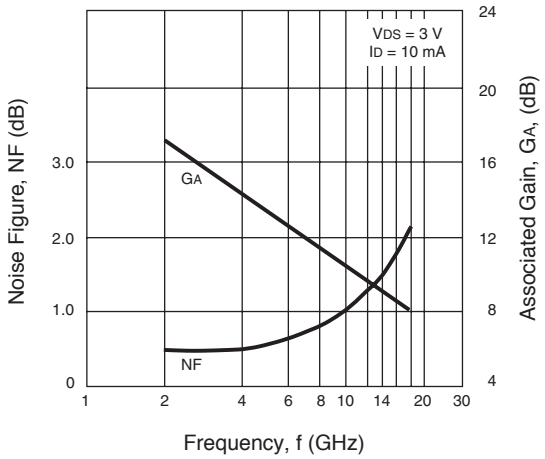
# NEC's L TO Ku BAND LOW NOISE AMPLIFIER N-CHANNEL GaAS MESFET

# NE67400
# NE67483B

## FEATURES

- **LOW NOISE FIGURE:** NF = 1.4 dB TYP at f = at 12 GHz
- **HIGH ASSOCIATED GAIN:** $G_A$ = 10 dB TYP at f = 12 GHz
- **GATE WIDTH:** $W_G$ = 280 μm
- **GATE LENGTH:** $L_G$ = 0.3 μm

**NOISE FIGURE, ASSOCIATED GAIN vs. FREQUENCY**




## DESCRIPTION

NEC's NE674 is a L to Ku Band low noise GaAs MESFET. This device features a low noise figure with high associated gain, employing a recessed 0.3 micron gate and triple epitaxial technology. The active area of the chip is covered with $SiD_2$ and $Si_3N_4$ for scratch protection and surface stability. This device is suitable for both amplifier and oscillator applications. This device is housed in a solder sealed hermetic, metal ceramic package for high reliability in space applications.

## ELECTRICAL CHARACTERISTICS ($T_A$ = 25°C)

| PART NUMBER<br>PACKAGE OUTLINE | | | | NE67400<br>NE67483B | | |
|---|---|---|---|---|---|---|
| **SYMBOLS** | **PARAMETERS AND CONDITIONS** | | **UNITS** | **MIN** | **TYP** | **MAX** |
| NF | Noise Figure at $V_{DS}$ = 3 V, $I_D$ = 10 mA, f = 4 GHz<br>f = 12 GHz | | dB<br>dB | | 0.6<br>1.4 | <br>1.6 |
| $G_A$ | Associated Gain at $V_{DS}$ = 3 V $I_D$ = 10 mA, f = 4 GHz<br>f = 12 GHz | | dB<br>dB | <br>8.5 | 14.0<br>10.0 | |
| $P_{1dB}$ | Output Power at 1 dB Gain Compression Point, f = 12 GHz,<br>$V_{DS}$ = 3 V, $I_{DS}$ = 30 mA | | dBm | | 14.5 | |
| $I_{DSS}$ | Saturated Drain Current at $V_{DS}$ = 3 V, $V_{GS}$ = 0 V | | mA | 20 | 40 | 120 |
| $V_{GS(OFF)}$ | Gate to Source Cut Off Voltage at $V_{DS}$ = 3 V, $I_D$ = 100 μA | | V | -0.5 | -1.1 | -3.5 |
| $g_m$ | Transconductance at $V_{DS}$ = 3 V, $I_D$ = 10 mA | | mS | 20 | 50 | 100 |
| $I_{GSO}$ | Gate to Source Leakage Current at $V_{GS}$ = -5 V | | μA | | 1.0 | 10 |
| $R_{TH\ (CH-C)}$ | Thermal Resistance (Channel-to-Case) | NE67400 | °C/W | | | 190 |
| | | NE67483B | °C/W | | | 450 |

## ABSOLUTE MAXIMUM RATINGS[1] ($T_A$ = 25°C)

| SYMBOLS | PARAMETERS | UNITS | RATINGS |
|---|---|---|---|
| $V_{DS}$ | Drain to Source Voltage | V | 5.0 |
| $V_{GD}$ | Gate to Drain Voltage | V | –6.0 |
| $I_{DS}$ | Drain Current | mA | $I_{DSS}$ |
| $T_{CH}$ | Channel Temperature | °C | 175 |
| $T_{STG}$ | Storage Temperature | °C | -65 to +175 |
| $P_T$ | Total Power Dissipation<br>NE67483B<br>NE67400 | <br>mW<br>mW | <br>270<br>400 |

Note:
1. Operation in excess of any one of these conditions may result in permanent damage.

