# IXZ2210N50L2
# RF Power MOSFET

## N-channel enhancement mode linear RF power MOSFET

**Ideal for class AB and C industrial, scientific, medical, and commercial applications.**

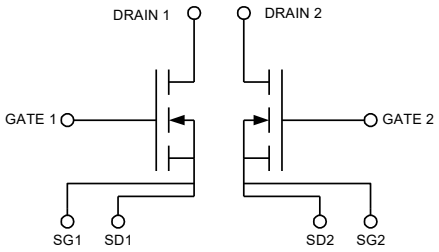
$V_{DSS}$ = 500 V
$I_{D25}$ = 10 A

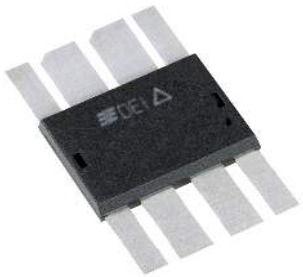
**Features**

- Isolated Substrate
  - high isolation voltage (>2500V)
  - excellent thermal transfer
  - Increased temperature and power cycling capability
- IXYS RF Low Capacitance Z-MOS™ Process
- Very low insertion inductance (<2nH)
- No beryllium oxide (BeO) or other hazardous materials

**Advantages**

- High Performance RF Package
- Easy to mount—no insulators needed



## Maximum Ratings

| Symbol | Parameter | Test Conditions | Maximum | Units |
|---|---|---|---|---|
| $V_{DSS}$ | Drain-source voltage | $T_J$ = 25°C to 150°C | 500 | V |
| $V_{DGR}$ | Drain-gate voltage | $T_J$ = 25°C to 150°C; $R_{GS}$ = 1 MΩ | 500 | |
| $V_{GS}$ | Gate-source voltage | Continuous | ±20 | |
| $V_{GSM}$ | | Transient | ±30 | |
| $I_{D25}$ | Continuous drain current | $T_c$ = 25°C | 10 | A |
| $P_{DC}$ | Package power dissipation per MOSFET | $T_c$ = 25°C | 270 | W |
| $P_{DHS}$ | Dissipation to heat-sink per MOSFET | $T_c$ = 25°C, Derate 2 W/°C above 25°C | 200 | |
| $P_{DAMB}$ | Ambient power dissipation | $T_{AMB}$ = 25°C | 3 | |
| $R_{thJC}$ | Thermal resistance junction to case | | 0.47 | ° C/W |
| $R_{thJHS}$ | Thermal resistance junction to heat-sink | | 0.65 | |
| $T_J$, $T_{STG}$ | Operating and storage junction temperature range | | -55 to 150 | ° C |
| $T_L$ | Lead temperature | 1.6mm(0.063 in) from case for 10 s | 300 | |

## Electrical Characteristics

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| $BV_{DSS}$ | Breakdown voltage drain to source | $V_{GS}$ = 0 V, $I_D$ = 4 ma | 500 | | | V |
| $I_{DSS}$ | Drain leakage current | $V_{DS}$ = 0.8$V_{DSS}$ $V_{GS}$= 0 $T_J$ = 25C $T_J$ =125C | | | 50<br>1 | µA<br>mA |
| $I_{GSS}$ | Gate leakage current | $V_{GS}$ = ±20 $V_{DC}$, $V_{DS}$ = 0 | | | ±100 | nA |
| $g_{fs}$ | Transconductance | $V_{DS}$ = 60 V, $I_D$ = 0.5$I_{D25}$, pulse test | | 3.1 | | S |
| $V_{GS(th)}$ | Threshold voltage | $V_{DS}$ = $V_{GS}$, $I_D$ = 250µA | 4.0 | 5.4 | 6.5 | V |

