

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

# TA75559P, TA75559S, TA75559F

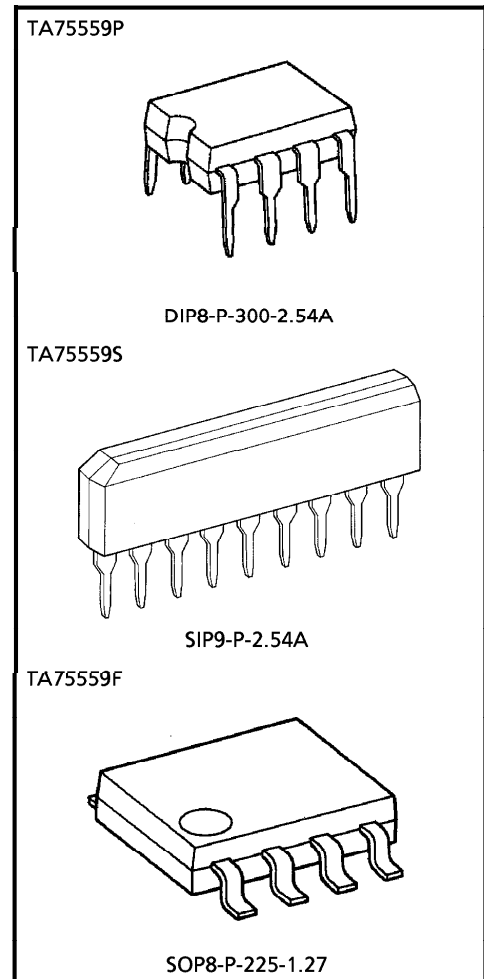
## DUAL OPERATIONAL AMPLIFIER

The TA75559P, TA75559S and TA75559F are Low-Noise Operational Amplifiers with High Speed and Wide Bandwidth.

It is Wide Bandwidth with Frequency Characteristic improvement TA75558P, TA75558S and TA75558F.

### FEATURES

- Wide Band Decompensated ( $A_V \geq 20\text{dB}$ )
- Pin Compatible with TA75458P, TA75458S and TA75458F
- Possible to Exchange the Position of 9 Pin for 1 Pin Because of Pin Connection Being Symmetric. (TA75559S Device Only)
- Wide Band Range :  $f_T = 5\text{MHz}$  (Typ.)
- Suitable Application for Active Filter, Equalizer Amp. and Headphone Amp.



### Weight

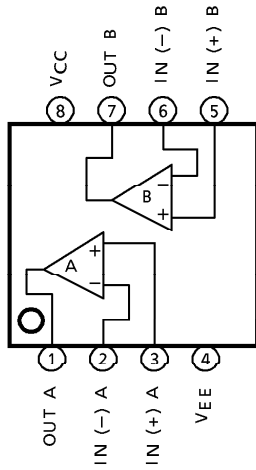
DIP8-P-300-2.54A	: 0.5g (Typ.)
SIP9-P-2.54A	: 0.9g (Typ.)
SOP8-P-225-1.27	: 0.1g (Typ.)

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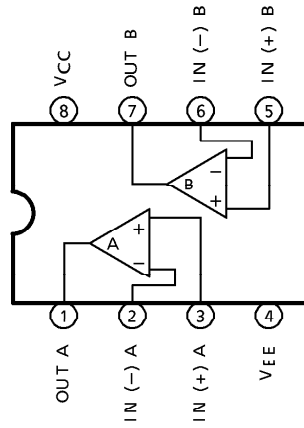
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**PIN CONNECTION (TOP VIEW)**

