

SJM PREWELL PW410

Wideband Gain Block

Features

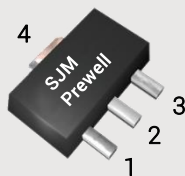
- 5 to 6000MHz
- Gain 21.5dB @ 75MHz
- P1dB 19.6dBm @ 75MHz
- OIP3 36.0dBm @ 900MHz
- Lead-free / Green / **RoHS** 
compliant SOT-89 Package

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 PW410 is a high performance InGaP HBT MMIC Amplifier and consists of Darlington pair amplifiers. The features of PW410 are high linear performance, wideband operation and high reliability. The PW410 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

Parameter	Units	Frequency (MHz)				
		75	900	1900	2300	2600
S21	dB	21.5	20.7	18.8	17.8	17.5
S11	dB	-20	-21	-17	-15	-15
S22	dB	-28	-24	-11	-9	-9
P1dB	dBm	19.6	19.4	18.3	17.6	17.0
OIP3	dBm	35.0	36.0	33.0	32.5	31.2
NF	dB	3.1	3.3	3.4	3.5	3.5
V/I	V/mA	4.96 / 70				
Rth	°C/W	57				

1) Test Conditions : T=25°C, Supply Voltage=5.3V, Rbias=4.7ohm, 50ohm System

2) OIP3 measured with two tones at an output power of 3dBm/ tone separated by 1MHz.

Absolute Maximum Ratings

Parameter	Rating	Unit
Supply Voltage	10	V
Supply 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

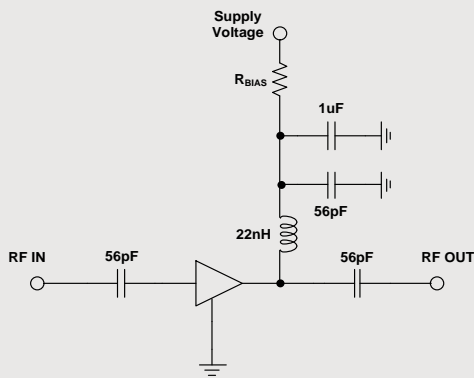
1) Stresses above the maximum values listed have may cause permanent damage to the device.

2) MTTF is more than 100 years.

Typical RF Performance for 1.9GHz Tuned Application Circuit

Supply Bias Voltage = 6V, R(bias)= 15 ohm, Current= 70mA

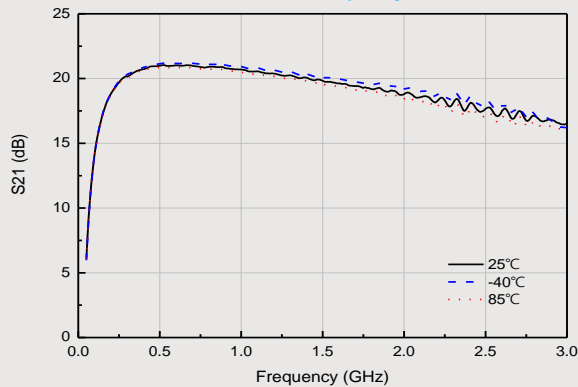
Parameters	Units	Frequency(MHz)						
		500	900	1500	1900	2300	2600	3000
S21	dB	20.9	20.7	19.7	18.8	17.8	17.5	16.5
S11	dB	-13	-21	-19	-17	-15	-15	-16
S22	dB	-12	-24	-13	-11	-9	-9	-8
P1dB	dBm	19.0	19.4	19.1	18.3	17.6	17.0	16.0
OIP3@3dBm	dBm	34.0	36.0	34.4	33.0	32.5	31.2	29.5
Noise Figure	dB	3.3	3.3	3.4	3.4	3.5	3.5	3.7



