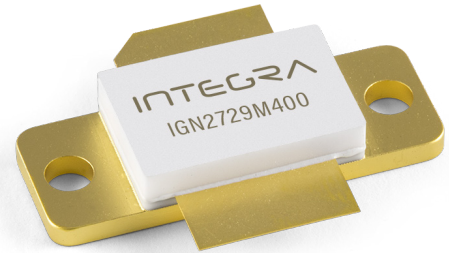


S-Band, GaN/SiC, RF Power Transistor

2.7 - 2.9 GHz | 440 W typ | 58% Efficiency typ | 11dB Gain typ | 50 V | 300µs Pulse Length, 10% Duty Cycle

IGN2729M400 is a high power GaN-on-SiC RF power transistor that has been designed to suit the unique needs of modern radar systems. It supplies a minimum of 400W of peak output power, with typically >11 dB of gain and 58% efficiency. It operates from a 50 V supply voltage. For optimal thermal efficiency, the transistor is housed in a metal-based package with an epoxy-sealed ceramic lid.



FEATURES

- GaN on SiC HEMT Technology
- Output Power >400W
- Pre-matched Input and Output Impedances
- High Efficiency - 58% typical
- 100% RF Tested Under 300µs, 10% duty cycle pulse conditions
- RoHS and REACH Compliant
- Full non-linear electrothermal model available, please contact the factory

APPLICATIONS

- S-band Radar Systems

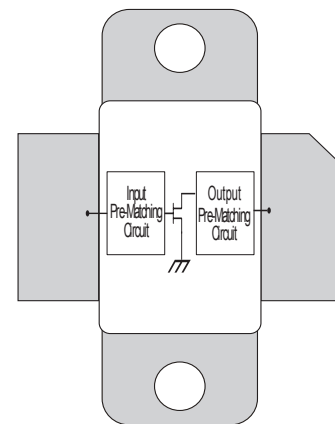


Table 1. RF Electrical Characteristics (Case temperature = 30 °C unless otherwise stated)

| Parameter | Symbol | Min | Typ | Max | Units | Test Conditions |
|-------------------------|--------------|------|-------|------|-------|---|
| RF Output Power | $P_{OUT,RF}$ | 400 | 440 | 634 | W | $P_{IN} = 34W$ $f = 2.7, 2.8, 2.9 \text{ GHz}$ 300µs pulse length, 10% duty cycle $V_{DS} = 50V, I_{DS} = 100mA$ |
| Gain | G | 10.7 | 11.2 | 12.7 | dB | |
| Drain Efficiency | η | 53 | 58 | 75 | % | |
| Pulse Droop | D | -0.5 | -0.25 | +0.3 | dB | |
| Input Return Loss | IRL | 9 | 12 | 18 | dB | |
| Load Mismatch Stability | VSWR-S | 2:1 | | | | |
| VSWR Withstand | VSWR-LMT | 3:1 | | | | |

Note: Consult Integra Technologies Application Note 001 for information on how RF output power and pulse droop are measured.

Table 2. DC Electrical Characteristics (Case temperature = 25 °C unless otherwise stated)

| Parameter | Symbol | Min | Typ | Max | Units | Test Conditions |
|------------------------|--------|------|------|-----|-------|--------------------------------|
| Gate Pinch-Off Voltage | V_p | -5.0 | | | V | $V_{DS} = 50V, I_{DS} = 1mA$ |
| Quiescent Gate Voltage | V_Q | | -2.6 | | V | $V_{DS} = 50V, I_{DS} = 100mA$ |

Table 3. Absolute Maximum Ratings (Not Simultaneous)

| Parameter | Symbol | Value | Units | Test Conditions |
|-------------------------------|--------------|-------------|-------|-----------------|
| DC Drain-Source Voltage | V_{DS} | 120 | V | 25 °C |
| DC Gate-Source Voltage | V_{GS} | -8 to +1.5 | V | 25 °C |
| DC Drain Current | I_D | 54 | A | 25 °C |
| DC Gate Current | I_G | 54 | mA | 25 °C |
| RF Input Power | $P_{RF,IN}$ | 34 | W | 25 °C |
| Operating Channel Temperature | T_{CH} | -55 to +225 | °C | |
| Storage Temperature | T_{STG} | -55 to +150 | °C | |
| Soldering Temperature | T_{SOLDER} | 260 for 60s | °C | |

Note: Operation outside the limits given in this table may cause permanent damage to the transistor

