

GTVA261701FA

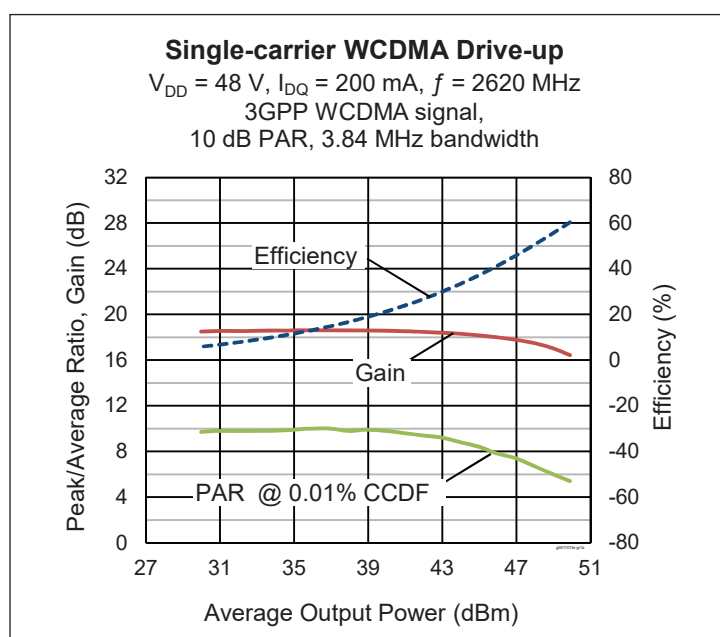
Thermally-Enhanced High Power RF GaN on SiC HEMT 170 W, 50 V, 2620 – 2690 MHz

Description

The GTVA261701FA is a 170-watt (P_{3dB}) GaN on SiC high electron mobility transistor (HEMT) for use in multi-standard cellular power amplifier applications. It features input matching, high efficiency, and a thermally-enhanced package with earless flange.



GTVA261701FA
Package H-37265J-2



Features

- GaN on SiC HEMT technology
- Input Matched
- Typical CW performance, 2690 MHz, 48 V, single side
 - Output power at $P_{3dB} = 170\text{ W}$
 - Efficiency = 75%
 - Gain = 15 dB
- Human Body Model, Class 1B (per ANSI/ESDA/ JEDEC JS-001)
- Capable of handling 10:1 VSWR @ 48 V, 40 W (CW) output power
- RoHS-compliant

RF Characteristics

Single-carrier WCDMA Specifications (tested in Wolfspeed test fixture)

$V_{DD} = 48\text{ V}$, $I_{DQ} = 200\text{ mA}$, $P_{OUT} = 40\text{ W}$ avg, $f = 2690\text{ MHz}$. 3GPP WDMA signal, 3.84 MHz channel bandwidth, 10 dB peak/average @ 0.01% CCDF.

| Characteristic | Symbol | Min | Typ | Max | Unit |
|------------------------------|----------|-----|-----|-----|------|
| Gain | G_{ps} | 16 | 17 | — | dB |
| Drain Efficiency | η_D | 38 | 43 | — | % |
| Adjacent Channel Power Ratio | ACPR | — | -29 | -25 | dBc |

All published data at $T_{CASE} = 25^\circ\text{C}$ unless otherwise indicated

ESD: Electrostatic discharge sensitive device—observe handling precautions!

DC Characteristics

| Characteristic | Conditions | Symbol | Min | Typ | Max | Unit |
|--------------------------------|---|---------------|------|------|------|------|
| Drain-source Breakdown Voltage | $V_{GS} = -8\text{ V}$, $I_D = 21\text{ mA}$ | $V_{(BR)DSS}$ | 150 | — | — | V |
| Drain-source Leakage Current | $V_{GS} = -8\text{ V}$, $V_{DS} = 50\text{ V}$ | I_{DSS} | — | — | 5 | mA |
| Gate Threshold Voltage | $V_{DS} = 10\text{ V}$, $I_D = 21\text{ mA}$ | $V_{GS(th)}$ | -3.8 | -3.0 | -2.3 | V |

