

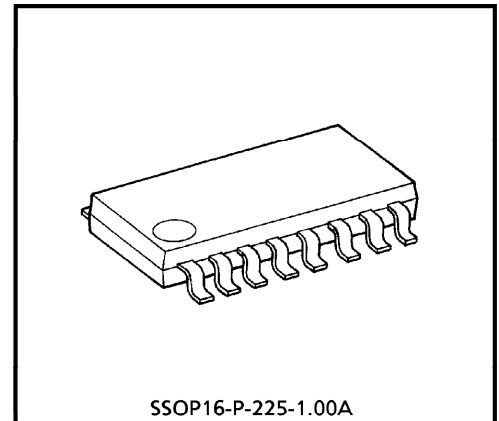
# TA7766AF

## FM PLL MPX (1.5V USE)

The TA7766AF is an FM PLL MPX IC designed for low voltage operation (1.5V), which is suitable for stereo headphone radio and radio cassette equipments. This can realize the low power dissipation.

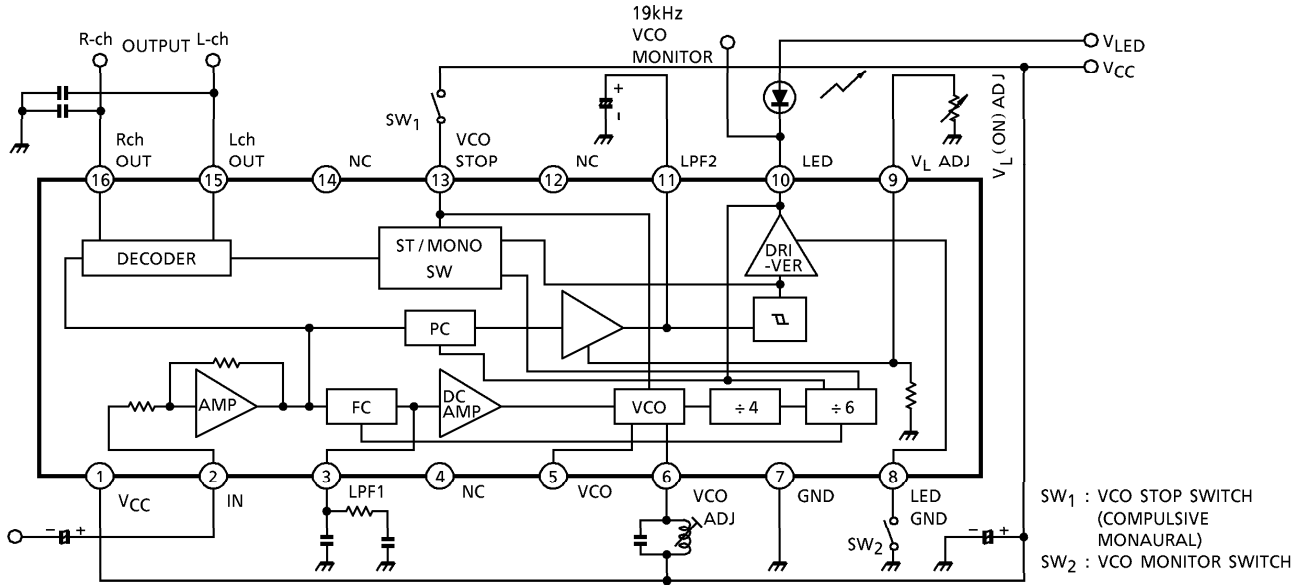
### FEATURES

- LED driver for stereo indication ( $V_{LED} = 3 \sim 6V$ )
- Adopting the LC type oscillator ( $f_{VCO} = 456kHz$ )
- Adjustable for lamp-on sensitivity
- Built-in compulsive monaural function (VCO stop, pin<sup>⑬</sup>)
- Free running frequency monitor terminal  
Pin<sup>⑧</sup> :  $f_{FREE} = 19kHz$
- Excellent low supply current  
:  $I_{CC} = 0.8mA$  (Typ.) ( $V_{CC} = 1.5V$ ,  $T_a = 25^\circ C$ )
- Operating supply voltage range  
:  $V_{CC} (opr) = 0.9 \sim 5V$  ( $T_a = 25^\circ C$ )
- Stereo operating supply voltage range  
:  $V_{CC} (opr) = 1 \sim 5V$  ( $T_a = 25^\circ C$ )



Weight : 0.14g (Typ.)

