

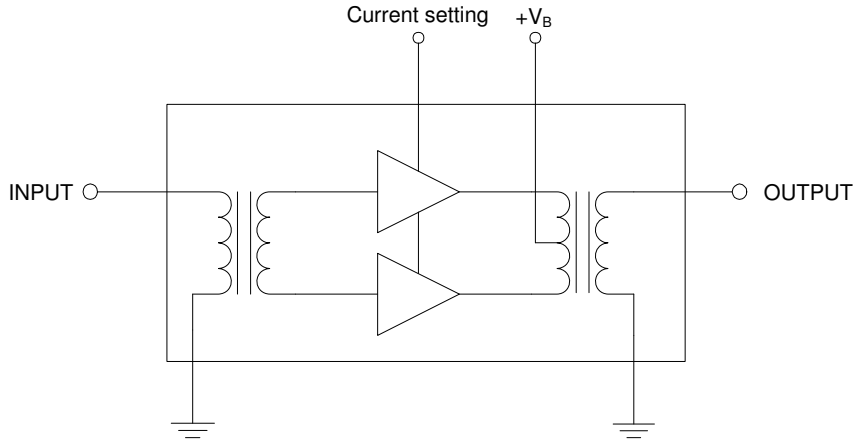


**Features**

- Excellent Linearity
- Superior Return Loss Performance
- Extremely Low Distortion
- Optimal Reliability
- Low Noise
- Unconditionally Stable Under all Terminations
- Extremely High Output Capability
- 24.5dB Min. Gain at 1003 MHz
- 450mA Max. at 24VDC
- Extra Pin For Current Adjustment

**Applications**

- 45MHz to 1003MHz CATV Amplifier Systems



Functional Block Diagram

**Product Description**

The RFPD2930 is a Hybrid Power Doubler amplifier module. The part employs GaAs pHEMT die and GaN HEMT die, has extremely high output capability, and is operated from 45MHz to 1003MHz. 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.

**Optimum Technology Matching® Applied**

- |                                      |                                      |  |  |
|--------------------------------------|--------------------------------------|--|--|
| <input type="checkbox"/> GaAs HBT    | <input type="checkbox"/> SiGe BiCMOS | <input checked="" type="checkbox"/> GaAs pHEMT | <input checked="" type="checkbox"/> GaN HEMT |
| <input type="checkbox"/> GaAs MESFET | <input type="checkbox"/> Si BiCMOS   | <input type="checkbox"/> Si CMOS               | <input type="checkbox"/> BiFET HBT           |
| <input type="checkbox"/> InGaP HBT   | <input type="checkbox"/> SiGe HBT    | <input type="checkbox"/> Si BJT                | <input type="checkbox"/> LDMOS               |

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## Absolute Maximum Ratings

Parameter	Rating	Unit
RF Input Voltage (single tone)	60	dBmV
DC Supply Over-Voltage (5 minutes)	30	V
Storage Temperature	-40 to +100	°C
Operating Mounting Base Temperature	-30 to +100	°C



**Caution!** ESD sensitive device.

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability. Specified typical performance or functional operation of the device under Absolute Maximum Rating conditions is not implied.

RoHS status based on EUDirective2002/95/EC (at time of this document revision).

