

Eudyna GaN-HEMT 45W

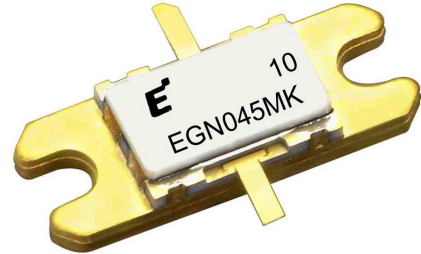
EGN045MK

Preliminary

High Voltage - High Power GaN-HEMT

FEATURES

- High Voltage Operation : $V_{DS}=50V$
- High Power : 47.5dBm (typ.) @ P3dB
- High Efficiency: 60%(typ.) @ P3dB
- Linear Gain : 12dB(typ.) @ $f=2200MHz$
- Broad Frequency Range : 800 to 2200MHz
- 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 target applications are low current and wide band applications for high voltage.

ABSOLUTE MAXIMUM RATINGS

| Item | Symbol | Condition | Rating | Unit |
|-------------------------|-----------|-------------------|-------------|-------------|
| Drain-Source Voltage | V_{DS} | $T_c=25^{\circ}C$ | 120 | V |
| Gate-Source Voltage | V_{GS} | | -5 | V |
| Total Power Dissipation | P_t | | 75.0 | 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} | $R_G=10 \Omega$ | <9.7 | mA |
| Reverse Gate Current | I_{GR} | $R_G=10 \Omega$ | >-3.6 | mA |
| Channel Temperature | T_{ch} | | 200 | $^{\circ}C$ |

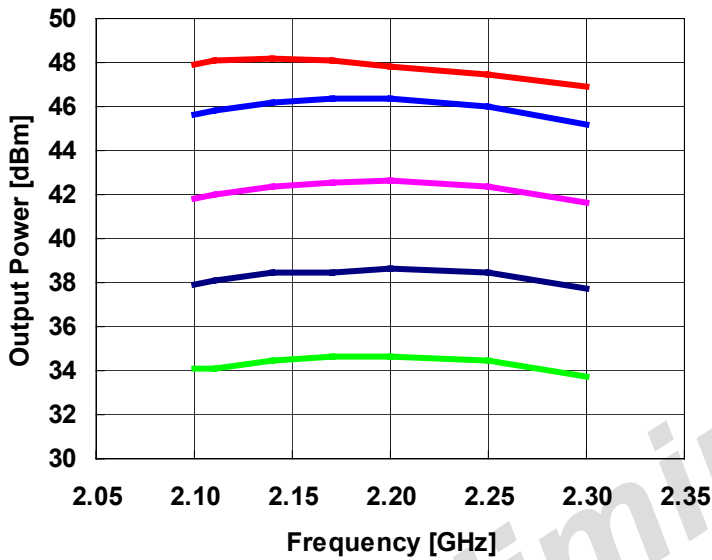
ELECTRICAL CHARACTERISTICS (Case Temperature $T_c=25^{\circ}C$)

| Item | Symbol | Condition | Limit | | | Unit |
|------------------------------|-----------|----------------------------|-------|------|------|---------------|
| | | | min. | Typ. | Max. | |
| Pinch-Off Voltage | V_p | $V_{DS}=50V$ $I_{DS}=18mA$ | -1.0 | -2.0 | -3.5 | V |
| Gate-Drain Breakdown Voltage | V_{GDO} | $I_{GS}=-9.0 mA$ | - | -350 | - | V |
| 3dB Gain Compression Power | P_{3dB} | $V_{DS}=50V$ | 46.5 | 47.5 | - | dBm |
| Drain Efficiency | η_d | $I_{DS}(DC)=250mA$ | - | 60 | - | % |
| Linear Gain | GL | $f=2.2GHz$ | 11.0 | 12.0 | - | dB |
| Thermal Resistance | R_{th} | Channel to Case | - | 2.0 | 3.0 | $^{\circ}C/W$ |

