

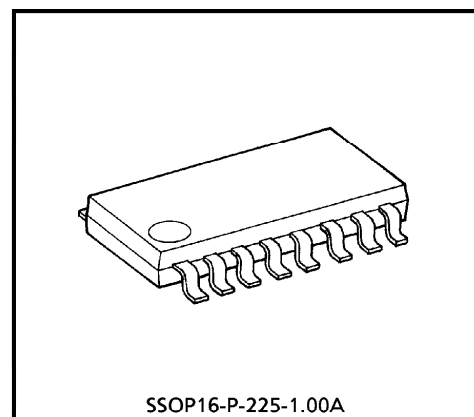
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

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, pin⑬)
- Free running frequency monitor terminal
Pin⑧ : $f_{FREE} = 19kHz$
- 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
: $V_{CC(opr)} = 1 \sim 5V$ ($T_a = 25^\circ C$)

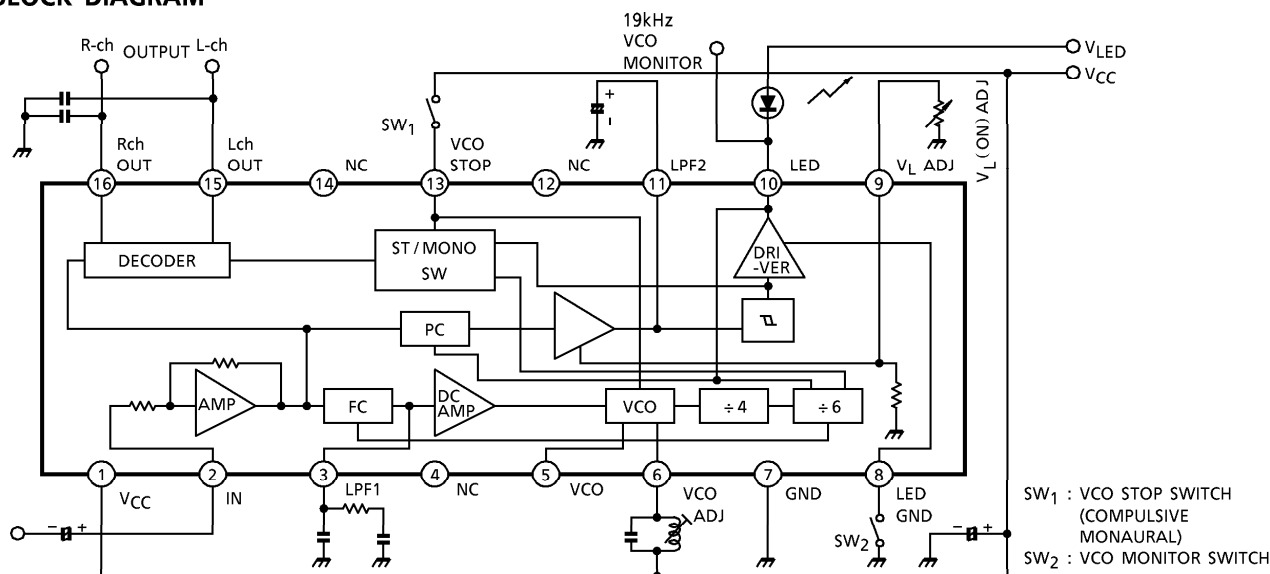


Weight : 0.14g (Typ.)

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BLOCK DIAGRAM



(Note) pin④, ⑫, ⑭ are no connected.

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 Ω .

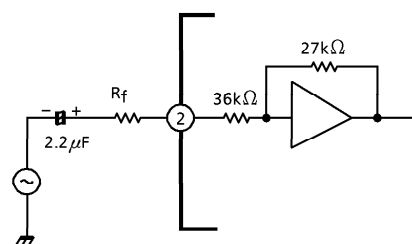


Fig.1

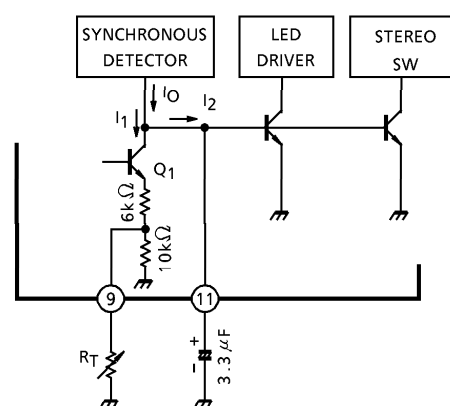


Fig.2

(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.

