



# 2731GN-220V

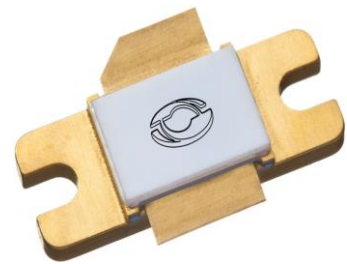
220 Watts - 50 Volts, 200  $\mu$ s, 10%  
S-Band Radar 2700 - 3100 MHz

## GENERAL DESCRIPTION

The 2731GN-220V is an internally matched, COMMON SOURCE, class AB, GaN on SiC HEMT transistor capable of providing over 10 dB gain, 220 Watts of pulsed RF output power at 200 $\mu$ s pulse width, 10% duty factor across the 2700 to 3100 MHz band. This hermetically sealed transistor is designed for S-Band Radar applications. It utilizes gold metallization and eutectic attach to provide highest reliability and superior ruggedness.

Market Application – 2731GN-220V is designed for S-Band Pulsed Radar

## CASE OUTLINE 55-QP Common Source



## ABSOLUTE MAXIMUM RATINGS

### Maximum Power Dissipation

Device Dissipation @ 25°C 650 W

### Maximum Voltage and Current

Drain-Source Voltage ( $V_{DSS}$ ) 150 V

Gate-Source Voltage ( $V_{GS}$ ) -8 to +0 V

### Maximum Temperatures

Storage Temperature ( $T_{STG}$ ) -55 to +125°C

Operating Junction Temperature +250 °C

## ELECTRICAL CHARACTERISTICS @ 25°C

| Symbol        | Characteristics         | Test Conditions                   | Min | Typ  | Max  | Units |
|---------------|-------------------------|-----------------------------------|-----|------|------|-------|
| Pout          | Output Power            | Pin=22.5W Freq=2700,2900,3100MHz  | 220 | 245  |      | W     |
| Gp            | Power Gain              | Pin=22.5W Freq=2700,2900,3100MHz  | 9.8 | 10.4 |      | dB    |
| $\eta_d$      | Drain Efficiency        | Pin=22.5W Freq=2700,2900,3100MHz  | 40  | 50   |      | %     |
| Dr            | Droop                   | Pin=22.5W Freq=2700,2900,3100MHz  |     |      | 0.8  | dB    |
| VSWR-T        | Load Mismatch Tolerance | Pout=220W, Freq= 2900MHz          |     |      | 3:1  |       |
| $\Theta_{jc}$ | Thermal Resistance      | Pulse Width=200 $\mu$ s, Duty=10% |     |      | 0.33 | °C/W  |

- Bias Condition: Vdd=+50V, Idq=150mA constant current ( $V_{GS}$ = -2.0 ~ -4.5V typical)

## FUNCTIONAL CHARACTERISTICS @ 25°C

|              |                       |                            |  |  |    |    |
|--------------|-----------------------|----------------------------|--|--|----|----|
| $I_{D(Off)}$ | Drain leakage current | $V_{GS} = -8V, V_D = 150V$ |  |  | 30 | mA |
| $I_{G(Off)}$ | Gate leakage current  | $V_{GS} = -8V, V_D = 0V$   |  |  | 8  | mA |

