

AGT0515 Datasheet

15 W GaN 30 MHz ~ 512 MHz Wide-Band Power Amplifier

1. Product Overview

1.1 Features

- 30 ~ 512 MHz Bandwidth
- 20 W Output Power(P3dB) at 500 MHz
- 19 dB Linear Gain at 250 MHz
- 62 % Efficiency(PAE) at 500 MHz & P3dB
- +28 V Supply

1.2 Applications

- Wireless Transmitters
- Wireless Infrastructure
- Test Instrument
- Radar

1.3 Package Profile & RoHS Compliance

 QFN40, 6.0x6.0x0.75 mm ³ , surface mount	 RoHS-compliant
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1.4 Pin Configuration

Pin	Description
5, 6	RF_IN
25, 26	RF_OUT
Others	NC or GND

Note: Backside metal paddle is RF and DC ground.

2. Summary on Product Performances

2.1 Typical Performance

Supply voltage = +28 V, T_A = +25 °C, CW, Z₀ = 50 Ω.

Parameters	Typical			Units	Condition
Frequency	30	250	500	MHz	
Small Signal Gain	20.4	19.4	18.3	dB	
Linear Gain	19.8	18.7	17.3	dB	At P _{out} =30 dBm
S ₁₁	-20	-13	-15	dB	
S ₂₂	-3	-6	-14	dB	
Noise Figure	2.9	3.1	3.2	dB	
Output Power(P _{3dB})	10.5	13.6	20.8	W	
Power Added Efficiency(PAE)	67	61	62	%	At P _{3dB}
I _{DQ}	55			mA	
Device Voltage	+28			V	

2.2 Absolute Maximum Ratings(not simultaneous) at 25°C

Parameters	Max. Rating
Device Voltage	+30 V
Gate Voltage	-5 to -1 V
Device Current	1.5 A
Gate Current	6 mA
Input RF Power, CW, 500 MHz*	30 dBm
Channel Temperature	225°C
Mounting Temperature (30 seconds)	260°C
Storage Temperature	-40 to +150°C

The operation of this device in excess of any of these limits may cause permanent damage.

* The max. input RF power, in principle, depends upon application frequency, matching circuit, and device voltage.

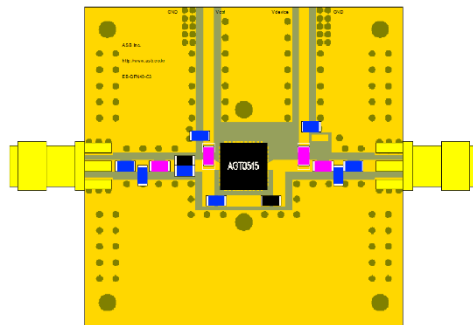
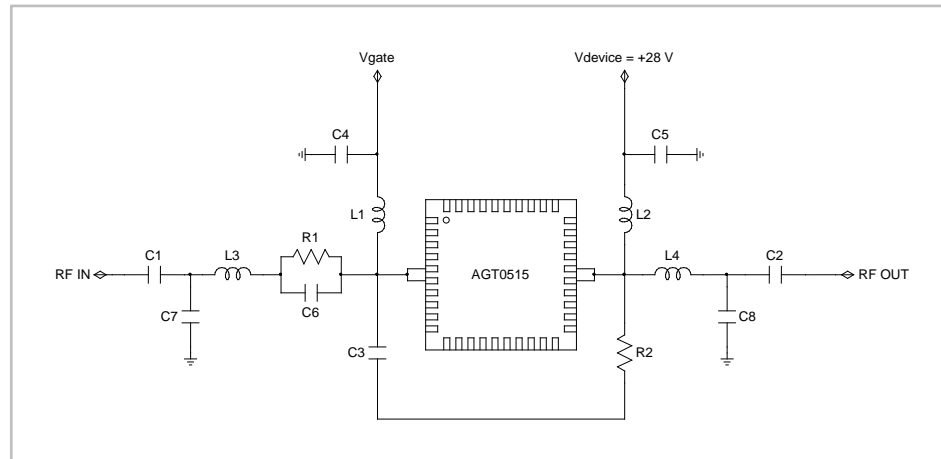
2.3 Recommended Operating Conditions

Parameter	Value
Operating Case Temperature Range	-40 to +85°C
Device Voltage	<= +30 V
Quiescent Drain current	55 mA
Gate Voltage*	-2.5 V

* To be adjusted to desired I_{DQ}.