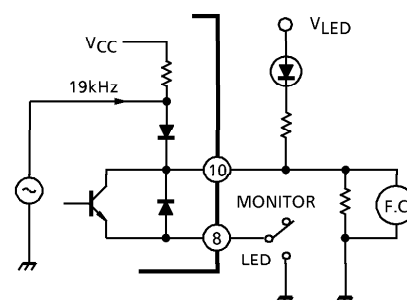


Fig.3

(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.

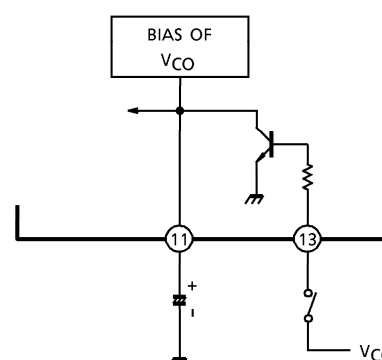


Fig.4

(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.

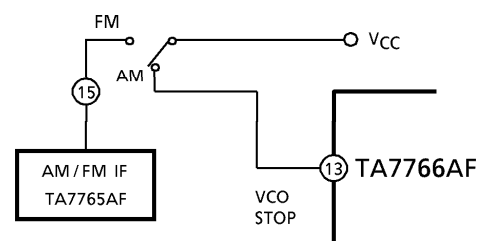


Fig.5

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°C in the proportion of $2.8\text{mW}/^\circ\text{C}$.

ELECTRICAL CHARACTERISTICS (Unless otherwise specified, $T_a = 25^\circ\text{C}$, $V_{CC} = 1.5\text{V}$, $f_m = 1\text{kHz}$)

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

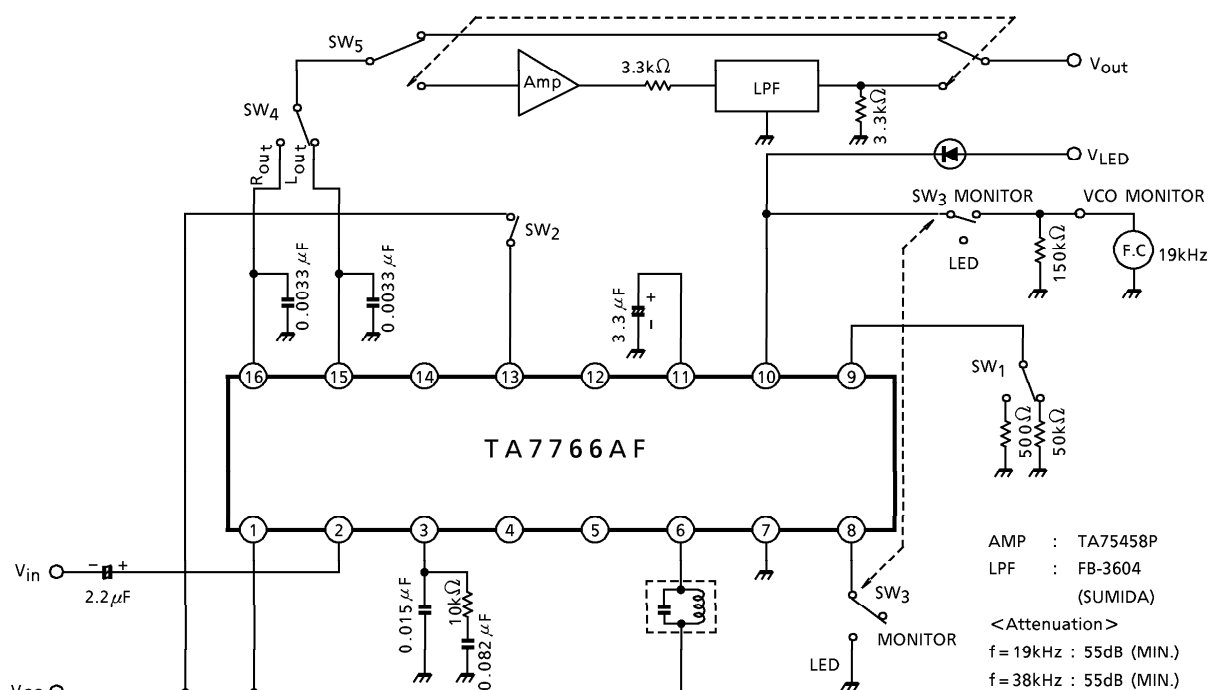
(Note) Carrier leak of 38kHz is only carrier.