## RECOMMENDED OPERATING CONDITIONS ($T_A$ = 25°C)

| SYMBOLS | PARAMETERS | UNITS | MIN | TYP | MAX |
|---|---|---|---|---|---|
| $V_{DS}$ | Drain to Source Voltage | V | | 3 | 4 |
| $I_D$ | Drain Current | mA | | 10 | 30 |
| $P_{IN}$ | Input Power | dBm | | | 15 |

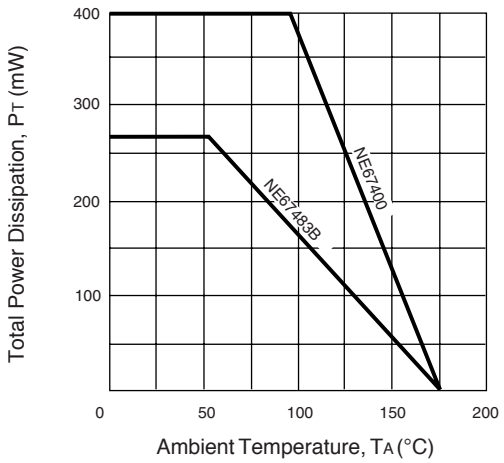
## TYPICAL NOISE PARAMETERS ($T_A$ = 25°C)

**$V_{DS}$ = 3 V, $I_{DS}$ = 10 mA (NE67483B)**

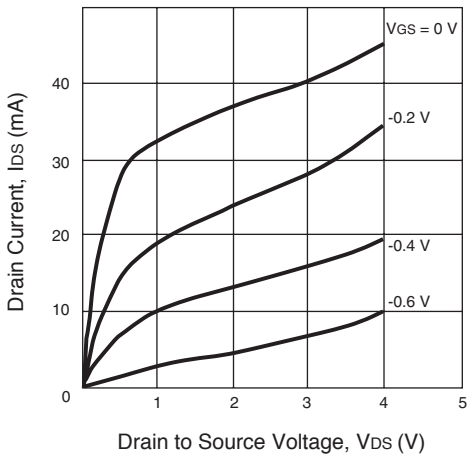
| FREQ. (GHz) | $NF_{OPT}$ (dB) | $G_A$ (dB) | $\Gamma_{OPT}$ MAG | $\Gamma_{OPT}$ ANG | Rn/50 |
|---|---|---|---|---|---|
| 2 | 0.55 | 17.0 | 0.81 | 37 | 0.57 |
| 3 | 0.58 | 15.2 | 0.75 | 53 | 0.51 |
| 4 | 0.60 | 14.0 | 0.70 | 69 | 0.44 |
| 5 | 0.68 | 13.2 | 0.67 | 83 | 0.37 |
| 6 | 0.76 | 12.6 | 0.65 | 97 | 0.31 |
| 7 | 0.85 | 12.0 | 0.64 | 111 | 0.25 |
| 8 | 0.93 | 11.5 | 0.64 | 123 | 0.19 |
| 9 | 1.03 | 11.0 | 0.64 | 136 | 0.14 |
| 10 | 1.15 | 10.7 | 0.64 | 148 | 0.10 |
| 11 | 1.26 | 10.3 | 0.64 | 161 | 0.06 |
| 12 | 1.40 | 10.0 | 0.63 | 173 | 0.05 |
| 13 | 1.55 | 9.6 | 0.62 | -173 | 0.05 |
| 14 | 1.70 | 9.2 | 0.60 | -159 | 0.08 |
| 15 | 1.84 | 9.0 | 0.57 | -145 | 0.15 |
| 16 | 2.04 | 8.6 | 0.53 | -129 | 0.23 |
| 17 | 2.18 | 8.3 | 0.46 | -113 | 0.34 |
| 18 | 2.35 | 8.0 | 0.38 | -95 | 0.44 |