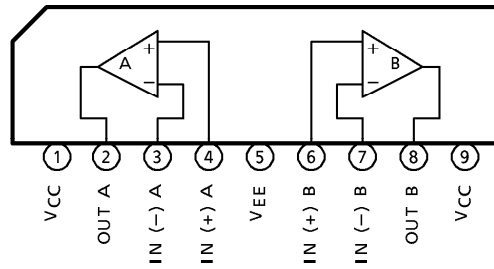
TA75559F



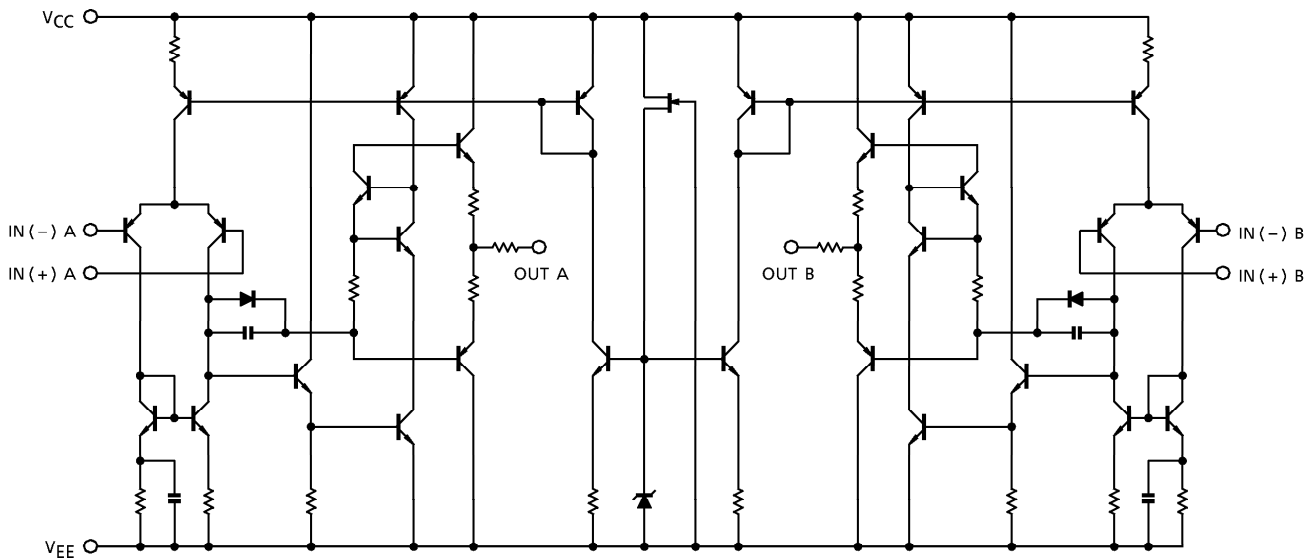
TA75559P



TA75559S



**EQUIVALENT CIRCUIT**



## MAXIMUM RATINGS (Ta = 25°C)

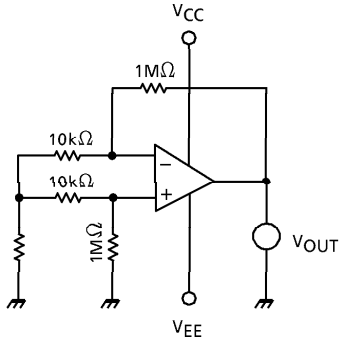
CHARACTERISTIC	SYMBOL	TA75559P TA75559S	TA75559F	UNIT
Supply Voltage	V <sub>CC</sub>	+ 18	+ 18	V
	V <sub>EE</sub>	- 18	- 18	
Differential Input Voltage	DV <sub>IN</sub>	± 30	± 30	V
Input Voltage	V <sub>IN</sub>	V <sub>CC</sub> ~V <sub>EE</sub>	V <sub>CC</sub> ~V <sub>EE</sub>	V
Power Dissipation	P <sub>D</sub>	500	240	mW
Operating Temperature	T <sub>opr</sub>	- 40~85	- 30~70	°C
Storage Temperature	T <sub>stg</sub>	- 55~125	- 55~125	°C

ELECTRICAL CHARACTERISTICS (V<sub>CC</sub> = 15V, V<sub>EE</sub> = - 15V, Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CIR- CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V <sub>IO</sub>	1	R <sub>g</sub> ≤ 10kΩ	—	0.5	6	mV
Input Offset Current	I <sub>IO</sub>	2	—	—	5	200	nA
Input Bias Current	I <sub>I</sub>	2	—	—	60	500	nA
Common Mode Input Voltage	CMV <sub>IN</sub>	3	—	± 12	± 14	—	V
Maximum Output Voltage	V <sub>OM</sub>	6	R <sub>L</sub> = 10kΩ	± 12	± 14	—	V
	V <sub>OMR</sub>		R <sub>L</sub> = 2kΩ	± 10	± 13	—	
Source Current	I <sub>source</sub>	8	—	—	40	—	mA
Sink Current	I <sub>sink</sub>	7	—	—	40	—	mA
Voltage Gain (Open Loop)	G <sub>V</sub>	5	V <sub>OUT</sub> = ± 10V, R <sub>L</sub> = 2kΩ	86	100	—	dB
Common Mode Input Signal Rejection Ratio	CMRR	3	R <sub>g</sub> ≤ 10kΩ	70	90	—	dB
Supply Voltage Rejection Ratio	SVRR	1	R <sub>g</sub> ≤ 10kΩ	—	30	150	μV/V
Slew Rate	SR	9	G <sub>V</sub> = 1, R <sub>L</sub> = 2kΩ	—	2.0	—	V/μs
Unity Gain Cross Frequency	f <sub>T</sub>	5	Open Loop	—	5.0	—	MHz
Supply Current	I <sub>CC</sub> , I <sub>EE</sub>	4	—	—	4.0	6.0	mA
Equivalent Input Noise Voltage	V <sub>NI</sub>	—	R <sub>S</sub> = 1kΩ, f = 30Hz~30kHz	—	2.5	—	μV <sub>rms</sub>