# BLOCK DIAGRAM



## APPLICATION NOTE

### (1) Input circuit

This circuit is composed of the inverted amplifier as shown Fig.1.

In case of the large signal input,  $R_f$  (the external resistance. in series) can reduce the voltage gain.

### (2) Lamp-on sensitivity and stereo / monaural sensitivity

It is possible to adjust the Lamp-on sensitivity and the stereo sensitivity by the external resistance ( $R_T$ ), which is connected to the terminal pin⑨.

The output current ( $I_O$ ) of the synchronous detector is determined by the input pilot signal. As the value of  $R_T$  is larger, the Lamp-on sensitivity and the stereo sensitivity become more increasing, because the current ( $I_1$ ) of  $Q_1$  is decreasing, and the current  $I_2$  is increasing. However, in case that the terminal pin⑨ is open, the stereo sensitivity is too increasing, the stereo switch remains turned-on, without pilot signal. Therefore, the value of  $R_T$  is efficient about 10~50k $\Omega$ .

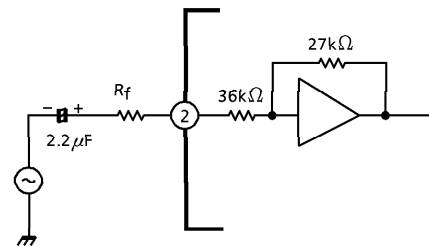


Fig.1

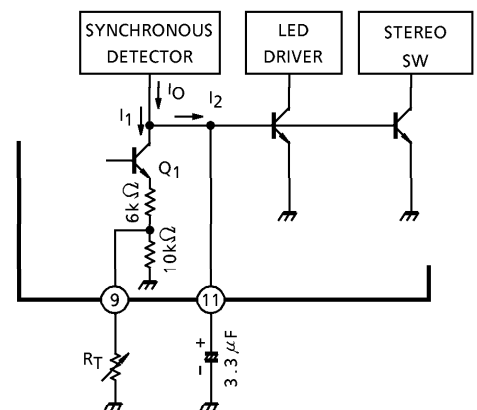


Fig.2

(3)  $f_{VCO}$  monitor

The LED terminal pin⑩ can be used as  $f_{VCO}$  (19kHz) monitor terminal, in case that the terminal pin⑧ is open, as Fig.3.

Under unlocked condition, in case that the terminal pin⑧ is connected to GND, it can be done, too.

In case that the LED indicator is not necessary, it is better that the terminal pin⑧ is open, because of the save of the supply current.

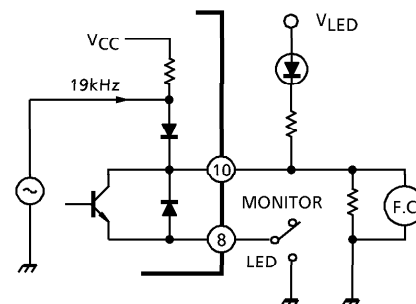


Fig.3

## (4) Compulsive monaural function

In case that the terminal pin⑬ is connected to  $V_{CC}$  as Fig.4, this item becomes compulsive monaural mode. That causes the VCO stopping. Connected as Fig.5, switchover between AM / FM mode is possible with one-make switch.

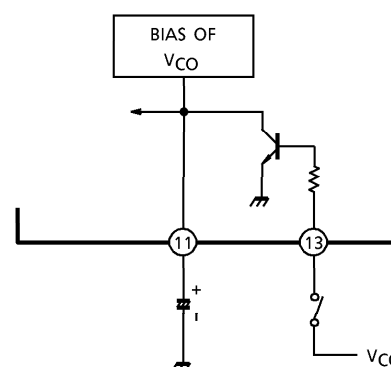


Fig.4

## (5) Anti-birdy effect

TA7766AF has beat-prevent performance, because switching wave (38kHz) hardly has a number of odd harmonic frequency of 38kHz in internal circuit.

