TSL8329M-EVB-B

Application Note

2900MHz~3300MHz

5.0V 90mA-HG mode

5.0V 45mA-LG mode

Rev-1.1

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1. GENERAL DESCRIPTION

The TSL8329M is a dual-channel, integrated RF, front-end, multichip module designed for different applications. The device operates from 2.0 GHz to 4.2GHz. The TSL8329M is configured in dual channels with a cascading, two-stage, LNA and a high GaN based SPDT switch. In high gain mode, the cascaded two-stage LNA and switch offer a low noise figure of 1 dB and a high gain of 32 dB at 3.6 GHz with an output third-order intercept point (OIP3) of 35 dBm (typical) at high gain mode. In low gain mode, one stage of the two-stage LNA is in bypass, providing 13 dB of gain at a lower current of 45 mA. In power-down mode, the LNAs are turned off and the device draws 5 mA. In transmit operation, when RF inputs are connected to a termination pin (TERM-CHA or TERM-CHB), the switch provides low insertion loss of 0.45 dB at 3.6GHz and handles long-term evolution (LTE) average power (9 dB peak to average ratio (PAR)) of 43 dBm for full lifetime operation. The device comes in an RoHS compliant, compact, 6 mm × 6 mm, 40-lead LFCSP.

TSL8329M-EVB-B is an evaluation board specially tuned for frequency range of 2900MHz~3300MHz applications. Its application in the areas of Wireless infrastructure, TDD massive multiple input & multiple output, active antenna systems, TDD-based communication systems etc.

