

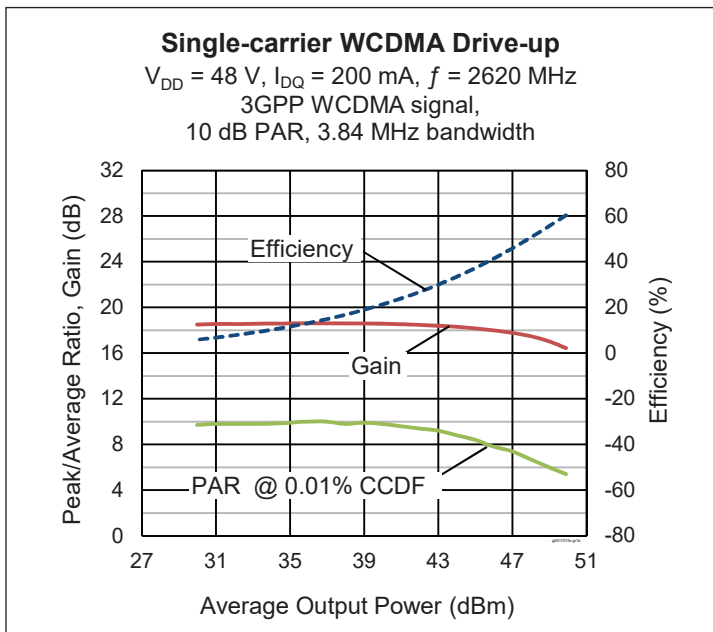
GTVA261701FA

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.

