TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

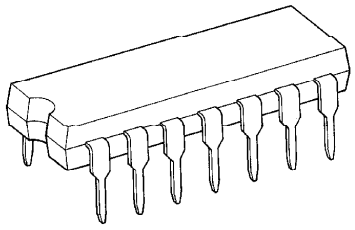
TA75902P, TA75902F, TA75902FB

QUAD OPERATIONAL AMPLIFIER

FEATURES

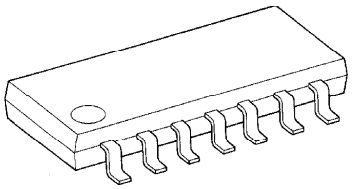
- In the linear mode the input common mode voltage range includes ground.
- Four internally compensated OP amps are in single package.
- Low power dissipation and power drain suitable for battery operation.
- Differential input voltage range equal to the power supply voltage.
- Large output voltage swing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

TA75902P



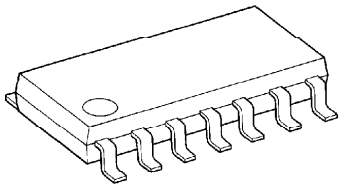
DIP14-P-300-2.54

TA75902F



SOP14-P-225-1.27

TA75902FB



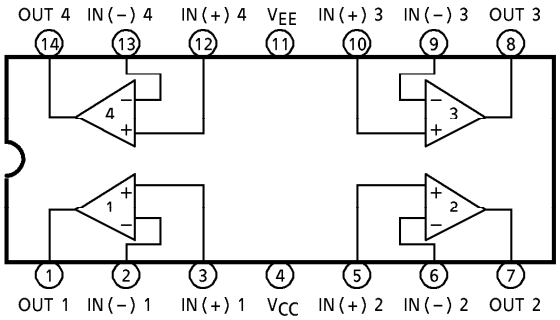
SOP14-P-225-1.27B

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.)

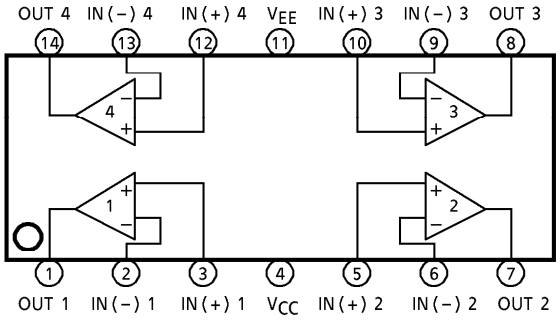
961001EBA1

PIN CONNECTION (TOP VIEW)

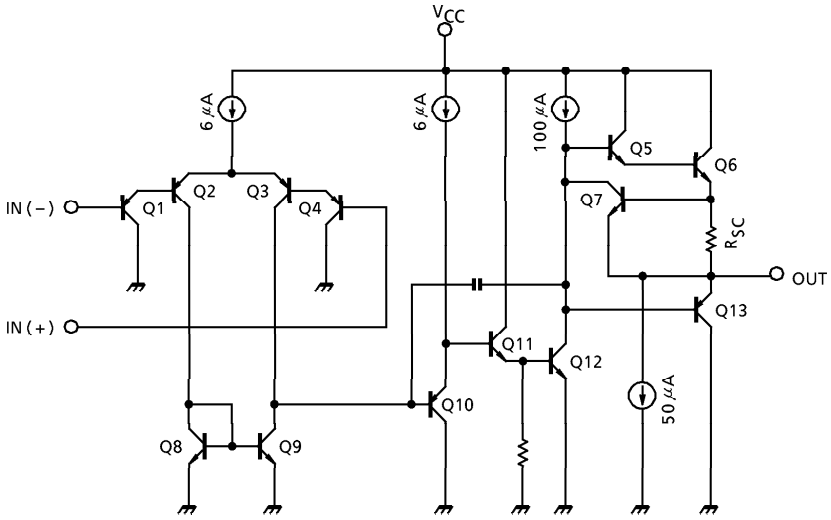
TA75902P



TA75902F
TA75902FB



EQUIVALENT CIRCUIT



MAXIMUM RATINGS (Ta = 25°C)

