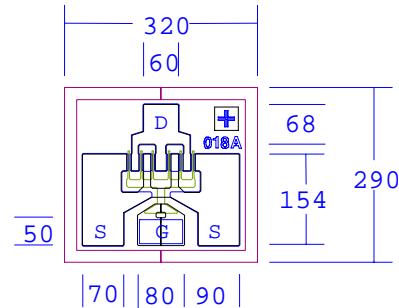


DATA SHEET
Low Distortion GaAs Power FET

- **VERY HIGH f_{max} : 100GHz**
- **+18.5dBm TYPICAL OUTPUT POWER**
- **11.5dB TYPICAL POWER GAIN AT 12GHz**
- **TYPICAL 1.1dB NOISE FIGURE AND 10.5dB ASSOCIATED GAIN AT 12GHz**
- **0.3 X 180 MICRON RECESSED “MUSHROOM” GATE**
- **Si_3N_4 PASSIVATION**
- **ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY**
- **I_{dss} SORTED IN 5mA PER BIN RANGE**



Chip Thickness: 75 ± 13 microns
All Dimensions In Microns

ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ C$)

| SYMBOLS | PARAMETERS/TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|-----------|--|---|------|-------------|------|--------------|
| P_{1dB} | Output Power at 1dB Compression | $f=12GHz$ $V_{ds}=6V, I_{ds}=50\% I_{dss}$ | 16.5 | 18.5* | | dBm |
| G_{1dB} | Gain at 1dB Compression | $f=12GHz$ $V_{ds}=6V, I_{ds}=50\% I_{dss}$ | 9.5 | 11.5 9.5 | | dB |
| PAE | Power Added Efficiency at 1dB Compression | $V_{ds}=6V, I_{ds}=50\% I_{dss}$ $f=12GHz$ | | 35 | | % |
| NF | Noise Figure | $V_{ds}=2V, I_{ds}=15mA$ $f=12GHz$ | | 1.1 | | dB |
| Ga | Associated Gain | $V_{ds}=2V, I_{ds}=15mA$ $f=12GHz$ | | 10.5 | | dB |
| I_{dss} | Saturated Drain Current | $V_{ds}=3V, V_{gs}=0V$ | 25 | 50 | 80 | mA |
| Gm | Transconductance | $V_{ds}=3V, V_{gs}=0V$ | 20 | 30 | | mS |
| V_p | Pinch-off Voltage | $V_{ds}=3V, I_{ds}=1.0mA$ | | -2.0 | -3.5 | V |
| BVgd | Drain Breakdown Voltage | $I_{gd}=0.5mA$ | -10 | -15 | | V |
| BVgs | Source Breakdown Voltage | $I_{gs}=0.5mA$ | -7 | -14 | | V |
| Rth | Thermal Resistance (Au-Sn Eutectic Attach) | | | 185 | | $^\circ C/W$ |

* $P_{1dB} = 19.5dBm$ can be obtained with 8v/50% I_{dss} bias. Consult factory for wafer selection.

MAXIMUM RATINGS AT $25^\circ C$

| SYMBOLS | PARAMETERS | ABSOLUTE ¹ | CONTINUOUS ² |
|---------|-------------------------|-----------------------|-------------------------|
| Vds | Drain-Source Voltage | 12V | 6V |
| Vgs | Gate-Source Voltage | -8V | -4V |
| Ids | Drain Current | I_{dss} | I_{dss} |
| Igsf | Forward Gate Current | 4mA | 0.7mA |
| Pin | Input Power | 17dBm | @ 3dB Compression |
| Tch | Channel Temperature | 175 $^\circ C$ | 150 $^\circ C$ |
| Tstg | Storage Temperature | -65/175 $^\circ C$ | -65/150 $^\circ C$ |
| Pt | Total Power Dissipation | 740mW | 625mW |

Note: 1. Exceeding any of the above ratings may result in permanent damage.

