

## Product Features

- 3-Way Splitter
- Small size (3X3 mm)
- QFN SMD Type package
- Higher productivity
- Lower manufacturing cost
- -63dBc CSO 135 Channels @ +15dBmV/ch
- -72dBc CTB 135 Channels @ +15dBmV/ch
- -65dBc XMD 135 Channels @ +15dBmV/ch
- 4.5 dB Typical Noise Figure
- 75 ohm input and outputs

## Applications

- Multi Tuner Set-Top Boxes
- Home Gateways
- FTTx (G-PON, GE-PON)



Package Type : QFN 3X3

## Description

AD311 is designed as low cost Active Divider for many applications including FTTH, CATV System.

This MMIC is based on Gallium Arsenide Enhancement Mode pHEMT which shows low current draw and very low noise.

The data in this spec sheet is valid only for 75ohm application.

## Electrical Specifications

PARAMETER		UNIT	MIN	TYP	MAX	Typ
Frequency		MHz	30 ~ 1000			-
Gain		dB	7	8	-	8
Gain Flatness		dB	-	0.3	1	1
Input Return Loss		dB	-	-12	-	-9
Output Return Loss		dB	-	-10	-	-11
IN&OUT Port Isolation		dB	-	-25	-	-25
OUT&OUT Port Isolation		dB	-	-40	-	-35
Output IP3		dBm	29	32	-	30
1dB Compression Point		dBm	14	17.8	-	14
Noise Figure		dB	-	4.5	6	4
CSO	50 ~ 870MHz 135 channel@ Input Power +15dBmV/ch	dBc	-	-63	-60	-59
CTB		dBc	-	-72	-65	-72
XMOD		dBc	-	-65	-60	-65
DC Current		mA	-	120	-	110
Supply Voltage		V	5			3.3

