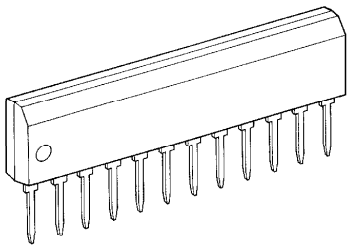
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

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.



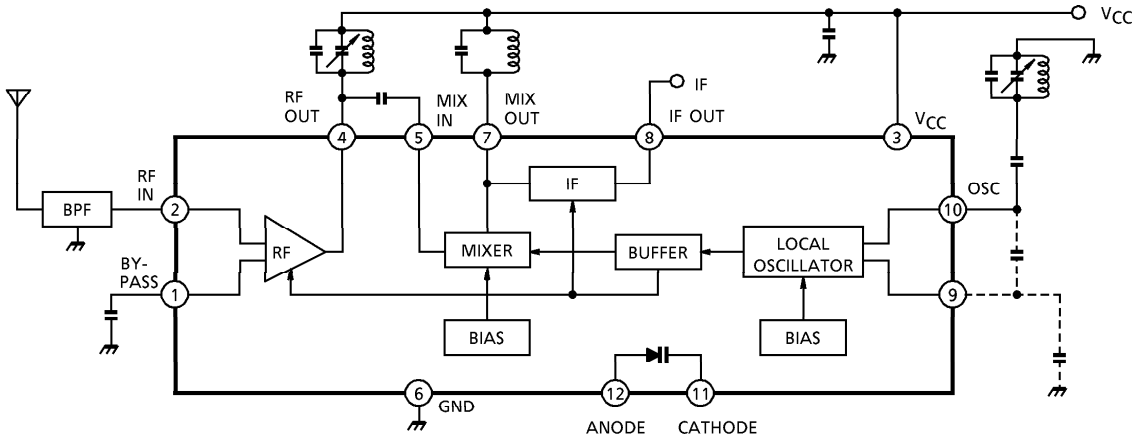
SSIP12-P-1.78

Weight : 0.65g (Typ.)

FEATURES

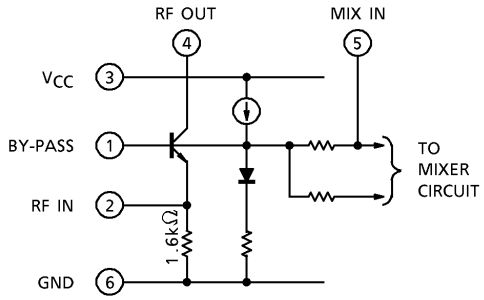
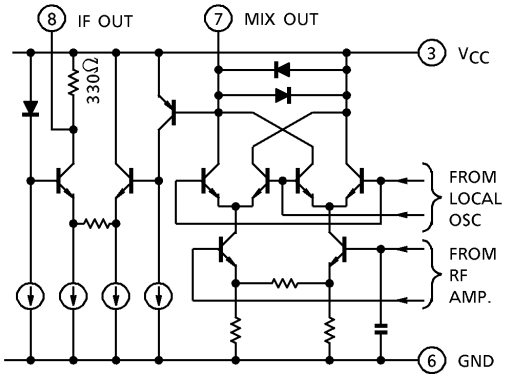
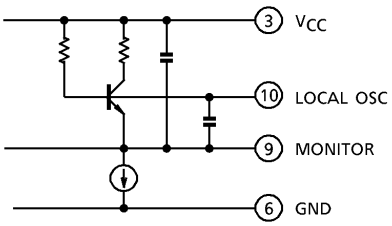
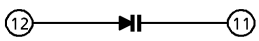
- Improved RF inter-modulation characteristics by double balanced type mixer circuit
- Low drift oscillation frequency for strong input
- It is available TV band frequency (up to 220MHz)
- Built-in IF amplifier
  $R_O = 330\Omega$ (Typ.), $V_{O\,(IF)} = 70mV_{rms}$ (Typ.)
- Emitter output of local oscillation transistor
- Built-in varactordiode for AFC
  Cathode and anode are floating
- Operating supply voltage range
  $V_{CC\,(opr)} = 3.5 \sim 14V$ (Ta = 25°C)

