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MBC13917 Evaluation Board Quick Start — 1900 MHz

INTRODUCTION

This evaluation board design demonstrates one possible design at 2.7 V that satisfies competing requirements for NF, IP3, gain, return losses and reverse isolation with unconditional stability. By changing any of the requirements, the performance for a particular parameter can be greatly improved to meet a particular spec requirement.

This circuit was designed to provide NF < 2.2 dB, S21 gain > 12 dB and S11 better than −10 dB S22 better than −10 dB at 1900 MHz.

Gain, NF and OIP3 can be improved by sacrificing stability and return losses.

Emitter inductance can be added to the board as an option for improved linearity.

NOTE: Tables 1 and 2 list measured parameters on three typical evaluation boards and are meant as a guide to the RF performance possible for this application circuit. Variations in matching component performance may result in variation in evaluation board performance results.

Table 1. Evaluation Board Measurements (1900 MHz, V_{CC} = 2.7 V, Frequency Spacing = 200 kHz)

Serial #	Input Power (dBm)	Output Power (dBm)	Power Gain (dB)	Output IP3 (dBm)	Input IP3 (dBm)	Output Ref P_{1dB} (dBm)	Input Ref P_{1dB} (dBm)	NF (dB)	I_{CC} (mA)
1	−30.00	−15.49	14.51	7.41	−7.1	−1.6	−16.1	1.67	4.93
2	−30.00	−15.21	14.79	7.99	−6.8	−1.2	−16.0	1.59	5.01
3	−30.00	−15.39	14.61	7.81	−6.8	−1.09	−15.7	1.62	4.99

Table 2. S-Parameters (1900 MHz, V_{CC} = 2.7 V)

Serial #	S11 (dB)	S21 (dB)	S12 (dB)	S22 (dB)
1	−10.02	14.46	−45.2	−9.97
2	−10.97	14.95	−46.1	−9.51
3	−10.81	14.54	−46.2	−9.17

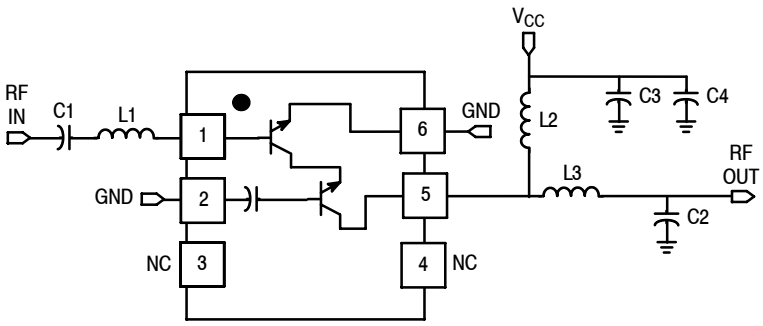

Figure 1. MBC13917 1900 MHz Schematic

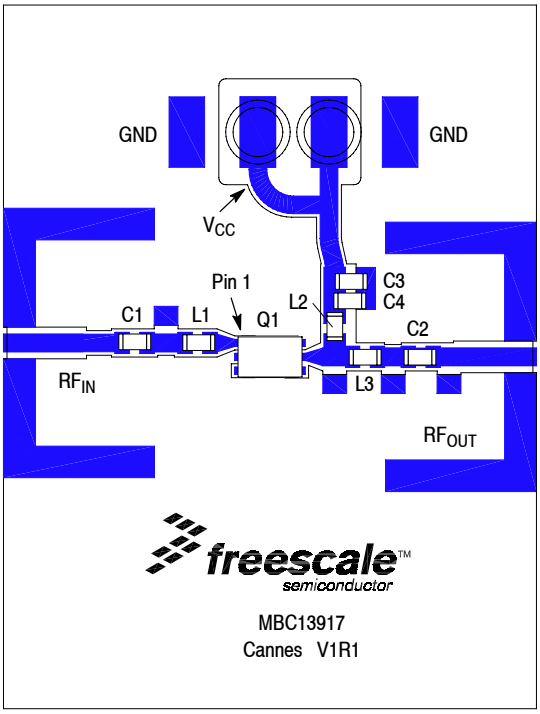

Figure 2. MBC13917 1900 MHz Evaluation Circuit Component Layout

Table 3. Evaluation Circuit Component Designations and Values

Component	Value	Case	Manufacturer	Comments
C1	3.3 pF	402	Murata	DC Block, Input match
C2	0.01 μF	402	Murata	Low freq bypass to improve IP3
C3	33 pF	402	Murata	RF bypass
C4	2.7 pF	402	Murata	DC Block, Output match
L1	3.3 nH	402	Murata	Input match
L2	10 nH	402	Murata	DC Feedthrough, Output match
L3	5.6 nH	402	Murata	Output match
Q1	MBC13917	MLP6	Freescale	SiGe cascode amp

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