

AM/FM TUNER + MPX

S1A0902X01

GENERAL DESCRIPTION

The S1A0902X01 is an AM/FM 1 chip tuner

- AM: RF_AMP, AM MIX, AM OSC, AM_IF AMP, AM detect, AGC, TUNLED INDICATOR OUTPUT
- FM_FE: RF AMP, MIX, OSC
- FM_IF: IF AMP, Quadrature detect, FM mute, tune indicator output
- MPX: PLL stereo decoder, stereo indicator output

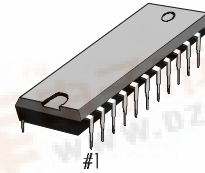
FEATURE

- For new FCC
- AM, FM_FE/IF. MPX 1 chip tuner
- Non adjustment MPX_VCO
- Wide operating voltage range: $V_{cc} = 2.0V - 7V$

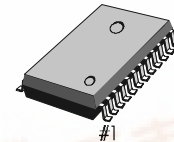
ORDERING INFORMATION

Device	Package	Operating Temperature
S1A0902X01-A0B0	24-SDIP-300	-20 – +75°C
S1A0902X01-R0B0	24-TSSOP	

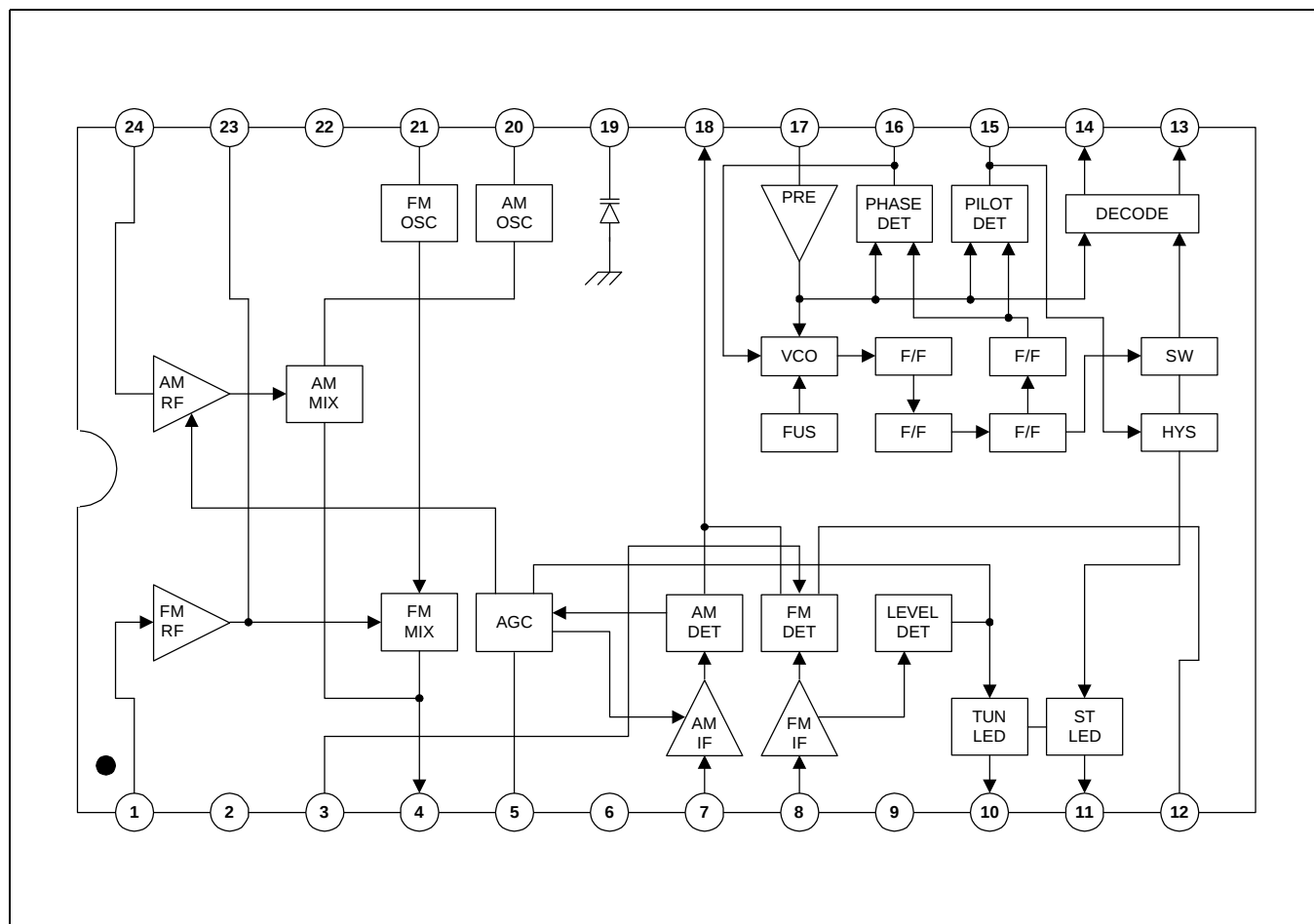
24-SDIP-300



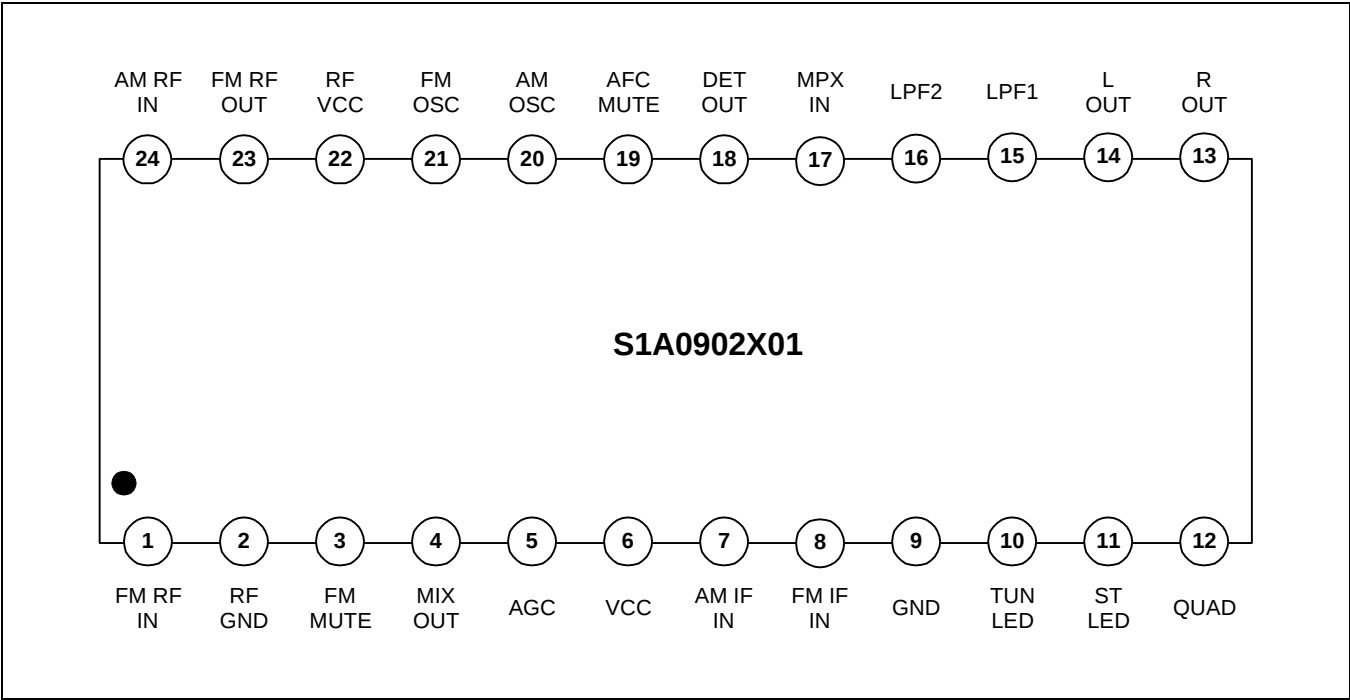
24-TSSOP



BLOCK DIAGRAM



PIN CONFIGURATION



ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit	Remarks
Supply Voltage	Vs	7	V	
Operating Temperature	Top	- 20 - +75	°C	
Storage Temperature	Tstg	- 55 - +150	°C	
Power Dissipation	Pdmax	1200	mW	

ELECTRICAL CHARACTERISTICS

Ta = 25°C, Vcc = 3V, Unless otherwise specified

FM F/E: f = 98MHz, fm = 1kHz

FM IF: f = 10.7MHz, Δf = 22.5kHz, fm = kHz

AM IF : f = 1MHz, mod = 30%, fm = 1kHz

MPX : fm = 1kHz, L + R = 90%, Pilot = 10%, Vin = 150mVrms

Characteristics		Test Condition	Symbol	SPEC			Unit
				Min.	Typ.	Max.	
FE	Input Limiting Voltage	-30dB	Vlim1	-	12	18	dBu
	Logic Oscilation Voltage	fosc = 108.7MHz	Vosc	40	70	110	mVrms
FM IF	Input Limiting Voltage	-3dB	Vlim2	35	40	45	dBu
	Detection Output Voltage	Vin = 80dBu	Vod1	55	80	110	mVrms
	FM Mute Attenuation Ratio	Vin = 80dBu, SW3 = on	Amute	60	70	-	dB
	Signal to Noise Ratio	Vin = 80dBu	S/N1	55	65	-	dB
	Total Hamonic Distortion	Vin = 80dBu	THD1	-	0.2	1	%
	AM Rejection Ratio	Vin = 80dBu	AMR	40	50	-	dB
	Tuning LED On Voltage	IL = 1mA	VL1	40	45	50	dBu
AM IF	Detection Output Voltage1	Vin = 26dBu	Vod2	20	40	60	mVrms
	Detection Output Voltage2	Vin = 60dBu	Vod3	55	70	110	mVrms
	Signal to Noise Ratio	Vin = 60dBu	S/N2	32	42	-	dB
	Total Hamonic Distortion	Vin = 60dBu	THD2	-	1	2	%
	Tuning LED On Voltage	IL = 1mA	VL2	20	25	30	dBu

