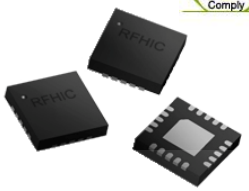
Product Features

- Small size (4 x 4 mm)
- High gain
- High linearity
- Low cost
- Low Noise Figure
- 30dB AGC Range
- Pb-free/RoHS compliant

Applications

- FTTH (G-PON, GE-PON)
- Optical node
- RFoG



Package Type : QFN4X4

Description

ACQ629 is designed as low cost Trans-impedance amplifiers for many applications including FTTH, RFoG, Optical, Triplexers. 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 RF Video output application.

Electrical Specifications

PARAMETER		UNIT	MIN	TYP	MAX	CONDITION
Frequency		MHz	50	-	1000	-
Gain		dB	-	37.5	-	ACQ629 + AGC Insertion Loss 2dB AGC Vctr = 10.0V
Gain Flatness		dB	-	1	-	
Input Return Loss		dB	-	-15	-10	
Output Return Loss		dB	-	-12	-8	
Output IP3		dBm	30	36	-	
1dB Compression Point		dBm	19	22	-	
Noise Figure		dB	-	2	4	
AGC Range π Pin Diode (SMP1307-027)		dB	-	30	-	Vctr = 0V ~ 10V
CSO	50 ~ 870MHz	dBc	-	-60	-55	135 channel FLAT +30dBmV/ch
CTB		dBc	-	-65	-60	
XMOD		dBc	-	-60	-55	
CSO	50 ~ 870MHz	dBc	-	-70	-65	135 channel FLAT +20dBmV/ch
CTB		dBc	-	-80	-75	
XMOD		dBc	-	-75	-70	
ACQ629 DC Current		mA	-	130	-	VDD = +12.0V
AGC DC Current		mA	-	30	-	AGC Vctr = 10.0V

Note

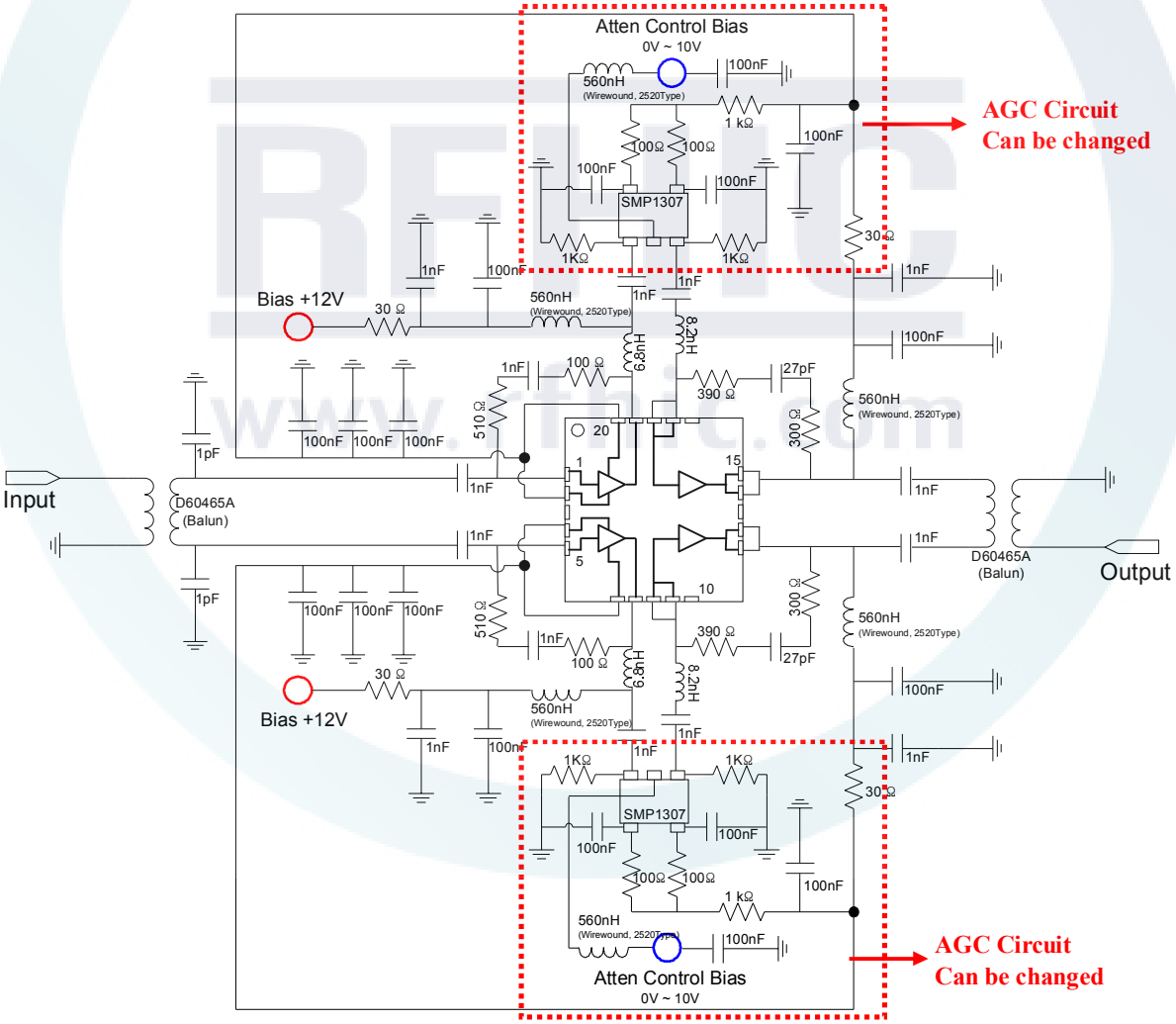
1. Test conditions unless otherwise noted. Test Freq = 500MHz, T=25℃, VDD=5V, 75Ω system
2. OIP3 measured with 2 tones at an output power of +5dBm/tone separated by 1MHz

