GaN 28V 100W,S band RF Power Transistor

XTAH35101A2C

Description

The XTAH35101A2C is a 100W internally matched, GaN HEMT, designed from 3 to 4.0GHz, especially 5G NR or LTE application, as well as either Pulse or CW application There is no guarantee of performance when this part is used in applications designed Outside of these frequencies.

- Typical performance (on narrow band fixture with device soldered)

V_{DD}=28V I_{DQ}=100mA, CW，3.6-3.8GHz fixture 1

Freq	P1	P3	P3	EFF	Gp1
(MHz)	(dBm)	(dBm)	W	%	(dB)
3600	50.14	50.95	124.50	63.50	13.36
3700	49.88	50.83	121.06	63.58	13.43
3800	49.90	50.82	120.78	65.74	13.29

V_{DD}=28V I_{DQ}=100mA, CW，3.3-3.6GHz fixture 2

Freq	P1	P3	P3	EFF	Gp1
(MHz)	(dBm)	(dBm)	W	%	(dB)
3300	50.22	50.84	121.30	67.80	13.31
3400	50.34	50.90	123.01	65.08	13.92
3500	50.07	51.02	126.30	64.24	14.32
3600	49.90	50.82	120.78	64.23	13.39

Recommended driver: GTAH35012PD or ITEH38012C6

Applications and Features

- Suitable for wireless communication infrastructure, wideband amplifier, EMC testing, ISM etc.
- High Efficiency and Linear Gain Operations
- Thermally Enhanced Industry Standard Package
- High Reliability Metallization Process
- Excellent thermal Stability and Excellent Ruggedness
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

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 (28V)
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

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DSS}	150	Vdc
Gate--Source Voltage	V_{GS}	-10,+2	Vdc
Operating Voltage	V_{DD}	36	Vdc

Maximum Forward Gate Current @ T_C = 25°C	Igmax	27.2	mA
Storage Temperature Range	T_{stg}	-65 to +150	°C
Case Operating Temperature	T_C	+150	°C
Operating Junction Temperature(See note 1)	T_J	+225	°C

Note: 1. Continuous operation at maximum junction temperature will affect MTTF
2.Bias Conditions should also satisfy the following expression: Pdiss < (Tj – Tc) / RJC and Tc = Tcase

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case T_C= 85°C, T_J=200°C, RF CW operation	$R_{\theta JC}$	1.7	C/W

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

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=-8V; I_{DS}=27.2mA	V_{DSS}	150			V
Gate Threshold Voltage	V_{DS} = 28V, I_D =27.2mA	V_{GS}(th)	-4		-2	V
Gate Quiescent Voltage	V_{DS} =28V, I_{DS}=120mA, Measured in Functional Test	$V_{GS(Q)}$		-2.4		V

