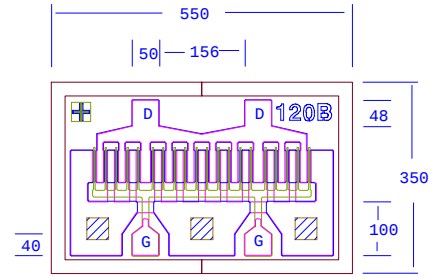


## DATA SHEET

### High Efficiency Heterojunction Power FET

- +29.5dBm TYPICAL OUTPUT POWER
- 9.0dB TYPICAL POWER GAIN FOR EPA120B AND 10.5dB FOR EPA120BV AT 18GHz
- 0.3 X 1200 MICRON RECESSED “MUSHROOM” GATE
- Si<sub>3</sub>N<sub>4</sub> PASSIVATION
- ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY
- EPA120BV WITH VIA HOLE SOURCE GROUNDING
- Idss SORTED IN 30mA PER BIN RANGE



Chip Thickness: 75 ± 20 microns  
All Dimensions In Microns

☒ : Via Hole

**No Via Hole For EPA120B**

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

| SYMBOLS                | PARAMETERS/TEST CONDITIONS                                                                 | EPA120B |              |      | EPA120BV |              |      | UNIT |
|------------------------|--------------------------------------------------------------------------------------------|---------|--------------|------|----------|--------------|------|------|
|                        |                                                                                            | MIN     | TYP          | MAX  | MIN      | TYP          | MAX  |      |
| <b>P<sub>1dB</sub></b> | Output Power at 1dB Compression<br>V <sub>ds</sub> =8V, Ids=50% Idss<br>f=12GHz<br>f=18GHz | 28.0    | 29.5<br>29.5 |      | 28.0     | 29.5<br>29.5 |      | dBm  |
| <b>G<sub>1dB</sub></b> | Gain at 1dB Compression<br>V <sub>ds</sub> =8V, Ids=50% Idss<br>f=12GHz<br>f=18GHz         | 10.0    | 11.5<br>9.0  |      | 11.5     | 13.0<br>10.5 |      | dB   |
| <b>PAE</b>             | Gain at 1dB Compression<br>V <sub>ds</sub> =8V, Ids=50% Idss<br>f=12GHz                    |         | 45           |      |          | 46           |      | %    |
| <b>Idss</b>            | Saturated Drain Current V <sub>ds</sub> =3V, V <sub>gs</sub> =0V                           | 220     | 360          | 500  | 220      | 360          | 500  | mA   |
| <b>G<sub>m</sub></b>   | Transconductance V <sub>ds</sub> =3V, V <sub>gs</sub> =0V                                  | 240     | 380          |      | 240      | 380          |      | mS   |
| <b>V<sub>p</sub></b>   | Pinch-off Voltage V <sub>ds</sub> =3V, Ids=3.0mA                                           |         | -1.0         | -2.5 |          | -1.0         | -2.5 | V    |
| <b>BV<sub>gd</sub></b> | Drain Breakdown Voltage I <sub>gd</sub> =1.2mA                                             | -11     | -15          |      | -11      | -15          |      | V    |
| <b>BV<sub>gs</sub></b> | Source Breakdown Voltage I <sub>gs</sub> =1.2mA                                            | -7      | -14          |      | -7       | -14          |      | V    |
| <b>R<sub>th</sub></b>  | Thermal Resistance (Au-Sn Eutectic Attach)                                                 |         | 40           |      |          | 30           |      | °C/W |

### MAXIMUM RATINGS AT 25°C

| SYMBOLS                | PARAMETERS              | EPA120B               |                         | EPA120BV              |                         |
|------------------------|-------------------------|-----------------------|-------------------------|-----------------------|-------------------------|
|                        |                         | 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>Id<sub>s</sub></b>  | Drain Current           | Idss                  | 355mA                   | Idss                  | 470mA                   |
| <b>I<sub>gsf</sub></b> | Forward Gate Current    | 60mA                  | 10mA                    | 60mA                  | 10mA                    |
| <b>P<sub>in</sub></b>  | Input Power             | 27dBm                 | @ 3dB<br>Compression    | 27dBm                 | @ 3dB<br>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 | 3.4W                  | 2.8W                    | 4.5W                  | 3.8W                    |

