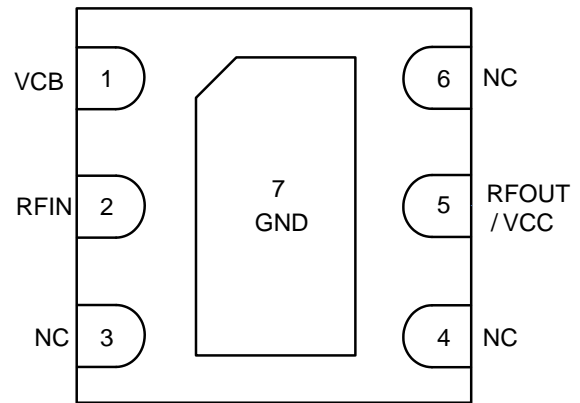


## Features

- 1MHz to 6GHz operational
- Typical +30dBm P1dB
- 13.8dB Gain at 2140MHz
- Typical +45 dBm OIP3
- 5V typical supply, 160mA Current at VCB=3.75V
- ESD protection all ports above 1000V HBM
- Industry Standard DFN2x2-6L Package
- Linearity and thermal compensation with Integrated Active Bias Circuit



**Functional Block Diagram**

## Applications

- |                                   |                            |
|-----------------------------------|----------------------------|
| ■ Repeaters                       | ■ TDD / FDD System         |
| ■ BTS High Power Amplifiers       | ■ GSM / CDMA / PCS         |
| ■ WCDMA / LTE                     | ■ ISM                      |
| ■ GPS / COMPASS / BDS / WALK TALK | ■ General Purpose Wireless |

## Product Description

The YG401530TL is an InGaP/GaAs MMIC linear amplifier targeted for use as a driver amplifier in wireless infrastructure where high linearity, medium power, and high efficiency are required. The YG401530TL delivers high performance across a broad range of frequencies. At 2140MHz, the YG401530TL typically provides 13.8dB of gain, 30.9dBm P1dB and 45dBm OIP3 while drawing 160mA quiescent current from a 5V supply. The YG401530TL is assembled in an industry standard DFN2x2-6L package with internally integrated ESD protection unit.



## Pin Description

Pin No.	Symbol	Description
1	VCB	Supply voltage for bias
2	RFIN	RF input
3,4,6	N/C	No Connection
5	RFOUT/ VCC	RF output and Supply voltage
7	GND	Ground

Notes: The Current, Gain and Linearity can be controlled by VCB.

## Absolute Maximum Ratings

Parameter	Rating	Unit
Input RF Power	+30	dBm
Supply Voltage	8	V
Device Current	1000	mA
Operating Ambient Temperature	-40 to +85	°C
Storage Temperature	-40 to +150	°C



### Caution!

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability.

## Electrical Specifications

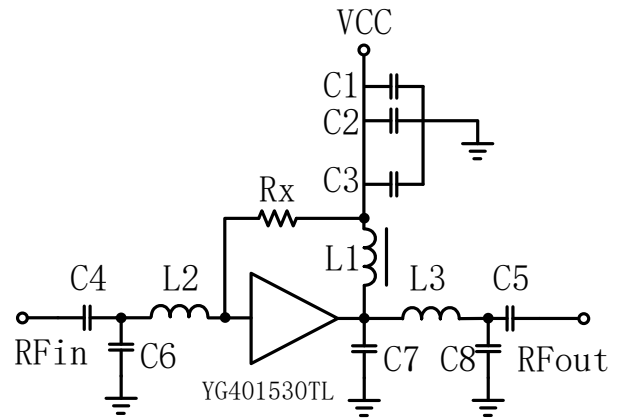
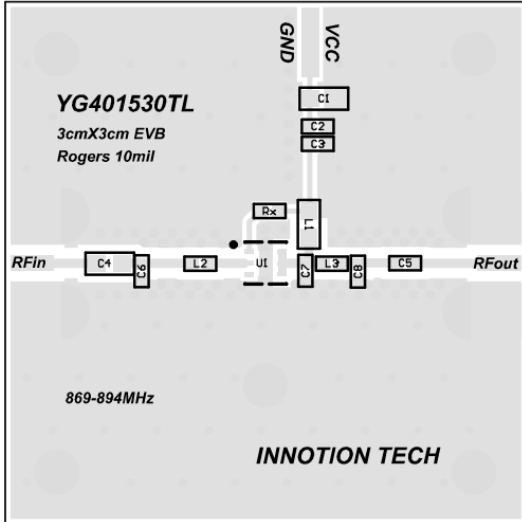
Parameter	Condition	Specification			Unit
		Min.	Typ.	Max.	
Operational Frequency Range		1		6000	MHz
Test Frequency			2140		MHz
Small Signal Gain			13.8		dB
P1dB Output Power			30.9		dBm
Input Return Loss			17.9		dB
Output Return Loss			17		dB
OIP3	Pout=15dBm/ tone, Δf = 1MHz		45		dBm
WCDA Channel power (at -50dBc ACLR)	3GPP WCDMA, TM1+64 DPCH, +5 MHz offset		20.9		dBm
Supply Voltage		3	5	6	V
Quiescent Current, Icq	VCC=5V, VCB=3.75V		160		mA

## Device Quiescent Current (Icq) vs. VCB at VCC=5V

VCB (V)	3	3.2	3.4	3.6	3.8	4	4.2	4.4	4.6	4.8	5
Icq (mA)	75	99	123	144	165	184	202	219	234	249	262

## Reference Evaluation Board

### 869MHz~894MHz Application



Notes: Use a divided resistor RX to replace the function of VCB.

## Bill of material

Reference Des.	Value	Description	Manuf.	Part Number
PCB		Printed circuit Board,3CMX3CM		
U1		YG401530TL, DFN2x2_6L	Innotion	YG401530TL
C1	22uF	CAP, SMD, 0603	various	
C2	1000pF	CAP, SMD, 0402	various	
C3	10pF	CAP, SMD, 0402	various	
C4	3.9pF	CAP, SMD, 0603	Dalicap	
C5	22pF	CAP, SMD, 0402	various	
C6	7.5pF	CAP, SMD, 0402	various	
C7	2.7pF	CAP, SMD, 0402	various	
C8	6.3pF	CAP, SMD, 0402	various	
L1	9.5nH	Coli IND, SMD, 0603	TDK	
L2	1.2nH	IND, SMD, 0402	various	
L3	3.3nH	IND, SMD, 0402	various	
Rx	200 Ω	RES, SMD, 0402	various	

## Critical component placement locations

- Distance from U1 Pin2 Pad (left edge) to L2 (right edge): 70mil
- Distance from L2 (left edge) to C6 (right edge): 91mil
- Distance from C6 (left edge) to C4 (right edge): 0mil
- Distance from U1 Pin5 Pad (right edge) to C7 (left edge): 30mil
- Distance from C7 (right edge) to L3 (left edge): 16mil
- Distance from L3 (right edge) to C8 (left edge): 16mil
- Distance from C8 (right edge) to C5 (left edge): 64mil

