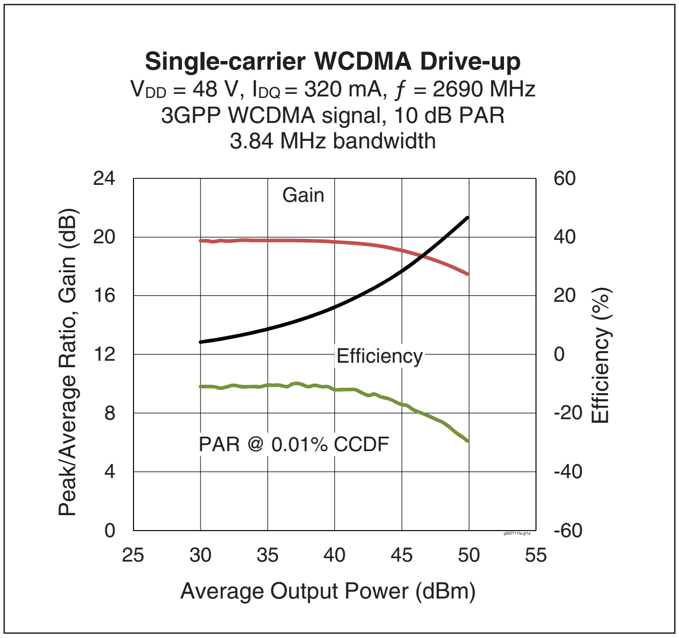
GTVA262711FA

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

Package Types: H-87265J-2

Description

The GTVA262711FA is a 300-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.



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 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 Wolfspeed production test fixture)
V_{DD} = 48 V, I_{DQ} = 320 mA, P_{OUT} = 70 W avg, ƒ = 2690 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°C unless otherwise indicated
ESD: Electrostatic discharge sensitive device—observe handling precautions!

RoHS compliant

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DC Characteristics

Characteristic	Symbol	Min.	Typ.	Max.	Unit	Conditions
Drain-source Breakdown Voltage	$V_{BR(DSS)}$	150	—	—	V	V_{GS} = -8 V, I_D = 32 mA
Drain-source Leakage Current	I_{DSS}	—	—	4.5	mA	V_{GS} = -8 V, V_{DS} = 10 V
Gate Threshold Voltage	$V_{GS(th)}$	–3.8	–3.0	–2.3	V	V_{DS} = 10 V, I_D = 32 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	—		V_{DS} = 50 V, I_D = 320 mA

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 °C, 70 W (CW), V_{DD} = 48 V, I_{DQ} = 320 mA, 2690 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

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Typical Performance (data taken in Wolfspeed production test fixture)

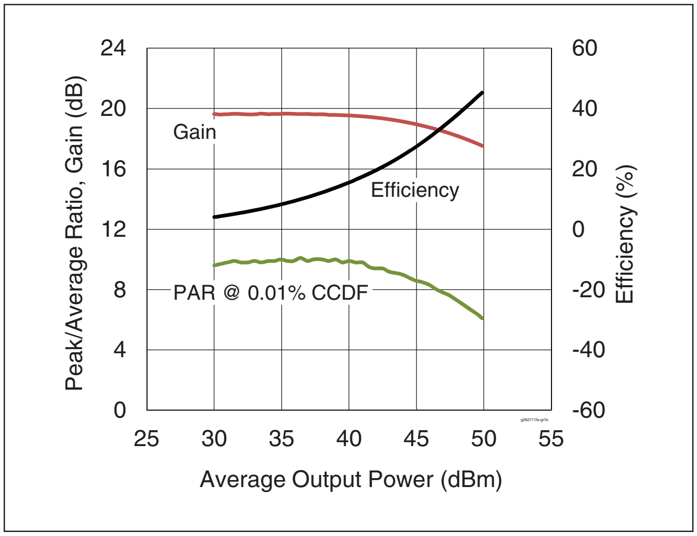


Figure 1. Single-carrier WCDMA Drive-up

V_{DD} = 48 V, I_{DQ} = 320 mA, ƒ = 2655 MHz,
3GPP WCDMA signal, 10 dB PAR,
3.84 MHz bankdwidth