## Electrical Characteristics cont.

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Dynamic** | | | | | | |
| $R_{DS(on)}$ | Drain to source ON resistance | $V_{GS}$ = 15 V, $I_D$ = 0.5 $I_{D25}$<br>Pulse test, t ≤ 300μS, duty cycle d ≤ 2% | | 1 | | Ω |
| $C_{ISS}$ | Input capacitance | $V_{GS}$ = 0 V, $V_{DS}$ = 0.8 $V_{DSS}$, f = 1 MHz | | 611 | | pF |
| $C_{OSS}$ | Output capacitance | | | 100 | | pF |
| $C_{RSS}$ | Reverse transfer capacitance | | | 6 | | pF |
| $t_{D(ON)}$ | Turn-on delay time | $V_{GS}$ = 15 V, $V_{DS}$ = 0.8 $V_{DSS}$ | | 4 | | ns |
| $t_R$ | Rise time | | | 3 | | ns |
| $t_{D(OFF)}$ | Turn-off delay time | | | 4 | | ns |
| $t_F$ | Fall time | | | 5 | | ns |

CAUTION: Operation at or above the Maximum Ratings values may impact device reliability or cause permanent damage to the device.

Information in this document is believed to be accurate and reliable. IXYSRF reserves the right to make changes to information published in this document at any time and without notice.

**For detailed device mounting and installation instructions, see the "*Device Installation & Mounting Instructions*" technical note on the IXYSRF web site;**

