采用 2SC5245A 的 RKE 用 434MHz 低噪音放大器

应用资料

ON Semiconductor®

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概要

该资料是关于用于RKE(Remote Keyless Entry) 434MHz低噪音放大器(LNA)的安森美半导体2SC5245A的说明。

2SC5245A采用3-pin面贴装封装, 是适于高频的高性能硅双极晶体管。有关2SC5245A的详细性能, 请参考产品的数据表。

调整评价板, 使之在RKE(434MHz)实现最佳性能。在此条件下评价板提供14dB的功率增益和1.45dB的噪音指数。

线路板使用标准的FR-4材料。

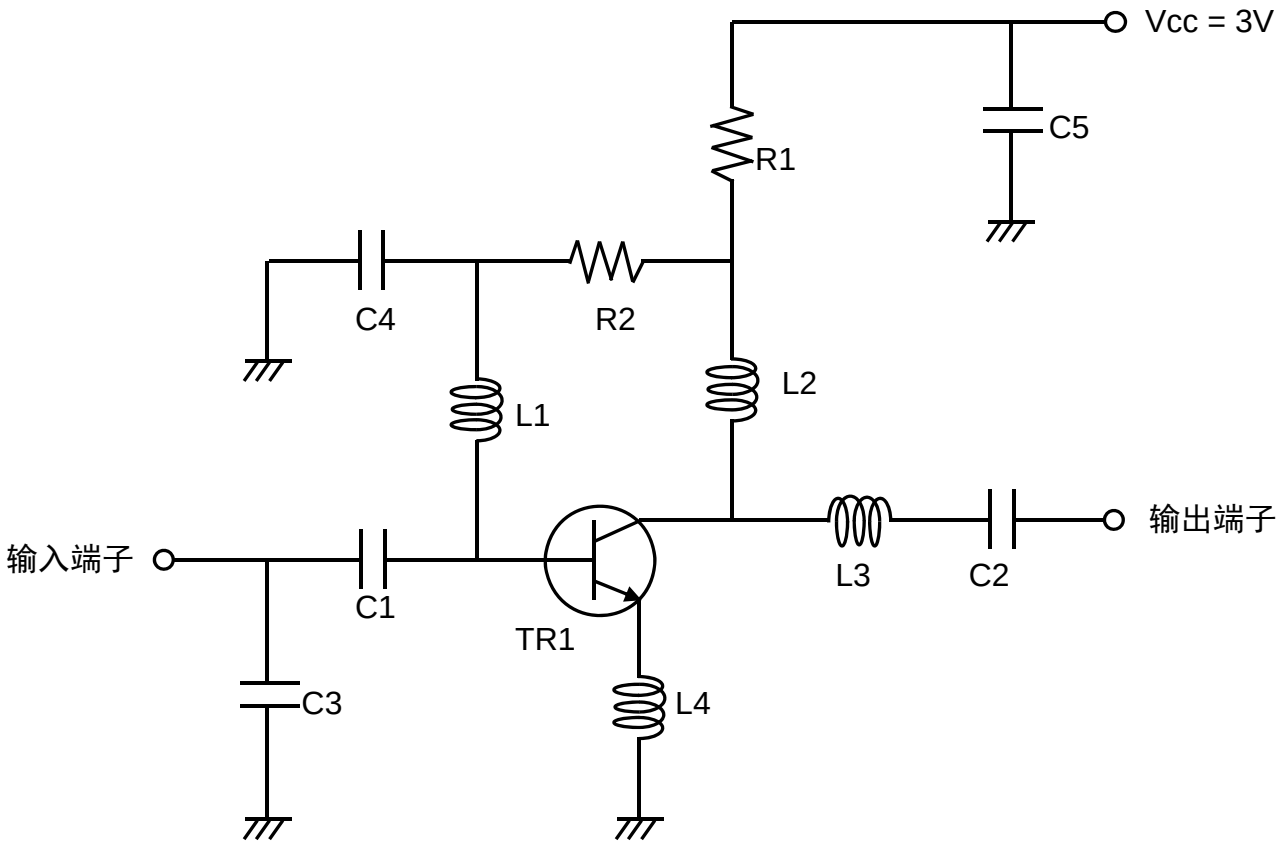
请注意:噪音指数没有扣除线路板和SMA连接器的损失。

■性能概要

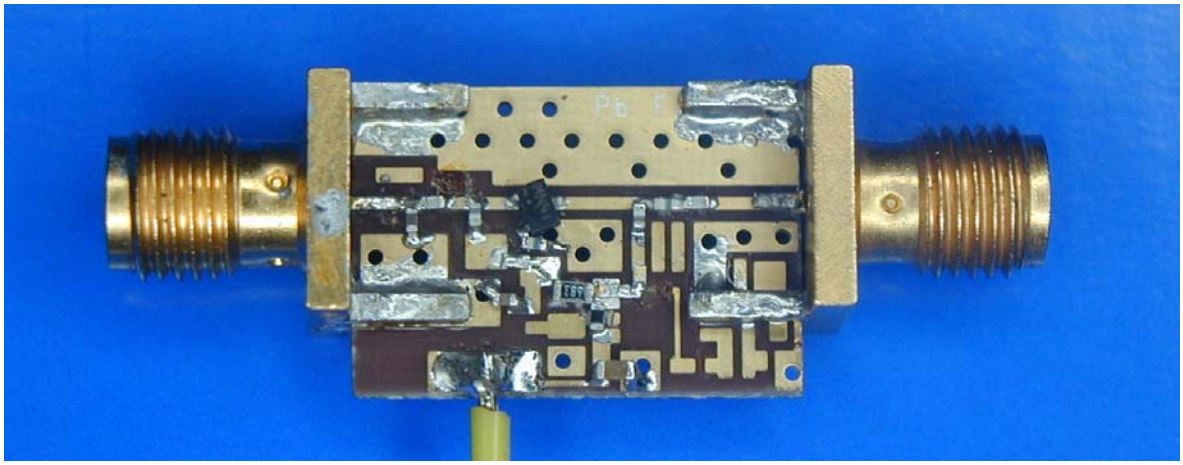
Ta = 25ºC，输入功率 = -40 dBm, Zo = 50 Ω

项目	记号	条件	结果	单位
电源电压	Vdd		3.0	V
电路电流	Idd		1.96	mA
功率增益	Gp	f = 434 MHz	14.0	dB
噪音指数	NF	f = 434 MHz	1.45	dB
输入传回损耗	RLin	f = 434 MHz	6.2	dB
输出传回损耗	RLout	f = 434 MHz	13.0	dB
隔离	ISL	f = 434 MHz	20.2	dB
1dB 增益压缩时输入功率	Pin1dB	f = 434 MHz	-20	dBm
输入交叉点	IIP3	f1 = 433 MHz f2 = 434 MHz Pin = -35 dBm	-10	dBm

■电路图



■评价板



■部品表

項目	記号	常数	製造会社/品番	尺寸
双极晶体管	TR1	2SC5245A	安森美半导体	SC-70
容量	C1	10 pF	村田製作所 / GRM155	1005
	C2	6 pF	村田製作所 / GRM155	1005
	C3	4 pF	村田製作所 / GRM155	1005
	C4	150 pF	村田製作所 / GRM155	1005
	C5	0.1 uF		1608
电阻	R1	470 Ω		1608
	R2	68 kΩ		1608
线圈	L1	22 uH	TDK / MLG1005S	1005
	L2	10 nH	TDK / MLG1005S	1005
	L3	39 nH	TDK / MLG1005S	1005
	L4	2.2 nH	TDK / MLG1005S	1005
基板		FR-4		19 x 12 mm

