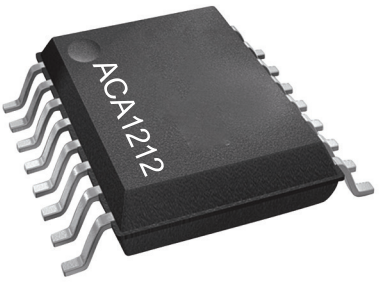
ACA1212

1.2 GHz CATV Line Amplifier MMIC

PRELIMINARY DATA SHEET

FEATURES

- 50 to 1218 MHz Frequency Range
- Flat Gain
- Very Low Distortion
- Excellent Input/Output Match
- Low DC Power Consumption
- Single 12 V supply
- Surface Mount Package Compatible with Automatic Assembly
- Repeatability of Monolithic Fabrication
- RoHS-Compliant Packaging
- Highly Reliable GaAs MESFET Technology



16 Pin Wide Body SOIC with Heat Slug

PRODUCT DESCRIPTION

The ACA1212 is a highly linear, high output power integrated RF amplifier designed for CATV head ends and HFC distribution systems. The IC consists of two parallel amplifiers cascaded between transmission line baluns that are optimized for exceptionally low distortion, high output power, and high crash point in a thermally enhanced surface mount package. The ACA1212 covers the full 50 to 1218 MHz CATV downstream band demanded by DOCSIS 3.1 systems.

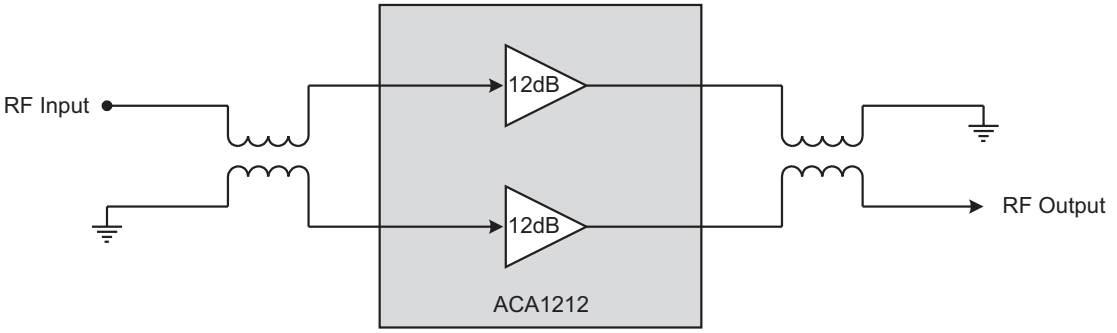


Figure 1: Application Diagram

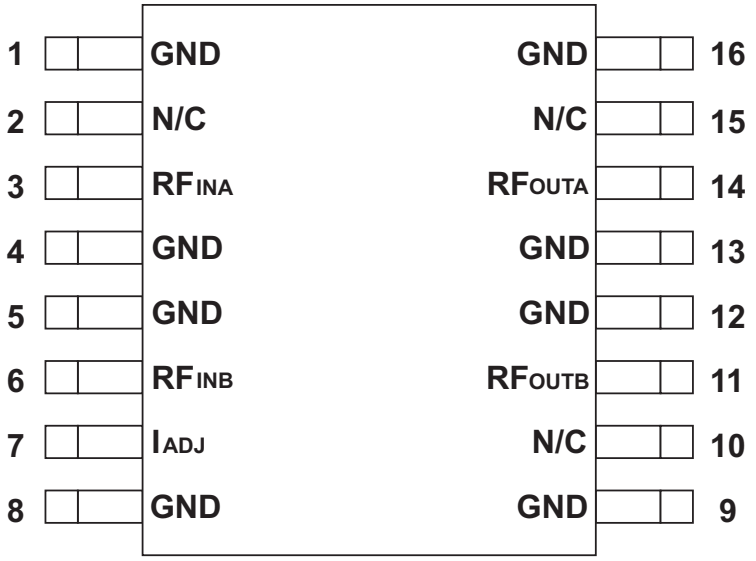


Figure 2: Pinout Diagram

Table 1: Pin Description

PIN	NAME	DESCRIPTION	PIN	NAME	DESCRIPTION
1	GND	Ground	9	GND	Ground
2	N/C	No Connection	10	N/C	No Connection
3	RF_{INA}	Input to Amplifier A	11	RF_{OUTB}	Output from Amplifier B
4	GND	Ground	12	GND	Ground
5	GND	Ground	13	GND	Ground
6	RF_{INB}	Input to Amplifier B	14	RF_{OUTA}	Output from Amplifier A
7	I_{ADJ}	Current Adjust	15	N/C	No Connection
8	GND	Ground	16	GND	Ground

ELECTRICAL CHARACTERISTICS

Table 2: Absolute Minimum and Maximum Ratings

PARAMETER	MIN	MAX	UNIT
Amplifier Supplies (pins 11, 14)	0	+15	VDC
RF Input Power (pins 3, 6)	-	+70	dBmV
Storage Temperature	-65	+150	°C
Soldering Temperature	-	+260	°C
Soldering Time	-	5.0	sec

Stresses in excess of the absolute ratings may cause permanent damage. Functional operation is not implied under these conditions. Exposure to absolute ratings for extended periods of time may adversely affect reliability.