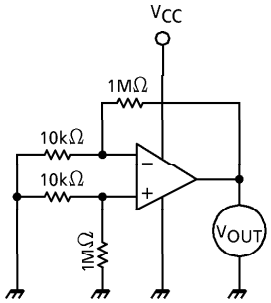
CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V_{CC}, V_{EE}	± 18 OR 36	V
Differential Input Voltage		DV_{IN}	± 36	V
Input Voltage		V_{IN}	− 0.3~36	V
Power Dissipation	TA75902P	P_D	625	mW
	TA75902F		280	
	TA75902FB		280	
Operating Temperature		T_{opr}	− 40~85	°C
Storage Temperature		T_{stg}	− 55~125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

ELECTRICAL CHARACTERISTICS (V_{CC} = 5V, V_{EE} = GND, Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V_{IO}	1	$R_g \leqq 10k\Omega$	—	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	$R_L = \infty$, ALL OP Amps	—	0.7	1.2	mA
Voltage Gain	G_V	5	$R_L \geqq 2k\Omega$	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

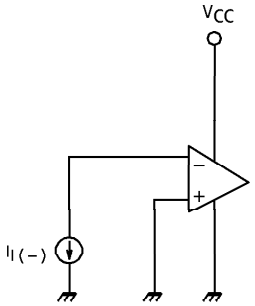


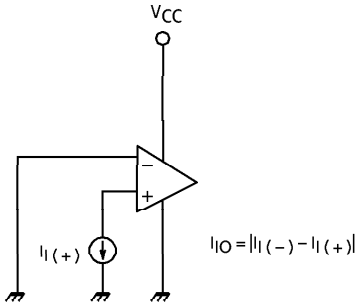
- $V_{IO} = V_{OUT} / 100$
- SVRR = 20ℓog E (dB)

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

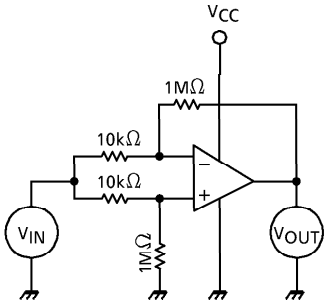
V_{OUT1} : V_{OUT} (V_{CC1} = 5V)
V_{OUT2} : V_{OUT} (V_{CC2} = 10V)

(2) I_I, I_{IO}



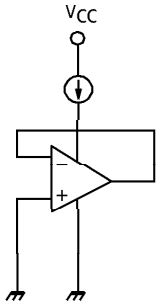


(3) CMV_{IN}, CMRR



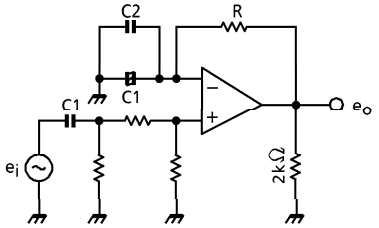
- CMRR = 20ℓog · G_D / G_C (dB)
  G_D : DIFFERENTIAL VOLTAGE GAIN
  G_C : COMMON MODE VOLTAGE GAIN
- CMV_{IN} : V_{IN} = 0V, V_{CC} − 1.5V SUPPLES

(4) I_{CC}



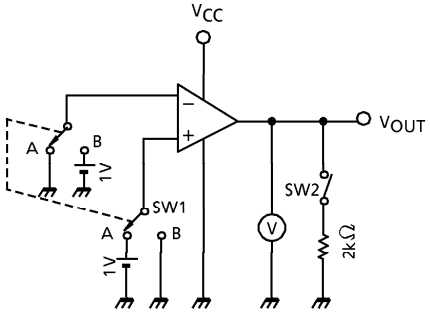
- I_{CC} : (V_{CC} = 5V)

