

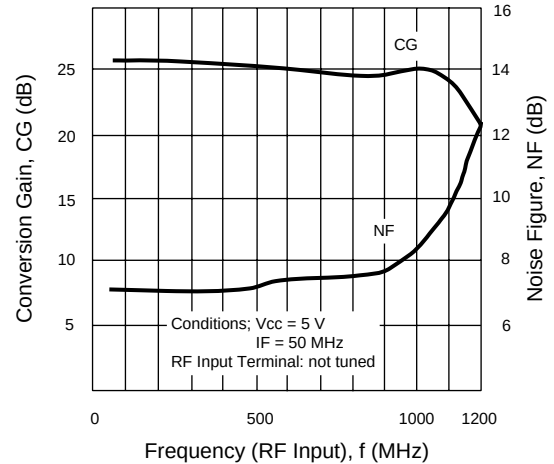
FEATURES

- **WIDE-BAND OPERATION:** DC to 890 MHz
- **SMALL PACKAGE**
- **DOUBLE BALANCED MIXER:**
Low Distortion
Low Oscillator Radiation
- **BALANCED AMPLIFIER FOR VOLTAGE CONTROLLED OSCILLATORS:**
Up to UHF Frequency
- **SINGLE ENDED PUSH-PULL IF AMPLIFIER:**
Constant Resistive Impedance
- **SWITCHABLE AS MIXER OR IF AMP**

DESCRIPTION

The UPC1687 is a silicon monolithic integrated circuit designed as a wide-band mixer/oscillator/IF amp suitable for UHF TV tuners. Device features include: 25 dB gain from 55 to 890 MHz and an output power of +10 dBm at the saturation point. The device is available in an 8 pin mini-flat package. The nominal output impedance of the UPC1687G is 75 ohms.

CONVERSION GAIN AND NOISE
FIGURE vs. FREQUENCY



ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

PART NUMBER PACKAGE OUTLINE			UPC1687G G08	TEST CIRCUIT
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	TYP	
I _{CC}	Circuit Current, no input signal	mA	38	Fig. 1
CG1	Conversion Gain (RF Input Terminal is not tuned) at IF = 50 MHz, RF = 55 to 890 MHz	dB	25	Fig. 1
CG2	Conversion Gain (RF Input Terminal is tuned) at IF = 50 MHz, RF = 55 MHz	dB	32	Fig. 4
	RF = 200 MHz	dB	32	Fig. 4
	RF = 500 MHz	dB	30	Fig. 4
	RF = 890 MHz	dB	28	Fig. 5
NF	Noise Figure at IF = 50 MHz, RF = 55 to 470 MHz	dB	8	Fig. 1 or Fig. 2
	RF = 470 to 890 MHz	dB	10	Fig. 3
CM	1% Cross modulation* at IF = 50 MHz, 75 Ω Open Terminal, RF = 55 to 470 MHz	dB μ	88	Fig. 1
	RF = 470 to 890 MHz	dB μ	88	Fig. 1
PSAT	Output Power (Saturation Point)	dBm	+10	Fig. 1
f _{STB}	Oscillator Frequency Stability at $V_{CC} \pm 10\%$ OSC f = 100 to 520 MHz	kHz	100	Fig. 2
	OSC f = 520 to 940 MHz	kHz	200	Fig. 3
V _{OSC}	V_{CC} at OSC Stop	V	2.3	Fig. 2
	OSC f = 100 to 520 MHz OSC f = 520 to 940 MHz	V	3.0	Fig. 3
VSWR	IF Output		1.3	Fig. 1

* Undesired = Desired $\pm 12\text{ MHz}$, 30% 100 kHz AM S/I Ratio = 46 dB

ABSOLUTE MAXIMUM RATINGS¹ (T_A = 25°C)

