

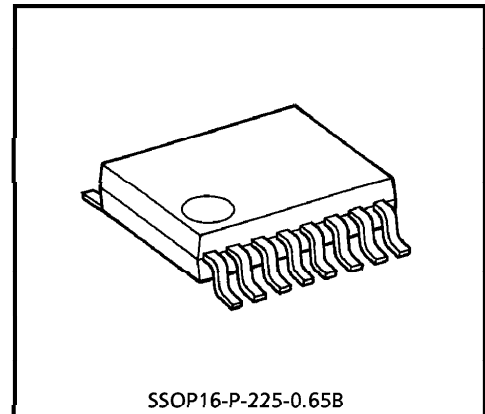
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

**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).

**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 ( $V_{CC} = 1.2V$ ,  $T_a = 25^\circ C$ )  
FM mode :  $I_{CC} = 4.6mA$  (Typ.)  
TV mode :  $I_{CC} = 5.5mA$  (Typ.)
- Operating supply voltage range ( $T_a = 25^\circ C$ )  
 $V_{CC} (opr) = 0.95 \sim 4V$



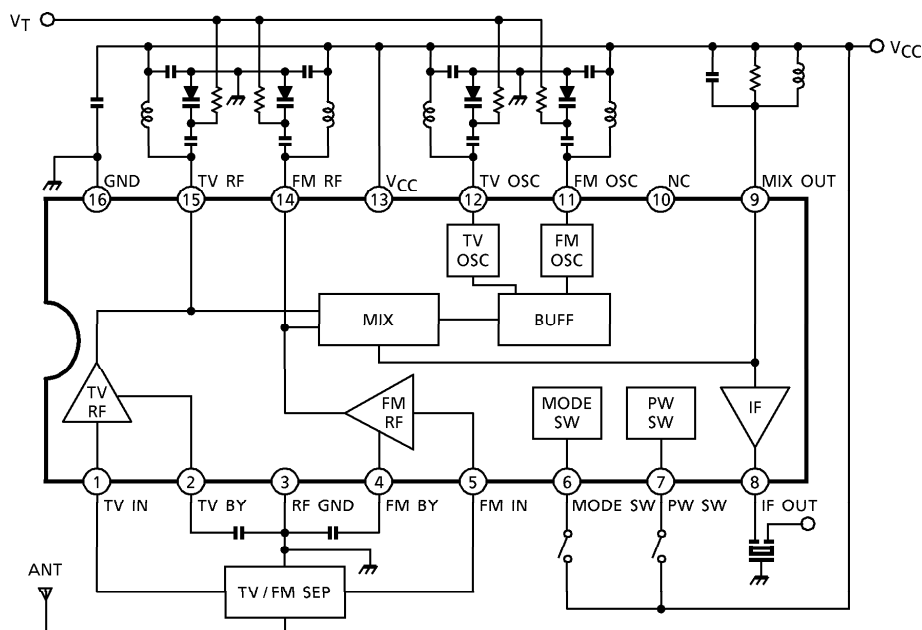
SSOP16-P-225-0.65B

Weight : 0.09g (Typ.)

980508EBA2

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**BLOCK DIAGRAM**



**TERMINAL EXPLANATION**

Terminal voltage : Typ. terminal voltage at no signal with test circuit. ( $V_{CC} = 1.2V, T_a = 25^\circ C$ )

| TERMI-<br>NAL<br>No. | TERMINAL<br>NAME | FUNCTION   | INTERNAL CIRCUIT | TERMINAL<br>VOLTAGE (V) |     |
|----------------------|------------------|--|------------------|-------------------------|-----|
|                      |                  |  |                  | FM                      | TV  |
| 1                    | TV IN            | Input of TV RF signal.<br>(Common-base type)   |                  | 0                       | 0.1 |
| 2                    | TV BY            | By-pass terminal of TV RF and<br>MIX.<br>(Radiation is lightened by<br>connected capacitor.) |                  | —                       | 0.7 |
| 15                   | TV RF            | TV RF tuning circuit is<br>connected.  |                  | 1.2                     | 1.2 |
| 3                    | RF GND           | —  | —                | 0                       | 0   |
| 4                    | FM BY            | By-pass terminal of FM RF<br>and MIX.<br>(Radiation is lightened by<br>connected capacitor.) |                  | 0.7                     | —   |
| 5                    | FM IN            | Input of FM RF signal.<br>(Common-base type)   |                  | 0.1                     | —   |
| 14                   | FM RF            | FM RF tuning circuit is<br>connected.  |                  | 1.2                     | 1.2 |

