FM front end

BA4402 / BA4404

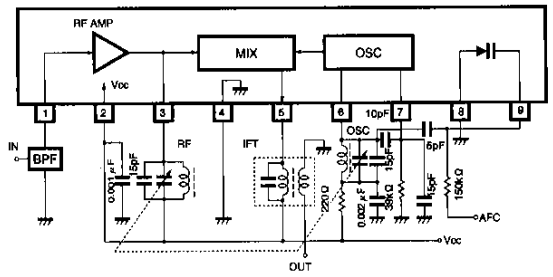
The BA4402 and BA4404 are front end ICs for FM radio receivers. These devices can be used in a wide range of applications, from 3V portable radios to home stereo tuners.
The BA4402 and BA4404 consist of an RF amplifier, oscillator circuit, mixer circuit, and a variable capacitor-diode for AFC. They are pin compatible, and either can be selected depending on the amount of gain needed and other requirements of the application.

●Applications
FM pocket radios
Radio cassette players
Home stereos

●Features
1) Wide operating voltage range : 1.8 to 9V.
2) High gain with good stability.
3) An appropriate device can be selected depending on the need for AFC and the amount of gain required.

●Block diagram

BA4402/BA4404



Product name	Variable capacitor	Gain	RF amplifier
BA4402	Yes	32dB	Common base
BA4404	Yes	38dB	Common emitter

●Absolute maximum ratings (Ta = 25℃)

Parameter	Symbol	Limits	Unit
Supply voltage	V_{CC}	9	V
Power dissipation	Pd	1000*1	mW
Operating temperature	Topr	−25~75	℃
Storage temperature	Tstg	−55~125	℃

*1 At temperatures above Ta = 25℃, decreases 10 mW per degree.

●Electrical characteristics (unless otherwise indicated, Ta = 25℃ and V_{CC} = 3V)

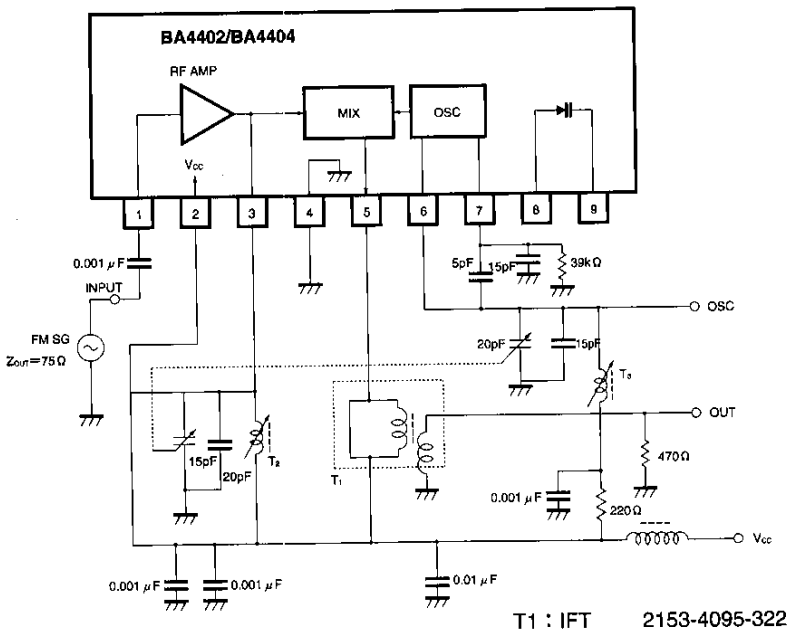
BA4402

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement Circuit
Quiescent current	I_Q	—	2.5	4.0	mA	—	Fig.1
Output voltage 1	V_{O1}	25	40	55	mV	f_{IN}=100MHz, 60dB μV	Fig.1
Output voltage 2	V_{O2}	80	120	160	mV	f_{IN}=100MHz, 100dB μV	Fig.1
Oscillator voltage	V_{OSC}	180	250	340	mV	V_{CC}=2V	Fig.1
Oscillation stop voltage	V_{STOP}	—	1.4	1.6	V	—	Fig.1

