

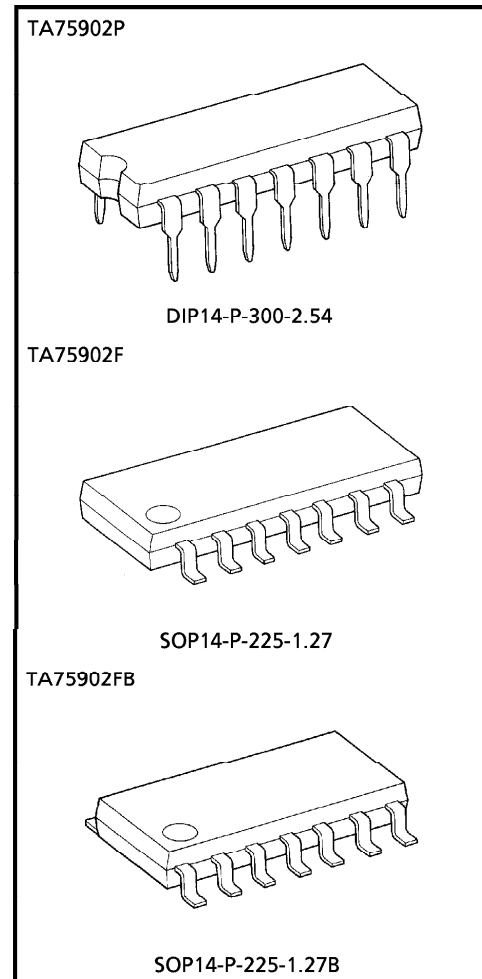
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA75902P, TA75902F, TA75902FB

QUAD OPERATIONAL AMPLIFIER

FEATURES

- In the linear mode the input common mode voltage range includes ground.
- Four internally compensated OP amps are in single package.
- Low power dissipation and power drain suitable for battery operation.
- Differential input voltage range equal to the power supply voltage.
- Large output voltage swing : $0V \sim V_{CC} - 1.5V$
- Wide power supply voltage range and signal power supply : Single Supply 3~36V
Dual Supplies $\pm 1.5 \sim 18V$
- Low input biasing current : $I_I = 45nA$ (Typ.)



Weight

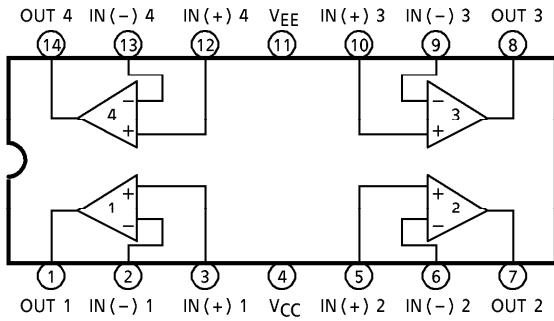
DIP14-P-300-2.54	: 1.0g (Typ.)
SOP14-P-225-1.27	: 0.2g (Typ.)
SOP14-P-225-1.27B	: 0.2g (Typ.)

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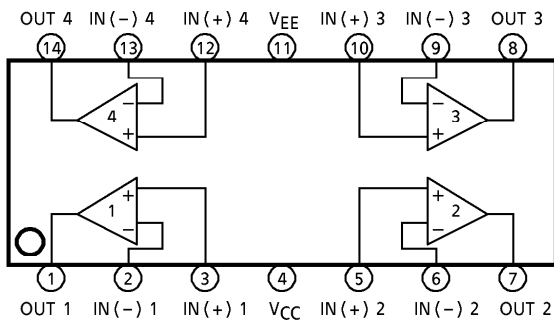
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PIN CONNECTION (TOP VIEW)