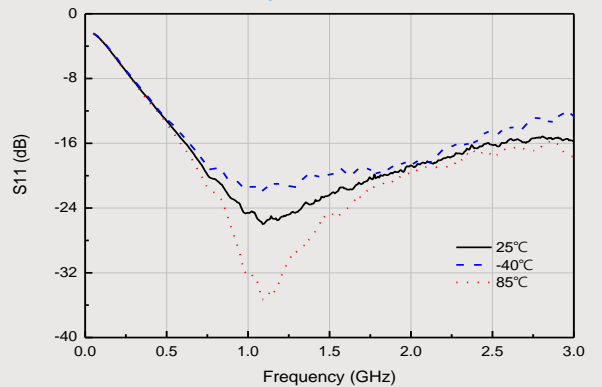
Recommended Bias Values

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

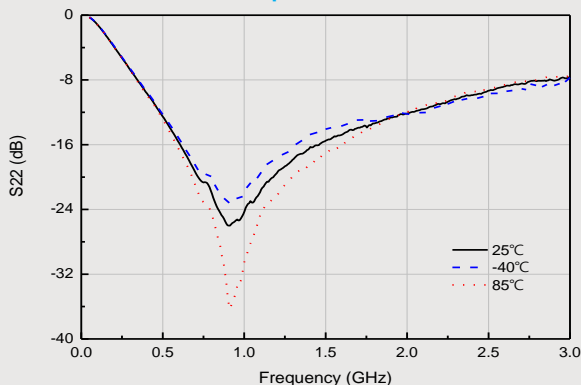
Gain vs. Frequency



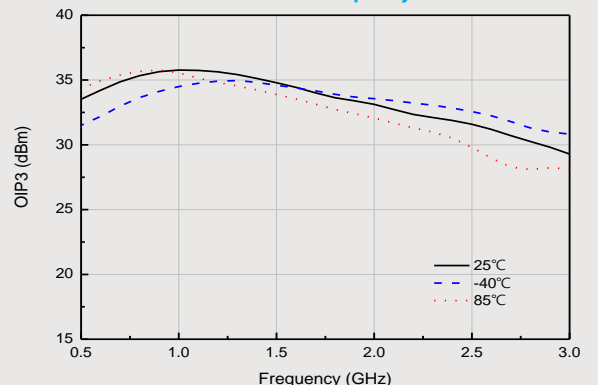
Input Return Loss



Output Return Loss



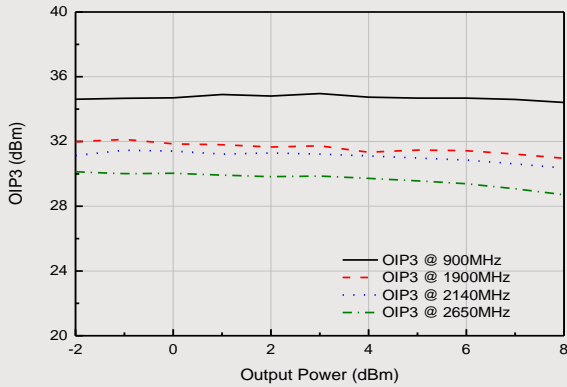
OIP3 vs. Frequency



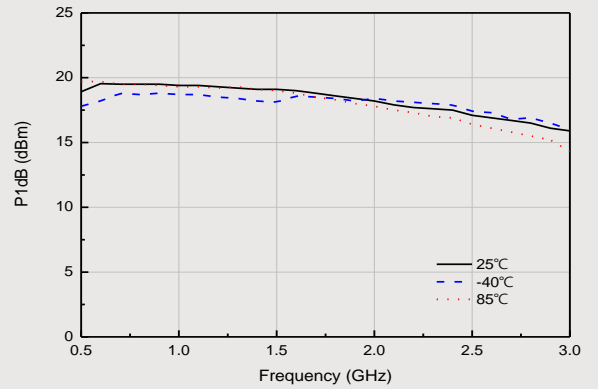
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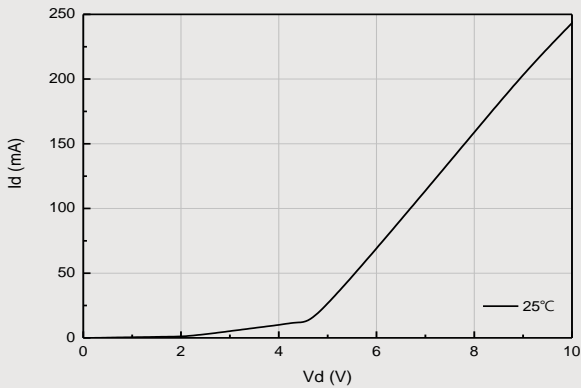
OIP3 vs. Output Power



