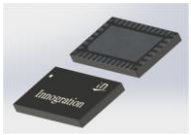
GaN 28V, 30W, HF to S band RF Power Transistor

YTAH30032C6



Description

The YTAH30032C6 is a 30W GaN HEMT, designed for multiple applications, up to 3GHz.

The transistor is available in a highly cost effective 10*6mm, surface mount, QFN package with 100% DC 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 2-3G CW RF Performance with device soldered through high density and plated grounding vias

Vds=28V, Idq=100mA

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
2000	43.98	25.02	59.31	13.76	45.33	34.13	66.17
2100	43.77	23.82	57.72	13.82	44.95	31.26	62.26
2200	43.95	24.85	55.75	13.67	45.18	32.98	60.31
2300	44.02	25.24	53.66	13.39	45.38	34.50	59.00
2400	44.17	26.10	54.02	13.19	45.54	35.82	60.19
2500	44.06	25.49	52.74	13.41	45.51	35.56	59.70
2600	44.28	26.79	55.01	13.78	45.73	37.42	62.41
2700	44.35	27.21	57.61	13.99	45.74	37.50	64.63
2800	44.96	31.34	60.68	13.91	46.06	40.32	65.64
2900	44.49	28.13	61.59	14.22	45.57	36.08	66.44
3000	43.88	24.41	61.01	14.35	44.97	31.37	65.15

- Typical 1-2G CW RF Performance with device soldered through high density and plated grounding vias

Vds=28V, Idq=100mA

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
1000	44.05	25.40	64.25	17.47	44.91	31.01	66.47
1100	43.90	24.56	57.35	17.30	44.99	31.53	60.74
1200	45.03	31.82	55.52	16.36	46.37	43.30	63.43
1300	46.13	41.03	67.24	16.83	47.01	50.21	73.80
1400	45.74	37.49	67.66	17.41	46.65	46.28	74.63
1500	44.06	25.45	55.15	17.04	45.63	36.53	65.75
1600	44.48	28.06	64.73	18.42	45.44	35.03	69.67
1700	44.61	28.90	67.57	18.16	45.51	35.58	71.67
1800	44.76	29.93	67.20	18.00	45.69	37.03	71.82
1900	44.94	31.20	66.30	18.01	45.90	38.88	70.20
2000	44.73	29.71	62.42	16.65	45.60	36.34	65.43

Applications

- HF to UHF band power amplifier
- L band power amplifier
- S band power amplifier
- ISM/RF Energy power amplifier

Important Note: Proper Biasing Sequence for GaN HEMT Transistors

Turning the device ON

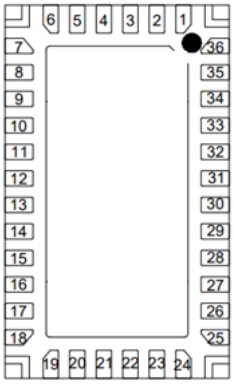
1. Set VGS to the pinch--off (VP) voltage, typically –5 V
2. Turn on VDS to nominal supply voltage
3. Increase VGS until IDS current is attained
4. Apply RF input power to desired level

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
8,9,10,11,14,15,16,17	RF IN/Vgs	RF Input, Vgs bias
26,27,28,29,32,33,34,35	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}	+200	Vdc
Gate--Source Voltage	V_{GS}	-8 to +0.5	Vdc
Operating Voltage	V_{DD}	36	Vdc
Maximum gate current	Igs	10	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=15W	$R_{\theta JC}$	6	°C /W

