GT080D 50V, DC – 3.7GHZ, 80W GAN HEMT

FEATURES

- Operating Frequency Range: DC to 3.7GHz
- Operating Drain Voltage: +50V
- Maximum Output Power (P_{SAT}): 100W
- Maximum Drain Efficiency: 73.1% (1)
- Efficiency-Tuned P3dB Gain: 23.1 dB (1)
- Surface Mount Plastic Package

(1) Load pull P3dB performance at 1.8 GHz

14 Pin 6x3 mm DFN Package

DESCRIPTION

The GT080D is an 100W (P3dB) unmatched discrete GaN-on-SiC HEMT which operates from DC to 3.7GHz on a 50V supply rail. The wide bandwidth of the GT080D 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 at P3dB, T_A = 25°C (2)

Parameter	1.7 GHz	2.0 GHz	2.3 GHz	Units
Gain	20.5	18.1	17.7	dB
Saturated Output Power	100	97	97	W
Drain Efficiency	64	59	60	%

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

TYPICAL PERFORMANCE: MAX EFFICIENCY TUNED at P3dB, T_A = 25°C (3)

Parameter	1.7 GHz	2.0 GHz	2.3 GHz	Units
Gain	23.5	20.3	19.1	dB
Saturated Output Power	71	74	79	W
Drain Efficiency	72	67	66	%

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

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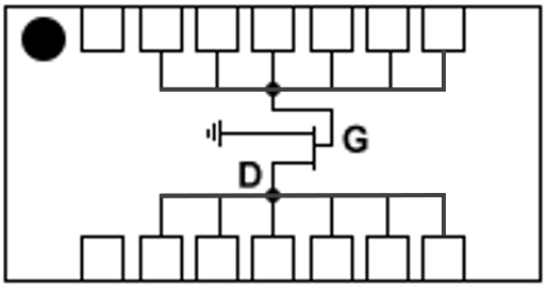
ABSOLUTE MAXIMUM RATINGS

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



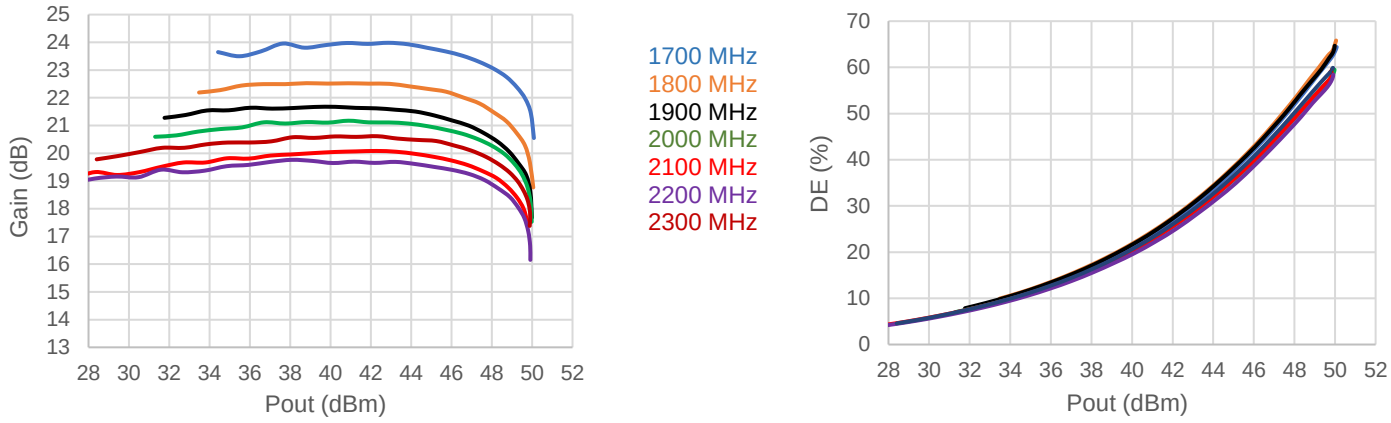
ELECTRICAL SPECIFICATIONS: T_A = 25°C

Parameter	Min.	Typ.	Max.	Units	Notes
Frequency Range	DC		3700	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		100		I_{DQ} (mA)	
Thermal Characteristics					
Thermal Resistance at Pave (1)		2.5		θ_{JC} (°C/W)	T_{case} = 85°C, T_{CH} = 143°C P_{diss} = 23.5W, P_{out} = 7.0W

(1) T_{case} is referred as temperature at the package back side. T_{CH} is modeled peak junction temperature based on 2.2GHz load pull RF performance at 10dB back off.