Notes:
(1) Pins 3 and 6 should be AC-coupled. No external DC bias should be applied.

Table 3: Operating Ranges

PARAMETER	MIN	TYP	MAX	UNIT
RF Frequency	40	-	1218	MHz
Supply: V_D (pins 11, 14)	-	+12	-	VDC
Operating Temperature: T_A	-40	-	+110	°C

The device may be operated safely over these conditions; however, parametric performance is guaranteed only over the conditions defined in the electrical specifications.

Table 4: Electrical Specifications
(T_A = +25 °C, V_D = +12 VDC)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Gain (1)	10.5	11.1	11.7	dB	at 1.218 GHz
Gain Flatness (1)	-	-	± 0.3	dB	
Noise Figure (1)	-	4	4.5	dB	
CTB (1), (2)	-	-72	-70	dBc	
CSO (1), (2)	-	-70	-68	dBc	
XMOD (1), (2)	-	-67	-	dBc	
Supply Current	-	395	445	mA	
Cable Equivalent Slope (1)	-0.5	.25	1.0	dB	
Return Loss (Input/Output) (1)	18	22	-	dB	
Thermal resistance (θ_{JC})	-	-	6.0	°C/W	

Notes:
(1) Measured with a balun on input and output of the device. See Figure 3 for test setup.
(2) Device measured with 79 analog channels, +47 dBmV output power at 1002 MHz with a 3 dB tilt and QAM to 1002 MHz.

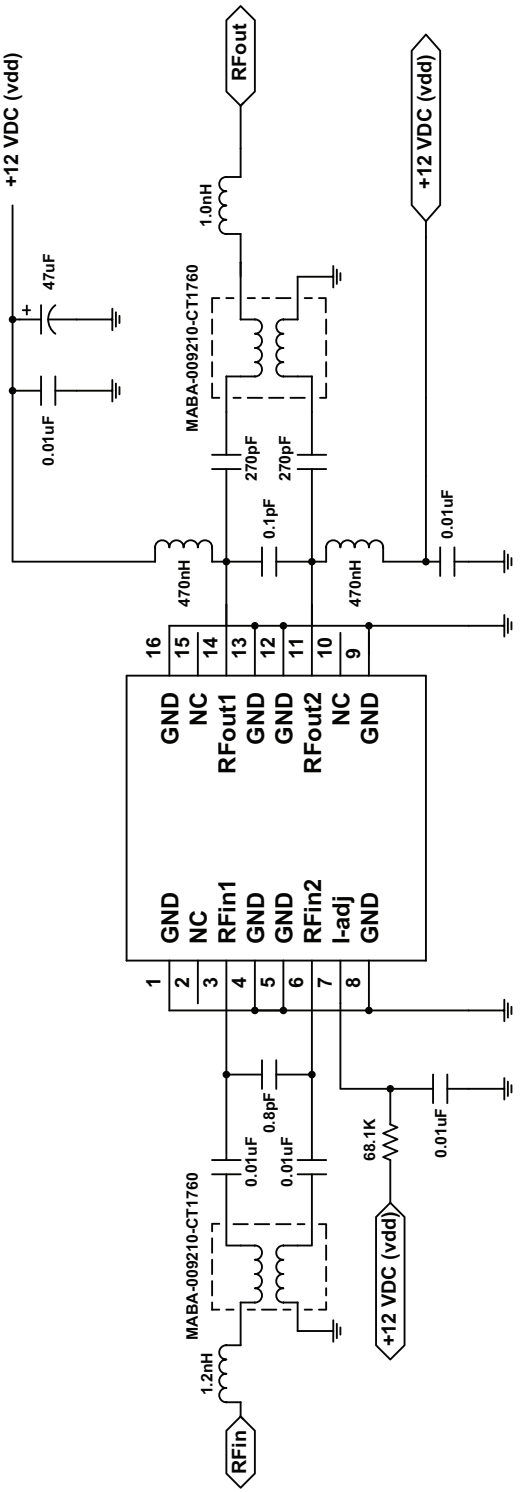
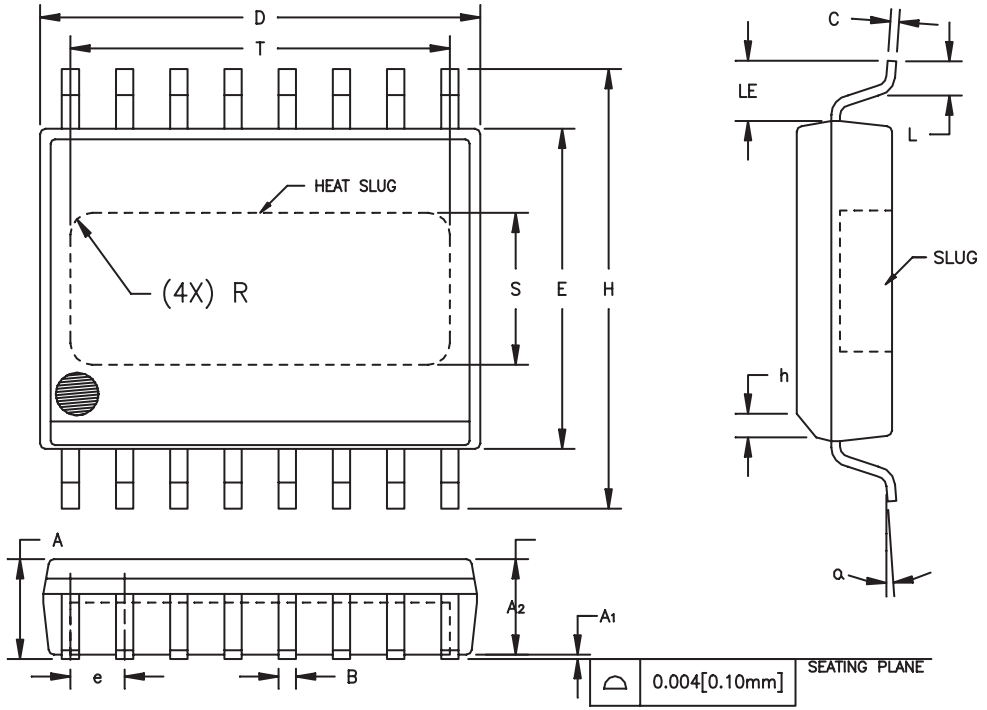


