

SJM PREWELL PW118

Gain Block

Features

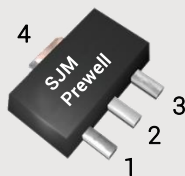
- 5 to 500MHz
- Gain 29.2dB @ 70MHz
- P1dB 21.2dBm @ 250MHz
- OIP3 40.3dBm @ 70MHz
- Lead-free / Green / **RoHS** 
compliant SOT-89 Package

Applications

- Base station / Repeater / Mobile
/ Automotive / Military
 - FDD-LTE, TD-LTE, TDS-CDMA,
CDMA, WCDMA, WiMAX, PCS, GSM,
GPS, GPRS, TETRA
- IoT / Broadcasting / WLAN
 - FM, DMB, DVB, ISM

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 PW118 is a high performance InGaP HBT MMIC Amplifier and consists of Darlington pair amplifiers. The features of PW118 are high linear performance, high reliability as an IF amplifier and provide stable current variation over temperature. The PW118 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 buffer 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 for Vd=4.6V Ic=115mA

Parameter	Units	Frequency (MHz)			
		70	140	250	500
S21	dB	29.2	29.0	28.4	26.8
S11	dB	-26	-25	-19	-14
S22	dB	-31	-19	-13	-8
P1dB	dBm	20.9	21.2	21.2	20.8
OIP3	dBm	40.3	39.5	38.3	35.5
NF	dB	28	28	28	28
V/I	V/mA	4.6/115			
Rth	°C/W	58			

- 1) Test Conditions : T=25°C, Supply Voltage=5V, Rbias=3ohm, 50ohm System
- 2) OIP3 measured with two tones at an output power of 9dBm/tone separated by 1MHz.

Specifications for Vd=4.2V Ic=76mA

Parameter	Units	Frequency (MHz)			
		70	140	250	500
S21	dB	28.7	28.5	28.0	26.5
S11	dB	-20	-20	-17	-13
S22	dB	-22	-17	-12	-8
P1dB	dBm	18.9	19.0	19.0	18.8
OIP3	dBm	36.3	35.7	35.2	33.0
NF	dB	2.5	2.6	2.8	2.8
V/I	V/mA	4.2/76			
Rth	°C/W	58			

- 1) Test Conditions : T=25°C, Supply Voltage=5V, Rbias=10ohm, 50ohm System
- 2) OIP3 measured with two tones at an output power of 5dBm/tone separated by 1MHz.

Absolute Maximum Ratings

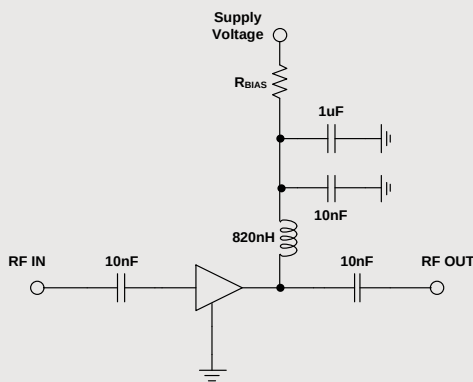
Parameter	Rating	Unit
Device Voltage	6.5	V
Device Current	240	mA
RF Power Input	10	dBm
Storage Temperature	-55 to 150	°C
Ambient Operating Temperature	-40 to 85	°C
Junction Temperature	187	°C

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

Typical RF Performance for IF Amp Application Circuit

Supply Bias Voltage = 5V, R(bias)= 3ohm, Current= 115mA

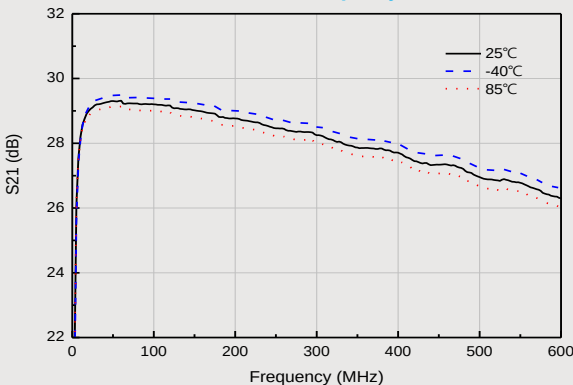
Parameters	Units	Frequency(MHz)				
		50	70	140	250	500
S21	dB	29.3	29.2	29.0	28.4	26.8
S11	dB	-21	-26	-25	-19	-14
S22	dB	-24	-31	-19	-13	-8
P1dB	dBm	20.8	20.9	21.2	21.2	20.8
OIP3 @ 9dBm	dBm	40.5	40.3	39.5	38.3	35.5
NF	dB	2.8	2.8	2.8	2.8	2.8