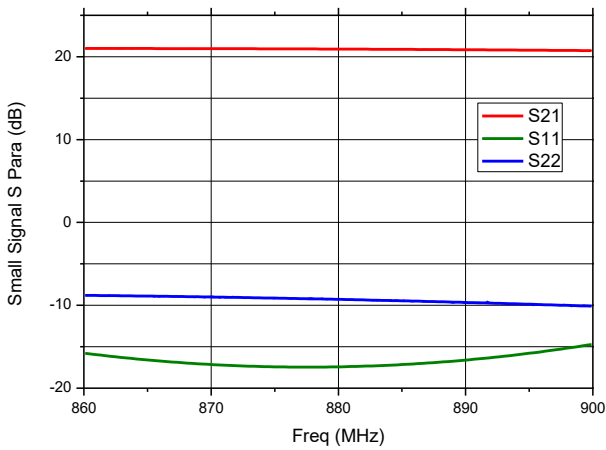


## Typical performance on EVB

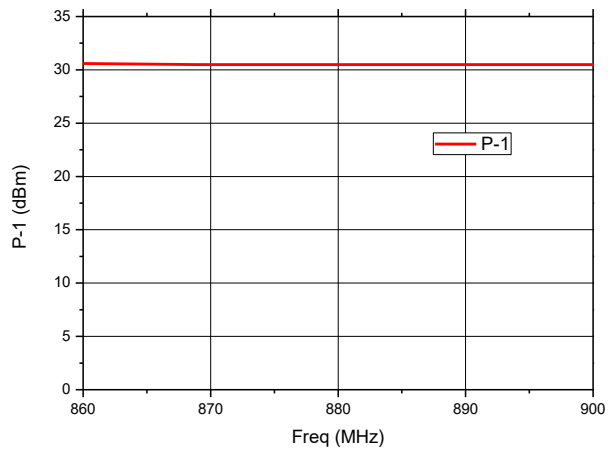
Typical Performance at +25 °C	(MHz)	869	881.5	894
Small Signal Gain	dB	21	20.9	20.8
Input Return Loss	dB	-16.8	-17.8	-16
Output Return Loss	dB	-9	-9.4	-9.8
P1dB	dBm	30.5	30.5	30.5
OIP3 (+19dBm/tone, Δf=1MHz)	dBm	45.3	45.5	45.8
WCDMA Channel power (at -50dBc ACLR)	dBm	20.5	20.4	20.3
Efficiency at Pout=30dBm	%	51.28	52.22	53.33
Supply Voltage, Vcc	V	5		
Quiescent Collector Current (at Rx=200 Ω), Icq	mA	160		

## Performance plots

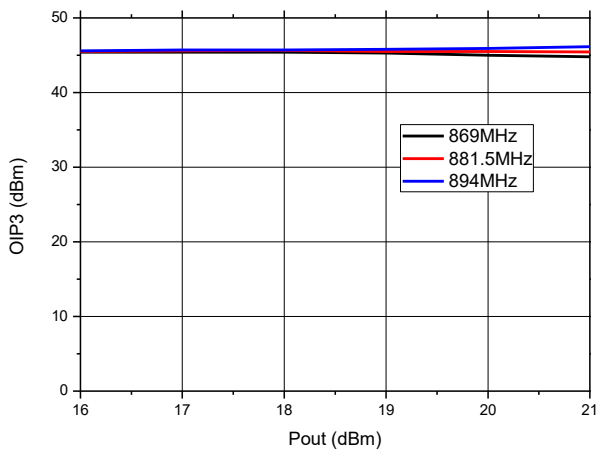
Small Signal S Parameters vs. Freq.



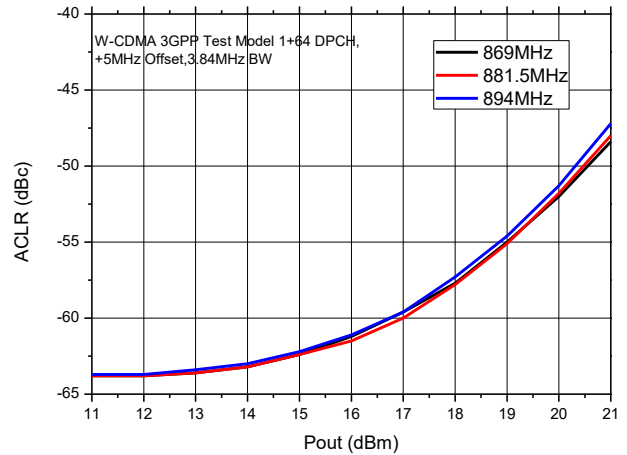
P1dB vs. Freq.



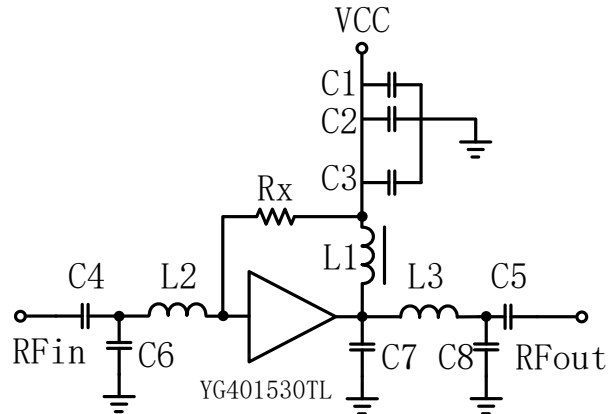
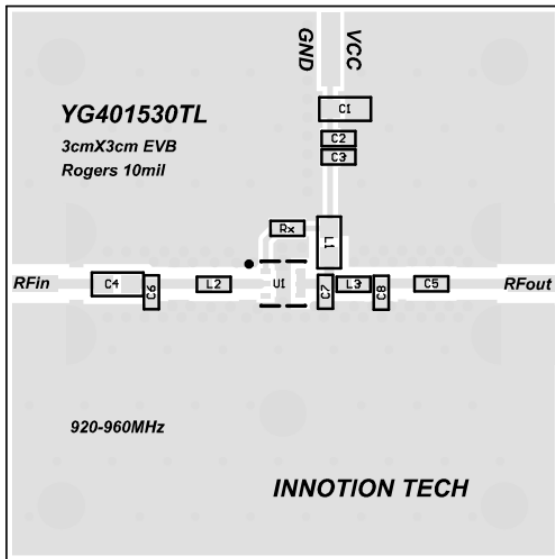
OIP3 vs. Pout/tone vs. Freq.



ACLR vs. Pout vs. Freq.



## 920MHz~960MHz Application



### Bill of material

Reference Des.	Value	Description	Manuf.	Part Number
PCB		Printed circuit Board,3CMX3CM		
U1		YG401530TL, DFN2x2_6L	Innotion	YG401530TL
C1	22uF	CAP, SMD, 0603	various	
C2	1000pF	CAP, SMD, 0402	various	
C3	10pF	CAP, SMD, 0402	various	
C4	3.9pF	CAP, SMD, 0603	Dalicap	
C5	22pF	CAP, SMD, 0402	various	
C6	5.6pF	CAP, SMD, 0402	various	
C7	2.4pF	CAP, SMD, 0402	various	
C8	5pF	CAP, SMD, 0402	various	
L1	9.5nH	Coli IND, SMD, 0603	TDK	
L2	1.2nH	IND, SMD, 0402	various	
L3	3.3nH	IND, SMD, 0402	various	
Rx	200 Ω	RES, SMD, 0402	various	

### Critical component placement locations

- Distance from U1 Pin2 Pad (left edge) to L2 (right edge): 70mil
- Distance from L2 (left edge) to C6 (right edge): 91mil
- Distance from C6 (left edge) to C4 (right edge): 0mil
- Distance from U1 Pin5 Pad (right edge) to C7 (left edge): 30mil
- Distance from C7 (right edge) to L3 (left edge): 16mil
- Distance from L3 (right edge) to C8 (left edge): 16mil
- Distance from C8 (right edge) to C5 (left edge): 64mil

