

# TA8168SN

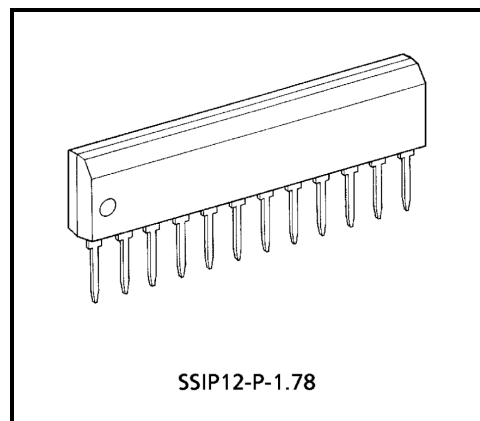
## FM Front End IC

The TA8168SN is a FM front-end IC which is designed for radio cassette recorders and music centers.

Comparing with conventional types, RF inter-modulation characteristics and overload characteristics are improved.

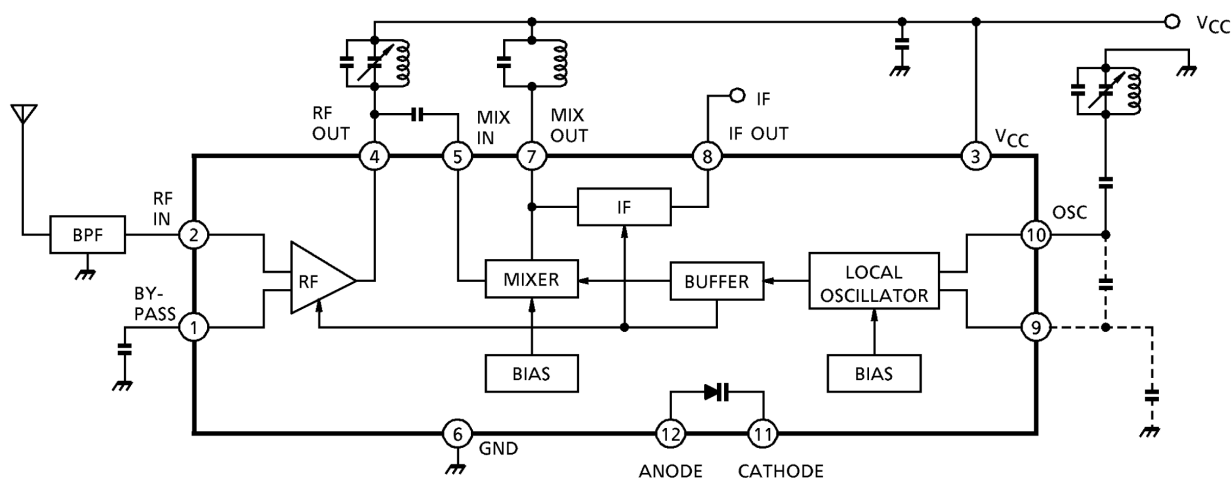
## Features

- Improved RF inter-modulation characteristics by double balanced type mixer circuit
- Low drift oscillation frequency for strong input
- It is available TV band frequency (up to 220MHz)
- Built-in IF amplifier
  - $R_O = 330\Omega$  (typ.),  $V_o$  (IF) = 70mV<sub>rms</sub> (typ.)
- Emitter output of local oscillation transistor
- Built-in varactordiode for AFC
  - Cathode and anode are floating
- Operating supply voltage range
  - $V_{CC}$  (opr) = 3.5~14V ( $T_a = 25^\circ\text{C}$ )



Weight: 0.65g (typ.)

## Block Diagram



## Explanation Of Terminals

(terminal voltage is DC voltage at  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 5\text{V}$ , and no signal)

