# QPA3238 CATV Power Doubler Hybrid 1003MHz 23dB

## **Product Description**

The QPA3238 is a Hybrid Power Doubler amplifier module. The part employs GaAs/GaN die and is operated from 45 MHz to 1003 MHz. It provides excellent linearity and superior return loss performance with low noise and optimal reliability. DC current of the device can be externally adjusted for optimum distortion performance versus power consumption over a wide range of output level.



Package: SOT-115J

#### **Product Features**

- Excellent Linearity
- Superior Return Loss Performance
- Extremely Low Distortion
- Optimal Reliability
- Extremely Low Noise
- Unconditionally Stable Under all Terminations
- 22.5dB Min Gain at 1003 MHz
- 480 mA Max. at 24 VDC
- Extra Pin for current adjustment

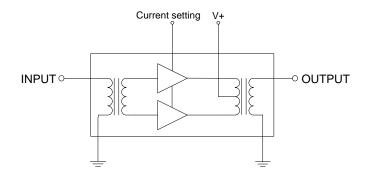
# **Applications**

• 45-1003 MHz CATV Amplifier Systems

### **Ordering Information**

Part No.	Description	
QPA3238	Box with 50 pcs	

## **Functional Block Diagram**



# **QPA3238 Absolute Maximum Ratings**

Parameter	Value / Range		
RF Input Voltage (single tone)	75 dBmV		
DC Supply over-voltage (5 minutes)	+30 V		
Storage Temperature	−40 to 100 °C		
Operating Mounting Base Temperature	−30 to 100 °C		

Operation of this device outside the parameter ranges given above may cause permanent damage.

# **Electrical Specifications**

Parameter	Test Conditions: V+=24V, $T_{MB}$ =30°C, Z <sub>S</sub> =Z <sub>L</sub> =75 $\Omega$ , I <sub>DC</sub> set >370mA	Min	Тур	Мах	Unit	
Operational Frequency Range	-	40	-	1003	MHz	
Gain	f <sub>o</sub> = 50 MHz	21.3	21.8	22.3		
Gain	f <sub>o</sub> = 1003 MHz	22.3	22.8	24.0		
Gain Slope	40 to 1003 MHz <sup>[1]</sup>	0.5	1.0	2.0	2.0 dB	
Gain Flatness	40 to 1003 MHz		0.	0.8	-	
	f <sub>o</sub> = 40 to 320 MHz	20		_		
	f <sub>0</sub> = 320 to 640 MHz	19 –			-	
Input Return Loss	f <sub>0</sub> = 640 to 870 MHz	18		_	dB	
	f <sub>0</sub> = 870 to 1003 MHz	17		_		
	f <sub>0</sub> = 40 to 320 MHz	20		_		
Output Return Loss	f <sub>0</sub> = 320 to 640 MHz	19		_	dB	
	f <sub>0</sub> = 640 to 870 MHz	18				
	f <sub>0</sub> = 870 to 1003 MHz	17		_		
Noise Figure	f <sub>0</sub> = 50 to 1003 MHz	-		4.0	dB	
СТВ	I <sub>DC</sub> =I <sub>DC</sub> typical		-73	-68	dBc	
XMOD	$V_0 = 61.0$ dBmV at 1000MHz, 18dB extrapolated tilt,		-65	-60	dBc	
CSO	79 analog channels plus 75 digital channels (-6dB		-76	-70	dBc	
CIN	offset) <sup>[2][4][5]</sup>	55	60		dB	
					-10 -	
СТВ	Ibc=Ibc typical		-77		dBc	
XMOD	$V_0 = 56.4$ dBmV at 1000MHz, 13.4dB extrapolated tilt, 79 analog channels plus 75 digital channels (-6dB		-75		dBc	
CSO			-77		dBc	
CIN			67		dB	
СТВ	I <sub>DC</sub> =370mA		-70		dBc	
XMOD	$V_0 = 56.4$ dBmV at 1000MHz, 13.4dB extrapolated tilt,		-63		dBc	
CSO	79 analog channels plus 75 digital channels (-6dB		-70		dBc	
CIN	offset) <sup>[3][4][6]</sup>		62		dB	