| TERMI-<br>NAL<br>No. | TERMINAL<br>NAME | FUNCTION   | INTERNAL CIRCUIT | TERMINAL<br>VOLTAGE (V) |     |
|----------------------|------------------|--|------------------|-------------------------|-----|
|                      |                  |  |                  | FM                      | TV  |
| 6                    | MODE SW          | Mode switch.<br>( $V_{CC}$ : TV mode)<br>(Open / GND : FM mode)          |                  | 0                       | 1.2 |
| 7                    | PW SW            | Power switch.<br>( $V_{CC}$ : Power on)<br>(Open / GND : Power off)      |                  | 1.2                     | 1.2 |
| 8                    | IF OUT           | Output of TV / FM IF signal.<br>Output impedance<br>: $330\Omega$ (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.<br>(Colpitts type oscillator)          |                  | 1.2                     | 1.2 |
| 12                   | TV OSC           | TV OSC tank circuit is connected.<br>(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, pin⑩ : GND). External parts shown in below should be connected with RF GND (pin③), and other parts should be connected with GND (pin⑩).

- 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 <sub>CC</sub>  | 4.5     | V    |
| Power Dissipation (Note) | P <sub>D</sub>   | 400     | mW   |
| Operating Temperature    | T <sub>opr</sub> | -25~75  | °C   |
| Storage Temperature      | T <sub>stg</sub> | -55~150 |      |

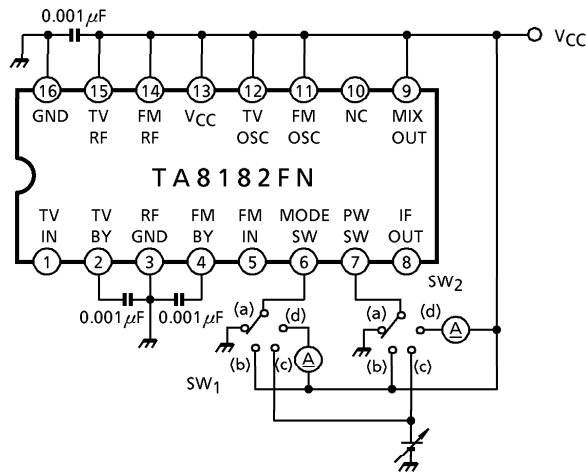
(Note) Derated above Ta = 25°C in the proportion of 3.2mW/°C.

**ELECTRICAL CHARACTERISTICS**

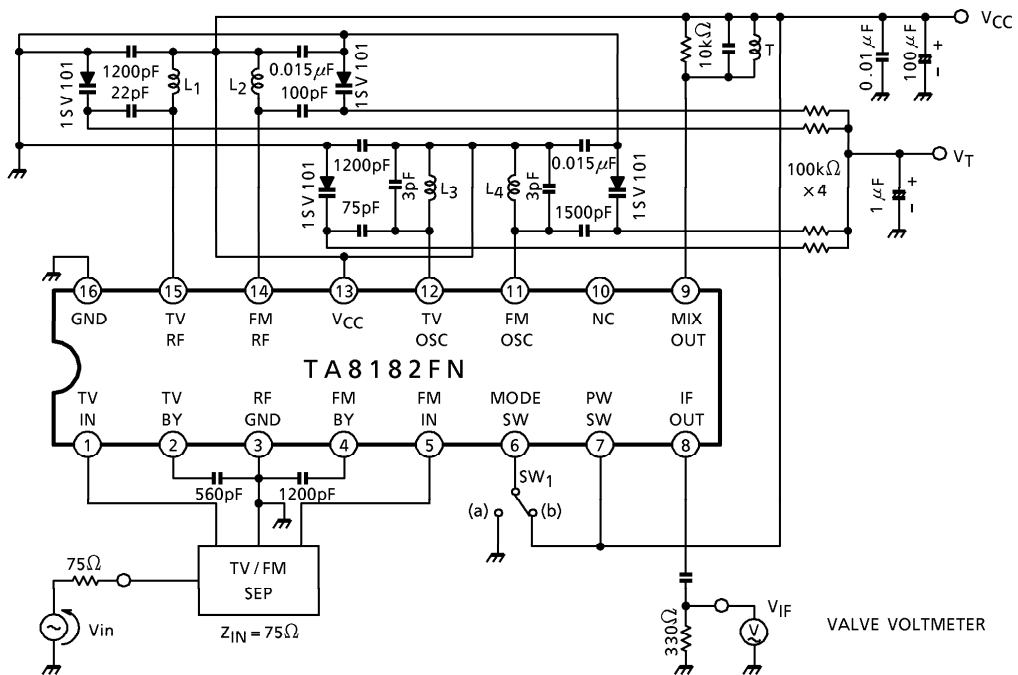
Unless otherwise specified,  $V_{CC} = 1.2V$ ,  $T_a = 25^\circ C$ ,  $f_{FM} = 92MHz$ ,  $f_{TV} = 200MHz$   
 $\Delta f = \pm 22.5kHz$ ,  $f_m = 1kHz$ ,  $SW_2 : b$