■测定结果

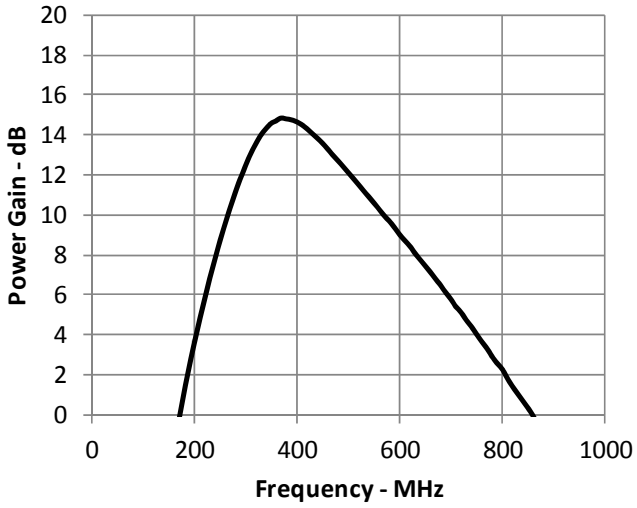


Figure 1 Power Gain vs. Frequency

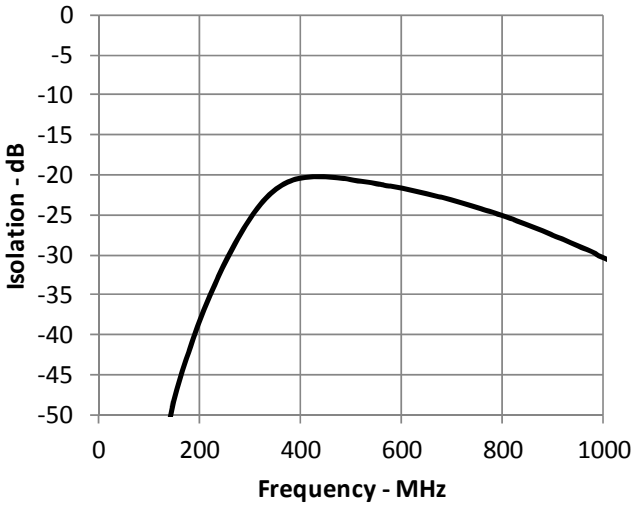


Figure 2 Isolation vs. Frequency

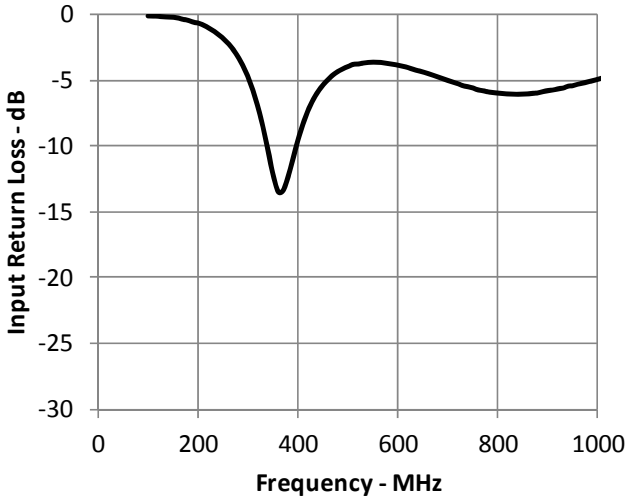


Figure 3 Input Return Loss vs. Frequency

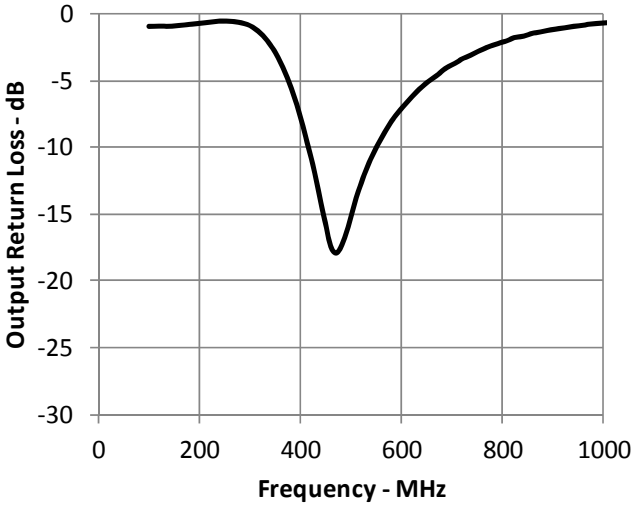


Figure 4 Output Return Loss vs. Frequency

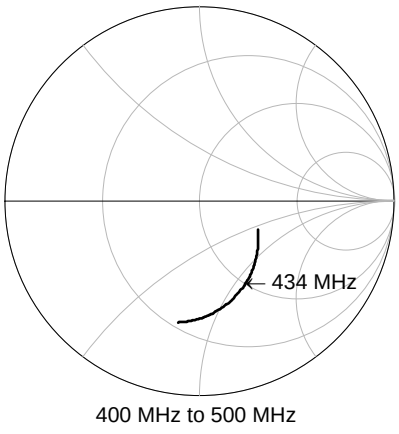


Figure 5 Smith Chart S11

