

GTVA262711FA

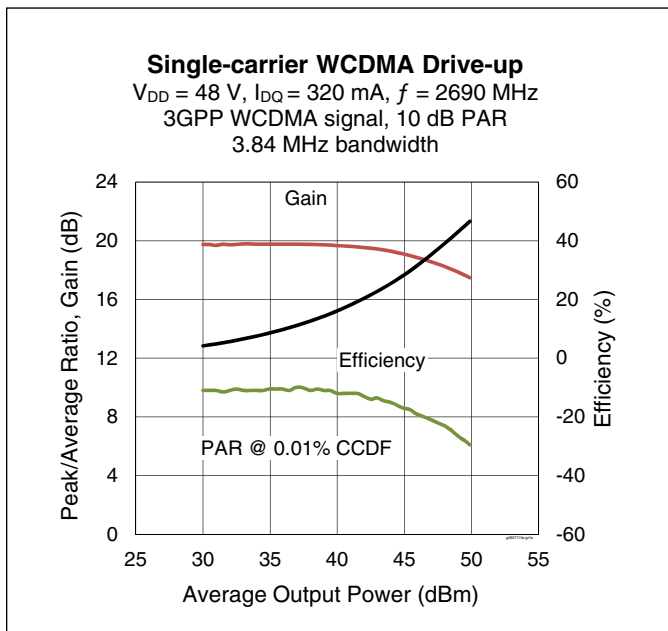
Thermally-Enhanced High Power RF GaN on SiC Amplifier, 300 W, 48 V, 2620 – 2690 MHz



Description

The GTVA262711FA is a 300-watt (P_{3dB}) GaN on SiC HEMT D-mode amplifier for use in multi-standard cellular power amplifier applications. It features input matching, high efficiency, and a thermally-enhanced package with earless flange.

Package Types: H-87265J-2



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 $P_{3dB} = 300\text{ W}$
 - Efficiency = 62%
 - Gain = 19.1 dB
- Human Body Model Class 1B (per ANSI/ESDA/ JEDEC JS-001)
- Capable of handling 10:1 VSWR @ 48 V, 70 W (CW) output power
- Pb-free and RoHS-compliant

RF Characteristics

Single-carrier WCDMA Specifications (tested in the production test fixture)

$V_{DD} = 48\text{ V}$, $I_{DQ} = 320\text{ mA}$, $P_{OUT} = 70\text{ W avg}$, $f = 2690\text{ MHz}$. 3GPP WDMA signal, 3.84 MHz channel bandwidth, peak/average = 10 dB @ 0.01% CCDF

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Gain	G_{ps}	16	18	—	dB
Drain Efficiency	η_D	38	38.5	—	%
Adjacent Channel Power Ratio	ACPR	—	-27.5	-25	dBc
Output PAR @ 0.01% CCDF	OPAR	5.7	6.3	—	dB

Note:

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

ESD: Electrostatic discharge sensitive device—observe handling precautions!



DC Characteristics

Characteristic	Symbol	Min.	Typ.	Max.	Unit	Conditions
Drain-source Breakdown Voltage	$V_{BR(DSS)}$	150	—	—	V	$V_{GS} = -8\text{ V}, I_D = 32\text{ mA}$
Drain-source Leakage Current	I_{DSS}	—	—	4.5	mA	$V_{GS} = -8\text{ V}, V_{DS} = 10\text{ V}$
Gate Threshold Voltage	$V_{GS(th)}$	-3.8	-3.0	-2.3	V	$V_{DS} = 10\text{ V}, I_D = 32\text{ mA}$

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Operating Voltage	V_{DD}	0	—	50	V	
Gate Quiescent Voltage	$V_{GS(Q)}$	—	-3.0	—		

Gate Quiescent Voltage's ($V_{GS(Q)}$) range can be estimated by adding +0.1 V to the Gate Threshold Voltage ($V_{GS(th)}$) range.

Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source Voltage	V_{DSS}	125	V
Gate-source Voltage	V_{GS}	-10 to +2	
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	

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	Conditions
Thermal Resistance	$R_{\theta JC}$	1.0	°C/W	$T_{CASE} = 70\text{ °C}, 70\text{ W (CW)}, V_{DD} = 48\text{ V}, I_{DQ} = 320\text{ mA}, 2690\text{ MHz}$

Ordering Information

Type and Version	Order Code	Package	Shipping
GTVA262711FA V2 R0	GTVA262711FA-V2-R0	H-87265J-2	Tape & Reel, 50 pcs
GTVA262711FA V2 R2	GTVA262711FA-V2-R2	H-87265J-2	Tape & Reel, 250 pcs

Typical Performance (data taken in the production test fixture)

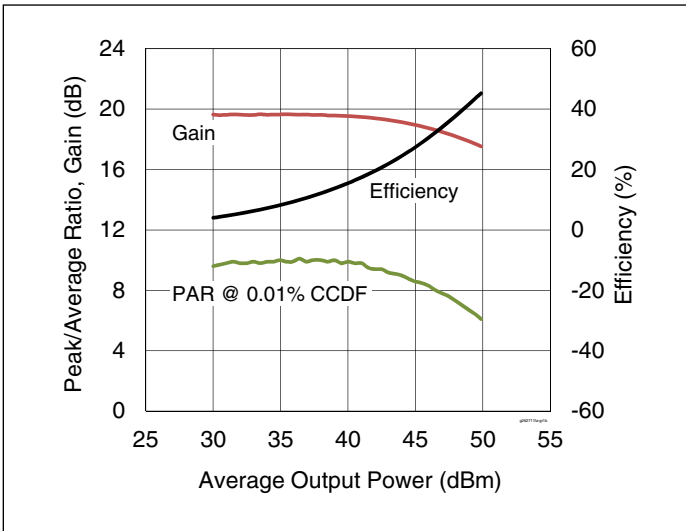


Figure 1. Single-carrier WCDMA Drive-up

$V_{DD} = 48\text{ V}$, $I_{DQ} = 320\text{ mA}$, $f = 2655\text{ MHz}$,
3GPP WCDMA signal, 10 dB PAR,
3.84 MHz bandwidth

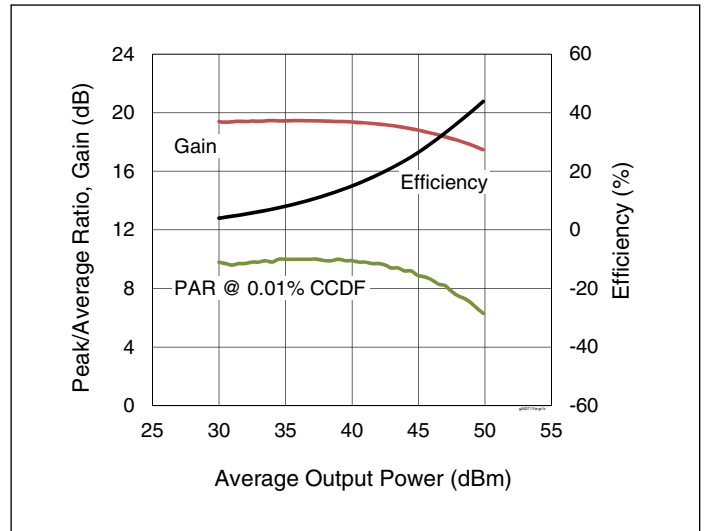


Figure 2. Single-carrier WCDMA Drive-up

$V_{DD} = 48\text{ V}$, $I_{DQ} = 320\text{ mA}$, $f = 2620\text{ MHz}$,
3GPP WCDMA signal, 10 dB PAR,
3.84 MHz bandwidth