| CHARACTERISTIC     |                               | SYMBOL            | TEST CIRCUIT | SW <sub>1</sub> | TEST CONDITION  | MIN.                        | TYP. | MAX. | UNIT              |         |
|--------------------|-------------------------------|-------------------|--------------|-----------------|---|-----------------------------|------|------|-------------------|---------|
| Supply Current     |                               | I <sub>CC1</sub>  | 1            | a               | V <sub>in</sub> < -20dB $\mu$ V EMF   | IC OFF, SW <sub>2</sub> : a | —    | 0.1  | 5                 | $\mu$ A |
|                    |                               | I <sub>CC2</sub>  |              |                 |   | FM mode                     | —    | 4.6  | 6.0               | mA      |
|                    |                               | I <sub>CC3</sub>  |              | b               | TV mode   | —                           | 5.5  | 7.0  |                   |         |
| FM                 | Conversion Gain               | G <sub>c1</sub>   | 2            | a               | V <sub>in</sub> = 65dB $\mu$ V EMF  | 29                          | 33   | —    | dB                |         |
|                    | Local Oscillator Voltage      | V <sub>osc1</sub> | 3            |                 | f <sub>osc</sub> = 65MHz  | —                           | 47   | —    | mV <sub>rms</sub> |         |
|                    | Local Oscillator Stop Voltage | V <sub>STP1</sub> |              |                 |   | —                           | 0.85 | 0.95 | V                 |         |
| TV                 | Conversion Gain               | G <sub>c2</sub>   | 2            | b               | V <sub>in</sub> = 65dB $\mu$ V EMF  | 21                          | 25   | —    | dB                |         |
|                    | Local Oscillator Voltage      | V <sub>osc2</sub> | 3            |                 | f <sub>osc</sub> = 165MHz   | —                           | 27   | —    | mV <sub>rms</sub> |         |
|                    | Local Oscillator Stop Voltage | V <sub>STP2</sub> |              |                 |   | —                           | 0.88 | 0.95 | V                 |         |
| Power On Current   |                               | I <sub>7</sub>    | 1            | a               | V <sub>CC</sub> = 0.95V, V <sub>2</sub> $\leq$ 0.2V<br>SW <sub>2</sub> : d V <sub>4</sub> $\geq$ 0.4V | 5                           | —    | —    | $\mu$ A           |         |
| Power Off Voltage  |                               | V <sub>7</sub>    |              | a               | V <sub>CC</sub> = 0.95V, V <sub>2</sub> $\leq$ 0.2V<br>SW <sub>2</sub> : c V <sub>4</sub> $\leq$ 0.2V | 0                           | —    | 0.3  | V                 |         |
| TV Mode On Current |                               | I <sub>6</sub>    |              | d               | V <sub>CC</sub> = 0.95V, V <sub>2</sub> $\geq$ 0.4V<br>V <sub>4</sub> $\leq$ 0.2V                     | 5                           | —    | —    | $\mu$ A           |         |
| FM Mode On Voltage |                               | V <sub>6</sub>    |              | c               | V <sub>CC</sub> = 0.95V, V <sub>2</sub> $\leq$ 0.2V<br>V <sub>4</sub> $\geq$ 0.4V                     | 0                           | —    | 0.3  | V                 |         |