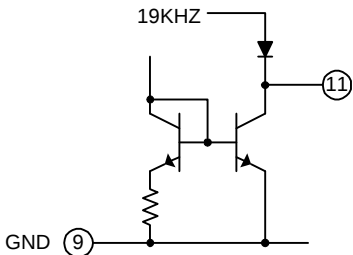
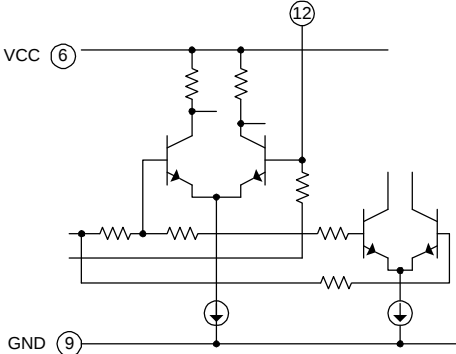
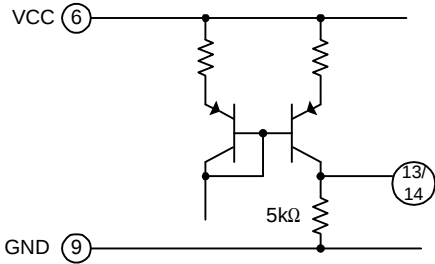
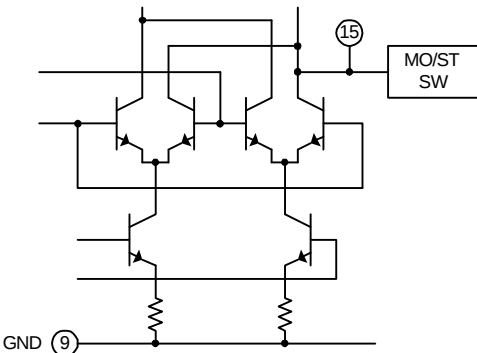
Characteristics		Test Condition	Symbol	SPEC			Unit
				Min.	Typ.	Max.	
MPX	Maximum Input Voltage	Stereo, THD = 3%	Vi(max)	300	450	-	mVrms
	Channel Separation	Stereo, f = 100Hz	CS1	25	45	-	dB
		Stereo, f = 1kHz	CS2	32	45	-	dB
		Stereo, f = 10kHz	CS3	25	45	-	dB
	Total Harmonic Distortion	Mono	THD3	-	0.2	1	%
		Stereo	THD4	-	0.2	1	%
	Voltage Gain	Mono, L-Channel	AV3	-5	-1	0.5	dB
	Channel Balance	Mono	CB	-1.5	0	1.5	dB
	Stereo LED On Level	Pilot only	VL(on)	-	8	16	mVrms
	Stereo LED Off Level	Pilot only	VL(off)	1	6	-	mVrms
	Lamp Hysteresis	LED on off	HY	-	2	-	mVrms
	Capture Range	Pilot only	CR	-	± 4	-	%
	Signal to Noise Ratio	Mono	S/N3	65	75	-	dB

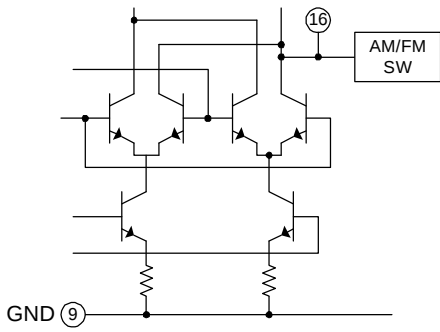
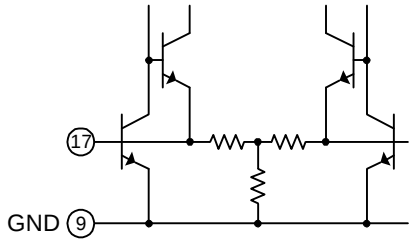
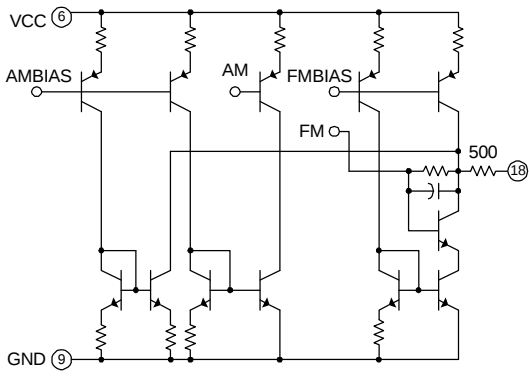
PIN DESCRIPTION

Terminal voltage: Typical terminal voltage at no signal with test circuit.
VCC = 3V, Ta = 25°C

