

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA7371AF

FM FRONT-END (1.5V USE)

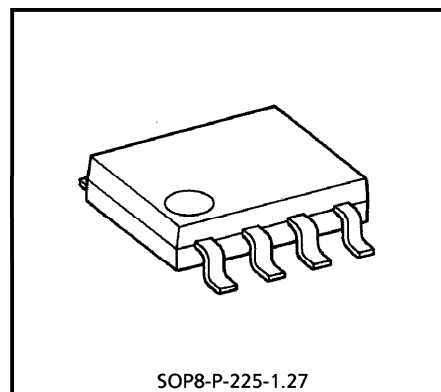
The TA7371AF is an FM FRONT END IC designed for low voltage operation (1.5V), which is suitable for Stereo Headphone Radio or Radio Cassette.

This IC contains RF Amplifier, MIX, Local Oscillator and Varactor Diode for AFC.

It simplifies the design of FRONT END Circuit.

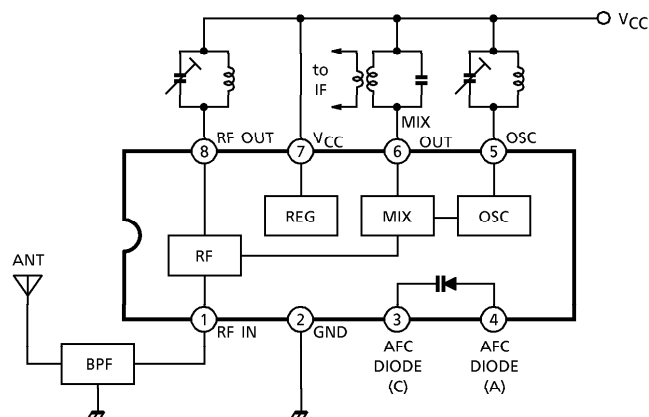
FEATURES

- Clamping diode for mixer output.
- Varactor diode for AFC.
- Local OSC. stop voltage : $V_{CC} = 0.85V$ (Typ.)
- Low quiescent current.
 $I_{CC} = 1.8mA$ (Typ.) ($V_{CC} = 1.5V$, $T_a = 25^\circ C$)
- Low noise.
- Very few external parts.
- Operating supply voltage range. : $V_{CC} = 0.95 \sim 5V$ ($T_a = 25^\circ C$)



Weight : 0.08g (Typ.)

BLOCK DIAGRAM



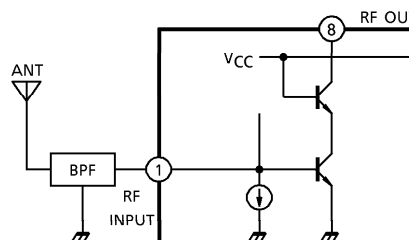
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EXPLANATION OF INNER CIRCUIT AND FUNCTIONS

(1) RF block

The radio signal is applied to RF INPUT passed through the ANT and BPF.
 This RF block is composed of the common emitter amplifier. The output is designed to be the cascade connection, because of high sensitivity characteristic, and excellent spurious radiation. (Fig.1)



(Fig.1)

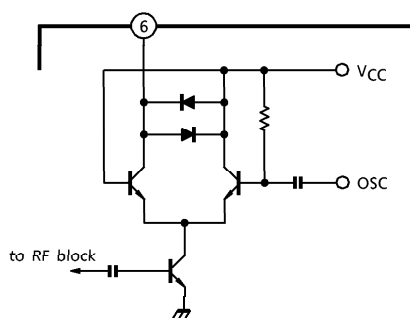
(2) MIX block

The MIX block is composed of the emitter coupled pair amplifier. (Fig.2)

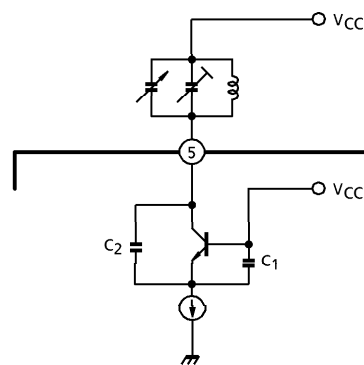
(3) OSC block

OSC block is composed of the colpitts oscillation circuit.

The capacitors C₁ and C₂ are built in this IC.



