



Gallium Nitride 28V 25W, RF Power Transistor

Description

The GTAH35025P3 is a 25W GaN HEMT, designed for multiple applications, especially sub-6GHz MC-GSM/WCDMA/LTE/LTE-A up to 5000MHz, in 6*5mm DFN plastic package, supporting surface mounted on PCB through high density grounding vias.

It is the low cost version of its ceramic version GTAH35025M2 with similar performance

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

• Typical 1.6GHz performance with device soldered

$V_{DS} = 28V$, $I_{DQ} = 100mA$ $V_{GS} = -2.49V$ CW

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff (%)	P1dB Gain (dB)	P3dB (dBm)	P3dB (W)	P3dB Eff (%)
1610	43.38	21.8	60.8	21.92	44.91	31.0	69.4
1640	43.26	21.2	62.3	21.15	44.83	30.4	71.2
1675	42.98	19.9	61.6	21.26	44.67	29.3	72.2

• Typical 4.4-5GHz performance with device soldered

$V_{DS} = 28V$, $I_{DQ} = 100mA$ $V_{GS} = -2.49V$ CW

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff (%)	P1dB Gain (dB)	P3dB (dBm)	P3dB (W)	P3dB Eff (%)
4400	43.29	21.3	42.3	9.42	44.37	27.3	45.1
4500	43.38	21.8	43.4	10.01	44.45	27.8	46.0
4600	43.25	21.1	43.6	10.61	44.49	28.1	47.4
4700	43.49	22.3	45.8	10.48	44.69	29.4	48.9
4800	43.42	22.0	47.6	9.84	44.65	29.2	51.0
4900	43.22	21.0	48.2	9.26	44.43	27.7	51.2
5000	43.12	20.5	48.7	8.79	44.33	27.1	52.1

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

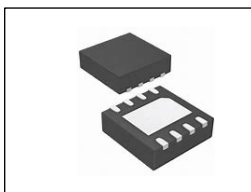
Important Note: Proper Biasing Sequence for GaN HEMT Transistors

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

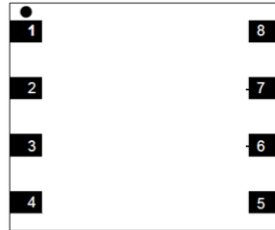
Turning the device OFF

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





Pin Configuration and Description(Top view)



Pin No.	Symbol	Description
1,2,3,4	RF IN/VGS	Gate Bias/RF Input
5,6, 7,8	RF OUT /VDS	RF Output, Drain Bias
Backside metal	GND	DC/RF Ground. Must be soldered to EVB ground plane over array of vias for thermal and RF performance. Solder voids under Pkg Base will result in excessive junction temperatures causing permanent damage.

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DS}	150	Vdc
Gate--Source Voltage	V_{GS}	-10,+2	Vdc
Operating Voltage	V_{DD}	32	Vdc
Maximum Forward Gate Current @ $T_C = 25^{\circ}\text{C}$	I_{gmax}	6	mA
Storage Temperature Range	T_{stg}	-65 to +150	$^{\circ}\text{C}$
Case Operating Temperature	T_C	+150	$^{\circ}\text{C}$
Operating Junction Temperature(See note 1)	T_J	+200	$^{\circ}\text{C}$
Total Device Power Dissipation (Derated above 25°C , see note 2)	P_{diss}	32	W

Note: 1. Continuous operation at maximum junction temperature will affect MTTF
2. Bias Conditions should also satisfy the following expression: $P_{diss} < (T_J - T_C) / R_{JC}$ and $T_C = T_{case}$

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case $T_C = 85^{\circ}\text{C}$, $T_J = 200^{\circ}\text{C}$, RF CW operation, FEA mode	$R_{\theta JC}$	5.4	C/W

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

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = -8\text{V}$; $I_{DS} = 6\text{mA}$	V_{DSS}	150			V
Gate Threshold Voltage	$V_{DS} = 28\text{V}$, $I_D = 6\text{mA}$	$V_{GS(th)}$		-2.7		V
Gate Quiescent Voltage	$V_{DS} = 28\text{V}$, $I_{DS} = 100\text{mA}$, Measured in Functional Test	$V_{GS(Q)}$		-2.27		V