EGN045MK

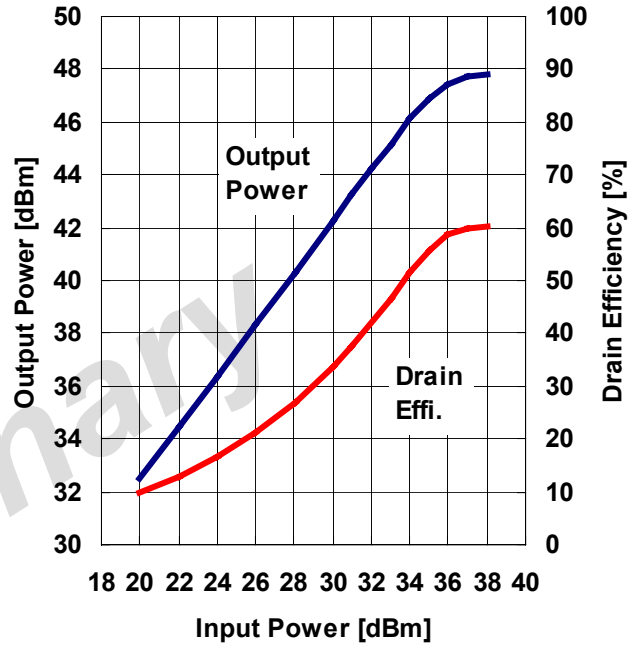
High Voltage - High Power GaN-HEMT

Output Power vs. Frequency
 $V_{DS}=50V$ $I_{DS(DC)}=250mA$

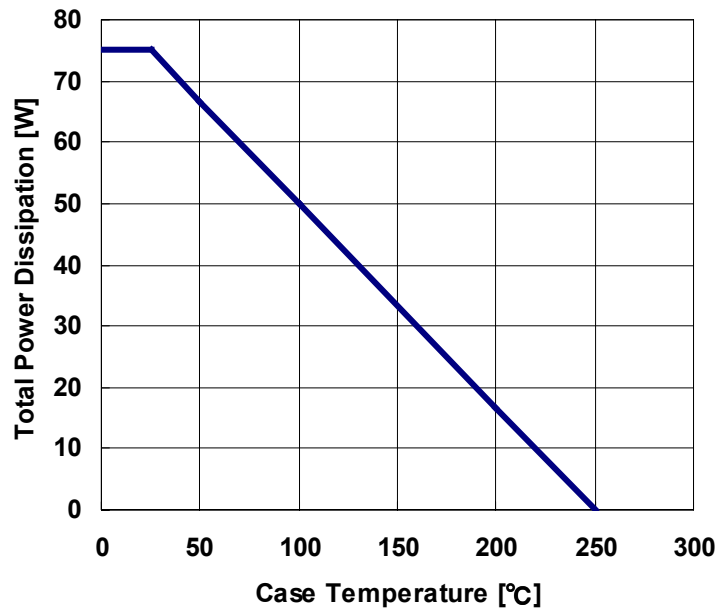


Pin=22dBm Pin=26dBm Pin=30dBm
Pin=34dBm Pin=38dBm

Output Power and Drain Efficiency vs. Input Power
 $V_{DS}=50V$ $I_{DS(DC)}=250mA$ $f=2.2GHz$