**TEST CIRCUIT 1**



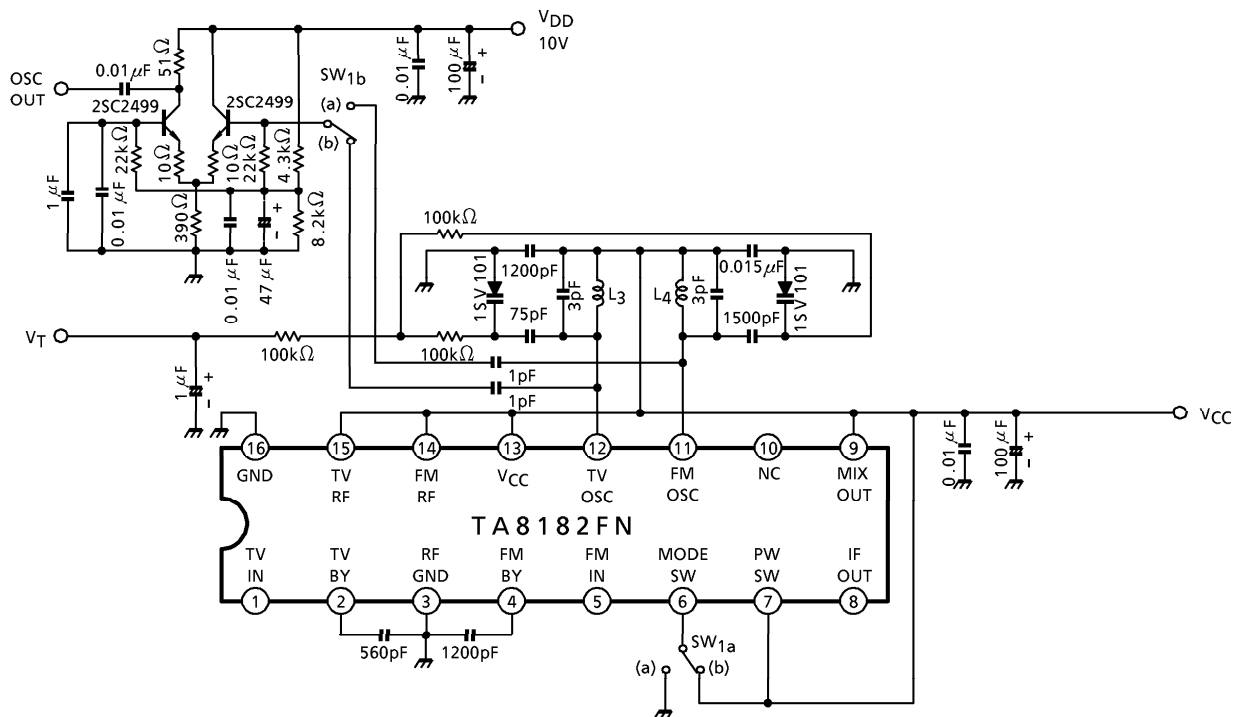
**TEST CIRCUIT 2**



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

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

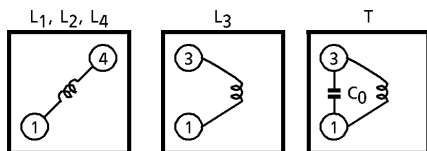
TEST CIRCUIT 3

