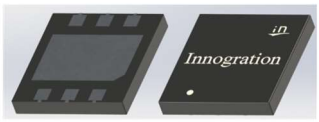
GaN 28V 1-3GHz full band 20W, RF Power Transistor

GMAH25025P5



Description

The GMAH25025P5 is a 20W input matched GaN HEMT, designed for multiple applications, within full band of 1-3GHz, in 7*6.5mm DFN plastic package, supporting surface mounted on PCB through high density grounding vias.

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

•Typical wideband performance with device soldered

V_{DS} = 28V, I_{DQ} = 100mA Vgs=-2.3V CW

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
1000	41.73	14.9	50.9	9.01	43.02	20.1	57.4
1100	42.05	16.1	51.7	9.2	43.19	20.8	58.0
1200	42.23	16.7	50.8	9.38	43.29	21.3	56.6
1300	42.63	18.3	51.4	9.52	43.61	23.0	56.0
1400	42.75	18.8	50.3	9.7	43.71	23.5	54.0
1500	42.4	17.4	43.9	9.36	43.4	21.9	47.1
1600	42.85	19.3	48.2	9.88	43.92	24.7	52.1
1700	43.05	20.2	48.8	9.99	44.13	25.9	52.9
1800	43.09	20.4	48.4	10.1	44.35	27.2	53.8
1900	43.03	20.1	48.1	10.07	44.35	27.3	53.6
2000	43.13	20.5	49.8	10.33	44.52	28.3	56.0
2100	43.23	21.0	49.9	10.36	44.66	29.2	56.6
2200	43.38	21.8	51.5	10.31	44.82	30.4	57.8
2300	43.5	22.4	52.9	10.39	44.95	31.2	59.4
2400	43.34	21.6	51.6	10.25	44.89	30.9	58.6
2500	43.42	22.0	52.8	10.14	44.96	31.3	60.0
2600	43.43	22.0	55.9	10.16	45	31.6	63.7
2700	41.86	15.4	48.6	9.23	43.49	22.4	55.2
2800	42.28	16.9	52.2	9.22	43.72	23.5	57.6
2900	42.01	15.9	52.8	8.61	43.63	23.1	59.3
3000	41.94	15.6	56.2	8.69	43.63	23.1	63.1

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

Subject to change without notice

Important Note: Proper Biasing Sequence for GaN HEMT Transistors

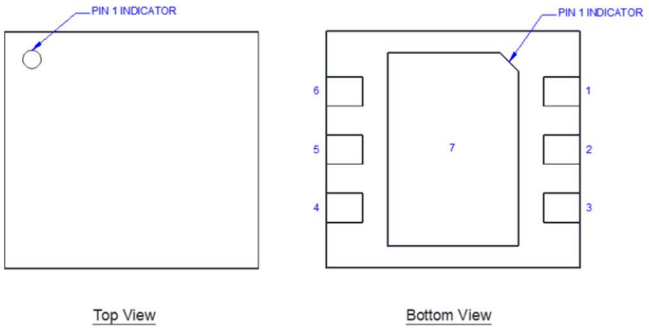
Turning the device ON

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



Pin Number	Label	Description
1	V_G	Gate Bias
2	RF_IN	RF Input
3	NC	NC
4	NC	NC
5	RF_OUT, V_D	RF Output, Drain Bias
6	NC	NC
7(Back Paddle)	GND	RF and DC Ground

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 @ T_C = 25°C	Igmax	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	+200	°C
Total Device Power Dissipation (Derated above 25°C, see note 2)	Pdiss	32	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, T_J=200°C, RF CW operation, **FEA mode**	$R_{\theta JC}$	5.4	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}=6mA	V_{DSS}	150			V

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Gate Threshold Voltage	V_{DS} = 28V, I_D = 6mA	V_{GS}(th)		-2.7		V
Gate Quiescent Voltage	V_{DS} =28V, I_{DS}=100mA, Measured in Functional Test	$V_{GS(Q)}$		-2.3		V

TYPICAL CHARACTERISTICS

Figure 2. Network analyzer plots (S11/S21)