1.6GHz

TYPICAL CHARACTERISTICS

Figure 1. Power gain and drain efficiency as function of average load power

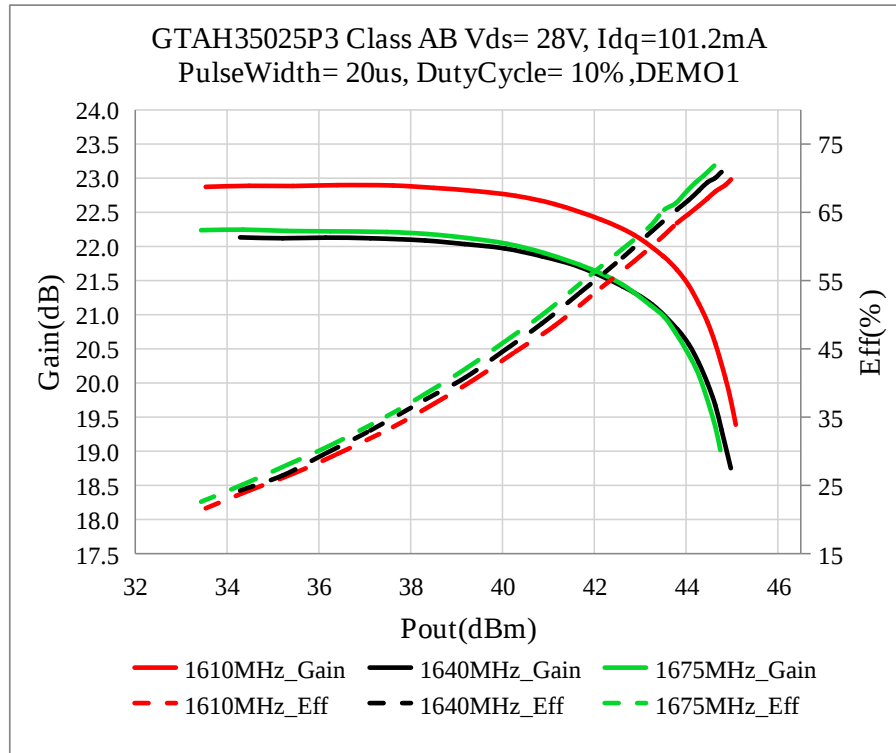


Figure 2. Network analyzer plots (S11/S21)

