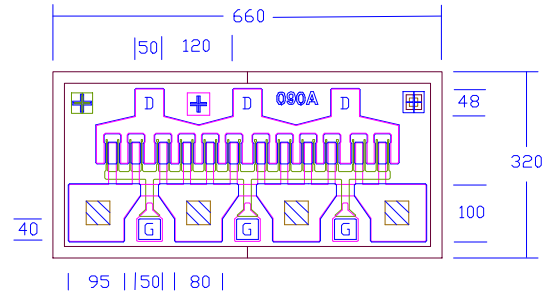


## DATA SHEET

### High Efficiency Heterojunction Power FET

- +28.0dBm TYPICAL OUTPUT POWER
- 10.0dB TYPICAL POWER GAIN FOR EPA090A AND 11.0dB FOR EPA090AV AT 18GHz
- 0.3 X 900 MICRON RECESSED "MUSHROOM" GATE
- Si<sub>3</sub>N<sub>4</sub> PASSIVATION
- ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY
- EPA090AV WITH VIA HOLE SOURCE GROUNDING
- Idss SORTED IN 20mA PER BIN RANGE



Chip Thickness: 75 ± 20 microns

All Dimensions In Microns

▨ : Via Hole

**No Via Hole For EPA090A**

### ELECTRICAL CHARACTERISTICS (T<sub>a</sub> = 25 °C)

| SYMBOLS                | PARAMETERS/TEST CONDITIONS                                         | EPA090A |      |      | EPA090AV |      |      | UNIT |
|------------------------|--------------------------------------------------------------------|---------|------|------|----------|------|------|------|
|                        |                                                                    | MIN     | TYP  | MAX  | MIN      | TYP  | MAX  |      |
| <b>P<sub>1dB</sub></b> | Output Power at 1dB Compression f=12GHz                            | 25.0    | 28.0 |      | 25.0     | 28.0 |      | dBm  |
|                        | V <sub>ds</sub> =8V, I <sub>ds</sub> =50% I <sub>dss</sub> f=18GHz |         | 28.0 |      |          | 28.0 |      |      |
| <b>G<sub>1dB</sub></b> | Gain at 1dB Compression f=12GHz                                    | 11.5    | 13.0 |      | 12.0     | 13.5 |      | dB   |
|                        | V <sub>ds</sub> =8V, I <sub>ds</sub> =50% I <sub>dss</sub> f=18GHz |         | 10.0 |      |          | 11.0 |      |      |
| <b>PAE</b>             | Gain at 1dB Compression                                            |         |      |      |          |      |      | %    |
|                        | V <sub>ds</sub> =8V, I <sub>ds</sub> =50% I <sub>dss</sub> f=12GHz |         | 45   |      |          | 46   |      |      |
| <b>I<sub>dss</sub></b> | Saturated Drain Current V <sub>ds</sub> =3V, V <sub>gs</sub> =0V   | 160     | 270  | 380  | 160      | 270  | 380  | mA   |
| <b>G<sub>m</sub></b>   | Transconductance V <sub>ds</sub> =3V, V <sub>gs</sub> =0V          | 180     | 290  |      | 180      | 290  |      | mS   |
| <b>V<sub>p</sub></b>   | Pinch-off Voltage V <sub>ds</sub> =3V, I <sub>ds</sub> =3.0mA      |         | -1.0 | -2.5 |          | -1.0 | -2.5 | V    |
| <b>BV<sub>gd</sub></b> | Drain Breakdown Voltage I <sub>gd</sub> =1.0mA                     | -11     | -15  |      | -11      | -15  |      | V    |
| <b>BV<sub>gs</sub></b> | Source Breakdown Voltage I <sub>gs</sub> =1.0mA                    | -7      | -14  |      | -7       | -14  |      | V    |
| <b>R<sub>th</sub></b>  | Thermal Resistance (Au-Sn Eutectic Attach)                         |         | 45   |      |          | 35   |      | °C/W |

