

### Features

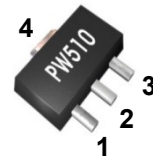
- ➔ 45 - 1000MHz
- ➔ 20.5dB Gain at 45MHz
- ➔ CSO 56dBc @+25dBmV
- ➔ CTB 74dBc @+25dBmV
- ➔ NF 3.5dB
- ➔ Lead-free / Green / RoHS-compliant SOT-89 Package



### Applications

- ➔ Headend Driver Amplifier
- ➔ Predriver Amplifier
- ➔ Line Driver Amplifier
- ➔ Optic Transceiver Application
- ➔ Active Splitter
- ➔ MOCA
- ➔ FTTH Application

### Functional Diagram



Function	Pin No.
RF IN	1
RF OUT / Bias	3
Ground	2,4

### Description

The PW510 is a high performance InGaP HBT MMIC Amplifier and consists of Darlington pair amplifiers that is internally matched to 75Ω input/output. The amplifier features high gain, high linear performance, high reliability, low noise as an CATV amplifier. The PW510 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-mountable plastic SOT-89 packages.

### Specifications

\* Test Conditions : T=25°C, Supply Voltage=+6V, 75ohm System

Symbol	Parameters	Units	Min.	Typ.	Max.	Condition
F	Frequency	MHz	45		1000	
S21	Gain	dB	19.5	20.5	21.5	45 ~ 1000MHz
S11	Input Return Loss	dB	-10	-16		45 ~ 1000MHz
S22	Output Return Loss	dB	-11	-16		45 ~ 1000MHz
CSO	Composite Second Order	dBc		56		+25dBmV/132ch Flat
CTB	Composite Triple Beat	dBc		74		+25dBmV/132ch Flat
OIP3	Output Third Order Intercept Point	dBm		36.5		Note 1
P1dB	Output Power at 1dB Compression	dBm		20.0		
Vo	Output Voltage	dBmV		57.8		Note 2
d2	Second Order Distortion	dBc		60.7		Note 3
NF	Noise Figure	dB		3.5		
I	Current	mA	85	90	95	
Rth	Thermal Resistance	°C/W		65		

Note 1. Two Tones, 1MHz Spacing, +5dBm per Tone at Output

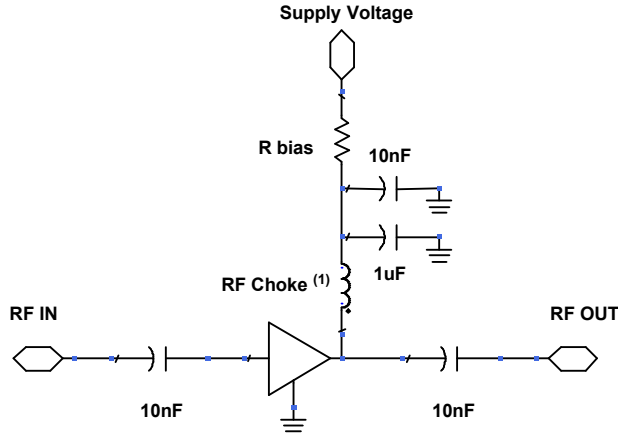
Note 2  $f_p=851.25\text{MHz}$ ;  $V_p=V_o$ ;  $f_q=858.25\text{MHz}$ ;  $V_q=V_o-6\text{dB}$ ;  $f_r=860.25\text{MHz}$ ;  $V_r=V_o-6\text{dB}$ ; measured at  $f_p+f_q-f_r=849.25\text{MHz}$

Note 3  $f_p=55.25\text{MHz}$ ;  $V_p=40\text{dBmV}$ ,  $f_q=805.25\text{MHz}$ ;  $V_q=40\text{dBmV}$ , measured at  $f_p+f_q=860.5\text{MHz}$