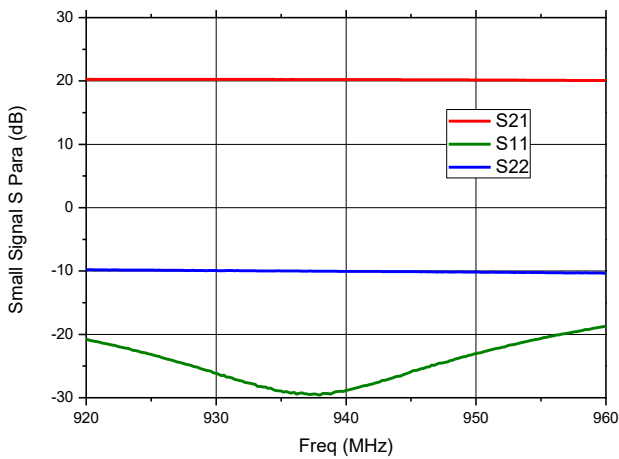


## Typical performance on EVB

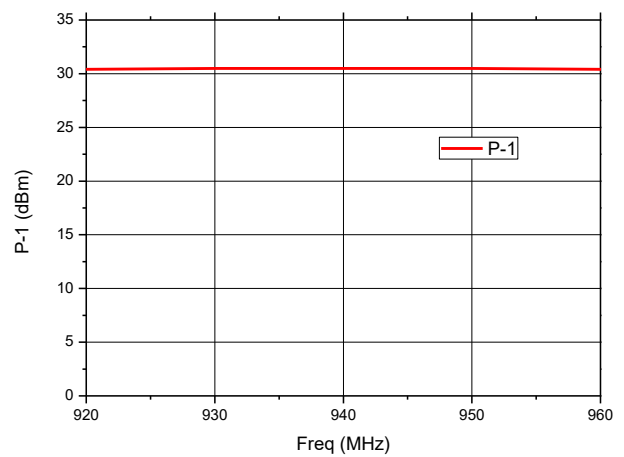
Typical Performance at +25 °C	(MHz)	920	940	960
Small Signal Gain	dB	20.26	20.23	20.1
Input Return Loss	dB	-20.76	-28.8	-18.72
Output Return Loss	dB	-9.8	-10	-10.33
P1dB	dBm	30.4	30.5	30.4
OIP3 (+19dBm/tone, Δf=1MHz)	dBm	46	45.2	45.2
WCDMA Channel power (at -50dBc ACLR)	dBm	20.5	20.5	20.3
Efficiency at Pout=30dBm	%	53.62	52.49	52.77
Supply Voltage, Vcc	V	5		
Quiescent Collector Current (at Rx=200 Ω), Icq	mA	160		

## Performance plots

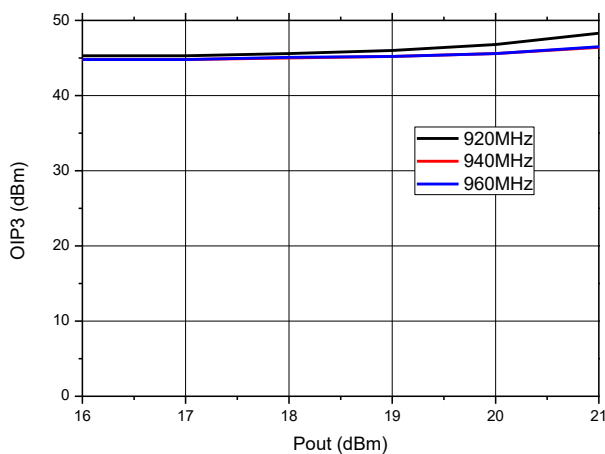
Small Signal S Parameters vs. Freq.



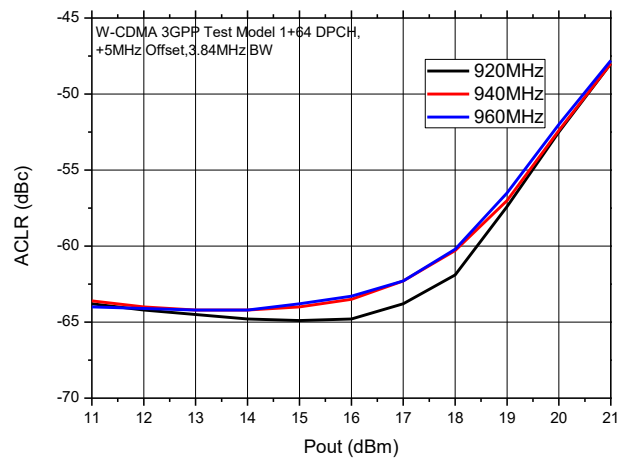
P1dB vs. Freq.



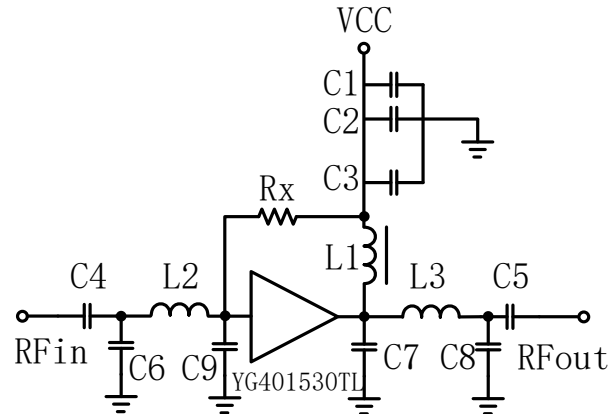
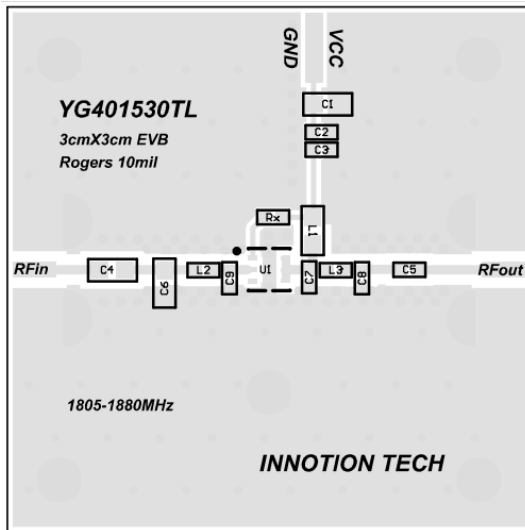
OIP3 vs. Pout/tone vs. Freq.



ACLR vs. Pout vs. Freq.



## 1805MHz~1880MHz Application



### Bill of material

Reference Des.	Value	Description	Manuf.	Part Number
PCB		Printed circuit Board,3CMX3CM		
U1		YG401530TL, DFN2x2_6L	Innotion	YG401530TL
C1	22uF	CAP, SMD, 0603	various	
C2	1000pF	CAP, SMD, 0402	various	
C3	10pF	CAP, SMD, 0402	various	
C4	1pF	CAP, SMD, 0603	Dalicap	
C5	22pF	CAP, SMD, 0402	various	
C6	1.4pF	CAP, SMD, 0603	Dalicap	
C7	4pF	CAP, SMD, 0402	various	
C8	1.8pF	CAP, SMD, 0402	various	
C9	1pF	CAP, SMD, 0402	various	
L1	9.5nH	Coli IND, SMD, 0603	TDK	
L2	0.8nH	IND, SMD, 0402	various	
L3	1.5nH	IND, SMD, 0402	various	
Rx	200 Ω	RES, SMD, 0402	various	