## TYPICAL PERFORMANCE CURVES ($T_A$ = 25°C)

**TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE**

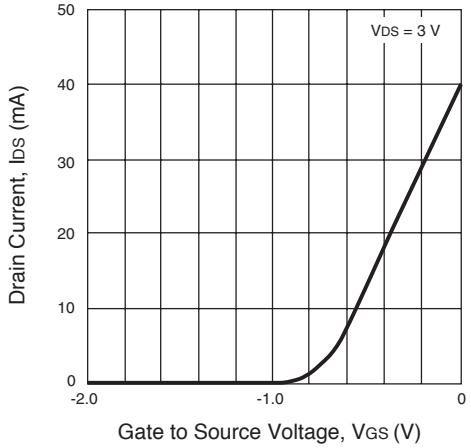



**DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE**



## TYPICAL PERFORMANCE CURVES ($T_A$ = 25°C)

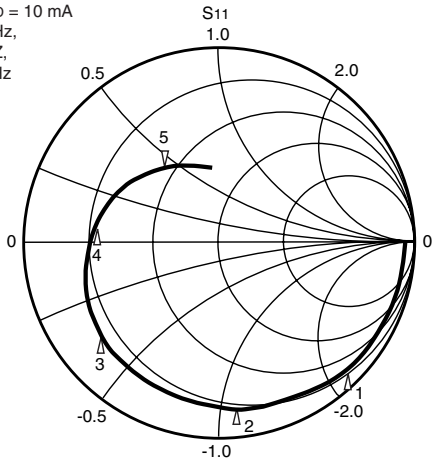
**DRAIN CURRENT vs. GATE TO SOURCE VOLTAGE**

