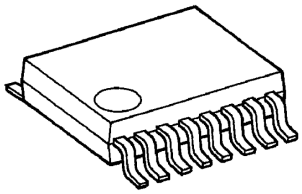
TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

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).



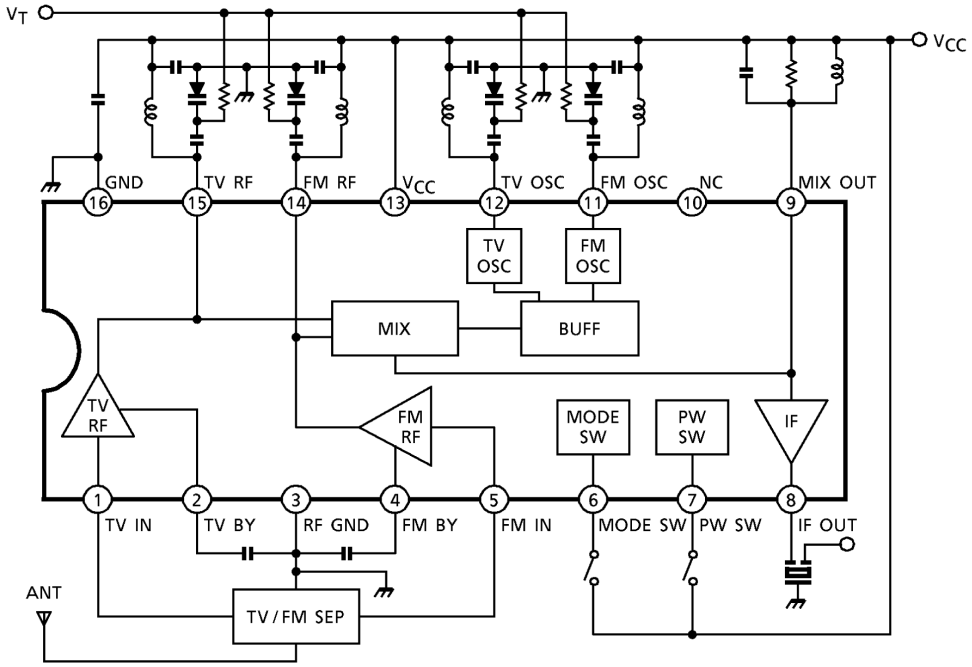
SSOP16-P-225-0.65B

Weight: 0.09g (typ.)

Features

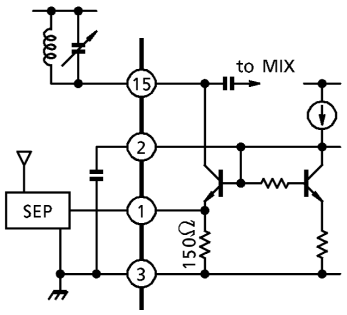
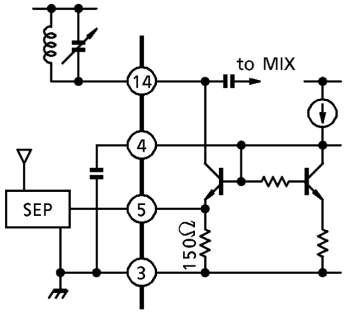
- Built−in FM F / E and TV F / E
  FM mode: 75~109MHz
  TV mode: 175~225MHz
- Suitable for combination with digital tuning system.
- Built−in power switch
- Built−in FM / TV switch
- Built−in IF amplifier
- Improved inter−modulation characteristics by double balanced type mixer circuit.
- Supply current (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

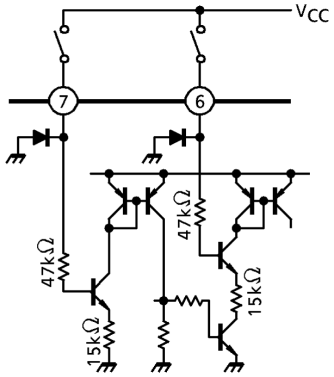
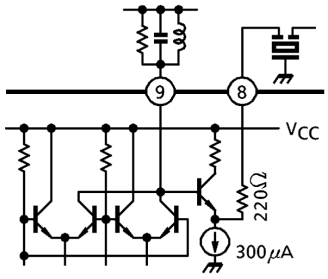
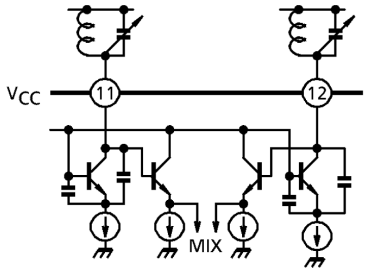
Block Diagram



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	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	Terminal Voltage (V) 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 (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.
3. RF GND
   This IC has two GND terminals (pin(3): RF GND, pin(16): GND). External parts shown in below should be 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).