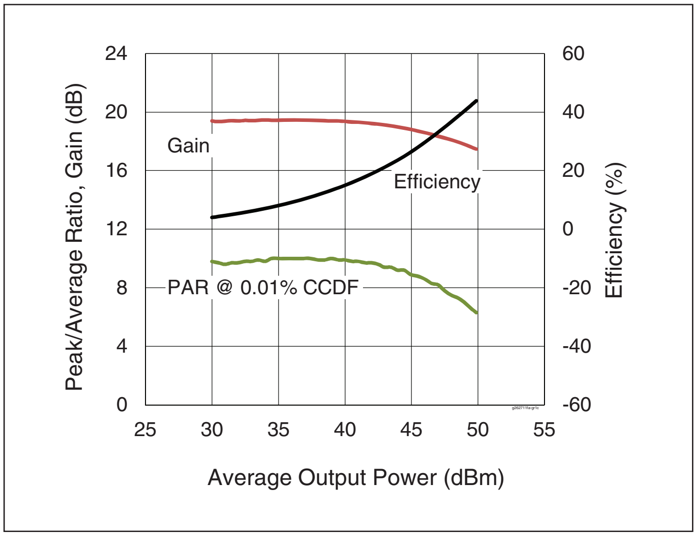


Figure 2. Single-carrier WCDMA Drive-up

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

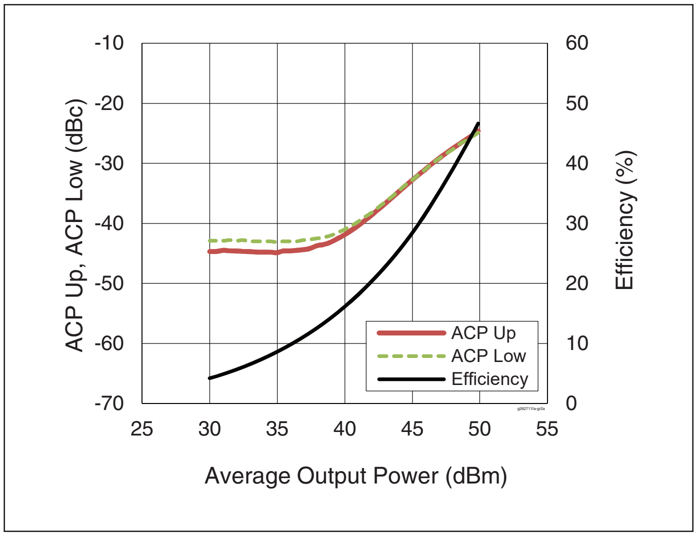


Figure 3. Single-carrier WCDMA Drive-up

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

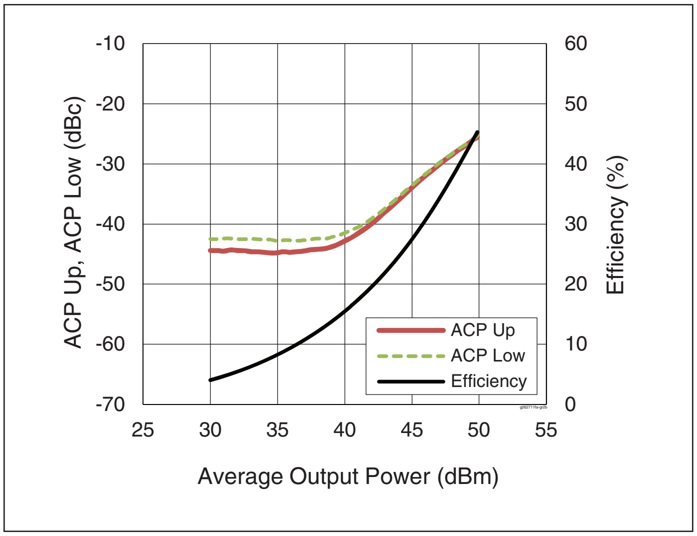


Figure 4. Single-carrier WCDMA Drive-up

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

Typical Performance (cont.)