### Critical component placement locations

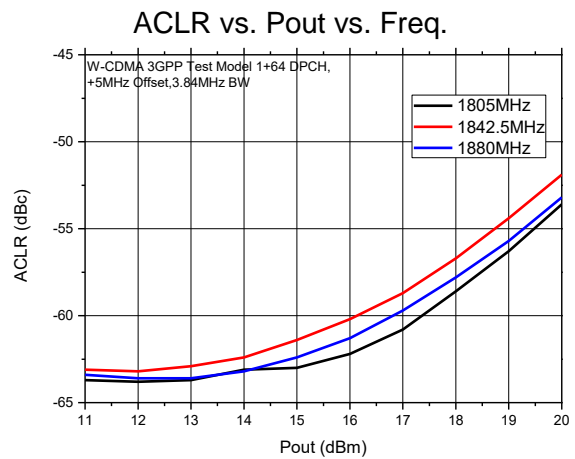
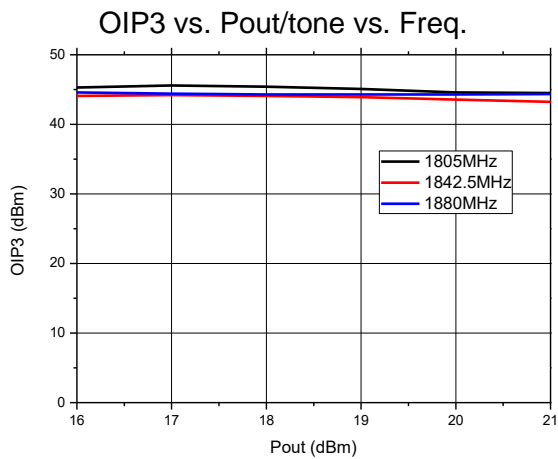
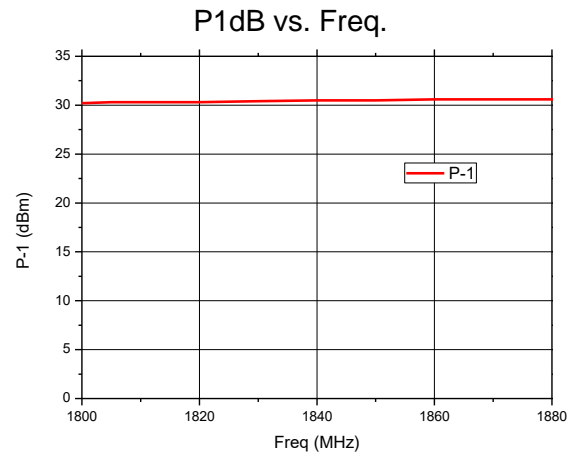
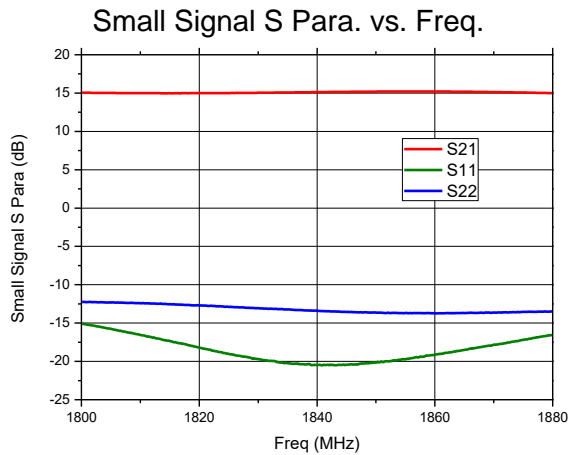
- Distance from U1 Pin2 Pad (left edge) to C9 (right edge): 30mil
- Distance from C9 (left edge) to L2 (right edge): 15mil
- Distance from L2 (left edge) to C6 (right edge): 39.4mil
- Distance from C6 (left edge) to C4 (right edge): 33.5mil
- Distance from U1 Pin5 Pad (right edge) to C7 (left edge): 30mil
- Distance from C7 (right edge) to L3 (left edge): 16mil
- Distance from L3 (right edge) to C8 (left edge): 16mil
- Distance from C8 (right edge) to C5 (left edge): 64mil



## Typical performance on EVB

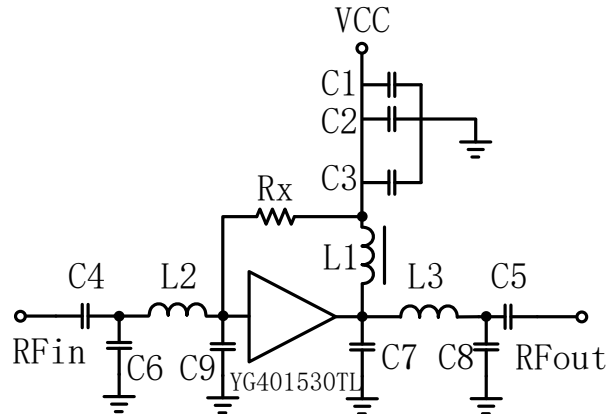
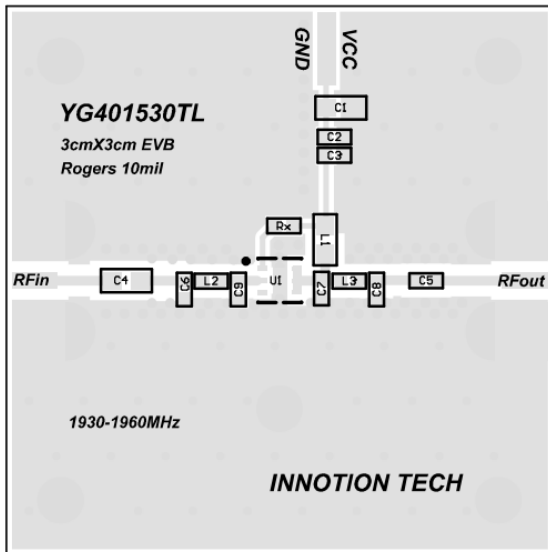
Typical Performance at +25 °C	(MHz)	1805	1842.5	1880
Small Signal Gain	dB	15.02	15.14	14.99
Input Return Loss	dB	-15.77	-20.49	-16.56
Output Return Loss	dB	-12.33	-13.48	-13.48
P1dB	dBm	30.3	30.5	30.6
OIP3 (+17dBm/tone, Δf=1MHz)	dBm	45.6	44.2	44.4
WCDMA Channel power (at -50dBc ACLR)	dBm	21	20.7	21.1
Efficiency at Pout=30dBm	%	48.17	48.61	49.14
Supply Voltage, Vcc	V	5		
Quiescent Collector Current (at Rx=200 Ω), Icq	mA	160		

## Performance plots





## 1930MHz~1960MHz Application



### Bill of material

Reference Des.	Value	Description	Manuf.	Part Number
PCB		Printed circuit Board,3CMX3CM		
U1		YG401530TL, DFN2x2_6L	Innotion	YG401530TL
C1	22uF	CAP, SMD, 0603	various	
C2	1000pF	CAP, SMD, 0402	various	
C3	10pF	CAP, SMD, 0402	various	
C4	1.2pF	CAP, SMD, 0603	Dalicap	
C5	22pF	CAP, SMD, 0402	various	
C6	0.1pF	CAP, SMD, 0402	various	
C7	2pF	CAP, SMD, 0402	various	
C8	2pF	CAP, SMD, 0402	various	
C9	3.3pF	CAP, SMD, 0402	various	
L1	9.5nH	Coli IND, SMD, 0603	TDK	
L2	0.8nH	IND, SMD, 0402	various	
L3	0.8nH	IND, SMD, 0402	various	
Rx	200 Ω	RES, SMD, 0402	various	

### Critical component placement locations

- Distance from U1 Pin2 Pad (left edge) to C9 (right edge): 30mil
- Distance from C9 (left edge) to L2 (right edge): 15mil
- Distance from L2 (left edge) to C6 (right edge): 15mil
- Distance from C6 (left edge) to C4 (right edge): 63mil
- Distance from U1 Pin5 Pad (right edge) to C7 (left edge): 30mil
- Distance from C7 (right edge) to L3 (left edge): 16mil
- Distance from L3 (right edge) to C8 (left edge): 16mil
- Distance from C8 (right edge) to C5 (left edge): 64mil

