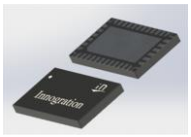
GaN HEMT 28V, 5.8GHz 8W, RF Power Transistor

GTAH58008C6



Description

The GTAH58008C6 is a 8W GaN HEMT, designed for multiple applications from HF up to 5.8GHz

The transistor is available in a highly cost effective 10*6mm, surface mount, QFN package with100% production test to ensure the quality and consistency.

It can be used in CW, Pulse and any other modulation modes.

- Typical 5.1-5.9G Class AB RF Performance

CW, Vds=28V, Idq=20mA

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
5100	39.64	9.20	51.86	14.50	40.92	12.36	56.86
5200	39.57	9.05	53.55	15.11	40.76	11.91	57.61
5300	39.49	8.89	54.52	15.45	40.48	11.17	56.91
5400	39.24	8.40	54.66	15.84	40.12	10.27	55.38
5500	39.07	8.07	54.54	16.03	40.04	10.10	56.57
5600	39.02	7.97	56.11	16.33	40.20	10.47	61.18
5700	38.84	7.66	57.85	16.57	39.97	9.94	62.05
5800	38.57	7.20	57.05	16.14	39.67	9.26	60.35
5900	38.51	7.09	54.14	14.95	39.49	8.89	56.67

- Typical 4.3-4.6G Class AB RF Performance

CW, Vds=28V, Idq=20mA

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
4390	38.58	7.2	50.2	11.66	40.2	10.5	55.8
4500	38.64	7.3	49.6	11.47	40.13	10.3	54.6
4610	38.52	7.1	49.7	12.64	40.01	10.0	54.4

Applications

- C band power amplifier
- ISM/RF Energy power amplifier

Important Note: Proper Biasing Sequence for GaN HEMT Transistors

Turning the device ON

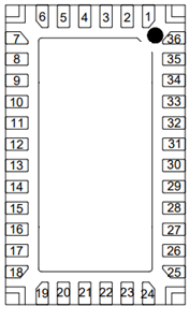
1. Set VGS to the pinch--off (VP) voltage, typically –5 V
2. Turn on VDS to nominal supply voltage
3. Increase VGS until IDS current is attained
4. Apply RF input power to desired level

Turning the device OFF

1. Turn RF power off
2. Reduce VGS down to VP, typically –5 V
3. Reduce VDS down to 0 V
4. Turn off VGS

Figure 1: Pin Connection definition

Transparent top view (Backside grounding for source)



Pin No.	Symbol	Description
8,9,10,11	RF IN/Vgs	RF Input, Vgs bias
32,33,34,35	RF OUT/VDD	RFOutput, Drain bias
Rest Pins and Package Base	GND	DC/RF Ground. Must be soldered directly to heatsink or copper coin for CW application.

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DSS}	+150	Vdc
Gate--Source Voltage	V_{GS}	-8 to +0.5	Vdc
Operating Voltage	V_{DD}	36	Vdc
Maximum gate current	Igs	2	mA
Storage Temperature Range	Tstg	-65 to +150	°C
Case Operating Temperature	T_C	+150	°C
Operating Junction Temperature	T_J	+225	°C

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case by FEA T_C= 85°C, at Pdiss=7W	$R_{\theta JC}$	10	°C /W

Table 3. Electrical Characteristics (TA = 25℃ unless otherwise noted)

