# 1214GN-20V

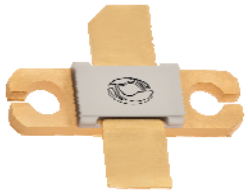
20 Watts - 50 Volts, 300 µs, 10%
L-Band Radar 1200 - 1400 MHz

## GENERAL DESCRIPTION

The 1214GN-20V is an internally matched, COMMON SOURCE, class AB, GaN on SiC HEMT transistor capable of providing over 16dB gain, over 20 Watts of pulsed RF output power at 300µs pulse width, 10% duty factor across the 1200 to 1400 MHz band.

Market Application – 1214GN-20V is designed for L-Band Pulsed Radar

## CASE OUTLINE
## 55-QP
## Common Source



## ABSOLUTE MAXIMUM RATINGS

**Maximum Power Dissipation**

Device Dissipation @ 25°C 35 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=.5W Freq=1200,1300,1400 MHz | 20 | 25 | | W |
| Gp | Power Gain | Pin=.5W Freq=1200,1300,1400 MHz | 16 | 17 | | dB |
| ηd | Drain Efficiency | Pin=.5W Freq=1200,1300,1400 MHz | 45 | 50 | | % |
| Dr | Droop | Pin=.5W Freq=1200,1300,1400 MHz | | | .5 | dB |
| VSWR-T | Load Mismatch Tolerance | Pout=20W, Freq= 1300MHz | | | 5:1 | |
| Θjc | Thermal Resistance | Pulse Width=300uS, Duty=10% | | | 0.1 | °C/W |

- **Bias Condition: Vdd=+50V, Idq=20mA constant current (Vgs= -2.0 ~ -4.5V typical)**

## FUNCTIONAL CHARACTERISTICS @ 25°C

| | | | | | | |
|---|---|---|---|---|---|---|
| $I_{D(Off)}$ | Drain leakage current | $V_{gS}$ = -8V, $V_D$ = 60V | | | 10 | mA |
| $I_{G(Off)}$ | Gate leakage current | $V_{gS}$ = -8V, $V_D$ = 0V | | | 8 | mA |
| $BV_{DSS}$ | Drain-source breakdown voltage | $V_{gs}$ =-8V, $I_D$ = 10mA | 250 | | | V |

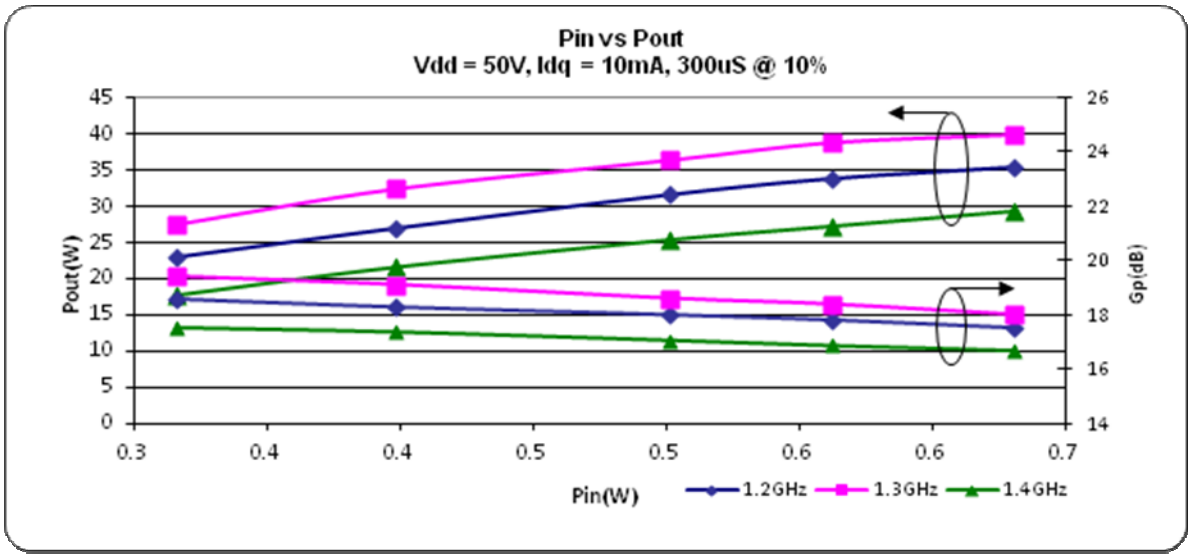
***Export Classification: EAR-99*** April 2013