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	

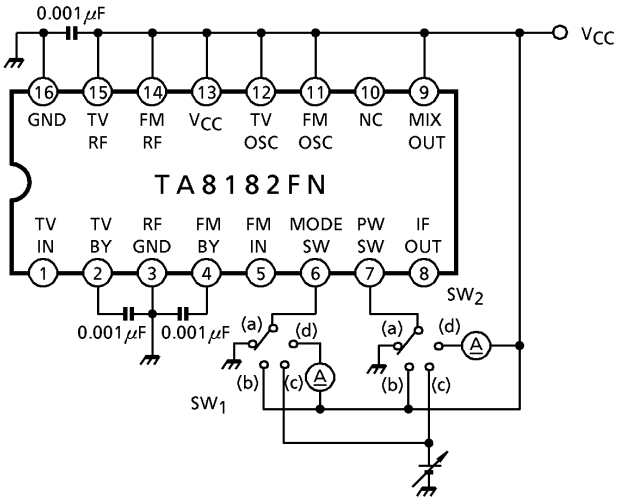
(Note) Derated above Ta = 25°C in the proportion of 3.2mW / °C.

Electrical Characteristics

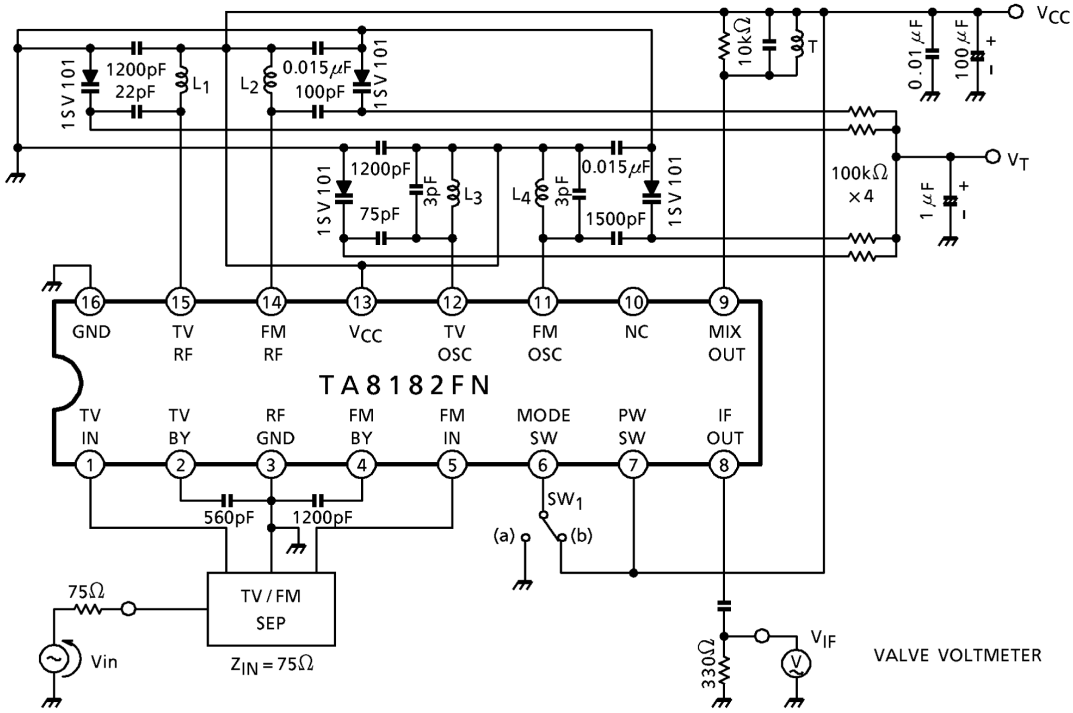
Unless Otherwise Specified, V_{CC} = 1.2V, Ta = 25°C, f_{FM} = 92MHz, f_{TV} = 200MHz
Δf = ±22.5kHz, fm = 1kHz, SW2: b

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, 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

