.0 | 1.206 | -70.0 | 0.102 | -59.0 | 0.471 | 51.4 |

# EFC240D

## PRELIMINARY DATA SHEET

## Low Distortion GaAs Power FET

- **+31.0dBm TYPICAL OUTPUT POWER**
- **18.5dB TYPICAL POWER GAIN AT 2GHz**
- **HIGH BVgd FOR 10V BIAS**
- **0.5 X 2400 MICRON RECESSED "MUSHROOM" GATE**
- **$Si_3N_4$ PASSIVATION**
- **ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY**
- **Idss SORTED IN 40mA PER BIN RANGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **$P_{1dB}$** | Output Power at 1dB Compression<br>Vds=10V, Ids=50% Idss | f= 2GHz<br>f= 4 GHz | 29.0 | 31.0<br>31.0 | | dBm |
| **$G_{1dB}$** | Gain at 1dB Compression<br>Vds=10V, Ids=50% Idss | f= 2GHz<br>f= 4GHz | 16.0 | 18.5<br>13.5 | | dB |
| **PAE** | Power Added Efficiency at 1dB Compression<br>Vds=10V, Ids=50% Idss | f=2GHz | | 45 | | % |
| **Idss** | Saturated Drain Current Vds=3V, Vgs=0V | | 320 | 480 | 720 | mA |
| **Gm** | Transconductance Vds=3V, Vgs=0V | | 200 | 280 | | mS |
| **Vp** | Pinch-off Voltage Vds=3V, Ids=6mA | | | -2.5 | -4.0 | V |
| **BVgd** | Drain Breakdown Voltage Igd=2.4mA | | -15 | -20 | | V |
| **BVgs** | Source Breakdown Voltage Igs=2.4mA | | -10 | -17 | | V |
| **Rth** | Thermal Resistance (Au-Sn Eutectic Attach) | | | 23 | | $^{o}$C/W |

## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| **Vds** | Drain-Source Voltage | 14V | 10V |
| **Vgs** | Gate-Source Voltage | -8V | -4.5V |
| **Ids** | Drain Current | Idss | 500mA |
| **Igsf** | Forward Gate Current | 60mA | 10mA |
| **Pin** | Input Power | 29dBm | @ 3dB Compression |
| **Tch** | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| **Tstg** | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| **Pt** | Total Power Dissipation | 6.0W | 5.0W |

# EFC240D

**PRELIMINARY DATA SHEET**

## Low Distortion GaAs Power FET

### S-PARAMETERS

**10V, 1/2 Idss**

| Freq GHz | S11 Mag | S11 Ang | S21 Mag | S21 Ang | S12 Mag | S12 Ang | S22 Mag | S22 Ang |
|---|---|---|---|---|---|---|---|---|
| 0.500 | 0.962 | -66.3 | 11.912 | 141.2 | 0.025 | 55.9 | 0.239 | -129.1 |
| 1.000 | 0.933 | -106.1 | 8.577 | 117.9 | 0.036 | 36.9 | 0.337 | -144.0 |
| 1.500 | 0.859 | -121.0 | 6.591 | 108.2 | 0.042 | 32.6 | 0.303 | -146.3 |
| 2.000 | 0.860 | -136.6 | 5.272 | 97.9 | 0.044 | 26.7 | 0.330 | -151.9 |
| 2.500 | 0.849 | -147.5 | 4.344 | 89.7 | 0.046 | 22.6 | 0.343 | -155.1 |
| 3.000 | 0.848 | -155.8 | 3.689 | 82.9 | 0.047 | 20.8 | 0.354 | -157.6 |
| 3.500 | 0.846 | -162.2 | 3.195 | 76.9 | 0.047 | 19.4 | 0.365 | -159.4 |
| 4.000 | 0.846 | -167.3 | 2.809 | 71.5 | 0.048 | 18.7 | 0.373 | -160.6 |
| 4.500 | 0.849 | -172.0 | 2.472 | 66.5 | 0.047 | 18.7 | 0.389 | -162.9 |
| 5.000 | 0.856 | -176.1 | 2.229 | 61.8 | 0.048 | 18.6 | 0.399 | -163.5 |
| 5.500 | 0.853 | -179.3 | 2.024 | 57.2 | 0.048 | 18.8 | 0.411 | -164.5 |
| 6.000 | 0.855 | 177.4 | 1.852 | 52.9 | 0.048 | 20.4 | 0.422 | -165.6 |
| 6.500 | 0.857 | 174.4 | 1.708 | 48.7 | 0.048 | 19.7 | 0.434 | -165.8 |
| 7.000 | 0.861 | 171.7 | 1.577 | 44.8 | 0.049 | 20.7 | 0.444 | -166.5 |
| 7.500 | 0.861 | 169.3 | 1.466 | 41.0 | 0.049 | 20.7 | 0.457 | -167.7 |
| 8.000 | 0.865 | 167.0 | 1.375 | 37.2 | 0.049 | 21.7 | 0.468 | -168.4 |
| 8.500 | 0.869 | 165.2 | 1.288 | 33.7 | 0.050 | 22.1 | 0.477 | -169.7 |
| 9.000 | 0.873 | 163.5 | 1.213 | 30.1 | 0.050 | 24.0 | 0.487 | -171.2 |
| 9.500 | 0.877 | 161.9 | 1.146 | 26.8 | 0.052 | 24.7 | 0.500 | -172.4 |
| 10.000 | 0.876 | 160.4 | 1.085 | 23.3 | 0.053 | 25.4 | 0.509 | -174.2 |

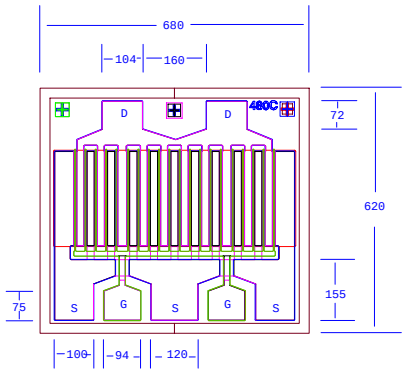
**Note:** **The data included 0.7 mils diameter Au bonding wires:**
**1 gate wires, 20 mils each; 2 drain wires, 12 mils each; 4 source wires, 7 mils each.**

# EFA480C

## DATA SHEET

## Low Distortion GaAs Power FET

- **+34.0dBm TYPICAL OUTPUT POWER**
- **18.0dB TYPICAL POWER GAIN AT 2GHz**
- **0.5 X 4800 MICRON RECESSED "MUSHROOM" GATE**
- **$Si_3N_4$ PASSIVATION AND PLATED HEAT SINK**
- **ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY**
- **Idss SORTED IN 80mA PER BIN RANGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **$P_{1dB}$** | Output Power at 1dB Compression<br>Vds=8V, Ids=50% Idss | f= 2GHz<br>f= 4GHz | 32.0 | 34.0<br>34.0 | | dBm |
| **$G_{1dB}$** | Gain at 1dB Compression<br>Vds=8V, Ids=50% Idss | f= 2GHz<br>f= 4GHz | 16.0 | 18.0<br>12.5 | | dB |
| **PAE** | Gain at 1dB Compression<br>Vds=8V, Ids=50% Idss | f= 2GHz | | 40 | | % |
| **Idss** | Saturated Drain Current Vds=3V, Vgs=0V | | 800 | 1360 | 1760 | mA |
| **Gm** | Transconductance Vds=3V, Vgs=0V | | 560 | 720 | | mS |
| **Vp** | Pinch-off Voltage Vds=3V, Ids=10mA | | | -2.0 | -3.5 | V |
| **BVgd** | Drain Breakdown Voltage Igd=4.8mA | | -12 | -15 | | V |
| **BVgs** | Source Breakdown Voltage Igs=4.8mA | | -7 | -14 | | V |
| **Rth** | Thermal Resistance (Au-Sn Eutectic Attach) | | | 12 | | $^{o}$C/W |

## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE [1] | CONTINUOUS[2] |
|---|---|---|---|
| **Vds** | Drain-Source Voltage | 12V | 8V |
| **Vgs** | Gate-Source Voltage | -8V | -4V |
| **Ids** | Drain Current | Idss | 1.2A |
| **Igsf** | Forward Gate Current | 120mA | 20mA |
| **Pin** | Input Power | 32dBm | @3dB Compression |
| **Tch** | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| **Tstg** | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| **Pt** | Total Power Dissipation | 11.4 W | 9.5 W |

# EFA480C

## DATA SHEET

## Low Distortion GaAs Power FET

### S-PARAMETERS

**8V, 1/2 Idss**

| FREQ | --- S11 --- | | --- S21 --- | | --- S12 --- | | --- S22 --- | |
|---|---|---|---|---|---|---|---|---|
| (GHz) | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.500 | 0.944 | -119.8 | 9.669 | 115.5 | 0.023 | 33.8 | 0.515 | -166.9 |
| 1.000 | 0.931 | -149.2 | 5.352 | 97.6 | 0.026 | 24.2 | 0.553 | -172.1 |
| 1.500 | 0.928 | -161.0 | 3.646 | 88.3 | 0.027 | 23.1 | 0.564 | -174.0 |
| 2.000 | 0.927 | -167.6 | 2.756 | 81.6 | 0.027 | 24.4 | 0.569 | -175.0 |
| 2.500 | 0.927 | -172.0 | 2.213 | 75.9 | 0.028 | 26.6 | 0.574 | -175.4 |
| 3.000 | 0.927 | -175.4 | 1.849 | 70.7 | 0.029 | 29.2 | 0.580 | -175.7 |
| 3.500 | 0.928 | -178.1 | 1.587 | 66.0 | 0.030 | 31.9 | 0.585 | -175.9 |
| 4.000 | 0.928 | 179.6 | 1.389 | 61.4 | 0.031 | 34.6 | 0.591 | -176.0 |
| 4.500 | 0.929 | 177.5 | 1.235 | 57.0 | 0.032 | 37.2 | 0.597 | -176.1 |
| 5.000 | 0.930 | 175.6 | 1.112 | 52.8 | 0.034 | 39.6 | 0.604 | -176.3 |
| 5.500 | 0.931 | 173.9 | 1.010 | 48.7 | 0.035 | 41.9 | 0.612 | -176.5 |
| 6.000 | 0.932 | 172.3 | 0.925 | 44.7 | 0.037 | 44.1 | 0.620 | -176.7 |
| 6.500 | 0.933 | 170.7 | 0.853 | 40.8 | 0.039 | 46.0 | 0.628 | -176.9 |
| 7.000 | 0.934 | 169.2 | 0.790 | 37.0 | 0.040 | 47.8 | 0.636 | -177.2 |
| 7.500 | 0.935 | 167.7 | 0.735 | 33.3 | 0.042 | 49.4 | 0.645 | -177.5 |
| 8.000 | 0.937 | 166.3 | 0.687 | 29.7 | 0.044 | 50.8 | 0.654 | -177.9 |
| 8.500 | 0.938 | 164.9 | 0.643 | 26.2 | 0.047 | 52.1 | 0.664 | -178.3 |
| 9.000 | 0.939 | 163.6 | 0.604 | 22.8 | 0.049 | 53.2 | 0.673 | -178.8 |
| 9.500 | 0.941 | 162.3 | 0.569 | 19.5 | 0.051 | 54.1 | 0.683 | -179.4 |
| 10.000 | 0.942 | 160.9 | 0.537 | 16.2 | 0.054 | 54.9 | 0.693 | -179.9 |

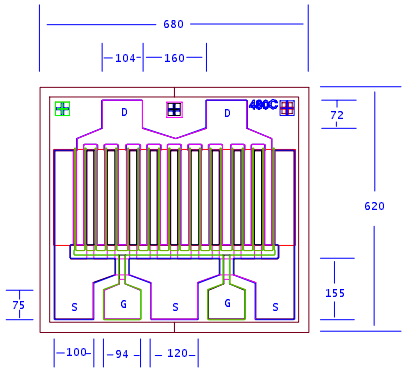
Note: The data included 0.7 mils diameter Au bonding wires:
2 gate wires, 20 mils each; 2 drain wires, 12 mils each; 6 source wires, 7 mils each.

# EFC480C

## PRELIMINARY DATA SHEET

## Low Distortion GaAs Power FET

- **+33.5dBm TYPICAL OUTPUT POWER**
- **18.0dB TYPICAL POWER GAIN AT 2GHz**
- **High BVgd FOR 10V BIAS**
- **0.5 X 4800 MICRON RECESSED "MUSHROOM" GATE**
- **$Si_3N_4$ PASSIVATION AND PLATED HEAT SINK**
- **ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY**
- **Idss SORTED IN 80mA PER BIN RANGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **$P_{1dB}$** | Output Power at 1dB Compression<br>Vds=8V, Ids=50% Idss | f= 2GHz<br>f= 4GHz | 32.0 | 33.5<br>33.5 | | dBm |
| **$G_{1dB}$** | Gain at 1dB Compression<br>Vds=8V, Ids=50% Idss | f= 2GHz<br>f= 4GHz | 16.0 | 18.0<br>12.5 | | dB |
| **PAE** | Gain at 1dB Compression<br>Vds=8V, Ids=50% Idss | f= 2GHz | | 40 | | % |
| **Idss** | Saturated Drain Current Vds=3V, Vgs=0V | | 640 | 960 | 1440 | mA |
| **Gm** | Transconductance Vds=3V, Vgs=0V | | 200 | 560 | | mS |
| **Vp** | Pinch-off Voltage Vds=3V, Ids=10mA | | | -2.5 | -4.0 | V |
| **BVgd** | Drain Breakdown Voltage Igd=4.8mA | | -15 | -20 | | V |
| **BVgs** | Source Breakdown Voltage Igs=4.8mA | | -10 | -17 | | V |
| **Rth** | Thermal Resistance (Au-Sn Eutectic Attach) | | | 12 | | $^{o}$C/W |

## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE [1] | CONTINUOUS[2] |
|---|---|---|---|
| **Vds** | Drain-Source Voltage | 14V | 10V |
| **Vgs** | Gate-Source Voltage | -8V | -4.5V |
| **Ids** | Drain Current | Idss | 960mA |
| **Igsf** | Forward Gate Current | 120mA | 20mA |
| **Pin** | Input Power | 32dBm | @3dB Compression |
| **Tch** | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| **Tstg** | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| **Pt** | Total Power Dissipation | 11.4 W | 9.5 W |

# EFC480C

**PRELIMINARY DATA SHEET**

## Low Distortion GaAs Power FET

### S-PARAMETERS

**10V, 1/2 Idss**

| Freq | ---S11--- | | ---S21--- | | ---S12--- | | ---S22--- | |
|---|---|---|---|---|---|---|---|---|
| GHz | Mag | Ang | Mag | Ang | Mag | Ang | Mag | Ang |
| 0.500 | 0.937 | -106.2 | 10.161 | 120.8 | 0.022 | 35.8 | 0.518 | -166.8 |
| 1.000 | 0.897 | -134.9 | 6.389 | 104.7 | 0.028 | 26.4 | 0.505 | -168.3 |
| 1.500 | 0.897 | -151.8 | 4.443 | 93.5 | 0.028 | 21.5 | 0.524 | -171.2 |
| 2.000 | 0.897 | -161.0 | 3.370 | 85.4 | 0.029 | 19.0 | 0.533 | -173.0 |
| 2.500 | 0.898 | -167.2 | 2.695 | 79.2 | 0.030 | 20.2 | 0.539 | -173.8 |
| 3.000 | 0.895 | -171.8 | 2.231 | 73.9 | 0.030 | 19.5 | 0.542 | -174.2 |
| 3.500 | 0.890 | -175.4 | 1.894 | 69.4 | 0.030 | 20.9 | 0.542 | -173.9 |
| 4.000 | 0.850 | -176.6 | 1.654 | 66.9 | 0.026 | 27.6 | 0.560 | -172.2 |
| 4.500 | 0.901 | 177.7 | 1.535 | 59.9 | 0.032 | 23.1 | 0.607 | -169.5 |
| 5.000 | 0.899 | 174.5 | 1.357 | 55.2 | 0.031 | 25.8 | 0.617 | -170.8 |
| 5.500 | 0.900 | 172.5 | 1.208 | 51.4 | 0.031 | 28.1 | 0.620 | -171.8 |
| 6.000 | 0.901 | 170.8 | 1.087 | 48.2 | 0.031 | 30.4 | 0.619 | -172.8 |
| 6.500 | 0.902 | 169.6 | 0.999 | 45.8 | 0.032 | 32.0 | 0.616 | -172.6 |
| 7.000 | 0.893 | 168.8 | 0.941 | 43.3 | 0.033 | 37.1 | 0.637 | -171.2 |
| 7.500 | 0.904 | 170.7 | 0.916 | 39.2 | 0.037 | 34.8 | 0.669 | -172.8 |
| 8.000 | 0.919 | 169.5 | 0.840 | 34.2 | 0.036 | 35.0 | 0.681 | -175.0 |
| 8.500 | 0.918 | 169.2 | 0.783 | 31.0 | 0.038 | 36.6 | 0.693 | -176.9 |
| 9.000 | 0.924 | 168.7 | 0.729 | 27.9 | 0.037 | 37.6 | 0.701 | -178.6 |
| 9.500 | 0.927 | 168.0 | 0.687 | 24.5 | 0.038 | 39.8 | 0.706 | -179.3 |
| 10.000 | 0.932 | 167.3 | 0.647 | 22.3 | 0.040 | 42.4 | 0.716 | 179.8 |

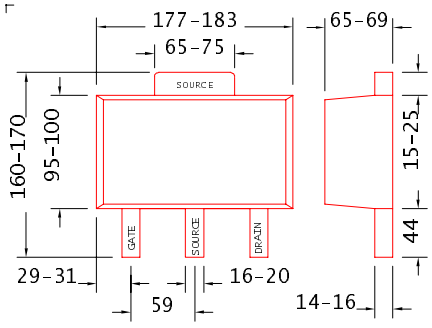
Note: The data included 0.7 mils diameter Au bonding wires:
2 gate wires, 20 mils each; 2 drain wires, 12 mils each; 6 source wires, 7 mils each.

# EFA480C-SOT89

## DATA SHEET
## DC-4GHz Low Distortion GaAs Power FET

### Features

- **LOW COST SURFACE-MOUNT PLASTIC PACKAGE**
- **+34.0dBm TYPICAL OUTPUT POWER**
- **12.0dB TYPICAL POWER GAIN AT 2GHz**
- **0.8dB TYPICAL NOISE FIGURE AT 2GHz**
- **+48dBm TYPICAL OUTPUT 3rd ORDER INTERCEPT POINT AT 2GHz**
- **0.5 X 4800 MICRON RECESSED "MUSHROOM" GATE**
- **$Si_3N_4$ PASSIVATION**
- **ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY**




### Applications

- **Analog and Digital Wireless System**
- **HPA**

### ELECTRICAL CHARACTERISTICS ($T_a$ = 25 °C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| **$P_{1dB}$** | Output Power at 1dB Compression f = 2GHz<br>Vds=7V, Ids=750mA | 32.5 | 34.0 | | dBm |
| **$G_{1dB}$** | Gain at 1dB Compression f = 2GHz<br>Vds=7V, Ids=750mA | 10.0 | 12.0 | | dB |
| **PAE** | Power Added Efficiency at 1dB Compression<br>Vds=7V, Ids=750mA f = 2GHz | | 45 | | % |
| **NF** | Noise Figure f = 2GHz<br>Vds=5V, Ids=300mA<br>Vds=5-7V, Ids=750mA | | 0.8<br>2.0 | | dB |
| **IP3** | Output 3rd Order Intercept Point f = 2GHz<br>Vds=5-7V, Ids=750mA<br>Vds=5V, Ids=300mA | | 48<br>39 | | dBm |
| **Idss** | Saturated Drain Current Vds=3V, Vgs=0V | 880 | 1360 | 1760 | mA |
| **Gm** | Transconductance Vds=3V, Vgs=0V | 560 | 720 | | mS |
| **Vp** | Pinch-off Voltage Vds=3V, Ids=14mA | | -2.0 | -3.5 | V |
| **BVgd** | Drain Breakdown Voltage Igd=4.8mA | -11 | -15 | | V |
| **BVgs** | Source Breakdown Voltage Igs=4.8mA | -7 | -14 | | V |
| **Rth** | Thermal Resistance | | 14* | | °C/W |

* Overall Rth depends on case mounting.