2. Exceeding any of the above ratings may reduce MTTF below design goals.

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EFA018A

DATA

SHEET

Low Distortion GaAs Power FET

| S-PARAMETERS | | | | | | | | |
|--------------|-------------|--------|-------------|-------|-------------|-------|-------------|--------|
| 6V, 1/2 Idss | | | | | | | | |
| FREQ | --- S11 --- | | --- S21 --- | | --- S12 --- | | --- S22 --- | |
| (GHz) | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 1.0 | 0.989 | -9.7 | 3.058 | 171.1 | 0.011 | 80.4 | 0.785 | -3.1 |
| 2.0 | 0.982 | -19.5 | 3.018 | 163.5 | 0.021 | 79.1 | 0.783 | -6.9 |
| 3.0 | 0.972 | -29.1 | 2.977 | 156.0 | 0.031 | 73.7 | 0.779 | -10.4 |
| 4.0 | 0.960 | -39.0 | 2.929 | 148.3 | 0.041 | 67.8 | 0.771 | -14.2 |
| 5.0 | 0.942 | -49.2 | 2.894 | 140.5 | 0.049 | 63.0 | 0.761 | -18.0 |
| 6.0 | 0.927 | -58.8 | 2.819 | 132.9 | 0.057 | 56.4 | 0.751 | -21.6 |
| 7.0 | 0.910 | -67.9 | 2.744 | 125.3 | 0.063 | 51.1 | 0.740 | -25.4 |
| 8.0 | 0.894 | -77.1 | 2.658 | 118.2 | 0.070 | 45.2 | 0.730 | -28.8 |
| 9.0 | 0.876 | -85.4 | 2.569 | 111.3 | 0.076 | 40.1 | 0.718 | -32.2 |
| 10.0 | 0.861 | -93.4 | 2.488 | 104.5 | 0.078 | 34.8 | 0.703 | -35.5 |
| 11.0 | 0.852 | -101.3 | 2.427 | 98.1 | 0.083 | 30.9 | 0.696 | -38.6 |
| 12.0 | 0.837 | -108.9 | 2.348 | 92.1 | 0.086 | 26.1 | 0.683 | -41.2 |
| 13.0 | 0.824 | -117.1 | 2.292 | 85.8 | 0.091 | 21.0 | 0.670 | -44.0 |
| 14.0 | 0.812 | -125.0 | 2.246 | 79.6 | 0.096 | 17.5 | 0.658 | -46.4 |
| 15.0 | 0.801 | -134.3 | 2.207 | 73.2 | 0.098 | 12.9 | 0.641 | -49.0 |
| 16.0 | 0.789 | -143.8 | 2.195 | 66.5 | 0.102 | 8.8 | 0.628 | -51.2 |
| 17.0 | 0.783 | -153.6 | 2.146 | 59.8 | 0.105 | 4.9 | 0.611 | -53.9 |
| 18.0 | 0.773 | -164.4 | 2.094 | 52.8 | 0.111 | 0.2 | 0.589 | -56.3 |
| 19.0 | 0.773 | -175.1 | 2.051 | 45.8 | 0.112 | -3.5 | 0.568 | -59.6 |
| 20.0 | 0.774 | -175.0 | 1.983 | 38.7 | 0.116 | -7.7 | 0.549 | -62.9 |
| 21.0 | 0.780 | 166.2 | 1.889 | 31.8 | 0.115 | -13.0 | 0.521 | -68.7 |
| 22.0 | 0.789 | 158.1 | 1.793 | 25.4 | 0.116 | -15.9 | 0.510 | -73.4 |
| 23.0 | 0.793 | 151.4 | 1.695 | 19.1 | 0.113 | -19.1 | 0.505 | -78.9 |
| 24.0 | 0.800 | 145.8 | 1.616 | 13.3 | 0.113 | -21.4 | 0.509 | -84.3 |
| 25.0 | 0.800 | 142.4 | 1.532 | 8.3 | 0.113 | -25.2 | 0.518 | -89.1 |
| 26.0 | 0.800 | 139.5 | 1.470 | 4.3 | 0.110 | -25.8 | 0.527 | -94.4 |
| 27.0 | 0.806 | 137.7 | 1.420 | -0.9 | 0.110 | -26.8 | 0.542 | -99.3 |
| 28.0 | 0.809 | 135.5 | 1.386 | -5.3 | 0.108 | -29.3 | 0.546 | -104.5 |
| 29.0 | 0.802 | 133.5 | 1.371 | -9.7 | 0.109 | -29.2 | 0.549 | -109.7 |
| 30.0 | 0.798 | 131.8 | 1.342 | -14.2 | 0.108 | -31.0 | 0.561 | -114.3 |
| 31.0 | 0.788 | 127.8 | 1.322 | -19.1 | 0.106 | -33.7 | 0.561 | -119.4 |
| 32.0 | 0.793 | 122.2 | 1.298 | -25.0 | 0.109 | -36.8 | 0.551 | -124.4 |
| 33.0 | 0.778 | 117.3 | 1.254 | -29.9 | 0.106 | -41.4 | 0.537 | -129.5 |
| 34.0 | 0.771 | 111.3 | 1.222 | -36.5 | 0.107 | -43.8 | 0.520 | -135.9 |
| 35.0 | 0.805 | 103.9 | 1.194 | -42.3 | 0.102 | -50.4 | 0.506 | -142.6 |
| 36.0 | 0.821 | 97.8 | 1.150 | -48.1 | 0.097 | -53.1 | 0.497 | -149.9 |
| 37.0 | 0.855 | 88.5 | 1.114 | -55.0 | 0.100 | -58.5 | 0.502 | -157.1 |
| 38.0 | 0.882 | 84.3 | 1.057 | -60.8 | 0.096 | -61.8 | 0.515 | -164.8 |
| 39.0 | 0.892 | 78.0 | 0.986 | -67.9 | 0.097 | -69.1 | 0.525 | -172.3 |
| 40.0 | 0.912 | 74.5 | 0.922 | -73.7 | 0.098 | -71.4 | 0.545 | -178.8 |

