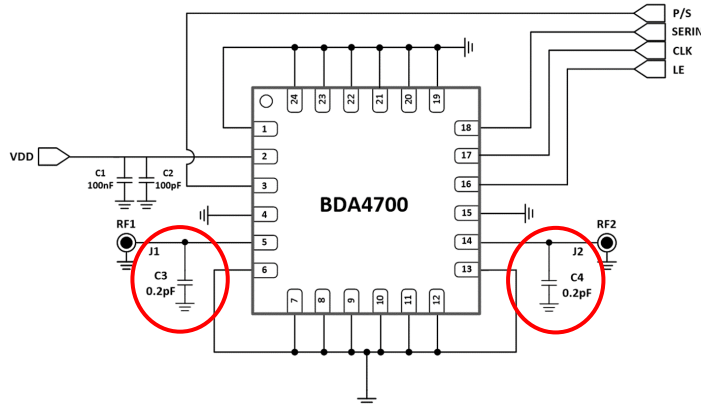


BDA4700 SWR Improvement Matching Circuits for over 4GHz

BeRex offers SWR(S11, S22) improvement circuits on the BDA4700. 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



Reference	Part	Value	Remark
C1	Capacitor	100nF	
C2	Capacitor	100pF	
C3	Capacitor	0.2pF	Matching Value
C4	Capacitor	0.2pF	Matching Value

Figure 1. BDA4700 Application Circuits for SWR improvement of Frequency 4GHz to 8GHz.

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 3 below shows the BDA4700 S parameter results when shunt 0.2pF is added on BVA4700 EVB.

			4GHz	4.5GHz	5GHz	5.5GHz	6GHz	6.5GHz	7GHz	7.5GHz	8GHz	Remark
S Parameter	Insertion Loss S21 [dB]	ATT=0dB	-1.16	-1.29	-1.45	-1.57	-1.62	-1.67	-1.86	-2.24	-2.86	Figure 22
		ATT=10dB	-11.49	-11.63	-11.83	-12.04	-12.24	-12.36	-12.50	-12.77	-13.25	Figure 2,3
		ATT=20dB	-21.49	-21.60	-21.74	-21.93	-22.09	-22.10	-22.17	-22.30	-22.67	Figure 3
		ATT=30dB	-31.79	-31.94	-32.11	-32.37	-32.58	-32.49	-32.71	-32.89	-33.32	Figure 3
		Flatness (ATT=0dB)	0.6dBpp						1.2dBpp			
	Input Return Loss S11 [dB]	ATT=0dB	-18.38	-16.56	-15.18	-15.67	-19.76	-26.02	-18.57	-17.23	-16.41	Figure 4
		ATT=10dB	-18.94	-19.43	-18.50	-17.02	-15.75	-14.56	-13.53	-12.61	-11.67	Figure 4
		ATT=20dB	-18.24	-18.53	-17.57	-16.50	-16.03	-16.13	-16.41	-15.40	-12.86	Figure 4
		ATT=30dB	-18.21	-18.64	-17.66	-16.08	-14.75	-13.83	-13.41	-13.09	-12.36	Figure 4
	Output Return Loss S22 [dB]	ATT=0dB	-20.46	-17.68	-15.91	-16.47	-21.45	-29.42	-17.16	-14.37	-12.43	Figure 5
		ATT=10dB	-26.91	-24.42	-20.66	-18.95	-18.85	-19.42	-17.87	-14.36	-11.15	Figure 5
		ATT=20dB	-22.87	-24.11	-21.00	-17.87	-15.82	-14.69	-14.06	-13.37	-12.08	Figure 5
ATT=30dB		-22.68	-23.98	-20.97	-17.82	-15.72	-14.54	-13.91	-13.28	-12.09	Figure 5	
ATT Accuracy	ATT Error	ATT=10dB	0.33	0.34	0.38	0.48	0.62	0.69	0.64	0.54	0.39	
		ATT=20dB	0.34	0.31	0.30	0.37	0.47	0.43	0.31	0.07	-0.19	
		ATT=30dB	0.64	0.66	0.67	0.80	0.96	0.82	0.85	0.65	0.46	
ATT Accuracy		±(0.25 +5.0% of attenuation state)					±(0.25+7.0% of attenuation state)					

BDA4700 SWR Improvement Matching Circuits for over 4GHz

Test Results (Graph)