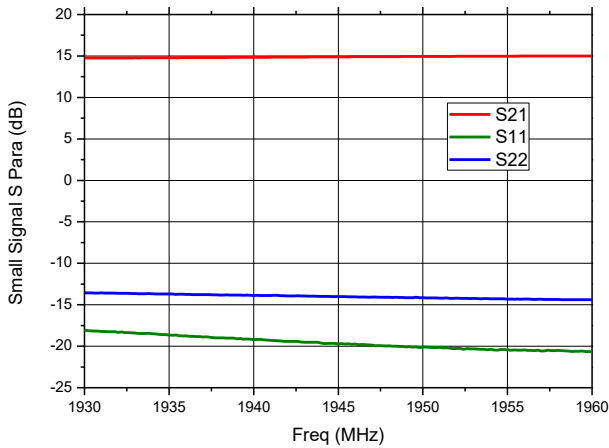


**Typical performance on EVB**

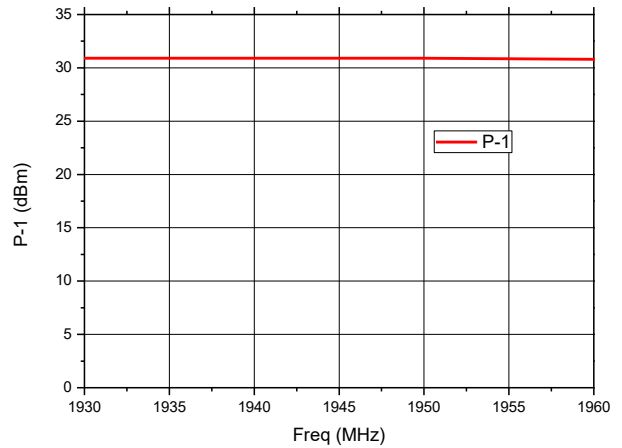
Typical Performance at +25 °C	(MHz)	1930	1945	1960
Small Signal Gain	dB	14.75	14.89	15
Input Return Loss	dB	-18.06	-19.72	-20.64
Output Return Loss	dB	-13.57	-14.02	-14.38
P1dB	dBm	30.9	30.9	30.8
OIP3 (+16dBm/tone, Δf=1MHz)	dBm	45.1	44.5	44.8
WCDMA Channel power (at -50dBc ACLR)	dBm	21	21	21
Efficiency at Pout=30dBm	%	48.9	48.9	48.54
Supply Voltage, Vcc	V	5		
Quiescent Collector Current (at Rx=200 Ω), Icq	mA	160		

**Performance plots**

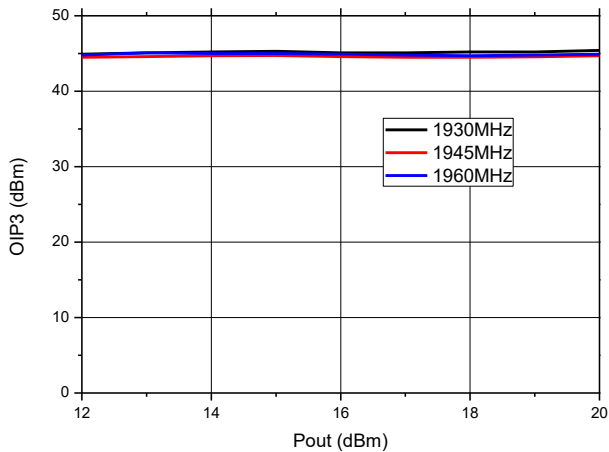
Small Signal S Para. vs. Frequency



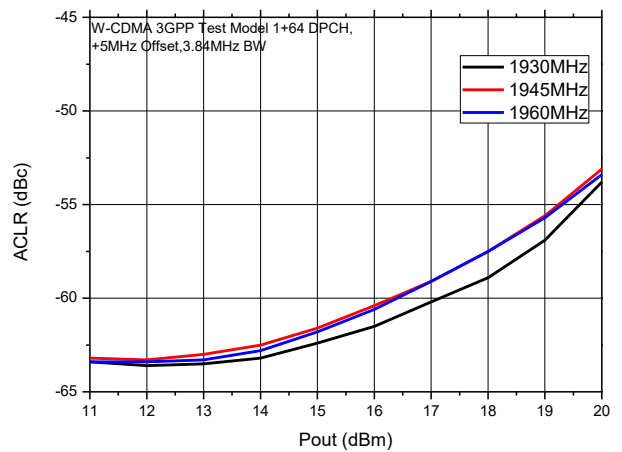
P1dB vs. Frequency



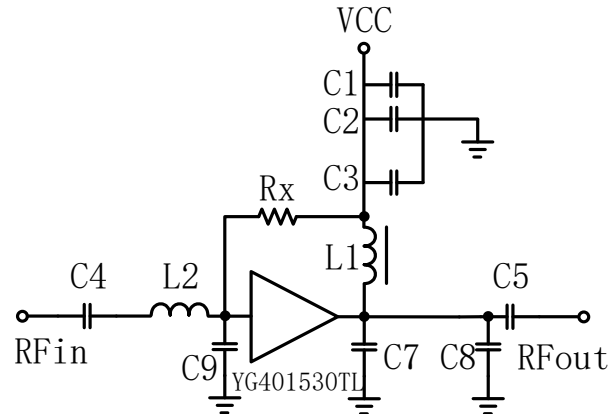
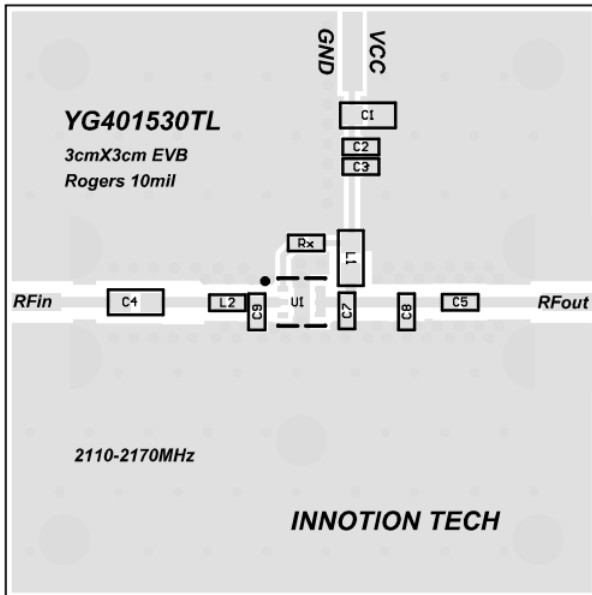
OIP3 vs. Pout/tone vs. Freq.



ACLR vs. Pout vs. Freq.



