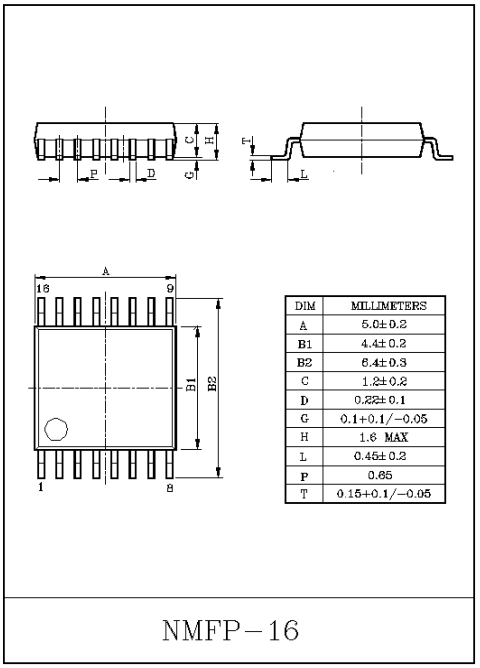
KIA8182FN

BIPOLAR LINEAR INTEGRATED CIRCUIT

TV/FM SYSTEM FRONT END (1.5V USE)

The KIA8182FN is TV/FM Front End IC, which is designed for 1.5V headphone radio.



DIM	MILLIMETERS
A	5.0±0.2
B1	4.4±0.2
B2	6.4±0.3
C	1.2±0.2
D	0.22±0.1
G	0.1+0.1/−0.05
H	1.6 MAX
L	0.45±0.2
P	0.65
T	0.15+0.1/−0.05

NMFP-16

FEATURES

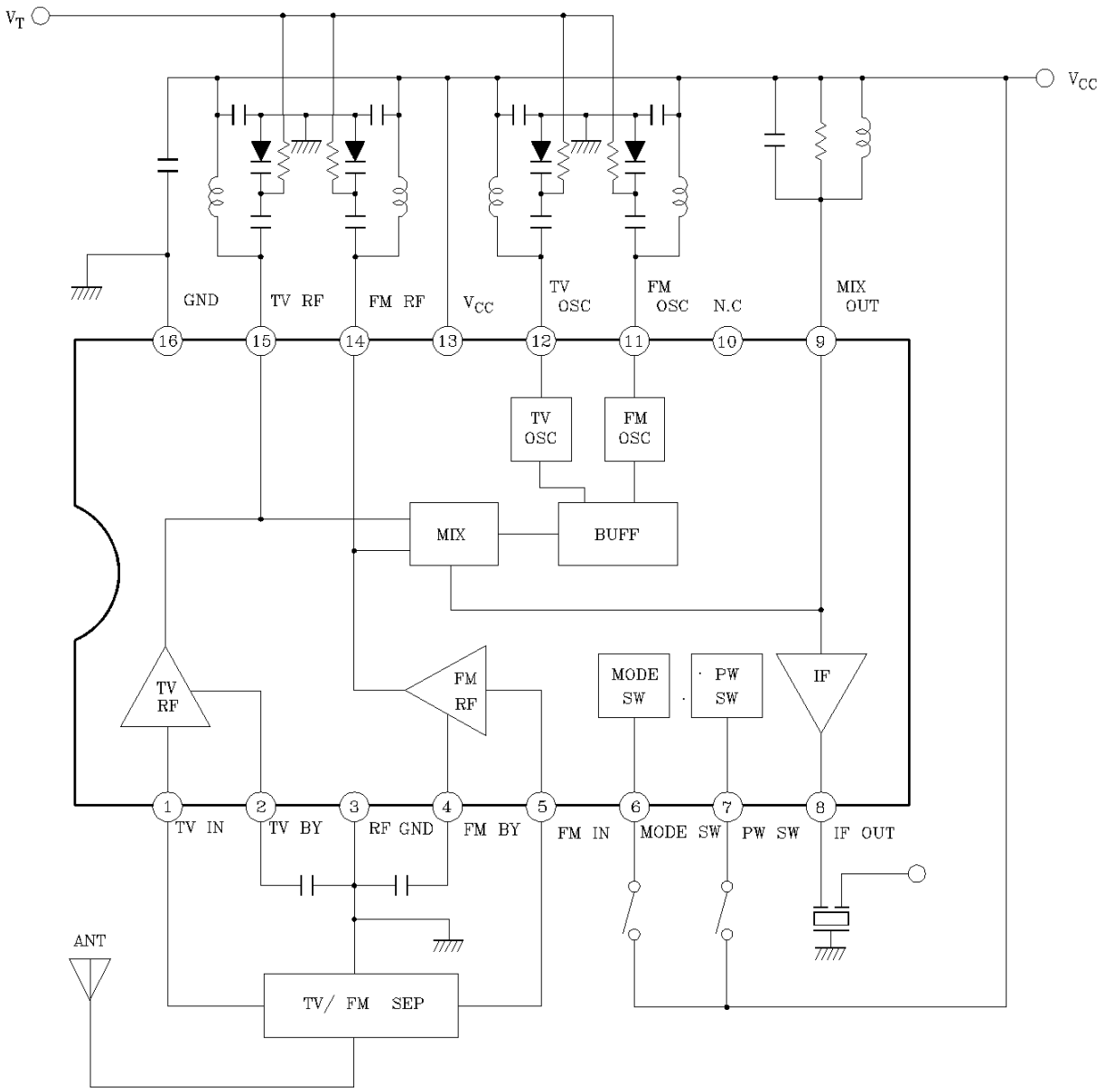
- Built-in VHF/FM band front end.
  - FM Mode : 75~109MHz
  - TV Mode : 175~225MHz
- Suitable for combination with Digital Tuning System.
- Built-in power ON/OFF switch.
- Built-in band switch.(FM/TV)
- Built-in IF amp.
- Built-in oscillator buffer circuit.
- Imjproved inter-Modulation characteristics by Double balanced type mixer circuit.
- Operating supply voltage range. (Ta=25℃)
  : $V_{CC(opr)}$=0.95~4V.

