

TA1281FN

UHF/VHF TUNER IC

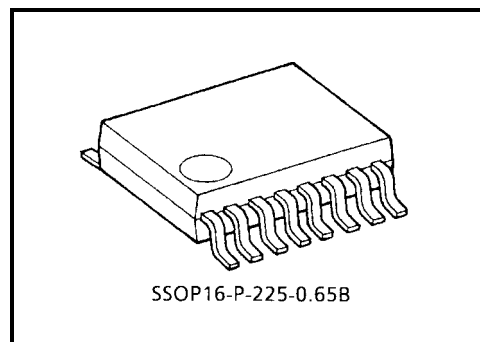
The TA1281FN is TV tuner ICs which integrate on a single chip IF amp, a mixer/oscillator for VHF band and cable TV, together with a mixer/oscillator for UHF band.

Supply voltage of 5 V helps lower power dissipation from the set. Compact 16-pin SSOP makes the tuner more compact.

Features

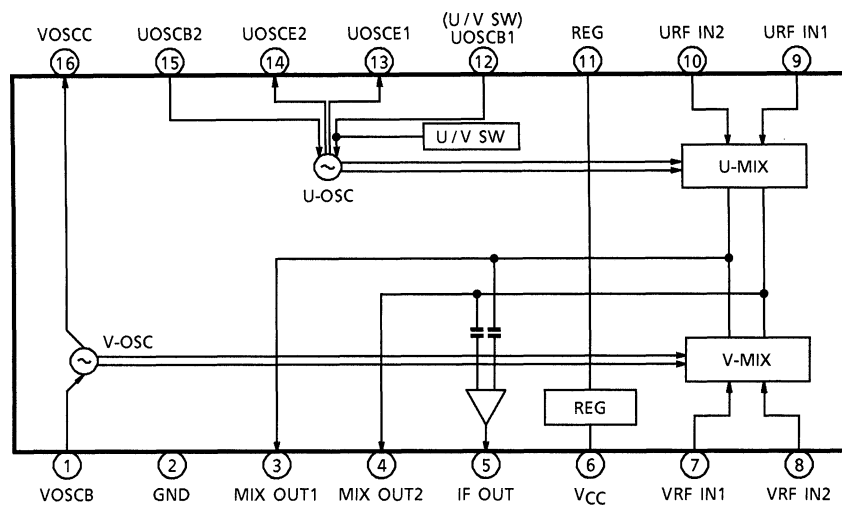
- Supply voltage: 5 V
- VHF, CATV bands: MIX · OSC
- UHF band: MIX · OSC
- Built-in IF amp
- IF unbalanced output
- Low power dissipation

Note: These devices are easy damaged by high static voltage or electric fields. In regards to this, please handle with care.



Weight: 0.07 g (typ.)

Block Diagram



Terminal Function

Pin No.	Pin Name	Function	Interface
1 16	VHF oscillator	VHF oscillator. To prevent abnormal oscillation, connect a resistor between pin 1 and the external capacitor.	
2	GND	GND	—
3 4	MIX output	Mixer output. For tuning, connect a tank circuit between pins 3 and 4.	
5	IF output	IF output. Output impedance : 75 Ω	
6	VCC	VCC	—
7 8	VHF input	VHF-RF input. Normally, ground pin 7 to AC using a capacitor and input to pin 8.	
9 10	UHF input	UHF-RF input. Either apply balanced input to pins 9 and 10 or ground pin 10 to AC and input to pin 9.	
11	REG	Regulator output.	

Pin No.	Pin Name	Function	Interface
12 13 14 15	UHF oscillator	<p>UHF oscillator.</p> <p>Pin 12 uses both as band switch. Connecting pin 12 to V_{CC} via 22 kΩ sets to UHF ; connecting pin 12 to GND sets to VHF. To use VHF SW voltage open rather than GND, connect a resistor of around 10 kΩ.</p> <p>Changing capacitor of 6pF connected to pins 12 and 15 of test circuit 2 varies the oscillation frequency range. Be careful not to set the constant too large, because abnormal oscillation may occur.</p>	

Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Power supply voltage	V_{CC}	6.5	V
Power dissipation	P_D	568	mW
Operating temperature	T_{opr}	-20 to 85	°C
Storage temperature	T_{stg}	-55 to 150	°C

Note: When using the device at above Ta = 25°C, decrease the power 4.6 mW for each increase of 1°C.