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

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

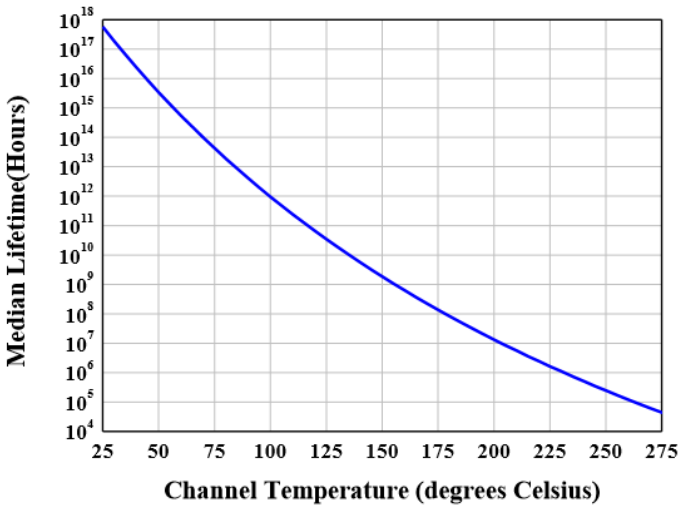
Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=8mA	V_{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 8mA	$V_{GS(th)}$	-4		-2	V

Gate Quiescent Voltage	VDS =28V, IDS=100mA, Measured in Functional Test	$V_{GS(Q)}$		-2.75		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	1.6GHz, Pout=30W Pulsed CW All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature



2-3GHz

Typical performance

Figure 3: Efficiency and power gain as function of Pout

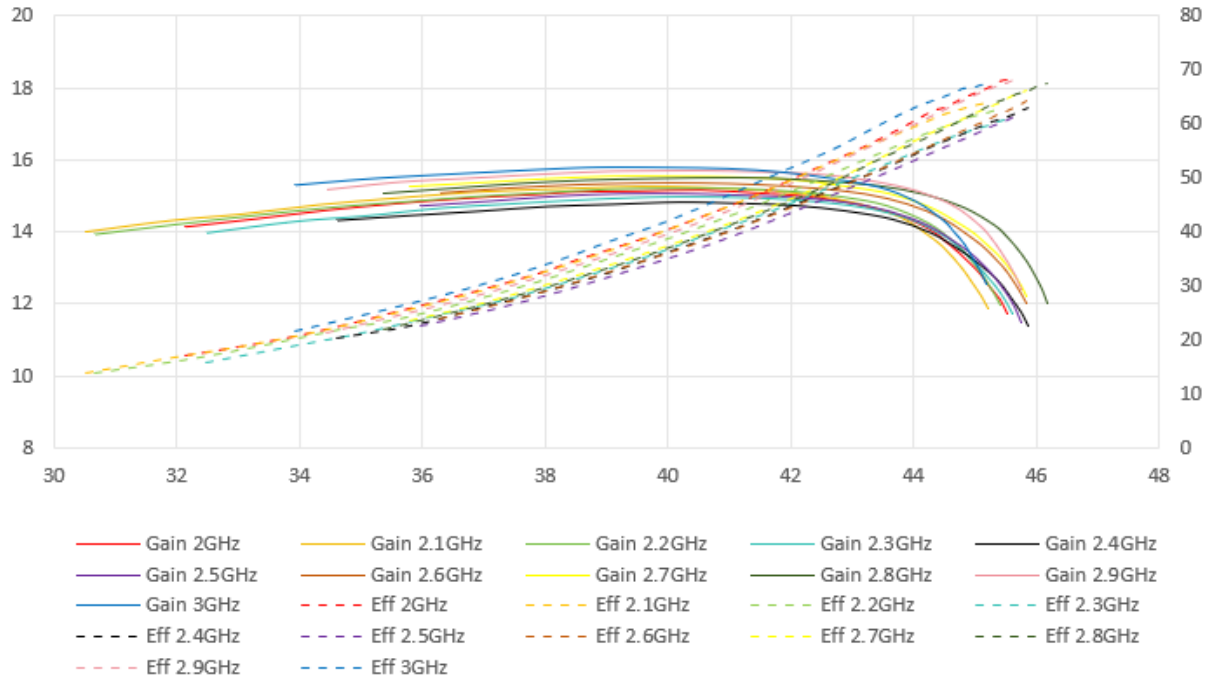


Figure 4: Picture of application board

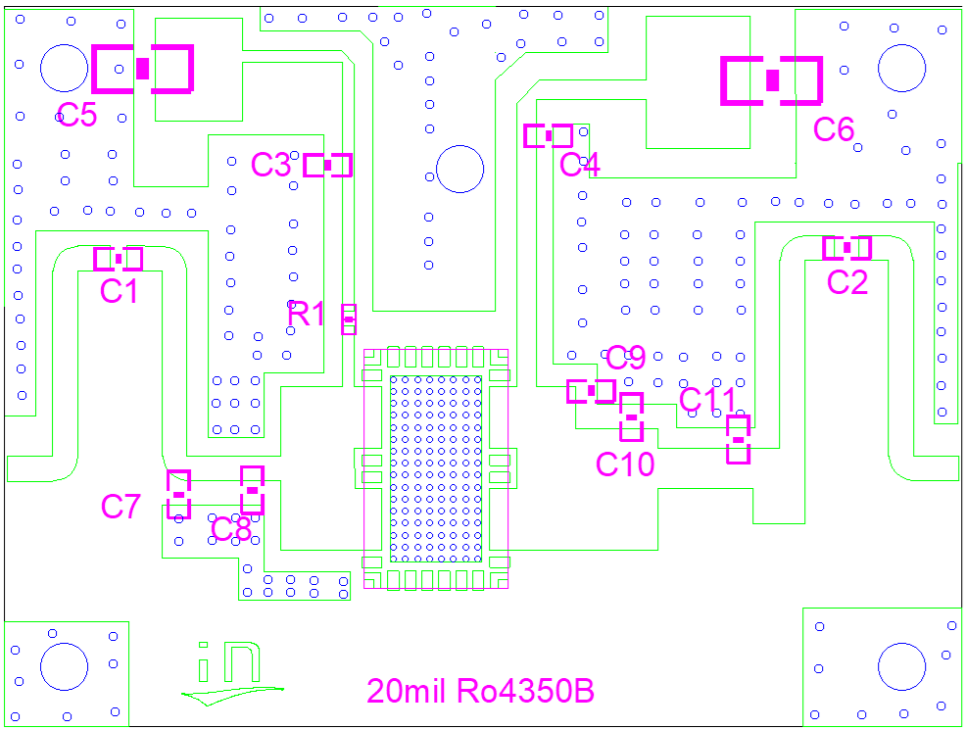


Table 4. Bill of materials of application board (PCB layout upon request, RO4350B 20mils)

C1	1	8.2pFHigh Q Capacitor	251SHS8R2BSE	TEMEX
C2,C3	2	18pFHigh Q Capacitor	251SHS180BSE	TEMEX
C4	1	2.2pFHigh Q Capacitor	251SHS2R2BSE	TEMEX
C7	1	0.7pFHigh Q Capacitor	251SHS0R7BSE	TEMEX
C8	1	0.9pFHigh Q Capacitor	251SHS0R9BSE	TEMEX
C9	1	0.4pFHigh Q Capacitor	251SHS0R4BSE	TEMEX
C10	1	0.8pFHigh Q Capacitor	251SHS0R8BSE	TEMEX
C11	1	1.2pFHigh Q Capacitor	251SHS1R2BSE	TEMEX
R1	1	10Ω Power Resistor	ESR03EZPF100	ROHM
C5,C6	2	10uF MLCC	GRM32EC72A106ME05	Murata
T1	1	GaN Transistor	YTAH30032C6	Innogration