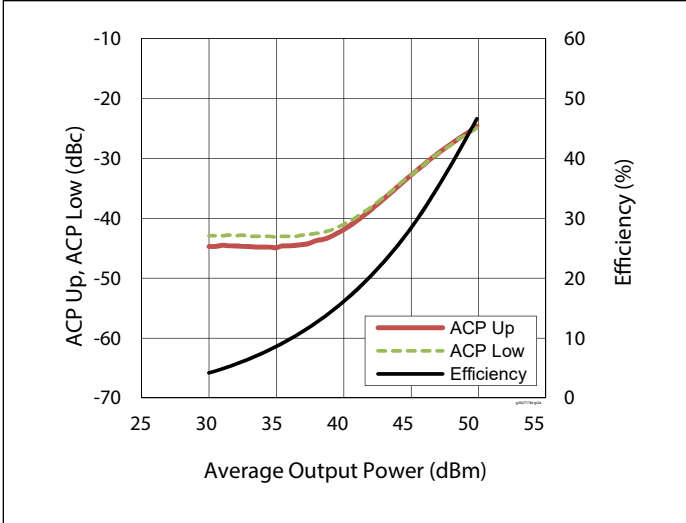


Figure 3. Single-carrier WCDMA Drive-up

$V_{DD} = 48\text{ V}$, $I_{DQ} = 320\text{ mA}$, $f = 2690\text{ MHz}$,
3GPP WCDMA signal, 10 dB PAR,
3.84 MHz bandwidth

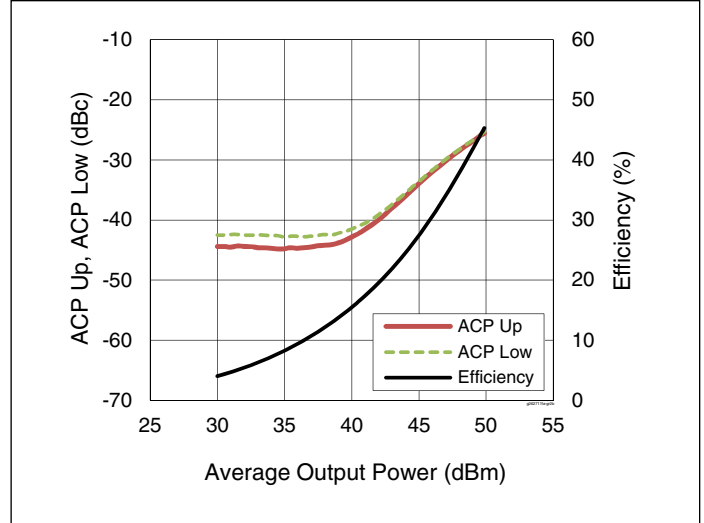


Figure 4. Single-carrier WCDMA Drive-up

$V_{DD} = 48\text{ V}$, $I_{DQ} = 320\text{ mA}$, $f = 2655\text{ MHz}$,
3GPP WCDMA signal, 10 dB PAR,
3.84 MHz bandwidth

Typical Performance (cont.)

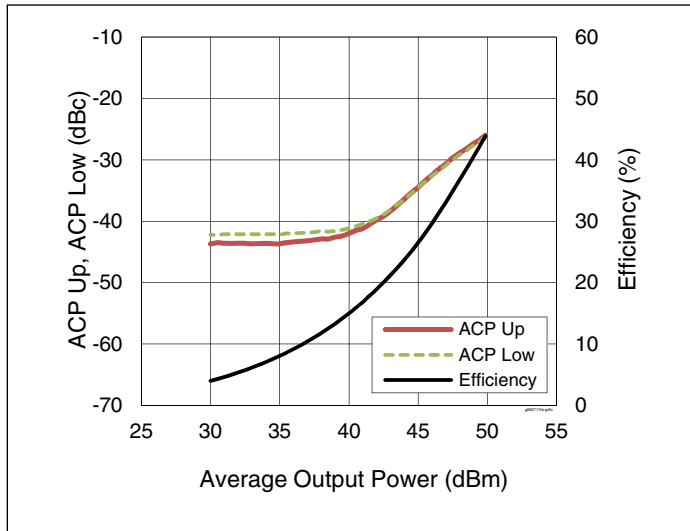


Figure 5. Single-carrier WCDMA Drive-up

$V_{DD} = 48\text{ V}$, $I_{DQ} = 320\text{ mA}$, $f = 2620\text{ MHz}$,
3GPP WCDMA signal, 10 dB PAR,
3.84 MHz bandwidth