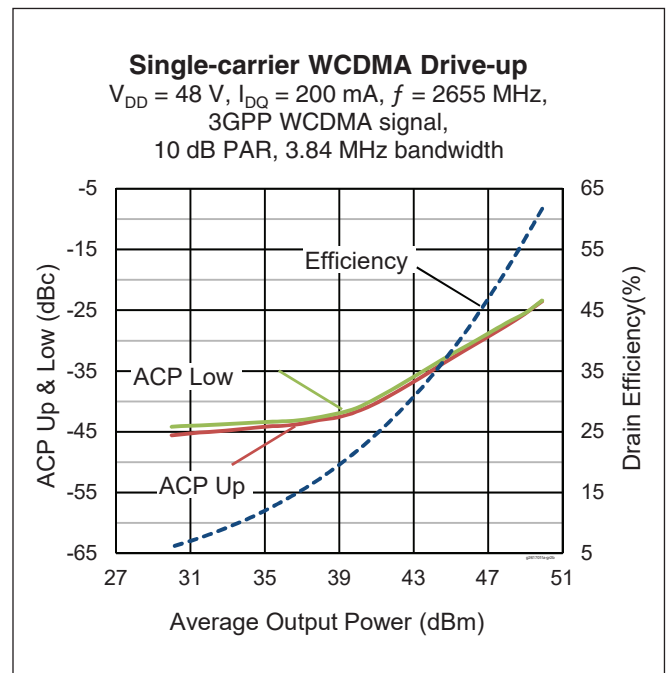
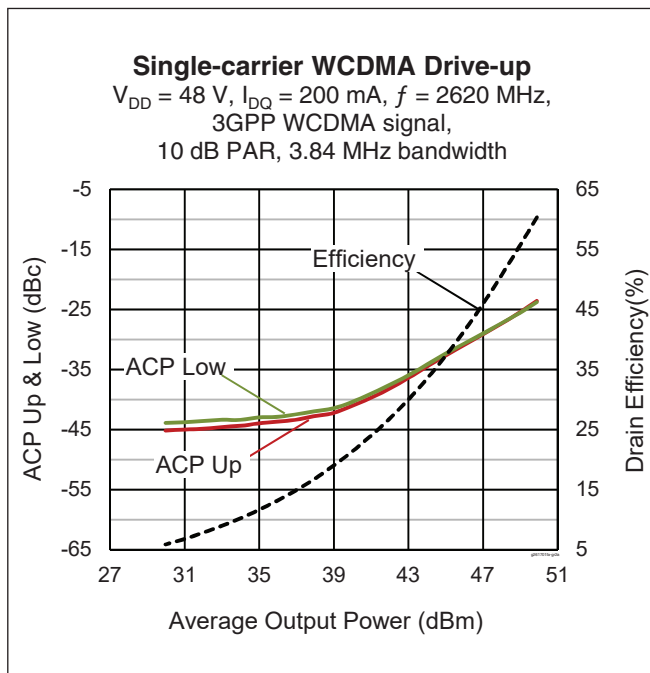
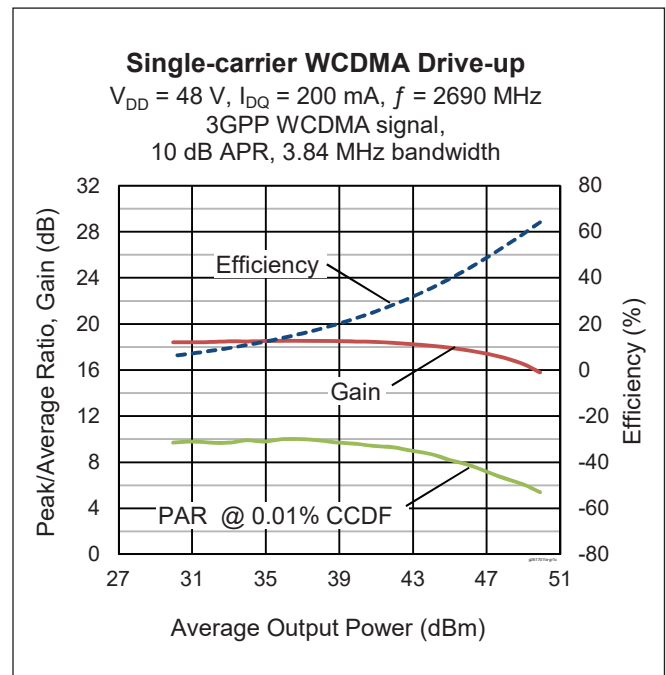
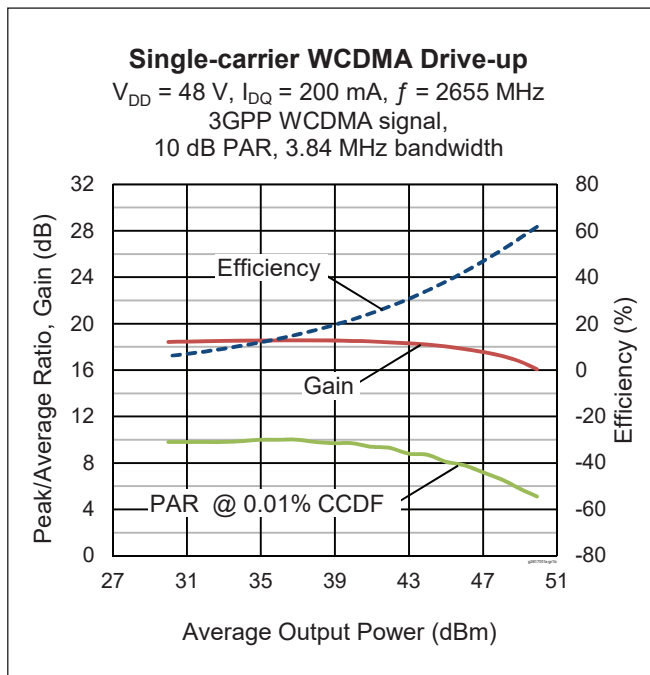
Thermal Characteristics

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

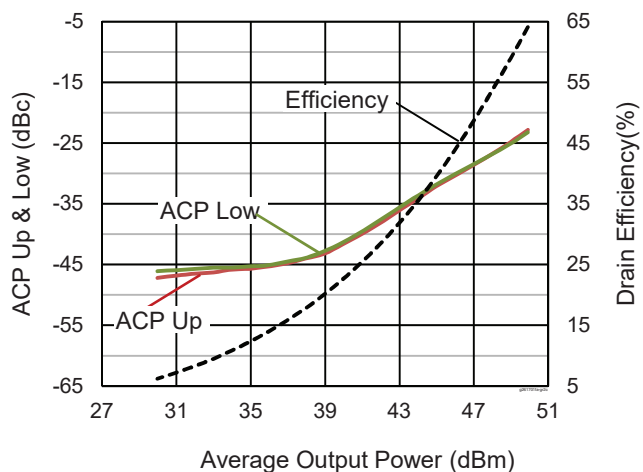
Typical Performance (data taken in an Wolfspeed production test fixture)