BLOCK DIAGRAM



961001EBA2

EXPLANATION OF TERMINALS (Terminal voltage is DC voltage at Ta = 25°C, V_{CC} = 5V, 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 $R_{O\ (IF)}$ = 330Ω (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		

961001EBA2'

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	15	V
AFC Diode Reverse Voltage	V_R	4	V
Power Dissipation	P_D (Note)	750	mW
Operating Temperature	T_{opr}	−25~75	°C
Storage Temperature	T_{stg}	−55~150	°C

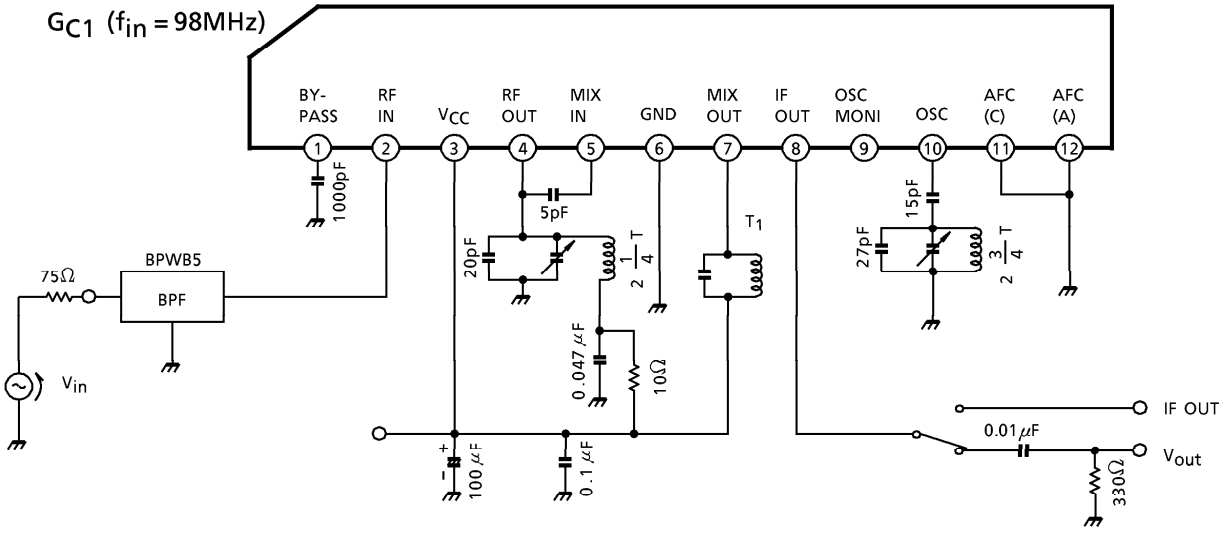
(Note) Derated linearly above Ta = 25°C in the proportion of 6mW / °C.

ELECTRICAL CHARACTERISTICS
(Unless otherwise specified, Ta = 25°C, V_{CC} = 5V, f_m = 1kHz, f = 98MHz, Δf = ±22.5kHz dev.)

