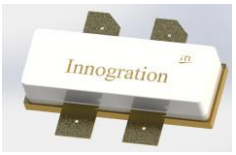
XTAH30160L4 GaN TRANSISTOR

Document Number: XTAH30160L4
Advanced Datasheet V1.0

Gallium Nitride 28V 160W, 3GHz RF Power Transistor

XTAH30160L4



Description

The XTAH30160L4 is a 160W internally matched, GaN HEMT, designed for multiple applications, up to 3GHz

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

In its typical wideband application, it can deliver 120W CW at 28V, and 140W at 32V across the full band of 0.5-3.0GHz.

- Typical **CW** performance (on 0.5-3.0GHz fixture with device soldered)：

Vds=28V, Idq=300mA

Freq(GHz)	Pin(dBm)	Psat(dBm)	Psat(W)	Ids(A)	Gain(dB)	Eff(%)
0.5	35.44	51.44	139.32	8.81	16	56.48
0.6	37.22	51.82	152.05	8.36	14.6	64.96
0.7	38.94	51.84	152.76	7.66	12.9	71.22
0.8	37.63	51.33	135.83	6.89	13.7	70.41
0.9	40.72	51.08	128.23	6.91	10.36	66.28
1.0	39.94	51.56	143.22	7.7	11.62	66.43
1.1	40.1	51.42	138.68	8.23	11.32	60.18
1.2	39	51.52	141.91	8.01	12.52	63.27
1.3	40.84	51.17	130.92	7.48	10.33	62.51
1.4	40.4	50.83	121.06	6.77	10.43	63.86
1.5	40.9	51.28	134.28	7.62	10.38	62.93
1.6	40.08	51	125.89	8.06	10.92	55.78
1.7	40.03	51.15	130.32	8.97	11.12	51.89
1.8	39.08	51.54	142.56	9.58	12.46	53.15
1.9	39.16	52	158.49	10.36	12.84	54.64
2.0	39.78	52.34	171.40	10.29	12.56	59.49
2.1	40.05	51.11	129.12	8.19	11.06	56.31
2.2	41.11	50.91	123.31	8.25	9.8	53.38
2.3	40.98	50.9	123.03	9.04	9.92	48.60
2.4	41.48	51.48	140.60	10.33	10	48.61
2.5	41.15	51.62	145.21	10.36	10.47	50.06
2.6	40.78	51.63	145.55	10.43	10.85	49.84
2.7	40.88	51.73	148.94	10.77	10.85	49.39
2.8	40.6	51.9	154.88	10.74	11.3	51.50
2.9	39.8	51.76	149.97	9.87	11.96	54.27
3.0	40.29	51.09	128.53	8.4	10.8	54.65

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

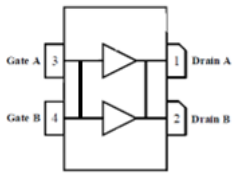
1. Set VGS to the pinch--off (VP) voltage, typically –5 V
2. Turn on VDS to nominal supply voltage (28V)
3. Increase VGS until IDS current is attained
4. Apply RF input power to desired level

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

Figure 1: Pin Connection definition

Transparent top view (Backside grounding for source)



***Notice: Both leads at input and output are internally connected, device is only usable as single ended**

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}	32	Vdc
Maximum Forward Gate Current @ TC = 25°C	Igmax	43.6	mA
Storage Temperature Range	Tstg	-65 to +150	°C
Case Operating Temperature	T_C	+150	°C
Operating Junction Temperature(See note 1)	T_J	+225	°C
Total Device Power Dissipation (Derated above 25°C, see note 2)	Pdiss	230	W

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, RF CW operation，Pout=160W, 3GHz	$R_{\theta JC}$	0.85	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}=43.6mA	V_{DSS}	150			V
Gate Threshold Voltage	V_{DS} = 28V, I_D =43.6mA	V_{GS}(th)	-4		-2	V
Gate Quiescent Voltage	V_{DS} =28V, I_{DS}=300mA, Measured in Functional Test	$V_{GS(Q)}$		-2.45		V

