NEC

900 MHz MIXER, OSCILLATOR SILICON MMIC

UPC1685G

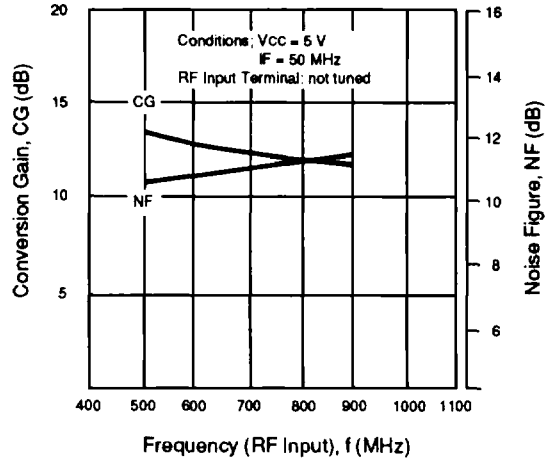
FEATURES

- **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

DESCRIPTION

The UPC1685 is a silicon monolithic integrated circuit designed as a wide-band mixer/oscillator suitable for TV/VTR tuners up to 890 MHz. Device features include, 11 dB gain from 55 to 890 MHz and an output power of -2 dBm at the saturation point. The device is available in: an 8 pin mini-flat package. The UPC1685G output impedance is the collector of one side of a balanced amplifier pair and operates best into a high impedance load. See internal schematic for details.

CONVERSION GAIN AND NOISE FIGURE vs. FREQUENCY



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ELECTRICAL CHARACTERISTICS (T_A = 25°C)

PART NUMBER / PACKAGE OUTLINE			UPC1685G G08	TEST
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	TYP	CIRCUIT
I_{CC}	Circuit Current, no input signal	mA	32	Fig. 1
CG1	Conversion Gain (RF Input Terminal is not tuned) at IF = 50 MHz, RF = 55 to 890 MHz	dB	11	Fig. 1
CG2	Conversion Gain (RF Input Terminal is tuned) at			
	IF = 50 MHz, RF = 55 MHz	dB	18	Fig. 4
	RF = 200 MHz	dB	18	Fig. 4
	RF = 500 MHz	dB	16	Fig. 4
	RF = 890 MHz	dB	14	Fig. 5
NF	Noise Figure at IF = 50 MHz,			Fig. 1 or
	RF = 55 to 470 MHz	dB	11.5	Fig. 2
	RF = 470 to 890 MHz	dB	12	Fig. 3
CM	Cross modulation* at IF = 50 MHz, 75 Ω Open Terminal,			
	RF = 55 to 470 MHz	dBμ	86	Fig. 1
	RF = 470 to 890 MHz	dBμ	86	Fig. 1
P_{SAT}	Output Power (Saturation Point)	dBm	-2	Fig. 1
f_{STB}	Oscillator Frequency Stability at V_{CC} ± 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			
	OSC f = 100 to 520 MHz	V	2.3	Fig. 2
	OSC f = 520 to 940 MHz	V	3.0	Fig. 3
VSWR	IF Output Power		1.3	Fig. 1

* Undesired = Desired ± 12 MHz, 30% 100 kHz AM S/I Ratio = 46

ABSOLUTE MAXIMUM RATINGS[1] (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V_{CC}	Supply Voltage	V	6
P_T	Total Power Dissipation[2]	mW	280
T_{OP}	Operating Temperature	°C	-40 to +85
T_{STG}	Storage Temperature	°C	-65 to +150

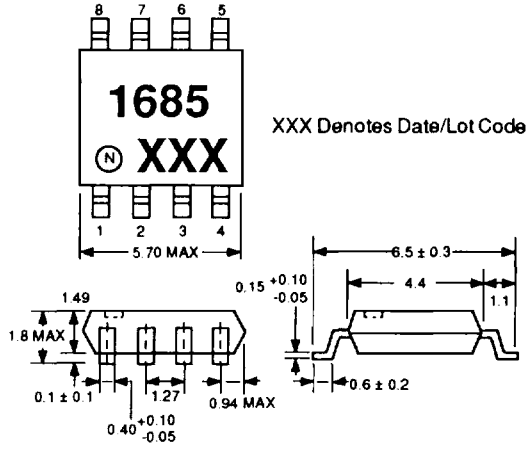
Notes:
1. Operation in excess of any one of these parameters may result in permanent damage.
2. T_A = 85° C mounted on 50 x 50 x 1.6 (mm) PWB (glass-epoxy).