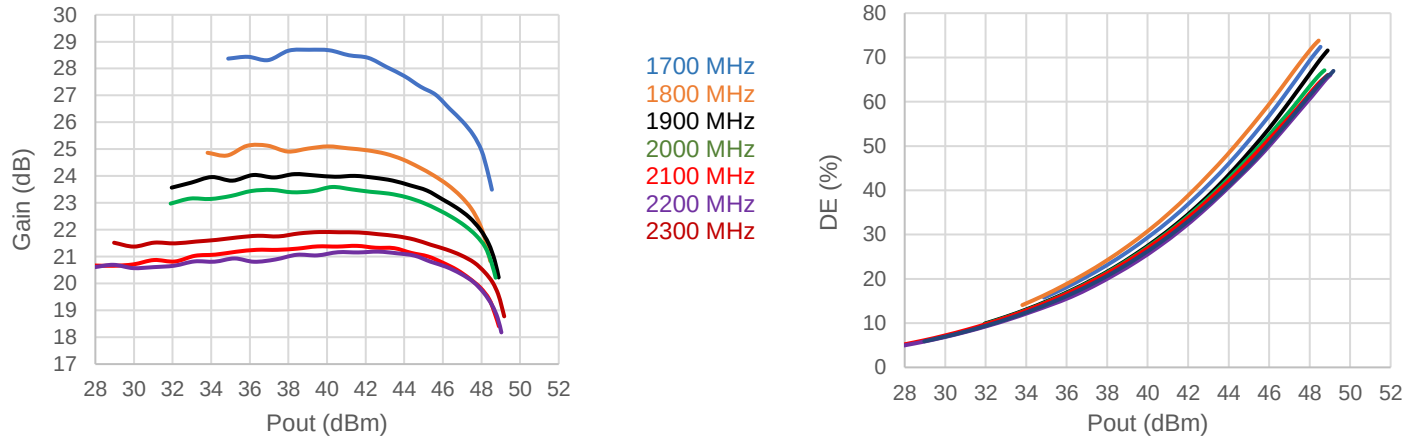
PERFORMANCE PLOTS: MAX POWER TUNED LOAD PULL

Test conditions: V_D = 50V, V_G = -2.72V, I_{DQ} = 100mA, T = +25°C, pulsed CW (10% duty cycle, 100µs width)



PERFORMANCE PLOTS: MAX EFFICIENCY TUNED LOAD PULL

Test conditions: V_D = 50V, V_G = -2.72V, I_{DQ} = 100mA, 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)
1700	0.8 – j4.3	8.5 + j2.9	50.1	64.4	20.5
1800	1.1 – j4.0	8.9 + j3.6	50.1	65.8	18.8
1900	1.3 – j3.6	9.1 + j3.9	49.9	63.8	18..2
2000	1.1 – j2.8	8.5 + j2.7	49.9	58.9	18.1
2100	1.2 – j1.6	8.0 + j2.5	49.9	58.6	17
2200	1.2 – j1.3	7.0 + j2.1	49.9	58.1	16.6
2300	0.9 – j1.3	6.3 + j3.0	49.9	59.9	17.7

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

LOAD PULL PERFORMANCE: MAX EFFICIENCY TUNED

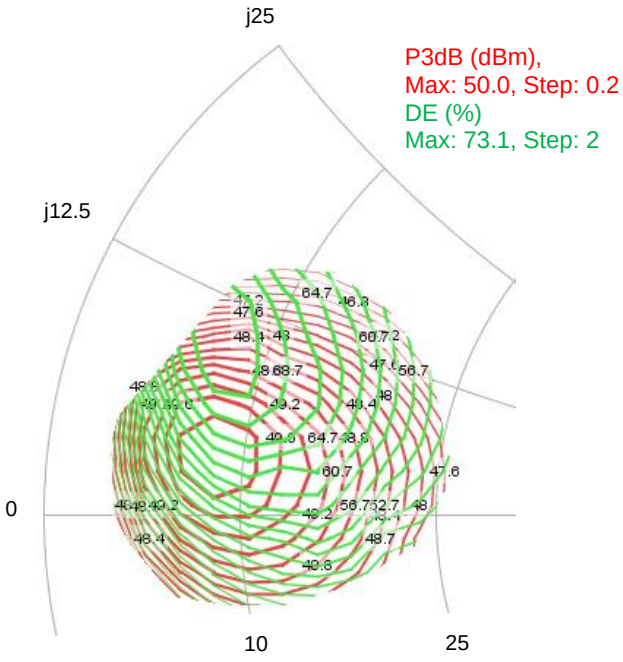
Frequency (MHz)	Source Impedance (Ω)	Load Impedance (Ω)	P3dB (dBm)	Drain Efficiency (%)	G3dB (dB)
1700	0.4 – j3.4	7.2 + j9.6	48.5	72.3	23.5
1800	0.7 – j3.2	7.5 + j10.5	48.3	73.1	21.3
1900	0.8 – j2.9	6.9 + j8.9	48.8	71.3	20.3
2000	0.7 – j2.0	6.7 + j8.6	48.7	67.3	20.3
2100	1.0 – j1.0	7.2 + j7.8	48.8	65.9	18.5
2200	0.9 – j0.6	6.4 + j6.8	48.9	65.9	18.2
2300	0.7 – j0.8	6.0 + j6.5	49.0	66.4	19.1