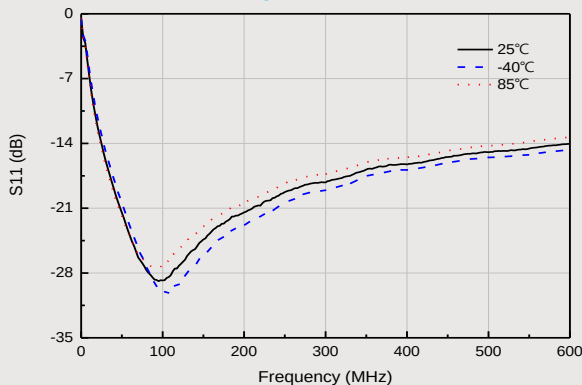
Recommended Bias Values

Supply Voltage(V)	R _{BIAS} Value(ohm)	Size
5	3.0	0805
5.3	5.6	0805
6	11.6	0805
7	20.3	1210
8	28.9	1210
9	37.5	2010
10	46.1	2010
12	63.4	2512

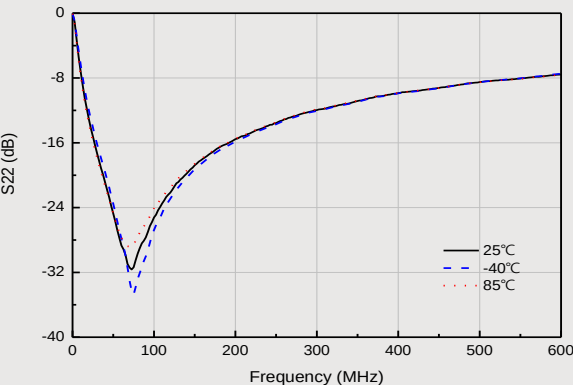
Gain vs. Frequency



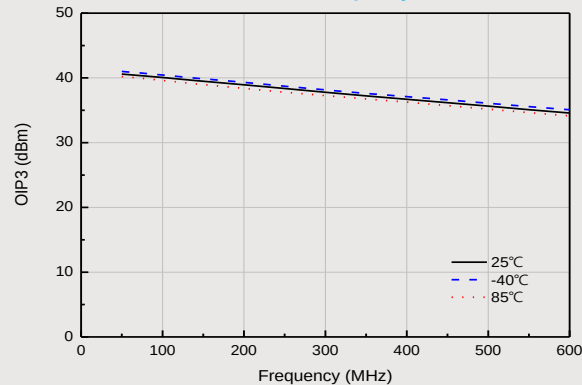
Input Return Loss



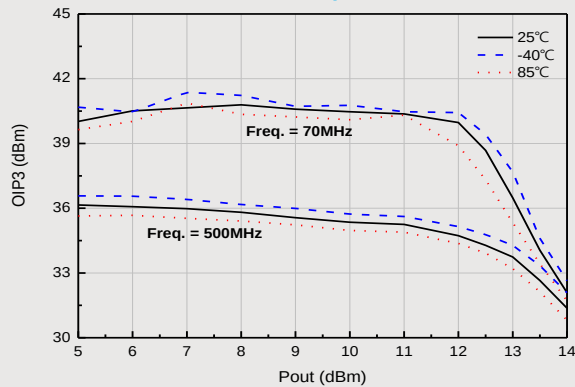
Output Return Loss



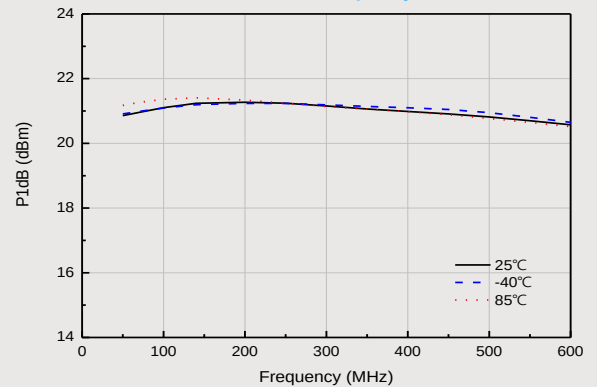
OIP3 vs. Frequency



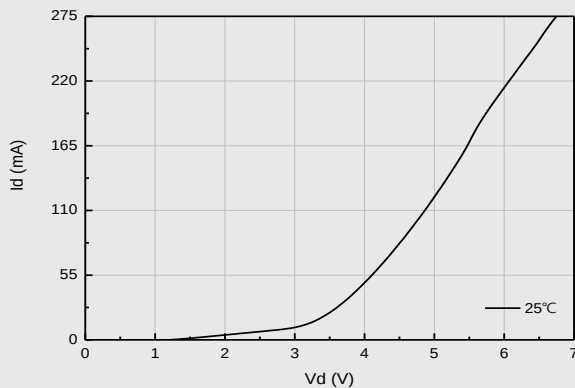
OIP3 vs. Output Power



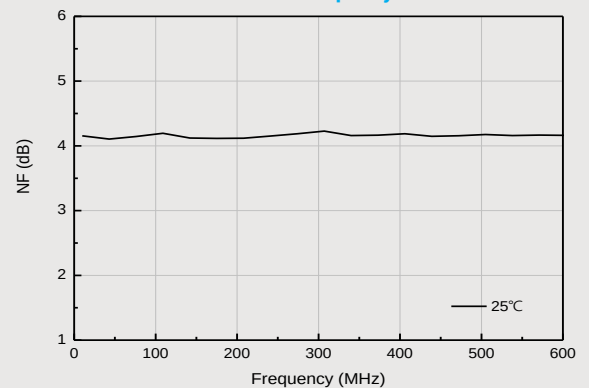
