



GaN HEMT 28V, 5.8GHz 18W, RF Power Transistor

Description

The GTAH58018C6 is a 18W GaN HEMT, designed for ISM/RF Energy application at 5.8GHz. The transistor is available in a highly cost effective 10*6mm, surface mount, QFN package with 100% production test to ensure the quality and consistency.

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

There is no guarantee of performance when this part is used in applications designed outside of these frequencies.

- Typical Class AB RF Performance with device soldered through high density and plated grounding vias

$V_{ds} = 28V$, $I_{dq} = 35mA$, $V_{gs} = -2.54V$

Pulsed CW, 100us, 10%

GTAH58018C6



Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff (%)	P1dB Gain (dB)	P3dB (dBm)	P3dB (W)	P3dB Eff (%)
5100	42.72	18.70	55.41	16.97	43.32	21.48	58.83
5200	42.25	16.79	55.61	18.78	43.16	20.71	60.05
5300	41.53	14.21	53.32	19.43	43.01	20.02	60.79
5400	41.10	12.89	50.18	18.94	42.86	19.34	58.51
5500	41.01	12.61	49.56	18.40	42.88	19.42	58.17
5600	41.20	13.19	50.87	17.83	43.05	20.20	59.27
5700	41.16	13.07	49.77	17.20	42.96	19.79	57.94
5800	40.93	12.38	49.65	16.56	42.76	18.88	57.85
5900	40.72	11.80	49.85	15.44	42.75	18.83	58.75

CW

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff (%)	P1dB Gain (dB)	P3dB (dBm)	P3dB (W)	P3dB Eff (%)
5100	42.42	17.48	53.87	16.53	43.06	20.22	57.53
5200	41.70	14.79	52.64	18.29	42.81	19.11	58.29
5300	40.95	12.45	50.74	18.78	42.66	18.43	58.80
5400	40.30	10.70	46.72	18.45	42.45	17.57	56.58
5500	40.16	10.39	46.04	17.78	42.48	17.70	56.19
5600	40.26	10.63	46.56	17.12	42.66	18.45	57.03
5700	40.31	10.75	45.93	16.47	42.59	18.13	55.39
5800	40.06	10.13	45.43	15.84	42.45	17.59	55.36
5900	40.03	10.06	45.91	14.74	42.50	17.77	56.00

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

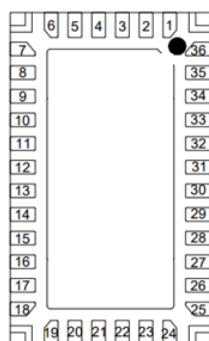
Turning the device OFF

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	RF Output, 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_{DS}	+150	Vdc
Gate--Source Voltage	V_{GS}	-8 to +0.5	Vdc
Operating Voltage	V_{DD}	36	Vdc
Maximum gate current	I_{GS}	4.5	mA
Storage Temperature Range	T_{stg}	-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 $T_C = 85^\circ\text{C}$, at $P_{diss} = 12\text{W}$	$R_{\theta JC}$	7	°C /W

Table 3. Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

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

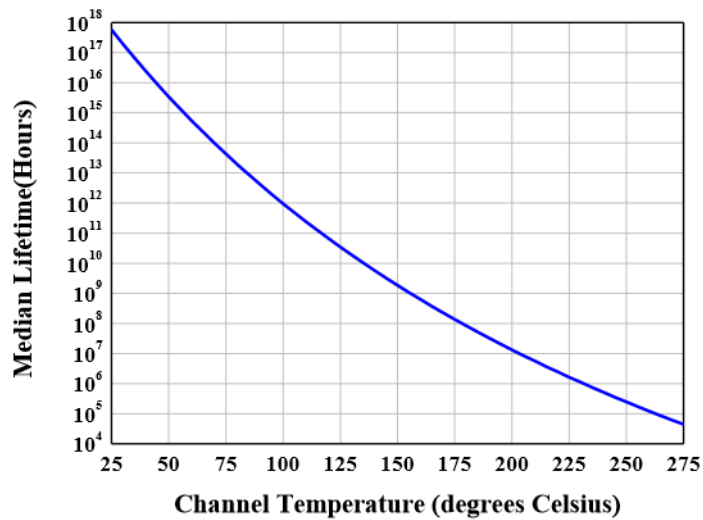
Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = -8\text{V}$; $I_{DS} = 4.5\text{mA}$	V_{DSS}		200		V
Gate Threshold Voltage	$V_{DS} = 10\text{V}$, $I_D = 4.5\text{mA}$	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	$V_{DS} = 28\text{V}$, $I_{DS} = 30\text{mA}$, Measured in Functional Test	$V_{GS(Q)}$		-2.5		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	5.8GHz, $P_{out} = 18\text{W}$ Pulsed CW All phase, No device damages	VSWR		10:1		



