GT060D 50V, DC – 6.0GHZ, 60W GAN HEMT

FEATURES

- Operating Frequency Range: DC to 6.0GHz
- Operating Drain Voltage: +50V
- Maximum Output Power (P_{SAT}): 80W
- Maximum Drain Efficiency: 62%
- Efficiency-Tuned Linear Gain: 17.2dB
- Surface Mount Plastic Package

14 Pin 6x3 mm DFN Package

DESCRIPTION

The GT060D is a 80W (P3dB) unmatched discrete GaN-on-SiC HEMT which operates from DC to 6.0GHz on a 50V supply rail. The wide bandwidth of the GT060D makes it suitable for a variety of applications including cellular infrastructure, radar, communications, and test instrumentation, and can support both linear and pulsed mode of operations.

The device is housed in an industry-standard 6x3 mm surface mount DFN package. Lead-free and ROHS compliant.

TYPICAL PERFORMANCE: MAX POWER TUNED, T_A = 25°C (1)

Parameter	3.4 GHz	3.6 GHz	3.8 GHz	Units
Linear Gain	15.7	15.1	15.1	dB
Saturated Output Power (P3dB)	80	80	80	W
Drain Efficiency (P3dB)	56	55	55	%

(1) Load pull at V_D = 50V, I_{DQ} = 78mA, pulsed CW (10% duty cycle, 100µs width)

TYPICAL PERFORMANCE: MAX EFFICIENCY TUNED, T_A = 25°C (2)

Parameter	3.4 GHz	3.6 GHz	3.8 GHz	Units
Linear Gain	17.2	16.4	16.2	dB
Saturated Output Power (Pd3dB)	62	62	62	W
Drain Efficiency (P3dB)	62	60	60	%

(2) Load pull at V_D = 50V, I_{DQ} = 78mA, pulsed CW (10% duty cycle, 100µs width)

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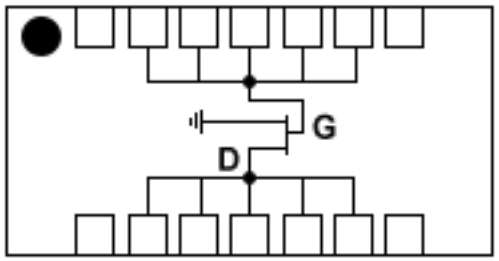
ABSOLUTE MAXIMUM RATINGS

Parameter	Rating	Units
Breakdown Voltage	>150	BV_{DG} (V)
Gate Source Voltage	-8 to +2	V_{GS} (V)
Operating Voltage	55	V (V)
Junction Temperature	+225	(°C)
Storage Temperature	-65 to +150	(°C)

