

ABU1526 Data Sheet

5 ~ 1200 MHz Wide-band CATV Linear Amplifier MMIC

1. Product Overview

1.1 General Description

ABU1526, a wide-band linear amplifier MMIC, has high linearity and low noise over a wide range of frequency from 5 MHz to 1200 MHz, being suitable for use in the fiber receiver, distribution amplifiers, and drop amplifiers of CATV. The amplifier is available in an SOT89 package and passes through the stringent 100% DC & RF test in an automated test handler.

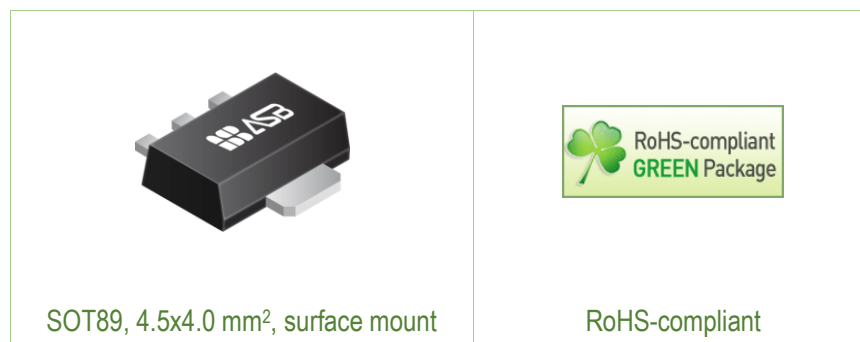
1.2 Features

- Low-noise and high linearity
- Wide-band CATV application at 5 ~ 1200 MHz
- 75 Ω input & output matching
- Robust under hard operating conditions
- 26.5 dB gain at 500 MHz
- CSO of 60 dBc, CTB of 66 dBc
@ Pout = 87 dB μ V flat for NTSC 77 channels, device voltage = +5 V
- Single supply: +5 V

1.3 Applications

- CATV Reverse at 5 ~ 300 MHz
- CATV Forward at 50 ~ 1200 MHz
- Optical Node, FTTH, RFoG

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 = 75 Ω.

Parameter	Typical			Unit
Frequency	50	500	1200	MHz
Noise Figure	1.7	2.1	2.2	dB
Gain	26.7	26.5	25.1	dB
S11	-11	-11	-11	dB
S22	-11	-14	-12	dB
Output IP3 ¹⁾	37	36	35	dBm
Output IP2 ²⁾	46			dBm
Output P1dB	21	21	16	dBm
CSO	60 ³⁾			dBc
CTB	66 ³⁾			dBc
Current	92			mA
Device Voltage	+5			V

1) OIP3 is measured with two tones at an output power of +5 dBm/tone separated by 6 MHz.

2) OIP2 is measured with two tones (F1 = 400 MHz + F2 = 450 MHz) at an output power of +5 dBm/tone.

3) CSO & CTB measured at P_{out} = 87 dBμV flat for NTSC 77 channels.

2.2 Product Specification

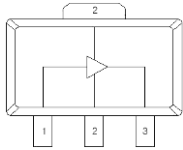
Supply voltage = +5 V, T_A = +25 °C, Z_O = 75 Ω.

Parameter	Min	Typ	Max	Unit
Frequency		500		MHz
Noise Figure		2.1		dB
Gain		26.5		dB
S11		-11		dB
S22		-14		dB
Output IP3 ¹⁾		34		dBm
Output IP2 ²⁾		46		dBm
Output P1dB		21		dBm
Current		92		mA
Device Voltage		+5		V

1) OIP3 is measured with two tones at an output power of +5 dBm/tone separated by 6 MHz.

2) OIP2 is measured with two tones (F1 = 400 MHz + F2 = 450 MHz) at an output power of +5 dBm/tone.

2.3 Pin Configuration

Pin	Description	Simplified Outline
1	RF_IN	
2	Ground	
3	RF_OUT & Bias	

2.4 Absolute Maximum Ratings, T_A = +25 °C

Parameters	Max. Ratings
Operating Case Temperature	-40 to +85 °C
Storage Temperature	-40 to +150 °C
Device Voltage	+6 V
Device Current	130 mA
Power Dissipation	+0.65 W
Junction Temperature	+150 °C
Input RF Power (CW, 75 Ω matched)	+23 dBm

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

* Refer to the max. input RF power data at http://www.asb.co.kr/pdf/Maximum_Input_Power_Analysis.pdf. The max. input RF power, in principle, depends upon application frequency, matching circuit, and device voltage.