Operating Supply Voltage

Pin No.	Symbol	Min	Typ.	Max	Unit
6	V_{CC}	4.5	5.0	5.5	V

Electrical Characteristics

DC Characteristics (unless otherwise specified, $V_{CC} = 5V$, $T_a = 25^\circ C$)

Characteristics		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Power supply and current for VHF		I_{CC-V}	1	—	21	29	36	mA
Power supply and current for UHF		I_{CC-U}		—	22	30	38	
Terminal voltage (*1)	Pin 1 for VHF	V1-V	1	—	1.8	2.1	2.5	V
	Pin 1 for UHF	V1-U		—	2.0	2.3	2.7	
	Pin 3 for VHF	V3-V		—	3.5	3.8	4.2	
	Pin 3 for UHF	V3-U		—	3.4	3.7	4.1	
	Pin 4 for VHF	V4-V		—	3.5	3.8	4.2	
	Pin 4 for UHF	V4-U		—	3.4	3.7	4.1	
	Pin 5 for VHF	V5-V		—	1.8	2.1	2.5	
	Pin 5 for UHF	V5-U		—	1.8	2.1	2.5	
	Pin 7 for VHF	V7-V		—	1.3	1.6	2.0	
	Pin 7 for UHF	V7-U		—	1.4	1.7	2.1	
	Pin 8 for VHF	V8-V		—	1.3	1.6	2.0	
	Pin 8 for UHF	V8-U		—	1.4	1.7	2.1	
	Pin 9 for VHF	V9-V		—	1.4	1.7	2.1	
	Pin 9 for UHF	V9-U		—	1.3	1.6	2.0	
	Pin 10 for VHF	V10-V		—	1.4	1.7	2.1	
	Pin 10 for UHF	V10-U		—	1.3	1.6	2.0	
	Pin 11 for VHF	V11-V		—	3.9	4.1	4.3	
	Pin 11 for UHF	V11-U		—	3.9	4.1	4.3	
	Pin 12 for VHF	V12-V		—		0		
	Pin 12 for UHF	V12-U		—	1.8	2.1	2.5	
	Pin 13 for VHF	V13-V		—		0		
	Pin 13 for UHF	V13-U		—	1.0	1.3	1.7	
	Pin 14 for VHF	V14-V		—	1.5	1.8	2.2	
	Pin 14 for UHF	V14-U		—	1.0	1.3	1.7	
	Pin 15 for VHF	V15-V		—	2.1	2.4	2.7	
	Pin 15 for UHF	V15-U		—	1.8	2.1	2.5	
	Pin 16 for VHF	V16-V		—	3.5	3.8	4.2	
	Pin 16 for UHF	V16-U		—		5.0		

*1 : Upper : VHF mode
 Lower : UHF mode

AC Characteristics (unless otherwise specified, $V_{CC} = 5\text{ V}$, $T_a = 25^\circ\text{C}$)