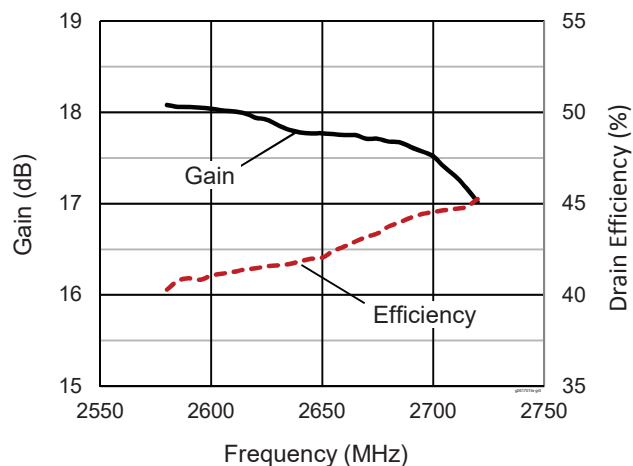
Typical Performance (cont.)

Single-carrier WCDMA Drive-up

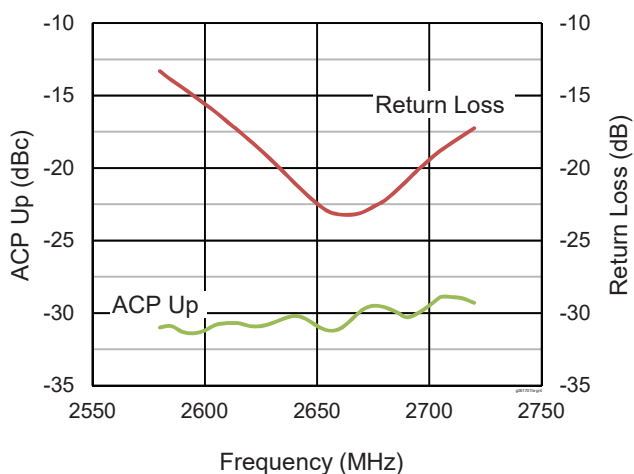
$V_{DD} = 48\text{ V}$, $I_{DQ} = 200\text{ mA}$, $f = 2690\text{ MHz}$,
3GPP WCDMA signal,
10 dB PAR, 3.84 MHz bandwidth

**Single-carrier WCDMA Broadband Performance**

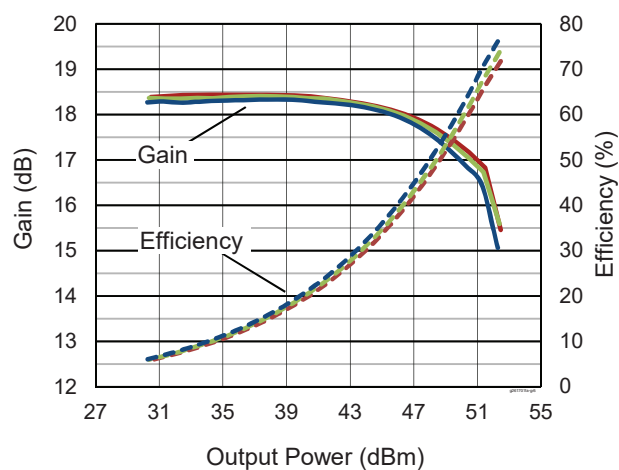
$V_{DD} = 48\text{ V}$, $I_{DQ} = 200\text{ mA}$, $P_{OUT} = 46.0\text{ dBm}$,
3GPP WCDMA signal, 10.0 dB PAR

