

ABB2516 Data Sheet

50 ~ 1200 MHz CATV Push-pull Amplifier MMIC

1. Product Overview

1.1 General Description

ABB2516, a wide-band linear push-pull amplifier MMIC, has high linearity and low noise over a wide range of frequency from 50 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 SOIC8 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 50 ~ 1200 MHz
- 75 Ω input & output matching
- Robust under hard operation conditions
- 16.7 dB gain at 500 MHz
- CSO of 68 dBc, CTB of 62 dBc
@ Pout = 102 dB μ V flat for NTSC 77 channels, device voltage = +5 V
- Single supply: +5 V

1.3 Applications

- CATV Forward at 50 ~ 1200 MHz
- HFC Nodes, Head-end Equipment

1.4 Package Profile & RoHS Compliance

 <p>SOIC8, 6.0x4.8 mm², surface mount</p>	 <p>RoHS-compliant</p>
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2. Summary on Product Performances

2.1 Typical Performance

Supply voltage = +5 V, $T_A = +25\text{ }^{\circ}\text{C}$, $Z_O = 75\text{ }\Omega$.

Parameter	Typical			Unit
Frequency	50	500	1200	MHz
Noise Figure	2.5	2.6	2.8	dB
Gain	17.0	16.7	15.6	dB
S11	-15	-18	-20	dB
S22	-16	-17	-18	dB
Output IP3 ¹⁾	43	43	41	dBm
Output IP2 ²⁾	65			dBm
Output P1dB	26	26	26	dBm
CSO	68 ³⁾			dBc
CTB	62 ³⁾			dBc
Current	280			mA
Device Voltage	+5			V

1) OIP3 is measured with two tones at an output power of +10 dBm/tone separated by 6 MHz.

2) OIP2 is measured with two tones (F1 = 400 MHz + F2 = 450 MHz) at an output power of +10 dBm/tone.

3) CSO & CTB measured at $P_{out} = 102\text{ dB}\mu\text{V}$ flat for NTSC 77 channels.

2.2 Product Specification

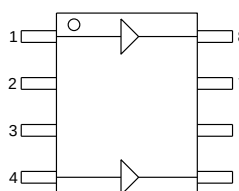
Supply voltage = +5 V, $T_A = +25\text{ }^{\circ}\text{C}$, $Z_O = 75\text{ }\Omega$.

Parameter	Min	Typ	Max	Unit
Frequency		500		MHz
Noise Figure		2.6		dB
Gain	15.7	16.7	17.7	dB
S11		-18		dB
S22		-17		dB
Output IP3 ¹⁾		43		dBm
Output IP2 ²⁾		65		dBm
Output P1dB		26		dBm
Current	240	280	320	mA
Device Voltage		+5		V

1) OIP3 is measured with two tones at an output power of +10 dBm/tone separated by 6 MHz.

2) OIP2 is measured with two tones (F1= 400 MHz + F2 = 450 MHz) at an output power of +10 dBm/tone.

2.3 Pin Configuration

Pin	Description	Simplified Outline
1,4	RF_IN	
2, 3, 6, 7	NC or GND	
5, 8	RF_OUT & Bias	

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

Parameters	Max. Ratings
Operating Case Temperature	-40 to +85 $^{\circ}\text{C}$
Storage Temperature	-40 to +150 $^{\circ}\text{C}$
Device Voltage	+6 V
Device Current	360 mA
Power Dissipation	+1.8 W
Junction Temperature	+150 $^{\circ}\text{C}$
Input RF Power (CW, 75 Ω matched)	+26 dBm

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

2.5 Thermal Resistance

Symbol	Description	Typ	Unit
R_{th}	Thermal resistance from junction to lead	32	$^{\circ}\text{C/W}$

2.6 ESD Classification & Moisture Sensitivity Level

ESD Classification

HBM Class 1A

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.