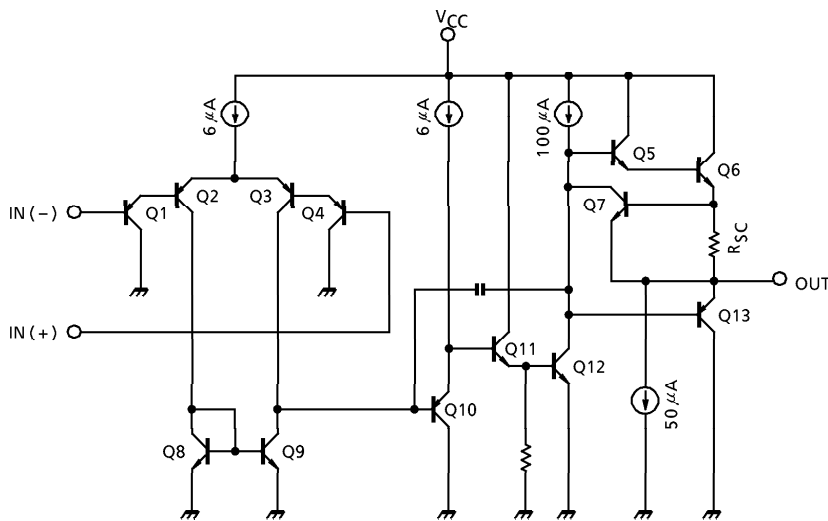
TA75902P



TA75902F
TA75902FB



EQUIVALENT CIRCUIT



MAXIMUM RATINGS (Ta = 25°C)

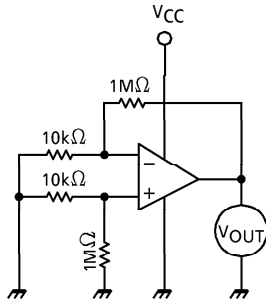
CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}, V_{EE}	± 18 OR 36	V
Differential Input Voltage	DV_{IN}	± 36	V
Input Voltage	V_{IN}	-0.3~36	V
Power Dissipation	TA75902P	625	mW
	TA75902F	280	
	TA75902FB	280	
Operating Temperature	T_{opr}	-40~85	°C
Storage Temperature	T_{stg}	-55~125	°C

ELECTRICAL CHARACTERISTICS ($V_{CC} = 5V, V_{EE} = GND, T_a = 25^\circ C$)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V_{IO}	1	$R_g \leq 10k\Omega$	—	2	7	mV
Input Offset Current	I_{IO}	2	—	—	5	30	nA
Input Bias Current	I_I	2	—	—	45	150	nA
Common Mode Input Voltage	CMV_{IN}	3	$V_{CC} = 30V, V_{EE} = GND$	0	—	$V_{CC} - 1.5$	V
Supply Current	I_{CC}, I_{EE}	4	$R_L = \infty, \text{ ALL OP Amps}$	—	0.7	1.2	mA
Voltage Gain	G_V	5	$R_L \geq 2k\Omega$	86	100	—	dB
Maximum Output Voltage Swing	V_{Op-p}	6	$R_L = 2k\Omega$	0	—	$V_{CC} - 1.5$	V
Common Mode Input Signal Rejection Ratio	CMRR	3	—	60	85	—	dB
Supply Voltage Rejection Ratio	SVRR	1	$R_g = 10k\Omega$	60	100	—	dB
Source Current	I_{source}	6	$IN(-) = 0V, IN(+) = 1V$	20	40	—	mA
Sink Current	I_{sink}	6	$IN(-) = 1V, IN(+) = 0V$	10	20	—	mA

TEST CIRCUIT

(1) V_{IO} , SVRR

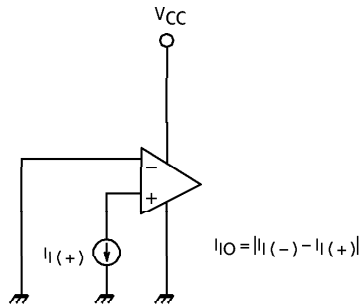
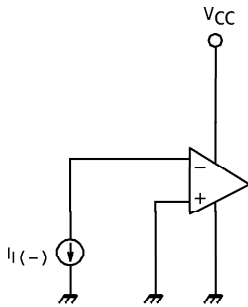


