SJM PREWELL

PW470

CATV Amplifier

Features

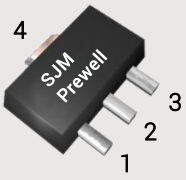
- 45 - 1500MHz
- Gain 15.5dB @ 45MHz
- CSO 55dBc @ 25dBmV
- CTB 74dBc @ 25dBmV
- NF 3.7dB @ 400MHz
- Lead-free / Green / RoHS compliant SOT-89 Package

Applications

- Headend
- Drop Amplifier
- Cable Modem
- Laser Diode Driver
- FTTH Receiver
- Optical Transmitter
- RFoG / MOCA

Functional Diagram

RF IN	1	RF OUT / Bias	3
GND	2,4		



ESD/MSL

1 ESD sensitive device. Observe handling precautions.

2 HBM: Class 2, JESD22-A114

3 CDM: Class C3 , JESD22-C101F

4 MSL 3, J-STD-020

Description

The PW470 is a high performance InGaP HBT MMIC Amplifier and consists of Darlington pair amplifiers that is internally matched to 75Ω input/output. The features of PW470 are high linear performance, high reliability and low noise as a CATV amplifier. The PW470 operates from a single voltage supply and requires only two DC-blocking capacitors, a bias resistor and an inductor for operation. The device is a general purpose CATV amplifier that offers high dynamic range in a low cost surface-mounted plastic SOT-89 package. All devices are 100% RF and DC tested.

Specifications

Parameter	Units	Typ.	Condition
S21	dB	15.5	45 ~ 1000MHz
S11	dB	-15	45 ~ 1000MHz
S22	dB	-19	45 ~ 1000MHz
CSO	dBc	55	25dBmV/132ch Flat
CTB	dBc	74	25dBmV/132ch Flat
OIP3	dBm	35.0	Note 1 [2]
P1dB	dBm	18.5	
Vo	dBmV	55.5	Note 2 [3]
d2	dBc	56.5	Note 3 [4]
NF	dB	3.7	
V / I	V / mA	5 / 70	
Rth	°C/W	57	

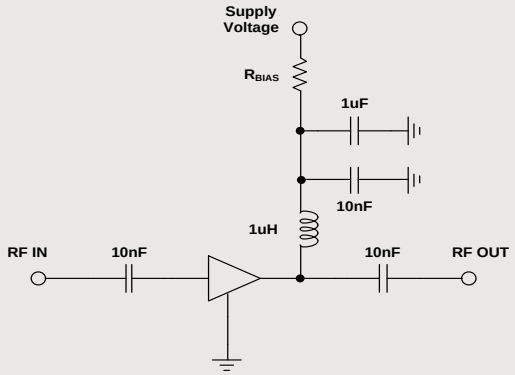
1) Test Conditions : T=25°C, Supply Voltage=6V, 75ohm System
2) Note 1. Two Tones, 1MHz Spacing, 5dBm per Tone at Output
3) Note 2. fp=851.25MHz; Vp=Vo; fq=858.25MHz; Vq=Vo-6dB; fr =860.25MHz; Vr=Vo-6dB; measured at fp+fq-fr =849.25MHz
4) Note 3. fp=55.25MHz; Vp=40dBmV, fq=805.25MHz; Vq=40dBmV, measured at fp+fq=860.5MHz

Absolute Maximum Ratings

Parameter	Rating	Unit
Device Voltage	11	V
Device Current	250	mA
RF Power Input	10	dBm
Storage Temperature	-55 to 150	°C
Ambient Operating Temperature	-40 to 85	°C
Junction Temperature	187	°C

1) Stresses above the maximum values listed have may cause permanent damage to the device.
2) MTTF is more than 100 years.