| Pin No. | Symbol    | Contents                                                                | Internal Circuit      | Terminal Voltage (V) |
|---------|-----------|-------------------------------------------------------------------------|-----------------------|----------------------|
| 1       | By-pass   | Bias terminal for RF amp.<br>Capacitor is connected                     |                       | 2.0                  |
| 2       | RF in     | RF input terminal                                                       |                       | 1.3                  |
| 3       | $V_{CC}$  | Power supply terminal                                                   |                       | 5.0                  |
| 4       | RF out    | RF output terminal<br>RF tank circuit is connected                      | Refer to pin(1), (2). | 5.0                  |
| 5       | Mix in    | Mixer input terminal                                                    |                       | 2.0                  |
| 6       | GND       | Ground terminal                                                         | —                     | —                    |
| 7       | Mix out   | Mixer output terminal<br>Mixer coil is connected                        |                       | 5.0                  |
| 8       | IF out    | IF output terminal<br>output impedance<br>$R_O (IF) = 330\Omega$ (typ.) |                       | 4.85                 |
| 9       | Monitor   | Local OSC monitor terminal                                              |                       | 4.25                 |
| 10      | Local OSC | Local OSC terminal<br>OSC tank circuit is connected                     |                       | 4.9                  |
| 11      | AFC (C)   | AFC diode cathode terminal                                              |                       | —                    |
| 12      | AFC (A)   | AFC diode anode terminal                                                |                       | —                    |

## Maximum Ratings (Ta = 25°C)

| Characteristic            | Symbol                | Rating  | Unit |
|---------------------------|-----------------------|---------|------|
| Supply voltage            | V <sub>CC</sub>       | 15      | V    |
| AFC diode reverse voltage | V <sub>R</sub>        | 4       | V    |
| Power dissipation         | P <sub>D</sub> (Note) | 750     | mW   |
| Operating temperature     | T <sub>opr</sub>      | -25~75  | °C   |
| Storage temperature       | T <sub>stg</sub>      | -55~150 | °C   |

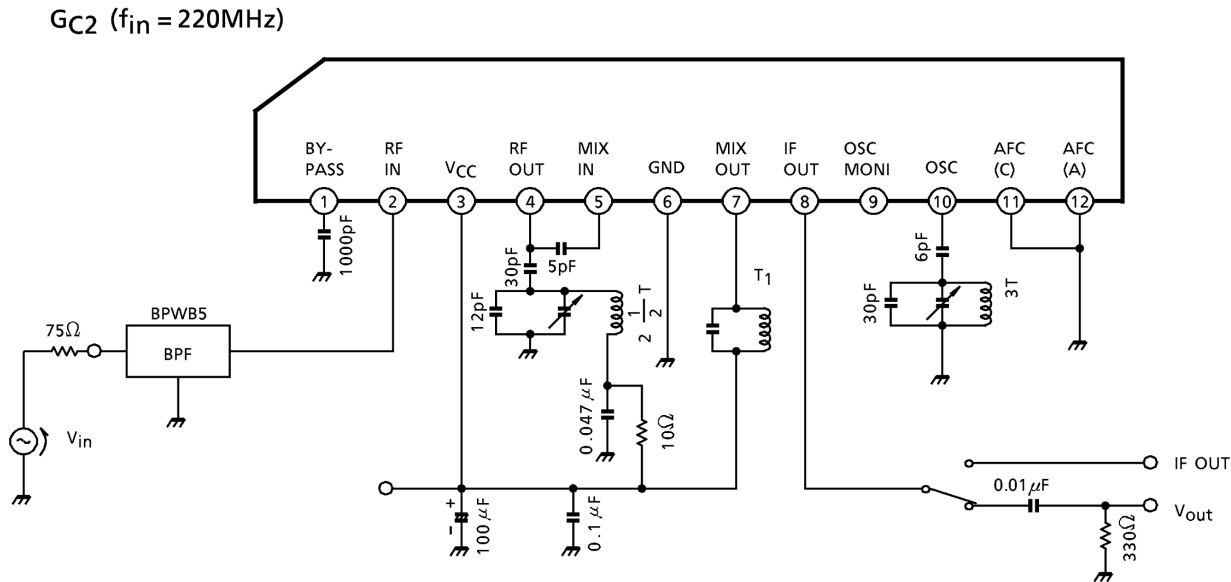
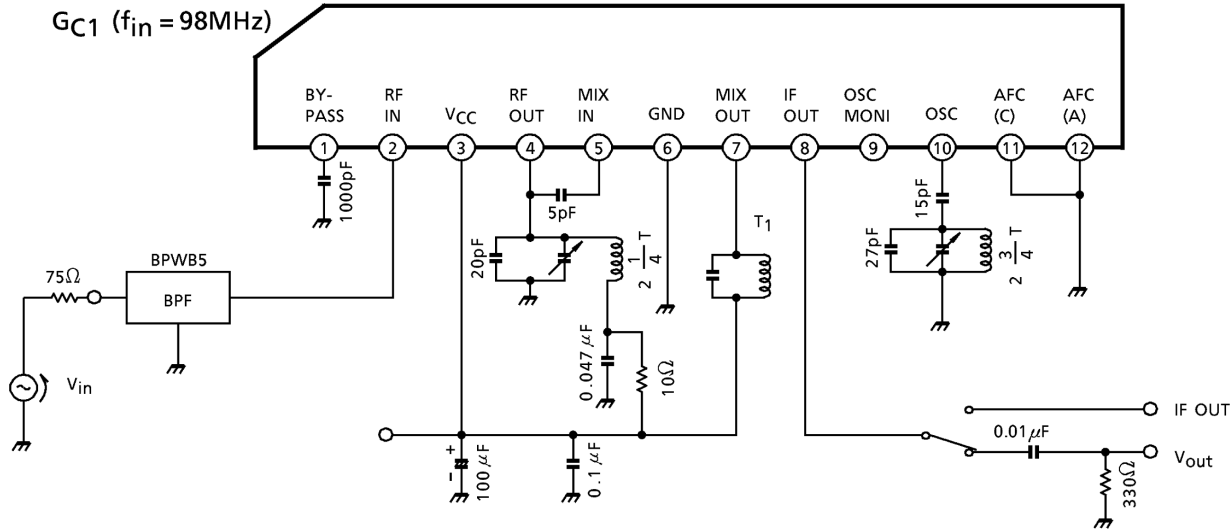
(Note) Derated linearly above Ta = 25°C in the proportion of 6mW / °C.