- $V_{IO} = V_{OUT} / 100$
- $SVRR = 20 \log E$ (dB)

$$E = \left| \frac{V_{OUT1} - V_{OUT2}}{V_{CC1} - V_{CC2}} \right| \times \frac{1}{100}$$

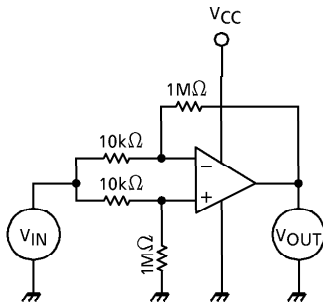
V_{OUT1} : V_{OUT} ($V_{CC1} = 5V$)
 V_{OUT2} : V_{OUT} ($V_{CC2} = 10V$)

(2) I_I , I_{IO}



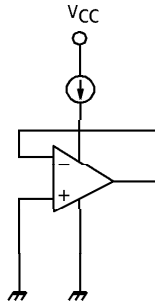
$$I_{IO} = |I_I(-) - I_I(+)|$$

(3) CMV_{IN} , CMRR



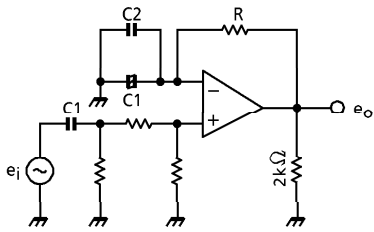
- $CMRR = 20 \log \cdot G_D / G_C$ (dB)
 G_D : DIFFERENTIAL VOLTAGE GAIN
 G_C : COMMON MODE VOLTAGE GAIN
- CMV_{IN} : $V_{IN} = 0V$, $V_{CC} - 1.5V$ SUPPLIES