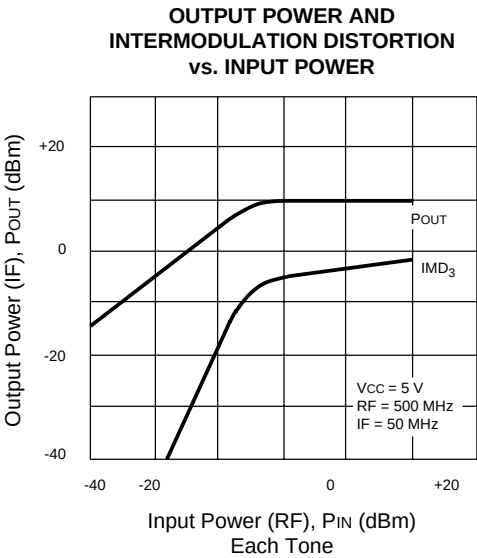
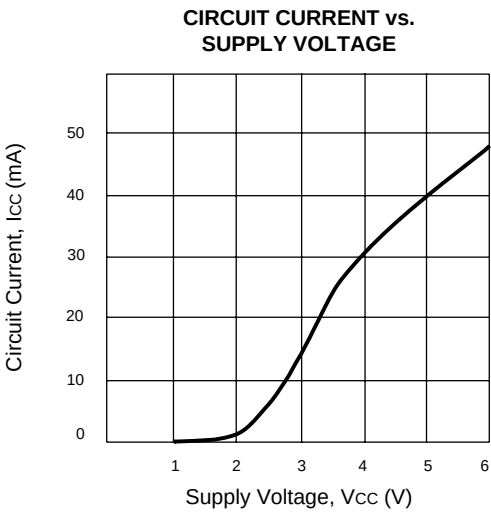
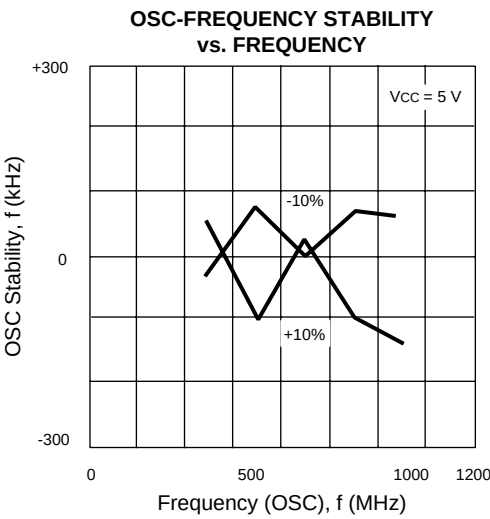
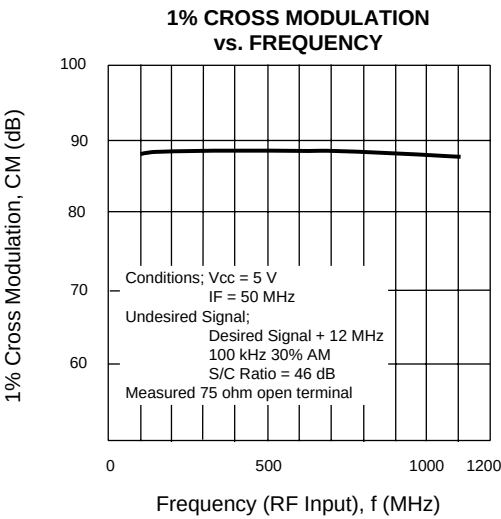
SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{CC}	Supply Voltage	V	6
P _T	Total Power Dissipation	mW	280 ²
T _{OP}	Operating Temperature	°C	-40 to +85
T _{STG}	Storage Temperature	°C	-65 to +150

- Notes:
1. Operation in excess of any one of these parameters may result in permanent damage.
 2. T_A = 85°C mounted on 50 x 50 x 1.6 (mm) PWB (glass-epoxy).