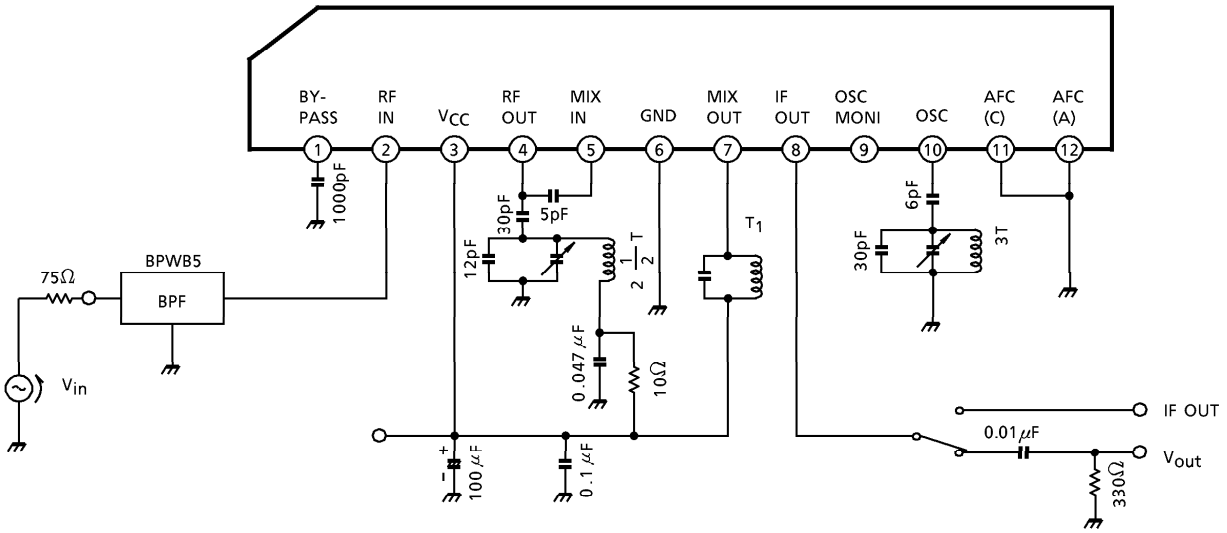
CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Current		I_{CC}	1	V_{in} = 0	—	10	15	mA
Conversion Gain		G_{C1}	1	f_{in} = 98MHz, V_{in} = 50dBμV EMF	42	46	50	dB
		G_{C2}	1	f_{in} = 220MHz, V_{in} = 50dBμV EMF	—	42	—	
Local Oscillation Voltage		V_{OSC1}	2	f_{OSC} = 108.7MHz	220	310	440	mV_{rms}
		V_{OSC2}	2	f_{OSC} = 230MHz	—	100	—	
Pin② Input Impedance	Parallel Input Resistance	r_{ip2}	3	f = 98MHz	—	50	—	Ω
	Parallel Input Capacitance	c_{ip2}			—	−15	—	pF
Pin④ Output Impedance	Parallel Output Resistance	r_{op4}	3		—	70	—	kΩ
	Parallel Output Capacitance	c_{op4}			—	1.5	—	pF
Pin⑤ Input Impedance	Parallel Input Resistance	r_{ip5}	3		—	4.0	—	kΩ
	Parallel Input Capacitance	c_{ip5}			—	2.0	—	pF
Pin⑦ Output Impedance	Parallel Output Resistance	r_{op7}	3	f = 10.7MHz	—	80	—	kΩ
	Parallel Output Capacitance	c_{op7}			—	2.5	—	pF
Local OSC Stop Voltage		V_{stop}	2	f_{OSC} = 108.7MHz	—	1.5	1.8	V
AFC Diode Capacitance		C_{AFC}	3	f = 98MHz, V_{AFC} = 3V	—	13	—	pF

TEST CIRCUIT 1

G_{C1} (f_{in} = 98MHz)



G_{C2} (f_{in} = 220MHz)