No.	Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
1	Conversion gain	CG	2	VHF-L	18	21	24	dB
				VHF-H	16	21	23	
				UHF	19	24	27	
2	Noise figure	NF	2	VHF-L	—	10.5	11.5	dB
				VHF-H	—	12.5	14.5	
				UHF	—	11.0	13.0	
3	IF out power level	IFp	2	VHF-L	5	7	—	dBmW
				VHF-H	5	7	—	
				UHF	5	7	—	
4	Conversion gain shift	CGs	2	(Note 1) VHF-L	—	—	± 1.0	dB
				(Note 1) VHF-H	—	—	± 1.0	
				(Note 1) UHF	—	—	± 1.0	
5	Frequency shift	Δf_B	2	(Note 2) VHF-L	—	—	± 200	kHz
				(Note 2) VHF-H	—	—	± 350	
				(Note 2) UHF	—	—	± 200	
6	Switching on drift	Δf_s	2	(Note 3) VHF-L	—	—	± 100	kHz
				(Note 3) VHF-H	—	—	± 100	
				(Note 3) UHF	—	—	± 150	
7	1% cross modulation	CM	2	(Note 4) VHF-L	81.0	82.5	—	dB μ V
				(Note 4) VHF-H	79.0	82.0	—	
				(Note 4) UHF	78.0	79.5	—	
8	Inter modulation	IM3	2	(Note 5) VHF-L	-56	-62	—	dBc
				(Note 5) VHF-H	-54	-61	—	
				(Note 5) UHF	-54	-62	—	
9	6-ch beat	B_6	2	(Note 6) VHF-L (6ch)	-55	-60	—	dBc
				(Note 6) VHF-H	—	—	—	
				(Note 6) UHF	—	—	—	

*2 : f_{IF} : 45.75 [MHz]
 VHF-L : $f_{RF} = 55.25$ [MHz]~127.25 [MHz]
 VHF-H : $f_{RF} = 133.25$ [MHz]~367.25 [MHz]
 UHF : $f_{RF} = 373.25$ [MHz]~801.25 [MHz]

Test Conditions

Note 1: Conversion Gain Shift

Measure conversion gain change when $V_{CC} \pm 10\%$ with input level = -50dBmW , $V_{CC} = 5\text{V}$ as the reference.

Note 2: Frequency Shift

Measure frequency change when $V_{CC} \pm 10\%$ with input level = -40dBmW , $V_{CC} = 5\text{V}$ as the reference.

Note 3: Switching On Drift

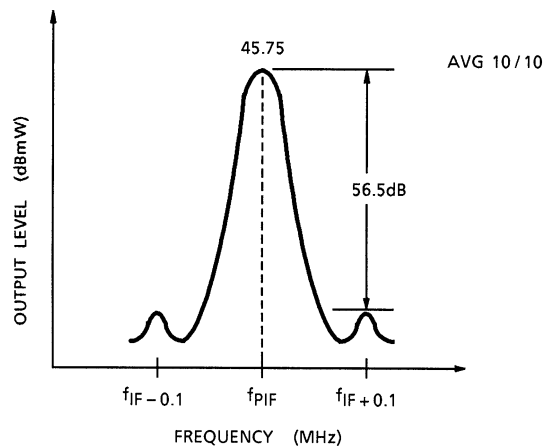
Measure frequency change up to 3 minutes with the frequency at 2 seconds after switching on as the reference. (Input level : -30dBmW)

Note 4: 1% Cross Modulation

- $f_D = f_P$ f_D : input level = -30dBmW
- $f_{UD} = f_D + 12\text{MHz}$ 100 kHz, 30%AM

Input the two signals above, and increase the f_{UD} input level.

Measure the f_{UD} input level when the suppression level reaches 56.5dB . (Averaging 10 times using a spectrum analyzer)

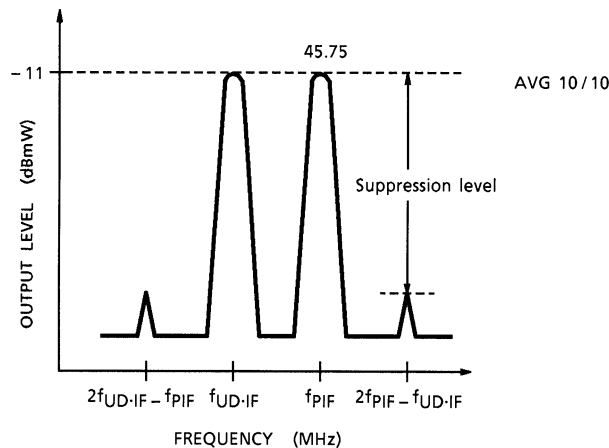


Note 5: Inter Modulation

- $f_D = f_P$
- $f_{UD} = f_D + 1\text{MHz}$

Input the two signals above, and increase the input levels.