| S-PARAMETERS | | | | | | | | |
|--------------|-------------|--------|-------------|-------|-------------|-------|-------------|--------|
| 2V, 15mA | | | | | | | | |
| FREQ | --- S11 --- | | --- S21 --- | | --- S12 --- | | --- S22 --- | |
| (GHz) | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 1.0 | 1.013 | -7.4 | 2.545 | 172.5 | 0.015 | 85.8 | 0.534 | -4.0 |
| 2.0 | 1.007 | -14.7 | 2.538 | 166.5 | 0.030 | 78.5 | 0.531 | -8.9 |
| 3.0 | 1.001 | -22.3 | 2.528 | 159.9 | 0.044 | 74.9 | 0.526 | -14.0 |
| 4.0 | 0.993 | -30.0 | 2.519 | 153.4 | 0.058 | 69.9 | 0.518 | -19.3 |
| 5.0 | 0.983 | -38.7 | 2.525 | 145.9 | 0.072 | 63.8 | 0.499 | -25.3 |
| 6.0 | 0.971 | -47.3 | 2.499 | 138.9 | 0.085 | 58.5 | 0.488 | -31.2 |
| 7.0 | 0.961 | -55.9 | 2.462 | 131.8 | 0.097 | 52.9 | 0.475 | -37.5 |
| 8.0 | 0.944 | -64.1 | 2.407 | 124.7 | 0.107 | 46.9 | 0.464 | -43.7 |
| 9.0 | 0.929 | -72.4 | 2.347 | 117.8 | 0.116 | 41.5 | 0.451 | -49.7 |
| 10.0 | 0.915 | -79.8 | 2.282 | 111.5 | 0.124 | 36.4 | 0.440 | -55.0 |
| 11.0 | 0.899 | -86.9 | 2.227 | 105.2 | 0.131 | 31.5 | 0.431 | -59.9 |
| 12.0 | 0.891 | -94.0 | 2.166 | 99.5 | 0.138 | 27.0 | 0.422 | -64.5 |
| 13.0 | 0.878 | -100.9 | 2.124 | 93.5 | 0.146 | 22.2 | 0.409 | -68.7 |
| 14.0 | 0.862 | -108.3 | 2.093 | 87.7 | 0.153 | 17.6 | 0.394 | -72.7 |
| 15.0 | 0.850 | -116.0 | 2.072 | 82.0 | 0.160 | 13.1 | 0.377 | -76.7 |
| 16.0 | 0.841 | -124.1 | 2.057 | 75.8 | 0.168 | 8.8 | 0.355 | -81.8 |
| 17.0 | 0.824 | -133.9 | 2.039 | 69.1 | 0.178 | 3.5 | 0.331 | -87.2 |
| 18.0 | 0.819 | -144.1 | 2.013 | 62.4 | 0.185 | -2.0 | 0.296 | -94.2 |
| 19.0 | 0.808 | -155.0 | 1.973 | 55.1 | 0.190 | -7.3 | 0.266 | -102.1 |
| 20.0 | 0.800 | -165.8 | 1.924 | 47.7 | 0.195 | -13.2 | 0.235 | -113.2 |