### MAXIMUM RATINGS AT 25°C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| **Vds** | Drain-Source Voltage | 12V | 7V |
| **Vgs** | Gate-Source Voltage | -8V | -4V |
| **Ids** | Drain Current | Idss | 1.2A |
| **Igsf** | Forward Gate Current | 120mA | 20mA |
| **Pin** | Input Power | 32dBm | @ 3dB Compression |
| **Tch** | Channel Temperature | 175°C | 150°C |
| **Tstg** | Storage Temperature | -65/175°C | -65/150°C |
| **Pt** | Total Power Dissipation | 10 W | 8.4 W |

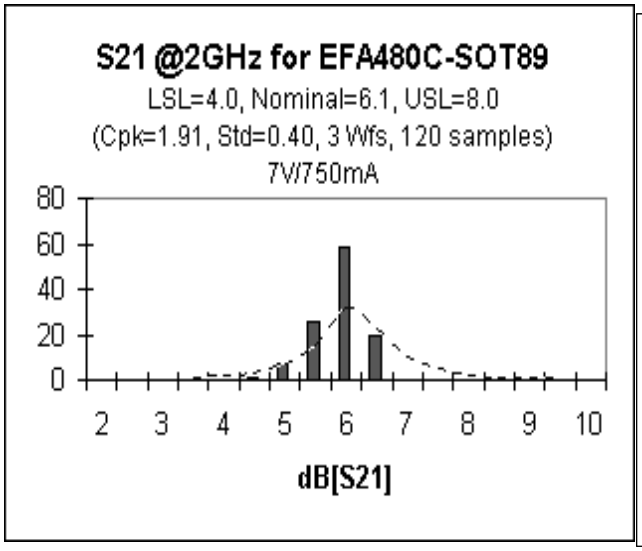
# EFA480C-SOT89

**DATA SHEET**

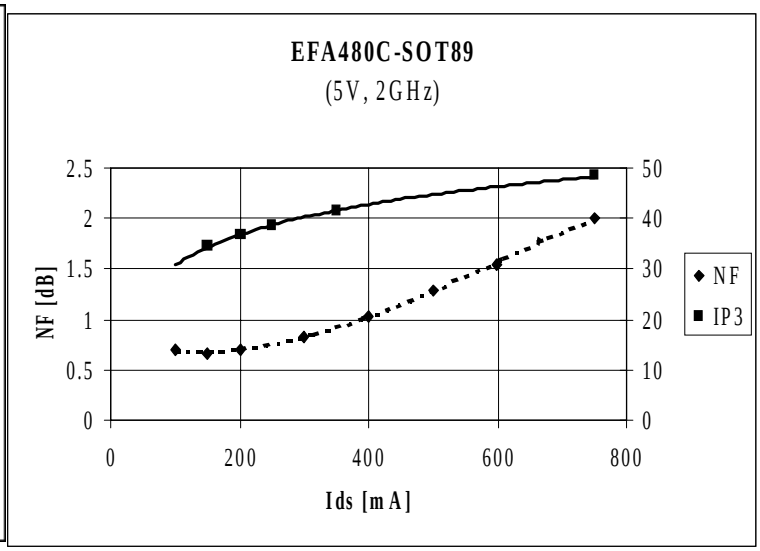
## DC-4GHz Low Distortion GaAs Power FET

### Typical Performance

**S21 Distribution**




**Noise Figure & IP3**




### S-PARAMETERS

**7V, 750mA**

| Freq | --- S11 --- | | --- S21 --- | | --- S12 --- | | --- S22 --- | |
|---|---|---|---|---|---|---|---|---|
| (GHz) | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.1 | 0.914 | -74.6 | 18.618 | 138.4 | 0.015 | 56.1 | 0.552 | -166.3 |
| 0.2 | 0.898 | -113.3 | 12.814 | 117.4 | 0.024 | 39.5 | 0.652 | -169.9 |
| 0.3 | 0.898 | -134.4 | 9.412 | 105.5 | 0.025 | 31.1 | 0.677 | -174.6 |
| 0.4 | 0.897 | -147.5 | 7.342 | 97.4 | 0.026 | 28.5 | 0.692 | -177.9 |
| 0.5 | 0.893 | -156.3 | 5.983 | 91.3 | 0.028 | 25.9 | 0.698 | 178.6 |
| 1.0 | 0.886 | 179.0 | 3.095 | 70.9 | 0.034 | 25.3 | 0.686 | 168.9 |
| 1.5 | 0.831 | 161.0 | 2.625 | 55.6 | 0.052 | 23.7 | 0.616 | 153.0 |
| 2.0 | 0.826 | 146.7 | 2.013 | 40.8 | 0.062 | 20.0 | 0.614 | 143.4 |
| 2.5 | 0.818 | 133.2 | 1.680 | 26.4 | 0.074 | 13.7 | 0.602 | 133.9 |
| 3.0 | 0.806 | 119.3 | 1.463 | 11.3 | 0.087 | 4.9 | 0.587 | 122.7 |
| 3.5 | 0.808 | 103.3 | 1.303 | -5.2 | 0.100 | -5.5 | 0.570 | 109.6 |
| 4.0 | 0.797 | 85.9 | 1.142 | -23.4 | 0.110 | -18.7 | 0.579 | 92.5 |
| 4.5 | 0.812 | 69.0 | 0.967 | -40.5 | 0.113 | -31.5 | 0.602 | 75.1 |
| 5.0 | 0.836 | 53.9 | 0.816 | -56.0 | 0.113 | -43.2 | 0.652 | 61.1 |
| 5.5 | 0.856 | 41.4 | 0.687 | -69.8 | 0.109 | -53.7 | 0.685 | 50.8 |
| 6.0 | 0.859 | 30.1 | 0.589 | -82.8 | 0.108 | -63.8 | 0.705 | 41.3 |

**5V, 150mA**

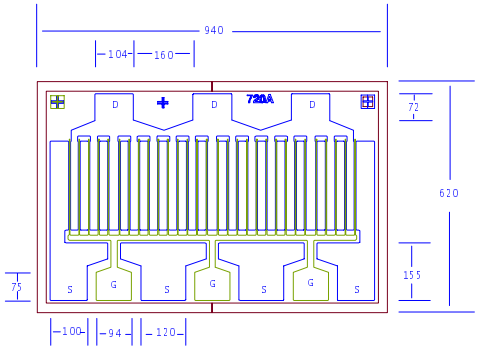
| Freq | --- S11 --- | | --- S21 --- | | --- S12 --- | | --- S22 --- | |
|---|---|---|---|---|---|---|---|---|
| (GHz) | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.1 | 0.953 | -71.1 | 17.133 | 141.6 | 0.018 | 68.2 | 0.586 | -167.0 |
| 0.2 | 0.929 | -111.0 | 12.353 | 120.2 | 0.026 | 39.7 | 0.678 | -170.2 |
| 0.3 | 0.916 | -133.1 | 9.150 | 107.7 | 0.031 | 29.3 | 0.712 | -174.9 |
| 0.4 | 0.908 | -146.6 | 7.156 | 99.3 | 0.030 | 28.1 | 0.731 | -178.2 |
| 0.5 | 0.902 | -155.7 | 5.838 | 93.1 | 0.033 | 27.1 | 0.742 | 178.3 |
| 1.0 | 0.886 | 179.2 | 3.037 | 72.8 | 0.039 | 24.0 | 0.736 | 168.3 |
| 1.5 | 0.828 | 161.0 | 2.596 | 57.9 | 0.059 | 21.8 | 0.676 | 152.7 |
| 2.0 | 0.822 | 146.4 | 2.002 | 43.6 | 0.070 | 17.8 | 0.673 | 142.9 |
| 2.5 | 0.812 | 132.9 | 1.671 | 29.8 | 0.083 | 11.0 | 0.662 | 133.2 |
| 3.0 | 0.799 | 119.0 | 1.465 | 14.9 | 0.097 | 2.6 | 0.647 | 121.7 |
| 3.5 | 0.800 | 103.0 | 1.313 | -1.0 | 0.111 | -8.0 | 0.626 | 108.6 |
| 4.0 | 0.790 | 85.6 | 1.154 | -18.7 | 0.120 | -21.8 | 0.632 | 91.7 |
| 4.5 | 0.806 | 68.8 | 0.982 | -35.4 | 0.124 | -34.2 | 0.651 | 74.5 |
| 5.0 | 0.830 | 54.0 | 0.831 | -50.4 | 0.123 | -46.1 | 0.693 | 60.9 |
| 5.5 | 0.851 | 41.4 | 0.706 | -63.8 | 0.120 | -56.5 | 0.721 | 50.4 |
| 6.0 | 0.855 | 30.2 | 0.611 | -76.3 | 0.118 | -66.2 | 0.733 | 41.0 |

# EFA720A

## DATA SHEET

## Low Distortion GaAs Power FET

- **+35.5dBm TYPICAL OUTPUT POWER**
- **17.5dB TYPICAL POWER GAIN AT 2GHz**
- **0.5 X 7200 MICRON RECESSED "MUSHROOM" GATE**
- **$Si_3N_4$ PASSIVATION AND PLATED HEAT SINK**
- **ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY**
- **Idss SORTED IN 120mA PER BIN RANGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **$P_{1dB}$** | Output Power at 1dB Compression<br>Vds=8V, Ids=50% Idss | f= 2GHz<br>f= 4GHz | 33.5 | 35.5<br>35.5 | | dBm |
| **$G_{1dB}$** | Gain at 1dB Compression<br>Vds=8V, Ids=50% Idss | f= 2GHz<br>f= 4GHz | 16.0 | 17.5<br>12.5 | | dB |
| **PAE** | Power Added Efficiency at 1dB Compression<br>Vds=8V, Ids=50% Idss | f= 2GHz | | <br>36 | | % |
| **Idss** | Saturated Drain Current Vds=3V, Vgs=0V | | 1200 | 2040 | 2640 | mA |
| **Gm** | Transconductance Vds=3V, Vgs=0V | | 840 | 1100 | | mS |
| **Vp** | Pinch-off Voltage Vds=3V, Ids=20mA | | | -2.0 | -3.5 | V |
| **BVgd** | Drain Breakdown Voltage Igd=7.2mA | | -12 | -15 | | V |
| **BVgs** | Source Breakdown Voltage Igs=7.2mA | | -7 | -14 | | V |
| **Rth** | Thermal Resistance (Au-Sn Eutectic Attach) | | | 6 | | $^{o}$C/W |

## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE [1] | CONTINUOUS[2] |
|---|---|---|---|
| **Vds** | Drain-Source Voltage | 12V | 8V |
| **Vgs** | Gate-Source Voltage | -8V | -4V |
| **Ids** | Drain Current | Idss | 2.4A |
| **Igsf** | Forward Gate Current | 180mA | 30mA |
| **Pin** | Input Power | 34dBm | @3dB Compression |
| **Tch** | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| **Tstg** | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| **Pt** | Total Power Dissipation | 23 W | 19 W |

# EFA720A

## DATA SHEET

## Low Distortion GaAs Power FET

### S-PARAMETERS

**8V, 1/2 Idss**

| FREQ | --- S11 --- | | --- S21 --- | | --- S12 --- | | --- S22 --- | |
|---|---|---|---|---|---|---|---|---|
| (GHz) | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.500 | 0.954 | -139.8 | 7.651 | 105.9 | 0.018 | 25.1 | 0.664 | -173.7 |
| 1.000 | 0.950 | -160.3 | 4.004 | 92.2 | 0.019 | 20.5 | 0.680 | -176.3 |
| 1.500 | 0.949 | -168.0 | 2.694 | 84.8 | 0.020 | 22.1 | 0.685 | -177.2 |
| 2.000 | 0.949 | -172.3 | 2.027 | 79.1 | 0.020 | 25.1 | 0.689 | -177.6 |
| 2.500 | 0.949 | -175.1 | 1.624 | 74.1 | 0.021 | 28.5 | 0.692 | -177.7 |
| 3.000 | 0.949 | -177.3 | 1.354 | 69.5 | 0.022 | 32.1 | 0.696 | -177.8 |
| 3.500 | 0.950 | -179.1 | 1.161 | 65.2 | 0.023 | 35.5 | 0.700 | -177.8 |
| 4.000 | 0.950 | 179.4 | 1.016 | 61.0 | 0.024 | 38.8 | 0.704 | -177.9 |
| 4.500 | 0.951 | 178.1 | 0.903 | 57.0 | 0.025 | 41.8 | 0.709 | -177.9 |
| 5.000 | 0.951 | 176.9 | 0.812 | 53.1 | 0.026 | 44.6 | 0.715 | -178.0 |
| 5.500 | 0.952 | 175.7 | 0.737 | 49.3 | 0.028 | 47.2 | 0.720 | -178.1 |
| 6.000 | 0.953 | 174.7 | 0.675 | 45.6 | 0.029 | 49.5 | 0.726 | -178.2 |
| 6.500 | 0.953 | 173.6 | 0.621 | 42.0 | 0.031 | 51.6 | 0.733 | -178.4 |
| 7.000 | 0.954 | 172.7 | 0.575 | 38.5 | 0.033 | 53.5 | 0.739 | -178.6 |
| 7.500 | 0.955 | 171.7 | 0.535 | 35.1 | 0.034 | 55.2 | 0.746 | -178.8 |
| 8.000 | 0.956 | 170.7 | 0.499 | 31.8 | 0.036 | 56.7 | 0.753 | -179.0 |
| 8.500 | 0.957 | 169.8 | 0.468 | 28.6 | 0.038 | 58.0 | 0.760 | -179.3 |
| 9.000 | 0.957 | 168.9 | 0.439 | 25.5 | 0.040 | 59.1 | 0.767 | -179.6 |
| 9.500 | 0.958 | 168.0 | 0.413 | 22.6 | 0.042 | 60.1 | 0.774 | -180.0 |
| 10.000 | 0.959 | 167.1 | 0.389 | 19.7 | 0.044 | 61.0 | 0.782 | 179.6 |

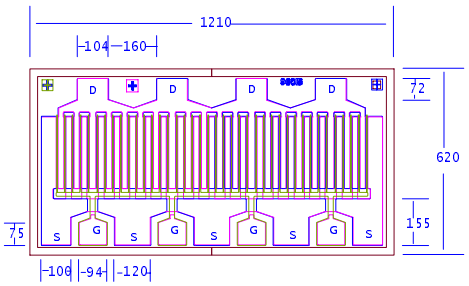
Note: The data included 0.7 mils diameter Au bonding wires:
3 gate wires, 20 mils each; 3 drain wires, 12 mils each; 8 source wires, 7 mils each.

# EFA960B

## DATA SHEET

## Low Distortion GaAs Power FET

- **+36.5dBm TYPICAL OUTPUT POWER**
- **16.0dB TYPICAL POWER GAIN AT 2GHz**
- **0.5 X 9600 MICRON RECESSED "MUSHROOM" GATE**
- **$Si_3N_4$ PASSIVATION AND PLATED HEAT SINK**
- **ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY**
- **Idss SORTED IN 160mA PER BIN RANGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 °C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| **$P_{1dB}$** | Output Power at 1dB Compression f= 2GHz<br>Vds=8V, Ids=50% Idss f= 4GHz | 35.0 | 36.5<br>36.5 | | dBm |
| **$G_{1dB}$** | Gain at 1dB Compression f= 2GHz<br>Vds=8V, Ids=50% Idss f= 4GHz | 15.0 | 16.5<br>11.5 | | dB |
| **PAE** | Power Added Efficiency at 1dB Compression<br>Vds=8V, Ids=50% Idss f= 2GHz | | 34 | | % |
| **Idss** | Saturated Drain Current Vds=3V, Vgs=0V | 1600 | 2720 | 3520 | mA |
| **Gm** | Transconductance Vds=3V, Vgs=0V | 1100 | 1450 | | mS |
| **Vp** | Pinch-off Voltage Vds=3V, Ids=25mA | | -2.0 | -3.5 | V |
| **BVgd** | Drain Breakdown Voltage Igd=9.6mA | -12 | -15 | | V |
| **BVgs** | Source Breakdown Voltage Igs=9.6mA | -7 | -14 | | V |
| **Rth** | Thermal Resistance (Au-Sn Eutectic Attach) | | 5 | | °C/W |

## MAXIMUM RATINGS AT 25°C

| SYMBOLS | PARAMETERS | ABSOLUTE [1] | CONTINUOUS[2] |
|---|---|---|---|
| **Vds** | Drain-Source Voltage | 12V | 8V |
| **Vgs** | Gate-Source Voltage | -8V | -4V |
| **Ids** | Drain Current | Idss | 2.8A |
| **Igsf** | Forward Gate Current | 240mA | 40mA |
| **Pin** | Input Power | 35dBm | @3dB Compression |
| **Tch** | Channel Temperature | 175°C | 150°C |
| **Tstg** | Storage Temperature | -65/175°C | -65/150°C |
| **Pt** | Total Power Dissipation | 27 W | 23 W |

# EFA960B

## DATA SHEET

## Low Distortion GaAs Power FET

### S-PARAMETERS

**8V, 1/2 Idss**

| FREQ | --- S11 --- | | --- S21 --- | | --- S12 --- | | --- S22 --- | |
|---|---|---|---|---|---|---|---|---|
| (GHz) | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.500 | 0.963 | -150.4 | 6.232 | 100.8 | 0.015 | 20.2 | 0.741 | -176.3 |
| 1.000 | 0.962 | -165.8 | 3.195 | 89.5 | 0.015 | 18.3 | 0.750 | -177.8 |
| 1.500 | 0.961 | -171.5 | 2.140 | 83.1 | 0.016 | 21.0 | 0.753 | -178.3 |
| 2.000 | 0.961 | -174.6 | 1.608 | 77.9 | 0.016 | 24.7 | 0.755 | -178.5 |
| 2.500 | 0.962 | -176.7 | 1.287 | 73.2 | 0.017 | 28.6 | 0.758 | -178.5 |
| 3.000 | 0.962 | -178.3 | 1.072 | 68.9 | 0.018 | 32.5 | 0.761 | -178.5 |
| 3.500 | 0.962 | -179.6 | 0.919 | 64.7 | 0.018 | 36.2 | 0.764 | -178.6 |
| 4.000 | 0.962 | 179.2 | 0.803 | 60.7 | 0.019 | 39.7 | 0.768 | -178.6 |
| 4.500 | 0.963 | 178.2 | 0.713 | 56.8 | 0.020 | 42.9 | 0.772 | -178.6 |
| 5.000 | 0.963 | 177.3 | 0.641 | 53.0 | 0.021 | 45.9 | 0.776 | -178.6 |
| 5.500 | 0.964 | 176.4 | 0.582 | 49.3 | 0.022 | 48.6 | 0.781 | -178.7 |
| 6.000 | 0.964 | 175.6 | 0.532 | 45.8 | 0.024 | 51.0 | 0.786 | -178.8 |
| 6.500 | 0.965 | 174.8 | 0.490 | 42.3 | 0.025 | 53.2 | 0.791 | -178.9 |
| 7.000 | 0.965 | 174.1 | 0.453 | 38.9 | 0.026 | 55.2 | 0.797 | -179.0 |
| 7.500 | 0.966 | 173.3 | 0.421 | 35.7 | 0.028 | 56.9 | 0.802 | -179.2 |
| 8.000 | 0.966 | 172.6 | 0.392 | 32.5 | 0.029 | 58.5 | 0.808 | -179.4 |
| 8.500 | 0.967 | 171.9 | 0.367 | 29.5 | 0.031 | 59.9 | 0.814 | -179.6 |
| 9.000 | 0.968 | 171.2 | 0.344 | 26.6 | 0.033 | 61.1 | 0.819 | -179.8 |
| 9.500 | 0.968 | 170.5 | 0.324 | 23.7 | 0.034 | 62.2 | 0.825 | 179.9 |
| 10.000 | 0.969 | 169.8 | 0.305 | 21.0 | 0.036 | 63.2 | 0.831 | 179.6 |

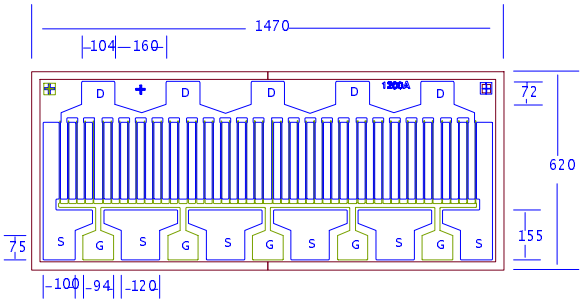
Note: The data included 0.7 mils diameter Au bonding wires:
4 gate wires, 20 mils each; 4 drain wires, 12 mils each; 10 source wires, 7 mils each.

