

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA7508P, TA7508F

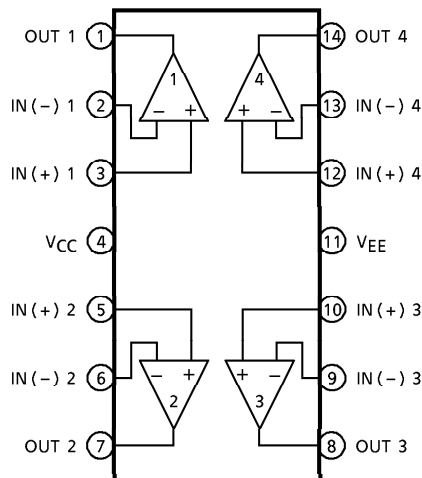
QUAD OPERATIONAL AMPLIFIER

The TA7508P and TA7508F are quad low-noise operational amplifier.

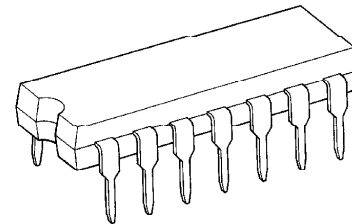
FEATURES

- Equivalent Input Noise Voltage : $2.5\mu\text{V}_{\text{rms}}$ (Typ.)
- Slew Rate : $1\text{V}/\mu\text{s}$ (Typ.)
- Wide Power Supply Range : $\pm 4 \sim \pm 18\text{V}$
- Internal Frequency Compensation
- Output Short Circuit Protection

PIN CONNECTION (TOP VIEW)

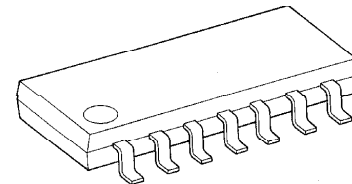


TA7508P



DIP14-P-300-2.54

TA7508F



SOP14-P-225-1.27

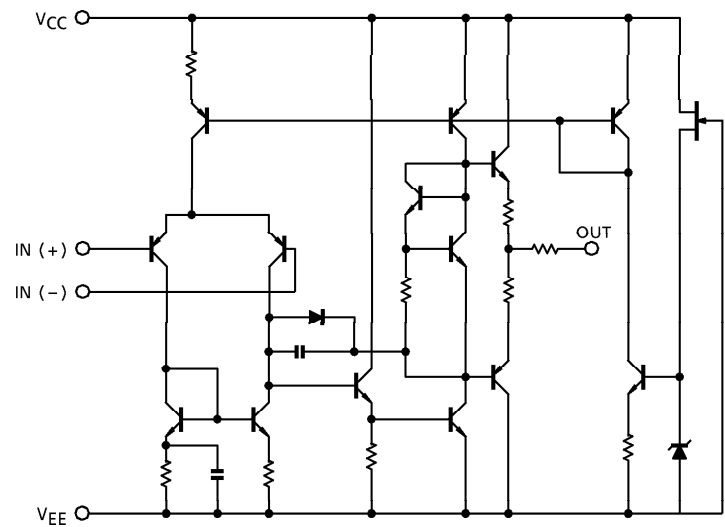
Weight

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

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EQUIVALENT CIRCUIT



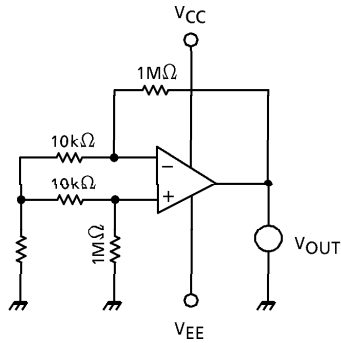
MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TA7508P	TA7508F	UNIT
Supply Voltage	V _{CC}	18	18	V
	V _{EE}	- 18	- 18	
Differential Input Voltage	DV _{IN}	± 36	± 36	V
Input Voltage	V _{IN}	V _{CC} ~V _{EE}	V _{CC} ~V _{EE}	V
Power Dissipation	P _D	625	280	mW
Operating Temperature	T _{opr}	- 40~85	- 40~85	°C
Ambient Temperature	T _{stg}	- 55~125	- 55~125	°C