Typical performance

3.6-3.8GHz

Figure 2: Small singal gain and return loss Vs Frequency

Vds=28V, Idq=120mA, input power=0dBm

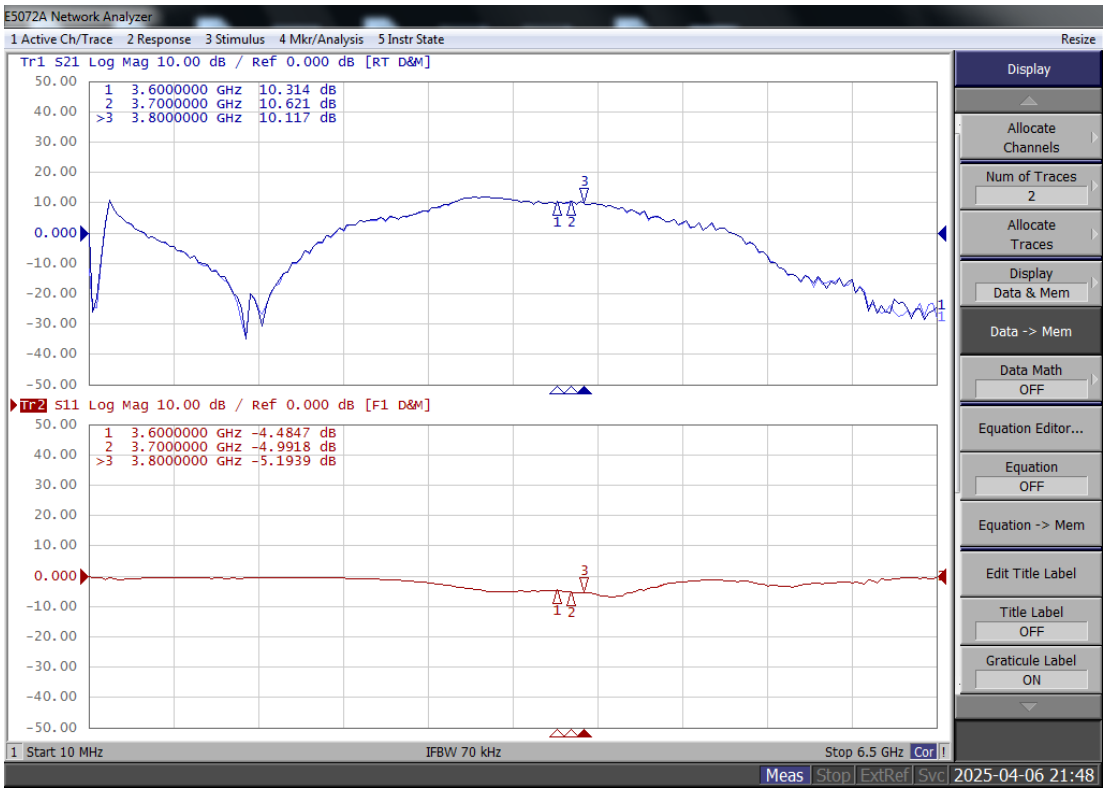