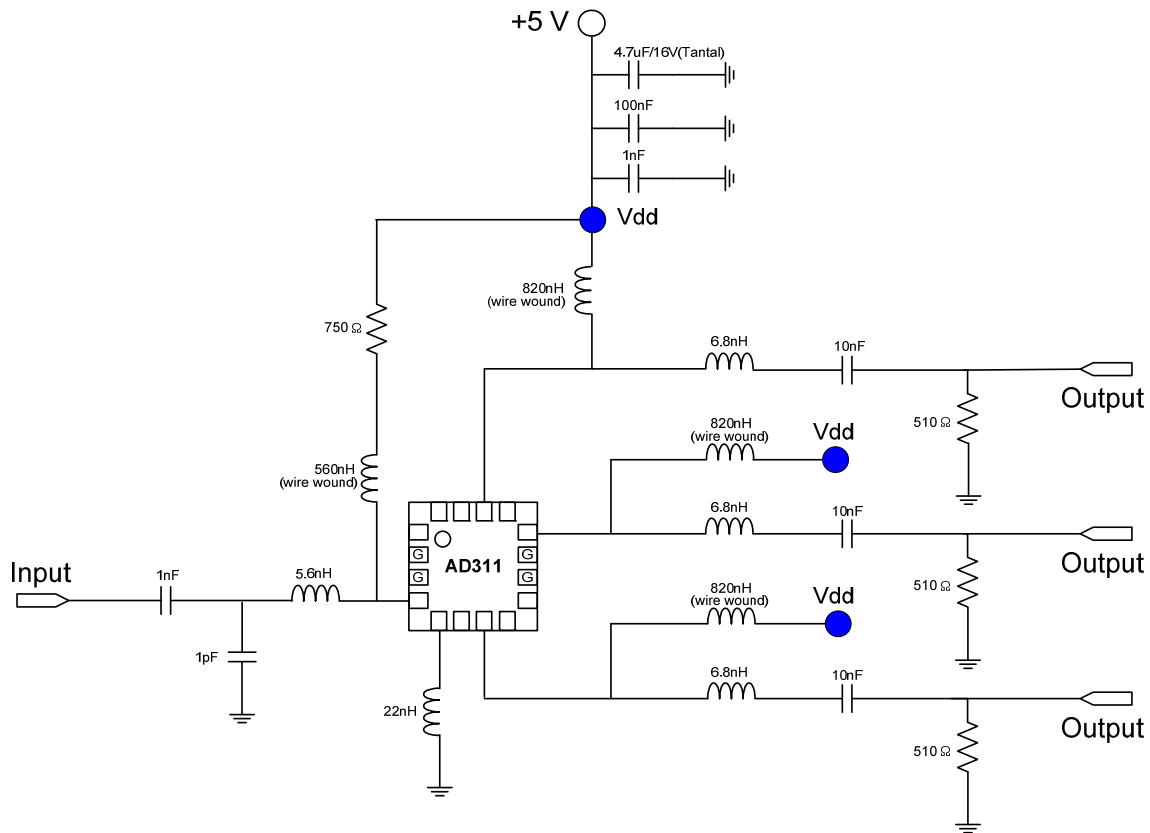
### Note

1. Test conditions unless otherwise noted. Test Freq = 500MHz, T=25°C, Vdd=5V, 75Ω system
2. OIP3 measured with 2 tones at an output power of +0dBm/tone separated by 1MHz, Test Freq = 500MHz

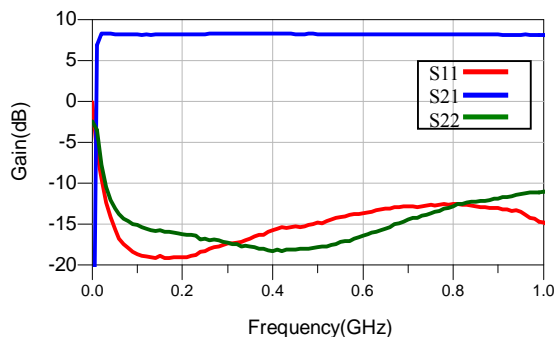
## Absolute Maximum Ratings

PARAMETER	UNIT	MIN	TYP	MAX	CONDITION
Device Voltage	VDC	-	5	6	-
Operating Temperature	°C	-40	-	85	-
Storage Temperature	°C	-40	-	150	-

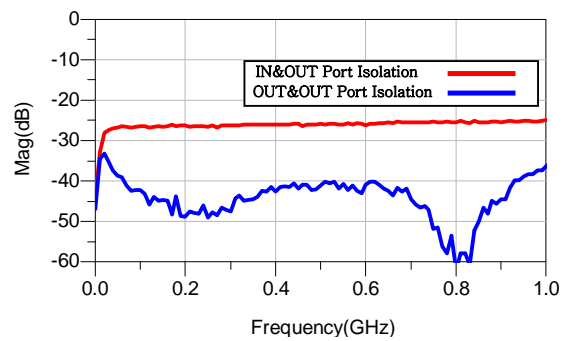
Application Circuit @ 30 ~ 1000MHz, 5v, 75ohm System