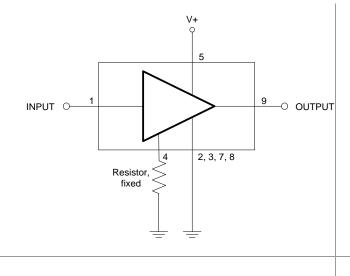
#### **QPA3238**

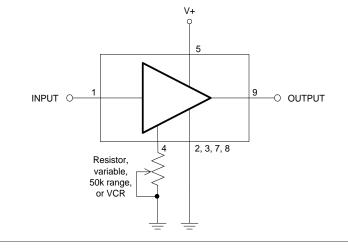
# QOCVO

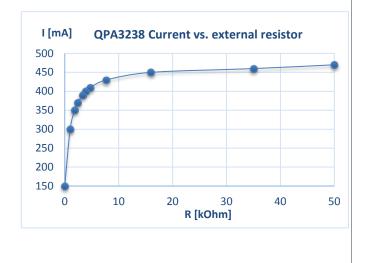
- 1. The slope is defined as the difference between the gain at the start frequency and the gain at the stop frequency.
- 79 analog channels, NTSC frequency raster: 55.25MHz to 547.25MHz, +43dBmV to +52.4dBmV tilted output level, plus 75 digital channels, -6dB offset relative to the equivalent analog carrier.
- 79 analog channels, NTSC frequency raster: 55.25MHz to 547.25MHz, +43dBmV to +50.0dBmV tilted output level, plus 75 digital channels, -6dB offset relative to the equivalent analog carrier.
- 4. Composite Triple Beat (CTB) The CTB parameter is defined by ANSI/SCTE 6.
  - Composite Second Order (CSO) The CSO parameter (both sum and difference products) is defined by ANSI/SCTE 6. Cross Modulation (XMOD) - Cross modulation (XMOD) is defined by ANSI/SCTE 58, measured at baseband (selective voltmeter method), referenced to 100% modulation of the carrier being tested.
- Carrier to Intermodulation Noise (CIN) The CIN parameter is defined by ANSI/SCTE 17 (Test procedure for carrier to noise).
- 5. Test condition: Pin 4 not connected
- 6. Test condition: Pin 4 connected to GND via 2.4k resistor

# **Current Adjustment Using Hybrid Pin 4**

The QPA3238 can be operated over a wide range of current to provide maximum required performance with minimum current consumption. A single external resistor connected between pin 4 and GND allows variation of current between 470mA and 150mA (typ.). Within the recommended range of current between 470mA and 370mA gain (S21) change is less than 0.2dB and noise figure change is less than 0.1dB. If pin 4 is not connected the devices operates at maximum current, see table below.