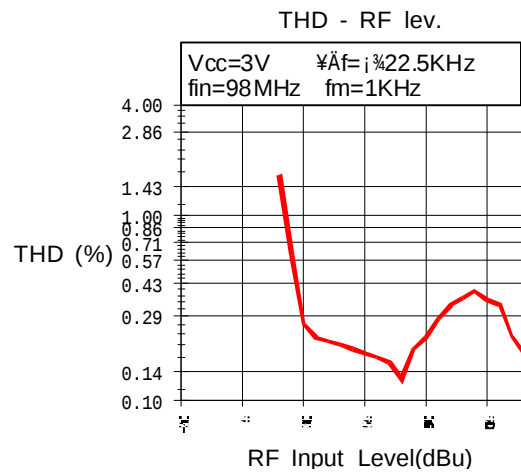
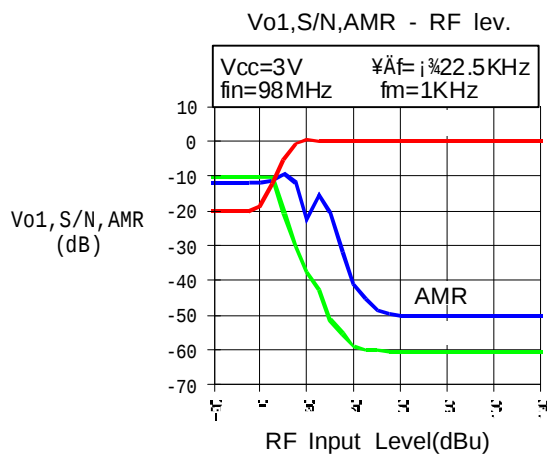
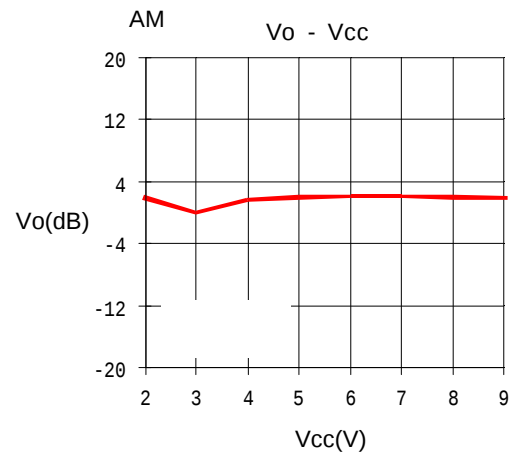
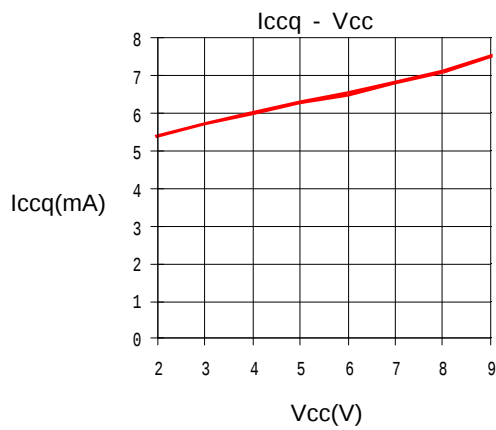
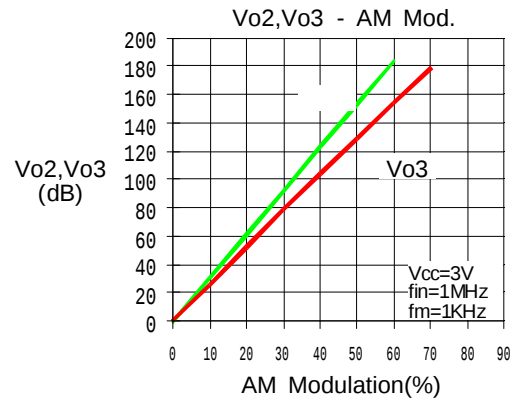
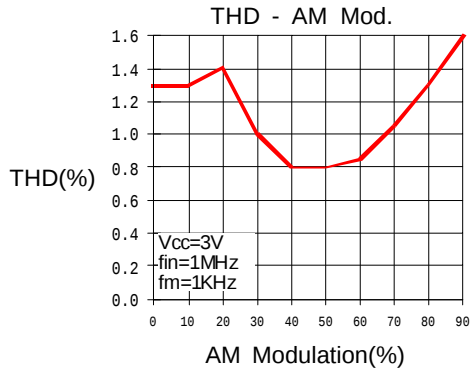
Pin No.	Characteristic	Internal Circuit	Termianl Voltage	
			AM	FM
1	FMRFIN		0	0.8
2	RFGND		0	0
3	FMMUTE		2.2	2.2
4	MIXOUT		3.0	2.9