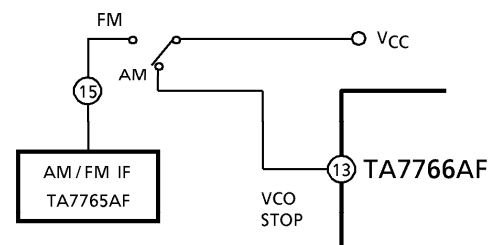


Fig.5

MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

| CHARACTERISTIC        | SYMBOL       | RATING         | UNIT             |
|-----------------------|--------------|----------------|------------------|
| Supply Voltage        | $V_{CC}$     | 5              | V                |
| Lamp Current          | $I_{LAMP}$   | 5              | mA               |
| Lamp Voltage          | $V_{LAMP}$   | 6              | V                |
| Power Dissipation     | $P_D$ (Note) | 350            | mW               |
| Operating Temperature | $T_{opr}$    | $-25 \sim 75$  | $^\circ\text{C}$ |
| Storage Temperature   | $T_{stg}$    | $-55 \sim 150$ | $^\circ\text{C}$ |

(Note) Derated above  $25^\circ\text{C}$  in the proportion of  $2.8\text{mW}/^\circ\text{C}$ .

ELECTRICAL CHARACTERISTICS (Unless otherwise specified, Ta = 25°C, V<sub>CC</sub> = 1.5V, f<sub>m</sub> = 1kHz)