Vdd=28V,Idq=100mA

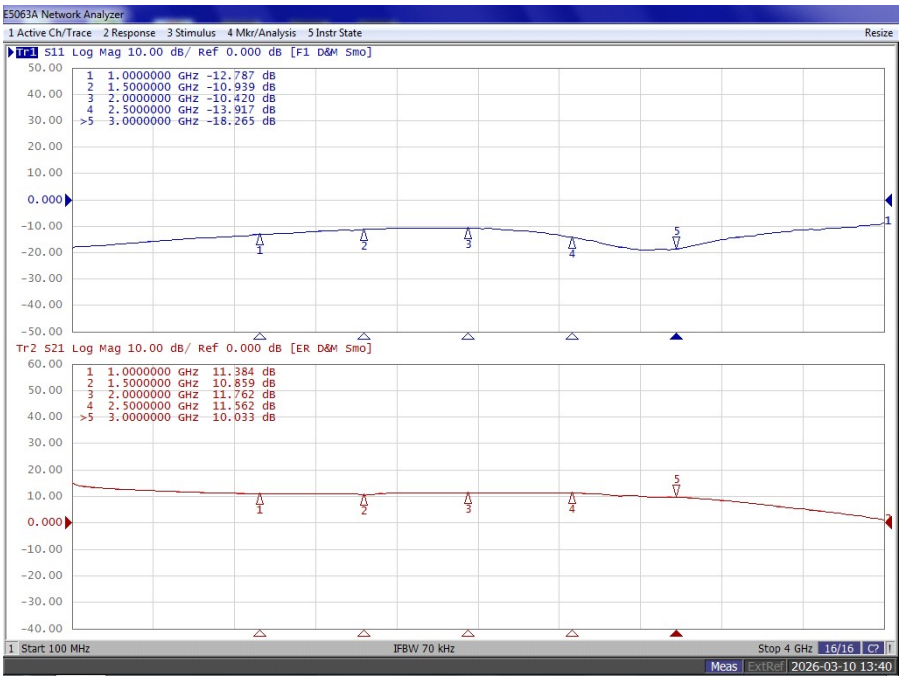
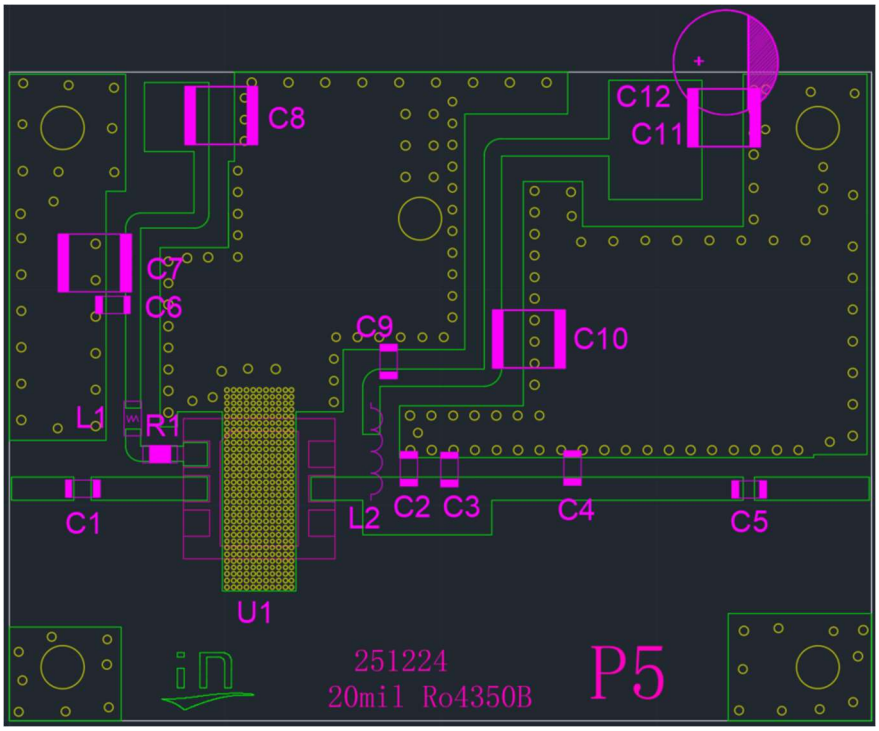


Figure 3. test fixture ,BOM and layout (Layout file upon request,)

PCB: 20 Mil Rogers 4350B



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Reference	Footprint	Value	Quantity
C1,C6,C9	0603	4.7 nF	3
C2	0603	1 pF	1
C3	0603	0.5 pF	1
C4	0603	0.4 pF	1
C5	0603	100 pF	1
C7,C8,C10,C11	1210	10 uF/63V	4
C12	/	470 uF	1
L1	0603	910 nH	1
L2	/	100 nH	1
R1	0603	10 ohm	1
U1	P5	GMAH25025P5	1

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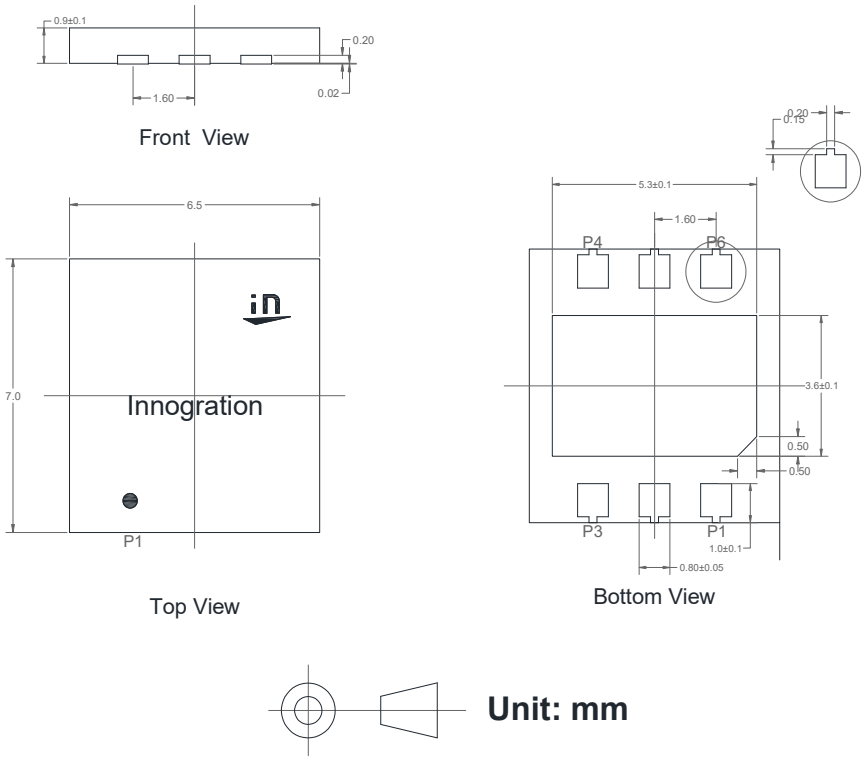
Package Dimensions

7.0*6.5mm Plastic Package



Notes:

1. All dimensions are in mm;
2. The tolerances unless specified are ±0.1mm.

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2026/3/10	V1.0	Preliminary datasheet creation

Application data based on CWZ-26-06

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