(4) I_{CC}



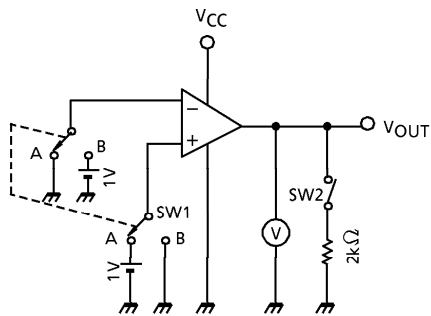
- $I_{CC} : (V_{CC} = 5V)$

(5) G_V



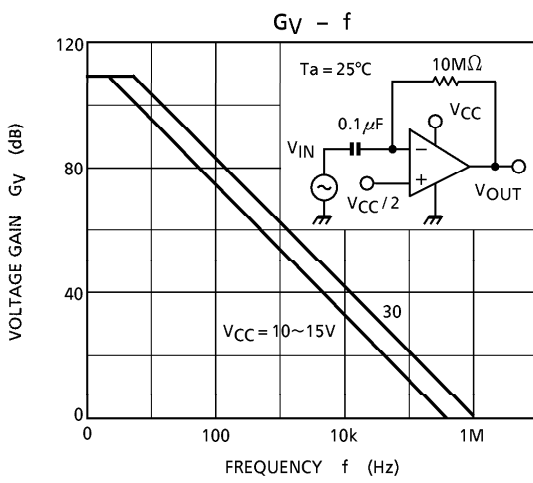
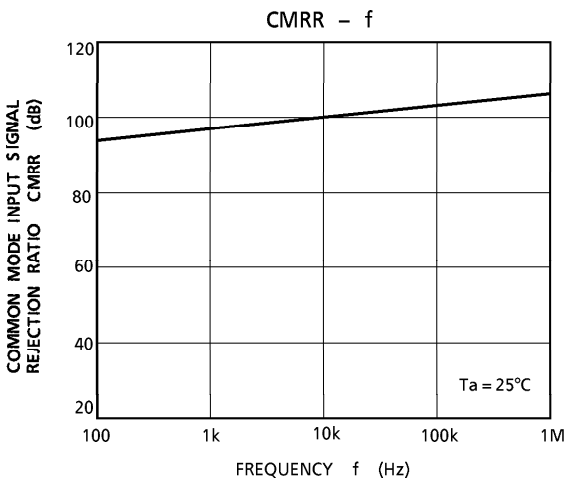
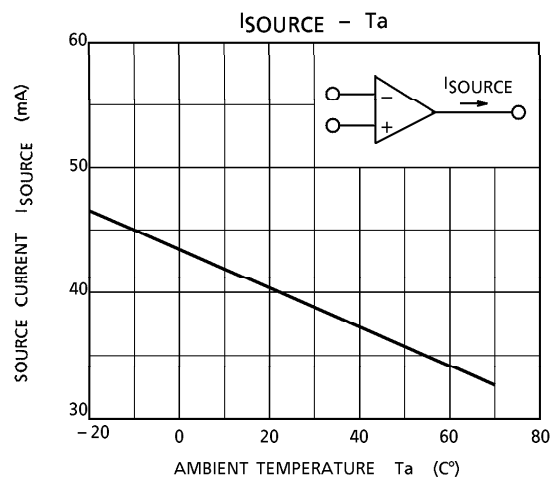