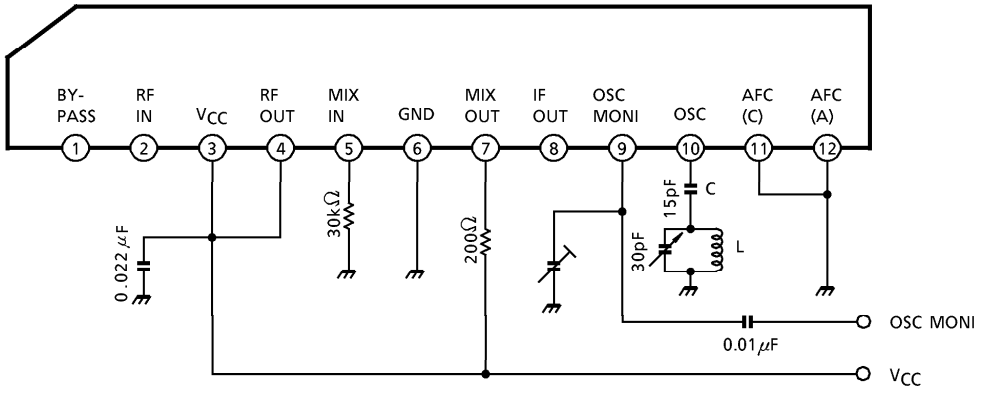
COIL DATA FOR TEST CIRCUIT

COIL No.	TEST FREQUENCY (Hz)	L (μH)	C_o (pF)	Q_o	TURNS					WIRE (mmϕ)	NOTE
					1-2	2-3	1-3	1-4	4-6		
T_1	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} = 108.7MHz

L : 5mmϕ, $2\frac{1}{2}$ turn with ferrite core

C : 15pF

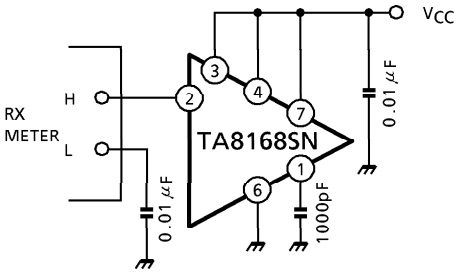
(2) f_{OSC} = 230MHz

L : 5mmϕ, 3 turn without ferrite core

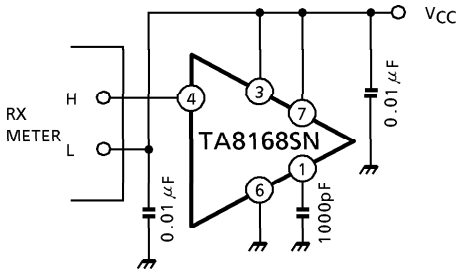
C : 6pF

TEST CIRCUIT 3

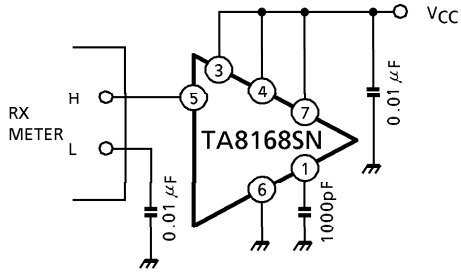
Pin② input resistance, input capacitance



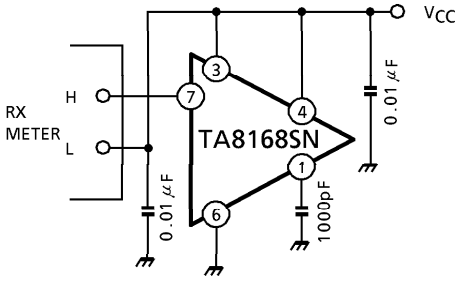
Pin④ output resistance, output capacitance



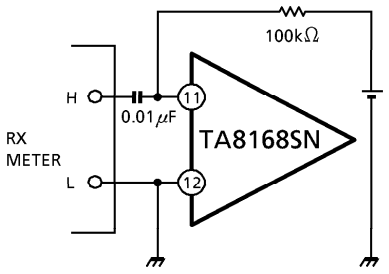
Pin⑤ input resistance, input capacitance