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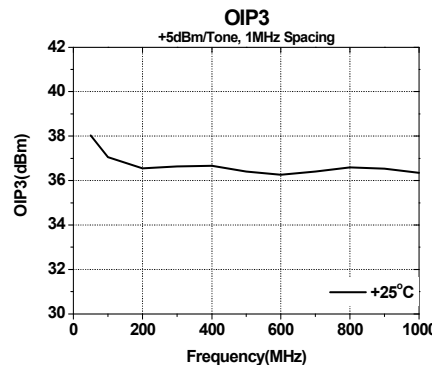
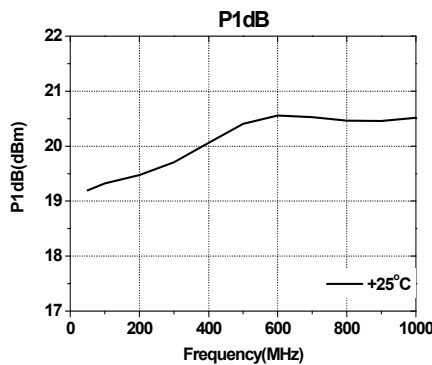
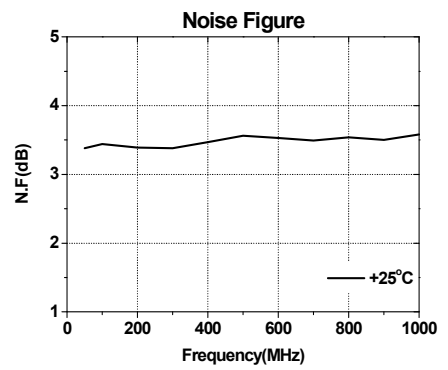
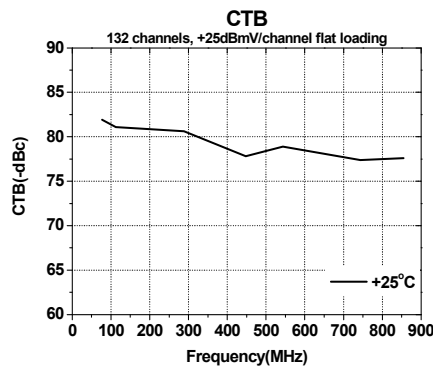
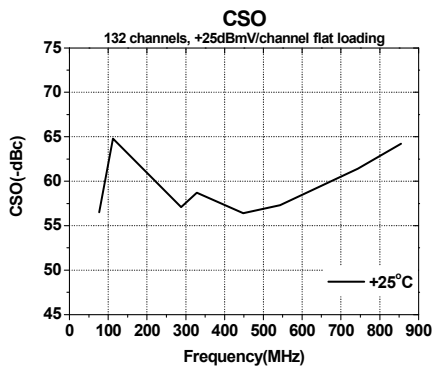
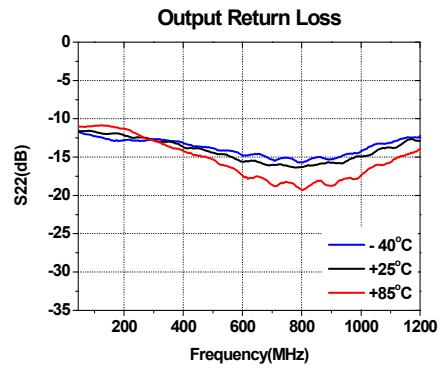
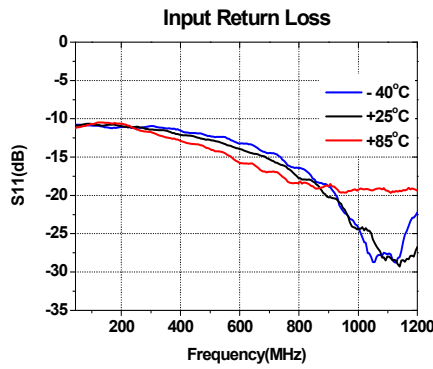
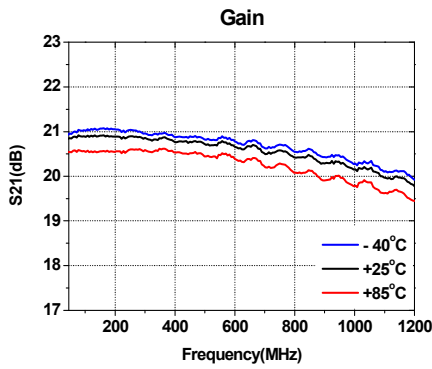
### 45 -1000MHz CATV Application Circuit