ELECTRICAL CHARACTERISTICS ($V_{CC} = 15V$, $V_{EE} = -15V$, $T_a = 25^\circ C$)

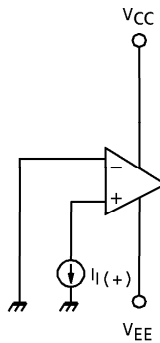
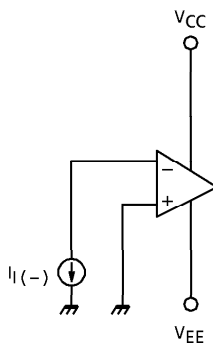
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V_{IO}	1	$R_g \leq 10k\Omega$	—	0.5	6	mV
Input Offset Current	I_{IO}	2	—	—	5	200	nA
Input Bias Current	I_I	2	—	—	60	500	nA
Common Mode Input Voltage	CMV_{IN}	3	—	± 12	± 14	—	V
Maximum Output Voltage	V_{OM}	6	$R_L = 10k\Omega$	± 12	± 14	—	V
	V_{OMR}		$R_L = 2k\Omega$	± 10	± 13	—	
Source Current	I_{source}	8	—	—	40	—	mA
Sink Current	I_{sink}	7	—	—	40	—	mA
Voltage Gain (Open Loop)	G_V	5	$V_{OUT} = \pm 10V$, $R_L = 2k\Omega$	86	100	—	dB
Common Mode Input Signal Rejection Ratio	CMRR	3	$R_g \leq 10k\Omega$	70	90	—	dB
Supply Voltage Rejection Ratio	SVRR	1	$R_g \leq 10k\Omega$	—	30	150	$\mu V/V$
Slew Rate	SR	9	$G_V = 1$, $R_L = 2k\Omega$	—	1.0	—	$V/\mu s$
Unity Gain Cross Frequency	f_T	5	Open Loop	—	3.0	—	MHz
Supply Current	I_{CC} , I_{EE}	4	—	—	7.0	11.3	mA
Equivalent Input Noise Voltage	V_{NI}	—	$R_S = 1k\Omega$, $f = 30Hz \sim 30kHz$	—	2.5	—	μV_{rms}

TEST CIRCUIT

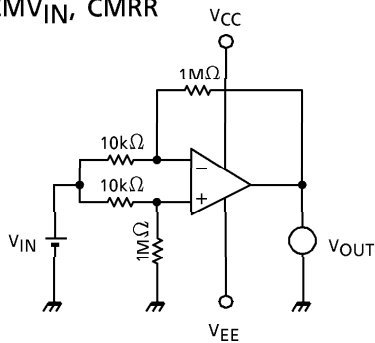
(1) V_{IO} , $SVRR$ 

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

$$E = \left| \frac{V_{OUT1} - V_{OUT2}}{(V_{CC1} - V_{EE1}) - (V_{CC2} - V_{EE2})} \right| \times \frac{1}{100}$$

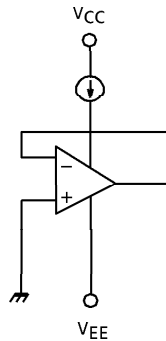
 V_{OUT1} : V_{OUT} (V_{CC} , $V_{EE} = \pm 8V$) V_{OUT2} : V_{OUT} (V_{CC} , $V_{EE} = \pm 18V$) V_{CC1} : $V_{CC} = -8V$ V_{EE1} : $V_{EE} = -8V$ V_{CC2} : $V_{CC} = +18V$ V_{EE2} : $V_{EE} = -18V$ (2) I_I , I_{IO} 

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

(3) CMV_{IN} , $CMRR$ 

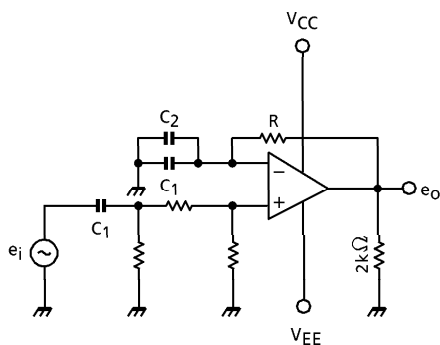
- $CMRR = 20 \log G_D / G_C \text{ (dB)}$
 G_D : DIFFERENTIAL VOLTAGE GAIN
 G_C : COMMON MODE VOLTAGE GAIN
- CMV_{IN} : $V_{IN} = -12V, 12V \text{ SUPPLIES}$

