

TV/FM SYSTEM FRONT END (1.5V USE)

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

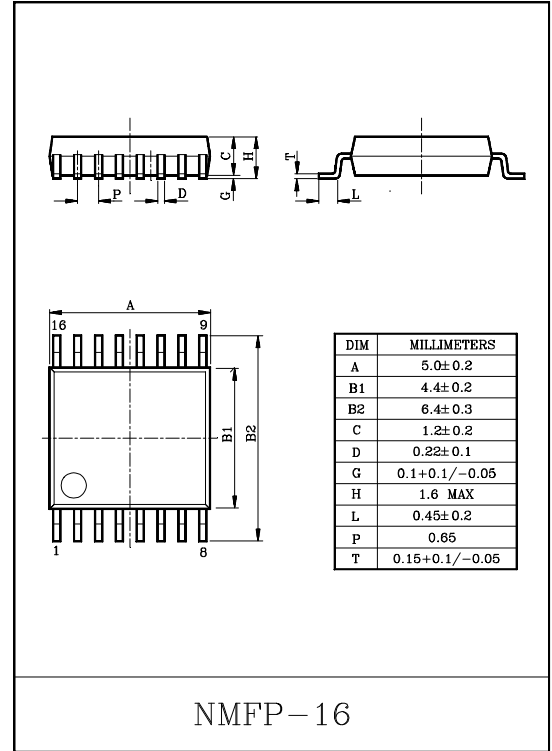
FEATURES

- 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.
- Improved inter-Modulation characteristics by Double balanced type mixer circuit.
- Operating supply voltage range. (Ta=25°C)
 - : V_{CC(opr)}=0.95~4V.

MAXIMUM RATINGS (Ta=25°C)

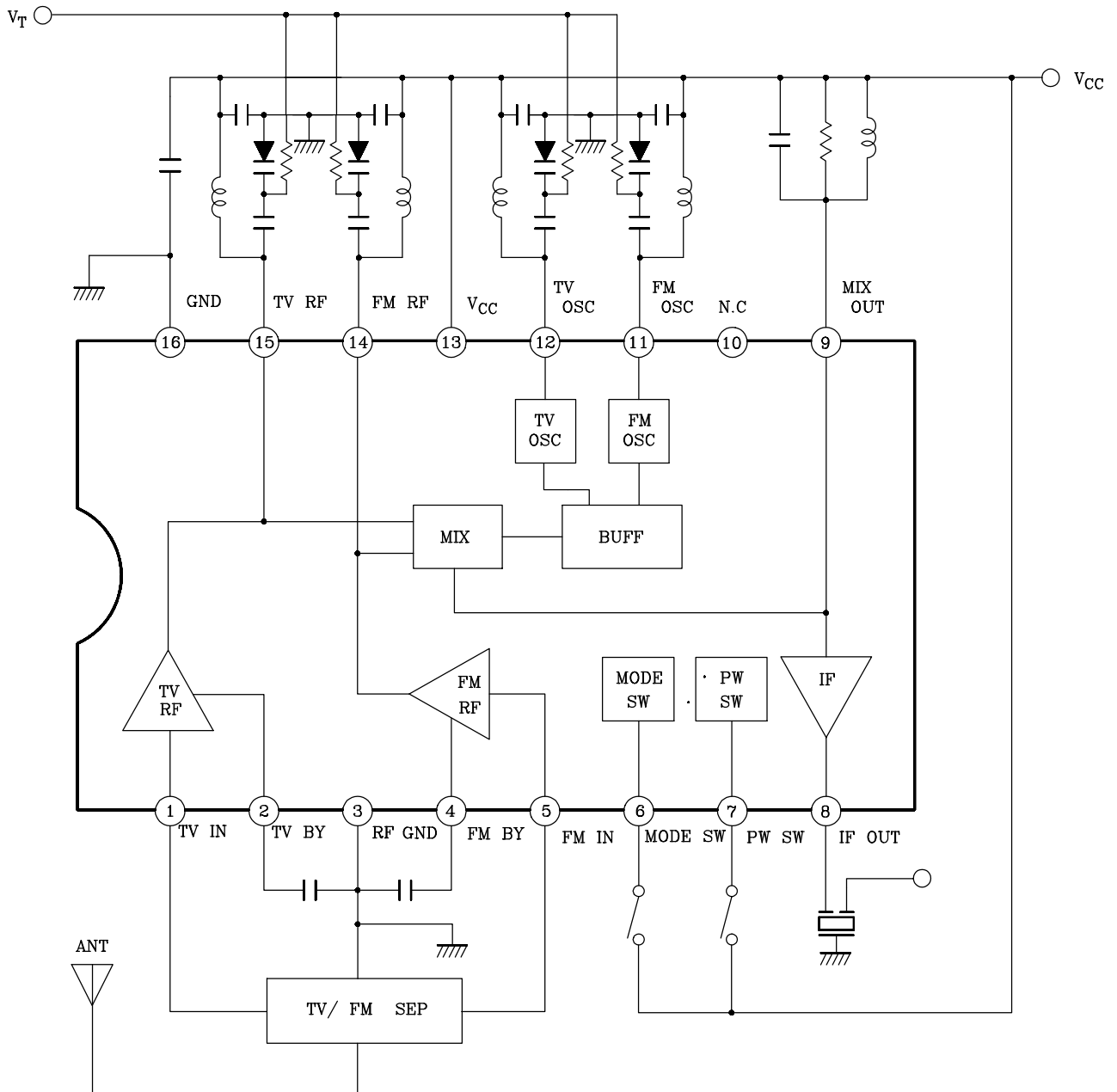
CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V _{CC}	4.5	V
Power Dissipation (Note)	P _D	400	mW
Operating Temperature	T _{opr}	-25~75	°C
Storage Temperature	T _{stg}	-55~150	

