

AHB5614T8 Data Sheet

50 ~ 6000 MHz Wide Band Gain Block Amplifier

1. Product Overview

1.1 General Description

AHB5614T8, a gain block amplifier MMIC, has high linearity and low noise over a wide range of frequency from 50 MHz to 6000 MHz, being suitable for use in both receiver and transmitter of telecommunication system up to 6000 MHz. The active bias circuit stabilizing the current over process variation is adopted. The amplifier is available in TDFN8 package and passes through the stringent 100% DC & RF test via an automated test handler.

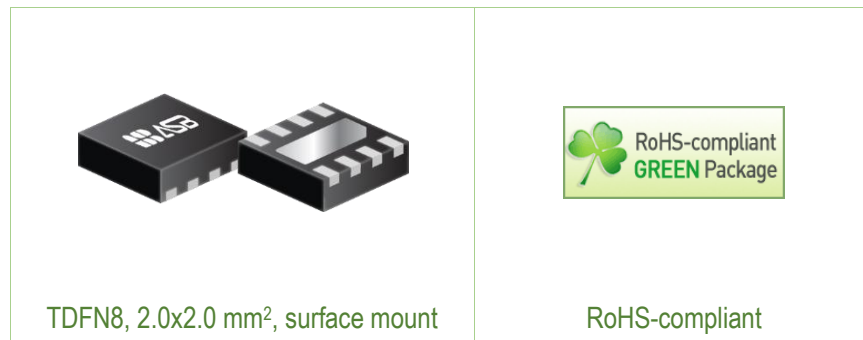
1.2 Features

- 14.4 dB Gain at 2000 MHz
- 1.0 dB Ultra Flat Gain at 50 ~ 6000 MHz
- 2.7 dB NF at 2000 MHz
- 19.7 dBm P1dB at 2000 MHz
- 36.2 dBm OIP3 at 2000 MHz
- MTTF > 100 Years
- Single Supply: +5 V, 80mA

1.3 Applications

- Wide-band application at 50 ~ 6000 MHz

1.4 Package Profile & RoHS Compliance



2. Summary on Product Performances

2.1 Typical Performance

Supply voltage = +5 V, T_A = +25 °C, Z_O = 50 Ω.

Parameter	Test Conditions	Typical									Unit
Frequency		50	1000	2000	3000	3400	3800	4200	5200	5900	MHz
Gain	Pin = -30 dBm	14.5	14.4	14.4	14.4	14.4	14.4	14.4	14.2	13.9	dB
S11	Pin = -30 dBm	-11	-22	-15	-15	-15	-15	-15	-12	-9	dB
S22	Pin = -30 dBm	-14	-30	-15	-15	-15	-15	-15	-12	-9	dB
Noise Figure		2.4	2.5	2.7	2.7	2.8	2.8	2.9	3.2	3.8	dB
Output IP3		38.0 ¹⁾	37.6 ¹⁾	36.2 ¹⁾	34.3 ¹⁾	33.2 ¹⁾	33.7 ¹⁾	34.4 ¹⁾	33.2 ²⁾	29.5 ³⁾	dBm
Output P1dB		18.8	19.9	19.7	19.2	18.4	18.5	18.1	18.6	17.2	dBm
Current	Without Pin	80									mA
Device Voltage	Without Pin	5									V

1) OIP3 is measured with two tones at an output power of +8 dBm/tone separated by 1 MHz.

2) OIP3 is measured with two tones at an output power of +7 dBm/tone separated by 1 MHz.

3) OIP3 is measured with two tones at an output power of +5 dBm/tone separated by 1 MHz.

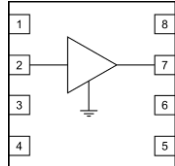
2.2 Product Specification

Supply voltage = +5 V, T_A = +25 °C, Z_O = 50 Ω.

Parameter	Min	Typ	Max	Unit
Frequency		2000		MHz
Gain		14.4		dB
S11		-15		dB
S22		-15		dB
Noise Figure		2.7		dB
OIP3		36.2 ¹⁾		dBm
P1dB		19.7		dBm
Current		80		mA
Device Voltage		5		V

1) OIP3 is measured with two tones at an output power of +8 dBm/tone separated by 1 MHz.