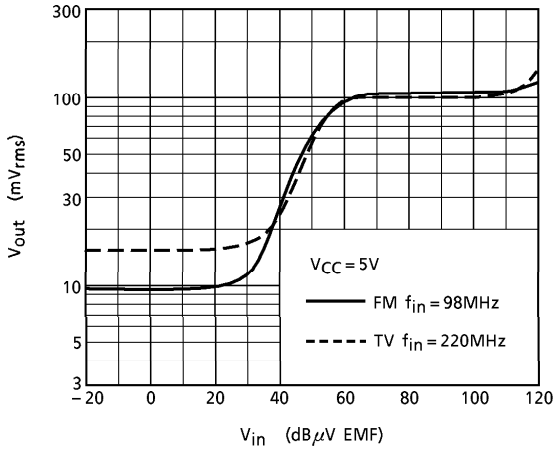
Pin⑦ output resistance, output capacitance



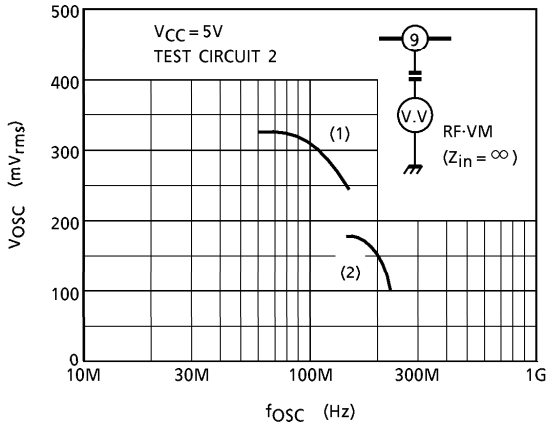
AFC diode capacitance



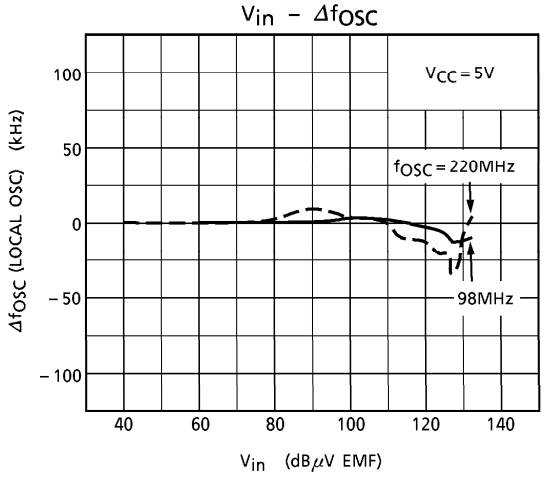
V_{in} – V_{out}



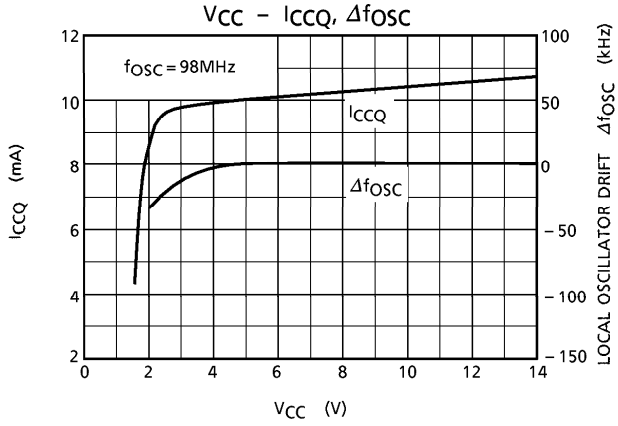
f_{OSC} – V_{OSC}



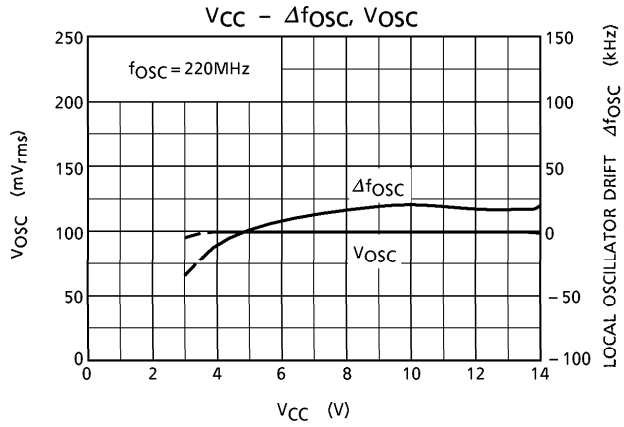
V_{in} – Δf_{OSC}