# EFA1200A

## PRELIMINARY DATA SHEET

## Low Distortion GaAs Power FET

- **+37.0dBm TYPICAL OUTPUT POWER**
- **16.0dB TYPICAL POWER GAIN AT 2GHz**
- **0.5 X 12,000 MICRON RECESSED "MUSHROOM" GATE**
- **$Si_3N_4$ PASSIVATION AND PLATED HEAT SINK**
- **ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY**
- **Idss SORTED IN 200mA PER BIN RANGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 °C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **$P_{1dB}$** | Output Power at 1dB Compression<br>Vds=8V, Ids=50% Idss | f= 2GHz<br>f= 4GHz | 35.5 | 37.0<br>37.0 | | dBm |
| **$G_{1dB}$** | Gain at 1dB Compression<br>Vds=8V, Ids=50% Idss | f= 2GHz<br>f= 4GHz | 14.5 | 16.0<br>11.0 | | dB |
| **Idss** | Saturated Drain Current Vds=3V, Vgs=0V | | 2000 | 3400 | 4400 | mA |
| **Gm** | Transconductance Vds=3V, Vgs=0V | | 1400 | 1800 | | mS |
| **Vp** | Pinch-off Voltage Vds=3V, Ids=30mA | | | -2.0 | -3.5 | V |
| **BVgd** | Drain Breakdown Voltage Igd=12mA | | -12 | -15 | | V |
| **BVgs** | Source Breakdown Voltage Igs=12mA | | -7 | -14 | | V |
| **Rth** | Thermal Resistance (Au-Sn Eutectic Attach) | | | 4 | | °C/W |

## MAXIMUM RATINGS AT 25°C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| **Vds** | Drain-Source Voltage | 12V | 8V |
| **Vgs** | Gate-Source Voltage | -8V | -4V |
| **Ids** | Drain Current | Idss | 2.0A |
| **Igsf** | Forward Gate Current | 300mA | 50mA |
| **Pin** | Input Power | 36dBm | @3dB Compression |
| **Tch** | Channel Temperature | 175°C | 150°C |
| **Tstg** | Storage Temperature | -65/175°C | -65/150°C |
| **Pt** | Total Power Dissipation | 34 W | 28 W |

# EFA1200A

**PRELIMINARY DATA SHEET**

## Low Distortion GaAs Power FET

### S-PARAMETERS

**8V, 1/2 Idss**

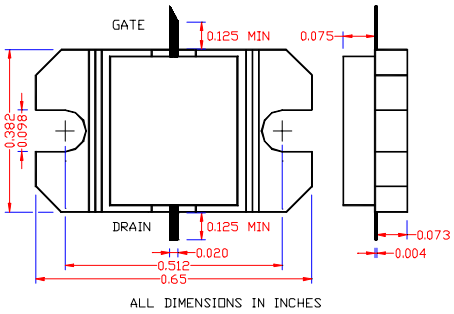
| FREQ | --- S11 --- | | --- S21 --- | | --- S12 --- | | --- S22 --- | |
|---|---|---|---|---|---|---|---|---|
| (GHz) | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.500 | 0.971 | -156.3 | 5.096 | 98.0 | 0.012 | 17.9 | 0.794 | -177.7 |
| 1.000 | 0.970 | -168.7 | 2.590 | 88.2 | 0.013 | 17.8 | 0.799 | -178.7 |
| 1.500 | 0.970 | -173.2 | 1.732 | 82.3 | 0.013 | 21.4 | 0.801 | -178.9 |
| 2.000 | 0.970 | -175.7 | 1.300 | 77.4 | 0.013 | 25.7 | 0.803 | -179.0 |
| 2.500 | 0.970 | -177.4 | 1.040 | 73.0 | 0.014 | 30.1 | 0.805 | -179.1 |
| 3.000 | 0.970 | -178.7 | 0.867 | 68.8 | 0.015 | 34.3 | 0.807 | -179.1 |
| 3.500 | 0.970 | -179.8 | 0.743 | 64.8 | 0.015 | 38.2 | 0.810 | -179.1 |
| 4.000 | 0.970 | 179.3 | 0.650 | 60.9 | 0.016 | 41.8 | 0.813 | -179.1 |
| 4.500 | 0.971 | 178.5 | 0.577 | 57.2 | 0.017 | 45.1 | 0.816 | -179.1 |
| 5.000 | 0.971 | 177.8 | 0.519 | 53.5 | 0.018 | 48.0 | 0.820 | -179.2 |
| 5.500 | 0.971 | 177.1 | 0.471 | 50.0 | 0.019 | 50.7 | 0.823 | -179.2 |
| 6.000 | 0.972 | 176.4 | 0.430 | 46.5 | 0.020 | 53.1 | 0.827 | -179.3 |
| 6.500 | 0.972 | 175.8 | 0.396 | 43.2 | 0.021 | 55.3 | 0.831 | -179.4 |
| 7.000 | 0.972 | 175.1 | 0.367 | 39.9 | 0.023 | 57.2 | 0.835 | -179.5 |
| 7.500 | 0.973 | 174.5 | 0.341 | 36.8 | 0.024 | 59.0 | 0.840 | -179.6 |
| 8.000 | 0.973 | 174.0 | 0.318 | 33.8 | 0.025 | 60.5 | 0.844 | -179.8 |
| 8.500 | 0.974 | 173.4 | 0.297 | 30.9 | 0.027 | 61.9 | 0.849 | -180.0 |
| 9.000 | 0.974 | 172.8 | 0.279 | 28.1 | 0.028 | 63.1 | 0.853 | 179.8 |
| 9.500 | 0.975 | 172.2 | 0.262 | 25.4 | 0.029 | 64.2 | 0.858 | 179.6 |
| 10.000 | 0.975 | 171.7 | 0.247 | 22.8 | 0.031 | 65.1 | 0.863 | 179.4 |

Note: The data included 0.7 mils diameter Au bonding wires:
5 gate wires, 20 mils each; 5 drain wires, 12 mils each; 12 source wires, 7 mils each.

# EIA/EIB1011-2P

## PRELIMINARY DATA SHEET
## 10.7-11.7GHz, 2W Internally Matched Power FET

- **10.7-11.7GHz BANDWIDTH AND INPUT/OUTPUT IMPEDANCE MATCHED TO 50 OHM**
- **EIA FEATURES HIGH PAE( 30% TYPICAL)**
- **EIB FEATURES HIGH IP3(46dBm TYPICAL)**
- **+33.5/+33.0dBm TYPICAL $P_{1dB}$ OUTPUT POWER FOR EIA/EIB**
- **9.5/8.5dB TYPICAL $G_{1dB}$ POWER GAIN FOR EIA/EIB**
- **NON-HERMETIC METAL FLANGE PACKAGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | EIA1011-2P | | | EIB1011-2P | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $P_{1dB}$ | Output Power at 1dB Compression f=10.7-11.7GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 32.5 | 33.5 | | 32 | 33.0 | | dBm |
| $G_{1dB}$ | Gain at 1dB Compression f=10.7-11.7GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 8.5 | 9.5 | | 7.5 | 8.5 | | dB |
| PAE | Power Added Efficiency at 1dB compression f=10.7-11.7GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 30 | | | 25 | | % |
| $Id_{1dB}$ | Drain Current at 1dB Compression | | 880 | | | 850 | | mA |
| $IP_3$ | Output 3rd Order Intercept Point f=10.7-11.7GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 40 | | | 46* | | dBm |
| Idss | Saturated Drain Current Vds=3V, Vgs=0V | 1100 | 1440 | 1700 | 1100 | 1360 | 1700 | mA |
| Gm | Transconductance Vds=3V, Vgs=0V | | 1500 | | | 700 | | mS |
| Vp | Pinch-off Voltage Vds=3V, Ids=12mA | | -1.0 | -2.5 | | -2.0 | -3.5 | V |
| BVgd | Drain Breakdown Voltage Igd=4.8mA | -13 | -15 | | | -15 | | V |
| Rth | Thermal Resistance (Au-Sn Eutectic Attach) | | 8 | | | 8 | | $^{o}$C/W |

*Typical –45dBc IM3 at Pout=23dBm/Tone

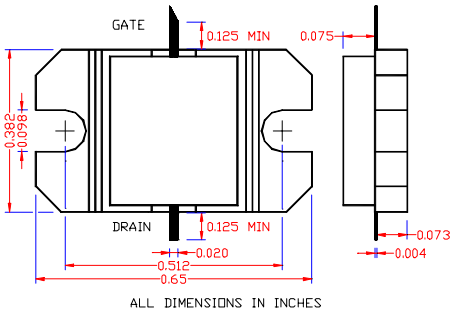
## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| Vds | Drain-Source Voltage | 12V | 8V |
| Vgs | Gate-Source Voltage | -8V | -3V |
| Ids | Drain Current | Idss | Idss |
| Igsf | Forward Gate Current | 180mA | 30mA |
| Pin | Input Power | 32dBm | @ 3dB Compression |
| Tch | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| Tstg | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| Pt | Total Power Dissipation | 17W | 14.2W |

# EIA/EIB1011-4P

## PRELIMINARY DATA SHEET
## 10.7-11.7GHz, 4W Internally Matched Power FET

- **10.7-11.7GHz BANDWIDTH AND INPUT/OUTPUT IMPEDANCE MATCHED TO 50 OHM**
- **EIA FEATURES HIGH PAE( 30% TYPICAL)**
- **EIB FEATURES HIGH IP3(49dBm TYPICAL)**
- **+36.5/+35.5dBm TYPICAL $P_{1dB}$ OUTPUT POWER FOR EIA/EIB**
- **9/8dB TYPICAL $G_{1dB}$ POWER GAIN FOR EIA/EIB**
- **NON-HERMETIC METAL FLANGE PACKAGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | EIA1011-4P | | | EIB1011-4P | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $P_{1dB}$ | Output Power at 1dB Compression f=10.7-11.7GHz<br>Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 35.5 | 36.5 | | 35 | 35.5 | | dBm |
| $G_{1dB}$ | Gain at 1dB Compression f=10.7-11.7GHz<br>Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 8 | 9 | | 7 | 8 | | dB |
| PAE | Power Added Efficiency at 1dB compression<br>f=10.7-11.7GHz<br>Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 30 | | | 25 | | % |
| $Id_{1dB}$ | Drain Current at 1dB Compression | | 1760 | | | 1700 | | mA |
| $IP_3$ | Output 3rd Order Intercept Point f=10.7-11.7GHz<br>Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 43 | | | 49* | | dBm |
| Idss | Saturated Drain Current Vds=3V, Vgs=0V | 2200 | 2880 | 3400 | 2200 | 2720 | 3400 | mA |
| Gm | Transconductance Vds=3V, Vgs=0V | | 3000 | | | 1400 | | mS |
| $V_p$ | Pinch-off Voltage Vds=3V, Ids=24mA | | -1.0 | -2.5 | | -2.0 | -3.5 | V |
| BVgd | Drain Breakdown Voltage Igd=9.6mA | -13 | -15 | | | -15 | | V |
| $R_{th}$ | Thermal Resistance (Au-Sn Eutectic Attach) | | 4.5 | | | 4.5 | | $^{o}$C/W |

*Typical –45dBc IM3 at Pout=26dBm/Tone

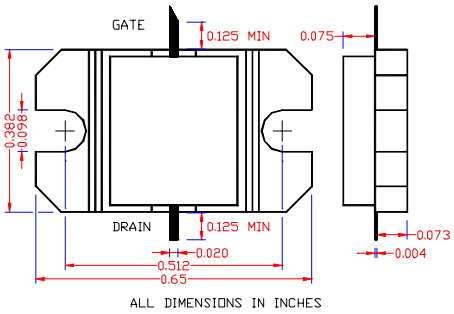
## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| Vds | Drain-Source Voltage | 12V | 8V |
| Vgs | Gate-Source Voltage | -8V | -3V |
| Ids | Drain Current | Idss | 3120mA |
| Igsf | Forward Gate Current | 360mA | 60mA |
| Pin | Input Power | 35dBm | @ 3dB Compression |
| Tch | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| Tstg | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| Pt | Total Power Dissipation | 30W | 25W |

# EIA/EIB1213-2P

## PRELIMINARY DATA SHEET
## 12.75-13.25GHz, 2W Internally Matched Power FET

- **12.75-13.25GHz BANDWIDTH AND INPUT/OUTPUT IMPEDANCE MATCHED TO 50 OHM**
- **EIA FEATURES HIGH PAE( 30% TYPICAL)**
- **EIB FEATURES HIGH IP3(46dBm TYPICAL)**
- **+33.5/+33.0dBm TYPICAL $P_{1dB}$ OUTPUT POWER FOR EIA/EIB**
- **9.5/8.5dB TYPICAL $G_{1dB}$ POWER GAIN FOR EIA/EIB**
- **NON-HERMETIC METAL FLANGE PACKAGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | EIA1213-2P | | | EIB1213-2P | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $P_{1dB}$ | Output Power at 1dB Compression f=12.75-13.25GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 32.5 | 33.5 | | 32 | 33.0 | | dBm |
| $G_{1dB}$ | Gain at 1dB Compression f=12.75-13.25GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 8.5 | 9.5 | | 7.5 | 8.5 | | dB |
| PAE | Power Added Efficiency at 1dB compression f=12.75-13.25GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 30 | | | 25 | | % |
| $Id_{1dB}$ | Drain Current at 1dB Compression | | 880 | | | 850 | | mA |
| $IP_3$ | Output 3rd Order Intercept Point f=12.75-13.25GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 40 | | | 46* | | dBm |
| Idss | Saturated Drain Current Vds=3V, Vgs=0V | 1100 | 1440 | 1700 | 1100 | 1360 | 1700 | mA |
| Gm | Transconductance Vds=3V, Vgs=0V | | 1500 | | | 700 | | mS |
| Vp | Pinch-off Voltage Vds=3V, Ids=12mA | | -1.0 | -2.5 | | -2.0 | -3.5 | V |
| BVgd | Drain Breakdown Voltage Igd=4.8mA | -13 | -15 | | | -15 | | V |
| Rth | Thermal Resistance (Au-Sn Eutectic Attach) | | 8 | | | 8 | | $^{o}$C/W |

*Typical –45dBc IM3 at Pout=23dBm/Tone

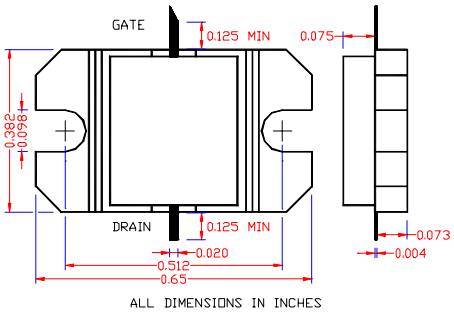
## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| Vds | Drain-Source Voltage | 12V | 8V |
| Vgs | Gate-Source Voltage | -8V | -3V |
| Ids | Drain Current | Idss | Idss |
| Igsf | Forward Gate Current | 180mA | 30mA |
| Pin | Input Power | 32dBm | @ 3dB Compression |
| Tch | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| Tstg | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| Pt | Total Power Dissipation | 17W | 14.2W |

# EIA/EIB1213-4P

## PRELIMINARY DATA SHEET
## 12.75-13.25GHz, 4W Internally Matched Power FET

- **12.75-13.25GHz BANDWIDTH AND INPUT/OUTPUT IMPEDANCE MATCHED TO 50 OHM**
- **EIA FEATURES HIGH PAE( 30% TYPICAL)**
- **EIB FEATURES HIGH IP3(49dBm TYPICAL)**
- **+36.5/+35.5dBm TYPICAL $P_{1dB}$ OUTPUT POWER FOR EIA/EIB**
- **9.5/8.5dB TYPICAL $G_{1dB}$ POWER GAIN FOR EIA/EIB**
- **NON-HERMETIC METAL FLANGE PACKAGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | EIA1213-4P | | | EIB1213-4P | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $P_{1dB}$ | Output Power at 1dB Compression f=12.75-13.25GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 35.5 | 36.5 | | 35 | 35.5 | | dBm |
| $G_{1dB}$ | Gain at 1dB Compression f=12.75-13.25GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 8.5 | 9.5 | | 7.5 | 8.5 | | dB |
| PAE | Power Added Efficiency at 1dB compression f=12.75-13.25GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 30 | | | 25 | | % |
| $Id_{1dB}$ | Drain Current at 1dB Compression | | 1760 | | | 1700 | | mA |
| $IP_3$ | Output 3rd Order Intercept Point f=12.75-13.25GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 43 | | | 49* | | dBm |
| Idss | Saturated Drain Current Vds=3V, Vgs=0V | 2200 | 2880 | 3400 | 2200 | 2720 | 3400 | mA |
| Gm | Transconductance Vds=3V, Vgs=0V | | 3000 | | | 1400 | | mS |
| Vp | Pinch-off Voltage Vds=3V, Ids=24mA | | -1.0 | -2.5 | | -2.0 | -3.5 | V |
| BVgd | Drain Breakdown Voltage Igd=9.6mA | -13 | -15 | | | -15 | | V |
| Rth | Thermal Resistance (Au-Sn Eutectic Attach) | | 4.5 | | | 4.5 | | $^{o}$C/W |

*Typical –45dBc IM3 at Pout=26dBm/Tone

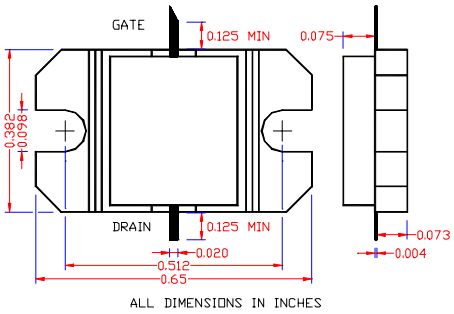
## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| Vds | Drain-Source Voltage | 12V | 8V |
| Vgs | Gate-Source Voltage | -8V | -3V |
| Ids | Drain Current | Idss | 3120mA |
| Igsf | Forward Gate Current | 360mA | 60mA |
| Pin | Input Power | 35dBm | @ 3dB Compression |
| Tch | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| Tstg | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| Pt | Total Power Dissipation | 30W | 25W |

# EIA/EIB1314-2P

## PRELIMINARY DATA SHEET
## 13.75-14.5GHz, 2W Internally Matched Power FET

- **13.75-14.5GHz BANDWIDTH AND INPUT/OUTPUT IMPEDANCE MATCHED TO 50 OHM**
- **EIA FEATURES HIGH PAE( 30% TYPICAL)**
- **EIB FEATURES HIGH IP3(46dBm TYPICAL)**
- **+33.5/+33.0dBm TYPICAL $P_{1dB}$ OUTPUT POWER FOR EIA/EIB**
- **9.0/8.0dB TYPICAL $G_{1dB}$ POWER GAIN FOR EIA/EIB**
- **NON-HERMETIC METAL FLANGE PACKAGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | EIA1314-2P | | | EIB1314-2P | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $P_{1dB}$ | Output Power at 1dB Compression f=13.75-14.5GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 32.5 | 33.5 | | 32 | 33.0 | | dBm |
| $G_{1dB}$ | Gain at 1dB Compression f=13.75-14.5GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 8 | 9 | | 7 | 8 | | dB |
| PAE | Power Added Efficiency at 1dB compression f=13.75-14.5GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 30 | | | 25 | | % |
| $Id_{1dB}$ | Drain Current at 1dB Compression | | 880 | | | 850 | | mA |
| $IP_3$ | Output 3rd Order Intercept Point f=13.75-14.5GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 40 | | | 46* | | dBm |
| Idss | Saturated Drain Current Vds=3V, Vgs=0V | 1100 | 1440 | 1700 | 1100 | 1360 | 1700 | mA |
| Gm | Transconductance Vds=3V, Vgs=0V | | 1500 | | | 700 | | mS |
| $V_p$ | Pinch-off Voltage Vds=3V, Ids=12mA | | -1.0 | -2.5 | | -2.0 | -3.5 | V |
| BVgd | Drain Breakdown Voltage Igd=4.8mA | -13 | -15 | | | -15 | | V |
| $R_{th}$ | Thermal Resistance (Au-Sn Eutectic Attach) | | 8 | | | 8 | | $^{o}$C/W |

*Typical –45dBc IM3 at Pout=23dBm/Tone

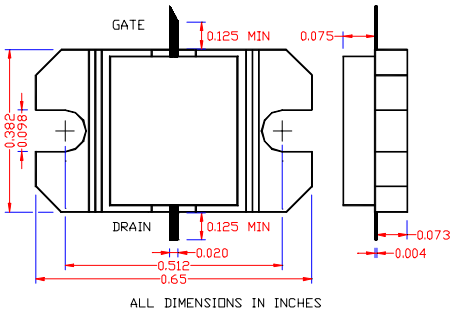
## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| Vds | Drain-Source Voltage | 12V | 8V |
| Vgs | Gate-Source Voltage | -8V | -3V |
| Ids | Drain Current | Idss | Idss |
| Igsf | Forward Gate Current | 180mA | 30mA |
| Pin | Input Power | 32dBm | @ 3dB Compression |
| Tch | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| Tstg | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| Pt | Total Power Dissipation | 17W | 14.2W |