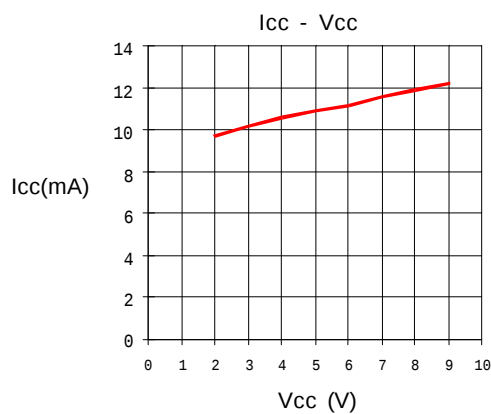
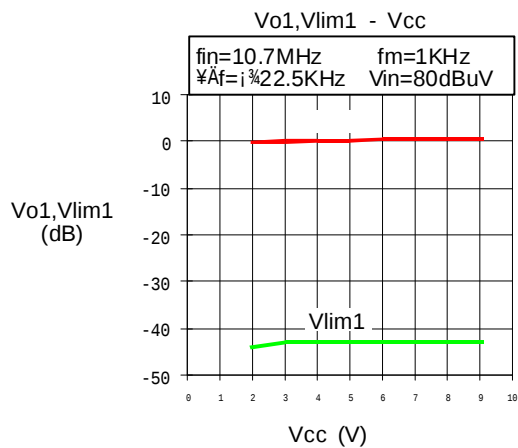
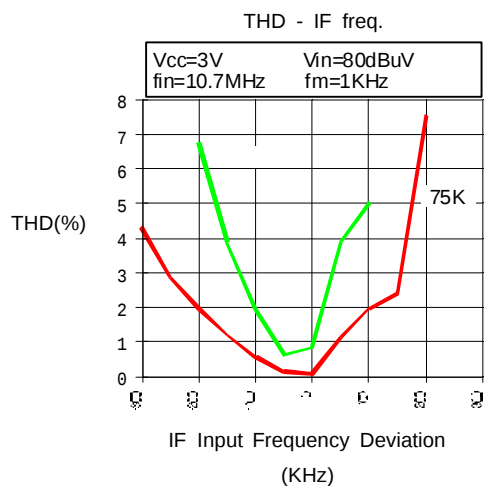
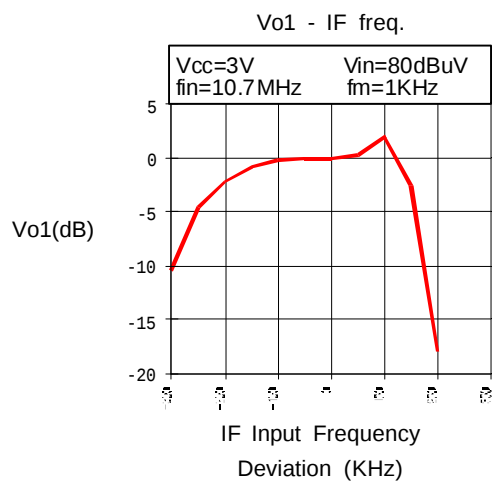
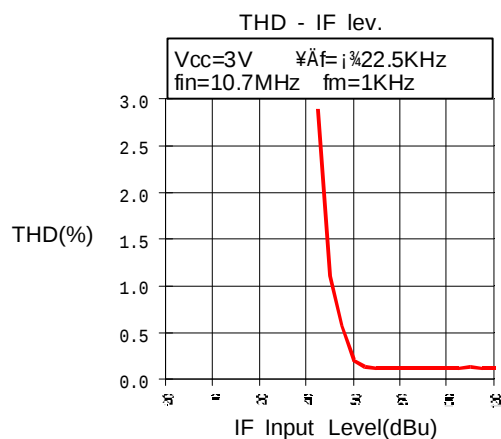
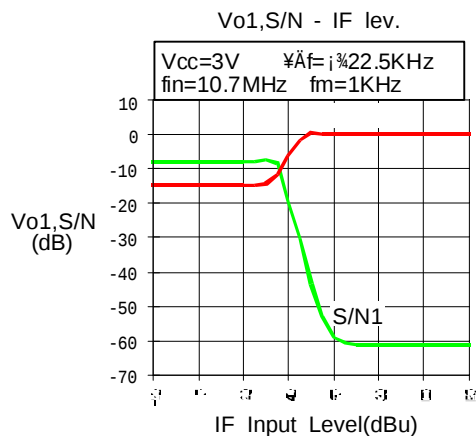
Pin No.	Characteristic	Internal Circuit	Termianl Voltage	
			AM	FM
5	AGC(AMAGC)		0	0
6	VCC	-	3.0	3.0
7	AMIFIN		3.0	3.0
8	FMIFIN		3.0	3.0
9	GND	-	0	0
10	TUNLED (Tuning LED)		-	-

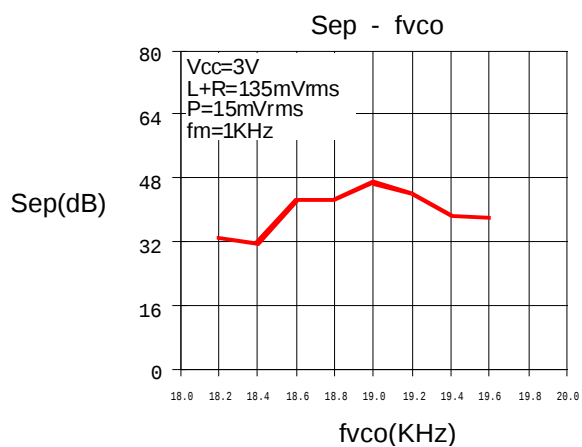
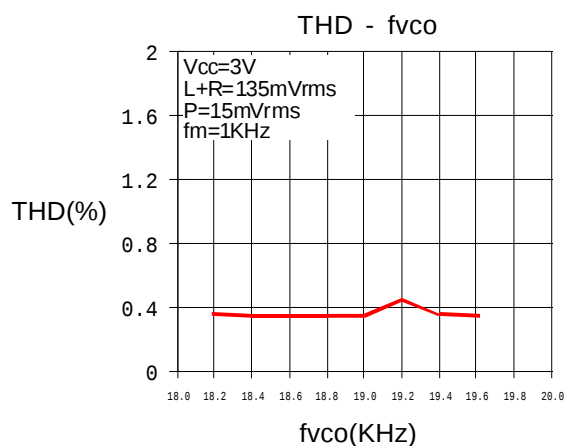