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

PART NUMBER PACKAGE OUTLINE			UPC1687G G08	TEST CIRCUIT
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	TYP	
G _s	Small Signal Gain of IF amplifier at f = 50 MHz	dB	29	Fig. 7
NF	Noise Figure of IF amplifier at f = 50 MHz	dB	7	Fig. 7
CM	1% Cross Modulation of IF amplifier (30% 100 kHz AM S/I Ratio = 46 dB) Desired = 50 MHz Undesired = 62 MHz	dBμ	87	Fig. 7

TYPICAL PERFORMANCE CURVES (T_A = 25°C)



TEST CIRCUITS

Figure 1

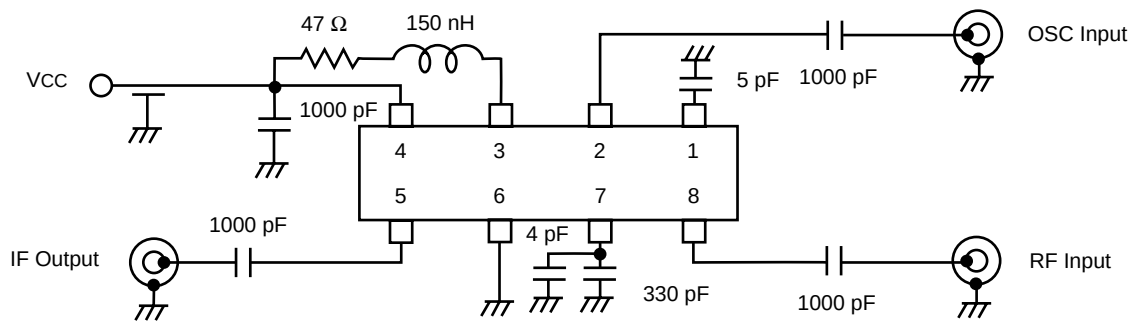


Figure 2

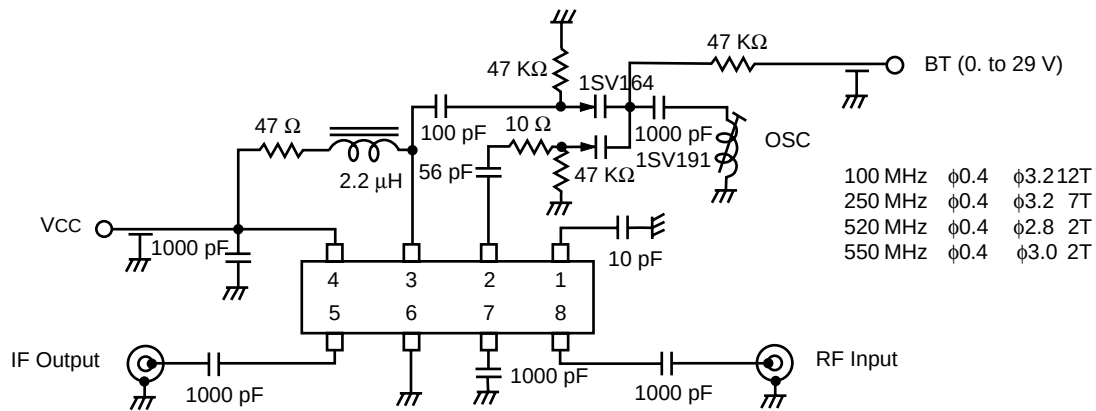
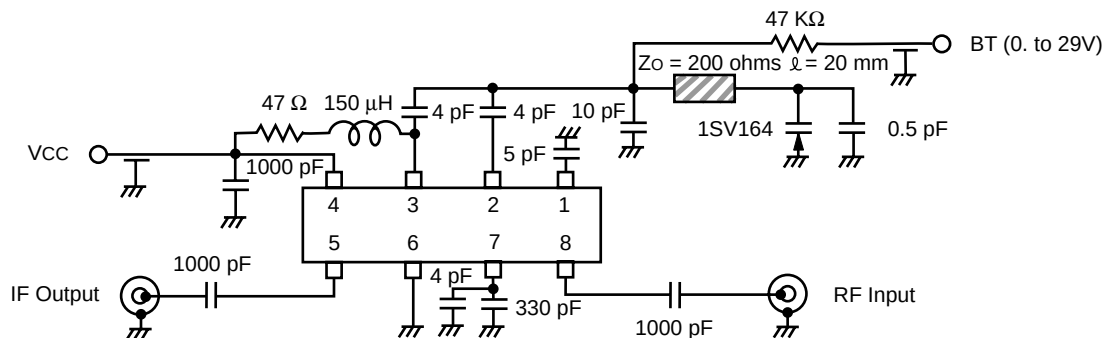


