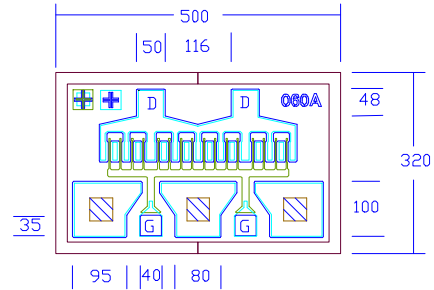



**DATA SHEET**
**High Efficiency Heterojunction Power FET**

- +26.5dBm TYPICAL OUTPUT POWER
- 10.5dB TYPICAL POWER GAIN FOR EPA060A AND 11.5dB FOR EPA060AV AT 18GHz
- 0.3 X 600 MICRON RECESSED “MUSHROOM” GATE
- Si<sub>3</sub>N<sub>4</sub> PASSIVATION
- ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY
- EPA060AV WITH VIA HOLE SOURCE GROUNDING
- Idss SORTED IN 15mA PER BIN RANGE



Chip Thickness: 75 ± 20 microns  
 All Dimensions In Microns  
 : Via Hole  
**No Via Hole For EPA060A**

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

| SYMBOLS          | PARAMETERS/TEST CONDITIONS  | EPA060A |      |      | EPA060AV |      |      | UNIT |
|------------------|---|---------|------|------|----------|------|------|------|
|                  |   | MIN     | TYP  | MAX  | MIN      | TYP  | MAX  |      |
| P <sub>1dB</sub> | Output Power at 1dB Compression f=12GHz   | 25.0    | 26.5 |      | 25.0     | 26.5 |      | dBm  |
|                  | V <sub>ds</sub> =8V, I <sub>ds</sub> =50% I <sub>dss</sub> f=18GHz                            |         | 26.5 |      |          | 26.5 |      |      |
| G <sub>1dB</sub> | 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                            |         | 10.5 |      |          | 11.5 |      |      |
| PAE              | Gain at 1dB Compression<br>V <sub>ds</sub> =8V, I <sub>ds</sub> =50% I <sub>dss</sub> f=12GHz |         | 45   |      |          | 46   |      | %    |
| I <sub>dss</sub> | Saturated Drain Current V <sub>ds</sub> =3V, V <sub>gs</sub> =0V                              | 105     | 180  | 255  | 105      | 180  | 255  | mA   |
| G <sub>m</sub>   | Transconductance V <sub>ds</sub> =3V, V <sub>gs</sub> =0V                                     | 120     | 190  |      | 120      | 190  |      | mS   |
| V <sub>p</sub>   | Pinch-off Voltage V <sub>ds</sub> =3V, I <sub>ds</sub> =2.0mA                                 |         | -1.0 | -2.5 |          | -1.0 | -2.5 | V    |
| BV <sub>gd</sub> | Drain Breakdown Voltage I <sub>gd</sub> =1.0mA  | -11     | -15  |      | -11      | -15  |      | V    |
| BV <sub>gs</sub> | Source Breakdown Voltage I <sub>gs</sub> =1.0mA   | -7      | -14  |      | -7       | -14  |      | V    |
| R <sub>th</sub>  | Thermal Resistance (Au-Sn Eutectic Attach)  |         | 65   |      |          | 50   |      | °C/W |

**MAXIMUM RATINGS AT 25 °C**

| SYMBOLS          | PARAMETERS              | EPA060A               |                         | EPA060AV              |                         |
|------------------|-------------------------|-----------------------|-------------------------|-----------------------|-------------------------|
|                  |                         | ABSOLUTE <sup>1</sup> | CONTINUOUS <sup>2</sup> | ABSOLUTE <sup>1</sup> | CONTINUOUS <sup>2</sup> |
| V <sub>ds</sub>  | Drain-Source Voltage    | 12V                   | 8V                      | 12V                   | 8V                      |
| V <sub>gs</sub>  | Gate-Source Voltage     | -8V                   | -3V                     | -8V                   | -3V                     |
| I <sub>ds</sub>  | Drain Current           | I <sub>dss</sub>      | 220mA                   | I <sub>dss</sub>      | I <sub>dss</sub>        |
| I <sub>gsf</sub> | Forward Gate Current    | 30mA                  | 5mA                     | 30mA                  | 5mA                     |
| P <sub>in</sub>  | Input Power             | 24dBm                 | @ 3dB<br>Compression    | 24dBm                 | @ 3dB<br>Compression    |
| T <sub>ch</sub>  | Channel Temperature     | 175°C                 | 150°C                   | 175°C                 | 150°C                   |
| T <sub>stg</sub> | Storage Temperature     | -65/175°C             | -65/150°C               | -65/175°C             | -65/150°C               |
| P <sub>t</sub>   | Total Power Dissipation | 2.1W                  | 1.7W                    | 2.7W                  | 2.3W                    |