2.5 Thermal Resistance

Symbol	Description	Typ	Unit
R _{th}	Thermal resistance from junction to lead	70	°C/W

2.6 ESD Classification & Moisture Sensitivity Level

ESD Classification

HBM	Class 1A
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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.

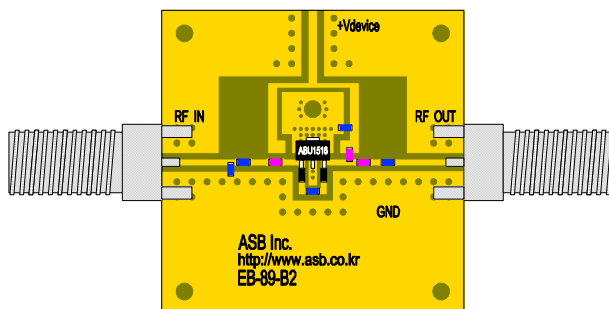
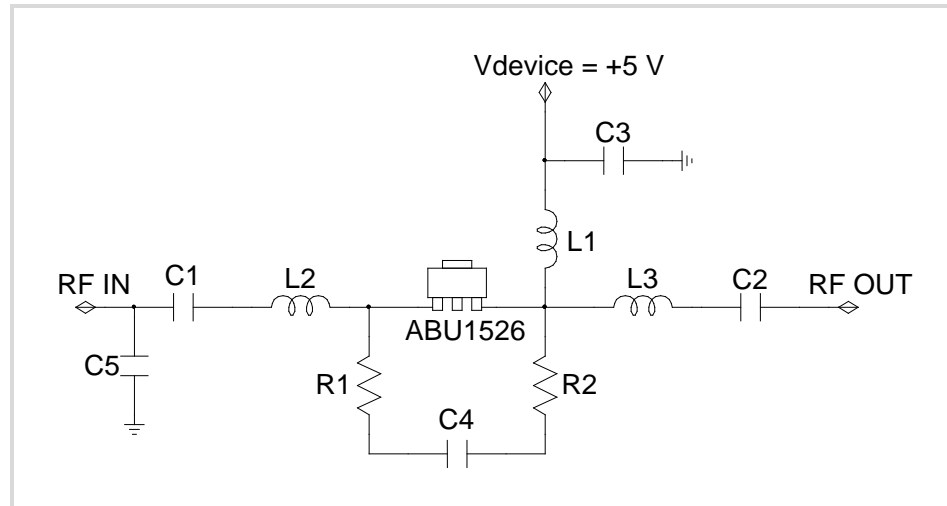
Moisture Sensitivity Level

MSL 3 at 260 °C reflow

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3. Application: 50 ~ 1200 MHz ($V_{\text{device}} = +5 \text{ V}$)

3.1 Application Circuit & Evaluation Board



PCB Information	
Material	FR4
Thickness (mm)	0.8
Size (mm)	40x40
EB No.	EB-89-B2

Bill of Material

Symbol	Value	Size	Description	Manufacturer
ABU1526	-	-	MMIC Amplifier	ASB
C1, C2	4.7 nF	0603	DC blocking capacitor	Murata
C3	10 μ F	0805	Decoupling capacitor	Murata
C4	10 nF	0402	Feedback capacitor	Murata
C5	1.5 pF	0603	Matching capacitor	Murata
L1	1 μ H	1206	RF choke inductor	Murata
L2, L3	6.8 nH	0603	Matching inductor	Murata
R1	360 Ω	0402	Feedback resistor	Samsung
R2	1.5 k Ω	0402	Feedback resistor	Samsung

3.2 Performance Table

Supply voltage = +5 V, T_A = +25 °C, Z_O = 75 Ω.