All charts are per MOSFET

Fig. 1

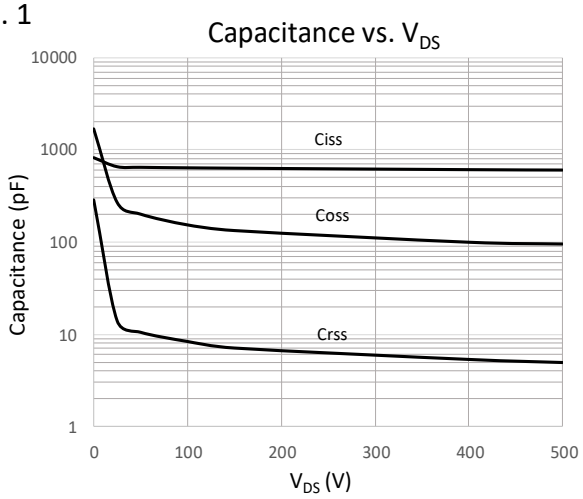



Fig. 2

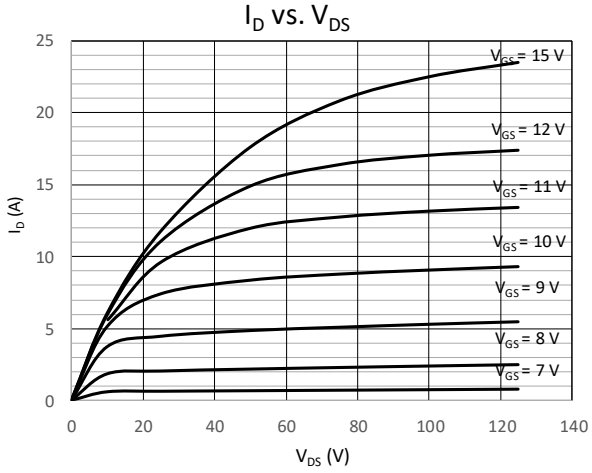



Fig. 3

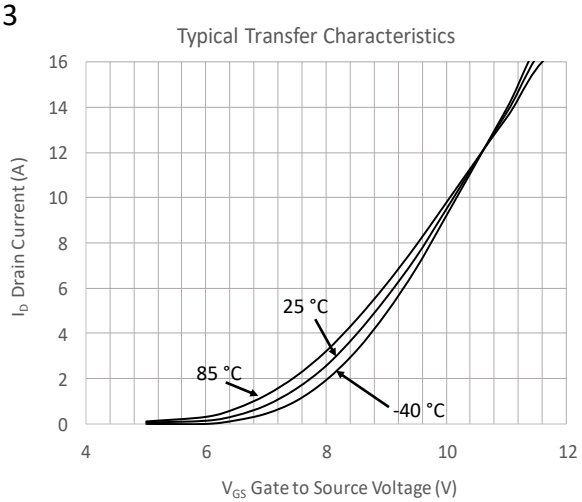



Fig. 4

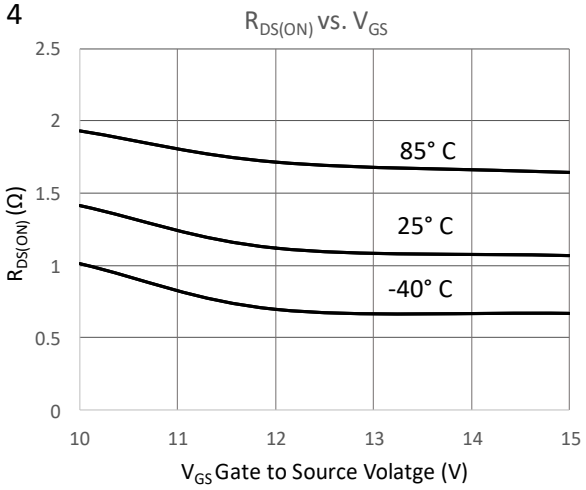



Fig. 5

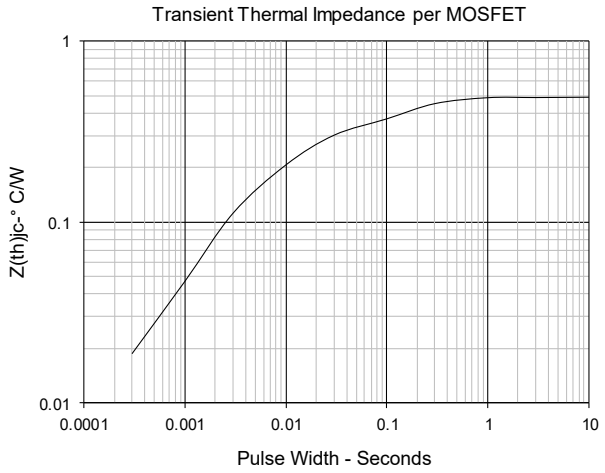



Fig. 6

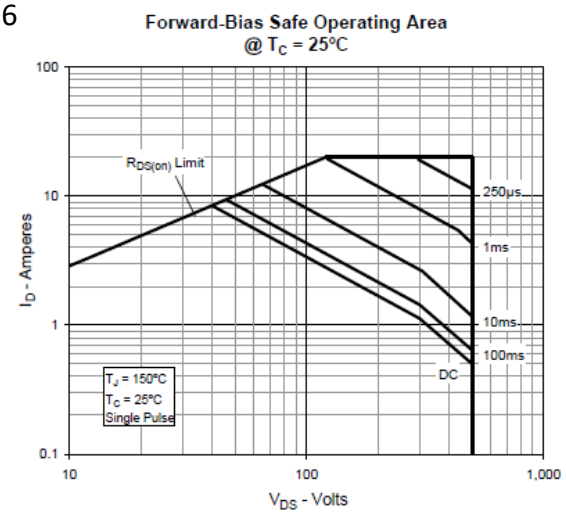


Fig. 7

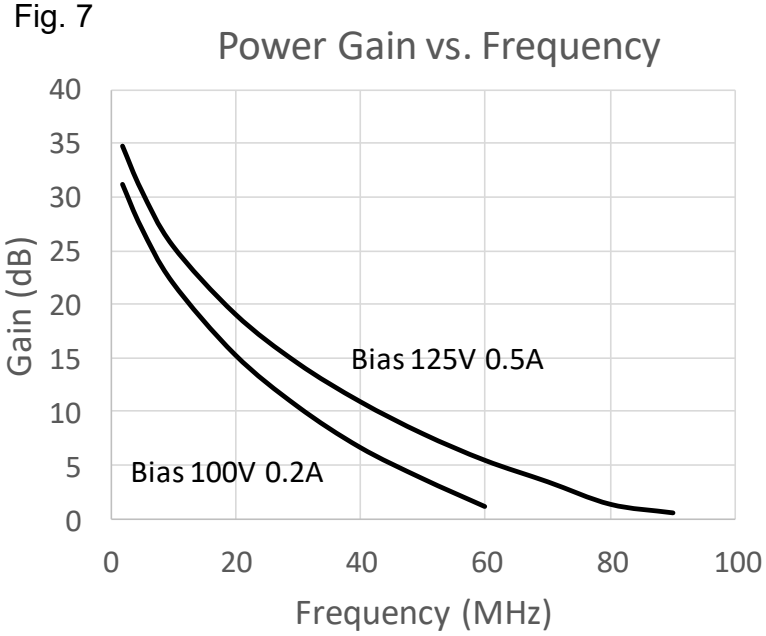



Table 1
S Parameters
$V_{DS}$ = 100V $I_{BIAS}$ = 0.2A

| Freq. (MHz) | Mag. S11 | Phase S11 | Mag. S12 | Phase S12 | Mag. S21 | Phase S21 | Mag. S22 | Phase S22 |
|---|---|---|---|---|---|---|---|---|
| 2 | 1 | -56 | 0.011 | 66 | 35.6 | 155.4 | 0.886 | -3.7 |
| 5 | 0.95 | -106.4 | 0.018 | 31 | 23.2 | 118.6 | 0.727 | -36 |
| 10 | 0.934 | -138.5 | 0.019 | 5.4 | 12.6 | 92.9 | 0.664 | -61 |
| 13.56 | 0.937 | -149.1 | 0.018 | -4.2 | 8.45 | 82.1 | 0.674 | -75 |
| 15 | 0.938 | -151.9 | 0.018 | -7.3 | 7.8 | 78.3 | 0.69 | -80 |
| 20 | 0.945 | -158.6 | 0.016 | -16 | 5.5 | 67.8 | 0.725 | -94.7 |
