GT010D 50V, DC – 8.0GHZ, 10W GAN HEMT

FEATURES

- Operating Frequency Range: DC to 8.0GHz
- Operating Drain Voltage: +50V
- Maximum Output Power (P_{SAT}): 15W
- Maximum Drain Efficiency: 64%
- Efficiency-Tuned P3dB Gain: 18.5dB
- Surface Mount Plastic Package

14 Pin 6x3 mm DFN Package

DESCRIPTION

The GT010D is a 10W (P3dB) unmatched discrete GaN-on-SiC HEMT which operates from DC to 8.0GHz on a 50V supply rail. The wide bandwidth of the GT010D makes it suitable for a variety of applications including cellular infrastructure, radar, communications, and test instrumentation, and can support both CW 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: POWER TUNED AT P3dB, T_A = 25°C

	3.4 GHz	3.6 GHz	3.8 GHz	Units
Gain	17	16.5	16	dB
Saturated Output Power	15	15	15	W
Drain Efficiency	56	58	55	%

V_D = 50V, I_{DQ} = 15mA

TYPICAL PERFORMANCE: EFFICIENCY TUNED AT P3dB, T_A = 25°C

	3.4 GHz	3.6 GHz	3.8 GHz	Units
Gain	18.5	17.5	17	dB
Saturated Output Power	11	11	11	W
Drain Efficiency	64	64	62	%

V_D = 50V, I_{DQ} = 15mA

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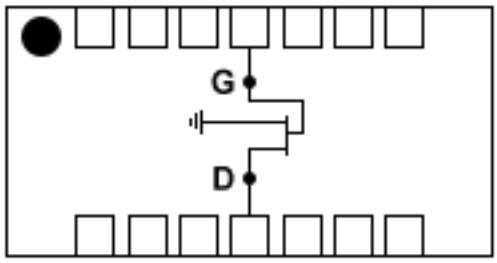
ABSOLUTE MAXIMUM RATINGS