DC CHARACTERISTICS

(V_{CC} = 1.5V, T_a = 25°C, terminal voltage at no signal)

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

TEST CIRCUIT

SW₁ Lamp (stereo indicator) ON / OFF check

Lamp ON $SW_1 : 50k\Omega$

Lamp OFF $SW_1 : 500\Omega$

SW₂ VCO stop switch pin⑬ connected to V_{CC} (compulsive monaural)

SW ₂	VCO stop sw.
SW ₃	VCO monitor

At monitor mode, pin⑩ is connected to the resistor (150kΩ) at test circuit.

In case that the input has no pilot signal and pin⑧ is connected to GND, it is possible to check the VCO frequency, too.

SW₄ L_{OUT} / R_{OUT} switchover

SW₅ LPF switchover

(Note) In the test of ELECTRICAL CHARACTERISTIC

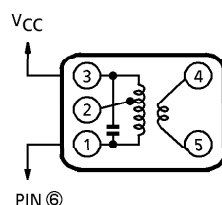
Monaural mode ($V_{in} = 100\text{mV}_{\text{rms}}$)

$$SW_1 : 500\Omega$$

Stereo mode (L + R = 90mV_{rms}, P = 10mV_{rms})

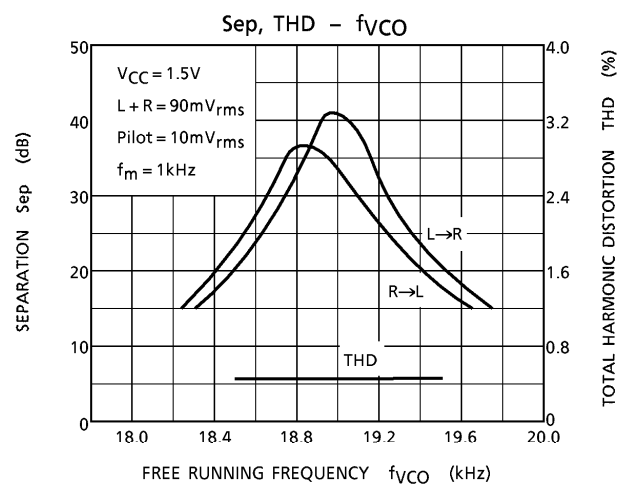
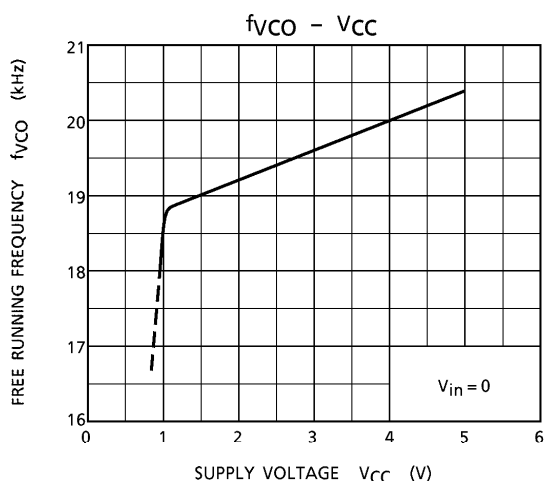
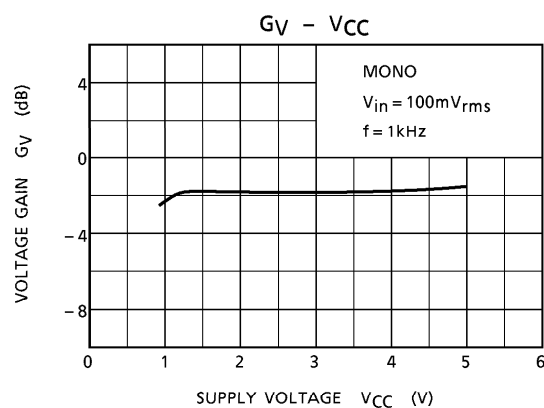
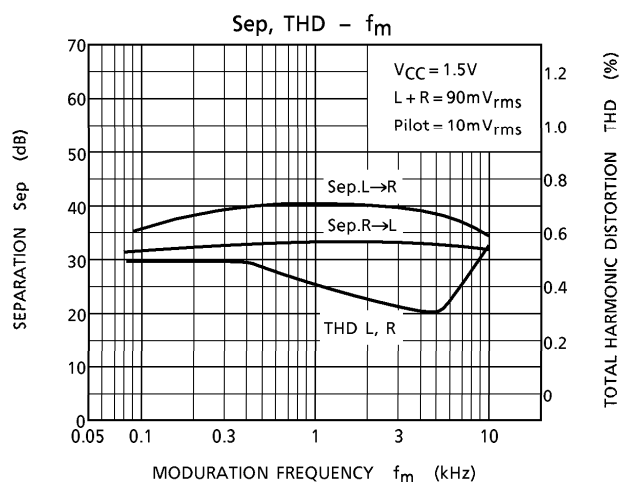
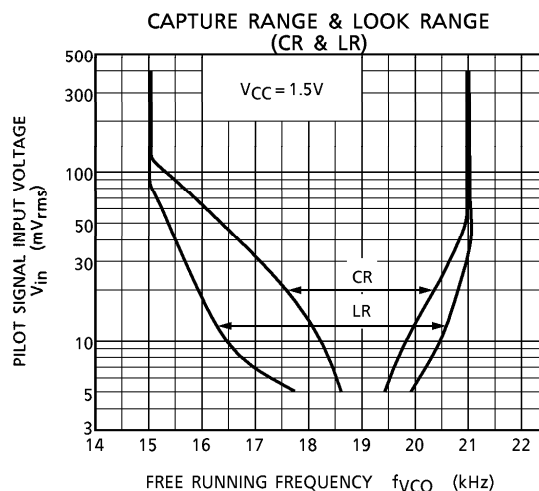
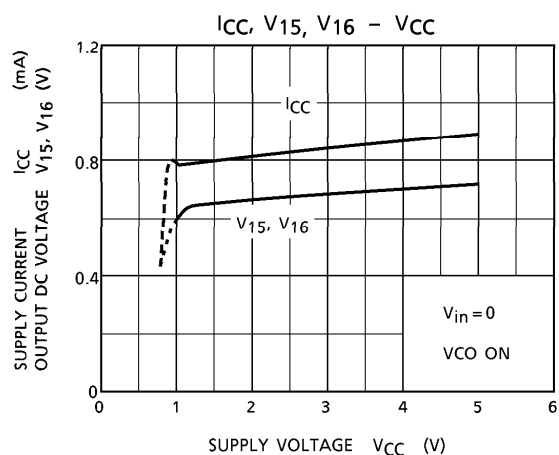
 $SW_1 : 50k\Omega$