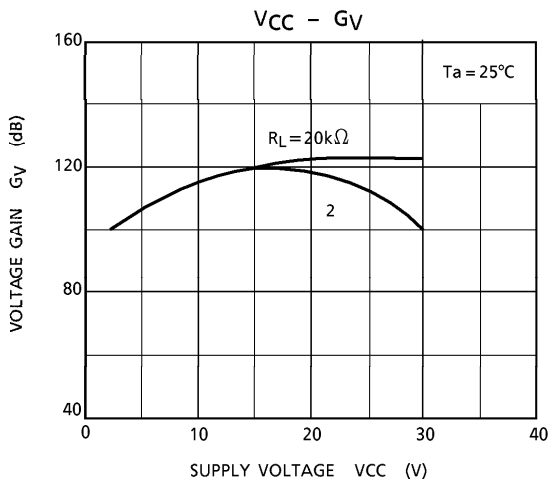
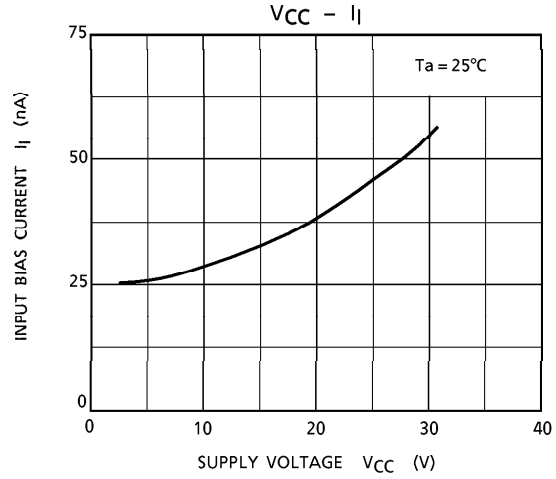
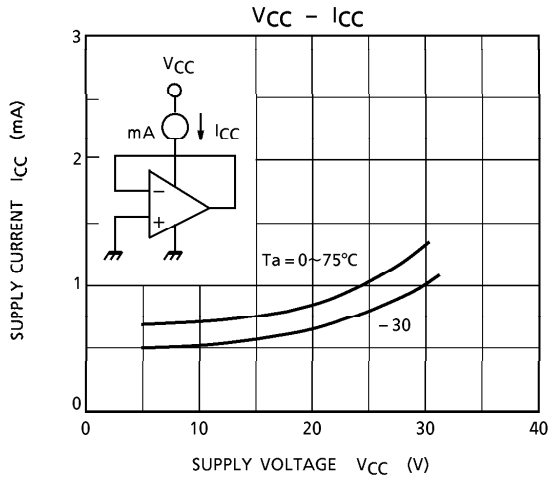
- $G_V = 20 \log e_o / e_i$ (dB)
 $R \gg 1 / \omega C_1$
 C1 : COUPLING CONDENSER
 C2 : HIGH FREQUENCY BYPASS CONDENSER

