

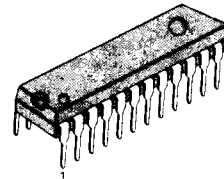
FM/AM TUNER + MPX

The KA2293 is a monolithic integrated circuit which consists of a one chip tuner and no adjustment FM multiplex for AM/FM radios and headphone radios.

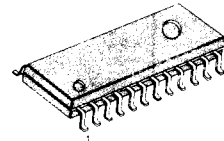
FEATURES

- One-chip tuner with built-in FM multiplex.
- No adjustment for FM detector and VCO.
- No AM detect coil, IF coupling capacitor, FM IF bypass capacitor needed.
- Built-in AM/FM selection switch.
- Minimum number of external parts required.
- Wide operating voltage range: $V_{CC} = 1.8V \sim 7V$
- Low distortion
(FM IF: 0.4%, AM IF: 1%, MPX: 0.2% (Typ)).

24 SDIP



24 SOP



ORDERING INFORMATION

Device	Package	Operating Temperature
KA2293	24 SDIP	-20°C ~ +75°C
KA2293D	24 SOP	

BLOCK DIAGRAM

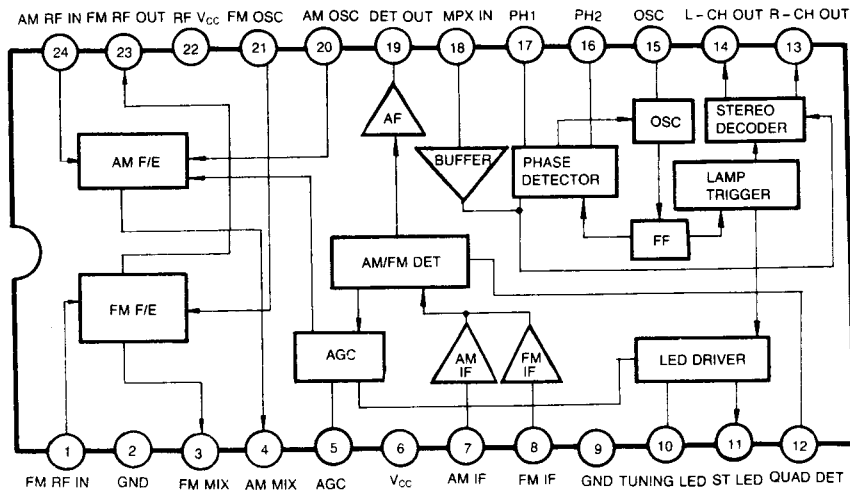


Fig. 1

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Value	Unit
Supply Voltage	V _{CC}	8	V
Power Dissipation	P _D	1200	mW
Operating Temperature	T _{OPR}	-20 ~ +75	°C
Storage Temperature	T _{STG}	-55 ~ +150	°C
LED Drive Voltage	V _{DR}	10	V
LED Drive Current	I _{DR}	10	mA

ELECTRICAL CHARACTERISTICS

(Ta = 25°C, V_{CC} = 3V, unless otherwise specified)