Typical performance

0.5-3.0GHz

Figure 1: Small singal gain and return loss Vs Frequency

Vgs=-2.45V, Vds=28V, Idq=300mA, input power=0dBm

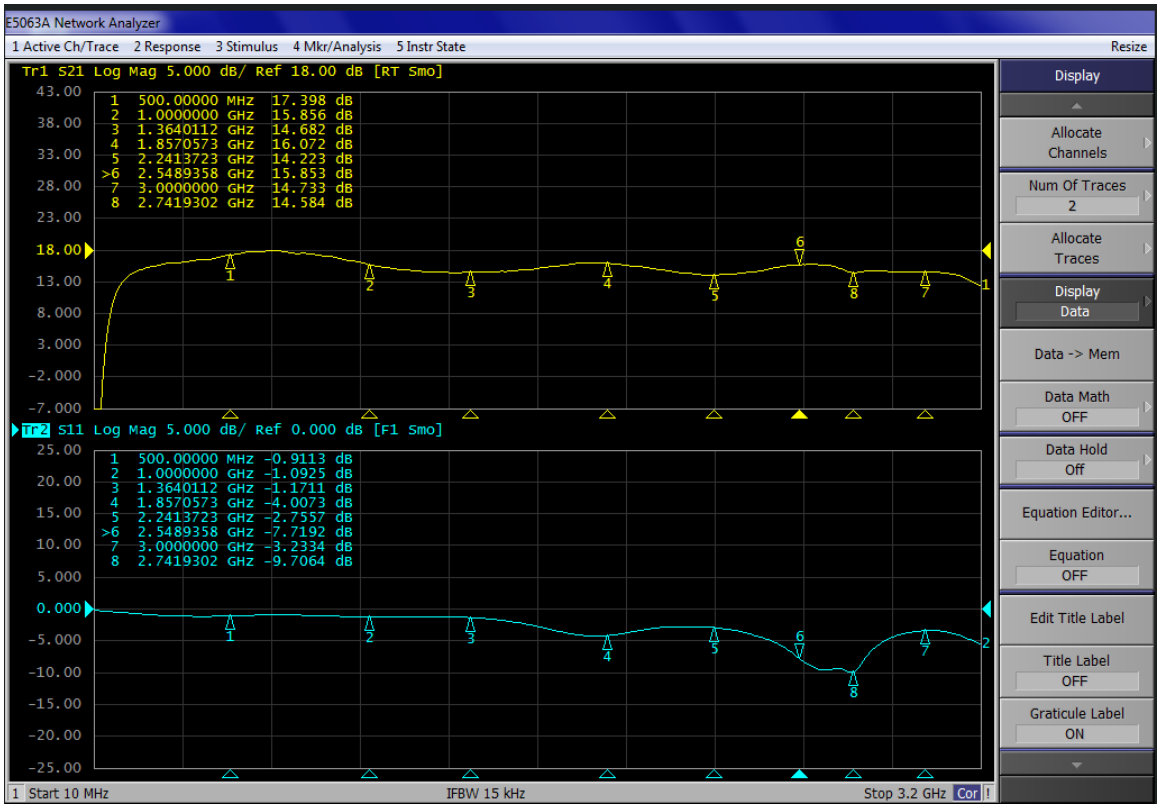
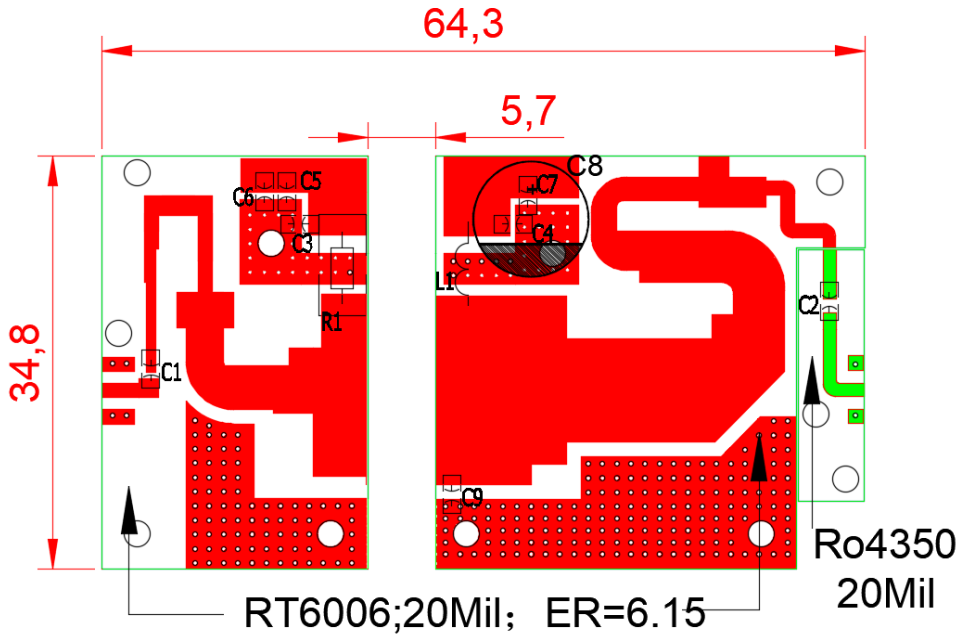