Figure 3: Efficiency and power gain as function of Pout

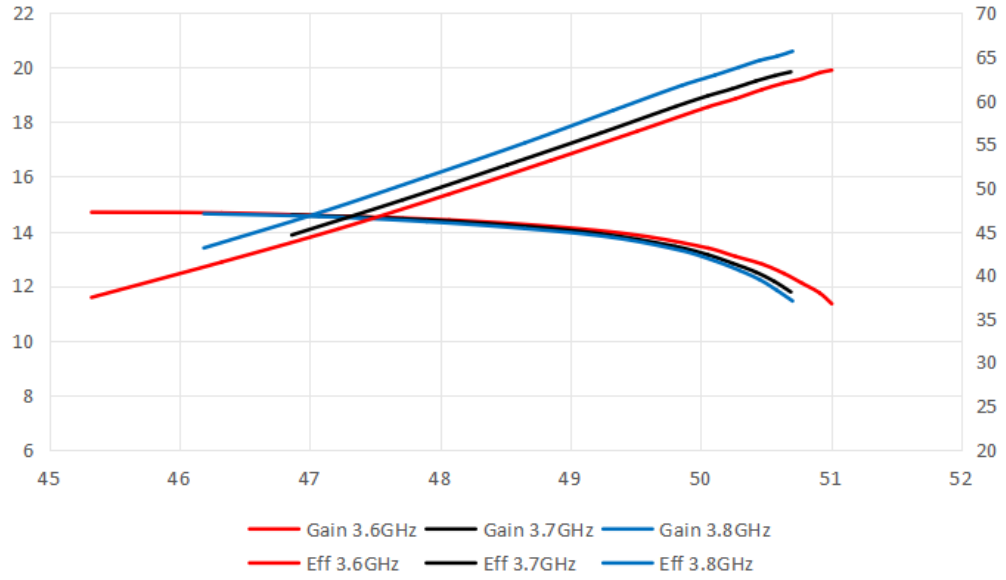
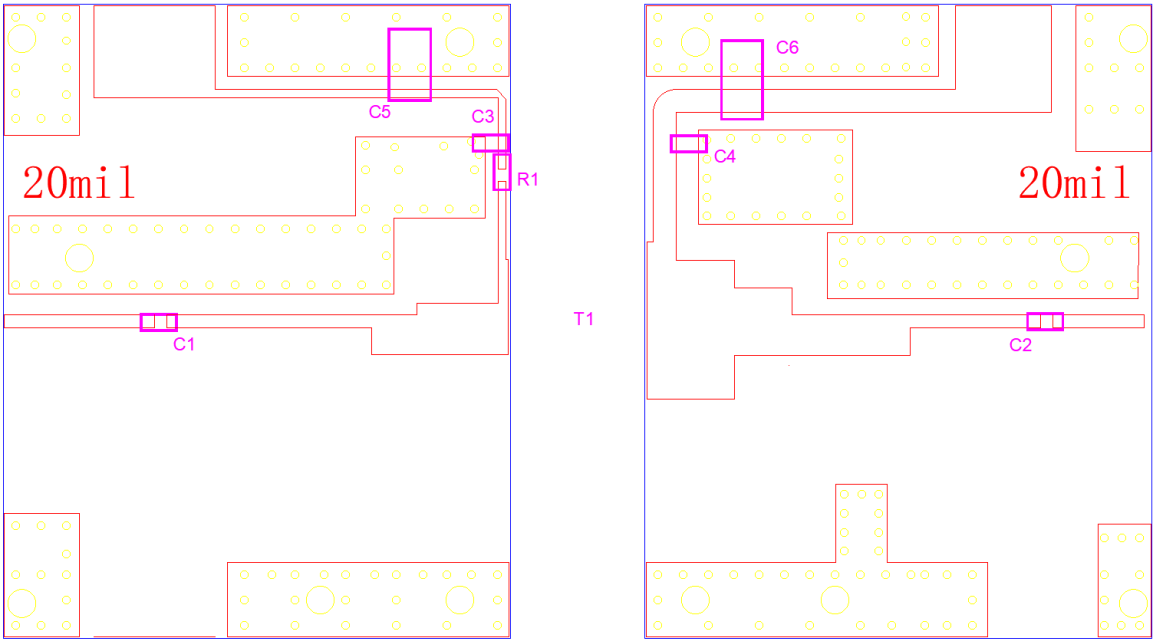