FM F/E : f = 98MHz, fm = 1KHz, Δf = 22.5KHz

FM IF : f = 10, 7MHz, fm = 1KHz, Δf = 22.5KHz

AM : f = 1MHz, fm = 1KHz, 30% Mod

MPX : f = 1KHz, L + R = 90%, P = 10%, V_i = 150mV

Characteristic		Symbol	Test Conditions	Min	Typ	Max	Unit	Test Circuit
Quiescent Circuit Current		I _{CCQ1}	FM, V _i = 0	10	14	18	mA	1
		I _{CCQ2}	AM, V _i = 0	3.5	6.0	9	mA	1
F/E	-3dB Limiting Sensitivity	V _{i(LIM)1}	V _O = -3dB	10	14	18	dBμ	1
	Oscillation Voltage	V _{OSC}	f _{OSC} = 72.3MHz	70	105	140	mV	2
FM IF	-3dB Limiting Sensitivity	V _{i(LIM)2}	V _O = -3dB	39	44	49	dBμ	1
	Detector Output Voltage	V _{O1}	V _i = 80dBμ	55	80	110	mV	1
	Signal to Noise Ratio	S/N ₁	V _i = 80dBμ	60	70		dB	1
	Total Harmonic Distortion	THD ₁	V _i = 80dBμ		0.4	1	%	1
	AM Rejection Ratio	AMR	V _i = 80dBμ	40	50		dB	1
	Tuning Indication Voltage	V _{L1}	I _{LED} = 1mA	43	48	53	dBμ	1
AM IF	Voltage Gain	G _{V1}	V _i = 23dBμ	20	40	80	mV	1
	Detector Output Voltage	V _{O(DET)2}	V _i = 60dBμ	50	60	100	mV	1
	Signal to Noise Ratio	S/N ₂	V _i = 60dBμ	34	44		dB	1
	Total Harmonic Distortion	THD ₂	V _i = 60dBμ		1	2	%	1
	Tuning Indication Voltage	V _{L2}	I _{LED} = 1mA	19	24	30	dBμ	1
MPX	Maximum Input Voltage	V _{i(MAX)}	Stereo, THD = 3%	250	350		mV	1
	Channel Separation	CS ₁	Stereo, f = 100Hz	35	42		dB	1
		CS ₂	Stereo, f = 1KHz	35	42		dB	1
		CS ₃	Stereo, f = 10KHz	35	42		dB	1
	Total Harmonic Distortion	THD ₃	Mono		0.2	1	%	1
		THD ₄	Stereo		0.2	1	%	1
	Voltage Gain	G _{V2}	Mono	-5	-3	-1	dB	1
	Channel Balance	CB	Mono	-2	0	2	dB	1
	Lamp on Level	V _{L(ON)}	Pilot only		8	16	mV	1
		V _{L(OFF)}	Pilot only	2	6		mV	1
	Lamp Hysteresis	HY			2		mV	1
Capture Range	CR	Pilot only		±3		%	1	
Signal to Noise Ratio	S/N ₃	Mono	60	70		dB	1	