Export Classification: ECCN 3A001.b.3.a.3

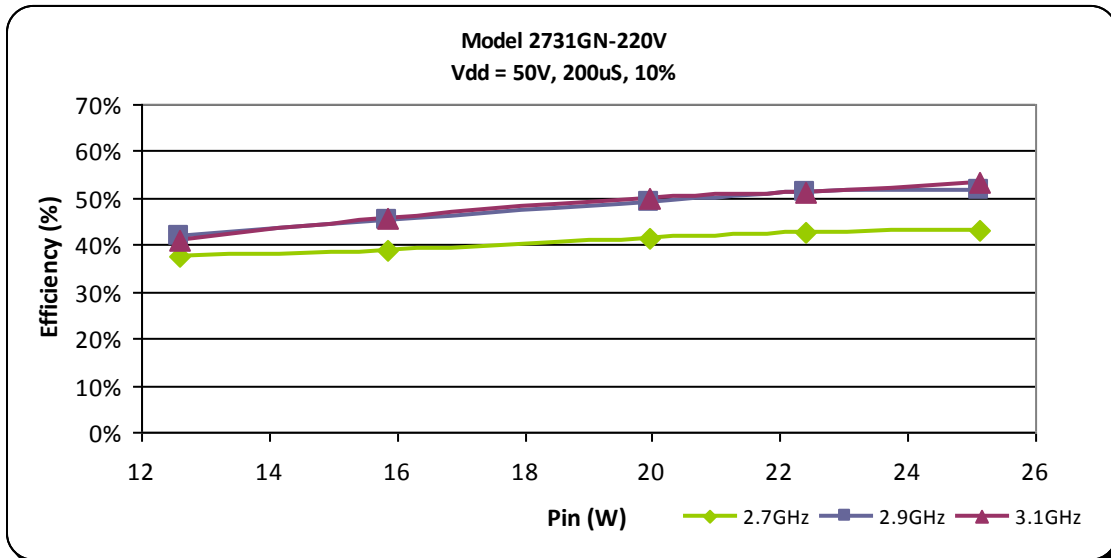
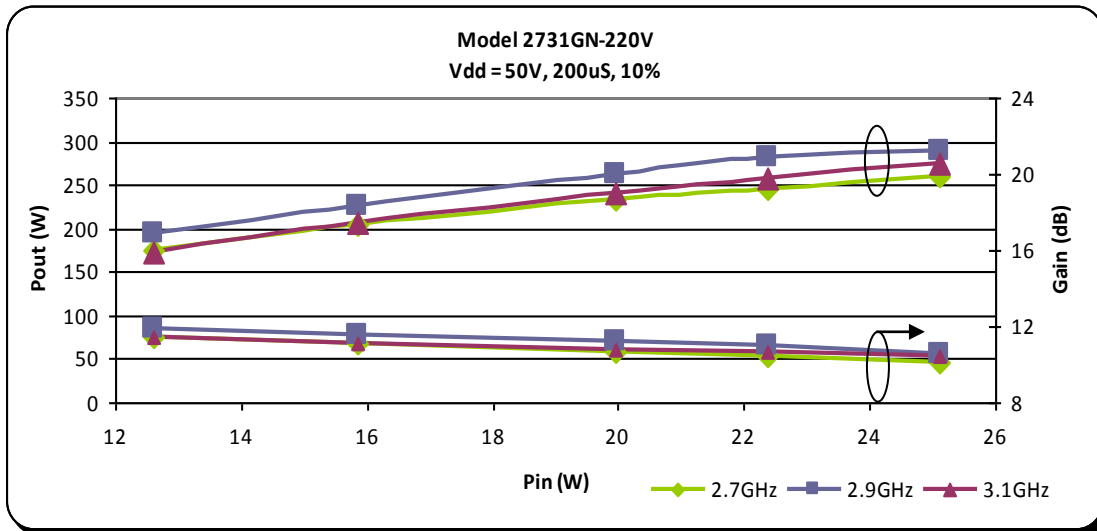


# 2731GN-220V

220 Watts - 50 Volts, 200  $\mu$ s, 10%  
S-Band Radar 2700 - 3100 MHz

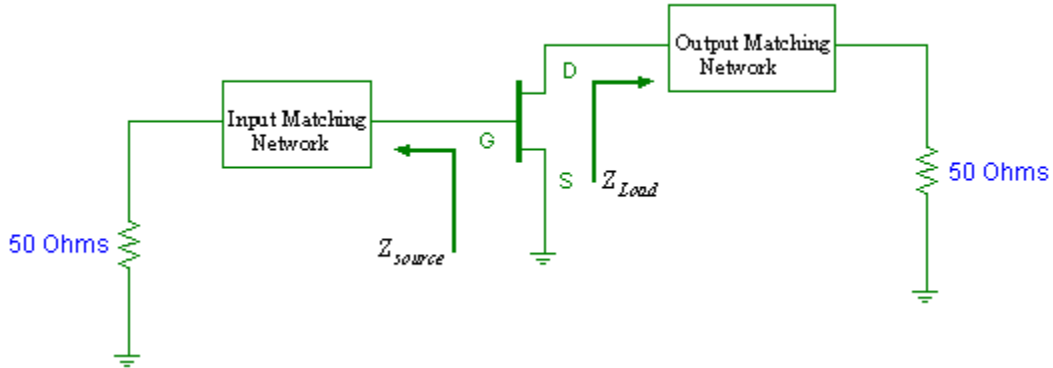
## TYPICAL BROAD BAND PERFORMANCE DATA

| Frequency | Pin (W) | Pout (W) | Id (A) | RL (dB) | Nd (%) | G (dB) | Droop (dB) |
|-----------|---------|----------|--------|---------|--------|--------|------------|
| 2700 MHz  | 22.5    | 246      | 1.24   | -8      | 43     | 10.4   | 0.6        |
| 2900 MHz  | 22.5    | 280      | 1.17   | -14     | 51     | 11.0   | 0.5        |
| 3100 MHz  | 22.5    | 258      | 1.08   | -7      | 51     | 10.6   | 0.4        |