Figure 2: Median Lifetime vs. Channel Temperature



Typical performance

Figure 3: Network analyzer output S11/S21

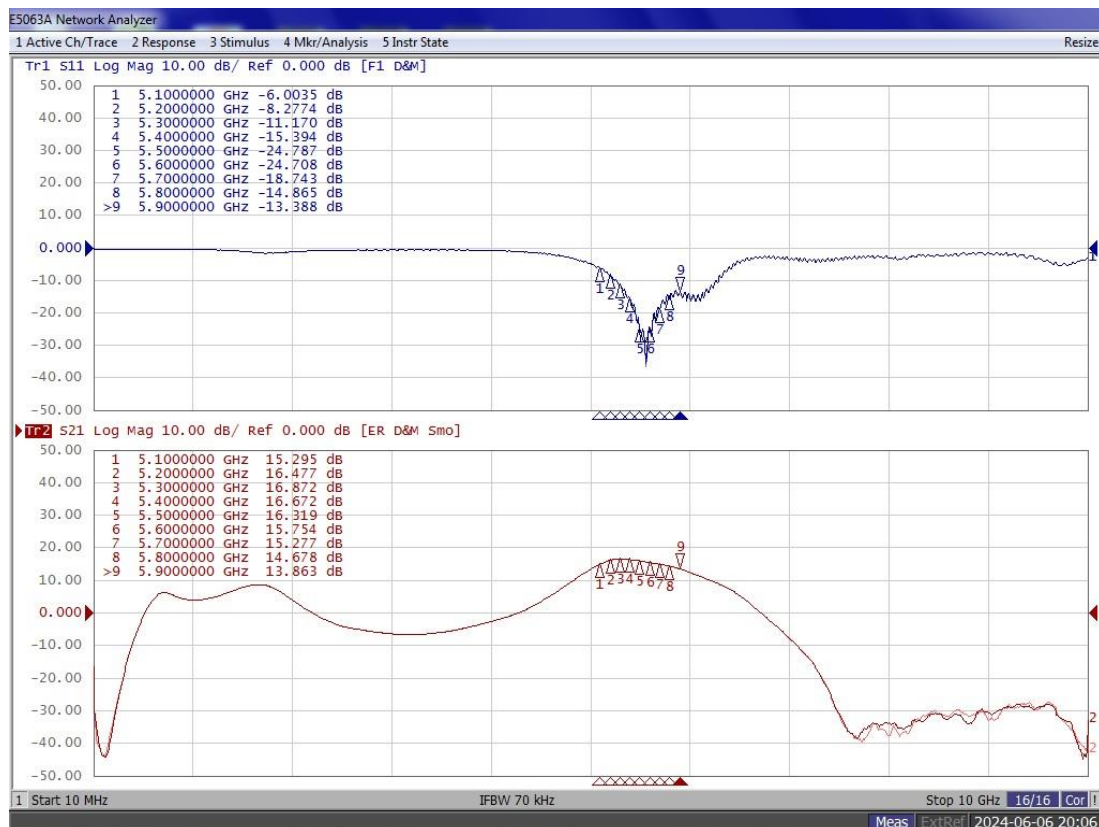
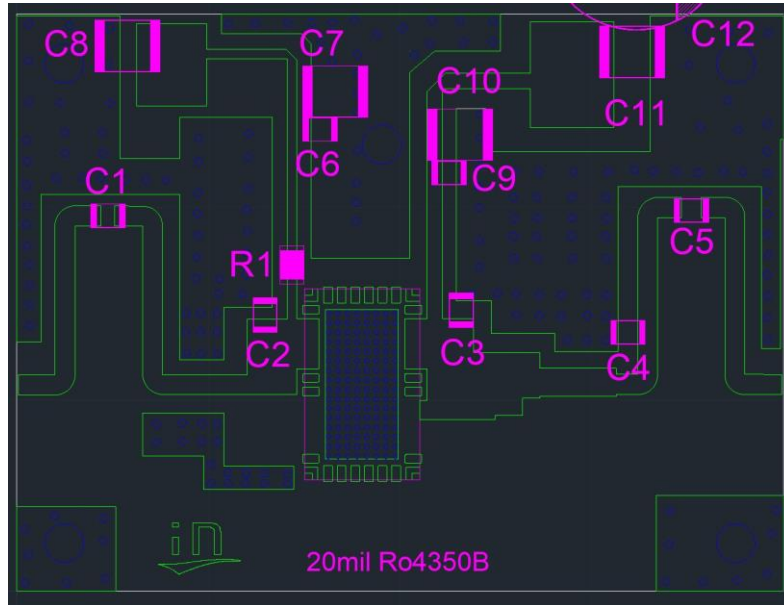