(5) G_V



- $G_V = 20\ell og\ e_o / e_i$ (dB)
  $R \gg 1/WC1$
  C1 : COUPLING CONDENSER
  C2 : HIGH FREQUENCY BYPASS CONDENSER

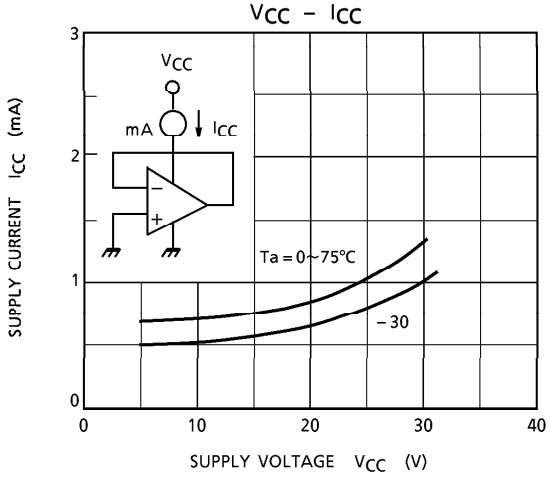
(6) V_{Op-p}, I_{source}, I_{sink}



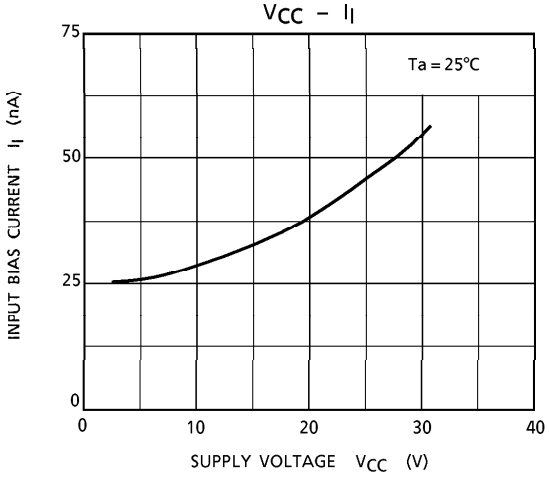
- V_{Op-p}
  V_{OH} : SW1 IS SIDE A
  V_{OL} : SW1 IS SIDE B
- I_{source}
  SW1 IS SIDE A
  $V_{OUT} \rightarrow$0V MEASURE
- I_{sink}
  SW1 IS SIDE B
  $V_{OUT} \rightarrow$5V MEASURE