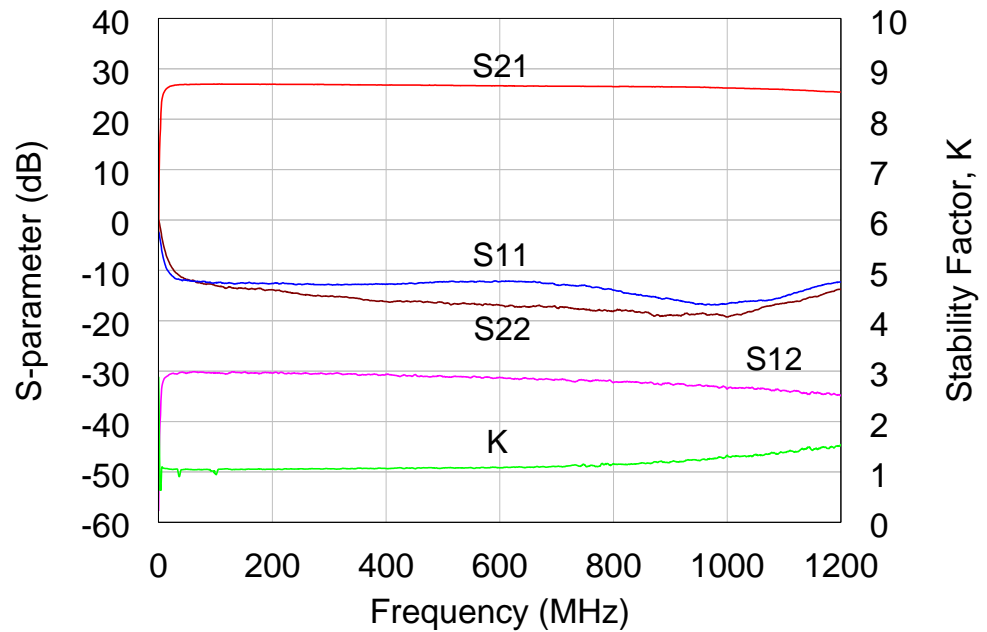
Parameter	Typical			Unit
Frequency	50	500	1200	MHz
Noise Figure	1.7	2.1	2.2	dB
Gain	26.7	26.5	25.1	dB
S11	-11	-11	-11	dB
S22	-11	-14	-12	dB
Output IP3 ¹⁾	37	36	35	dBm
Output IP2 ²⁾	46			dBm
Output P1dB	21	21	16	dBm
CSO	60 ³⁾			dBc
CTB	66 ³⁾			dBc
Current	92			mA
Device Voltage	+5			V

1) OIP3 is measured with two tones at an output power of +5 dBm/tone separated by 6 MHz.

