ABB817 Data Sheet

1.2 GHz CATV Push-pull Amplifier MMIC

1. Product Overview

1.1 Features

- 50 ~ 1200 MHz Bandwidth
- 17.3 dB Gain at 500 MHz
- CSO : 62 dBc, CTB : 61 dBc
  @ Pout = 111 dBμV with 8 dB slope for CENELEC 42 channels
- 109 dBμV Pout @ BER < 1E-9, 138 channels 12 dB slope, 256 QAM
- 108.5 dBμV Pout @ BER < 1E-9, 100 channels flat, 256 QAM
- Robust under Hard Operating Conditions
- +12 V, 365 mA Supply

1.2 Applications

- CATV Line Amplifiers
- HFC Nodes
- Head End Equipment

1.3 Package Profile & RoHS Compliance

	
TSSOP24, 7.8x6.4 mm^2, surface mount	RoHS-compliant

2. Summary on Product Performances

2.1 Typical Performance

Supply voltage = +12 V, T_A = +25 °C, Z_O = 75 Ω.

Parameter	Typical				Unit
Frequency	50	500	1000	1200	MHz
Gain	17.6	17.3	16.9	17.0	dB
S11	-16	-15	-18	-18	dB
S22	-19	-19	-15	-15	dB
Output IP3[1)]	44	45	42	42	dBm
Output IP2[1),2)]	66				dBm
Noise Figure	3.2	3.7	4.2	4.5	dB
CSO	62[3)]				dBc
CTB	61[3)]				dBc
Pout	109[4)], 108.5[5)]				dBμV
Current	365				mA
Device Voltage	+12				V

1) OIP3 and OIP2 are measured with two tones at an output power of +18 dBm/tone separated by 6 MHz.

2) OIP2 is measured at F1+F2 Frequency. (F1 = 400 MHz, F2 = 450 MHz)

3) CSO & CTB measured at Pout = 111 dBμV, 8 dB slope for CENELEC 42 channels.

4) BER < 1E-9 for 138 channels 12 dB slope, 256 QAM.

5) BER < 1E-9 for 100 channels flat, 256 QAM.

2.2 Product Specification

Supply voltage = +12 V, T_A = +25 °C, Z_O = 75 Ω.

Parameter	Min	Typ	Max	Unit
Frequency		500		MHz
Gain		17.3		dB
S11		-15		dB
S22		-19		dB
Output IP3[1)]		45		dBm
Output IP2[1),2)]		66		dBm
Noise Figure		3.7		dB
Current		365		mA
Device Voltage		+12		V

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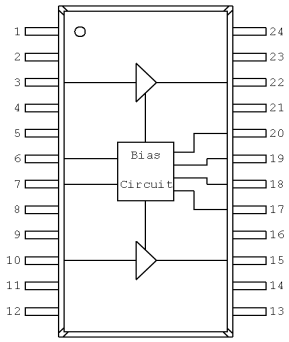
2.3 Pin Configuration

Pin	Description	Simplified Outline
3, 10	RF_IN	
6, 7	Current Adjustable	
17, 20	V_{CG2} Adjustable	
18, 19	V_{CG1} Adjustable	
15, 22	RF_ OUT	
Others	NC or GND	



Note: Backside metal paddle is RF and DC ground.

2.4 Absolute Maximum Ratings

Parameters	Max. Ratings
Operation Case Temperature	-40 to +85 °C
Storage Temperature	-40 to +150 °C
Device Voltage	+13 V
Maximum Current	450 mA
Operation Junction Temperature	+150 °C
Input RF Power (CW, 75 Ω matched)	+22 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	9	°C/W