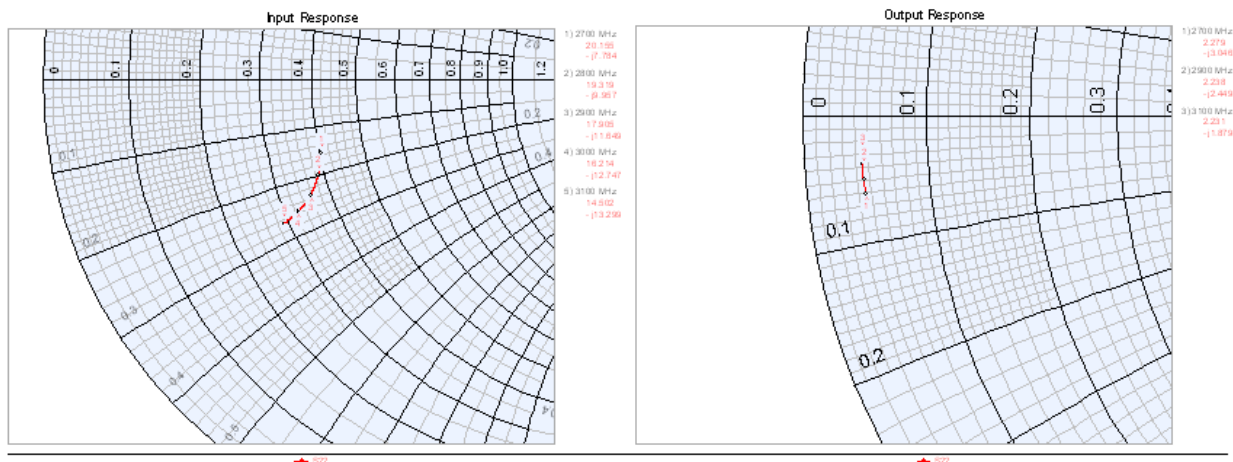
For the most current data, consult MICROSEMI's website: [www.MICROSEMI.com](http://www.MICROSEMI.com)  
Specifications are subject to change, consult the Santa Clara factory at (408) 986-8031 for the latest information.

## TRANSISTOR IMPEDANCE INFORMATION



Note:  $Z_{Source}$  is looking into the input circuit  
 $Z_{Load}$  is looking into the output circuit

| Impedance Data |                |              |
|----------------|----------------|--------------|
| Freq (GHz)     | $Z_{Source}$   | $Z_{Load}$   |
| 2.7            | 20.15 - j07.78 | 2.27 - j3.04 |
| 2.9            | 17.90 - j11.64 | 2.23 - j2.44 |
| 3.1            | 14.50 - j13.29 | 2.23 - j1.87 |