| 25 | 0.95 | -162.7 | 0.015 | -20.9 | 4.3 | 60 | 0.77 | -107.3 |
| 27.12 | 0.954 | -164.2 | 0.014 | -22.4 | 3.97 | 57.3 | 0.782 | -111.4 |
| 30 | 0.959 | -165.2 | 0.013 | -24.6 | 3.3 | 54 | 0.798 | -117.2 |
| 35 | 0.96 | -168 | 0.011 | -26.8 | 2.76 | 48.8 | 0.83 | -125.3 |
| 40 | 0.962 | -169.7 | 0.009 | -26.3 | 2.19 | 44.5 | 0.856 | -132.5 |
| 45 | 0.965 | -171.4 | 0.008 | -24.4 | 1.88 | 41.4 | 0.87 | -137.9 |
| 50 | 0.969 | -172.2 | 0.007 | -19.6 | 1.55 | 38 | 0.89 | -143.4 |
| 60 | 0.971 | -174.3 | 0.005 | -2 | 1.19 | 33 | 0.909 | -151 |
| 70 | 0.972 | -175.8 | 0.005 | 26.3 | 0.93 | 28.7 | 0.92 | -159 |
| 80 | 0.9724 | -177.4 | 0.006 | 45.8 | 0.746 | 25.4 | 0.935 | -165 |
| 90 | 0.972 | -178.3 | 0.008 | 54.1 | 0.68 | 26.8 | 0.901 | -167.24 |
| 100 | 0.972 | -179.3 | 0.009 | 60 | 0.585 | 20 | 0.939 | -172.3 |
| 105 | 0.973 | -179.7 | 0.01 | 61.5 | 0.5 | 19.7 | 0.94 | -174.6 |
| 110 | 0.971 | 179.7 | 0.011 | 64.3 | 0.468 | 17.1 | 0.939 | -176.76 |