(Fig.2)



(Fig.3)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V _{CC}	5	V
Power Dissipation	P _D (Note)	240	mW
Operating Temperature	T _{opr}	- 25~75	°C
Storage Temperature	T _{stg}	- 55~150	°C

(Note) Derated above Ta = 25°C in the proportion of 2mW/°C.

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{CC} = 1.5V, Ta = 25°C, f = 83MHz, Δf = ± 22.5kHz, f_m = 1kHz)

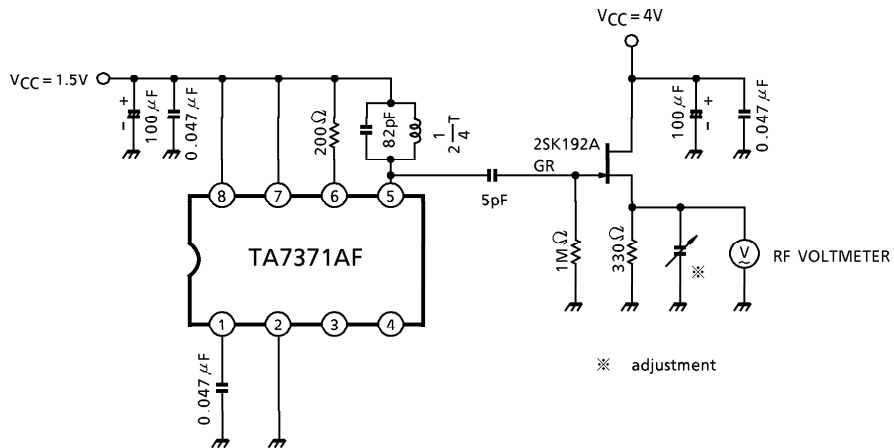
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Current	I _{CC}	2	V _{in} = 0	—	1.8	2.6	mA
Input Limiting Sensitivity	V _{in} (lim)	2	- 3dB Limiting Point	—	10	16	dB/μV EMF
Quiescent Sensitivity	Q _S	2	S / N = 30dB	—	12	—	dB/μV EMF
Conversion Gain	G _C	2	V _{if} = 20mV _{rms}	—	25	—	dB
Local Oscillator Voltage	V _{osc}	1	f = 60MHz	75	110	150	mV _{rms}
Local Oscillator Stop Voltage	V _{stop}	1	f = 60MHz	—	0.85	0.95	V
AFC Diode Capacity	C _{AFC}	6	f = 70MHz, V _{AFC} = 3V	—	5.0	—	pF
Pin① Input Impedance	R _{ip} 1	3	f = 83MHz	—	300	—	Ω
	C _{ip} 1			—	8.7	—	pF
Pin⑥ Input Impedance	R _{op} 2	4	f = 10.7MHz	—	100	—	kΩ
	C _{op} 2			—	3.8	—	pF
Pin⑧ Input Impedance	R _{op} 3	5	f = 83MHz	—	2.2	—	kΩ
	C _{op} 3			—	4.8	—	pF

TERMINAL VOLTAGE

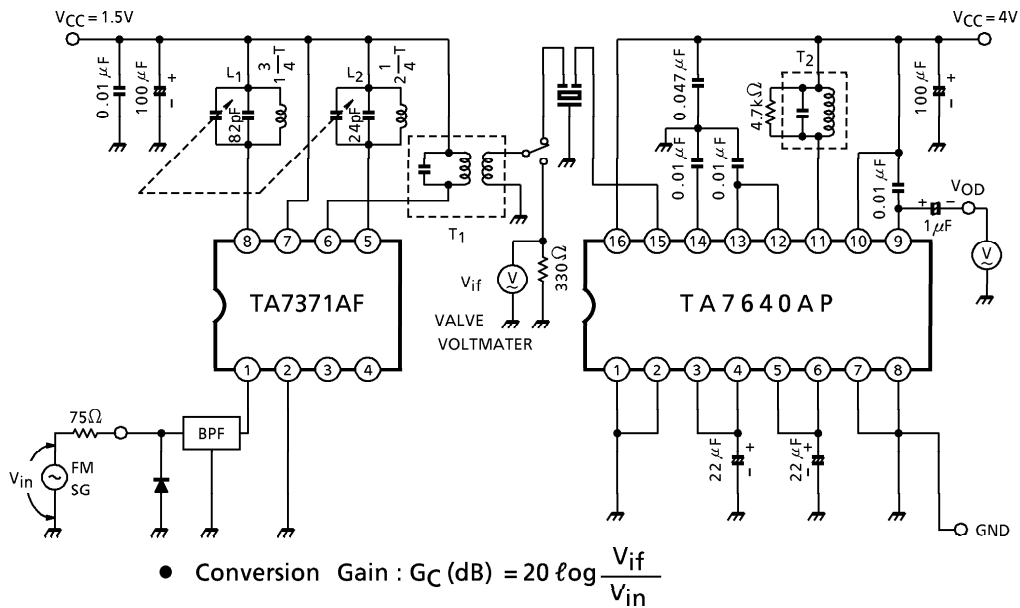
Terminal voltage at no signal (V_{CC} = 1.5V, Ta = 25°C)