3. Application: 30 ~ 512 MHz

3.1 Application Circuit & Evaluation Board



PCB Information

Material	FR4
Thickness (mm)	0.8
Size (mm)	40x40
EB No.	EB-QFN40-C3

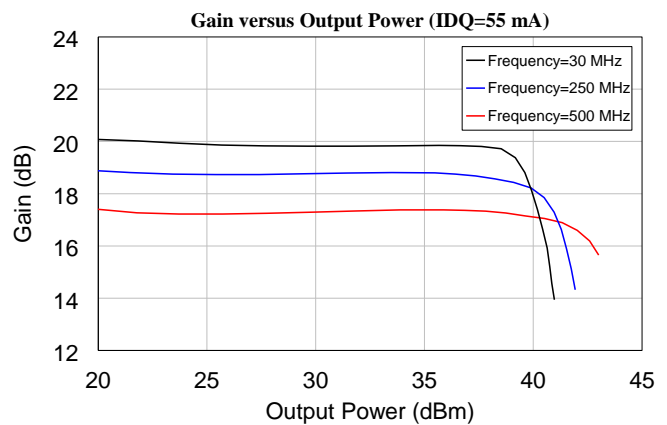
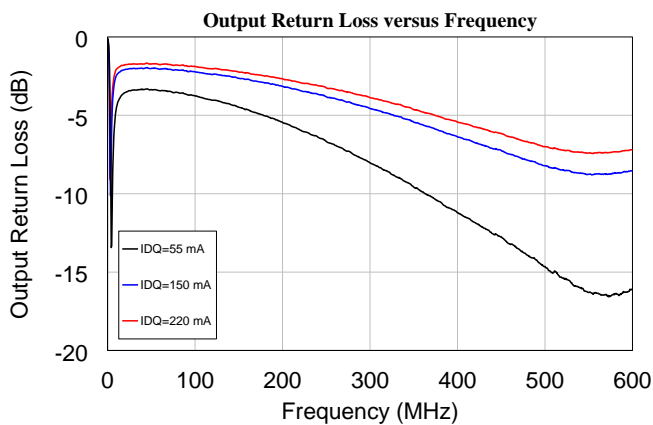
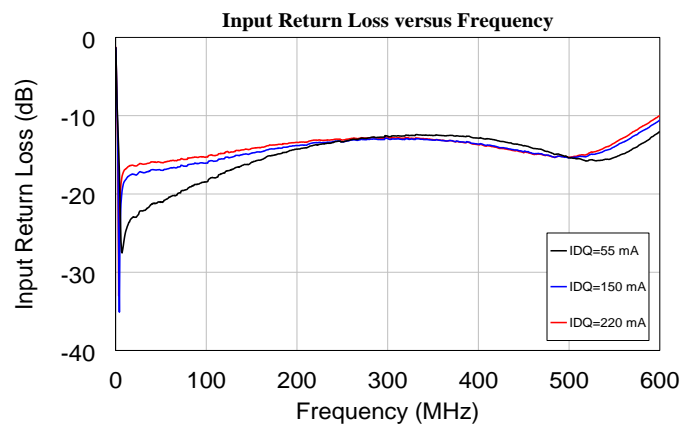
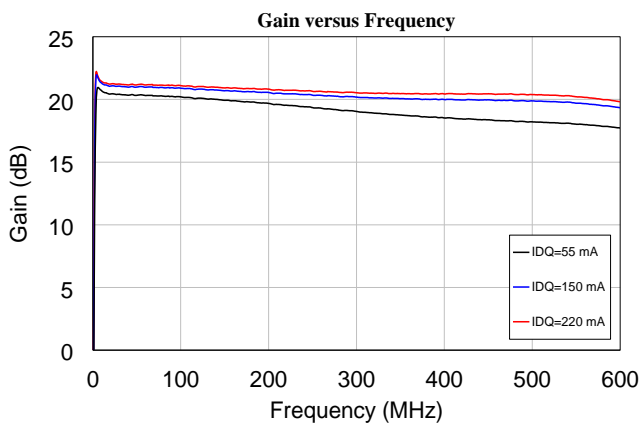
Bill of Material