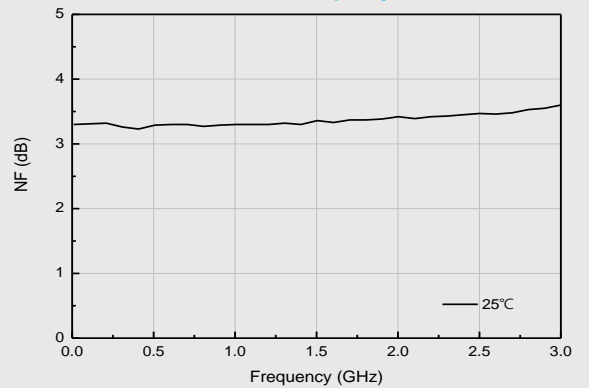
P1dB vs. Frequency



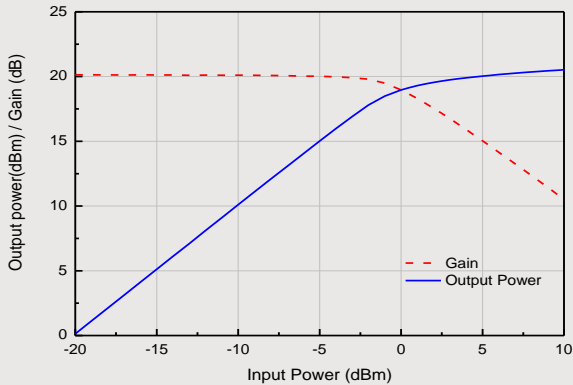
Id vs. Vd



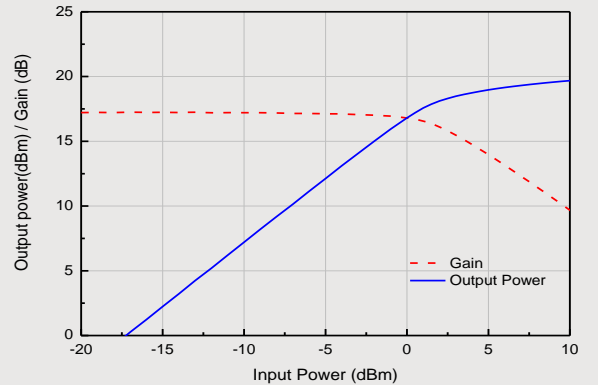
NF vs. Frequency



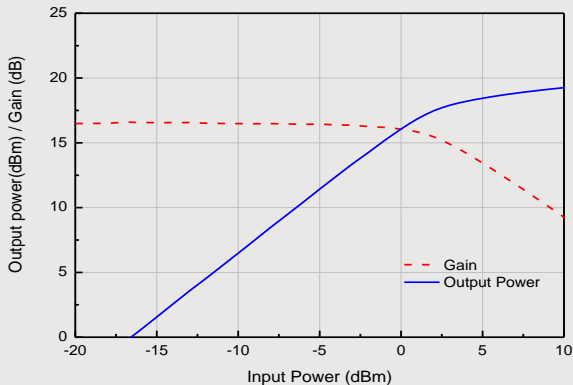
Output Power / Gain vs Input Power @ 900MHz



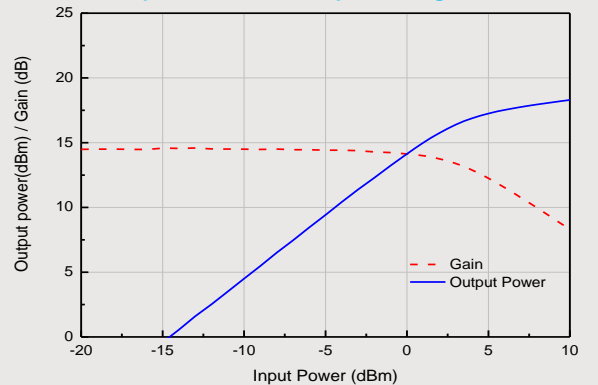
Output Power / Gain vs Input Power @ 1900MHz