Absolute Maximum Ratings

PARAMETER	UNIT	MIN	TYP	MAX	CONDITION
Device Voltage	VDC	-	12	14	-
Operating Temperature	℃	-40	-	85	-
Storage Temperature	℃	-40	-	150	-
ESD Human Body Model	-	-	Class 0	-	-
Moisture Sensitivity Level	-	-	MSL1	-	-
Junction Temperature	℃	-	-	180	-
Thermal Resistance (Rth)	℃/W	-	30	-	-

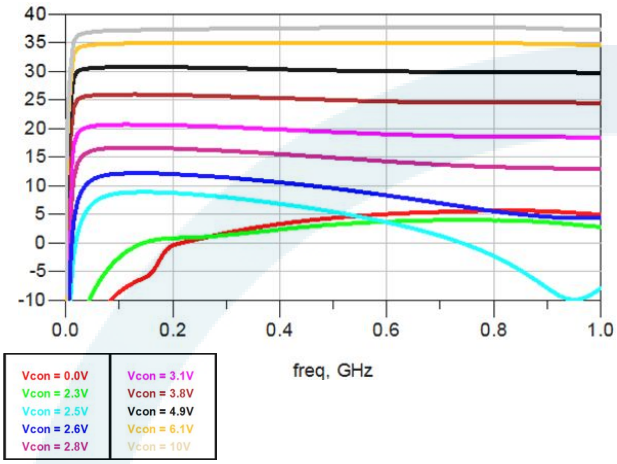
Application Circuit @ 50 ~ 1000MHz, 75ohm System

*** Bias of the same color can be configured as the Common Bias**

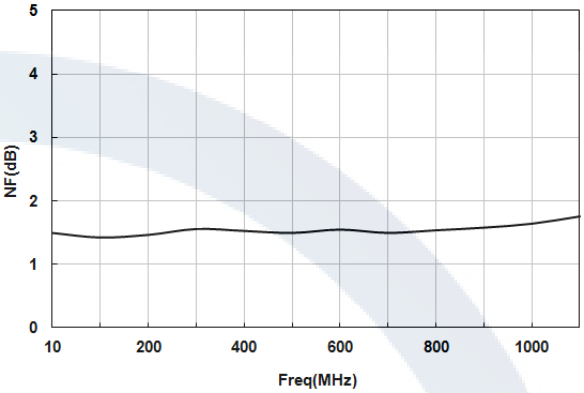


Typical Performance @ Vdd=12V, Ids=130mA, T=25℃, 75ohm System, AGC Range: Vcontrol = 0 ~ 10V