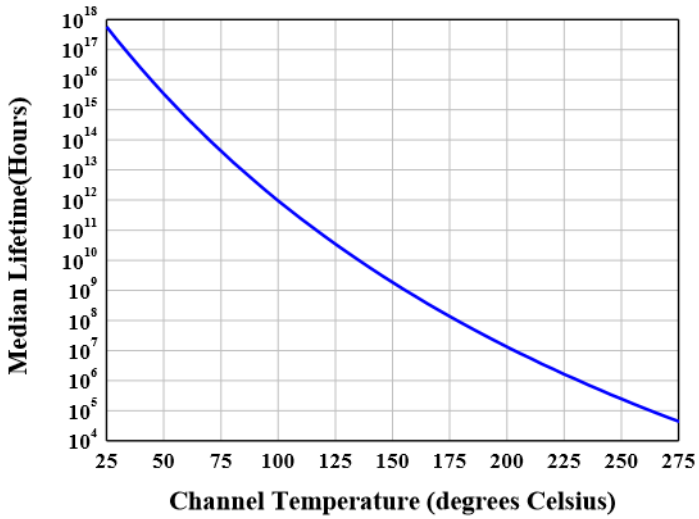
DC Characteristics (main path, measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=2mA	V_{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 2mA	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	VDS =28V, IDS=20mA, Measured in Functional Test	$V_{GS(Q)}$		-2.6		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	5.8GHz, Pout=8W Pulsed CW All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature



5.1-5.9G

Typical performance

Figure 3: Efficiency and power gain as function of Pout

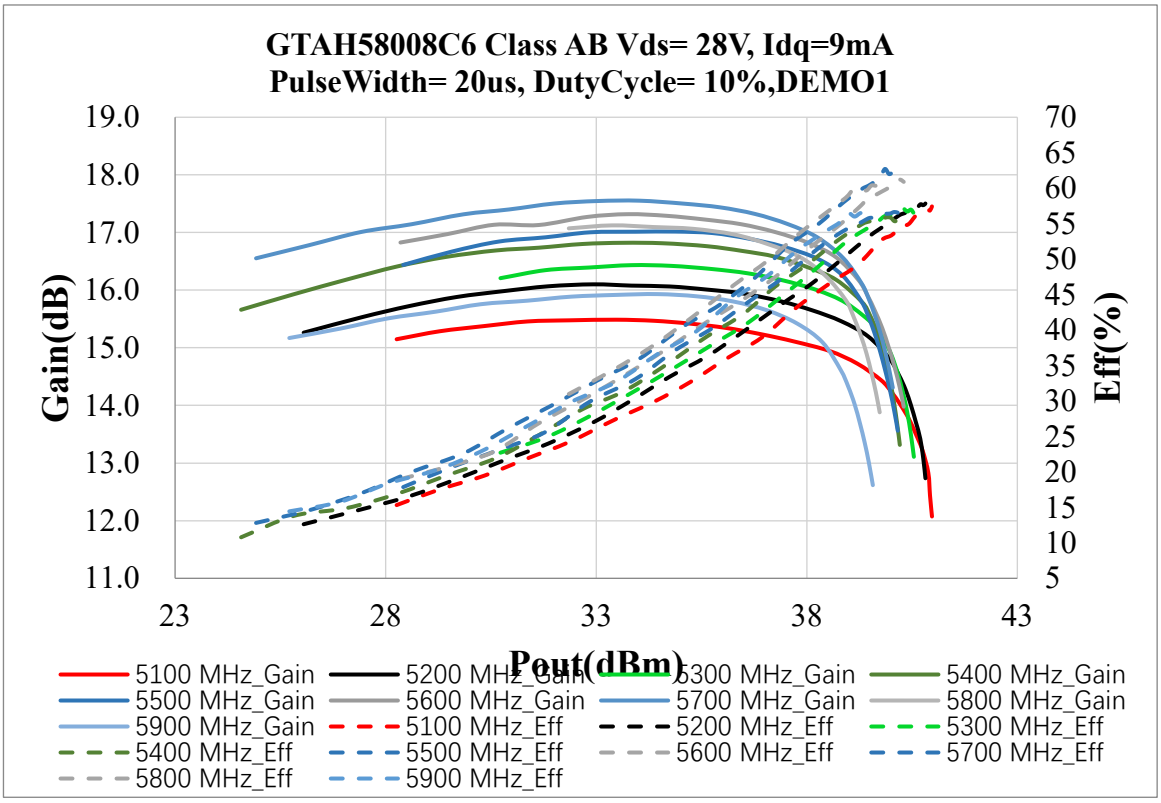


Figure 4: Network analyzer output S11/S21

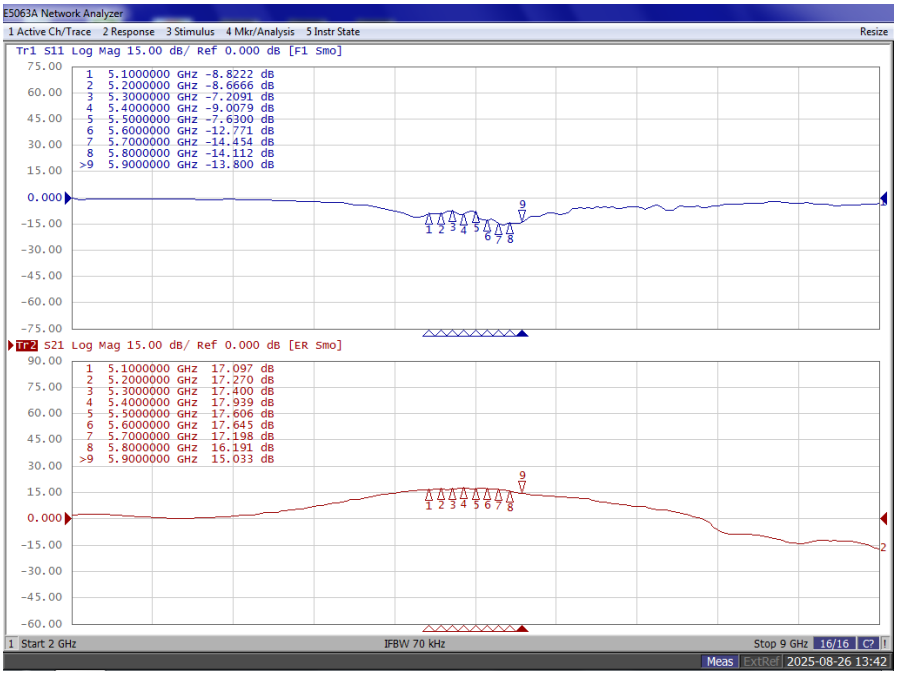


Figure 5: Picture of application board

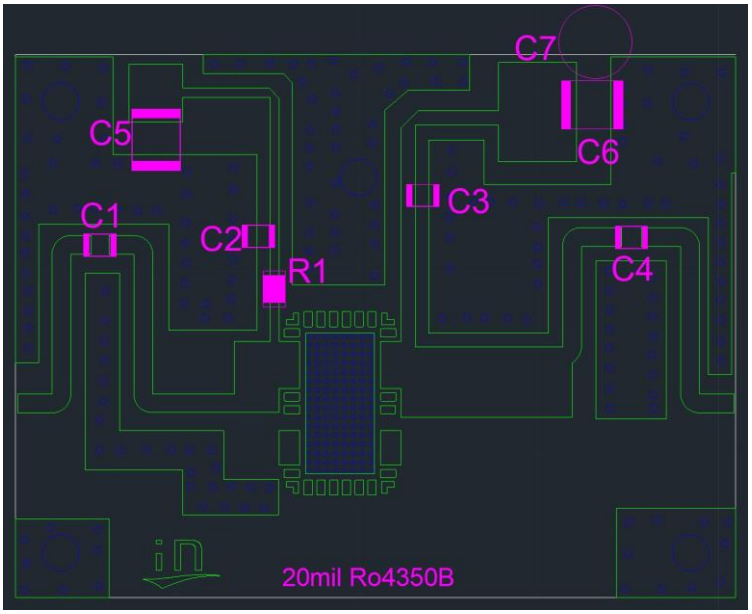


Table 4. Bill of materials of application board (PCB layout upon request, RO4350B 20mils)