TSL8329M-EVB-B Board Design

2. TSL8329M-EVB-B SCHEMATIC

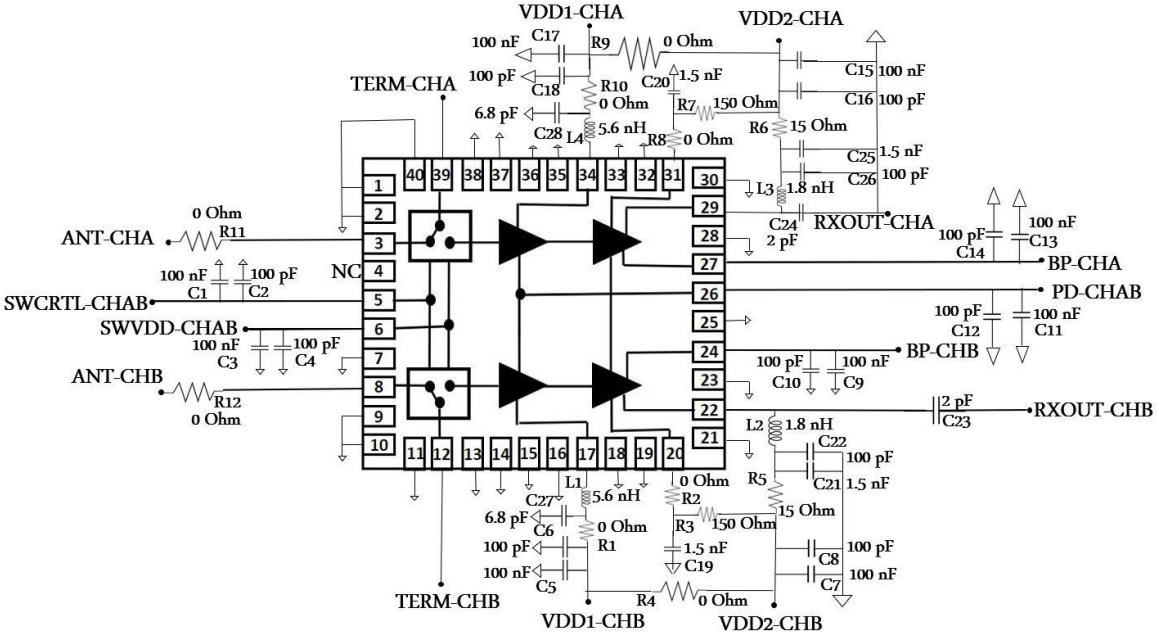

Figure 1 TSL8329M-EVB-B 2900MHz ~3300MHz schematic

3. TSL8329M-EVB-B LAYOUT

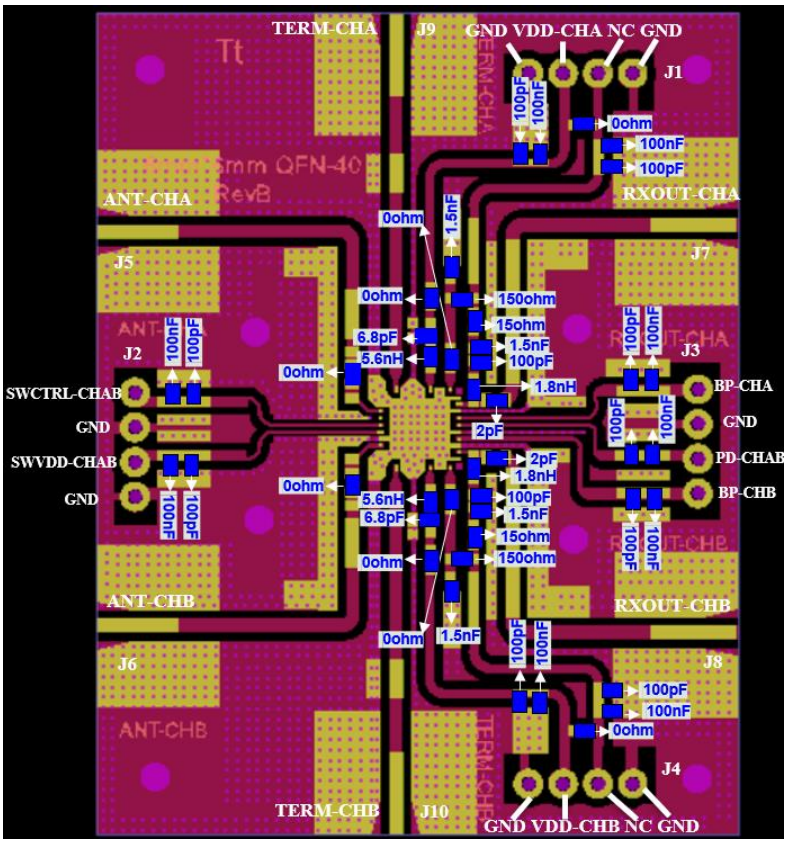

Figure 2 TSL8329M-EVB-B 2900MHz ~ 3300MHz layout

4. TSL8329M-EVB-B BILL OF MATERIAL

Component ID	Value	Manufacturer	Recommended Part Number	Qty
R1, R2, R4, R8, R9, R10, R11, R12	0Ω	Panasonic	ERJ-2GE0R00X	8
R3, R7	150Ω	Panasonic	ERJ-2RHD1500X	2
R5, R6	15Ω	Panasonic	ERJ-H2RD15R0X	2
L2, L3	1.8nH	Coil craft	0603HP-1N8XJLW	2
L1, L4	5.6nH	Coil craft	0402HP-5N6XGRW	2
C27, C28	6.8pF	Murata	GJM1555C1H6R8BB01D	2
C19, C20, C21, C25	1.5nF	Murata	04025C152JAT2A	4
C23, C24	2pF	Murata	GJM1555C1H2R0BB01D	2
C2, C4, C6, C8, C10, C12, C14, C16, C18, C22, C26	100pF	AVX	04025A101JAT4A	11
C1, C3, C5, C7, C9, C11, C13, C15, C17	100nF	TDK	C1005X7R1H104K050BE	9
PCB	Rogers RO4350B, 20 mils, 1 oz copper			1

5. TSL8329M-EVB-B BOARD MEASUREMENT RESULTS

5.1. TSL8329M-EVB-B TEST RESULTS

All the tests are carried out at room temperature.

5.2. Summary

Parameter	Test Condition	Typical Values	Unit
Operational frequency Range		2.9-3.3G	Hz
Gain	HG	35-38	dB
	LG	14.8-13.5	dB
Noise Figure (De-embedded)	HG	0.9-1	dB
	LG	0.9-1	
EVB Noise Figure	HG	1.3-1.2	dB
	LG	1.3-1.2	
Input Return Loss	HG	Less than -9	dB
	LG	Less than -9	dB
Output Return Loss	HG	Less than -11	dB
	LG	Less than -4	dBm
OP1dB	HG	17-18.2	dBm
	LG	10-11	dBm
OIP3 (With 1MHz tone spacing)	0dBm per tone,	30-32.5	dBm
	-2dBm per tone,	20-25	dBm
Current, Id	HG	90	mA
	LG	45	
	PD	5	
Insertion Loss	Transmit operation at 3.1 GHz	0.45	dB
Channel to Channel Isolation Between RXOUT -CHA & RXOUT -CHB	At 3.1GHz Receive operation	35	dB
Between TERM-CHA AND TERM-CHB	Transmit operation	55	dB
SWITCH ISOLATION ANT-CHA to TERM-CHA and ANT-CHB to TERM-CHB	Transmit operation, PD-CHAB = 0 V	25	dB