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

PART NUMBER PACKAGE OUTLINE			UPC1685G G08	TEST CIRCUIT
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	TYP	
Gs	Small Signal Gain of IF amplifier at f = 50 MHz	dB	15	Fig.7
NF	Noise Figure of IF amplifier at f = 50 MHz	dB	11	Fig. 7
CM	1% Cross Modulation (30% 100 kHz AM S/I Ratio = 46 dB) Desired = 50 MHz Undesired = 62 MHz	dBμ	86	Fig. 7

OUTLINE DIMENSIONS (Units in mm)

UPC1685G
PACKAGE OUTLINE G08



PIN CONNECTION
1. OSC-Base (Bypass)
2. OSC-Base (Feedback)
3. OSC-Collector (Coupling)
4. V_{CC}
5. IF OUT
6. GND
7. RF IN2 (Bypass)
8. RF IN1

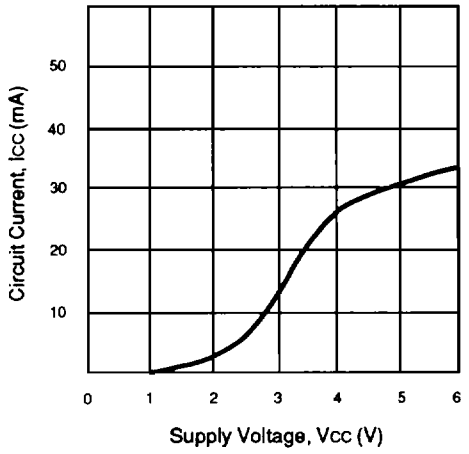
Note:
All dimensions are typical unless otherwise specified.

ORDERING INFORMATION

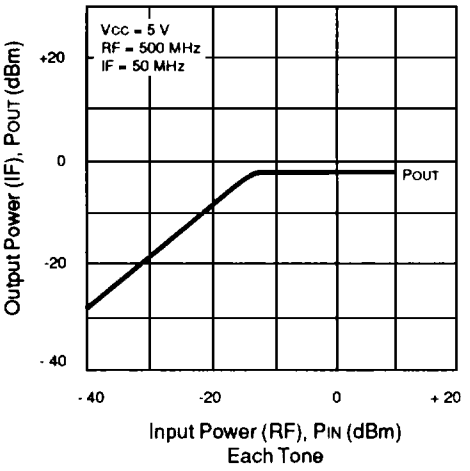
PART NUMBER	QUANTITY
UPC1685G-E1	2500/REEL

TYPICAL PERFORMANCE CURVES (T_A = 25°C)