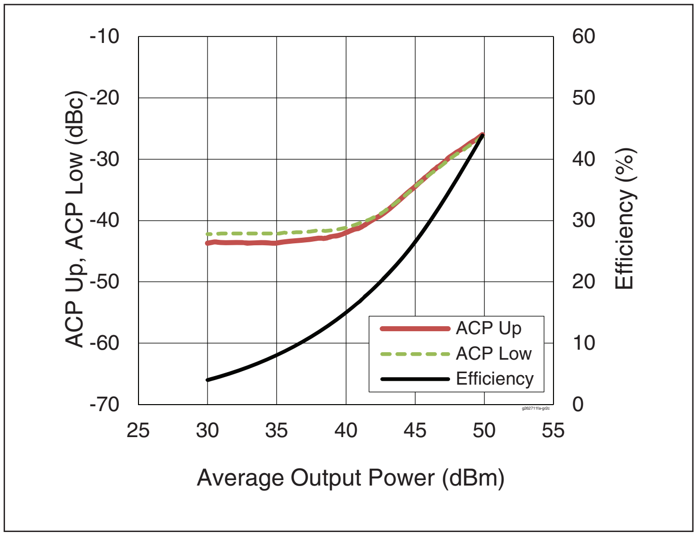


Figure 5. Single-carrier WCDMA Drive-up

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

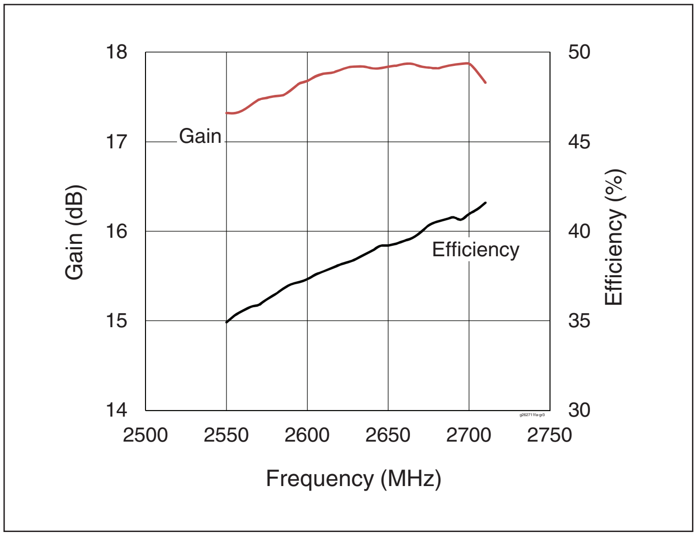


Figure 6. Single-carrier WCDMA Broadband

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

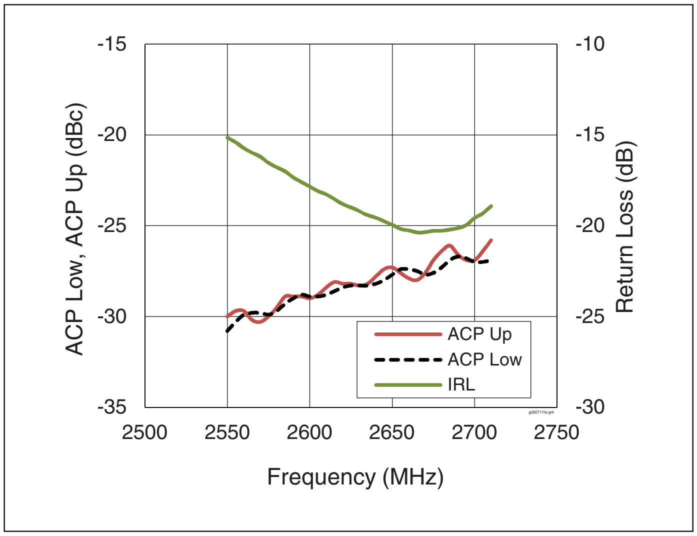


Figure 7. Single-carrier WCDMA Broadband

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

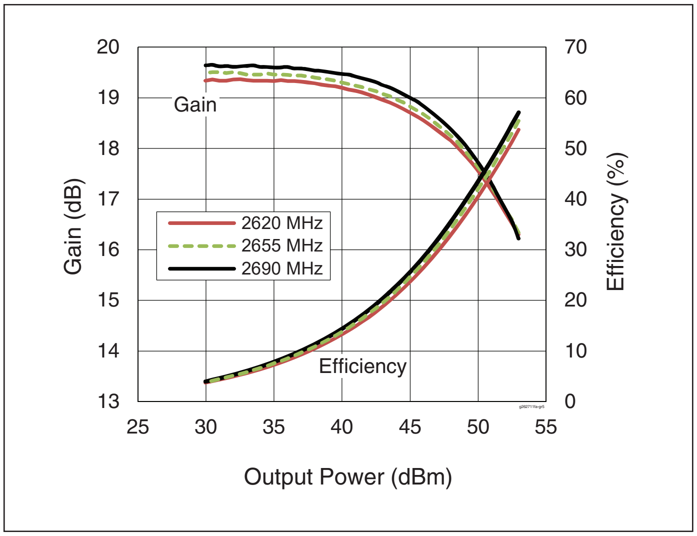


Figure 8. CW Performance

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

Typical Performance (cont.)

