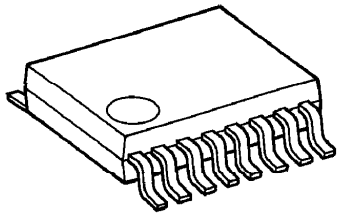
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA8182FN

TV / FM SYSTEM F / E (1.5V USE)

The TA8182FN is a TV / FM SYSTEM FRONT END IC, which is developed for headphone radio in 1.5V use. It is built in FM F / E and TV F / E (Japanese VHF band).



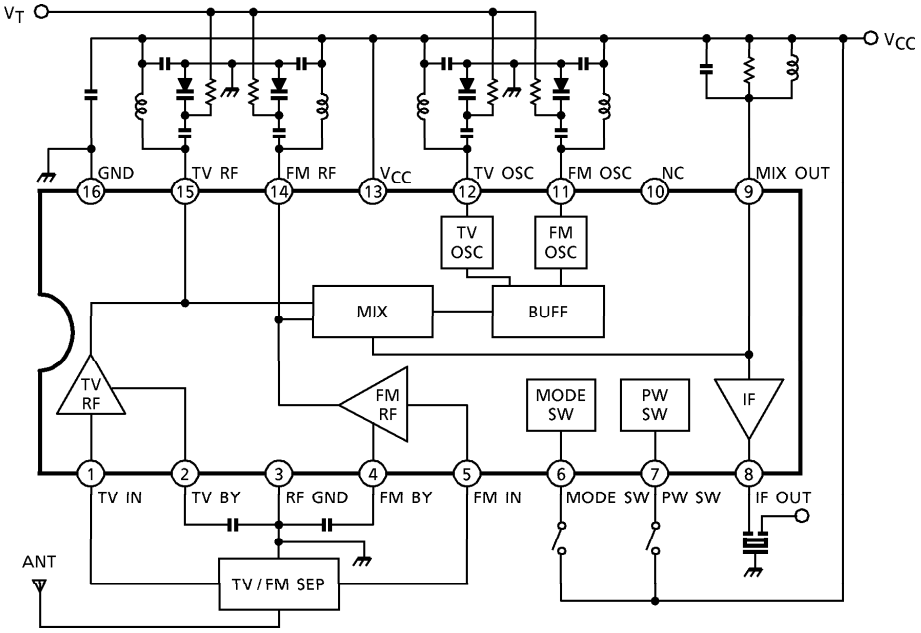
SSOP16-P-225-0.65B

Weight : 0.09g (Typ.)

FEATURES

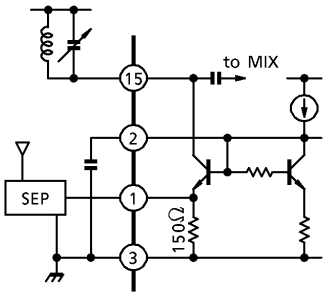
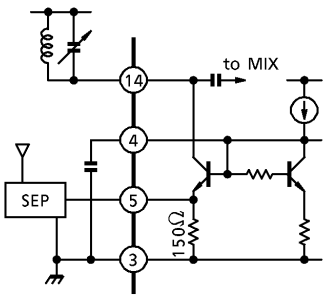
- Built-in FM F / E and TV F / E
  FM mode : 75~109MHz
  TV mode : 175~225MHz
- Suitable for combination with Digital Tuning System.
- Built-in power switch
- Built-in FM / TV switch
- Built-in IF amplifier
- Improved Inter-Modulation characteristics by Double Balanced Type Mixer circuit.
- Supply current (V_{CC} = 1.2V, Ta = 25°C)
  FM mode : I_{CC} = 4.6mA (Typ.)
  TV mode : I_{CC} = 5.5mA (Typ.)
- Operating supply voltage range (Ta = 25°C)
  $V_{CC\ (opr)}$ = 0.95~4V