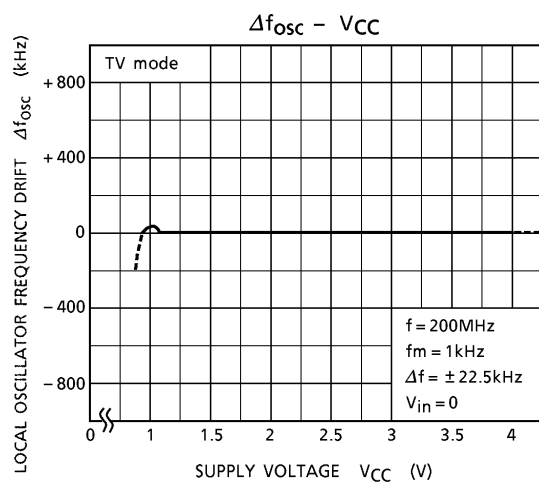
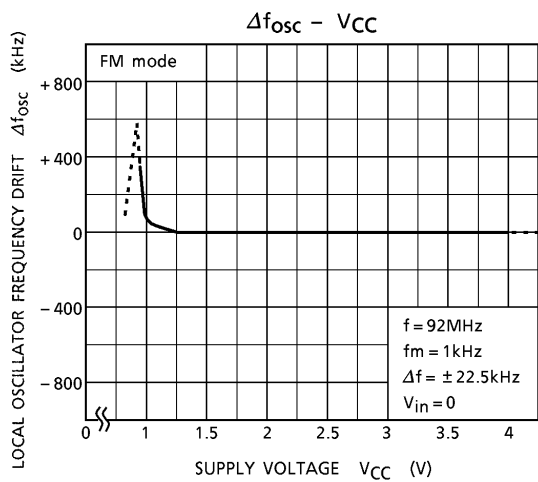
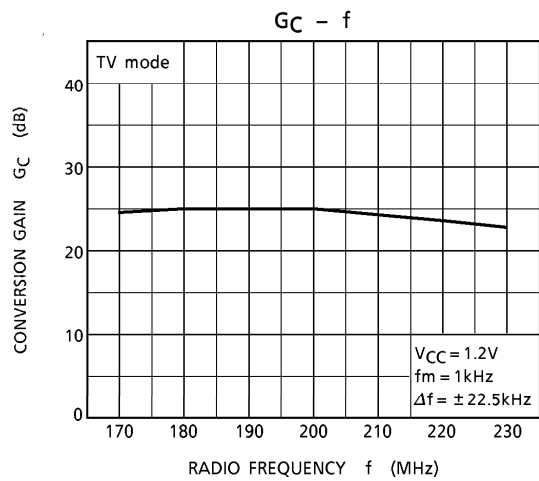
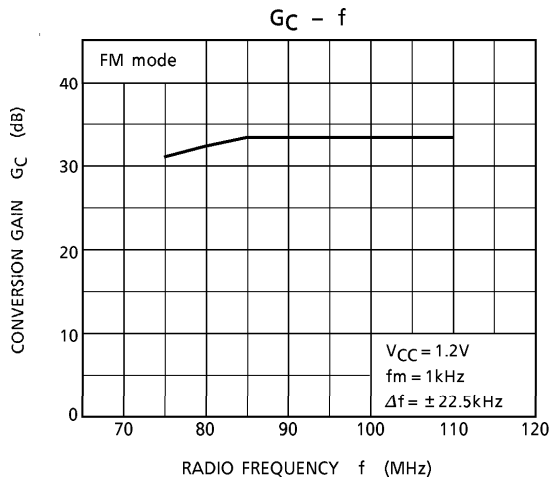
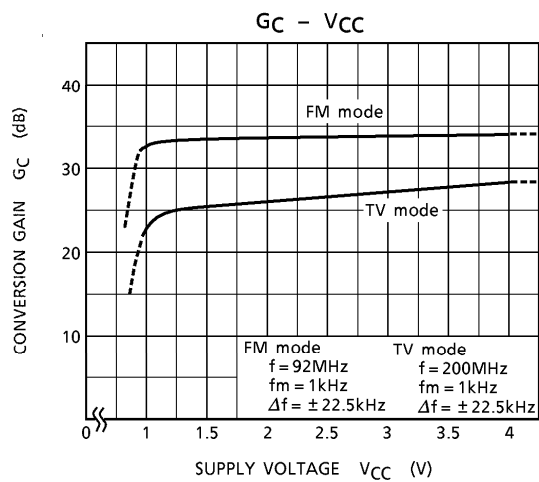
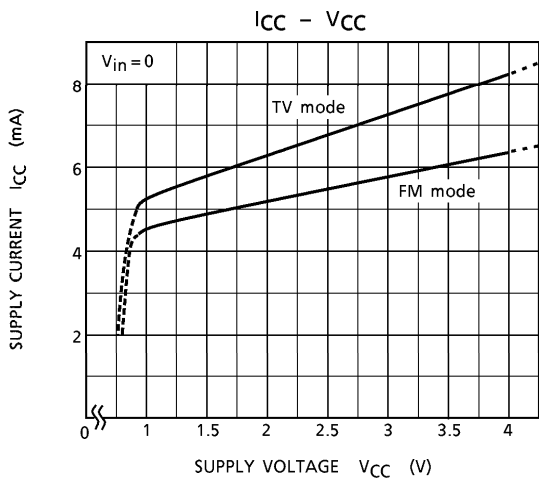


COIL DATA (Test circuit)