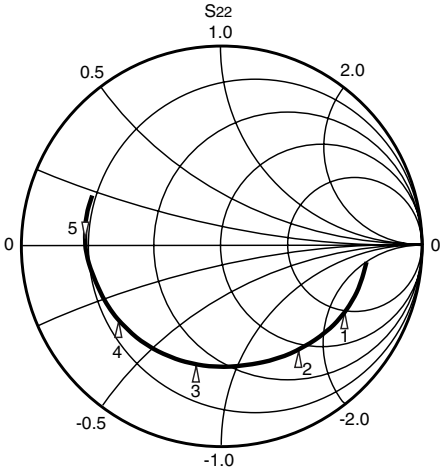



## TYPICAL COMMON SOURCE SCATTERING PARAMETERS ($T_A$ = 25°C)

**NE67483B**

$V_{DS}$ = 3 V, $I_D$ = 10 mA
Start 500 MHz,
Stop 18 GHZ,
Step 500 MHz




Marker
1 : 2 GHz
2 : 4 GHz
3 : 8 GHz
4 : 12 GHz
5 : 16 GHz

## NE67483B

### $V_{DS}$ = 3 V, $I_{DS}$ = 10 mA

| FREQUENCY | $S_{11}$ | | $S_{21}$ | | $S_{12}$ | | $S_{22}$ | | K | MAG[1] |
|---|---|---|---|---|---|---|---|---|---|---|
| MHz | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG | | (dB) |
| 500 | 0.992 | -11.4 | 3.091 | 169.6 | 0.011 | 81.8 | 0.729 | -6.9 | 0.13 | 31.25 |
| 1000 | 0.961 | -21.7 | 3.045 | 159.3 | 0.022 | 74.6 | 0.721 | -14.0 | 0.32 | 23.98 |
| 1500 | 0.985 | -32.1 | 3.029 | 150.2 | 0.032 | 67.1 | 0.714 | -21.0 | 0.12 | 27.96 |
| 2000 | 0.960 | -42.5 | 2.941 | 141.1 | 0.041 | 59.8 | 0.709 | -27.6 | 0.21 | 23.47 |
| 2500 | 0.930 | -53.1 | 2.914 | 130.6 | 0.049 | 53.3 | 0.696 | -34.1 | 0.30 | 20.85 |
| 3000 | 0.934 | -61.7 | 2.795 | 123.1 | 0.056 | 46.5 | 0.687 | -40.4 | 0.27 | 20.66 |
| 3500 | 0.885 | -70.6 | 2.662 | 113.5 | 0.062 | 39.6 | 0.672 | -47.1 | 0.44 | 17.75 |
| 4000 | 0.855 | -81.8 | 2.568 | 104.4 | 0.068 | 34.7 | 0.657 | -53.6 | 0.48 | 16.36 |
| 4500 | 0.876 | -89.4 | 2.537 | 95.5 | 0.071 | 29.3 | 0.651 | -59.9 | 0.42 | 16.80 |
| 5000 | 0.830 | -97.3 | 2.436 | 88.7 | 0.076 | 23.4 | 0.637 | -66.3 | 0.54 | 15.07 |
| 5500 | 0.818 | -106.0 | 2.333 | 80.9 | 0.077 | 17.6 | 0.630 | -72.4 | 0.58 | 14.37 |
| 6000 | 0.817 | -111.4 | 2.251 | 74.2 | 0.080 | 14.0 | 0.623 | -78.6 | 0.58 | 13.97 |
| 6500 | 0.786 | -120.2 | 2.132 | 66.2 | 0.080 | 9.3 | 0.613 | -84.7 | 0.70 | 12.80 |
| 7000 | 0.781 | -126.4 | 2.100 | 59.2 | 0.081 | 5.9 | 0.619 | -90.5 | 0.70 | 12.63 |
| 7500 | 0.772 | -133.0 | 2.028 | 52.6 | 0.081 | 1.6 | 0.616 | -96.0 | 0.74 | 12.14 |
