

### Features

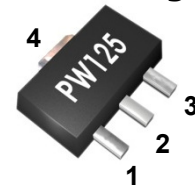
- ➔ 45 - 1000MHz
- ➔ 21.7dB Gain at 45MHz
- ➔ CSO 53dBc @+25dBmV
- ➔ CTB 71dBc @+25dBmV
- ➔ NF 2.7dB
- ➔ Lead-free / Green / RoHS-compliant SOT-89 Package



### 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 PW125 is a high performance InGaP HBT MMIC Amplifier and consists of Darlington pair amplifiers with temperature compensation that is internally matched 75Ω input/output. The amplifier features broadband, high gain, high linear performance, high reliability, low noise as an CATV amplifier and provides stable current variation over temperature. The PW125 operates from a single voltage supply and requires 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=+5V, 75ohm System

Symbol	Parameters	Units	Min.	Typ.	Max.	Condition
<b>Forward ( 45MHz ~ 1000MHz )</b>						
S21	Gain	dB	20.5	21.5	22.5	45 ~ 1000MHz
S11	Input Return Loss	dB	-10	-15		45 ~ 1000MHz
S22	Output Return Loss	dB	-12	-18		45 ~ 1000MHz
CSO	Composite Second Order	dBc		53		+25dBmV/132ch Flat
CTB	Composite Triple Beat	dBc		71		+25dBmV/132ch Flat
OIP3	Output Third Order Intercept Point	dBm		35.0		Note 1
P1dB	Output Power at 1dB Compression	dBm		18.5		
Vo	Output Voltage	dBmV		54.5		Note 2
d2	Second Order Distortion	dBc		55.0		Note 3
NF	Noise Figure	dB		2.7		
I	Current	mA	115	120	125	
<b>Reverse ( 5MHz ~ 100MHz )</b>						
S21	Gain	dB	22.5	23.0	23.5	5 ~ 100MHz
S11&S22	Return Loss	dB	-19	-22		5 ~ 100MHz
OIP3	Output Third Order Intercept Point	dBm		36.5		Note 1
P1dB	Output Power at 1dB Compression	dBm		17.0		
NF	Noise Figure	dB		2.5		
I	Current	mA	90	95	100	
Rth	Thermal Resistance	°C/W		76		

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

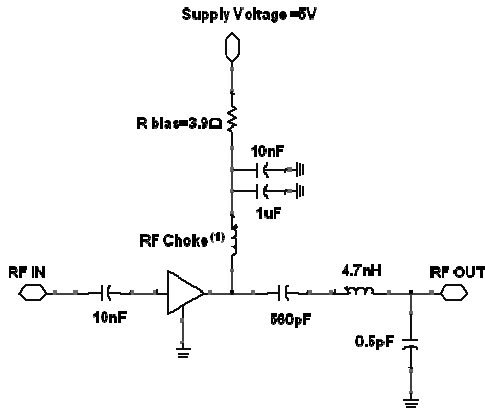
Note 2  $f_p=851.25\text{MHz}$ ;  $V_p=V_o$ ;  $f_q=858.25\text{MHz}$ ;  $V_q=V_o-6\text{dB}$ ;  $f_r=860.25\text{MHz}$ ;  $V_r=V_o-6\text{dB}$ ; measured at  $f_p+f_q-f_r=849.25\text{MHz}$