MAXIMUM RATINGS (Ta=25℃)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	4.5	V
Power Dissipation (Note)	P_D	400	mW
Operating Temperature	T_{opr}	-25~75	℃
Storage Temperature	T_{stg}	-55~150	

Note) Derated above Ta=25℃ in the proportion of 3.2mW/℃

BLOCK DIAGRAM

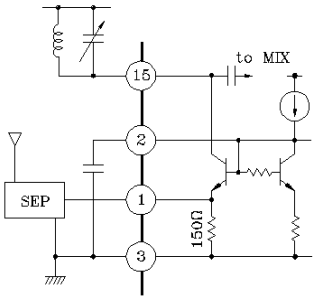
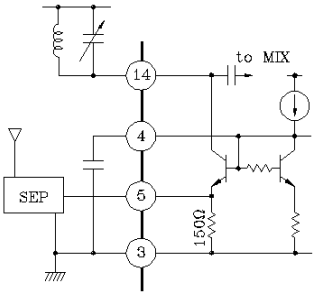
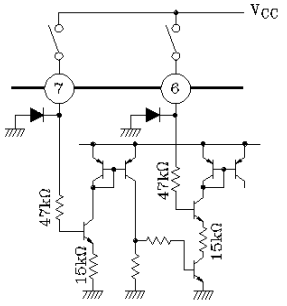
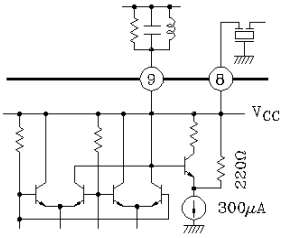


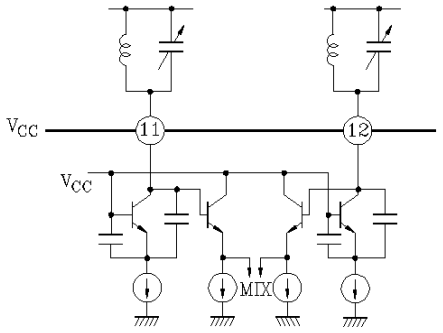
ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{CC}=1.2V, f_{FM}=92MHz, f_{TV}=200MHz, Δf=±22.5kHz, f=1kHz, Ta=25℃ SW2 : b)