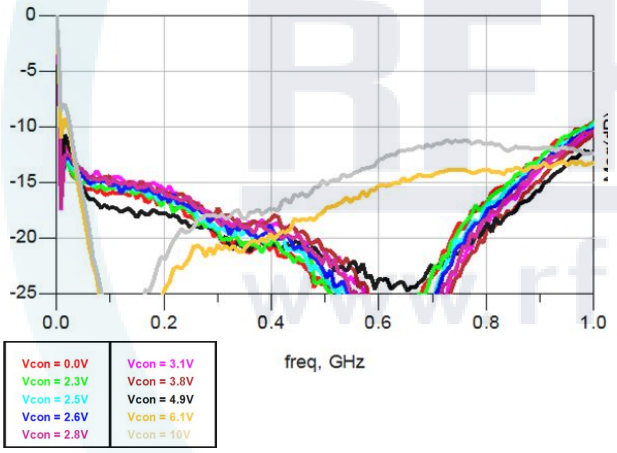
Gain vs. Frequency



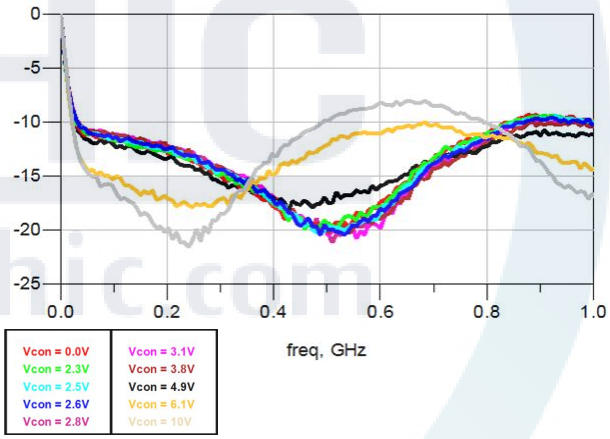
Noise Figure vs. Frequency



Input Return Loss vs. Frequency



Output Return Loss vs. Frequency

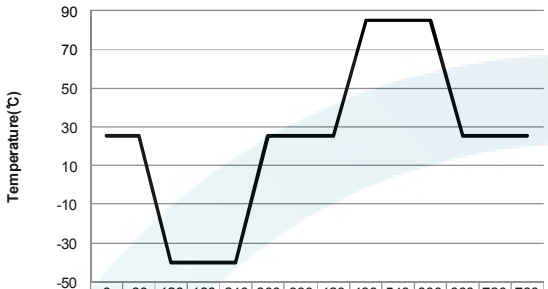


Multi-Tone Test: 135CH_FLAT @ Output +30dBmV/ch, Vctr = 10V

FRQ	XMD(NCTA)	CTB_RAW	CTB_COR	N-FLR	CSU_RAW	CSU_COR	CSU_FRQ	CSL_RAW	CSL_COR	CSL_FRQ
55.25	60.9	66.1	67.8	71	70.4	75	109.99	63.1	63.9	107.99
77.25	61	67.4	69.6	71.3	62.3	63	77.99	70	74.3	75.89
109.25	61.9	67.6	69.5	72	70.4	74.7	110	62.7	63.2	107.99
211.25	61.2	65.8	67.5	71.1	69.9	74.3	212.5	63.9	64.8	209.99
331.25	61.5	66.6	68.5	71.1	69	73.4	332.49	64.6	65.9	329.99
445.25	61.8	66	67.5	71.7	68.4	71	446.49	64.9	66	443.98
547.25	60.5	65	66.4	70.6	64.3	65.4	548.49	65.3	67	545.98
637.25	60.3	63.7	64.7	70.6	64.7	66	638.49	65.3	66.7	635.98
745.25	58.8	64.2	65.3	70.8	64.1	65.1	746.49	67.7	70.7	743.99
859.25	59	64.3	65.9	69.4	63.1	64.2	860.49	69	73.3	857.98
Min	58.8	63.7	64.7	69.4	62.3	63	77.99	62.7	63.2	75.89
Max	61.9	67.6	69.6	72	70.4	75	860.49	70	74.3	857.98