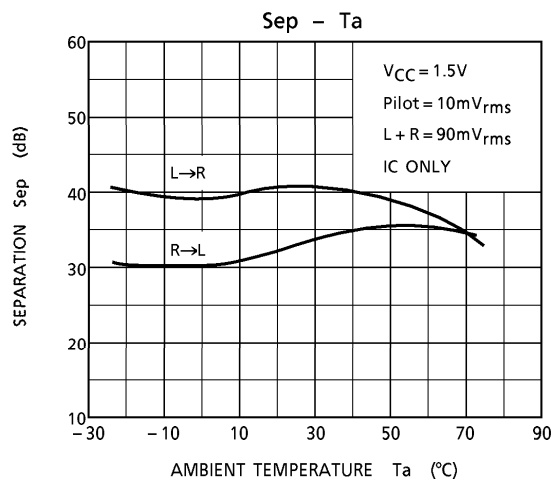
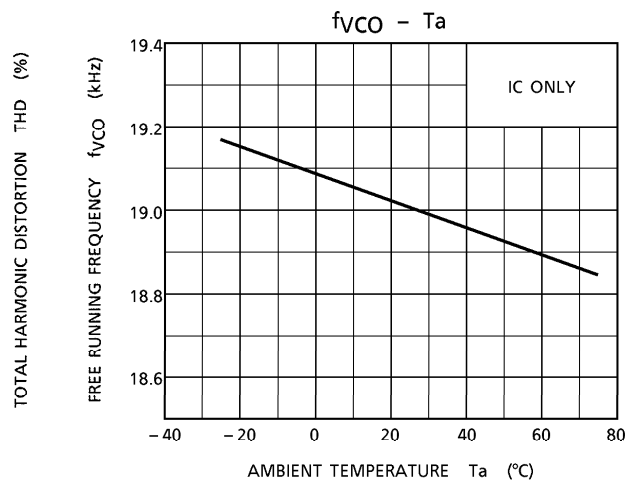
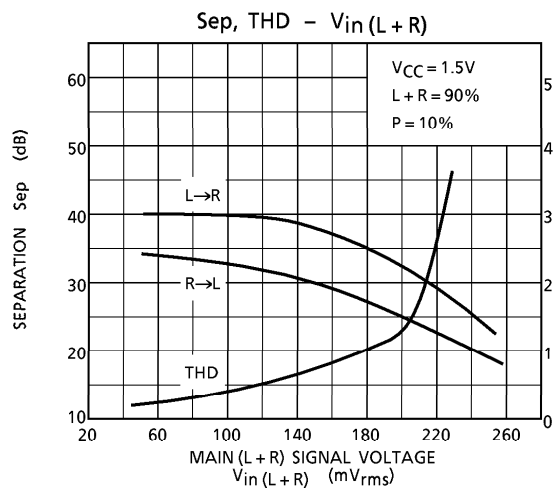
COIL DATA (Test circuit)