CHARACTERISTIC		SYMBOL	TEST CIRCUIT	SW_1	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Supply Current		I_{CC1}	1	a	V_{IN}< -20dBμV EMF	IC OFF SW2 : a	-	0.1	5	μA
		I_{CC2}				FM MODE	-	4.6	6.0	mA
		I_{CC3}		b		TV MODE	-	5.5	7.0	
FM	Conversion Gain	G_{C1}	2	a	V_{IN}=65dBμV EMF		29	33	-	dB
	Local OSC Voltage	V_{OSC1}	3		f_{OSC}=65MHz		-	47	-	mV_{rms}
	Local OSC Stop Voltage	V_{STP1}					-	0.85	0.95	V
TV	Conversion Gain	G_{C2}	2	b	V_{IN}=65dBμV EMF		21	25	-	dB
	Local OSC Voltage	V_{OSC2}	3		f_{OSC}=165MHz		-	27	-	mV_{rms}
	Local OSC Stop Voltage	V_{STP2}					-	0.88	0.95	V
Power ON Current		I_7	1	a	V_{CC}=0.95V, V_2≦0.2V SW_2 : d, V_4≧0.4V		5	-	-	μA
Power OFF Voltage		V_7		a	V_{CC}=0.95V, V_2≦0.2V SW_2 : c, V_4≦0.2V		0	-	0.3	V
TV Mode On Current		I_6		d	V_{CC}=0.95V, V_2≧0.4V V_4≦0.2V		5	-	-	μA
FM Mode On Voltage		V_6		c	V_{CC}=0.95V, V_2≦0.2V V_4≧0.4V		0	-	0.3	V

EXPLANATION OF TERMINALS (Terminal voltage V_{CC}=1.2V, Ta=25℃)

PIN NO.	TERMINAL NAME	CONTENTS	INTERNAL EQUIVALENT CIRCUIT	DC VOLTAGE(V) (at No Signal)	
				FM	TV
1	TV IN	Input of TV RF Signal (Common Base Type)		0	0.1
2	TV BY	By-pass terminal of TV RF and MIX. (Radiation is lightened by connected capacitor)		-	0.7
15	TV RF	TV Band RF Tuning Circuit is Connected		1.2	1.2
3	RF GND	-	-	0	0
4	FM BY	By-pass terminal of FM RF and MIX. (Radiation is lightened by connected capacitor)		0.7	-
5	FM IN	Input of FM RF Signal (Common Base Type)		0.1	-
14	FM RF	FM RF Tuning Circuit is Connected		1.2	1.2
6	MODE SW	Mode Switch [V_{CC} : TV Mode [GND/OPEN : FM Mode		0	1.2
7	PW SW	Power ON/OFF Switch [V_{CC} : Power ON [GND/OPEN : Power OFF		1.2	1.2
8	IF OUT	·Output of TV/FM IF Signal ·Output Impedance 330Ω (Typ.)		0.5	0.5
9	MIX OUT	Mixer Coil is Connected		1.2	1.2

PIN NO.	TERMINAL NAME	CONTENTS	INTERNAL EQUIVALENT CIRCUIT	DC VOLTAGE(V) (at N_O Signal)	
				FM	TV
10	NC	This terminal should be connected with V_{CC} line or open	-	-	-
11	FM OSC	FM OSC Tank Circuit is Connected (Collpitts type oscillator)		1.2	1.2
12	TV OSC	TV OSC Tank Circuit is Connected (Collpitts type oscillator)		1.2	1.2
13	V_{CC}	V_{CC}	-	1.2	1.2
16	GND	GND (Except RF Part)	-	0	0

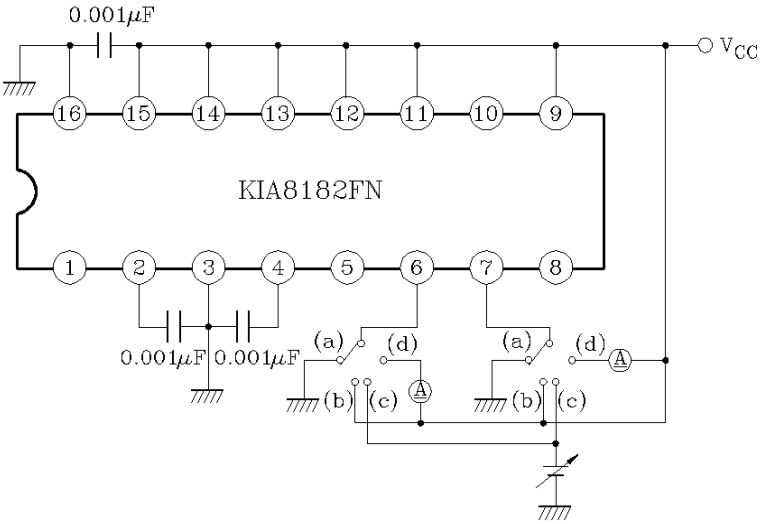
APPLICATION NOTE

1. PW SW
   It is necessary to connect an external pull-down resistor with the terminal PW SW (pin ⑦), in case that this IC is turned on due to external noise etc.