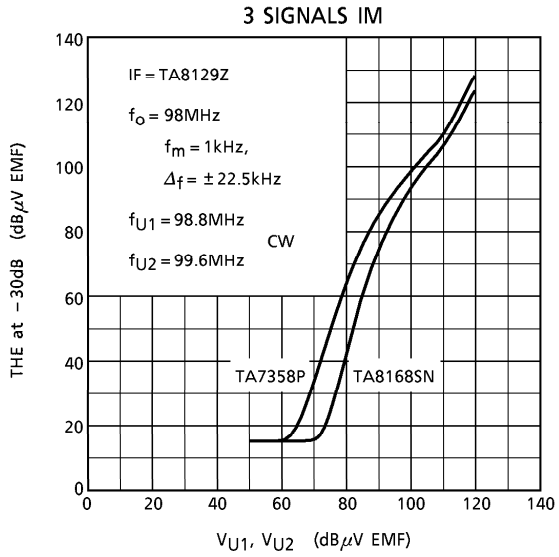
V_{CC} – I_{CCQ}, Δf_{OSC}



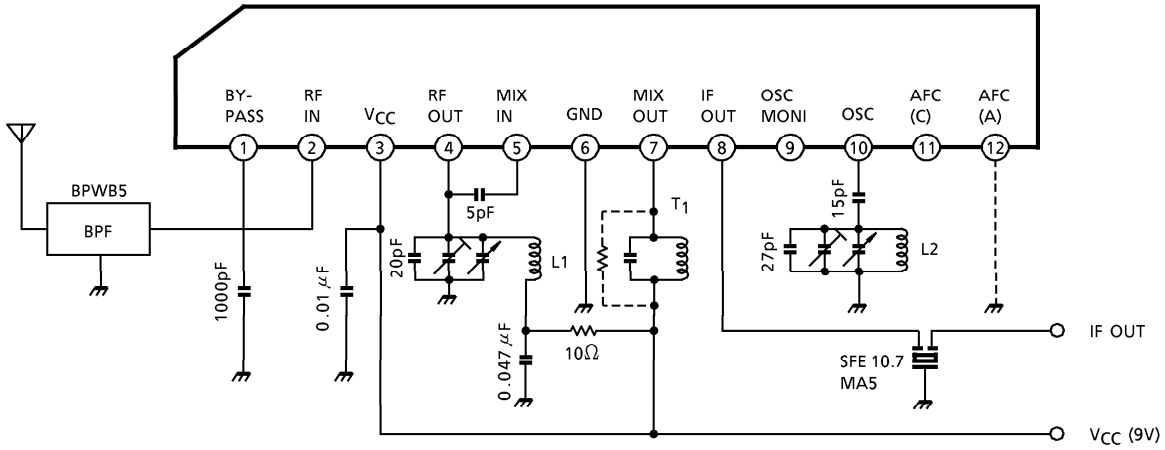
V_{CC} – Δf_{OSC}, V_{OSC}



3 SIGNALS IM



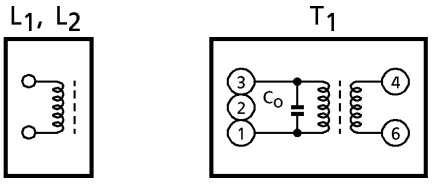
APPLICATION CIRCUIT



COIL DATA FOR APPLICATION CIRCUIT

COIL No.	STAGE	TEST PREQ	L (μH)	C_o (pF)	Q_o	TURNS 1-2	TURNS 2-3	TURNS 1-3	TURNS 4-6	WIRE (mm)	REMARKS