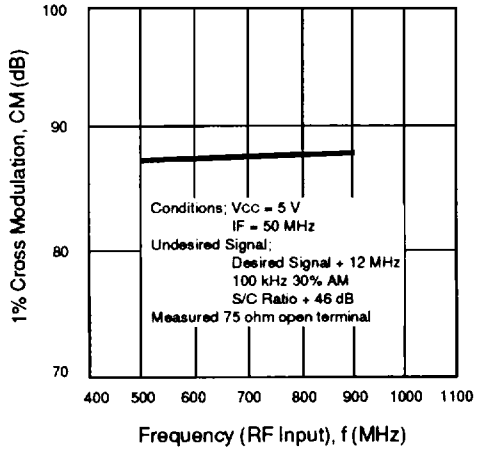
CIRCUIT CURRENT vs. SUPPLY VOLTAGE



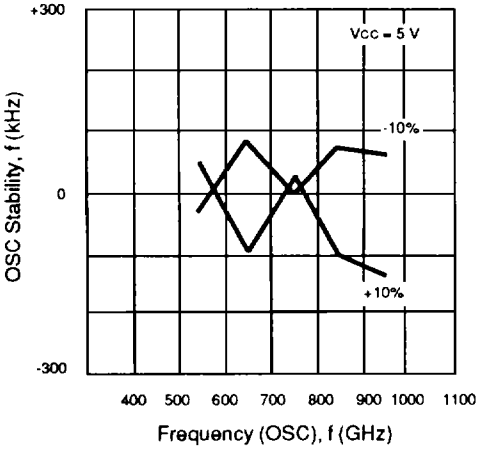
OUTPUT POWER vs. INPUT POWER



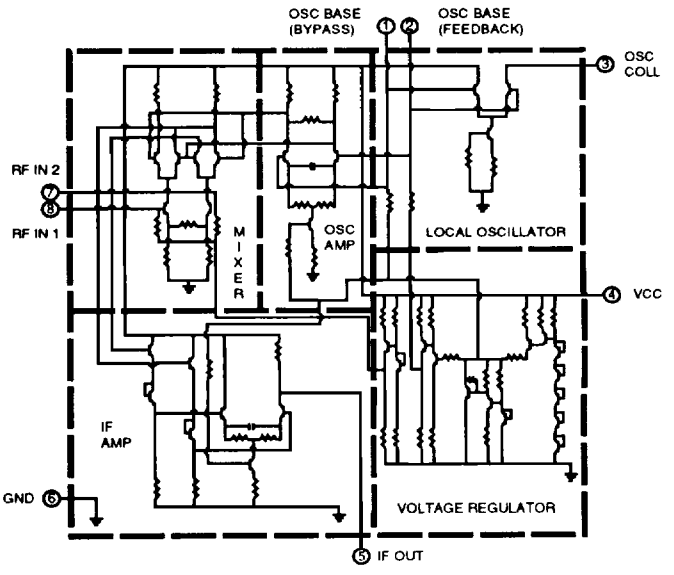
1% CROSS MODULATION vs. FREQUENCY



OSC-FREQUENCY STABILITY vs. FREQUENCY