Figure 3



TEST CIRCUITS

Figure 4

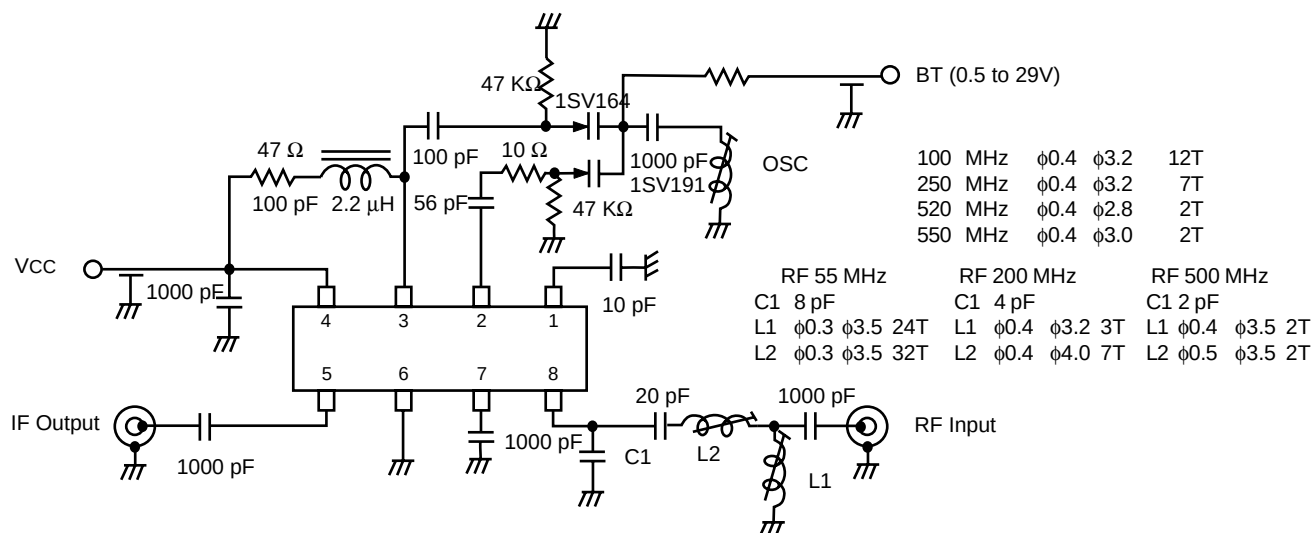


Figure 5