TEST CIRCUIT

(1)  $V_{IO}$ ,  $SVRR$



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

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

$V_{OUT1}$  :  $V_{OUT}$  ( $V_{CC}$ ,  $V_{EE} = \pm 8V$ )

$V_{OUT2}$  :  $V_{OUT}$  ( $V_{CC}$ ,  $V_{EE} = \pm 18V$ )

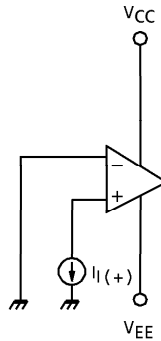
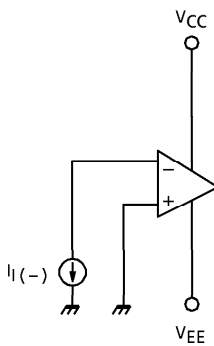
$V_{CC1}$  :  $V_{CC} = -8V$

$V_{EE1}$  :  $V_{EE} = -8V$

$V_{CC2}$  :  $V_{CC} = +18V$

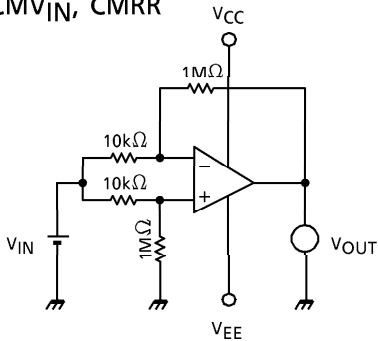
$V_{EE2}$  :  $V_{EE} = -18V$

(2)  $I_I$ ,  $I_{IO}$



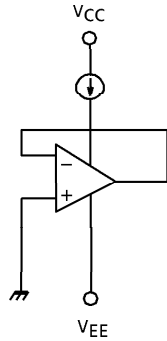
$$I_{IO} = |I_I(-) - I_I(+)|$$

(3)  $CMV_{IN}$ ,  $CMRR$



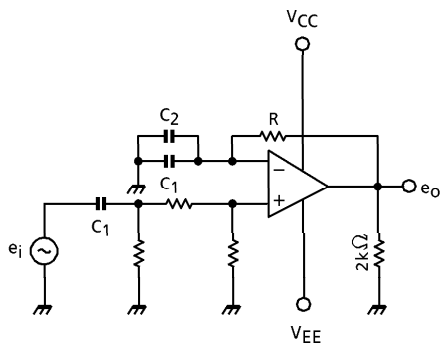
- $CMRR = 20 \log G_D / G_C \text{ (dB)}$
- $G_D$  : DIFFERENTIAL VOLTAGE GAIN
- $G_C$  : COMMON MODE VOLTAGE GAIN
- $CMV_{IN}$  :  $V_{IN} = -12V, 12V \text{ SUPPLIES}$

(4)  $I_{CC}$



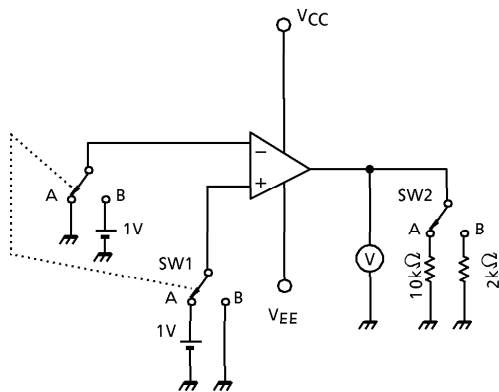
- $I_{CC} : V_{CC}, V_{EE} = \pm 15V$

(5)  $G_V, f_T$



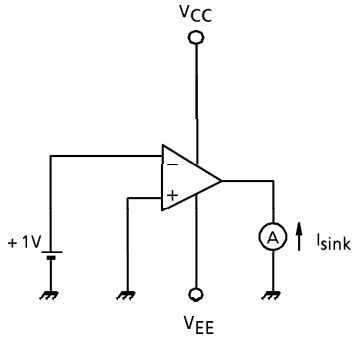
- $G_V = 20 \log e_o / e_i$  (dB)  
 $R \gg 1 / \omega C_1$   
 $C_1$  : COUPLING CONDENSER  
 $C_2$  : HIGH FREQUENCY BYPASS CONDENSER
- $f_T$  : INPUT FREQUENCY AT  $e_i = e_o$