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



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BLOCK DIAGRAM



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ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, $V_{CC}=1.2V$, $f_{FM}=92MHz$, $f_{TV}=200MHz$, $\Delta f=\pm 22.5kHz$, $f=1kHz$, $T_a=25^\circ C$ SW2 : b)

CHARACTERISTIC		SYMBOL	TEST CIRCUIT	SW ₁	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Supply Current		I_{CC1}	1	a	$V_{IN}<-20dB\mu V$ 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	$V_{IN}=65dB\mu V$ 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	$V_{IN}=65dB\mu V$ 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	$V_{CC}=0.95V$, $V_2\leq 0.2V$ SW ₂ : d, $V_4\geq 0.4V$	5	-	-	μA	
Power OFF Voltage		V_7		a	$V_{CC}=0.95V$, $V_2\leq 0.2V$ SW ₂ : c, $V_4\leq 0.2V$	0	-	0.3	V	
TV Mode On Current		I_6		d	$V_{CC}=0.95V$, $V_2\geq 0.4V$ $V_4\leq 0.2V$	5	-	-	μA	
FM Mode On Voltage		V_6		c	$V_{CC}=0.95V$, $V_2\leq 0.2V$ $V_4\geq 0.4V$	0	-	0.3	V	

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EXPLANATION OF TERMINALS (Terminal voltage $V_{CC}=1.2V$, $T_a=25^\circ C$)

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 $\left[\begin{array}{l} V_{CC} : \text{TV Mode} \\ \text{GND/OPEN} : \text{FM Mode} \end{array} \right.$		0	1.2
7	PW SW	Power ON/OFF Switch $\left[\begin{array}{l} V_{CC} : \text{Power ON} \\ \text{GND/OPEN} : \text{Power OFF} \end{array} \right.$		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

KIA8182FN

PIN NO.	TERMINAL NAME	CONTENTS	INTERNAL EQUIVALENT CIRCUIT	DC VOLTAGE(V) (at No 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