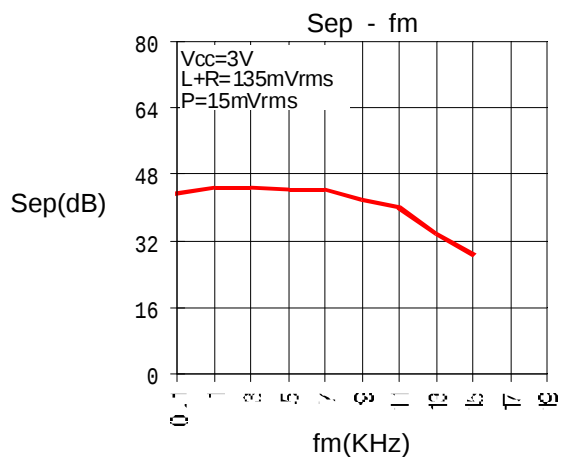
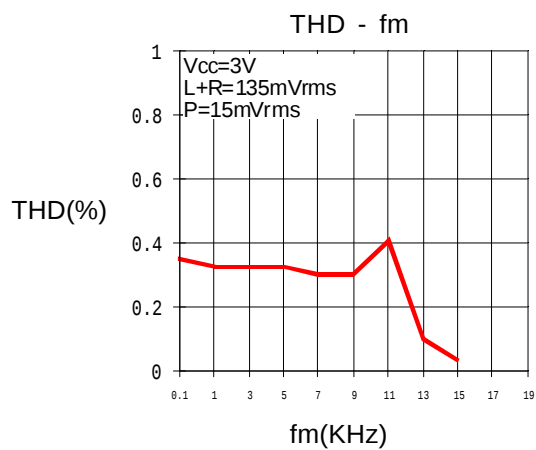
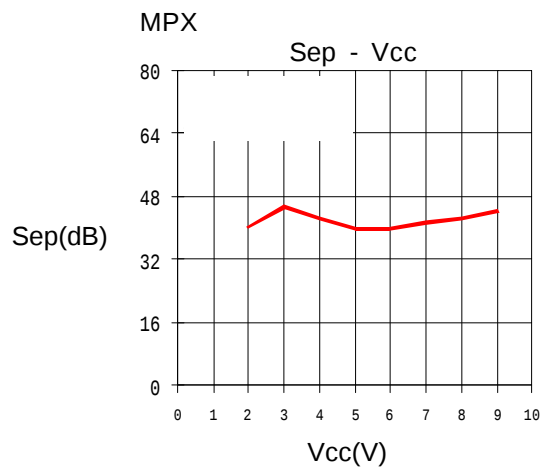
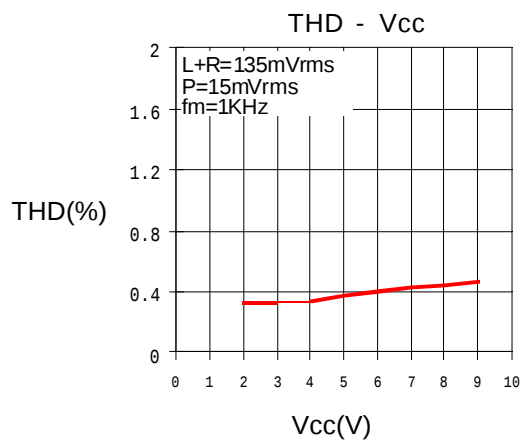
Pin No.	Characteristic	Internal Circuit	Termianl Voltage	
			AM	FM
11	STLED (Stereo LED)		-	-
12	QUAD (FM QUAD. Detector)		2.5	2.2
13 14	R-OUT (R-ch out) L-OUT (L-ch out)		1.1	1.1
15	LPF1 - LPF terminal for sync. Detector - Bias terminal for MO/ST SW ckt. V16 = Vcc → MONO V16 = OPEN → STEREO		2.2	2.2