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

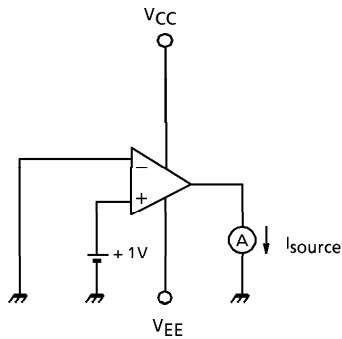


- $V_{OM} : (+) : SW1$  IS SIDE A,  $SW2$  IS SIDE A  
 $(-) : SW1$  IS SIDE B,  $SW2$  IS SIDE A
- $V_{OMR} : (+) : SW1$  IS SIDE A,  $SW2$  IS SIDE B  
 $(-) : SW1$  IS SIDE B,  $SW2$  IS SIDE B

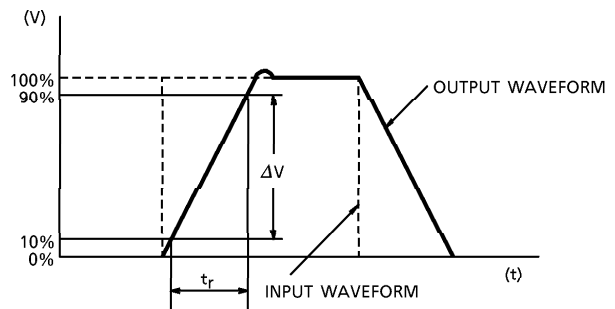
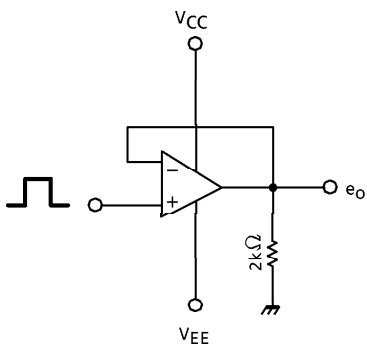
(7)  $I_{sink}$



