GTVA262701FA

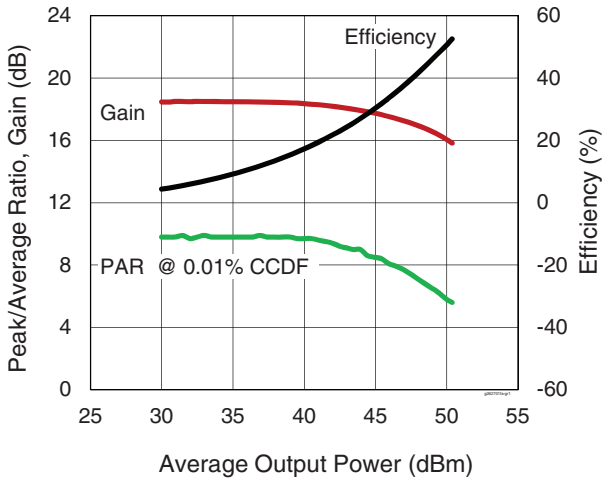
Thermally-Enhanced High Power RF GaN on SiC HEMT
270 W, 48 V, 2620 – 2690 MHz

Description

The GTVA262701FA is a 270-watt 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 surface-mount package with earless flange.

GTVA262701FA
Package H-87265J-2

Single-carrier WCDMA Drive-up
V_{DD} = 48 V, I_{DQ} = 320 mA, f = 2690 MHz.
3GPP WCDMA signal, 10 dB PAR,
3.84 MHz bandwidth



Features

- GaN on SiC HEMT technology
- Input matched
- Typical pulsed CW performance: 10 µs pulse width, 10% duty cycle, 2690 MHz, 48 V
  - Output power at P_{3dB} = 270 W
  - Efficiency = 66%
  - Gain = 18.1 dB
- Human Body Model Class 1B (per ANSI/ESDA/JEDEC JS-001)
- Capable of handling 10:1 VSWR @48 V, 60 W (WCDMA) output power
- Pb-free and RoHS compliant

RF Characteristics

Single-carrier WCDMA Specifications (tested in Wolfspeed production test fixture)
V_{DD} = 48 V, I_{DQ} = 320 mA, P_{OUT} = 60 W avg, f = 2690 MHz, 3GPP signal, channel bandwidth = 3.84 MHz, peak/average = 10 dB @ 0.01% CCDF

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	16.5	17	—	dB
Drain Efficiency	η_D	40	42	—	%
Adjacent Channel Power Ratio	ACPR	—	–28	–27	dBc
Output PAR @ 0.01% CCDF	OPAR	5.5	6.2	—	dB

All published data at T_{CASE} = 25°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 V, I_D = 10 mA	$V_{(BR)DSS}$	150	—	—	V
Drain-source Leakage Current	V_{GS} = –8 V, V_{DS} = 10 V	I_{DSS}	—	—	4.5	mA
Gate Threshold Voltage	V_{DS} = 10 V, I_D = 32 mA	$V_{GS(th)}$	–3.8	–3.0	–2.3	V

Recommended Operating Conditions

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Operating Voltage		V_{DD}	0	—	55	V
Gate Quiescent Voltage	V_{DS} = 50 V, I_D = 320 mA	$V_{GS(Q)}$	—	–3.0	—	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	32	mA
Drain Current	I_D	12	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 °C, 60 W (CW), V_{DD} = 48 V, I_{DQ} = 320 mA, 2690 MHz)	$R_{\theta JC}$	1.1	°C/W

Ordering Information

Type and Version	Order Code	Package	Shipping
GTVA262701FA V2 R0	GTVA262701FA-V2-R0	H-87265J-2	Tape & Reel, 50 pcs
GTVA262701FA V2 R2	GTVA262701FA-V2-R2	H-87265J-2	Tape & Reel, 250 pcs

Typical Performance (data taken in Wolfspeed production test fixture)