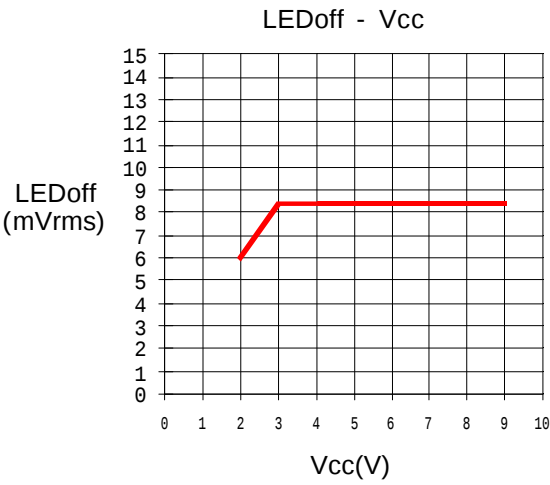
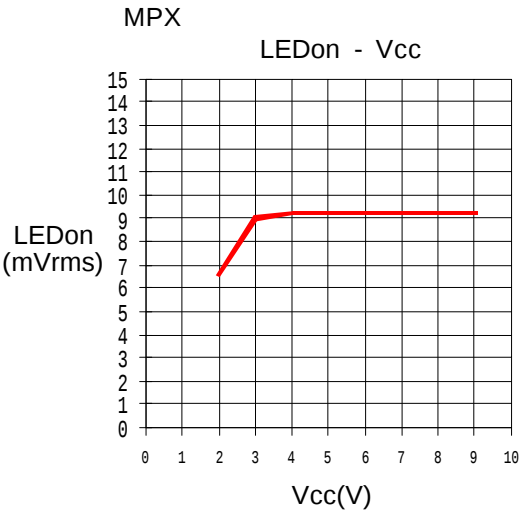
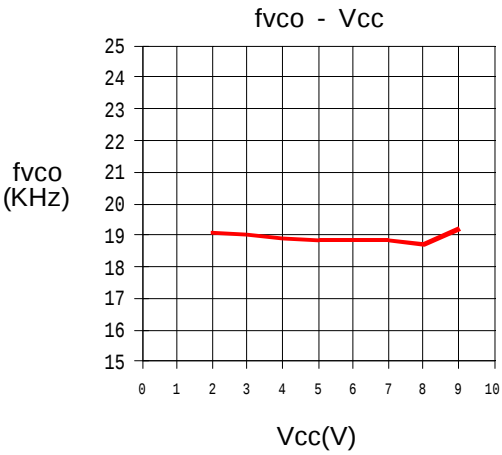
Pin No.	Characteristic	Internal Circuit	Termianl Voltage	
			AM	FM
16	LPF2 - LPF terminal for phase detector - Bias terminal for AM/FM SW ckt. $V_{16}=V_{cc} \rightarrow \text{AM}$ $V_{16}=\text{OPEN} \rightarrow \text{FM}$		3	2.2
17	MPXIN		0.8	0.8
18	DETOUT	 V_{CC} (6) AMBIAS AM FMBIAS FM 500 GND (9) AMBIAS: AM mode $\rightarrow$ ON, FM mode $\rightarrow$ OFF FMBIAS: AM mode $\rightarrow$ OFF, FM mode $\rightarrow$ ON	1.0	0.9
19	AFC		-	-