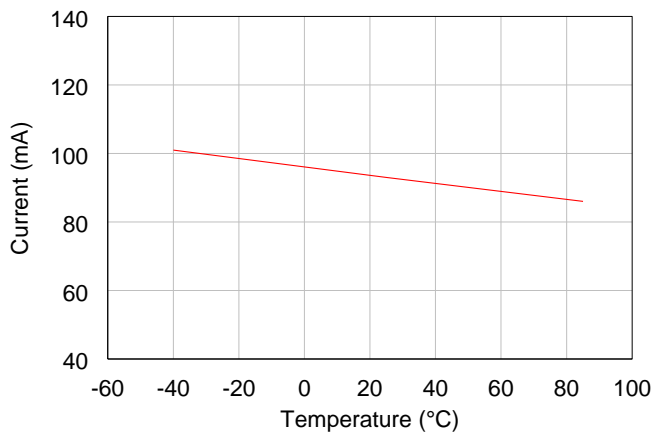
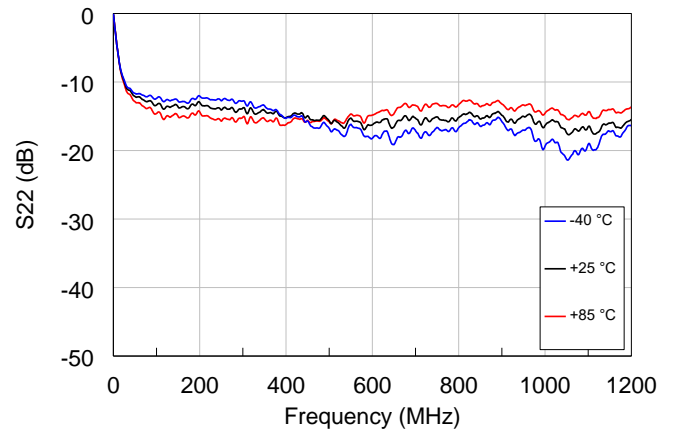
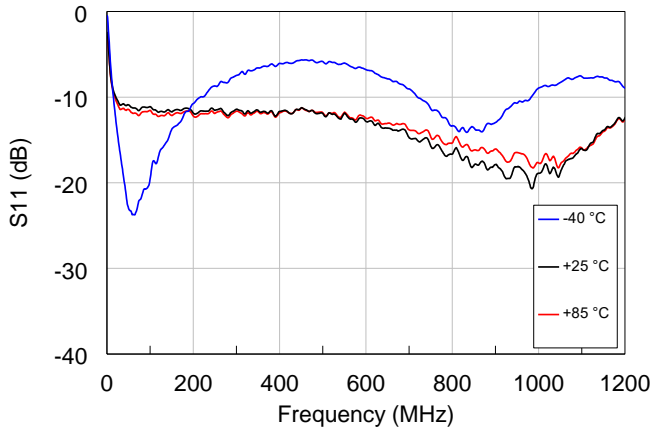
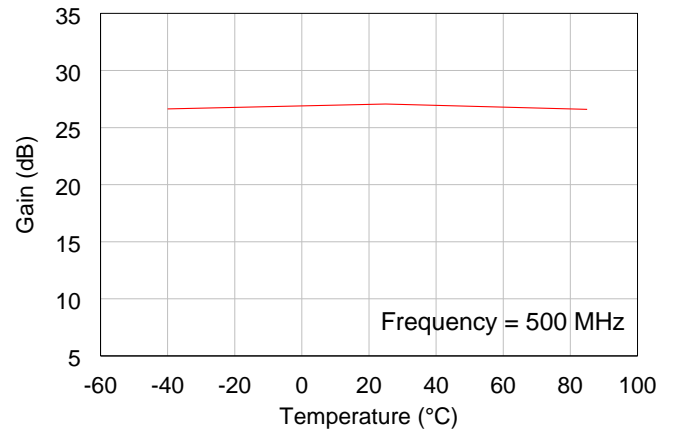
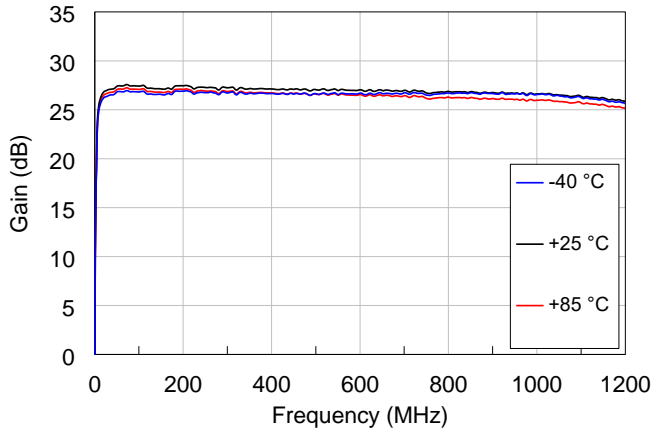
2) OIP2 is measured with two tones (F1 = 400 MHz + F2 = 450 MHz) at an output power of +5 dBm/tone.

3) CSO & CTB measured at P_{out} = 87 dBμV flat for NTSC 77 channels.