2.6 ESD Classification & Moisture Sensitivity Level

ESD Classification

HBM	TBD

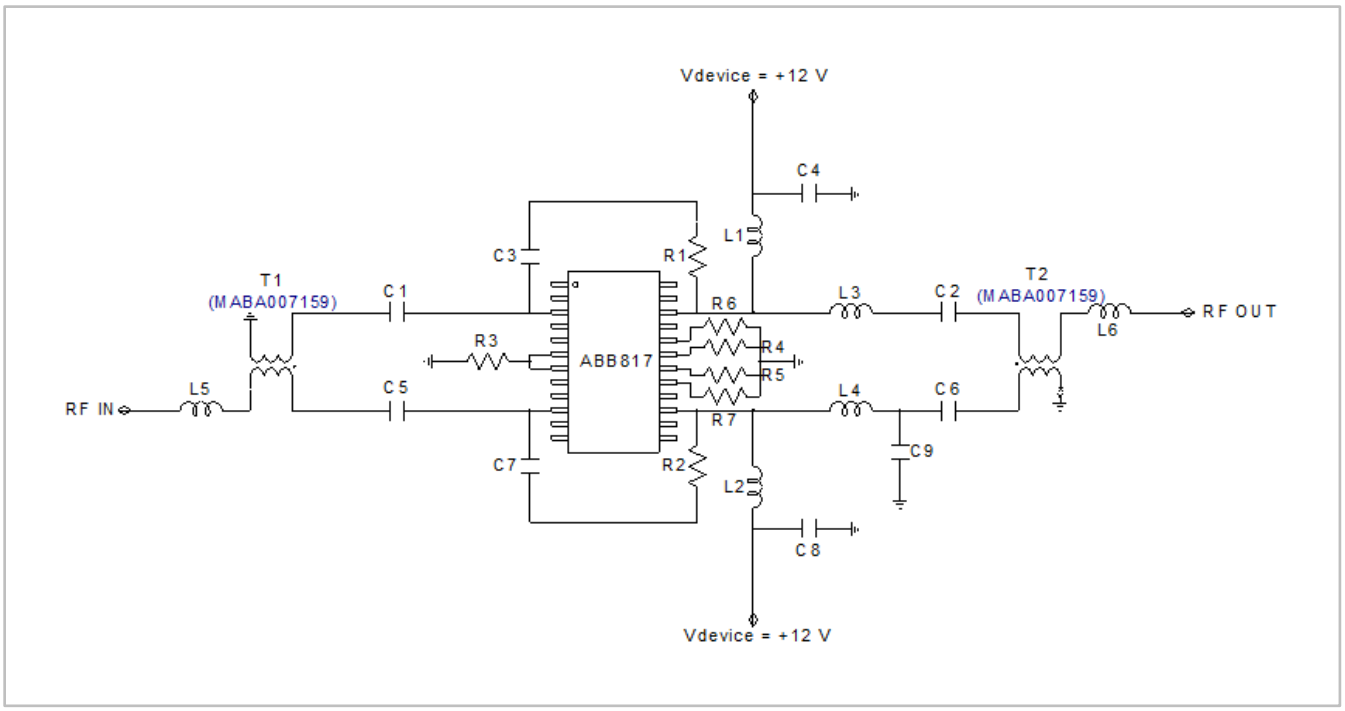
CAUTION: Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Moisture Sensitivity Level

MSL 3 at 260 °C reflow

3. Application: 50 ~ 1200 MHz (75 Ω Push-pull, V_{supply} = +12 V)

3.1 Application Circuit & Evaluation Board



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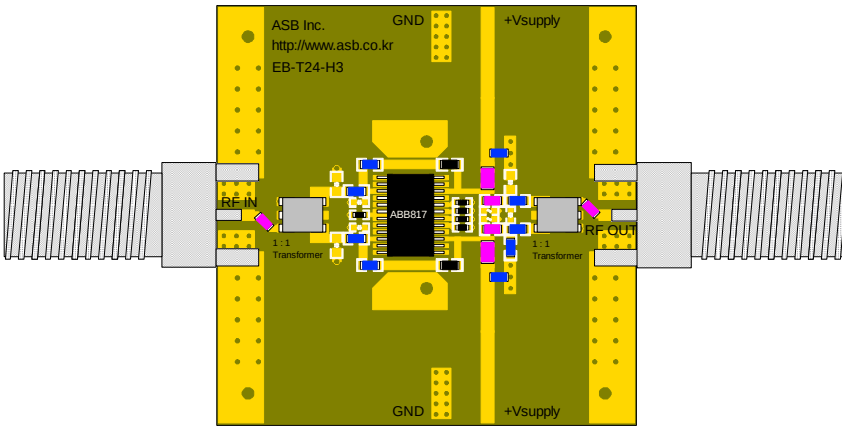

PCB Information	
Material	FR4
Thickness (mm)	0.8
Size (mm)	40x40
EB No.	EB-T24-H3