L_1	FM RF	100M	0.06	—	100	—	—	$2\frac{1}{4}$	—	ϕ0.5UEW	Within Core
L_2	FM OSC	100M	0.045	—	100	—	—	$1\frac{3}{4}$	—	ϕ0.5UEW	Within Core
T_1	FM IFT	10.7M	—	75	100	—	—	13	2	ϕ0.16UEW	Ⓜ TY-20580 Ⓢ 2153-414-041A

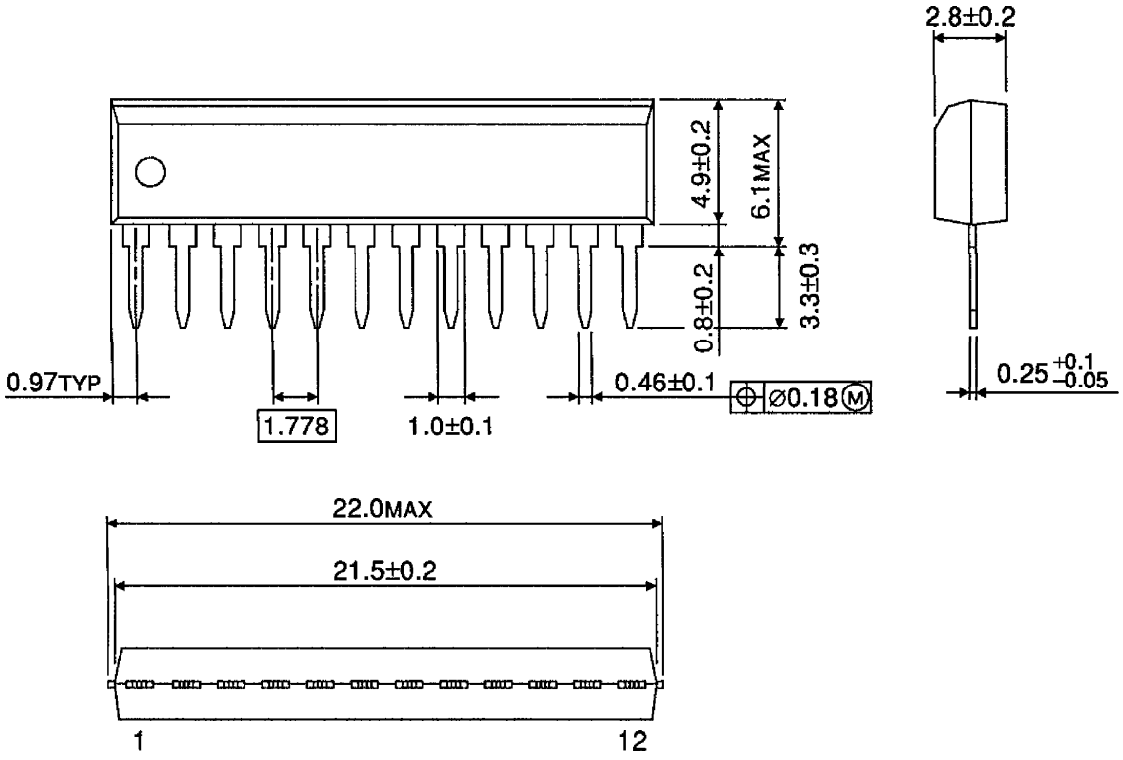
Ⓢ : SUMIDA ELECTRIC CO., LTD
Ⓜ : MITSUMI ELECTRIC CO., LTD



OUTLINE DRAWING

SSIP12-P-1.78

Unit : mm



Weight : 0.65g (Typ.)