

Eudyna GaN-HEMT 30W

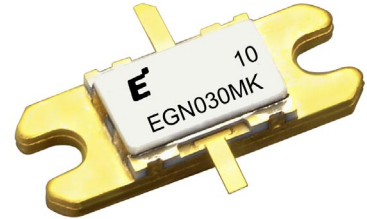
EGN030MK

Preliminary

High Voltage - High Power GaN-HEMT

FEATURES

- High Voltage Operation : $V_{DS}=50V$
- High Power : 46.5dBm (typ.) @ P3dB
- High Efficiency: 60%(typ.) @ P3dB
- Linear Gain : 12dB(typ.) @ $f=2700MHz$
- Broad Frequency Range : 800 to 2800MHz
- Proven Reliability



DESCRIPTION

Eudyna's GaN-HEMT offers high efficiency, ease of matching, greater consistency and broad bandwidth for high power L-band amplifiers with 50V operation, and gives you higher gain.

This device targets applications for low current and wide band applications for high voltage.

ABSOLUTE MAXIMUM RATINGS

| Item | Symbol | Condition | Rating | Unit |
|-------------------------|-----------|------------------|-------------|------------|
| Drain-Source Voltage | V_{DS} | | 120 | V |
| Gate-Source Voltage | V_{GS} | $T_c=25^\circ C$ | -5 | V |
| Total Power Dissipation | P_t | | 56.25 | W |
| Storage Temperature | T_{stg} | | -65 to +175 | $^\circ C$ |
| Channel Temperature | T_{ch} | | 250 | $^\circ C$ |

RECOMMENDED OPERATING CONDITION(Case Temperature $T_c= 25^\circ C$)

| Item | Symbol | Condition | Limit | Unit |
|----------------------|----------|-----------------|-------|------------|
| DC Input Voltage | V_{DS} | | 50 | V |
| Forward Gate Current | I_{GF} | $R_G=15 \Omega$ | <6.1 | mA |
| Reverse Gate Current | I_{GR} | $R_G=15 \Omega$ | >-2.2 | mA |
| Channel Temperature | T_{ch} | | 200 | $^\circ C$ |

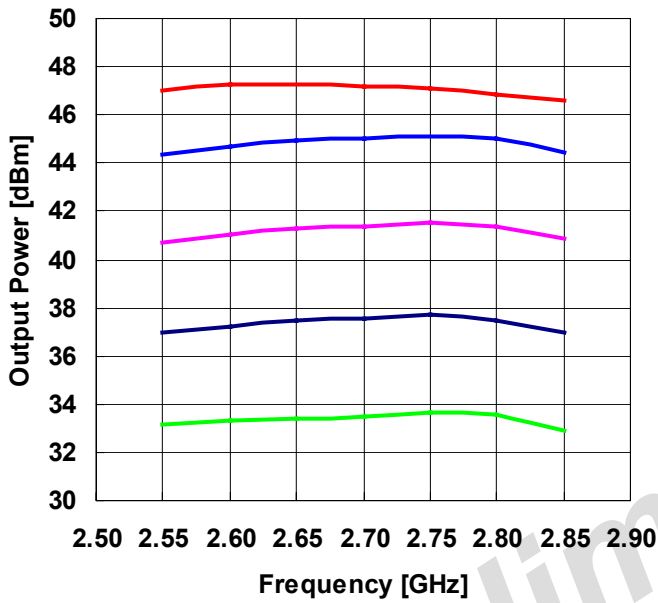
ELECTRICAL CHARACTERISTICS (Case Temperature $T_c=25^\circ C$)

| Item | Symbol | Condition | Limit | | | Unit |
|------------------------------|-----------|----------------------------|-------|------|------|--------------|
| | | | min. | Typ. | Max. | |
| Pinch-Off Voltage | V_p | $V_{DS}=50V$ $I_{DS}=11mA$ | -1.0 | -2.0 | -3.5 | V |
| Gate-Drain Breakdown Voltage | V_{GDO} | $I_{GS}=-5.6 mA$ | - | -350 | - | V |
| 3dB Gain Compression Power | P_{3dB} | $V_{DS}=50V$ | 45.5 | 46.5 | - | dBm |
| Drain Efficiency | η_d | $I_{DS}(DC)=200mA$ | - | 60 | - | % |
| Linear Gain | GL | $f=2.7GHz$ | 11.0 | 12.0 | - | dB |
| Thermal Resistance | R_{th} | Channel to Case | - | 3.0 | 4.0 | $^\circ C/W$ |

