

S-Band Radar 50Ω Transistor

Part number IGT2735M30 is a high power transistor which is internally matched to 50 ohms. It is designed for S-Band radar applications and operates over the instantaneous bandwidth of 2.7 – 3.5 GHz. It utilizes gold metal gallium nitride (GaN) high electron mobility transistor (HEMT) technology operating in common source configuration. Under 300us / 10% pulse conditions it supplies a minimum of 30 watts of peak output power with 11dB gain typically. Specified operation is with Class AB bias. All devices are 100% screened for large signal RF parameters in a fixed tuned broadband matching circuit / test fixture. The use of external tuners is not allowed during screening. This device is rated for a peak output power level of $P_{PEAK} = 30W$ @ 10% duty factor. This corresponds to an average power $P_{AVG} = 3.0W$.



50 Ohm Matched

- Requires no external impedance matching circuitry

GaN on Silicon Carbide FET

- High Power Gain
- Excellent thermal stability

Depletion Mode Device

- Negative Gate Voltage to Bias
- Bias Sequencing Required
- See App Note to Prevent Damage

Gold Metal System

- Complete Gold System
- Gold Bond Wires
- Gold Package Metal
- Maximum Reliability

BeO Free Package

- Metal Based
- Epoxy Seal

High Power 50Ω RF Test / Fixture

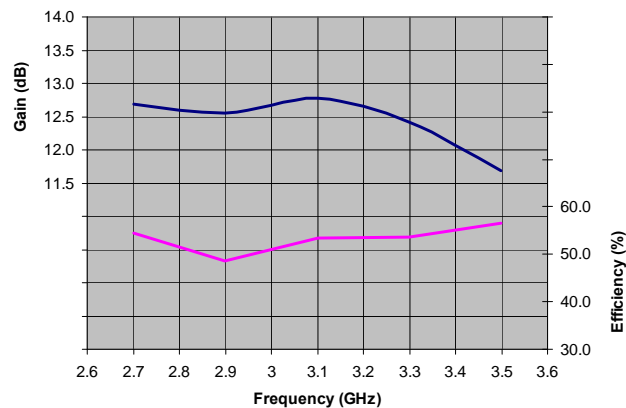
- Broadband
- Long-term Correlation
- 100% Device RF Screening
- No External Tuning Allowed

Patent Issued

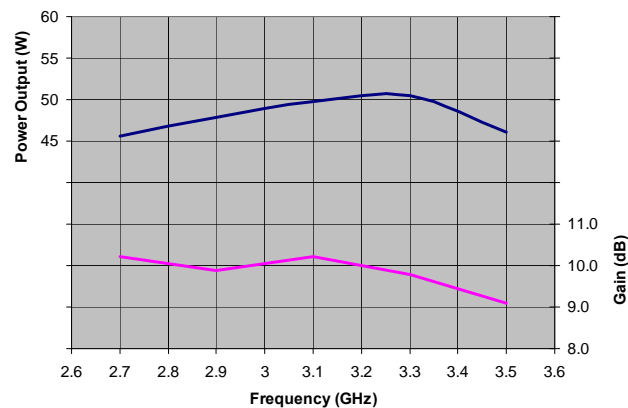
- US 8,299,857 B2

SAMPLE RF DATA

Power Output = 30 Watts



Power Output = Saturated



MAXIMUM RATINGS

| Screen | Parameter | Symbol | Min | Max | Units | Test Conditions |
|--------|--|-------------|-----|------|-------|-----------------------------|
| BD | Drain-Source Breakdown Voltage | V_{DS-BK} | -- | 80 | V | -- |
| BD | Drain-Source Voltage | V_{DS} | -- | 40 | V | -- |
| BD | Gate-Source Voltage | V_{GS} | -10 | 0 | V | -- |
| BD | Storage Temperature Range | T_{STG} | -55 | +150 | °C | -- |
| BD | Operating Junction Temperature Range | T_J | -55 | +200 | °C | -- |
| BD | CW Operation | -- | -- | -- | -- | Not rated for CW operation. |
| Note | Screen 'BD' = parameter qualified By Design. | | | | | |