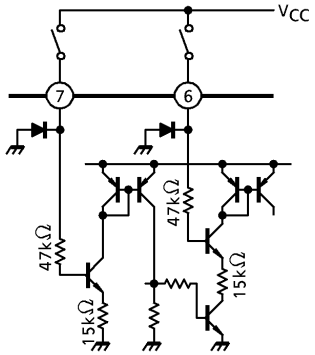
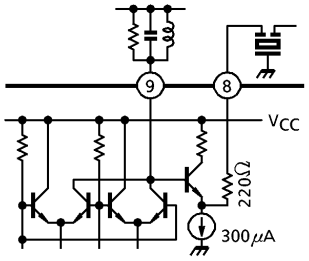
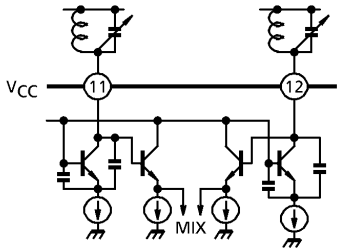
BLOCK DIAGRAM



TERMINAL EXPLANATION

Terminal voltage : Typ. terminal voltage at no signal with test circuit. (V_{CC} = 1.2V, Ta = 25°C)

TERMINAL No.	TERMINAL NAME	FUNCTION	INTERNAL CIRCUIT	TERMINAL VOLTAGE (V) FM	TERMINAL VOLTAGE (V) 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 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

TERMINAL No.	TERMINAL NAME	FUNCTION	INTERNAL CIRCUIT	TERMINAL VOLTAGE (V) FM	TV
6	MODE SW	Mode switch. (V_{CC} : TV mode / Open / GND : FM mode)		0	1.2
7	PW SW	Power switch. (V_{CC} : Power on / Open / GND : 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	MIX Coil is connected.		1.2	1.2
10	NC	This terminal should be connected with V_{CC} line or open.	—	—	—
11	FM OSC	FM OSC tank circuit is connected. (Colpitts type oscillator)		1.2	1.2
12	TV OSC	TV OSC tank circuit is connected. (Colpitts 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 (pin⑦), 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 (pin⑥), in case that this IC doesn't operate normally due to external noise etc.

3. RF GND

   This IC has two GND terminals (pin③ : RF GND, pin⑯ : GND). External parts shown in below should be connected with RF GND (pin③), and other parts should be connected with GND (pin⑯).

   - By-pass capacitor at pin⑭ (FM RF) and pin⑮ (TV RF)
   - By-pass capacitor at pin④ (FM BY) and pin② (TV BY)

   The pattern diagram of capacitor connected with pin② and pin④ should be shortly, because RF circuit and MIX circuit operate on the voltage of pin② or pin④.

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	

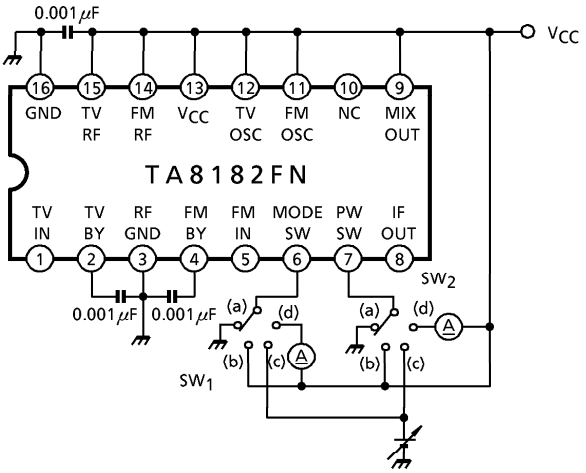
(Note) Derated above Ta = 25°C in the proportion of 3.2mW / °C.