Recommended Operating Conditions

| Parameter | Conditions | Symbol | Min | Typ | Max | Unit |
|-------------------------|---|-------------|-----|------|-----|------|
| Drain Operating Voltage | | V_{DD} | 0 | — | 50 | V |
| Gate Quiescent Voltage | $V_{DS} = 50\text{ V}$, $I_D = 1.0\text{ A}$ | $V_{GS(Q)}$ | — | -2.8 | — | V |

Absolute Maximum Ratings

| Parameter | Symbol | Value | Unit |
|---------------------------|-----------|-------------|------|
| Drain-source Voltage | V_{DSS} | 125 | V |
| Gate-source Voltage | V_{GS} | -10 to +2 | V |
| Gate Current | I_G | 20 | mA |
| Drain Current | I_D | 7.5 | A |
| Junction Temperature | T_J | 225 | °C |
| Storage Temperature Range | T_{STG} | -65 to +150 | °C |

Operation above the maximum values listed here may cause permanent damage. Maximum ratings are absolute ratings; exceeding only one of these values may cause irreversible damage to the component. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. For reliable continuous operation, the device should be operated within the operating voltage range (V_{DD}) specified above.

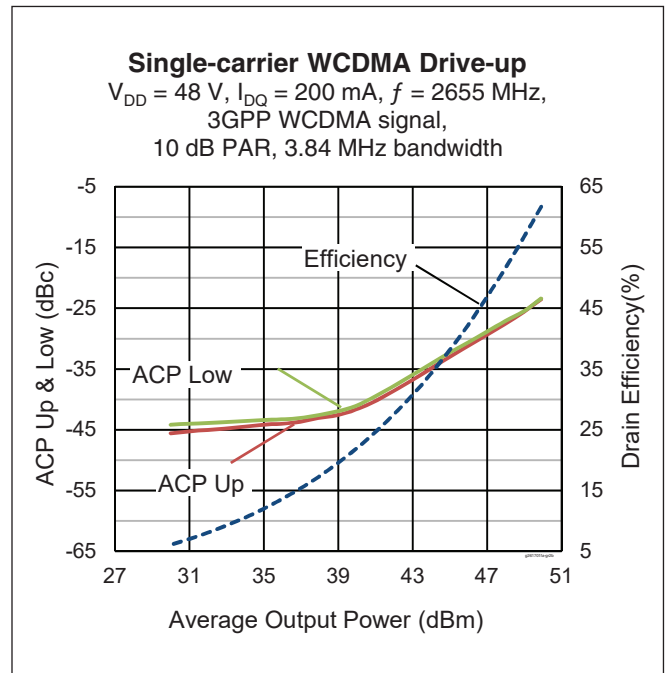
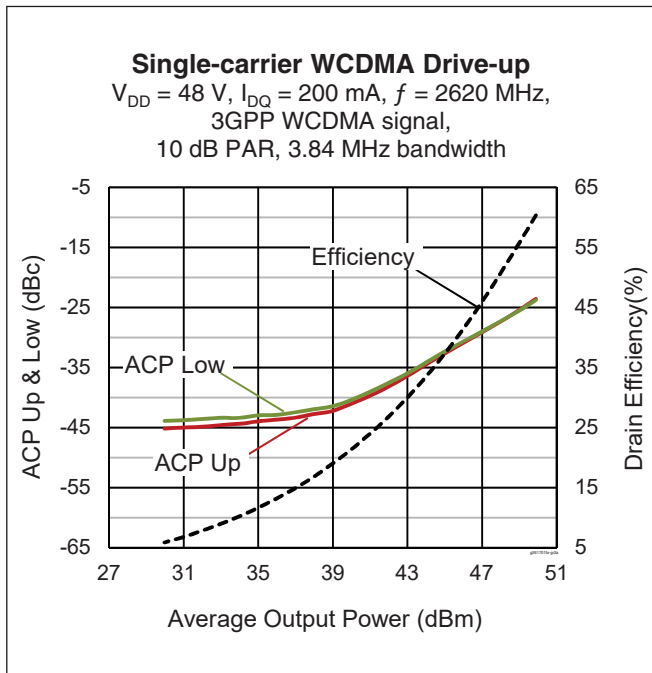
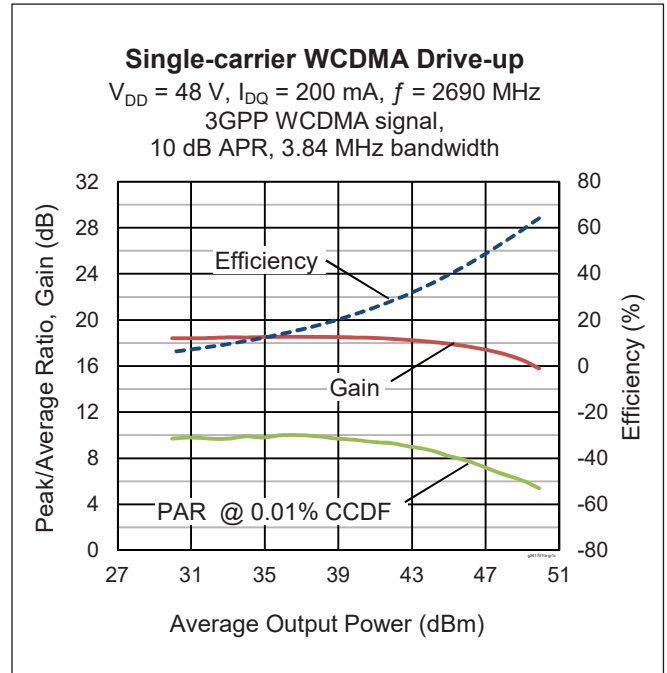
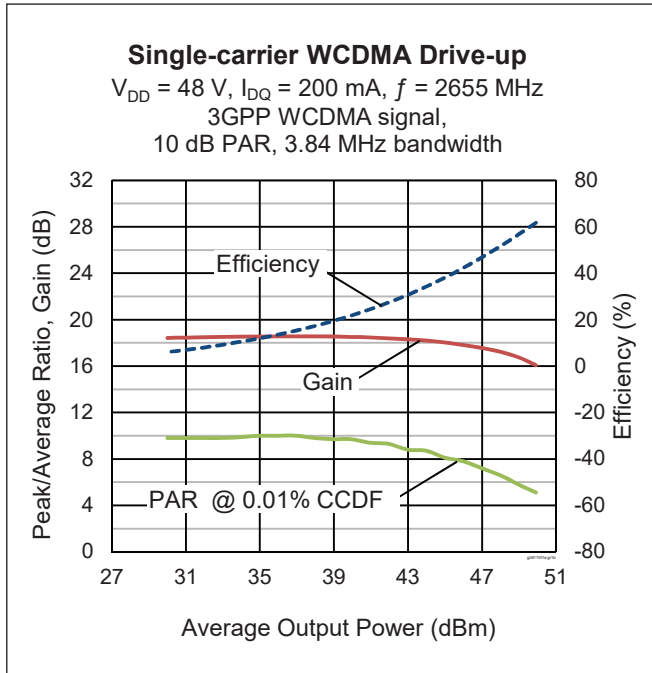
Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|-----------------|-------|------|
| Thermal Resistance ($T_{CASE} = 70\text{ °C}$, 50 W (CW), $V_{DD} = 48\text{ V}$, 2620 MHz) | $R_{\theta JC}$ | 1.07 | °C/W |