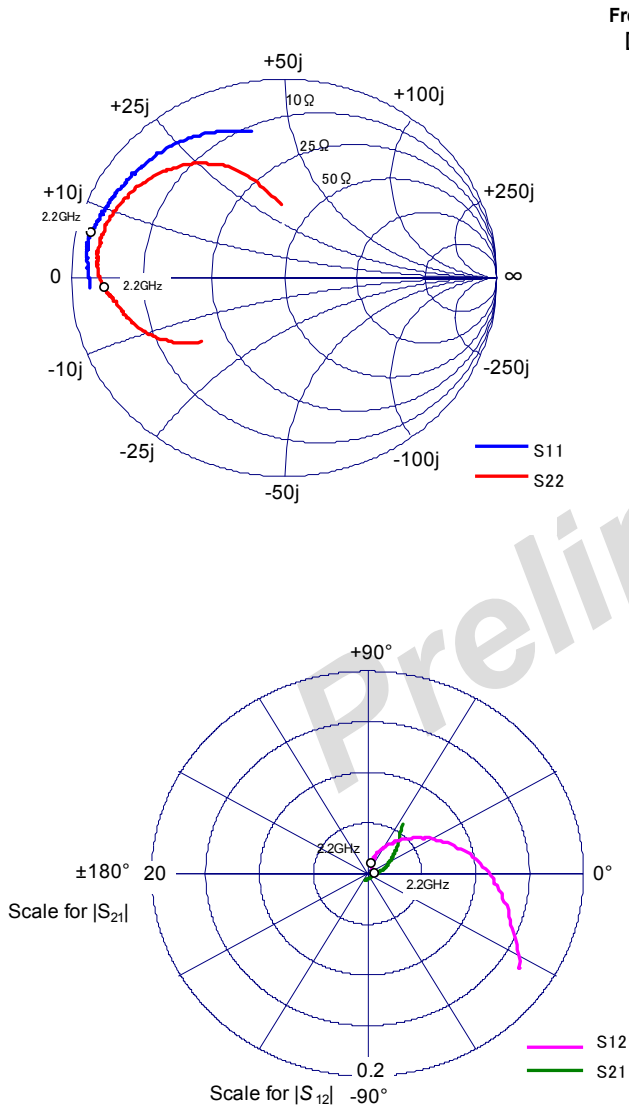
Power Derating Curve



EGN045MK

High Voltage - High Power GaN-HEMT

S-Parameters @V_{ds}=50V I_{ds}=250mA f=0.5 to 5.5 GHz
Z_l = Z_s = 50 ohm Marker : 2.2GHz