When the IF out level is -11dBmW , measure the suppression level. (Averaging 10 times using a spectrum analyzer)

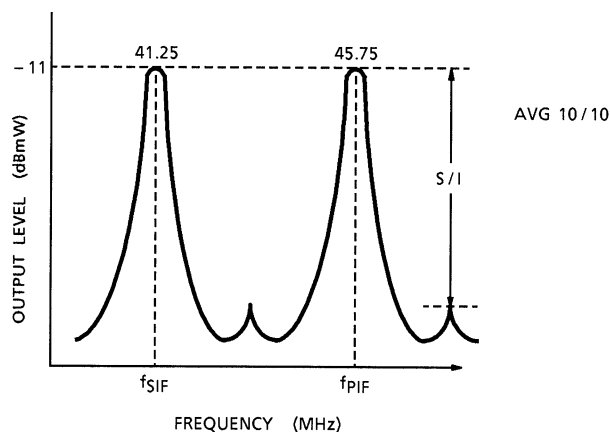


Note 6: 6-ch Beat

- $f_p = 83.25$ MHz (USA : 6ch)
- $f_s = 87.75$ MHz (USA : 6ch)

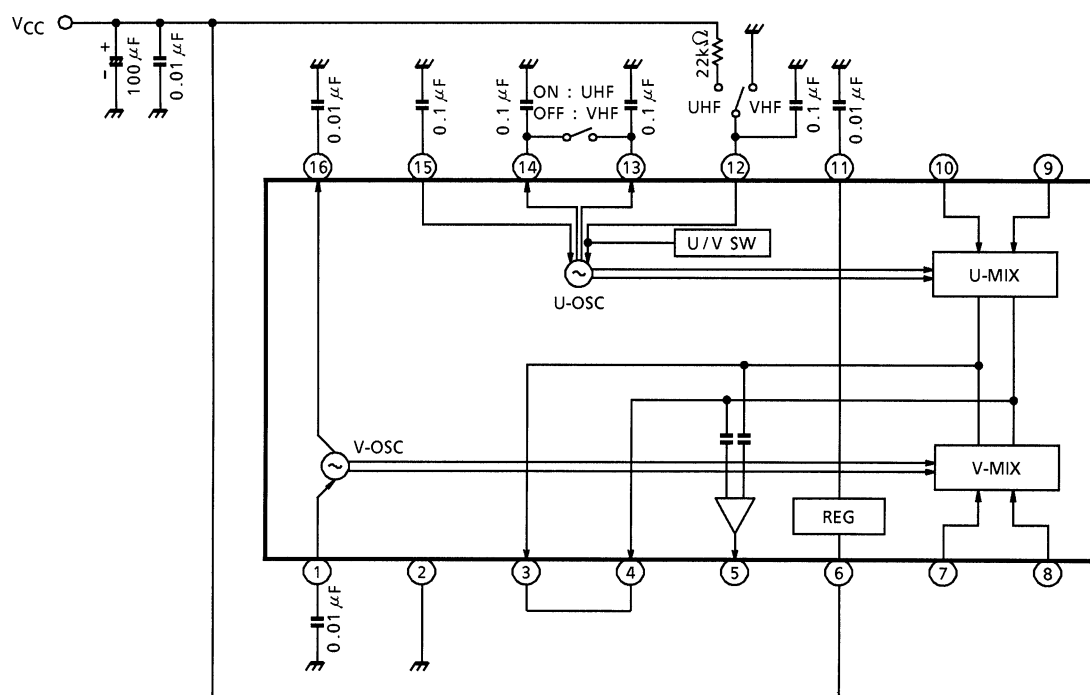
Input the two signals above, and increase the input levels.