## Electrical Characteristics

(unless otherwise specified, Ta = 25°C, V<sub>CC</sub> = 5V, f<sub>m</sub> = 1kHz, f = 98MHz, Δf = ±22.5kHz dev.)

| Characteristic            |                             | Symbol            | Test Cir-<br>cuit | Test Condition                                            | Min.        | Typ. | Max. | Unit              |    |
|---------------------------|-----------------------------|-------------------|-------------------|-----------------------------------------------------------|-------------|------|------|-------------------|----|
| Supply current            |                             | I <sub>CC</sub>   | 1                 | V <sub>in</sub> = 0                                       | —           | 10   | 15   | mA                |    |
| Conversion gain           |                             | G <sub>C1</sub>   | 1                 | f <sub>in</sub> = 98MHz,<br>V <sub>in</sub> = 50dBμV EMF  | 42          | 46   | 50   | dB                |    |
|                           |                             | G <sub>C2</sub>   | 1                 | f <sub>in</sub> = 220MHz,<br>V <sub>in</sub> = 50dBμV EMF | —           | 42   | —    |                   |    |
| Local oscillation voltage |                             | V <sub>OSC1</sub> | 2                 | f <sub>OSC</sub> = 108.7MHz                               | 220         | 310  | 440  | mV <sub>rms</sub> |    |
|                           |                             | V <sub>OSC2</sub> | 2                 | f <sub>OSC</sub> = 230MHz                                 | —           | 100  | —    |                   |    |
| Pin(2) input impedance    | Parallel input resistance   | r <sub>ip2</sub>  | 3                 | f = 98MHz                                                 | —           | 50   | —    | Ω                 |    |
|                           | Parallel input capacitance  | c <sub>ip2</sub>  |                   |                                                           | —           | –15  | —    | pF                |    |
| Pin(4) output impedance   | Parallel output resistance  | r <sub>op4</sub>  | 3                 |                                                           | —           | 70   | —    | kΩ                |    |
|                           | Parallel output Capacitance | c <sub>op4</sub>  |                   |                                                           | —           | 1.5  | —    | pF                |    |
| Pin(5) input impedance    | Parallel input resistance   | r <sub>ip5</sub>  | 3                 |                                                           | —           | 4.0  | —    | kΩ                |    |
|                           | Parallel input capacitance  | c <sub>ip5</sub>  |                   |                                                           | —           | 2.0  | —    | pF                |    |
| Pin(7) output impedance   | Parallel output resistance  | r <sub>op7</sub>  | 3                 |                                                           | f = 10.7MHz | —    | 80   | —                 | kΩ |
|                           | Parallel output capacitance | c <sub>op7</sub>  |                   |                                                           |             | —    | 2.5  | —                 | pF |
| Local OSC stop voltage    |                             | V <sub>stop</sub> | 2                 | f <sub>OSC</sub> = 108.7MHz                               | —           | 1.5  | 1.8  | V                 |    |
| AFC diode capacitance     |                             | C <sub>AFC</sub>  | 3                 | f = 98MHz, V <sub>AFC</sub> = 3V                          | —           | 13   | —    | pF                |    |