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Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
<b>Overall</b>					$V_B = 24V$ ; $T_{MB} = 30^\circ C$ ; $Z_S = Z_L = 75\Omega$ , IDC set > 370 mA
Power Gain	23.3	23.8	24.3	dB	f = 45 MHz
	24.5	25.0	26.0	dB	f = 1003 MHz
Slope	0.5	1.0	2.0	dB	f = 45 MHz to 1003 MHz [1]
Flatness of Frequency Response			0.8	dB	f = 45 MHz to 1003 MHz
Input Return Loss	-20			dB	f = 45 MHz to 320 MHz
	-19			dB	f = 320 MHz to 640 MHz
	-18			dB	f = 640 MHz to 870 MHz
	-16			dB	f = 870 MHz to 1003 MHz
Output Return Loss	-20			dB	f = 45 MHz to 320 MHz
	-19			dB	f = 320 MHz to 640 MHz
	-18			dB	f = 640 MHz to 870 MHz
	-17			dB	f = 870 MHz to 1003 MHz
Noise Figure		3.0	4.0	dB	f = 50 MHz to 1003 MHz
Total Current Consumption (DC)		430.0	450.0	mA	[2]
<b>Distortion data</b>					$V_B = 24V$ ; $T_{MB} = 30^\circ C$ ; $Z_S = Z_L = 75\Omega$ ; IDC = IDC typical [2]
CTB		-77	-74	dBc	$V_O = 56.4$ dBmV at 1000 MHz, 13.4 dB extrapolated tilt, 79 analog channels plus 75 digital channels (-6 dB offset)[3]
XMOD		-71	-68	dBc	
CSO		-71	-68	dBc	
CIN	63	66		dB	
<b>Distortion data</b>					$V_B = 24V$ ; $T_{MB} = 30^\circ C$ ; $Z_S = Z_L = 75\Omega$ ; IDC = 370 mA
CTB		-70		dBc	$V_O = 56.4$ dBmV at 1000 MHz, 13.4 dB extrapolated tilt, 79 analog channels plus 75 digital channels (-6 dB offset)[3]
XMOD		-65		dBc	
CSO		-71		dBc	
CIN		61		dB	

[1] The slope is defined as the difference between the gain at the start frequency and the gain at the stop frequency.

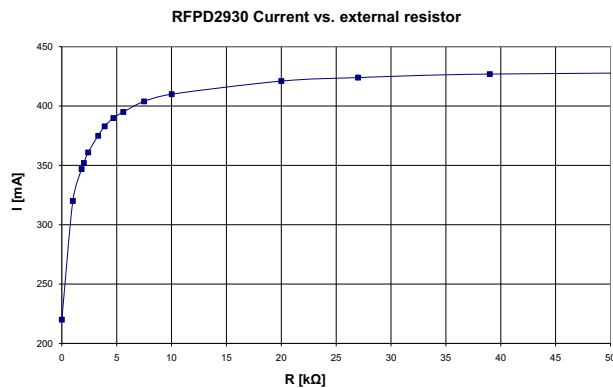
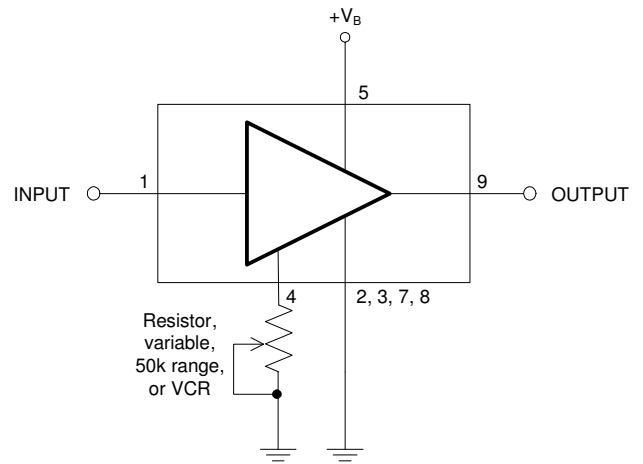
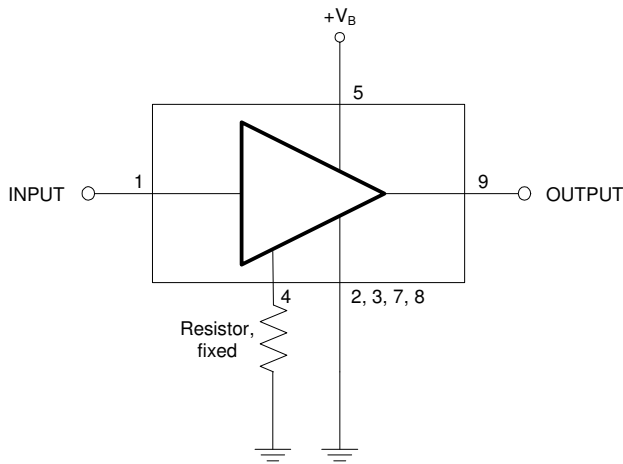
[2] Test condition: Pin 4 not connected

