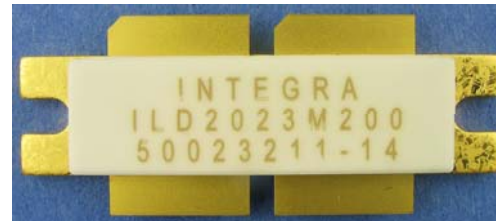


**S-Band RF Power LDMOS Transistor**

The high power pulsed transistor part number ILD2023M200 is designed for S-Band systems operating from 2.05 to 2.25GHz. Operating at a pulse width of 500µs with a duty factor of 17%, this dual MOSFET device supplies a minimum of 200 watts of peak pulse power across the instantaneous operating bandwidth of 2.05 to 2.25 GHz. Fabricated with all gold metal contact, wire bonding and package for maximum reliability. All devices are 100% screened for large signal RF parameters in the broadband RF test fixture across the entire specified operating bandwidth with no variable or external tuning.



**Silicon LDMOS**

- High Power Gain
- Superior thermal stability

**Class AB Operation**

- Gate biased to  $I_{DQ}=2x50mA$

**Configuration**

- Common Source

**Gold Metal**

- Gold Chip Metal
- Gold Wire Bond
- Maximum Reliability

**Package**

- Thermally Enhanced
- Gold Metal based

**Epoxy Sealed Lid**

- Gross Leak Qualified

**RF Test Fixture**

- Broadband
- Matched to 50Ω
- Long-term Correlation
- 100% Device RF Screening
- No External Tuning required

*PRELIMINARY DATA*

*PRELIMINARY DATA*

*PRELIMINARY DATA*

| Device     | Bias (mA) | Freq (MHz) | PW (ms) | Duty (%) | V <sub>DD</sub> (V) | P <sub>IN</sub> (W) | IRL (dB) | P <sub>OUT</sub> (W) | G <sub>P</sub> (dB) | η <sub>D</sub> (%) | Drp (dB) | VSWR 1.5:1 | VSWR 2:1 |
|------------|-----------|------------|---------|----------|---------------------|---------------------|----------|----------------------|---------------------|--------------------|----------|------------|----------|
|            | 100       | 2050       | 0.5     | 17       | 28                  | 19                  | -11      | 244                  | 11.1                | 49.3               | -015     | P          | P        |
| 50029648-3 | 100       | 2150       | 0.5     | 17       | 28                  | 19                  | -12      | 267                  | 11.5                | 53.2               | -0.15    | P          | P        |
|            | 100       | 2250       | 0.5     | 17       | 28                  | 18                  | -9       | 245                  | 11.4                | 51.6               | -0.14    | P          | P        |

**MAXIMUM RATINGS**

| Screen | Parameter                                    | Symbol    | Min | Max  | Units | Test Conditions |
|--------|----------------------------------------------|-----------|-----|------|-------|-----------------|
| BD     | Drain-Source Voltage                         | $V_{DS}$  | --  | 65   | V     | --              |
| BD     | Gate-Source Voltage                          | $V_{GS}$  | -10 | +10  | V     | --              |
| BD     | Storage Temperature Range                    | $T_{STG}$ | -40 | +150 | °C    | --              |
| BD     | Operating Junction Temperature Range         | $T_J$     | -55 | +200 | °C    | --              |
| BD     | CW Power                                     | $P_{CW}$  | --  | 200  | W     | --              |
| Note   | Screen 'BD' = parameter qualified By Design. |           |     |      |       |                 |

**THERMAL CHARACTERISTICS**

| Screen | Parameter                                    | Symbol       | Min | Max | Units | Test Conditions                                   |
|--------|----------------------------------------------|--------------|-----|-----|-------|---------------------------------------------------|
| BD     | Thermal Resistance                           | $R_{TH(JC)}$ | --  | TBD | °C/W  | $V_1, I_{DQ1}, T_{F1}, PW_1, DF_1, P_{out}=200W.$ |
| Note   | Screen 'BD' = parameter qualified By Design. |              |     |     |       |                                                   |