P1dB vs. Frequency



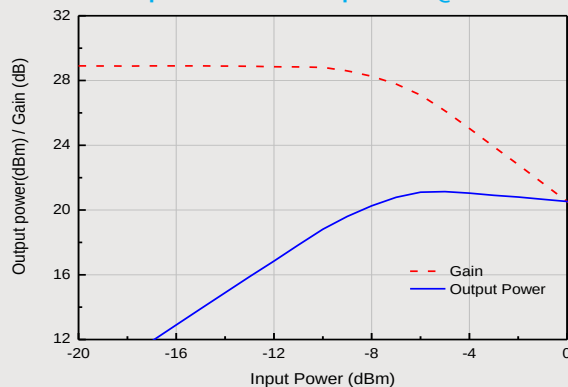
Id vs. Vd



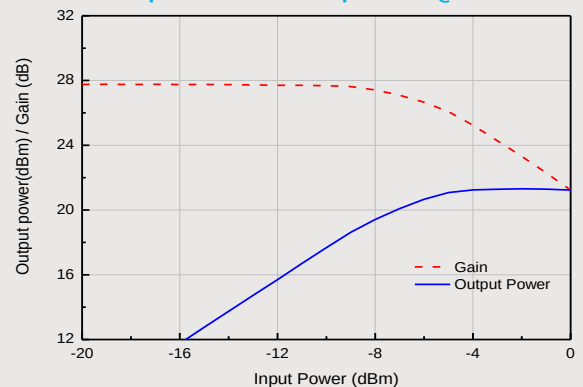
NF vs. Frequency



Output Power / Gain vs Input Power @ 70MHz

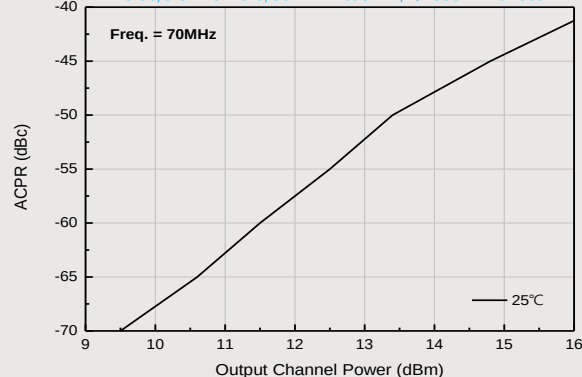


Output Power / Gain vs Input Power @ 250MHz



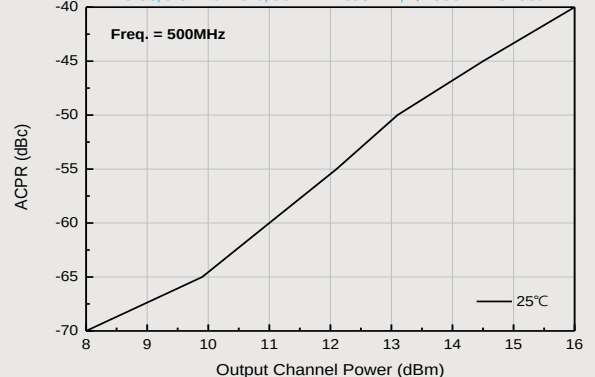
ACPR IS-95A vs. Channel Power

IS-95, 9 Ch.Forward, 30 kHz Meas BW, +/- 885 kHz offset



ACPR IS-95A vs. Channel Power

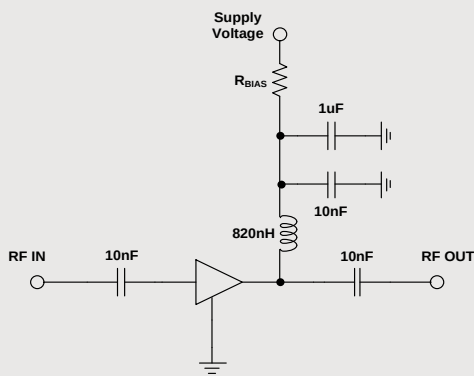
IS-95, 9 Ch.Forward, 30 kHz Meas BW, +/- 885 kHz offset



Typical RF Performance for Vd=4.2V, Ic=76mA