BLOCK DIAGRAM



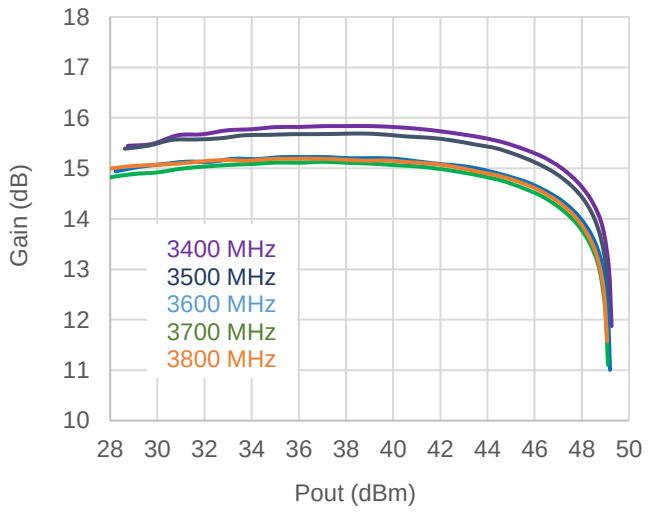
ELECTRICAL SPECIFICATIONS: T_A = 25°C

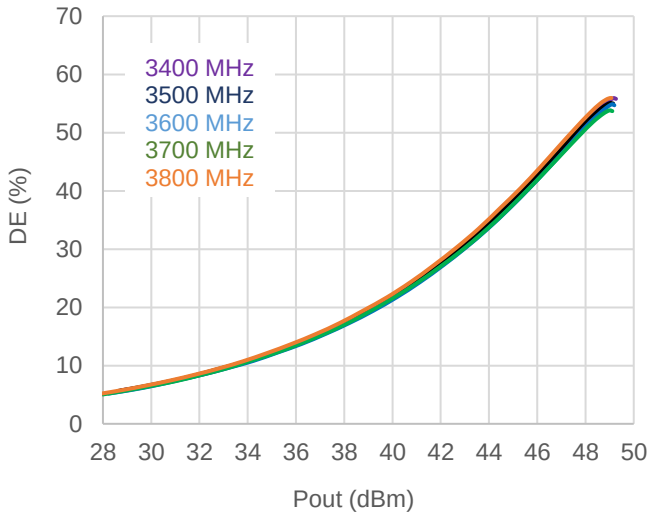
Parameter	Min.	Typ.	Max.	Units	Notes
Frequency Range	DC		6000	MHz	
DC Characteristics					
Drain Source Breakdown Voltage		>150		V_{DS} (V)	
Drain Source Leakage Current		0.78		I_{DS} (mA)	
Gate Threshold Voltage		-3.5 to -1.5		V_{GS} (V)	
Operating Conditions					
Gate Voltage		-2.5		V_G (V)	
Drain Voltage		50		V_D (V)	
Quiescent Drain Current		80		I_{DQ} (mA)	
Thermal Characteristics					
Thermal Resistance at Pave (1)		3.0		θ_{JC} (°C/W)	T_{case} = 85°C, T_{CH} = 153°C P_{diss} = 23.1W, P_{out} = 6.1W

(1) T_{case} is referred as temperature at the package back side. T_{CH} is modeled peak junction temperature based on 3.6GHz load pull RF performance at 10dB back off.

PERFORMANCE PLOTS: MAX POWER TUNED LOAD PULL

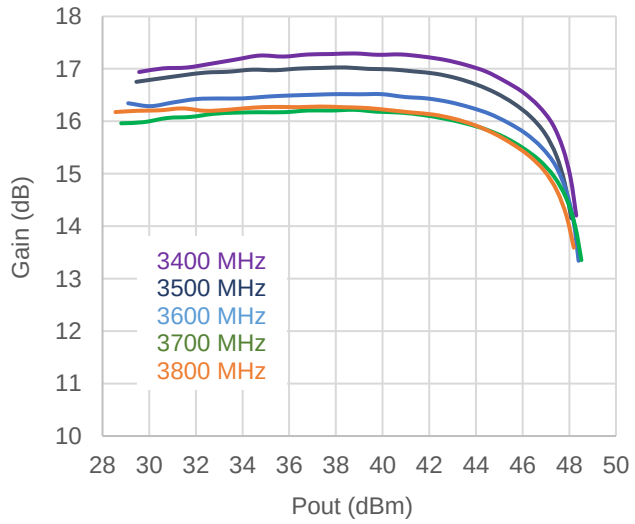
Test conditions: V_D = 50V, V_G = -2.71V, I_{DQ} = 78mA, T = +25°C, pulsed CW (10% duty cycle, 100µs width)

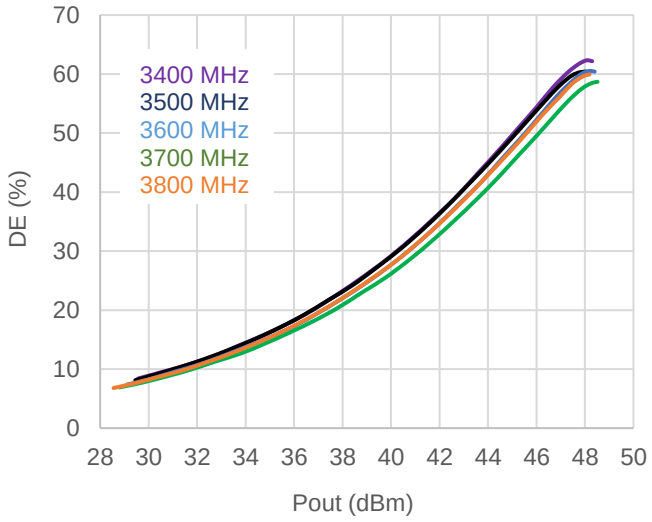




PERFORMANCE PLOTS: MAX EFFICIENCY TUNED LOAD PULL

Test conditions: V_D = 50V, V_G = -2.71V, I_{DQ} = 78mA, T = +25°C, pulsed CW (10% duty cycle, 100µs width)