# EIA/EIB1314-4P

## PRELIMINARY DATA SHEET
## 13.75-14.5GHz, 4W Internally Matched Power FET

- **13.75-14.5GHz BANDWIDTH AND INPUT/OUTPUT IMPEDANCE MATCHED TO 50 OHM**
- **EIA FEATURES HIGH PAE( 27% TYPICAL)**
- **EIB FEATURES HIGH IP3(49dBm TYPICAL)**
- **+36.5/+36dBm TYPICAL $P_{1dB}$ OUTPUT POWER FOR EIA/EIB**
- **8.5/7.5dB TYPICAL $G_{1dB}$ POWER GAIN FOR EIA/EIB**
- **NON-HERMETIC METAL FLANGE PACKAGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | EIA1314-4P | | | EIB1314-4P | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $P_{1dB}$ | Output Power at 1dB Compression f=13.75-14.5GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 35.5 | 36.5 | | 35 | 36 | | dBm |
| $G_{1dB}$ | Gain at 1dB Compression f=13.75-14.5GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 7.5 | 8.5 | | 6.5 | 7.5 | | dB |
| PAE | Power Added Efficiency at 1dB compression f=13.75-14.5GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 27 | | | 22 | | % |
| $Id_{1dB}$ | Drain Current at 1dB Compression | | 1760 | | | 1700 | | mA |
| $IP_3$ | Output 3$^{rd}$ Order Intercept Point f=13.75-14.5GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 43 | | | 49* | | dBm |
| Idss | Saturated Drain Current Vds=3V, Vgs=0V | 2200 | 2880 | 3400 | 2200 | 2720 | 3400 | mA |
| Gm | Transconductance Vds=3V, Vgs=0V | | 3000 | | | 1400 | | mS |
| $V_p$ | Pinch-off Voltage Vds=3V, Ids=24mA | | -1.0 | -2.5 | | -2.0 | -3.5 | V |
| BVgd | Drain Breakdown Voltage Igd=9.6mA | -13 | -15 | | | -15 | | V |
| $R_{th}$ | Thermal Resistance (Au-Sn Eutectic Attach) | | 4.5 | | | 4.5 | | $^{o}$C/W |

*Typical –45dBc IM3 at Pout=26dBm/Tone

## MAXIMUM RATINGS AT 25$^{O}$C

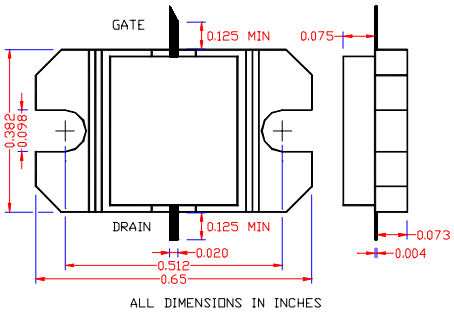
| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| Vds | Drain-Source Voltage | 12V | 8V |
| Vgs | Gate-Source Voltage | -8V | -3V |
| Ids | Drain Current | Idss | 3120mA |
| Igsf | Forward Gate Current | 360mA | 60mA |
| Pin | Input Power | 35dBm | @ 3dB Compression |
| Tch | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| Tstg | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| Pt | Total Power Dissipation | 30W | 25W |

# EIA/EIB1414-2P

## PRELIMINARY DATA SHEET

## 14.0-14.5GHz, 2W Internally Matched Power FET

- **14.0-14.5GHz BANDWIDTH AND INPUT/OUTPUT IMPEDANCE MATCHED TO 50 OHM**
- **EIA FEATURES HIGH PAE( 30% TYPICAL)**
- **EIB FEATURES HIGH IP3(46dBm TYPICAL)**
- **+33.5/+33.0dBm TYPICAL $P_{1dB}$ OUTPUT POWER FOR EIA/EIB**
- **9.0/8.0dB TYPICAL $G_{1dB}$ POWER GAIN FOR EIA/EIB**
- **NON-HERMETIC METAL FLANGE PACKAGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | EIA1414-2P | | | EIB1414-2P | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $P_{1dB}$ | Output Power at 1dB Compression f=14.0-14.5GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 33 | 33.5 | | 32 | 33.0 | | dBm |
| $G_{1dB}$ | Gain at 1dB Compression f=14.0-14.5GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 8 | 9 | | 7 | 8 | | dB |
| PAE | Power Added Efficiency at 1dB compression f=14.0-14.5GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 30 | | | 25 | | % |
| $Id_{1dB}$ | Drain Current at 1dB Compression | | 880 | | | 850 | | mA |
| $IP_3$ | Output 3rd Order Intercept Point f=14.0-14.5GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 40 | | | 46* | | dBm |
| Idss | Saturated Drain Current Vds=3V, Vgs=0V | 1100 | 1440 | 1700 | 1100 | 1360 | 1700 | mA |
| Gm | Transconductance Vds=3V, Vgs=0V | | 1500 | | | 700 | | mS |
| Vp | Pinch-off Voltage Vds=3V, Ids=12mA | | -1.0 | -2.5 | | -2.0 | -3.5 | V |
| BVgd | Drain Breakdown Voltage Igd=4.8mA | -13 | -15 | | | -15 | | V |
| Rth | Thermal Resistance (Au-Sn Eutectic Attach) | | 8 | | | 8 | | $^{o}$C/W |

*Typical –45dBc IM3 at Pout=23dBm/Tone

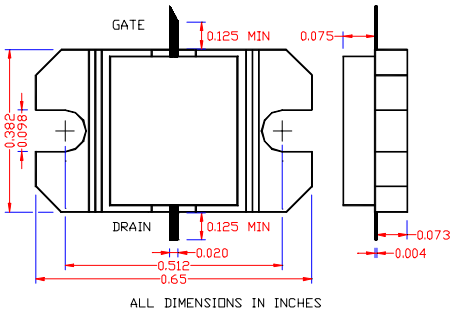
## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| Vds | Drain-Source Voltage | 12V | 8V |
| Vgs | Gate-Source Voltage | -8V | -3V |
| Ids | Drain Current | Idss | Idss |
| Igsf | Forward Gate Current | 180mA | 30mA |
| Pin | Input Power | 32dBm | @ 3dB Compression |
| Tch | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| Tstg | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| Pt | Total Power Dissipation | 17W | 14.2W |

# EIA/EIB1414-4P

## PRELIMINARY DATA SHEET
## 14.0-14.5GHz, 4W Internally Matched Power FET

- **14.0-14.5GHz BANDWIDTH AND INPUT/OUTPUT IMPEDANCE MATCHED TO 50 OHM**
- **EIA FEATURES HIGH PAE( 27% TYPICAL)**
- **EIB FEATURES HIGH IP3(49dBm TYPICAL)**
- **+36.5/+35.5dBm TYPICAL $P_{1dB}$ OUTPUT POWER FOR EIA/EIB**
- **8.5/7.5dB TYPICAL $G_{1dB}$ POWER GAIN FOR EIA/EIB**
- **NON-HERMETIC METAL FLANGE PACKAGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | EIA1414-4P | | | EIB1414-4P | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $P_{1dB}$ | Output Power at 1dB Compression f=14.0-14.5GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 35.5 | 36.5 | | 35 | 35.5 | | dBm |
| $G_{1dB}$ | Gain at 1dB Compression f=14.0-14.5GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 7.5 | 8.5 | | 6.5 | 7.5 | | dB |
| PAE | Power Added Efficiency at 1dB compression f=14.0-14.5GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 27 | | | 22 | | % |
| $Id_{1dB}$ | Drain Current at 1dB Compression | | 1760 | | | 1700 | | mA |
| $IP_3$ | Output 3rd Order Intercept Point f=14.0-14.5GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 43 | | | 49* | | dBm |
| Idss | Saturated Drain Current Vds=3V, Vgs=0V | 2200 | 2880 | 3400 | 2200 | 2720 | 3400 | mA |
| Gm | Transconductance Vds=3V, Vgs=0V | | 3000 | | | 1400 | | mS |
| $V_p$ | Pinch-off Voltage Vds=3V, Ids=24mA | | -1.0 | -2.5 | | -2.0 | -3.5 | V |
| BVgd | Drain Breakdown Voltage Igd=9.6mA | -13 | -15 | | | -15 | | V |
| $R_{th}$ | Thermal Resistance (Au-Sn Eutectic Attach) | | 4.5 | | | 4.5 | | $^{o}$C/W |

*Typical –45dBc IM3 at Pout=26dBm/Tone

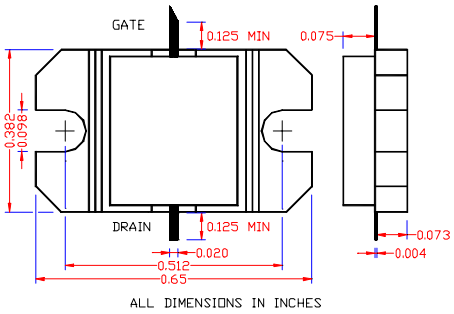
## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| Vds | Drain-Source Voltage | 12V | 8V |
| Vgs | Gate-Source Voltage | -8V | -3V |
| Ids | Drain Current | Idss | 3120mA |
| Igsf | Forward Gate Current | 360mA | 60mA |
| Pin | Input Power | 35dBm | @ 3dB Compression |
| Tch | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| Tstg | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| Pt | Total Power Dissipation | 30W | 25W |

# EIA/EIB1415-2P

## PRELIMINARY DATA SHEET
## 14.40-15.35GHz, 2W Internally Matched Power FET

- **14.40-15.35GHz BANDWIDTH AND INPUT/OUTPUT IMPEDANCE MATCHED TO 50 OHM**
- **EIA FEATURES HIGH PAE( 27% TYPICAL)**
- **EIB FEATURES HIGH IP3(46dBm TYPICAL)**
- **+33.0/+32.5dBm TYPICAL $P_{1dB}$ OUTPUT POWER FOR EIA/EIB**
- **8.5/7.5dB TYPICAL $G_{1dB}$ POWER GAIN FOR EIA/EIB**
- **NON-HERMETIC METAL FLANGE PACKAGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | EIA1415-2P | | | EIB1415-2P | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $P_{1dB}$ | Output Power at 1dB Compression f=14.40-15.35GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 32.5 | 33.0 | | 32 | 32.5 | | dBm |
| $G_{1dB}$ | Gain at 1dB Compression f=14.40-15.35GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 7.5 | 8.5 | | 6.5 | 7.5 | | dB |
| PAE | Power Added Efficiency at 1dB compression f=14.40-15.35GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 27 | | | 22 | | % |
| $Id_{1dB}$ | Drain Current at 1dB Compression | | 880 | | | 850 | | mA |
| $IP_3$ | Output 3rd Order Intercept Point f=14.40-15.35GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 40 | | | 46* | | dBm |
| Idss | Saturated Drain Current Vds=3V, Vgs=0V | 1100 | 1440 | 1700 | 1100 | 1360 | 1700 | mA |
| Gm | Transconductance Vds=3V, Vgs=0V | | 1500 | | | 700 | | mS |
| Vp | Pinch-off Voltage Vds=3V, Ids=12mA | | -1.0 | -2.5 | | -2.0 | -3.5 | V |
| BVgd | Drain Breakdown Voltage Igd=4.8mA | -13 | -15 | | | -15 | | V |
| Rth | Thermal Resistance (Au-Sn Eutectic Attach) | | 8 | | | 8 | | $^{o}$C/W |

*Typical –45dBc IM3 at Pout=23dBm/Tone

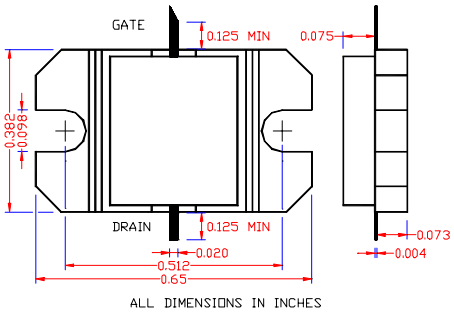
## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| Vds | Drain-Source Voltage | 12V | 8V |
| Vgs | Gate-Source Voltage | -8V | -3V |
| Ids | Drain Current | Idss | Idss |
| Igsf | Forward Gate Current | 180mA | 30mA |
| Pin | Input Power | 32dBm | @ 3dB Compression |
| Tch | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| Tstg | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| Pt | Total Power Dissipation | 17W | 14.2W |

# EIA/EIB1415-4P

## PRELIMINARY DATA SHEET
## 14.40-15.35GHz, 4W Internally Matched Power FET

- **14.40-15.35GHz BANDWIDTH AND INPUT/OUTPUT IMPEDANCE MATCHED TO 50 OHM**
- **EIA FEATURES HIGH PAE( 27% TYPICAL)**
- **EIB FEATURES HIGH IP3(49dBm TYPICAL)**
- **+36.0/+35.5dBm TYPICAL $P_{1dB}$ OUTPUT POWER FOR EIA/EIB**
- **8/7dB TYPICAL $G_{1dB}$ POWER GAIN FOR EIA/EIB**
- **NON-HERMETIC METAL FLANGE PACKAGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | EIA1415-4P | | | EIB1415-4P | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $P_{1dB}$ | Output Power at 1dB Compression f=14.40-15.35GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 35.5 | 36.0 | | 35 | 35.5 | | dBm |
| $G_{1dB}$ | Gain at 1dB Compression f=14.40-15.35GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 7 | 8 | | 6 | 7 | | dB |
| PAE | Power Added Efficiency at 1dB compression f=14.40-15.35GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 27 | | | 22 | | % |
| $Id_{1dB}$ | Drain Current at 1dB Compression | | 1760 | | | 1700 | | mA |
| $IP_3$ | Output 3rd Order Intercept Point f=14.40-15.35GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 43 | | | 49* | | dBm |
| Idss | Saturated Drain Current Vds=3V, Vgs=0V | 2200 | 2880 | 3400 | 2200 | 2720 | 3400 | mA |
| Gm | Transconductance Vds=3V, Vgs=0V | | 3000 | | | 1400 | | mS |
| Vp | Pinch-off Voltage Vds=3V, Ids=24mA | | -1.0 | -2.5 | | -2.0 | -3.5 | V |
| BVgd | Drain Breakdown Voltage Igd=9.6mA | -13 | -15 | | | -15 | | V |
| Rth | Thermal Resistance (Au-Sn Eutectic Attach) | | 4.5 | | | 4.5 | | $^{o}$C/W |

*Typical –45dBc IM3 at Pout=26dBm/Tone

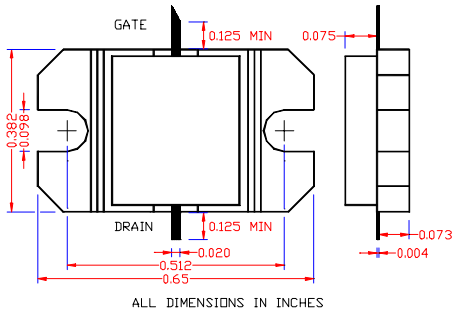
## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| Vds | Drain-Source Voltage | 12V | 8V |
| Vgs | Gate-Source Voltage | -8V | -3V |
| Ids | Drain Current | Idss | 3120mA |
| Igsf | Forward Gate Current | 360mA | 60mA |
| Pin | Input Power | 35dBm | @ 3dB Compression |
| Tch | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| Tstg | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| Pt | Total Power Dissipation | 30W | 25W |

# EIA1616-8P

## PRELIMINARY DATA SHEET
## 16.2-16.4GHz, 8W Internally Matched Power FET

- **16.2-16.4GHz BANDWIDTH AND INPUT/OUTPUT IMPEDANCE MATCHED TO 50 OHM**
- **HIGH PAE( 20% TYPICAL)**
- **+39dBm TYPICAL $P_{1dB}$ OUTPUT POWER**
- **6dB TYPICAL $G_{1dB}$ POWER GAIN**
- **NON-HERMETIC METAL FLANGE PACKAGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | EIA1616-8P | | | | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | | | | |
| $P_{1dB}$ | Output Power at 1dB Compression f=16.2-16.4GHz Vds=8V, Idsq=0.5 Idss | 38 | 39 | | | | | dBm |
| $G_{1dB}$ | Gain at 1dB Compression f=16.2-16.4GHz Vds=8V, Idsq=0.5 Idss | 5 | 6 | | | | | dB |
| PAE | Power Added Efficiency at 1dB compression f=16.2-16.4GHz Vds=8V, Idsq=0.5 Idss | | 20 | | | | | % |
| $Id_{1dB}$ | Drain Current at 1dB Compression | | 3520 | | | | | mA |
| $IP_3$ | Output 3rd Order Intercept Point f=16.2-16.4GHz Vds=8V, Idsq=0.5 Idss | | | | | | | dBm |
| Idss | Saturated Drain Current Vds=3V, Vgs=0V | 4400 | 5760 | 6800 | | | | mA |
| Gm | Transconductance Vds=3V, Vgs=0V | | 6000 | | | | | mS |
| Vp | Pinch-off Voltage Vds=3V, Ids=48mA | | -1.0 | -2.5 | | | | V |
| BVgd | Drain Breakdown Voltage Igd=19.2mA | -13 | -15 | | | | | V |
| Rth | Thermal Resistance (Au-Sn Eutectic Attach) | | 2.3 | | | | | $^{o}$C/W |

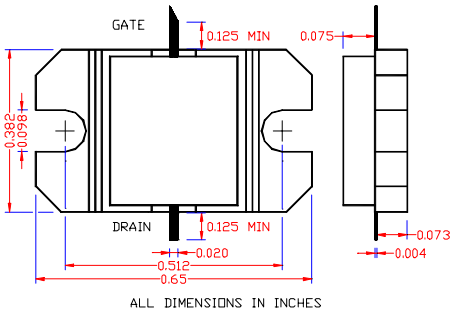
## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| Vds | Drain-Source Voltage | 12V | 8V |
| Vgs | Gate-Source Voltage | -8V | -3V |
| Ids | Drain Current | Idss | 6240mA |
| Igsf | Forward Gate Current | 720mA | 120mA |
| Pin | Input Power | 38dBm | @ 3dB Compression |
| Tch | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| Tstg | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| Pt | Total Power Dissipation | 60W | 50W |

# EIA/EIB1718A-1P

## PRELIMINARY DATA SHEET
## 17.3-18.1GHz, 1W Internally Matched Power FET

- **17.3-18.1GHz BANDWIDTH AND INPUT/OUTPUT IMPEDANCE MATCHED TO 50 OHM**
- **EIA FEATURES HIGH PAE( 25% TYPICAL)**
- **EIB FEATURES HIGH IP3(43dBm TYPICAL)**
- **+30.5/+29.5dBm TYPICAL $P_{1dB}$ OUTPUT POWER FOR EIA/EIB**
- **7.5/6.0dB TYPICAL $G_{1dB}$ POWER GAIN FOR EIA/EIB**
- **NON-HERMETIC METAL FLANGE PACKAGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | EIA1718A-1P | | | EIB1718A-1P | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $P_{1dB}$ | Output Power at 1dB Compression f=17.3-18.1GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 29 | 30.5 | | 29.0 | 29.5 | | dBm |
| $G_{1dB}$ | Gain at 1dB Compression f=17.3-18.1GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 6.5 | 7.5 | | 5.5 | 6.0 | | dB |
| PAE | Power Added Efficiency at 1dB compression f=17.3-18.1GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 30 | | | 25 | | % |
| $Id_{1dB}$ | Drain Current at 1dB Compression | | 440 | | | 425 | | mA |
| $IP_3$ | Output 3rd Order Intercept Point f=17.3-18.1GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 37 | | | 43* | | dBm |
| Idss | Saturated Drain Current Vds=3V, Vgs=0V | 550 | 720 | 850 | 550 | 720 | 850 | mA |
| Gm | Transconductance Vds=3V, Vgs=0V | | 760 | | | 360 | | mS |
| Vp | Pinch-off Voltage Vds=3V, Ids=6mA | | -1.0 | -2.5 | | -2.0 | -3.5 | V |
| BVgd | Drain Breakdown Voltage Igd=2.4mA | -13 | -15 | | | -15 | | V |
| Rth | Thermal Resistance (Au-Sn Eutectic Attach) | | 16 | | | 16 | | $^{o}$C/W |

*Typical –45dBc IM3 at Pout=20dBm/Tone

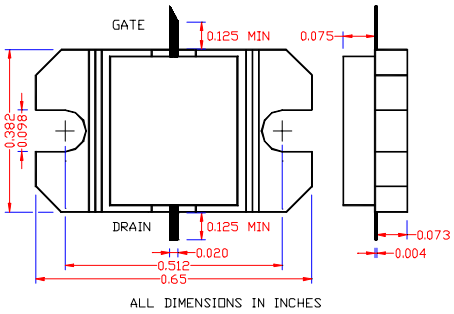
## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| Vds | Drain-Source Voltage | 12V | 8V |
| Vgs | Gate-Source Voltage | -8V | -3V |
| Ids | Drain Current | Idss | Idss |
| Igsf | Forward Gate Current | 90mA | 15mA |
| Pin | Input Power | 32dBm | @ 3dB Compression |
| Tch | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| Tstg | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| Pt | Total Power Dissipation | 8.5 | 7.1W |