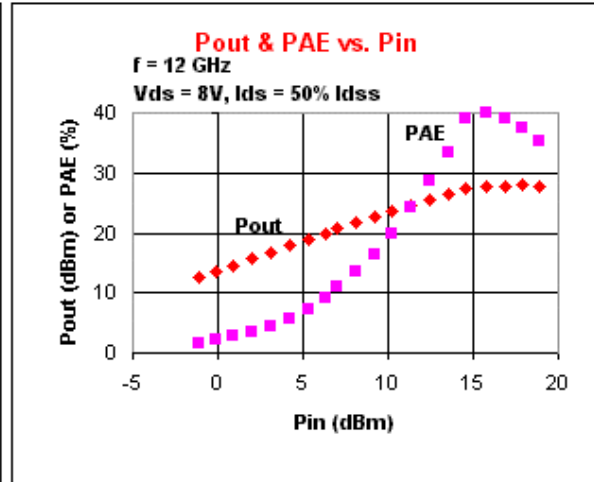
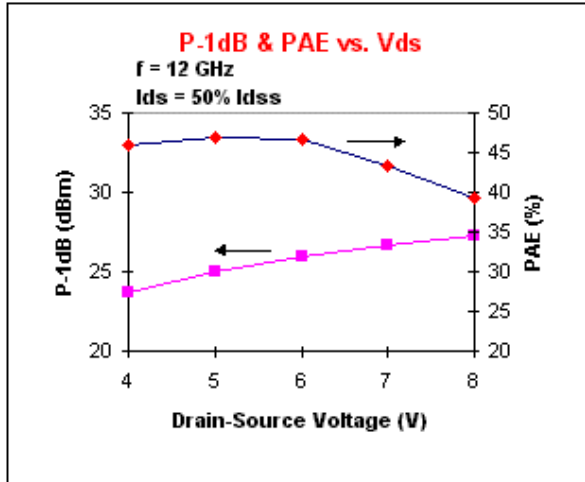
- Note: 1. Exceeding any of the above ratings may result in permanent damage.  
 2. Exceeding any of the above ratings may reduce MTTF below design goals.

# EPA060A/EPA060AV

## DATA SHEET

### High Efficiency Heterojunction Power FET

#### EPA060A



#### S-PARAMETERS

##### EPA060A 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        | 0.944 | -49.2  | 12.673 | 148.9 | 0.027 | 63.8 | 0.506 | -26.9  | 21.0       | 0.863 | 154.4 | 1.284 | 3.3   | 0.049 | -0.4  | 0.523 | -161.7 |
| 2.0        | 0.898 | -85.9  | 10.129 | 127.1 | 0.043 | 44.6 | 0.428 | -47.2  | 22.0       | 0.866 | 152.6 | 1.207 | -1.1  | 0.050 | 0.1   | 0.547 | -166.3 |
| 4.0        | 0.850 | -126.7 | 6.507  | 100.2 | 0.054 | 26.2 | 0.329 | -71.5  | 24.0       | 0.877 | 149.9 | 1.078 | -9.9  | 0.053 | 2.5   | 0.594 | -174.5 |
| 6.0        | 0.845 | -146.8 | 4.644  | 83.5  | 0.057 | 17.1 | 0.301 | -87.7  | 26.0       | 0.893 | 148.0 | 0.987 | -18.2 | 0.055 | 3.6   | 0.642 | 178.5  |
| 8.0        | 0.843 | -159.5 | 3.585  | 70.2  | 0.057 | 12.3 | 0.315 | -101.2 | 28.0       | 0.902 | 144.8 | 0.895 | -26.1 | 0.061 | 5.8   | 0.675 | 172.9  |
| 10.0       | 0.846 | -168.3 | 2.897  | 59.2  | 0.053 | 6.7  | 0.342 | -111.8 | 30.0       | 0.898 | 141.4 | 0.817 | -33.6 | 0.064 | 5.1   | 0.699 | 168.4  |
| 12.0       | 0.851 | -175.6 | 2.416  | 48.4  | 0.052 | 4.9  | 0.379 | -121.3 | 32.0       | 0.898 | 136.0 | 0.752 | -41.1 | 0.064 | 3.0   | 0.720 | 163.8  |
| 14.0       | 0.855 | -177.3 | 2.068  | 38.0  | 0.050 | 1.9  | 0.413 | -129.8 | 34.0       | 0.891 | 129.2 | 0.671 | -49.3 | 0.064 | 2.6   | 0.740 | 157.9  |
| 16.0       | 0.857 | -170.3 | 1.801  | 27.5  | 0.049 | 1.0  | 0.447 | -138.3 | 36.0       | 0.891 | 122.5 | 0.604 | -58.2 | 0.066 | -4.6  | 0.774 | 149.6  |
| 18.0       | 0.856 | -162.7 | 1.576  | 16.9  | 0.050 | -2.9 | 0.472 | -146.6 | 38.0       | 0.914 | 116.3 | 0.551 | -67.0 | 0.069 | -21.6 | 0.789 | 138.7  |
| 20.0       | 0.854 | -156.5 | 1.404  | 7.1   | 0.048 | -2.1 | 0.492 | -155.7 | 40.0       | 0.909 | 108.9 | 0.497 | -79.1 | 0.073 | -41.6 | 0.786 | 129.4  |