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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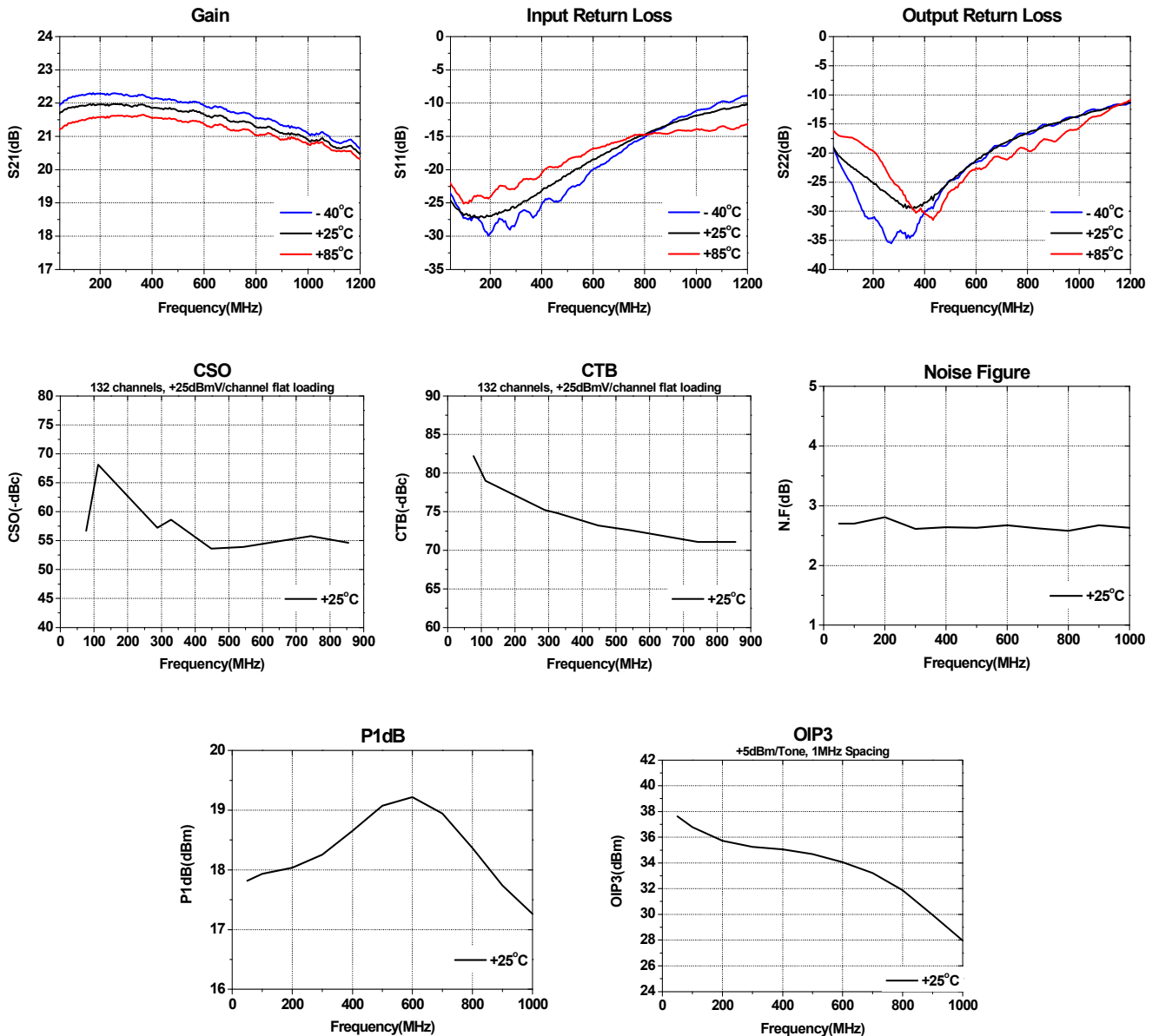
### 45 -1000MHz CATV Application Circuit