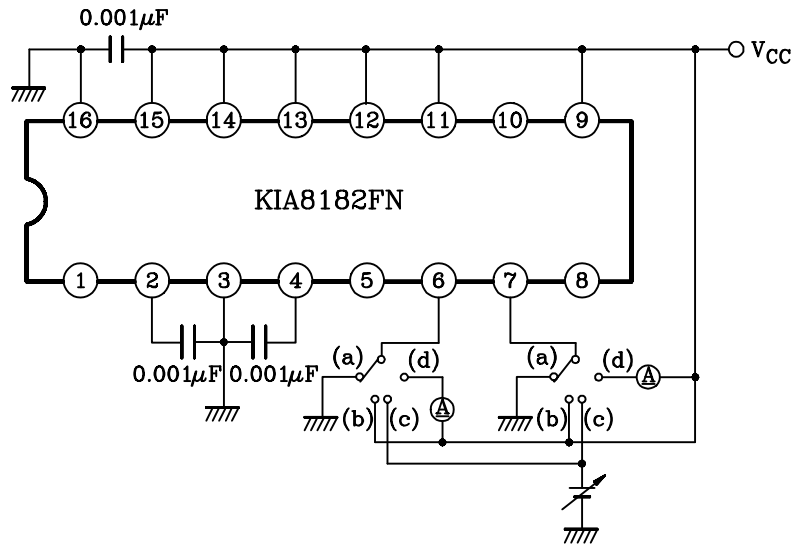
This IC has two GND terminals (pin ③ : RF GND, pin ⑩ : GND). External parts shown in below should be connected with RF GND (pin ③), and other parts should be connected with GND (pin ⑩).

- 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)

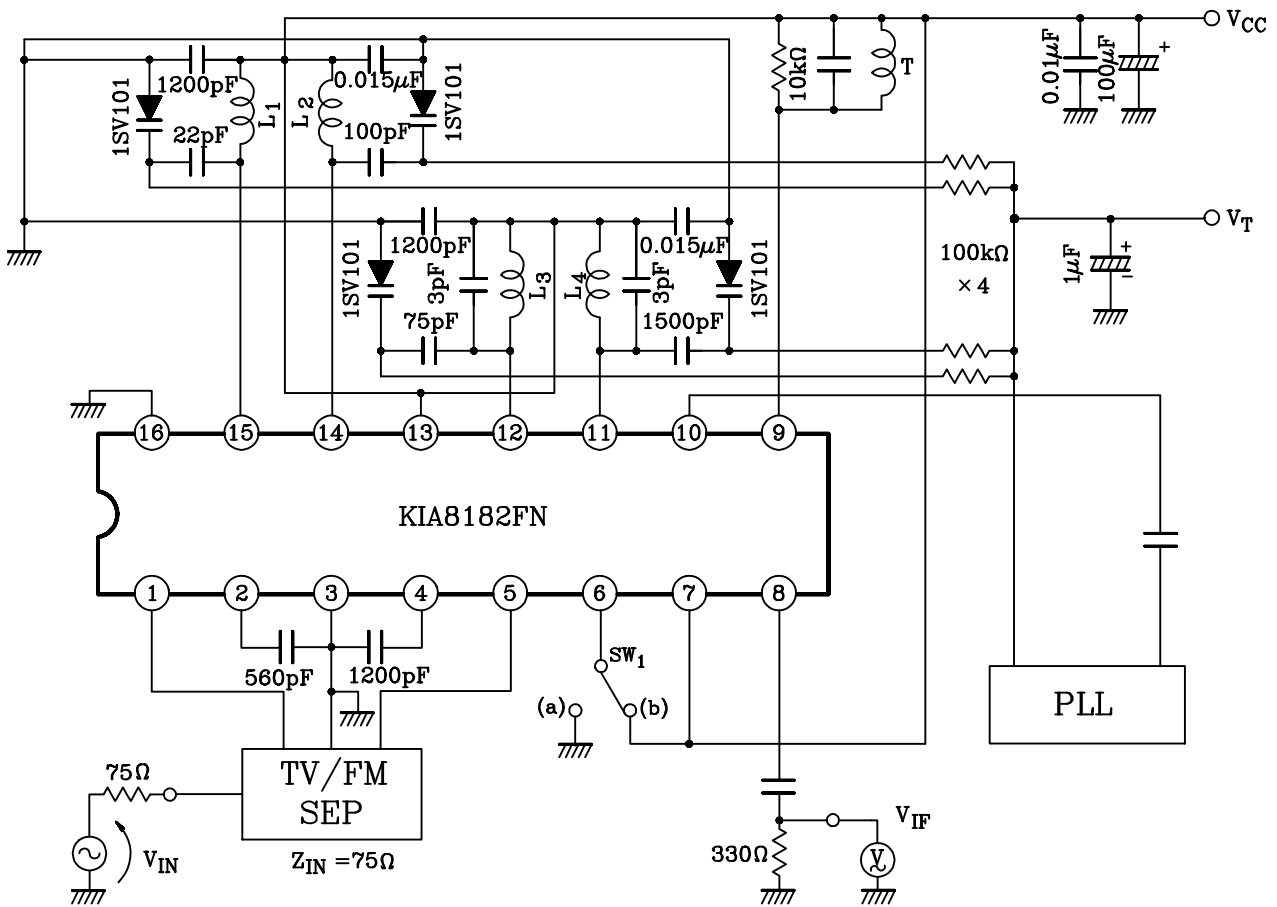
The pattern diagram of capacitor connected with pin ② and pin ④ should be shortly, because RF circuit and MIX circuit operate on the voltage of pin ② or pin ④.