Supply Bias Voltage = 5V, R(bias)= 10ohm, Current= 76mA

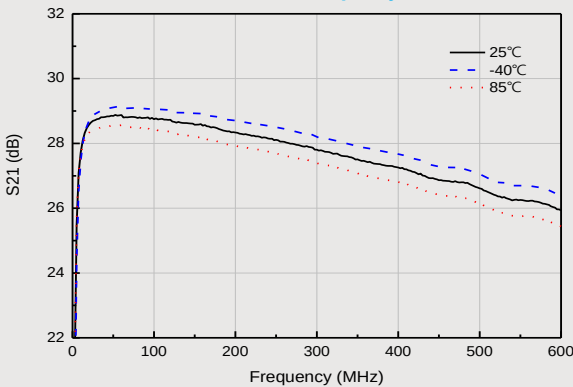
Parameters	Units	Frequency(MHz)				
		50	70	140	250	500
S21	dB	28.7	28.7	28.5	28.0	26.5
S11	dB	-18	-20	-20	-17	-13
S22	dB	-20	-22	-17	-12	-8
P1dB	dBm	18.9	18.9	19.0	19.0	18.8
OIP3 @ 5dBm	dBm	37.2	36.3	35.7	35.2	33.0
NF	dB	2.5	2.5	2.6	2.8	2.8



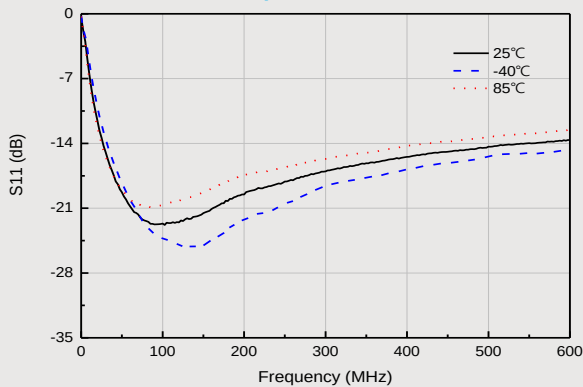
Recommended Bias Values

Supply Voltage (V)	R _{BIAS} Value (ohm)	Size
5	10.0	0805
5.3	14.0	0805
6	23.1	0805
7	36.2	1210
8	49.3	1210
9	62.5	2010
10	75.5	2010
12	102.0	2512