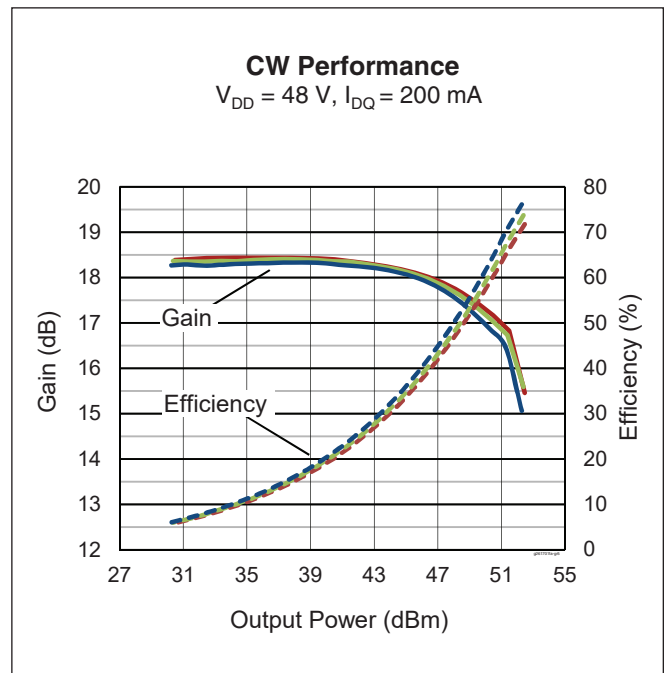
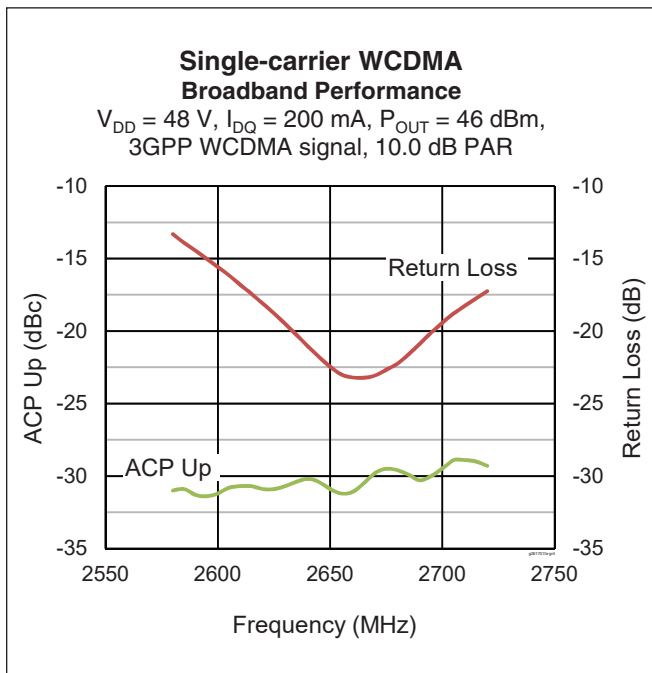
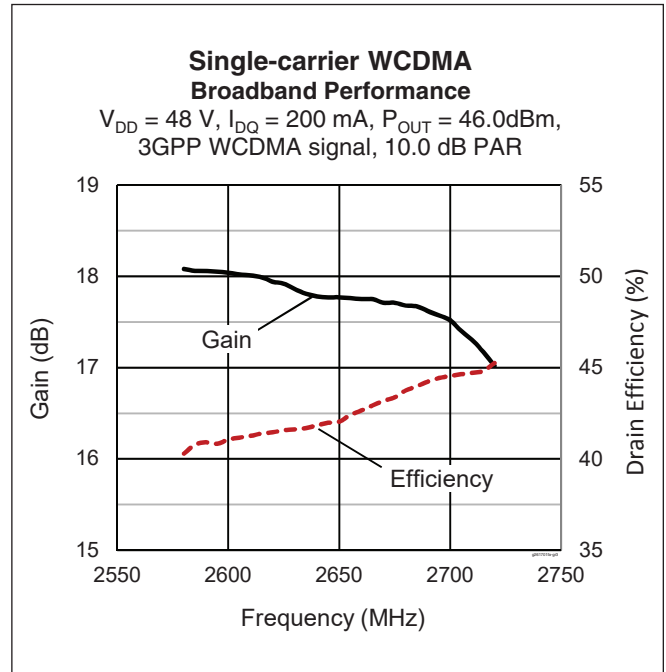
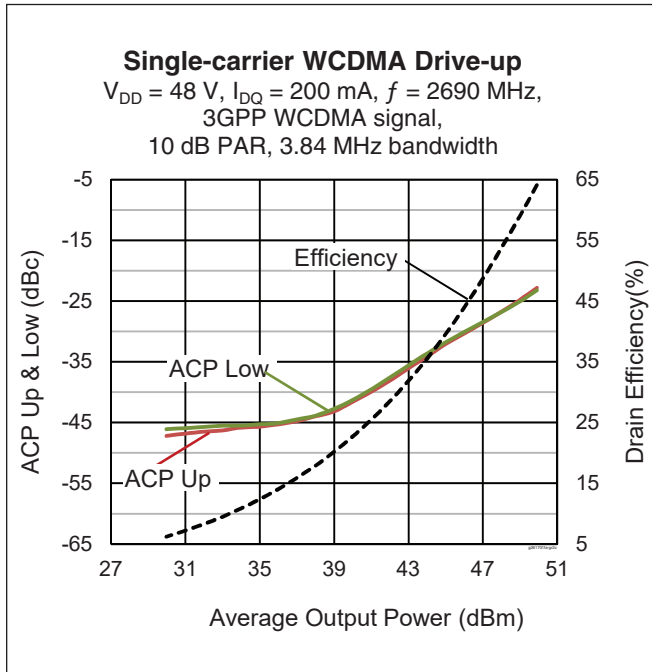
Ordering Information