CHARACTERISTICS

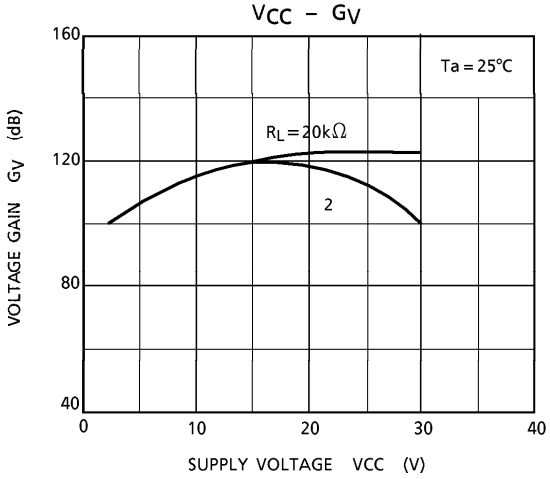
V_{CC} – I_{CC}



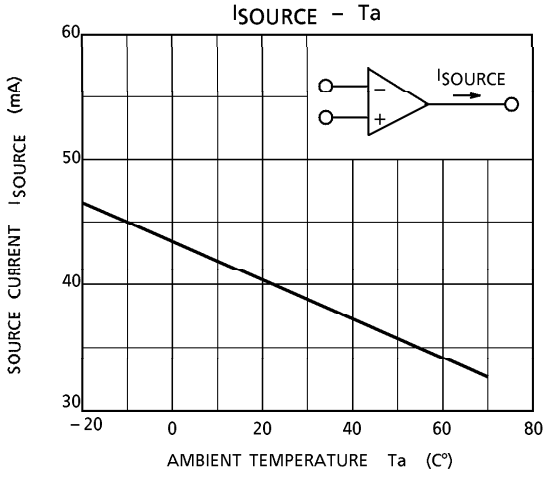
V_{CC} – I_I



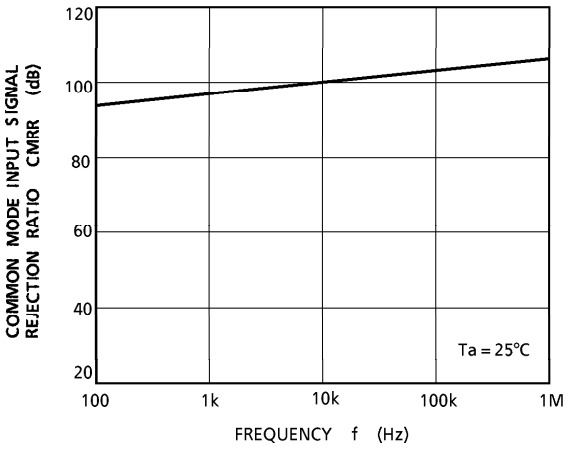
V_{CC} – G_V



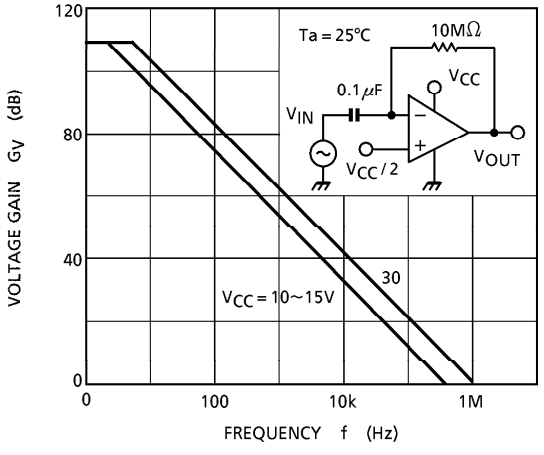