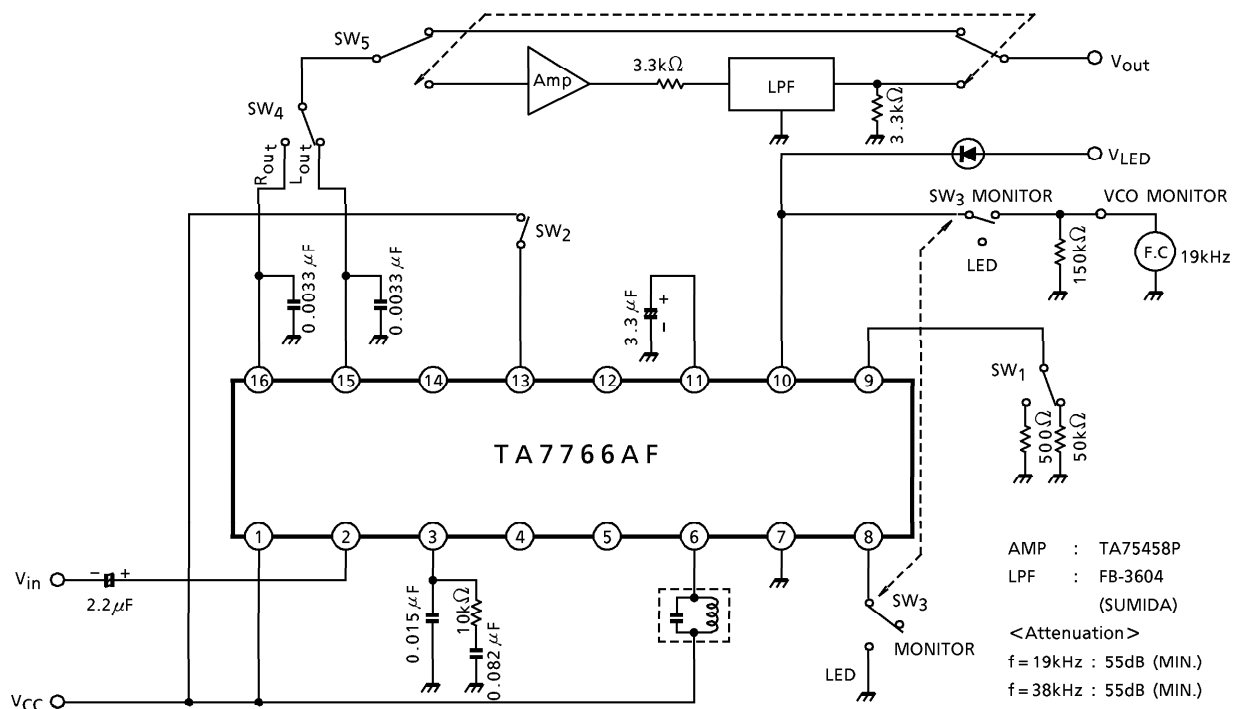
| CHARACTERISTIC                         |          | SYMBOL                            | TEST CIR-<br>CUIT | TEST CONDITION                                                                                                                                            |                                          | MIN. | TYP. | MAX. | UNIT              |
|----------------------------------------|----------|-----------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|------|------|------|-------------------|
| Supply Current                         |          | I <sub>CC</sub>                   | —                 | At lamp off                                                                                                                                               |                                          | —    | 0.8  | 1.6  | mA                |
| Input Resistance                       |          | R <sub>IN</sub>                   | —                 |                                                                                                                                                           |                                          | —    | 36   | —    | kΩ                |
| Output Resistance                      |          | R <sub>OUT</sub>                  | —                 |                                                                                                                                                           |                                          | —    | 15   | —    | kΩ                |
| Max. Composite<br>Signal Input Voltage |          | V <sub>in</sub> (MAX)<br>(STEREO) | —                 | L + R = 90%, P = 10%, THD = 5%<br>SW <sub>1</sub> →R <sub>LED</sub> = 50kΩ<br>SW <sub>5</sub> →LPF ON                                                     |                                          | —    | 250  | —    | mV <sub>rms</sub> |
| Separation                             |          | Sep                               | —                 | L + R = 90mV <sub>rms</sub><br>P = 10mV <sub>rms</sub><br>SW <sub>1</sub> →R <sub>LED</sub> = 50kΩ<br>SW <sub>5</sub> →LPF ON                             | f <sub>m</sub> = 100Hz                   | —    | 30   | —    | dB                |
|                                        |          |                                   |                   |                                                                                                                                                           | f <sub>m</sub> = 1kHz                    | 22   | 35   | —    |                   |
|                                        |          |                                   |                   |                                                                                                                                                           | f <sub>m</sub> = 10kHz                   | —    | 30   | —    |                   |
| Total<br>Harmonic<br>Distortion        | Monaural | THD<br>(MONAURAL)                 | —                 | V <sub>in</sub> = 100mV <sub>rms</sub><br>SW <sub>1</sub> →R <sub>LED</sub> = 500Ω                                                                        |                                          | —    | 0.2  | 1.5  | %                 |
|                                        | Stereo   | THD<br>(STEREO)                   |                   | L + R = 90mV <sub>rms</sub> , P = 10mV <sub>rms</sub><br>SW <sub>1</sub> →R <sub>LED</sub> = 50kΩ<br>SW <sub>5</sub> →LPF ON                              |                                          | —    | 0.4  | —    |                   |
| Voltage Gain                           |          | G <sub>V</sub>                    | —                 | V <sub>in</sub> = 100mV <sub>rms</sub><br>SW <sub>1</sub> →R <sub>LED</sub> = 500Ω                                                                        |                                          | − 4  | − 2  | 1    | dB                |
| Channel Balance                        |          | CB                                | —                 | V <sub>in</sub> = 100mV <sub>rms</sub><br>SW <sub>1</sub> →R <sub>LED</sub> = 500Ω                                                                        |                                          | —    | 0    | 2.0  | dB                |
| Lamp ON Sensitivity                    |          | V <sub>L</sub> (ON)               | —                 | Pilot                                                                                                                                                     | SW <sub>1</sub> →R <sub>LED</sub> = 50kΩ | —    | —    | 5    | mV <sub>rms</sub> |
| Lamp OFF Sensitivity                   |          | V <sub>L</sub> (OFF)              |                   | input                                                                                                                                                     | SW <sub>1</sub> →R <sub>LED</sub> = 500Ω | 7    | —    | —    |                   |
| Stereo Lamp<br>Hysteresis              |          | V <sub>H</sub>                    | —                 | to turn-off from turn-on                                                                                                                                  |                                          | —    | 3    | —    | mV <sub>rms</sub> |
| Capture Range                          |          | CR                                | —                 | P = 10mV <sub>rms</sub>                                                                                                                                   |                                          | —    | ± 3  | —    | %                 |
| Carrier Leak<br>(Note)                 | 19kHz    | CL                                | —                 | L + R = 90mV <sub>rms</sub><br>P = 10mV <sub>rms</sub><br>SW <sub>1</sub> →R <sub>LED</sub> = 50kΩ                                                        |                                          | —    | 30   | —    | dB                |
|                                        | 38kHz    |                                   |                   |                                                                                                                                                           | —                                        | 50   | —    |      |                   |
| SCA Rejection Ratio                    |          | SCA Rej                           | —                 | P = 10mV <sub>rms</sub> , L + R = 80mV <sub>rms</sub><br>SCA = 10mV <sub>rms</sub> , f <sub>SCA</sub> = 67kHz<br>SW <sub>1</sub> →R <sub>LED</sub> = 50kΩ |                                          | —    | 70   | —    | dB                |
| Signal To Noise Ratio                  |          | S / N                             | —                 | V <sub>in</sub> = 100mV <sub>rms</sub> , R <sub>g</sub> = 620Ω<br>SW <sub>1</sub> →R <sub>LED</sub> = 500Ω                                                |                                          | —    | 65   | —    | dB                |