Vdd=28V, Idq=100mA

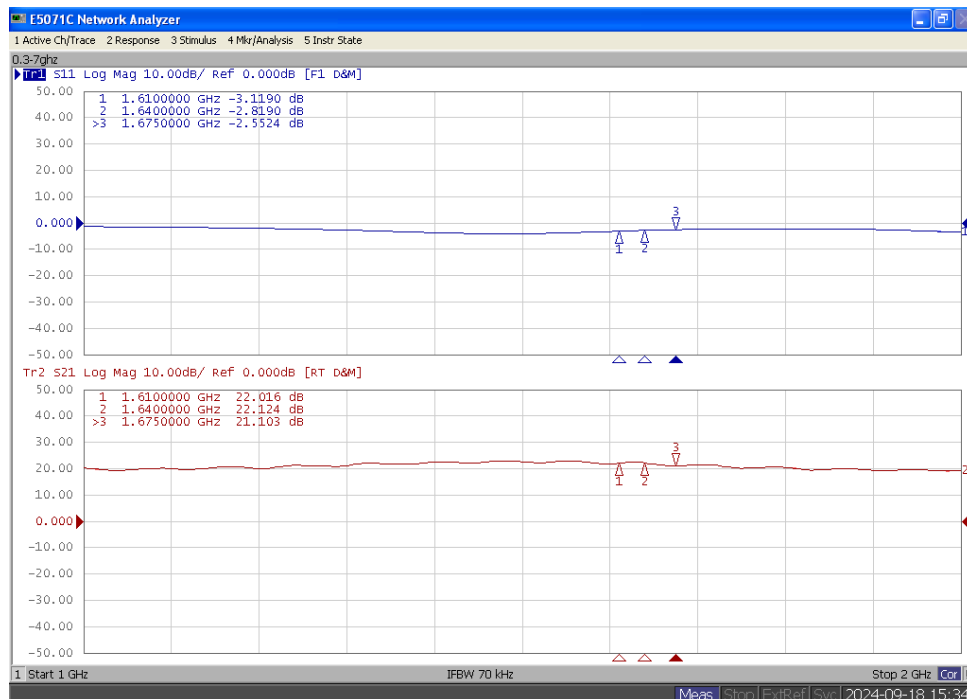
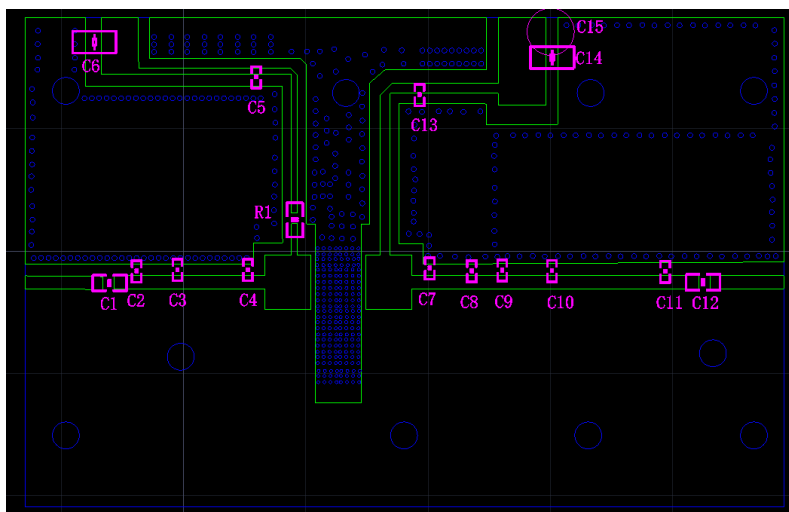


Figure 3. test fixture ,BOM and layout (Layout file upon request,)

PCB: 20 Mil Rogers 4350B



Component	Value	Footprint	Quantity
C6,C14	10uF/63V	1210	2
R1	10 ohm	0603	1
C1,C5,C12,C13	30pF	0603	4
C2	1.6pF	0603	1
C3,C8	2.2pF	0603	2
C4	5.6 pF	0603	1
C7	0.5pF	0603	1
C9	0.7pF	0603	1
C10	1.1pF	0603	1
C11	0.2pf	0603	1
C15	470uF		1
U1	GTAH35025P3	P3	1