TERMINAL No.	TERMINAL NAME	TERMINAL VOLTAGE TYP. (V)
1	RF INPUT	0.7
2	GND	0
3	AFC DIODE (CATHODE)	—
4	AFC DIODE (ANODE)	—
5	LOCAL OSC	1.5
6	MIXER OUTPUT	1.5
7	V _{CC}	1.5
8	RF OUTPUT	1.5

TEST CIRCUIT 1
 V_{osc} , V_{stop} TEST CIRCUIT



TEST CIRCUIT 2

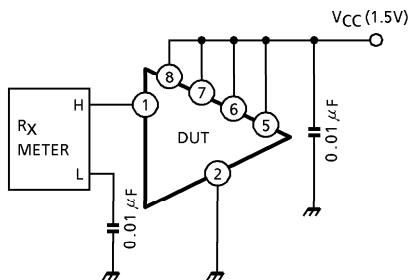


INPUT/OUTPUT IMPEDANCE TEST CIRCUIT

Input/output impedance and AFC diode capacity test circuit

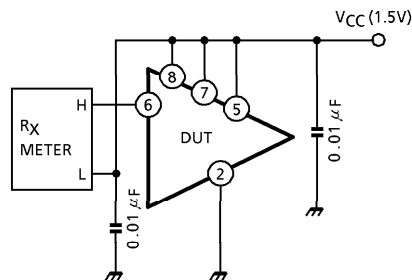
TEST CIRCUIT 3 (R_{ip} 1, C_{ip} 1)

Pin① input impedance



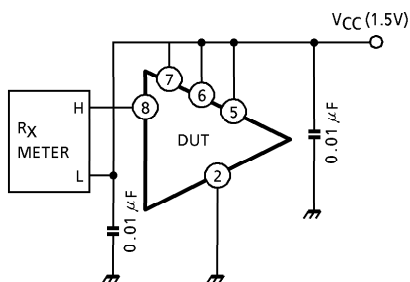
TEST CIRCUIT 4 (R_{op} 2, C_{op} 2)

Pin⑥ output impedance



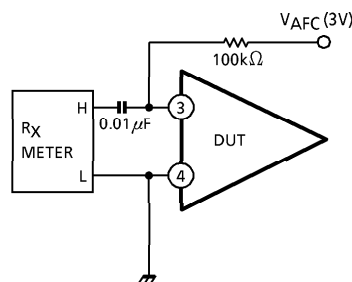
TEST CIRCUIT 5 (R_{op} 3, C_{op} 3)

Pin⑧ output impedance



TEST CIRCUIT 6 (C_{AFC})

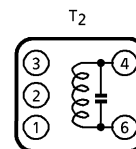
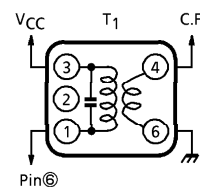
AFC diode