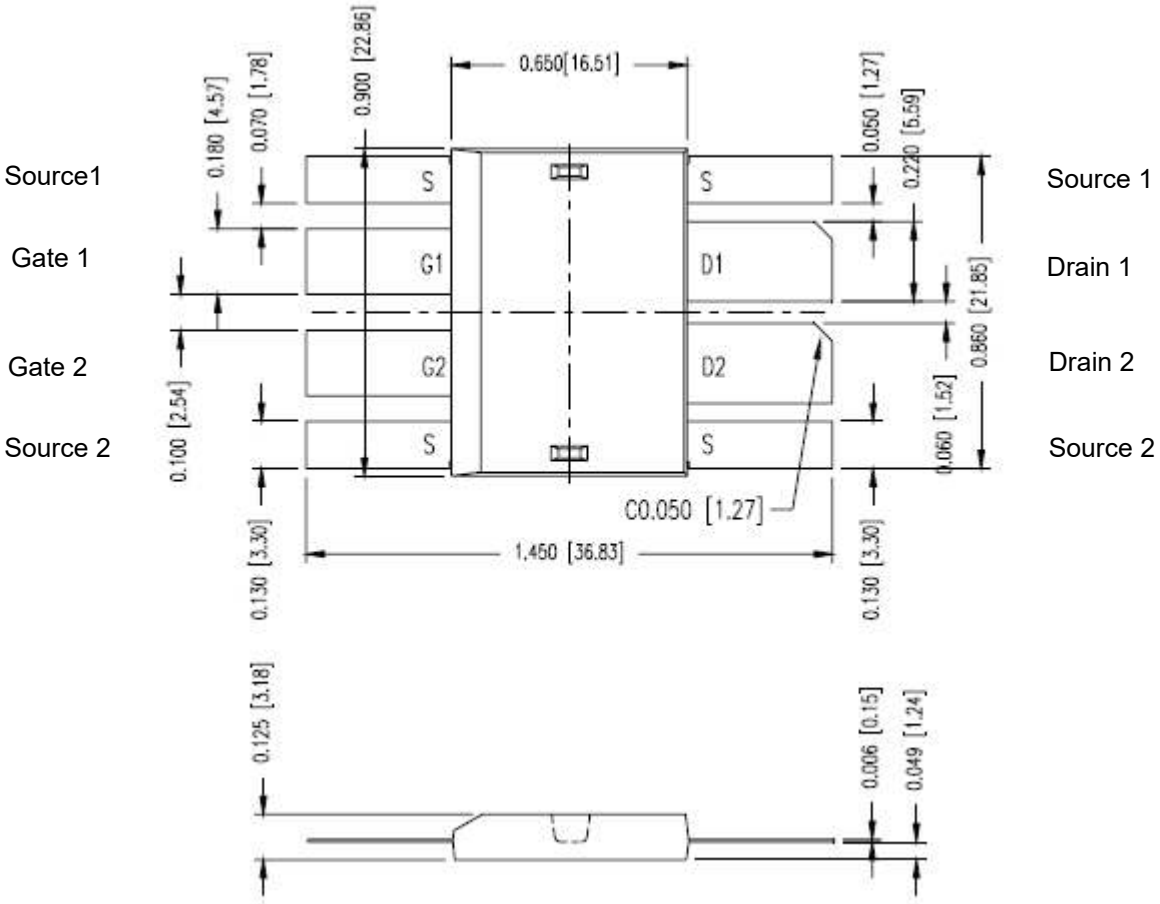
Table 2
S Parameters
$V_{DS}$ = 100V $I_{BIAS}$ = 0.6A

| Freq. (MHz) | Mag. S11 | Phase S11 | Mag. S12 | Phase S12 | Mag. S21 | Phase S21 | Mag. S22 | Phase S22 |
|---|---|---|---|---|---|---|---|---|
| 2 | 1 | -67.8 | 0.01 | 61.9 | 62.5 | 151 | 0.79 | -15 |
| 5 | 0.924 | -117 | 0.015 | 26.6 | 36.5 | 114 | 0.57 | -53 |
| 10 | 0.91 | -145.7 | 0.016 | 5.3 | 19.7 | 91 | 0.51 | -76 |
| 13.56 | 0.916 | -154 | 0.015 | -2.2 | 14.3 | 81.6 | 0.53 | -88 |
| 15 | 0.92 | -157 | 0.015 | -4.6 | 12.9 | 78.1 | 0.54 | -92 |
| 20 | 0.927 | -161 | 0.014 | -11 | 9.3 | 68.7 | 0.59 | -105 |
| 25 | 0.933 | -165 | 0.012 | -15 | 6.9 | 61.2 | 0.62 | -115.6 |
| 27.12 | 0.935 | -166 | 0.011 | -15.5 | 6.3 | 58.4 | 0.65 | -118 |
| 30 | 0.939 | -167.5 | 0.011 | -17.4 | 5.4 | 55.2 | 0.702 | -123 |
| 35 | 0.945 | -169.5 | 0.01 | -19 | 4.3 | 50 | 0.74 | -130 |
| 40 | 0.95 | -171 | 0.008 | -17.6 | 3.6 | 45.6 | 0.78 | -136 |
| 45 | 0.955 | -172.3 | 0.008 | -13 | 3 | 42.1 | 0.805 | -141 |
| 50 | 0.96 | -173.4 | 0.006 | -9 | 2.5 | 38.6 | 0.825 | -146 |
| 60 | 0.964 | -175.4 | 0.0057 | 8 | 1.94 | 33.1 | 0.86 | -154 |
| 70 | 0.967 | -177 | 0.005 | 31 | 1.49 | 28.6 | 0.885 | -160.5 |
| 80 | 0.97 | -178.3 | 0.006 | 47 | 1.19 | 25.3 | 0.897 | -166.5 |
| 90 | 0.972 | -178.5 | 0.008 | 56 | 1.05 | 27.8 | 0.865 | -169.7 |
| 100 | 0.971 | -179.5 | 0.01 | 61 | 0.903 | 19.7 | 0.905 | -173.7 |
| 105 | 0.972 | -179.9 | 0.01 | 62 | 0.82 | 18 | 0.912 | -175.8 |
| 110 | 0.972 | 179.5 | 0.011 | 64 | 0.78 | 16.7 | 0.912 | -177.8 |