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

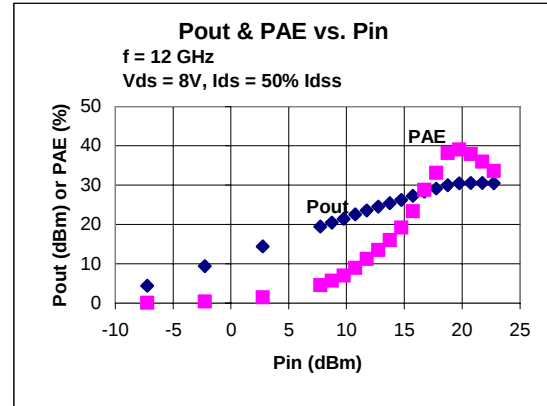
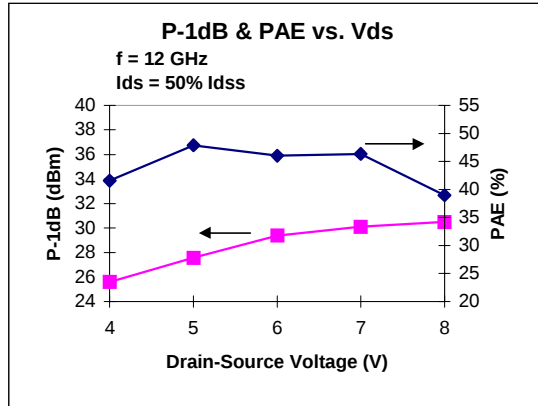
Phone: (408) 970-8664 Fax: (408) 970-8998 Web Site: [www.excelics.com](http://www.excelics.com)

# EPA120B/EPA120BV

## DATA SHEET

### High Efficiency Heterojunction Power FET

#### EPA120B



#### S-PARAMETERS

EPA120B 8V, 1/2 Idss

| FREQ<br>(GHz) | --- S11 --- |        | --- S21 --- |       | --- S12 --- |      | --- S22 --- |        |
|---------------|-------------|--------|-------------|-------|-------------|------|-------------|--------|
|               | MAG         | ANG    | MAG         | ANG   | MAG         | ANG  | MAG         | ANG    |
| 1.0           | 0.873       | -97.8  | 14.614      | 124.8 | 0.030       | 40.1 | 0.245       | -89.7  |
| 2.0           | 0.866       | -133.3 | 8.974       | 103.2 | 0.035       | 27.0 | 0.239       | -119.4 |
| 4.0           | 0.865       | -159.6 | 4.841       | 81.9  | 0.038       | 19.8 | 0.258       | -137.9 |
| 6.0           | 0.864       | -170.9 | 3.287       | 67.7  | 0.037       | 21.8 | 0.296       | -142.5 |
| 8.0           | 0.872       | -177.9 | 2.476       | 55.8  | 0.037       | 23.5 | 0.344       | -145.9 |
| 10.0          | 0.877       | 176.9  | 1.974       | 45.6  | 0.035       | 27.7 | 0.385       | -149.2 |
| 12.0          | 0.890       | 171.7  | 1.633       | 35.0  | 0.036       | 30.8 | 0.429       | -154.4 |
| 14.0          | 0.899       | 166.4  | 1.367       | 24.3  | 0.039       | 30.5 | 0.472       | -161.9 |
| 16.0          | 0.901       | 161.5  | 1.148       | 13.5  | 0.041       | 29.9 | 0.519       | -171.5 |
| 18.0          | 0.917       | 156.9  | 0.980       | 2.7   | 0.045       | 27.3 | 0.575       | 178.6  |
| 20.0          | 0.908       | 152.3  | 0.819       | -7.9  | 0.051       | 26.1 | 0.635       | 169.2  |
| 22.0          | 0.896       | 149.4  | 0.698       | -16.0 | 0.058       | 26.3 | 0.686       | 162.5  |
| 24.0          | 0.903       | 145.8  | 0.616       | -23.4 | 0.069       | 26.7 | 0.734       | 157.7  |
| 26.0          | 0.886       | 143.8  | 0.552       | -28.0 | 0.084       | 27.1 | 0.750       | 155.7  |