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

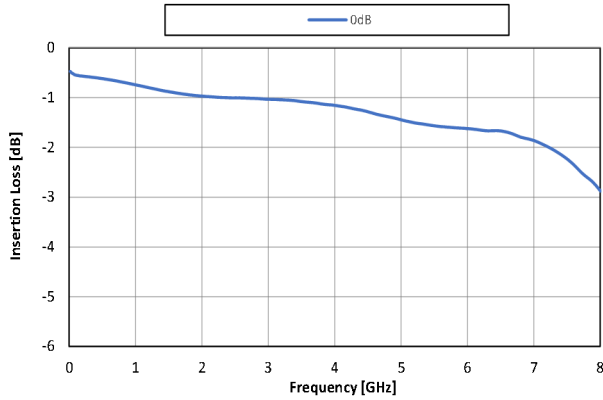


Figure 3. S21 (ATT = 0dB, 10dB, 20dB, 30dB) : Added 0.2pF Shunt

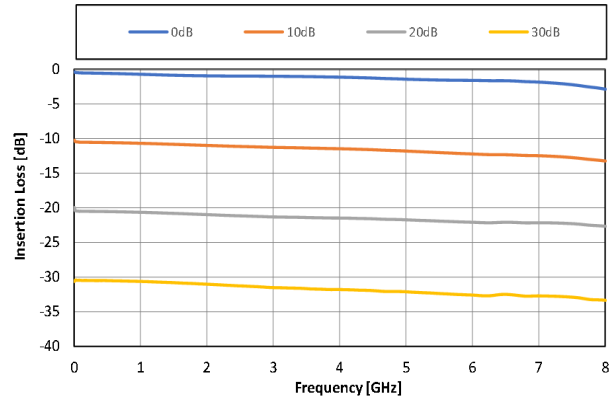


Figure 4. S11 (ATT = 0, 10, 20, 30dB) : Added 0.2pF Shunt.

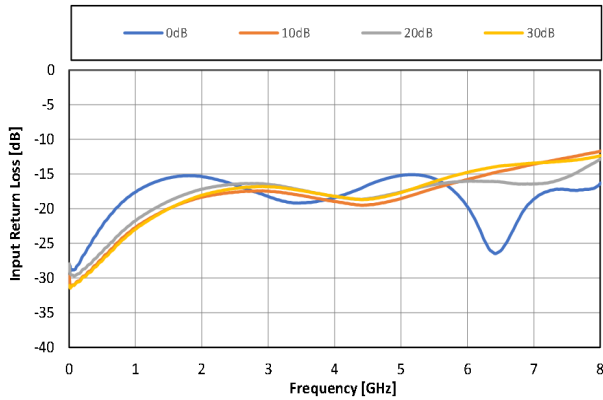


Figure 4-1. S11 : No matching, datasheet graph

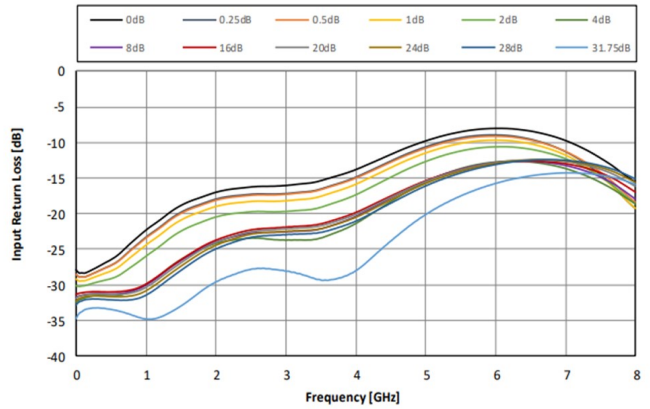


Figure 5. S22 (ATT = 0, 10, 20, 30dB) : Added 0.2pF Shunt.

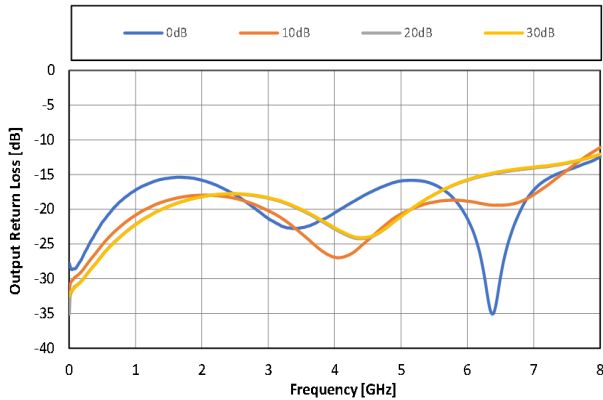


Figure 5-1. S22 : No matching state, datasheet graph

