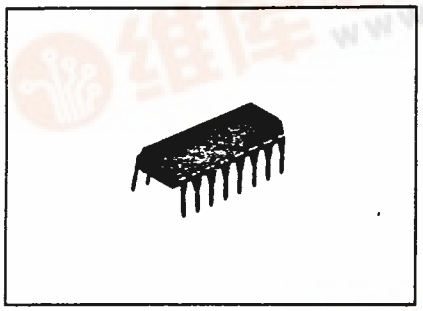
AM/FM IF Amplifier

BA4224

T-77-05-07



The BA4224 is a monolithic integrated circuit having the FM IF amplifier and detector and AM mixer IF amplifier and detector functions used in radio cassette recorders.

Features

1. Wide operating voltage range (V_{CC}=4~15V).
2. The AM section uses a double-balanced mixer for good usable sensitivity.
3. High FM sensitivity (V_{IN}=26dB, measured with test circuit 3).
4. High AM sensitivity and S/N ratio (10mV sensitivity=20dBμV, and S/N=50dB, measured with test circuit 3).
5. An internal 5.2V regulated supply can be used for the front end circuitry as well.
6. Few external components.

Applications

AM/FM radios
Radio cassette recorders

Dimensions (Unit: mm)

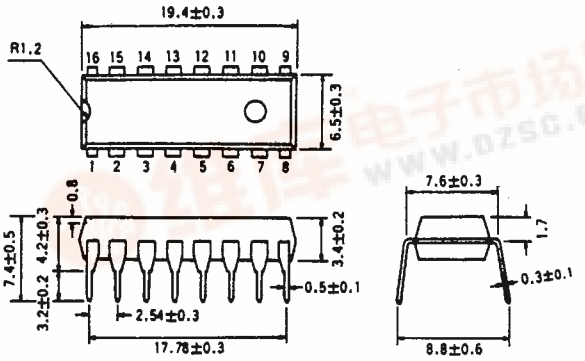


Fig. 1

Block Diagram

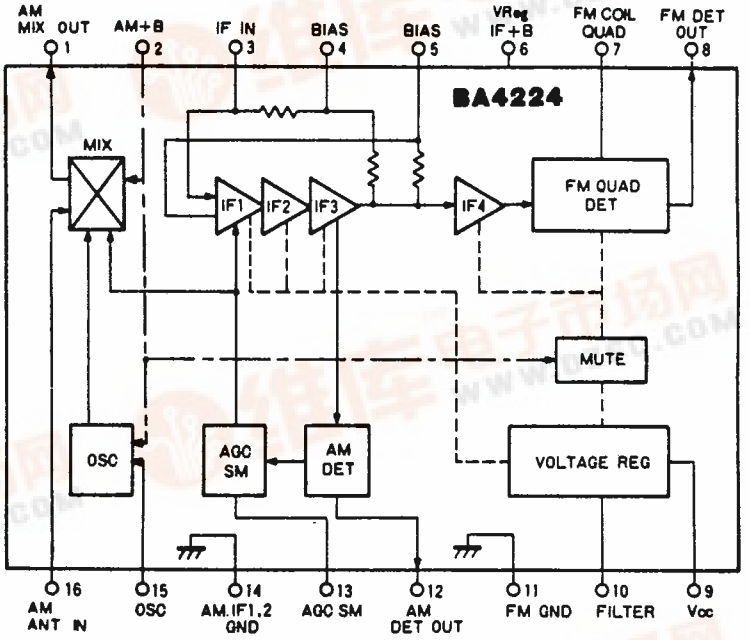


Fig. 2

Absolute Maximum Ratings (Ta=25°C)