#### S-PARAMETERS

EPA120BV 8V, 1/2 Idss

| FREQ<br>(GHz) | --- S11 --- |        | --- S21 --- |       | --- S12 --- |       | --- S22 --- |        |
|---------------|-------------|--------|-------------|-------|-------------|-------|-------------|--------|
|               | MAG         | ANG    | MAG         | ANG   | MAG         | ANG   | MAG         | ANG    |
| 1.0           | 0.887       | -88.4  | 15.05       | 130.0 | 0.029       | 41.8  | 0.272       | -73.8  |
| 2.0           | 0.879       | -127.4 | 9.718       | 107.1 | 0.036       | 25.4  | 0.256       | -107.7 |
| 4.0           | 0.887       | -157.2 | 5.309       | 84.0  | 0.038       | 11.4  | 0.274       | -129.7 |
| 6.0           | 0.899       | -168.8 | 3.554       | 69.5  | 0.036       | 6.6   | 0.316       | -137.2 |
| 8.0           | 0.905       | -175.1 | 2.651       | 58.1  | 0.035       | 3.3   | 0.372       | -140.3 |
| 10.0          | 0.909       | -179.4 | 2.091       | 48.2  | 0.032       | 1.0   | 0.430       | -143.1 |
| 12.0          | 0.913       | 176.6  | 1.726       | 38.2  | 0.030       | -0.8  | 0.484       | -147.7 |
| 14.0          | 0.916       | 171.5  | 1.462       | 27.9  | 0.030       | -2.9  | 0.528       | -154.0 |
| 16.0          | 0.925       | 165.2  | 1.263       | 16.8  | 0.030       | -6.7  | 0.570       | -162.0 |
| 18.0          | 0.930       | 157.9  | 1.088       | 4.6   | 0.030       | -10.1 | 0.611       | -171.8 |
| 20.0          | 0.939       | 151.1  | 0.936       | -7.4  | 0.031       | -14.1 | 0.654       | 178.3  |

| FREQ<br>(GHz) | --- S11 --- |       | --- S21 --- |       | --- S12 --- |       | --- S22 --- |       |
|---------------|-------------|-------|-------------|-------|-------------|-------|-------------|-------|
|               | MAG         | ANG   | MAG         | ANG   | MAG         | ANG   | MAG         | ANG   |
| 21.0          | 0.946       | 149.8 | 0.824       | -11.5 | 0.029       | -15.2 | 0.700       | 174.9 |
| 22.0          | 0.956       | 148.9 | 0.752       | -16.0 | 0.030       | -13.2 | 0.720       | 170.6 |
| 24.0          | 0.967       | 148.0 | 0.636       | -24.1 | 0.029       | -11.8 | 0.769       | 164.6 |
| 26.0          | 0.967       | 148.0 | 0.554       | -30.0 | 0.029       | -4.9  | 0.799       | 162.4 |
| 28.0          | 0.956       | 148.0 | 0.503       | -34.2 | 0.033       | 0.1   | 0.828       | 161.4 |
| 30.0          | 0.951       | 146.2 | 0.473       | -39.5 | 0.034       | -3.5  | 0.850       | 161.0 |
| 32.0          | 0.937       | 141.5 | 0.443       | -47.2 | 0.033       | -11.3 | 0.854       | 158.1 |
| 34.0          | 0.931       | 134.2 | 0.403       | -57.4 | 0.029       | -15.4 | 0.858       | 151.4 |
| 36.0          | 0.949       | 125.4 | 0.363       | -69.3 | 0.029       | -29.0 | 0.881       | 140.4 |
| 38.0          | 0.969       | 117.5 | 0.316       | -81.0 | 0.038       | -56.8 | 0.910       | 127.9 |
| 40.0          | 0.981       | 113.5 | 0.284       | -92.8 | 0.050       | -85.1 | 0.930       | 119.2 |

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 EPA120BV.