45 -1000MHz CATV Application Circuit

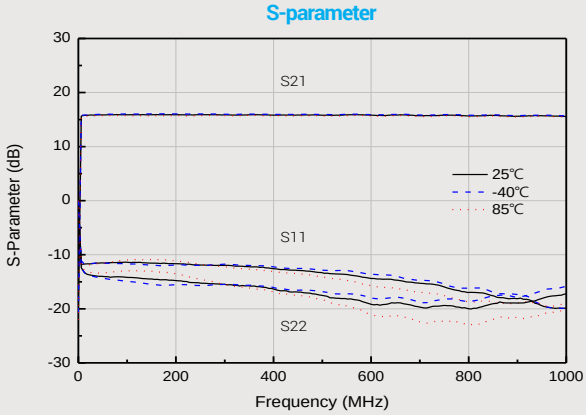


Recommended Bias Values

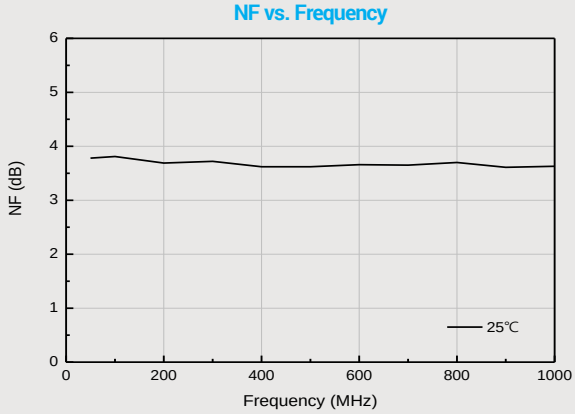
Supply Voltage (V)	R_{BIAS} Value (ohm)	Size
5.3	4.7	0805
6	15	0805
7	30	1210
8	45	1210
9	58	2010
10	74	2010
12	115	2512

1) Measurement for our datasheet was made on 1.6mm thick FR-4 Board and 75 ohm microstrip line.

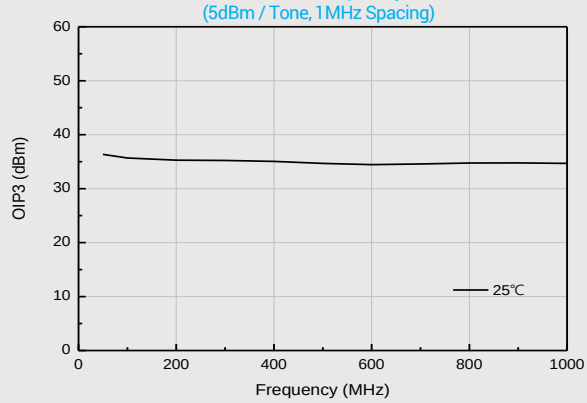
S-parameter



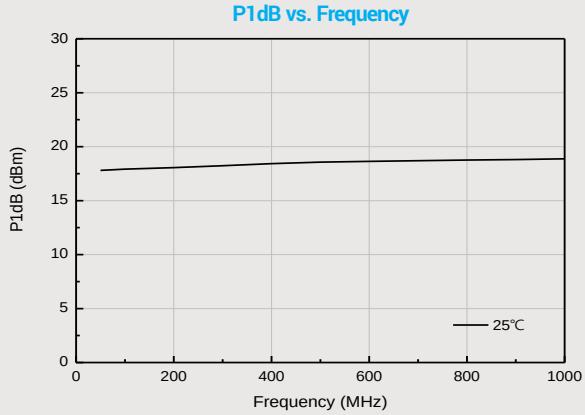
NF vs. Frequency



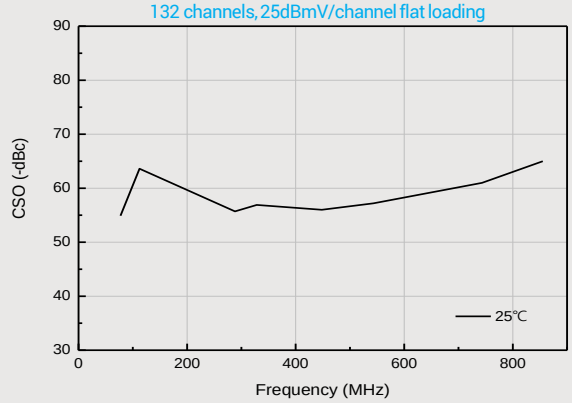
OIP3 vs. Frequency
(5dBm / Tone, 1MHz Spacing)