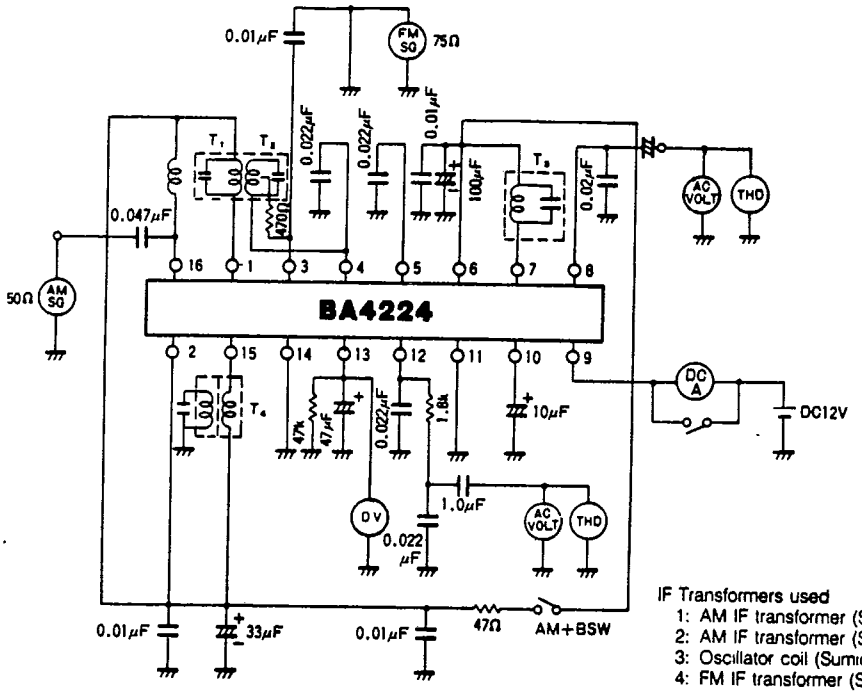
Parameter	Symbol	Limits	Unit
Supply voltage	Vcc	16	V
Power dissipation	Pd	550*	mW
Operating temperature range	Topr	−25~75	°C
Storage temperature range	Tstg	−55~125	°C

* Derating is done at 5.5mW/°C for operation above Ta=25°C

Electrical Characteristics (Unless otherwise noted, Ta=25°C, V_{CC}=12V)

	Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Test circuit
FM Section	Quiescent current	I_Q	4.0	10.5	16	mA	—	Fig. 3
	Detector output	V_O	30	40	65	mV	100dBμV, 10.7MHz, 100% MOD, 400Hz	Fig. 3
	Total harmonic distortion	THD	—	0.4	0.8	%	100dBμV, 10.7MHz, 100% MOD, 400Hz	Fig. 3
	Signal-to-noise ratio	S/N	60	68	—	dB	100dBμV, 10.7MHz, 100% MOD, 400Hz	Fig. 3
	Limiting sensitivity	V_{IN} (lim)	—	26	30	dB	At V_O=−3dB	Fig. 3
	Signal meter output	V_S	—	1.0	—	V	With 100dBμV input	Fig. 3
AM Section	Quiescent current	I_Q	7.5	11.5	18.5	mA	—	Fig. 3
	Detector output	V_O	24	34	48	mV	80dBμV, 1MHz, 30% MOD, 400Hz	Fig. 3
	Total harmonic distortion	THD	—	1.0	2.5	%	80dBμV, 1MHz, 30% MOD, 400Hz	Fig. 3
	Signal-to-noise ratio	S/N	45	55	—	dB	80dBμV, 1MHz, 30% MOD, 400Hz	Fig. 3
	Maximum sensitivity	SIF	—	20	25	dBμV	With V_O=10mV input	Fig. 3
	Signal meter output	V_S	—	1.6	—	V	With V_{IN}=80dBμV input	Fig. 3

Test Circuit



IF Transformers used
1: AM IF transformer (Sumida 2150-2162-081)
2: AM IF transformer (Sumida 2150-2162-082)
3: Oscillator coil (Sumida 2157-2239-239)
4: FM IF transformer (Sumida 2153-409-090)

Fig. 3