# EIA/EIB1718A-2P

## PRELIMINARY DATA SHEET
## 17.3-18.1GHz, 2W Internally Matched Power FET

- **17.3-18.1GHz BANDWIDTH AND INPUT/OUTPUT IMPEDANCE MATCHED TO 50 OHM**
- **EIA FEATURES HIGH PAE( 25% TYPICAL)**
- **EIB FEATURES HIGH IP3(46dBm TYPICAL)**
- **+33.5/+32.5dBm TYPICAL $P_{1dB}$ OUTPUT POWER FOR EIA/EIB**
- **7.5/5.5dB TYPICAL $G_{1dB}$ POWER GAIN FOR EIA/EIB**
- **NON-HERMETIC METAL FLANGE PACKAGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | EIA1718A-2P | | | EIB1718A-2P | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $P_{1dB}$ | Output Power at 1dB Compression f=17.3-18.1GHz<br>Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 32.5 | 33.5 | | 32.0 | 32.5 | | dBm |
| $G_{1dB}$ | Gain at 1dB Compression f=17.3-18.1GHz<br>Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 6.5 | 7.5 | | 5.0 | 5.5 | | dB |
| PAE | Power Added Efficiency at 1dB compression<br>f=17.3-18.1GHz<br>Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 25 | | | 20 | | % |
| $Id_{1dB}$ | Drain Current at 1dB Compression | | 880 | | | 850 | | mA |
| $IP_3$ | Output 3rd Order Intercept Point f=17.3-18.1GHz<br>Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 40 | | | 46* | | dBm |
| Idss | Saturated Drain Current Vds=3V, Vgs=0V | 1100 | 1440 | 1700 | 1100 | 1360 | 1700 | mA |
| Gm | Transconductance Vds=3V, Vgs=0V | | 1500 | | | 700 | | mS |
| $V_p$ | Pinch-off Voltage Vds=3V, Ids=12mA | | -1.0 | -2.5 | | -2.0 | -3.5 | V |
| BVgd | Drain Breakdown Voltage Igd=4.8mA | -13 | -15 | | | -15 | | V |
| $R_{th}$ | Thermal Resistance (Au-Sn Eutectic Attach) | | 8 | | | 8 | | $^{o}$C/W |

*Typical –45dBc IM3 at Pout=23dBm/Tone

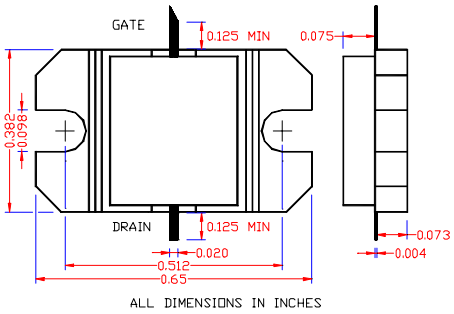
## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| Vds | Drain-Source Voltage | 12V | 8V |
| Vgs | Gate-Source Voltage | -8V | -3V |
| Ids | Drain Current | Idss | Idss |
| Igsf | Forward Gate Current | 180mA | 30mA |
| Pin | Input Power | 32dBm | @ 3dB Compression |
| Tch | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| Tstg | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| Pt | Total Power Dissipation | 17W | 14.2W |

# EIA/EIB1718-1P

## PRELIMINARY DATA SHEET
## 17.7-18.7GHz, 1W Internally Matched Power FET

- **17.7-18.7GHz BANDWIDTH AND INPUT/OUTPUT IMPEDANCE MATCHED TO 50 OHM**
- **EIA FEATURES HIGH PAE( 25% TYPICAL)**
- **EIB FEATURES HIGH IP3(43dBm TYPICAL)**
- **+30.0/+29.5dBm TYPICAL $P_{1dB}$ OUTPUT POWER FOR EIA/EIB**
- **6.5/5.5dB TYPICAL $G_{1dB}$ POWER GAIN FOR EIA/EIB**
- **NON-HERMETIC METAL FLANGE PACKAGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | EIA1718-1P | | | EIB1718-1P | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $P_{1dB}$ | Output Power at 1dB Compression f=17.7-18.7GHz<br>Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 29 | 30.0 | | 29.0 | 29.5 | | dBm |
| $G_{1dB}$ | Gain at 1dB Compression f=17.7-18.7GHz<br>Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 6.0 | 6.5 | | 5.0 | 5.5 | | dB |
| PAE | Power Added Efficiency at 1dB compression<br>f=17.7-18.7GHz<br>Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 25 | | | 20 | | % |
| $Id_{1dB}$ | Drain Current at 1dB Compression | | 440 | | | 425 | | mA |
| $IP_3$ | Output 3rd Order Intercept Point f=17.7-18.7GHz<br>Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 37 | | | 43* | | dBm |
| Idss | Saturated Drain Current Vds=3V, Vgs=0V | 550 | 720 | 850 | 550 | 720 | 850 | mA |
| Gm | Transconductance Vds=3V, Vgs=0V | | 760 | | | 360 | | mS |
| $V_p$ | Pinch-off Voltage Vds=3V, Ids=6mA | | -1.0 | -2.5 | | -2.0 | -3.5 | V |
| BVgd | Drain Breakdown Voltage Igd=2.4mA | -13 | -15 | | | -15 | | V |
| $R_{th}$ | Thermal Resistance (Au-Sn Eutectic Attach) | | 16 | | | 16 | | $^{o}$C/W |

*Typical –45dBc IM3 at Pout=20dBm/Tone

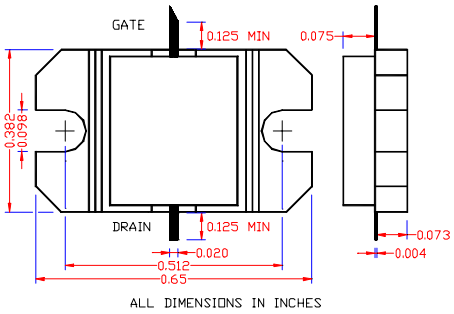
## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| Vds | Drain-Source Voltage | 12V | 8V |
| Vgs | Gate-Source Voltage | -8V | -3V |
| Ids | Drain Current | Idss | Idss |
| Igsf | Forward Gate Current | 90mA | 15mA |
| Pin | Input Power | 32dBm | @ 3dB Compression |
| Tch | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| Tstg | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| Pt | Total Power Dissipation | 8.5W | 7.1W |

# EIA/EIB1718-2P

## PRELIMINARY DATA SHEET
## 17.7-18.7GHz, 2W Internally Matched Power FET

- **17.7-18.7GHz BANDWIDTH AND INPUT/OUTPUT IMPEDANCE MATCHED TO 50 OHM**
- **EIA FEATURES HIGH PAE( 25% TYPICAL)**
- **EIB FEATURES HIGH IP3(46dBm TYPICAL)**
- **+33.0/+32.5dBm TYPICAL $P_{1dB}$ OUTPUT POWER FOR EIA/EIB**
- **6.0/5.0dB TYPICAL $G_{1dB}$ POWER GAIN FOR EIA/EIB**
- **NON-HERMETIC METAL FLANGE PACKAGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | EIA1718-2P | | | EIB1718-2P | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $P_{1dB}$ | Output Power at 1dB Compression f=17.7-18.7GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 32.0 | 33.0 | | 32.0 | 32.5 | | dBm |
| $G_{1dB}$ | Gain at 1dB Compression f=17.7-18.7GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 5.5 | 6.0 | | 4.5 | 5.0 | | dB |
| PAE | Power Added Efficiency at 1dB compression f=17.7-18.7GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 25 | | | 20 | | % |
| $Id_{1dB}$ | Drain Current at 1dB Compression | | 880 | | | 850 | | mA |
| $IP_3$ | Output 3rd Order Intercept Point f=17.7-18.7GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 40 | | | 46* | | dBm |
| Idss | Saturated Drain Current Vds=3V, Vgs=0V | 1100 | 1440 | 1700 | 1100 | 1360 | 1700 | mA |
| Gm | Transconductance Vds=3V, Vgs=0V | | 1500 | | | 700 | | mS |
| $V_p$ | Pinch-off Voltage Vds=3V, Ids=12mA | | -1.0 | -2.5 | | -2.0 | -3.5 | V |
| BVgd | Drain Breakdown Voltage Igd=4.8mA | -13 | -15 | | | -15 | | V |
| $R_{th}$ | Thermal Resistance (Au-Sn Eutectic Attach) | | 8 | | | 8 | | $^{o}$C/W |

*Typical –45dBc IM3 at Pout=23dBm/Tone

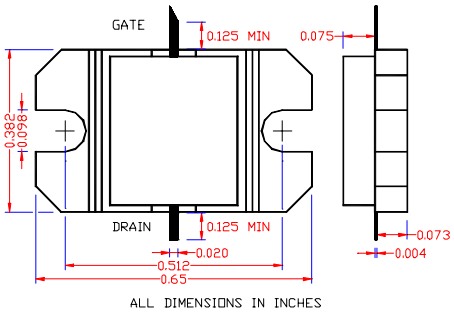
## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| Vds | Drain-Source Voltage | 12V | 8V |
| Vgs | Gate-Source Voltage | -8V | -3V |
| Ids | Drain Current | Idss | Idss |
| Igsf | Forward Gate Current | 180mA | 30mA |
| Pin | Input Power | 32dBm | @ 3dB Compression |
| Tch | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| Tstg | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| Pt | Total Power Dissipation | 17W | 14.2W |

# EIA/EIB1818-1P

## PRELIMINARY DATA SHEET
## 18.15-18.75GHz, 1W Internally Matched Power FET

- **18.15-18.75GHz BANDWIDTH AND INPUT/OUTPUT IMPEDANCE MATCHED TO 50 OHM**
- **EIA FEATURES HIGH PAE( 25% TYPICAL)**
- **EIB FEATURES HIGH IP3(43dBm TYPICAL)**
- **+30.0/+29.5dBm TYPICAL $P_{1dB}$ OUTPUT POWER FOR EIA/EIB**
- **6.5/5.5dB TYPICAL $G_{1dB}$ POWER GAIN FOR EIA/EIB**
- **NON-HERMETIC METAL FLANGE PACKAGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | EIA1818-1P | | | EIB1818-1P | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $P_{1dB}$ | Output Power at 1dB Compression f=18.15-18.75GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 29 | 30.0 | | 29.0 | 29.5 | | dBm |
| $G_{1dB}$ | Gain at 1dB Compression f=18.15-18.75GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 6.0 | 6.5 | | 5.0 | 5.5 | | dB |
| PAE | Power Added Efficiency at 1dB compression f=18.15-18.75GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 25 | | | 20 | | % |
| $Id_{1dB}$ | Drain Current at 1dB Compression | | 440 | | | 425 | | mA |
| $IP_3$ | Output 3rd Order Intercept Point f=18.15-18.75GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 37 | | | 43* | | dBm |
| Idss | Saturated Drain Current Vds=3V, Vgs=0V | 550 | 720 | 850 | 550 | 720 | 850 | mA |
| Gm | Transconductance Vds=3V, Vgs=0V | | 760 | | | 360 | | mS |
| Vp | Pinch-off Voltage Vds=3V, Ids=6mA | | -1.0 | -2.5 | | -2.0 | -3.5 | V |
| BVgd | Drain Breakdown Voltage Igd=2.4mA | -13 | -15 | | | -15 | | V |
| Rth | Thermal Resistance (Au-Sn Eutectic Attach) | | 16 | | | 16 | | $^{o}$C/W |

*Typical –45dBc IM3 at Pout=20dBm/Tone

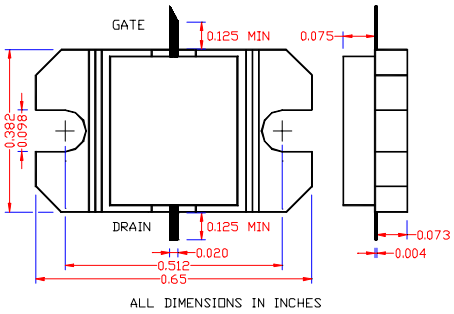
## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| Vds | Drain-Source Voltage | 12V | 8V |
| Vgs | Gate-Source Voltage | -8V | -3V |
| Ids | Drain Current | Idss | Idss |
| Igsf | Forward Gate Current | 90mA | 15mA |
| Pin | Input Power | 32dBm | @ 3dB Compression |
| Tch | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| Tstg | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| Pt | Total Power Dissipation | 8.5W | 7.1W |

# EIA/EIB1818-2P

## PRELIMINARY DATA SHEET
## 18.15-18.75GHz, 2W Internally Matched Power FET

- **18.15-18.75GHz BANDWIDTH AND INPUT/OUTPUT IMPEDANCE MATCHED TO 50 OHM**
- **EIA FEATURES HIGH PAE( 25% TYPICAL)**
- **EIB FEATURES HIGH IP3(46dBm TYPICAL)**
- **+33.0/+32.5dBm TYPICAL $P_{1dB}$ OUTPUT POWER FOR EIA/EIB**
- **6.0/5.0dB TYPICAL $G_{1dB}$ POWER GAIN FOR EIA/EIB**
- **NON-HERMETIC METAL FLANGE PACKAGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | EIA1818-2P | | | EIB1818-2P | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $P_{1dB}$ | Output Power at 1dB Compression f=18.15-18.75GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 32.0 | 33.0 | | 32.0 | 32.5 | | dBm |
| $G_{1dB}$ | Gain at 1dB Compression f=18.15-18.75GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 5.5 | 6.0 | | 4.5 | 5.0 | | dB |
| PAE | Power Added Efficiency at 1dB compression f=18.15-18.75GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 25 | | | 20 | | % |
| $Id_{1dB}$ | Drain Current at 1dB Compression | | 880 | | | 850 | | mA |
| $IP_3$ | Output 3rd Order Intercept Point f=18.15-18.75GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 40 | | | 46* | | dBm |
| Idss | Saturated Drain Current Vds=3V, Vgs=0V | 1100 | 1440 | 1700 | 1100 | 1360 | 1700 | mA |
| Gm | Transconductance Vds=3V, Vgs=0V | | 1500 | | | 700 | | mS |
| Vp | Pinch-off Voltage Vds=3V, Ids=12mA | | -1.0 | -2.5 | | -2.0 | -3.5 | V |
| BVgd | Drain Breakdown Voltage Igd=4.8mA | -13 | -15 | | | -15 | | V |
| Rth | Thermal Resistance (Au-Sn Eutectic Attach) | | 8 | | | 8 | | $^{o}$C/W |

*Typical –45dBc IM3 at Pout=23dBm/Tone

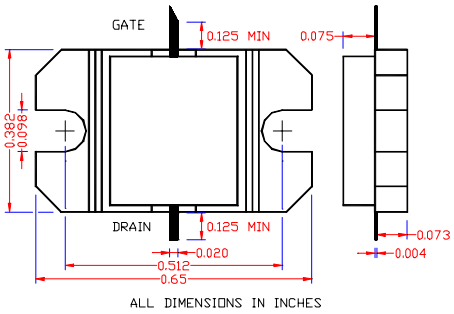
## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| Vds | Drain-Source Voltage | 12V | 8V |
| Vgs | Gate-Source Voltage | -8V | -3V |
| Ids | Drain Current | Idss | Idss |
| Igsf | Forward Gate Current | 180mA | 30mA |
| Pin | Input Power | 32dBm | @ 3dB Compression |
| Tch | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| Tstg | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| Pt | Total Power Dissipation | 17W | 14.2W |

# EIA/EIB1819-1P

## PRELIMINARY DATA SHEET
## 18.7-19.7GHz, 1W Internally Matched Power FET

- **18.7-19.7GHz BANDWIDTH AND INPUT/OUTPUT IMPEDANCE MATCHED TO 50 OHM**
- **EIA FEATURES HIGH PAE( 25% TYPICAL)**
- **EIB FEATURES HIGH IP3(43dBm TYPICAL)**
- **+30.0/+29.5dBm TYPICAL $P_{1dB}$ OUTPUT POWER FOR EIA/EIB**
- **6.5/5.5dB TYPICAL $G_{1dB}$ POWER GAIN FOR EIA/EIB**
- **NON-HERMETIC METAL FLANGE PACKAGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | EIA1819-1P | | | EIB1819-1P | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $P_{1dB}$ | Output Power at 1dB Compression f=18.7-19.7GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 29 | 30.0 | | 29.0 | 29.5 | | dBm |
| $G_{1dB}$ | Gain at 1dB Compression f=18.7-19.7GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 6.0 | 6.5 | | 5.0 | 5.5 | | dB |
| PAE | Power Added Efficiency at 1dB compression f=18.7-19.7GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 25 | | | 20 | | % |
| $Id_{1dB}$ | Drain Current at 1dB Compression | | 440 | | | 425 | | mA |
| $IP_3$ | Output 3rd Order Intercept Point f=18.7-19.7GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 37 | | | 43* | | dBm |
| Idss | Saturated Drain Current Vds=3V, Vgs=0V | 550 | 720 | 850 | 550 | 720 | 850 | mA |
| Gm | Transconductance Vds=3V, Vgs=0V | | 760 | | | 360 | | mS |
| Vp | Pinch-off Voltage Vds=3V, Ids=6mA | | -1.0 | -2.5 | | -2.0 | -3.5 | V |
| BVgd | Drain Breakdown Voltage Igd=2.4mA | -13 | -15 | | | -15 | | V |
| Rth | Thermal Resistance (Au-Sn Eutectic Attach) | | 16 | | | 16 | | $^{o}$C/W |

*Typical –45dBc IM3 at Pout=20dBm/Tone

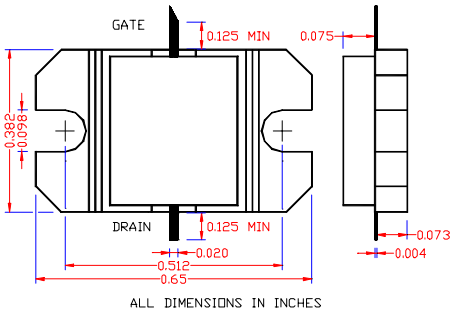
## MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| Vds | Drain-Source Voltage | 12V | 8V |
| Vgs | Gate-Source Voltage | -8V | -3V |
| Ids | Drain Current | Idss | Idss |
| Igsf | Forward Gate Current | 90mA | 15mA |
| Pin | Input Power | 32dBm | @ 3dB Compression |
| Tch | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| Tstg | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| Pt | Total Power Dissipation | 8.5W | 7.1W |

# EIA/EIB1819-2P

## PRELIMINARY DATA SHEET
## 18.7-19.7GHz, 2W Internally Matched Power FET

- **18.7-19.7GHz BANDWIDTH AND INPUT/OUTPUT IMPEDANCE MATCHED TO 50 OHM**
- **EIA FEATURES HIGH PAE( 25% TYPICAL)**
- **EIB FEATURES HIGH IP3(46dBm TYPICAL)**
- **+33.0/+32.5dBm TYPICAL $P_{1dB}$ OUTPUT POWER FOR EIA/EIB**
- **6.0/5.0dB TYPICAL $G_{1dB}$ POWER GAIN FOR EIA/EIB**
- **NON-HERMETIC METAL FLANGE PACKAGE**




## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 $^{O}$C)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | EIA1819-2P | | | EIB1819-2P | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $P_{1dB}$ | Output Power at 1dB Compression f=18.7-19.7GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 32.0 | 33.0 | | 32.0 | 32.5 | | dBm |
| $G_{1dB}$ | Gain at 1dB Compression f=18.7-19.7GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | 5.5 | 6.0 | | 4.5 | 5.0 | | dB |
| PAE | Power Added Efficiency at 1dB compression f=18.7-19.7GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 25 | | | 20 | | % |
| $Id_{1dB}$ | Drain Current at 1dB Compression | | 880 | | | 850 | | mA |
| $IP_3$ | Output 3rd Order Intercept Point f=18.7-19.7GHz Vds=8V, Idsq=0.5 Idss(EIA), 0.6Idss(EIB) | | 40 | | | 46* | | dBm |
| Idss | Saturated Drain Current Vds=3V, Vgs=0V | 1100 | 1440 | 1700 | 1100 | 1360 | 1700 | mA |
| Gm | Transconductance Vds=3V, Vgs=0V | | 1500 | | | 700 | | mS |
| Vp | Pinch-off Voltage Vds=3V, Ids=12mA | | -1.0 | -2.5 | | -2.0 | -3.5 | V |
| BVgd | Drain Breakdown Voltage Igd=4.8mA | -13 | -15 | | | -15 | | V |
| Rth | Thermal Resistance (Au-Sn Eutectic Attach) | | 8 | | | 8 | | $^{o}$C/W |

*Typical –45dBc IM3 at Pout=23dBm/Tone

## MAXIMUM RATINGS AT 25$^{O}$C

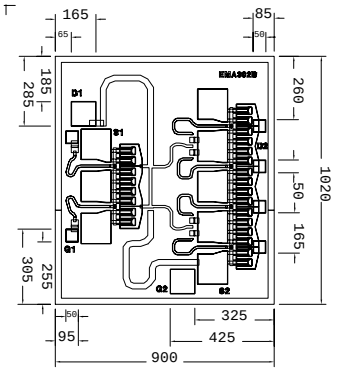
| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| Vds | Drain-Source Voltage | 12V | 8V |
| Vgs | Gate-Source Voltage | -8V | -3V |
| Ids | Drain Current | Idss | Idss |
| Igsf | Forward Gate Current | 180mA | 30mA |
| Pin | Input Power | 32dBm | @ 3dB Compression |
| Tch | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| Tstg | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| Pt | Total Power Dissipation | 17W | 14.2W |

# EMA302B

**PRELIMINARY DATA SHEET**

## 22-26 GHz Medium Power MMIC

- **22-26 GHz BANDWIDTH**
- **+28.0 dBm TYPICAL OUTPUT POWER**
- **15 dB ± 1.5 dB TYPICAL POWER GAIN**
- **TWO STAGE, INPUT PARTIALLY MATCHED, OUTPUT MATCH OFF CHIP**
- **0.3 MICRON RECESSED "MUSHROOM" GATE**
- **$Si_3N_4$ PASSIVATION**
- **ADVANCED EPITAXIAL HETEROJUNCTION PROFILE PROVIDES EXTRA HIGH POWER EFFICIENCY, AND HIGH RELIABILITY**




## ELECTRICAL CHARACTERISTICS[1] ($T_a$ = 25 °C)

| SYMBOL | PARAMETERS/TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| **F** | Operating Frequency Range | 22 | | 26 | GHz |
| **$P_{1dB}$** | Ouput Power at 1dB Gain Compression | | 28 | | dBm |
| **Gss** | Small Signal Gain | | 15 | | dB |
| **PAE** | Power added efficiency at 1dB gain Compression | | 24 | | % |
| **VSWR in** | Input VSWR | | 2.5:1 | | |
| **VSWR out** | Output VSWR | | 3.0:1 | | |
| **Ids1/Ids2** | Drain Supply Currents for 1st & 2nd Stages | | 120/240 | | mA |
| **Vdd** | Power Supply Voltage | | 6 | 8 | V |
| **Rth** | Thermal Resistance (Au-Sn Eutectic Attach) | | 18 | | °C/W |

Note: 1. Specifications are based on device mounted in application circuit.
D.C. characteristics for 1st & 2nd FETs follow those of EPA080A and EPA160A, respectively.