| 21.0 | 0.808 | -175.2 | 1.784 | 40.4 | 0.189 | -18.4 | 0.223 | -133.0 |
| 22.0 | 0.795 | 176.9 | 1.695 | 34.6 | 0.188 | -22.6 | 0.215 | -144.3 |
| 23.0 | 0.820 | 169.5 | 1.628 | 28.5 | 0.186 | -27.0 | 0.226 | -155.0 |
| 24.0 | 0.816 | 164.8 | 1.539 | 23.0 | 0.185 | -30.6 | 0.237 | -162.2 |
| 25.0 | 0.824 | 159.8 | 1.486 | 18.3 | 0.181 | -34.1 | 0.257 | -167.1 |
| 26.0 | 0.838 | 157.1 | 1.424 | 13.9 | 0.179 | -36.3 | 0.270 | -169.9 |
| 27.0 | 0.820 | 154.5 | 1.362 | 9.9 | 0.177 | -39.0 | 0.282 | -172.4 |
| 28.0 | 0.827 | 152.5 | 1.317 | 5.9 | 0.175 | -41.0 | 0.284 | -173.1 |
| 29.0 | 0.825 | 150.3 | 1.291 | 1.8 | 0.176 | -43.3 | 0.294 | -175.0 |
| 30.0 | 0.825 | 147.0 | 1.266 | -2.5 | 0.176 | -46.1 | 0.296 | -175.6 |
| 31.0 | 0.815 | 143.5 | 1.240 | -6.3 | 0.175 | -48.5 | 0.292 | -179.4 |
| 32.0 | 0.816 | 138.1 | 1.217 | -11.6 | 0.173 | -52.9 | 0.290 | -176.4 |
| 33.0 | 0.801 | 133.0 | 1.165 | -16.2 | 0.170 | -57.2 | 0.277 | -169.0 |
| 34.0 | 0.808 | 126.0 | 1.135 | -21.5 | 0.169 | -62.0 | 0.275 | -162.0 |
| 35.0 | 0.811 | 120.1 | 1.092 | -26.5 | 0.168 | -66.3 | 0.268 | -149.4 |
| 36.0 | 0.830 | 111.8 | 1.049 | -31.6 | 0.163 | -72.0 | 0.295 | -137.7 |
| 37.0 | 0.857 | 106.2 | 0.996 | -37.4 | 0.160 | -77.8 | 0.319 | -125.0 |
| 38.0 | 0.883 | 100.1 | 0.952 | -43.0 | 0.158 | -83.8 | 0.359 | -116.9 |
| 39.0 | 0.914 | 94.9 | 0.890 | -49.1 | 0.155 | -88.9 | 0.405 | -109.5 |
| 40.0 | 0.918 | 91.0 | 0.821 | -54.9 | 0.148 | -95.5 | 0.453 | -106.1 |

Note: The data included 0.7 mils diameter Au bonding wires:
 1 gate wire, 15 mils each; 1 drain wire, 20 mils each; 6 source wires, 8 mils each.

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