

# GTVA261701FA

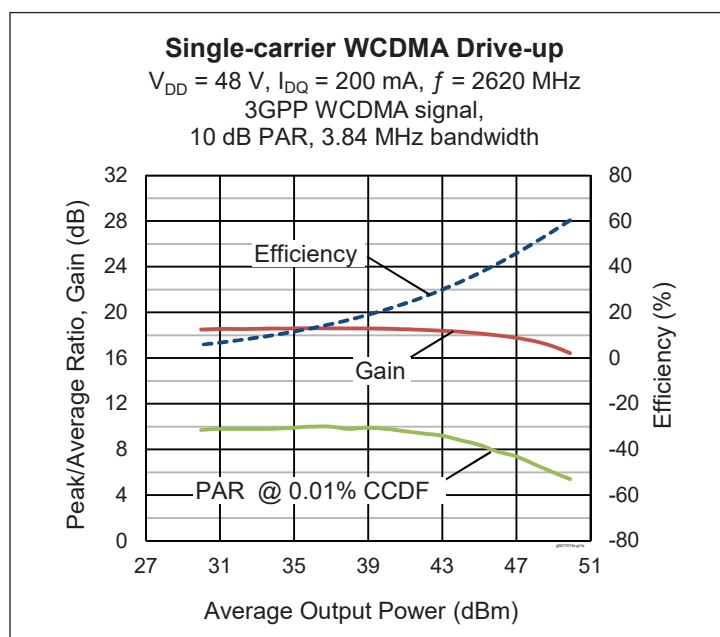
## Thermally-Enhanced High Power RF GaN on SiC HEMT 170 W, 50 V, 2620 – 2690 MHz

### 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	$\eta_D$	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.