S-Parameter



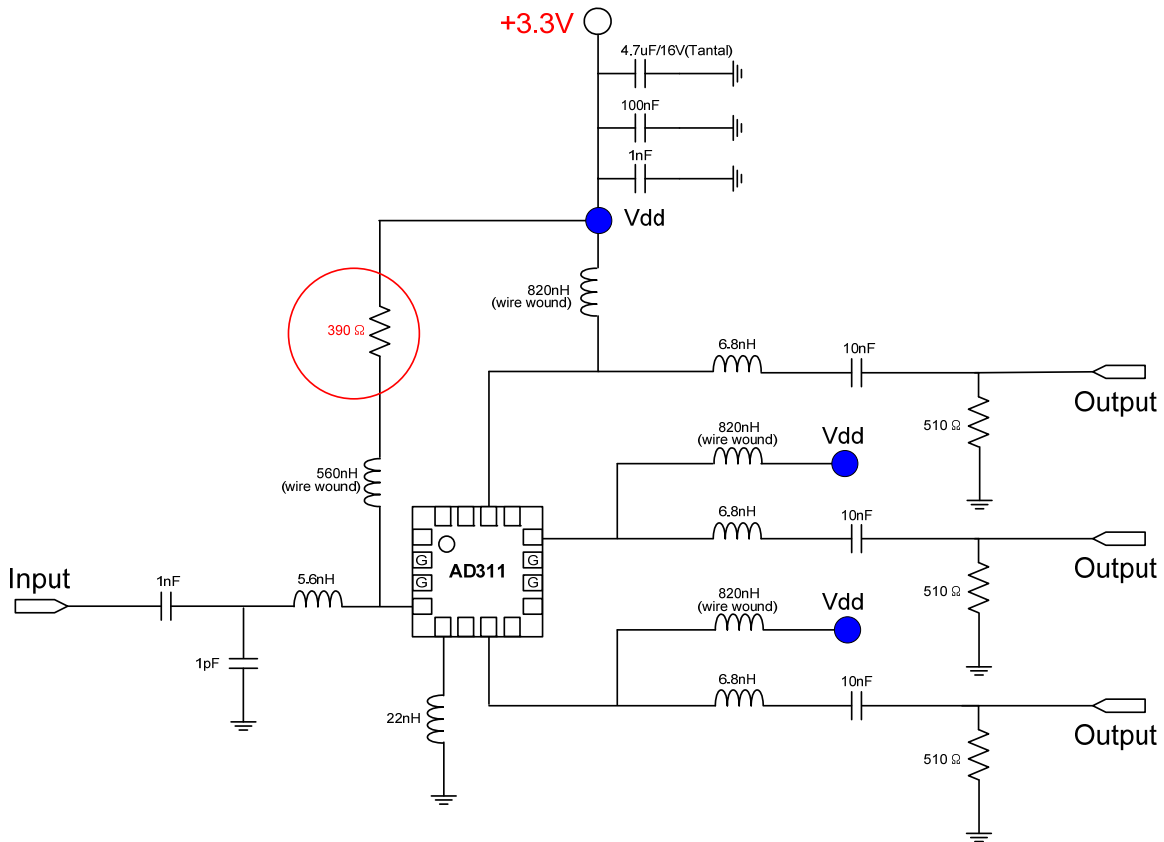
Isolation



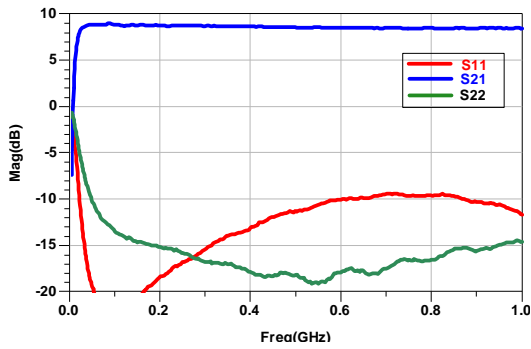
**Multi-Tone Test** : 135CH\_FLAT@Input Power +15dBmV/Ch

		Level : Input +15dBmV				Tilt : 135CH				
FRQ	XMOD	CTB RAW	CTB COR	N-FLR	CSU RAW	CSU COR	CSU FRQ	CSL RAW	CSL COR	CSL FRQ
55.25	65.7	74	74.4	84.5	82.7	87	56	70.7	71	54
77.25	66	74.3	74.7	84.6	71.6	71.8	77.99	84	88.3	76.14
109.25	65.7	73.9	74.2	84.8	83.3	87.6	109.99	71.2	71.4	107.99
211.25	65.8	72.6	72.9	84.3	79.2	80.8	212.5	70.5	70.7	209.99
331.25	66.1	72.2	72.6	83.5	73.3	73.7	332.49	67.5	67.6	329.99
445.25	66.8	72.4	72.3	83.2	67	70	446.49	64.7	66	443.99
547.25	67.3	72.9	73.4	82.3	67.3	67.5	548.49	66.1	66.2	545.99
637.25	68.2	73.3	73.9	82.4	66.3	66.4	638.5	67.4	67.6	635.99
745.25	68.8	73.7	74.4	82.2	64.7	64.7	746.49	71.3	71.6	743.99
859.25	69.2	74.3	75.5	80.3	63.1	63.1	860.49	73.9	75	858.49
<b>Min</b>	65.7	72.2	72.3	80.3	63.1	63.1	56	64.7	66	54
<b>Max</b>	69.2	74.3	75.5	84.8	83.3	87.6	860.49	84	88.3	858.49