## 2110MHz~2170MHz Application



### Bill of material

Reference Des.	Value	Description	Manuf.	Part Number
PCB		Printed circuit Board,3CMX3CM		
U1		YG401530TL, DFN2x2_6L	Innotion	YG401530TL
C1	22uF	CAP, SMD, 0603	various	
C2	1000pF	CAP, SMD, 0402	various	
C3	10pF	CAP, SMD, 0402	various	
C4	1pF	CAP, SMD, 0603	Dalicap	
C5	22pF	CAP, SMD, 0402	various	
C7	1.8pF	CAP, SMD, 0402	various	
C8	2pF	CAP, SMD, 0402	various	
C9	2.7pF	CAP, SMD, 0402	various	
L1	4.3nH	Coli IND, SMD, 0603	TDK	
L2	0.8nH	IND, SMD, 0402	various	
Rx	200 Ω	RES, SMD, 0402	various	

### Critical component placement locations

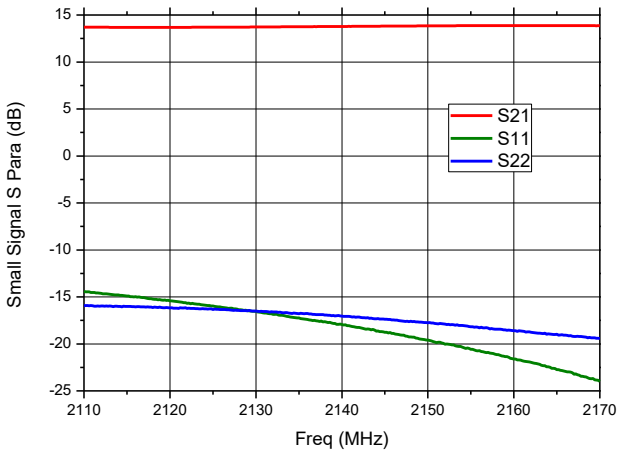
- Distance from U1 Pin2 Pad (left edge) to C9 (right edge): 30mil
- Distance from C9 (left edge) to L2 (right edge): 15mil
- Distance from L2 (left edge) to C4 (right edge): 103.5mil
- Distance from U1 Pin5 Pad (right edge) to C7 (left edge): 30mil
- Distance from C7 (right edge) to C8 (left edge): 93.5mil
- Distance from C8 (right edge) to C5 (left edge): 64mil

## Typical performance on EVB

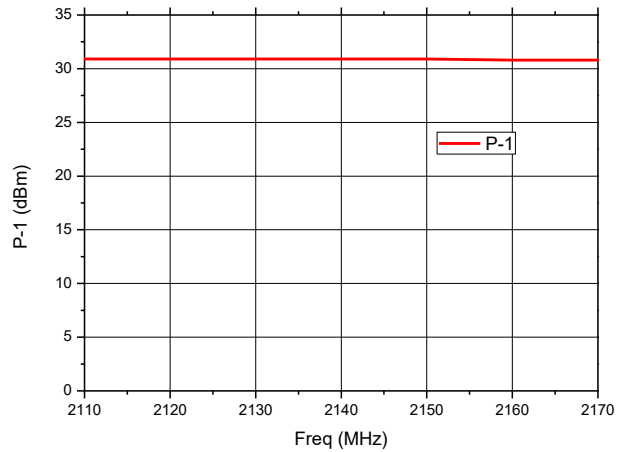
Typical Performance at +25 °C	(MHz)	2110	2140	2170
Small Signal Gain	dB	13.7	13.78	13.86
Input Return Loss	dB	-14.4	-17.94	-23.99
Output Return Loss	dB	-15.93	-17.04	-19.42
P1dB	dBm	30.9	30.9	30.8
OIP3 (+15dBm/tone, Δf=1MHz)	dBm	45.2	45	45.2
WCDMA Channel power (at -50dBc ACLR)	dBm	21	20.9	20.5
Efficiency at Pout=30dBm	%	48.29	47.64	47.02
Supply Voltage, Vcc	V	5		
Quiescent Collector Current (at Rx=200 Ω), Icq	mA	160		

## Performance plots

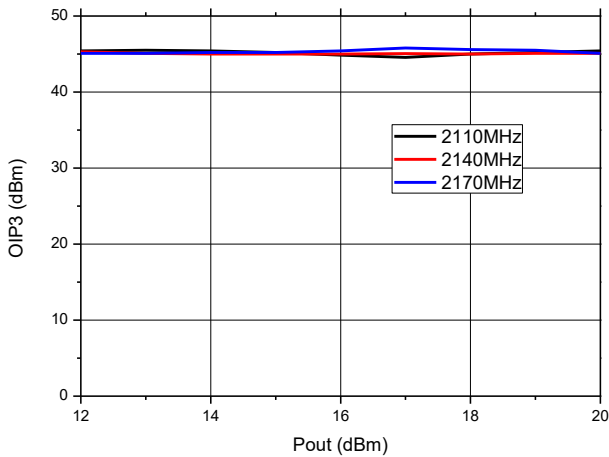
Small Signal S Para. vs. Freq.



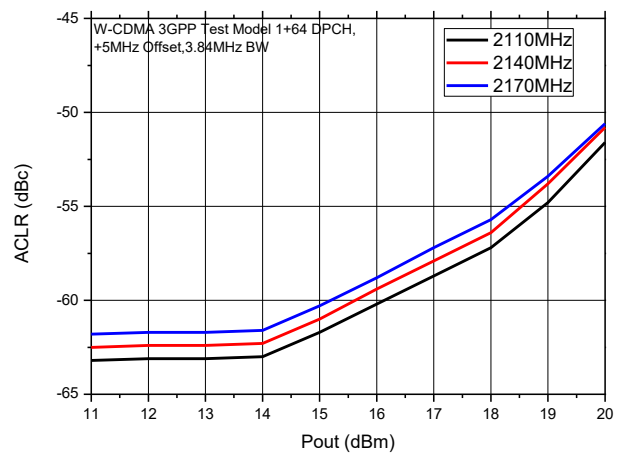
P1dB vs. Freq.



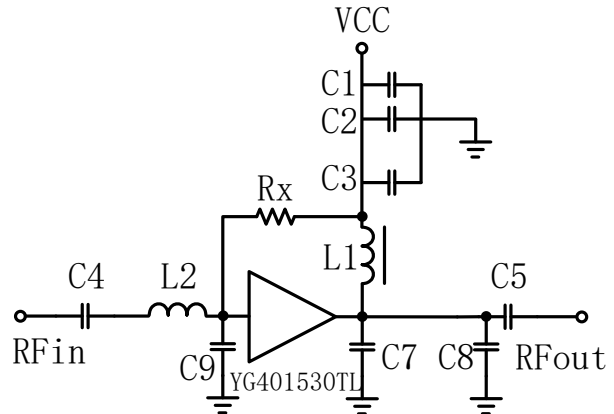
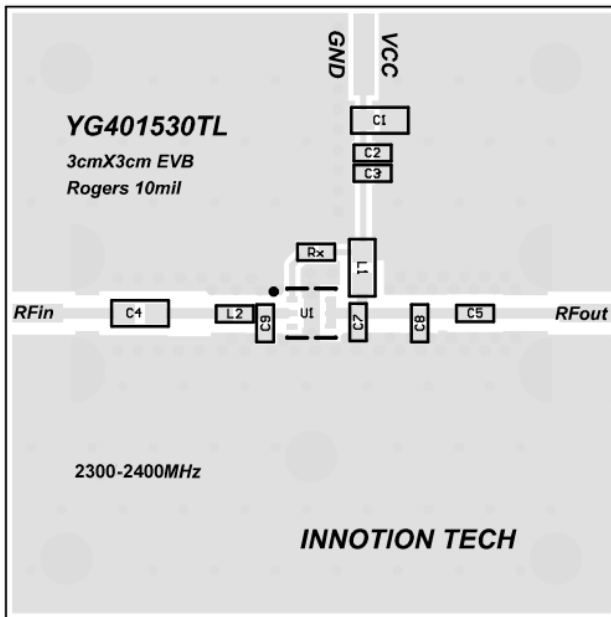
OIP3 vs. Pout/tone vs. Freq.



ACLR vs. Pout vs. Freq.