1-2GHz

Typical performance

Figure 5: Efficiency and power gain as function of Pout

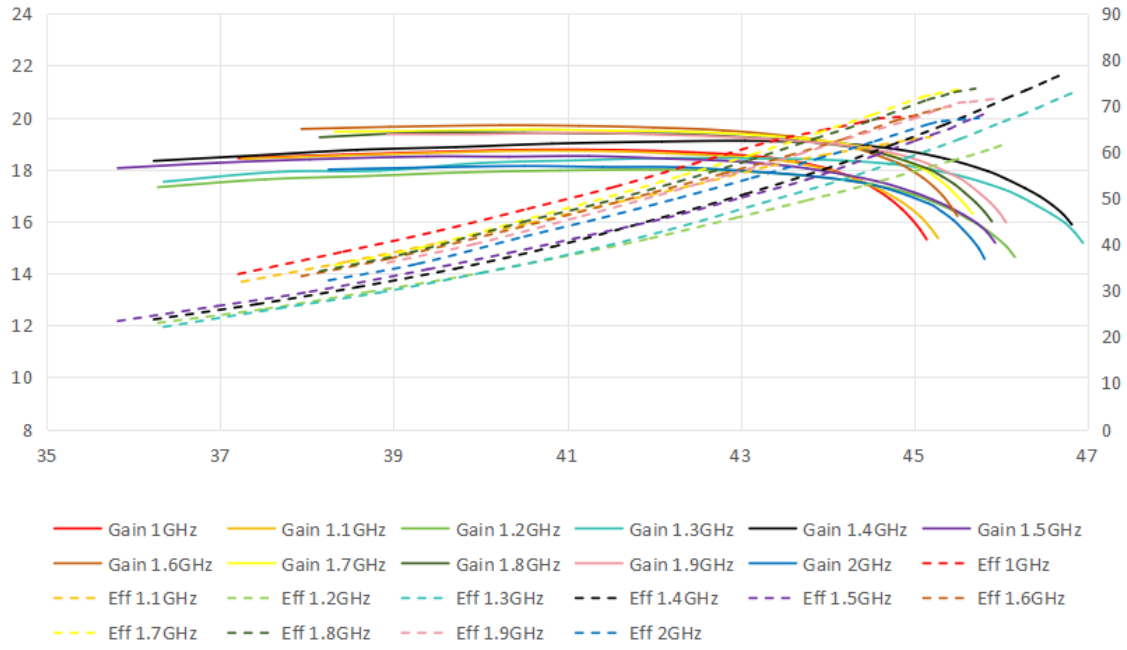


Figure 6: Picture of application board

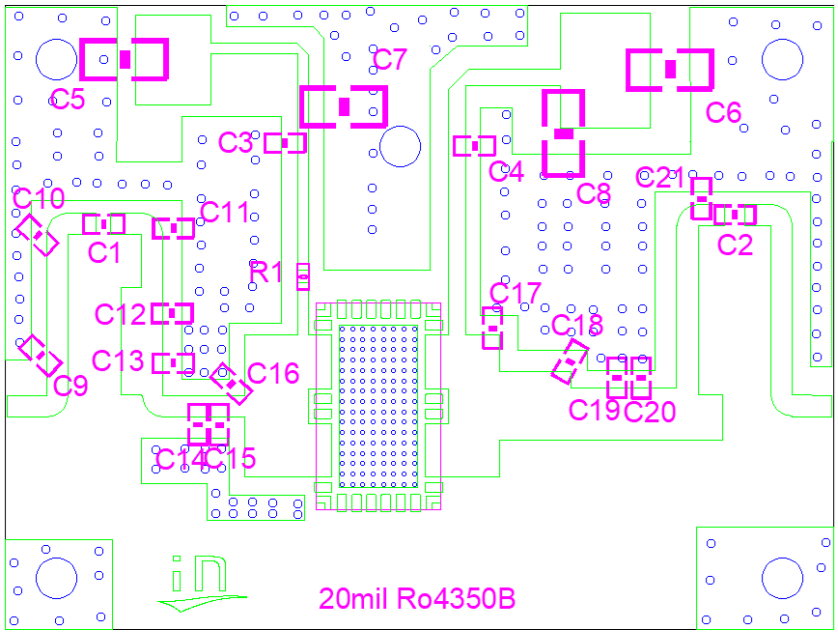
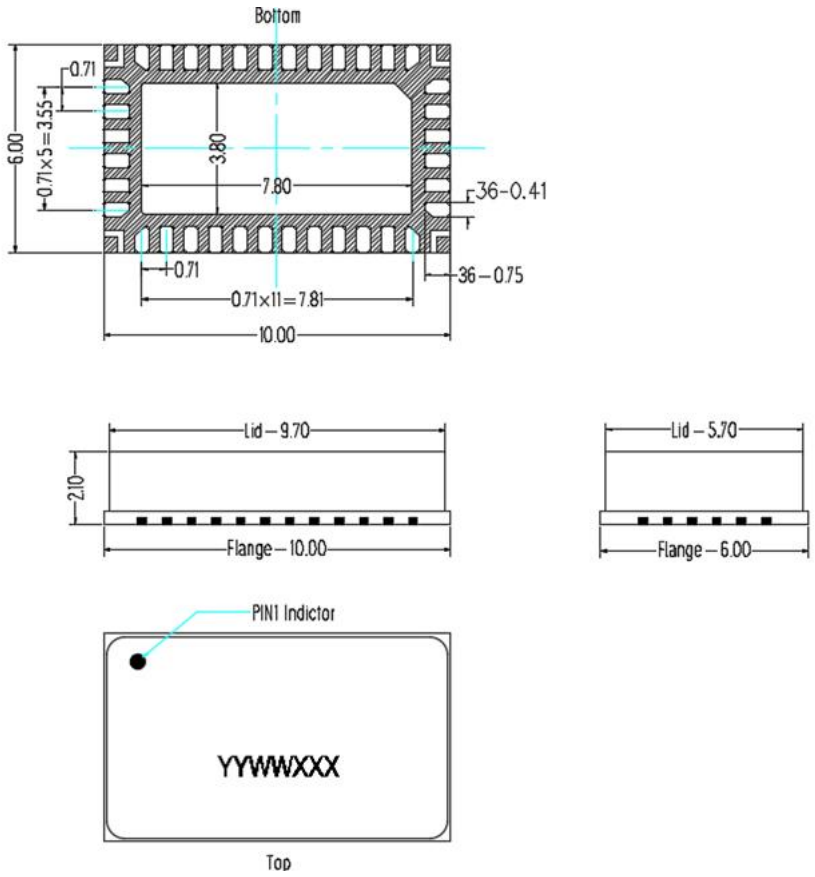


Table 5. Bill of materials of application board (PCB layout upon request, RO4350B 20mils)

C1,C3,C4	3	30pFHigh Q Capacitor	251SHS8R2BSE	TEMEX
C2	1	20pFHigh Q Capacitor	251SHS180BSE	TEMEX

C9,C10	2	0.3pFHigh Q Capacitor	251SHS0R3BSE	TEMEX
C11,C12,C13	3	0.4pFHigh Q Capacitor	251SHS0R4BSE	TEMEX
C14	1	2.4pFHigh Q Capacitor	251SHS2R4BSE	TEMEX
C15	1	1.0pFHigh Q Capacitor	251SHS1R0BSE	TEMEX
C16,C17,C18	3	0.6pFHigh Q Capacitor	251SHS0R6BSE	TEMEX
C19	1	3.3pFHigh Q Capacitor	251SHS3R3BSE	TEMEX
C20	1	0.2pFHigh Q Capacitor	251SHS0R2BSE	TEMEX
C21	1	1.5pFHigh Q Capacitor	251SHS1R5BSE	TEMEX
R1	1	10Ω Power Resistor	ESR03EZPF100	ROHM
C5,C6,C7,C8	4	10uF MLCC	GRM32EC72A106ME05	Murata
T1	1	GaN Transistor	YTAH30032C6	Innogration

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
2026/1/19	**V1.0**	**Preliminary Datasheet Creation**

Application data based on: HZH-26-01/02

Notice

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