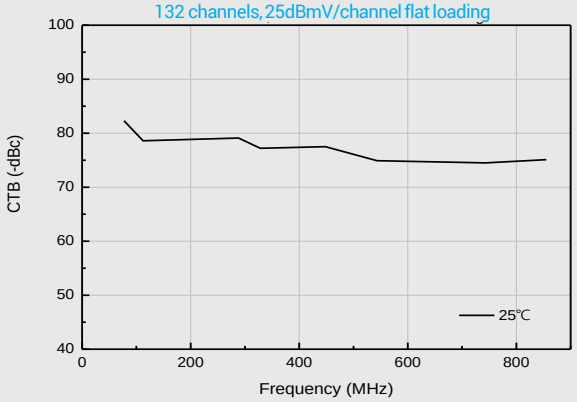
P1dB vs. Frequency



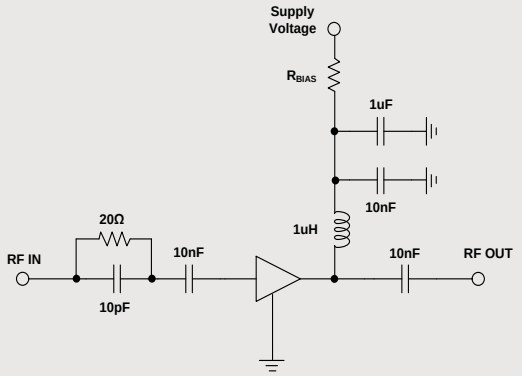
CSO vs. Frequency
132 channels, 25dBmV/channel flat loading



CTB vs. Frequency
132 channels, 25dBmV/channel flat loading



45 -1500MHz CATV Application Circuit



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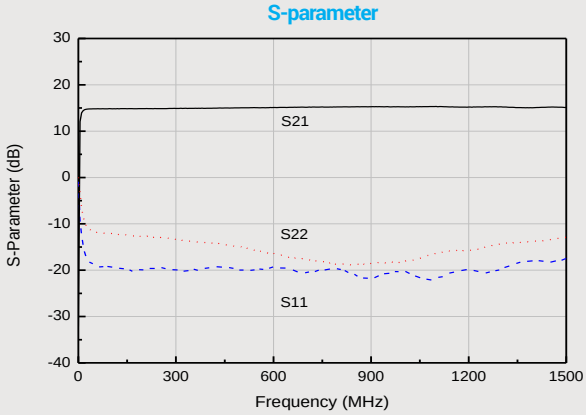
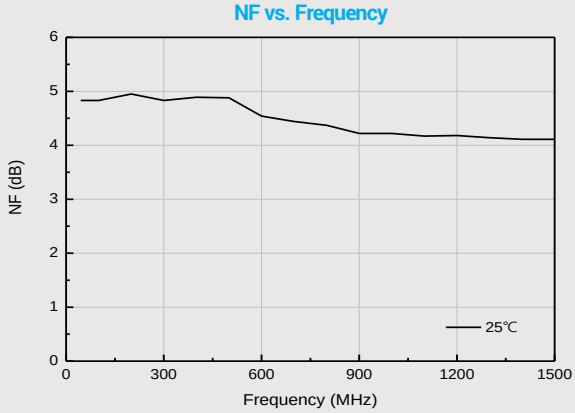
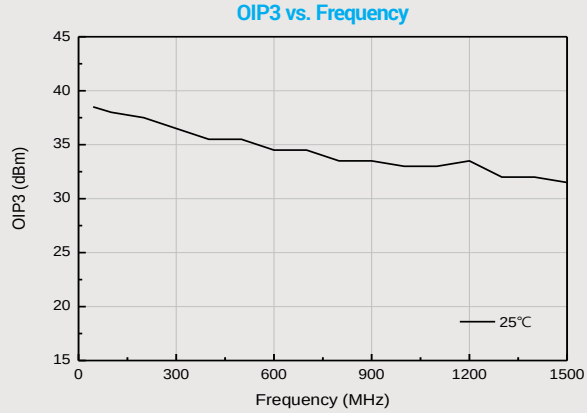
S-parameter