KIA8182FN

TEST CIRCUIT 1



TEST CIRCUIT 2

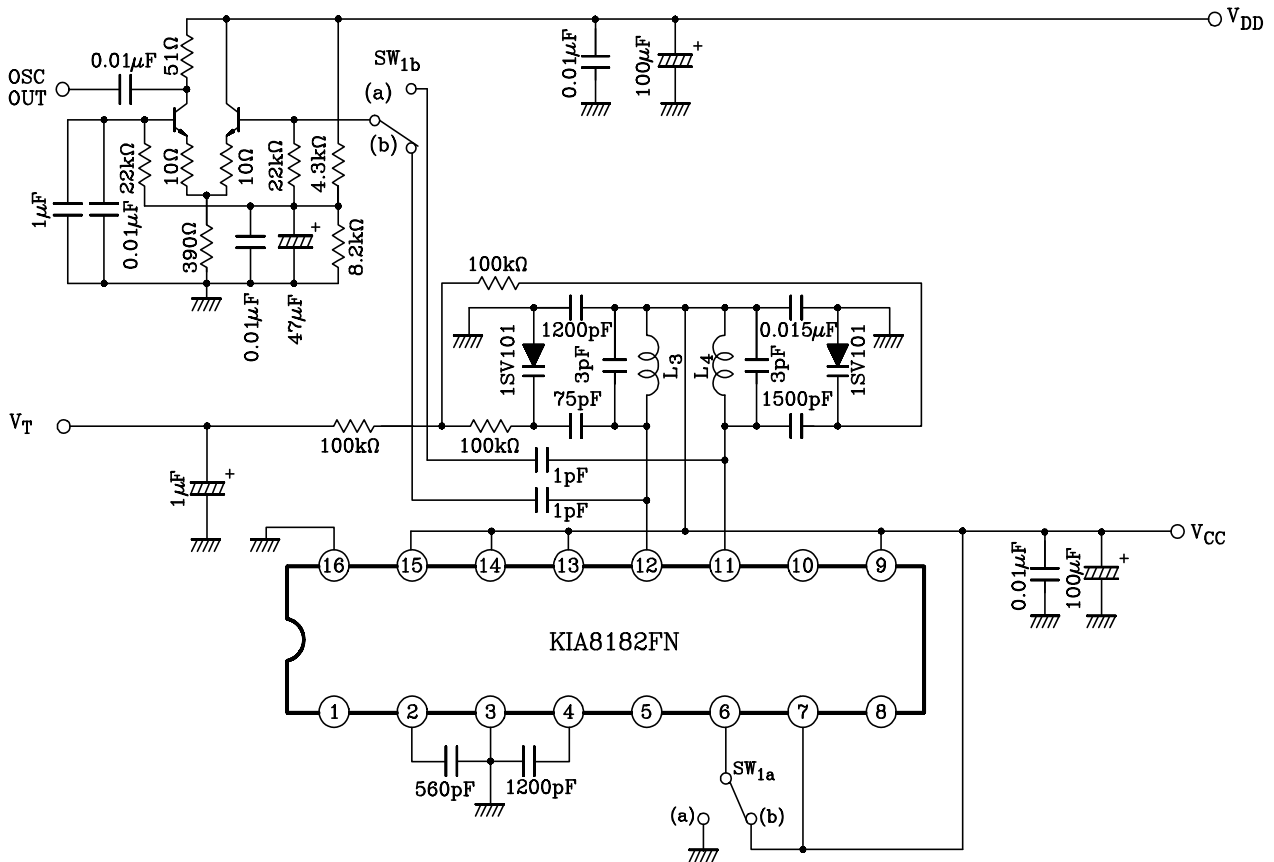


$$G_C(\text{dB}) = 20 \log V_{IF} (\mu\text{V}_{\text{rms}}) - (V_{IN} (\text{dB}\mu\text{V EMF}) - 6(\text{dB}))$$

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

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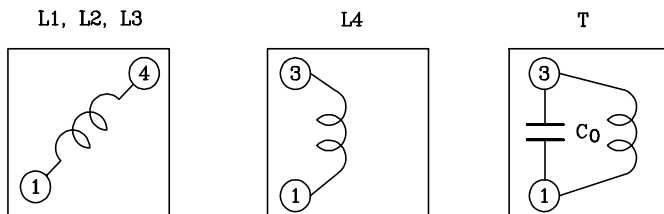
TEST CIRCUIT 3



COIL DATA FOR TEST CIRCUIT