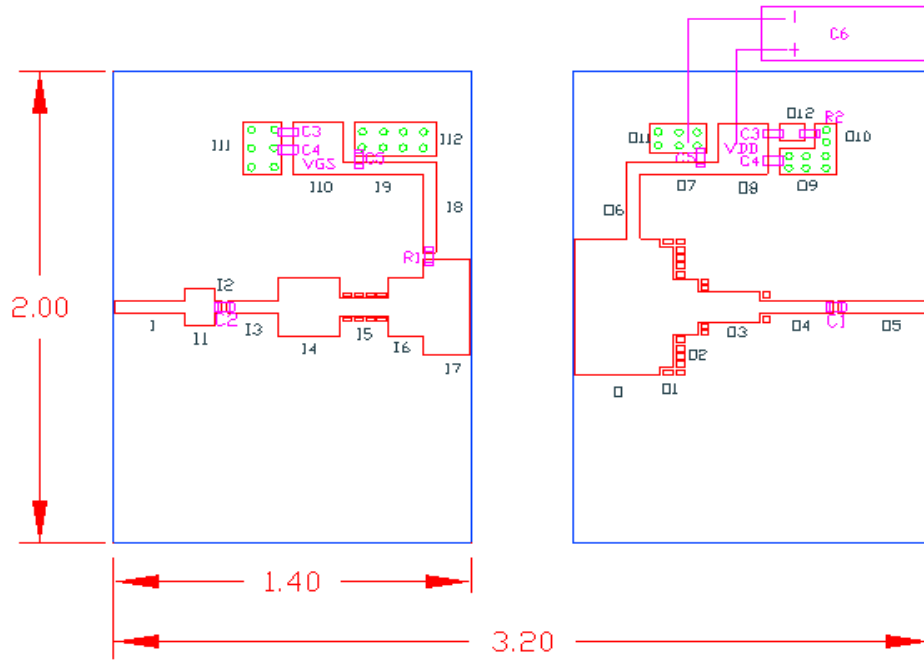




# 2731GN-220V

220 Watts - 50 Volts, 200  $\mu$ s, 10%  
S-Band Radar 2700 - 3100 MHz

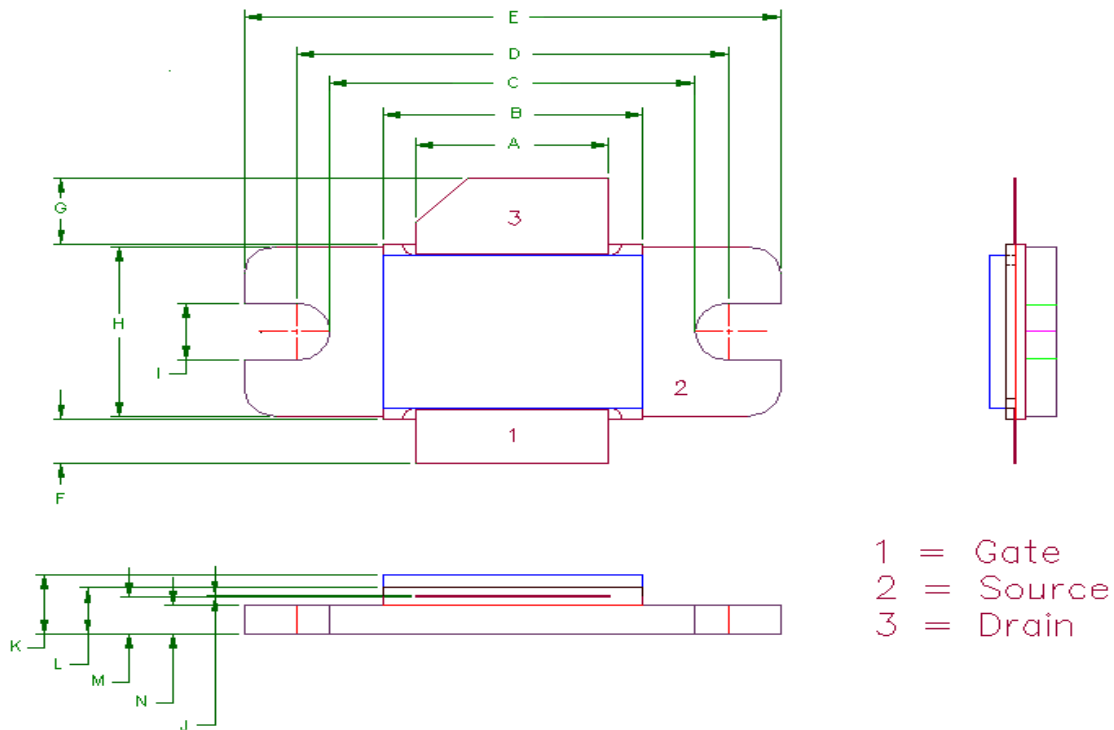
## TEST CIRCUIT DIAGRAM



**Board Material: Roger Duriod 6002 @ 20 Mil Thickness, Er=2.9**

| Component List |                                       |           | Input Physical Circuit Layout |         |         | Output Physical Circuit Layout |         |         |
|----------------|---------------------------------------|-----------|-------------------------------|---------|---------|--------------------------------|---------|---------|
| Item           | Description                           | Value     | Item                          | W (mil) | L (mil) | Item                           | W (mil) | L (mil) |
| C1             | Chip Cap A size                       | 9.1pF     | I                             | 52      | 278     | O                              | 580     | 334     |
| C2             | Chip Cap A size                       | 9.1pF     | I1                            | 160     | 112     | O1                             | 508     | 50      |
| C3             | Chip Cap B size                       | 10,000pF  | I2                            | 52      | 30      | O2                             | 230     | 100     |
| C4             | Chip Cap B size                       | 1000pF    | I3                            | 52      | 200     | O3                             | 130     | 241     |
| C5             | Chip Cap B size                       | 100pF     | I4                            | 250     | 240     | O4                             | 52      | 286     |
| C10            | Electrolytic Cap (63V)                | 2200uF    | I5                            | 80      | 190     | O5                             | 52      | 360     |
| R1             | Chip Resistor size 0805               | 11.5 ohms | I6                            | 250     | 130     | O6                             | 52      | 270     |
| R2             | Chip Resistor size 0805               | 2 Ohms    | I7                            | 400     | 187     | O7                             | 52      | 390     |
|                |                                       |           | I8                            | 52      | 340     | O8                             | 216     | 190     |
| Board:         | Duroid 6002 - 20 Mil Thick - Er = 2.9 |           | I9                            | 52      | 330     | O9                             | 110     | 140     |
|                |                                       |           | I10                           | 220     | 190     | O10                            | 216     | 80      |
|                |                                       |           | I11                           | 220     | 150     | O11                            | 126     | 220     |
|                |                                       |           | I12                           | 140     | 320     | O12                            | 73      | 110     |