THERMAL CHARACTERISTICS

| Screen | Parameter | Symbol | Min | Max | Units | Test Conditions |
|--------|--|--------------|-----|-----|-------|--|
| BD | Thermal Resistance | $R_{TH(JC)}$ | -- | 2.5 | °C/W | $V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=25\pm5^\circ C, P_{OUT}=30W$ |
| 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 1071.6, 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. | | | | | |

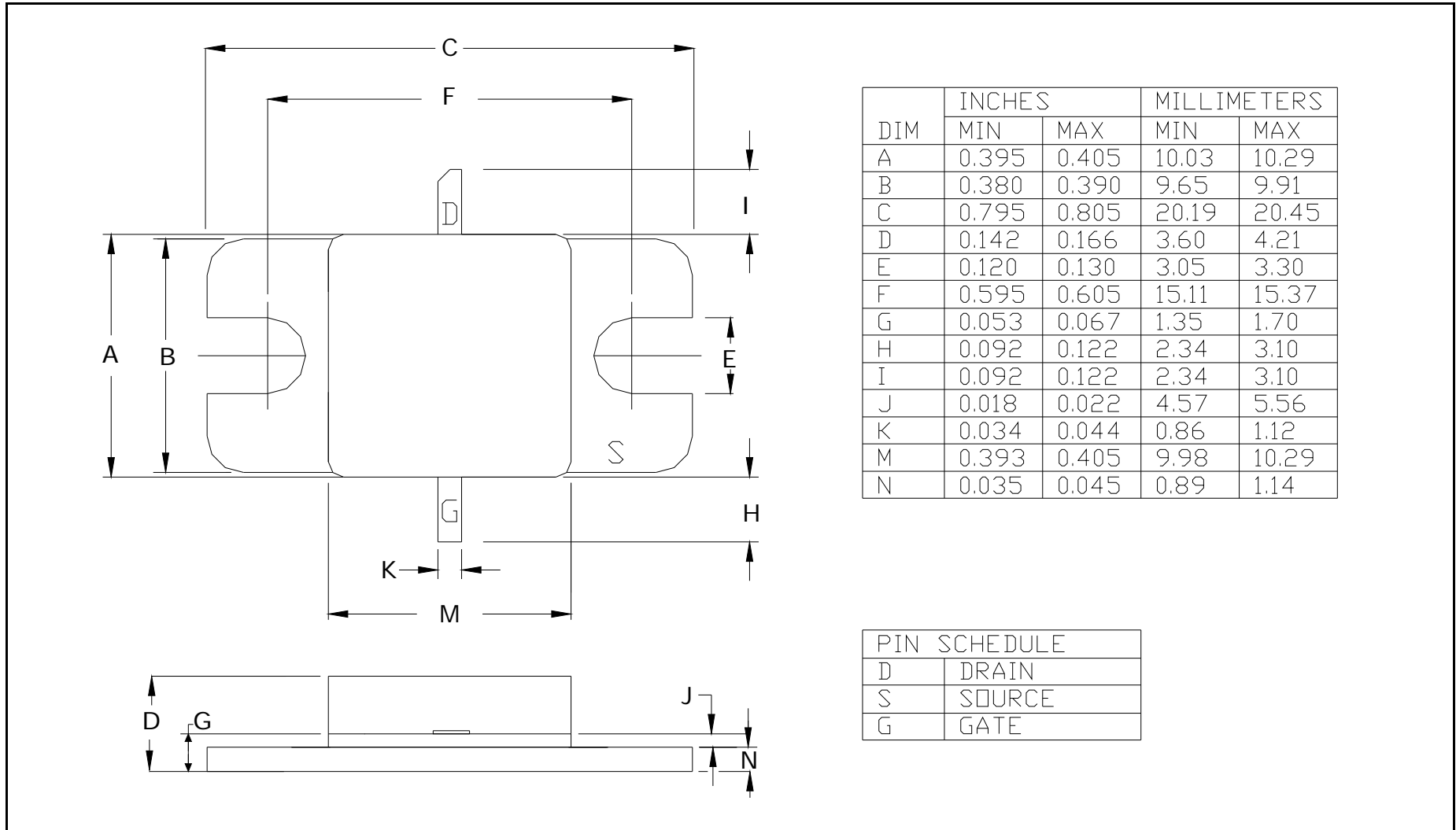
DC ELECTRICAL CHARACTERISTICS

| Screen | Parameter | Symbol | Min | Typ | Max | Units | Test Conditions |
|--------|------------------------|-------------|-----|-------|-----|-------|---|
| 100% | Drain Leakage Current | I_{D-OFF} | -- | 0.2* | -- | mA | $V_{GS} = -8V, V_{DS} = 32V, T_F = 25\pm5^\circ C, *$ Typical Only. |
| 100% | Gate Threshold Voltage | V_{GS-TH} | -- | -3.5* | -- | V | $V_{DS} = 32V, I_D = 40mA, T_F = 25\pm5^\circ C, *$ Typical Only. |

RF ELECTRICAL CHARACTERISTICS

| Screen | Parameter | Symbol | Min | Typ | Max | Units | Test Conditions |
|--------|---|----------|-------|-------|------|-------|---|
| 100% | Input Return Loss | IRL | -18 | -10 | -5 | dB | $V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{OUT}=P_{OUT1}, F=F1, F2, F3.$ |