(4) I_{CC}



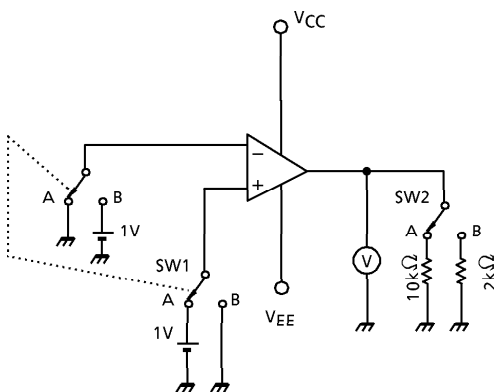
- I_{CC} : $V_{CC}, V_{EE} = \pm 15V$

(5) G_V, f_T



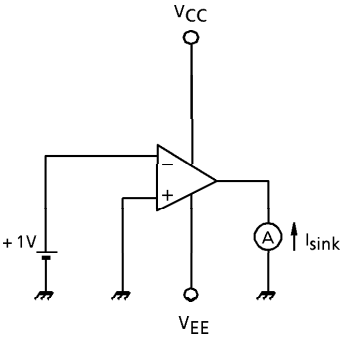
- $G_V = 20 \log e_o / e_i$ (dB)
 $R \gg 1 / \omega C_1$
 C_1 : COUPLING CONDENSER
 C_2 : HIGH FREQUENCY BYPASS CONDENSER
- f_T : INPUT FREQUENCY AT $e_i = e_o$

(6) V_{OM}, V_{OMR}

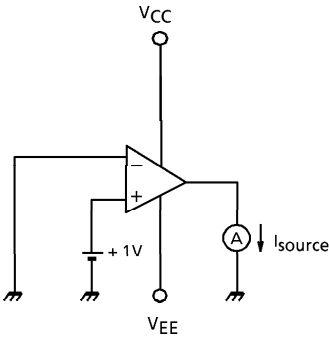


- V_{OM} : (+) : SW1 IS SIDE A, SW2 IS SIDE A
 (-) : SW1 IS SIDE B, SW2 IS SIDE A
- V_{OMR} : (+) : SW1 IS SIDE A, SW2 IS SIDE B
 (-) : SW1 IS SIDE B, SW2 IS SIDE B

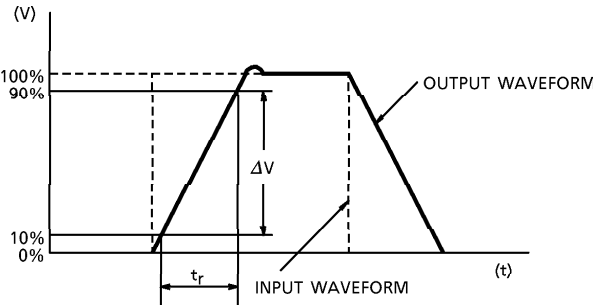
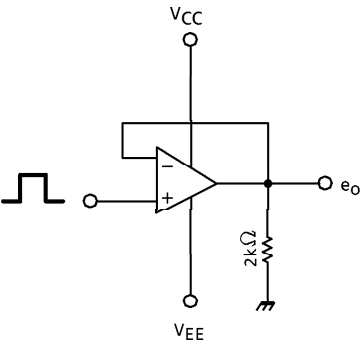
(7) I_{sink}