EQUIVALENT CIRCUIT



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TEST CIRCUITS

Figure 1

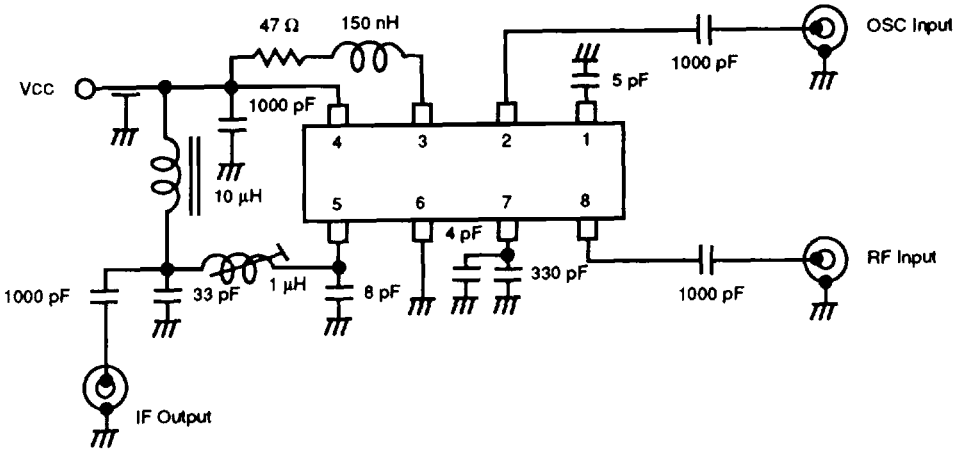


Figure 2

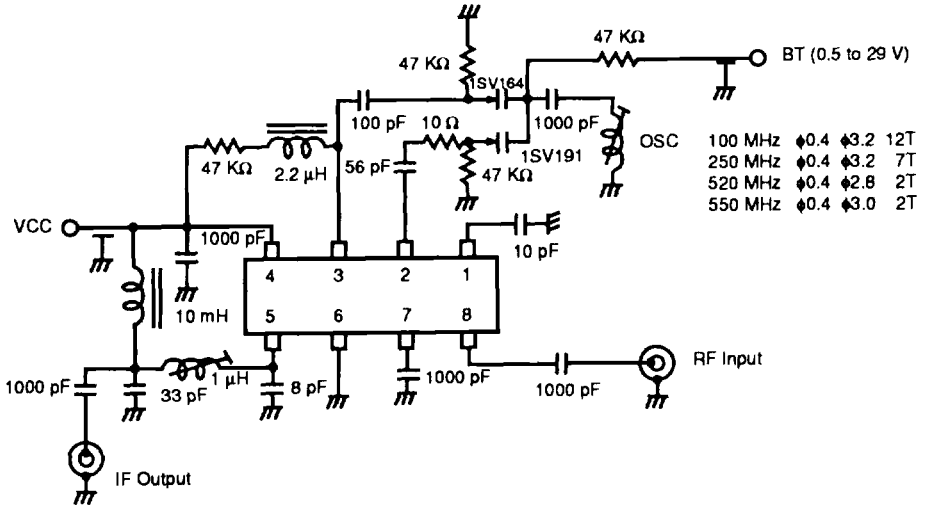
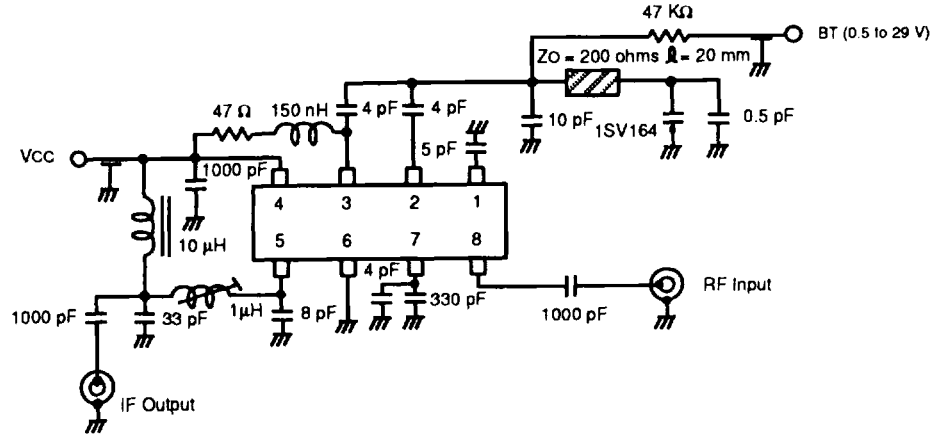


