QPA3248

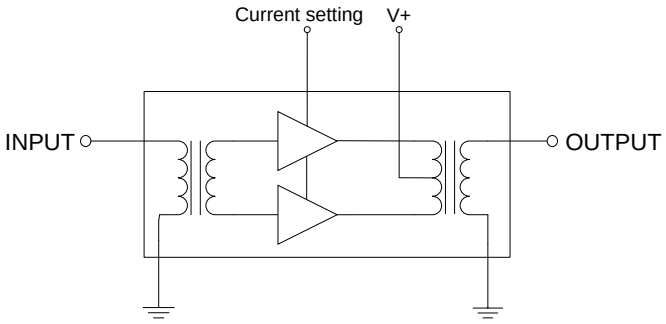
CATV Power Doubler Hybrid 1003MHz 25dB

Product Description

The QPA3248 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

Functional Block Diagram



Product Features

- Excellent Linearity
- Superior Return Loss Performance
- Extremely Low Distortion
- Optimal Reliability
- Extremely Low Noise
- Unconditionally Stable Under all Terminations
- 24.5dB 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
QPA3248	Box with 50 pcs

QPA3248 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.

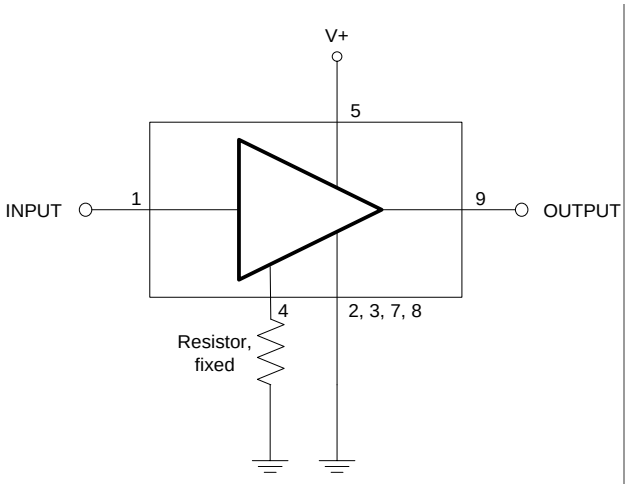
Electrical Specifications

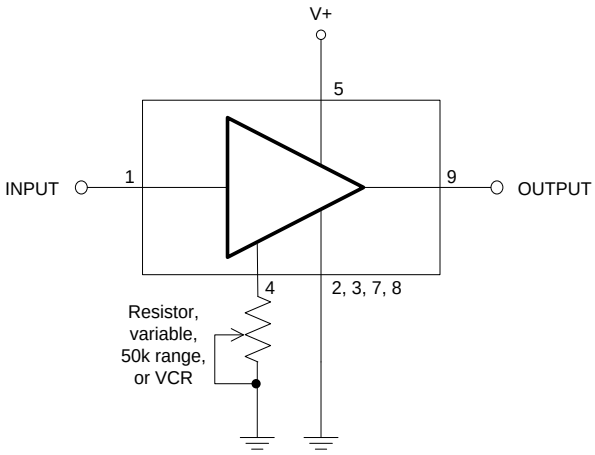
Parameter	Test Conditions: V+=24V, T_{MB}=30°C, Z_S=Z_L=75Ω, I_{DC} set >370mA	Min	Typ	Max	Unit
Operational Frequency Range	–	40	–	1003	MHz
Gain	f_o = 50 MHz	23.3	23.8	24.3	dB
Gain	f_o = 1003 MHz	24.5	25.0	26.0	
Gain Slope	40 to 1003 MHz [1]	0.5	1.0	2.0	
Gain Flatness	40 to 1003 MHz			0.8	
Input Return Loss	f_o= 40 to 320 MHz	20		–	dB
	f_o= 320 to 640 MHz	19		–	
	f_o= 640 to 870 MHz	18		–	
	f_o= 870 to 1003 MHz	17		–	
Output Return Loss	f_o= 40 to 320 MHz	20		–	dB
	f_o= 320 to 640 MHz	19		–	
	f_o= 640 to 870 MHz	18			
	f_o= 870 to 1003 MHz	17		–	
Noise Figure	f_o= 50 to 1003 MHz	–		4.0	dB
CTB	I_{DC}=I_{DC} typical V_O = 61.0dBmV at 1000MHz, 18dB extrapolated tilt, 79 analog channels plus 75 digital channels (-6dB offset)[2][4][5]		-73	-68	dBc
XMOD			-65	-60	dBc
CSO			-76	-70	dBc
CIN		55	60		dB
CTB	I_{DC}=I_{DC} typical V_O = 56.4dBmV at 1000MHz, 13.4dB extrapolated tilt, 79 analog channels plus 75 digital channels (-6dB offset)[3][4][5]		-77		dBc
XMOD			-75		dBc
CSO			-77		dBc
CIN			66		dB
CTB	I_{DC}=370mA V_O = 56.4dBmV at 1000MHz, 13.4dB extrapolated tilt, 79 analog channels plus 75 digital channels (-6dB offset)[3][4][6]		-70		dBc
XMOD			-63		dBc
CSO			-75		dBc
CIN			58		dB