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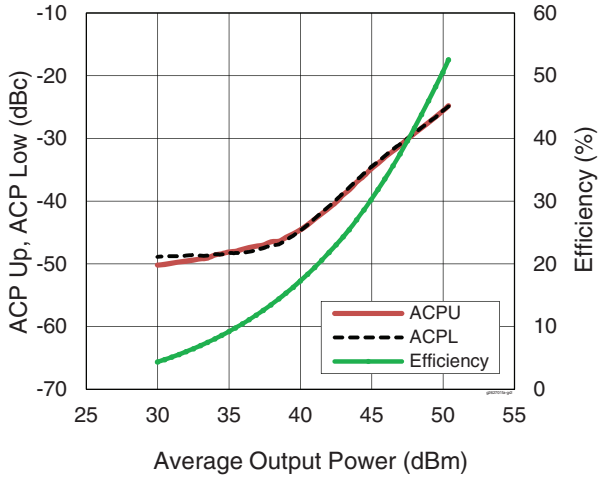
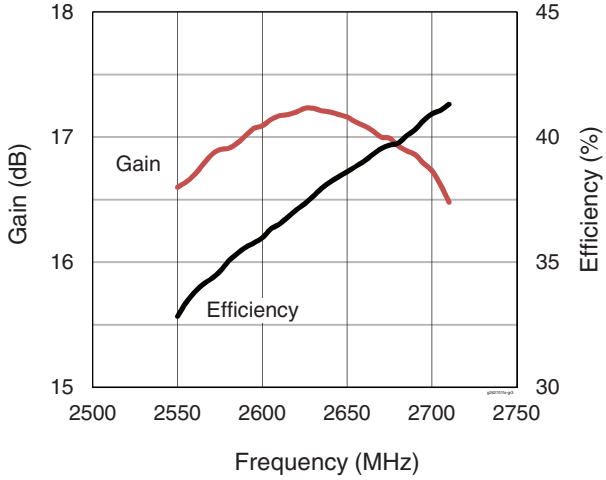
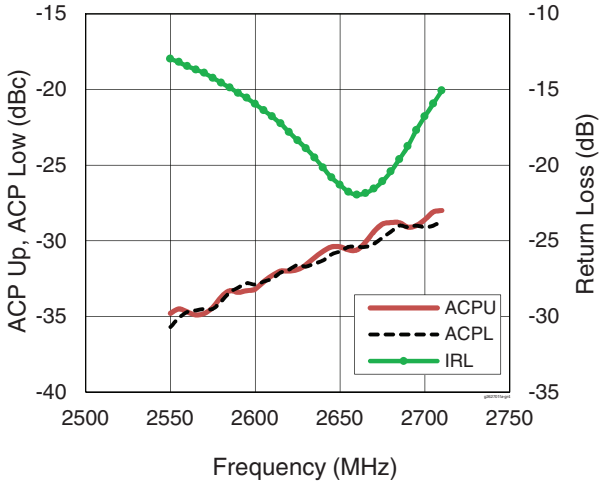
3.84 MHz bandwidth



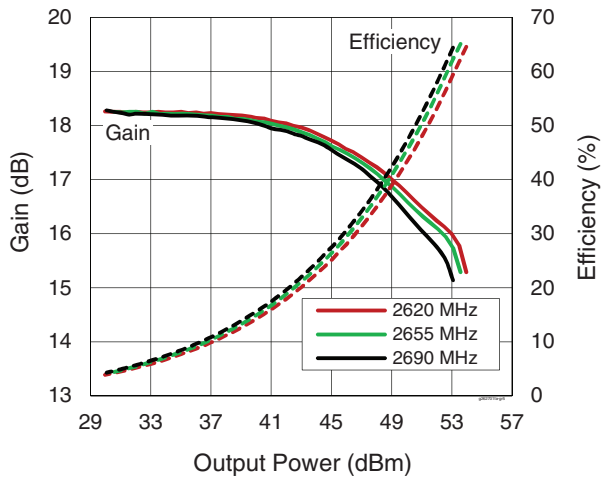
Single-carrier WCDMA Broadband
V_{DD} = 48 V, I_{DQ} = 320 mA, P_{OUT} = 47.78 dBm
3GPP WCDMA signal, 10 dB PAR