4.4-5GHz

TYPICAL CHARACTERISTICS

Figure 4. Power gain and drain efficiency as function of average load power

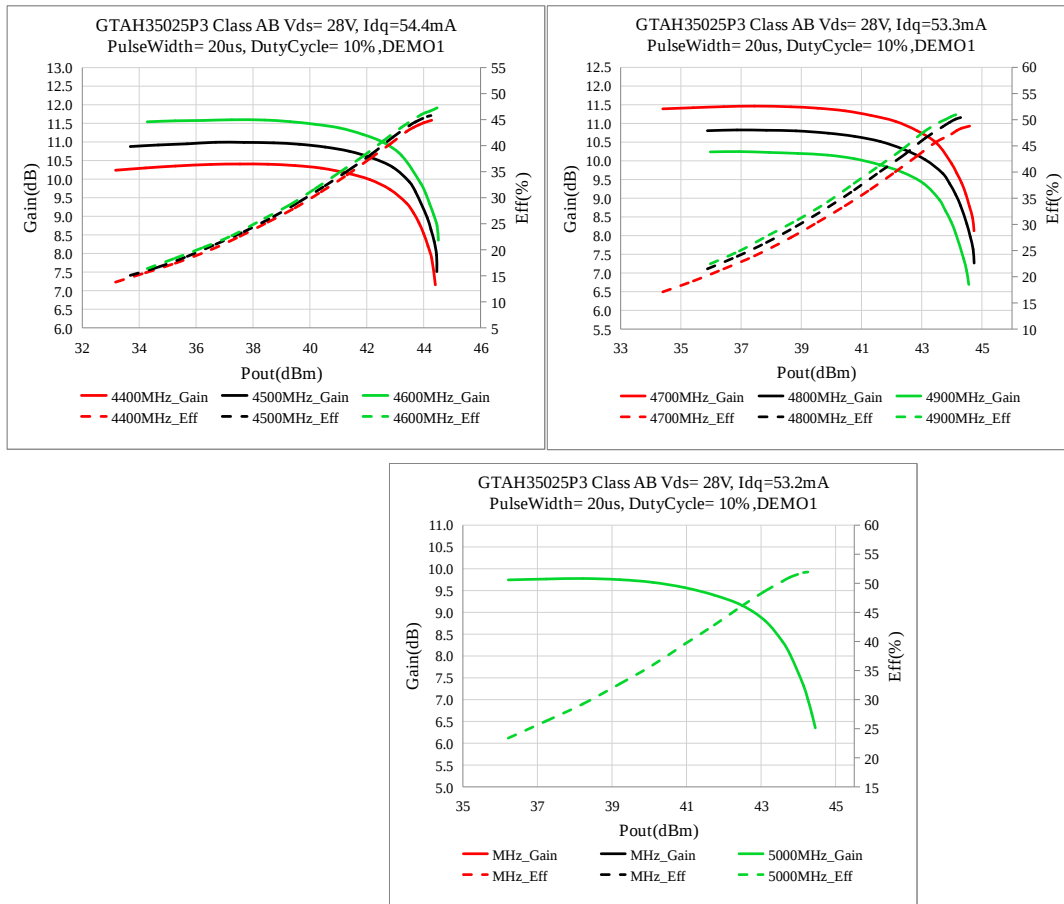


Figure 5. Network analyzer plots (S11/S21) Vdd=28V, Idq=100mA

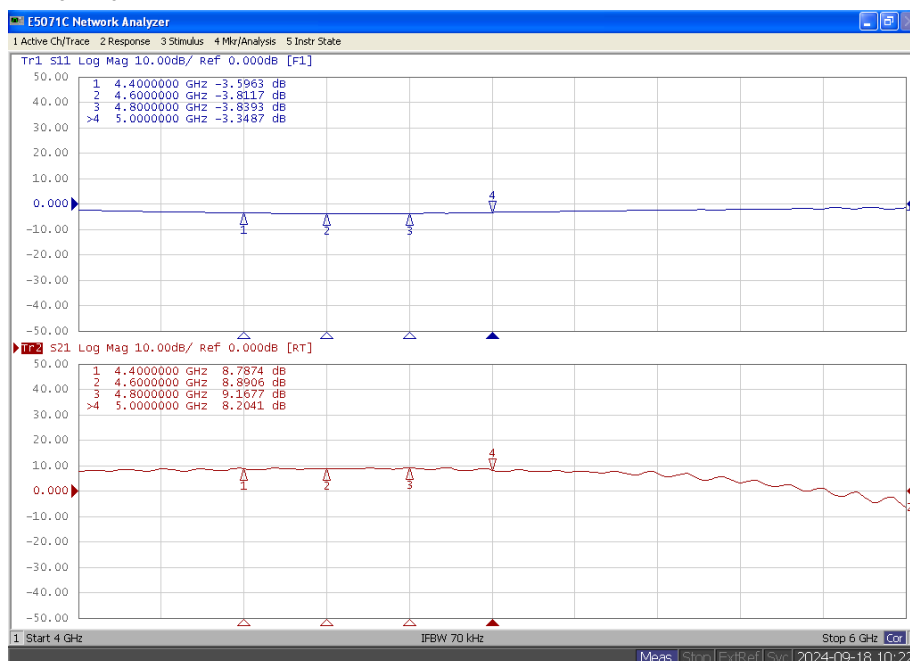
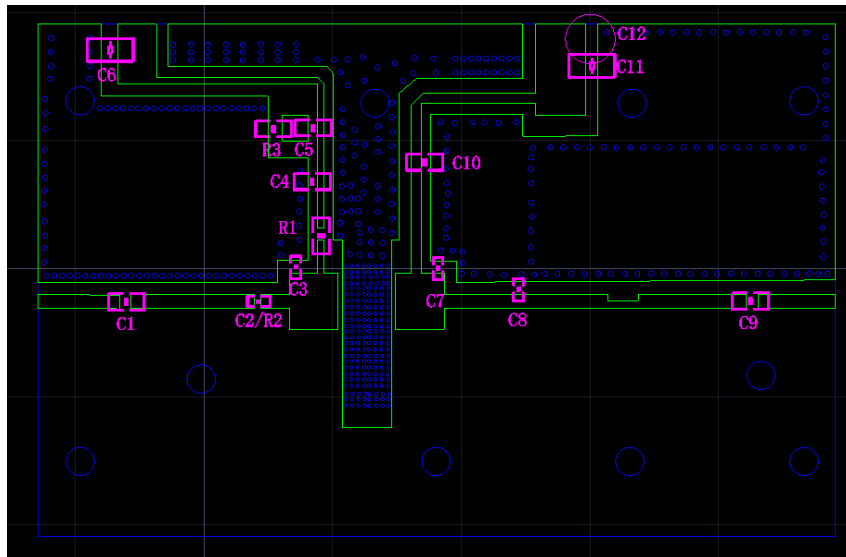