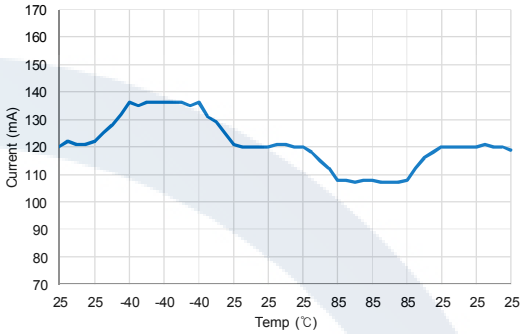
Temperature Test @ -40℃ ~ +85℃, 50ohm System, Nothing AGC Circuit

Temperature Cycle

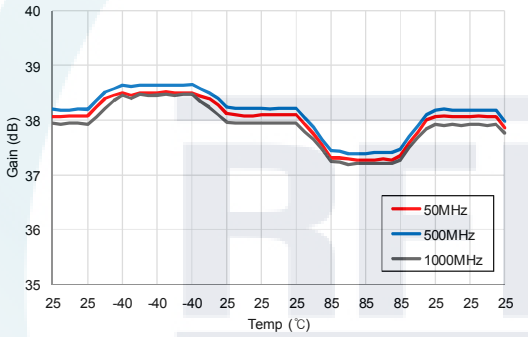


	0	60	120	180	240	300	360	420	480	540	600	660	720	780
Temp	25	25	-40	-40	-40	25	25	25	85	85	85	25	25	25