C _O (pF)	f (kHz)	Q _o 1-3	TURN		
			1-2	2-3	4-6
180	455	110	146	6	13

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

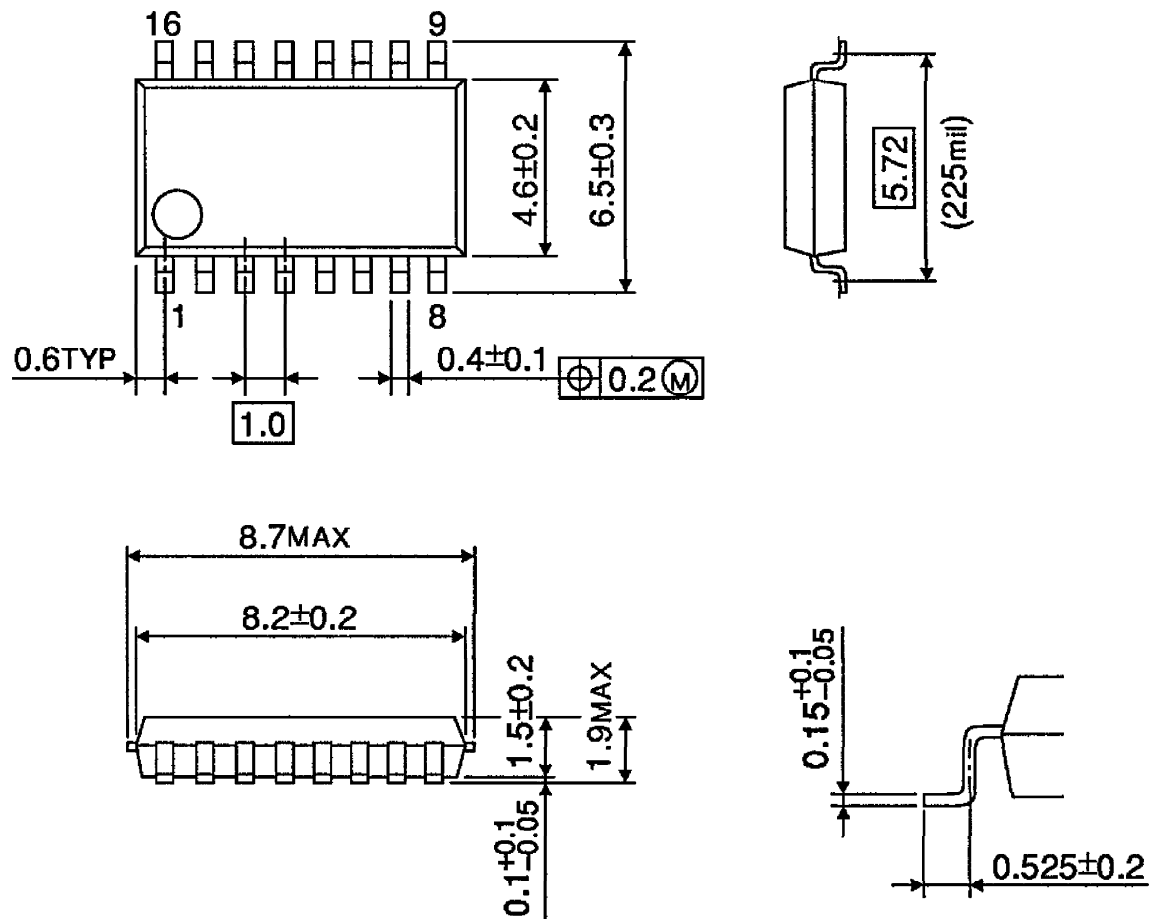




OUTLINE DRAWING

SSOP16-P-225-1.00A

Unit : mm



Weight : 0.14g (Typ.)