(Note) Carrier leak of 38kHz is only carrier.

**DC CHARACTERISTICS**(V<sub>CC</sub> = 1.5V, T<sub>a</sub> = 25°C, terminal voltage at no signal)

| PIN No.                    | SYMBOL          | TYP. | UNIT |
|----------------------------|-----------------|------|------|
| PIN ① (V <sub>CC</sub> )   | V <sub>1</sub>  | 1.5  | V    |
| PIN ② (INPUT)              | V <sub>2</sub>  | 0.6  | V    |
| PIN ③ (LPF1)               | V <sub>3</sub>  | 0.7  | V    |
| PIN ④ (NC)                 | V <sub>4</sub>  | —    | V    |
| PIN ⑤ (VCO)                | V <sub>5</sub>  | 0.8  | V    |
| PIN ⑥ (VCO ADJ)            | V <sub>6</sub>  | 1.5  | V    |
| PIN ⑦ (GND)                | V <sub>7</sub>  | 0    | V    |
| PIN ⑧ (LED GND)            | V <sub>8</sub>  | 0    | V    |
| PIN ⑨ (V <sub>L</sub> ADJ) | V <sub>9</sub>  | 0.05 | V    |
| PIN ⑩ (LED)                | V <sub>10</sub> | —    | V    |
| PIN ⑪ (LPF2)               | V <sub>11</sub> | 0.7  | V    |
| PIN ⑫ (NC)                 | V <sub>12</sub> | —    | V    |
| PIN ⑬ (VCO STOP)           | V <sub>13</sub> | —    | V    |
| PIN ⑭ (NC)                 | V <sub>14</sub> | —    | V    |
| PIN ⑮ (L-ch OUTPUT)        | V <sub>15</sub> | 0.65 | V    |
| PIN ⑯ (R-ch OUTPUT)        | V <sub>16</sub> | 0.65 | V    |

## TEST CIRCUIT



SW<sub>1</sub> Lamp (stereo indicator) ON/OFF check

Lamp ON SW<sub>1</sub> : 50kΩ

Lamp OFF SW<sub>1</sub> : 500Ω

SW<sub>2</sub> VCO stop switch pin<sup>⑬</sup> connected to V<sub>CC</sub> (compulsive monaural)

SW<sub>3</sub> VCO monitor

At monitor mode, pin<sup>⑩</sup> is connected to the resistor (150kΩ) at test circuit.

In case that the input has no pilot signal and pin<sup>⑧</sup> is connected to GND, it is possible to check the VCO frequency, too.