Bill of Material

Symbol	Value	Size	Description	Manufacturer
ABB817	-	-	MMIC Amplifier	ASB
C1, C2, C5, C6	1 μF	0603	DC blocking capacitor	Murata
C3, C7	1 μF	0603	Feedback capacitor	Murata
C4, C8	10 μF	0805	Decoupling capacitor	Murata
C9	0.5 pF	0603	Matching capacitor	Murata
L1, L2	1 μH	1206	RF choke inductor	Murata
L3, L4	2.7 nH	0603	Matching inductor	Murata
L5	3.9 nH	0603	Matching inductor	Murata
L6	5.6 nH	0603	Matching inductor	Murata
R1, R2	430 Ω	0603	Feedback resistor	Samsung
R3	68 Ω	0603	Current adjust resistor	Samsung
R4, R5	750 Ω	0402	V_{CG1} adjust resistor	Samsung
R6, R7	1.2 kΩ	0402	V_{CG2} adjust resistor	Samsung
T1, T2	1:1	-	Transformer balun	MACOM

3.2 Performance Table

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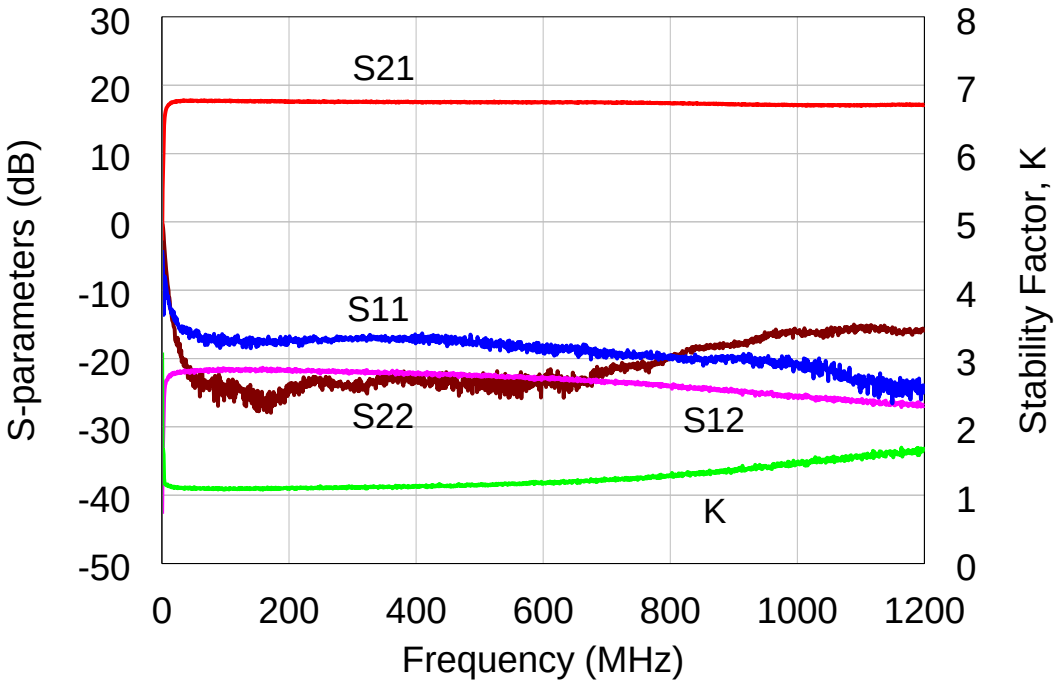
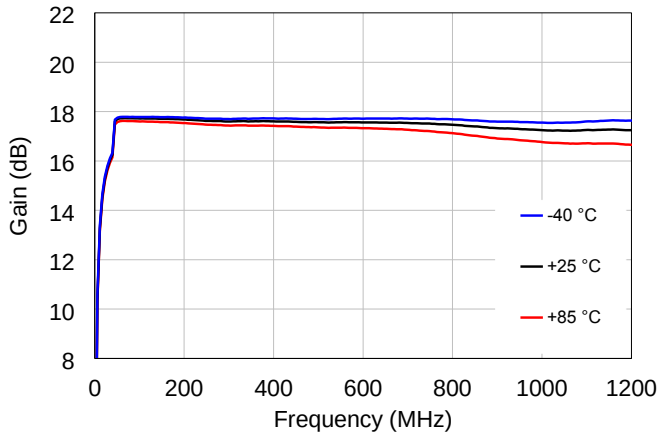
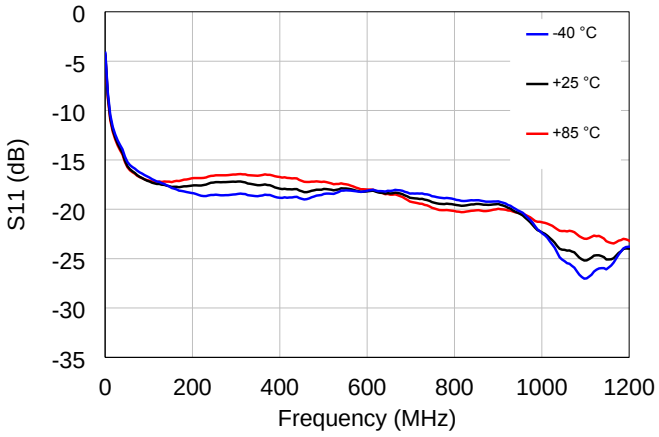
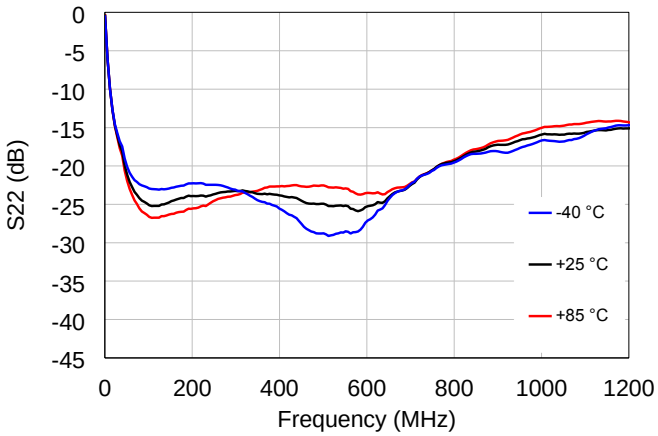
3.3 Plot of S-parameter & Stability Factor