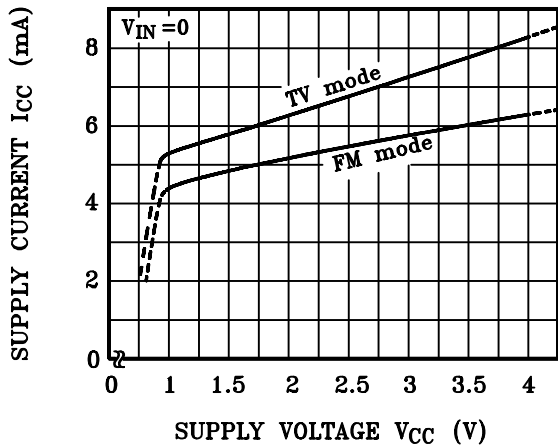
COIL SYMBOL	TEST FREQUENCY	C ₀ (pF)	Q ₀	TURNS		WIRE (mm ϕ)	REFERENCE
				1-3	1-4		
L ₁ TV RF	100MHz	-	55	-	1 1/2	0.5 UEW	Ⓢ 0258-236
L ₂ FM RF	100MHz	-	90	-	3 1/2	0.5 UEW	Ⓢ 0258-238
L ₃ TV OSC	100MHz	-	55	1 1/4	-	0.5 UEW	Ⓢ 0258-250
L ₄ FM OSC	100MHz	-	90	-	3 1/2	0.5 UEW	Ⓢ 0258-238
T FM IFT	10.7MHz	82	45	18	-	0.09 UEW	Ⓢ 4162-083A

Ⓢ : SUMIDA ELECTRIC Co., Ltd.