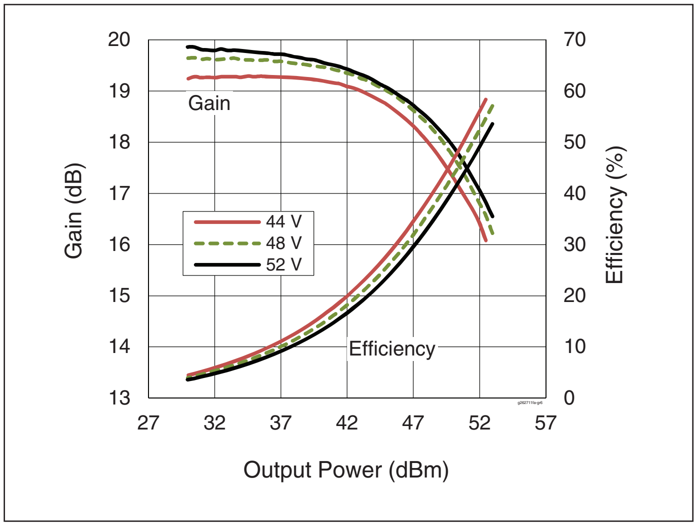


Figure 9. CW Performance at various V_{DD}

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

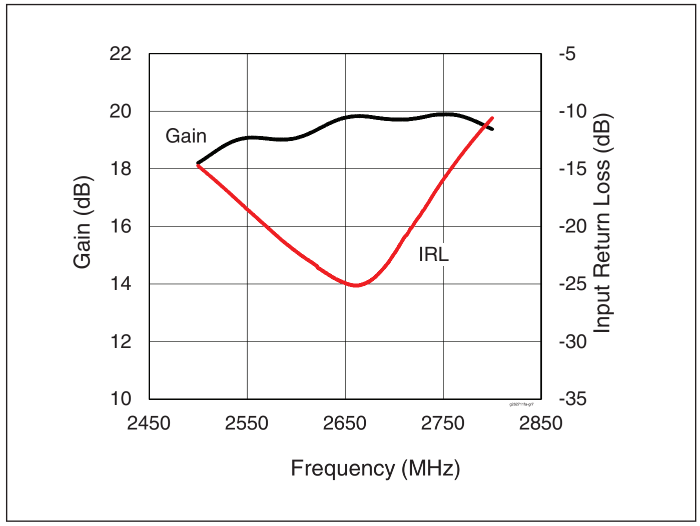