Table 3
S Parameters
$V_{DS}$ = 125V $I_{BIAS}$ = 0.5A

| Freq. (MHz) | Mag. S11 | Phase S11 | Mag. S12 | Phase S12 | Mag. S21 | Phase S21 | Mag. S22 | Phase S22 |
|---|---|---|---|---|---|---|---|---|
| 2 | 1 | -60 | 0.009 | 64 | 55 | 153 | 0.825 | -9.5 |
| 5 | 0.935 | -112 | 0.015 | 29 | 34 | 116 | 0.618 | -43 |
| 10 | 0.922 | -142 | 0.016 | 6.5 | 18.7 | 92 | 0.54 | -66 |
| 13.56 | 0.925 | -151 | 0.016 | -1.4 | 13.7 | 83 | 0.55 | -79 |
| 15 | 0.927 | -155 | 0.015 | -3.7 | 12.5 | 79.6 | 0.56 | -83 |
| 20 | 0.933 | -160 | 0.014 | -11.2 | 9 | 70.1 | 0.61 | -97 |
| 25 | 0.939 | -164 | 0.0128 | -15.1 | 6.7 | 62.4 | 0.67 | -107 |
| 27.12 | 0.942 | -165.8 | 0.0123 | -16.3 | 6 | 59.8 | 0.68 | -111 |
| 30 | 0.944 | -167 | 0.0116 | -17.5 | 5.3 | 56.5 | 0.72 | -116 |
| 35 | 0.95 | -169 | 0.01 | -18 | 4.2 | 51.3 | 0.76 | -124 |
| 40 | 0.955 | -171 | 0.0089 | -17.8 | 3.3 | 47 | 0.79 | -130 |
| 45 | 0.959 | -172 | 0.008 | -15 | 2.8 | 43.4 | 0.81 | -136 |
| 50 | 0.961 | -173.2 | 0.007 | -11 | 2.4 | 39 | 0.83 | -141 |
| 60 | 0.967 | -175 | 0.0055 | 6 | 1.8 | 34.5 | 0.86 | -150 |
| 70 | 0.97 | -177 | 0.0055 | 31 | 1.4 | 29.6 | 0.88 | -157 |
| 80 | 0.971 | -178.3 | 0.0064 | 44.5 | 1.1 | 26.3 | 0.9 | -164 |
| 90 | 0.972 | -179.6 | 0.0084 | 56 | 1.04 | 28.5 | 0.86 | -165 |
| 100 | 0.972 | -179.4 | 0.0095 | 61 | 0.88 | 20.6 | 0.908 | -171 |
| 105 | 0.97 | -179.9 | 0.01 | 61.7 | 0.8 | 19 | 0.91 | -173 |
| 110 | 0.97 | 179 | 0.011 | 64 | 0.74 | 17.5 | 0.91 | -175 |

**Fig. 7 Package Dimensions**







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