Pin No.	Characteristic	Internal Circuit	Terminal Voltage	
			AM	FM
20	AMOSC		3.0	3.0
21	FMOSC		3.0	3.0
22	REVCC	-	3.0	3.0
23	FMRFOUT	cf. pin 1	3.0	3.0
24	AMRFIN		3.0	3.0

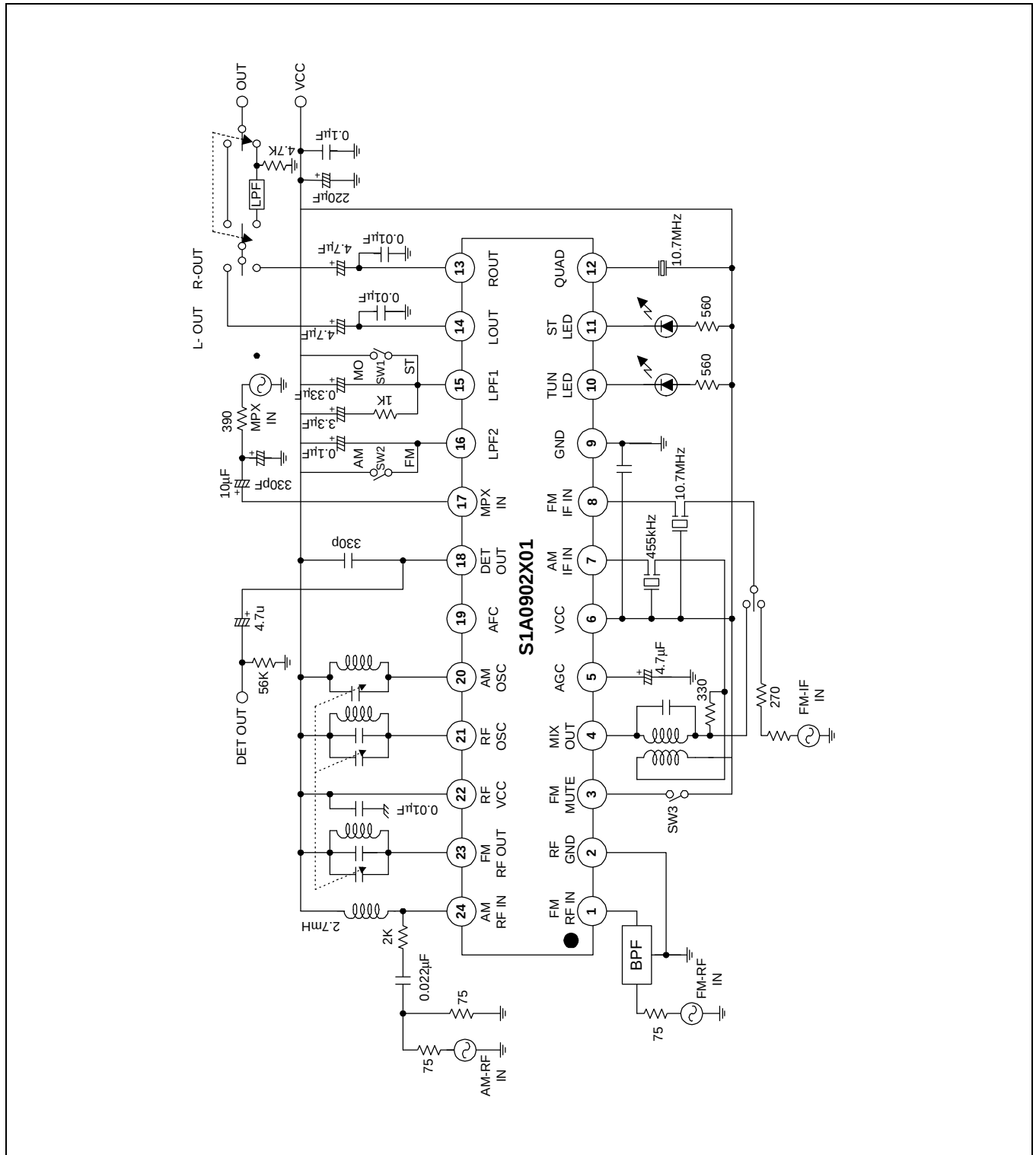


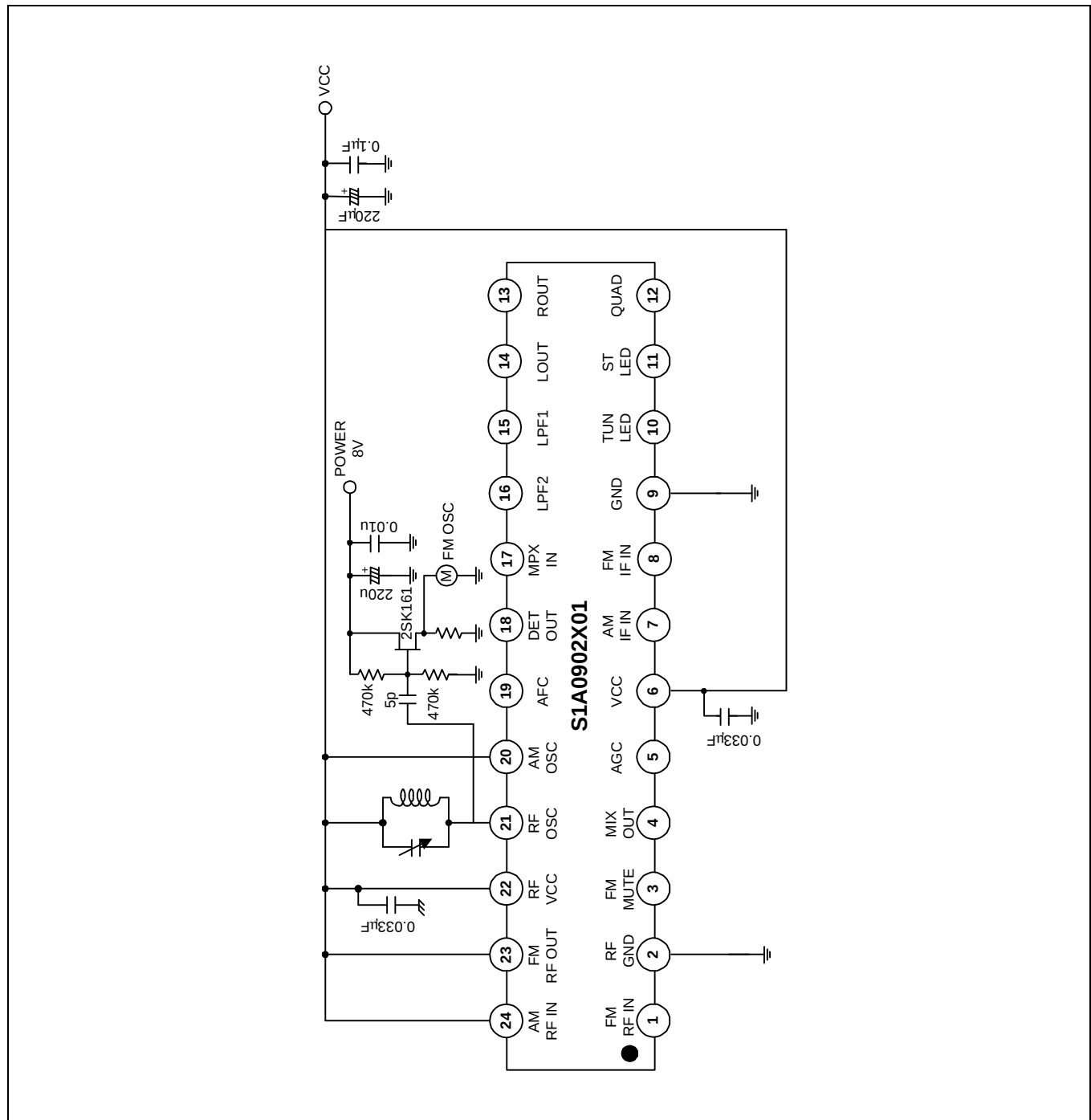






TEST CIRCUIT

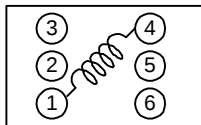






COIL SPECIFICATION

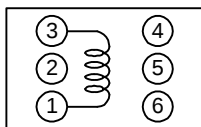
L1 FM RF



f (MHz)	Qo	TURNS		
		1-4		
100	100	2 1/2		

0.5mmφ

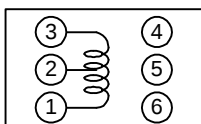
L2 FM SOC



f (MHz)	Qo	TURNS		
		1-3		
100	100	2 3/4		

0.5mmφ

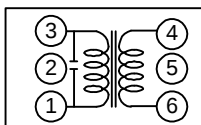
T1 AM OSC



f (MHz)	Qo	TURNS			L (uH)
		1-3	2-3		
796	115	13	73		

KOREA TOKO
0.08mmφ