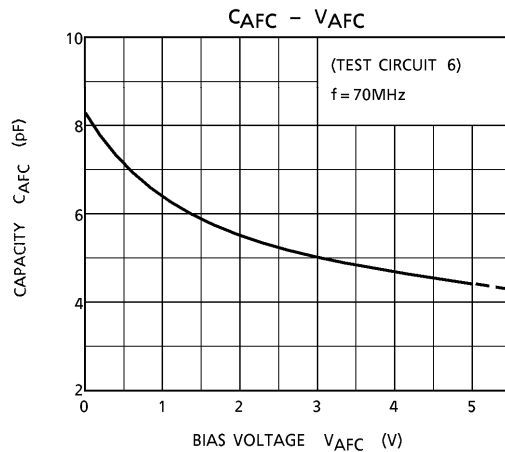
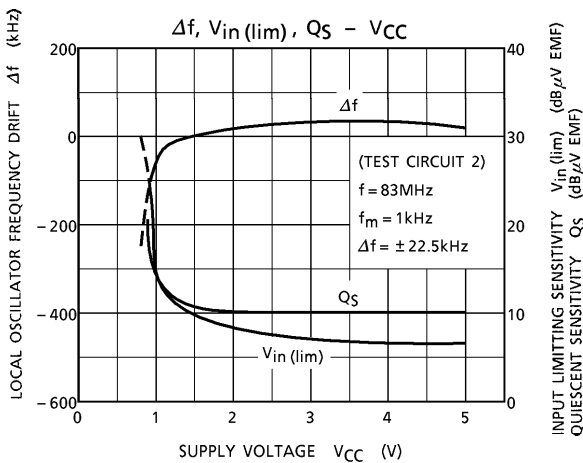
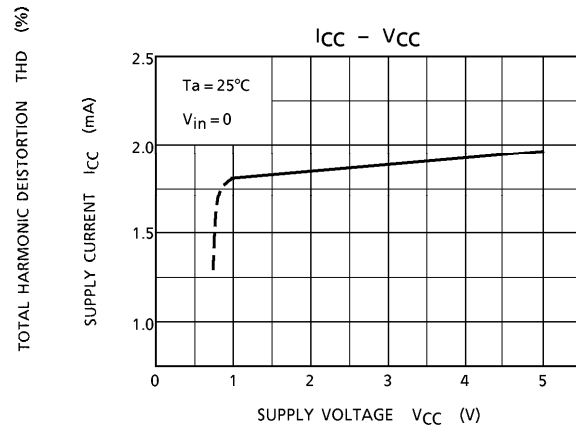
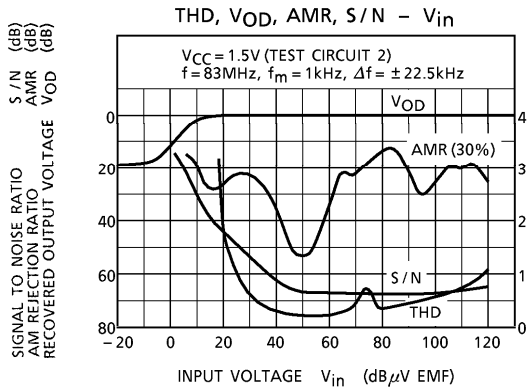
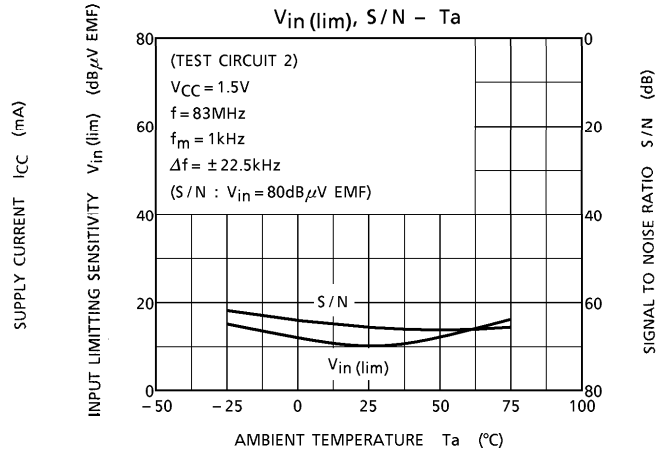
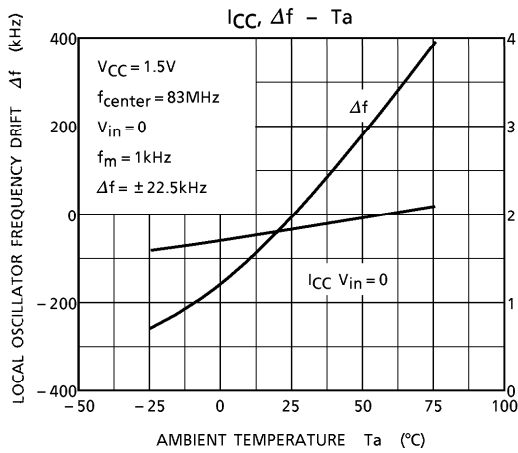
COIL DATA FOR TEST CIRCUIT (Lower side heterodyne type)