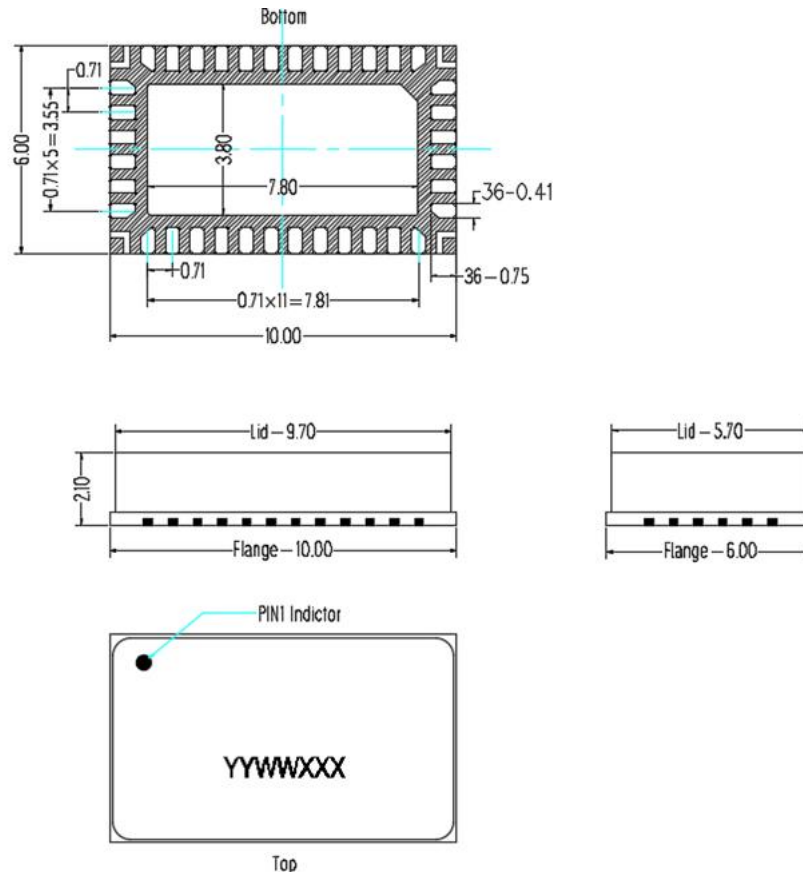
Table 4. Bill of materials of application board (PCB layout upon request, RO4350B 20mils)



Component	Value	Quantity
U1	GTAH58018C6	1
C1	1.2pF	1
C2、C3、C4	0.3pF	3
C5、C6、C9	3.9pF	3
C7、C8、C10、C11	10uF/63V	4
C12	470uF/63V	1
R1	10 Ω	1



10*6 Plastic Package



Notes:

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

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2024/1/4	V1.0	Preliminary Datasheet Creation
2024/6/7	V1.1	Change application data from 5.3-5.9GHz to 5.1-5.9GHz
2024/9/6	V1.2	Correct the typo of pin definition on figure 1

Application data based on: ZYX-24-01/CWZ-24-10

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