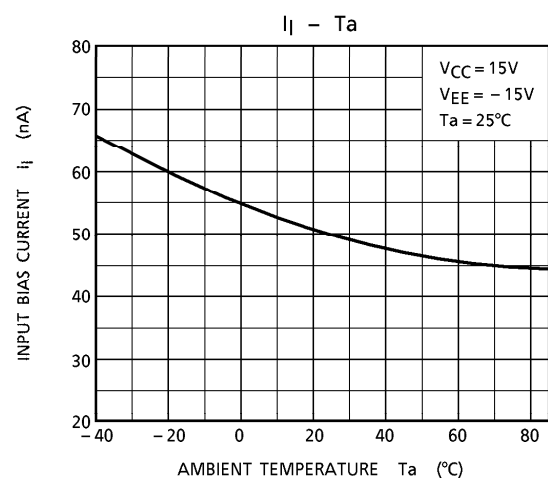
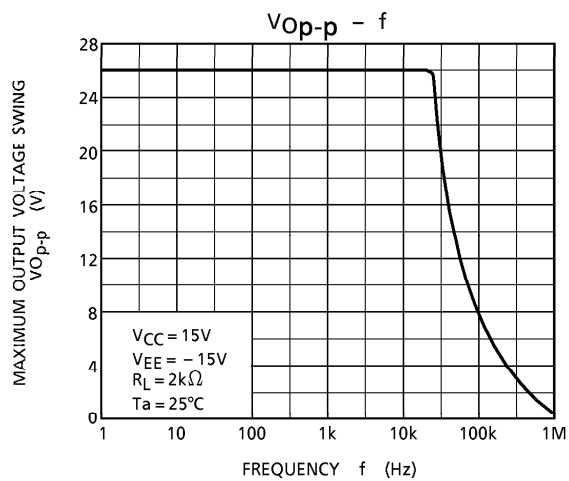
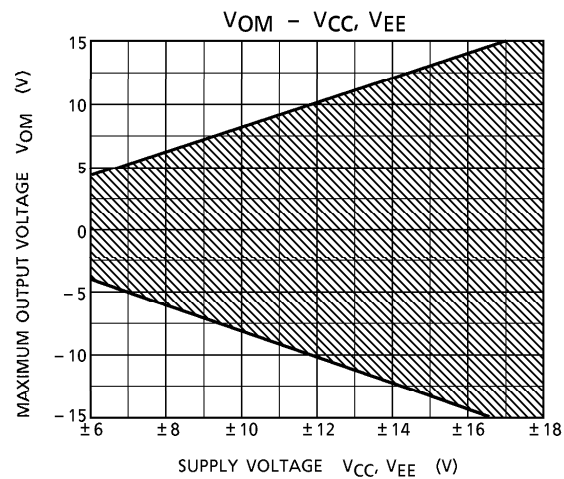
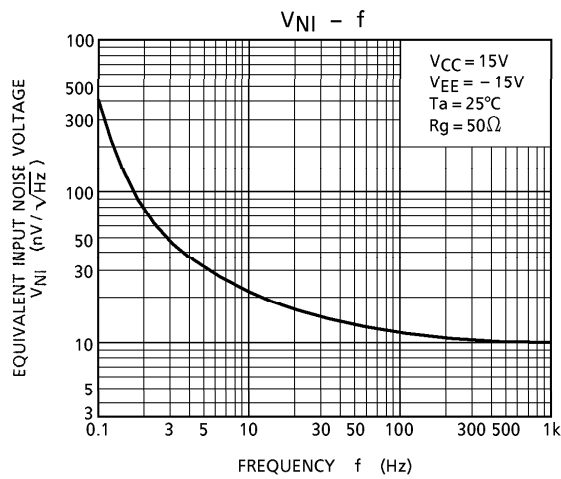
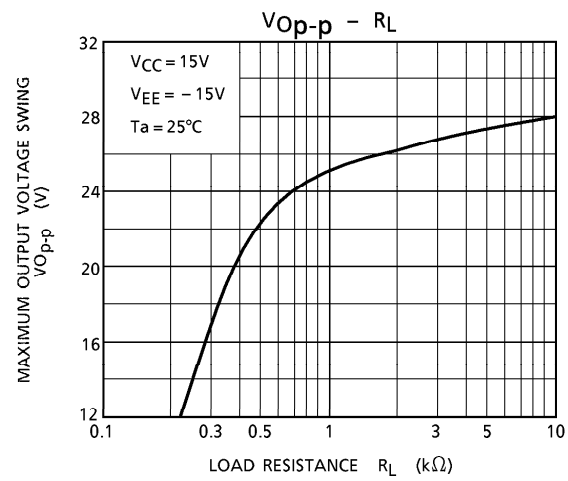
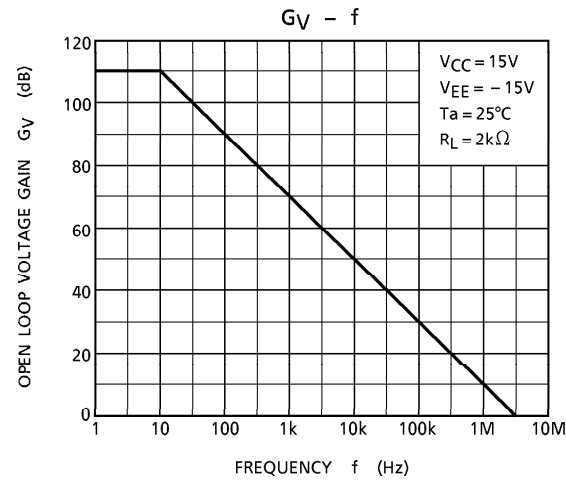
(8) I_{source}