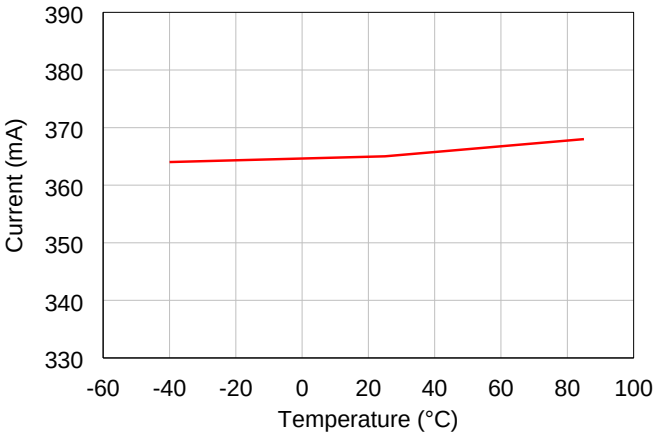


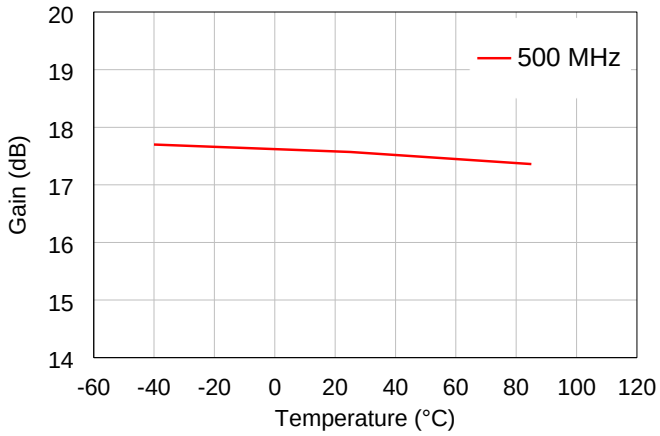
3.4 Plots of Performances with Temperature