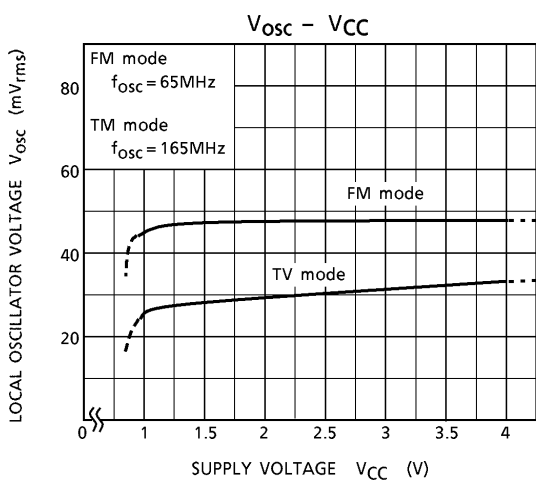
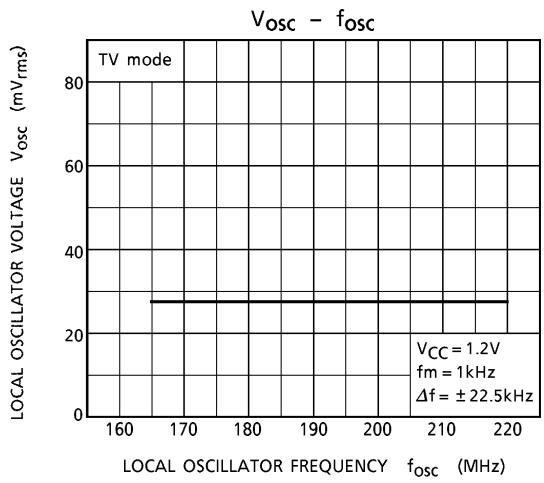
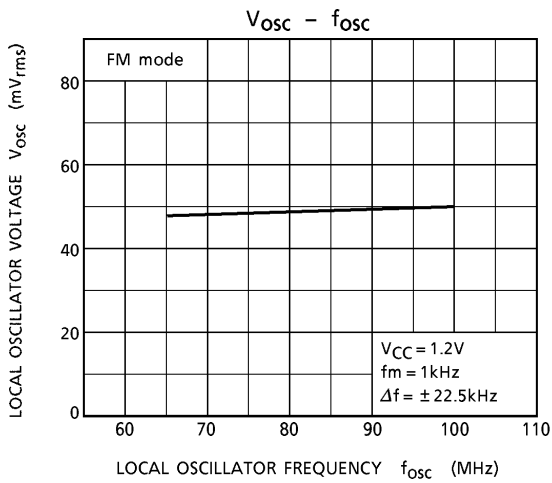
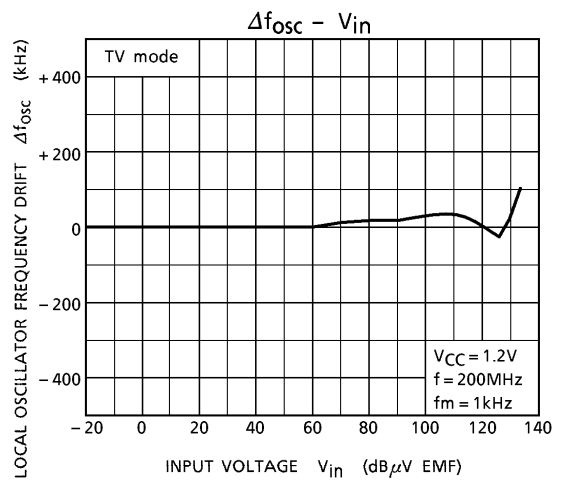
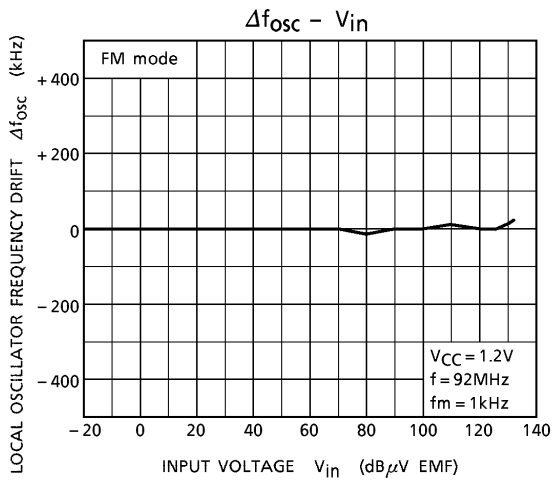
| COIL No.              | TEST FREQ. | C <sub>0</sub> (pF) | Q <sub>0</sub> | TURNS |       | WIRE (mm φ) | REFERENCE   |
|-----------------------|------------|---------------------|----------------|-------|-------|-------------|-------------|
|                       |            |                     |                | 1-3   | 1-4   |             |             |
| L <sub>1</sub> TV RF  | 100MHz     | —                   | 55             | —     | 1 1/2 | 0.5UEW      | Ⓢ 0258-236  |
| L <sub>2</sub> FM RF  | 100MHz     | —                   | 90             | —     | 3 1/2 | 0.5UEW      | Ⓢ 0258-238  |
| L <sub>3</sub> TV OSC | 100MHz     | —                   | 55             | 1 1/4 | —     | 0.5UEW      | Ⓢ 0258-250  |
| L <sub>4</sub> 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.