**Single-carrier WCDMA Broadband Performance**

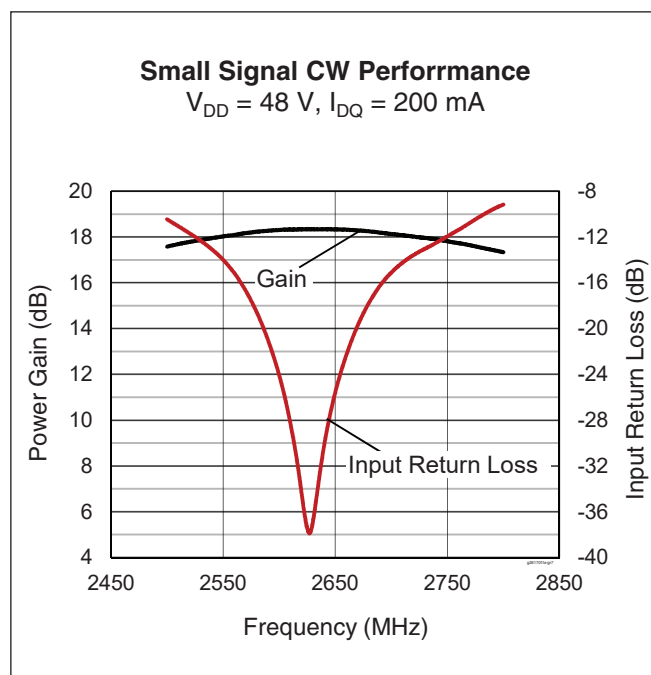
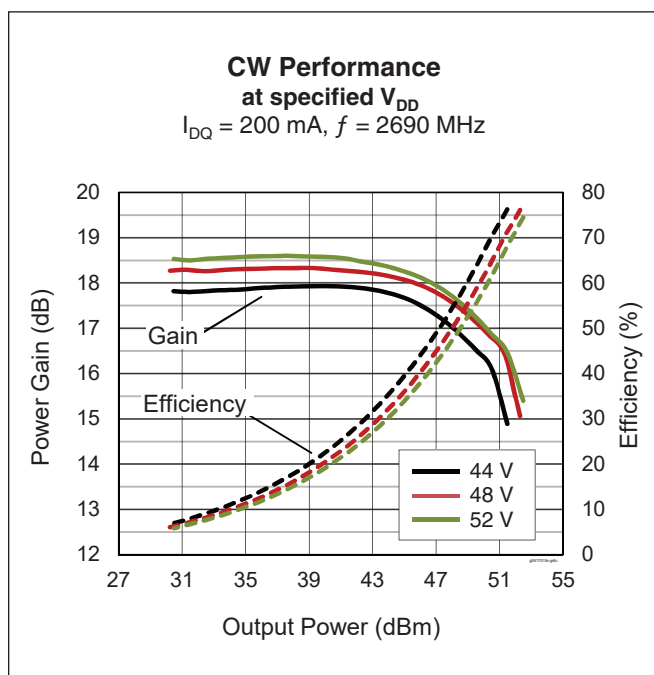
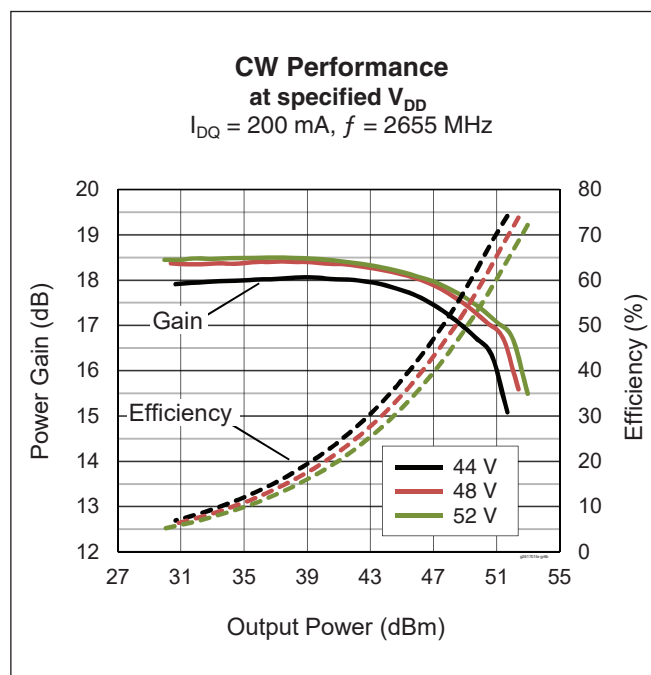
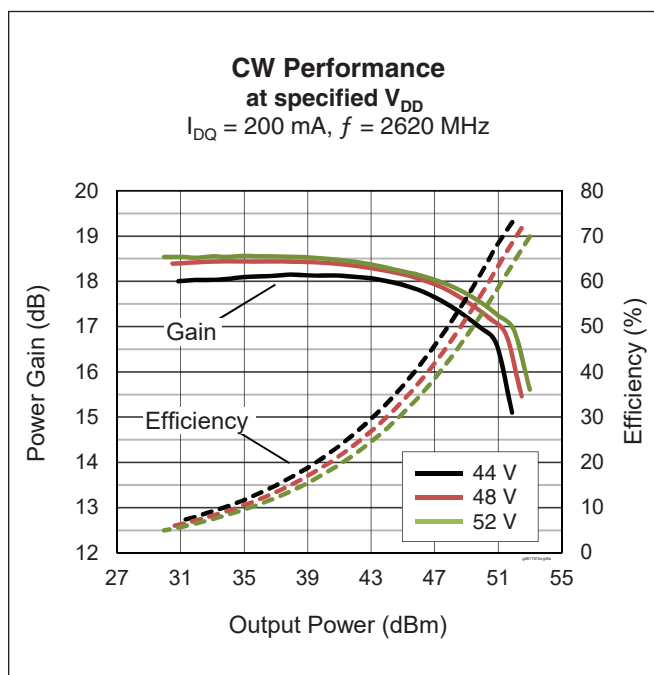
$V_{DD} = 48\text{ V}$, $I_{DQ} = 200\text{ mA}$, $P_{OUT} = 46\text{ dBm}$,
3GPP WCDMA signal, 10.0 dB PAR