I_{SOURCE} – Ta



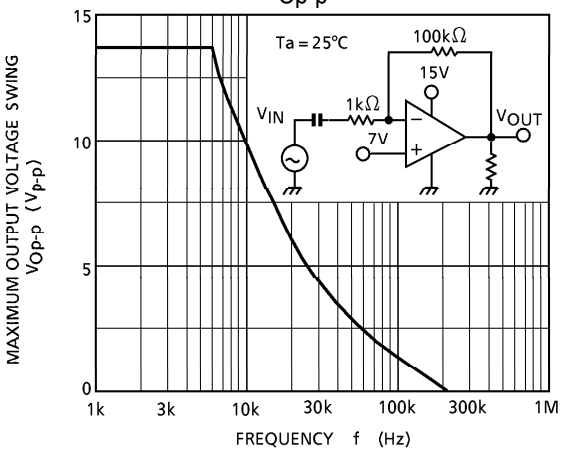
CMRR – f



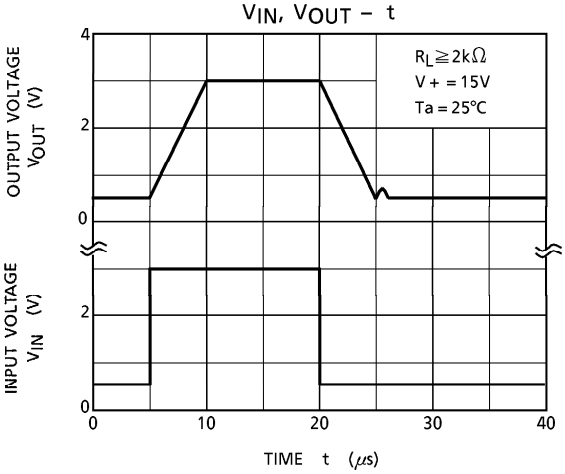
G_V – f



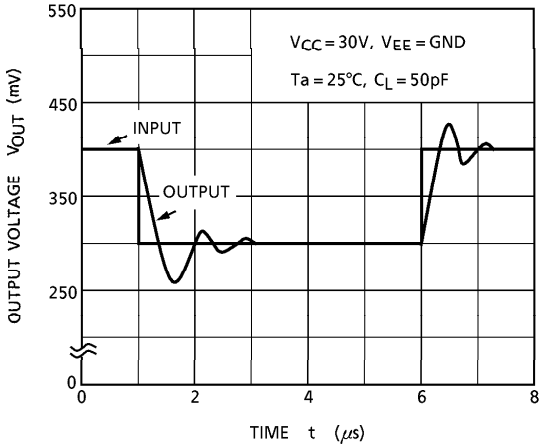
V_{Op-p} – f



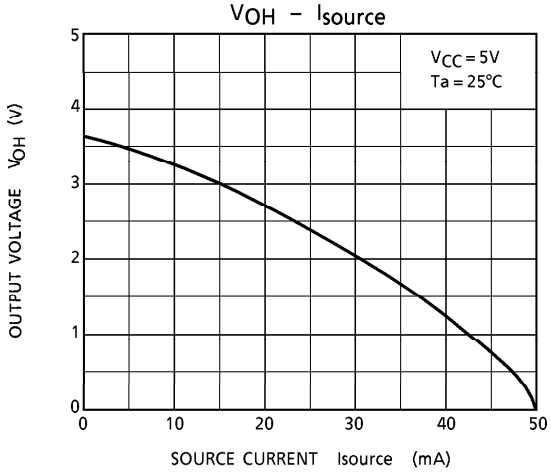
V_{IN}, V_{OUT} – t