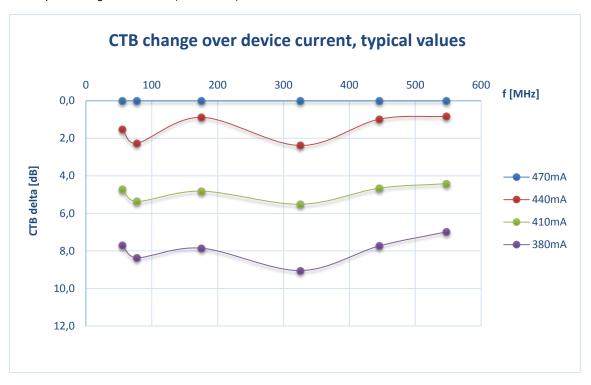


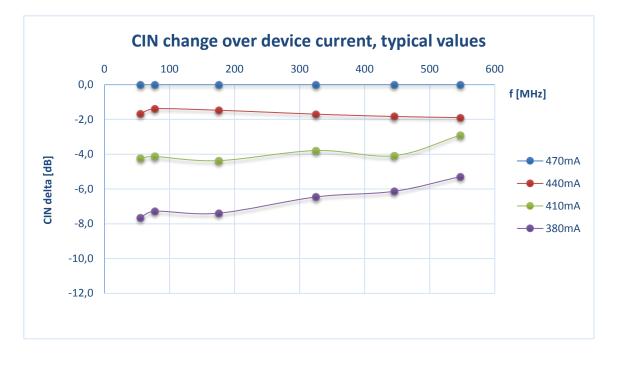


Device current [mA], typical	External resistor [Ω]		
470	>50k (open)		
450	16k		
430	7k5		
400	3k9		
370	2k4		
340	1k5		
150	0 (short)		
	$\label{eq:V+} \begin{array}{l} V+=24V; \ T_{MB}=30^{\circ}C; \\ Z_{S}=Z_{L}=75\Omega \end{array}$		

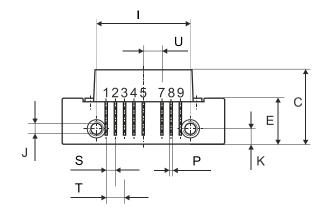
#### Change of distortion performance over current

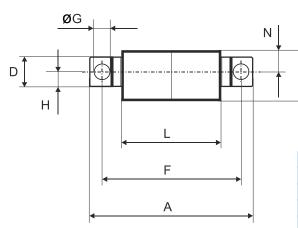
Test Condition: V+=24V,  $T_{MB}$  = 30°C;  $Z_S$  =  $Z_L$  = 75 $\Omega$ ,  $V_O$  = 61.0dBmV at 1000MHz, 18dB extrapolated tilt, 79 analog channels plus 75 digital channels (-6dB offset)

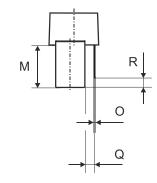




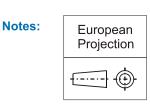
# Package Drawing (Dimensions in millimeters)







0 5 10mm



**Pinning:** 

•			
Pin	Name		
1	Input		
2-3	GND		
4	CURRENT SETTING		
5	V+		
6			
7-8	GND		
9	Output		

	Nominal	Min	Мах
А	44,6 <sup>± 0,2</sup>	44,4	44,8
В	13,6 <sup>± 0,2</sup>	13,4	13,8
С	20,4 <sup>± 0,5</sup>	19,9	20,9
D	8 <sup>± 0,15</sup>	7,85	8,15
Е	12,6 <sup>± 0,15</sup>	12,45	12,75
F	38,1 <sup>± 0,2</sup>	37,9	38,3
G	4 +0,2 / -0,05	3,95	4,2
Н	4 <sup>± 0,2</sup>	3,8	4,2
T	25,4 <sup>± 0,2</sup>	25,2	25,6
J	UNC 6-32	-	-
К	4,2 <sup>± 0,2</sup>	4,0	4,4
L	27,2 <sup>± 0,2</sup>	27,0	27,4
М	11,6 <sup>± 0,5</sup>	11,1	12,1
N	5,8 <sup>± 0,4</sup>	5,4	6,2
0	0,25 <sup>± 0,02</sup>	0,23	0,27
Р	0,45 <sup>±0,03</sup>	0,42	0,48
Q	2,54 <sup>± 0,3</sup>	2,24	2,84
R	2,54 <sup>± 0,5</sup>	2,04	3,04
S	2,54 <sup>± 0,25</sup>	2,29	2,79
Т	5,08 <sup>± 0,25</sup>	4,83	5,33
U	5,08 <sup>± 0,25</sup>	4,83	5,33

В

## Handling Precautions

Parameter	Rating	Standard		Caution!
ESD-Human Body Model (HBM)	1C	ANSI/ESD/JEDEC JS-001-2012	18A	ESD-Sensitive Device

## **RoHS Compliance**

This part is compliant with 2011/65/EU RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment) as amended by Directive 2015/863/EU.

### **Contact Information**

For the latest specifications, additional product information, worldwide sales and distribution locations:

- Web: www.qorvo.com
- Tel: 1-844-890-8163
- Email: customer.support@gorvo.com

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