ELECTRICAL CHARACTERISTICS

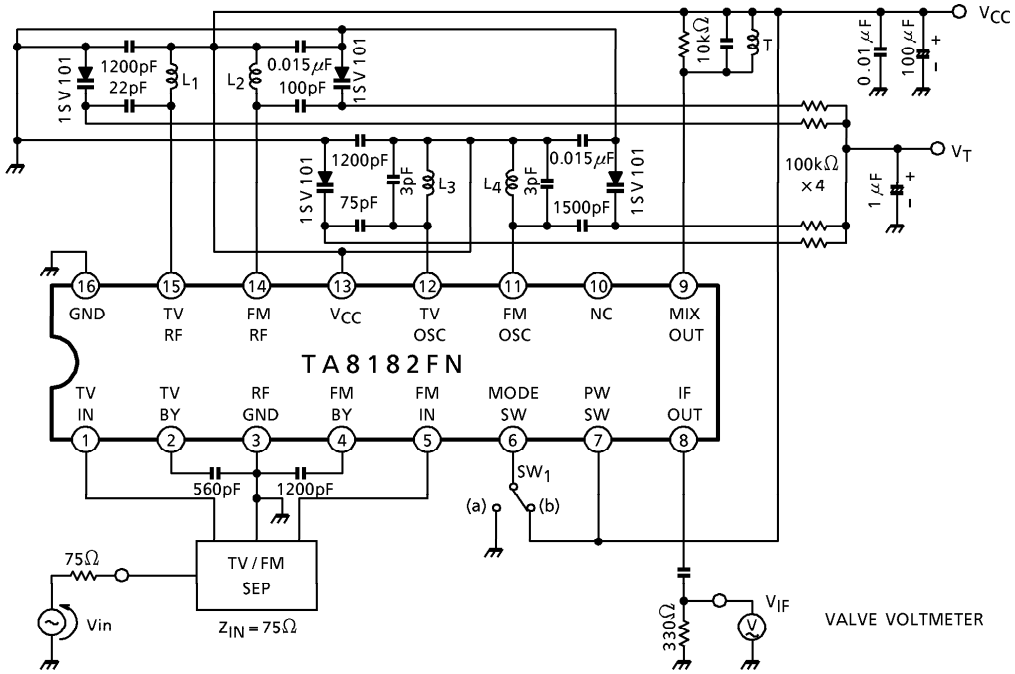
Unless otherwise specified, V_{CC} = 1.2V, Ta = 25°C, f_{FM} = 92MHz, f_{TV} = 200MHz
Δf = ±22.5kHz, f_m = 1kHz, SW_2 : b

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	SW_1	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Supply Current		I_{CC1}	1	a	V_{in} < −20dBμV EMF	IC OFF, SW_2 : 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	Vin = 65dBμV EMF		29	33	—	dB
	Local Oscillator Voltage	V_{osc1}	3		f_{osc} = 65MHz		—	47	—	mV_{rms}
	Local Oscillator Stop Voltage	V_{STP1}					—	0.85	0.95	V
TV	Conversion Gain	G_{c2}	2	b	V_{in} = 65dBμV EMF		21	25	—	dB
	Local Oscillator Voltage	V_{osc2}	3		f_{osc} = 165MHz		—	27	—	mV_{rms}
	Local Oscillator Stop Voltage	V_{STP2}					—	0.88	0.95	V
Power On Current		I_7	1	a	V_{CC} = 0.95V, SW_2 : d	$V_2 \leqq 0.2V$, $V_4 \geqq 0.4V$	5	—	—	μA
Power Off Voltage		V_7		a	V_{CC} = 0.95V, SW_2 : c	$V_2 \leqq 0.2V$, $V_4 \leqq 0.2V$	0	—	0.3	V
TV Mode On Current		I_6		d	V_{CC} = 0.95V,	$V_2 \geqq 0.4V$, $V_4 \leqq 0.2V$	5	—	—	μA
FM Mode On Voltage		V_6		c	V_{CC} = 0.95V,	$V_2 \leqq 0.2V$, $V_4 \geqq 0.4V$	0	—	0.3	V