Figure 3



TEST CIRCUITS

Figure 4

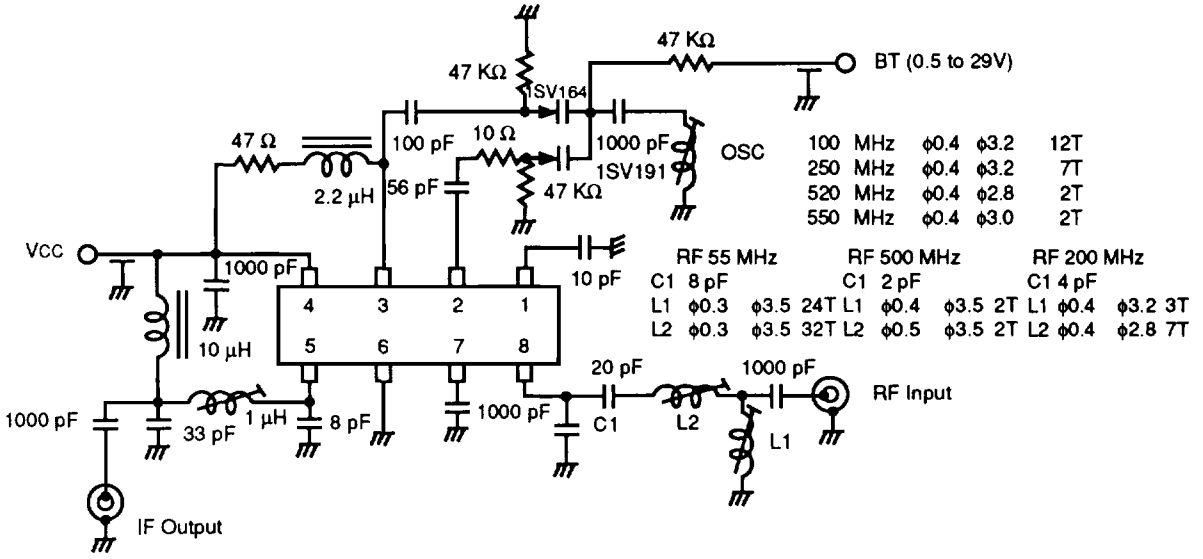


Figure 5

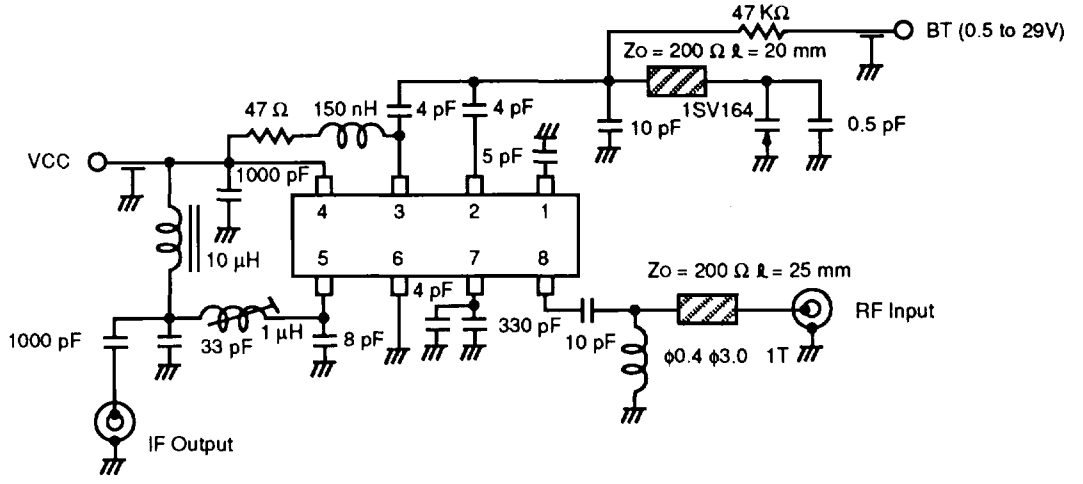
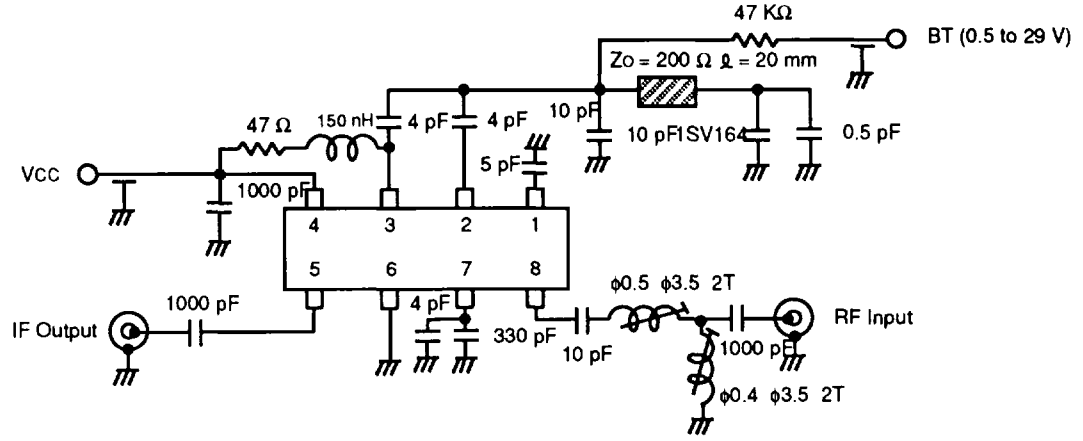