**CW Performance**

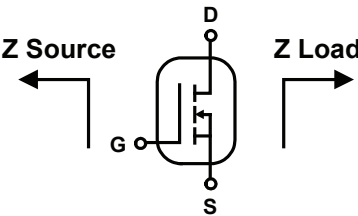
$V_{DD} = 48\text{ V}$, $I_{DQ} = 200\text{ mA}$



Typical Performance (cont.)



Load Pull Performance



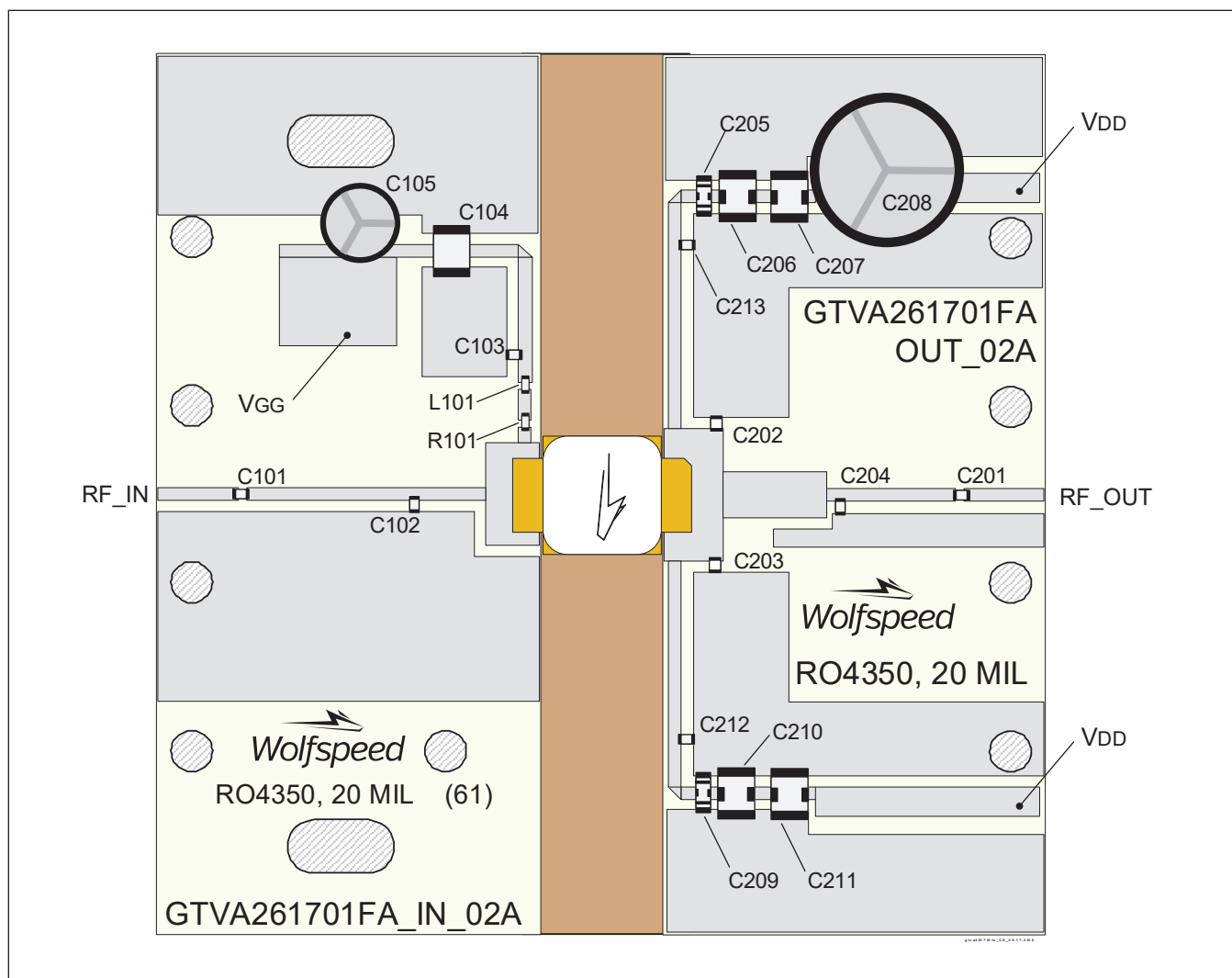
Single side, pulsed CW signal: 10 μ sec, 10% duty cycle; 48 V, 200 mA