| Type and Version | Order Code | Package | Shipping |
|--------------------|--------------------|----------------------------|----------------------|
| GTVA261701FA V1 RO | GTVA261701FA-V1-R0 | H-37265J-2, earless flange | Tape & Reel, 50 pcs |
| GTVA261701FA V1 R2 | GTVA261701FA-V1-R2 | H-37265J-2, earless flange | Tape & Reel, 250 pcs |

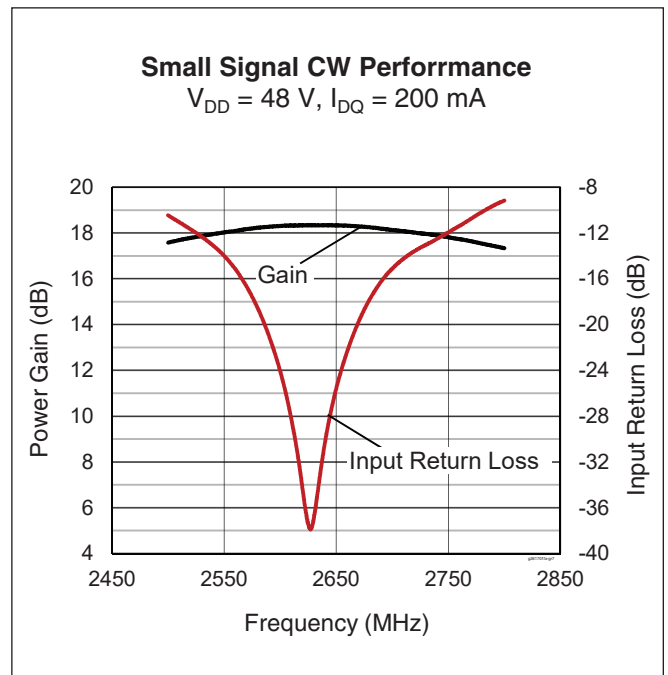
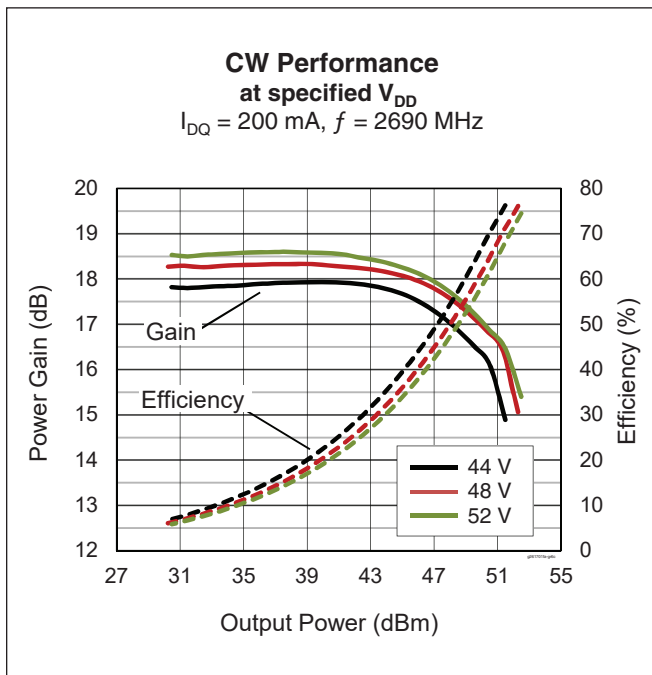
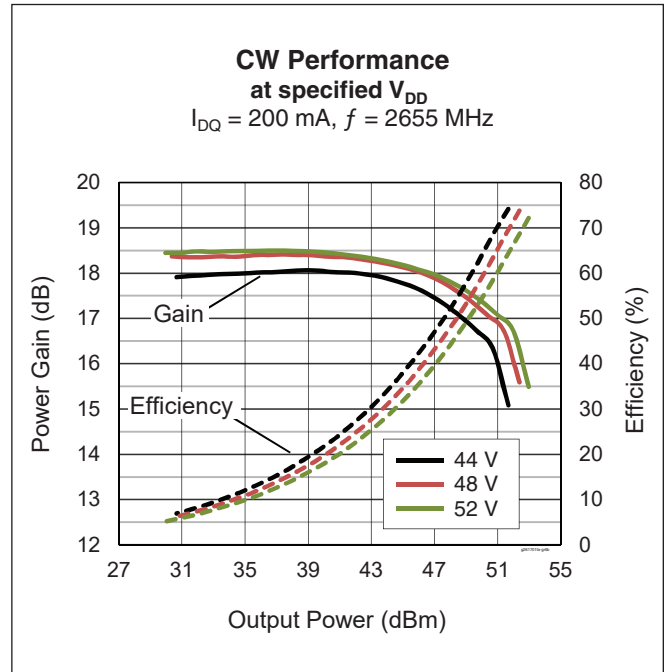
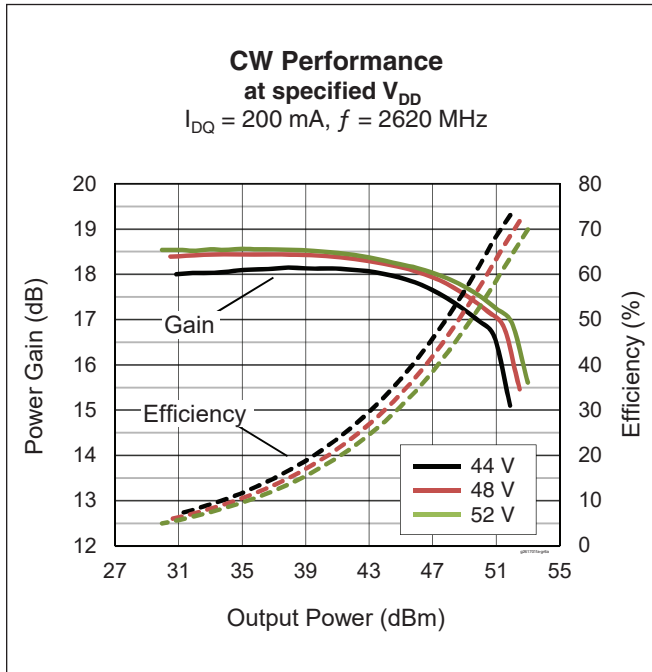
Typical Performance (data taken in an Wolfspeed production test fixture)



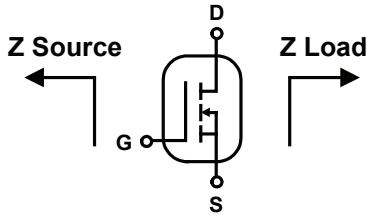
Typical Performance (cont.)