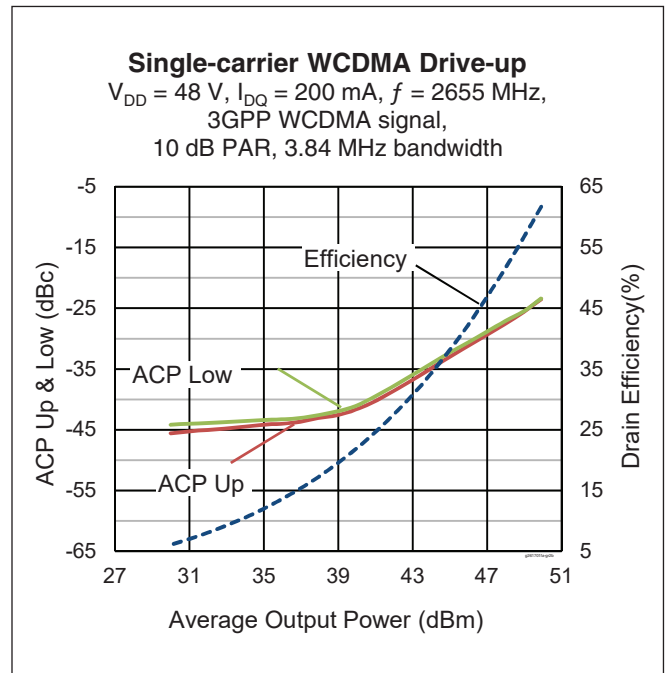
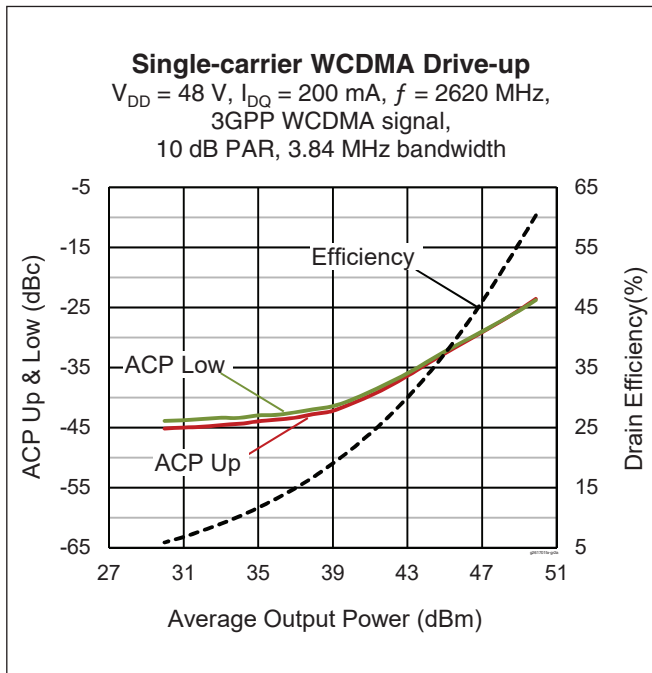