### MAXIMUM RATINGS AT 25°C

| SYMBOLS                | PARAMETERS              | EPA090A               |                         | EPA090AV              |                         |
|------------------------|-------------------------|-----------------------|-------------------------|-----------------------|-------------------------|
|                        |                         | ABSOLUTE <sup>1</sup> | CONTINUOUS <sup>2</sup> | ABSOLUTE <sup>1</sup> | CONTINUOUS <sup>2</sup> |
| <b>V<sub>ds</sub></b>  | Drain-Source Voltage    | 12V                   | 8V                      | 12V                   | 8V                      |
| <b>V<sub>gs</sub></b>  | Gate-Source Voltage     | -8V                   | -3V                     | -8V                   | -3V                     |
| <b>I<sub>ds</sub></b>  | Drain Current           | I <sub>dss</sub>      | 315mA                   | I <sub>dss</sub>      | I <sub>dss</sub>        |
| <b>I<sub>gsf</sub></b> | Forward Gate Current    | 45mA                  | 7.5mA                   | 45mA                  | 7.5mA                   |
| <b>P<sub>in</sub></b>  | Input Power             | 26dBm                 | @ 3dB Compression       | 26dBm                 | @ 3dB Compression       |
| <b>T<sub>ch</sub></b>  | Channel Temperature     | 175°C                 | 150°C                   | 175°C                 | 150°C                   |
| <b>T<sub>stg</sub></b> | Storage Temperature     | -65/175°C             | -65/150°C               | -65/175°C             | -65/150°C               |
| <b>P<sub>t</sub></b>   | Total Power Dissipation | 3.0W                  | 2.5W                    | 3.8W                  | 3.2W                    |

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.

**Excelics Semiconductor, Inc., 2908 Scott Blvd., Santa Clara, CA 95054**

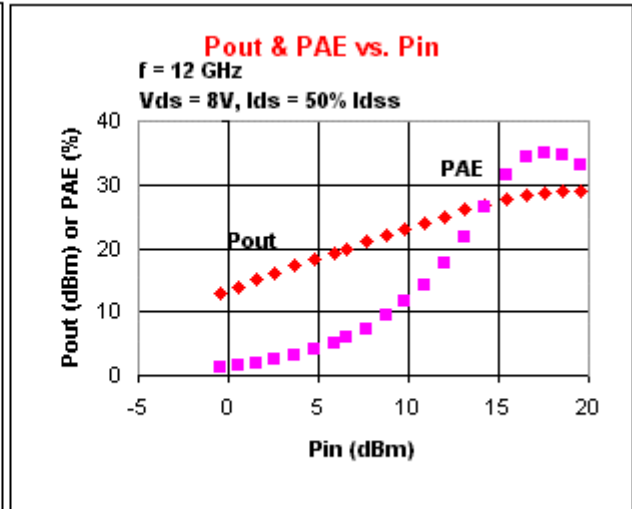
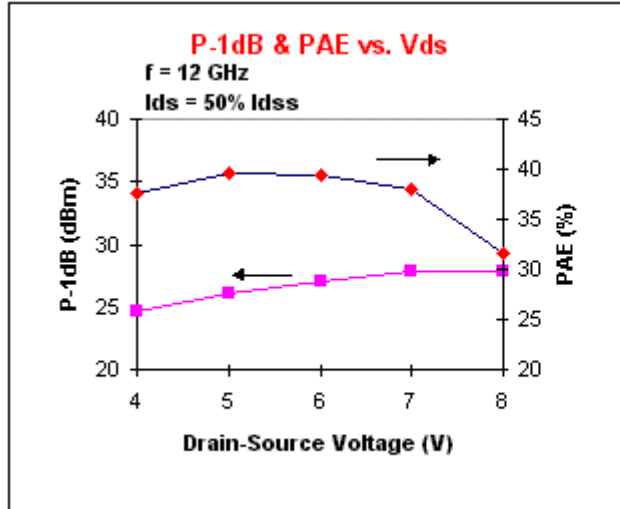
**Phone: (408) 970-8664 Fax: (408) 970-8998 Web Site: [www.excelics.com](http://www.excelics.com)**