LOAD PULL PERFORMANCE: MAX POWER TUNED

Frequency (MHz)	Source Impedance (Ω)	Load Impedance (Ω)	P3dB (dBm)	Drain Efficiency (%)	G3dB (dB)
3400	1.4 + j0.7	6.6 + j1.1	49.2	55.9	12.7
3500	1.4 + j1.1	6.4 + j0.9	49.2	55.0	12.6
3600	1.5 + j1.5	6.2 + j0.3	49.1	54.9	12.1
3700	1.5 + j1.9	6.1 + j0	49.0	53.8	12.1
3800	1.4 + j2.4	5.7 + j0.3	49.0	55.2	12.1

Test conditions: V_D = +50V, I_{DQ} = 78mA, T = +25°C, pulsed CW (10% duty cycle, 100µs width). Harmonics not optimized

LOAD PULL PERFORMANCE: MAX EFFICIENCY TUNED

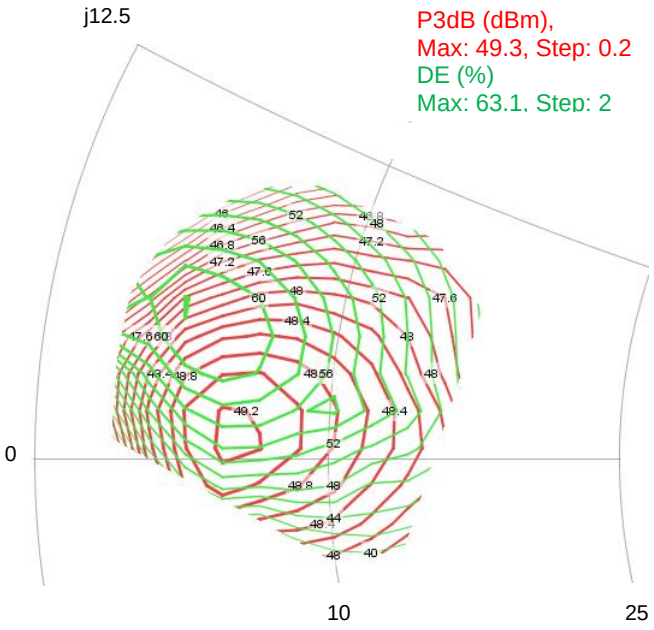
Frequency (MHz)	Source Impedance (Ω)	Load Impedance (Ω)	P3dB (dBm)	Drain Efficiency (%)	G3dB (dB)
3400	1.0 + j1.0	5.1 + j4.7	48.1	62.3	14.8
3500	1.1 + j1.3	4.7 + j4.2	48.0	60.4	14.4
3600	1.1 + j1.7	4.9 + j3.2	48.3	60.4	13.8
3700	1.1 + j2.1	5.0 + j3.3	48.0	58.6	13.8
3800	1.1 + j2.6	5.0 + j3.1	48.1	59.9	13.6

Test conditions: V_D = +50V, I_{DQ} = 78mA, T = +25°C, pulsed CW (10% duty cycle, 100µs width). Harmonics not optimized