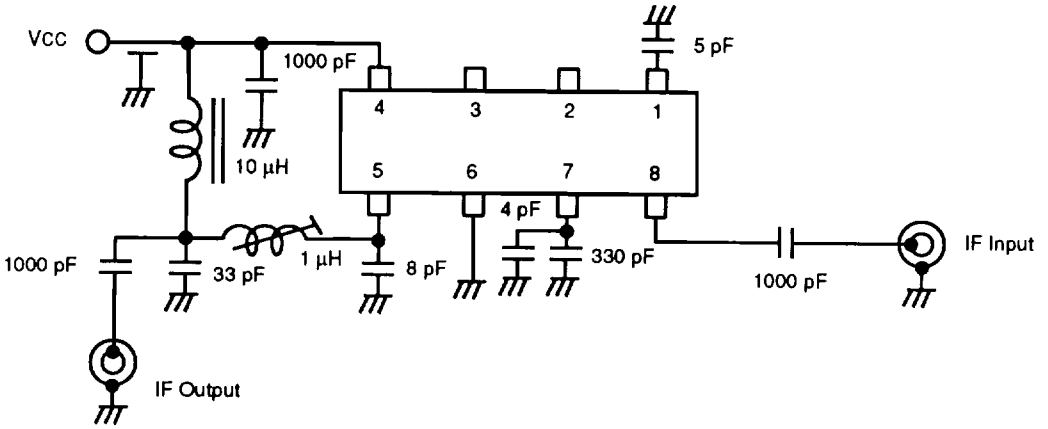
Figure 6*



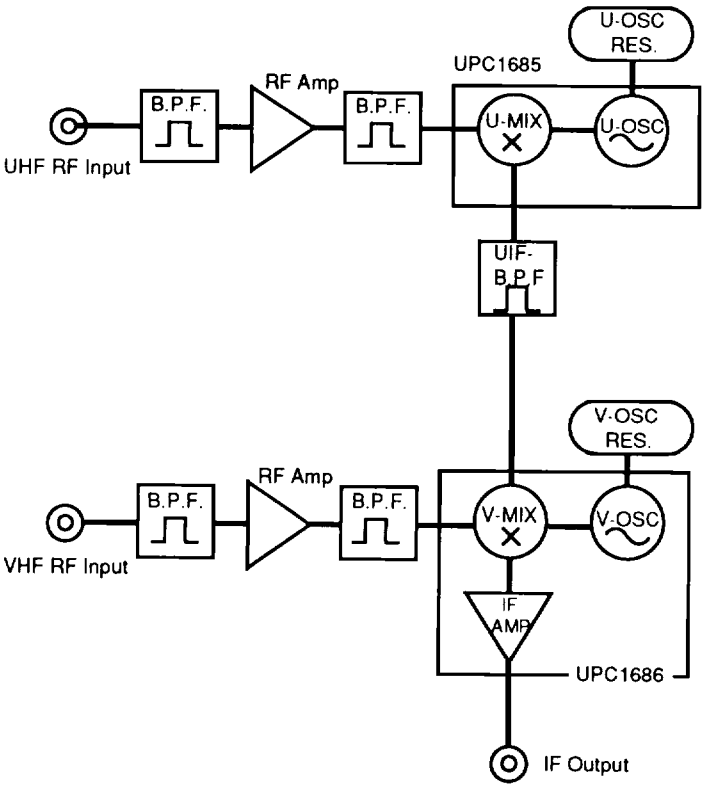
* This test circuit is used to match the device from 500 to 890 MHz. 500 MHz matching is shown.