Test Circuit 1



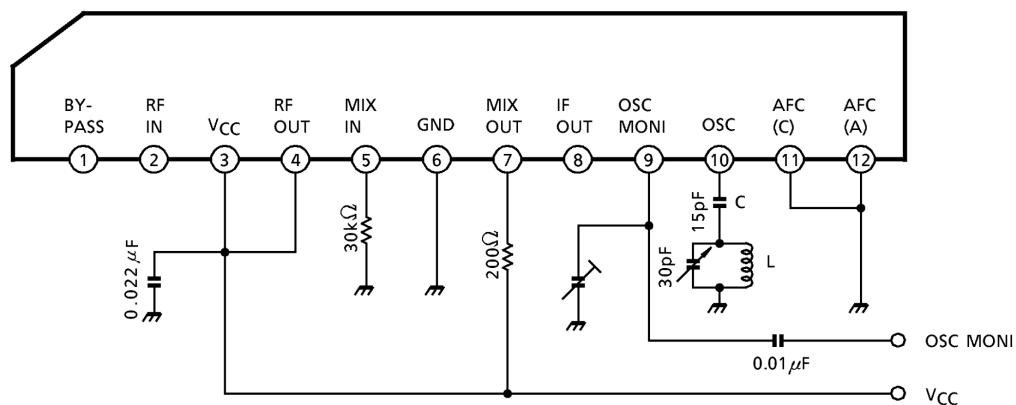
Coil Data For Test Circuit

| Coil No.       | Test Frequency (Hz) | L (μH) | C <sub>0</sub> (pF) | Q <sub>0</sub> | Turns |     |     |     |     | Wire (mmφ) | Note              |
|----------------|---------------------|--------|---------------------|----------------|-------|-----|-----|-----|-----|------------|-------------------|
|                |                     |        |                     |                | 1-2   | 2-3 | 1-3 | 1-4 | 4-6 |            |                   |
| T <sub>1</sub> | 10.7M               | —      | 75                  | 100            | —     | —   | 13  | —   | 2   | 0.1UEW     | (S) 2153-414-041A |

(S) : SUMIDA ELECTRIC CO., LTD

## Test Circuit 2

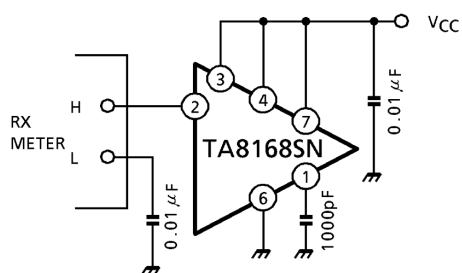
$V_{OSC}$ ,  $V_{stop}$



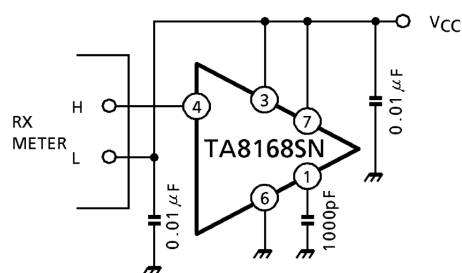
- (1)  $f_{OSC} = 108.7\text{MHz}$   
 $L$ : 5mm $\phi$ ,  $2\frac{1}{2}$  turn with ferrite core  
 $C$ : 15pF
- (2)  $f_{OSC} = 230\text{MHz}$   
 $L$ : 5mm $\phi$ , 3 turn without ferrite core  
 $C$ : 6pF

## Test Circuit 3

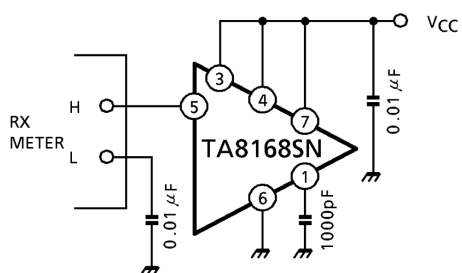
Pin② input resistance, input capacitance