COIL NAME	f_o	Q_o	TURN	CAPACITANCE	COMMENT
L ₁ RF	100MHz	85	①-③ 1 $\frac{3}{4}$ -T	82pF (External)	Bobbin with ferrite core ϕ 0.5mm UEW
L ₂ OSC	100MHz	100	①-③ 2 $\frac{1}{4}$ -T	24pF (External)	Bobbin with ferrite core ϕ 0.5mm UEW
T ₁ IFT	10.7MHz	115	①-③ 12T ④-⑥ 1T	75pF	SUMIDA ELECTRIC Co. LTD. 0133-309-048
T ₂ QUAD	10.7MHz	150	④-⑥ 14T	47pF	SUMIDA ELECTRIC Co. LTD. 44M-037-933A

RF BPF SOSHIN ELECTRIC Co. LTD. BPW B6A
IF BPF MURATA ELECTRIC Co. LTD. SFE 10.7 MA5

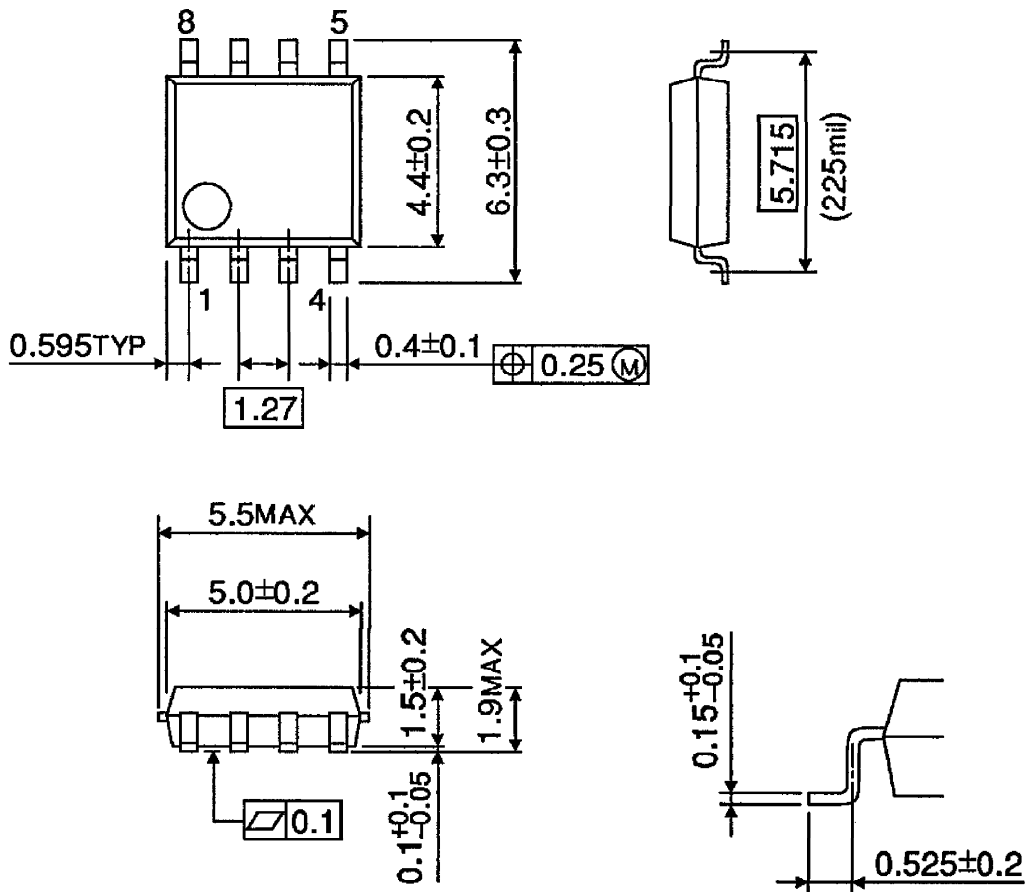


(Bottom view)



OUTLINE DRAWING
SOP8-P-225-1.27

Unit : mm



Weight : 0.08g (Typ.)