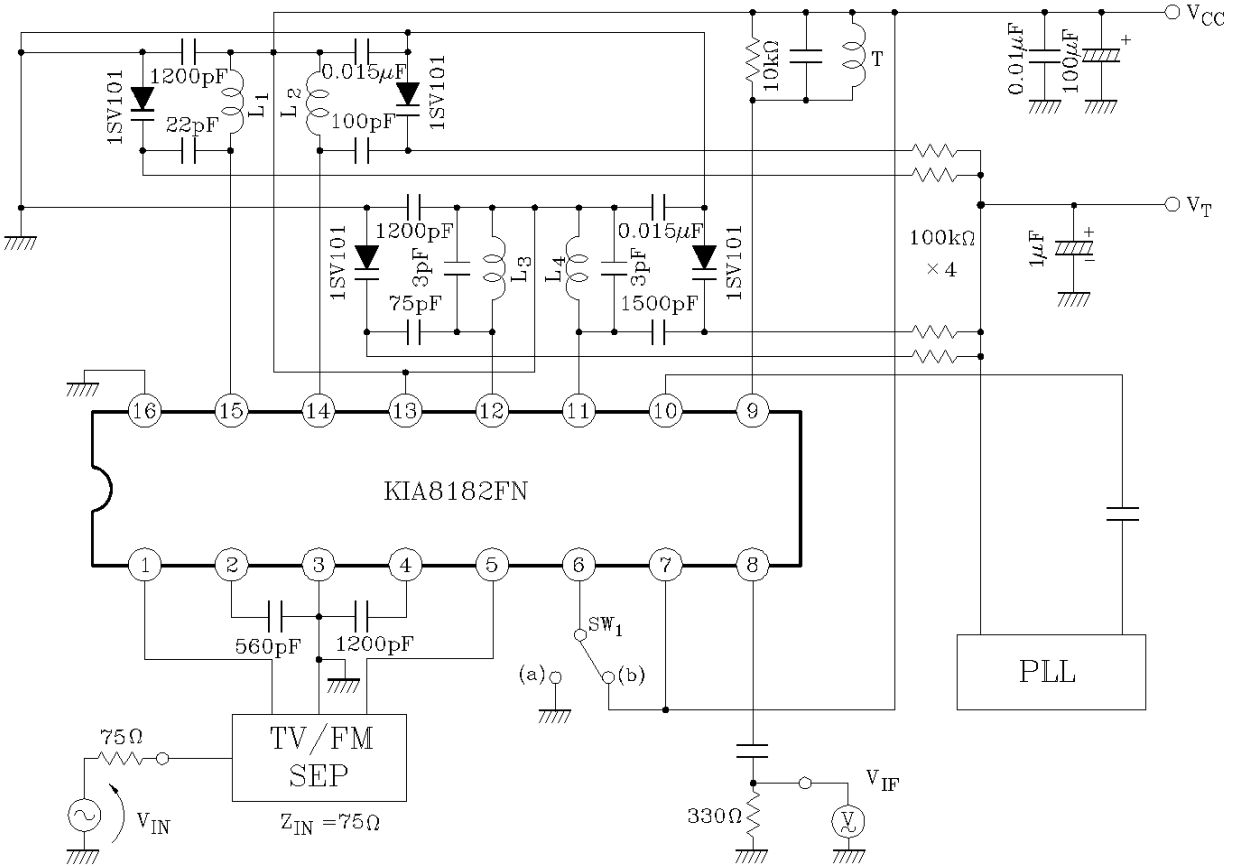
2. MODE SW
   It is necessary to connect an external pull-down resistor with the terminal MODE SW (pin ⑥), in case that this IC doesn't operate normally due to external noise etc.