Figure 3: Test Circuit

Table 5: Bill of Materials

ITEM #	QTY	REFERENCE	DESCRIPTION	PART #	MANUFACTURER
1	1	L1	1.2nH inductor (0402)	LQG15HS1N2S02D	Murata
2	2	T1,T2	1:1 transmission line balun	MABA-009210-CT1760	Macom
3	5	C1,C2,C4,C6,C8	0.01uF capacitor (0603)	GRM188R71H-103KA01D	Murata
4	1	C3	0.8pF (0402)	GRM-1555C1HR80RZ01D	Murata
5	1	R1	68.1Kohm (0402)	MCR01MRTF6802	Rohm
6	2	L2,L3	470nH (0805)	LQH31CNR47M03L	Murata
7	1	C5	0.1pF (0402)	GJM-1555C1HR10WB01D	Murata
8	2	C9,C10	270pF (0603)	GRM1885C1H-271JA01D	Murata
9	1	L4	1.0nH (0402)	LQG15HS1N0S02D	Murata
10	1	C7	47uF electrolytic cap	ECEA1HGE470	Panasonic
11	2	CON1-2	75 ohm N bulkhead	PE4504	Paternack

PACKAGE OUTLINE

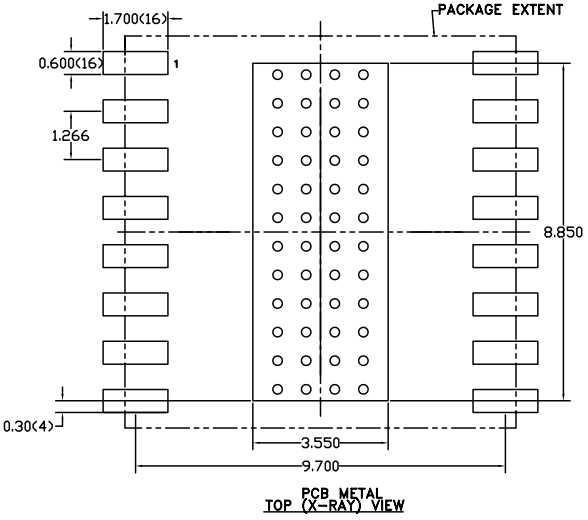


SYMBOL	INCHES		MILLIMETERS		NOTE
	MIN.	MAX.	MIN.	MAX.	
A	0.087	0.098	2.21	2.49	
A_1	0.000	0.004	0.00	0.10	6
A_2	0.087	0.094	2.21	2.39	
B	0.013	0.019	0.33	0.48	
C	0.007	0.009	0.18	0.23	
D	0.398	0.412	10.11	10.46	2
E	0.290	0.300	7.37	7.62	3
e	0.050 BSC		1.27 BSC		4
H	0.394	0.418	10.01	10.62	
h	0.010	0.028	0.25	0.71	
L	0.024	0.040	0.61	1.02	
LE	0.052	—	1.32	—	
α	0°	8°	0°	8°	
S	0.120	0.140	3.05	3.56	5
T	0.330	0.350	8.38	8.89	5
R	REF. 0.015		REF. 0.38		5