3.3 Plot of S-parameter & Stability Factor

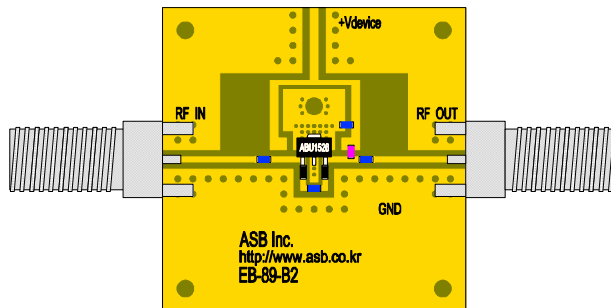
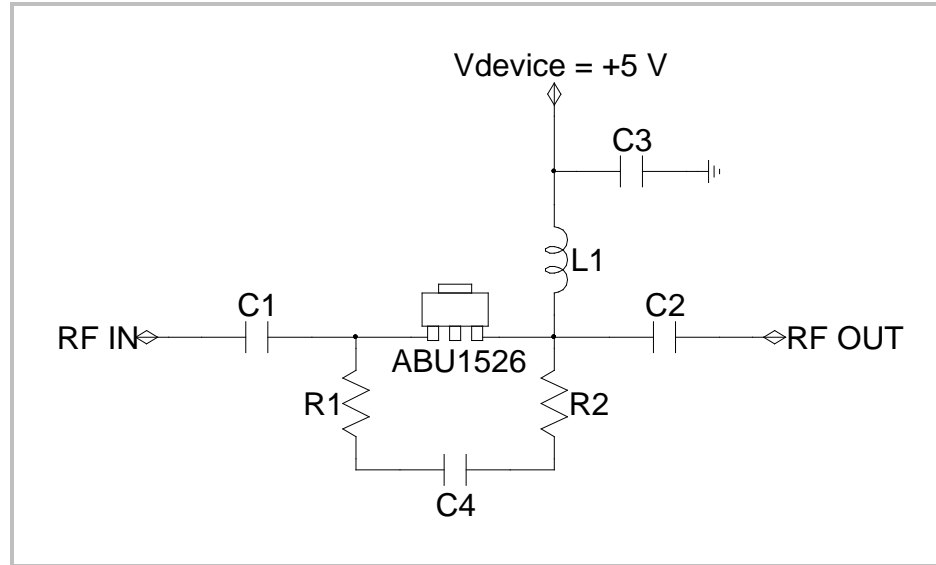


3.4 Plots of Noise Figure and Performances with Temperature



4. Application: 5 ~ 300 MHz ($V_{\text{device}} = +5 \text{ V}$)

4.1 Application Circuit & Evaluation Board



PCB Information	
Material	FR4
Thickness (mm)	0.8
Size (mm)	40x40
EB No.	EB-89-B2

Bill of Material

Symbol	Value	Size	Description	Manufacturer
ABU1526	-	-	MMIC Amplifier	ASB
C1, C2	1 μF	0603	DC blocking capacitor	Murata
C3	10 μF	0805	Decoupling capacitor	Murata
C4	1 μF	0402	Feedback capacitor	Murata
L1	22 μH	1206	RF choke inductor	Murata
R1	360 Ω	0402	Feedback resistor	Samsung
R2	1.5 k Ω	0402	Feedback resistor	Samsung

4.2 Performance Table

Supply voltage = +5 V, T_A = +25 °C, Z_O = 75 Ω.

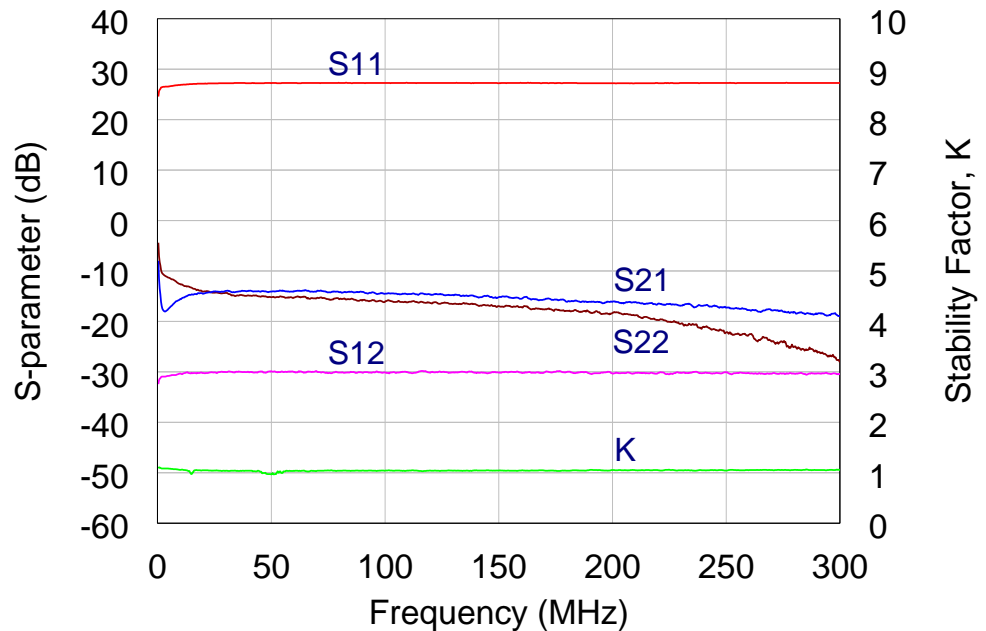
Parameter	Typical			Unit
Frequency	5	50	300	MHz
Noise Figure	2.4 ³⁾	1.5	1.6	dB
Gain	26.4	27.1	27.1	dB
S11	-16	-13	-17	dB
S22	-11	-14	-20	dB
Output IP3 ¹⁾	36 ¹⁾	37 ²⁾	35 ²⁾	dBm
Output IP2 ²⁾	46 ¹⁾	46 ²⁾	44 ²⁾	dBm
Output P1dB	20	21	21	dBm
Current	92			mA
Device Voltage	+5			V