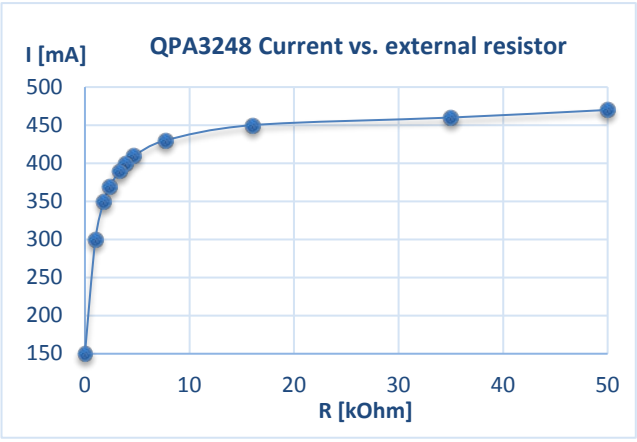
1. The slope is defined as the difference between the gain at the start frequency and the gain at the stop frequency.
2. 79 analog channels, NTSC frequency raster: 55.25MHz to 547.25MHz, +43dBmV to +52.4dBmV tilted output level, plus 75 digital channels, -6dB offset relative to the equivalent analog carrier.
3. 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 QPA3248 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.



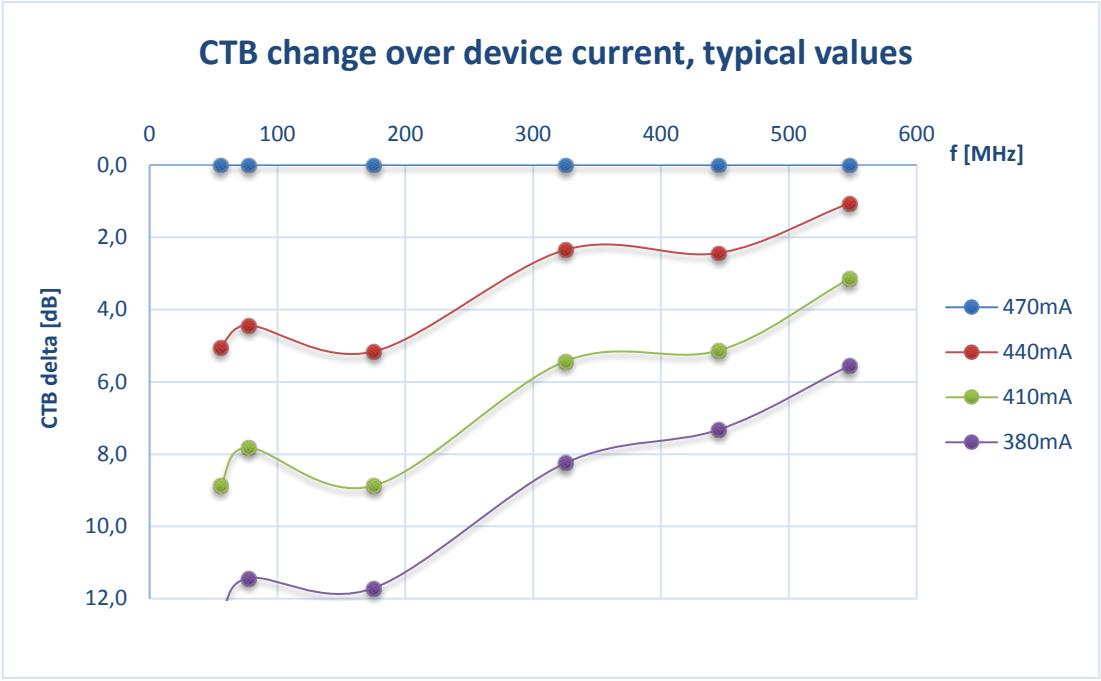


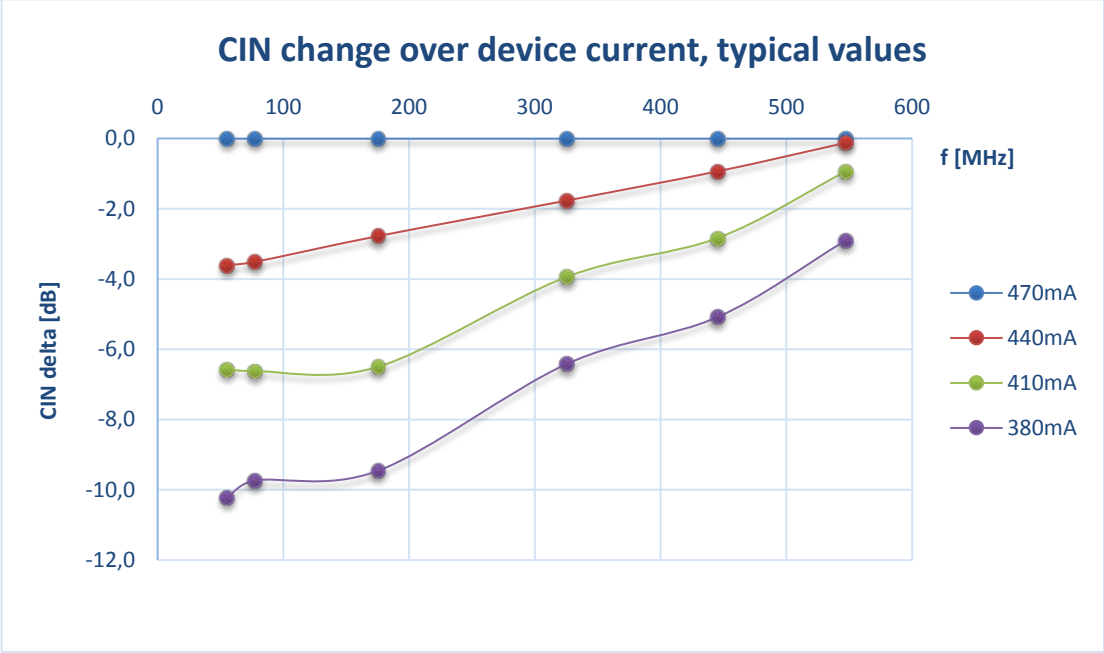


Device current [mA], typical	External resistor [Ω]
470	>50k (open)
450	16k
430	7k5
400	3k9
370	2k4
340	1k5
150	0 (short)
	V+ = 24V; T_{MB} = 30°C; $Z_S = Z_L$ = 75Ω