SW<sub>4</sub> L<sub>out</sub>/R<sub>out</sub> switchover

SW<sub>5</sub> LPF switchover

(Note) In the test of ELECTRICAL CHARACTERISTIC

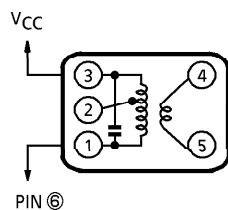
Monaural mode (V<sub>in</sub> = 100mV<sub>rms</sub>)

SW<sub>1</sub> : 500Ω

Stereo mode (L + R = 90mV<sub>rms</sub>, P = 10mV<sub>rms</sub>)

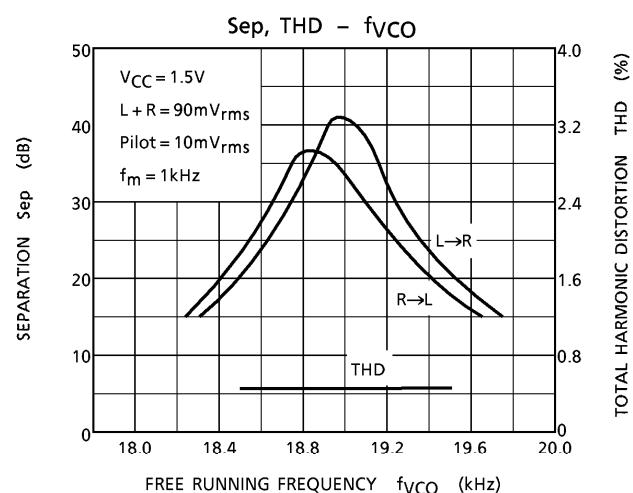
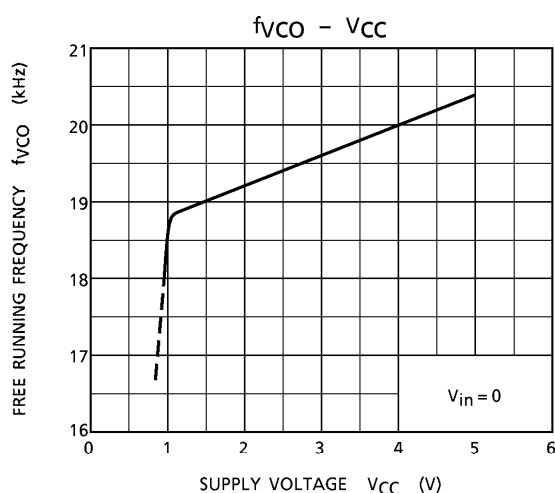
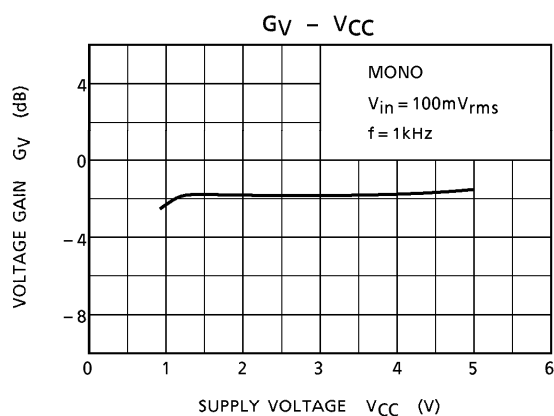
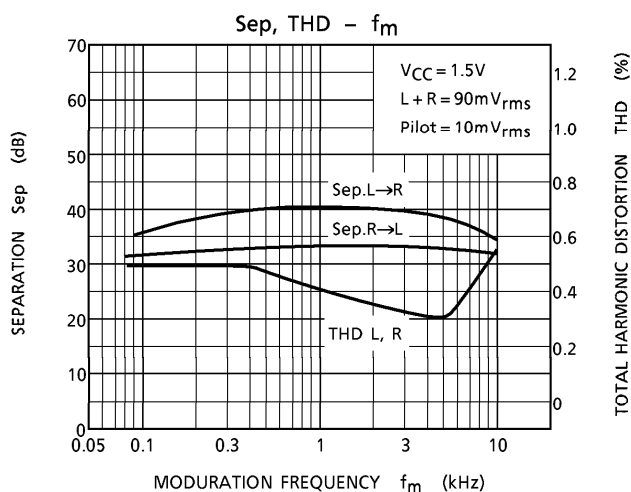
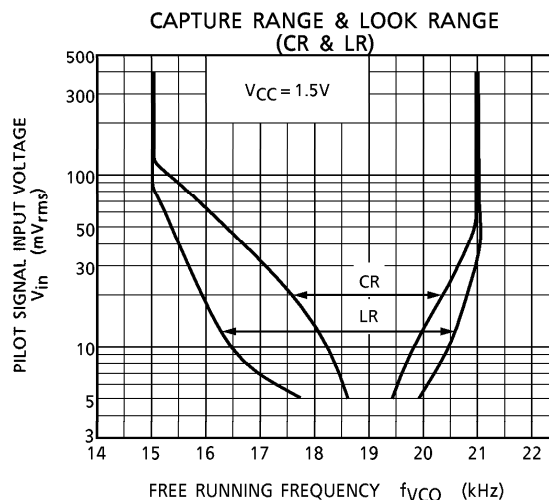
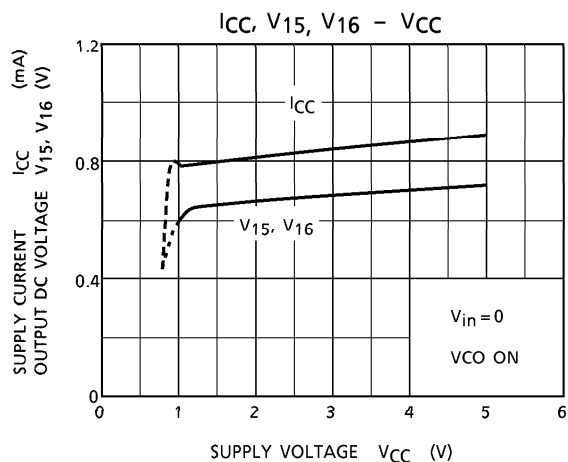
SW<sub>1</sub> : 50kΩ