BA4404

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement Circuit
Quiescent current	I_Q	—	3.0	5.0	mA	—	Fig.1
Output voltage 1	V_{O1}	55	80	120	mV	f_{IN}=100MHz, 60dB μV	Fig.1
Output voltage 2	V_{O2}	80	120	160	mV	f_{IN}=100MHz, 100dB μV	Fig.1
Oscillator voltage	V_{OSC}	180	250	340	mV	V_{CC}=2V	Fig.1
Oscillation stop voltage	V_{STOP}	—	1.4	1.6	V	—	Fig.1

●Measurement circuit



T1 : IFT 2153-4095-322 (SUMIDA)
T2 : RF-L FEM10C-2F6 (SUMIDA)
T3 : OSC-L FEM10C-2F6 (SUMIDA)

Fig. 1

●Application example

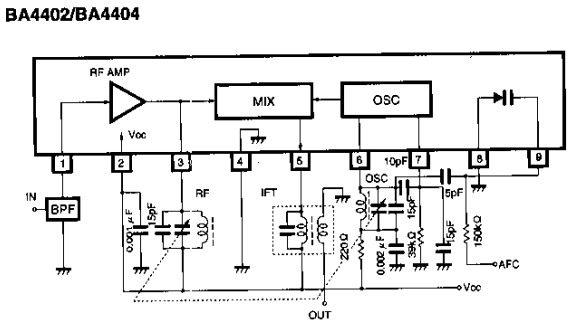


Fig. 2

●Electrical characteristic curves

BA4402

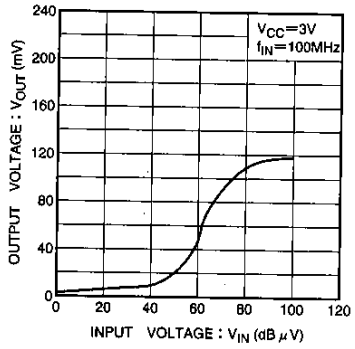


Fig. 3 Output voltage vs. input voltage

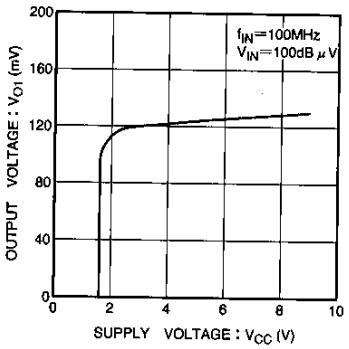


Fig. 4 Output voltage 1 vs. supply voltage

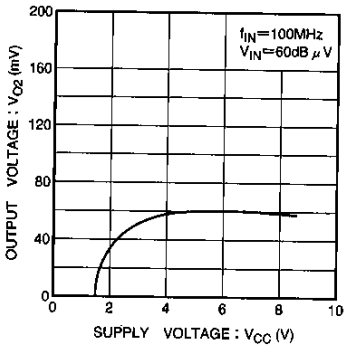


Fig. 5 Output voltage 2 vs. supply voltage

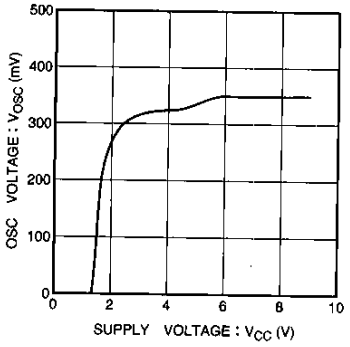


Fig. 6 Oscillator voltage vs. supply voltage

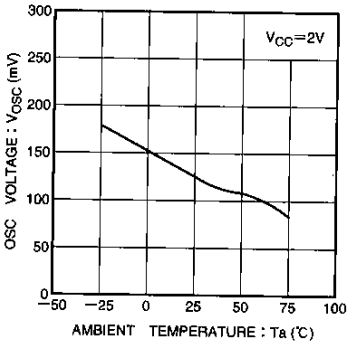


