TSL8329M-EVB-C

Application Note 2000MHz~4000MHz 5.0V 90mA-HG mode 5.0V 45mA-LG mode

Rev-1.1

2022-09-23

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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 powerdown 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-C is an evaluation board specially tuned for frequency range of 2000MHz~4000MHz 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-C Board Design



2. TSL8329M-EVB-C SCHEMATIC

Figure 1 TSL8329M-EVB-C 2000MHz ~4000MHz schematic Tagore Technology Inc. Confidential

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3. TSL8329M-EVB-C LAYOUT



Figure 2 TSL8329M-EVB-C 2000MHz ~ 4000MHz layout

4. TSL8329M-EVB-C 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
L1, L2, L3, L4	8.2nH	Coil craft	0402HP-8N2XGRW	4
C27, C28	6.8pF	Murata	GJM1555C1H6R8BB01D	2
C19, C20, C21, C25, C29, C30	1.5nF	Murata	04025C152JAT2A	6
C23, C24	220pF	Murata	C0402C221K5GACAUTO	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		

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5. TSL8329M-EVB-C BOARD MEASUREMENT RESULTS

5.1. TSL8329M-EVB-C TEST RESULTS

All the tests are carried out at room temperature.

5.2. Summary

Parameter	Test Condition	Typical Values	Unit	
Operational frequency Range		2.0-4.0G	Hz	
Cain	HG	37-29	dB	
Galli	LG	18-12	dB	
Noise Figure	HG	0.7-1.2	dB	
(De-embedded)	LG	0.7-1.2	dB	
EVP Noise Figure	HG	1.1-1.6	dB	
E V B Noise Figure	LG	1.1-1.6	dB	
Input Poturn Logo	HG	7.3-3.3	dB	
input Return Loss	LG	4.2-7.3	dB	
Output Datum Laga	HG	4-17	dB	
Output Return Loss	LG	3-24	dBm	
	HG	18.5-20.5	dBm	
OPIdB	LG	7-12	dBm	
OIP3	0dBm per tone,	31-35	dBm	
(With 1MHz tone spacing)	-2dBm per tone,	17-21	dBm	
	HG	90	mA	
Current, Id	LG	45		
	PD	5		
Insertion Loss	Transmit operation at 3.0 GHz	0.45	dB	
Channel to Channel Isolation Between RXOUT -CHA &	At 3.0GHz	40	dB	
RXOUT -CHB	Receive operation			
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-C Electrical Characteristics Summary

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TSL8329M-EVB-C

5.3. S parameters.



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



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

5.4. De-embedded Noise Figure.

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

5.5. Large Signal Test Results.



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



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





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



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



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



Figure 12 OIP3 Vs Pout per tone of LG mode of TSL8329M-EVB-C Tagore Technology Inc. Confidential