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 (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

Package H-37265J-2

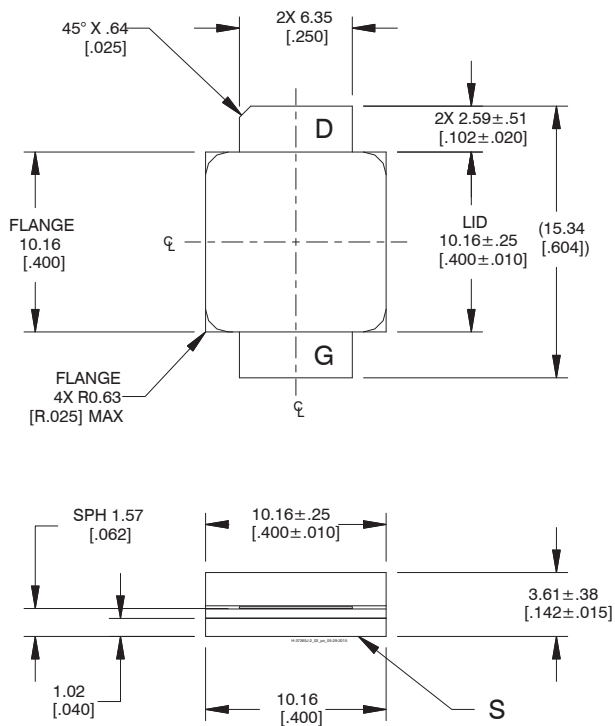


Diagram Notes—unless otherwise specified:

1. Interpret dimensions and tolerances per ASME Y14.5M-1994.
2. Primary dimensions are mm. Alternate dimensions are inches.
3. All tolerances ± 0.127 [.005] unless specified otherwise.
4. Pins: D – drain; G – gate; S – source.
5. Lead thickness: $0.10 + 0.051/-0.025$ mm [.004 +0.002/-0.001 inch].
6. Gold plating thickness: 1.14 ± 0.38 micron [45 ± 15 microinch].



Revision History

Revision	Date	Data Sheet	Page	Subjects (major changes since last revision)
01	2015-05-29	Advance	All	Data Sheet reflects advance specification for product development
02	2015-06-29	Preliminary	All	Data Sheet reflects preliminary specification
03	2016-03-28	Production	3 to 8	Information for production-released product, including firm specifications, performance curves, load pull table, and reference circuit information.
04	2017-04-06	Production	1 2	Remove "Integrated ESD protection" from Features Restructure tables for clarity.
05	2018-05-08	Production	All	Converted to Wolfspeed Data Sheet

For more information, please contact:

4600 Silicon Drive
Durham, North Carolina, USA 27703
www.wolfspeed.com/RF

Sales Contact
RFSales@wolfspeed.com

RF Product Marketing Contact
RFMarketing@wolfspeed.com
919.407.7816

Notes

Disclaimer

Specifications are subject to change without notice. Cree, Inc. believes the information contained within this data sheet to be accurate and reliable. However, no responsibility is assumed by Cree for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Cree. Cree makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose. "Typical" parameters are the average values expected by Cree in large quantities and are provided for information purposes only. These values can and do vary in different applications and actual performance can vary over time. All operating parameters should be validated by customer's technical experts for each application. Cree products are not designed, intended or authorized for use as components in applications intended for surgical implant into the body or to support or sustain life, in applications in which the failure of the Cree product could result in personal injury or death or in applications for planning, construction, maintenance or direct operation of a nuclear facility.