1) OIP3 & OIP2 are measured with two tones at an output power of +3 dBm/tone separated by 1 MHz.

2) OIP3 & OIP2 are measured with two tones at an output power of +6 dBm/tone separated by 6 MHz.

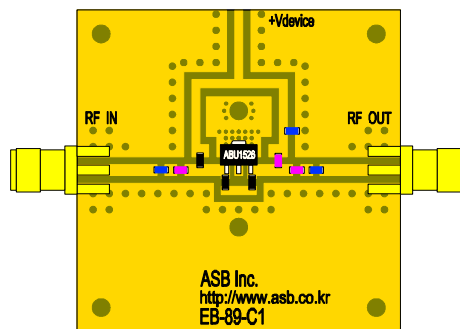
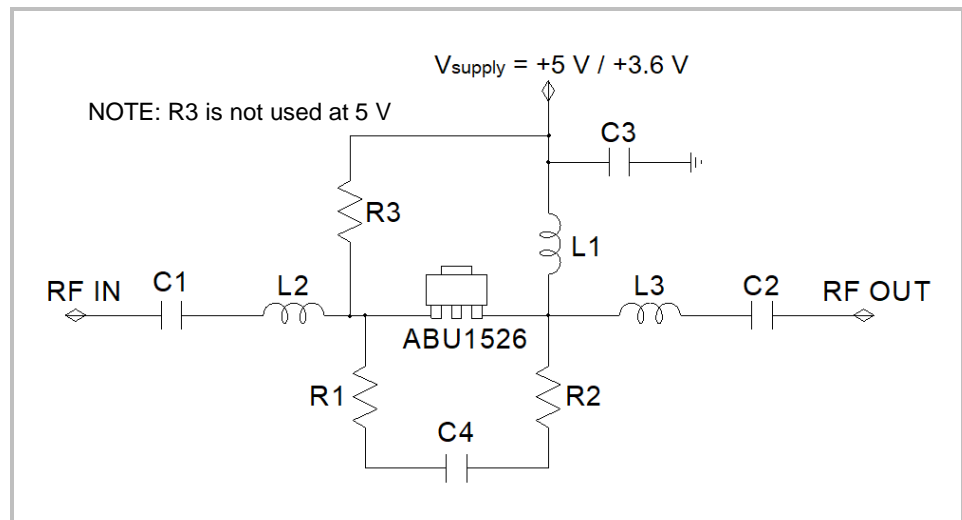
3) NF is measured at 10 MHz

4.3 Plot of S-parameter & Stability Factor



5. Application: 2 ~ 512 MHz (50Ω , $V_{\text{supply}} = +5 \text{ V}, +3.6 \text{ V}$)

5.1 Application Circuit & Evaluation Board



PCB Information	
Material	FR4
Thickness (mm)	0.8
Size (mm)	40x40
EB No.	EB-89-C1

Bill of Material

Symbol	Value	Size	Description	Manufacturer
ABU1526	-	-	MMIC Amplifier	ASB
C1, C2	1 μF	0603	DC blocking capacitor	Murata
C3	10 μF	0805	Decoupling capacitor	Murata
C4	10 nF	0603	Feedback capacitor	Murata
L1	22 μH	1206	RF choke inductor (Internal resistance 3 ohm)	Murata
L2, L3	6.8 nH	0603	Matching inductor	Murata
R1	360 Ω	0603	Feedback resistor	Samsung
R2	1 k Ω	0603	Feedback resistor	Samsung
R3 ¹⁾	68 k Ω	0603	Current Adjust resistor	Samsung

1) R3 is not used at 5 V.