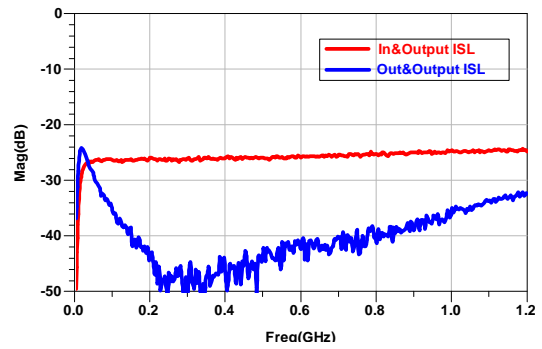
Application Circuit @ 30~ 1000MHz, +3.3V, 75ohm System



S-Parameter



Isolation



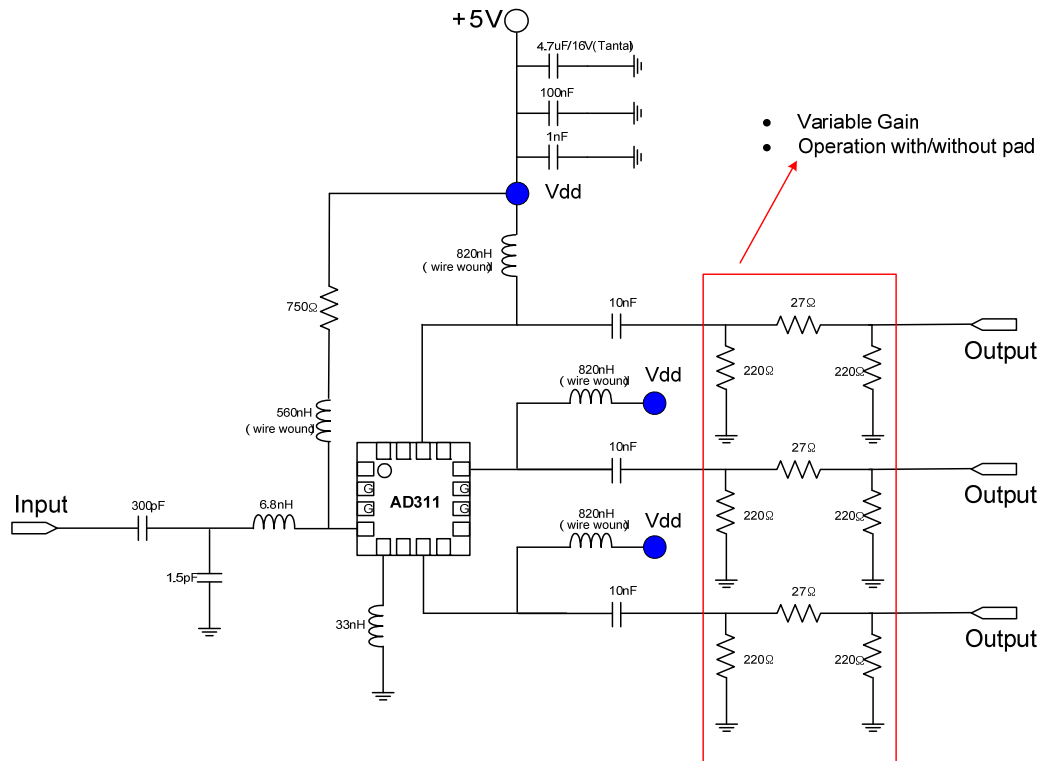
**Multi-Tone Test** : 135CH\_FLAT@Input Power +15dBmV/Ch, Vdd = +3.3V