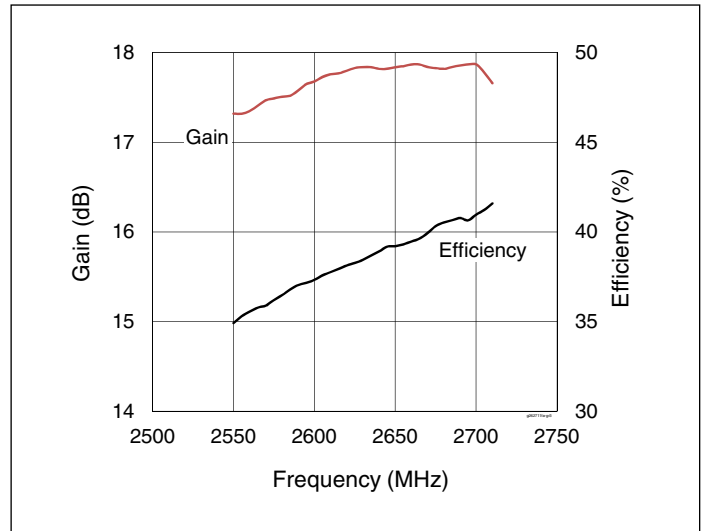


Figure 6. Single-carrier WCDMA Broadband

$V_{DD} = 48\text{ V}$, $I_{DQ} = 320\text{ mA}$, $P_{OUT} = 48.45\text{ dBm}$,
3GPP WCDMA signal, 10 dB PAR

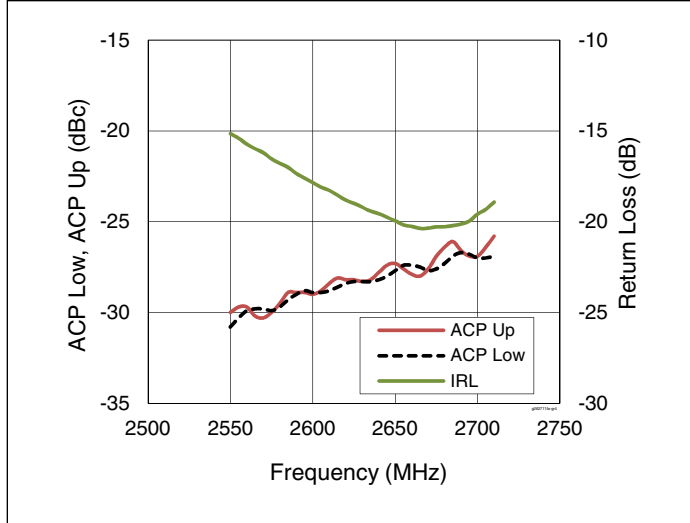


Figure 7. Single-carrier WCDMA Broadband

$V_{DD} = 48\text{ V}$, $I_{DQ} = 320\text{ mA}$, $P_{OUT} = 48.45\text{ dBm}$,
3GPP WCDMA signal, 10 dB PAR

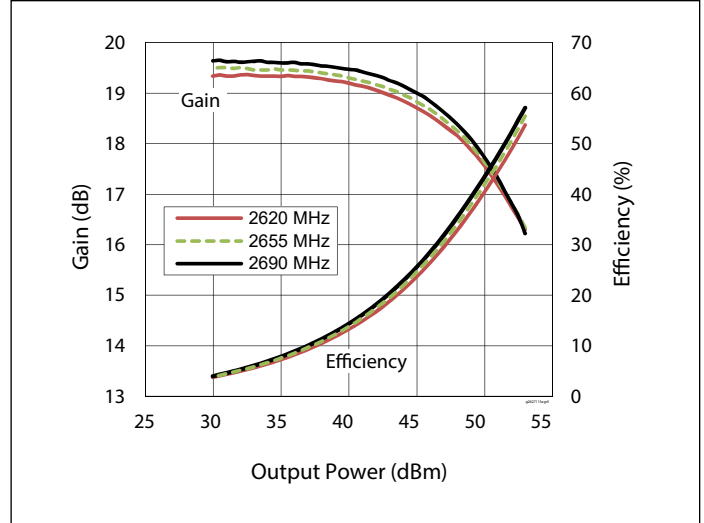


Figure 8. CW Performance

$V_{DD} = 48\text{ V}$, $I_{DQ} = 320\text{ mA}$

Typical Performance (cont.)