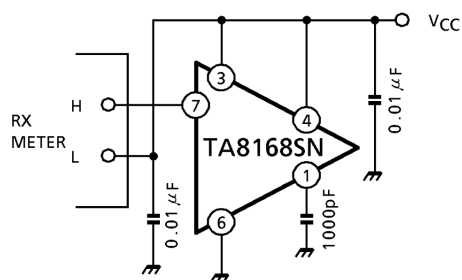
Pin④ output resistance, output capacitance



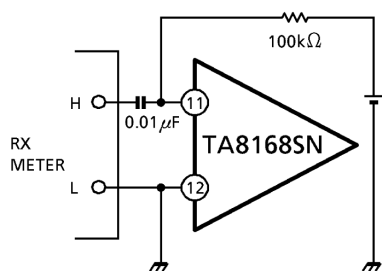
Pin⑤ input resistance, input capacitance

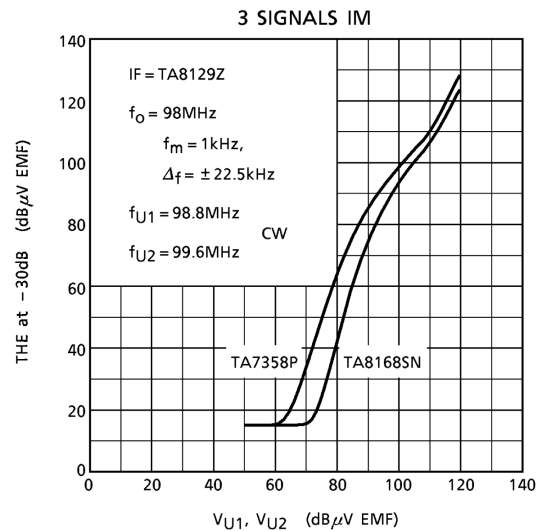
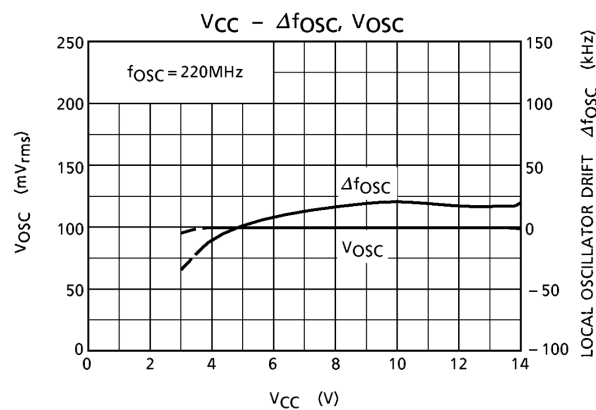
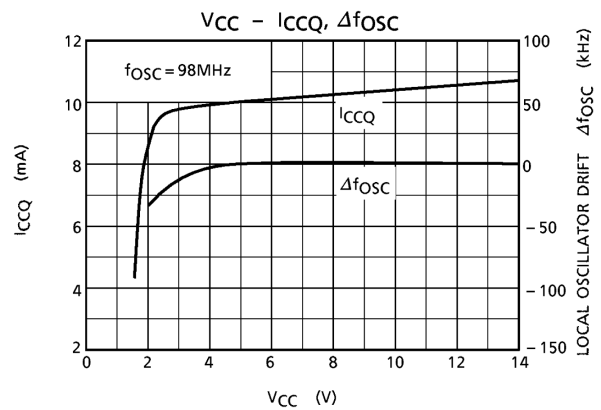
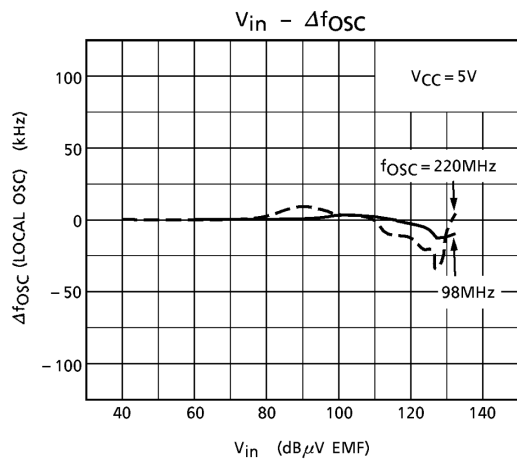
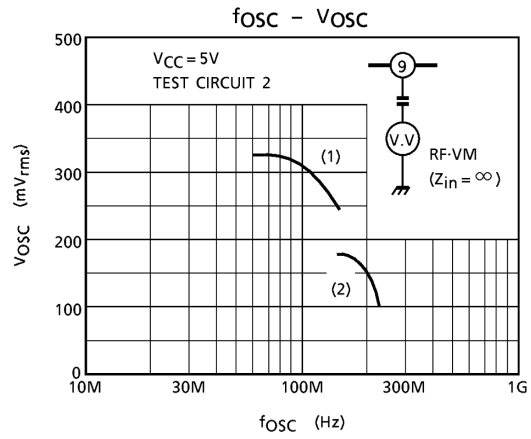
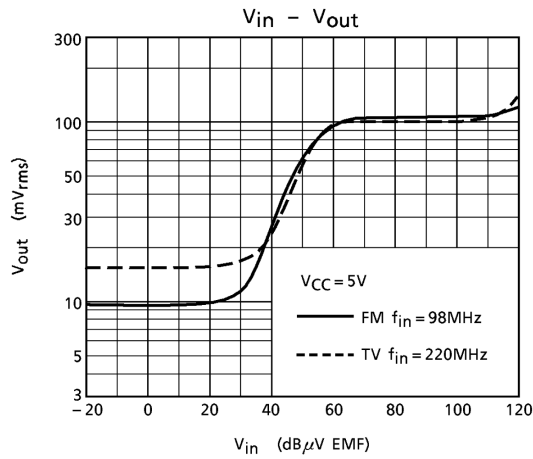