Table 4. Thermal Resistance (Case temperature = 85 °C unless otherwise stated)

| Parameter | Symbol | Min | Typ | Max | Units | Test Conditions |
|--|----------|-----|------|-----|-------|---|
| Peak Thermal Resistance, Channel to Case | R_{TH} | | 0.15 | | °C/W | $P_{DISS} = 318.6W$ 300µs pulse length, 10% duty cycle $V_{DS} = 50V$ |

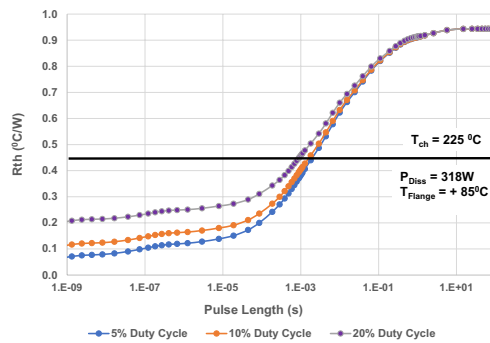
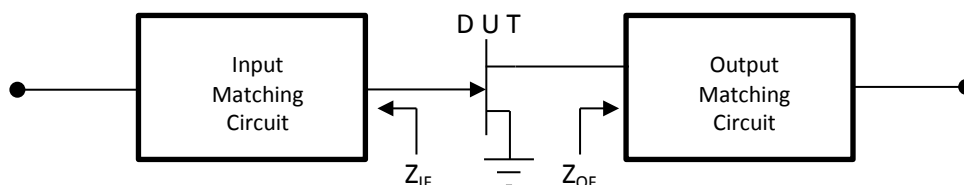


Table 5. Optimum Source & Load Impedances (Case temperature = 25 °C unless otherwise stated)

| Frequency (GHz) | Z_{IF} | Z_{OF} | Units | Test Conditions |
|-----------------|-------------|-------------|----------|--|
| 2.7 | 3.1 - j 1.6 | 3.3 - j 1.0 | Ω | $P_{IN} = 34W$ 300µs Pulse length, 10% Duty Cycle $V_{DS} = 50V, I_{DS} = 100mA$ |
| 2.8 | 3.1 - j 1.0 | 3.0 - j 0.3 | Ω | |
| 2.9 | 3.3 - j 0.3 | 3.2 + j 0.6 | Ω | |