Test Circuit 1

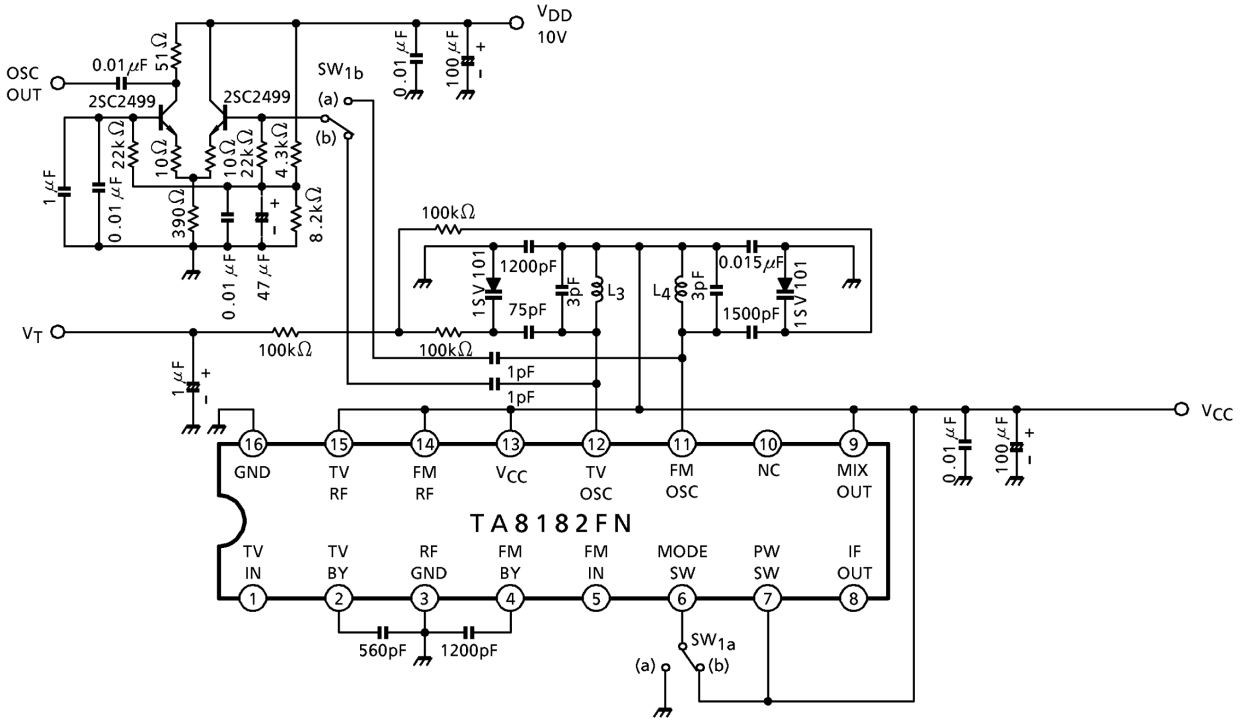


Test Circuit 2



G_C (dB) = 20ℓogV_{IF} (μV_{rms}) –(V_{in} (dBμV EMF) –6dB)
TV / FM separator: GTVS03 (SOSHIN ELECTRIC CO.,LTD.)

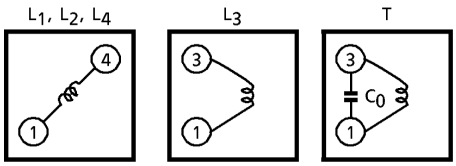
Test Circuit 3



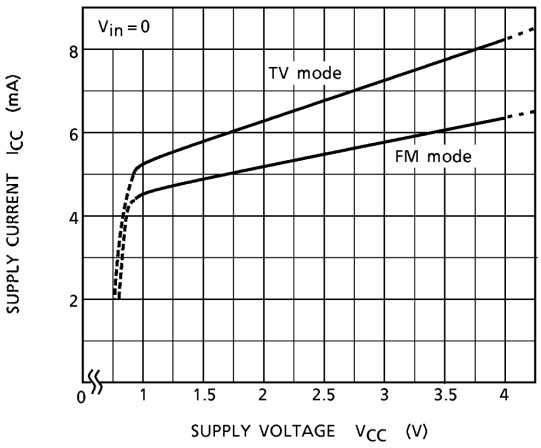
Coil Data (test circuit)