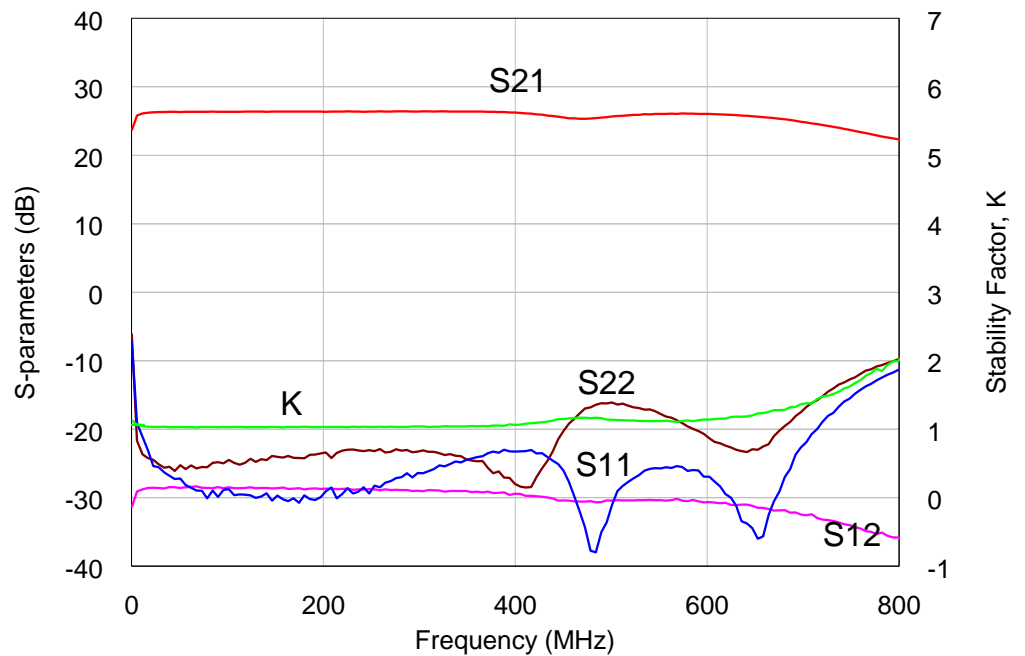
5.2 Performance Table

Supply voltage = +5 V, +3.6 V, T_A = +25 °C, Z_O = 50 Ω.

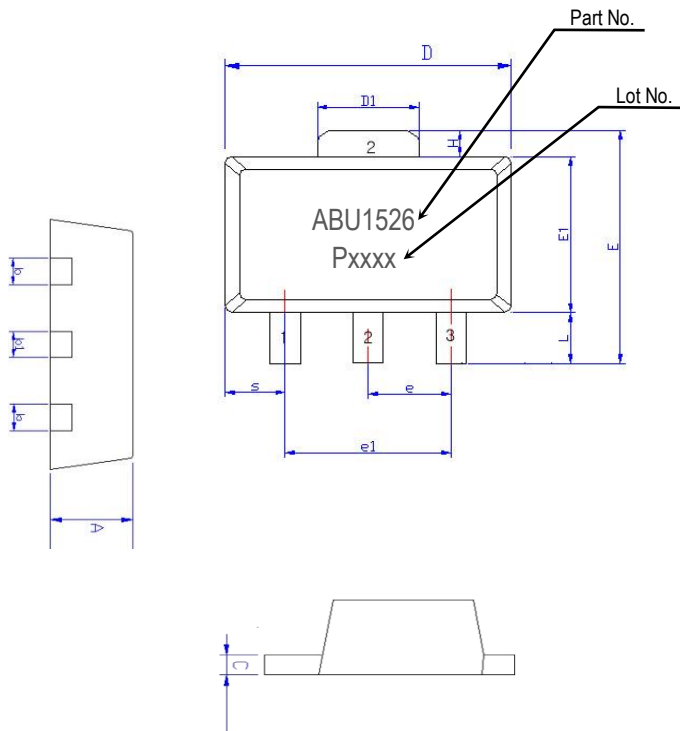
Parameter	Typical						Unit
	2	30	512	2	30	512	
Frequency							MHz
Noise Figure	3.1 ³⁾	1.8	1.5	3.0 ³⁾	1.7	1.5	dB
Gain	25.3	26.1	25.6	24.9	25.8	25.3	dB
S11	-15	-20	-20	-14	-20	-20	dB
S22	-17	-20	-15	-17	-20	-16	dB
Output IP3	34 ¹⁾	35 ²⁾	35 ²⁾	32 ¹⁾	33 ²⁾	32 ²⁾	dBm
Output P1dB	20	22	21	17	19	19	dBm
Current	89			69			mA
Device Voltage	+4.7			+3.4			V

