

LTC5552

3GHz to 20GHz Microwave Mixer with Wideband DC to 6GHz IF

DESCRIPTION

Demonstration circuit 2668A is optimized for evaluation of the [LTC®5552](#) passive double-balanced mixer. Its RF port is broadband matched from 3GHz to 20GHz, and the internal LO amplifier, requiring only a 0dBm drive level, is broadband matched to 50Ω from 1GHz to 20GHz with 10dB Return Loss. The differential IF output is usable from DC to 6GHz. The LTC5552 can be used for upconverting and downconverting applications.

Design files for this circuit board are available at <http://www.linear.com/demo/DC2668A>

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ABSOLUTE MAXIMUM INPUTS

Supply Voltage (V_{CC})	4.0V
Enable Input Voltage (EN)	-0.3V to $V_{CC}+0.3V$
LO Input Power (1GHz to 20GHz)	10dBm
RF Power (3GHz to 20GHz)	20dBm
RF DC Voltage	$\pm 0.1V$
IF ⁺ /IF ⁻ Power (LF to 6GHz)	20dBm
IF ⁺ /IF ⁻ DC Voltage	$\pm 0.3V$
Operating Temperature Range (T_C)	-40°C to 105°C
Junction Temperature (T_J)	150°C
Storage Temperature Range	-65°C to 150°C

CAUTION: THIS PART IS SENSITIVE TO ELECTROSTATIC DISCHARGE (ESD). OBSERVE PROPER ESD PRECAUTIONS WHEN HANDLING THE LTC5552.