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



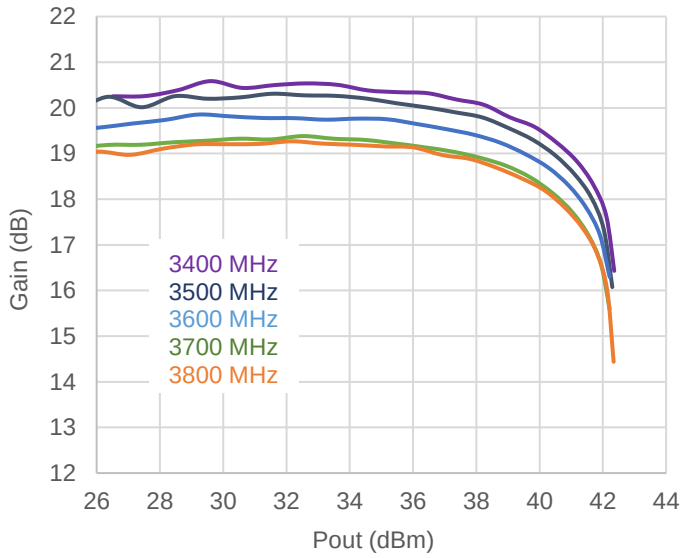
ELECTRICAL SPECIFICATIONS: T_A = 25°C

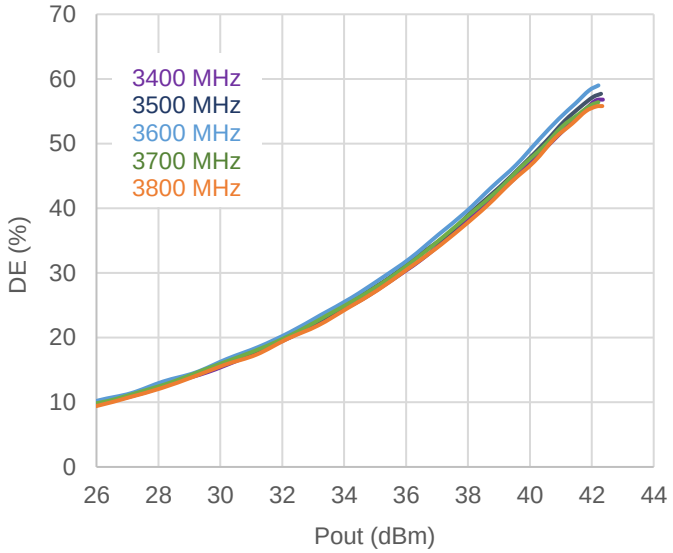
Parameter	Min.	Typ.	Max.	Units	Notes
Frequency Range	DC		8000	MHz	
DC Characteristics					
Drain Source Breakdown Voltage		>150		V_{DS} (V)	
Drain Source Leakage Current		0.16		I_{DS} (mA)	
Gate Threshold Voltage		-3.5 to -1.5		V_{GS} (V)	
Operating Conditions					
Gate Voltage		-2.5		V_G (V)	
Drain Voltage		50		V_D (V)	
Quiescent Drain Current		15		I_{DQ} (mA)	
Thermal Characteristics					
Thermal Resistance at Pave (1)		11.5		θ_{JC} (°C/W)	T_{case} = 85°C, T_{CH} = 128°C P_{diss} = 3.7W, P_{out} = 1.1W

(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

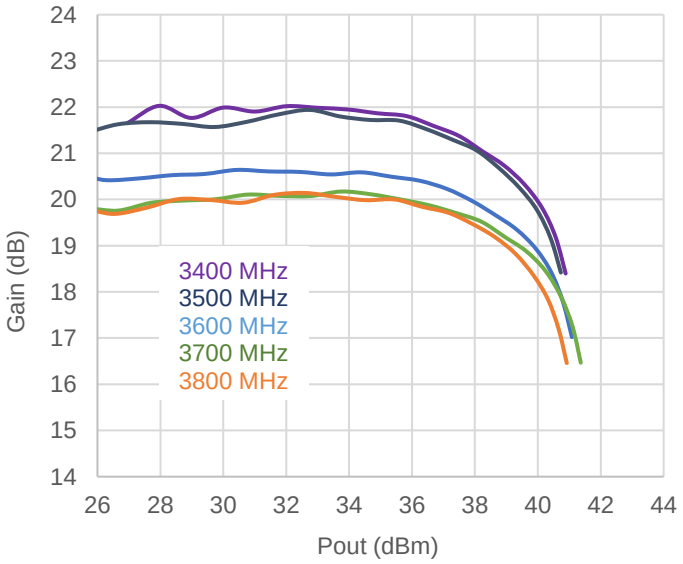
Test conditions: V_D = 50V, V_G = -2.70V, I_{DQ} = 16mA, T = +25°C, pulsed CW (10% duty cycle, 100µs width)