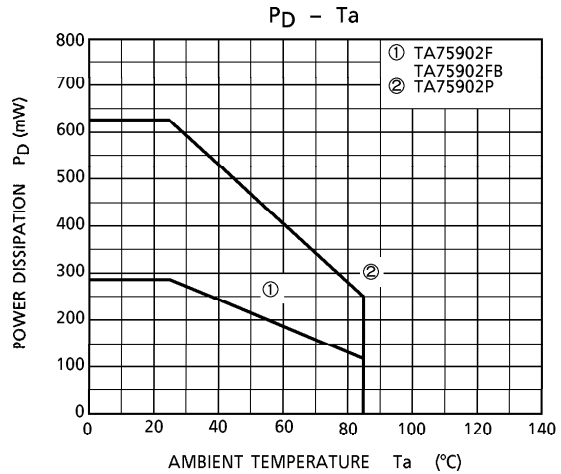
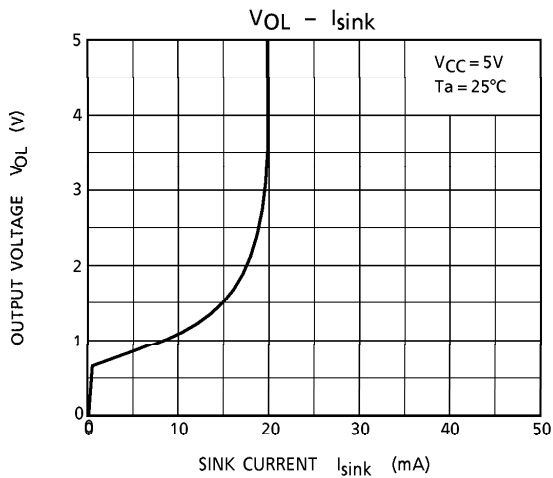
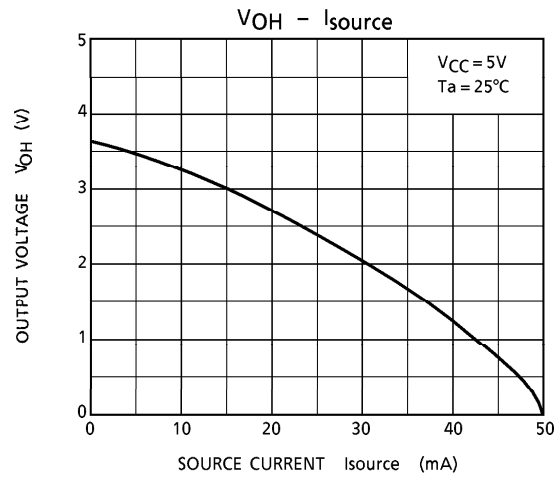
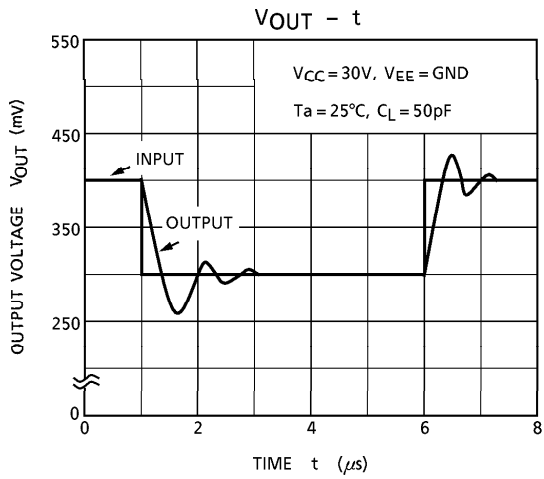
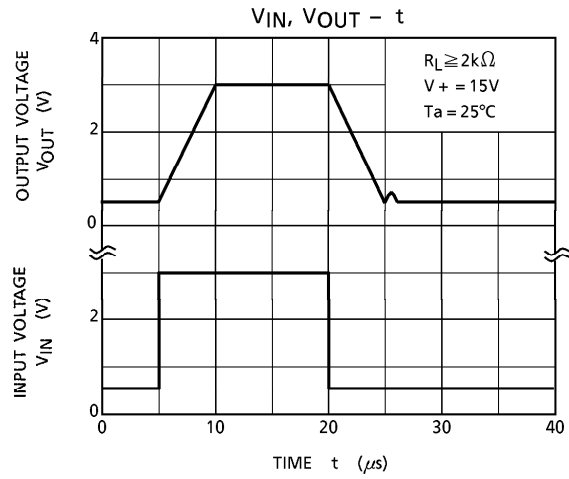
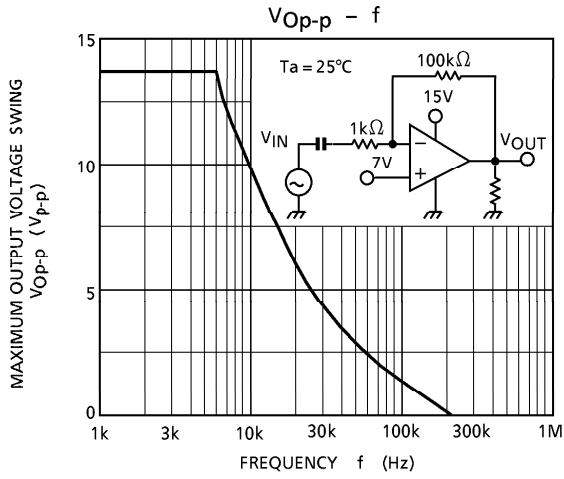
(6) V_{Op-p} , I_{source} , I_{sink}