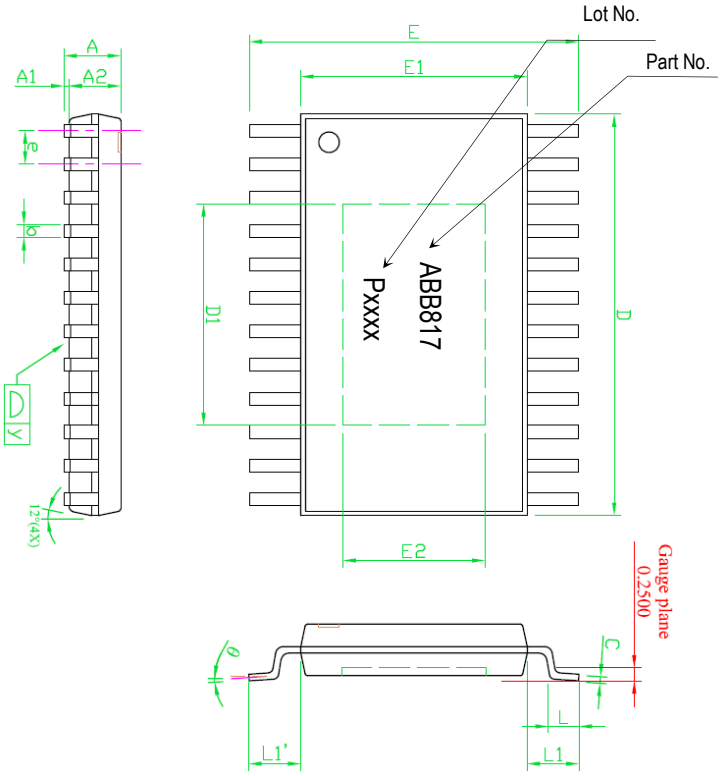






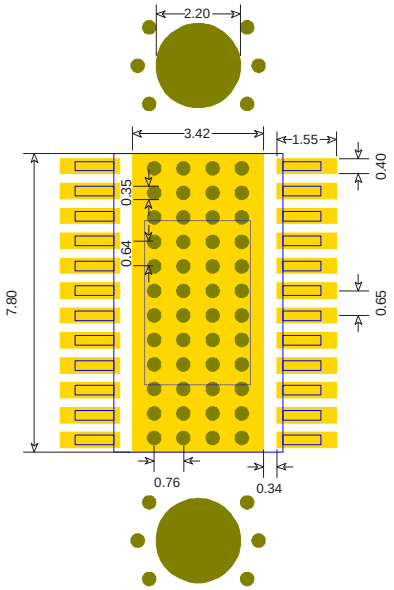


4. Package Outline (TSSOP24)



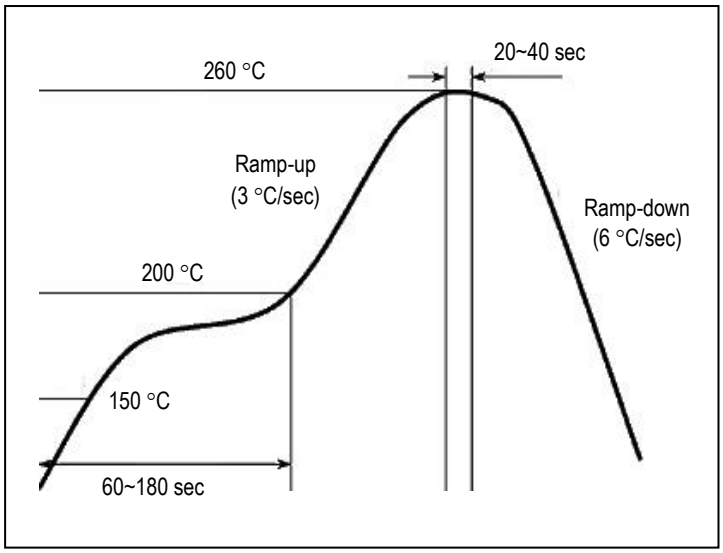
Symbols	Dimensions (In mm)		
	MIN	NOM	MAX
A	---	---	1.15
A1	0.00	----	0.10
A2	0.80	1.00	1.05
B	0.19	---	0.30
C	0.09	---	0.20
D	7.70	7.80	7.90
D1	4.086	4.286	4.486
E	6.20	6.40	6.60
E1	4.30	4.40	4.50
E2	2.55	2.75	2.95
e	---	0.65	---
L	0.45	0.60	0.75
y	---	---	0.10
θ	0°	---	8°
|L1-L1′|	---	---	0.12
L1		1.00REF	

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. Recommended is that thermal grease used for better thermal performance.
3. Add mounting screws near the part to fasten the board to a heat sinker. Ensure that the ground & thermal via region contacts the heat sinker.
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



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