Figure 10. CW Performance Small Signal Gain & Input Return Loss

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

Load Pull Performance

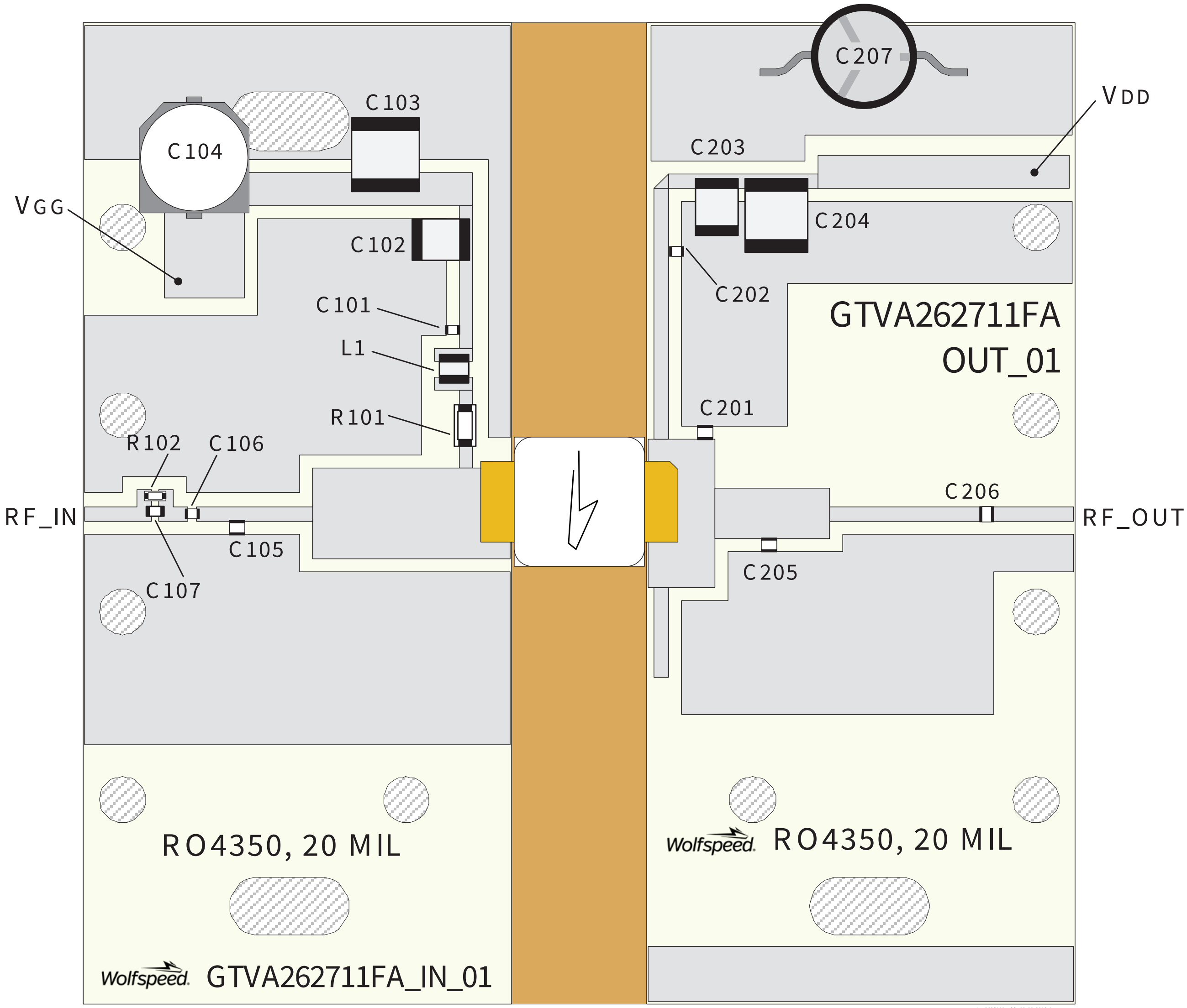
Pulsed CW signal – 10 µsec, 10% duty cycle; 48 V, 320 mA