TYPICAL PERFORMANCE

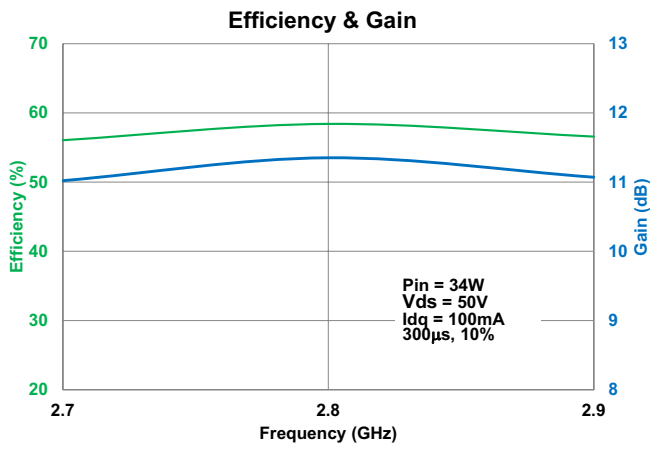


Figure 1

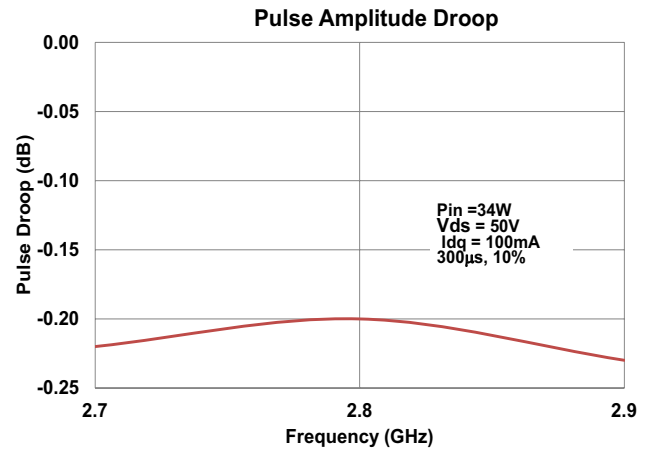


Figure 2

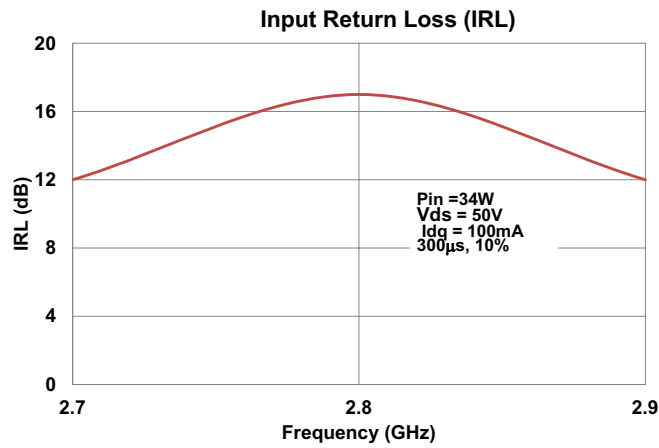
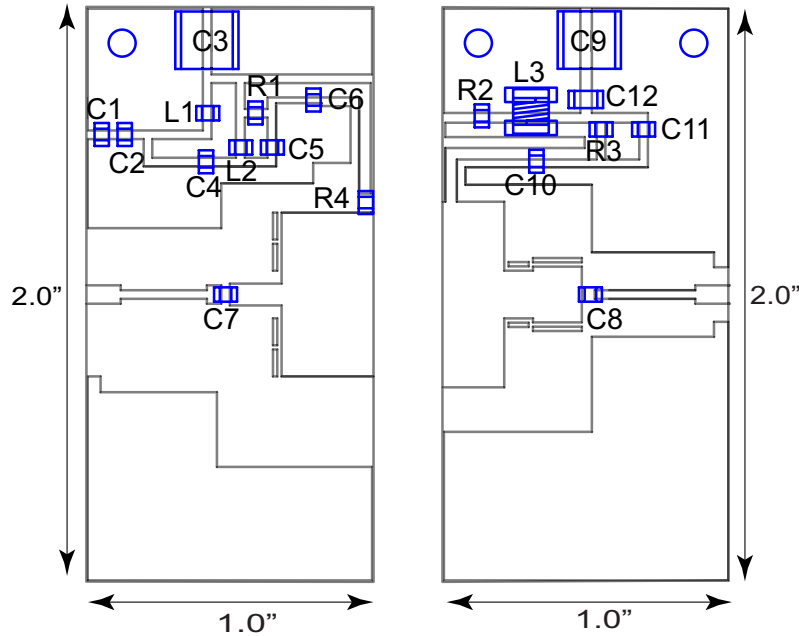