#### EPA060AV 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        | 0.941 | -45.8  | 10.923 | 150.6 | 0.026 | 63.8  | 0.540 | -23.4  | 21.0       | 0.856 | 150.2 | 1.167 | -1.7  | 0.049 | -16.0 | 0.541 | -149.4 |
| 2.0        | 0.901 | -81.3  | 8.948  | 128.8 | 0.042 | 46.0  | 0.475 | -41.6  | 22.0       | 0.855 | 145.9 | 1.073 | -7.8  | 0.049 | -17.9 | 0.572 | -155.6 |
| 4.0        | 0.849 | -123.6 | 5.868  | 100.3 | 0.054 | 24.2  | 0.380 | -62.5  | 24.0       | 0.849 | 144.8 | 0.935 | -16.2 | 0.048 | -15.9 | 0.595 | -167.5 |
| 6.0        | 0.824 | -149.5 | 4.191  | 81.9  | 0.057 | 12.9  | 0.349 | -74.1  | 26.0       | 0.863 | 137.5 | 0.797 | -26.0 | 0.047 | -15.0 | 0.632 | -173.1 |
| 8.0        | 0.829 | -161.5 | 3.259  | 68.9  | 0.057 | 8.1   | 0.325 | -83.0  | 28.0       | 0.873 | 129.4 | 0.693 | -35.1 | 0.044 | -18.8 | 0.655 | -179.7 |
| 10.0       | 0.826 | -170.9 | 2.641  | 57.2  | 0.054 | 1.9   | 0.319 | -95.2  | 30.0       | 0.871 | 126.6 | 0.619 | -45.1 | 0.044 | -21.3 | 0.689 | 166.1  |
| 12.0       | 0.830 | -175.8 | 2.170  | 44.3  | 0.051 | -3.1  | 0.360 | -106.1 | 32.0       | 0.870 | 123.9 | 0.537 | -53.5 | 0.040 | -24.9 | 0.720 | 156.9  |
| 14.0       | 0.842 | -167.4 | 1.807  | 33.4  | 0.050 | -8.2  | 0.397 | -116.9 | 34.0       | 0.865 | 121.5 | 0.473 | -61.7 | 0.038 | -26.5 | 0.754 | 151.5  |
| 16.0       | 0.862 | -159.7 | 1.551  | 22.1  | 0.048 | -10.6 | 0.459 | -127.9 | 36.0       | 0.867 | 119.2 | 0.423 | -68.1 | 0.039 | -27.1 | 0.808 | 150.1  |
| 18.0       | 0.875 | -158.2 | 1.370  | 12.9  | 0.048 | -13.5 | 0.498 | -141.6 | 38.0       | 0.907 | 116.3 | 0.394 | -73.1 | 0.045 | -44.2 | 0.837 | 149.8  |
| 20.0       | 0.861 | -153.6 | 1.203  | 3.6   | 0.048 | -15.8 | 0.523 | -148.5 | 40.0       | 0.900 | 115.8 | 0.372 | -80.4 | 0.050 | -59.8 | 0.859 | 146.3  |

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 EPA060AV.