Coil No.	Test Freq.	C_0 (pF)	Q_0	Turns		Wire (mmϕ)	Reference
				1–3	1–4		
L1 TV RF	100MHz	—	55	—	1 1 / 2	0.5UEW	(S) 0258–236
L2 FM RF	100MHz	—	90	—	3 1 / 2	0.5UEW	(S) 0258–238
L3 TV OSC	100MHz	—	55	1 1 / 4	—	0.5UEW	(S) 0258–250
L4 FM OSC	100MHz	—	90	—	3 1 / 2	0.5UEW	(S) 0258–238
T FM IFT	10.7MHz	82	45	18	—	0.09UEW	(S) 4162–083A

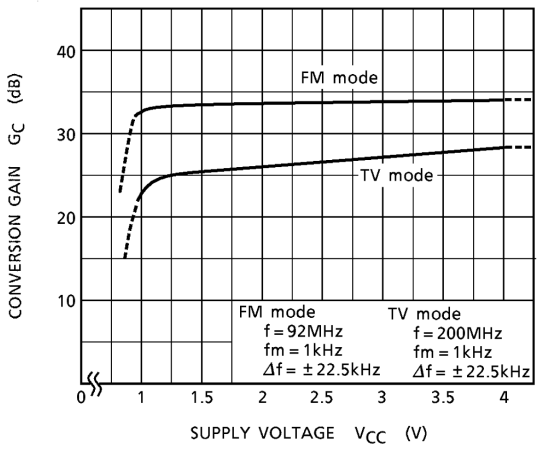
(S): SUMIDA ELECTRIC CO., LTD.