Output Power / Gain vs Input Power @ 2140MHz



Output Power / Gain vs Input Power @ 2600MHz

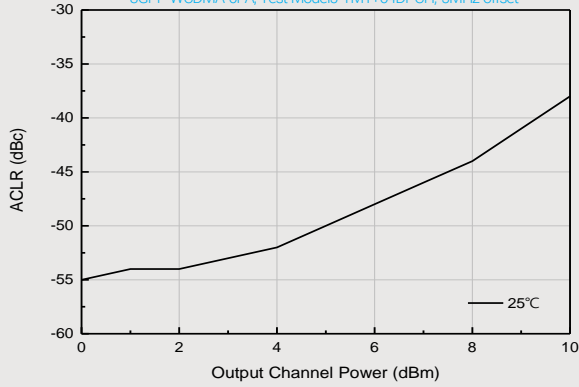


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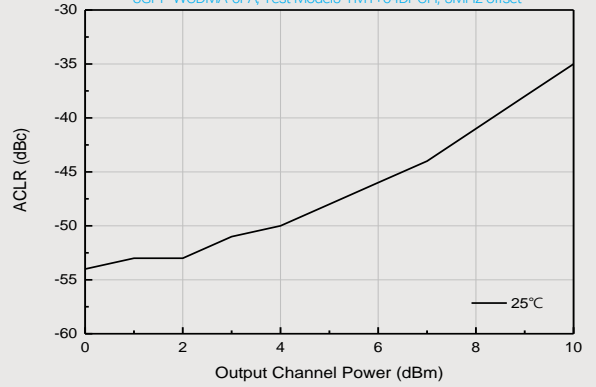
ACLR vs. Channel Power @ 1850MHz

3GPP WCDMA 6FA, Test Model5 TM1+64DPCH, 5MHz offset



ACLR vs. Channel Power @ 2140MHz

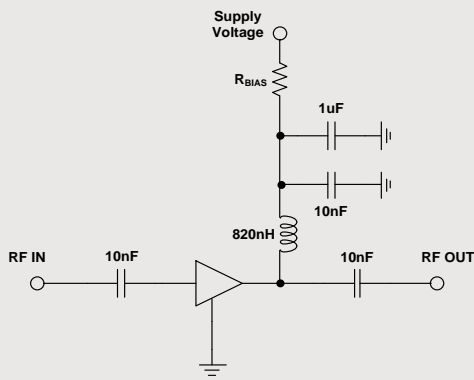
3GPP WCDMA 6FA, Test Model5 TM1+64DPCH, 5MHz offset



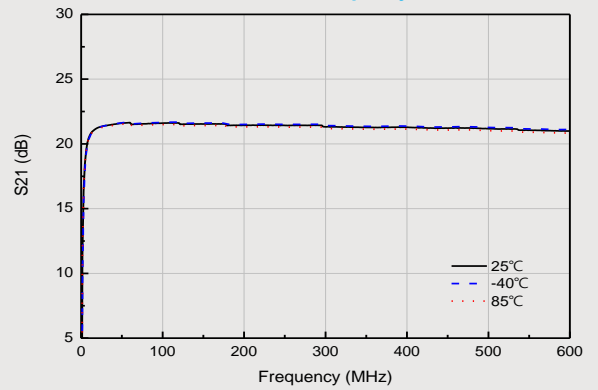
Typical RF Performance for 50 - 500MHz Tuned Application Circuit

Supply Bias Voltage = 6V, R(bias)= 15 ohm, Current= 70mA

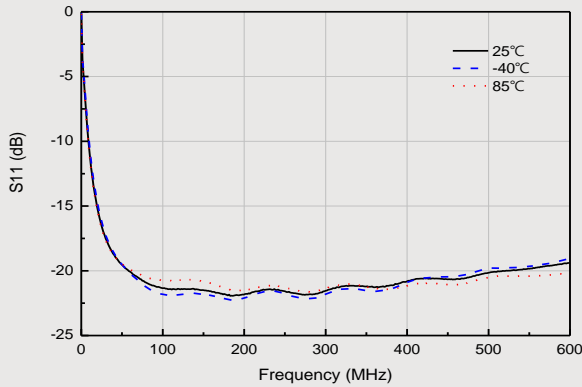
Parameters	Units	Frequency(MHz)			
		75	125	300	500
S21	dB	21.5	21.5	21.3	21.1
S11	dB	-20	-21	-21	-20
S22	dB	-28	-55	-24	-19
P1dB	dBm	19.6	19.8	19.6	19.5
OIP3@3dBm	dBm	35.0	35.0	35.0	34.0
NF	dB	3.1	3.1	3.2	3.2