### Recommended Bias Values



Supply Voltage	R bias Value	Size
6 V	6.8 $\Omega$	0805
7 V	18.6 $\Omega$	1210
8 V	30.4 $\Omega$	1210
9 V	42.1 $\Omega$	2010
10 V	53.9 $\Omega$	2010
12 V	77.4 $\Omega$	2512

1. RF Choke is about 4uH. We recommend that wire of 0.2 phi radius wind 7 turns on toroidal core(size:4.0x1.5x2.0)
2. Measurement for our datasheet was made on 1.6mm thick FR-4 Board. And 75 ohm microstrip line



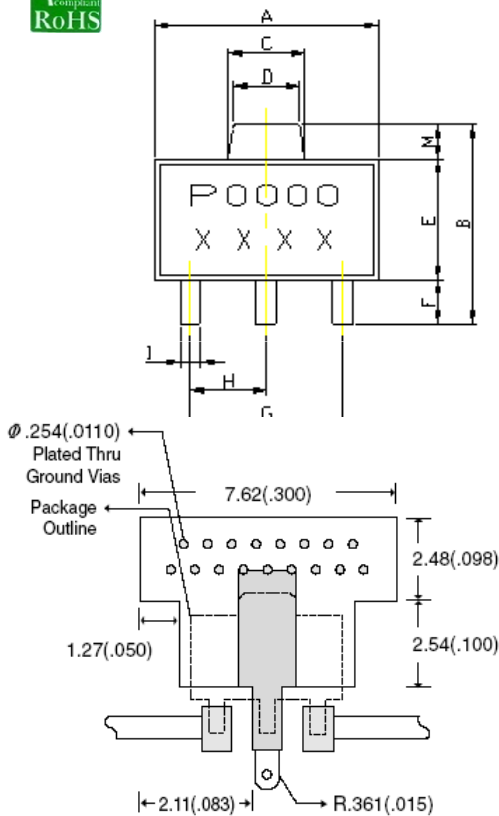
### Absolute Maximum Ratings

Parameter	Rating	Unit
Device Voltage	+6	V
Device Current	170	mA
RF Power Input	10	dBm
Storage Temperature	-55 to +125	°C
Ambient Operating Temperature	-40 to +85	°C
Junction Temperature	160	°C

Operation of this device above any of these parameters may cause permanent damage.



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

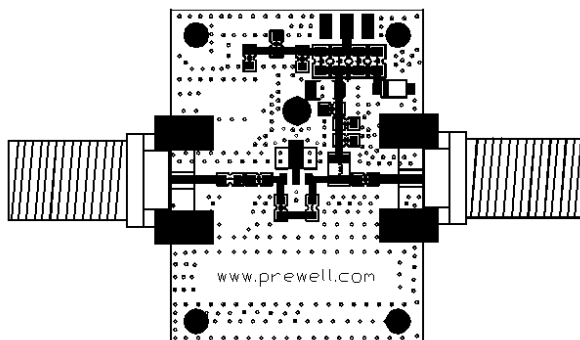


REF	DIMENSIONS	
	Millimeters	
	Min.	Max.
A	4.40	4.60
B	4.05	4.25
C	1.50	1.70
D	1.30	1.50
E	2.40	2.60
F	0.89	1.20
G	3.00 REF.	
H	1.50 REF.	
I	0.40	0.52
J	1.40	1.60
K	0.35	0.41
L	5° TYP.	
M	0.70 REF.	

### ESD / MSL Ratings

1. ESD sensitive device.  
Observe Handling Precautions.
2. ESD Rating : Class 2(Passes at 2000V min.)  
Human Body Model (HBM), JESD22-A114
3. ESD Rating : Class IV (Passes at 1000V min.)  
Charged Device Model (CDM), JESD22-C101
4. MSL (Moisture Sensitive Level) Rating : Level 3  
at +260 °C Convection reflow, J-STD-020

### 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. Add as much copper as possible to inner and outer layers near the part to ensure optimal thermal performance.
5. RF trace width depends on the board material and construction.
6. Add mounting screws near the part to fasten the board to a heatsink.

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