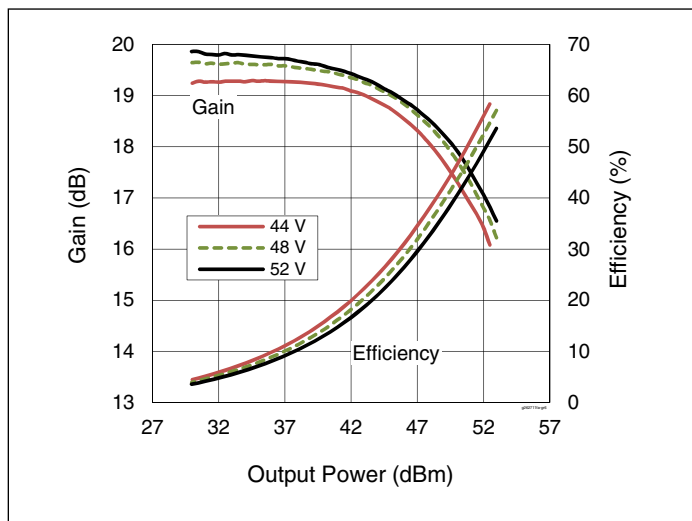


Figure 9. CW Performance at various V_{DD}

$I_{DQ} = 320 \text{ mA}$, $f = 2690 \text{ MHz}$
(series show supply voltage)