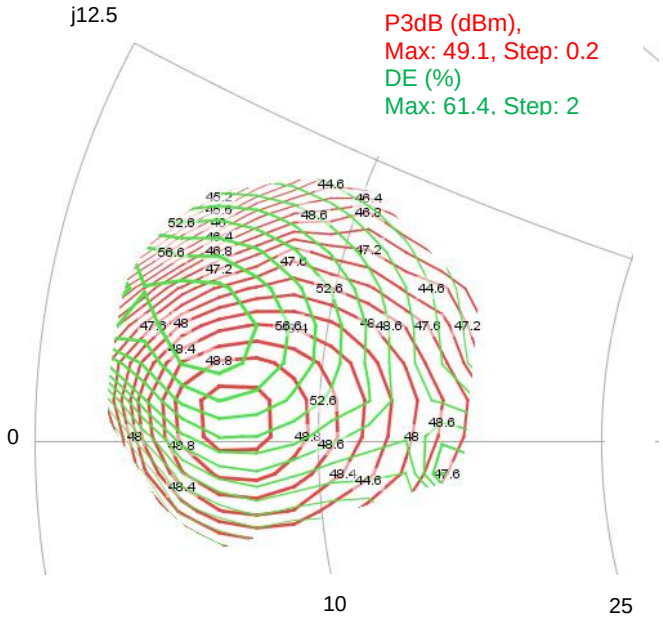
LOADPULL CONTOURS

Test conditions: V_D = +50V, I_{DQ} = 78mA, T = +25°C, pulsed CW (10% duty cycle, 100µs width). Harmonics not optimized