**PROCESSING SPECIFICATIONS**

| Screen | Parameter                                                                                | Symbol | Min | Max | Units | Test Conditions                             |
|--------|------------------------------------------------------------------------------------------|--------|-----|-----|-------|---------------------------------------------|
| 100%   | DC Wafer Probe                                                                           | --     | --  | --  | --    | Per Integra specification.                  |
| Q1     | Wafer DC and RF Qualification                                                            | --     | --  | --  | --    | Per Integra specification.                  |
| LM     | Wire Bond Strength                                                                       | --     | --  | --  | --    | Line monitor per Integra specification.     |
| 100%   | Pre-cap visual inspection                                                                | --     | --  | --  | --    | Per Integra specification                   |
| 100%   | Gross leak test                                                                          | --     | --  | --  | --    | MIL-STD-750D, Method 1071, Test Condition C |
| Note   | Screen 'Q1' = parameter is qualified by assembly and test of 3 pieces minimum per wafer. |        |     |     |       |                                             |
| Note   | Screen 'LM' = parameter is qualified by assembly line monitor.                           |        |     |     |       |                                             |

**DC ELECTRICAL CHARACTERISTICS**

| Screen | Parameter                                  | Symbol      | Min | Max | Units   | Test Conditions                                    |
|--------|--------------------------------------------|-------------|-----|-----|---------|----------------------------------------------------|
| 100%   | Drain-Source Breakdown Voltage (each side) | $BV_{DSS}$  | 65  | --  | V       | $I_D = 3mA, V_{GS} = 0V, T_F = 25\pm 5^\circ C$    |
| 100%   | Drain Leakage Current (each side)          | $I_{DSS}$   | --  | 20  | $\mu A$ | $V_{DS} = 28V, V_{GS} = 0V, T_F = 25\pm 5^\circ C$ |
| 100%   | Gate Threshold Voltage (each side)         | $V_{Gsth2}$ | 1.5 | 3.5 | V       | $I_D = 0.1A, V_{DS} = 5V, T_F = 25\pm 5^\circ C$   |
| 100%   | Gate Leakage Current (each side)           | $I_{GSS}$   | --  | 1.0 | $\mu A$ | $V_{GS} = 5V, V_{DS} = 0V, T_F = 25\pm 5^\circ C$  |