Component	Value	Quantity
U1	GTAH58008C6	1
C1、C2、C3、C4	3.3pF	4
C5、C6	10uF/63V	2
C7	470uF/63V	1
R1	10Ω	1

4.3-4.6G

Typical performance

Figure 6: Efficiency and power gain as function of Pout

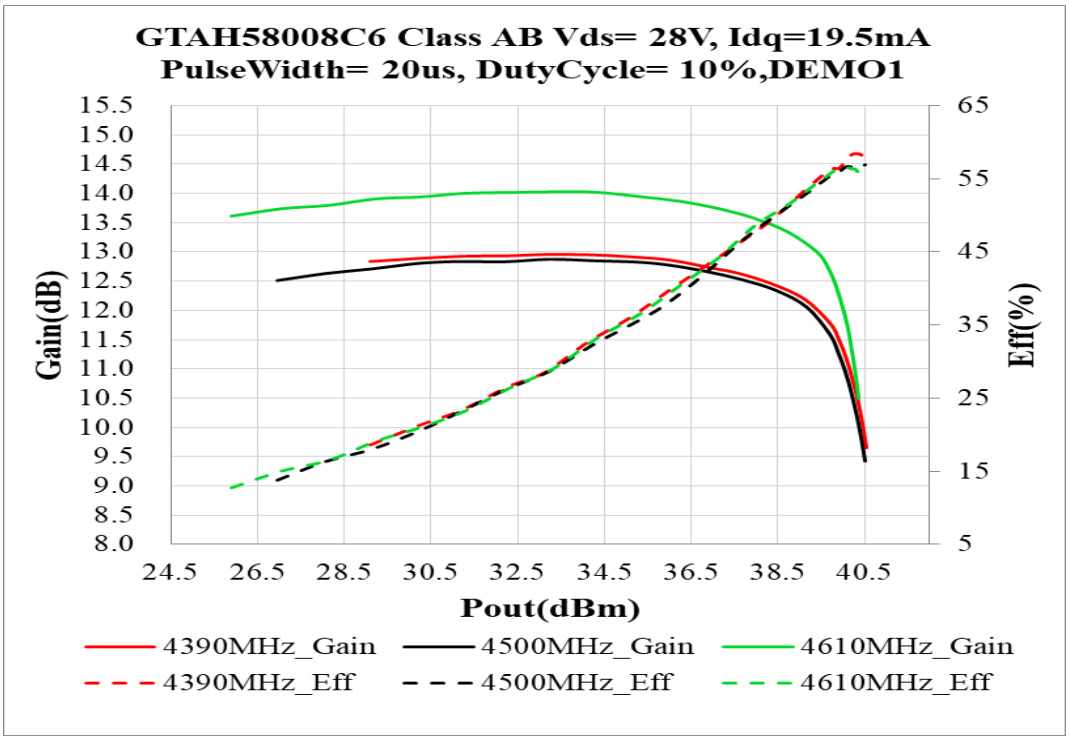


Figure 7: Network analyzer output S11/S21

Figure 8: Picture of application board

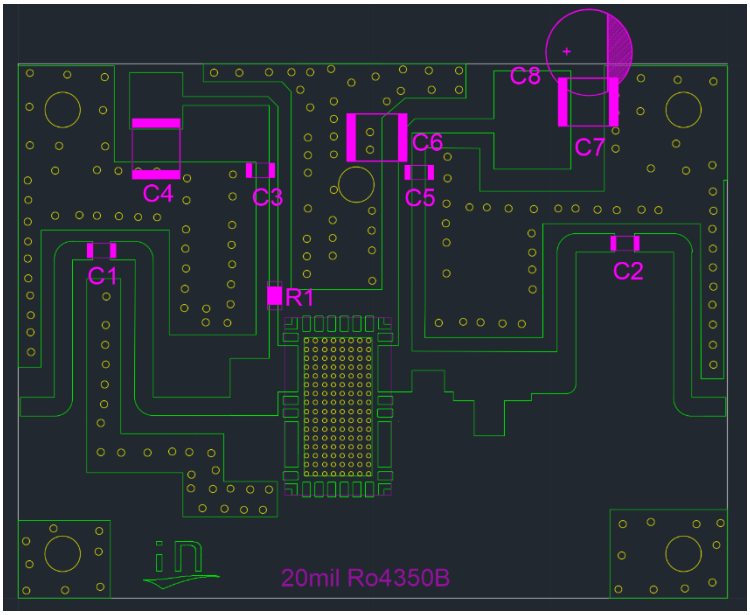
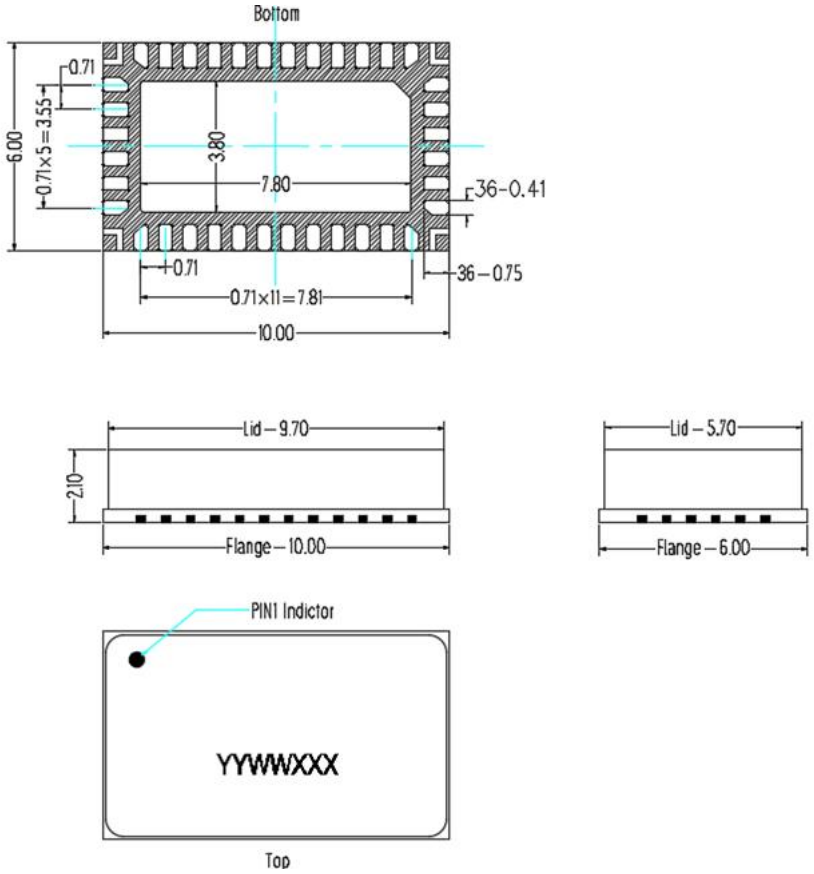


Table 5. Bill of materials of application board (PCB layout upon request, RO4350B 20mils)

Reference	Footprint	Value
C1,C2,C3,C5	0603	3.9 pF
C4,C6,C7	1210	10 uF/63V
C8	\	470 uF/63V
R1	0603	10 ohm
U1	C6	GTAH58008C6

10*6 Plastic Package



Notes:

1. All dimensions are in mm;
2. The tolerances unless specified are ±0.2mm.

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2024/5/14	**V1.0**	**Preliminary Datasheet Creation**
2025/6/13	**V1.1**	**Add 4.3-4.6G data**
2025/8/26	**V1.2**	**Modify S11/S21 curve with increased Idq**

Application data based on: CWZ-24-09/25-06

Notice

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