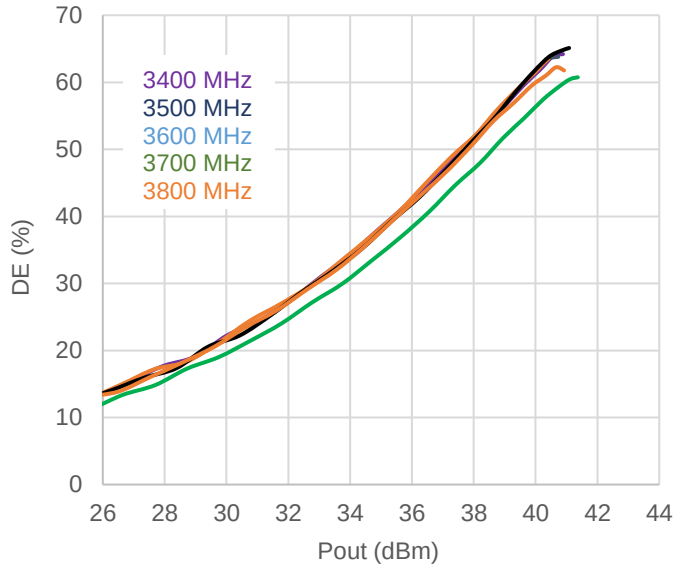




PERFORMANCE PLOTS: MAX EFFICIENCY TUNED LOAD PULL

Test conditions: V_D = 50V, V_G = -2.70V, I_{DQ} = 16mA, 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	2.9 – j4.7	30 + j24.4	42.2	56.7	17
3500	3.2 – j4.2	30.2 + j24.7	42.1	57.7	16.9
3600	3.3 – j4.1	28.6 + j24.8	42.2	58.9	16.4
3700	3.3 – j4.4	30 + j24.2	42.1	56.1	16.1
3800	3.4 – j4.3	29.7 + j20.1	42.2	55.7	15.9

Test conditions: V_D = +50V, I_{DQ} = 16mA, T = +25°C, pulsed CW (10% duty cycle, 100µs width). Harmonics not optimized

LOAD PULL PERFORMANCE: MAX EFFICIENCY TUNED

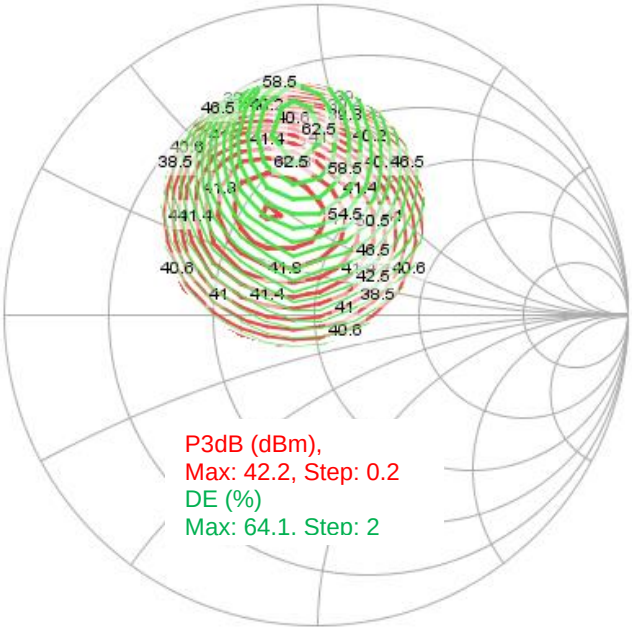
Frequency (MHz)	Source Impedance (Ω)	Load Impedance (Ω)	P3dB (dBm)	Drain Efficiency (%)	G3dB (dB)
3400	2.2 – j2.3	20.4 + j41.1	40.8	64.1	18.7
3500	2.3 – j2.2	19.1 + j39	40.7	63.8	18.6
3600	2.7 – j2.1	20.7 + j37.7	40.9	64.9	17.5
3700	2.9 – j3.0	22.5 + j34.6	41.2	60.6	16.9
3800	2.7 – j2.2	20 + j35.6	40.7	62.2	17.1

Test conditions: V_D = +50V, I_{DQ} = 16mA, T = +25°C, pulsed CW (10% duty cycle, 100µs width). Harmonics not optimized