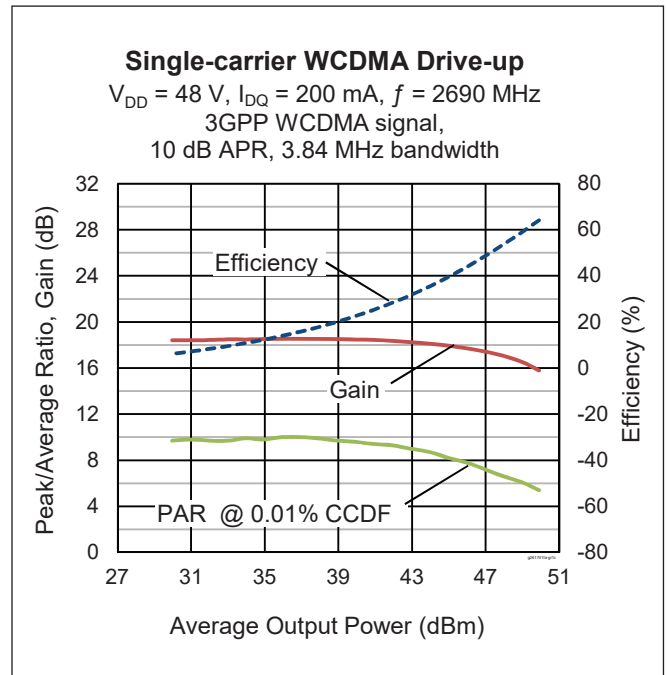
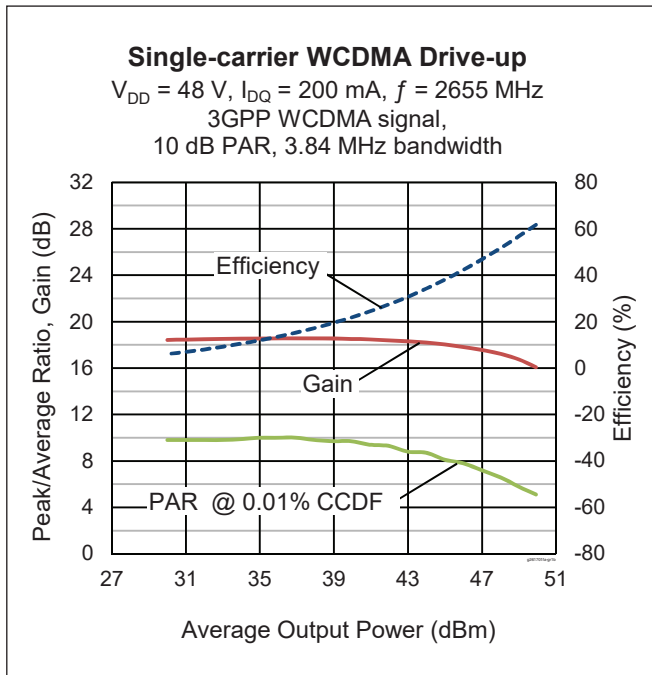
## Thermal Characteristics