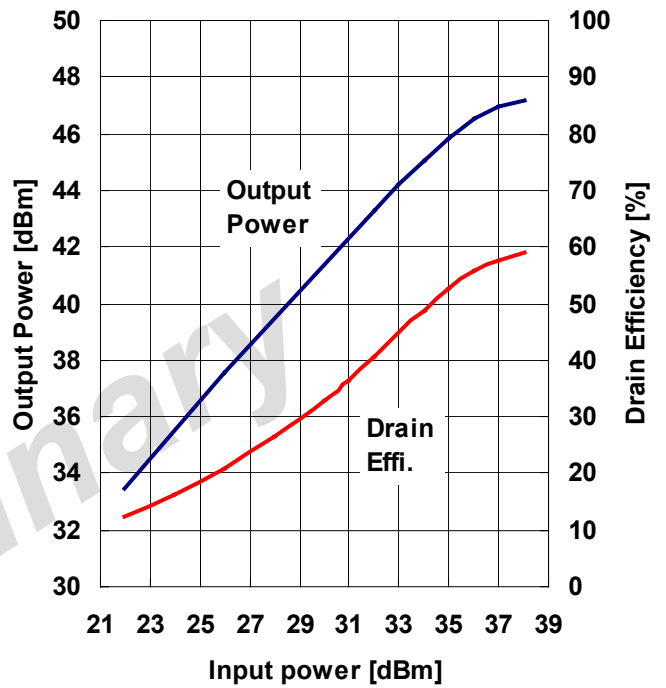
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High Voltage - High Power GaN-HEMT

Output Power vs. Frequency
 $V_{DS}=50V$ $I_{DS(DC)}=200mA$

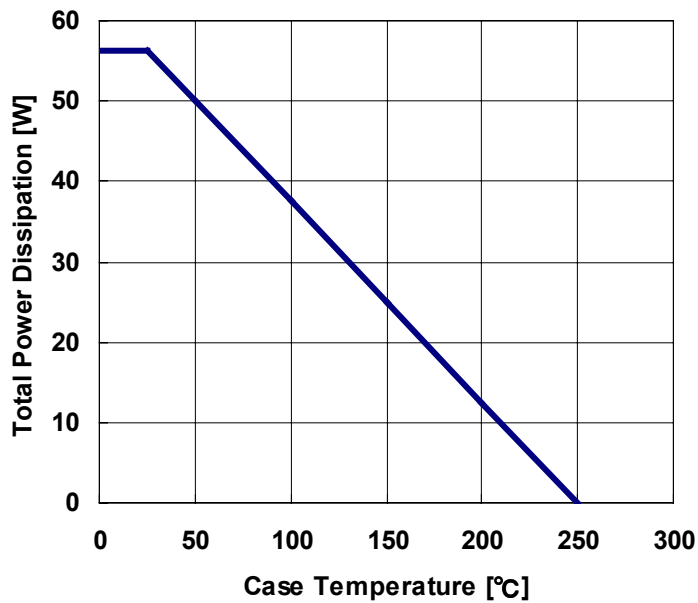


Output Power and Drain Efficiency vs. Input Power
 $V_{DS}=50V$ $I_{DS(DC)}=200mA$ $f=2.7GHz$