BOARD PHOTO

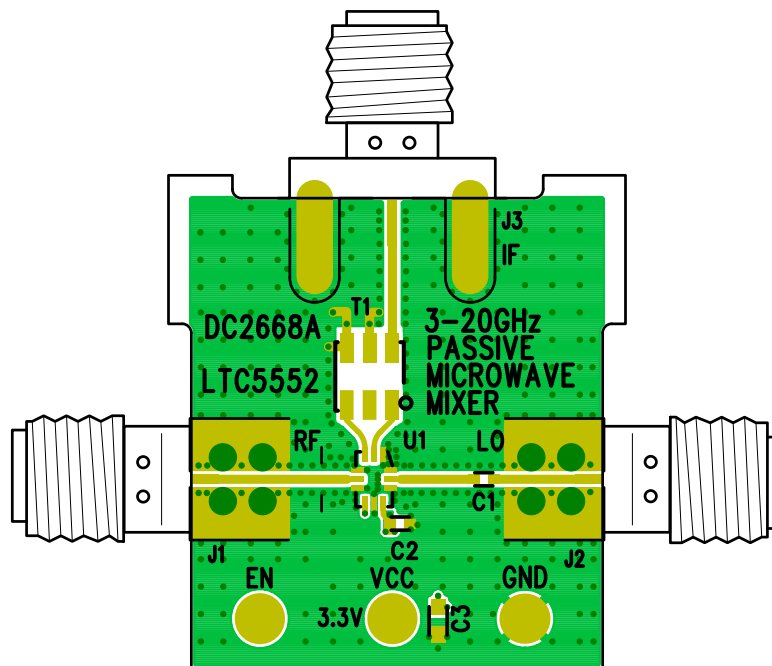


Figure 1. DC2668A

PROPER TEST SETUPS

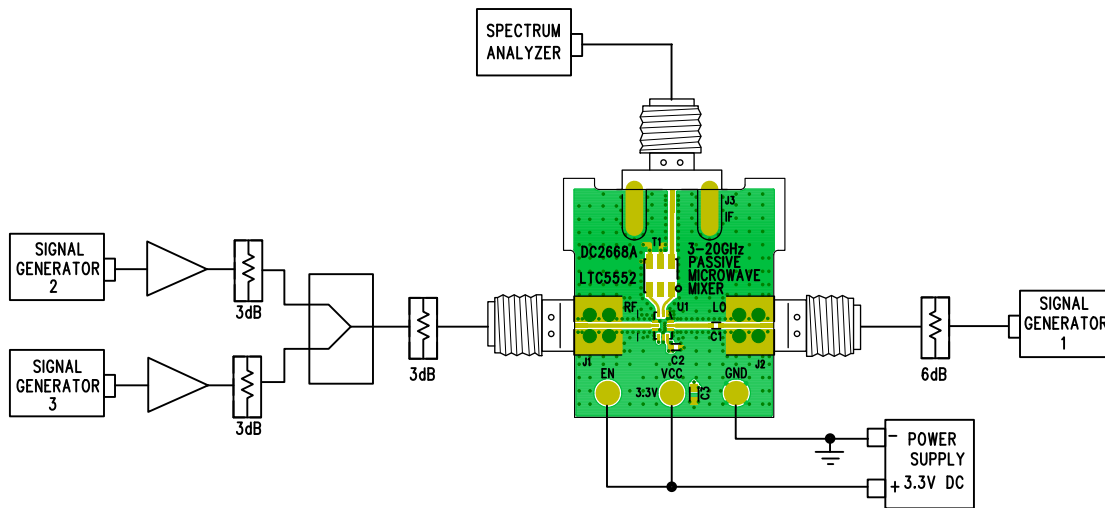


Figure 2. Test Setup for Downconverting Mixer Two-Tone Measurements

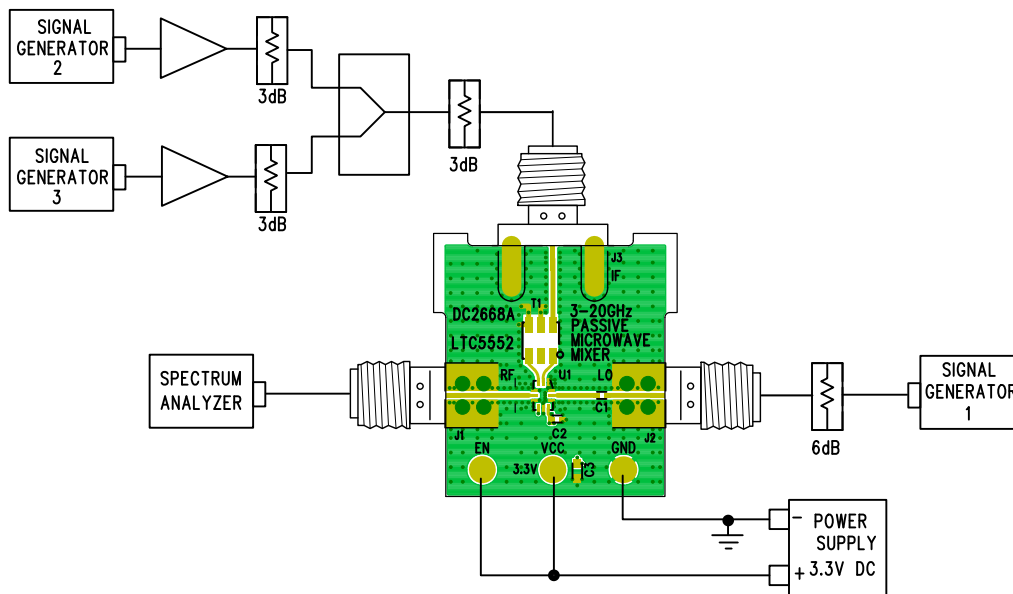


Figure 3. Test Setup for Upconverting Mixer Two-Tone Measurements

NOTES ON TEST EQUIPMENT SETUP

- High performance signal generators with low harmonic outputs should be used for 2-tone measurements. Otherwise, low-pass filters at the signal generator outputs should be used to suppress harmonics.
- High quality combiners should be used to present a broadband 50Ω termination on all ports as well as provide good port-to-port isolation. Adding attenuator pads further improves source isolation and helps prevent the signal generators from producing intermodulation products.
- Spectrum analyzers can produce significant internal distortion products if they are overdriven. Generally, spectrum analyzers are designed to operate at their best with about -30dBm to -40dBm at their input. The spectrum analyzer's input attenuation setting should be used to avoid saturating the instrument.
- Set the spectrum analyzer's input attenuation depending on the spectrum analyzer used.
- Before performing measurements on the DUT, the system performance should be evaluated to ensure that a clean input signal is obtained and that the spectrum analyzer's internal distortion is minimized.