Fig. 7 Oscillator voltage vs. ambient temperature

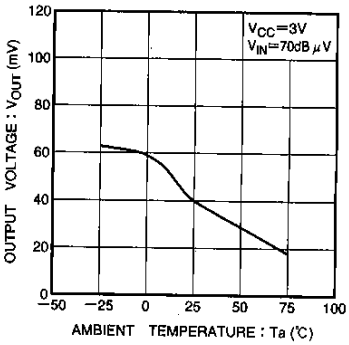


Fig. 8 Output voltage vs. ambient temperature

BA4404

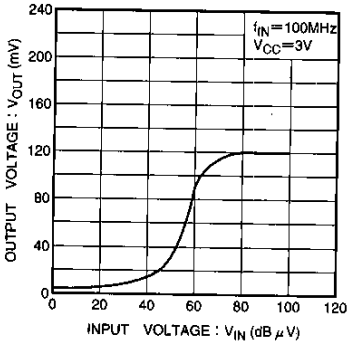


Fig. 9 Output voltage vs. input voltage

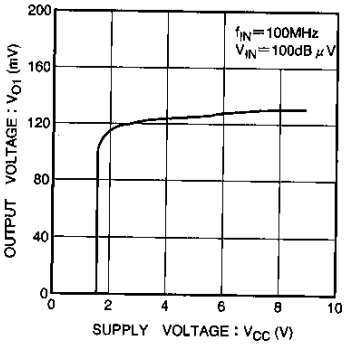


Fig. 10 Output voltage1 vs. supply voltage

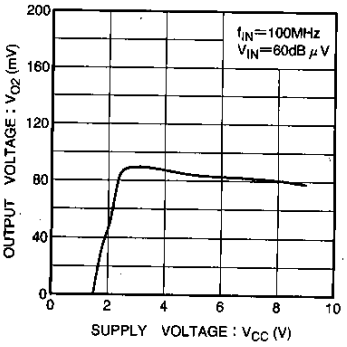


Fig. 11 Output voltage 2 vs. supply voltage

BA4404

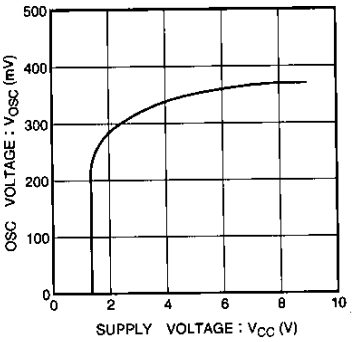


Fig. 12 Oscillator voltage vs. supply voltage

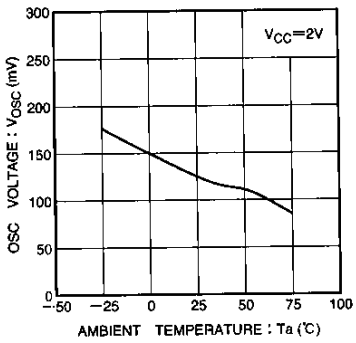


Fig. 13 Oscillator voltage vs. ambient temperature

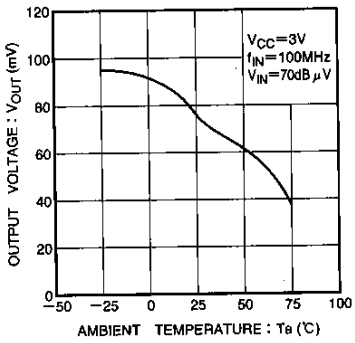


Fig. 14 Output voltage vs. ambient temperature

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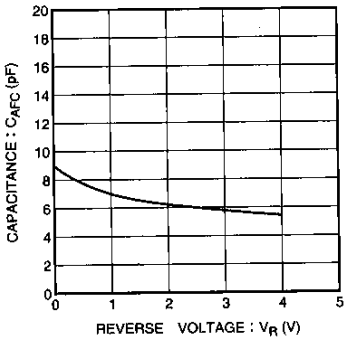
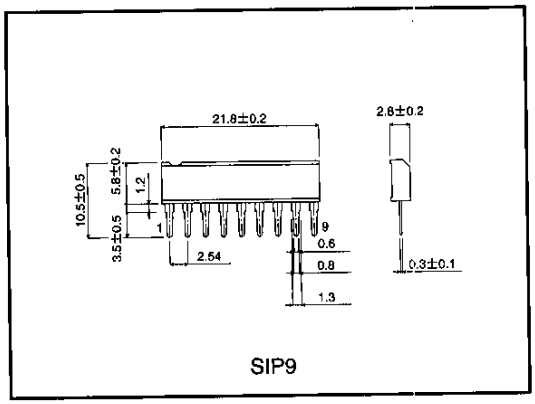


Fig. 15 AFC capacitor capacitance vs. applied voltage

●External dimensions (Unit: mm)



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