| 100% | Power Gain | Gp | 10.0 | 11.0 | 13.0 | dB | $V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{OUT}=P_{OUT1}, F=F1, F2, F3.$ |
| 100% | Drain Efficiency | η_D | 45 | 50 | 75 | % | $V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{OUT}=P_{OUT1}, F=F1, F2, F3.$ |
| 100% | Pulse Amplitude Droop | D | -0.50 | -0.10 | 0.30 | dB | $V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{OUT}=P_{OUT1}, F=F1, F2, F3.$ |
| 100% | Delta Insertion Phase | DIP | -30 | -- | +30 | DEG | $V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{OUT}=P_{OUT1}, F=F3.$ |
| 100% | 3:1 Load Mismatch Stability | VSWR-S | 3:1 | | -- | -- | $V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{OUT}=P_{OUT1}, F=F1, F2, F3.$ Rotate 3:1 output VSWR through 360° phase. No oscillatory or pulse break-up characteristics allowed on detected output pulse. All non-harmonically related signals must be at least -65 dBc. |
| Note 1 | $V1 = 32V; I_{DQ1} = 40mA; PW1 = 300\mu s; DF1 = 10\%, P_{OUT1} = 30W.$ | | | | | | |
| Note 2 | Test Frequencies: F1 = 2.7 GHz, F2 = 3.1 GHz, F3 = 3.5 GHz. | | | | | | |
| Note 3 | $T_{F1} = 30\pm 5^\circ C$ = Device flange temperature. | | | | | | |
| Note 4 | Screen 'BD' = parameter qualified By Design. | | | | | | |

