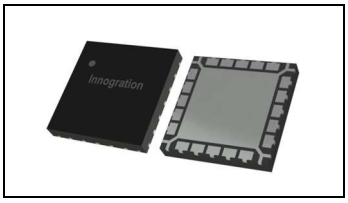
3.3-3.6GHz, 15W, 28V GaN PA Module



Description

The GMAH3336-15P4 is a 28V 15-watt peak power, integrated 2-stage Power Amplifier Module, designed for small cell applications, with frequencies from 3.3 to 3.6GHz. The module is 50 Ω input and output, it requires minimal external components. The module offers a much smaller footprint than traditional discrete component solutions. The module incorporates a Doherty final stage delivering high power added efficiency, excellent linearity for the entire module at 2-2.5W average power according to normal 8-9dB back off.

This module is assembled in 7*7mm over molded plastic package, with complete thermally enhanced metal flange to dissipate heat effectively, while maintaining high RF performance.

It is part of 5G small cell PA MCM family from Innogration, with complete pin to pin compatibility across all key 5G bands, N41/N78/N79.

To use it at lower drain voltage for fine power tuning, it can be used to replace 4-10W LDMOS or GaAs Doherty MCM with better performance

- Typical Performance of 1 Carrier WCDMA (On Innogration fixture with device soldered):

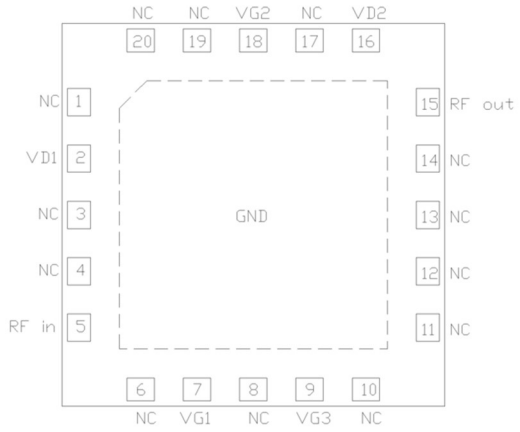
VDS= 28V, Idq1=2mA, Idq2=20mA,Vpeak=-5.0V					
Pout(dBm)	Freq (MHz)	Ppeak(dBm)	ACPR (dBc)	Gain(dB)	EFF (%)
33	3300	41.98	-30.36	32.1	43
	3400	42.04	-31.1	31.7	44.5
	3500	42.01	-31.5	30.8	45
	3600	41.96	-31.5	30.1	44.5

VDS= 32V, Idq1=2mA, Idq2=20mA,Vpeak=-5.0V					
Pout(dBm)	Freq (MHz)	Ppeak(dBm)	ACPR (dBc)	Gain(dB)	EFF (%)
34	3300	42.95	-30.5	32.8	42
	3400	43.01	-31.4	32.6	43
	3500	42.88	-32.2	31.8	44.5
	3600	42.74	-31.9	31.2	44

Features

- Industry leading RF performance for N78 5G Small cell, for instance
- ✓ 4*750mW / 300MHz
- ✓ 4*500mW / 200MHz
- 50 Ω Input/output matched,
- Integrated Doherty Final and driver Stage
- 7x7 mm Surface Mount Package, full copper flange underneath for grounding and heat dissipation

Pin Configuration and Description （Top view）



NC	No connection
GND	Grounding
RF In	RF input
RF out	RF output
VG1	Gate bias for driver stage
VD1	Drain bias for driver stage
VG2	Gate bias for peak path
VD2	Drain bias for peak path
VG3	Gate bias for main path
VD3	Drain bias for main path

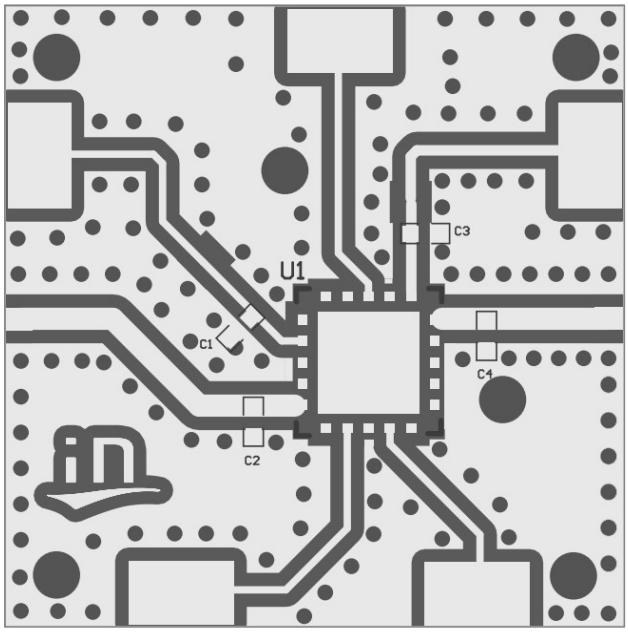
Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DSS}	150	Vdc
Gate--Source Voltage	V_{GS}	-10 to +2	Vdc
Operating Voltage	V_{DD}	+40	Vdc
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 T_C= 87°C, T_J=175°C, DC test	$R_{\theta JC}$	14	°C/W