- V_{Op-p}
 $V_{OH} : SW1$ IS SIDE A
 $V_{OL} : SW1$ IS SIDE B
- I_{source}
 $SW1$ IS SIDE A
 $V_{OUT} \rightarrow 0V$ MEASURE
- I_{sink}
 $SW1$ IS SIDE B
 $V_{OUT} \rightarrow 5V$ MEASURE

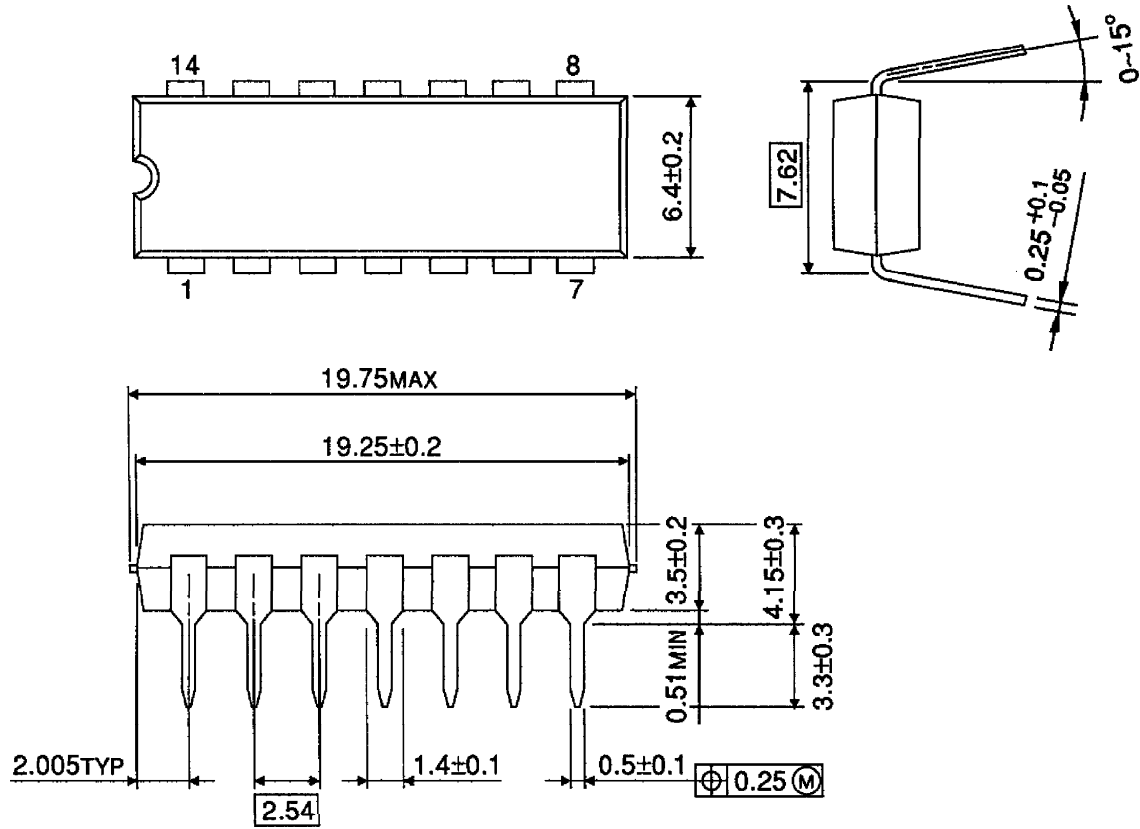
CHARACTERISTICS





OUTLINE DRAWING