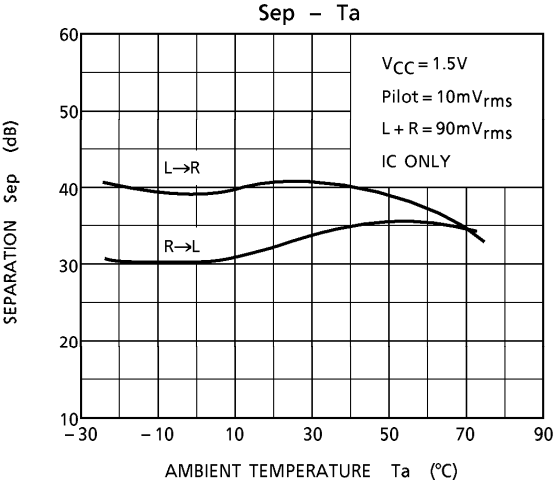
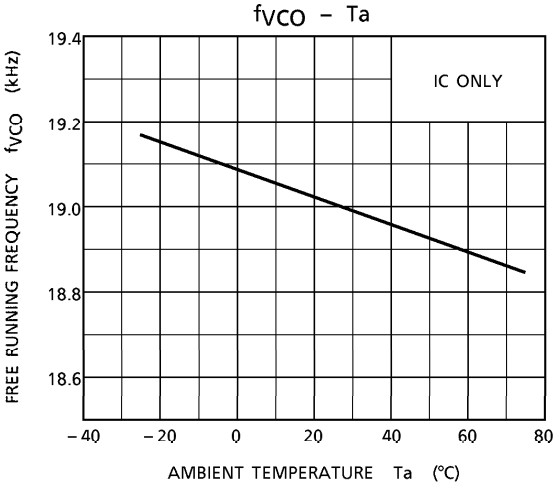
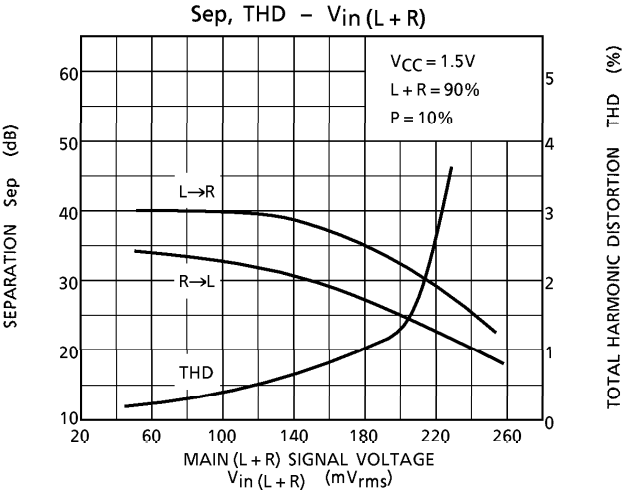
## COIL DATA (Test circuit)