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

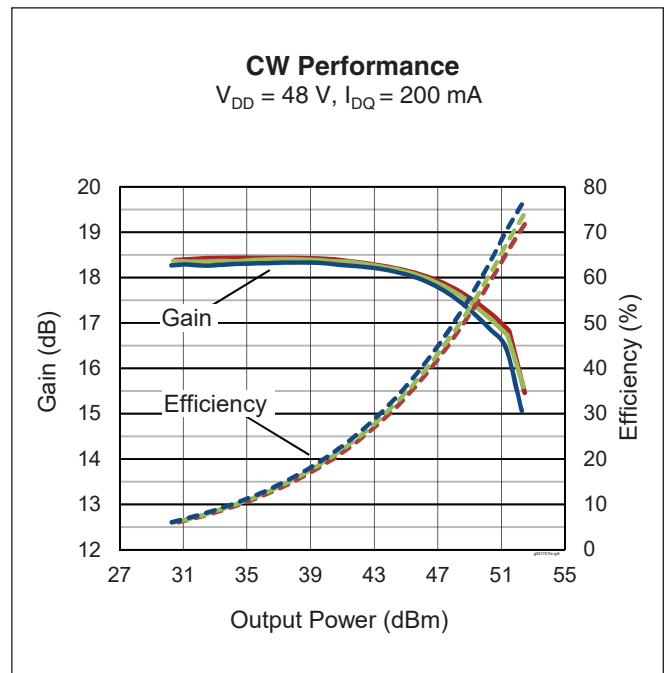
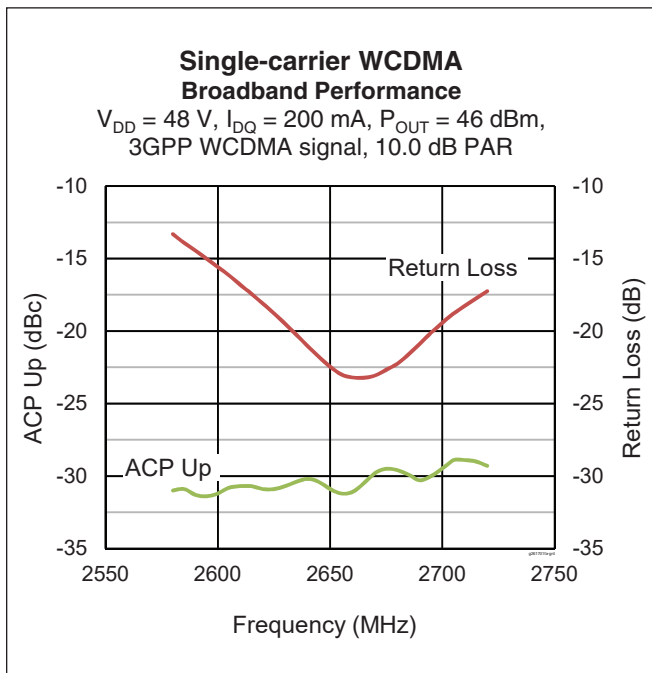
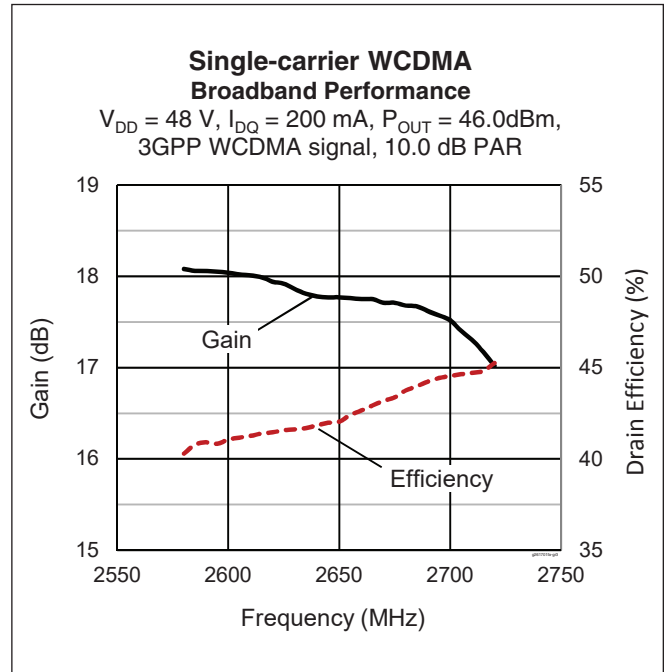
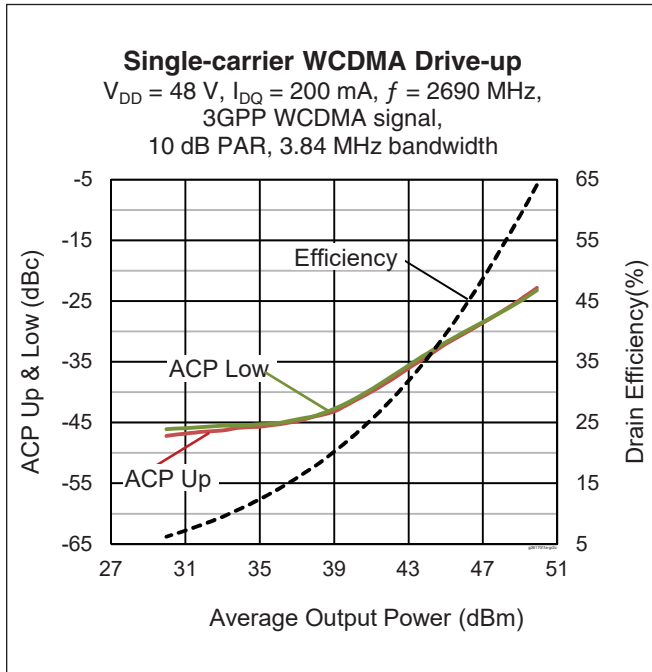
## Ordering Information