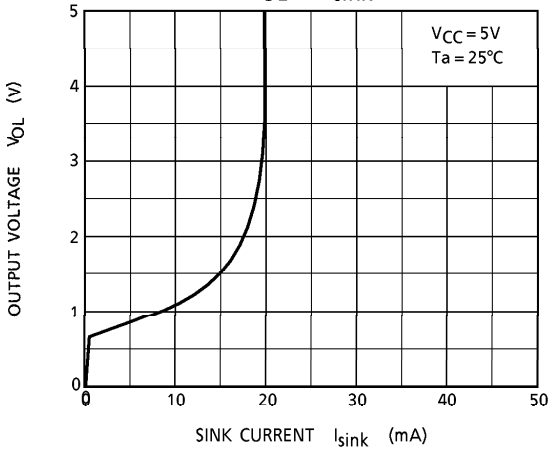
V_{OUT} – t



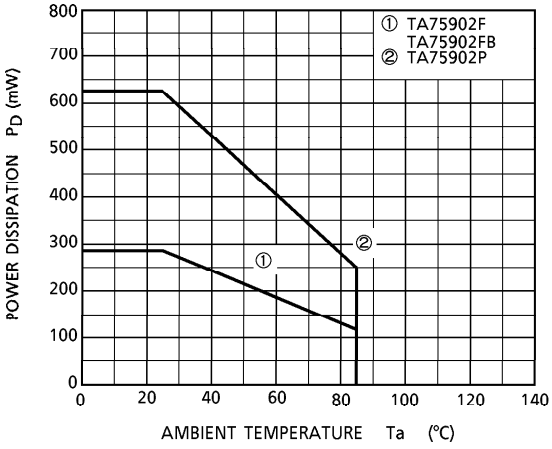
V_{OH} – I_{source}



V_{OL} – I_{sink}

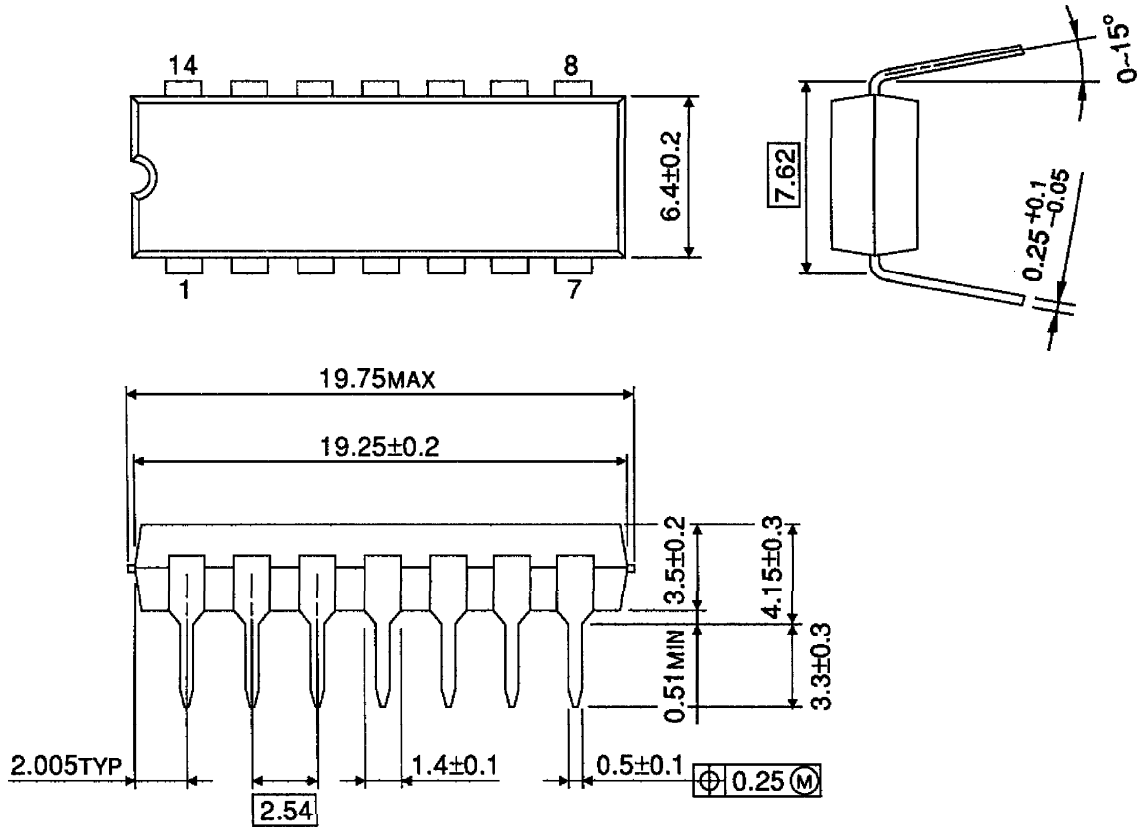


P_D – Ta



OUTLINE DRAWING

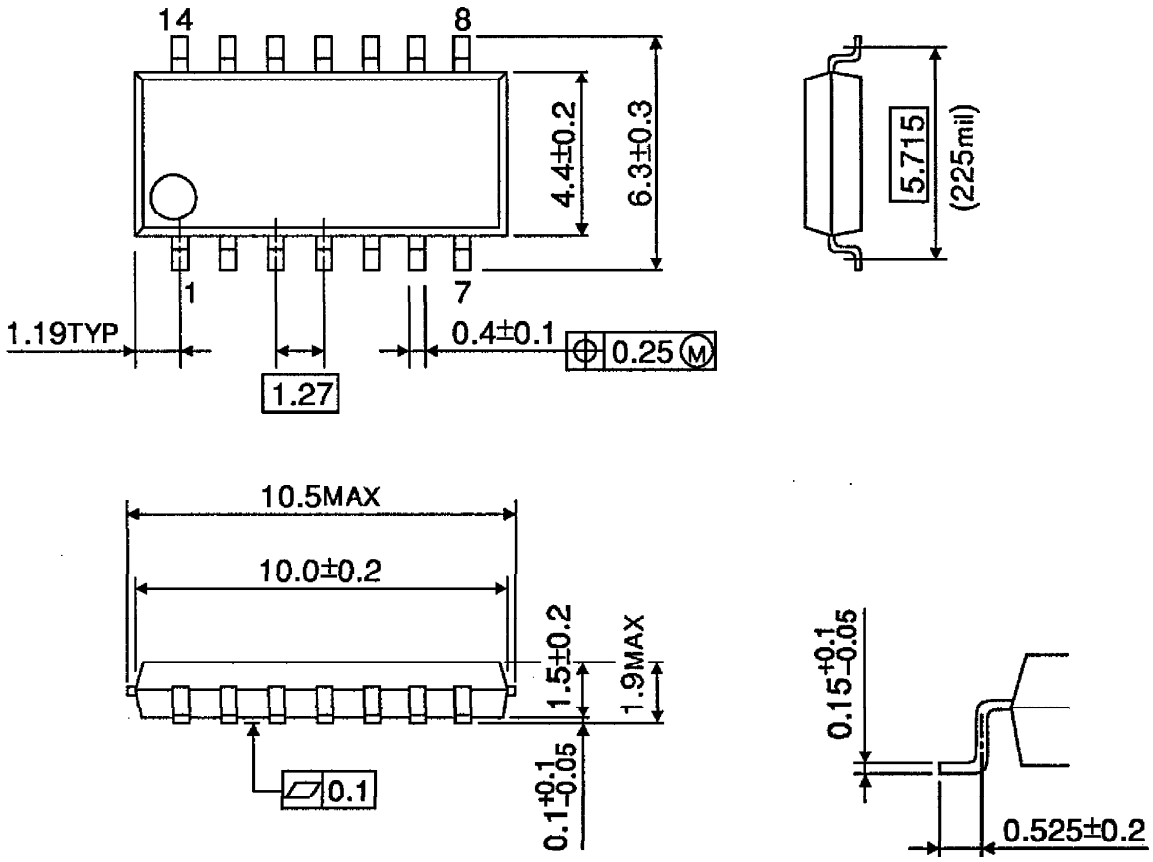