Figure 4: Picture and Bill of materials of application circuit

(Layout Gerber file upon request，20mils RO4350B)



Part	Quantity	Description	Part Number	Manufacture
C1,C2,C3,C4	4	8.2pFHigh Q Capacitor	251SHS120BSE	TEMEX
C5,C6	1	10uF MLCC	GRM32EC72A106ME05	Murata
R1	1	10Ω Power Resistor	ESR03EZPF100	ROHM
T1	1	GaN Transistor	XTAH35101A2C	Innogration

3.3-3.6GHz

Figure 5: Small singal gain and return loss Vs Frequency

Vds=28V, Idq=120mA, input power=0dBm

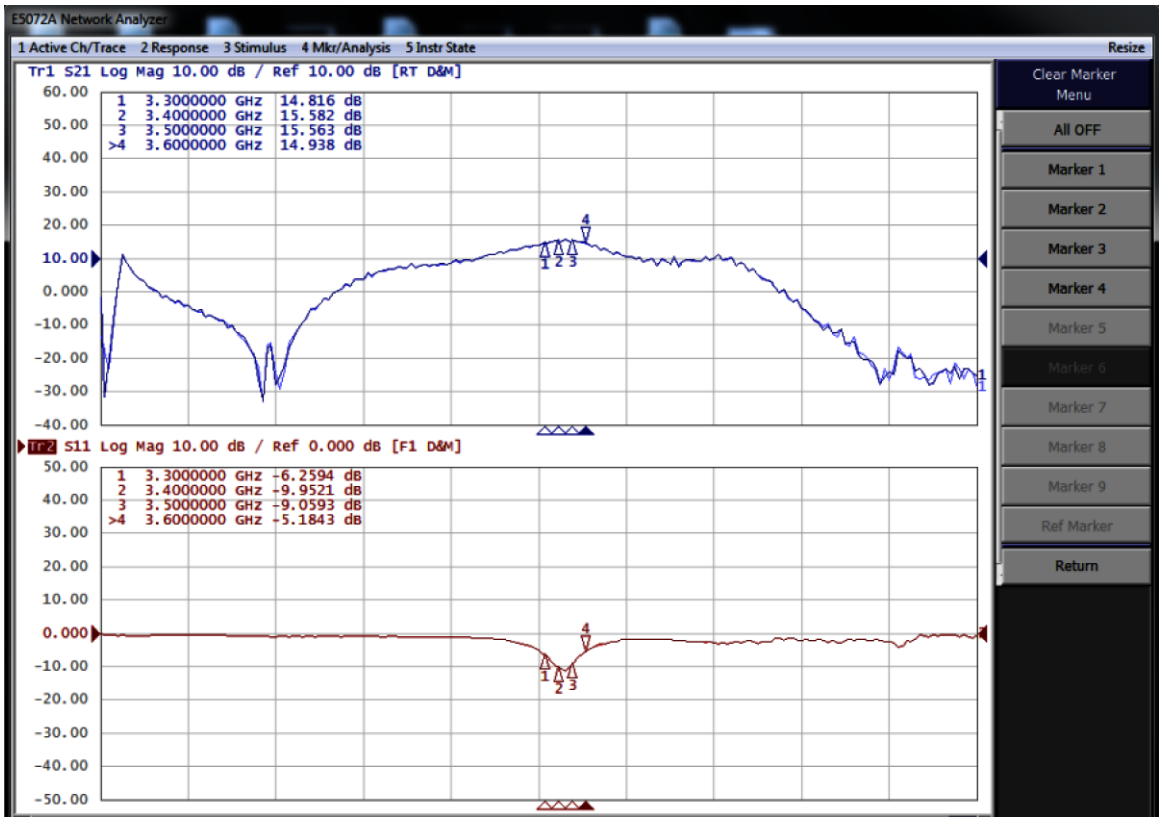


Figure 6: Efficiency and power gain as function of Pout

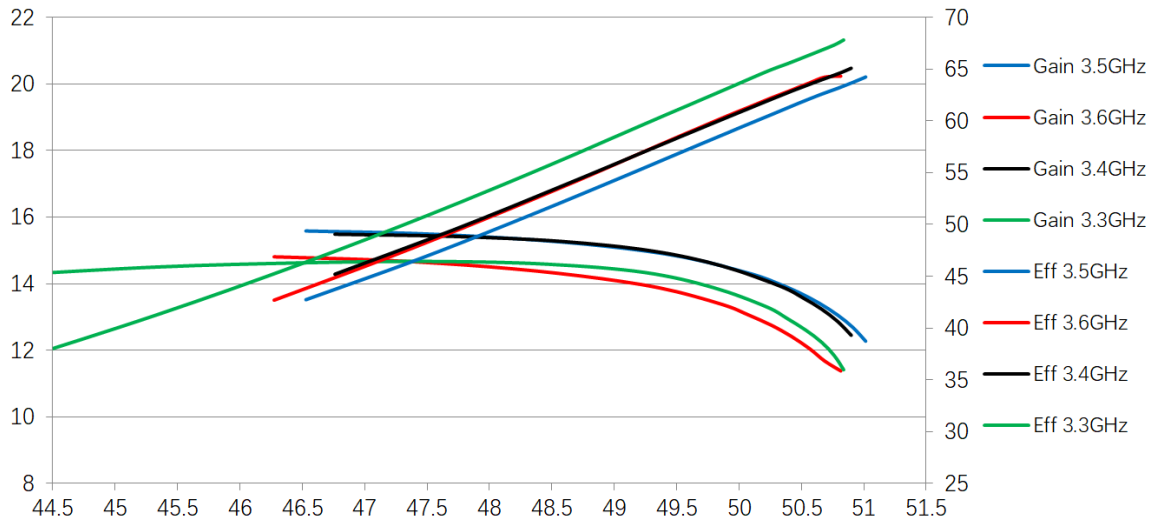