Figure 3 TSL8329M-EVB-B Electrical Characteristics Summary

5.3. S parameters.

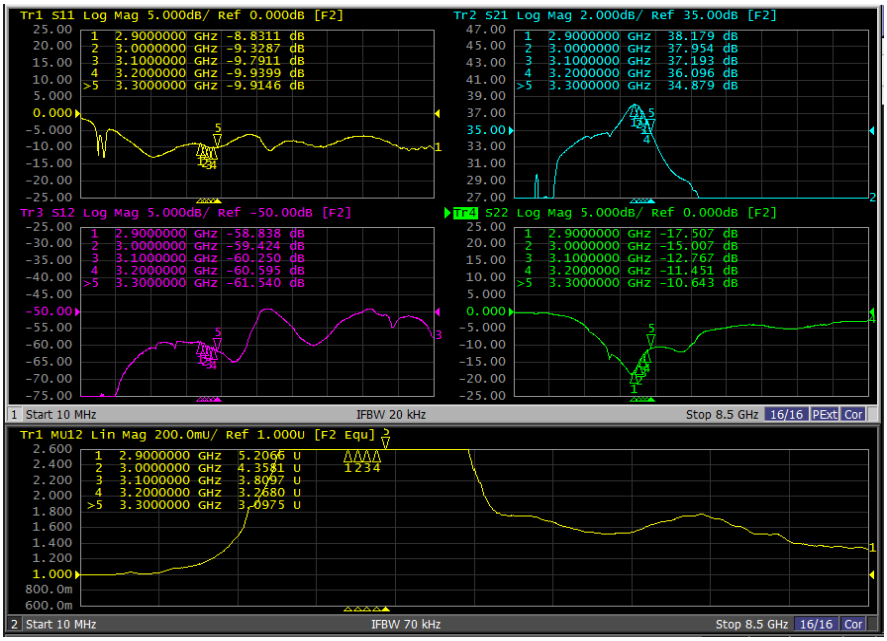

Figure 4 S parameters of HG mode of TSL8329M-EVB-B

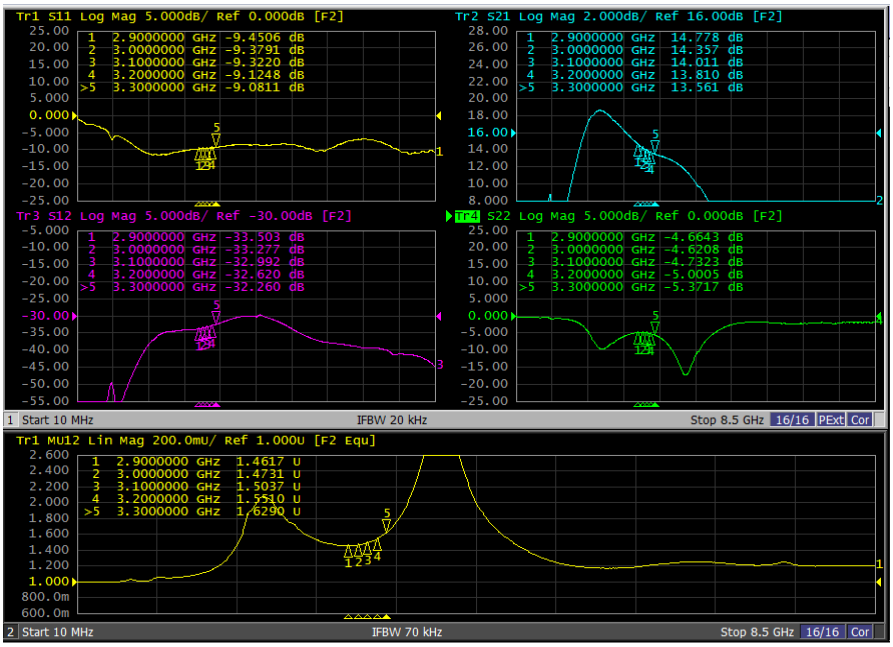

Figure 5 S parameters of LG mode of TSL8329M-EVB-B

5.4. De-embedded Noise Figure.

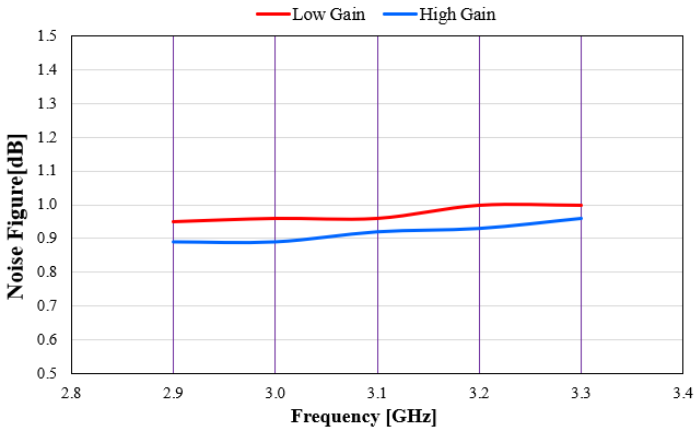