# EPA090A/EPA090AV

## DATA SHEET

### High Efficiency Heterojunction Power FET

#### EPA090A



#### S-PARAMETERS

##### EPA090A 8V, 1/2 Idss

| FREQ (GHz) | S11   |        | S21    |       | S12   |      | S22   |        | FREQ (GHz) | S11   |       | S21   |       | S12   |       | S22   |        |
|------------|-------|--------|--------|-------|-------|------|-------|--------|------------|-------|-------|-------|-------|-------|-------|-------|--------|
|            | MAG   | ANG    | MAG    | ANG   | MAG   | ANG  | MAG   | ANG    |            | MAG   | ANG   | MAG   | ANG   | MAG   | ANG   | MAG   | ANG    |
| 1.0        | 0.913 | -76.1  | 14.462 | 135.6 | 0.033 | 50.3 | 0.347 | -57.3  | 21.0       | 0.915 | 160.0 | 0.971 | 2.0   | 0.042 | 4.5   | 0.631 | -173.0 |
| 2.0        | 0.884 | -115.9 | 9.815  | 112.5 | 0.044 | 31.1 | 0.295 | -90.6  | 22.0       | 0.917 | 159.2 | 0.907 | -2.5  | 0.043 | 5.1   | 0.660 | -176.7 |
| 4.0        | 0.869 | -147.8 | 5.534  | 89.0  | 0.048 | 16.9 | 0.284 | -118.8 | 24.0       | 0.912 | 156.7 | 0.800 | -10.7 | 0.044 | 7.0   | 0.713 | 178.1  |
| 6.0        | 0.872 | -160.8 | 3.792  | 74.7  | 0.048 | 11.3 | 0.315 | -129.8 | 26.0       | 0.914 | 154.4 | 0.713 | -17.5 | 0.046 | 10.8  | 0.761 | 175.6  |
| 8.0        | 0.871 | -169.3 | 2.856  | 63.0  | 0.047 | 7.4  | 0.367 | -134.7 | 28.0       | 0.914 | 151.6 | 0.643 | -23.0 | 0.052 | 13.7  | 0.771 | 175.3  |
| 10.0       | 0.875 | -175.4 | 2.267  | 52.8  | 0.044 | 6.3  | 0.418 | -137.6 | 30.0       | 0.917 | 147.5 | 0.591 | -28.5 | 0.057 | 12.5  | 0.782 | 175.6  |
| 12.0       | 0.884 | 179.5  | 1.861  | 43.2  | 0.042 | 5.1  | 0.462 | -141.2 | 32.0       | 0.932 | 144.1 | 0.545 | -33.7 | 0.057 | 14.0  | 0.781 | 174.3  |
| 14.0       | 0.890 | 175.2  | 1.563  | 34.1  | 0.041 | 5.5  | 0.497 | -145.7 | 34.0       | 0.937 | 140.9 | 0.502 | -40.4 | 0.057 | 13.3  | 0.777 | 168.7  |
| 16.0       | 0.901 | 170.7  | 1.357  | 24.8  | 0.040 | 2.9  | 0.528 | -151.9 | 36.0       | 0.953 | 139.1 | 0.464 | -47.4 | 0.060 | 12.2  | 0.792 | 157.1  |
| 18.0       | 0.912 | 166.4  | 1.193  | 15.4  | 0.041 | 3.9  | 0.557 | -159.7 | 38.0       | 0.982 | 136.7 | 0.435 | -55.6 | 0.065 | -2.0  | 0.810 | 142.8  |
| 20.0       | 0.913 | 162.0  | 1.068  | 5.6   | 0.044 | 1.8  | 0.591 | -168.6 | 40.0       | 0.977 | 132.3 | 0.402 | -67.4 | 0.069 | -20.3 | 0.810 | 131.8  |