**RF ELECTRICAL CHARACTERISTICS**

| Screen | Parameter                                                                                                                         | Symbol    | Min  | Max  | Units | Test Conditions                                                                                                                                                                                                       |
|--------|-----------------------------------------------------------------------------------------------------------------------------------|-----------|------|------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 100%   | Input Return Loss                                                                                                                 | IRL       | --   | -9   | dB    | $V_{DD}=V1, I_{DQ}=I_{DQ1}, T_F=T_{F1}, P_{in}=P_{in1}, F=F1, F2, F3: PW1, DF1$                                                                                                                                       |
| 100%   | Output Power                                                                                                                      | $P_{OUT}$ | 200  | --   | W     | $V_{DD}=V1, I_{DQ}=I_{DQ1}, T_F=T_{F1}, F=F1, F2, F3: PW1, DF1$                                                                                                                                                       |
| 100%   | Power Gain                                                                                                                        | $G_P$     | 12   | --   | dB    | $V_{DD}=V1, I_{DQ}=I_{DQ1}, T_F=T_{F1}, P_{in}=P_{in1}, F=F1, F2, F3: PW1, DF1$                                                                                                                                       |
| 100%   | Pulse Amplitude Droop                                                                                                             | Drp       | -0.5 | +0.5 | dB    | $V_{DD}=V1, I_{DQ}=I_{DQ1}, T_F=T_{F1}, P_{in}=P_{in1}, F=F1, F2, F3: PW1, DF1$                                                                                                                                       |
| 100%   | Gain Flatness versus Frequency                                                                                                    | dG        | 0    | 2    | dB    | $V_{DD}=V1, I_{DQ}=I_{DQ1}, T_F=T_{F1}, P_{in}=P_{in1}, F=F1, F2, F3: PW1, DF1$                                                                                                                                       |
| 100%   | Drain Efficiency                                                                                                                  | Nd        | 45   | --   | %     | $V_{DD}=V1, I_{DQ}=I_{DQ1}, T_F=T_{F1}, P_{in}=P_{in1}, F=F1, F2, F3: PW1, DF1$                                                                                                                                       |
| 100%   | Stability into 1.5:1 VSWR                                                                                                         | VSWR-S    | S    | --   | --    | $V_{DD}=V1, I_{DQ}=I_{DQ1}, T_F=T_{F1}, P_{in}=P_{in1}, F=F1, F2, F3: PW1, DF1$<br>Rotate 1.5:1 output VSWR through 360° phase.<br>No oscillatory or pulse break-up characteristics allowed on detected output pulse. |
| 100%   | 2:1 Load Mismatch Tolerance                                                                                                       | LMT       | P    | --   | --    | $V_{DD}=V1, I_{DQ}=I_{DQ1}, T_F=T_{F1}, P_{in}=P_{in1}, F=F1, F2, F3: PW1, DF1$<br>Rotate 2:1 output VSWR through 360° phase.                                                                                         |
| Note 1 | $V1=28V; I_{DQ1}$ (Drain Quiescent Current)=50mA/side, $PW1$ =(Pulse Width 1) =0.5ms; $DF1$ =(Duty Factor 1)=17%; $P_{in1}=12W$ . |           |      |      |       |                                                                                                                                                                                                                       |
| Note 2 | Test Frequencies: $F1=2.05GHz, F2=2.15GHz, F3=2.25GHz$ .                                                                          |           |      |      |       |                                                                                                                                                                                                                       |
| Note 3 | $T_{F1}=30\pm5^\circ C$ = Device Flange Temperature.                                                                              |           |      |      |       |                                                                                                                                                                                                                       |
| Note 4 | RF Electrical characteristics tested in broadband RF test fixture                                                                 |           |      |      |       |                                                                                                                                                                                                                       |