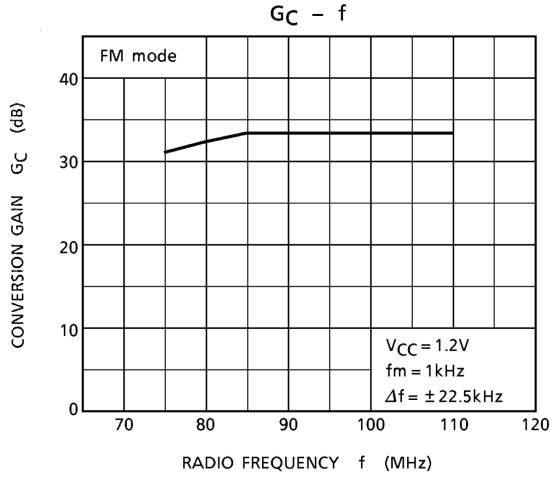
I_{CC} – V_{CC}



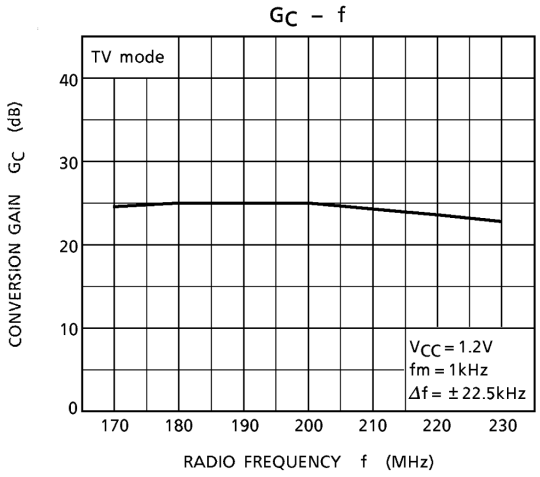
G_C – V_{CC}



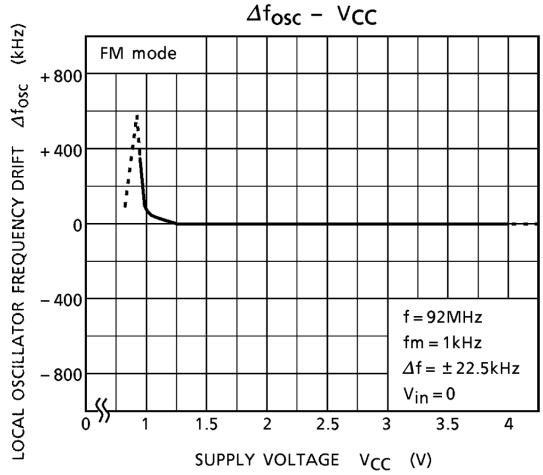
G_C – f



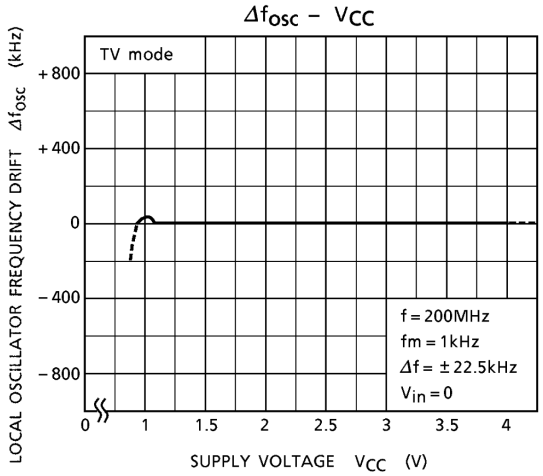
G_C – f



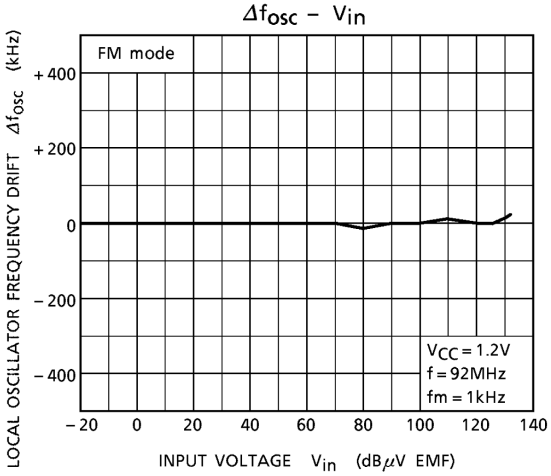
Δf_{osc} – V_{CC}



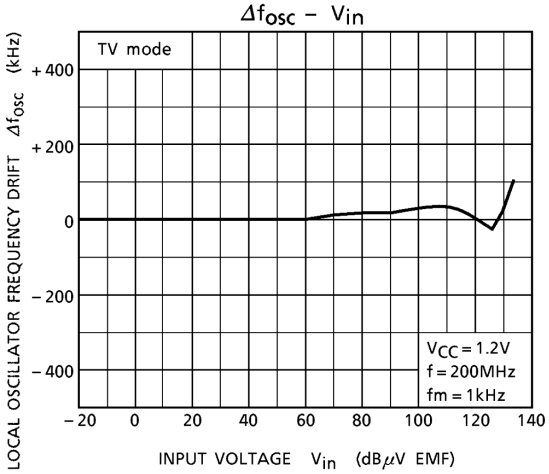
Δf_{osc} – V_{CC}



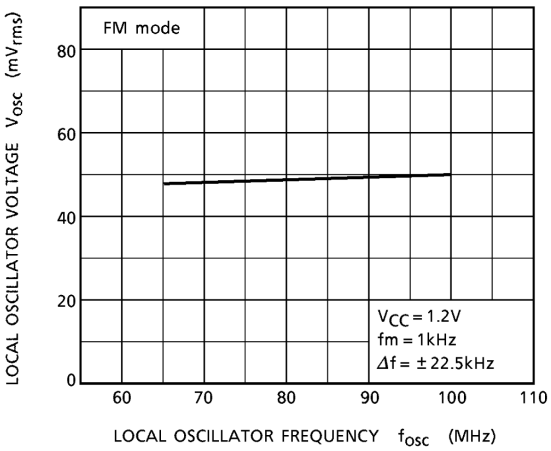