##### EPA090AV 8V, 1/2 Idss

| FREQ (GHz) | S11   |        | S21    |       | S12   |       | S22   |        | FREQ (GHz) | S11   |       | S21   |       | S12   |       | S22   |        |
|------------|-------|--------|--------|-------|-------|-------|-------|--------|------------|-------|-------|-------|-------|-------|-------|-------|--------|
|            | MAG   | ANG    | MAG    | ANG   | MAG   | ANG   | MAG   | ANG    |            | MAG   | ANG   | MAG   | ANG   | MAG   | ANG   | MAG   | ANG    |
| 1.0        | 0.915 | -72.5  | 13.092 | 137.0 | 0.032 | 51.7  | 0.371 | -49.4  | 21.0       | 0.868 | 158.6 | 0.879 | -2.9  | 0.039 | -11.4 | 0.631 | -166.2 |
| 2.0        | 0.883 | -112.6 | 9.023  | 113.3 | 0.044 | 32.1  | 0.305 | -77.7  | 22.0       | 0.862 | 154.6 | 0.804 | -8.6  | 0.039 | -11.9 | 0.662 | -170.9 |
| 4.0        | 0.865 | -146.5 | 5.119  | 88.4  | 0.049 | 14.9  | 0.269 | -104.4 | 24.0       | 0.857 | 155.2 | 0.691 | -16.0 | 0.039 | -10.5 | 0.685 | 178.9  |
| 6.0        | 0.856 | -164.7 | 3.482  | 72.8  | 0.049 | 6.9   | 0.293 | -115.1 | 26.0       | 0.879 | 148.6 | 0.593 | -24.5 | 0.038 | -8.1  | 0.715 | 174.6  |
| 8.0        | 0.866 | -170.9 | 2.649  | 61.1  | 0.047 | 3.7   | 0.304 | -125.4 | 28.0       | 0.899 | 141.4 | 0.521 | -33.3 | 0.037 | -7.8  | 0.736 | 169.4  |
| 10.0       | 0.864 | -175.6 | 2.108  | 50.3  | 0.044 | -0.3  | 0.339 | -136.0 | 30.0       | 0.892 | 140.6 | 0.454 | -42.8 | 0.038 | -11.5 | 0.765 | 158.1  |
| 12.0       | 0.867 | 174.8  | 1.706  | 38.7  | 0.041 | -3.0  | 0.408 | -139.9 | 32.0       | 0.880 | 138.9 | 0.393 | -50.6 | 0.034 | -15.2 | 0.792 | 151.2  |
| 14.0       | 0.873 | 169.3  | 1.404  | 28.8  | 0.039 | -5.7  | 0.470 | -145.6 | 34.0       | 0.859 | 137.5 | 0.344 | -57.6 | 0.032 | -16.6 | 0.813 | 147.8  |
| 16.0       | 0.888 | 164.0  | 1.187  | 18.7  | 0.037 | -9.6  | 0.541 | -150.4 | 36.0       | 0.833 | 135.6 | 0.309 | -63.4 | 0.030 | -20.7 | 0.858 | 147.6  |
| 18.0       | 0.894 | 164.3  | 1.035  | 10.1  | 0.038 | -8.1  | 0.590 | -160.6 | 38.0       | 0.864 | 133.8 | 0.288 | -67.0 | 0.034 | -33.8 | 0.883 | 148.8  |
| 20.0       | 0.872 | 161.1  | 0.903  | 2.0   | 0.038 | -11.7 | 0.615 | -165.6 | 40.0       | 0.852 | 134.8 | 0.274 | -71.8 | 0.040 | -47.5 | 0.896 | 146.5  |

Note: The data included 0.7 mils diameter Au bonding wires; 3 gate wires, 15 mils each; 3 drain wires, 20 mils each; 8 source wires, 7 mils each; no source wires for EPA090AV.