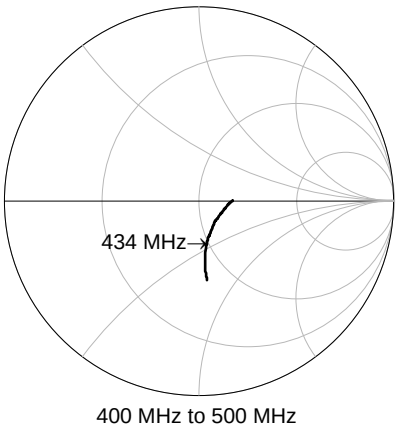


Figure 6 Smith Chart S22

■测定结果

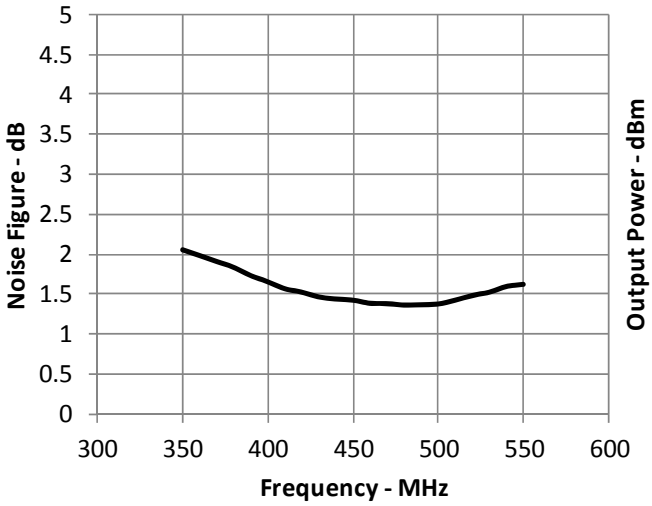


Figure 7 Noise Figure vs. Frequency

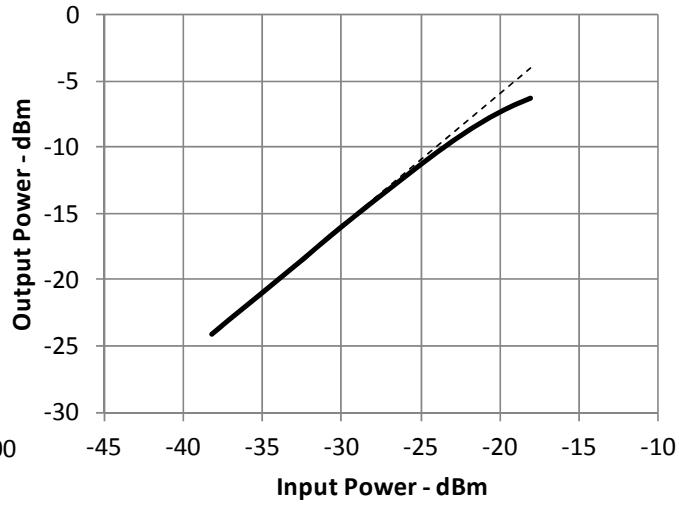


Figure 8 Gain 1dB Compression Point

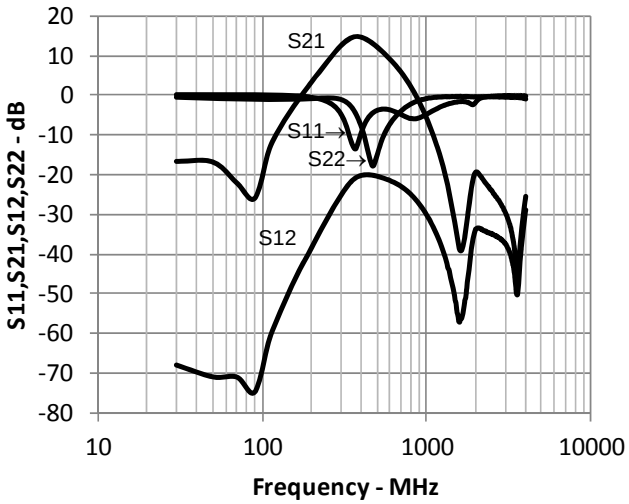


Figure 9 S11,S21,S12,S22 Wide Span

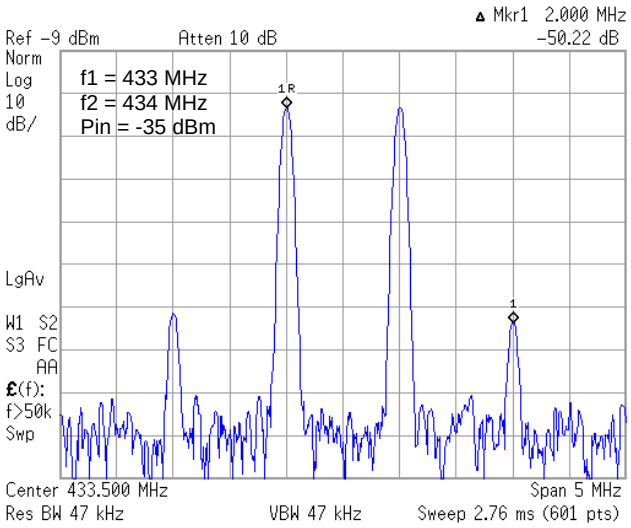


Figure 10 Input 3rd Order Intercept Point