Figure 6 De-embedded NF of HG mode of TSL8329M-EVB-B

5.5. Large Signal Test Results.

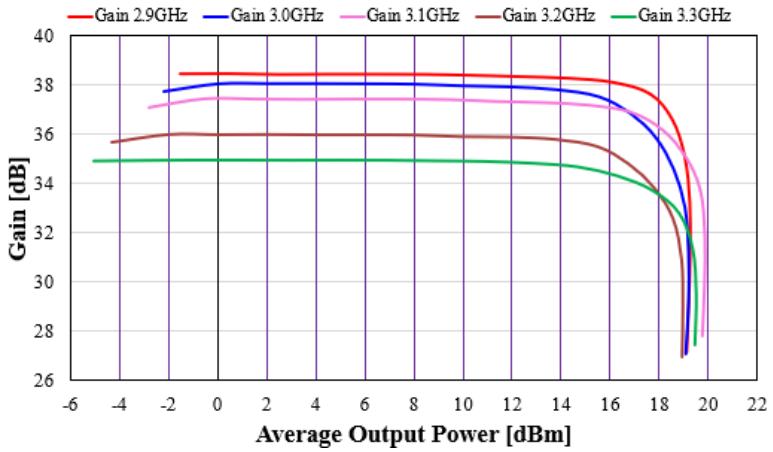

Figure 7 Gain Vs Pout of HG mode of TSL8329M-EVB-B

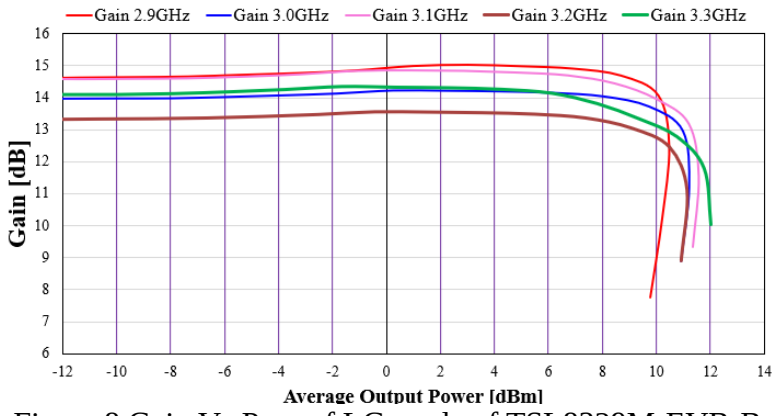

Figure 8 Gain Vs Pout of LG mode of TSL8329M-EVB-B

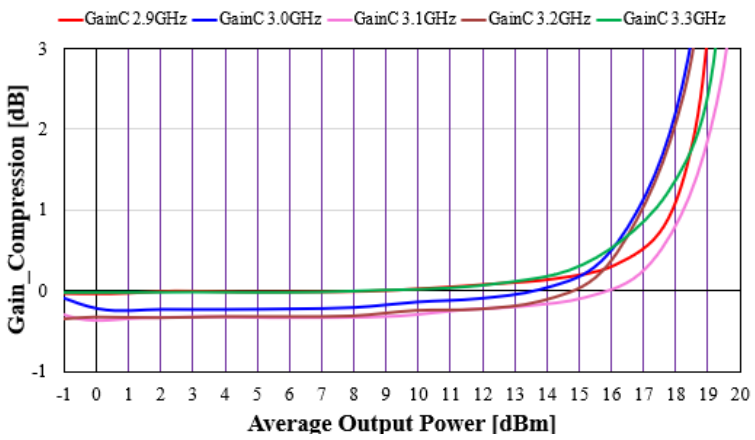