## MAXIMUM RATINGS AT 25°C

| SYMBOLS | PARAMETERS | ABSOLUTE[2] | CONTINUOUS[3] |
|---|---|---|---|
| **Vds** | Drain-Source Voltage | 12V | 8V |
| **Vgs** | Gate-Source Voltage | -8V | -3V |
| **Ids1/Ids2** | Drain Current | Idss | 260 mA / 520 mA |
| **Igsf1/Igsf2** | Forward Gate Current | 40 mA / 80 mA | 7mA / 14 mA |
| **Pin** | Input Power | 25dBm | @3dB Compression |
| **Tch** | Channel Temperature | 175°C | 150°C |
| **Tstg** | Storage Temperature | -65/175°C | -65/150°C |
| **Pt** | Total Power Dissipation | 7.5 W | 6.3 W |

**PRELIMINARY DATA SHEET**

## 22-26 GHz Medium Power MMIC

### S-PARAMETERS

**(CHIP WITHOUT EXTERNAL MATCHING CIRCUIT)**

**8V, 1/2 Idss**

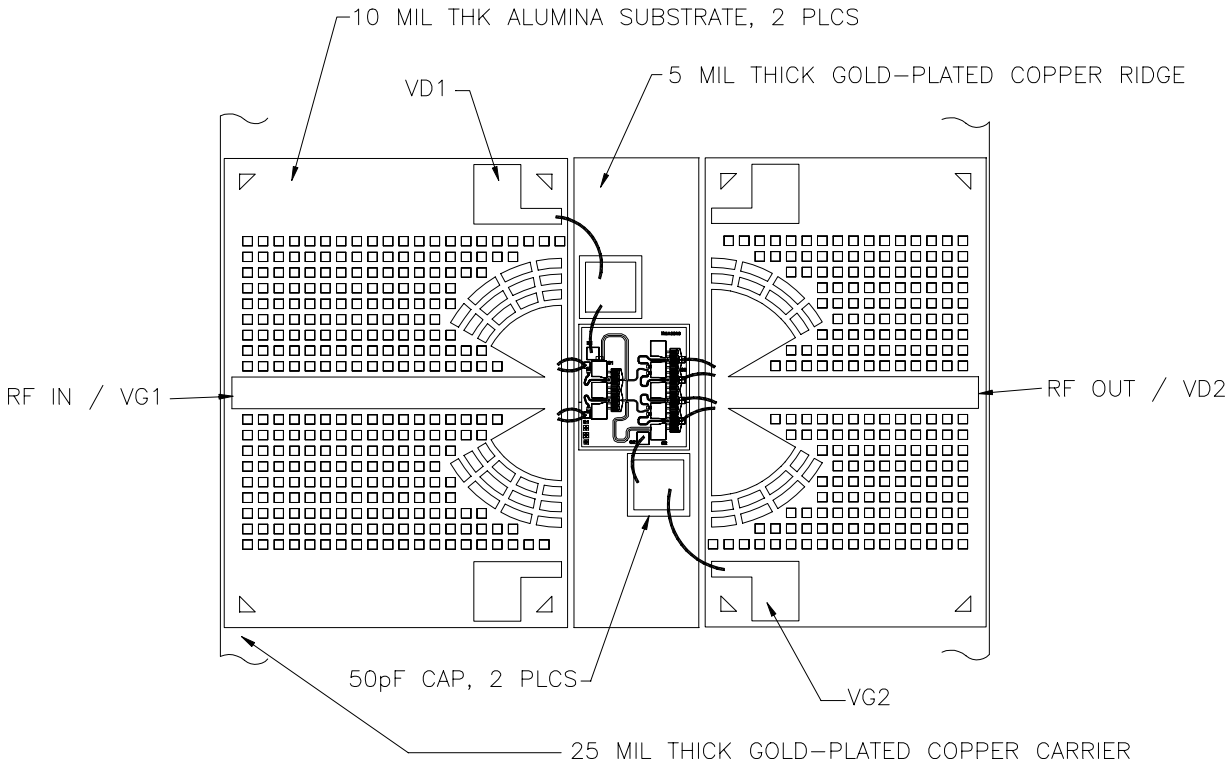
| FREQ | --- S11 --- | | --- S21 --- | | --- S12 --- | | --- S22 --- | |
|---|---|---|---|---|---|---|---|---|
| (GHz) | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 1 | 0.955 | -72.5 | 0.396 | -138.9 | 0.000 | 177.5 | 0.019 | -164.0 |
| 2 | 0.959 | -110.2 | 6.670 | 107.4 | 0.001 | 73.5 | 0.155 | -66.5 |
| 3 | 1.046 | -126.7 | 10.324 | -37.5 | 0.001 | 172.1 | 0.307 | -100.9 |
| 4 | 1.061 | -145.3 | 6.669 | -15.9 | 0.004 | 165.1 | 0.346 | -102.5 |
| 5 | 1.075 | -156.4 | 15.100 | -72.7 | 0.009 | 143.1 | 0.686 | -101.5 |
| 6 | 0.916 | -164.1 | 11.585 | -154.3 | 0.010 | 100.1 | 0.754 | -147.9 |
| 7 | 0.913 | -163.5 | 5.883 | 172.1 | 0.007 | 95.3 | 0.536 | -152.7 |
| 8 | 0.925 | -164.5 | 3.726 | 154.9 | 0.007 | 103.4 | 0.484 | -147.5 |
| 9 | 0.926 | -165.4 | 2.660 | 142.4 | 0.009 | 108.3 | 0.484 | -143.2 |
| 10 | 0.933 | -165.4 | 2.109 | 133.0 | 0.005 | 100.8 | 0.517 | -139.2 |
| 11 | 0.939 | -165.7 | 1.747 | 123.3 | 0.006 | 115.3 | 0.543 | -138.2 |
| 12 | 0.938 | -164.6 | 1.520 | 114.7 | 0.007 | 117.3 | 0.571 | -139.3 |
| 13 | 0.936 | -164.4 | 1.372 | 106.1 | 0.008 | 131.5 | 0.598 | -140.6 |
| 14 | 0.935 | -165.7 | 1.278 | 97.5 | 0.008 | 121.1 | 0.631 | -141.3 |
| 15 | 0.934 | -167.8 | 1.229 | 88.1 | 0.008 | 120.0 | 0.649 | -142.0 |
| 16 | 0.933 | -168.4 | 1.249 | 79.2 | 0.008 | 104.3 | 0.679 | -143.5 |
| 17 | 0.924 | -169.2 | 1.272 | 68.3 | 0.007 | 111.8 | 0.695 | -147.6 |
| 18 | 0.910 | -172.3 | 1.358 | 56.3 | 0.010 | 84.6 | 0.743 | -150.3 |
| 19 | 0.895 | 179.7 | 1.486 | 43.5 | 0.006 | 91.2 | 0.767 | -147.5 |
| 20 | 0.868 | 171.0 | 1.688 | 28.1 | 0.006 | 87.5 | 0.797 | -145.3 |
| 21 | 0.809 | 171.2 | 2.027 | 10.4 | 0.006 | 89.1 | 0.835 | -154.2 |
| 22 | 0.713 | 164.0 | 2.606 | -13.9 | 0.004 | 73.0 | 0.881 | -156.3 |
| 22.5 | 0.613 | 162.1 | 3.032 | -30.7 | 0.004 | 63.4 | 0.895 | -159.4 |
| 23 | 0.473 | 164.8 | 3.459 | -51.3 | 0.002 | 66.1 | 0.923 | -162.8 |
| 23.5 | 0.347 | -176.7 | 3.728 | -76.5 | 0.003 | 121.7 | 0.926 | -166.6 |
| 24 | 0.400 | -147.1 | 3.618 | -103.8 | 0.007 | 133.1 | 0.922 | -169.1 |
| 24.5 | 0.558 | -139.4 | 3.175 | -129.8 | 0.009 | 122.1 | 0.897 | -170.7 |
| 25 | 0.684 | -141.3 | 2.647 | -152.3 | 0.012 | 114.1 | 0.874 | -169.7 |
| 25.5 | 0.764 | -145.0 | 2.135 | -171.9 | 0.012 | 99.9 | 0.861 | -169.7 |
| 26 | 0.810 | -147.9 | 1.708 | 170.0 | 0.014 | 90.0 | 0.879 | -169.4 |
| 27 | 0.891 | -153.0 | 1.142 | 141.0 | 0.014 | 85.5 | 0.870 | -165.1 |
| 28 | 0.929 | -156.3 | 0.750 | 113.7 | 0.016 | 84.5 | 0.851 | -163.6 |
| 29 | 0.956 | -156.5 | 0.502 | 91.7 | 0.019 | 81.6 | 0.839 | -162.0 |
| 30 | 0.968 | -155.1 | 0.338 | 78.3 | 0.026 | 64.0 | 0.852 | -163.2 |
| 31 | 0.975 | -152.8 | 0.228 | 52.3 | 0.018 | 49.3 | 0.846 | -160.7 |
| 32 | 0.981 | -153.0 | 0.157 | 31.8 | 0.013 | 54.7 | 0.856 | -158.2 |
| 33 | 0.983 | -154.1 | 0.118 | 14.7 | 0.012 | 57.3 | 0.902 | -157.0 |
| 34 | 0.988 | -153.9 | 0.113 | -20.8 | 0.017 | 48.1 | 0.772 | -160.7 |
| 35 | 0.983 | -154.0 | 0.035 | -18.1 | 0.011 | 78.3 | 0.879 | -157.1 |
| 36 | 0.988 | -155.5 | 0.025 | -38.4 | 0.007 | 85.2 | 0.881 | -157.3 |
| 37 | 0.997 | -158.4 | 0.012 | -53.2 | 0.007 | 107.8 | 0.867 | -158.0 |
| 38 | 1.007 | -157.6 | 0.006 | 112.6 | 0.009 | 109.7 | 0.862 | -163.6 |
| 39 | 1.004 | -153.8 | 0.002 | 165.9 | 0.008 | 89.1 | 0.851 | -172.9 |
| 40 | 0.981 | -154.9 | 0.015 | -101.3 | 0.008 | 56.0 | 0.871 | -177.9 |

Note: The data included 0.7 mils diameter au bonding wires:
2 input wires, 10 mils each; 4 output wires, 12 mils each.

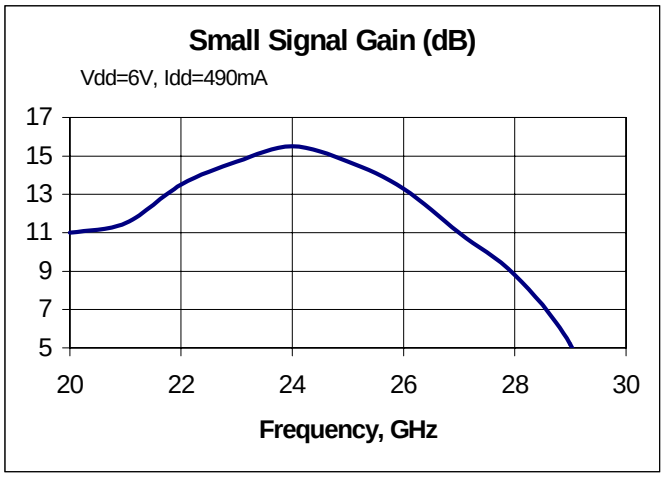
**PRELIMINARY DATA SHEET**

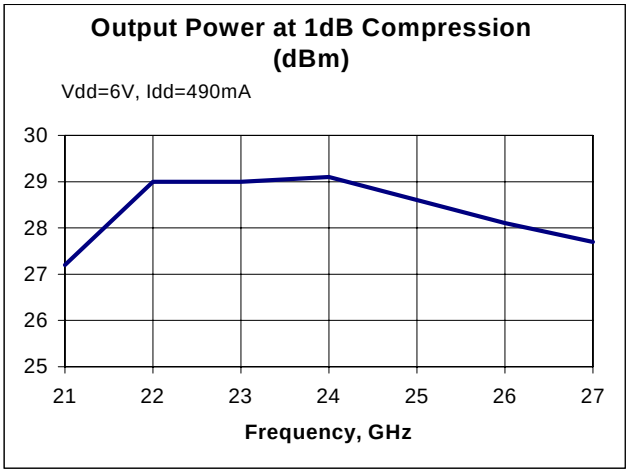
**22-26 GHz Medium Power MMIC**

## TYPICAL APPLICATION CIRCUIT




## TYPICAL APPLICATION PERFORMANCE CHARACTERISTICS



## APPLICATION HINTS

The device should be die attached with Gold-Tin eutectic. Epoxy die attach is not recommended. Thermocompression bonding of .7 mil to 1 mil diameter gold wire is recommended.

The EMA302B is partially input matched. Some input match and the output match must be provided off-chip. This allows the use of optimal materials for matching networks to minimize loss, and provides for flexibility to optimize the match for the application frequency. Typically the bond wire inductance will form part of the matching network, so bond wire lengths must be controlled and repeatable.

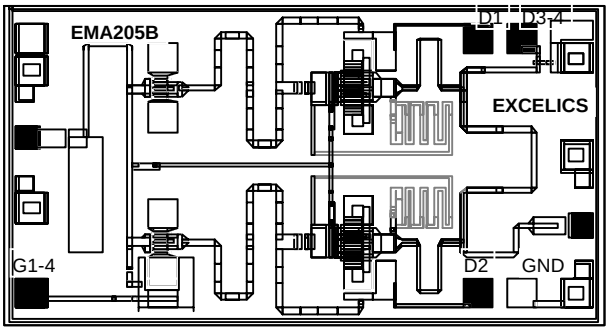
The sources of the transistors are directly via-hole grounded. A negative voltage is required to bias the gates of the transistors. The gate voltage for the input stage must be provided at the RF input bonding pad, and the drain current for the output stage must be provided through the output bonding pad. Appropriate bias networks must be provided off chip. Typically a quarter wave microstrip line or bond wire will suffice. Adequate DC blocking and bypassing must also be provided. A series resistance of about 50 ohms is recommended in the gate DC bias circuit of each FET to limit gate current and suppress low frequency oscillations. The drain bias circuits should be well bypassed down to MHz frequencies to prevent oscillations. Some isolation should be provided between the two drain circuits at GHz frequencies to prevent oscillations. Although there is some bypassing on chip of the VD1 and VG2 terminals, additional bypass capacitors, placed close to the chip, are recommended.

The gate and drain power supplies should be sequenced to turn on the negative gate voltage before the positive drain voltage is applied. Turning on the full drain voltage before the gate voltage can cause excessive power dissipation or destructive oscillations.

# EMA205B

**TENTATIVE DATA SHEET**

## 9-16 GHz Low Noise MMIC




### FEATURES

- **9-16 GHz BANDWIDTH**
- **+18.0 dBm TYPICAL OUTPUT POWER**
- **14 dB ± 1.5 dB TYPICAL POWER GAIN**
- **TWO SECTION, DISTRIBUTED AMPLIFIER**
- **DUAL BIAS SUPPLY**
- **0.3 MICRON RECESSED "MUSHROOM" GATE**
- **$Si_3N_4$ PASSIVATION**
- **ADVANCED EPITAXIAL HETEROJUNCTION PROFILE PROVIDES EXTRA HIGH POWER EFFICIENCY, AND HIGH RELIABILITY**

### ELECTRICAL CHARACTERISTICS[1] ($T_a$ = 25 $^{O}$C)

| SYMBOL | PARAMETERS/TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| **F** | Operating Frequency Range | 9 | | 16 | GHz |
| **$P_{1dB}$** | Ouput Power at 1dB Gain Compression | | 18 | | dBm |
| **Gss** | Small Signal Gain | | 14 | | dB |
| **ΔGss** | Small Signal Gain Flatness | | ± 1.5 | | dB |
| **NF** | Noise Figure | | 4 | | dB |
| **VSWR in** | Input VSWR | | 1.5:1 | | |
| **VSWR out** | Output VSWR | | 2.0:1 | | |
| **Idd** | Power Supply Current | | 160 | | mA |
| **Vdd** | Power Supply Voltage | | 5 | 8 | V |

### MAXIMUM RATINGS AT 25$^{O}$C

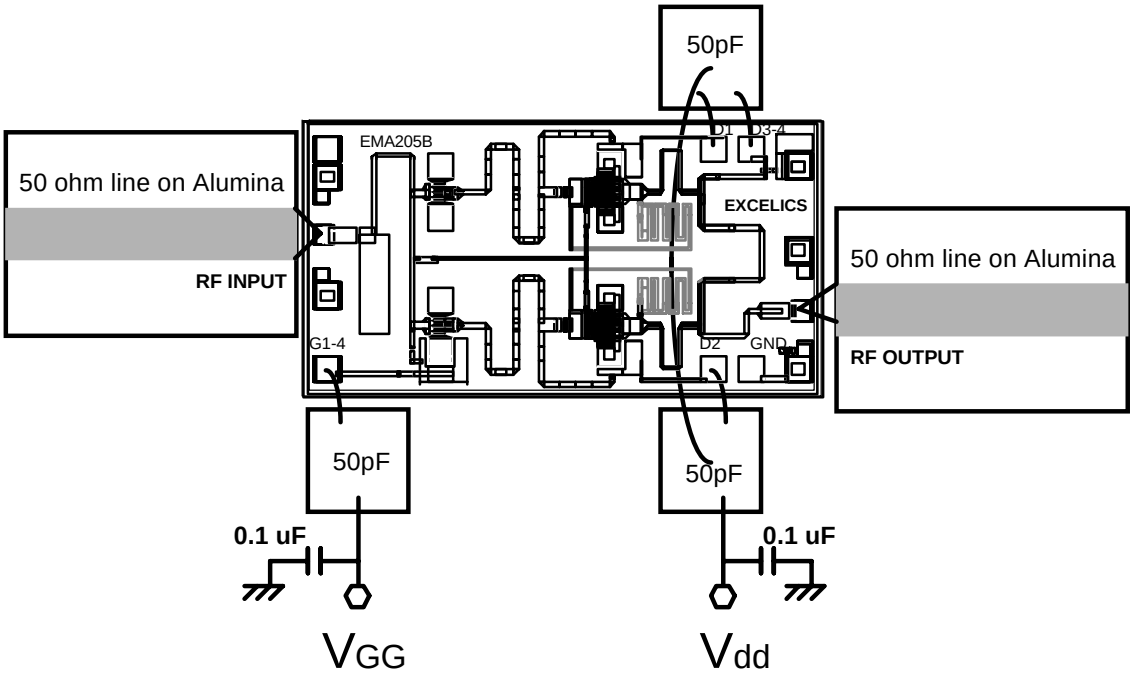
| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| **Vds** | Drain-Source Voltage | 12V | 8V |
| **Vgs** | Gate-Source Voltage | -8V | -3V |
| **Ids** | Drain Current | Idss | 225mA |
| **Igf** | Forward Gate Current | 55 mA | 9mA |
| **Pin** | Input Power | 13dBm | @3dB Compression |
| **Tch** | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| **Tstg** | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| **Pt** | Total Power Dissipation | 1.1 W | 900 mW |