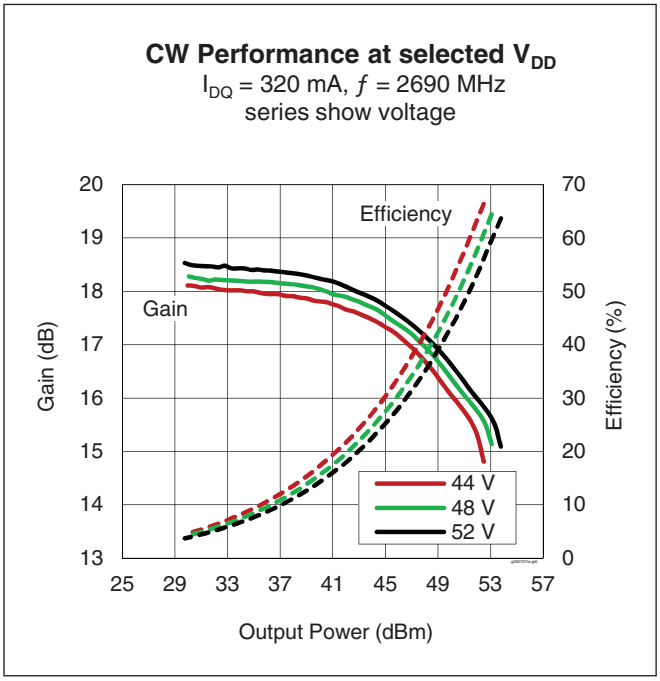
Single-carrier WCDMA Broadband
V_{DD} = 48 V, I_{DQ} = 320 mA, P_{OUT} = 47.78 dBm
3GPP WCDMA signal, 10 dB PAR

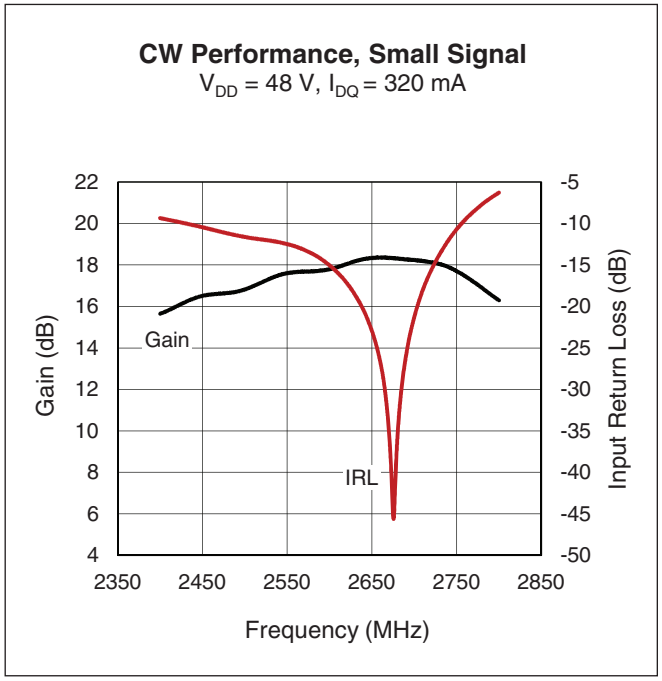


CW Performance
V_{DD} = 48 V, I_{DQ} = 320 mA
series show frequency



Typical Performance (cont.)