Figure 9 Gain compression Pout of HG mode of TSL8329M-EVB-B

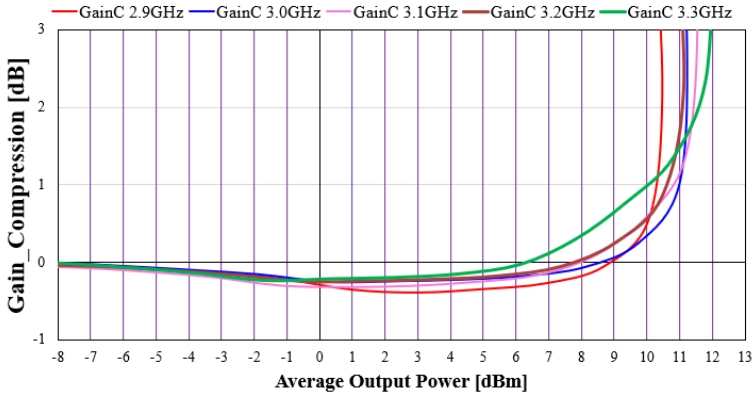

Figure 10 Gain compression Pout of LG mode of TSL8329M-EVB-B

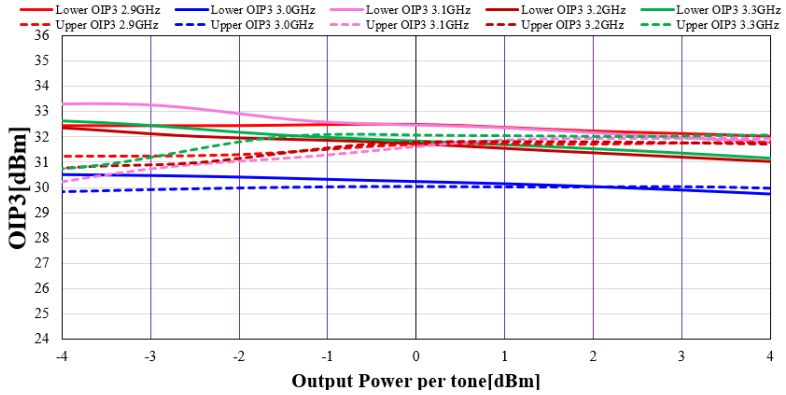

Figure 11 OIP3 Vs Pout per tone of HG mode of TSL8329M-EVB-B

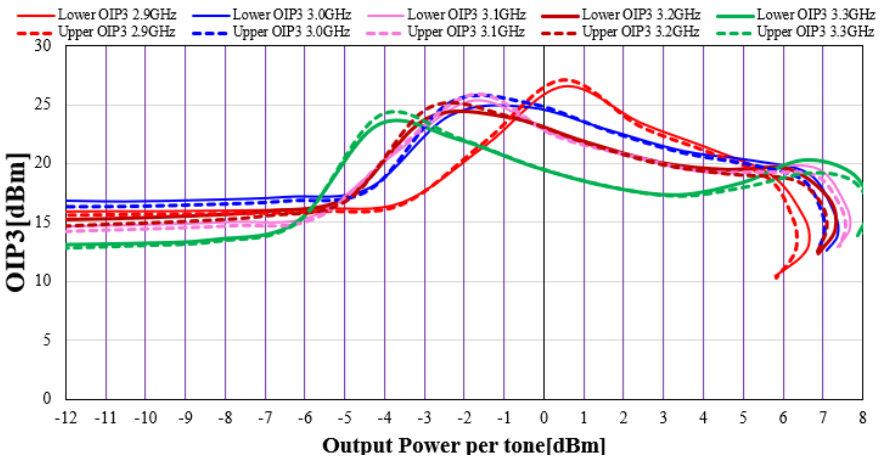

Figure 12 OIP3 Vs Pout per tone of LG mode of TSL8329M-EVB-B