Pin⑦ output resistance, output capacitance

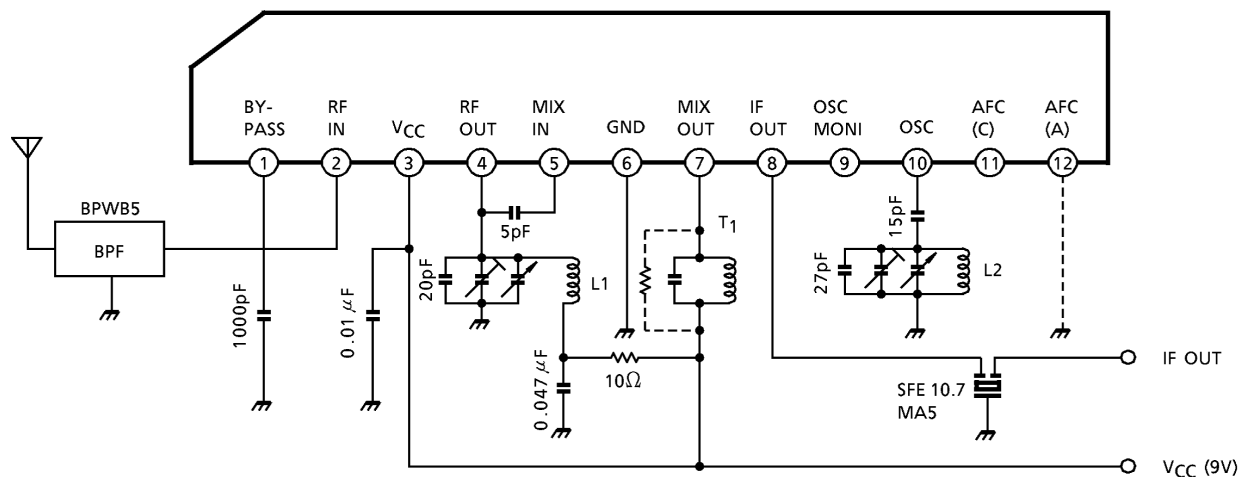


AFC diode capacitance





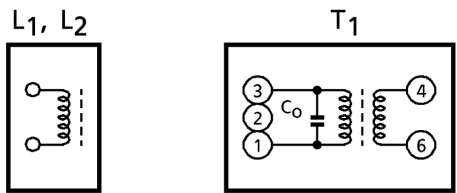
Application Circuit



Coil Data For Application Circuit

| Coil No.       | Stage  | Test Preq | L (μH) | C <sub>0</sub> (pF) | Q <sub>0</sub> | Turns |     |                 |     | Wire (mm) | Remarks                         |
|----------------|--------|-----------|--------|---------------------|----------------|-------|-----|-----------------|-----|-----------|---------------------------------|
|                |        |           |        |                     |                | 1-2   | 2-3 | 1-3             | 4-6 |           |                                 |