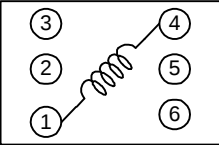
T2 AM IFT (MIX OUT)



Co (pF)	f (MHz)	Qo	TURNS		
1-3			1-3	4-6	
180	455	120	180	15	

KOREA TOKO
0.08mmφ

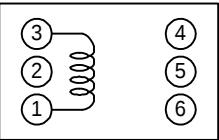
L1 FM RF



KST-FR1

f (MHz)	Qo	TURNS		KWANG SUNG PART NO
		1-4	WIRE	
100	80	2*(1/2)	15	KST-FR1

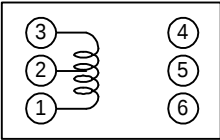
L2 FM OSC



KST-FO1

f (MHz)	Qo	TURNS		KWANG SUNG PART NO
		1-4	WIRE	
100	80	2*(3/4)	0.5m/m	KST-FO1

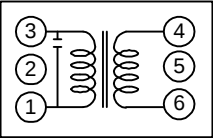
T1 AM OSC



KS50-SAO

f (MHz)	Qo	TURNS		L (uH)	KWANG SUNG PART NO
		1-3	2-3		
796	60	18	94	270	KS50-SAO

T2 AM IFT (MEX OUT)



KS50-SAA

Co (pF)	f (MHz)	Qo	TURNS		KWANG SUNG PART NO
			1-3	4-6	
180	455	40	182	15	KS50-SAA

NOTES