TEST CIRCUIT 1



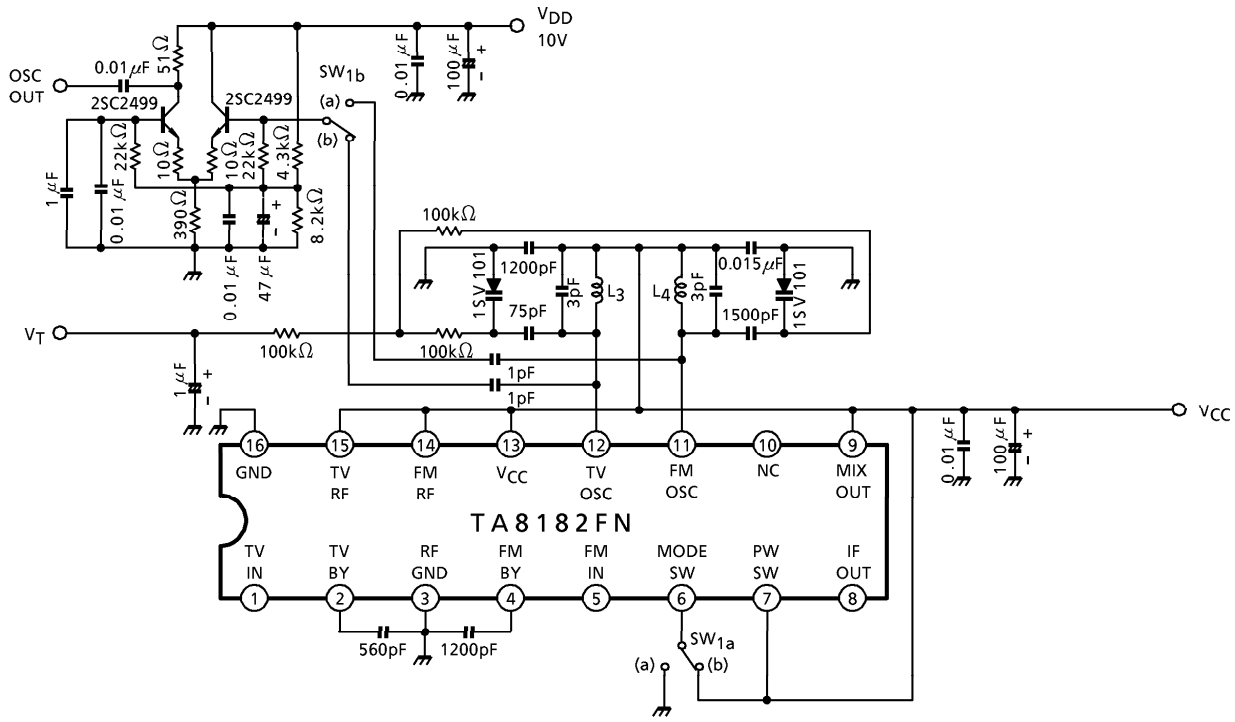
TEST CIRCUIT 2



G_C (dB) = 20ℓogV_{IF} (μV_{rms}) − (V_{in} (dBμV EMF) − 6dB)

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

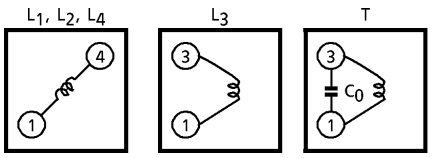
TEST CIRCUIT 3



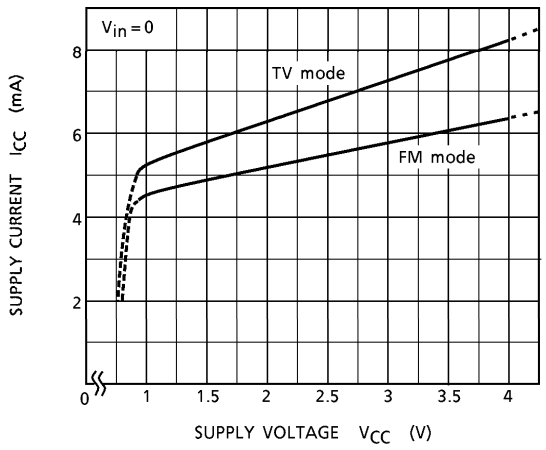
COIL DATA (Test circuit)

COIL No.	TEST FREQ.	C_0 (pF)	Q_0	TURNS 1-3	TURNS 1-4	WIRE (mmϕ)	REFERENCE
L_1 TV RF	100MHz	—	55	—	1 1/2	0.5UEW	Ⓢ 0258-236
L_2 FM RF	100MHz	—	90	—	3 1/2	0.5UEW	Ⓢ 0258-238
L_3 TV OSC	100MHz	—	55	1 1/4	—	0.5UEW	Ⓢ 0258-250
L_4 FM OSC	100MHz	—	90	—	3 1/2	0.5UEW	Ⓢ 0258-238
T FM IFT	10.7MHz	82	45	18	—	0.09UEW	Ⓢ 4162-083A