**S-PARAMETERS** ( On wafer Sij measurements )

**5V, 1/2 Idss_6**

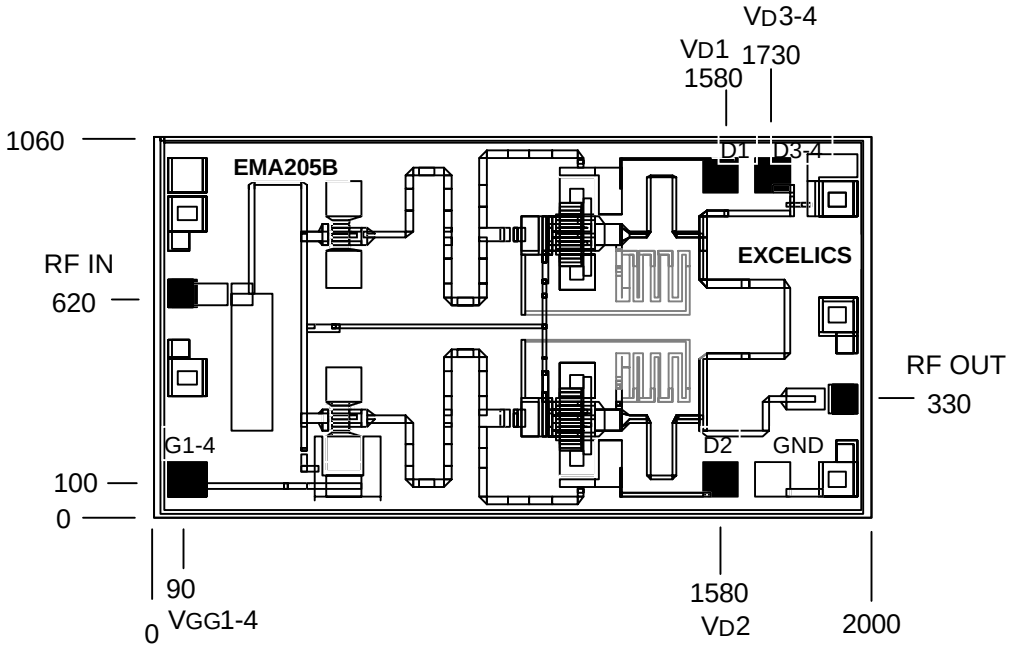
| FREQ | --- S11 --- | | --- S21 --- | | --- S12 --- | | --- S22 --- | |
|---|---|---|---|---|---|---|---|---|
| (GHz) | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 1 | 0.365 | -129.2 | 0.276 | 82.1 | 0.0038 | -28.6 | 0.620 | -112.2 |
| 2 | 0.471 | -172.2 | 0.441 | 47.4 | 0.0011 | -88.5 | 0.844 | -167.7 |
| 3 | 0.450 | 172.4 | 0.416 | 3.6 | 0.0008 | -125.9 | 0.810 | 158.0 |
| 4 | 0.422 | 162.0 | 0.389 | 16.1 | 0.0006 | -139.8 | 0.732 | 130.9 |
| 5 | 0.389 | 154.2 | 0.826 | 35.4 | 0.0007 | -175.1 | 0.614 | 104.5 |
| 6 | 0.350 | 148.0 | 1.825 | 8.7 | 0.0011 | 160.0 | 0.430 | 73.8 |
| 7 | 0.312 | 143.6 | 3.185 | -29.7 | 0.0020 | 139.7 | 0.185 | 34.2 |
| 8 | 0.276 | 141.4 | 4.559 | -73.3 | 0.0030 | 97.5 | 0.078 | -139.8 |
| 9 | 0.250 | 138.6 | 5.385 | -117.5 | 0.0037 | 58.0 | 0.245 | 168.1 |
| 10 | 0.234 | 136.9 | 5.626 | -159.0 | 0.0045 | 18.1 | 0.300 | 137.5 |
| 11 | 0.226 | 139.7 | 5.497 | 166.2 | 0.0052 | -10.6 | 0.275 | 115.0 |
| 12 | 0.221 | 141.9 | 5.350 | 136.0 | 0.0052 | -34.2 | 0.214 | 99.9 |
| 13 | 0.222 | 140.6 | 5.326 | 107.4 | 0.0060 | -54.4 | 0.149 | 95.2 |
| 14 | 0.220 | 135.3 | 5.360 | 79.5 | 0.0067 | -76.5 | 0.092 | 109.1 |
| 15 | 0.235 | 131.2 | 5.594 | 50.3 | 0.0077 | -103.0 | 0.088 | 149.1 |
| 16 | 0.271 | 127.6 | 6.062 | 18.7 | 0.0101 | -130.2 | 0.132 | 172.4 |
| 17 | 0.385 | 119.2 | 6.709 | -17.2 | 0.0122 | -160.7 | 0.205 | 176.3 |
| 18 | 0.511 | 89.3 | 6.771 | -59.4 | 0.0122 | 160.1 | 0.314 | 172.1 |
| 19 | 0.577 | 53.6 | 5.973 | -105.7 | 0.0111 | 115.1 | 0.457 | 159.6 |
| 20 | 0.577 | 21.6 | 4.309 | -151.4 | 0.0072 | 74.4 | 0.608 | 141.4 |
| 21 | 0.564 | -2.5 | 2.567 | 171.8 | 0.0022 | 33.0 | 0.711 | 119.8 |
| 22 | 0.589 | -23.7 | 1.423 | 155.1 | 0.0004 | 127.1 | 0.733 | 98.4 |
| 23 | 0.606 | -42.8 | 1.095 | 146.8 | 0.0018 | 108.7 | 0.686 | 81.3 |
| 24 | 0.623 | -58.4 | 0.917 | 130.5 | 0.0021 | 87.5 | 0.628 | 69.0 |
| 25 | 0.6426 | -70.4 | 0.754 | 112.2 | 0.0023 | 72.2 | 0.585 | 59.3 |
| 26 | 0.664 | -79.7 | 0.607 | 94.3 | 0.0027 | 75.1 | 0.555 | 50.8 |
| 27 | 0.694 | -88.2 | 0.487 | 76.6 | 0.0031 | 76.8 | 0.531 | 42.8 |
| 28 | 0.732 | -98.1 | 0.399 | 58.6 | 0.0026 | 68.9 | 0.511 | 34.9 |
| 29 | 0.761 | -106.2 | 0.330 | 41.6 | 0.0015 | 58.9 | 0.496 | 27.0 |
| 30 | 0.791 | -114.1 | 0.271 | 24.2 | 0.0014 | 23.6 | 0.480 | 19.1 |

## ASSEMBLY DRAWING



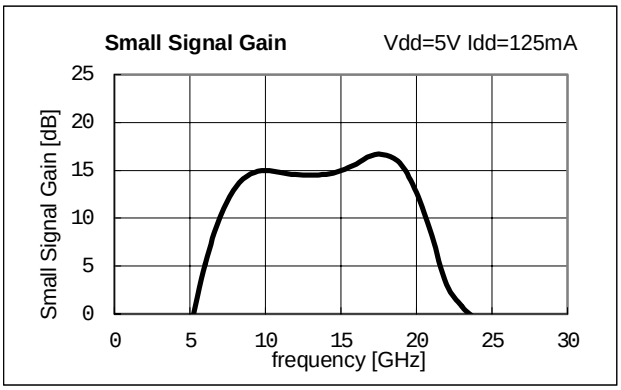

The length of RF wires should be as short as possible. Use at least two wires between RF pad and 50 ohm line and separate the wires to minimize the mutual inductance.

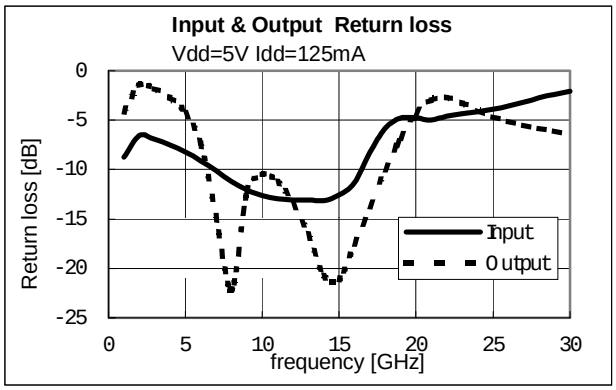
## CHIP OUTLINE

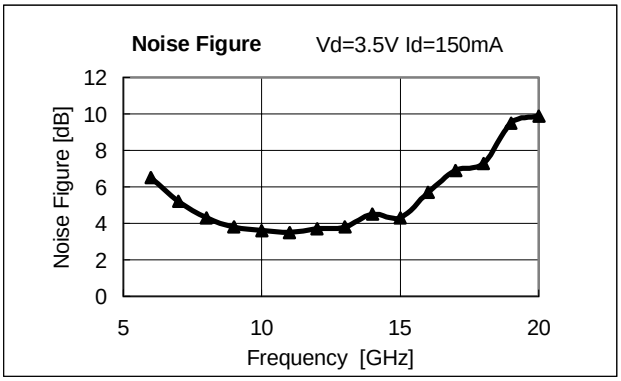


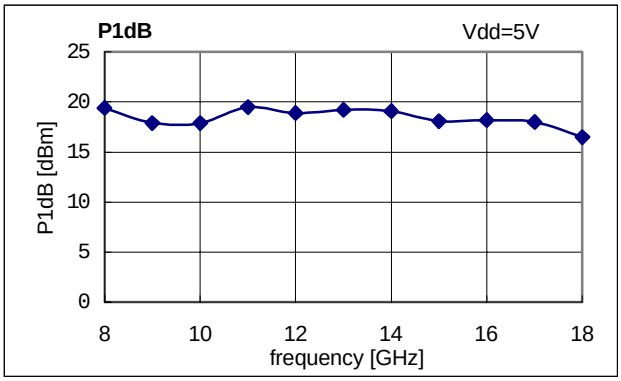

Chip Size 1060 x 2000 microns
Chip Thickness: 75 ± 13 microns
PAD Dimensions: 1. DC 100 x 100 microns
2. RF 80 x 68 microns
All Dimensions In Microns

## TYPICAL APPLICATION PERFORMANCE



# EMA406C

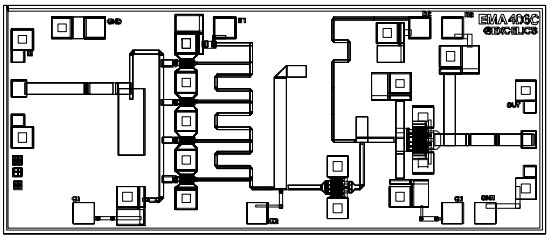
**TENTATIVE DATA SHEET**

## 26 - 32 GHz Low Noise MMIC

### FEATURES

- **26 -32 GHz BANDWIDTH**
- **+20.0 dBm TYPICAL OUTPUT POWER**
- **21 dB ± 1.5 dB TYPICAL POWER GAIN**
- **FOUR SECTION, DISTRIBUTED AMPLIFIER**
- **DUAL BIAS SUPPLY**
- **0.3 MICRON RECESSED "MUSHROOM" GATE**
- **$Si_3N_4$ PASSIVATION**
- **ADVANCED EPITAXIAL HETEROJUNCTION**

**PROFILE PROVIDES EXTRA HIGH POWER EFFICIENCY, AND HIGH RELIABILITY**



### ELECTRICAL CHARACTERISTICS[1] ($T_a$ = 25 $^{O}$C)

| SYMBOL | PARAMETERS/TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| **F** | Operating Frequency Range | 26 | | 32 | GHz |
| **$P_{1dB}$** | Ouput Power at 1dB Gain Compression | | 20 | | dBm |
| **Gss** | Small Signal Gain | | 21 | | dB |
| **ΔGss** | Small Signal Gain Flatness | | ± 1.5 | | dB |
| **NF** | Noise Figure | | 6 | | dB |
| **VSWR in** | Input VSWR | | 2.0:1 | | |
| **VSWR out** | Output VSWR | | 3.0:1 | | |
| **Idd** | Power Supply Current | | 140 | | mA |
| **Vdd** | Power Supply Voltage | | 5 | 8 | V |

### MAXIMUM RATINGS AT 25$^{O}$C

| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| **Vds** | Drain-Source Voltage | 12V | 8V |
| **Vgs** | Gate-Source Voltage | -8V | -3V |
| **Ids** | Drain Current | Idss | 215mA |
| **Igf** | Forward Gate Current | 50 mA | 8.5mA |
| **Pin** | Input Power | 15dBm | @3dB Compression |
| **Tch** | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| **Tstg** | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| **Pt** | Total Power Dissipation | 1 W | 0.85 W |

# EMA406C

**TENTATIVE DATA SHEET**

## 26 - 32 GHz Low Noise MMIC

**S-PARAMETERS** ( On wafer Sij measurements )

**5V, 1/2 Idss**

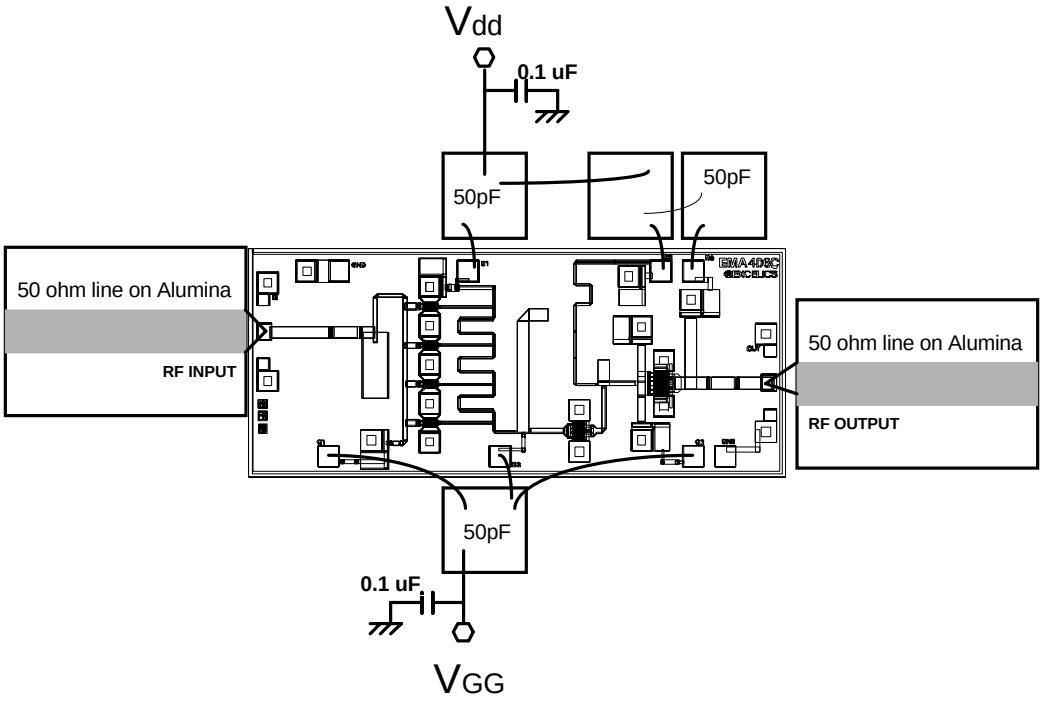
| FREQ | --- S11 --- | | --- S21 --- | | --- S12 --- | | --- S22 --- | |
|---|---|---|---|---|---|---|---|---|
| (GHz) | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 20.00 | 0.33 | 77.79 | 1.28 | -95.95 | 0.0008 | 44.60 | 0.96 | 85.42 |
| 20.50 | 0.32 | 68.81 | 1.41 | -106.07 | 0.0011 | 42.01 | 0.96 | 80.89 |
| 21.00 | 0.30 | 59.18 | 1.57 | -115.93 | 0.0010 | 52.46 | 0.97 | 75.97 |
| 21.50 | 0.29 | 48.60 | 1.79 | -125.92 | 0.0014 | 89.17 | 0.97 | 70.79 |
| 22.00 | 0.27 | 37.50 | 2.09 | -136.41 | 0.0016 | 91.70 | 0.98 | 65.27 |
| 22.50 | 0.25 | 25.58 | 2.49 | -147.65 | 0.0006 | 98.47 | 0.99 | 59.31 |
| 23.00 | 0.24 | 11.90 | 3.02 | -159.81 | 0.0003 | 98.74 | 1.00 | 52.73 |
| 23.50 | 0.23 | -3.74 | 3.72 | -173.45 | 0.0010 | 34.03 | 1.00 | 45.39 |
| 24.00 | 0.22 | -20.84 | 4.67 | 171.42 | 0.0012 | 26.69 | 1.00 | 36.93 |
| 24.50 | 0.22 | -38.46 | 5.89 | 153.98 | 0.0009 | 64.11 | 1.00 | 26.90 |
| 25.00 | 0.23 | -56.48 | 7.47 | 134.19 | 0.0018 | 35.00 | 1.00 | 15.59 |
| 25.50 | 0.24 | -74.69 | 9.29 | 111.36 | 0.0017 | 23.11 | 1.00 | 2.57 |
| 26.00 | 0.24 | -92.54 | 11.07 | 86.85 | 0.0020 | 3.86 | 0.93 | -11.48 |
| 26.50 | 0.25 | -110.29 | 12.61 | 60.91 | 0.0028 | -2.64 | 0.83 | -25.69 |
| 27.00 | 0.25 | -127.45 | 13.95 | 34.87 | 0.0030 | -33.85 | 0.70 | -40.01 |
| 27.50 | 0.26 | -143.64 | 14.79 | 8.57 | 0.0034 | -33.53 | 0.56 | -52.60 |
| 28.00 | 0.25 | -158.95 | 15.29 | -17.59 | 0.0034 | -46.81 | 0.43 | -61.28 |
| 28.50 | 0.24 | -173.35 | 15.27 | -43.11 | 0.0019 | -76.82 | 0.33 | -63.93 |
| 29.00 | 0.22 | 171.21 | 15.04 | -67.65 | 0.0023 | -138.41 | 0.27 | -60.16 |
| 29.50 | 0.19 | 155.15 | 14.71 | -90.91 | 0.0029 | -169.26 | 0.25 | -54.40 |
| 30.00 | 0.15 | 138.97 | 14.44 | -113.14 | 0.0042 | 173.19 | 0.26 | -51.72 |
| 30.50 | 0.11 | 119.25 | 14.21 | -135.14 | 0.0045 | 168.43 | 0.27 | -53.13 |
| 31.00 | 0.05 | 89.26 | 14.12 | -157.28 | 0.0050 | 138.57 | 0.30 | -57.53 |
| 31.50 | 0.03 | -10.38 | 14.03 | -179.93 | 0.0066 | 110.64 | 0.33 | -63.39 |
| 32.00 | 0.08 | -63.92 | 14.02 | 156.67 | 0.0067 | 104.86 | 0.36 | -71.39 |
| 32.50 | 0.14 | -86.84 | 13.83 | 132.18 | 0.0074 | 104.16 | 0.40 | -81.21 |
| 33.00 | 0.18 | -103.57 | 13.45 | 106.66 | 0.0071 | 104.21 | 0.44 | -91.19 |
| 33.50 | 0.21 | -117.45 | 12.82 | 80.81 | 0.0071 | 116.13 | 0.48 | -102.55 |
| 34.00 | 0.25 | -129.30 | 12.12 | 53.53 | 0.0086 | 114.18 | 0.53 | -114.85 |
| 34.50 | 0.26 | -140.80 | 10.88 | 26.05 | 0.0100 | 99.52 | 0.55 | -128.52 |
| 35.00 | 0.26 | -149.75 | 9.50 | -1.43 | 0.0112 | 90.23 | 0.55 | -141.63 |
| 35.50 | 0.25 | -153.15 | 8.12 | -27.78 | 0.0099 | 72.51 | 0.54 | -152.84 |
| 36.00 | 0.25 | -156.29 | 6.90 | -54.90 | 0.0141 | 24.34 | 0.50 | -163.71 |
| 36.50 | 0.26 | -151.97 | 5.53 | -80.97 | 0.0137 | 8.68 | 0.46 | -170.54 |
| 37.00 | 0.30 | -149.76 | 4.37 | -105.16 | 0.0128 | -3.35 | 0.43 | -175.21 |
| 37.50 | 0.36 | -151.29 | 3.44 | -126.85 | 0.0108 | -11.68 | 0.43 | -178.10 |
| 38.00 | 0.42 | -156.26 | 2.71 | -148.14 | 0.0046 | -2.18 | 0.44 | 178.29 |
| 38.50 | 0.48 | -162.95 | 2.14 | -168.76 | 0.0019 | 54.40 | 0.44 | 173.94 |
| 39.00 | 0.52 | -170.50 | 1.66 | 170.83 | 0.0036 | 74.41 | 0.44 | 170.08 |
| 39.50 | 0.56 | -176.61 | 1.35 | 152.84 | 0.0051 | 78.45 | 0.44 | 166.96 |
| 40.00 | 0.59 | 178.86 | 1.17 | 138.10 | 0.0054 | 78.89 | 0.44 | 164.74 |