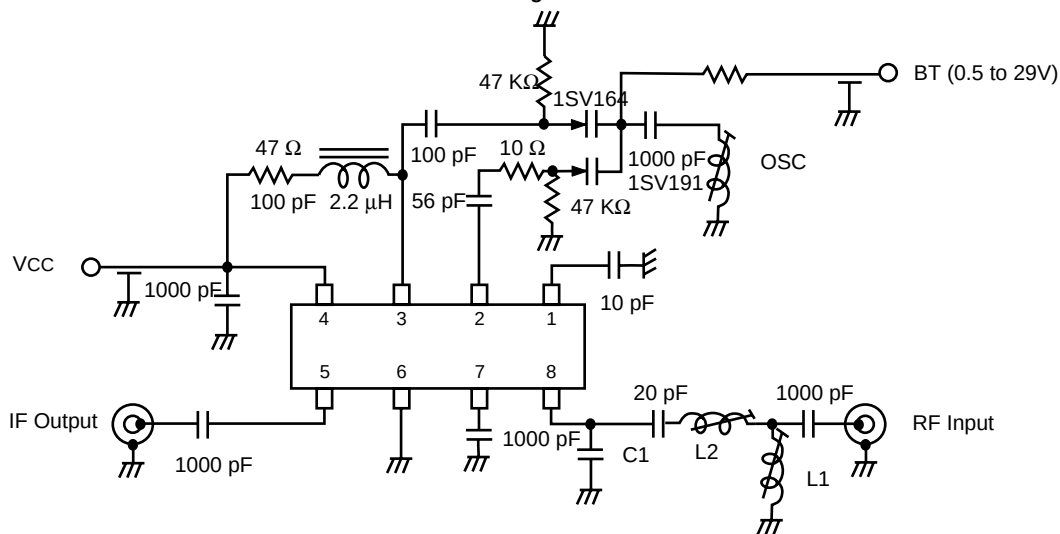
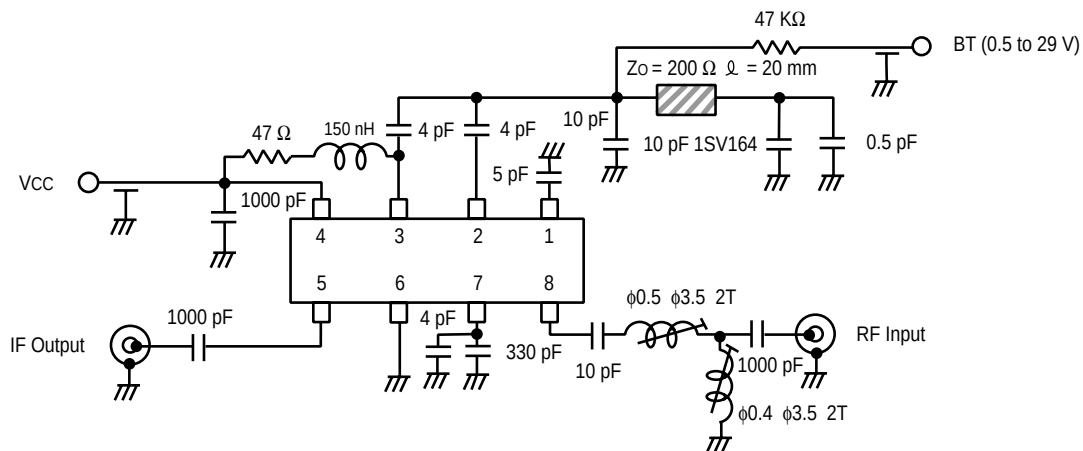