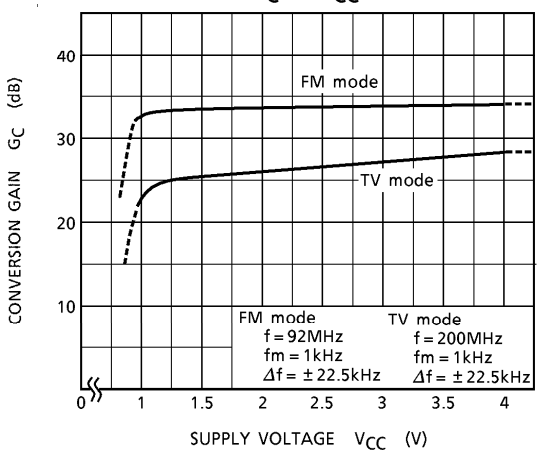
Ⓢ : SUMIDA ELECTRIC CO., LTD.



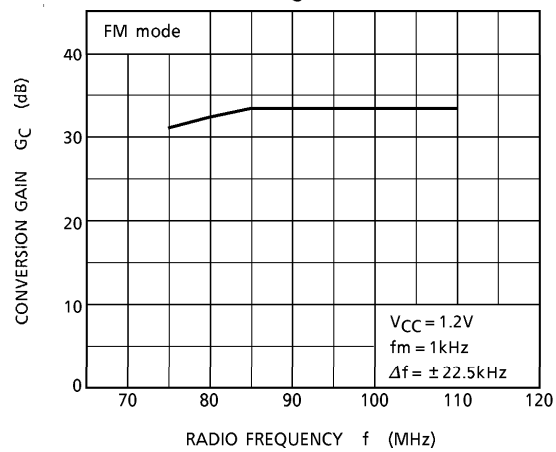
I_{CC} – V_{CC}



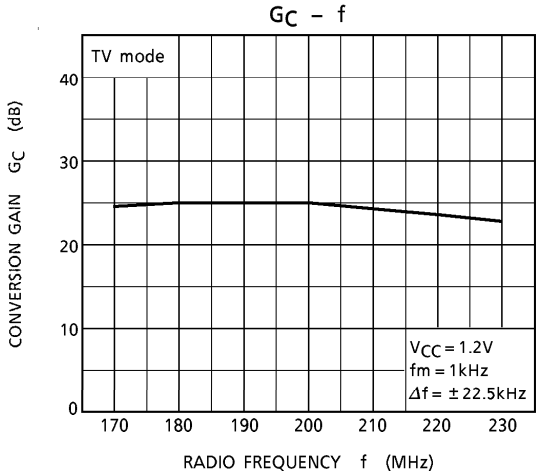
G_C – V_{CC}



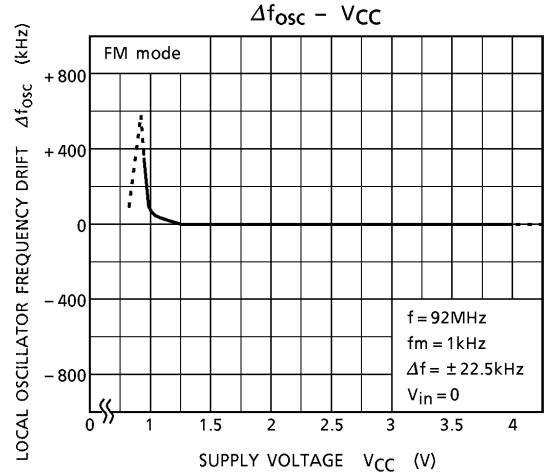
G_C – f