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

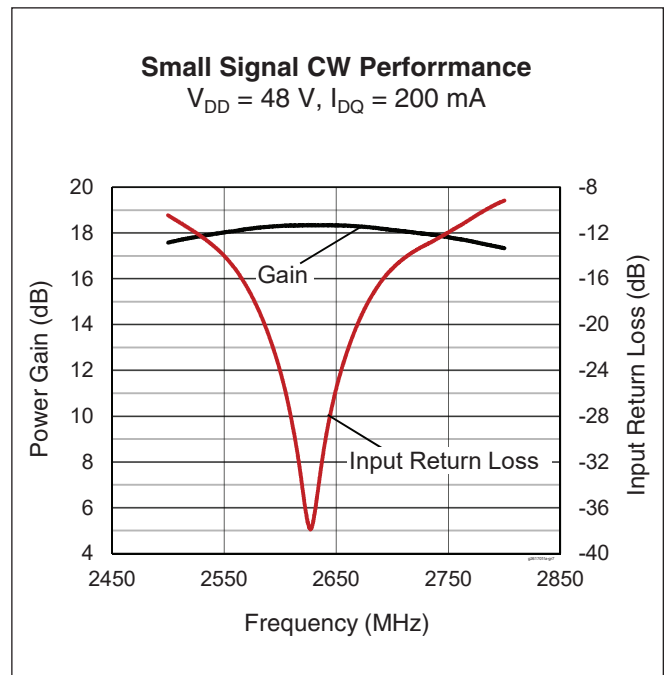
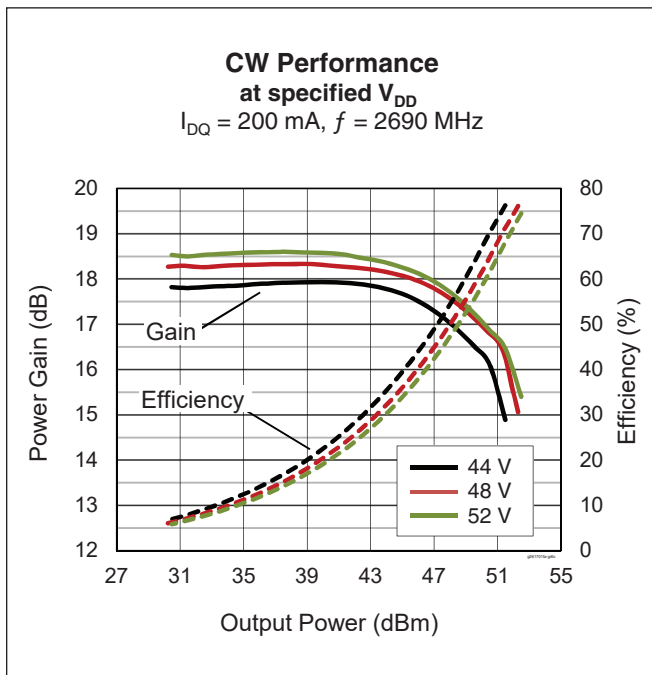
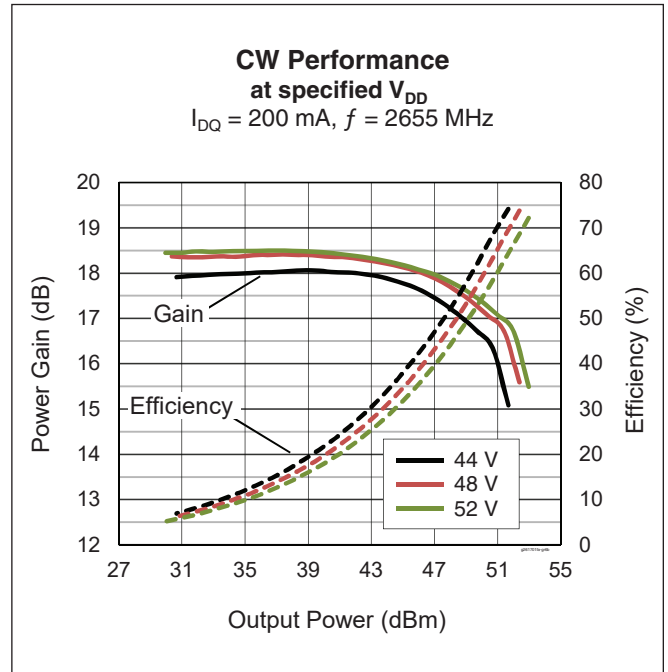
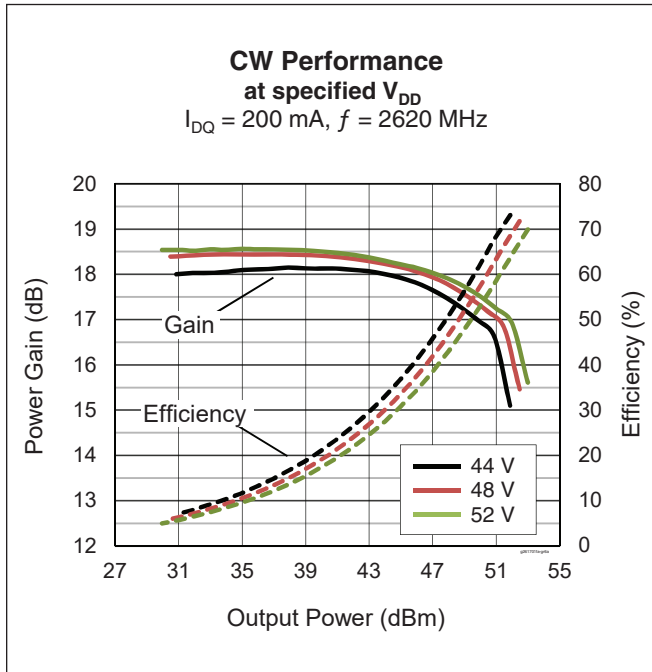
**Typical Performance** (data taken in an Wolfspeed production test fixture)