[3] 79 analog channels, NTSC frequency raster: 55.25 MHz to 547.25 MHz, +43 dBmV to +50 dBmV tilted output level, plus 75 digital channels, -6 dB offset relative to the equivalent analog carrier. Composite Second Order (CSO) - The CSO parameter (both sum and difference products) is defined by the NCTA. Composite Triple Beat (CTB) - The CTB parameter is defined by the NCTA. Cross Modulation (XMOD) - Cross modulation (XMOD) is 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).

### Current Adjustment Using Hybrid Pin 4

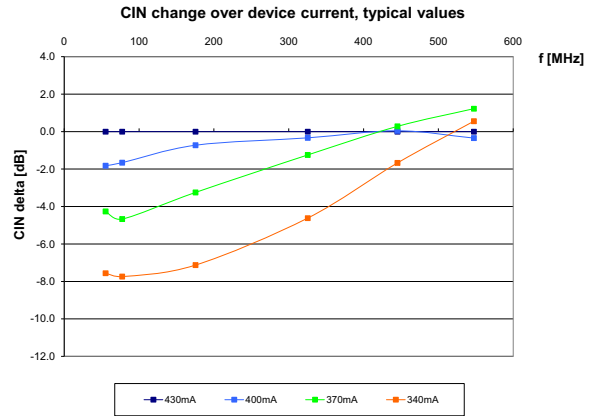
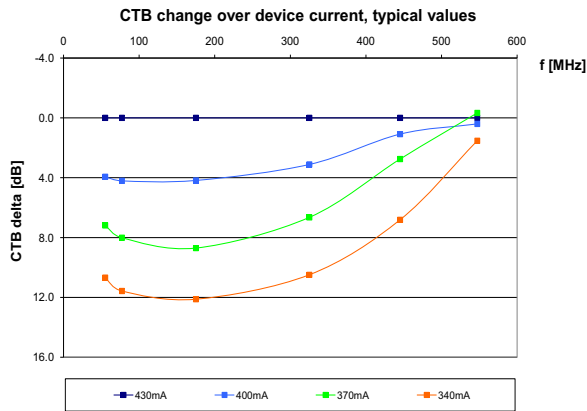
The RFPD2930 can be operated over a wide range of current to provide maximum required performance with minimum current consumption. A single external resistor connected between pin 4 and GND allows variation of current between 430mA and 220mA (typ.). Within the recommended range of current between 430mA 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 device operates at maximum current, see table below.

Examples of connecting pin 4:



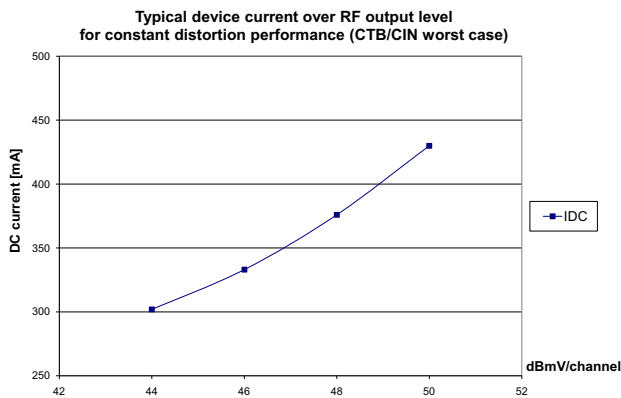
Device current [mA], typical	External resistor [Ω]
430	>50k (open)
420	18k
400	6k8
370	3k
340	1k8
320	1k
220	0 (short)
$V_B = 24V$ ; $T_{MB} = 30^\circ C$ ; $Z_S = Z_L = 75\Omega$	