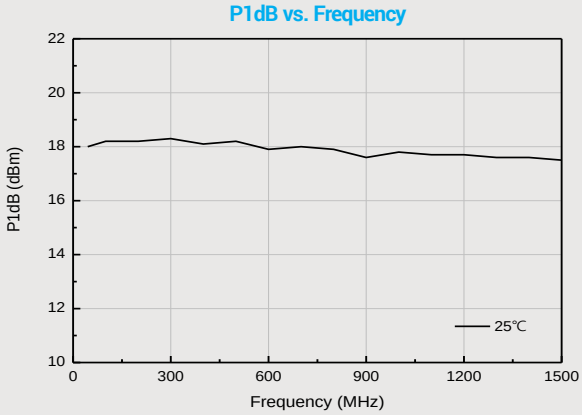
NF vs. Frequency



OIP3 vs. Frequency

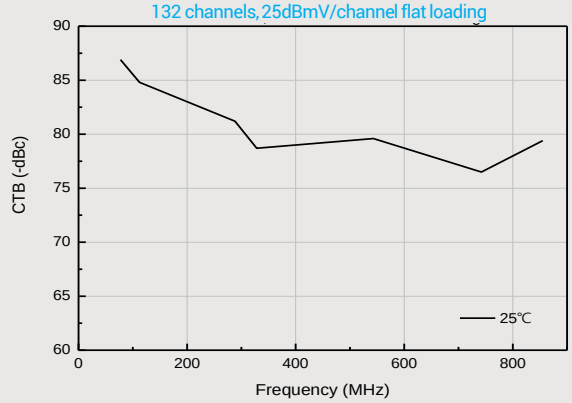


P1dB vs. Frequency



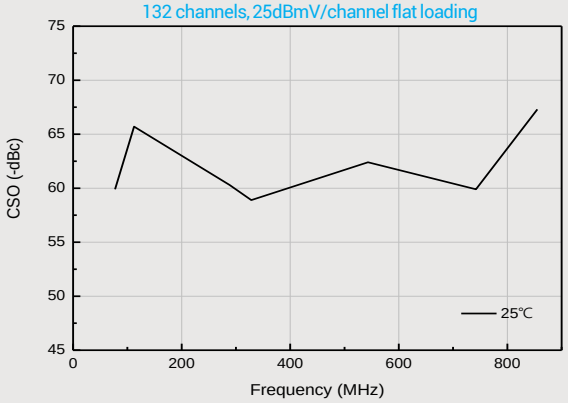
CTB vs. Frequency

132 channels, 25dBmV/channel flat loading

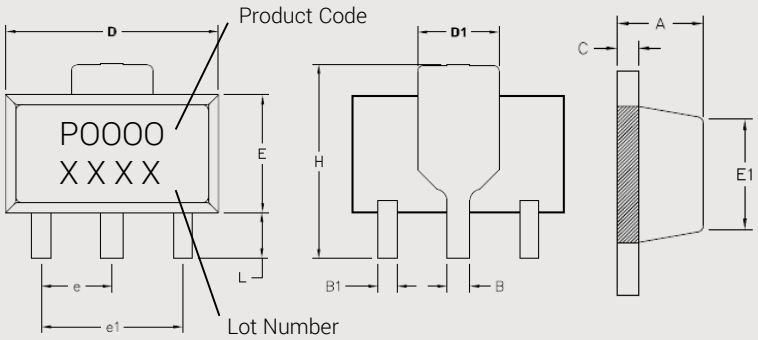


CSO vs. Frequency

132 channels, 25dBmV/channel flat loading

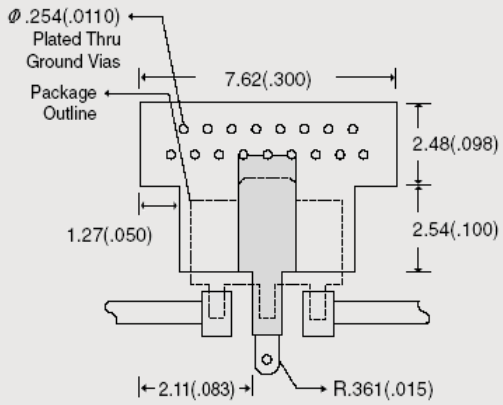


Lead-free /RoHS Compliant / Green SOT-89 Package Outline

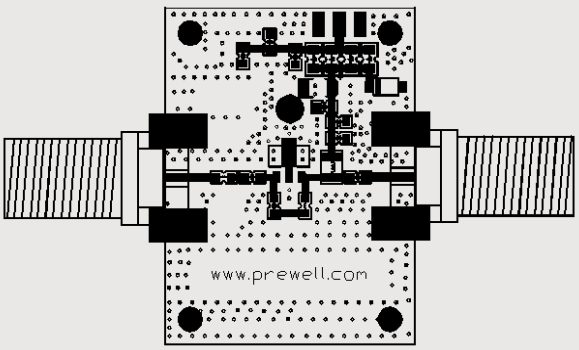


REF.	DIMENSIONS (mm)	
	Min.	Max.
A	1.40	1.60
B	0.43	0.58
B1	0.36	0.54
C	0.35	0.46
D	4.30	4.70
D1	1.50	1.87
E	2.29	2.70
E1	2.13	2.18
e	1.5	
e1	3.0	
H	3.43	5.10
L	0.74	1.20

Land Pattern



Evaluation Board Layout (30x40)



Mounting Instructions

1. Use a large ground pad area with many plated through-holes as shown.
2. We recommend 1 oz copper minimum.
3. Measurement for our data sheet was made on 1.6mm thick FR-4 Board.
4. RF trace width depends on the board material and construction.
5. Add mounting screws near the part to fasten the board to a heatsink.
6. Add as much copper as possible to inner and outer layers near the part to ensure optimal thermal performance.