2. RF GND
   This IC has two GND terminals (pin ③ : RF GND, pin ⑯ : GND). External parts shown in below should de connected with RF GND (pin ③), and other parts should be connected with GND (pin ⑯).
   · By-pass capacitor at pin ⑭ (FM RF) and pin ⑮ (TV RF)
   · By-pass capacitor at pin ④ (FM BY) and pin ② (TV BY)
   The pattern diagram of capacitor connected with pin ② and pin ④ should be shortly, because RF circuit and MIX circuit operate on the voltage of pin ② or pin ④.

TEST CIRCUIT 1



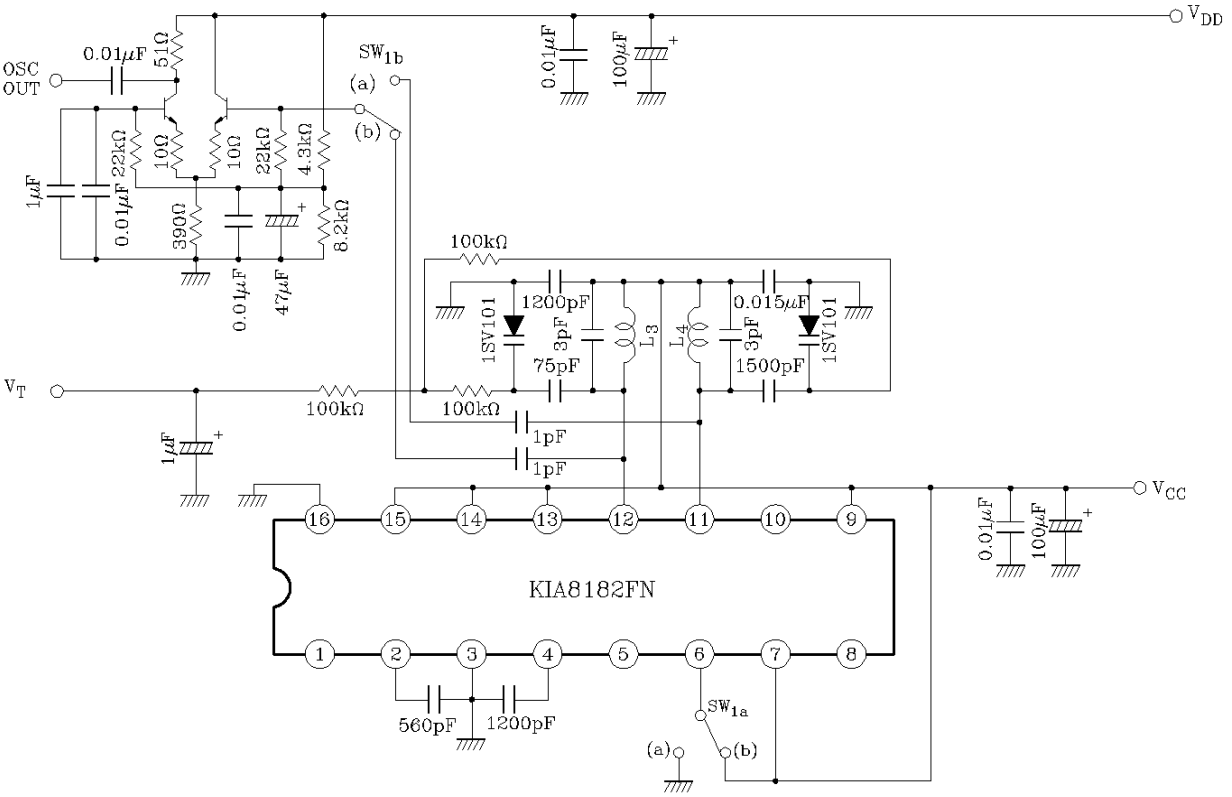
TEST CIRCUIT 2



$G_C(dB)=20\log V_{IF}\ (\mu V_{rms})-(V_{IN}\ (dB\mu V\ EMF)-6(dB))$

TV/FM SEPARATOR : GTVS03 (SOSHIN ELECTRIC CO., LTD.)