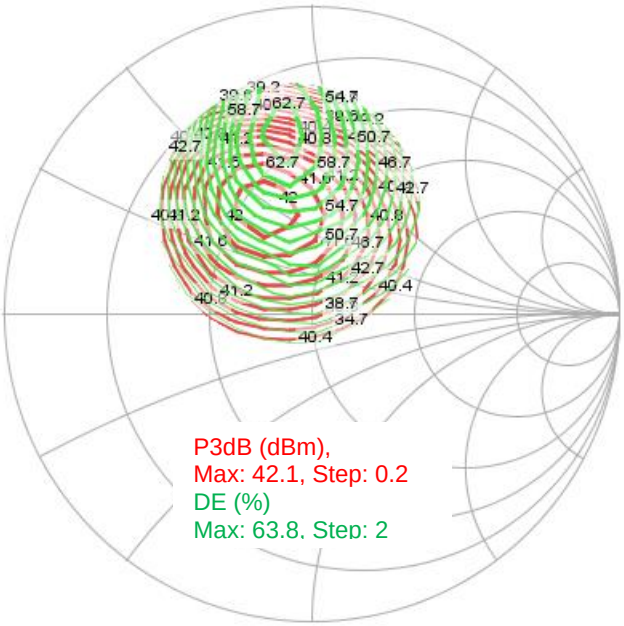
LOADPULL CONTOURS

Test conditions: V_D = +50V, I_{DQ} = 16mA, T = +25°C, pulsed CW (10% duty cycle, 100µs width). Harmonics not optimized