When the IF out level is -11 dBmW, measure the suppression level. (Averaging 10 times using a spectrum analyzer)



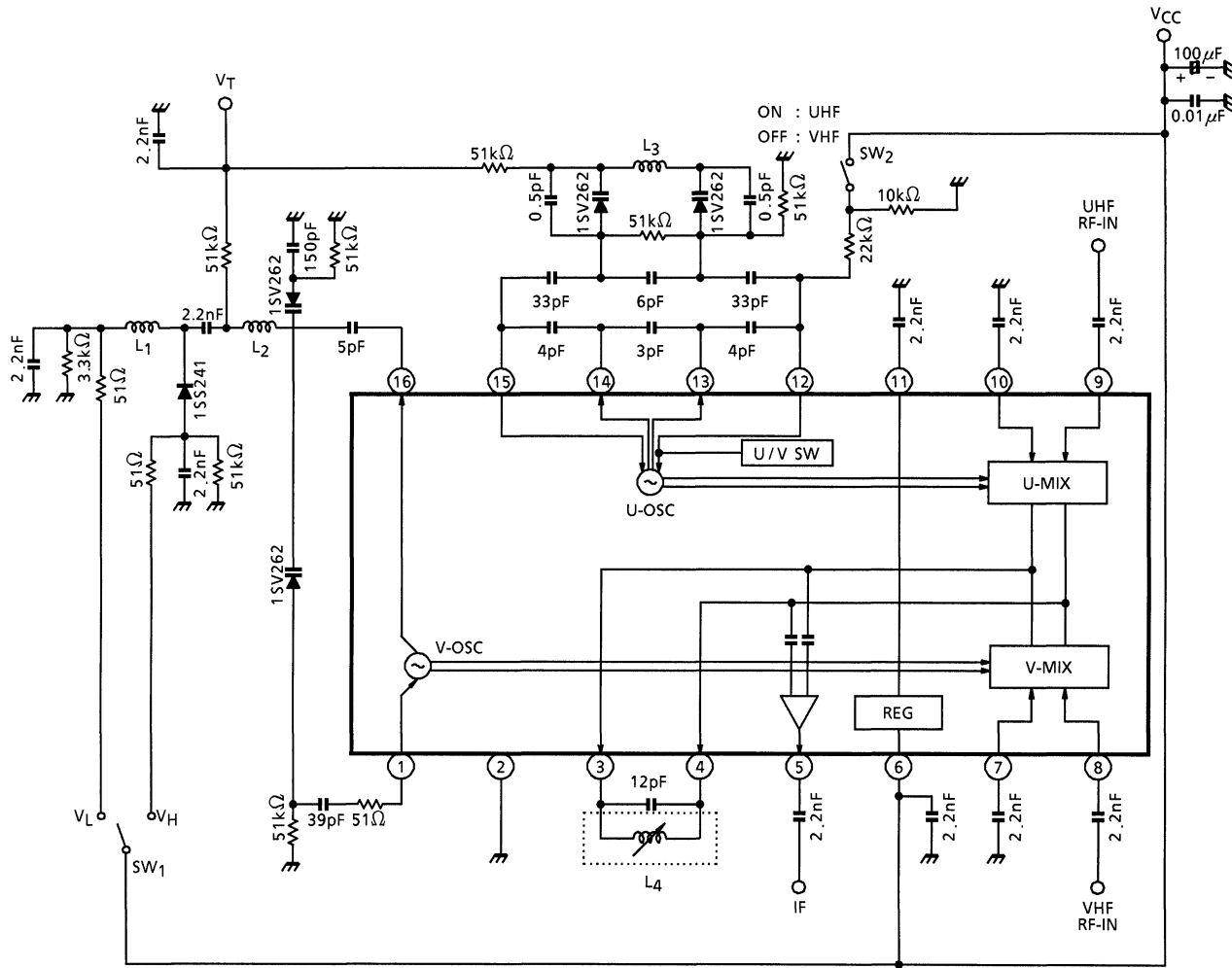
Test Circuit1

DC Characteristics



Test Circuit2

AC Characteristics



	Line Diameter	Turn Diameter	Number of Turns
L ₁	0.32 mm	2.0 mm	7.5 T
L ₂	0.32 mm	1.5 mm	2.5 T
L ₃	0.32 mm	2.5 mm	2.5 T