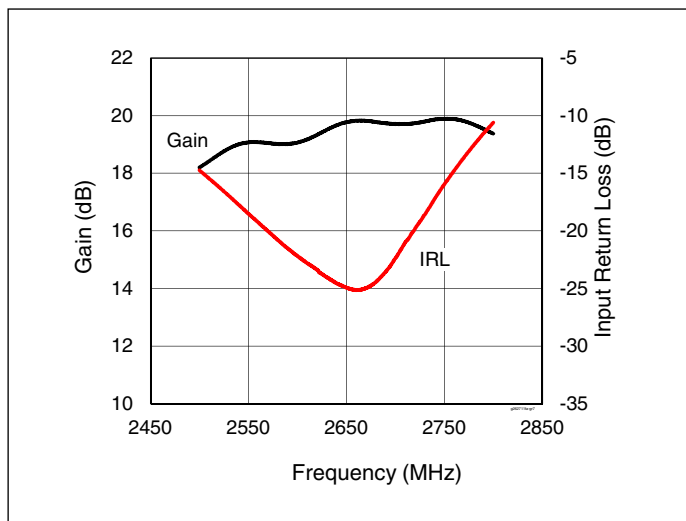


Figure 10. CW Performance Small Signal Gain & Input Return Loss

$V_{DD} = 48 \text{ V}$, $I_{DQ} = 320 \text{ mA}$

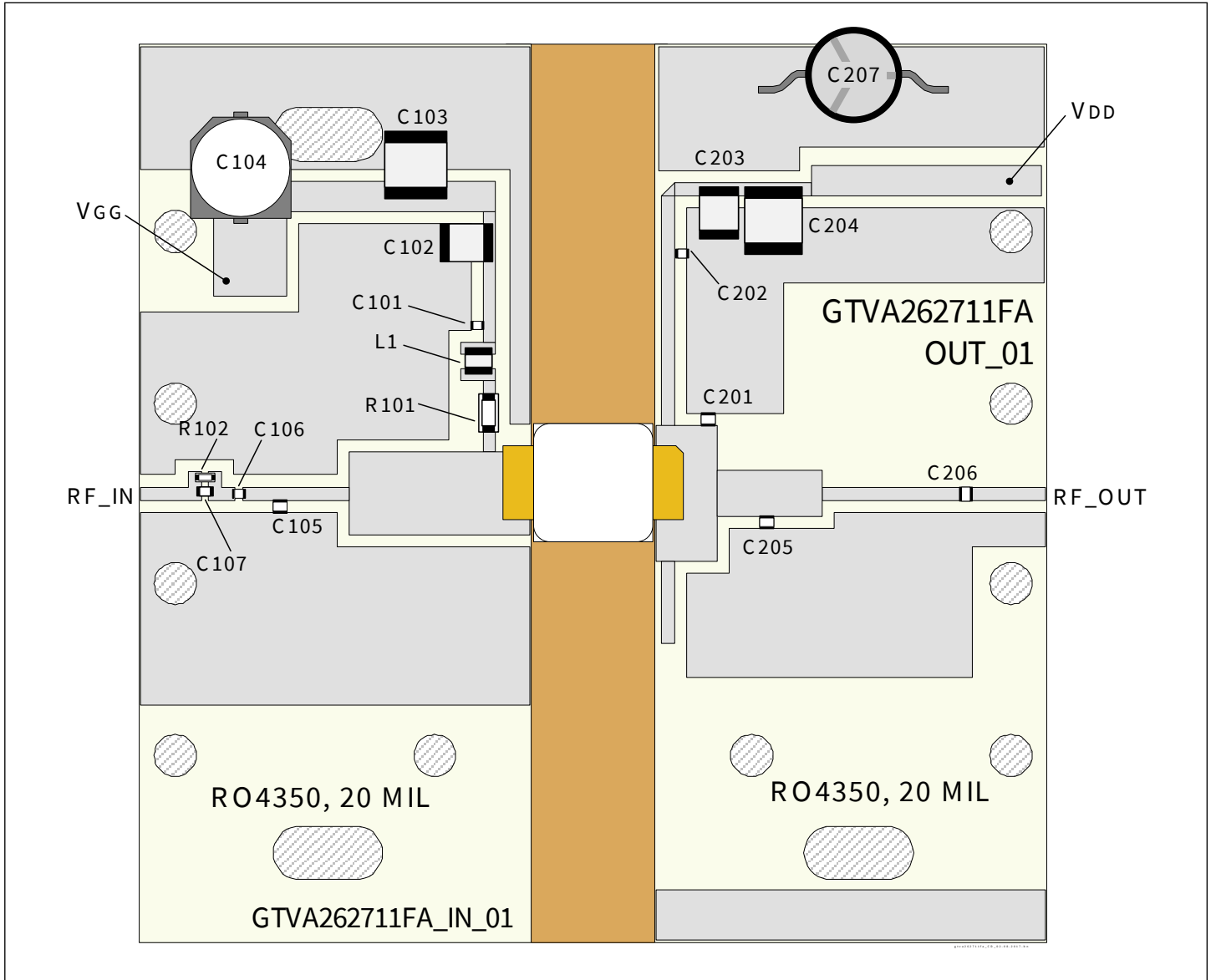
Load Pull Performance

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

Class AB			P_{3dB}									
			Max Output Power					Max Drain Efficiency				
Freq [MHz]	$Z_s [\Omega]$	$Z_{ 2f_0} [\Omega]$	$Z_l [\Omega]$	Gain [dB]	$P_{3dB} [\text{dBm}]$	$P_{3dB} [\text{W}]$	$\eta_D [\%]$	$Z_l [\Omega]$	Gain [dB]	$P_{3dB} [\text{dBm}]$	$P_{3dB} [\text{W}]$	$\eta_D [\%]$
2620	8.3 – j4.7	1.2 + j0	2.75 – j4.56	15.5	55.48	353	60.7	2.5 – j2.94	16.8	54.52	283	68.0
2655	6.7 – j4.3	1.3 + j0	2.79 – j4.59	15.5	55.46	352	60.8	2.14 – j2.85	17.2	53.83	242	66.3
2690	5.6 – j5.2	1.2 + j0	2.85 – j4.50	15.4	55.43	349	60.2	2.46 – j3.03	16.7	54.38	274	65.9

Evaluation Board, 2620 to 2690 MHz

Evaluation Board Part Number	LTN/GTVA262711FA-V2
PCB Information	Rogers 4350, 0.508 mm [.020"] thick, 2 oz. copper, $\epsilon_r = 3.66$



Reference circuit assembly diagram (not to scale)