DIP14-P-300-2.54 Unit : mm



Weight : 1.0g (Typ.)

OUTLINE DRAWING

SOP14-P-225-1.27 Unit : mm

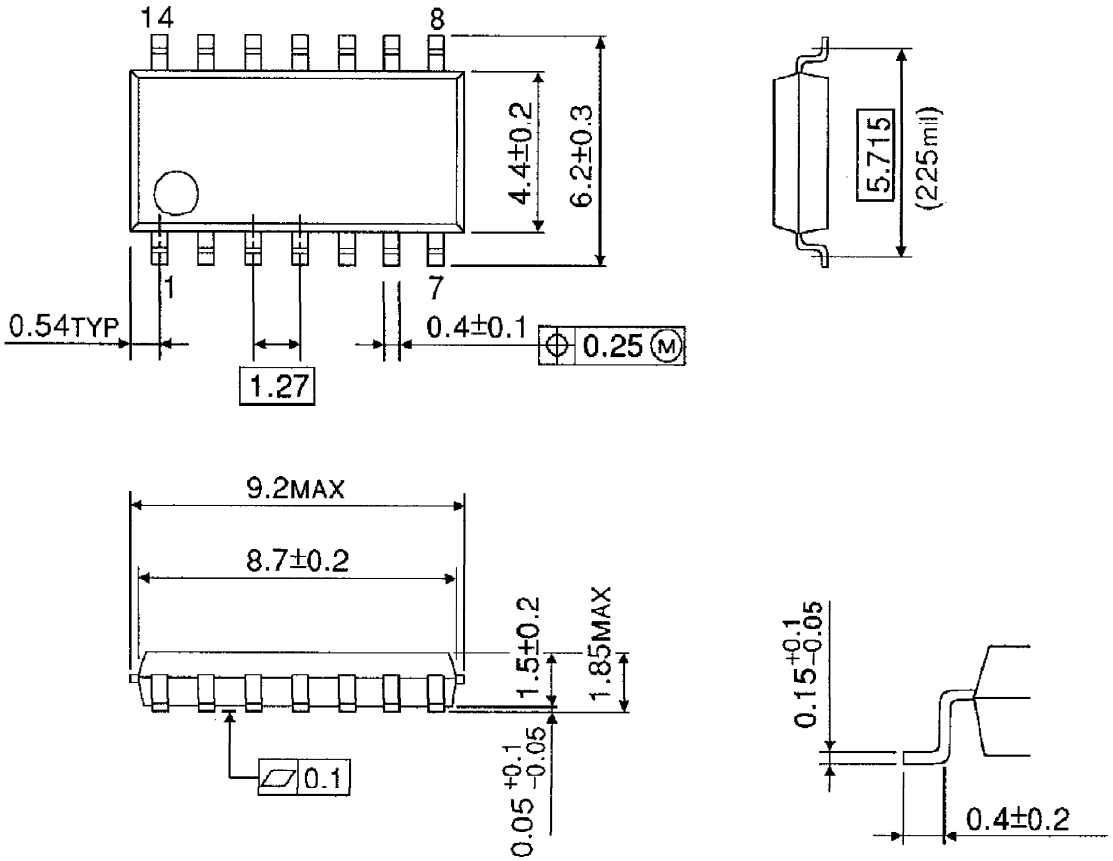


Weight : 0.2g (Typ.)

OUTLINE DRAWING

SOP14-P-225-1.27B

Unit : mm



Weight : 0.2g (Typ.)