| C <sub>O</sub> (pF) | f (kHz) | Q <sub>O</sub> | TURN |     |     |
|---------------------|---------|----------------|------|-----|-----|
|                     |         |                | 1-2  | 2-3 | 4-6 |
| 180                 | 455     | 110            | 146  | 6   | 13  |

SUMIDA ELECTRIC Co., Ltd.  
 : 44M-037-935C  
 WITE : 0.07mmφ UEW

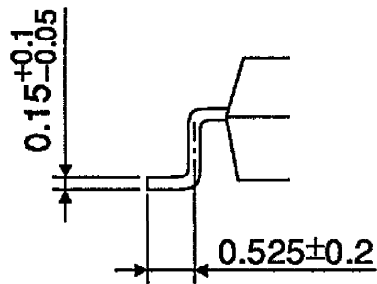
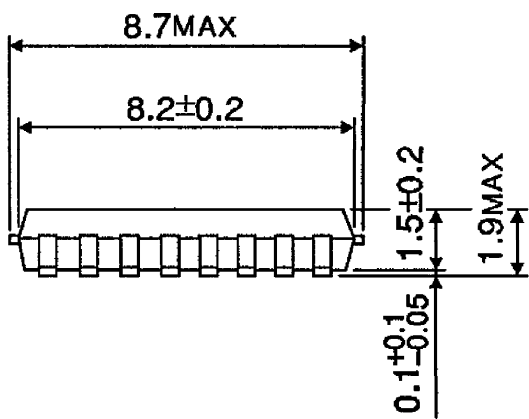
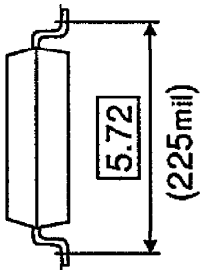
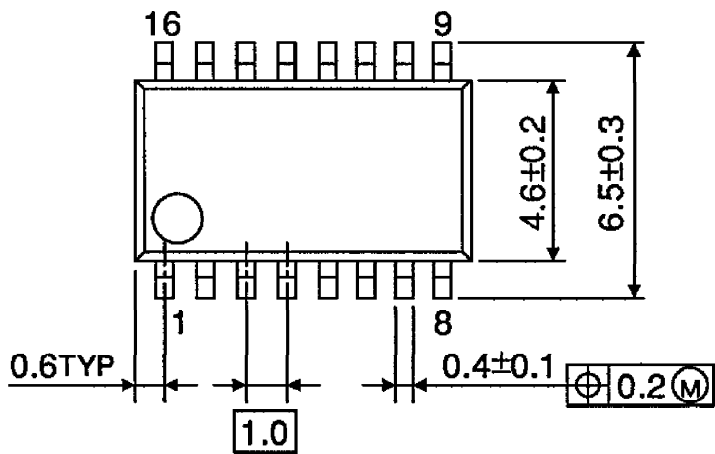






PACKAGE DIMENSIONS  
SSOP16-P-225-1.00A

Unit : mm



Weight : 0.14g (Typ.)

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000707EBA

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