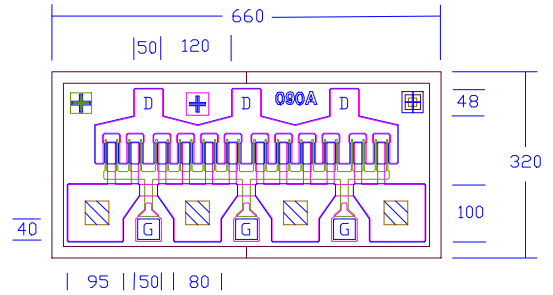



DATA SHEET
High Efficiency Heterojunction Power FET

- +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
- Si₃N₄ 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_a = 25 °C)

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

MAXIMUM RATINGS AT 25°C

| SYMBOLS | PARAMETERS | EPA090A | | EPA090AV | |
|------------------|-------------------------|-----------------------|-------------------------|-----------------------|-------------------------|
| | | ABSOLUTE ¹ | CONTINUOUS ² | ABSOLUTE ¹ | CONTINUOUS ² |
| V _{ds} | Drain-Source Voltage | 12V | 8V | 12V | 8V |
| V _{gs} | Gate-Source Voltage | -8V | -3V | -8V | -3V |
| I _{ds} | Drain Current | I _{dss} | 315mA | I _{dss} | I _{dss} |
| I _{gsf} | Forward Gate Current | 45mA | 7.5mA | 45mA | 7.5mA |
| P _{in} | Input Power | 26dBm | @ 3dB Compression | 26dBm | @ 3dB Compression |
| T _{ch} | Channel Temperature | 175°C | 150°C | 175°C | 150°C |
| T _{stg} | Storage Temperature | -65/175°C | -65/150°C | -65/175°C | -65/150°C |
| P _t | 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.

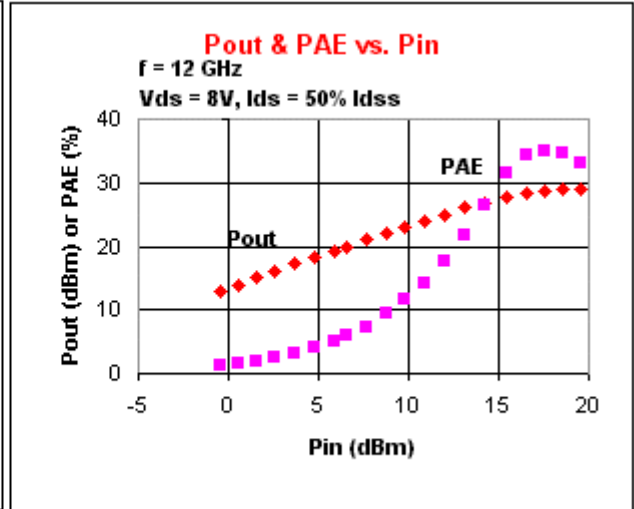
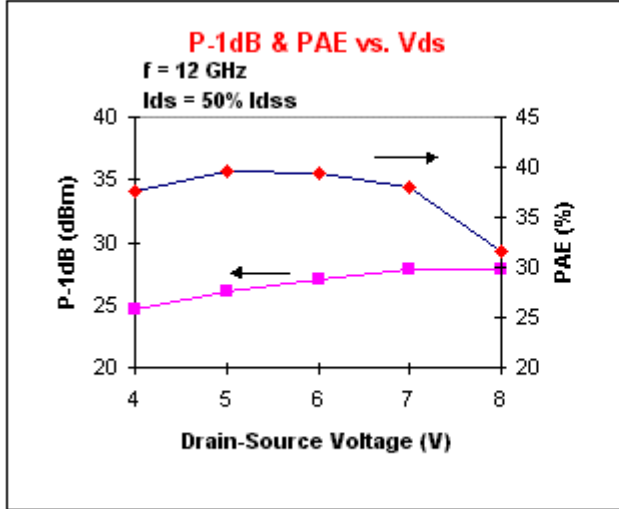
Excelics Semiconductor, Inc., 2908 Scott Blvd., Santa Clara, CA 95054
Phone: (408) 970-8664 Fax: (408) 970-8998 Web Site: www.excelics.com

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.