### Recommended Bias Values

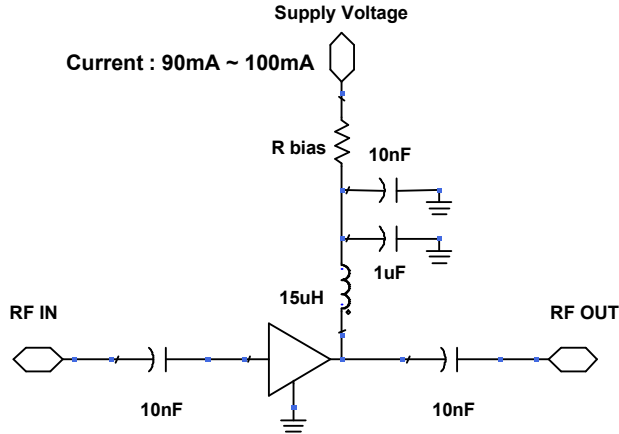


Supply Voltage	R bias Value	Size
5 V	3.9 Ω	0805
5.3 V	6.4 Ω	0805
6 V	12.3 Ω	0805
7 V	20.6 Ω	1210
8 V	28.9 Ω	1210
9 V	37.3 Ω	2010
10 V	45.6 Ω	2010
12 V	62.3 Ω	2512

1. RF Choke is about 4uH. We recommend that wire of 0.2 phi radius wind 4 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

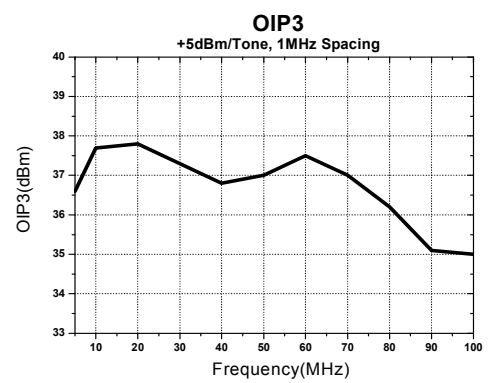
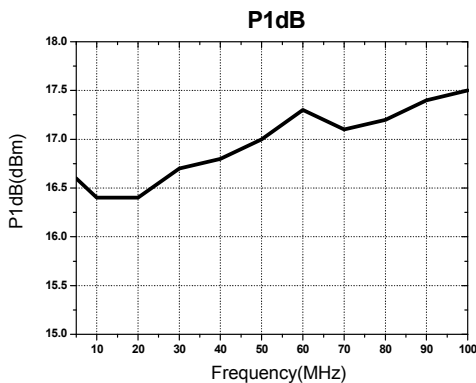
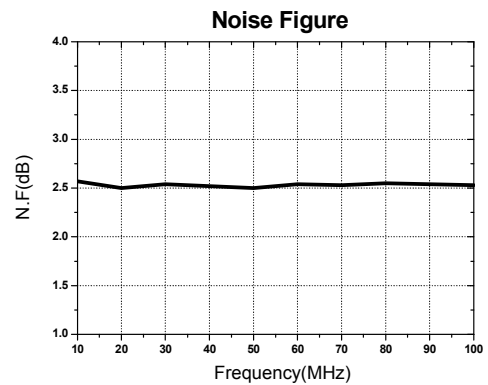
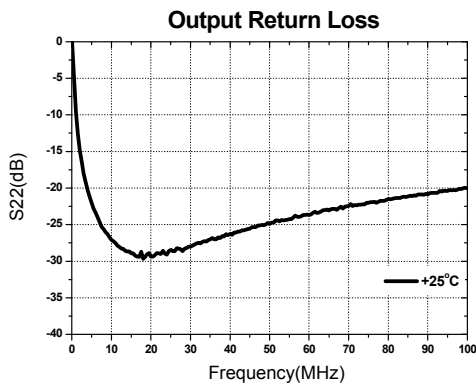
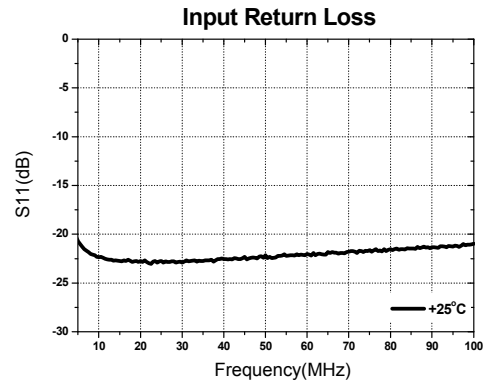
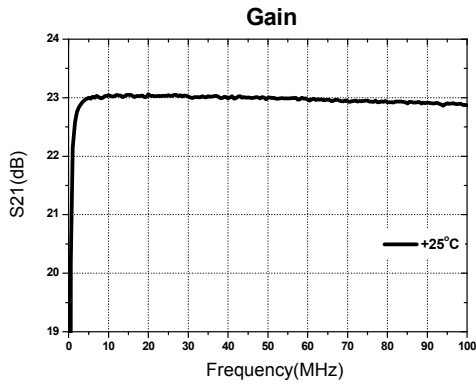