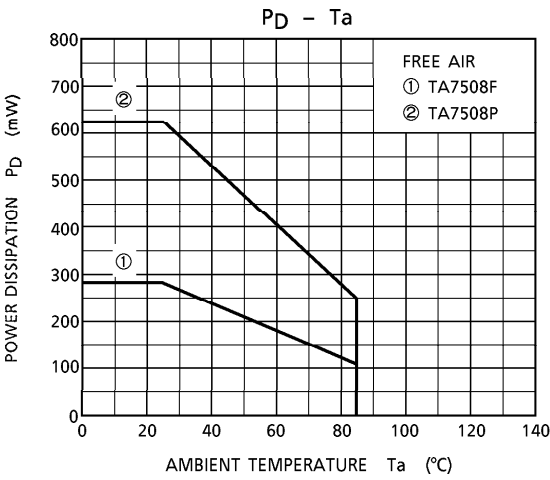


(9) SR



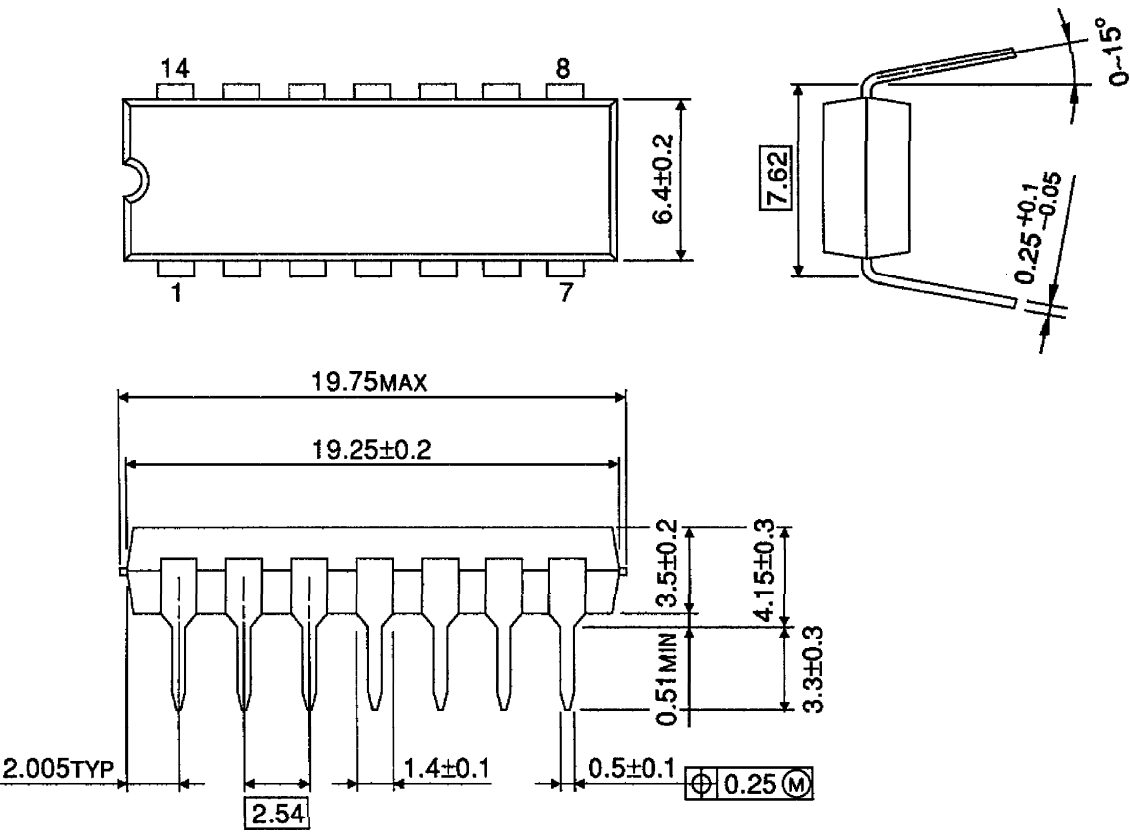
CHARACTERISTIC





OUTLINE DRAWING
DIP14-P-300-2.54