Figure 7: Picture and Bill of materials of application circuit

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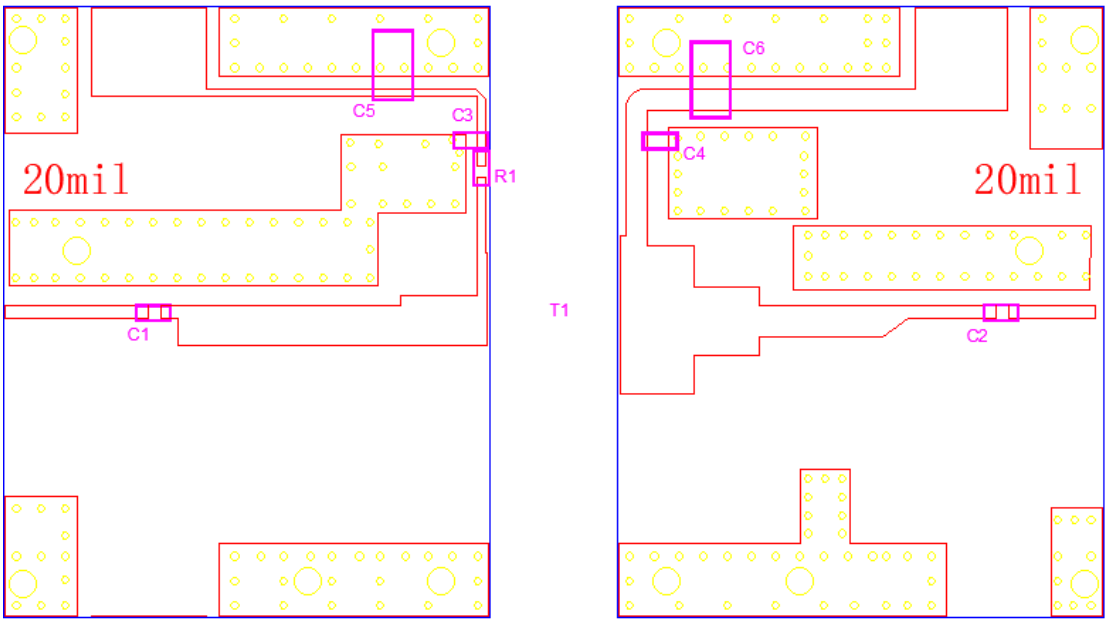

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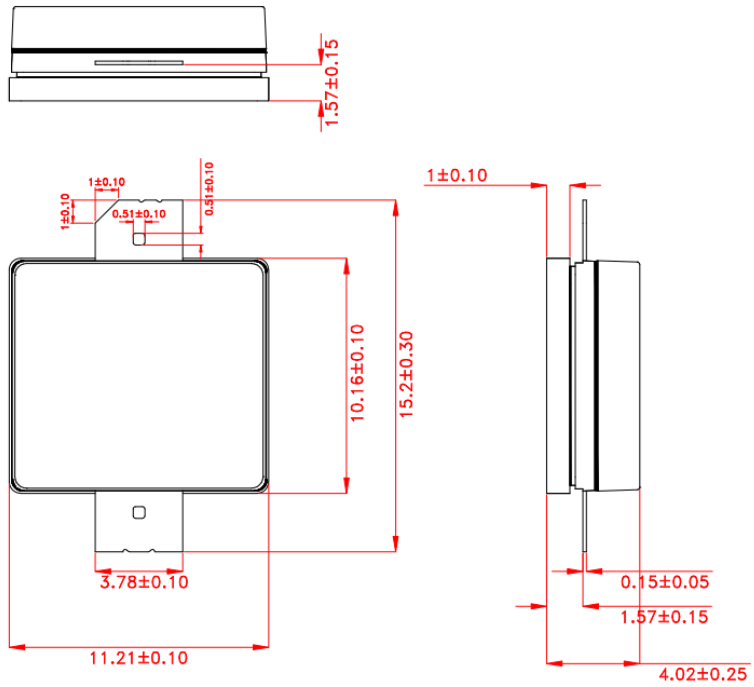
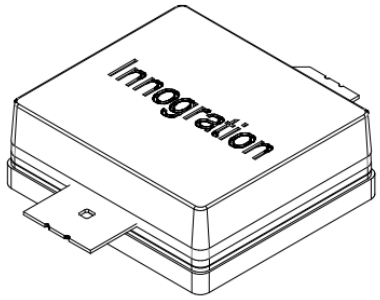
Package Dimensions （Unit:mm）





Unit:mm

Tolerance ±0.10mm,Except as Noted.

Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2025/4/14	V1.0	Preliminary Datasheet Creation

Application data based on LWH-25-14/15

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