2.3 Pin Configuration

Pin	Description	Simplified Outline
1, 3, 4, 5, 6, 8	NC or GND	
2	RF_IN	
7	RF_OUT	
Backside Paddle	DC/RF Ground	

2.4 Absolute Maximum Ratings, $T_A = +25\text{ }^\circ\text{C}$

Parameters	Max. Ratings
Operation Case Temperature	-40 to +85 °C
Storage Temperature	-40 to +150 °C
Device Voltage	+6 V
Operation Junction Temperature	+150 °C
Input RF Power	TBD

2.5 Thermal Resistance

Symbol	Description	Typ	Unit
R_{th}	Thermal resistance from junction to lead	TBD	°C/W

2.6 ESD Classification & Moisture Sensitivity Level

ESD Classification

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

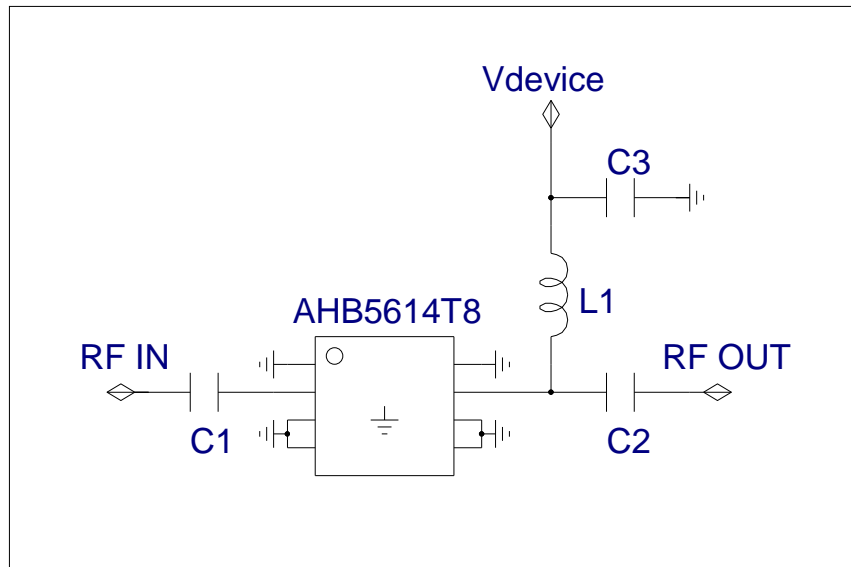
Moisture Sensitivity Level

MSL 3 at 260 °C reflow

(Intentionally Blanked)

3. Application: 50 ~ 6000 MHz, $V_{device} = +5 V$

3.1 Application Circuit & Evaluation Board



Note: 1. The ground via should be located beneath the ground pins
(Refer to 'Surface Mount Recommendation')

Bill of Material

Symbol	Value	Size(Inch)	Description	Manufacturer
AHB5614T8	-	-	MMIC Amplifier	ASB
C1, C2	1 μ F	0402	DC blocking Capacitor	Murata
C3	1 μ F	0402	Decoupling Capacitor	Murata
L1	270 nH	0402	RF Choke Inductor	Murata

(Intentionally Blanked)

3.2 Performance Table

Supply voltage = +5 V, $T_A = +25\text{ }^\circ\text{C}$, $Z_O = 50\ \Omega$.

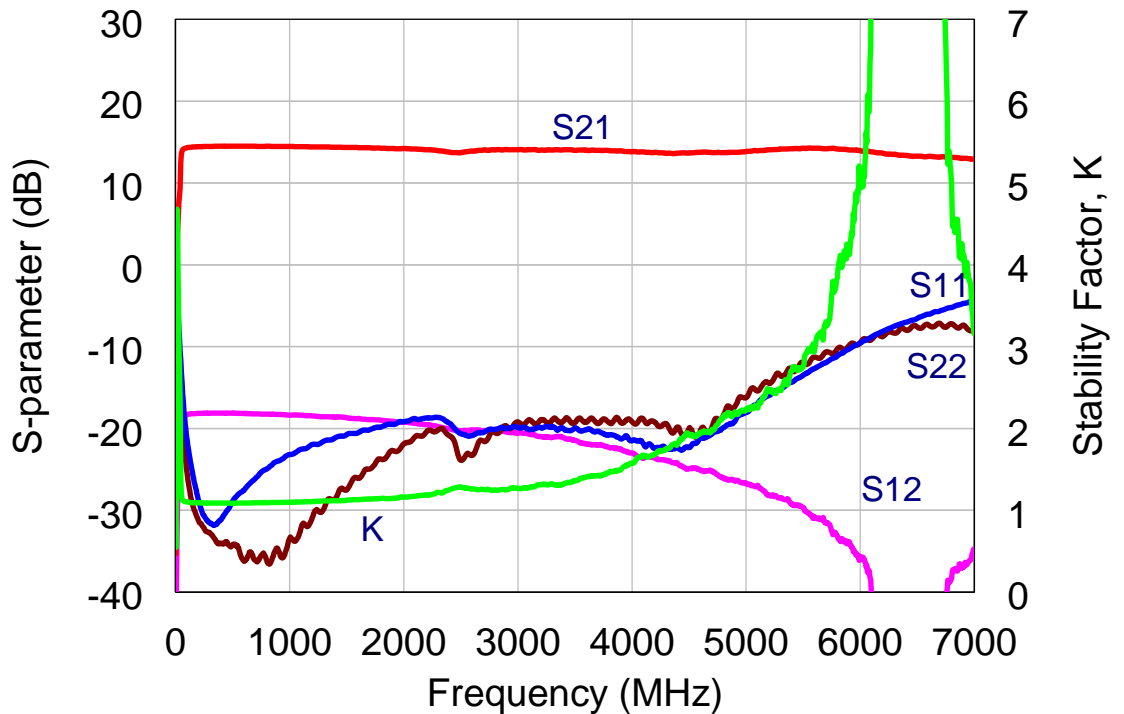
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Current	Without Pin	80										mA
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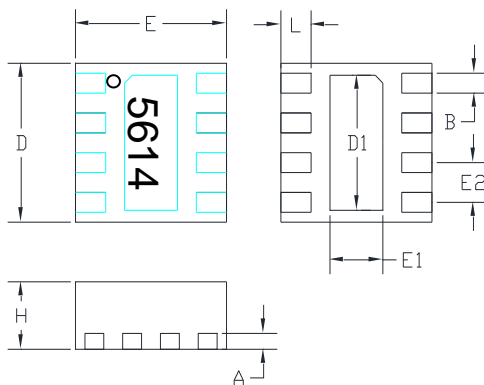
3.3 Plot of S-parameter & Stability Factor