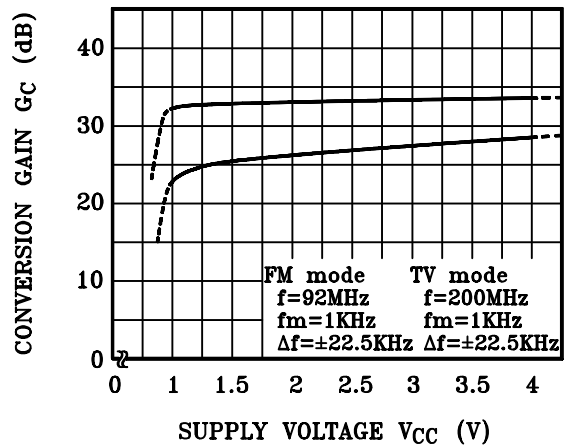


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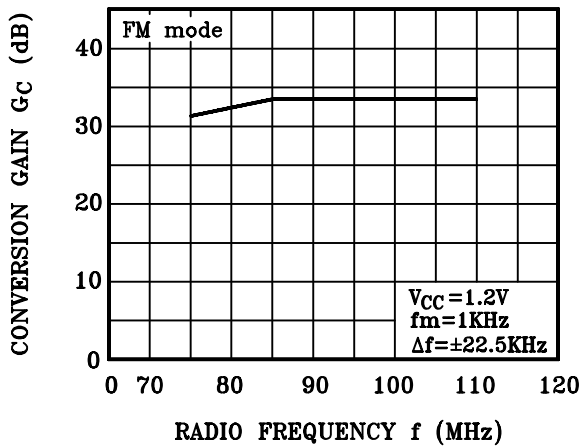
$I_{CC} - V_{CC}$



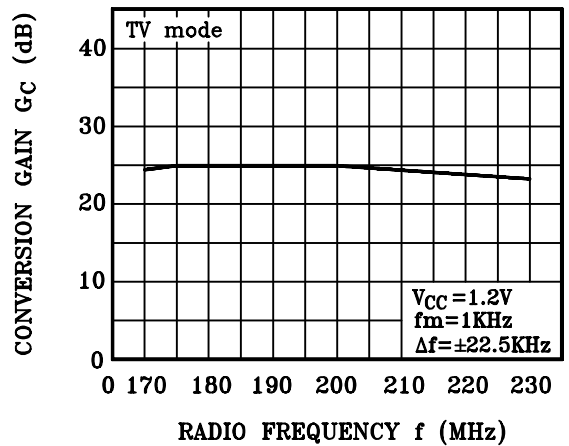
$G_C - V_{CC}$



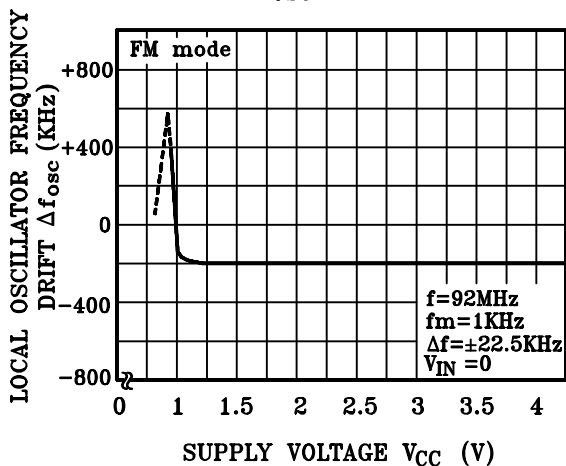
$G_C - f$



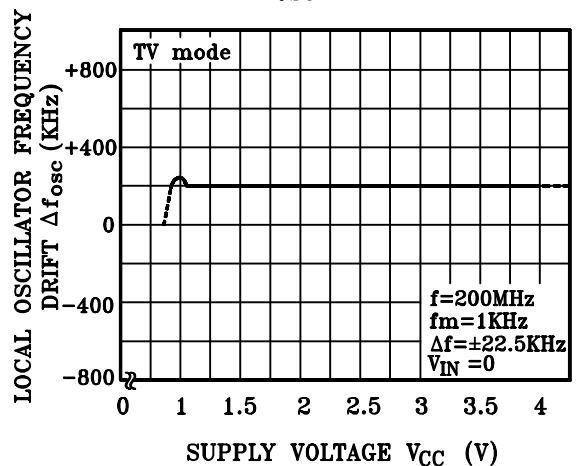
$G_C - f$



$\Delta f_{osc} - V_{CC}$



$\Delta f_{osc} - V_{CC}$



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