NOTES:

1. CONTROLLING DIMENSION: INCHES
2. DIMENSION "D" DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS AND GATE BURRS SHALL NOT EXCEED 0.006 [0.15mm] PER SIDE.
3. DIMENSION "E" DOES NOT INCLUDE INTER-LEAD FLASH OR PROTRUSIONS. INTER-LEAD FLASH AND PROTRUSIONS SHALL NOT EXCEED 0.010 [0.25mm] PER SIDE.
4. MAXIMUM LEAD TWIST/SKEW TO BE ±0.005 [0.13mm].
5. DIMENSIONS "S", "T" AND "R" INDICATE EXPOSED SLUG AREA.
6. STANDOFF HEIGHT (A_1) MEASURED FROM BOTTOM OF SLUG.

Figure 4: Package Outline - 16 Pin Wide Body SOIC with Heat Slug



NOTES:

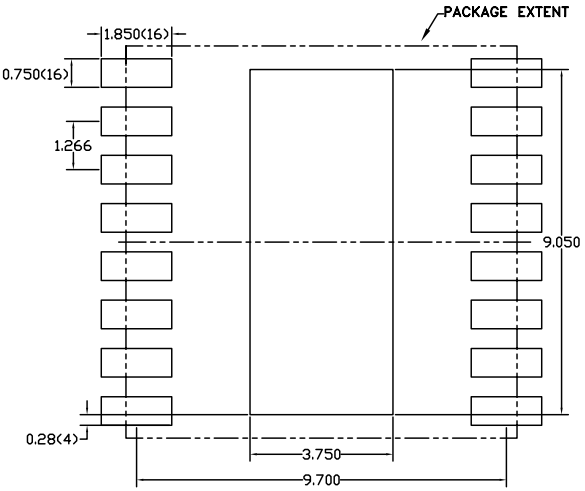
(1) OUTLINE DRAWING REFERENCE: 98001–014

(2) UNLESS SPECIFIED DIMENSIONS ARE SYMMETRICAL ABOUT CENTER LINES SHOWN.

(3) DIMENSIONS IN MILLIMETERS.

(4) VIAS SHOWN IN PCB METAL VIEW ARE FOR REFERENCE ONLY. NUMBER & SIZE OF THERMAL VIAS REQUIRED DEPENDENT ON HEA DISSIPATION REQUIREMENT AND THE PC PROC SS CAPABILITY.

(5) RECOMMENDED STENCIL THICKNESS: APPROX. 0.125mm (5 Mils)



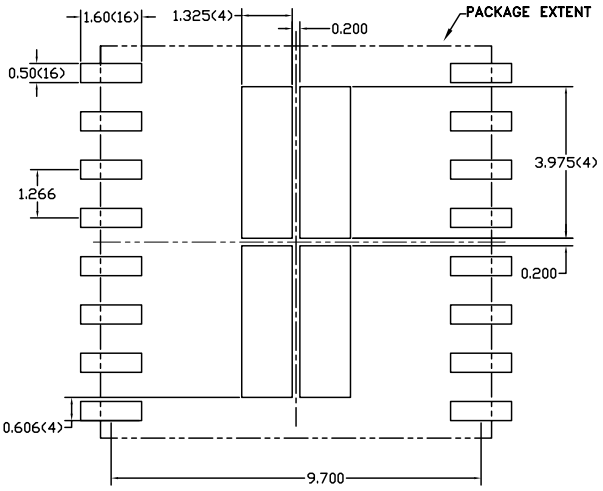


Figure 5: S7 Package Outline - 16 Pin Wide Body SOIC with Heat Slug

ORDERING INFORMATION

ORDER NUMBER	TEMPERATURE RANGE	PACKAGE DESCRIPTION	COMPONENT PACKAGING
ACA1212P0	-40 °C to 110 °C	16 Pin Wide Body SOIC with Heat Slug	Tubes
ACA1212P2	-40 °C to 110 °C	16 Pin Wide Body SOIC with Heat Slug	1,500 Piece Tape and Reel
ACA1212P9	-40 °C to 110 °C	16 Pin Wide Body SOIC with Heat Slug	Partial Reel

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