Typical Performance (cont.)



Load Pull Performance



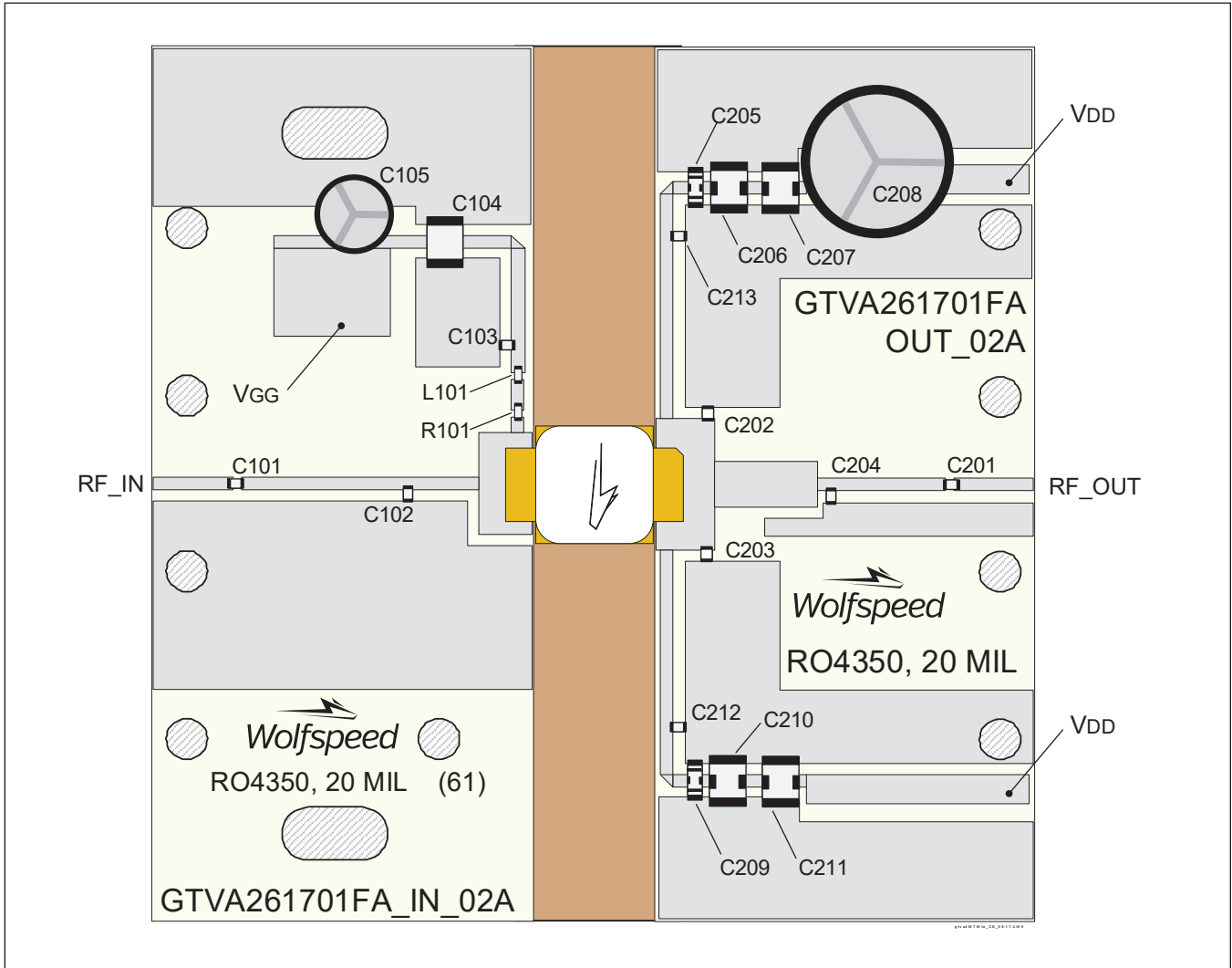
Single side, pulsed CW signal: 10 μ sec, 10% duty cycle; 48 V, 200 mA