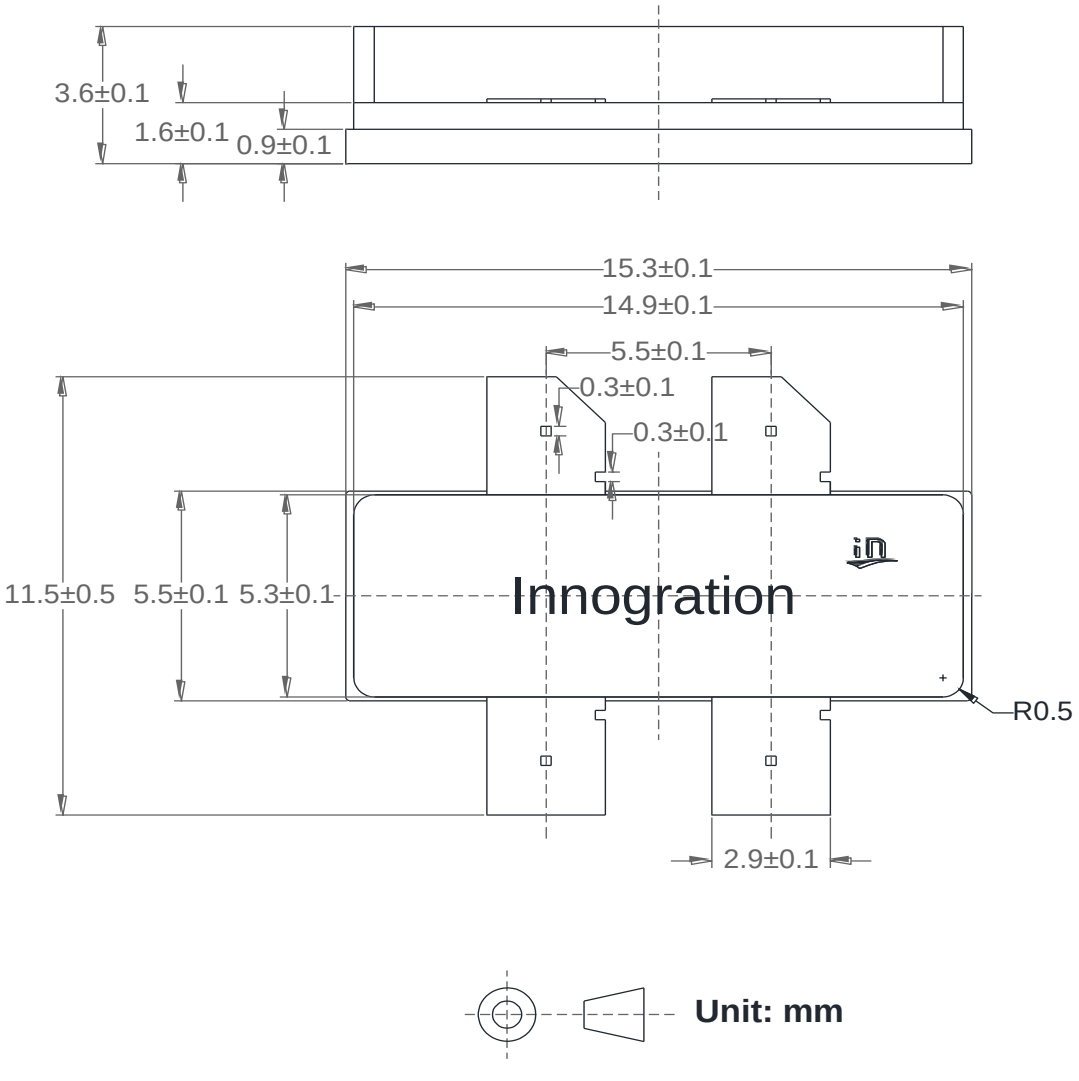
Figure 3: Picture and Bill of materials of 0.5-3GHz wide band application circuit

(Layout Gerber file upon request)



Component	Description	Suggestion
C8	470uF/63V	
C6，C7	10uF/200V-1210	Ceramic multilayer capacitor
C1	18pF	MQ400805
C2，C4	18pF	MQ30111
C3	27pf	.MQ201111
C5	1000pF	MQ201111
C9	1pF	MQ201111
L1	1mm wire， 3mm diameter，3turns	DIY
R1	10Ω-2512	Chip Resistor
PCB	RT6006,ER=6.15,20mil / Rogers4350 20mil	

Earless Flanged Ceramic Package; 4 leads



Unit: mm

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2025/2/27	**V1.0**	**Advanced Datasheet Creation**

Application data based on YHG-25-08

Notice

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