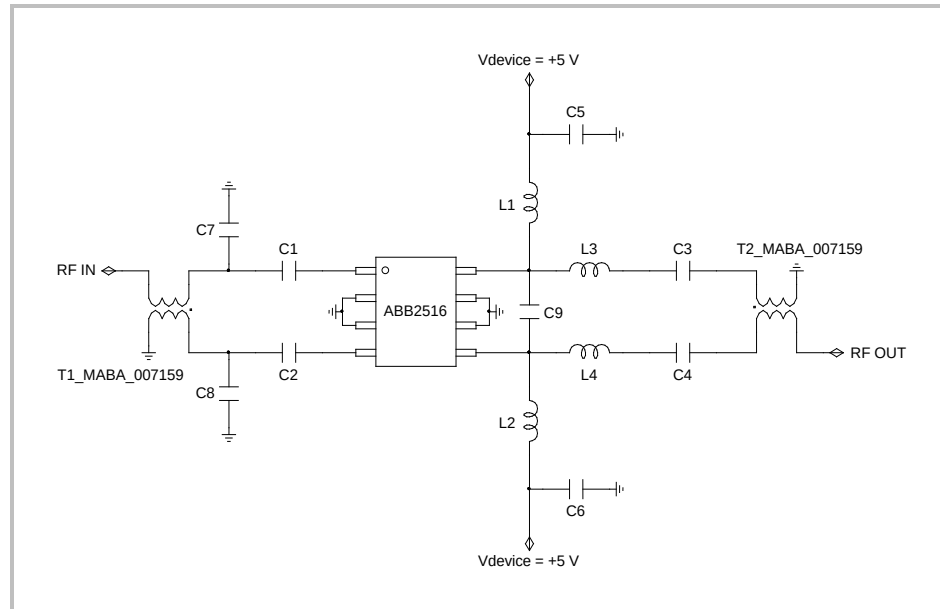
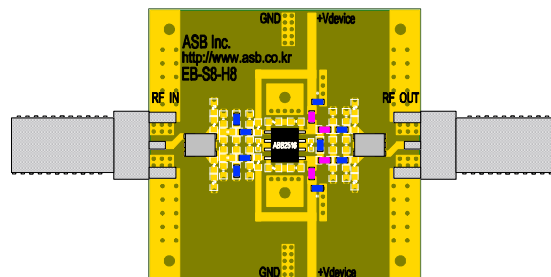
Moisture Sensitivity Level

MSL 3 at 260 $^{\circ}\text{C}$ reflow

(Intentionally Blanked)

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-S8-H8

Bill of Material

Symbol	Value	Size	Description	Manufacturer
ABB2516	-	-	MMIC Amplifier	ASB
C1, C2, C3, C4	1 μF	0603	DC blocking capacitor	Murata
C5, C6	10 μF	0603	Decoupling capacitor	Murata
C7, C8	1.5 pF	0603	Matching capacitor	Murata
C9	1.5 pF	0603	Matching capacitor	Murata
L1, L2	470 nH	1206	RF choke inductor	Murata
L3, L4	2.2 nH	0603	Matching inductor	Murata
T1, T2	1:1	-	Transformer balun	MACOM

3.2 Performance Table

Supply voltage = +5 V, $T_A = +25\text{ }^{\circ}\text{C}$, $Z_0 = 75\text{ }\Omega$.

Parameter	Typical			Unit
Frequency	50	500	1200	MHz
Noise Figure	2.5	2.6	2.8	dB
Gain	17.0	16.7	15.6	dB
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CTB	62 ³⁾			dBc
Current	280			mA
Device Voltage	+5			V