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

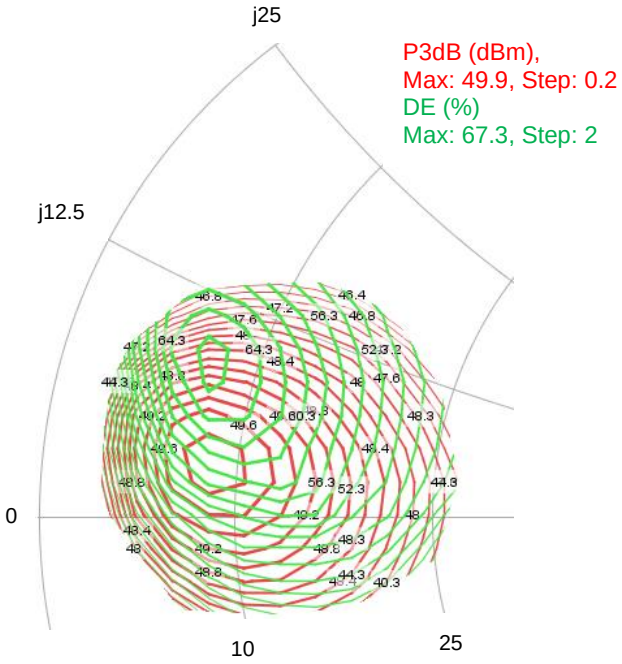
LOADPULL CONTOURS

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

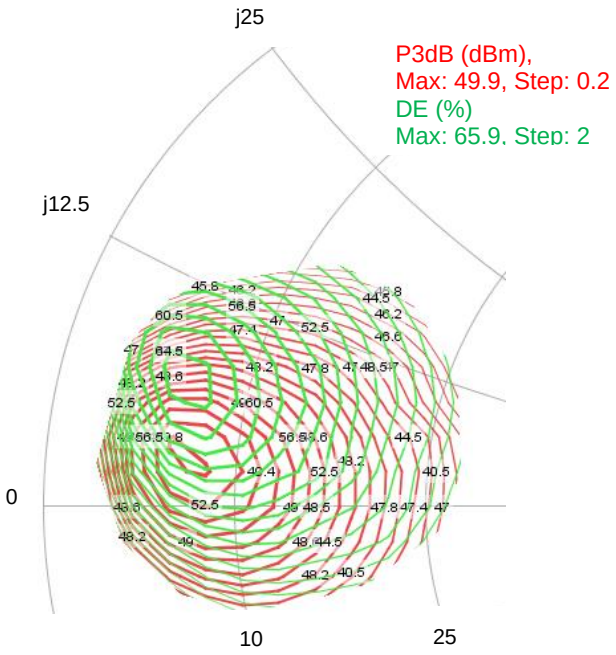
Contours at 1.8 GHz



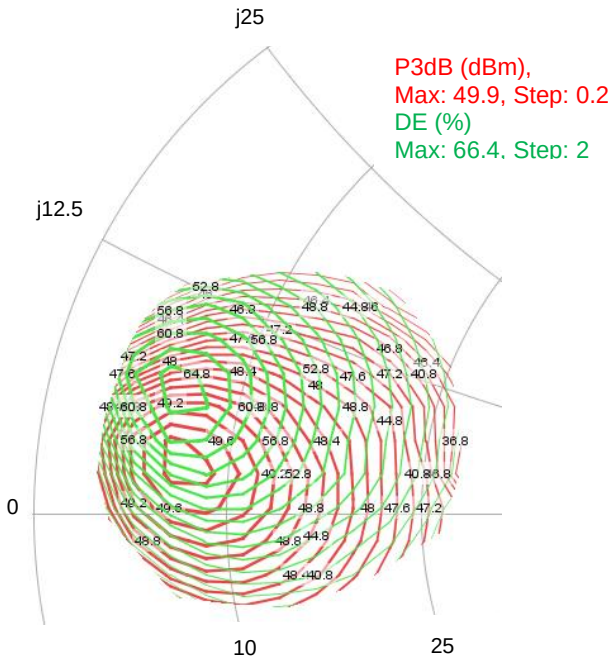
Contours at 2.0 GHz



Contours at 2.2 GHz



Contours at 2.3 GHz