| L <sub>1</sub> | FM RF  | 100M      | 0.06   | —                   | 100            | —     | —   | 2 $\frac{1}{4}$ | —   | φ0.5UEW   | Within core                     |
| L <sub>2</sub> | FM OSC | 100M      | 0.045  | —                   | 100            | —     | —   | 1 $\frac{3}{4}$ | —   | φ0.5UEW   | Within core                     |
| T <sub>1</sub> | FM IFT | 10.7M     | —      | 75                  | 100            | —     | —   | 13              | 2   | φ0.16UEW  | (M)TY-20580<br>(S)2153-414-041A |

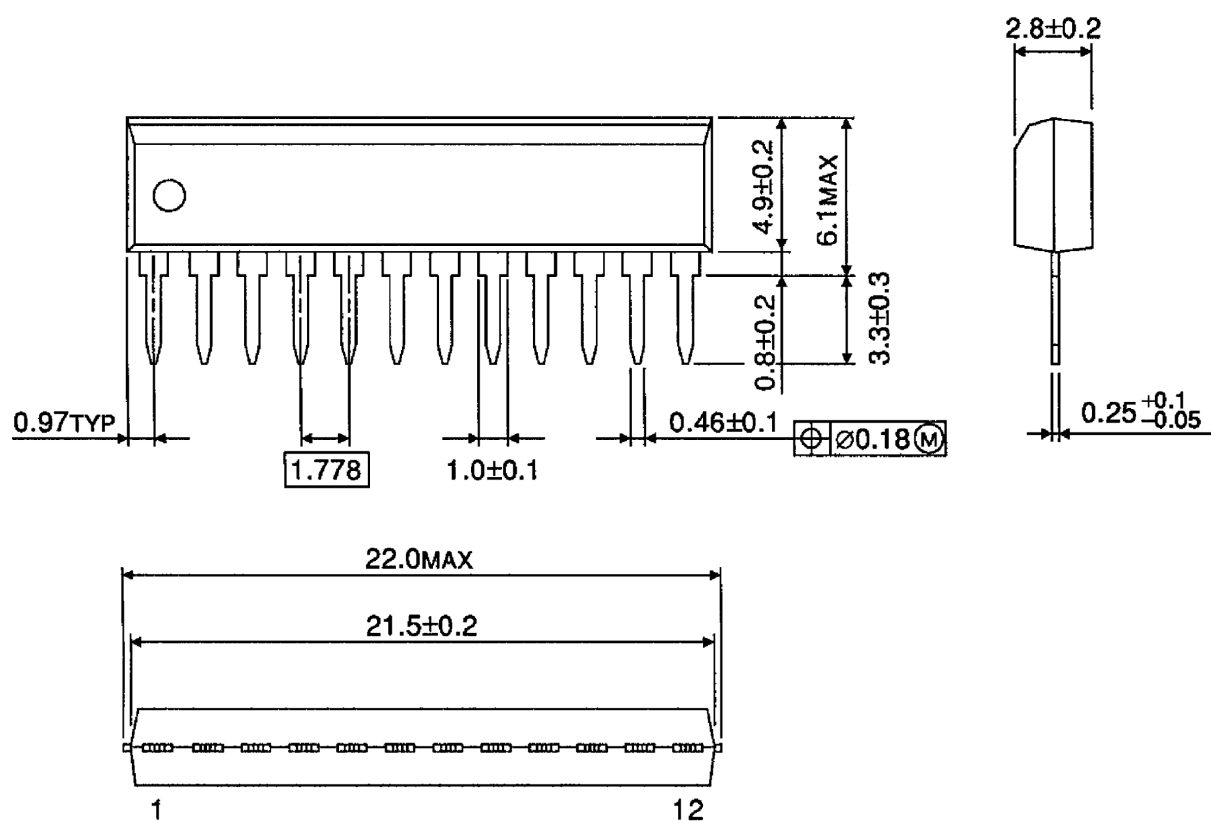
(S): SUMIDA ELECTRIC CO., LTD  
(M): MITSUMI ELECTRIC CO., LTD



## Package Dimensions

SSIP12-P-1.78

Unit : mm



Weight: 0.65g (typ.)

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