## Change of Distortion Performance Over Current



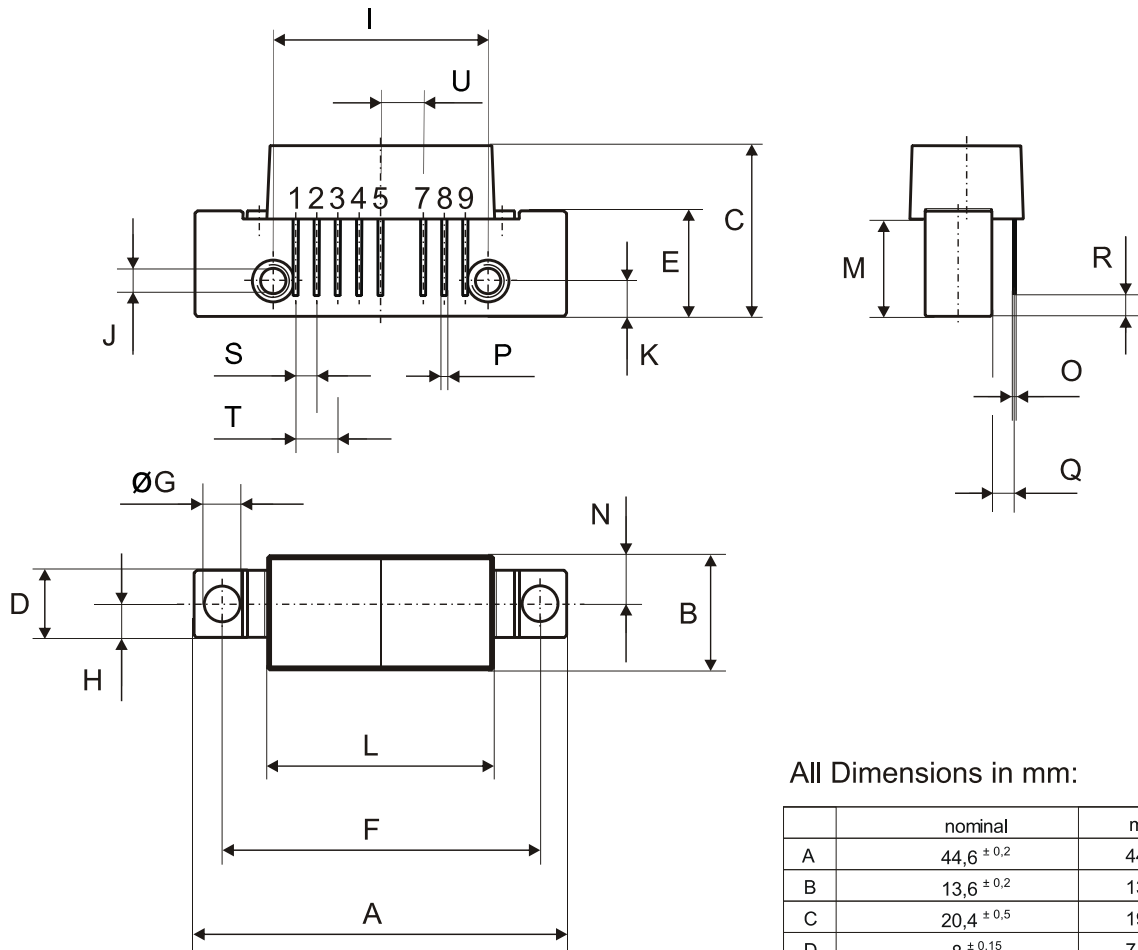
**Test condition:**

$V_B=24V$ ;  $T_{MB}=30^\circ C$ ;  $Z_S=Z_L=75\Omega$ ; 79 ch. 7 dB tilted;  $V_O=50dBmV$  at 550MHz, plus 75 digital channels (-6dB offset)



**Test condition:**

$V_B=24V$ ;  $T_{MB}=30^\circ C$ ;  $Z_S=Z_L=75\Omega$ ; 79 ch. 7 dB tilted;  $V_O=50dBmV$  at 550MHz, plus 75 digital channels (-6dB offset)

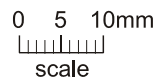


All Dimensions in mm:

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

Pinning:

1	2	3	4	5	6	7	8	9
INPUT	GND	GND	IDC ADJUSTMENT	+VB		GND	GND	OUTPUT



Notes:

