

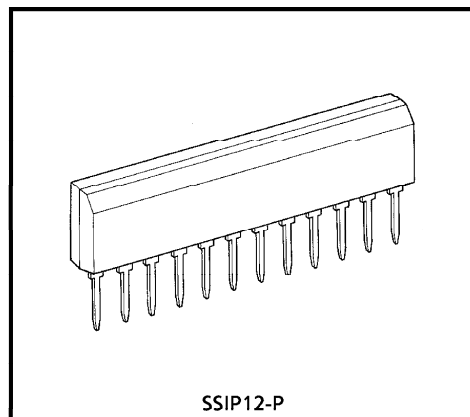
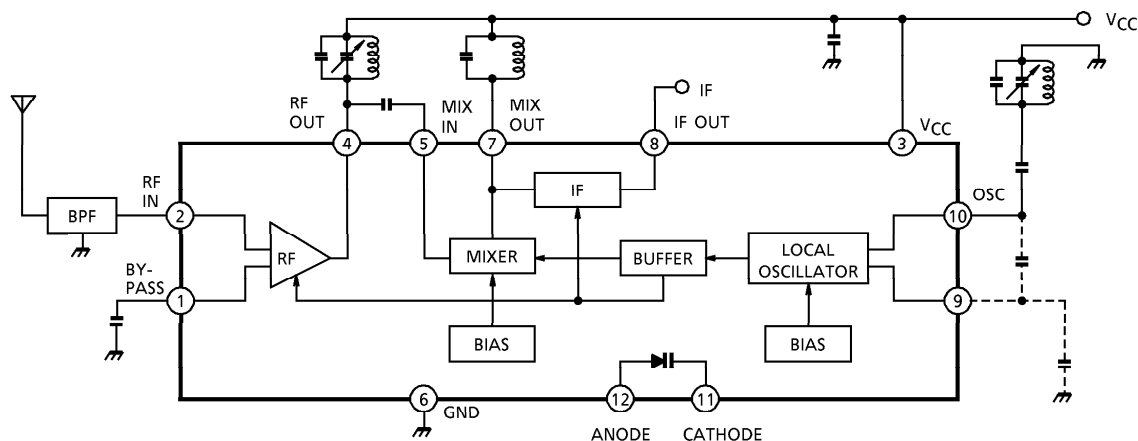
## FM FRONT END IC

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 oscillator transistor
- Built-in varactordiode for AFC  
Cathode and anode are floating
- Operating supply voltage range  
 $V_{CC}$  (opr) = 3.5~14V ( $T_a = 25^\circ\text{C}$ )

### BLOCK DIAGRAM



Weight : 0.65g (Typ.)

**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. 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 RF Tank circuit is connected		Refer to Pin①, ②.	5.0
5	MIX IN	Mixer Input Terminal			2.0
6	GND	Ground Terminal		—	—
7	MIX OUT	Mixer Output Terminal Mixer Coil is connected		5.0	
8	IF OUT	IF Output Terminal Output Impedance $R_O(\text{IF}) = 330\Omega$ (Typ.)		4.85	
9	MONITOR	Local OSC Monitor Terminal		4.25	
10	LOCAL OSC	Local OSC Terminal 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.

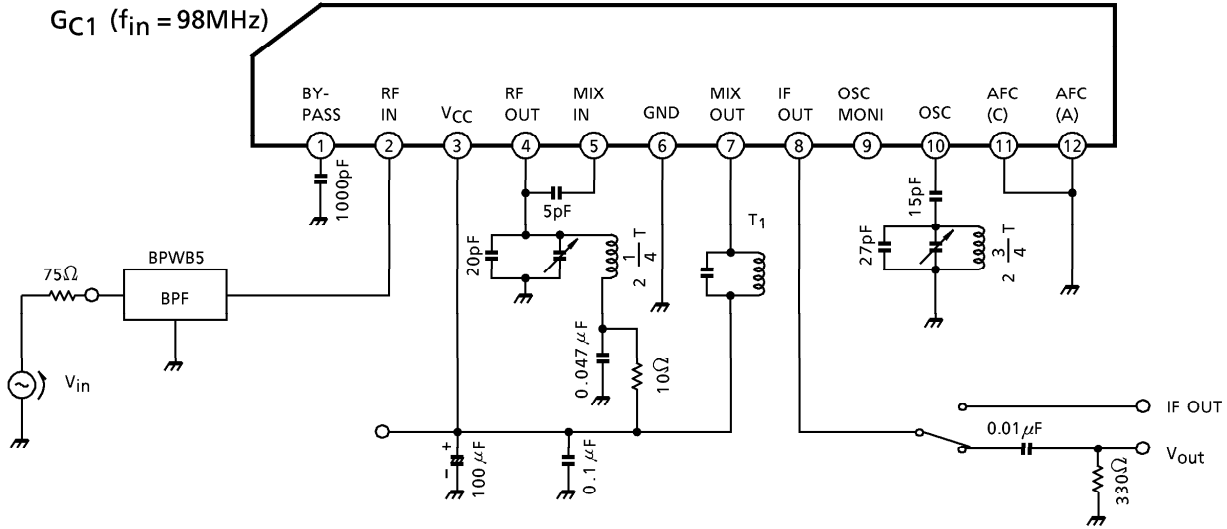
**ELECTRICAL CHARACTERISTICS**

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

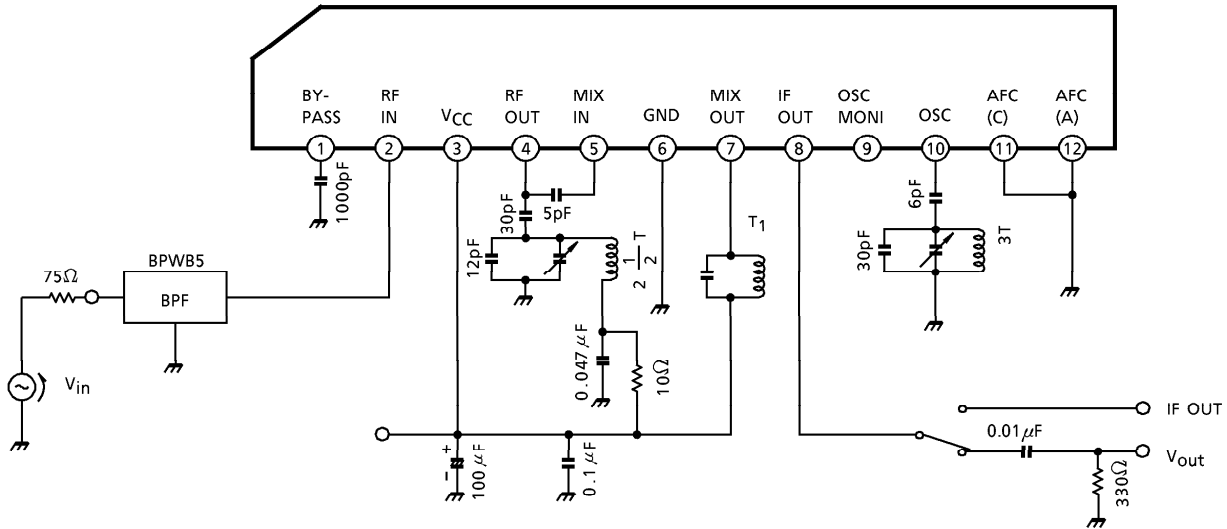
CHARACTERISTIC		SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Supply Current		I <sub>CC</sub>	1	V <sub>in</sub> = 0	—	10	15	mA	
Conversion Gain		G <sub>C1</sub>	1	f <sub>in</sub> = 98MHz, V <sub>in</sub> = 50dB <sub>μ</sub> V EMF	42	46	50	dB	
		G <sub>C2</sub>	1	f <sub>in</sub> = 220MHz, V <sub>in</sub> = 50dB <sub>μ</sub> V 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	—		
Pin② Input Impedance	Parallel Input Resistance	r <sub>ip2</sub>	3	f = 98MHz	—	50	—	Ω	
	Parallel Input Capacitance	c <sub>ip2</sub>			—	-15	—	pF	
Pin④ Output Impedance	Parallel Output Resistance	r <sub>op4</sub>	3		—	70	—	kΩ	
	Parallel Output Capacitance	c <sub>op4</sub>			—	1.5	—	pF	
Pin⑤ Input Impedance	Parallel Input Resistance	r <sub>ip5</sub>	3		—	4.0	—	kΩ	
	Parallel Input Capacitance	c <sub>ip5</sub>			—	2.0	—	pF	
Pin⑦ 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**

Gc1 ( $f_{in} = 98\text{MHz}$ )



Gc2 ( $f_{in} = 220\text{MHz}$ )



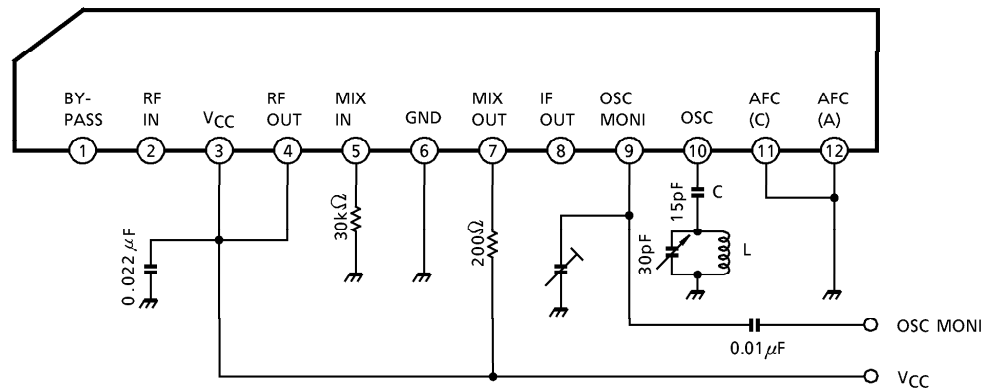
**COIL DATA FOR TEST CIRCUIT**

COIL No.	TEST FREQUENCY (Hz)	L ( $\mu\text{H}$ )	$C_o$ (pF)	$Q_o$	TURNS					WIRE (mm $\phi$ )	NOTE
					1-2	2-3	1-3	1-4	4-6		
T <sub>1</sub>	10.7M	—	75	100	—	—	13	—	2	0.1UEW	Ⓢ 2153-414-041A

Ⓢ : SUMIDA ELECTRIC CO., LTD

TEST CIRCUIT 2

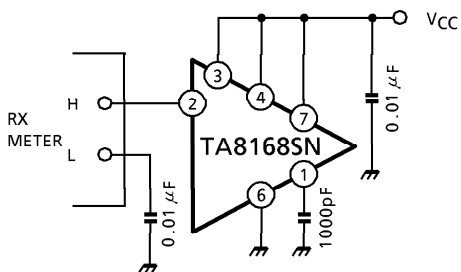
$V_{OSC}$ ,  $V_{stop}$



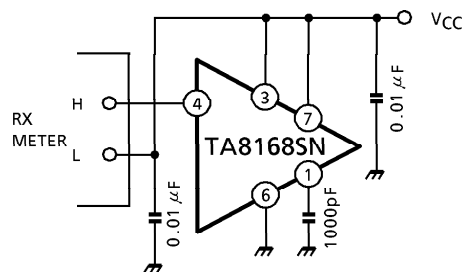
- (1)  $f_{OSC} = 108.7\text{MHz}$   
 $L : 5\text{mm}\phi, 2\frac{1}{2}$  turn with ferrite core  
 $C : 15\text{pF}$
- (2)  $f_{OSC} = 230\text{MHz}$   
 $L : 5\text{mm}\phi, 3$  turn without ferrite core  
 $C : 6\text{pF}$

**TEST CIRCUIT 3**

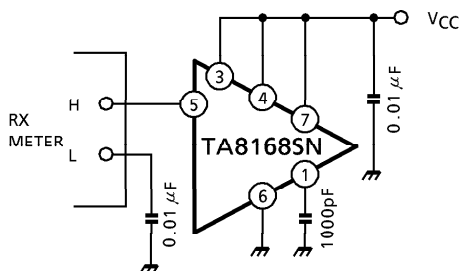
Pin② input resistance, input capacitance



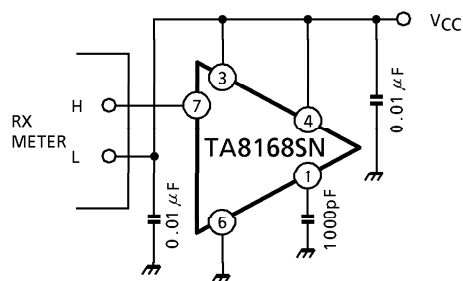
Pin④ output resistance, output capacitance



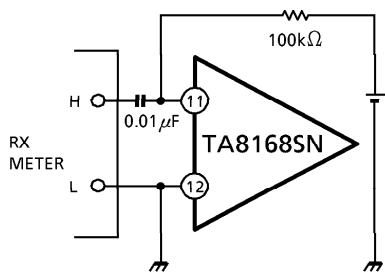
Pin⑤ input resistance, input capacitance