- 1) OIP3 is measured with two tones at an output power of +5 dBm/tone separated by 0.2 MHz.
- 2) OIP3 is measured with two tones at an output power of +5 dBm/tone separated by 1 MHz.
- 3) NF is measured at 10 MHz

5.3 Plot of S-parameter & Stability Factor

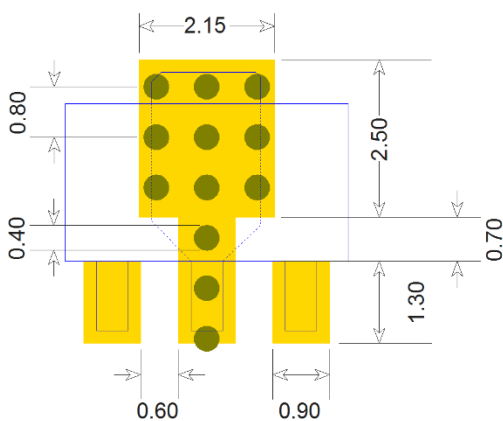


6. Package Outline (SOT89, 4.5x4.0x1.5 mm)



Symbols	Dimensions (In mm)		
	MIN	NOM	MAX
A	1.40	1.50	1.60
L	0.89	1.04	1.20
b	0.36	0.42	0.48
b1	0.41	0.47	0.53
C	0.38	0.40	0.43
D	4.40	4.50	4.60
D1	1.40	1.60	1.75
E	3.64	---	4.25
E1	2.40	2.50	2.60
e1	2.90	3.00	3.10
H	0.35	0.40	0.45
S	0.65	0.75	0.85
e	1.40	1.50	1.60

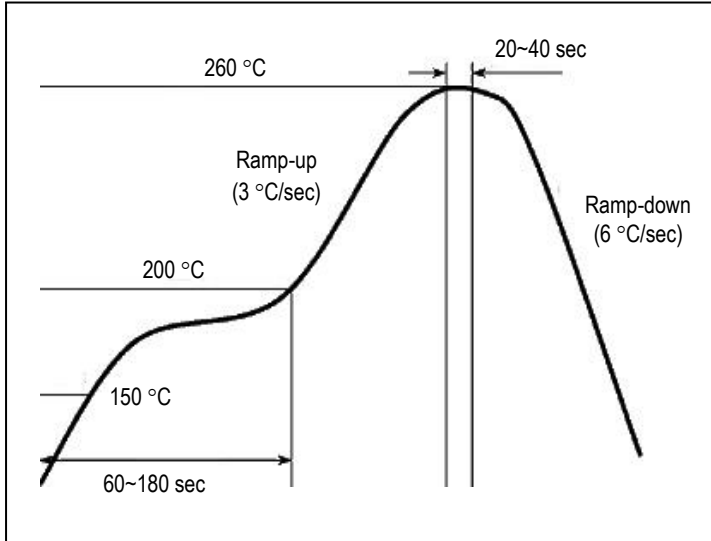
7. Surface Mount Recommendation (In mm)



NOTE

1. The number and size of ground via holes in a circuit board are critical for thermal and RF grounding considerations.
2. Recommended is that the ground via holes be placed on the bottom of the lead pin 2 and exposed pad of the device for better RF and thermal performance, as shown in the drawing at the left side.

8. Recommended Soldering Reflow Profile



(End of Datasheet)

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