| 8000 | 0.763 | -140.2 | 1.988 | 44.9 | 0.079 | -2.1 | 0.614 | -101.6 | 0.78 | 11.82 |
| 8500 | 0.752 | -145.6 | 1.929 | 39.3 | 0.082 | -4.4 | 0.619 | -106.8 | 0.78 | 11.42 |
| 9000 | 0.734 | -152.9 | 1.854 | 31.6 | 0.080 | -7.0 | 0.621 | -112.3 | 0.87 | 10.84 |
| 9500 | 0.716 | -158.2 | 1.815 | 25.8 | 0.079 | -9.8 | 0.620 | -117.7 | 0.95 | 10.41 |
| 10000 | 0.695 | -164.0 | 1.758 | 20.0 | 0.081 | -11.3 | 0.618 | -122.7 | 1.01 | 12.83 |
| 10500 | 0.685 | -169.5 | 1.714 | 14.1 | 0.079 | -14.2 | 0.628 | -127.7 | 1.06 | 11.85 |
| 11000 | 0.672 | -174.5 | 1.666 | 7.7 | 0.079 | -16.6 | 0.624 | -133.5 | 1.13 | 11.00 |
| 11500 | 0.661 | 179.4 | 1.657 | 1.2 | 0.080 | -18.3 | 0.624 | -138.4 | 1.15 | 10.83 |
| 12000 | 0.649 | 174.4 | 1.624 | -4.5 | 0.080 | -19.6 | 0.633 | -143.9 | 1.16 | 10.63 |
| 12500 | 0.633 | 169.1 | 1.597 | -11.4 | 0.080 | -21.6 | 0.629 | -149.3 | 1.24 | 10.04 |
| 13000 | 0.614 | 162.3 | 1.577 | -17.3 | 0.082 | -24.0 | 0.638 | -153.9 | 1.24 | 9.88 |
| 13500 | 0.594 | 156.9 | 1.542 | -24.1 | 0.082 | -24.4 | 0.646 | -159.1 | 1.28 | 9.53 |
| 14000 | 0.567 | 151.1 | 1.500 | -30.0 | 0.085 | -27.7 | 0.651 | -164.0 | 1.34 | 8.99 |
| 14500 | 0.543 | 143.5 | 1.483 | -36.1 | 0.088 | -28.7 | 0.662 | -168.7 | 1.31 | 8.95 |
| 15000 | 0.536 | 138.2 | 1.462 | -41.9 | 0.089 | -31.6 | 0.668 | -174.0 | 1.30 | 8.87 |
| 15500 | 0.512 | 131.0 | 1.455 | -47.9 | 0.094 | -34.7 | 0.670 | -178.5 | 1.28 | 8.74 |
| 16000 | 0.489 | 123.7 | 1.451 | -54.1 | 0.097 | -37.3 | 0.679 | 176.3 | 1.24 | 8.79 |
| 16500 | 0.465 | 116.9 | 1.433 | -60.5 | 0.100 | -40.8 | 0.681 | 172.0 | 1.27 | 8.45 |
| 17000 | 0.451 | 108.3 | 1.441 | -67.5 | 0.102 | -44.1 | 0.688 | 167.4 | 1.22 | 8.67 |
| 17500 | 0.418 | 100.7 | 1.408 | -74.6 | 0.106 | -48.5 | 0.686 | 162.6 | 1.28 | 8.05 |
| 18000 | 0.387 | 91.9 | 1.404 | -81.6 | 0.115 | -52.0 | 0.690 | 158.2 | 1.22 | 8.06 |