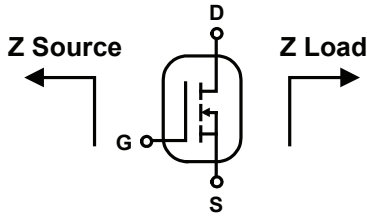
Typical Performance (cont.)



Typical Performance (cont.)



**Load Pull Performance**



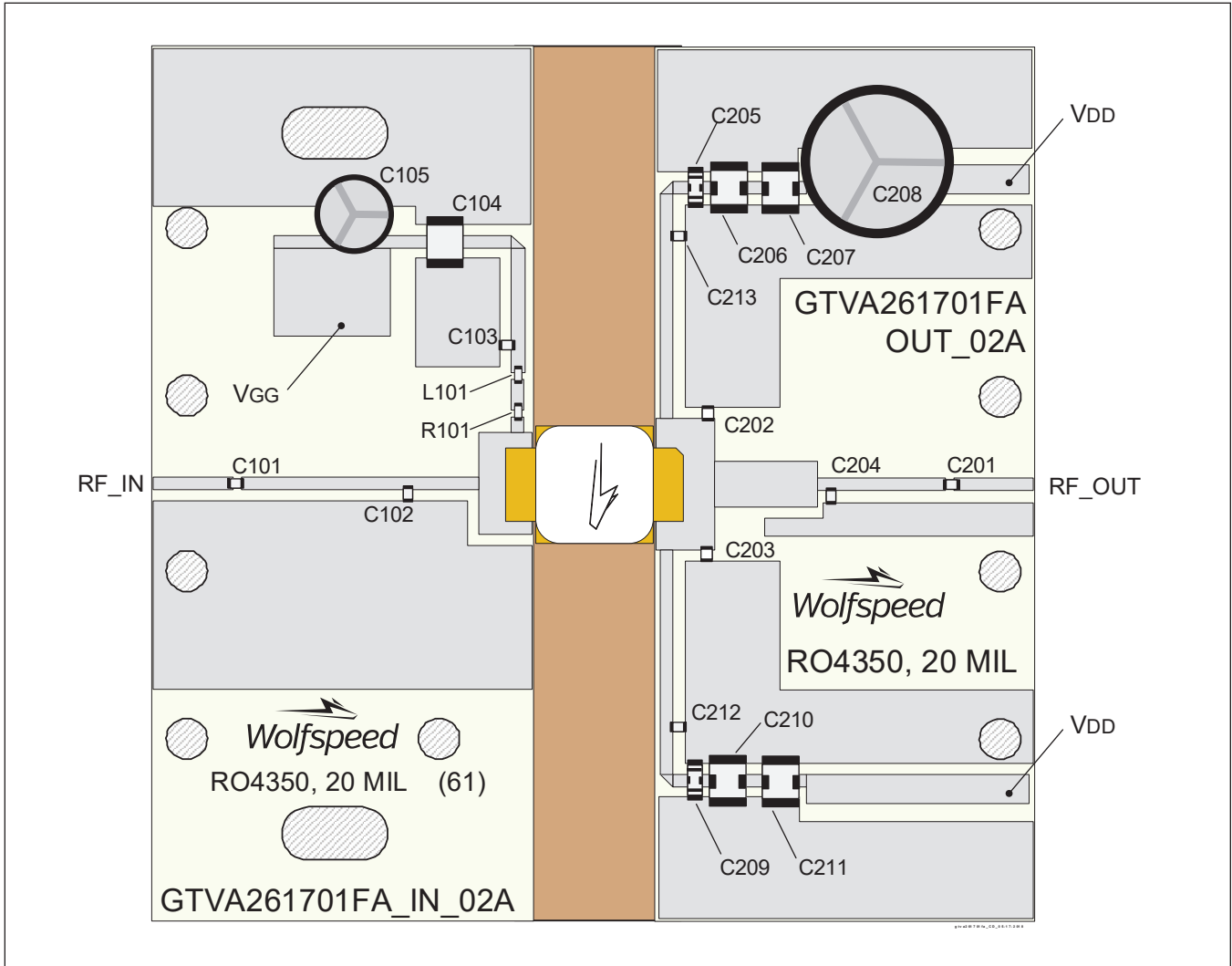
Single side, pulsed CW signal: 10  $\mu$ sec, 10% duty cycle; 48 V, 200 mA

Class AB		P <sub>3dB</sub>									
		Max Output Power					Max Efficiency				
Freq [MHz]	Z <sub>source</sub> [ $\Omega$ ]	Z <sub>load</sub> [ $\Omega$ ]	Gain [dB]	P <sub>OUT</sub> [dBm]	P <sub>OUT</sub> [W]	Efficiency [%]	Z <sub>load</sub> [ $\Omega$ ]	Gain [dB]	P <sub>OUT</sub> [dBm]	P <sub>OUT</sub> [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 <a href="http://www.wolfspeed.com/RF">www.wolfspeed.com/RF</a>	



Reference circuit assembly diagram (not to scale)

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

Component	Description	Manufacturer	P/N
<b>In</b>			
C101, C103	Capacitor, 10 pF	ATC	ATC800A100JT250T
C102	Capacitor, 1.3 pF	ATC	ATC800A1R3CT250T
C104	Capacitor, 0.047 $\mu$ F	Johanson Dielectrics Inc.	101X43W474MV4E
C105	Capacitor, 100 $\mu$ F	Panasonic Electronic Components	EEE-FT1V101AP
L101	Inductor, 100 nH	ATC	ATC0603WL101JT
R101	Resistor, 10 ohms	Panasonic Electronic Components	ERJ-8GEYJ100V
<b>Out</b>			
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 $\mu$ F	Johanson Dielectrics Inc.	101X43W474MV4E
C208	Capacitor, 220 $\mu$ F	Panasonic Electronic Components	ECA-2AHG221

**See next page for package mechanical specifications**