Figure 3

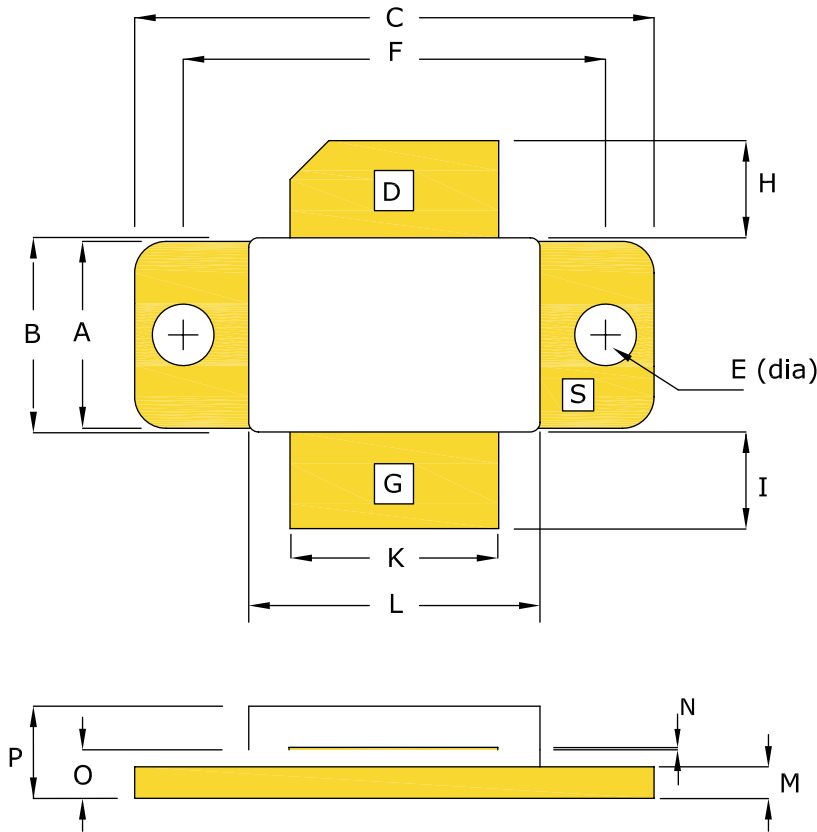
TEST FIXTURE



Bill of Materials for IGN2729M400 Test Fixture

| Designator | Description | Quantity | Part Number |
|----------------|--|----------|----------------|
| C1, C4, C11 | CAP 0.1 μ F, 0805 100V | 3 | 08051C104K4T2A |
| C2, C5, C6 | CAP 27pF, 0805, 100V | 3 | ATC600F270 |
| C3, C9 | CAP 10 μ F, 2220, X7R 50V | 2 | 22201C106MAT2A |
| C7, C8 | CAP 12pF, Edge Mount | 2 | ATC600F120 |
| C10 | CAP 5.6pF, Edge Mount | 1 | ATC600F5R6 |
| C12 | CAP 1 μ F, 1206, 100V | 1 | 12061C105K4T2A |
| L1, L2 | IND FB, 120 OHM, 0805 5A | 2 | ILHB0805ER121V |
| L3 | IND 5N5, 1508 | 1 | 1508-5N5JLB |
| R1, R2, R3, R4 | RES, 5R1, 0805 | 4 | ERJ-6GEYJ5R1V |
| PC Board Type | ROGERS RO4350B-03011, 30mil, 1/1oz. Copper | 2 | |

PACKAGE PL64A1



| DIM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.380 | 0.390 | | |
| B | 0.395 | 0.405 | | |
| C | 1.065 | 1.075 | 27.05 | 27.31 |
| E | 0.124 | 0.130 | 3.15 | 3.30 |
| F | 0.865 | 0.875 | 21.97 | 22.23 |
| H | 0.190 | 0.223 | 4.83 | 5.66 |
| I | 0.190 | 0.223 | 4.83 | 5.66 |
| J | -- | -- | -- | -- |
| K | 0.425 | 0.435 | 10.80 | 11.05 |
| L | 0.595 | 0.605 | 15.11 | 15.37 |
| M | 0.060 | 0.070 | 1.52 | 1.78 |
| N | 0.004 | 0.006 | 0.10 | 0.15 |
| O | 0.096 | 0.106 | 2.44 | 2.69 |
| P | 0.181 | 0.214 | 4.60 | 5.44 |

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

Dimensions

ESD & MSL Rating

| Parameter | Rating | Standard |
|----------------------------------|----------------------|------------------------|
| ESD Human Body Model (HBM) | TBD | ESDA/JEDEC JS-001-2012 |
| ESD Charged Device Model (CDM) | TBD | JEDEC JESD22-C101F |
| Moisture Sensitivity Level (MSL) | Unlimited Shelf Life | IPC/JEDEC J-STD-020 |

RoHS Compliance

Integra Technologies, Inc declares that its GaN and LDMOS Transistor Products comply with EU Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS2), as adopted by EU member states on January 2, 2013 and amended on March 31, 2015 by EU Directive 2015/863/EU.

REACH Compliance

Integra Technologies supports EU Regulation number 1907/2006 concerning the Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH) as these apply to Integra semiconductor products, development tools, and shipping packaging.

In support of the REACH regulation, Integra will:

- Inform customers and recipients of Integra product if they contain any substances that are of very high concern (SVHC) per the European Chemical Agency (ECHA) website.
- Notify ECHA if any Integra product that contains any SVHCs which exceed guidelines for REACH chemicals by weight per part number and for total content weight per year for all products produced in or imported to the European market.
- Cease shipments of product containing REACH Annex XIV substances until authorization has been obtained.
- Cease shipment of product containing REACH Annex XVII chemicals when restrictions apply.

Integra has evaluated its materials, BOMs, and product specifications and product and has determined that this transistor conforms to all REACH and SVHC regulations and guidelines. Integra has implemented actions and control programs that will assure continued compliance.

Disclaimer

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DEFINITIONS:

DATA SHEET STATUS

Advanced Specification - This data sheet contains Advanced specifications.

Preliminary Specification - This data sheet contains specifications based on preliminary measurements and data.

Final 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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