TEST CIRCUIT 3

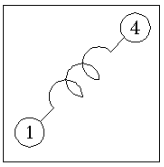


COIL DATA FOR TEST CIRCUIT

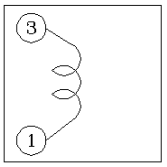
COIL SYMBOL	TEST FREQUENCY	C_O (pF)	Q_O	TURNS		WIRE (mmϕ)	REFERENCE
				1-3	1-4		
L_1 TV RF	100MHz	-	55	-	1 1/2	0.5 UEW	ⓢ 0258-236
L_2 FM RF	100MHz	-	90	-	3 1/2	0.5 UEW	ⓢ 0258-238
L_3 TV OSC	100MHz	-	55	1 ¼	-	0.5 UEW	ⓢ 0258-250
L_4 FM OSC	100MHz	-	90	-	3 1/2	0.5 UEW	ⓢ 0258-238
T FM IFT	10.7MHz	82	45	18	-	0.09 UEW	ⓢ 4162-083A

ⓢ : SUMIDA ELECTRIC Co., Ltd.

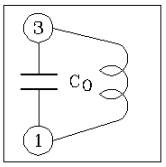
L1, L2, L3



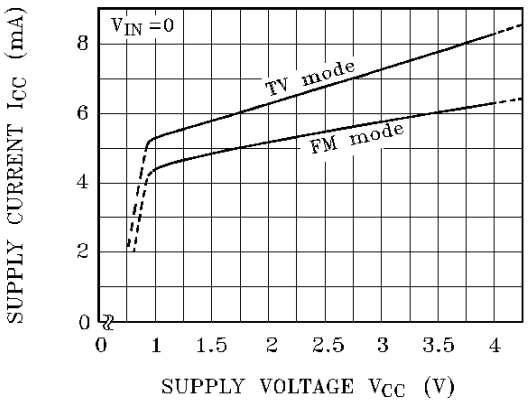