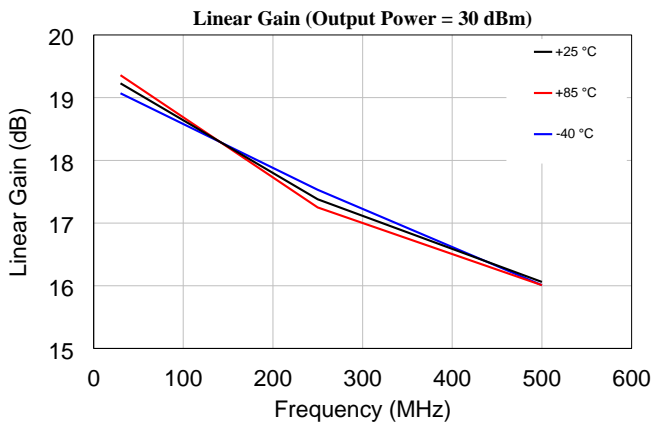
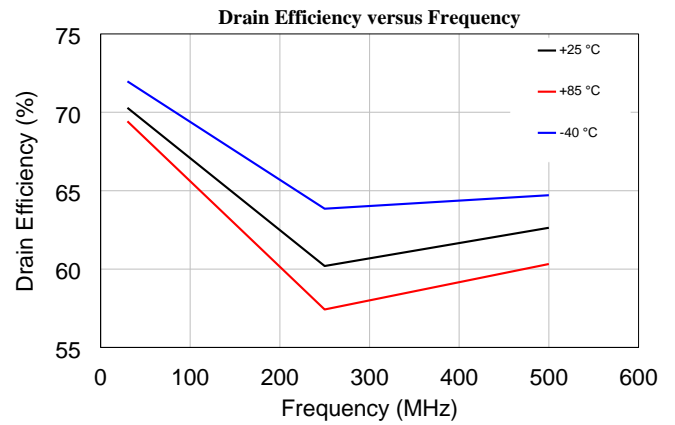
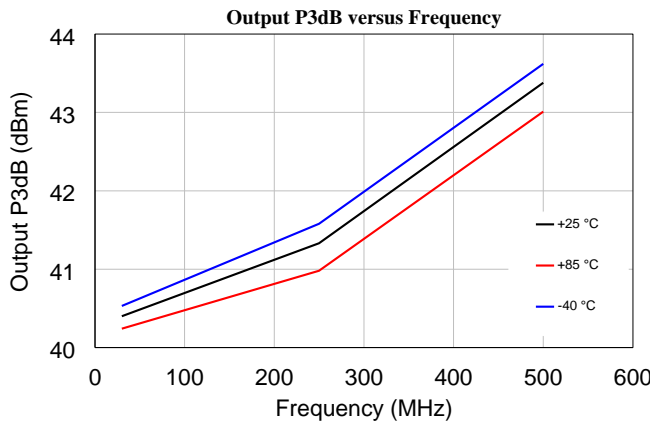
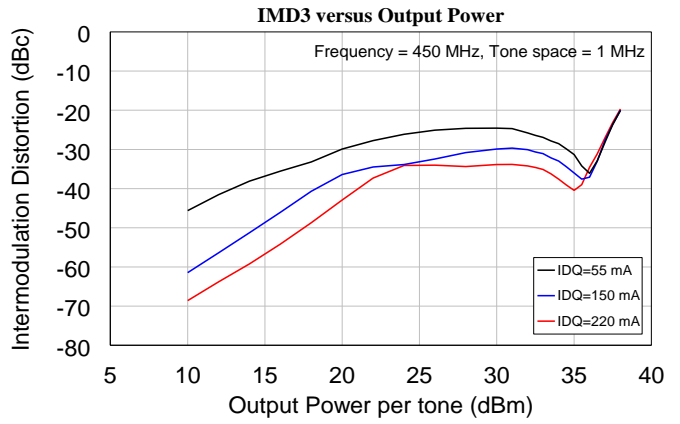
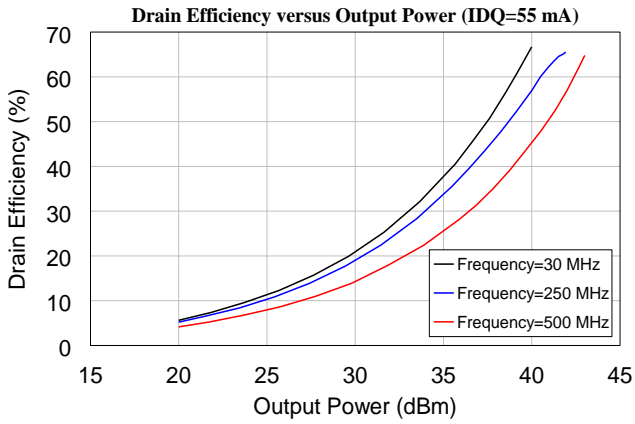
Symbol	Value	Size	Description	Manufacturer
AGT0515	-	-	MMIC Amplifier	ASB
C1, C2	4.7 nF	0603	DC blocking capacitor	Murata
C3	10 nF	0603	Feedback capacitor	Murata
C4, C5	10 μ F	0805	Decoupling capacitor	Murata
C6	12 pF	0603	Matching capacitor	Murata
C7	5.6 pF	0603	Matching capacitor	Murata
C8	5.6 pF	0603	Matching capacitor	Murata
L1	1 μ H	1206	RF choke inductor	Murata
L2	1 μ H	1210	RF choke inductor	Murata
L3	12 nH	0603	Matching inductor	Murata
L4	6.2 nH	0603	Matching inductor	Murata
R1	22 Ω	0603	Matching resistor	Samsung
R2	510 Ω	0603	Feedback resistor	Samsung