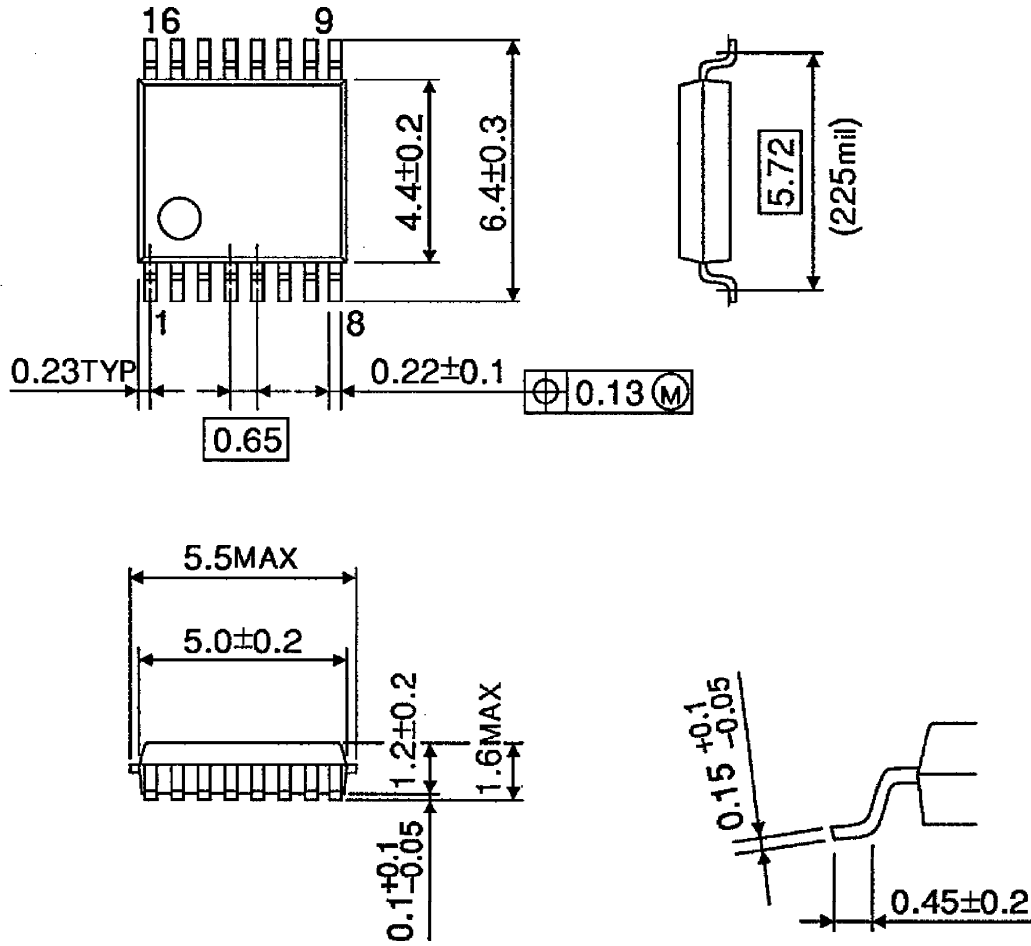






**OUTLINE DRAWING**  
SSOP16-P-225-0.65B

Unit : mm



Weight : 0.09g (Typ.)