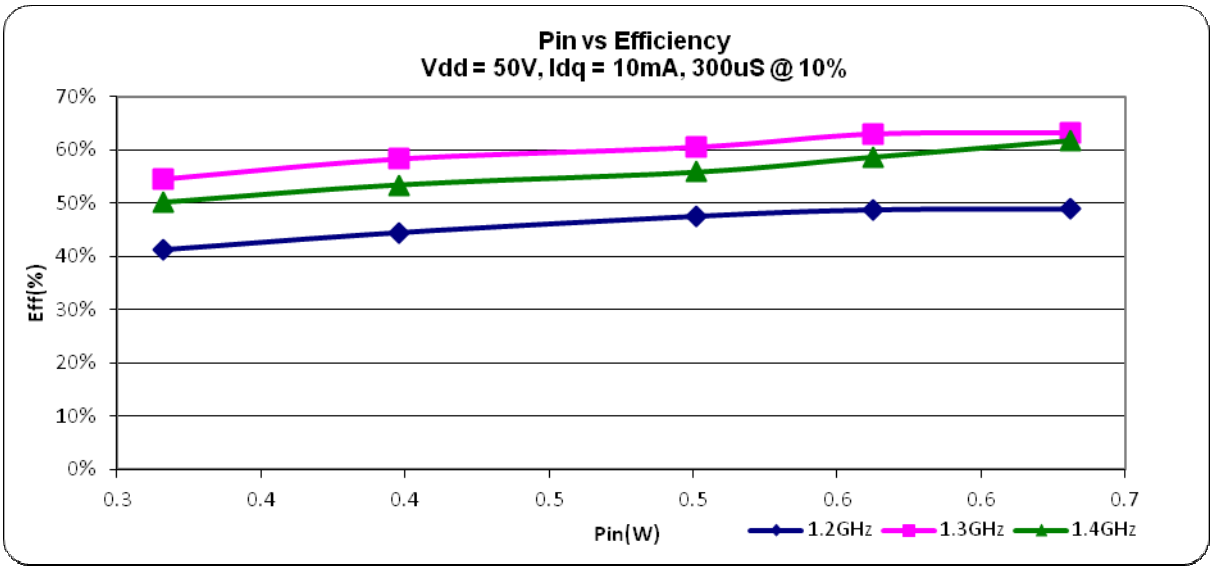
# 1214GN-20V

20 Watts - 50 Volts, 300 µs, 10%
L-Band Radar 1200 - 1400 MHz

## TYPICAL BROAD BAND PERFORMACE DATA

| Frequency | Pin (W) | Pout (W) | Id (A) | RL (dB) | Nd (%) | G (dB) | Droop (dB) |
|---|---|---|---|---|---|---|---|
| 1200 MHz | .5 | 31.6 | .14 | -9 | 48 | 18 | 0.25 |
| 1300 MHz | .5 | 36.3 | .129 | -10 | 61 | 18.6 | 0.20 |
| 1400 MHz | .5 | 25.4 | .1 | -8 | 56 | 17.05 | 0.15 |



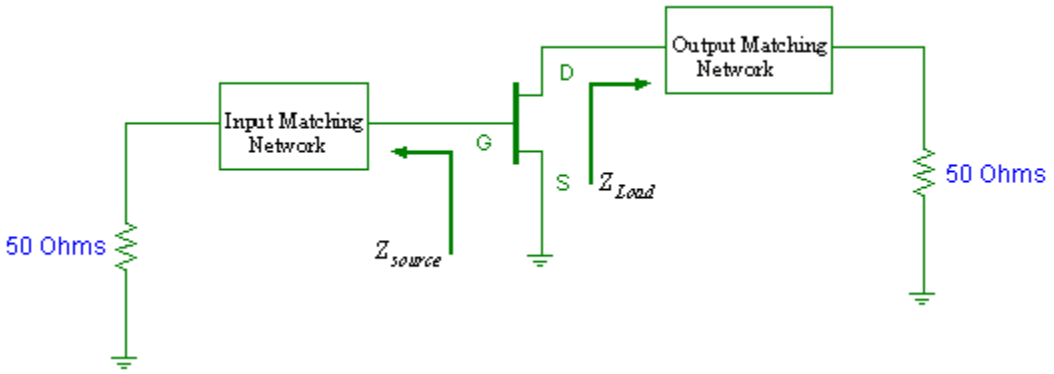




*For the most current data, consult MICROSEMI's website: **www.MICROSEMI.com***
*Specifications are subject to change, consult the RFIS factory at (408) 986-8031 for the latest information*