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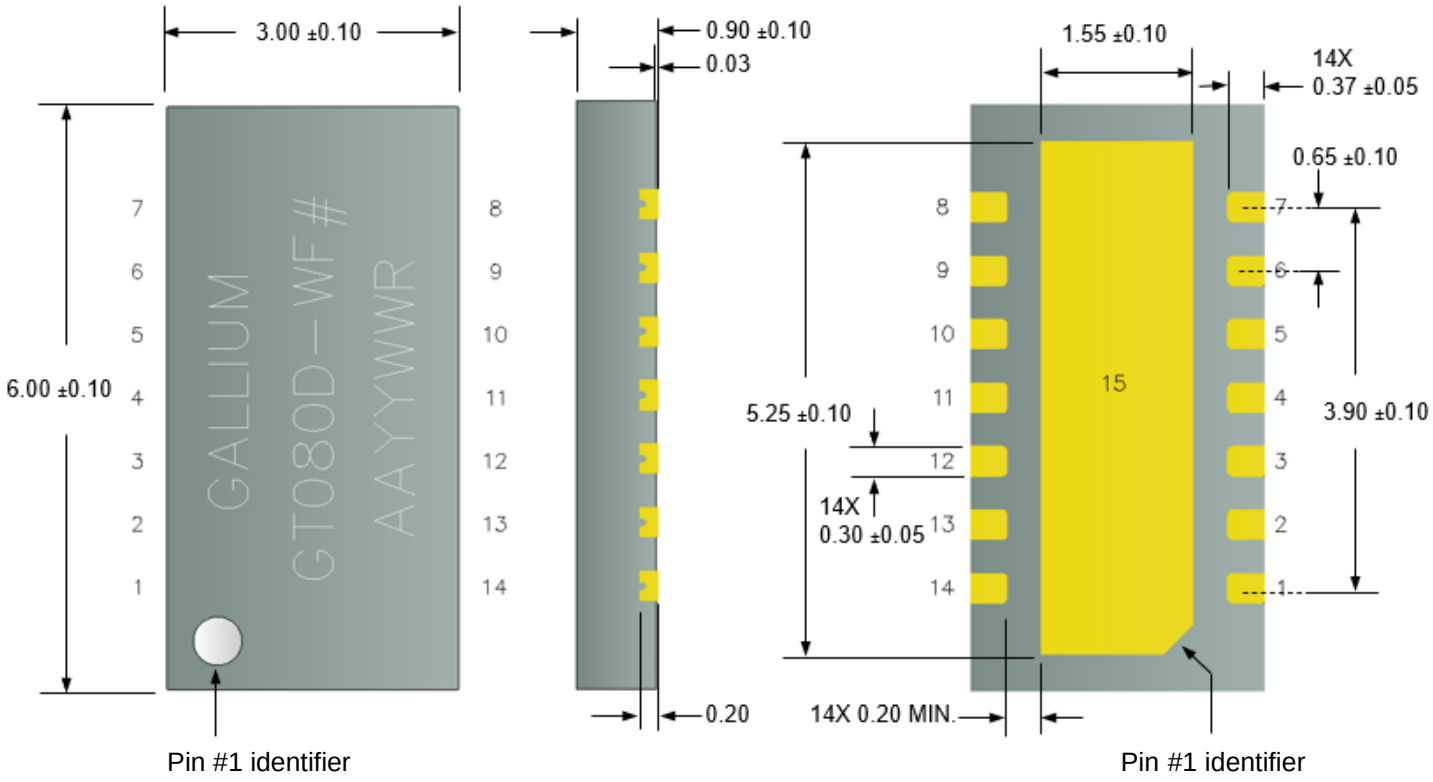
PACKAGE DIMENSIONS



Note: Dimension in mm

PIN CONFIGURATION

Pin	Input/Output
1	Not connected
2, 3, 4, 5, 6, 7	RF Input / Gate Voltage
8, 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 (100mA)
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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