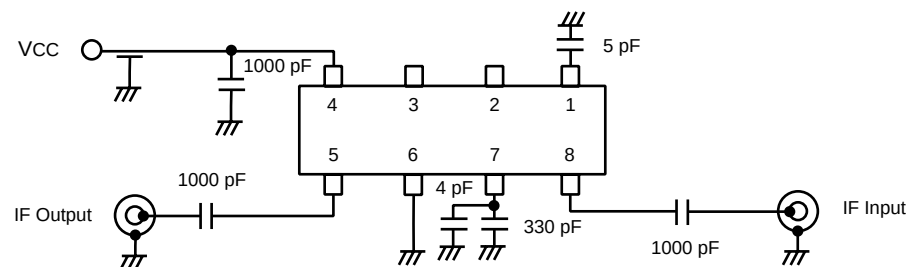
Figure 6*



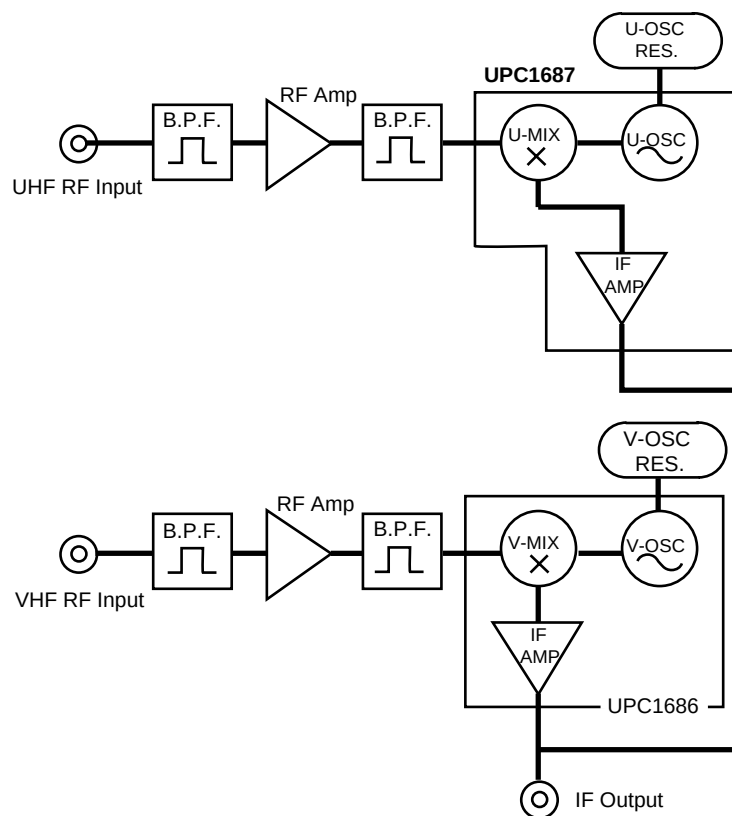
* This test circuit is used to match the device from 500 to 890 MHz. 500 MHz matching is shown.