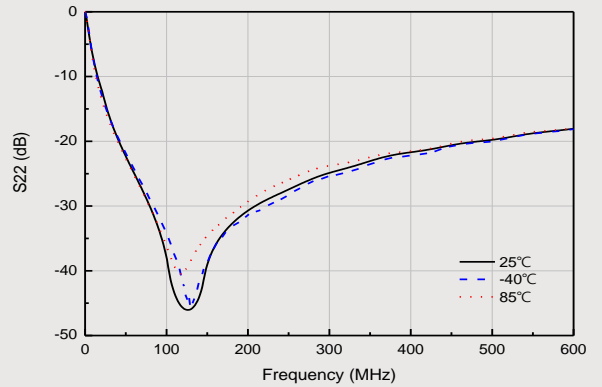
Gain vs. Frequency



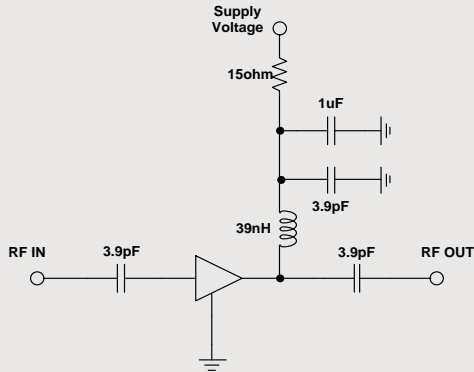
Input Return Loss



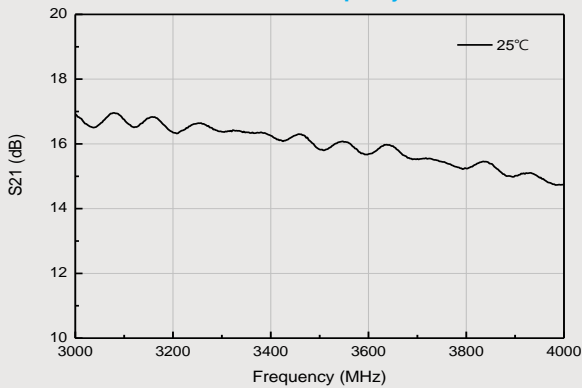
Output Return Loss



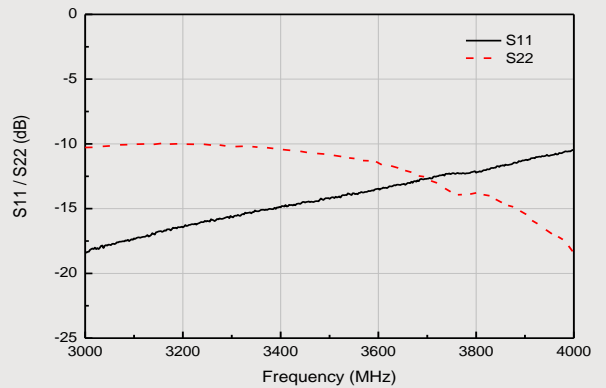
Typical RF Performance for 3.5GHz Tuned Application Circuit (6V / 70mA)



Gain vs. Frequency



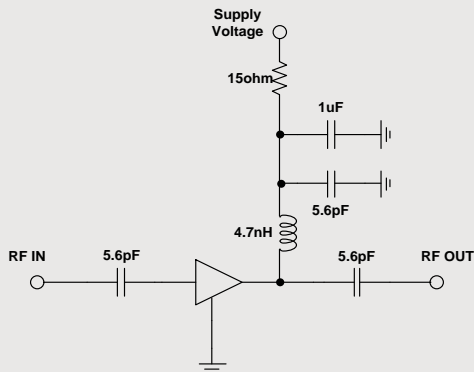
Return Loss



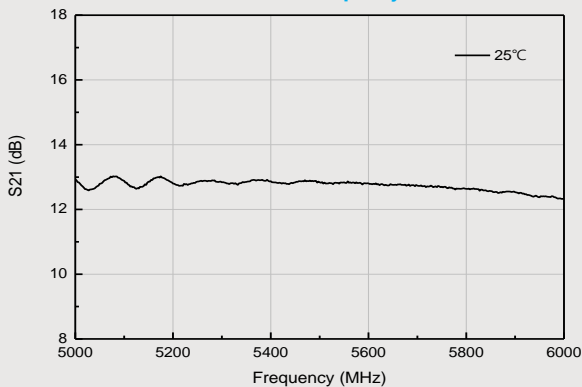
Parameter	Units	Frequency(MHz)
		3500
S21	dB	15.5
S11	dB	-13
S22	dB	-10
P1dB	dBm	15.4
OIP3@3dBm	dBm	27.5

