

BDA4630 SWR Improvement Matching Circuits for over 4GHz

BeRex offers SWR(S11, S22) improvement circuits on the BDA4630. This application note explains the method to improve Input / output Return loss of 4GHz and above. It will be helpful when using a frequency band of 4GHz or higher. For more detailed product specifications, please check the datasheet.

Application Schematic

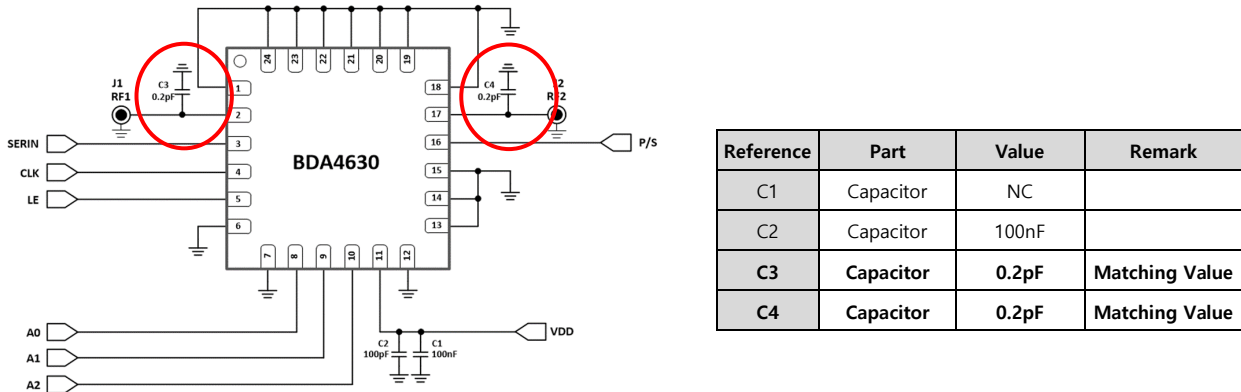


Figure 6. BDA4630 Application Circuits for SWR improvement of Frequency 4GHz to 6GHz.

Test Results

When 0.2pF of shunt capacitor is added to RF1 and RF2 port, respectively, both S11 and S22 are improved to below -15dB in frequency band 4GHz or higher. Table 2 below shows the BDA4630 S parameter results when shunt 0.2pF is added on BVA4630 EVB.

Test Parameter			3GHz	3.5GHz	4GHz	4.5GHz	5GHz	5.5GHz	6GHz	Remark
S Parameter	Insertion Loss S21 [dB]	ATT=0dB	-1.04	-1.04	-1.02	-1.10	-1.29	-1.38	-1.60	Figure 2
		ATT=10dB	-11.14	-11.28	-11.34	-11.47	-11.68	-11.84	-12.07	Figure 2, 3
		ATT=20dB	-21.13	-21.26	-21.29	-21.38	-21.58	-21.68	-21.80	Figure 3
		ATT=30dB	-31.08	-31.23	-31.28	-31.37	-31.67	-31.83	-31.88	Figure 3
		Flatness (ATT=0dB)	0.2dBpp				0.4dBpp			
	Input Return Loss S11 [dB]	ATT=0dB	-15.18	-16.90	-18.93	-20.45	-21.92	-25.62	-38.21	Figure 4
		ATT=10dB	-17.28	-17.47	-18.06	-18.69	-19.11	-19.68	-20.84	Figure 4
		ATT=20dB	-16.59	-16.72	-17.33	-18.01	-18.60	-19.55	-21.83	Figure 4
		ATT=30dB	-17.08	-16.96	-17.34	-17.75	-17.98	-18.22	-19.02	Figure 4
	Output Return Loss S22 [dB]	ATT=0dB	-16.06	-17.91	-20.13	-22.67	-26.70	-35.44	-26.96	Figure 5
ATT=10dB		-17.97	-18.07	-18.60	-19.43	-20.90	-21.79	-22.94	Figure 5	
ATT=20dB		-18.29	-17.88	-17.80	-18.01	-18.41	-18.34	-18.36	Figure 5	
ATT=30dB		-18.25	-17.86	-17.74	-17.98	-18.29	-18.13	-18.19	Figure 5	
ATT Accuracy	ATT Error	ATT=10dB	0.10	0.25	0.32	0.37	0.39	0.46	0.48	
		ATT=20dB	0.09	0.23	0.27	0.28	0.29	0.30	0.21	
		ATT=30dB	0.04	0.20	0.26	0.28	0.38	0.45	0.28	
	ATT Accuracy		±(0.25 +3.5% of attenuation state)				±(0.25 +5.0% of attenuation state)			

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Test Results (Graph)