TEST CIRCUIT 1

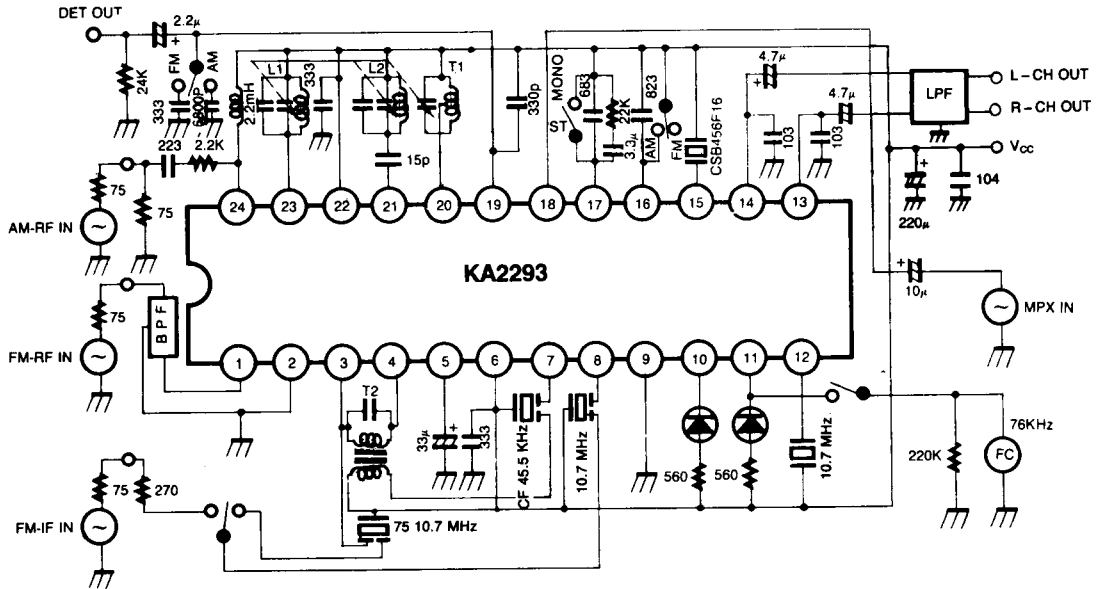


Fig. 2

TEST CIRCUIT 2

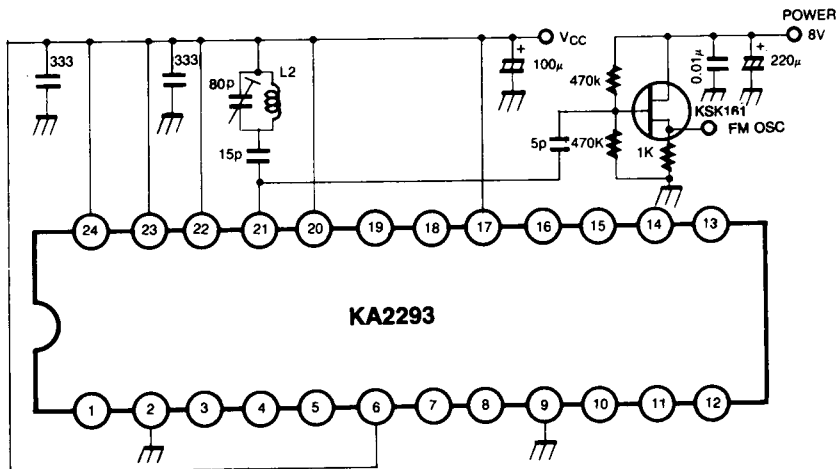
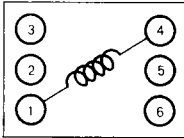


Fig. 3

COIL SPECIFICATION

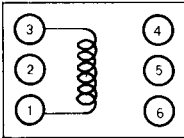
L1 FM RF



f (MHz)	Qo	TURNS		
		1-4		
100	100	2½		

0.5mmφ

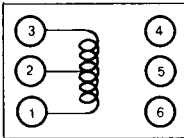
L2 FM OSC



f (MHz)	Qo	TURNS		
		1-3		
100	100	2¾		

0.5mmφ

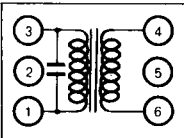
T1 AM OSC



f (MHz)	Qo	TURNS		L (μH)
		1-2	2-3	
796	115	13	73	288

KOREA TOKO
0.08mmφ

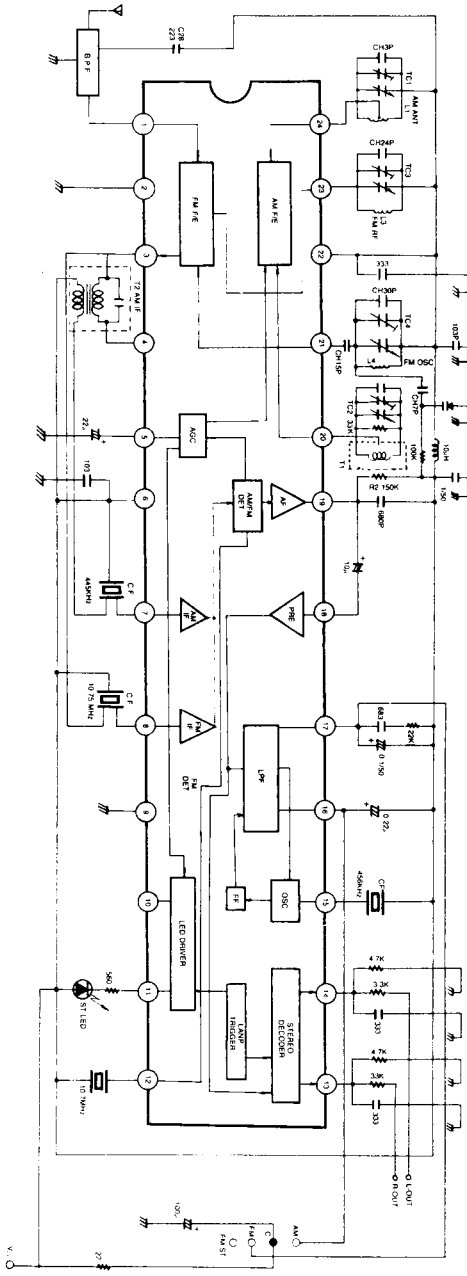
T2 AM IFT (MIX OUT)



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

KOREA TOKO
0.08mmφ

APPLICATION CIRCUIT



KA2293