3.2 Performance Table

Supply voltage = +28 V, $T_A = +25\text{ }^\circ\text{C}$, CW, $Z_0 = 50\ \Omega$.

Parameters	Typical			Units	Condition
Frequency	30	250	500	MHz	
Small Signal Gain	20.4	19.4	18.3	dB	
Linear Gain	19.8	18.7	17.3	dB	At $P_{out}=30\text{ dBm}$
S11	-20	-13	-15	dB	
S22	-3	-6	-14	dB	
Noise Figure	3.2	3.2	3.3	dB	
Output Power(P_{3dB})	10.5	13.6	20.8	W	
Power Added Efficiency(PAE)	67	61	62	%	At P_{3dB}
I_{DQ}	55			mA	
Device Voltage	+28			V	





4. Thermal and Reliability Information

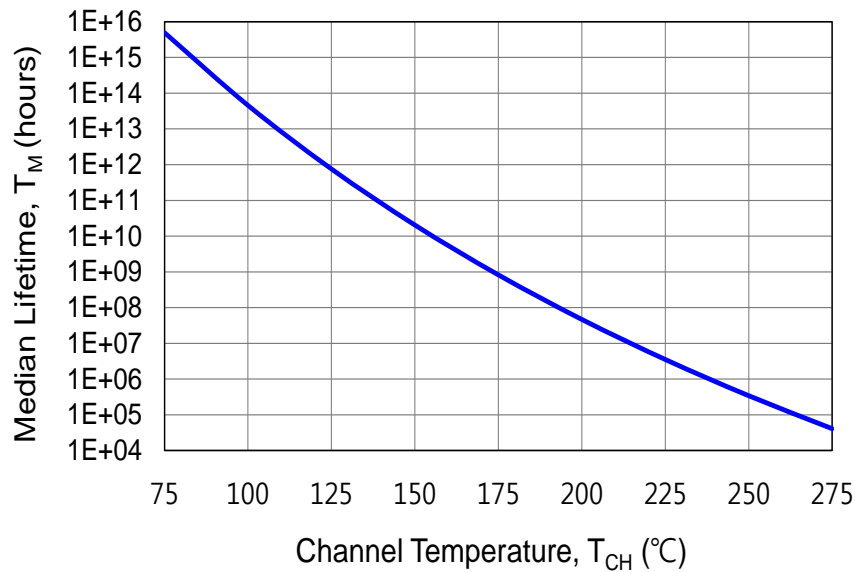
Parameters	Test Conditions	Value	Units
Thermal Resistance (θ_{JC}) ¹⁾		5.6	°C/W
Channel Temperature (T_{CH}) (No RF)	$T_{CASE} = 85^{\circ}C, V_D = +28 V, I_D = 300 mA,$ $P_{DISS} = 8.4 W, CW$	132	°C
Median Lifetime (T_M)		2.6E+11	hours

1) Thermal resistance is measured to the package backside.

Median Lifetime

Median Life Test Conditions: $V_D = +28 V$, Failure Criteria = 20% reduction in I_{D_MAX} during DC Life Testing.

Median Lifetime vs. T_{CH}



(Intentionally Blanked)

5. Bias Instruction

(Turn-on Procedure)

1. Connect RF cables at RFIN and RFOUT.
2. Connect ground line and DC supply line.
3. Apply -5 V to Vgate.
4. Apply 28 V to Vdevice.
5. Increase Vgate until drain current reaches 55 mA or desired bias point.
6. Turn on the RF input.