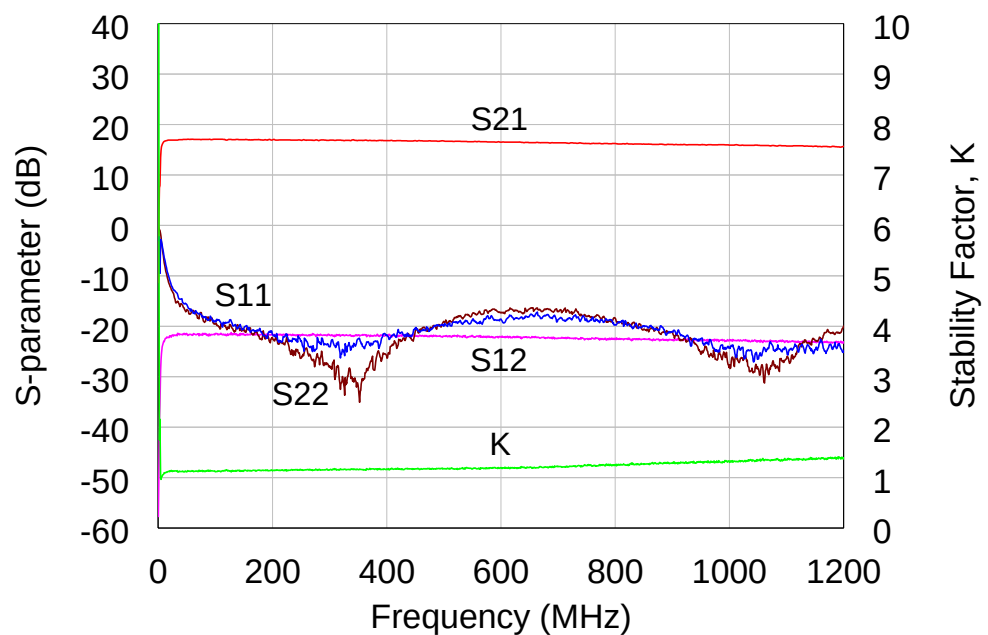
1) OIP3 is measured with two tones at an output power of +10 dBm/tone separated by 6 MHz.

2) OIP2 is measured with two tones ($F_1 = 400\text{ MHz} + F_2 = 450\text{ MHz}$) at an output power of +10 dBm/tone.