		Level : Input +15dBmV				Tilt : 135CH_FLAT				
FRQ	XMOD	CTB RAW	CTB COR	N-FLR	CSU RAW	CSU COR	CSU FRQ	CSL RAW	CSL COR	CSL FRQ
55.25	68.7	77.3	79.2	81.5	80.4	84.8	56	75.1	76.4	53.99
77.25	69.5	77	78.9	81.6	75.2	76.3	77.99	81.4	85.7	76.03
109.25	69.2	76.4	78.1	81.5	80.6	84.9	109.99	72.2	72.7	108.04
211.25	69.4	76	77.4	81.6	79	82	212.49	71.2	71.6	209.99
331.25	68.7	74.8	76.2	80.4	76.4	78.6	331.99	66.6	66.8	329.99
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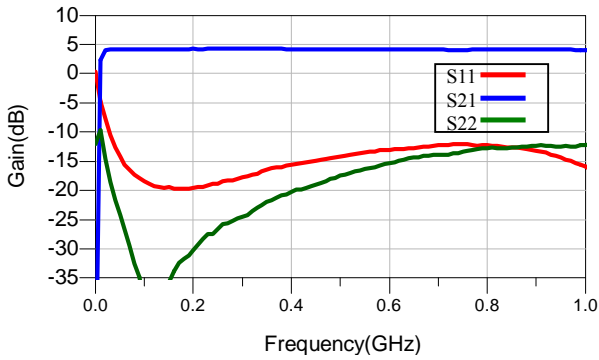
Electrical Specifications (Insert Pad)

PARAMETER	UNIT	TYPICAL DATA	CONDITION
Frequency	MHz	30~1000	-
Supply Voltage	V	5	-
Gain	dB	4.2	-
Gain Flatness	dB	0.3	-
Input Return Loss	dB	-17	-
Output Return Loss	dB	-18	-
IN&OUT Port Isolation	dB	-29	-
OUT&OUT Port Isolation	dB	-40	-
OIP3	dBm	27	-
P1dB	dBm	13	-
Noise Figure	dB	4.5	-
CSO	dBc	-61	135 channel, +15dBmV/ch
CTB	dBc	-74	135 channel, +15dBmV/ch
XMOD	dBc	-69	135 channel, +15dBmV/ch
DC Current	mA	120	Vdd = 5.0V

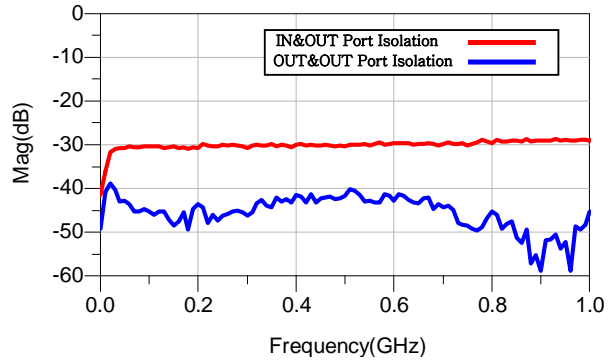
Application Circuit @ 30~ 1000MHz, +5V, 75ohm System