| Freq [GHz] | S11 | | S21 | | S12 | | S22 | |
|------------|-------|--------|-------|--------|-------|-------|-------|--------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.5 | 0.910 | -176.7 | 5.860 | 56.6 | 0.009 | -11.1 | 0.503 | -140.4 |
| 0.6 | 0.912 | -178.6 | 4.663 | 50.0 | 0.008 | -14.0 | 0.557 | -143.9 |
| 0.7 | 0.914 | 179.9 | 3.801 | 44.0 | 0.007 | -13.6 | 0.602 | -147.2 |
| 0.8 | 0.919 | 178.0 | 3.170 | 38.2 | 0.006 | -9.8 | 0.641 | -150.8 |
| 0.9 | 0.924 | 176.7 | 2.672 | 33.2 | 0.006 | -4.9 | 0.675 | -154.1 |
| 1.0 | 0.924 | 175.3 | 2.291 | 28.6 | 0.005 | 2.5 | 0.702 | -157.1 |
| 1.1 | 0.927 | 174.0 | 1.978 | 24.3 | 0.005 | 7.4 | 0.727 | -159.5 |
| 1.2 | 0.933 | 173.2 | 1.727 | 20.1 | 0.005 | 22.0 | 0.745 | -162.1 |
| 1.3 | 0.934 | 172.1 | 1.527 | 16.7 | 0.005 | 28.8 | 0.759 | -164.4 |
| 1.4 | 0.929 | 171.2 | 1.354 | 12.8 | 0.005 | 36.7 | 0.772 | -166.3 |
| 1.5 | 0.936 | 170.3 | 1.214 | 10.1 | 0.006 | 44.4 | 0.782 | -168.1 |
| 1.6 | 0.937 | 169.3 | 1.092 | 7.1 | 0.006 | 51.0 | 0.792 | -169.5 |
| 1.7 | 0.937 | 168.5 | 0.992 | 4.6 | 0.006 | 52.2 | 0.797 | -170.9 |
| 1.8 | 0.940 | 168.3 | 0.912 | 2.6 | 0.007 | 58.3 | 0.808 | -172.1 |
| 1.9 | 0.937 | 167.4 | 0.832 | -0.1 | 0.008 | 60.1 | 0.816 | -173.5 |
| 2.0 | 0.935 | 167.1 | 0.778 | -2.1 | 0.009 | 61.9 | 0.825 | -174.6 |
| 2.1 | 0.933 | 166.4 | 0.723 | -3.8 | 0.009 | 63.5 | 0.835 | -175.5 |
| 2.2 | 0.933 | 166.0 | 0.678 | -5.9 | 0.010 | 67.0 | 0.844 | -176.8 |
| 2.3 | 0.932 | 165.5 | 0.641 | -8.1 | 0.011 | 65.5 | 0.853 | -177.8 |
| 2.4 | 0.929 | 165.1 | 0.608 | -10.1 | 0.012 | 68.3 | 0.859 | -179.0 |
| 2.5 | 0.927 | 164.5 | 0.582 | -11.6 | 0.013 | 68.4 | 0.865 | -179.9 |
| 2.6 | 0.926 | 163.8 | 0.556 | -13.7 | 0.015 | 69.0 | 0.870 | 178.8 |
| 2.7 | 0.921 | 163.0 | 0.533 | -15.7 | 0.016 | 68.1 | 0.874 | 177.7 |
| 2.8 | 0.922 | 162.5 | 0.520 | -17.7 | 0.017 | 69.3 | 0.879 | 176.2 |
| 2.9 | 0.918 | 161.5 | 0.504 | -19.9 | 0.019 | 67.0 | 0.882 | 174.7 |
| 3.0 | 0.913 | 160.8 | 0.489 | -21.9 | 0.021 | 66.7 | 0.882 | 173.6 |
| 3.1 | 0.912 | 159.6 | 0.480 | -24.1 | 0.023 | 64.6 | 0.882 | 172.1 |
| 3.2 | 0.910 | 158.5 | 0.472 | -26.6 | 0.025 | 62.6 | 0.886 | 170.3 |
| 3.3 | 0.909 | 157.3 | 0.466 | -28.6 | 0.027 | 61.4 | 0.882 | 168.7 |
| 3.4 | 0.904 | 156.1 | 0.458 | -31.5 | 0.029 | 60.5 | 0.881 | 166.9 |
| 3.5 | 0.900 | 154.7 | 0.452 | -33.6 | 0.031 | 58.1 | 0.880 | 164.9 |
| 3.6 | 0.896 | 153.3 | 0.449 | -36.1 | 0.035 | 56.6 | 0.875 | 162.9 |
| 3.7 | 0.893 | 151.5 | 0.446 | -39.3 | 0.038 | 53.0 | 0.871 | 160.4 |
| 3.8 | 0.891 | 150.2 | 0.445 | -42.1 | 0.041 | 51.0 | 0.860 | 158.4 |
| 3.9 | 0.888 | 148.4 | 0.449 | -45.1 | 0.044 | 48.4 | 0.859 | 155.5 |
| 4.0 | 0.885 | 146.8 | 0.449 | -47.5 | 0.048 | 44.9 | 0.847 | 152.7 |
| 4.1 | 0.879 | 145.1 | 0.453 | -50.4 | 0.052 | 42.3 | 0.840 | 150.2 |
| 4.2 | 0.872 | 143.1 | 0.457 | -53.9 | 0.057 | 38.5 | 0.830 | 147.0 |
| 4.3 | 0.873 | 140.9 | 0.461 | -57.8 | 0.062 | 34.2 | 0.810 | 143.5 |
| 4.4 | 0.872 | 138.8 | 0.468 | -61.6 | 0.068 | 31.3 | 0.798 | 140.1 |
| 4.5 | 0.868 | 136.7 | 0.477 | -65.7 | 0.074 | 26.8 | 0.773 | 135.8 |
| 4.6 | 0.864 | 134.1 | 0.482 | -69.5 | 0.081 | 22.4 | 0.747 | 132.2 |
| 4.7 | 0.855 | 131.6 | 0.485 | -73.6 | 0.087 | 16.8 | 0.720 | 127.3 |
| 4.8 | 0.847 | 128.5 | 0.491 | -78.4 | 0.097 | 11.3 | 0.685 | 122.6 |
| 4.9 | 0.839 | 125.2 | 0.497 | -82.1 | 0.105 | 5.1 | 0.642 | 117.5 |
| 5.0 | 0.831 | 121.6 | 0.505 | -86.0 | 0.115 | -0.9 | 0.593 | 112.8 |
| 5.1 | 0.820 | 117.9 | 0.521 | -89.0 | 0.123 | -7.5 | 0.541 | 108.4 |
| 5.2 | 0.802 | 114.0 | 0.541 | -92.8 | 0.133 | -13.7 | 0.491 | 104.5 |
| 5.3 | 0.785 | 109.9 | 0.580 | -96.7 | 0.142 | -20.7 | 0.444 | 100.4 |
| 5.4 | 0.770 | 105.5 | 0.626 | -102.1 | 0.155 | -27.0 | 0.403 | 96.5 |
| 5.5 | 0.755 | 101.4 | 0.683 | -108.5 | 0.169 | -33.5 | 0.365 | 91.4 |