Load Pull Performance

Pulsed CW signal – 10 µsec, 10% duty cycle; 48 V, 320 mA

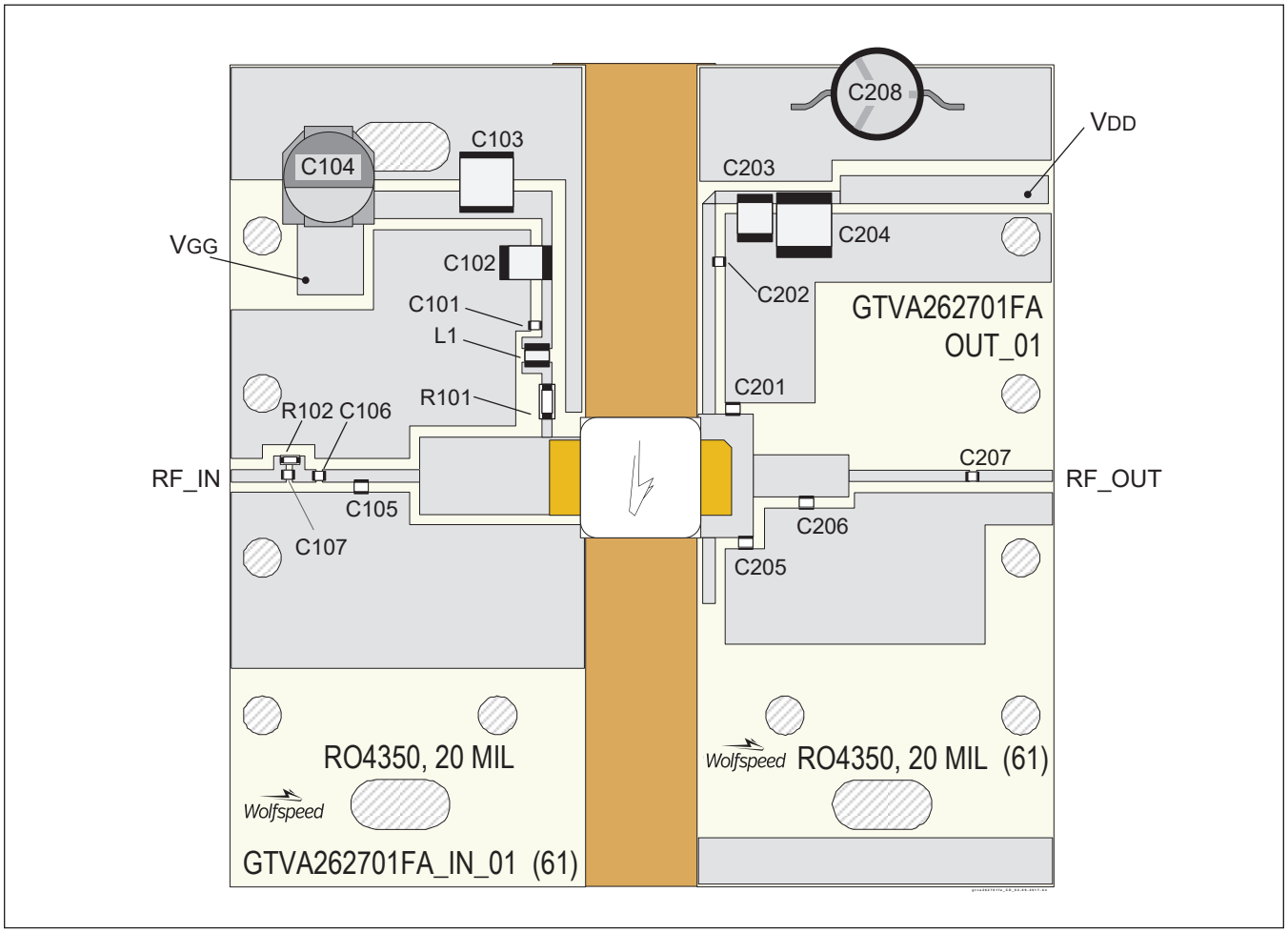
Class AB			P_{3dB}									
			Max Output Power					Max Drain Efficiency				
Freq [MHz]	Z_{source} [Ω]	$Z_{L\ 2f0}$ [Ω]	Z_{load} [Ω]	Gain [dB]	P_{3dB} [dBm]	P_{3dB} [W]	η_D [%]	Z_{load} [Ω]	Gain [dB]	P_{3dB} [dBm]	P_{3dB} [W]	η_D [%]
2620	6.90– j4.0	1.4 + j4.3	2.24 – j3.80	15.2	54.71	296	62.3	1.95 – j1.91	17.45	52.89	194.5	75.1
2655	6.85 – j3.4	2.3 + j10	2.20 – j3.78	15.2	54.80	302	63.4	2.26 – j2.27	16.70	53.14	206.1	73.6
2690	5.90 – j4.8	1.7 + j8.3	2.12 – j3.74	15.2	54.78	301	65.1	1.80 – j2.00	16.80	52.65	184.1	75.7

Reference Circuit tuned for 2620 to 2690 MHz

Reference Circuit Assembly

DUT	GTVA262701FA V2
Test Fixture Part No.	LTN/GTVA262701FA-V2
PCB	Rogers 4350, 0.508 mm [0.020"] thick, 2 oz. copper, ε_r = 3.66

Find Gerber files for this test fixture on the Wolfspeed Web site at **http://www.wolfspeed.com/RF**