## 2300MHz~2400MHz Application



### Bill of material

Reference Des.	Value	Description	Manuf.	Part Number
PCB		Printed circuit Board,3CMX3CM		
U1		YG401530TL, DFN2x2_6L	Innotion	YG401530TL
C1	22uF	CAP, SMD, 0603	various	
C2	1000pF	CAP, SMD, 0402	various	
C3	10pF	CAP, SMD, 0402	various	
C4	0.7pF	CAP, SMD, 0603	Dalicap	
C5	22pF	CAP, SMD, 0402	various	
C7	1.8pF	CAP, SMD, 0402	various	
C8	2pF	CAP, SMD, 0402	various	
C9	2pF	CAP, SMD, 0402	various	
L1	4.3nH	Coli IND, SMD, 0603	TDK	
L2	0.8nH	IND, SMD, 0402	various	
Rx	200 Ω	RES, SMD, 0402	various	

### Critical component placement locations

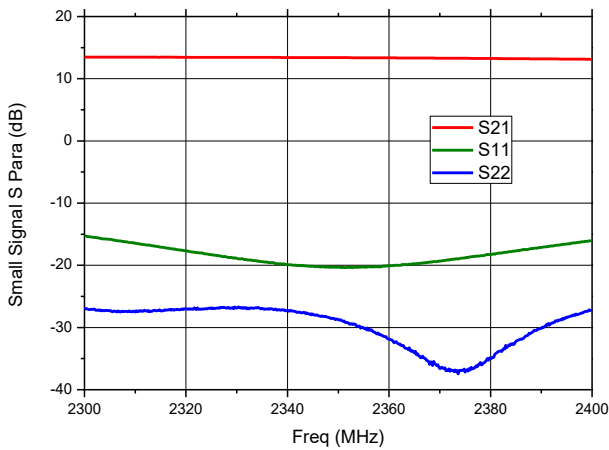
- Distance from U1 Pin2 Pad (left edge) to C9 (right edge): 30mil
- Distance from C9 (left edge) to L2 (right edge): 15mil
- Distance from L2 (left edge) to C4 (right edge): 103.5mil
- Distance from U1 Pin5 Pad (right edge) to C7 (left edge): 30mil
- Distance from C7 (right edge) to C8 (left edge): 93.5mil
- Distance from C8 (right edge) to C5 (left edge): 64mil

## Typical performance on EVB

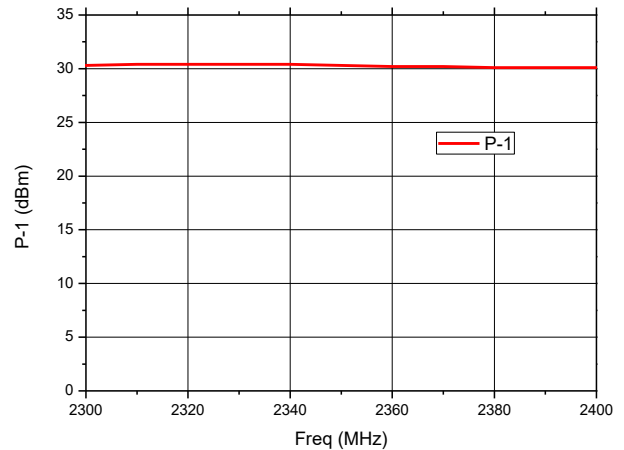
Typical Performance at +25 °C	(MHz)	2300	2350	2400
Small Signal Gain	dB	13.46	13.39	13.13
Input Return Loss	dB	-15.3	-20.31	-16
Output Return Loss	dB	-27.06	-28.76	-27.17
P1dB	dBm	30.3	30.3	30.1
OIP3 (+15dBm/tone, Δf=1MHz)	dBm	46.4	45.8	46.4
WCDMA Channel power (at -50dBc ACLR)	dBm	20.8	20.7	20.3
Efficiency at Pout=30dBm	%	43.57	45.05	45.98
Supply Voltage, Vcc	V	5		
Quiescent Collector Current (at Rx=200 Ω), Icq	mA	160		

## Performance plots

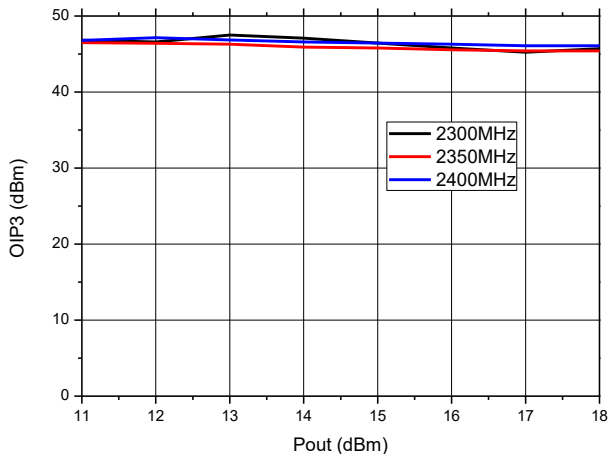
Small Signal S Para. vs. Freq.



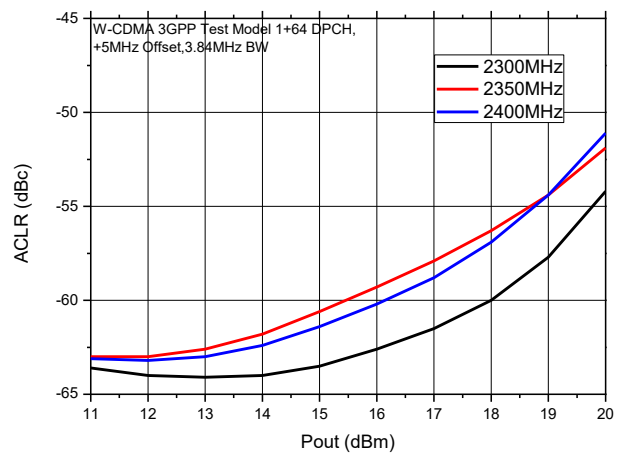
P1dB vs. Freq.



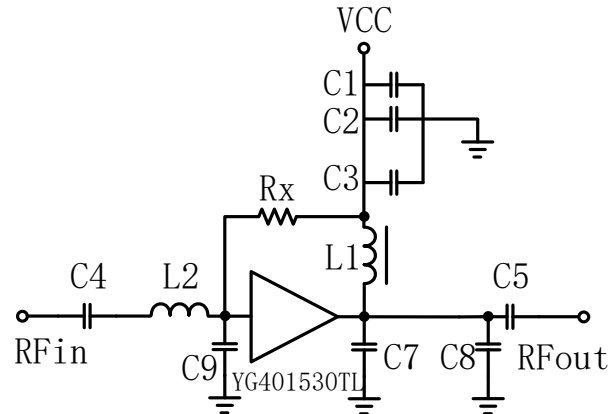
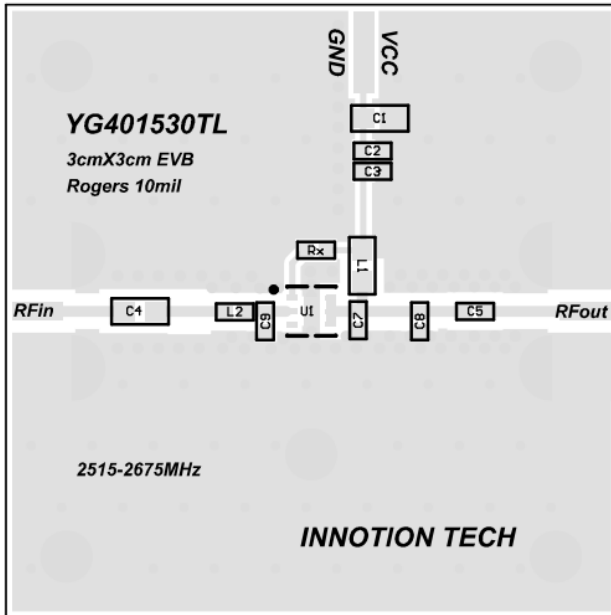
OIP3 vs. Pout/tone vs. Freq.



ACLR vs. Pout vs. Freq.