Components Information

Component	Description	Manufacturer	P/N
Input			
C101	Capacitor, 33 pF	ATC	ATC800A330JT250T
C102	Capacitor, 1 μ F	TDK Corporation	C4532X7R2A105M230KA
C103	Capacitor, 10 μ F	TDK Corporation	C5750X5R1H106K230KA
C104	Capacitor, 100 μ F	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, C206	Capacitor, 12 pF	ATC	ATC800A120JT250T
C203	Capacitor, 1 μ F	TDK Corporation	C4532X7R2A105M230KA
C204	Capacitor, 10 μ F	TDK Corporation	C5750X5R1H106K230KA
C205	Capacitor, 0.4 pF	ATC	ATC800A0R4CT250T
C207	Capacitor, 220 μ F	Panasonic Electronic Components	ECA-2AHG221

Bias Sequencing

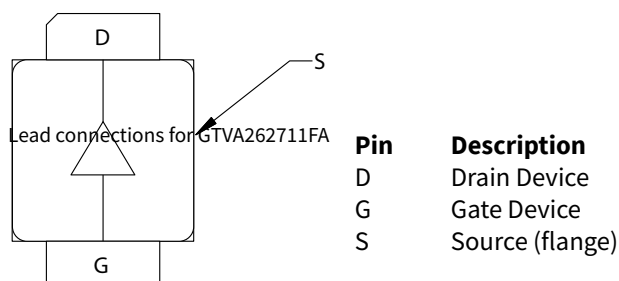
Bias On

1. Ensure RF is turned off
2. Apply pinch-off voltage of -5 V to the gate
3. Apply nominal drain voltage
4. Bias gate to desired quiescent drain current
5. Apply RF

Bias Off

1. Turn RF off
2. Apply pinch-off voltage to the gate
3. Turn-off drain voltage
4. Turn-off gate voltage

Pinout Diagram (top view)



Package Outline Specifications – Package H-87265J-2

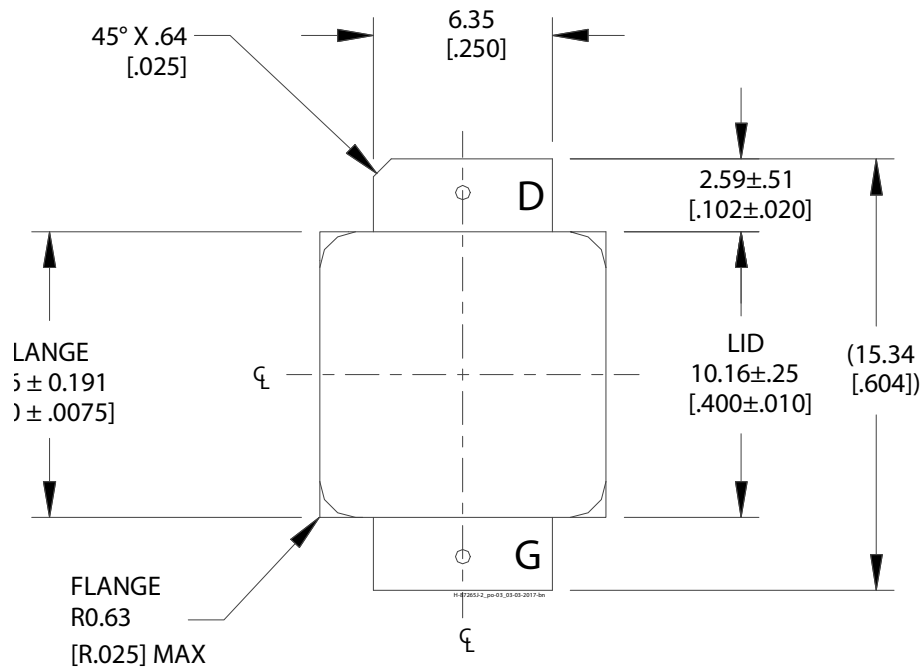


Diagram Notes—unless otherwise specified:

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 [$.005 \pm .002$ inch].
6. Gold plating thickness: 1.14 ± 0.38 micron [45 ± 15 microinch].

Notes & Disclaimer

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