# 1214GN-20V

20 Watts - 50 Volts, 300 μs, 10%
L-Band Radar 1200 - 1400MHz

## TRANSISTOR IMPEDANCE INFORMATION



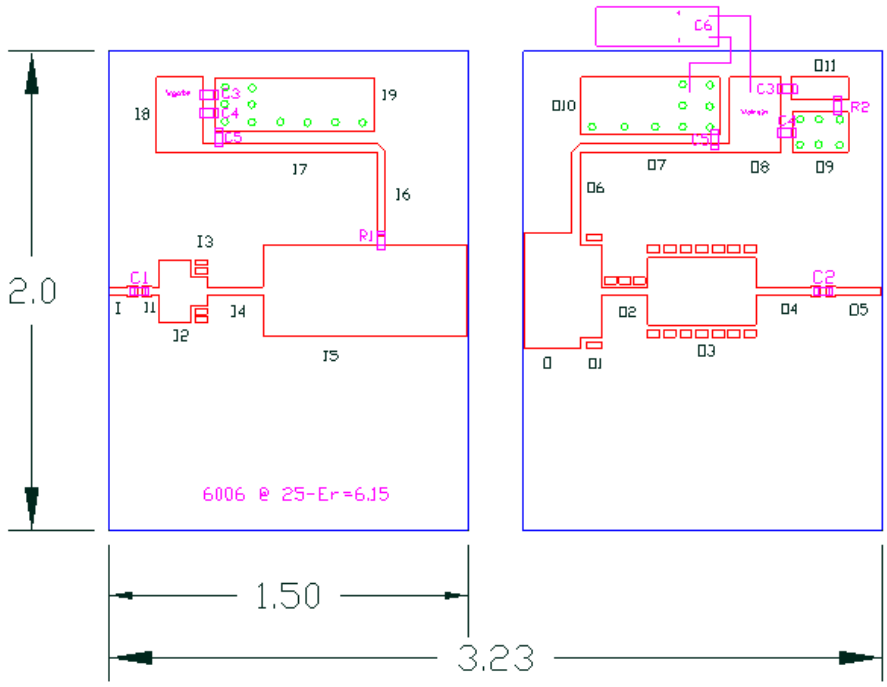

Note: $Z_{source}$ is looking into the input circuit;
$Z_{Load}$ is looking into the output circuit.

| Impedance Data | | |
|---|---|---|
| **Freq (GHz)** | **Zs** | **Zl** |
| 1.2 | 3.6 – j1.1 | 8.5 – j2.95 |
| 1.3 | 4.0 – j.50 | 12.1 – j5.68 |
| 1.4 | 4.4 – j.14 | 19.7 – j7.34 |

# 1214GN-20V

20 Watts - 50 Volts, 300 µs, 10%
L-Band Radar 1200 - 1400 MHz

## TEST CIRCUIT DIAGRAM




## Board Material: Roger Duriod 6006 @ 25 Mil Thickness, Er=6.15

| Component List | | | |
|---|---|---|---|
| Item | Description | | Value |
| C1 | Chip Cap A size | ATC800A1010JT250XT | 100pF |
| C2 | Chip Cap A size | ATC800A680JT250XT | 68pF |
| C3 | Chip Cap B size | ATC200B103KW50XT | 10,000pF |
| C4 | Chip Cap B size | ATC100B102102KW50XT | 1000pF |
| C5 | Chip Cap B size | ATC100B101FW1000XT | 100pF |
| C6 | Electrolytic Cap (63V) | ANY | 1000uF |
| R1 | Chip Resistor size 0805 | ANY | 20.5 ohms |
| R2 | Chip Resistor size 0805 | ANY | 2 ohm |
| **Note:** | | | |
| | Need 2x of C3,C4,C5 | | |
| | Board Material: Roger Duroid 6006 @ 25 mils thick, Er=6.15 | | |