Figure 2. S21 (ATT = 0dB) : Added 0.2pF Shunt

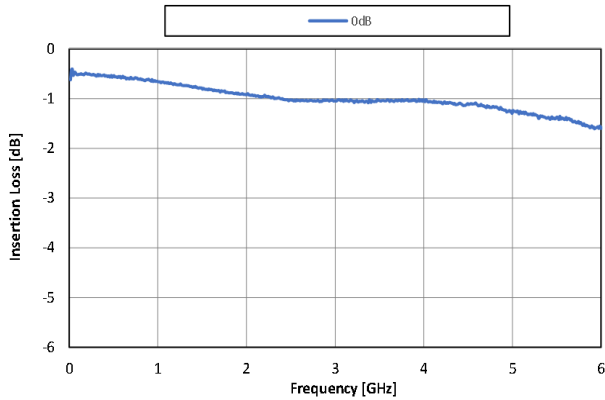


Figure 3. S21 (ATT = 0dB, 10dB, 20dB, 30dB) : Added 0.2pF Shunt

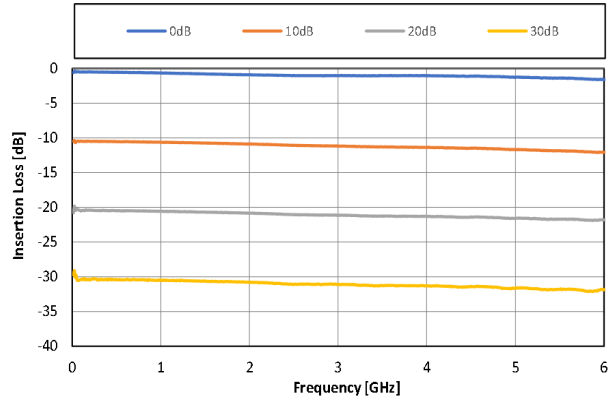


Figure 4. S11 (ATT = 0, 10, 20, 30dB) : Added 0.2pF Shunt.

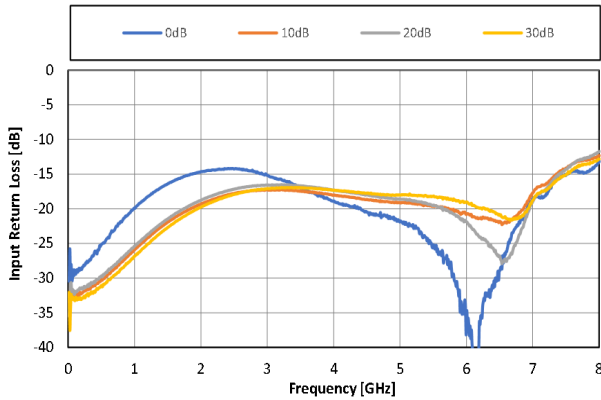


Figure 4-1. S11 : No matching, datasheet graph

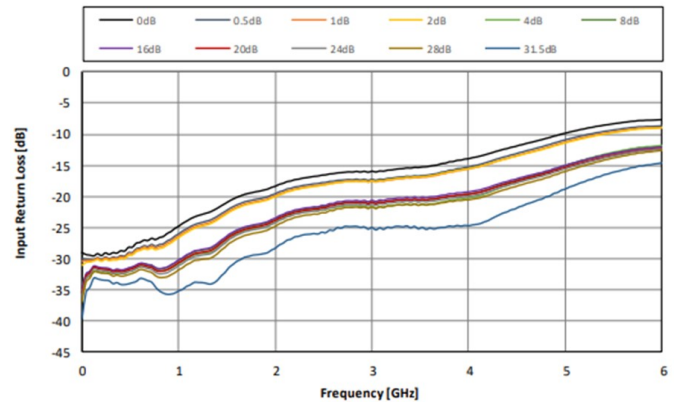


Figure 5. S22 (ATT = 0, 10, 20, 30dB) : Added 0.2pF Shunt.

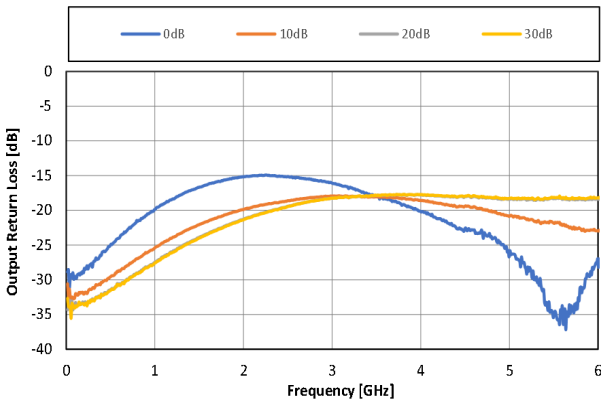


Figure 5-1. S22 : No matching state, datasheet graph