— Pin=22dBm — Pin=26dBm — Pin=30dBm
— Pin=34dBm — Pin=38dBm

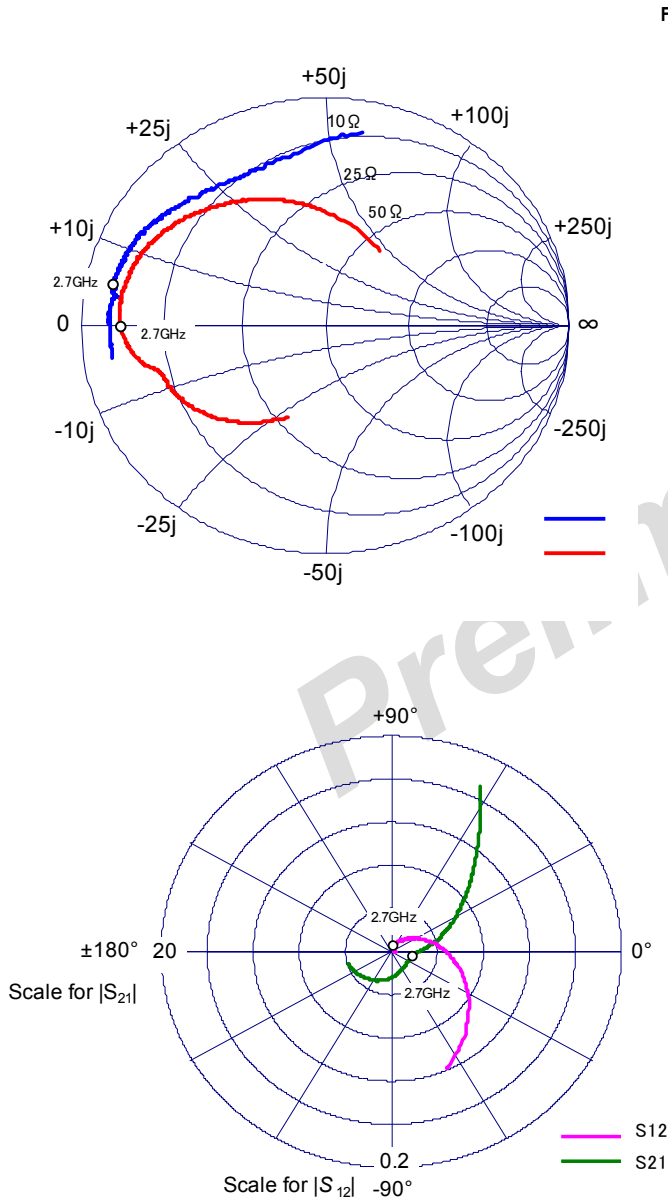
Power Derating Curve



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High Voltage - High Power GaN-HEMT

S-Parameters @V_{ds}=50V I_{ds}=200mA f=0.5 to 5.5 GHz
Z_l = Z_s = 50 ohm Marker : 2.7GHz