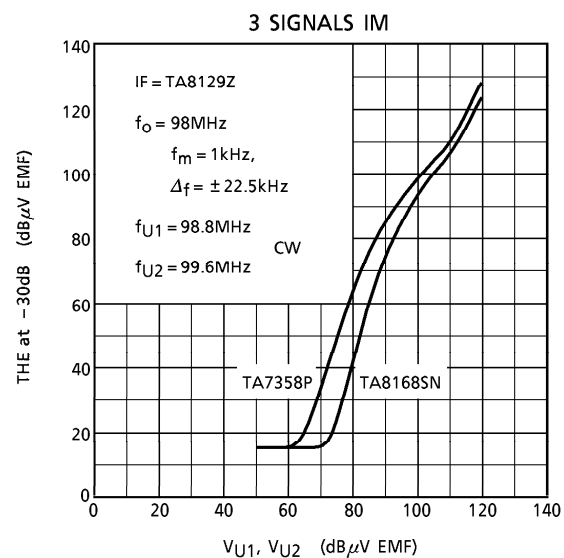
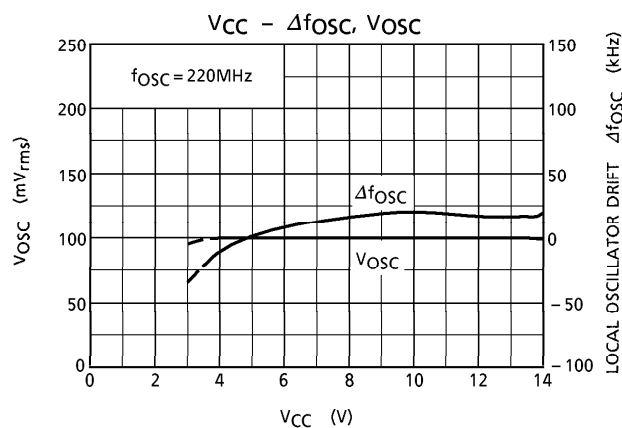
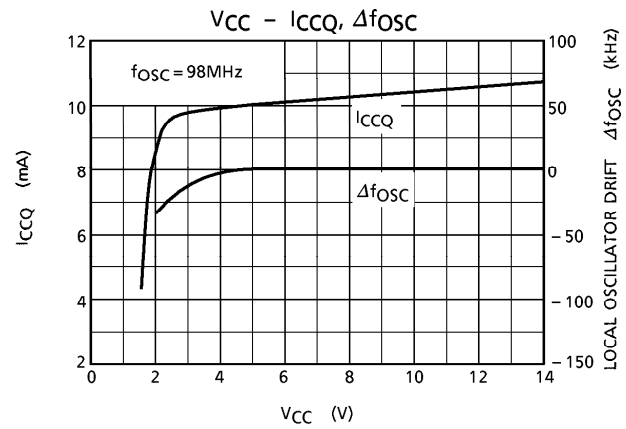
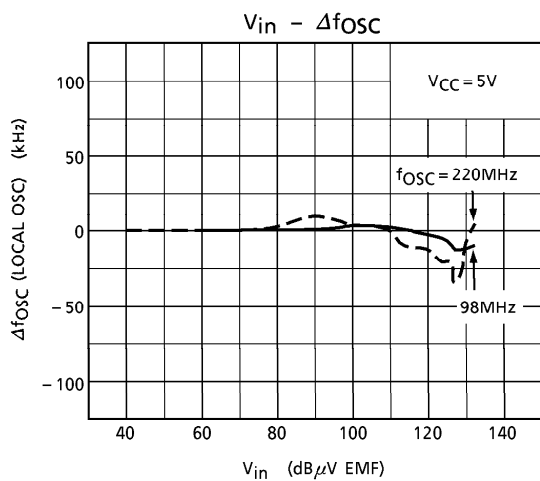
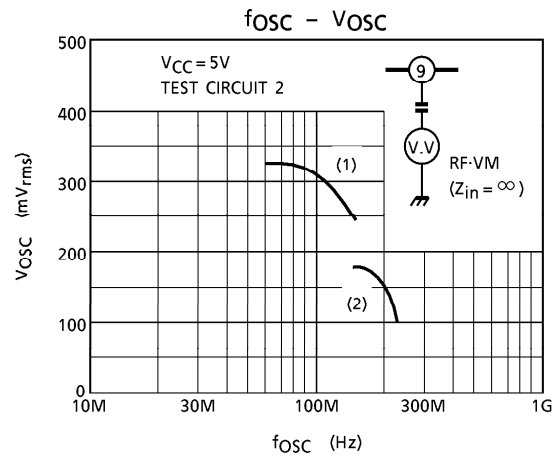
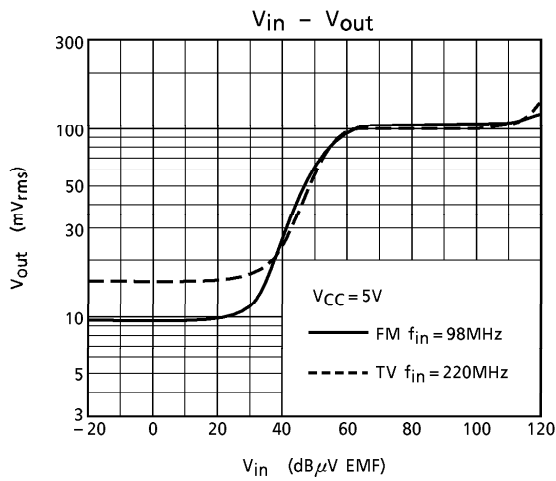