QUICK START PROCEDURE

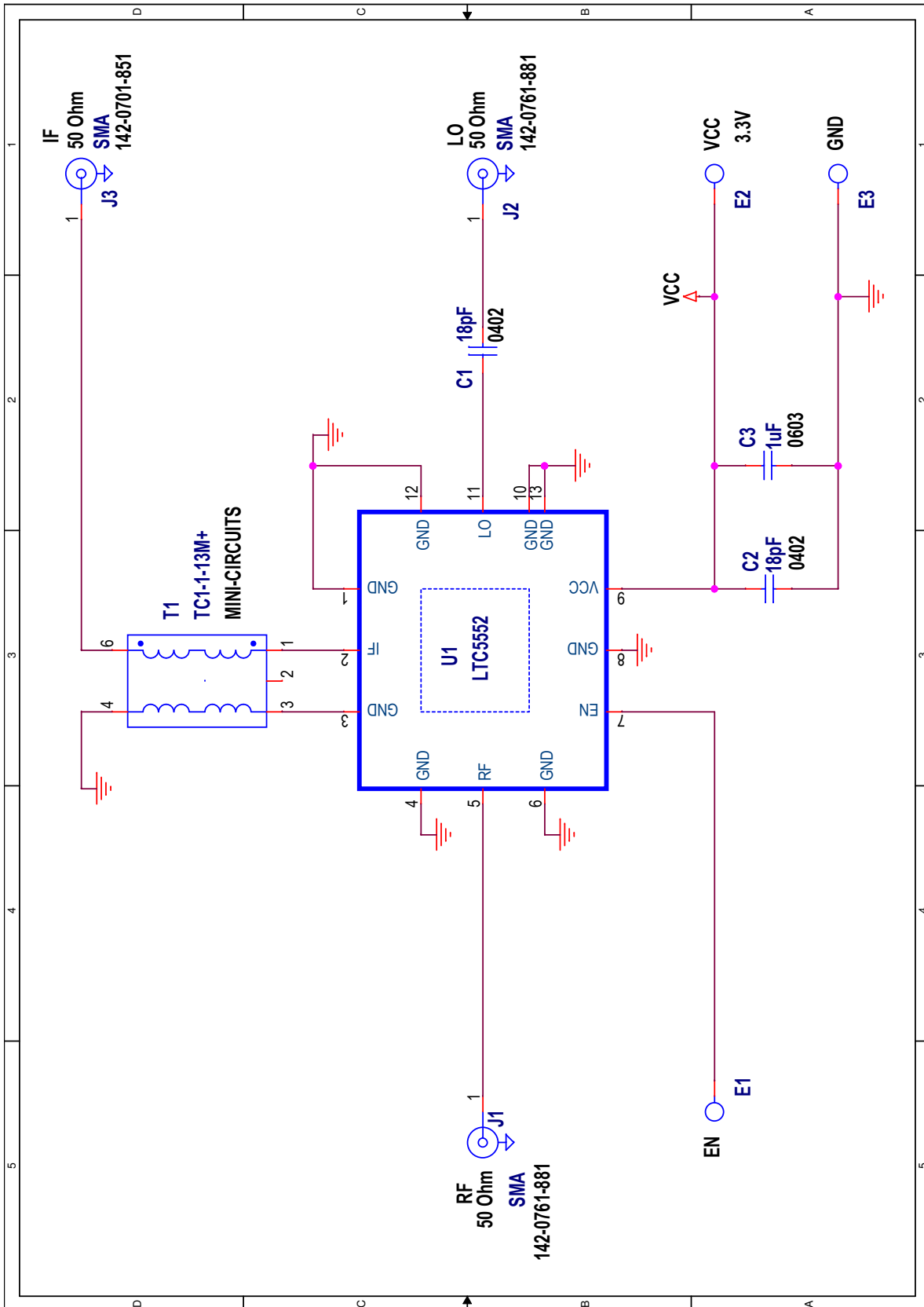
1. Connect all test equipment as shown in Figure 2.
2. Set the power supply output voltage to 3.3V and set the current limit to 200mA.
3. Connect the ground and V_{CC} turrets to the power supply.
BE SURE TO CONNECT THE V_{CC} TURRET BEFORE THE EN TURRET TO ENSURE THAT THE PART DOES NOT GET DAMAGED. ALSO, REMOVE POWER FROM EN TURRET BEFORE REMOVING POWER FROM THE V_{CC} TURRET.
4. Connect the EN turret to the power supply.
5. Set the LO signal generator to provide a 9560MHz CW signal at about 0dBm to the demo board's LO port.
6. Set the RF signal generators to provide one 9799MHz CW signal and one 9801MHz CW signal. The signals should be applied to the 2-way combiner. The output of the combiner should be applied to the demo board's RF input port. The two tones should be set to -5dBm each at the mixer's RF input port.
7. Set the spectrum analyzer's center frequency to 240MHz.
8. Perform various measurements (Conversion Gain, OIP3, LO leakage, etc.).

DEMO MANUAL DC2668A

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	C1	CAP, 18pF, COG, 10V, 2%, 0402	AVX, 0402ZK180GBSTR
2	1	C2	CAP, 18pF, COG, 50V, 1%, 0402	MURATA, GJM1555C1H180FB01
3	1	C3	CAP, 1μF, X7R, 10V, 10%, 0603	MURATA, GRM188R71A105KA61
4	3	E1-E3	TEST POINT, TURRET, 0.061" MTG. HOLE	MILL-MAX, 2308-2-00-80-00-00-07-0
5	2	J1, J2	CONN., SMA, 50Ω, EDGE-LAUNCH	E.F. JOHNSON, 142-0761-881
6	1	J3	CONN., SMA, 50Ω, EDGE-LAUNCH	E.F. JOHNSON, 142-0701-851
7	1	T1	XFMR., 1:1, 4.5-3000MHz	MINI-CIRCUITS, TC1-1-13M+
8	1	U1	I.C., LTC5552IUDB, QFN 12 PIN, 3mm × 2mm	LINEAR TECHNOLOGY, LTC5552IUDB#PBF

SCHEMATIC DIAGRAM



dc2668af

DEMO MANUAL DC2668A

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This notice contains important safety information about temperatures and voltages. For further safety concerns, please contact a LTC application engineer.

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