Reference Circuit of Test Fixture Assembly Diagram



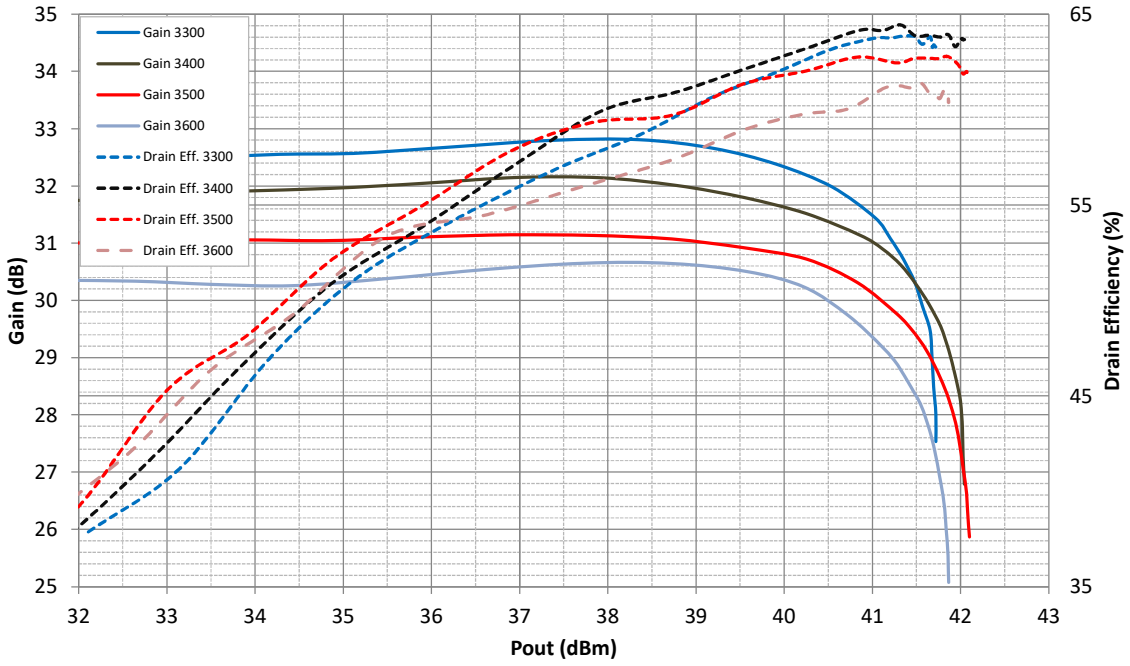
Component	Value	Description
U1	GMAH3336-15P4	PA (7*7mm)
C1、C3	8.2pF	ATC600S
C2	0.3pF	ATC600S
C4	0.7pF	ATC600S
Other used for drain bias	10uF	TDK1206

TYPICAL CHARACTERISTICS

Figure 1. Power Gain and Drain Efficiency as Function of Pulse Output Power at 28V and 32V

VDS= 28V, Idq1=2mA, Idq2=20mA,Vpeak=-5.0V					
Freq (MHz)	P1(dBm)	P1 Gain(dB)	P5dB(dBm)	P5dB(W)	EFF (%)
3300	40.68	31.8	41.72	14.9	63.2
3400	40.82	31.2	42.03	16.0	63.7
3500	40.95	30.2	42.09	16.2	61.8
3600	40.77	29.7	41.85	15.3	60.6

VDS= 32V, Idq1=2mA, Idq2=20mA,Vpeak=-5.0V					
Freq (MHz)	P1(dBm)	P1 Gain(dB)	P5dB(dBm)	P5dB(W)	EFF (%)
3300	41.57	32.6	42.59	18.2	60.0
3400	41.72	32.2	42.86	19.3	60.5
3500	41.63	31.2	42.85	19.3	59.0
3600	41.38	30.8	42.61	18.3	58.0