(Turn-off Procedure)

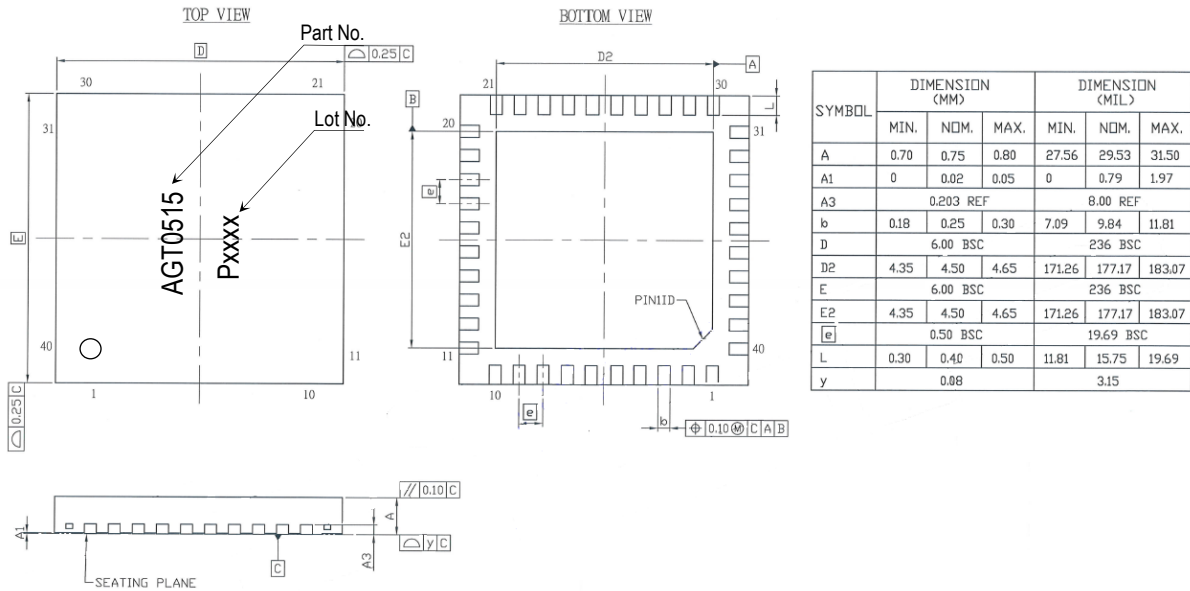
1. Turn off the RF input.
2. Turn off Vdevice.
3. Turn off Vgate.

6. Handling Precautions

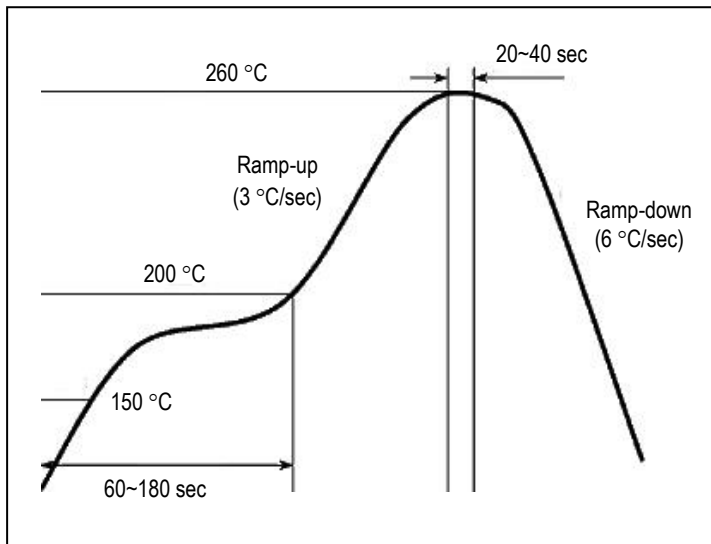
Parameters	Level
ESD-Human Body Model (HBM)	CLASS 1A (250 V ~ 500 V)
MSL-Moisture Sensitivity Level	MSL 3

CAUTION: Gallium Nitride Devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

7. Package Outline (QFN40, 6x6x0.75 mm³)



8. Recommended Soldering Reflow Profile



(End of Datasheet)

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