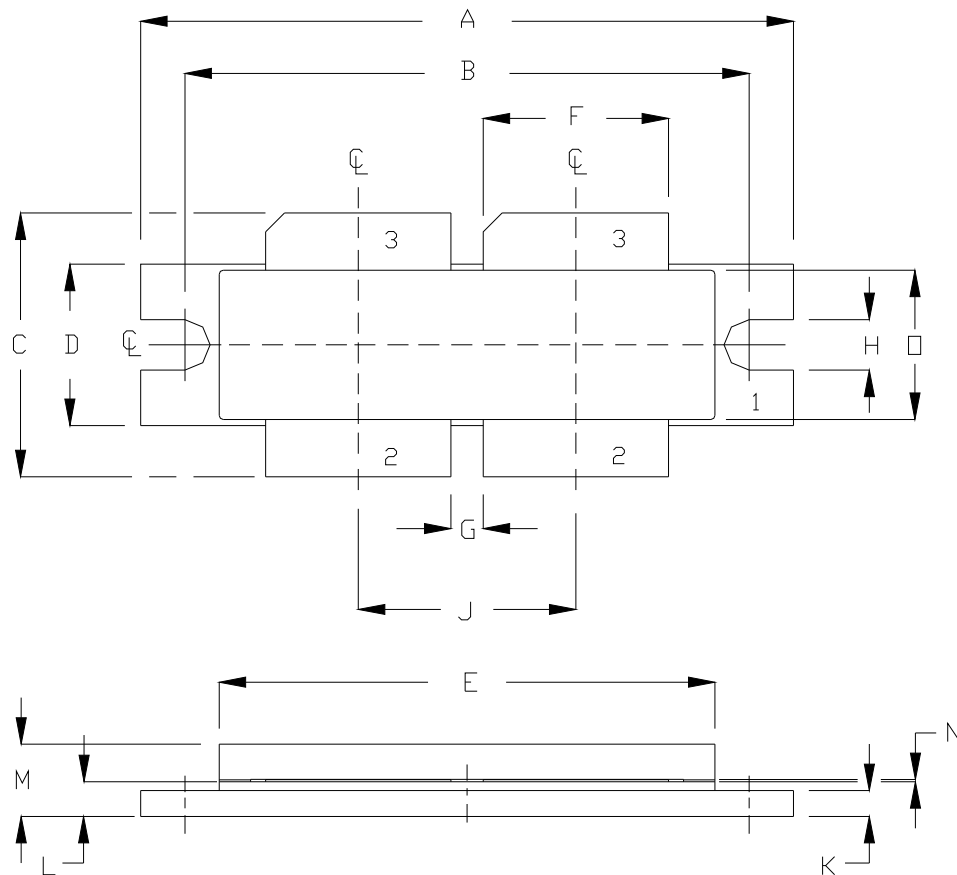
**BROADBAND RF TEST FIXTURE IMPEDANCE CHARACTERISTICS**

| Frequency (GHz) | $Z_{IF}$ ( $\Omega$ ) | $Z_{OF}$ ( $\Omega$ ) |
|-----------------|-----------------------|-----------------------|
| 2.05            | 1.58-j0.23            | 1.15-j1.2             |
| 2.15            | 1.56+j0.36            | 1.07-j0.65            |
| 2.25            | 1.60+j0.97            | 1.04-j0.1             |

$Z_{IF}$  = combined test fixture input impedance for both sides (single ended).

$Z_{OF}$  = combined test fixture output impedance for both sides (single ended).