Δf_{osc} – V_{in}



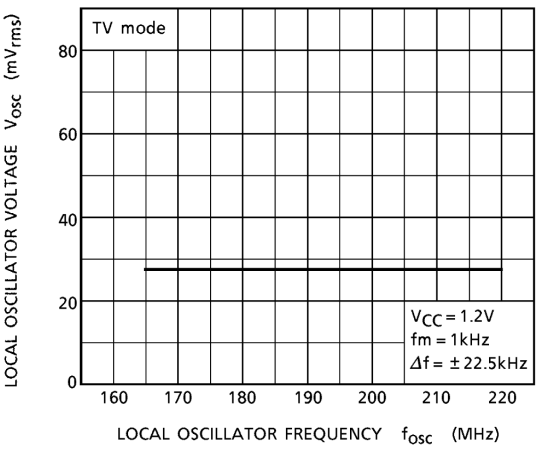
Δf_{osc} – V_{in}



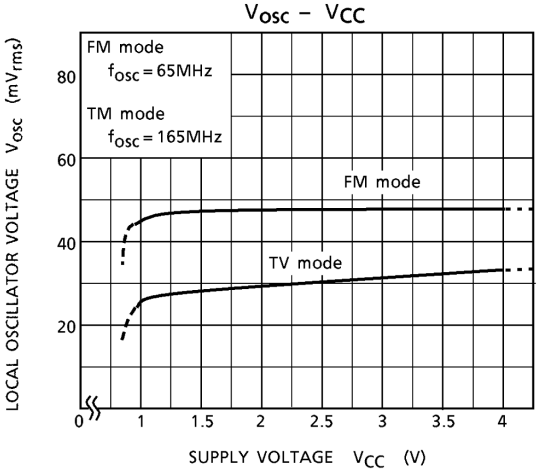
V_{osc} – f_{osc}



V_{osc} – f_{osc}

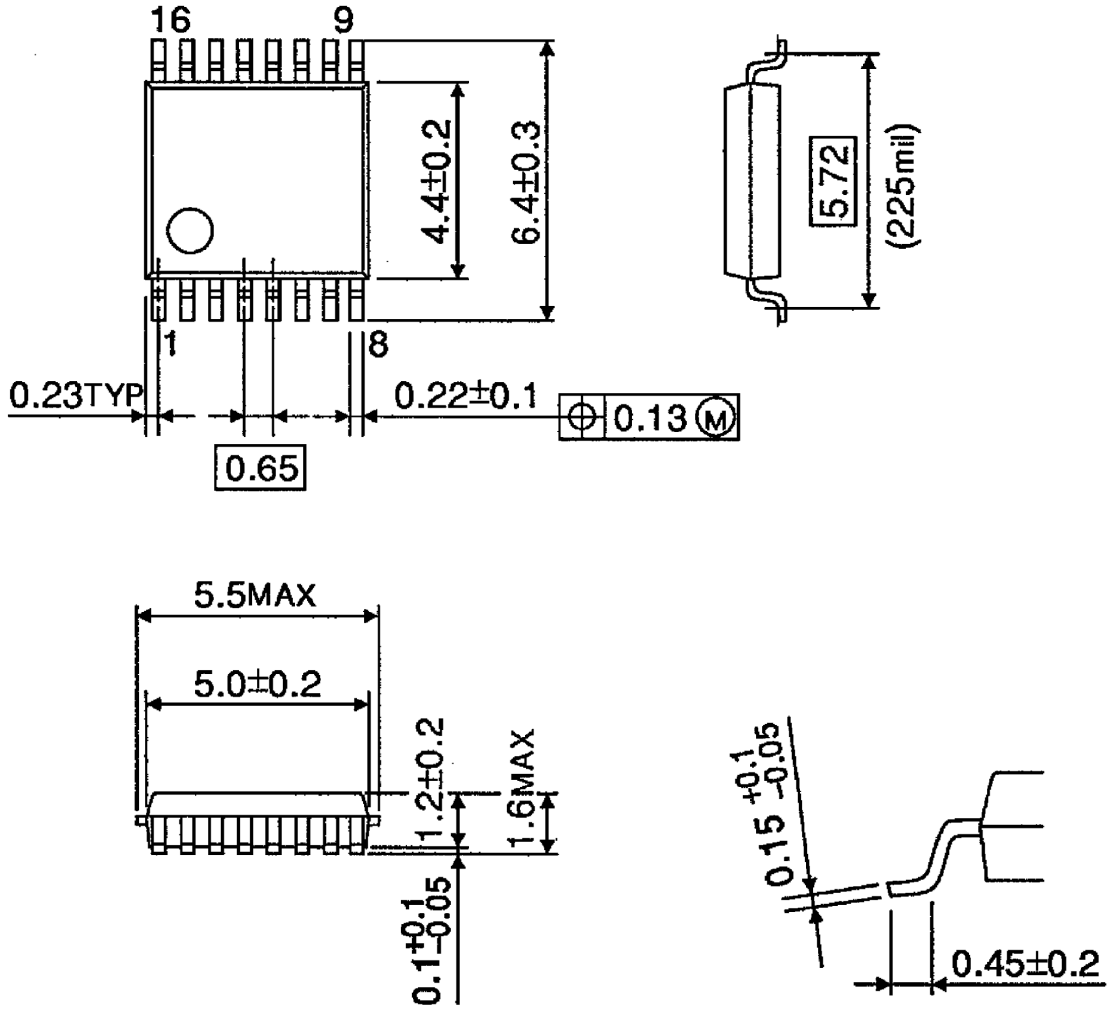


V_{osc} – V_{CC}



Package Dimensions

SSOP16-P-225-0.65B Unit : mm



Weight: 0.09g (typ.)

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