GaN 100W,2-3GHz ,28V,RF Power Transistor

Description

GTAH30140L4

The GTAH30140L4 is a 28V 100W CW device, internally matched GaN HEMT, ideal for multiple applications from 2-3GHz, and at higher voltage 32V, capable to output more than 110W.

It can support linear and saturated application, configured as push pull or Doherty.

There is no guarantee of performance when this part is used outside of stated frequencies.

- Typical performance across 2-3GHz class AB application circuit with device soldered

CW signal,Idq=200mA

Voltage (V)	Freq (GHz)	Psat (W)	Eff (%)	Power Gain (dB)
28	2-3	90-130	>48	9-12
32	2-3	110-140	>45	10-13
36	2-3	140-180	>45	11-14

Applications

- S band pulse or CW power amplifier
- 5G wideband power amplifier
- 2.45G RF Energy power amplifier

Important Note: Proper Biasing Sequence for GaN HEMT Transistors

Turning the device ON

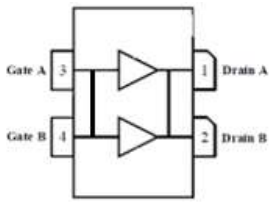
1. Set VGS to the pinch--off (VP) voltage, typically –5 V
2. Turn on VDS to nominal supply voltage
3. Increase VGS until IDS current is attained
4. Apply RF input power to desired level

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)



***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 to +2	Vdc
Operating Voltage	V_{DD}	36	Vdc
Maximum gate current	Igs	36	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 Pout=100W CW at 3GHz	$R_{\theta JC}$	1	°C /W

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

DC Characteristics (measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=36mA	V_{DSS}		150		V
Gate Threshold Voltage	VDS =10V, ID = 36mA	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	VDS =28V, IDS=110mA, Measured in Functional Test	$V_{GS(Q)}$		-2.57		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	3GHz, Pout=100W Pulsed CW All phase, No device damages	VSWR		10:1		