TEST CIRCUITS

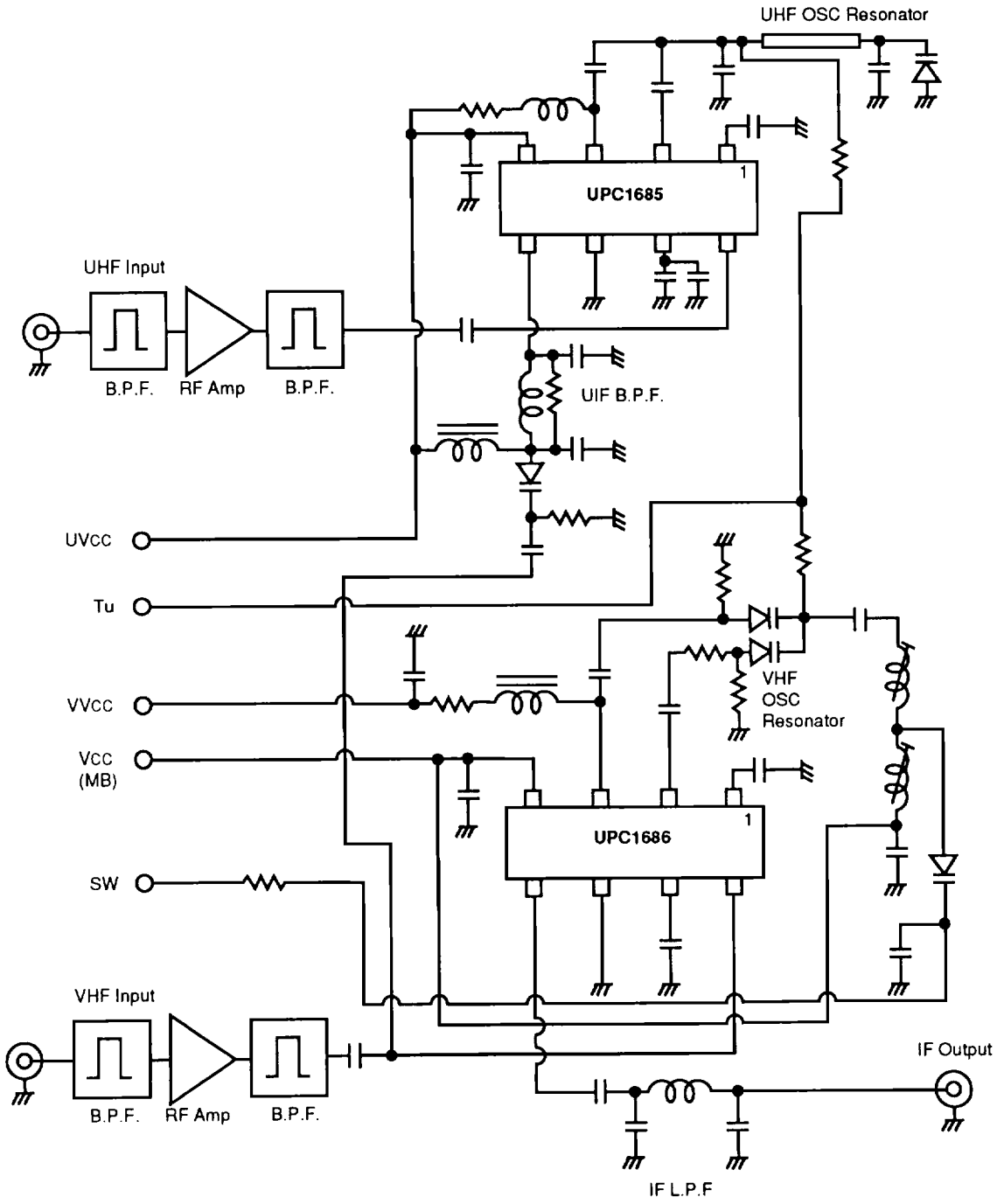
Figure 7



APPLICATION BLOCK DIAGRAM FOR T.V. TUNER



APPLICATION CIRCUIT FOR T.V. TUNER



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