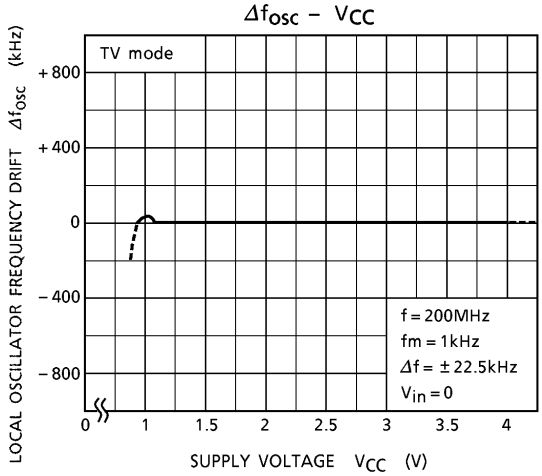
G_C – f



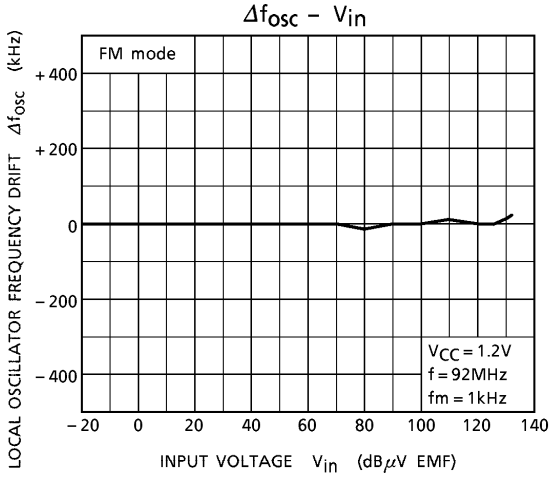
Δf_{osc} – V_{CC}



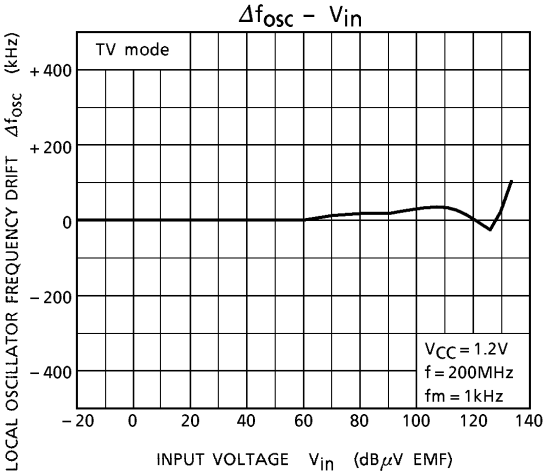
Δf_{osc} – V_{CC}



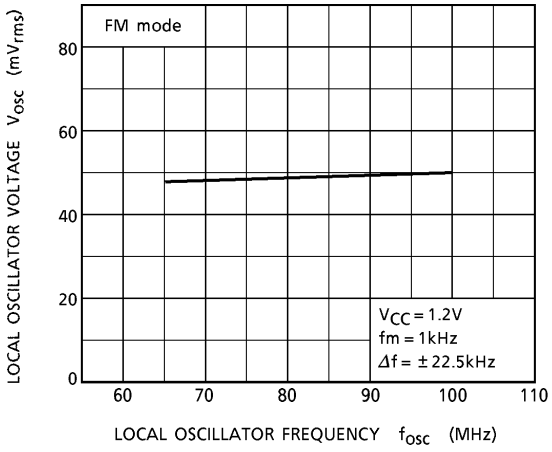
Δf_{osc} – V_{in}



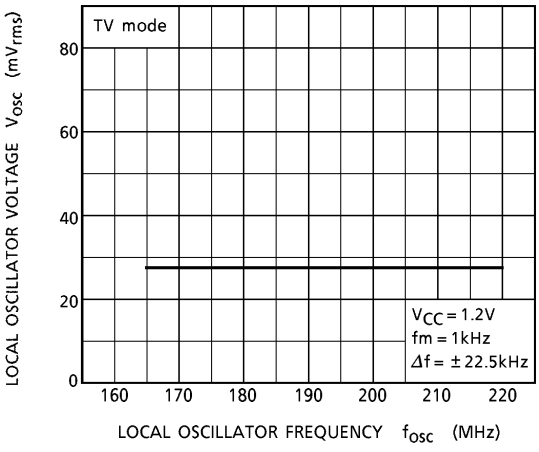