# EMA406C

**TENTATIVE DATA SHEET**

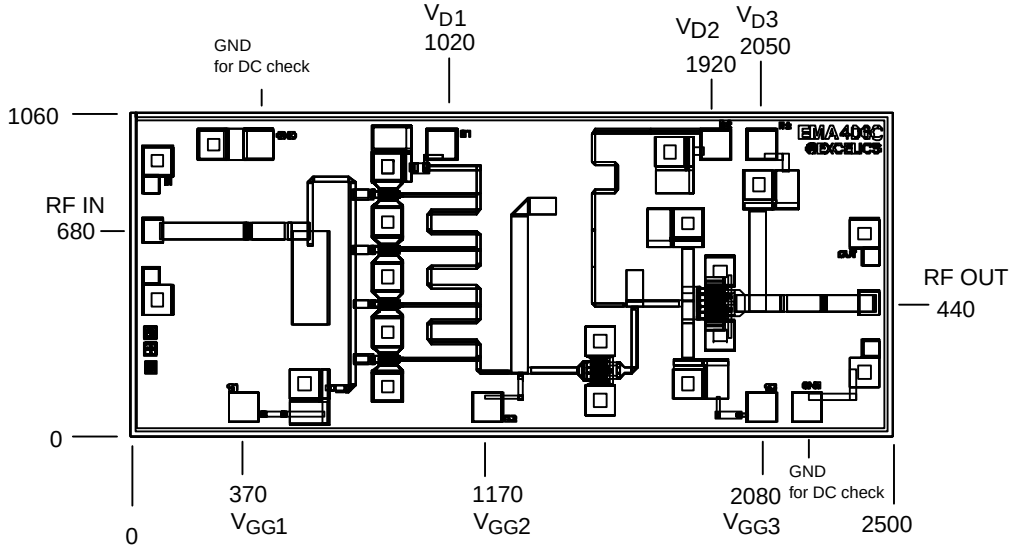
**26 - 32 GHz Low Noise MMIC**

## ASSEMBLY DRAWING



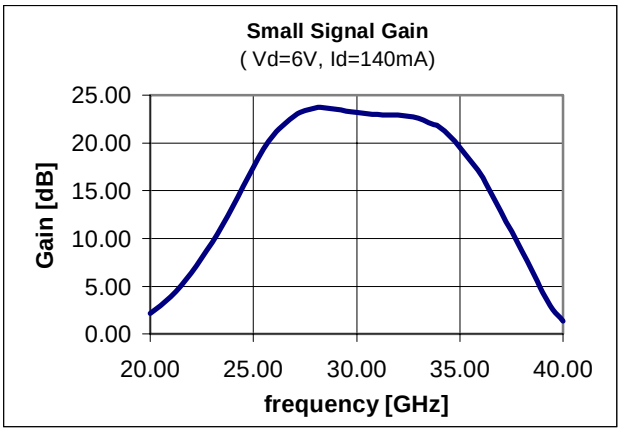

The length of RF wires should be as short as possible. Use at least two wires between RF pad and 50 ohm line and separate the wires to minimize the mutual inductance.

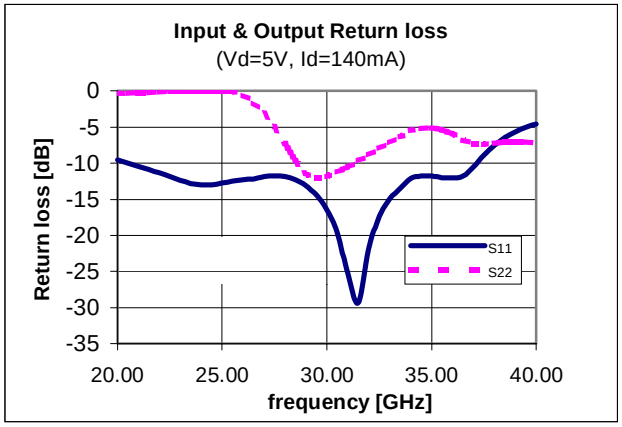
## CHIP OUTLINE

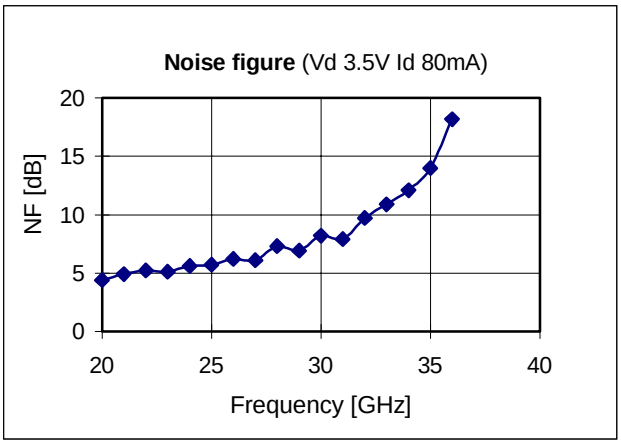


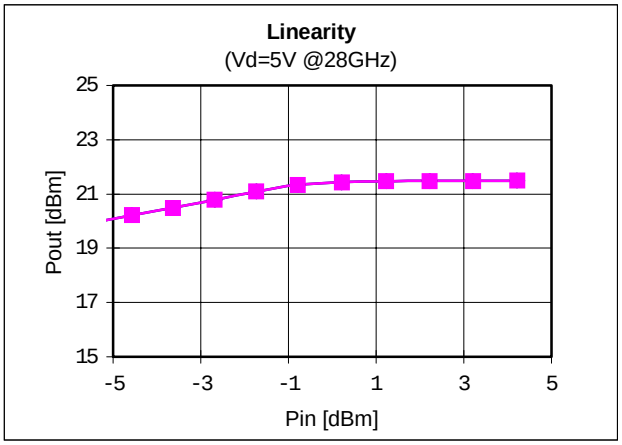

Chip Size 1060 x 2500 microns
Chip Thickness: 75 ± 13 microns
PAD Dimensions: 1. DC 100 x 100 microns
2. RF 80 x 68 microns
All Dimensions In Microns

## TYPICAL APPLICATION PERFORMANCE



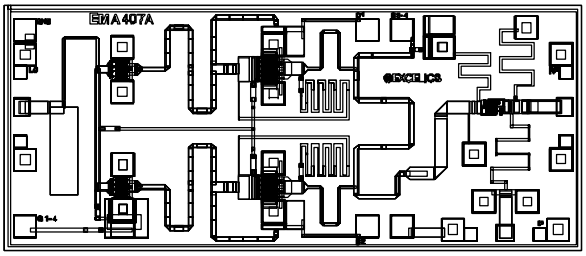
# EMA407A

**TENTATIVE DATA SHEET**

## 20-32 GHz SUB-HARMONICALLY PUMPED MIXER

### FEATURES

- **20-32 GHz BANDWIDTH**
- **INTEGRATED LO AMPLIFIER**
- **11 dB ± 1.5 dB TYPICAL CONVERSION LOSS**
- **0.3 MICRON RECESSED "MUSHROOM" GATE**
- **$Si_3N_4$ PASSIVATION**
- **ADVANCED EPITAXIAL HETEROJUNCTION**




**The EMA407A chip is a sub-harmonically pumped MMIC mixer with an integrated LO amplifier. It can be used as an up-converter or down-converter.**

### ELECTRICAL CHARACTERISTICS[1] ($T_a$ = 25 $^{O}$C)

| SYMBOL | PARAMETERS/TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| $F_{RF}$ | RF Frequency Range | 20 | | 32 | GHz |
| $F_{LO}$ | LO Frequency Range | 9 | | 18 | GHz |
| $F_{IF}$ | IF Frequency Range | | | 5 | GHz |
| $P_{1dB}$ | Input RF Power at 1dB Gain Compression | | 6 | | dBm |
| $C_L$ | Conversion loss | | 11 | | dB |
| $\Delta C_L$ | Flatness | | ± 1.5 | | dB |
| **NF** | Noise Figure | | 11 | | dB |
| **LOdr** | LO drive level | | 8 | | dBm |
| **Idd** | Power Supply Current | | 160 | | mA |
| **Vdd** | Power Supply Voltage | | 5 | 8 | V |

### MAXIMUM RATINGS AT 25$^{O}$C

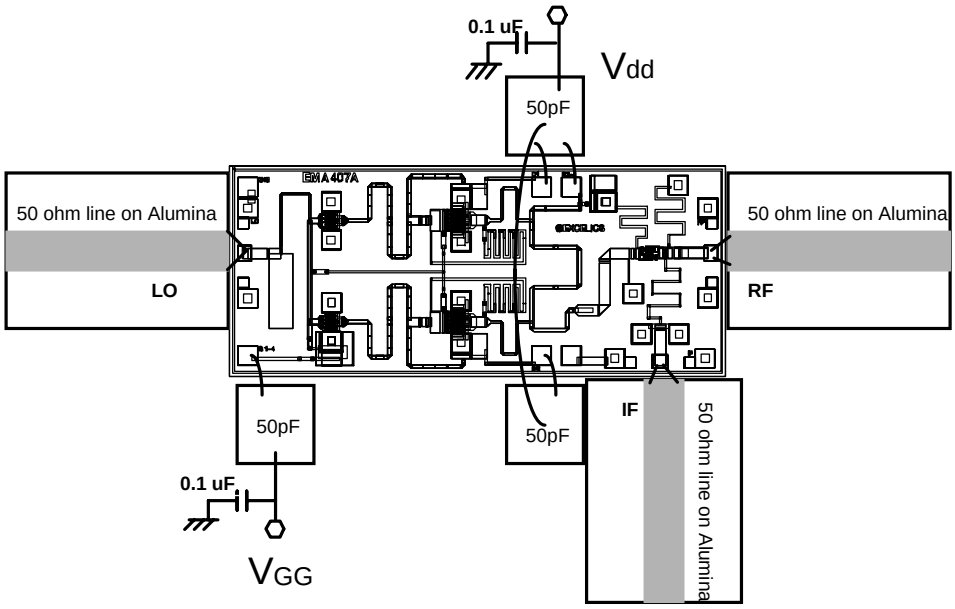
| SYMBOLS | PARAMETERS | ABSOLUTE[1] | CONTINUOUS[2] |
|---|---|---|---|
| **Vds** | Drain-Source Voltage | 12V | 8V |
| **Vgs** | Gate-Source Voltage | -8V | -3V |
| **Ids** | Drain Current | Idss | 225mA |
| **Igf** | Forward Gate Current | 55 mA | 9mA |
| **Pin** | Input Power | dBm | @3dB Compression |
| **Tch** | Channel Temperature | 175$^{o}$C | 150$^{o}$C |
| **Tstg** | Storage Temperature | -65/175$^{o}$C | -65/150$^{o}$C |
| **Pt** | Total Power Dissipation | 1.1 W | 900 mW |

# EMA407A

**TENTATIVE DATA SHEET**

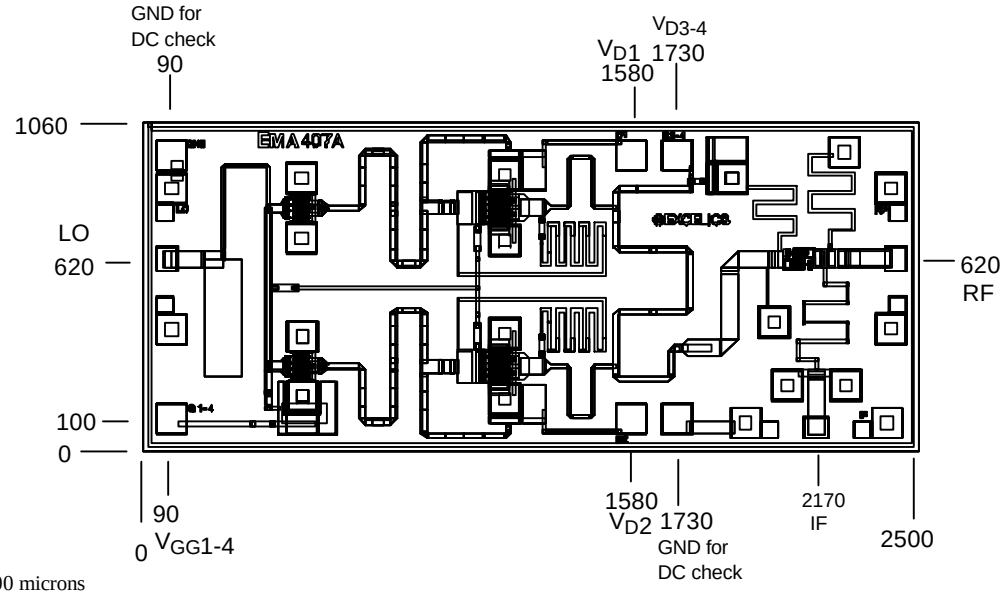
**20-32 GHz SUB-HARMONICALLY PUMPED MIXER**

## ASSEMBLY DRAWING




The length of wires for RF and LO connections should be as short as possible. Use at least two wires, and separate the wires to minimize the mutual inductance.

## CHIP OUTLINE

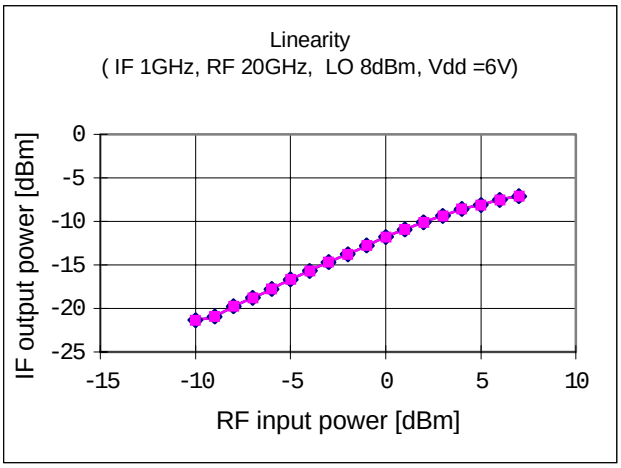


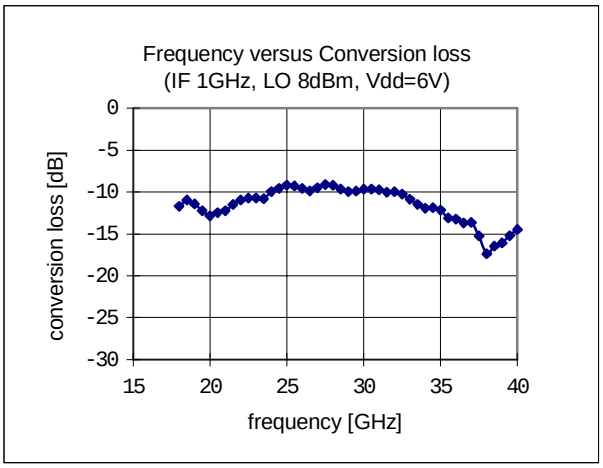

Chip Size 1060 x 2500 microns
Chip Thickness: 75 ± 13 microns
PAD Dimensions: 1. DC 100 x 100 microns
2. RF 80 x 68 microns
All Dimensions In Microns

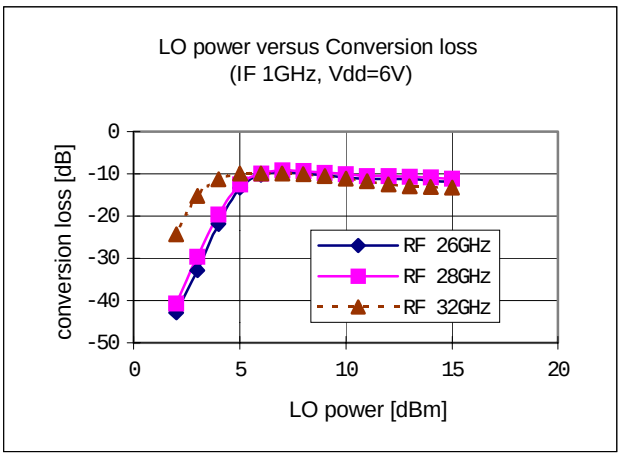
TENTATIVE DATA SHEET

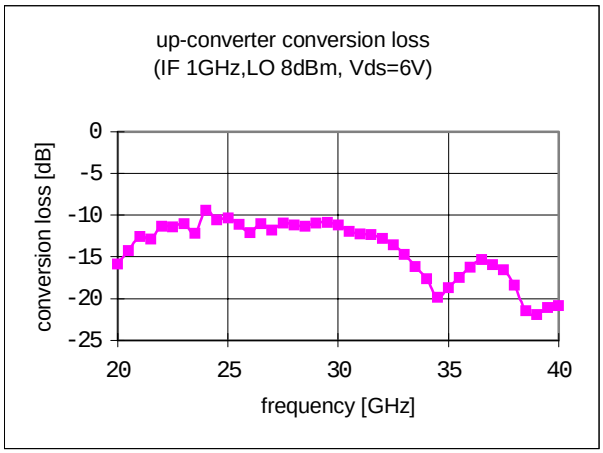
# 20-32 GHz SUB-HARMONICALLY PUMPED MIXER

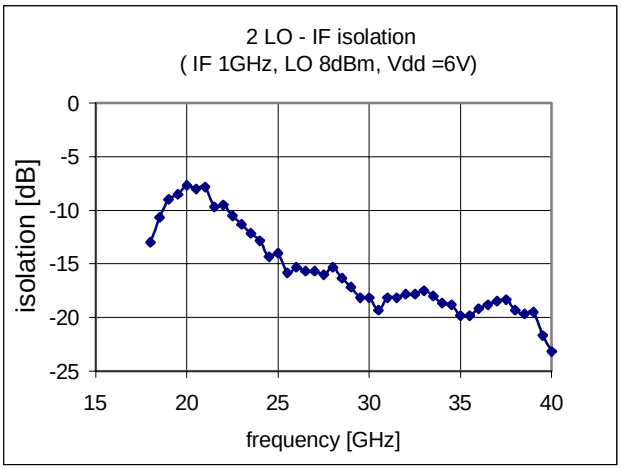
## TYPICAL APPLICATION PERFORMANCE



## APPLICATION HINTS

The device should be die attached with Gold-Tin eutectic. Epoxy die attach is not recommended. Thermocompression bonding of .7 mil to 1 mil diameter gold wire is recommended.

The sources of the transistors are directly via-hole grounded. A negative voltage is required to bias the gates of the transistors. The gate voltage for the input stage must be provided at the RF input bonding pad, and the drain current for the output stage must be provided through the output bonding pad. The drain bias circuits should be well bypassed down to MHz frequencies to prevent oscillations. Some isolation should be provided between the two drain circuits at GHz frequencies to prevent oscillations. Although there is some bypassing on chip of the VD1 and VG2 terminals, additional bypass capacitors, placed close to the chip, are recommended.

The gate and drain power supplies should be sequenced to turn on the negative gate voltage before the positive drain voltage is applied. Turning on the full drain voltage before the gate voltage can cause excessive power dissipation or destructive oscillations.

# 电子元器件系列

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**EMail:sales@rf-china.com**

**Sale Phone:86-592-5713956**