S-Parameter



Isolation

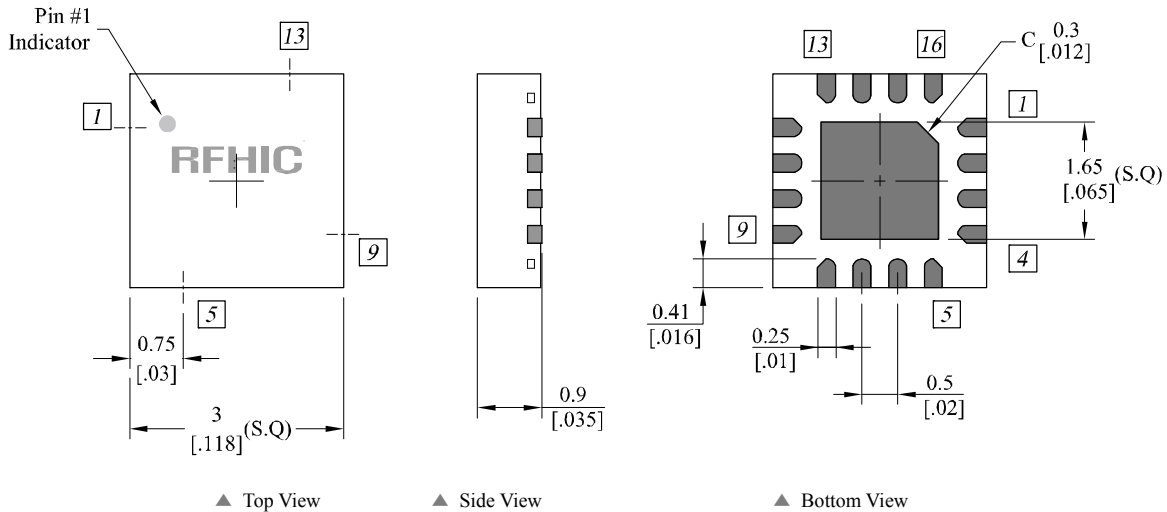


Multi-Tone Test : 135CH\_FLAT@Input Power +15dBmV/Ch

Level: +15dBmV Tilt: 135CH_FLAT										
FRQ	XMOD	CTB RAW	CTB COR	N-FLR	CSU RAW	CSU COR	CSU FRQ	CSL RAW	CSL COR	CSL FRQ
55.25	69.3	76.4	78.6	80.6	77.8	81.4	56	61.1	61.1	53.99
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109.25	69.3	76	77.7	80.8	78.1	81.7	110	61.8	61.8	108
211.25	69	75.2	76.7	80.6	74.1	75.3	212.5	63.2	63.2	210
331.25	69.6	74.3	76.2	79	70.2	70.8	332.5	63	63.1	329.99
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637.25	70.1	74.7	77.2	78.4	65.2	65.4	638.5	66.5	66.8	635.98
745.25	70.3	75	78	78.2	64.2	64.4	746.49	71.1	72.1	743.99
859.25	70.5	74.4	78.7	76.4	62.6	62.8	860.5	73.7	76.7	858.49
Min	69	74.2	76.2	76.4	61.7	61.7	56	61.1	61.1	53.99
Max	70.5	76.7	78.9	80.8	78.1	81.7	860.5	80.3	84.6	858.49

**Package Dimensions (Type: QFN3x3)**

\* Unit: mm[inch] | Tolerance:  $\pm 0.2$ [.008]



Pin Description							
Pin No	Function	Pin No	Function	Pin No	Function	Pin No	Function
1	NC	5	Input Matching	9	NC	13	NC
2	GND	6	NC	10	GND	14	Output-3
3	GND	7	Output-1	11	GND	15	NC
4	Input	8	NC	12	Output-2	16	NC

**\* Mounting Configuration Notes**

1. Ground / thermal via holes are critical for the proper performance of this device.
2. Add as much copper as possible to inner and outer layers near the part to ensure optimal thermal performance.
3. Mounting screws can be added near the part to fasten the board to a heatsink. Ensure that the ground / thermal via hole region contacts the heatsink.
4. Do not put solder mask on the backside of the PCB in the region where the board contacts the heatsink.
5. RF trace width depends upon the PCB material and construction.
6. Use 1 oz. Copper minimum.



**Revision History**

Part Number	Release Date	Version	Modification	Data Sheet Status
AD311	2013.01.08	1.3	Change by a new dimension form	-
AD311	2012.09.10	1.2	Change by a new document form	-
AD311	2012.02.06	1.1	3.3V Application Circuit was added	-

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