Class AB			P_{3dB}									
			Max Output Power					Max Drain Efficiency				
Freq [MHz]	Z_s [Ω]	Z_{l2f0} [Ω]	Z_l[Ω]	Gain [dB]	P_{3dB} [dBm]	P_{3dB} [W]	η_D [%]	Zl [Ω]	Gain [dB]	P_{3dB} [dBm]	P_{3dB} [W]	η_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, ε_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)

Components Information

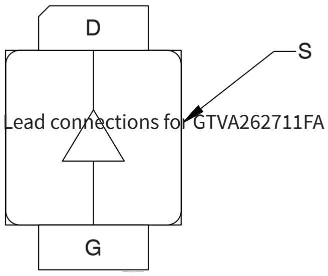
Component	Description	Manufacturer	P/N
Input			
C101	Capacitor, 33 pF	ATC	ATC800A330JT250T
C102	Capacitor, 1 µF	TDK Corporation	C4532X7R2A105M230KA
C103	Capacitor, 10 µF	TDK Corporation	C5750X5R1H106K230KA
C104	Capacitor, 100 µF	Panasonic Electronic Components	EEV-HD1V101P
C105	Capacitor, 1.8 pF	ATC	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, C206	Capacitor, 12 pF	ATC	ATC800A120JT250T
C203	Capacitor, 1 µF	TDK Corporation	C4532X7R2A105M230KA
C204	Capacitor, 10 µF	TDK Corporation	C5750X5R1H106K230KA
C205	Capacitor, 0.4 pF	ATC	ATC800A0R4CT250T
C207	Capacitor, 220 µF	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)



Lead connections for GTVA262711FA

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

Package Outline Specifications – Package H-87265J-2

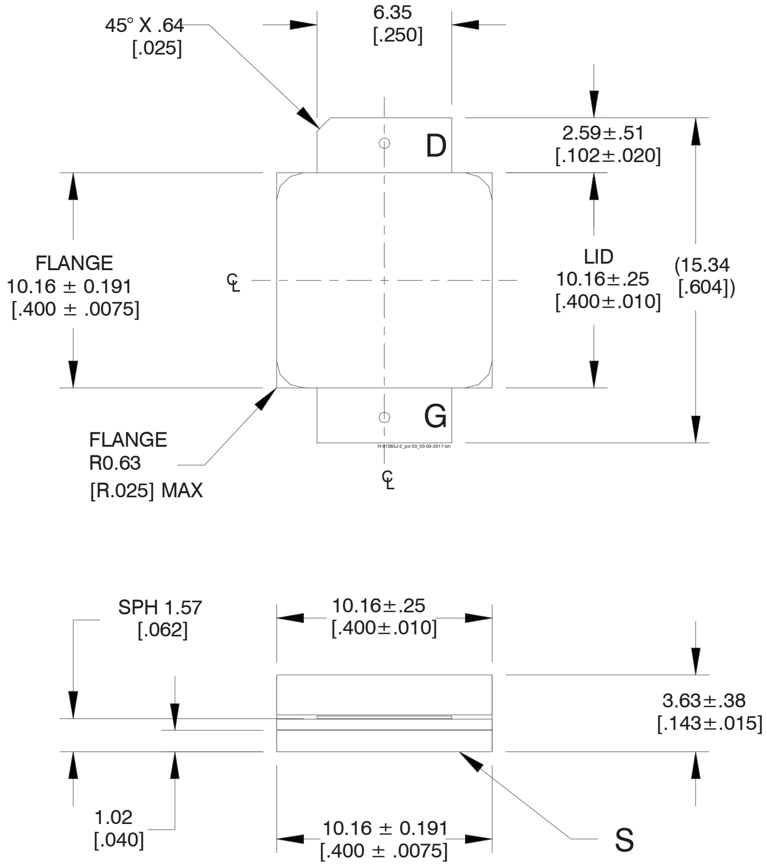


Diagram Notes—unless otherwise specified:

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].

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