Note:

1. Gain Calculations:

$MAG = \frac{|S_{21}|}{|S_{12}|}\left(K \pm \sqrt{K^2 - 1}\right)$. When $K \leq 1$, MAG is undefined and MSG values are used. $MSG = \frac{|S_{21}|}{|S_{12}|}$, $K = \frac{1 + |\Delta|^2 - |S_{11}|^2 - |S_{22}|^2}{2\,|S_{12}\,S_{21}|}$, $\Delta = S_{11}\,S_{22} - S_{21}\,S_{12}$

MAG = Maximum Available Gain
MSG = Maximum Stable Gain

## NE67483B

### $V_{DS}$ = 3 V, $I_{DS}$ = 20 mA

| FREQUENCY | $S_{11}$ | | $S_{21}$ | | $S_{12}$ | | $S_{22}$ | | K | MAG[1] |
|---|---|---|---|---|---|---|---|---|---|---|
| MHz | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG | | (dB) |
| 500 | 0.999 | -10.8 | 3.834 | 169.5 | 0.010 | 82.5 | 0.685 | -6.8 | 0.00 | 00.00 |
| 1000 | 0.998 | -21.9 | 3.746 | 160.0 | 0.020 | 73.6 | 0.680 | -13.8 | 0.00 | 00.00 |
| 1500 | 0.996 | -33.4 | 3.694 | 149.1 | 0.029 | 66.4 | 0.667 | -20.9 | 0.08 | 34.72 |
| 2000 | 0.987 | -43.8 | 3.630 | 140.2 | 0.037 | 59.9 | 0.663 | -27.4 | 0.10 | 29.65 |
| 2500 | 0.968 | -54.5 | 3.552 | 130.3 | 0.045 | 54.1 | 0.651 | -33.8 | 0.16 | 25.48 |
| 3000 | 0.948 | -63.8 | 3.417 | 121.7 | 0.052 | 47.6 | 0.638 | -40.2 | 0.23 | 22.86 |
| 3500 | 0.923 | -73.4 | 3.265 | 112.5 | 0.056 | 43.2 | 0.627 | -46.7 | 0.28 | 20.76 |
| 4000 | 0.890 | -84.3 | 3.107 | 103.1 | 0.062 | 36.6 | 0.612 | -52.9 | 0.37 | 18.70 |
| 4500 | 0.885 | -93.2 | 3.067 | 93.9 | 0.065 | 30.5 | 0.605 | -59.3 | 0.38 | 18.37 |
| 5000 | 0.860 | -100.9 | 2.929 | 87.3 | 0.067 | 26.0 | 0.592 | -65.4 | 0.44 | 17.05 |
| 5500 | 0.840 | -109.0 | 2.804 | 79.6 | 0.070 | 21.3 | 0.586 | -71.3 | 0.49 | 16.09 |
| 6000 | 0.828 | -115.7 | 2.694 | 72.9 | 0.071 | 18.9 | 0.580 | -77.6 | 0.51 | 15.42 |
| 6500 | 0.811 | -123.8 | 2.538 | 64.7 | 0.073 | 13.5 | 0.572 | -83.4 | 0.59 | 14.45 |
| 7000 | 0.797 | -130.5 | 2.500 | 57.9 | 0.073 | 10.6 | 0.578 | -88.9 | 0.61 | 14.11 |
| 7500 | 0.776 | -137.6 | 2.399 | 51.1 | 0.073 | 8.4 | 0.575 | -94.2 | 0.68 | 13.34 |
| 8000 | 0.780 | -144.3 | 2.349 | 43.6 | 0.074 | 5.4 | 0.575 | -99.8 | 0.67 | 13.24 |
| 8500 | 0.754 | -150.5 | 2.271 | 38.0 | 0.075 | 2.8 | 0.581 | -104.8 | 0.73 | 12.56 |
| 9000 | 0.738 | -157.3 | 2.175 | 29.9 | 0.075 | 0.5 | 0.584 | -110.1 | 0.80 | 11.97 |
| 9500 | 0.720 | -162.7 | 2.129 | 24.7 | 0.077 | -1.9 | 0.582 | -115.2 | 0.83 | 11.53 |
| 10000 | 0.693 | -169.1 | 2.050 | 18.5 | 0.078 | -3.4 | 0.585 | -120.0 | 0.92 | 10.89 |
| 10500 | 0.677 | -174.1 | 1.999 | 12.7 | 0.077 | -5.5 | 0.591 | -125.0 | 0.99 | 10.54 |
| 11000 | 0.661 | -179.3 | 1.943 | 6.6 | 0.078 | -6.6 | 0.593 | -131.1 | 1.02 | 13.04 |
| 11500 | 0.649 | 174.6 | 1.923 | 0.1 | 0.080 | -8.0 | 0.593 | -135.6 | 1.03 | 12.69 |
| 12000 | 0.627 | 169.6 | 1.884 | -5.8 | 0.081 | -10.2 | 0.600 | -141.0 | 1.08 | 11.95 |
| 12500 | 0.608 | 163.6 | 1.850 | -12.6 | 0.083 | -12.1 | 0.603 | -146.5 | 1.12 | 11.43 |
| 13000 | 0.594 | 157.6 | 1.820 | -18.5 | 0.086 | -14.1 | 0.615 | -150.9 | 1.09 | 11.48 |
| 13500 | 0.563 | 151.3 | 1.778 | -25.2 | 0.087 | -15.9 | 0.621 | -156.1 | 1.15 | 10.74 |
| 14000 | 0.536 | 145.7 | 1.730 | -31.3 | 0.092 | -19.1 | 0.632 | -160.9 | 1.15 | 10.42 |
| 14500 | 0.513 | 138.3 | 1.708 | -37.2 | 0.095 | -21.2 | 0.641 | -165.7 | 1.14 | 10.29 |
| 15000 | 0.499 | 131.9 | 1.678 | -43.1 | 0.098 | -24.1 | 0.648 | -170.8 | 1.12 | 10.24 |
| 15500 | 0.467 | 125.3 | 1.665 | -49.4 | 0.103 | -27.5 | 0.657 | -175.2 | 1.11 | 10.10 |
| 16000 | 0.456 | 117.8 | 1.654 | -55.4 | 0.105 | -31.5 | 0.666 | 179.2 | 1.07 | 10.30 |
| 16500 | 0.426 | 109.8 | 1.636 | -61.9 | 0.111 | -34.6 | 0.668 | 175.0 | 1.08 | 10.01 |
| 17000 | 0.401 | 101.8 | 1.631 | -68.8 | 0.114 | -39.1 | 0.683 | 170.1 | 1.04 | 10.34 |
| 17500 | 0.373 | 92.7 | 1.599 | -76.1 | 0.118 | -43.4 | 0.679 | 165.3 | 1.08 | 9.58 |
| 18000 | 0.344 | 82.3 | 1.595 | -83.0 | 0.125 | -49.5 | 0.691 | 160.4 | 1.03 | 10.05 |