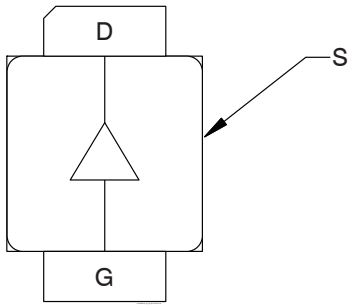
Reference circuit assembly diagram (not to scale)

Reference Circuit tuned for 2620 to 2690 MHz

Components Information

Component	Description	Manufacturer	P/N
Input			
C101	Capacitor, 33 pF	ATC	ATC800A330JT250T
C102	Capacitor, 1 µF	TDK Corporation	C4532X7R2A105M230KA
C103	Capacitor, 10 µF	TDK Corporation	C5750X5R1H106K230KA
C104	Capacitor, 100 µF	Panasonic Electronic Components	EEV-HD1V101P
C105	Capacitor, 1.8 pF	ATC	ATC800A1R8CT250T
C106, C107	Capacitor, 12 pF	ATC	ATC800A120JT250T
L1	Inductor, 22 nH	ATC	0805WL220JT
R101	Resistor, 5.6 ohms	Panasonic Electronic Components	ERJ-8RQJ5R6V
R102	Resistor, 10 ohms	Panasonic Electronic Components	ERJ-3GEYJ100V
Output			
C201	Capacitor, 1.1 pF	ATC	ATC800A1R1CT250T
C202, C207	Capacitor, 12 pF	ATC	ATC800A120JT250T
C203	Capacitor, 1 µF	TDK Corporation	C4532X7R2A105M230KA
C204	Capacitor, 10 µF	TDK Corporation	C5750X5R1H106K230KA
C205	Capacitor, 0.9 pF	ATC	ATC800A0R9CT250T
C206	Capacitor, 0.4 pF	ATC	ATC800A0R4CT250T
C208	Capacitor, 220 µF	Panasonic Electronic Components	ECA-2AHG221

Pinout Diagram (top view)



Pin	Description
D	Drain Device
G	Gate Device
S	Source (flange)

Lead connections for GTVA262701FA

Package Outline Specifications

Package H-87265J-2

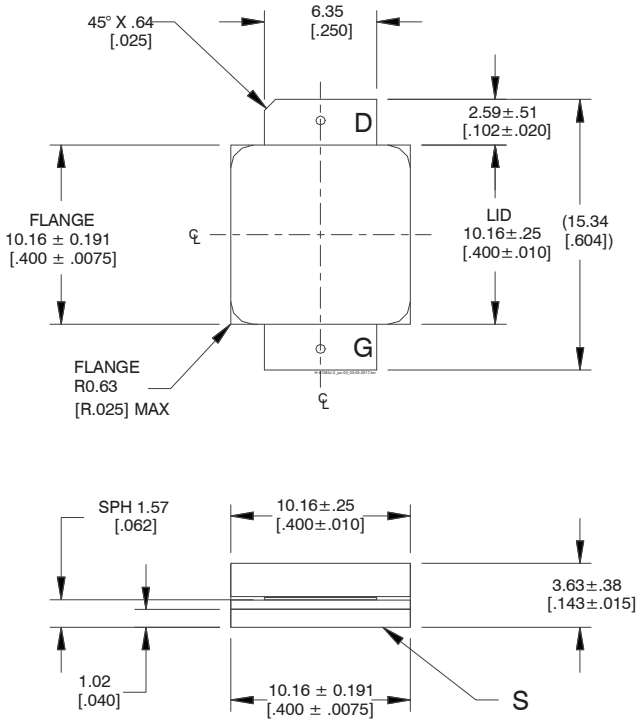


Diagram Notes—unless otherwise specified:

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: 0.13 ± 0.05 mm [.005 ± .002 inch].
6. Gold plating thickness: 1.14 ± 0.38 micron [45 ± 15 microinch].

Revision History

01	2016-03-31	Advance	All	Data Sheet reflects advance specification for product development
02	2017-03-03	Production	All	Data Sheet represents released product specifications, including reference circuit and updated performance information.
03	2017-03-31	Production	1 2	Remove "Integrated ESD protection" from Features Restructure tables for clarity.
04	2018-07-05	Production	All	Revised to V2. Converted to Wolfspeed data sheet.
04.1	2018-08-02	Production	1	Updated production test spec
04.2	2019-01-07	Production	5	Corrected test fixture p/n

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Notes

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