Figure 2: Network analyzer output S11/S21

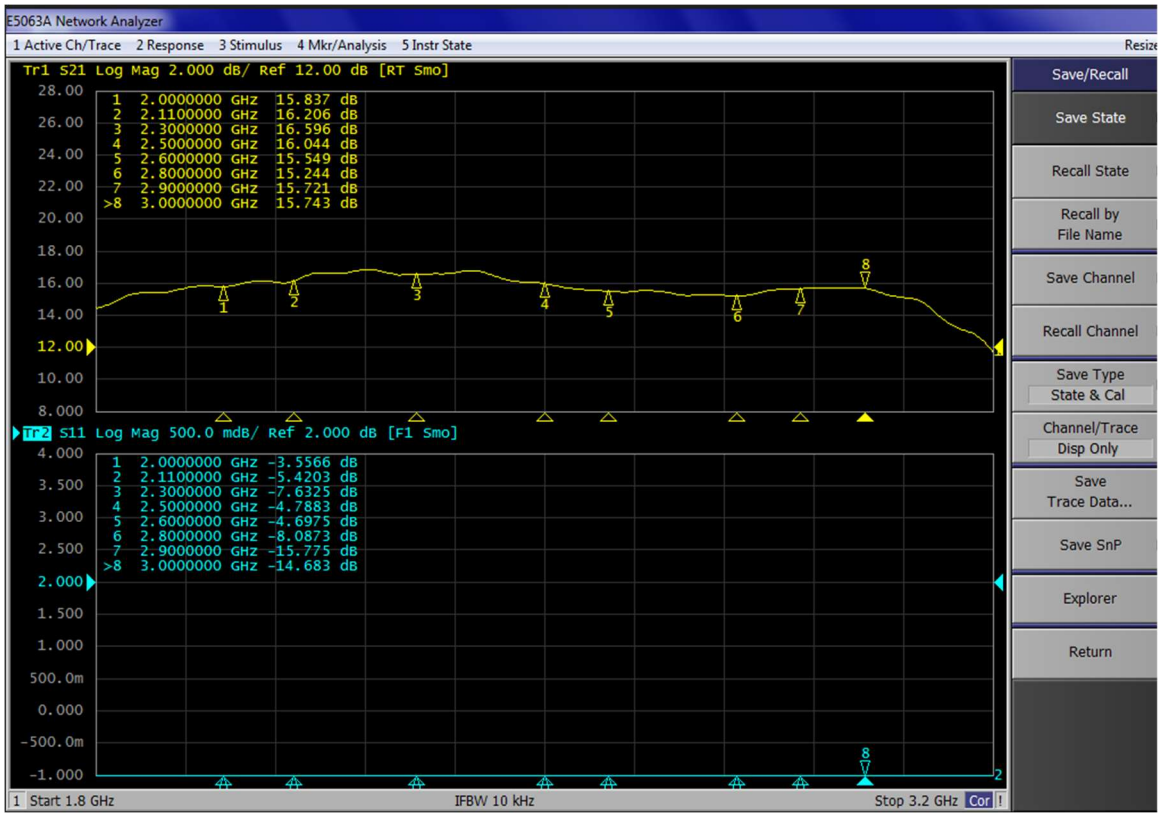


Figure 3: Picture of application board 2-3GHz class AB

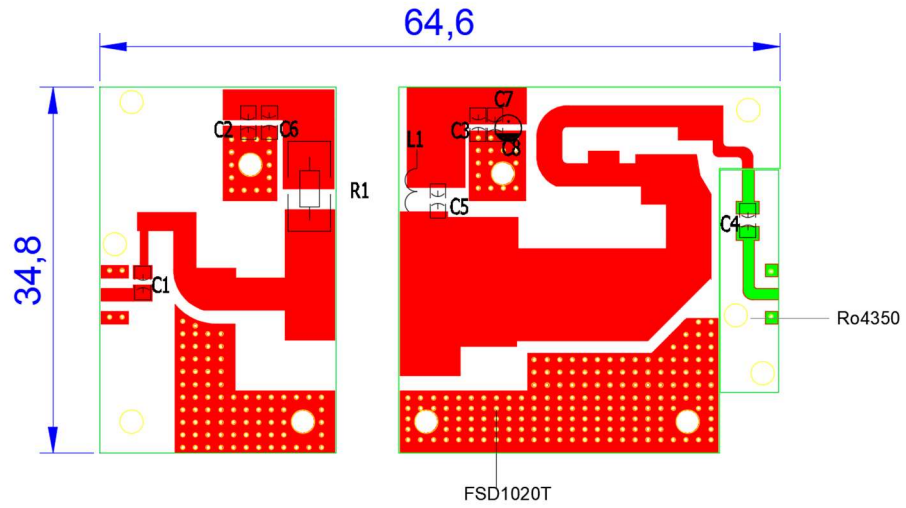
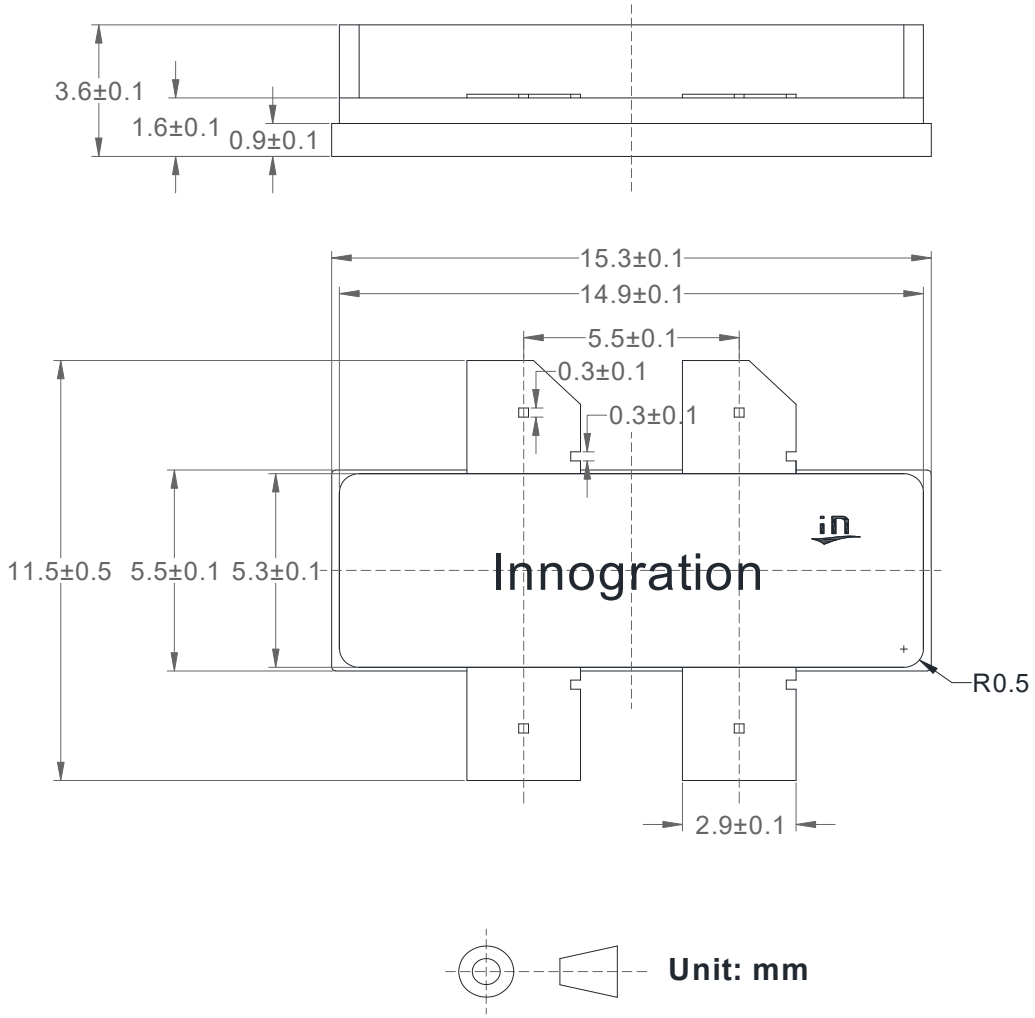


Table 4. Bill of materials of application board (PCB layout upon request)

Component	Description	Suggestion
C6,C7	10uF	10uF/100V
C3,C4	12pF	MQ301111
C1,C2	12pF	MQ300805
C5	1.2pF	MQ301111
C8	470uF/63V	Electrolytic Capacitor
R1	100Ω	Chip Resistor
L1	d=1.5mm，2Turns,D=5mm	DIY
PCB	FSD1020T ， Dk=10.2 ， 20mil / Rogers 4350 20mil	

Earless Flanged Ceramic Package; 4 leads



Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2023/12/22	V1.0	Product Datasheet Creation

Application data based on: YHG-23-33

Notice

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