## 2515MHz~2675MHz Application



### Bill of material

Reference Des.	Value	Description	Manuf.	Part Number
PCB		Printed circuit Board,3CMX3CM		
U1		YG401530TL, DFN2x2_6L	Innotion	YG401530TL
C1	22uF	CAP, SMD, 0603	various	
C2	1000pF	CAP, SMD, 0402	various	
C3	10pF	CAP, SMD, 0402	various	
C4	0.5pF	CAP, SMD, 0603	Dalicap	
C5	22pF	CAP, SMD, 0402	various	
C7	1.8pF	CAP, SMD, 0402	various	
C8	1.8pF	CAP, SMD, 0402	various	
C9	1.3pF	CAP, SMD, 0402	various	
L1	4.3nH	Coli IND, SMD, 0603	TDK	
L2	0.8nH	IND, SMD, 0402	various	
Rx	200 $\Omega$	RES, SMD, 0402	various	

### Critical component placement locations

- Distance from U1 Pin2 Pad (left edge) to C9 (right edge): 30mil
- Distance from C9 (left edge) to L2 (right edge): 15mil
- Distance from L2 (left edge) to C4 (right edge): 103.5mil
- Distance from U1 Pin5 Pad (right edge) to C7 (left edge): 30mil
- Distance from C7 (right edge) to C8 (left edge): 93.5mil
- Distance from C8 (right edge) to C5 (left edge): 64mil

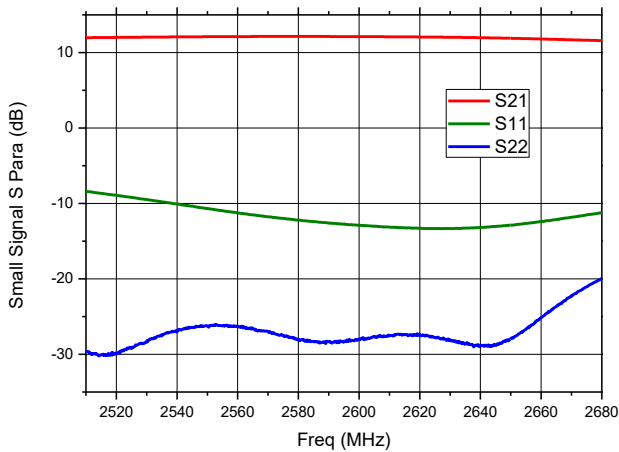


## Typical performance on EVB

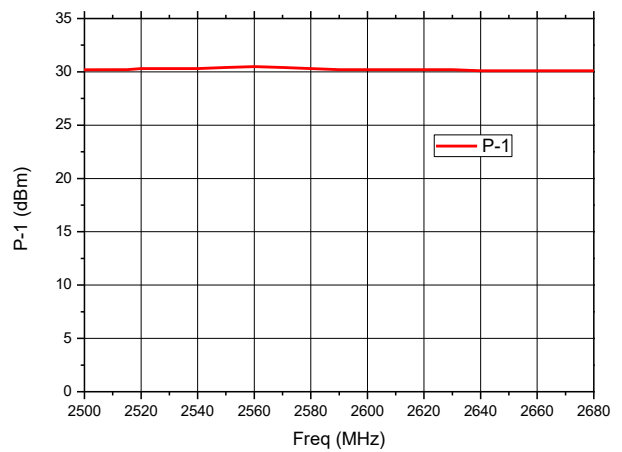
Typical Performance at +25 °C	(MHz)	2515	2595	2675
Small Signal Gain	dB	11.99	12.13	11.64
Input Return Loss	dB	-8.65	-12.74	-11.52
Output Return Loss	dB	-30.07	-28.32	-21.07
P1dB	dBm	30.2	30.2	30.1
OIP3 (+15dBm/tone, Δf=1MHz)	dBm	45.2	44.8	45
WCDMA Channel power (at -50dBc ACLR)	dBm	20.4	20.3	20.1
Efficiency at Pout=30dBm	%	44.96	45.65	45.27
Supply Voltage, Vcc	V	5		
Quiescent Collector Current (at Rx=200 Ω), Icq	mA	160		

## Performance plots

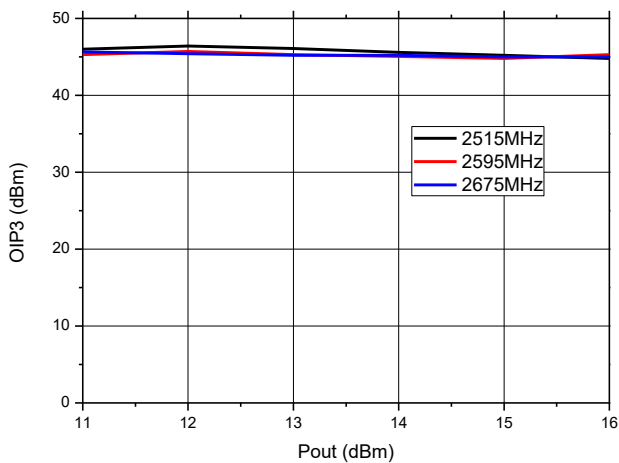
Small Signal S Para. vs. Freq.



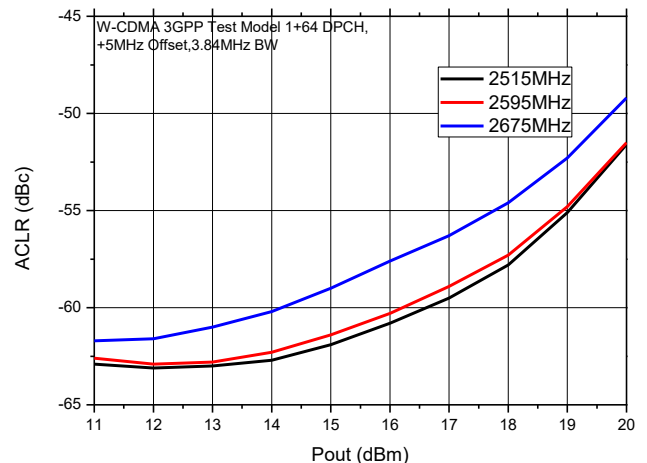
P1dB vs. Freq.



OIP3 vs. Pout/tone vs. Freq.



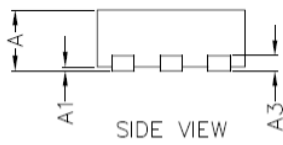
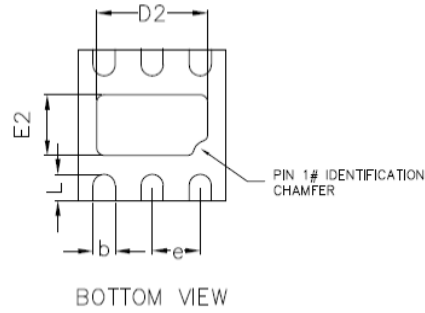
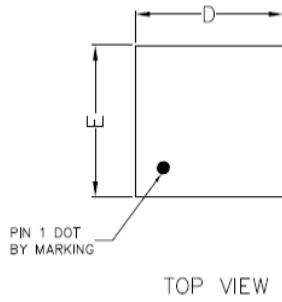
ACLR vs. Pout vs. Freq.





## Package Diagram

(Units: millimeters)



COMMON DIMENSIONS(MM)			
PKG. REF.	W:VERY VERY THIN		
	MIN.	NOM.	MAX
A	0.70	0.75	0.80
A1	0.00	-	0.05
A3	0.2 REF.		
D	1.95	2.00	2.05
F	1.95	2.00	2.05
D2	1.35	1.50	1.60
E2	0.65	0.80	0.90
L	0.25	0.35	0.45
b	0.25	0.30	0.35
e	0.65 Bsc		