L4



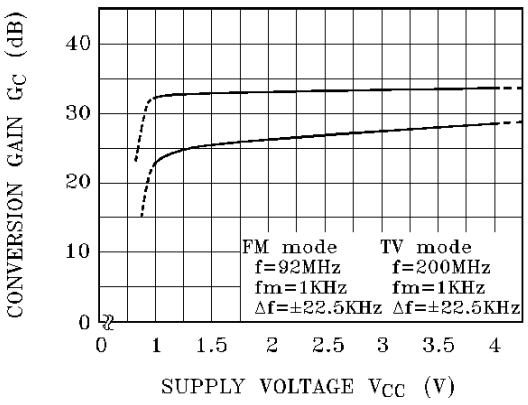
T



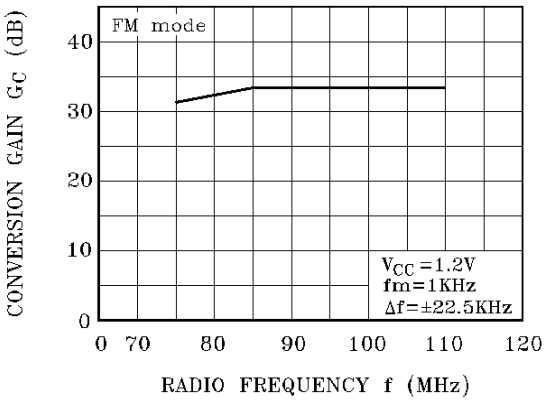
I_{CC} – V_{CC}



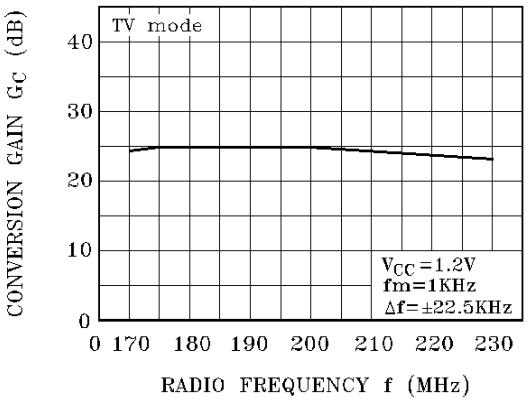
G_C – V_{CC}



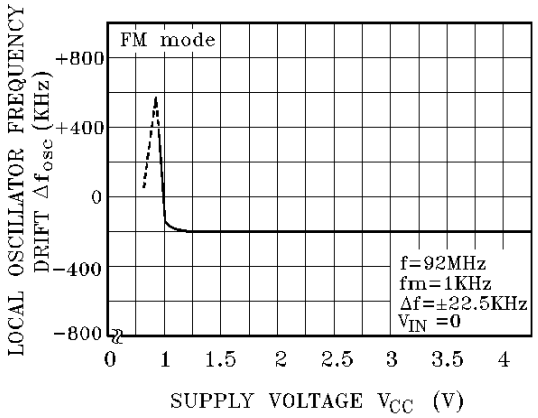
G_C – f



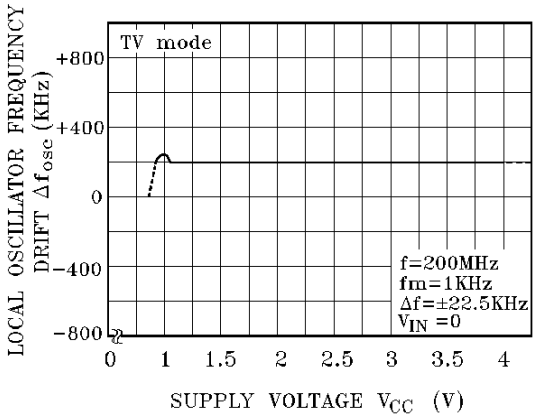
G_C – f



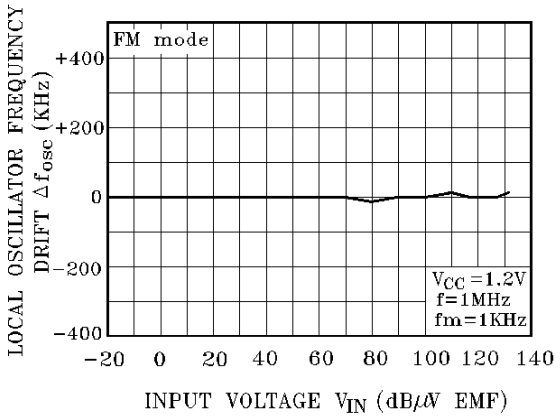
Δf_{osc} – V_{CC}



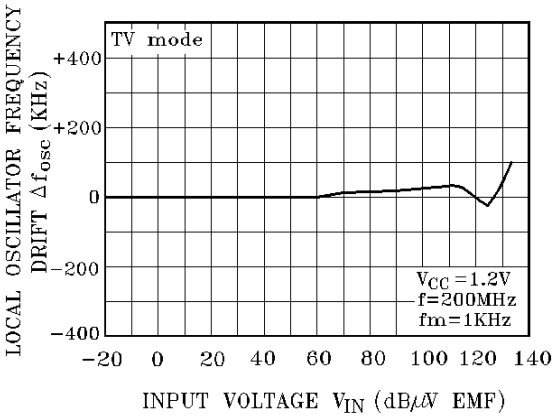
Δf_{osc} – V_{CC}



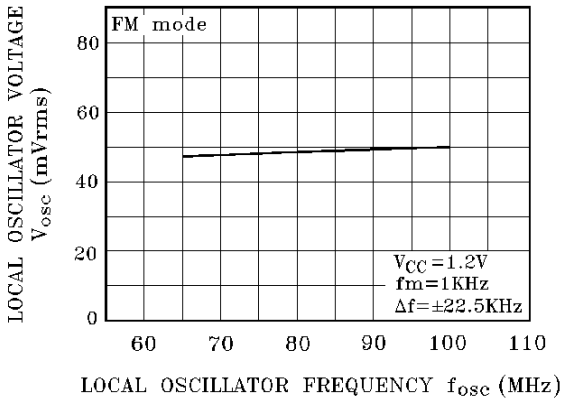
Δf_{osc} – V_{IN}



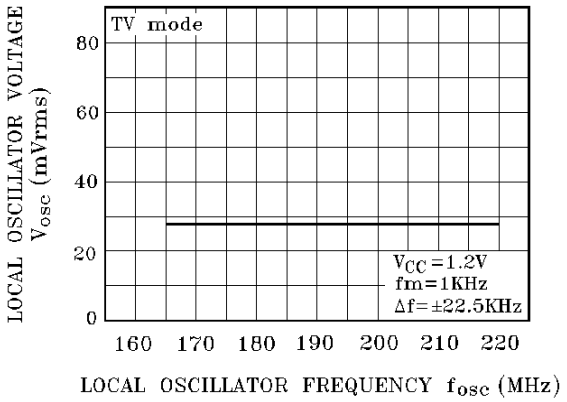
Δf_{osc} – V_{IN}



V_{osc} – f_{osc}



V_{osc} – f_{osc}



V_{osc} – V_{CC}