Note:

1. Gain Calculations:

$$MAG = \frac{|S_{21}|}{|S_{12}|}\left(K \pm \sqrt{K^2 - 1}\right)$$. When $K \leq 1$, MAG is undefined and MSG values are used. $$MSG = \frac{|S_{21}|}{|S_{12}|}$$, $$K = \frac{1 + |\Delta|^2 - |S_{11}|^2 - |S_{22}|^2}{2\,|S_{12}S_{21}|}$$, $\Delta = S_{11}S_{22} - S_{21}S_{12}$

MAG = Maximum Available Gain
MSG = Maximum Stable Gain

## NE67483B

### $V_{DS}$ = 3 V, $I_{DS}$ = 30 mA

| FREQUENCY | $S_{11}$ | | $S_{21}$ | | $S_{12}$ | | $S_{22}$ | | K | MAG[1] |
|---|---|---|---|---|---|---|---|---|---|---|
| MHz | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG | | (dB) |
| 500 | 0.999 | -11.1 | 4.104 | 169.4 | 0.009 | 80.0 | 0.672 | -6.7 | 0.00 | 00.00 |
| 1000 | 0.998 | -22.3 | 4.015 | 159.5 | 0.019 | 75.6 | 0.665 | -13.7 | 0.04 | 39.48 |
| 1500 | 0.991 | -34.0 | 3.946 | 148.9 | 0.026 | 68.0 | 0.655 | -20.9 | 0.08 | 31.92 |
| 2000 | 0.977 | -44.6 | 3.862 | 139.7 | 0.035 | 60.4 | 0.650 | -27.2 | 0.14 | 27.60 |
| 2500 | 0.962 | -55.3 | 3.789 | 129.7 | 0.042 | 54.8 | 0.638 | -33.7 | 0.18 | 25.13 |
| 3000 | 0.937 | -64.9 | 3.621 | 121.3 | 0.048 | 47.9 | 0.625 | -39.7 | 0.26 | 22.46 |
| 3500 | 0.909 | -74.5 | 3.459 | 111.8 | 0.053 | 42.5 | 0.613 | -46.4 | 0.34 | 20.41 |
| 4000 | 0.878 | -85.4 | 3.291 | 102.7 | 0.057 | 38.0 | 0.599 | -52.3 | 0.41 | 18.68 |
| 4500 | 0.870 | -94.5 | 3.237 | 93.4 | 0.060 | 31.2 | 0.592 | -58.8 | 0.43 | 18.21 |
| 5000 | 0.845 | -102.2 | 3.087 | 86.8 | 0.062 | 26.8 | 0.579 | -64.8 | 0.50 | 16.99 |
| 5500 | 0.824 | -110.4 | 2.951 | 79.1 | 0.066 | 24.1 | 0.574 | -70.7 | 0.54 | 16.07 |
| 6000 | 0.814 | -117.0 | 2.830 | 72.4 | 0.066 | 21.3 | 0.568 | -76.8 | 0.56 | 15.45 |
| 6500 | 0.793 | -125.4 | 2.666 | 64.4 | 0.067 | 16.6 | 0.560 | -82.6 | 0.65 | 14.46 |
| 7000 | 0.780 | -131.7 | 2.622 | 57.5 | 0.069 | 14.3 | 0.566 | -88.0 | 0.67 | 14.11 |
| 7500 | 0.759 | -139.0 | 2.511 | 50.8 | 0.069 | 11.4 | 0.563 | -93.2 | 0.75 | 13.38 |
| 8000 | 0.759 | -145.8 | 2.456 | 43.2 | 0.069 | 9.2 | 0.565 | -98.7 | 0.74 | 13.20 |
| 8500 | 0.738 | -151.7 | 2.376 | 37.8 | 0.070 | 6.5 | 0.570 | -103.8 | 0.80 | 12.64 |
| 9000 | 0.718 | -158.5 | 2.271 | 29.7 | 0.070 | 5.1 | 0.574 | -109.1 | 0.88 | 12.00 |
| 9500 | 0.702 | -164.1 | 2.225 | 24.5 | 0.073 | 3.0 | 0.575 | -114.2 | 0.89 | 11.64 |
| 10000 | 0.676 | -170.0 | 2.139 | 18.6 | 0.073 | 2.6 | 0.577 | -119.0 | 0.98 | 11.02 |
| 10500 | 0.663 | -175.2 | 2.088 | 12.6 | 0.073 | -0.1 | 0.585 | -123.7 | 1.02 | 13.62 |
| 11000 | 0.644 | 179.6 | 2.029 | 6.4 | 0.076 | -0.6 | 0.586 | -129.9 | 1.05 | 12.92 |
| 11500 | 0.630 | 173.5 | 2.004 | 0.0 | 0.078 | -2.4 | 0.584 | -134.4 | 1.07 | 12.49 |
| 12000 | 0.613 | 168.6 | 1.958 | -5.8 | 0.080 | -4.6 | 0.595 | -139.9 | 1.09 | 12.12 |
| 12500 | 0.594 | 162.7 | 1.930 | -12.5 | 0.081 | -7.0 | 0.599 | -145.1 | 1.12 | 11.64 |
| 13000 | 0.577 | 156.7 | 1.890 | -18.3 | 0.085 | -7.6 | 0.608 | -149.7 | 1.09 | 11.60 |
| 13500 | 0.549 | 150.2 | 1.850 | -25.1 | 0.088 | -9.6 | 0.616 | -154.8 | 1.12 | 11.14 |
| 14000 | 0.523 | 144.3 | 1.800 | -31.0 | 0.092 | -13.3 | 0.626 | -159.8 | 1.14 | 10.69 |
| 14500 | 0.496 | 137.0 | 1.772 | -37.1 | 0.096 | -16.1 | 0.638 | -164.3 | 1.11 | 10.61 |
| 15000 | 0.486 | 131.1 | 1.741 | -42.9 | 0.101 | -19.4 | 0.645 | -169.7 | 1.07 | 10.77 |
| 15500 | 0.455 | 123.6 | 1.733 | -49.1 | 0.106 | -21.7 | 0.653 | -174.0 | 1.05 | 10.74 |
| 16000 | 0.439 | 117.0 | 1.718 | -55.1 | 0.106 | -26.2 | 0.664 | -179.3 | 1.05 | 10.70 |
| 16500 | 0.416 | 108.5 | 1.693 | -61.6 | 0.113 | -30.1 | 0.668 | 176.2 | 1.03 | 10.68 |
| 17000 | 0.390 | 100.0 | 1.697 | -68.5 | 0.118 | -34.4 | 0.684 | 171.5 | 0.97 | 00.00 |
| 17500 | 0.364 | 92.3 | 1.654 | -75.7 | 0.123 | -39.2 | 0.679 | 166.8 | 1.01 | 10.78 |
| 18000 | 0.337 | 80.6 | 1.652 | -82.8 | 0.129 | -45.0 | 0.692 | 162.0 | 0.96 | 00.00 |