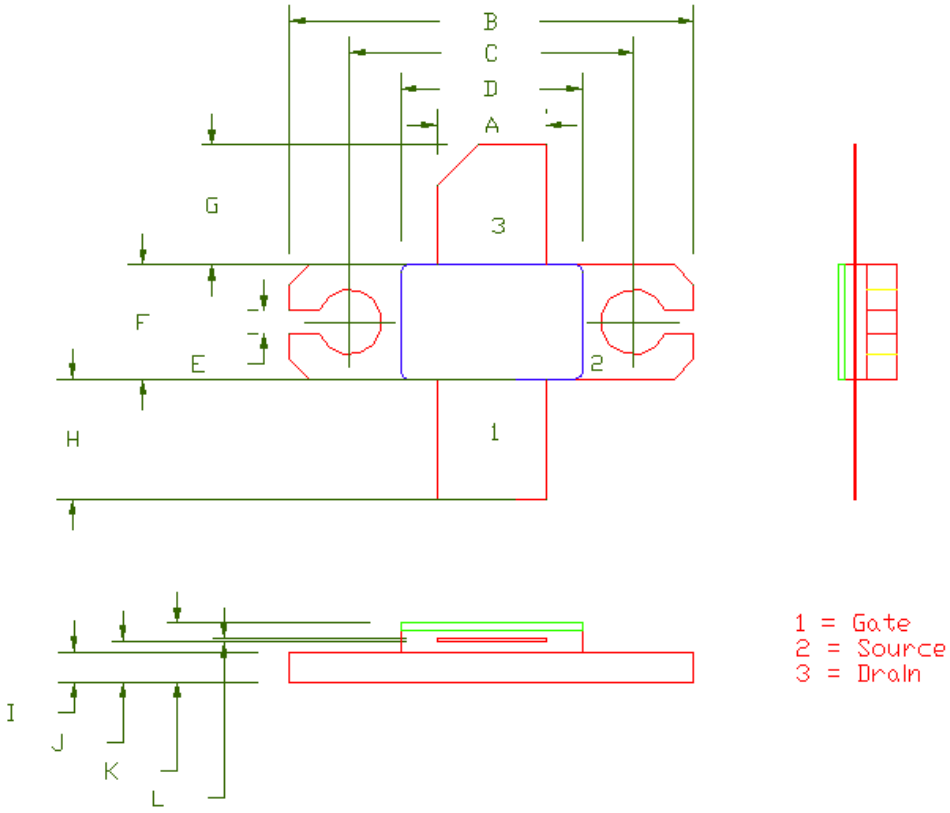
| Input Matching Network | | |
|---|---|---|
| Item | W (Mil) | L (Mil) |
| I | 35 | 116 |
| I1 | 35 | 70 |
| I2 | 262 | 134 |
| I3 | 124 | 65 |
| I4 | 35 | 235 |
| I5 | 380 | 850 |
| I6 | 35 | 350 |
| I7 | 35 | 730 |
| I8 | 310 | 194 |
| I9 | 220 | 660 |

| Output Matching Network | | |
|---|---|---|
| Item | W (Mil) | L (Mil) |
| O | 480 | 200 |
| O1 | 384 | 90 |
| O2 | 35 | 190 |
| O3 | 280 | 450 |
| O4 | 35 | 270 |
| O5 | 35 | 230 |
| O6 | 35 | 340 |
| O7 | 35 | 620 |
| O8 | 310 | 210 |
| O9 | 170 | 230 |
| O10 | 240 | 578 |
| O11 | 90 | 230 |

# 1214GN-20V

20 Watts - 50 Volts, 300 µs, 10%
L-Band Radar 1200 - 1400 MHz

## 55-QP PACKAGE DIMENSION




| Dimension | Min (mil) | Min (mm) | Max (mil) | Max (mm) |
|---|---|---|---|---|
| **A** | 213 | 5.41 | 217 | 5.51 |
| **B** | 798 | 20.26 | 802 | 20.37 |
| **C** | 560 | 14.22 | 564 | 14.32 |
| **D** | 258 | 6.55 | 362 | 9.19 |
| **E** | 43 | 1.09 | 47 | 1.19 |
| **F** | 226 | 5.74 | 230 | 5.84 |
| **G** | 235 | 5.96 | 239 | 6.07 |
| **H** | 235 | 5.96 | 239 | 6.07 |
| **I** | 60 | 1.52 | 62 | 1.57 |
| **J** | 81 | 2.06 | 82 | 2.08 |
| **K** | 116 | 2.94 | 118 | 2.99 |
| **L** | 4 | .102 | 6 | .152 |

# 1214GN-20LV

20 Watts - 50 Volts, 300 µs, 10%
L-Band Radar 1200 - 1400 MHz



***Revision History***

| Revision Level / Date | Para. Affected | Description |
|---|---|---|
| 0.1 / 6 March 2013 | - | Initial Preliminary Release |