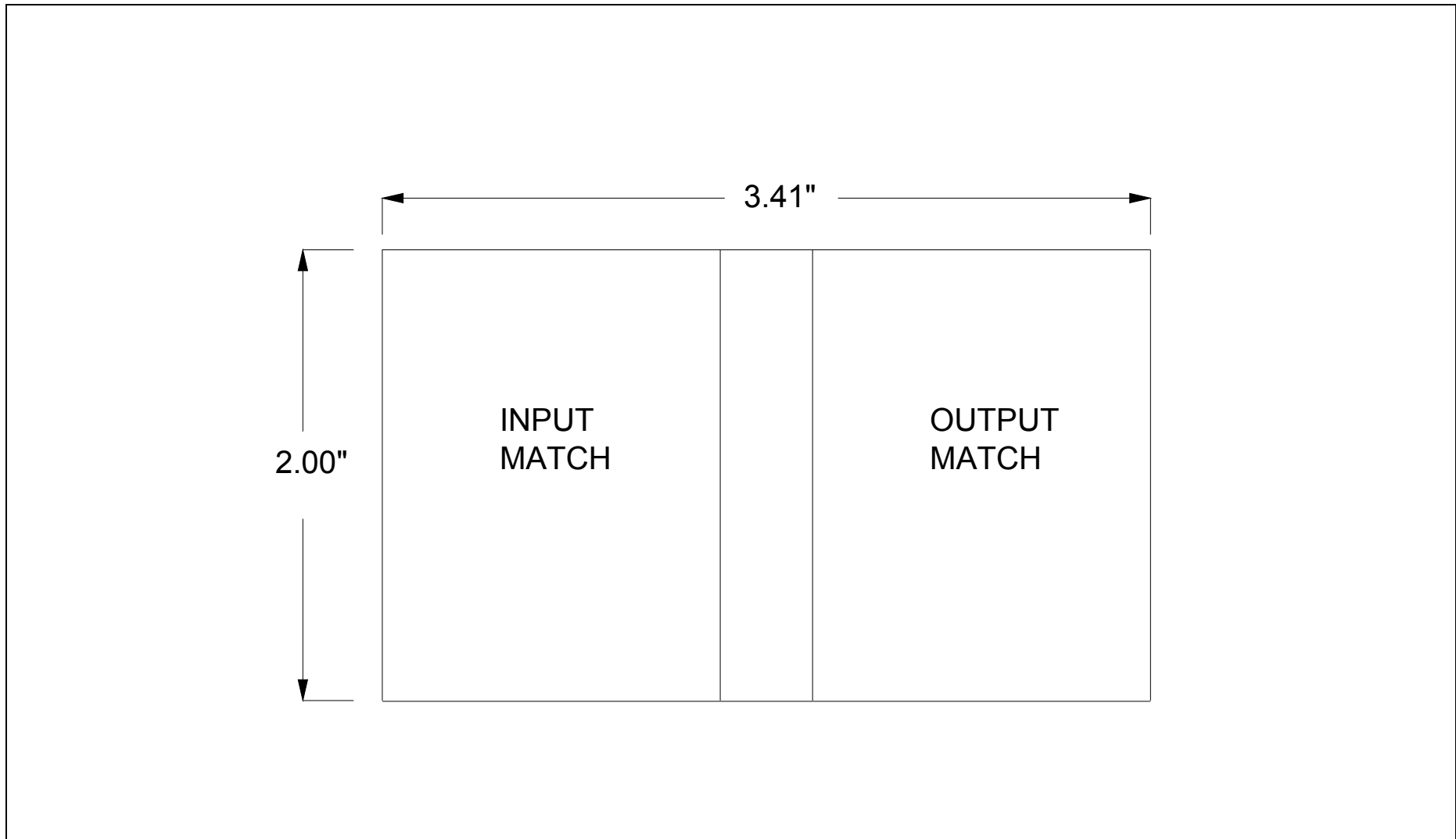
**PACKAGE DIMENSIONAL OUTLINE DRAWING**



| DIM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN    | MAX   | MIN         | MAX   |
| A   | 1.615  | 1.625 | 41.02       | 41.27 |
| B   | 1.395  | 1.405 | 35.43       | 35.69 |
| C   | 0.634  | 0.674 | 16.10       | 17.12 |
| D   | 0.395  | 0.405 | 10.03       | 10.29 |
| E   | 1.219  | 1.241 | 30.96       | 31.52 |
| F   | 0.455  | 0.465 | 11.56       | 11.81 |
| G   | 0.075  | 0.085 | 1.90        | 2.16  |
| H   | 0.120  | 0.130 | 3.05        | 3.30  |
| J   | 0.535  | 0.545 | 13.59       | 13.84 |
| K   | 0.059  | 0.069 | 1.499       | 1.753 |
| L   | 0.081  | 0.091 | 2.06        | 2.31  |
| M   | 0.164  | 0.194 | 4.16        | 4.93  |
| N   | 0.004  | 0.007 | 0.10        | 0.18  |
| □   | 0.354  | 0.364 | 8.99        | 9.24  |

| PIN SCHEDULE |        |
|--------------|--------|
| 1            | SOURCE |
| 2            | GATE   |
| 3            | DRAIN  |

**RF-TEST-FIXTURE**



**CONTACT FACTORY FOR RF TEST FIXTURE CAD DRAWING WITH CIRCUIT DIMENSIONS**

**DEFINITIONS**

| <b>Data Sheet Status</b>                                                                                                                                                                                                                                                                                                                                            |                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Proposed Specification                                                                                                                                                                                                                                                                                                                                              | This data sheet contains proposed specifications.                                   |
| Preliminary Specification                                                                                                                                                                                                                                                                                                                                           | This data sheet contains specifications based on preliminary measurements and data. |
| Product Specification                                                                                                                                                                                                                                                                                                                                               | This data sheet contains final product specifications.                              |
| <b>Maximum Ratings</b>                                                                                                                                                                                                                                                                                                                                              |                                                                                     |
| Stress above one or more of the maximum ratings may cause permanent damage to the device. These are maximum ratings only. Operation of the device at these or at any other conditions above those given in the characteristics sections of the specification is not implied. Exposure to maximum values for extended periods of time may affect device reliability. |                                                                                     |

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