Note:

1. Gain Calculations:

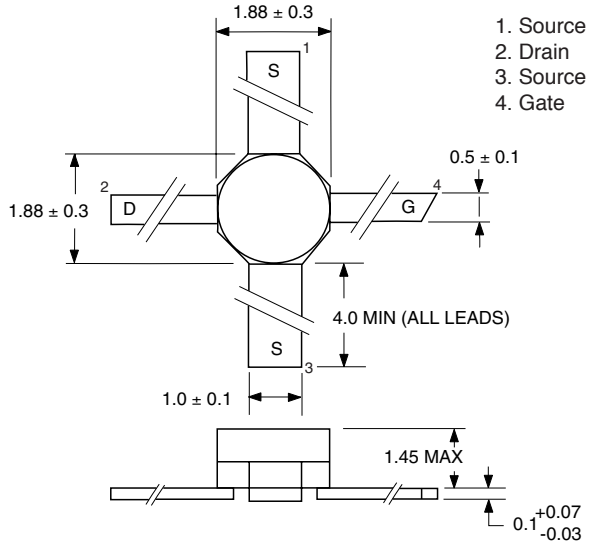
$MAG = \frac{|S_{21}|}{|S_{12}|}\left(K \pm \sqrt{K^2 - 1}\right)$. When $K \leq 1$, MAG is undefined and MSG values are used. $MSG = \frac{|S_{21}|}{|S_{12}|}$, $K = \frac{1 + |\Delta|^2 - |S_{11}|^2 - |S_{22}|^2}{2\,|S_{12}\,S_{21}|}$, $\Delta = S_{11}\,S_{22} - S_{21}\,S_{12}$

MAG = Maximum Available Gain

MSG = Maximum Stable Gain

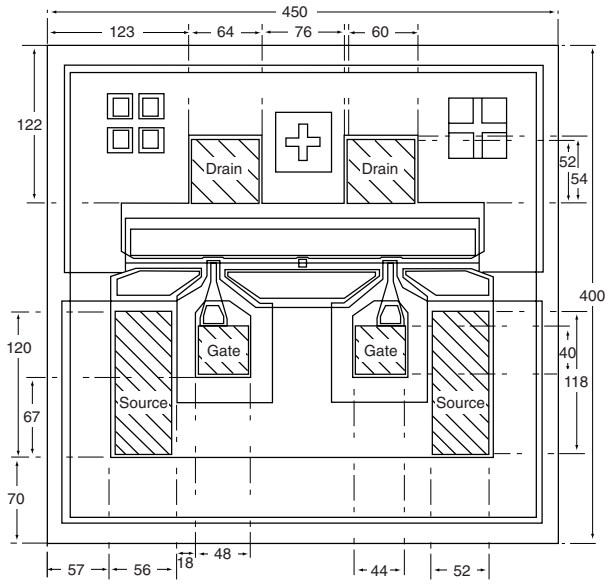
## OUTLINE DIMENSIONS (Units in mm)

**PACKAGE OUTLINE 83B**




## CHIP DIMENSIONS (Units in μm)

NE67400




Thickness = 140 μm

: Bonding Area

## ORDERING INFORMATION

| PART NUMBER | IDSS (mA) | PACKAGE OUTLINE |
|---|---|---|
| NE67400 | 20 to 120 | 00 (CHIP) |
| NE67483B | 20 to 120 | 83B |

Life Support Applications

These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.