Pin⑦ output resistance, output capacitance

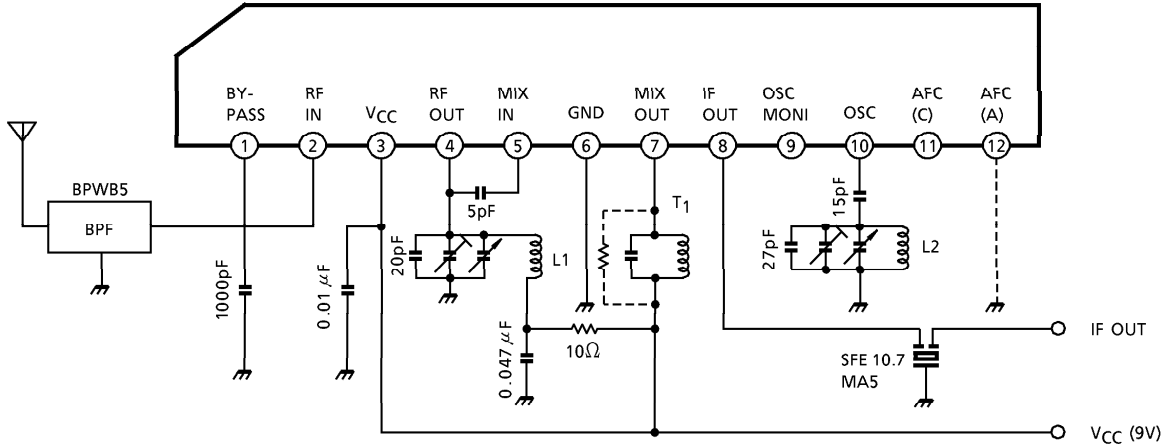


AFC diode capacitance





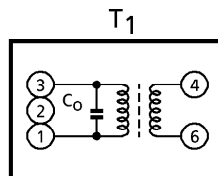
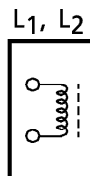
**APPLICATION CIRCUIT**



**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	Ⓜ TY-20580 Ⓢ 2153-414-041A

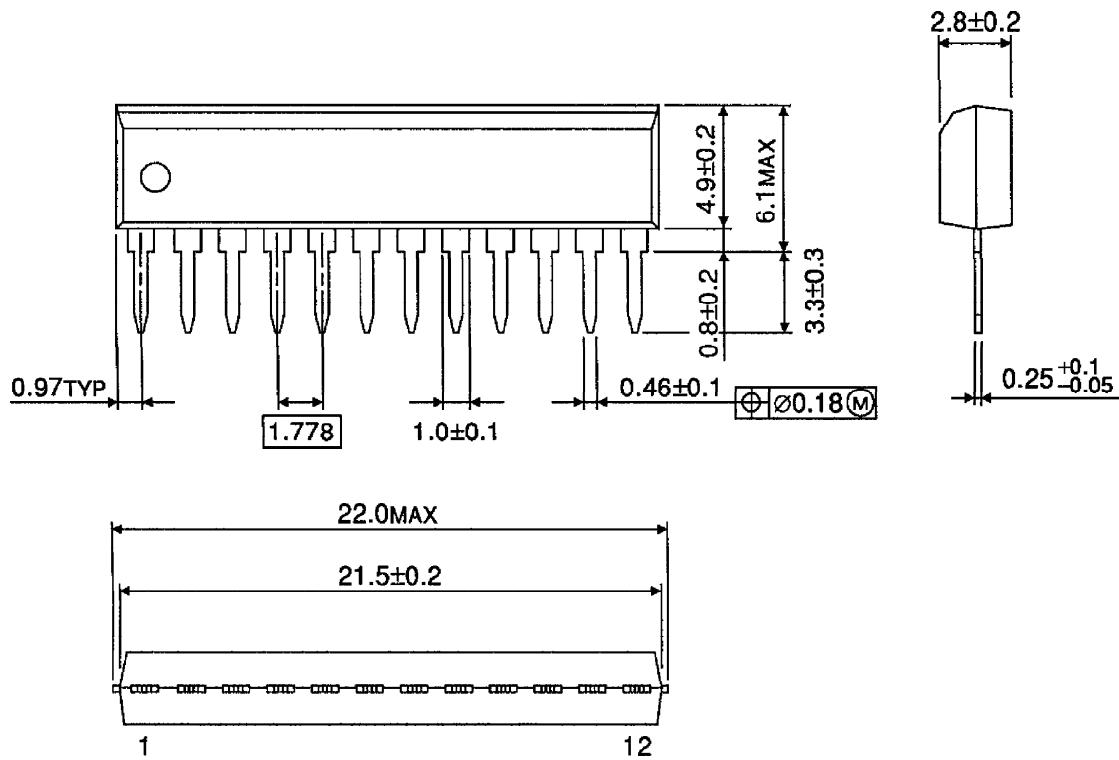
Ⓢ : SUMIDA ELECTRIC CO., LTD  
Ⓜ : MITSUMI ELECTRIC CO., LTD





**OUTLINE DRAWING**  
SSIP12-P

Unit : mm



Weight : 0.65g (Typ.)

TA8168SN - 9*
1996 - 6 - 17
<b>TOSHIBA CORPORATION</b>