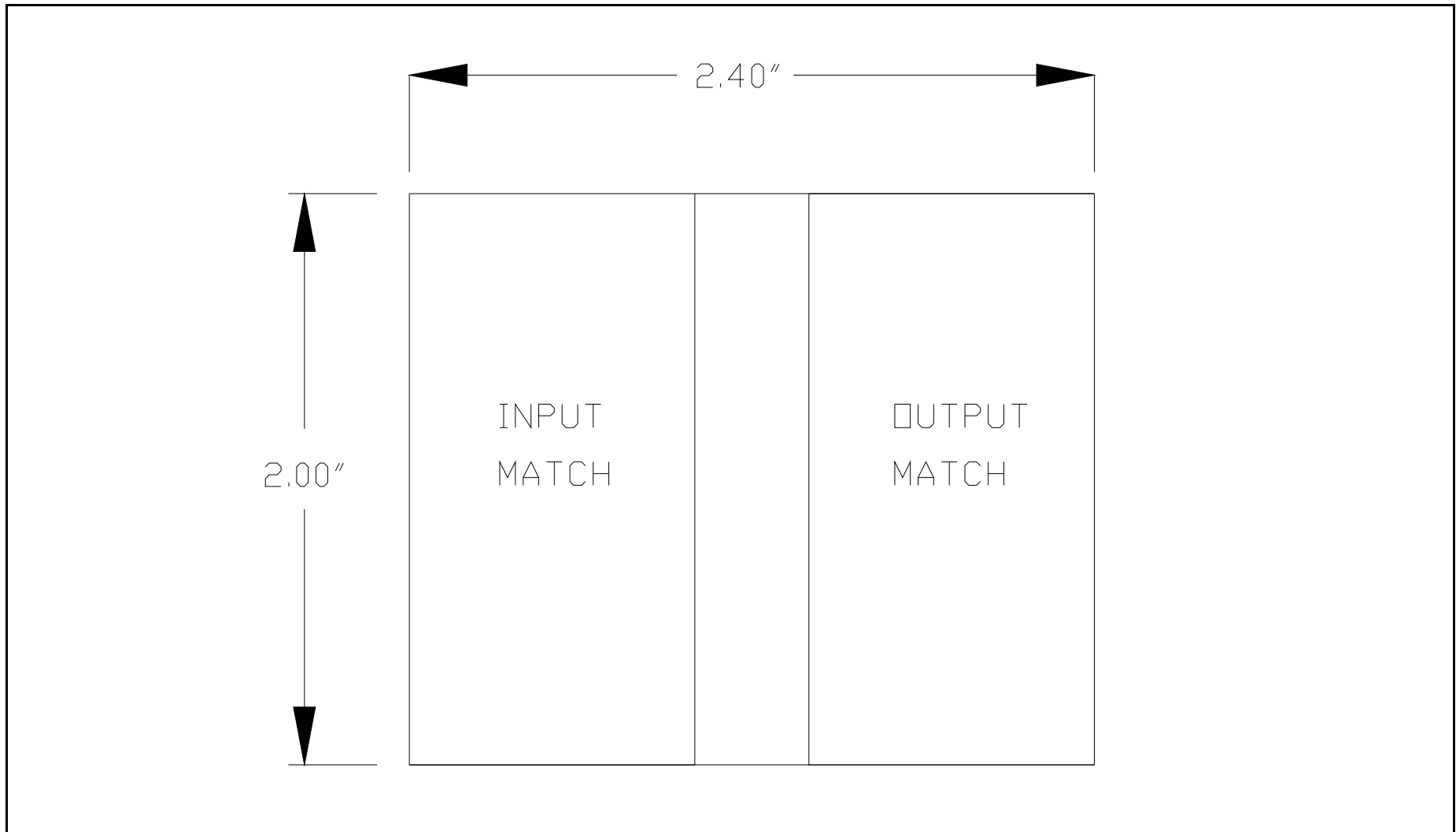
PACKAGE DIMENSIONAL OUTLINE DRAWING



| DIM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.395 | 0.405 | 10.03 | 10.29 |
| B | 0.380 | 0.390 | 9.65 | 9.91 |
| C | 0.795 | 0.805 | 20.19 | 20.45 |
| D | 0.142 | 0.166 | 3.60 | 4.21 |
| E | 0.120 | 0.130 | 3.05 | 3.30 |
| F | 0.595 | 0.605 | 15.11 | 15.37 |
| G | 0.053 | 0.067 | 1.35 | 1.70 |
| H | 0.092 | 0.122 | 2.34 | 3.10 |
| I | 0.092 | 0.122 | 2.34 | 3.10 |
| J | 0.018 | 0.022 | 4.57 | 5.56 |
| K | 0.034 | 0.044 | 0.86 | 1.12 |
| M | 0.393 | 0.405 | 9.98 | 10.29 |
| N | 0.035 | 0.045 | 0.89 | 1.14 |

| PIN SCHEDULE | |
|--------------|--------|
| D | DRAIN |
| S | SOURCE |
| G | GATE |

RF TEST FIXTURE



CONTACT FACTORY FOR RF TEST FIXTURE CAD DRAWING WITH CIRCUIT DIMENSIONS

DEFINITIONS

| Data Sheet Status | |
|--|---|
| 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. |
| Maximum Ratings | |
| 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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