## 55-QP PACKAGE DIMENSION



| Dimension | Min (mil) | Min (mm) | Max (mil) | Max (mm) |
|-----------|-----------|----------|-----------|----------|
| A         | 370       | 9.40     | 372       | 9.44     |
| B         | 498       | 12.65    | 500       | 12.7     |
| C         | 700       | 17.78    | 702       | 17.83    |
| D         | 830       | 21.08    | 832       | 21.13    |
| E         | 1030      | 26.16    | 1032      | 26.21    |
| F         | 101       | 2.56     | 102       | 2.59     |
| G         | 151       | 3.84     | 152       | 3.86     |
| H         | 385       | 9.78     | 387       | 9.83     |
| I         | 130       | 3.30     | 132       | 3.35     |
| J         | 003       | .076     | 004       | 0.10     |
| K         | 135       | 3.43     | 137       | 3.48     |
| L         | 105       | 2.67     | 107       | 2.72     |
| M         | 085       | 2.16     | 86        | 2.18     |
| N         | 065       | 1.65     | 66        | 1.68     |



---

# 2731GN-220V

220 Watts - 50 Volts, 200  $\mu$ s, 10%  
S-Band Radar 2700 - 3100 MHz

---

Microsemi makes no warranty, representation, or guarantee regarding the information contained herein or the suitability of its products and services for any particular purpose, nor does Microsemi assume any liability whatsoever arising out of the application or use of any product or circuit. The products sold hereunder and any other products sold by Microsemi have been subject to limited testing and should not be used in conjunction with mission-critical equipment or applications. Any performance specifications are believed to be reliable but are not verified, and Buyer must conduct and complete all performance and other testing of the products, alone and together with, or installed in, any end-products. Buyer shall not rely on any data and performance specifications or parameters provided by Microsemi. It is the Buyer's responsibility to independently determine suitability of any products and to test and verify the same. The information provided by Microsemi hereunder is provided "as is, where is" and with all faults, and the entire risk associated with such information is entirely with the Buyer. Microsemi does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other IP rights, whether with regard to such information itself or anything described by such information. Information provided in this document is proprietary to Microsemi, and Microsemi reserves the right to make any changes to the information in this document or to any products and services at any time without notice. Microsemi Corporation (Nasdaq: MSCC) offers a comprehensive portfolio of semiconductor and system solutions for communications, defense & security, aerospace and industrial markets. Products include high-performance and radiation-hardened analog mixed-signal integrated circuits, FPGAs, SoCs and ASICs; power management products; timing and synchronization devices and precise time solutions, setting the world's standard for time; voice processing devices; RF solutions; discrete components; security technologies and scalable anti-tamper products; Ethernet solutions; Power-over-Ethernet ICs and midspans; as well as custom design capabilities and services. Microsemi is headquartered in Aliso Viejo, Calif., and has approximately 3,600 employees globally. Learn more at [www.microsemi.com](http://www.microsemi.com).

©2016 Microsemi Corporation. All rights reserved. Microsemi and the Microsemi logo are registered trademarks of Microsemi Corporation. All other trademarks and service marks are the property of their respective owners.

### Revision History

| Revision Level / Date | Para. Affected | Description                              |
|-----------------------|----------------|--|
| 0.1 / June 2013       | -              | Initial Preliminary Release              |
| 1 / 9 Feb 2016        | -              | Formatted, updated export classification |

For the most current data, consult MICROSEMI's website: [www.MICROSEMI.com](http://www.MICROSEMI.com)  
Specifications are subject to change, consult the Santa Clara factory at [\(408\) 986-8031](tel:408-986-8031) for the latest information.