1) Test Board Information : Rogers 4350B PCB
(Dielectric Constant = 3.48, thick = 0.8mm(32mil))

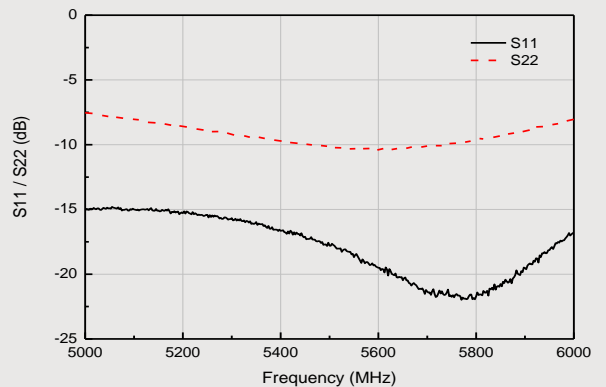
Typical RF Performance for 5.8GHz Tuned Application Circuit (6V / 70mA)



Gain vs. Frequency



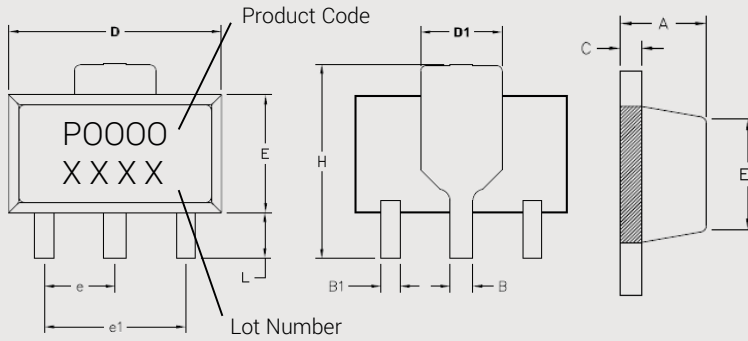
Return Loss



Parameters	Units	Frequency(MHz)
		5800
S21	dB	12.4
S11	dB	-21
S22	dB	-9
P1dB	dBm	11.0
OIP3@3dBm	dBm	24.5

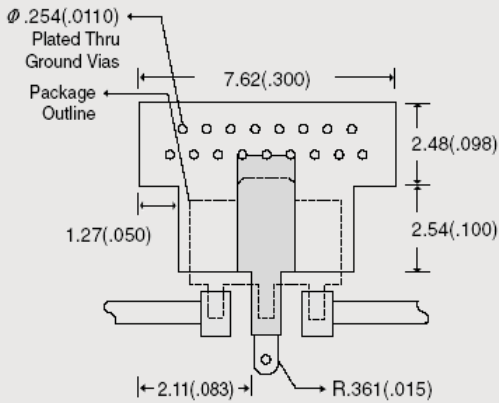
1) Test Board Information : Rogers 4350B PCB
(Dielectric Constant = 3.48, thick = 0.8mm(32mil))

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

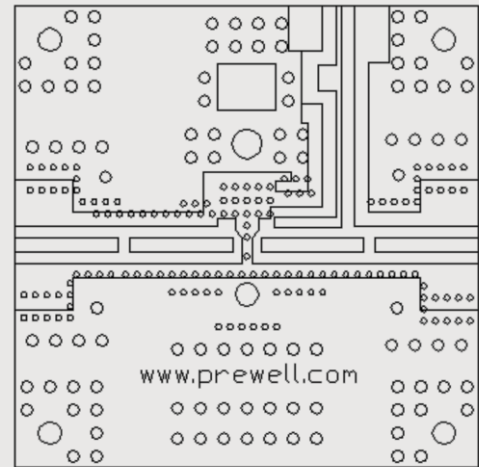


REF.	DIMENSIONS (mm)	
	Min.	Max.
A	1.40	1.60
B	0.43	0.58
B1	0.36	0.54
C	0.35	0.46
D	4.30	4.70
D1	1.50	1.87
E	2.29	2.70
E1	2.13	2.18
e	1.5	
e1	3.0	
H	3.43	5.10
L	0.74	1.20

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.