**5 -100MHz CATV Application Circuit**



**Recommended Bias Values**

Supply Voltage	R bias Value	Size
5 V	3.9 Ω	0805
5.3 V	6.4 Ω	0805
6 V	12.3 Ω	0805
7 V	20.6 Ω	1210
8 V	28.9 Ω	1210
9 V	37.3 Ω	2010
10 V	45.6 Ω	2010
12 V	62.3 Ω	2512



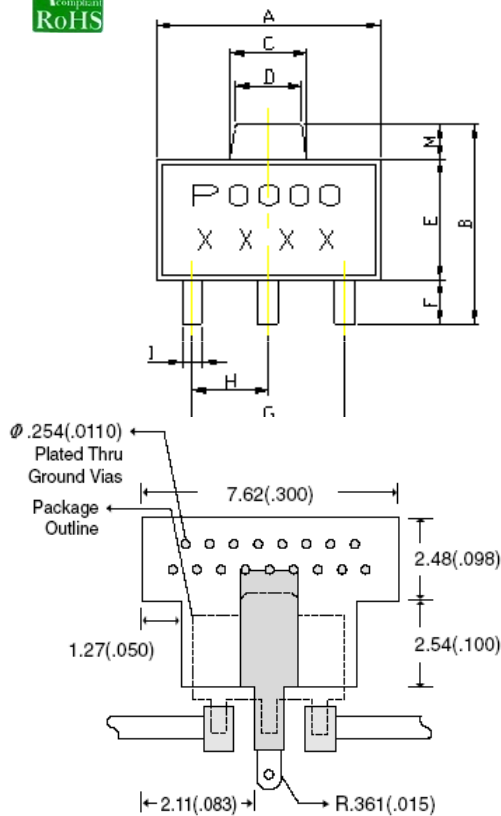
### Absolute Maximum Ratings

Parameter	Rating	Unit
Device Voltage	+5	V
Device Current	200	mA
RF Power Input	10	dBm
Storage Temperature	-55 to +125	°C
Ambient Operating Temperature	-40 to +85	°C
Junction Temperature	170	°C

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



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

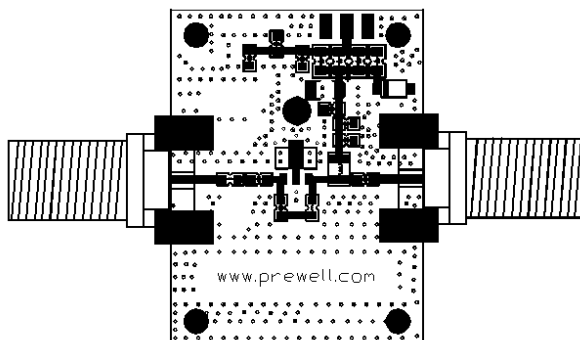


REF	DIMENSIONS	
	Millimeters	
	Min.	Max.
A	4.40	4.60
B	4.05	4.25
C	1.50	1.70
D	1.30	1.50
E	2.40	2.60
F	0.89	1.20
G	3.00 REF.	
H	1.50 REF.	
I	0.40	0.52
J	1.40	1.60
K	0.35	0.41
L	5° TYP.	
M	0.70 REF.	

### ESD / MSL Ratings

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

### Evaluation Board Layout (30x40)



### Mounting Instructions

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

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