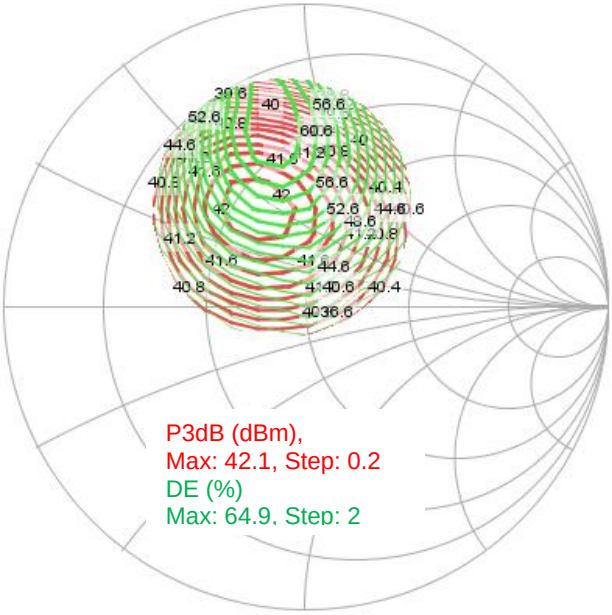
Contours at 3.4 GHz



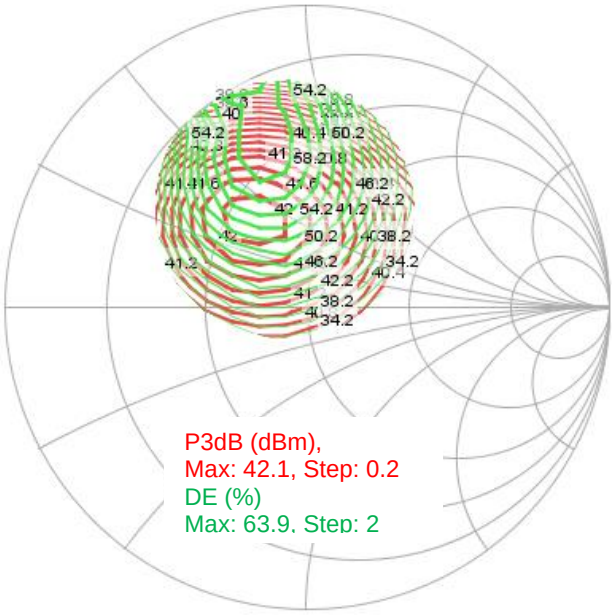
Contours at 3.5 GHz



Contours at 3.6 GHz



Contours at 3.8 GHz



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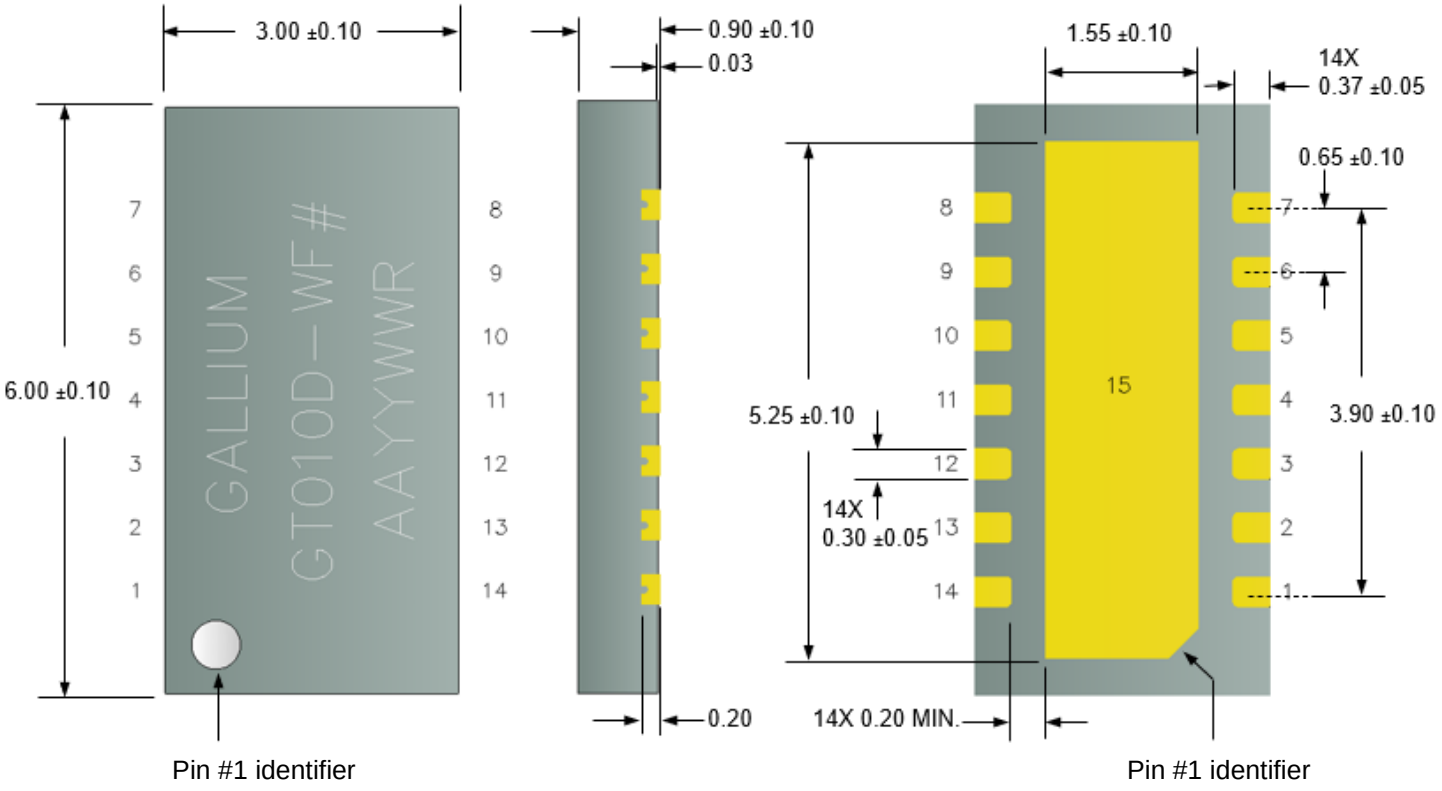
PACKAGE DIMENSIONS



Note: Dimension in mm

PIN CONFIGURATION

Pin	Input/Output
1, 2, 3	Not connected
4	RF Input / Gate Voltage
5, 6, 7, 8, 9, 10	Not connected
11	RF Output / Drain Voltage
12, 13, 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 (32mA)
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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