L4 = 0.9 μH ±5%

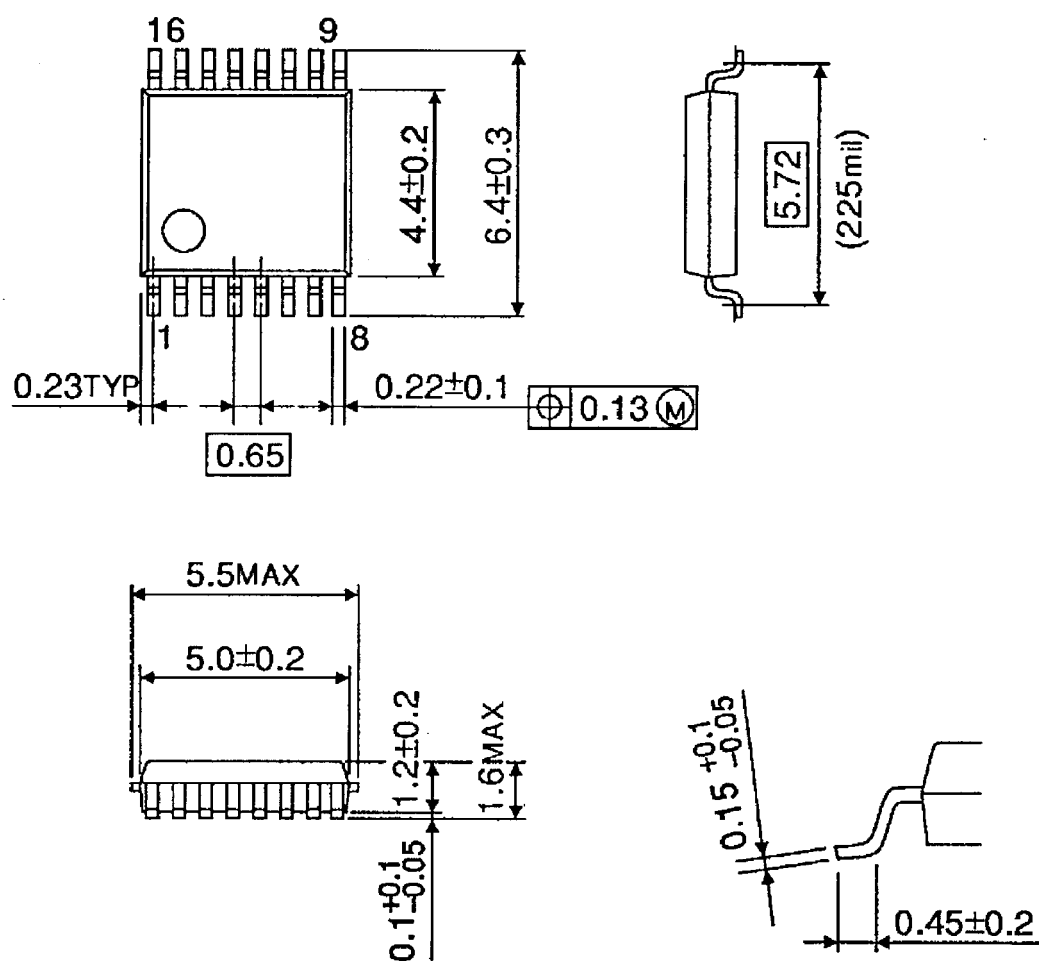
SW1 — V_{LOW} / V_{HI}

SW2 — VHF / UHF

Package Dimensions

SSOP16-P-225-0.65B

Unit : mm



Weight: 0.07 g (typ.)

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