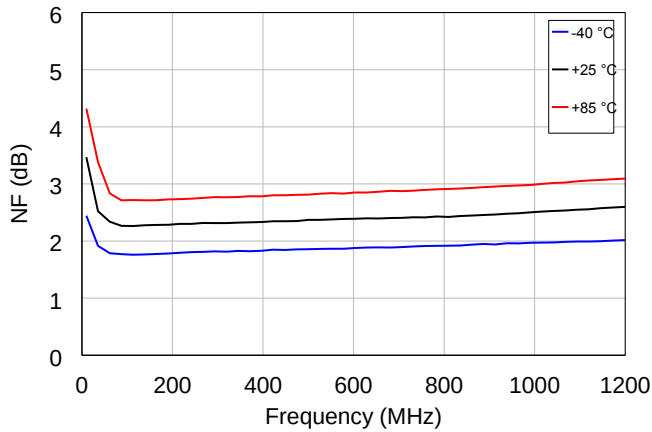
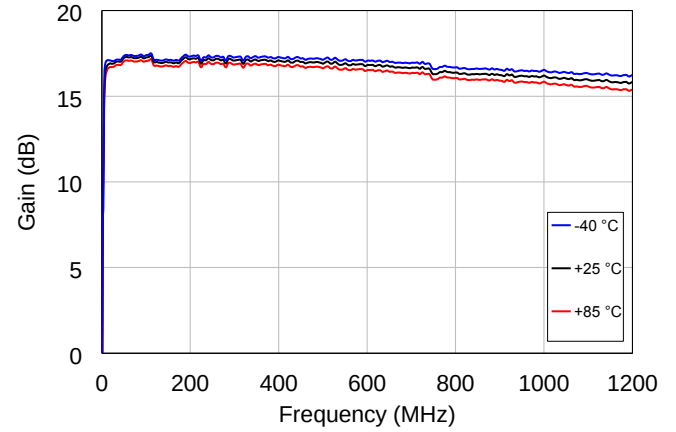
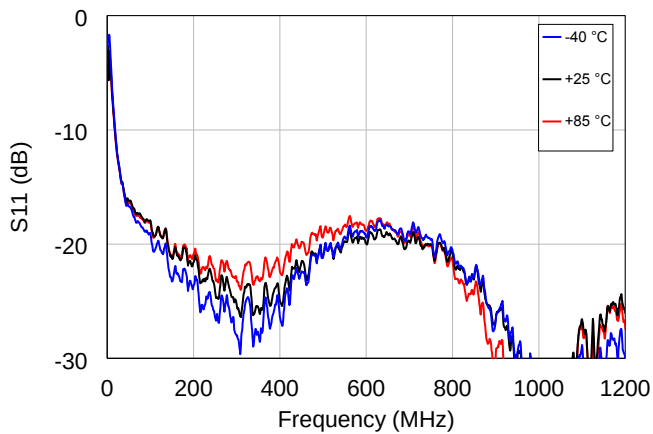
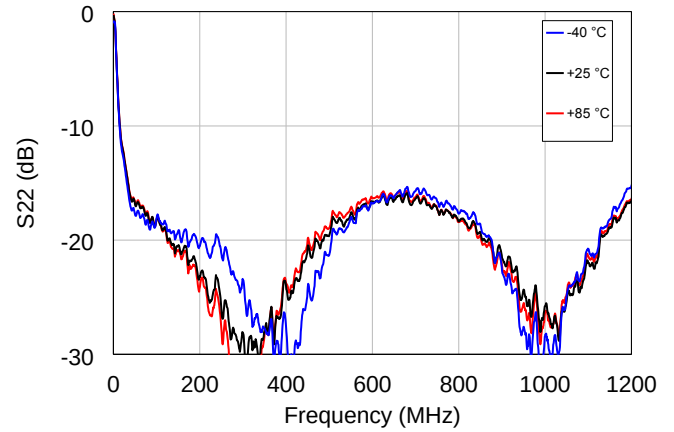
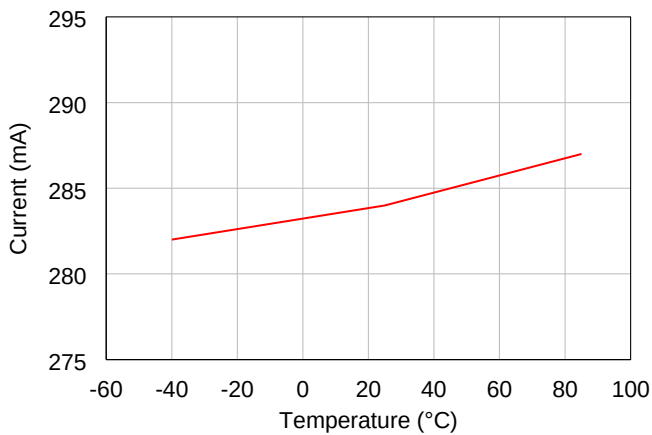
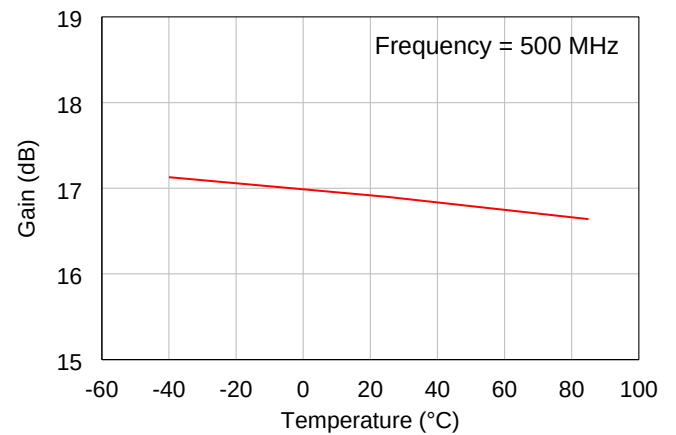
3) CSO & CTB measured at $P_{out} = 102\text{ dB}\mu\text{V}$ flat for NTSC 77 channels.

*Note : P_{out} is $105\text{ dB}\mu\text{V}$ @ flat ch and $110\text{ dB}\mu\text{V}$ @ 9 dB tilt for CENELEC 42 ch at CSO, CTB > 60 dBc.