TEST CIRCUITS

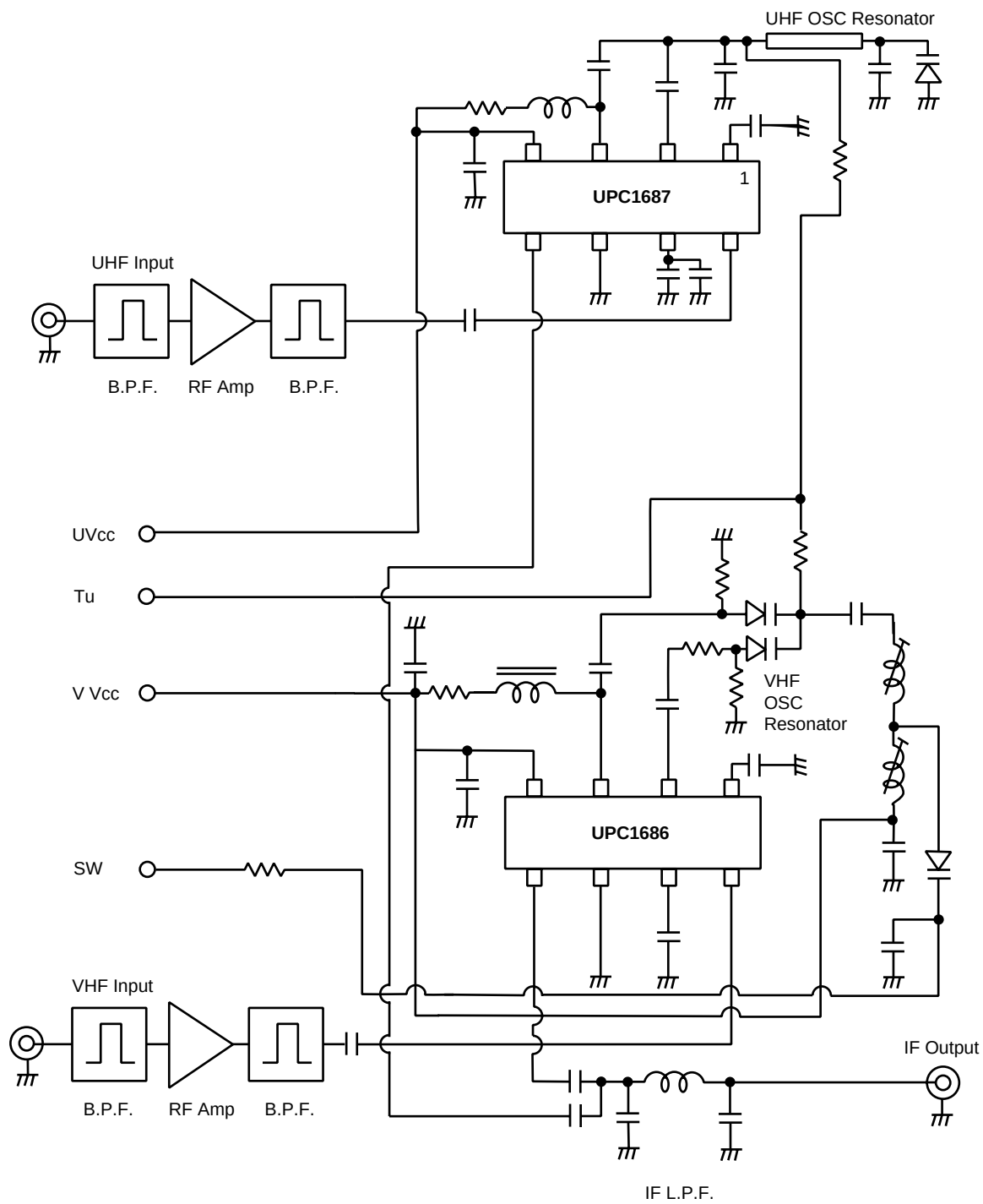
Figure 7



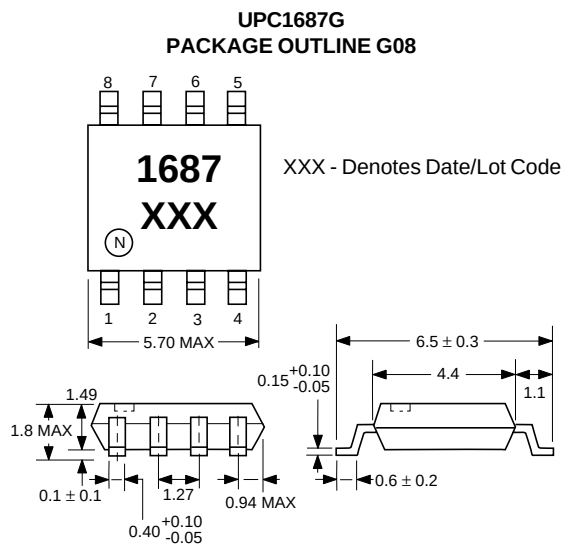
APPLICATION BLOCK DIAGRAM FOR T.V. TUNER



APPLICATION CIRCUIT FOR T.V. TUNER



OUTLINE DIMENSIONS (Units in mm)



PIN CONNECTION

1. OSC-Base (Bypass)
2. OSC-Base (Feedback)
3. OSC-Collector (Coupling)*
4. Vcc
5. IF OUT
6. GND
7. RF IN2 (Bypass)
8. RF IN1

Note:

All dimensions are typical unless otherwise specified.

ORDERING INFORMATION

PART NUMBER	QUANTITY
UPC1687G-E1	2500/REEL

Note:

Embossed Tape, 12 mm wide. Pin indicates pull-out direction of tape.

EQUIVALENT CIRCUIT