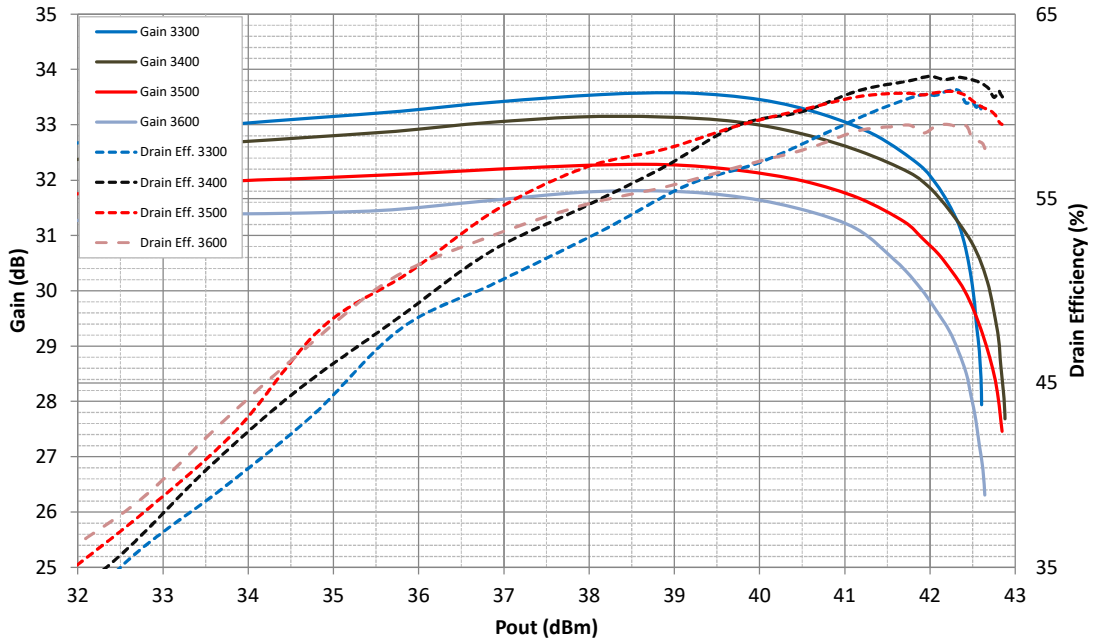
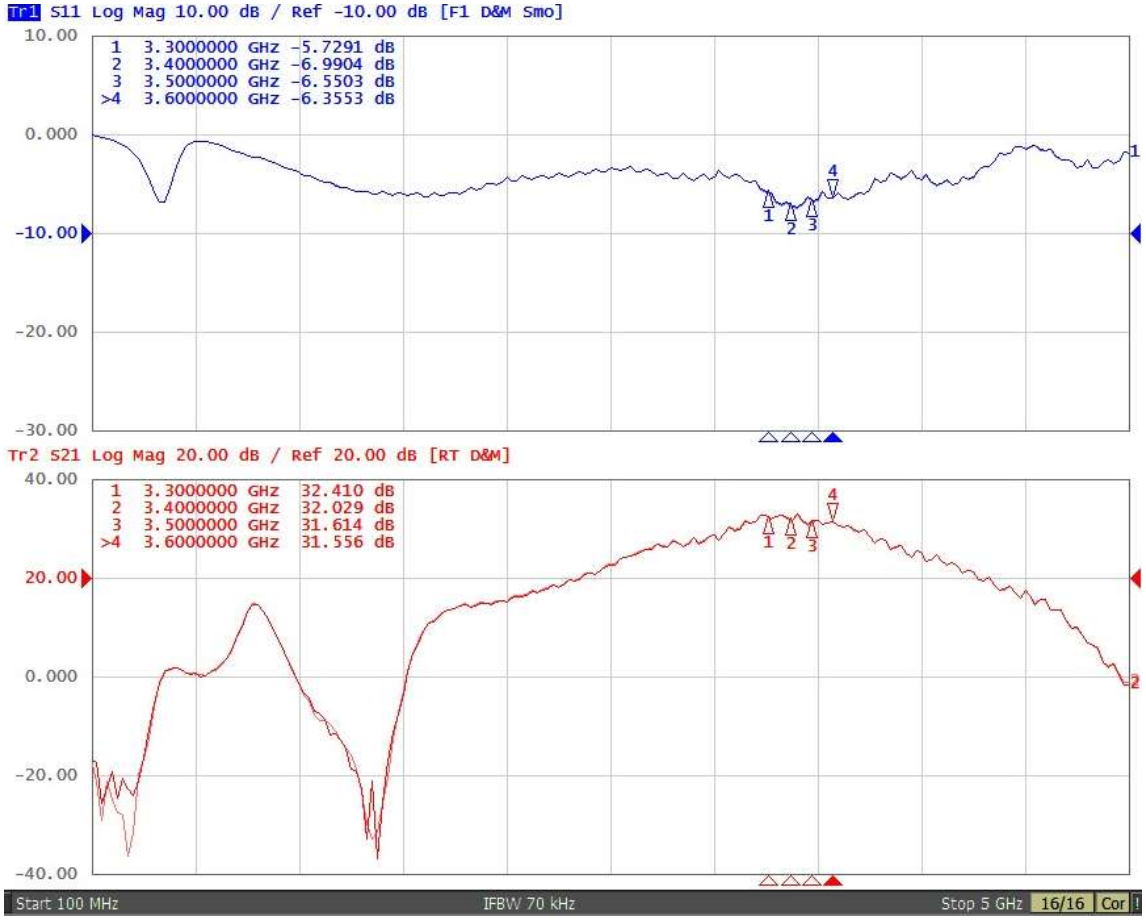
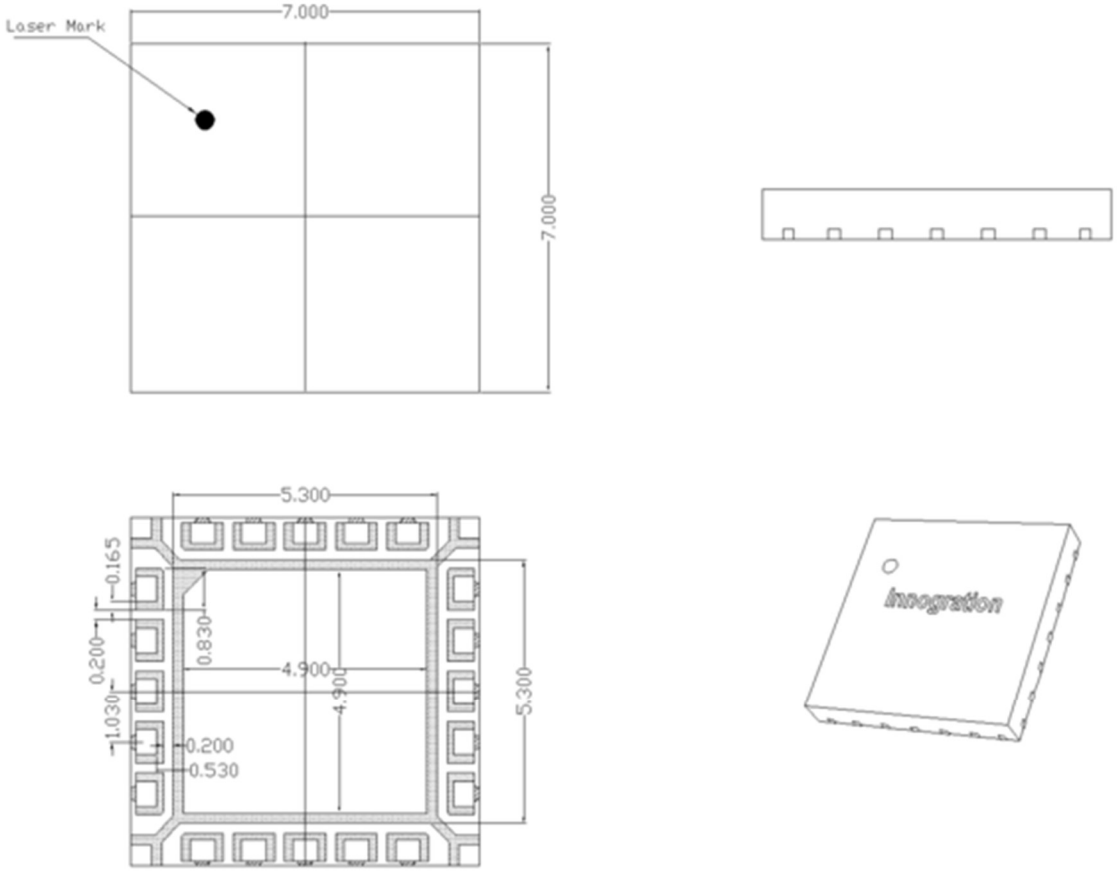


Figure 2. Network analyzer output S11, S21



Package Dimensions



Revision history

Table 3. Document revision history

Date	Revision	Datasheet Status
2020/6/1	Rev 1.0	Objective Datasheet
2020/7/23	Rev 1.0	Preliminary Datasheet
2021/10/18	Rev 1.1	Modify according to finalized 7*7mm package
2021/12/24	Rev 1.2	Modify according to latest test result

Application data based on HJ-20-14/21-18

Disclaimers

Specifications are subject to change without notice. Innogration believes the information contained within this data sheet to be accurate and reliable. However, no responsibility is assumed by Innogration for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Innogration . Innogration makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose."Typical" parameters are the average values expected by Innogration in large quantities and are provided for information purposes only. These values can and do vary in different applications and actual performance can vary over time. All operating parameters should be validated by customer's technical experts for each application. Innogration products are not designed, intended or authorized for use as components in applications intended for surgical implant into the body or to support or sustain life, in applications in which the failure of the Innogration product could result in personal injury or death or in applications for planning, construction, maintenance or direct operation of a nuclear facility. For any concerns or questions related to terms or conditions, pls check with Innogration and authorized distributors