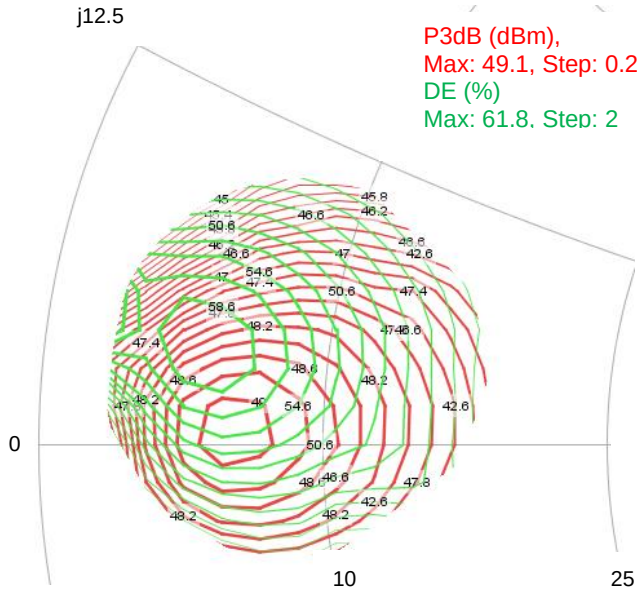
Contours at 3.4 GHz



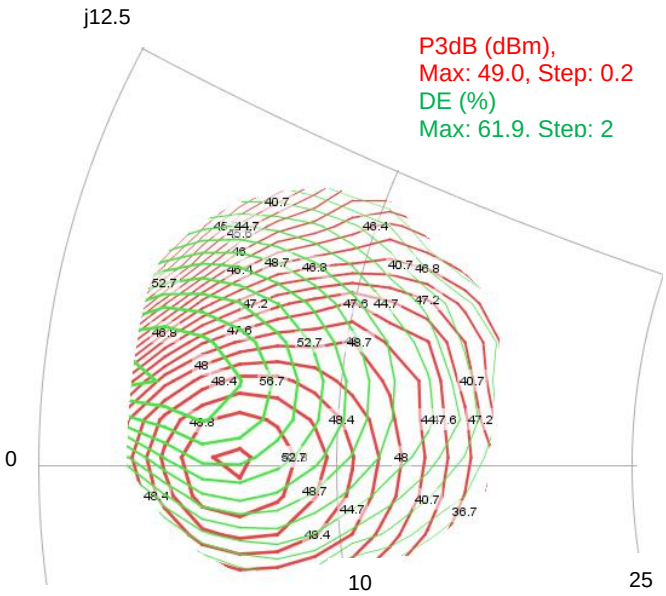
Contours at 3.5 GHz



Contours at 3.6 GHz



Contours at 3.8 GHz



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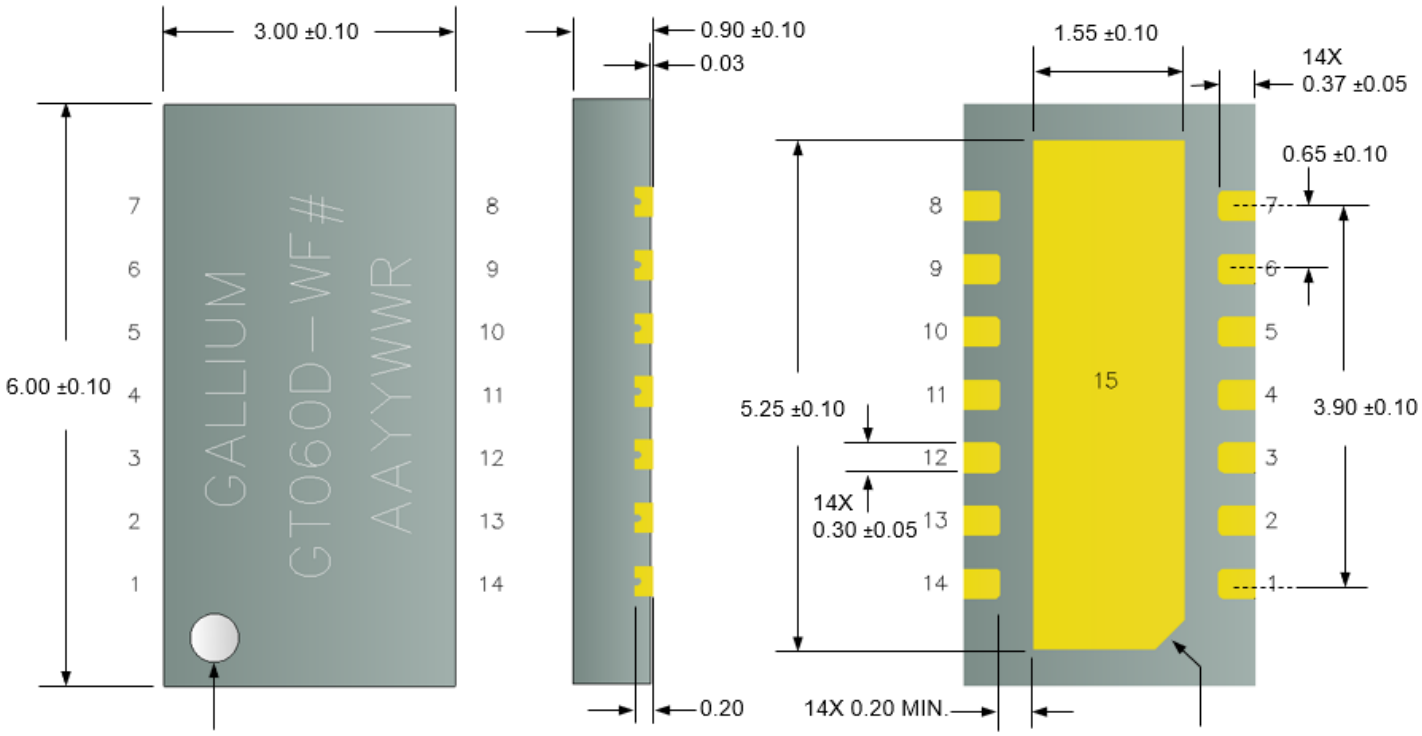
PACKAGE DIMENSIONS



Pin #1 identifier

Pin #1 identifier

Note: Dimension in mm

PIN CONFIGURATION

Pin	Input/Output
1	Not connected
2, 3, 4, 5, 6	RF Input / Gate Voltage
7, 8	Not connected
9, 10, 11, 12, 13	RF Output / Drain Voltage
14	Not connected
15 (Paddle)	Ground

DEVICE LABEL

Line 1:	COMPANY NAME:	GALLIUM
Line 2:	PART NUMBER - WAFER #	
Line 3:	AA:	Assembly Code
	YYWW:	Assembly Date Code
	R:	Reserved code

GaN HEMT BIASING SEQUENCE

To turn the transistor ON

1. Set V_{GS} to -5V
2. Turn on V_{DS} to normal operation voltage (50V)
3. Slowly increase V_{GS} to set I_{DS} current (78mA)
4. Apply RF power

To turn the transistor OFF

1. Turn the RF power off
2. Decrease V_{GS} to -5V
3. Turn off $V_{D.}$ Wait a few seconds for drain capacitor to discharge
4. Turn off V_{GS}

CONTACT INFORMATION

To request latest information and samples, please contact us at:

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Email: sales@galliumsemi.com