Figure 6. test fixture ,BOM and layout (Layout file upon request,)

PCB: 20 Mil Rogers 4350B

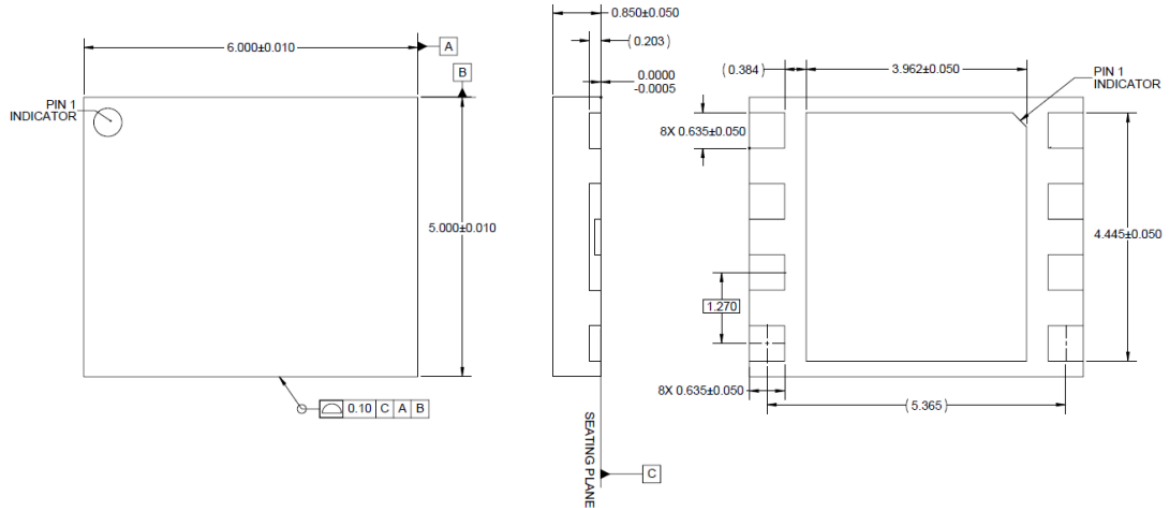


Component	Value	Footprint	Quantity
C5,C6,C12	10uF/63V	1210	3
R1,R2,R3	10 ohm	0603	3
C1,C2,C4,C9,C10	3.9pF	0603	5
C3	0.3pF	0603	1
C7	0.5pF	0603	1
C8	0.1 pF	0603	1
C12	470uF		1
U1	GTAH35025P3	P3	1



Package

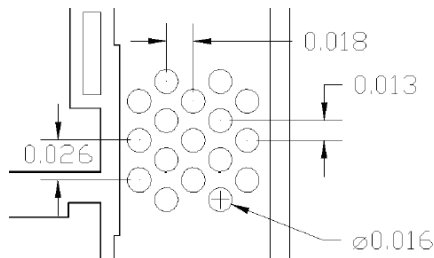
6*5 DFN Package



Notes:

1. All dimensions are in mm. Otherwise noted, the tolerance is ±0.1 mm.
2. Package leads are gold plated.
3. Part is mold encapsulated.

Recommended vias layout: (all in inches)



Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2024/9/18	V1.0	Preliminary datasheet creation

Application data based on LBG-24-38

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