DIP14-P-300-2.54

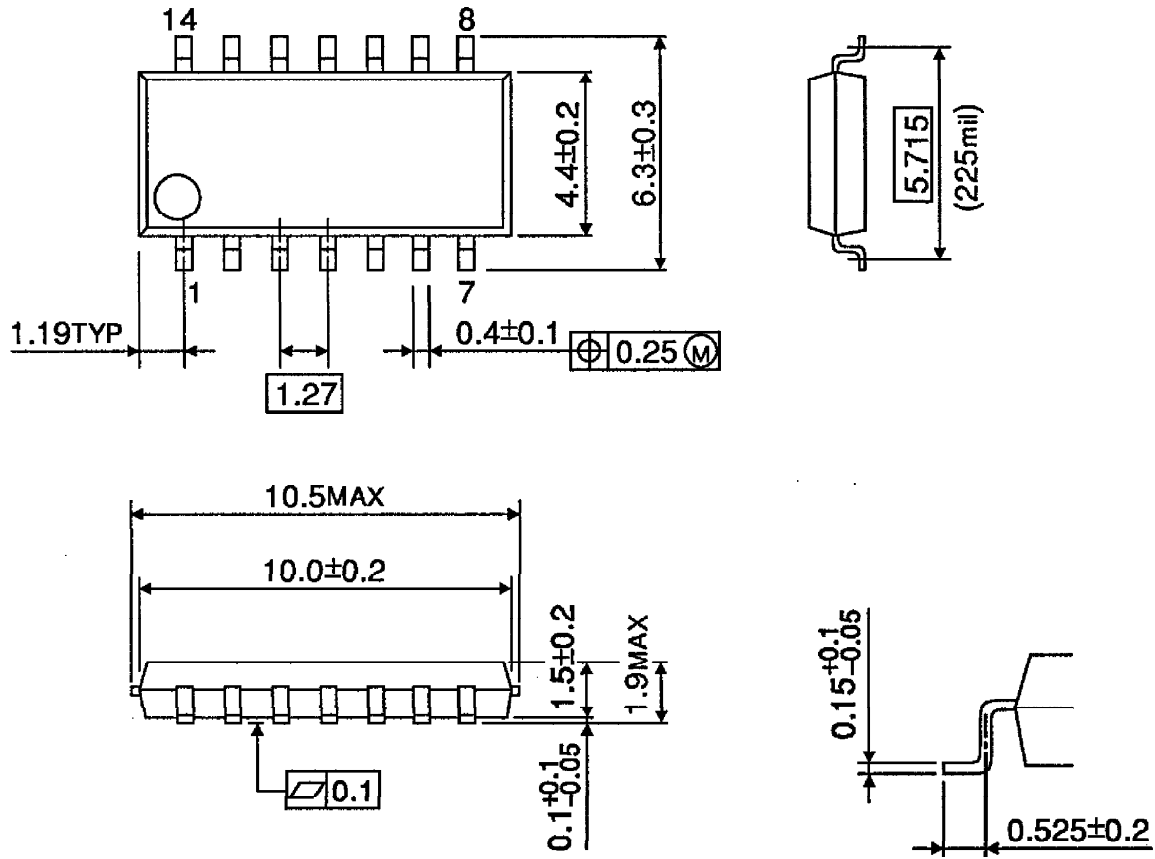
Unit : mm



Weight : 1.0g (Typ.)

OUTLINE DRAWING
SOP14-P-225-1.27

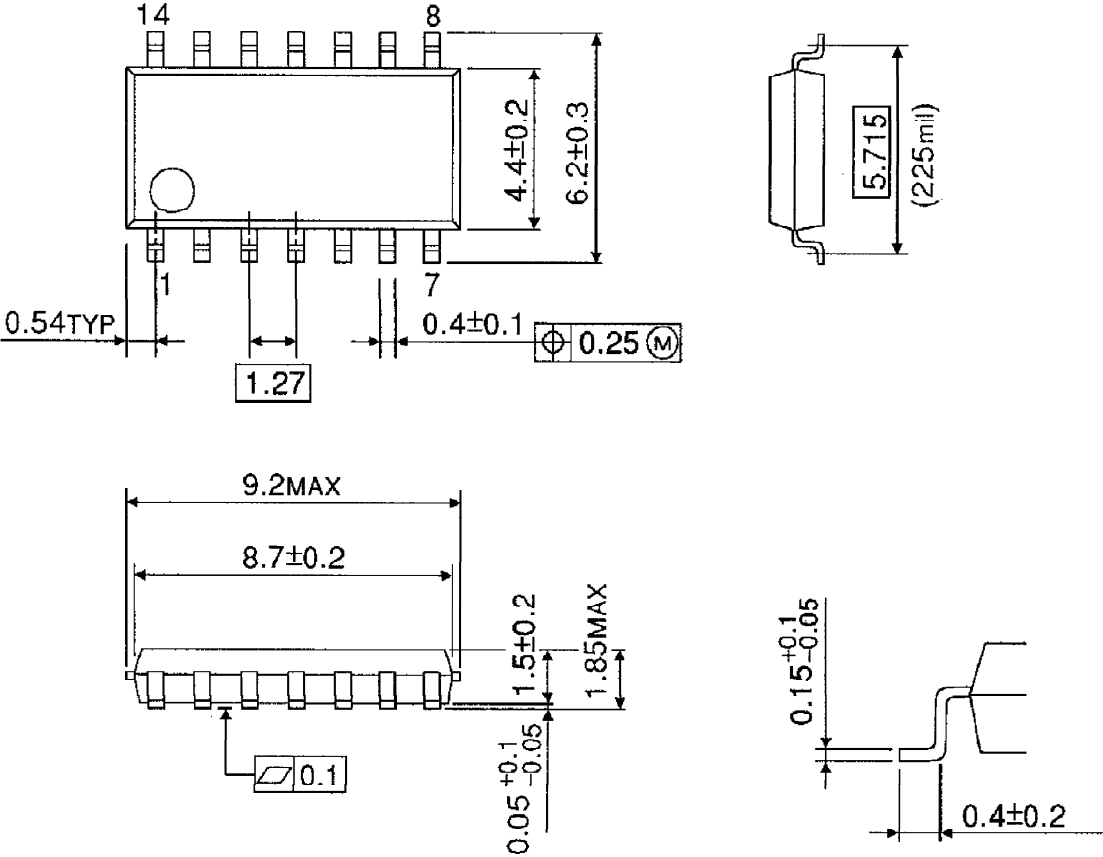
Unit : mm



Weight : 0.2g (Typ.)

OUTLINE DRAWING
SOP14-P-225-1.27B

Unit : mm



Weight : 0.2g (Typ.)