Δf_{osc} – V_{in}



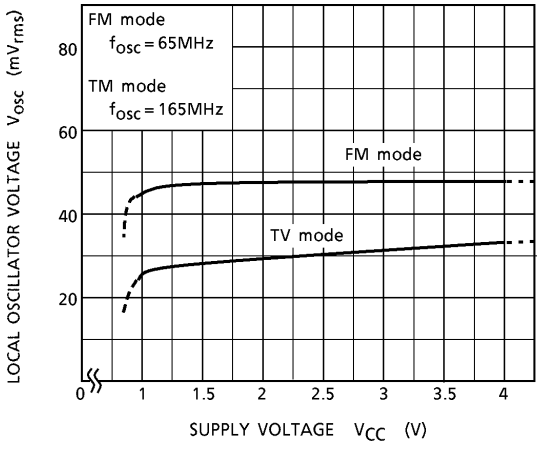
V_{osc} – f_{osc}



V_{osc} – f_{osc}



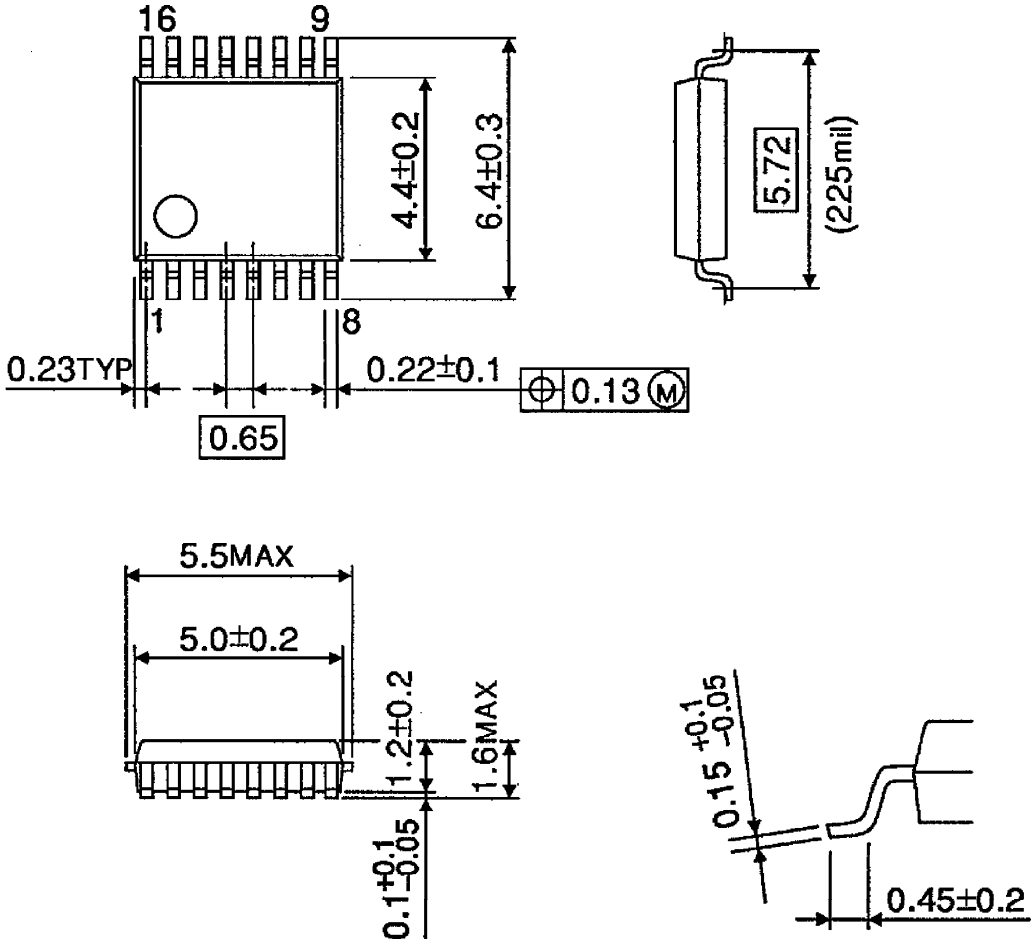
V_{osc} – V_{CC}



OUTLINE DRAWING

SSOP16-P-225-0.65B

Unit : mm



Weight : 0.09g (Typ.)