| Class AB | | P _{3dB} | | | | | | | | | |
|------------|----------------------------------|--------------------------------|-----------|------------------------|----------------------|----------------|--------------------------------|-----------|------------------------|----------------------|----------------|
| | | Max Output Power | | | | | Max Efficiency | | | | |
| Freq [MHz] | Z _{source} [Ω] | Z _{load} [Ω] | Gain [dB] | P _{OUT} [dBm] | P _{OUT} [W] | Efficiency [%] | Z _{load} [Ω] | Gain [dB] | P _{OUT} [dBm] | P _{OUT} [W] | Efficiency [%] |
| 2620 | 12.0 - j 5.7 | 2.9 - j2.0 | 15.0 | 53.81 | 240 | 64.8 | 2.1 - j0.0 | 16.7 | 51.62 | 145 | 76.9 |
| 2655 | 15.0 - j 8.0 | 2.6 - j2.3 | 14.8 | 53.68 | 233 | 65.3 | 2.2 - j0.2 | 16.3 | 51.76 | 150 | 75.9 |
| 2690 | 16.6 - j10.0 | 2.8 - j2.2 | 14.6 | 53.71 | 235 | 66.7 | 2.1 - j0.2 | 16.1 | 51.93 | 156 | 77.0 |

See next page for reference circuit information

Reference Circuit tuned for 2620 to 2690 MHz

| | |
|---|--|
| DUT | GTVA261701FA V1 |
| Test Fixture Part No. | LTN/GTVA261701FA |
| PCB | Rogers 4350, 0.508 mm [.020"] thick, 2 oz. copper, $\epsilon_r = 3.66$ |
| Find Gerber files for this test fixture on the Wolfspeed Web site at www.wolfspeed.com/RF | |



Reference circuit assembly diagram (not to scale)

Reference Circuit (cont.)**Components Information**

| Component | Description | Manufacturer | P/N |
|------------------------|--------------------------|---------------------------------|------------------|
| In | | | |
| C101, C103 | Capacitor, 10 pF | ATC | ATC800A100JT250T |
| C102 | Capacitor, 1.3 pF | ATC | ATC800A1R3CT250T |
| C104 | Capacitor, 0.047 μ F | Johanson Dielectrics Inc. | 101X43W474MV4E |
| C105 | Capacitor, 100 μ F | Panasonic Electronic Components | EEE-FT1V101AP |
| L101 | Inductor, 100 nH | ATC | ATC0603WL101JT |
| R101 | Resistor, 10 ohms | Panasonic Electronic Components | ERJ-8GEYJ100V |
| Out | | | |
| C201, C212, C213 | Capacitor, 10 pF | ATC | ATC800A100JT250T |
| C202, C203 | Capacitor, 1.9 pF | ATC | ATC800A1R9CT250T |
| C204 | Capacitor, 1 pF | ATC | ATC800A1R0CT250T |
| C205, C209 | Capacitor, 10000 pF | Johanson Dielectrics Inc. | 101X18W103MV4E |
| C206, C207, C210, C211 | Capacitor, 0.047 μ F | Johanson Dielectrics Inc. | 101X43W474MV4E |
| C208 | Capacitor, 220 μ F | Panasonic Electronic Components | ECA-2AHG221 |

See next page for package mechanical specifications

Package Outline Specifications