| Freq [GHz] | S11 | | S21 | | S12 | | S22 | |
|------------|-------|--------|-------|--------|-------|-------|-------|--------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.5 | 0.885 | -170.7 | 8.614 | 63.5 | 0.010 | -4.5 | 0.429 | -110.7 |
| 0.6 | 0.882 | -173.9 | 6.953 | 56.2 | 0.009 | -8.0 | 0.475 | -118.1 |
| 0.7 | 0.882 | -176.4 | 5.755 | 50.0 | 0.009 | -8.5 | 0.517 | -124.5 |
| 0.8 | 0.882 | -178.5 | 4.860 | 44.1 | 0.008 | -9.5 | 0.555 | -130.2 |
| 0.9 | 0.884 | 179.6 | 4.124 | 38.6 | 0.007 | -6.3 | 0.589 | -135.4 |
| 1.0 | 0.884 | 177.8 | 3.576 | 33.4 | 0.006 | -2.4 | 0.617 | -140.4 |
| 1.1 | 0.883 | 176.3 | 3.118 | 28.6 | 0.006 | 1.3 | 0.643 | -144.8 |
| 1.2 | 0.883 | 174.8 | 2.739 | 24.0 | 0.006 | 5.5 | 0.661 | -148.7 |
| 1.3 | 0.880 | 173.9 | 2.427 | 20.0 | 0.006 | 15.7 | 0.676 | -152.5 |
| 1.4 | 0.876 | 172.7 | 2.160 | 16.1 | 0.005 | 21.3 | 0.690 | -155.6 |
| 1.5 | 0.872 | 171.9 | 1.941 | 12.5 | 0.005 | 26.3 | 0.694 | -158.6 |
| 1.6 | 0.867 | 171.5 | 1.732 | 9.6 | 0.006 | 32.6 | 0.698 | -160.6 |
| 1.7 | 0.864 | 171.3 | 1.575 | 7.5 | 0.006 | 38.4 | 0.703 | -162.5 |
| 1.8 | 0.864 | 171.3 | 1.443 | 5.4 | 0.007 | 44.4 | 0.712 | -163.8 |
| 1.9 | 0.861 | 171.6 | 1.340 | 3.7 | 0.007 | 47.8 | 0.724 | -164.8 |
| 2.0 | 0.866 | 171.8 | 1.259 | 1.8 | 0.009 | 47.8 | 0.742 | -166.2 |
| 2.1 | 0.868 | 171.7 | 1.195 | -0.4 | 0.009 | 53.1 | 0.767 | -167.6 |
| 2.2 | 0.871 | 171.5 | 1.138 | -2.5 | 0.009 | 58.2 | 0.782 | -169.6 |
| 2.3 | 0.876 | 171.4 | 1.090 | -4.9 | 0.011 | 59.4 | 0.798 | -171.6 |
| 2.4 | 0.881 | 170.8 | 1.051 | -7.3 | 0.011 | 60.1 | 0.810 | -173.6 |
| 2.5 | 0.878 | 170.3 | 1.013 | -9.8 | 0.013 | 66.8 | 0.818 | -175.5 |
| 2.6 | 0.873 | 169.2 | 0.983 | -12.3 | 0.014 | 64.0 | 0.827 | -177.2 |
| 2.7 | 0.886 | 168.3 | 0.961 | -14.9 | 0.016 | 62.7 | 0.832 | -179.3 |
| 2.8 | 0.887 | 166.9 | 0.936 | -17.6 | 0.017 | 59.1 | 0.840 | 178.8 |
| 2.9 | 0.882 | 166.0 | 0.919 | -20.3 | 0.018 | 61.6 | 0.842 | 177.0 |
| 3.0 | 0.881 | 164.5 | 0.897 | -23.0 | 0.020 | 59.7 | 0.843 | 175.4 |
| 3.1 | 0.880 | 162.8 | 0.893 | -25.9 | 0.023 | 58.8 | 0.847 | 173.3 |
| 3.2 | 0.876 | 161.1 | 0.877 | -28.7 | 0.026 | 57.5 | 0.843 | 171.3 |
| 3.3 | 0.869 | 159.4 | 0.869 | -31.5 | 0.027 | 56.4 | 0.838 | 169.4 |
| 3.4 | 0.869 | 157.9 | 0.868 | -34.6 | 0.030 | 55.4 | 0.838 | 167.4 |
| 3.5 | 0.865 | 156.3 | 0.868 | -37.8 | 0.033 | 51.6 | 0.832 | 165.2 |
| 3.6 | 0.861 | 154.7 | 0.864 | -40.8 | 0.035 | 49.6 | 0.831 | 162.7 |
| 3.7 | 0.856 | 152.9 | 0.873 | -44.2 | 0.039 | 45.6 | 0.822 | 160.4 |
| 3.8 | 0.848 | 151.1 | 0.884 | -47.6 | 0.042 | 42.9 | 0.814 | 158.0 |
| 3.9 | 0.846 | 149.5 | 0.898 | -51.0 | 0.046 | 39.5 | 0.804 | 155.4 |
| 4.0 | 0.839 | 148.1 | 0.910 | -54.6 | 0.051 | 36.2 | 0.797 | 152.4 |
| 4.1 | 0.833 | 146.5 | 0.942 | -58.5 | 0.056 | 33.6 | 0.787 | 149.6 |
| 4.2 | 0.825 | 144.6 | 0.974 | -62.2 | 0.061 | 30.4 | 0.769 | 146.3 |
| 4.3 | 0.811 | 142.6 | 0.995 | -66.4 | 0.068 | 26.0 | 0.753 | 143.0 |
| 4.4 | 0.805 | 140.2 | 1.041 | -71.3 | 0.075 | 21.3 | 0.736 | 139.6 |
| 4.5 | 0.790 | 137.1 | 1.077 | -76.6 | 0.084 | 16.7 | 0.715 | 135.9 |
| 4.6 | 0.783 | 134.4 | 1.143 | -82.0 | 0.095 | 12.3 | 0.697 | 131.9 |
| 4.7 | 0.766 | 130.9 | 1.199 | -88.3 | 0.106 | 5.2 | 0.672 | 127.6 |
| 4.8 | 0.754 | 127.4 | 1.272 | -94.5 | 0.119 | 0.2 | 0.650 | 122.5 |
| 4.9 | 0.746 | 122.2 | 1.348 | -102.2 | 0.135 | -7.3 | 0.623 | 117.4 |
| 5.0 | 0.736 | 117.5 | 1.429 | -110.2 | 0.152 | -14.2 | 0.592 | 111.6 |
| 5.1 | 0.740 | 112.1 | 1.526 | -118.7 | 0.172 | -22.6 | 0.561 | 104.9 |
| 5.2 | 0.752 | 106.0 | 1.617 | -127.9 | 0.197 | -31.8 | 0.526 | 96.3 |
| 5.3 | 0.767 | 98.5 | 1.708 | -138.2 | 0.226 | -42.2 | 0.487 | 86.3 |
| 5.4 | 0.810 | 90.2 | 1.846 | -149.8 | 0.257 | -53.1 | 0.443 | 73.2 |
| 5.5 | 0.859 | 79.9 | 1.936 | -162.7 | 0.296 | -65.6 | 0.395 | 55.5 |