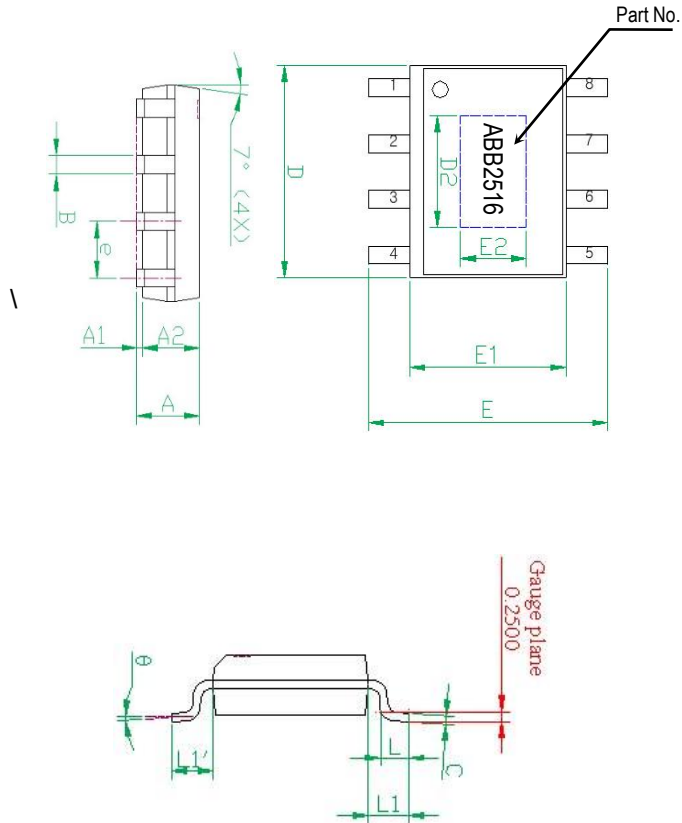
3.3 Plot of S-parameter & Stability Factor



3.4 Plots of Noise Figure and Performances with Temperature

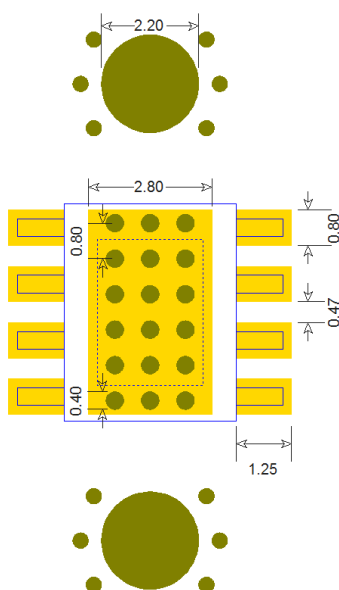


4. Package Outline (SOIC8)



Symbols	Dimensions (In mm)		
	MIN	NOM	MAX
A	1.40	1.50	1.60
A1	0.00	---	0.10
A2	---	1.45	---
B	0.33	---	0.51
C	0.19	---	0.25
D	4.80	---	5.00
D2	3.20	3.30	3.40
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
E2	2.30	2.40	2.50
e	---	1.27	---
L	0.40	---	1.27
y	---	---	0.10
θ	0°	---	8°
L1-L1'	---	---	0.12
L1		1.04REF	

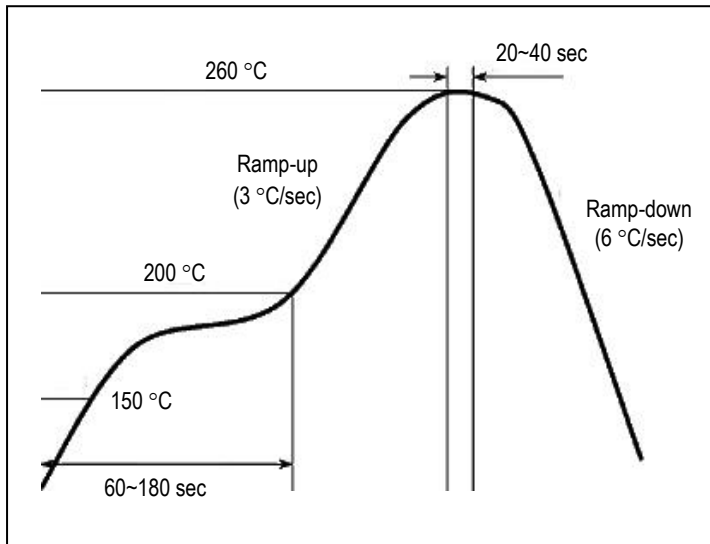
5. Surface Mount Recommendation (In mm)



NOTE

1. Add as much copper as possible to inner and outer layers near the part to ensure optimal thermal performance.
2. To ensure reliable operation, device ground paddle-to-ground pad soldering is critical.
3. Add mounting screws near the part to fasten the board to a heat sink. Ensure that the ground & thermal via region contacts the heat sink.
4. A proper heat dissipation path underneath the area of the PCB for the mounted device is strictly required for proper thermal operation. Damage to the device can result from inappropriate heat dissipation.

6. Recommended Soldering Reflow Profile



(End of Datasheet)

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