► Customized Application Circuit Support

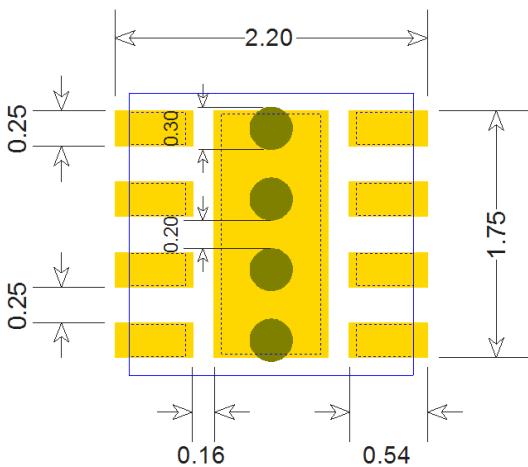
Customized application circuit (reference design) with respect to application frequency, impedance, gain, linearity, and bias condition can be supported upon customer's request. Please feel free to contact us at sales@asb.co.kr.

4. Package Outline (TDFN8)



Symbols	Dimensions (In mm)		
	MIN	NOM	MAX
A	-	0.20REF	-
B	0.18	0.23	0.28
D	1.95	2.00	2.03
D1	-	1.7BSC	-
E	1.95	2.00	2.03
E1	-	0.7BSC	-
E2	-	0.5BSC	-
L	0.35	0.40	0.45
H	0.80	0.85	0.90

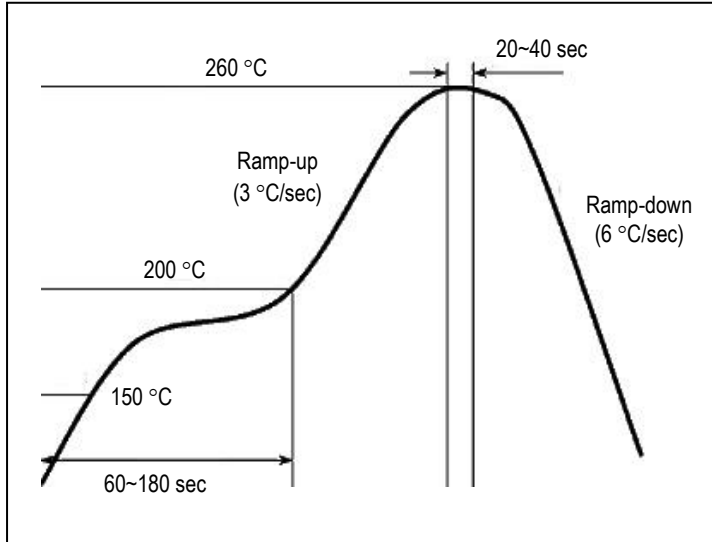
5. Surface Mount Recommendation (In mm)



NOTE

1. It is recommended that the ground via holes be placed as close to the ground pin of the device as possible for better RF and thermal performance, as shown in the drawing at the left side.

6. Recommended Soldering Reflow Profile



(End of Datasheet)

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