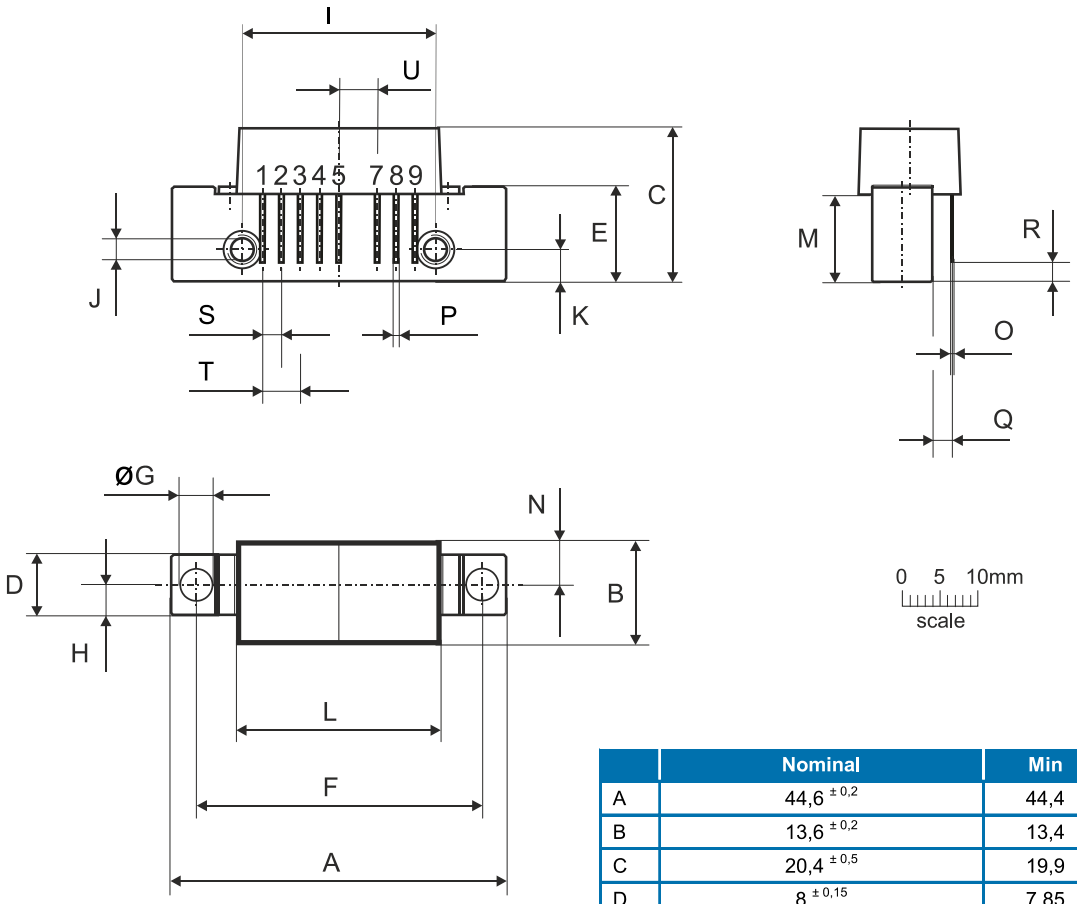
Change of distortion performance over current

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

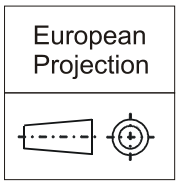




Package Drawing (Dimensions in millimeters)



Notes:



	Nominal	Min	Max
A	44,6 ± 0,2	44,4	44,8
B	13,6 ± 0,2	13,4	13,8
C	20,4 ± 0,5	19,9	20,9
D	8 ± 0,15	7,85	8,15
E	12,6 ± 0,15	12,45	12,75
F	38,1 ± 0,2	37,9	38,3
G	4 +0,2 / -0,05	3,95	4,2
H	4 ± 0,2	3,8	4,2
I	25,4 ± 0,2	25,2	25,6
J	UNC 6-32	-	-
K	4,2 ± 0,2	4,0	4,4
L	27,2 ± 0,2	27,0	27,4
M	11,6 ± 0,5	11,1	12,1
N	5,8 ± 0,4	5,4	6,2
O	0,25 ± 0,02	0,23	0,27
P	0,45 ± 0,03	0,42	0,48
Q	2,54 ± 0,3	2,24	2,84
R	2,54 ± 0,5	2,04	3,04
S	2,54 ± 0,25	2,29	2,79
T	5,08 ± 0,25	4,83	5,33
U	5,08 ± 0,25	4,83	5,33

Pinning:

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

Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	1C	ANSI/ESD/JEDEC JS-001-2012

Caution!
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@qorvo.com

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