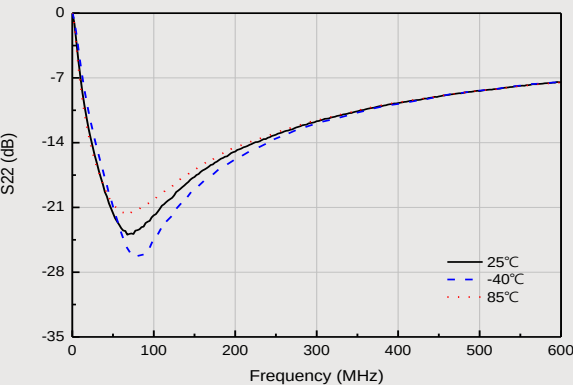
Gain vs. Frequency



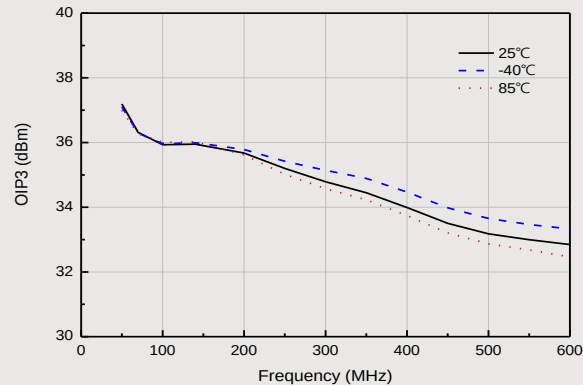
Input Return Loss



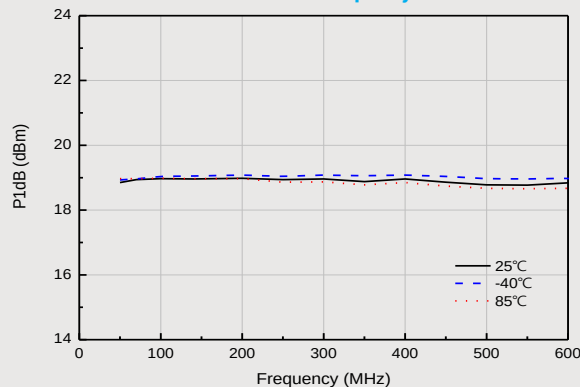
Output Return Loss



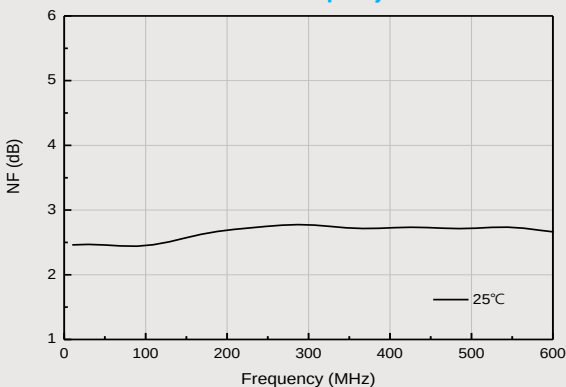
OIP3 vs. Frequency



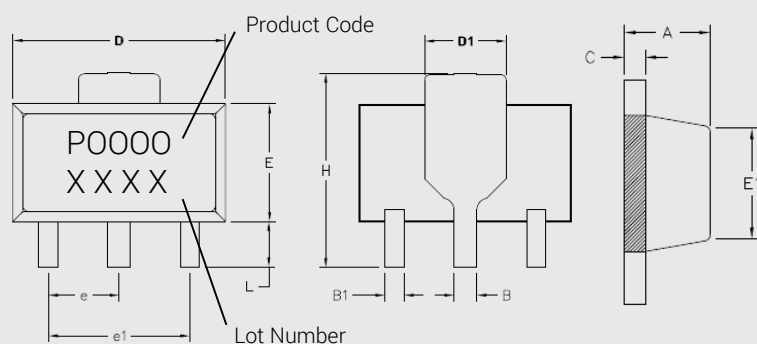
P1dB vs. Frequency



NF vs. Frequency

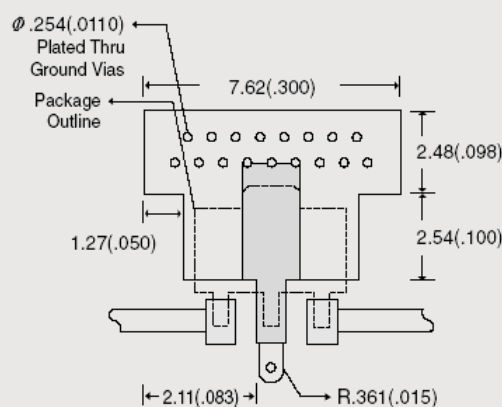


Lead-free /RoHS Compliant / Green SOT-89 Package Outline

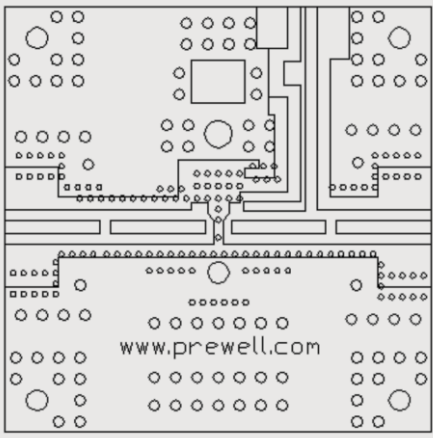


REF.	DIMENSIONS (mm)	
	Min.	Max.
A	1.40	1.60
B	0.43	0.58
B1	0.36	0.54
C	0.35	0.46
D	4.30	4.70
D1	1.50	1.87
E	2.29	2.70
E1	2.13	2.18
e	1.5	
e1	3.0	
H	3.43	5.10
L	0.74	1.20

Land Pattern



Evaluation Board Layout (40x40)



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 0.8mm 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.