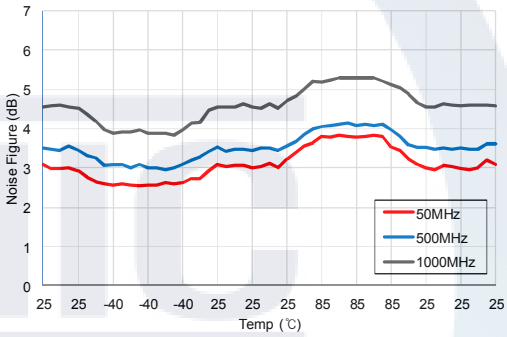
Temperature Range: Current



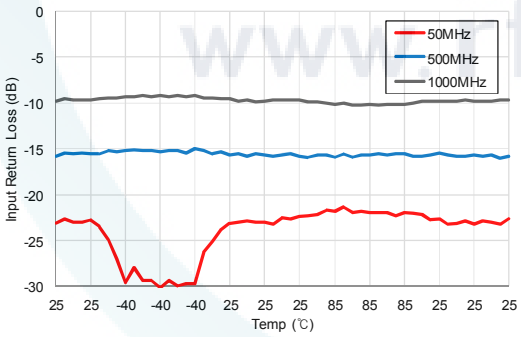
Temperature Range: Gain



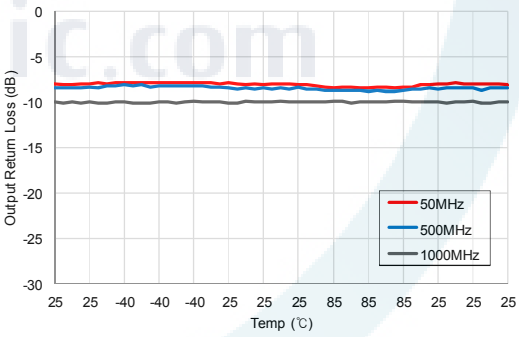
Temperature Range: Noise Figure



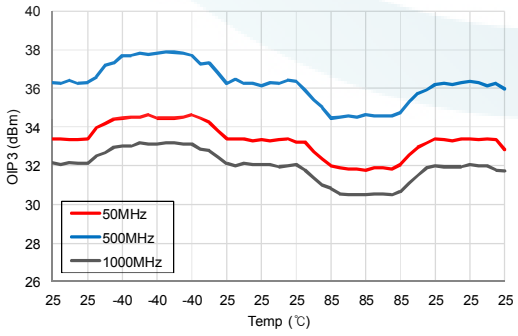
Temperature Range: Input Return Loss



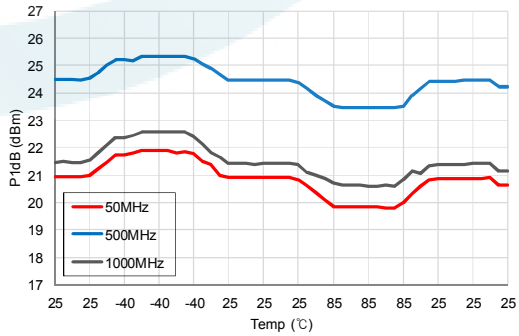
Temperature Range: Output Return Loss



Temperature Range: OIP3

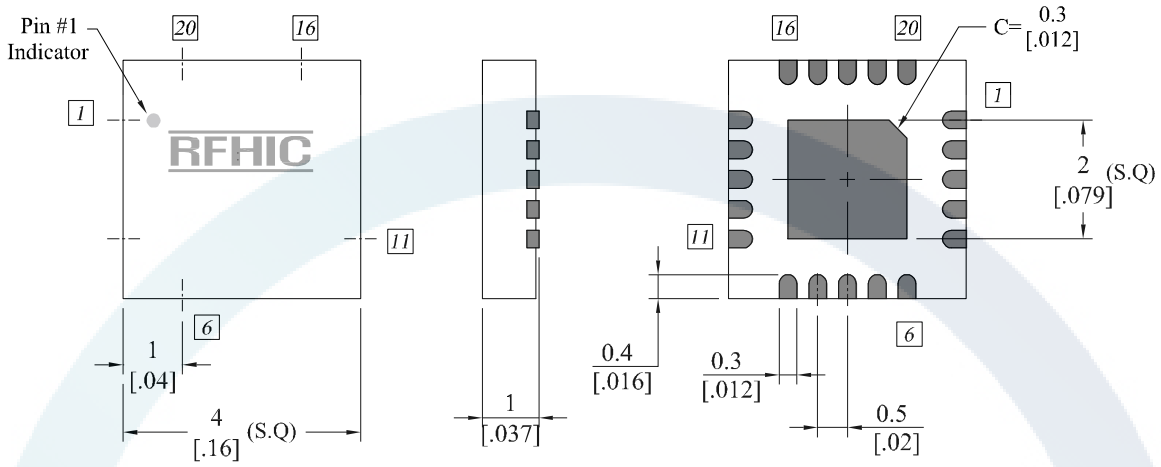


Temperature Range: P1dB



Package Dimension (Type: QFN4x4)

* Unit: mm[inch] | Tolerance ±0.2[.008]



▲ Top View ▲ Side View ▲ Bottom View

Pin Description							
Pin No	**Function**	**Pin No**	**Function**	**Pin No**	**Function**	**Pin No**	**Function**
1	AMP1_IN	6	AMP2_Source	11	AMP4_OUT	16	N/C
2	AMP1_Source	7	AMP2_OUT	12	AMP4_OUT	17	AMP3_IN
3	N/C	8	AMP4_IN	13	N/C	18	AMP3_IN
4	AMP2_Source	9	AMP4_IN	14	AMP3_OUT	19	AMP1_OUT
5	AMP2_IN	10	N/C	15	AMP3_OUT	20	AMP1_Source

*N/C: Not Connected

*** 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
ACQ629	2014.04.22	1.1	Absolute Maximum Ratings (Delete Tj Typ)	-
ACQ629	2013.12.17	1.0	Newly created & New datasheet format.	-