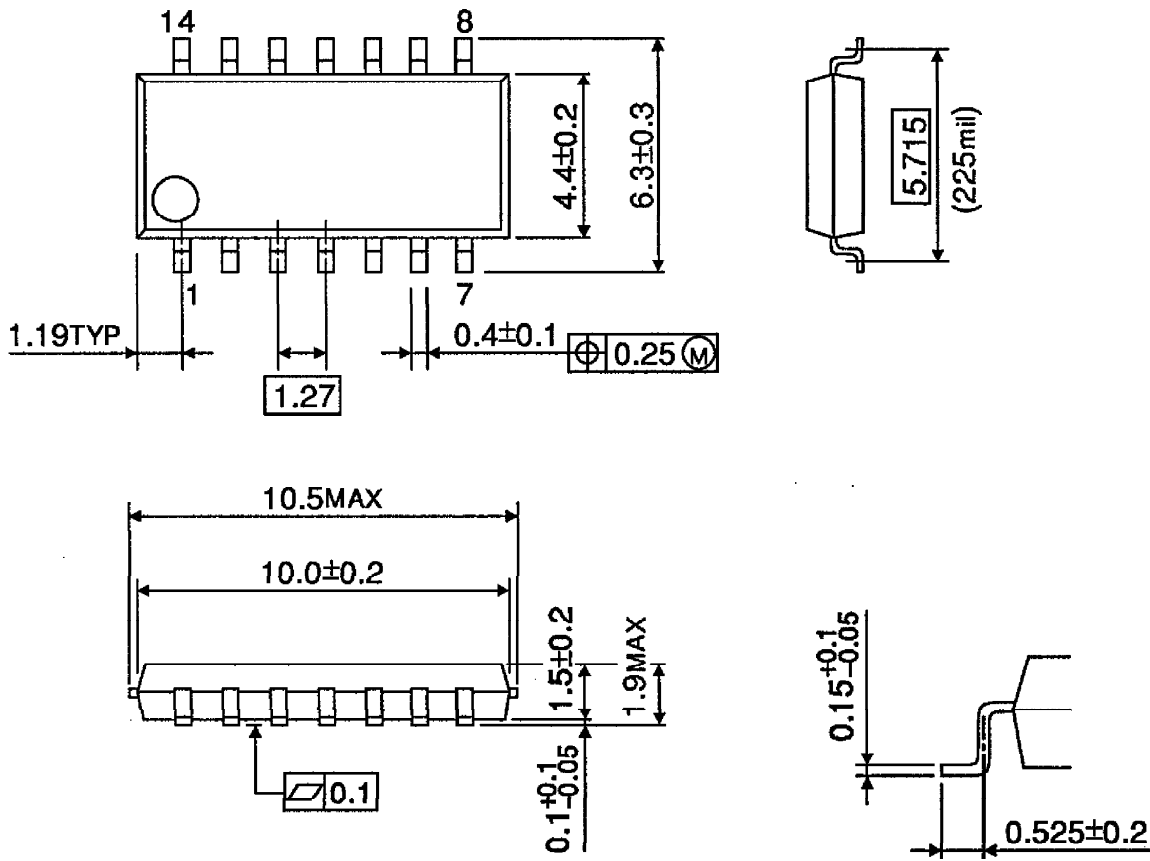
Unit : mm



Weight : 1.0g (Typ.)

OUTLINE DRAWING
SOP14-P-225-1.27

Unit : mm



Weight : 0.2g (Typ.)