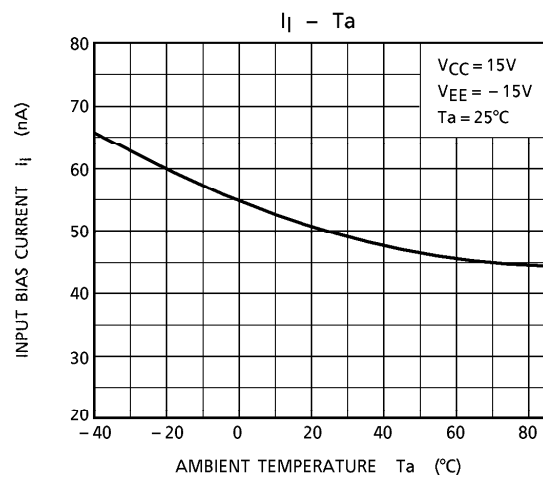
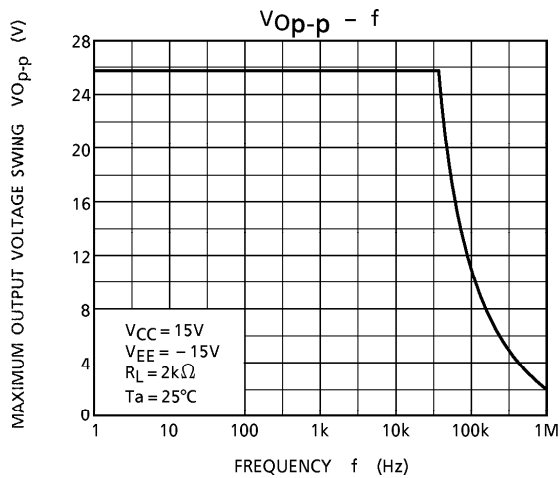
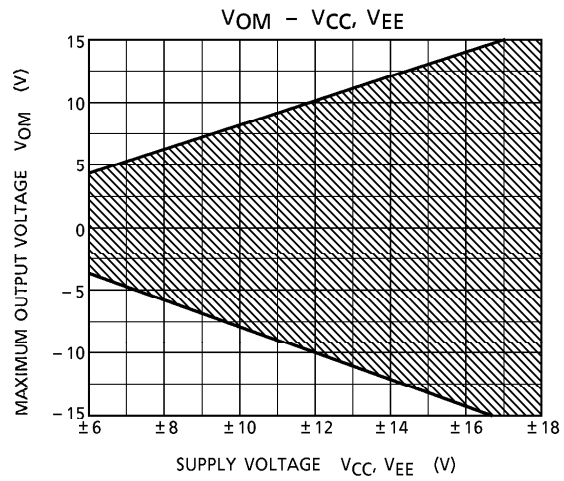
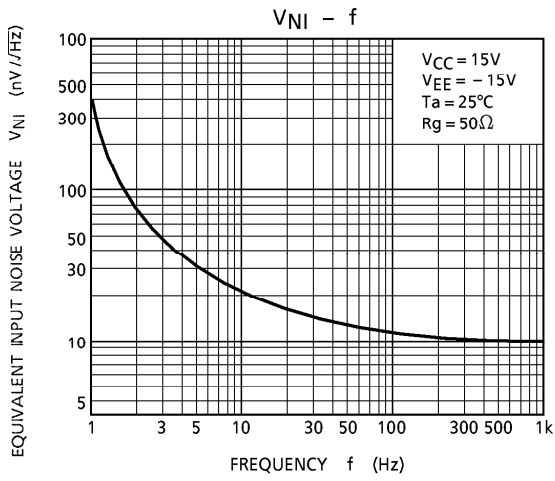
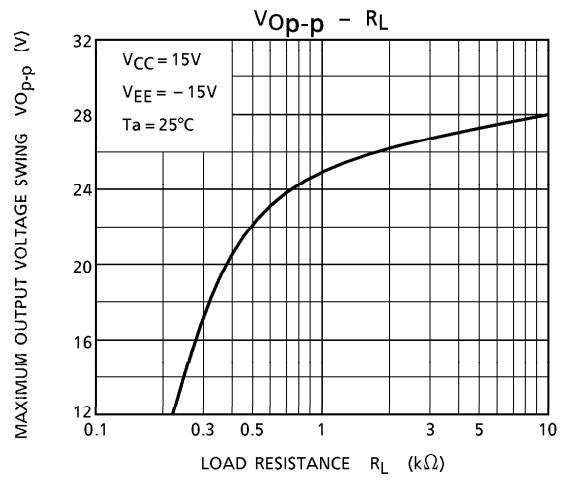
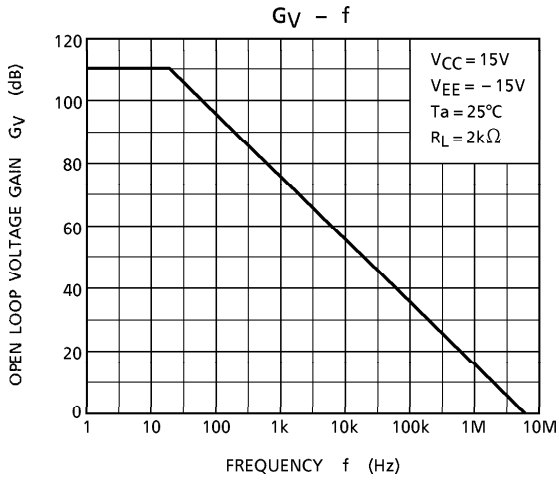
(8)  $I_{source}$

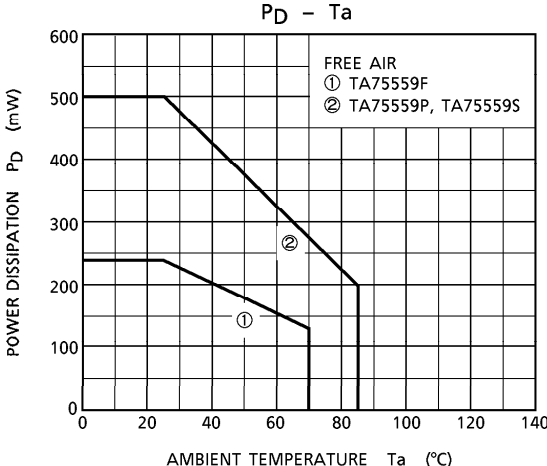


(9) SR



CHARACTERISTIC

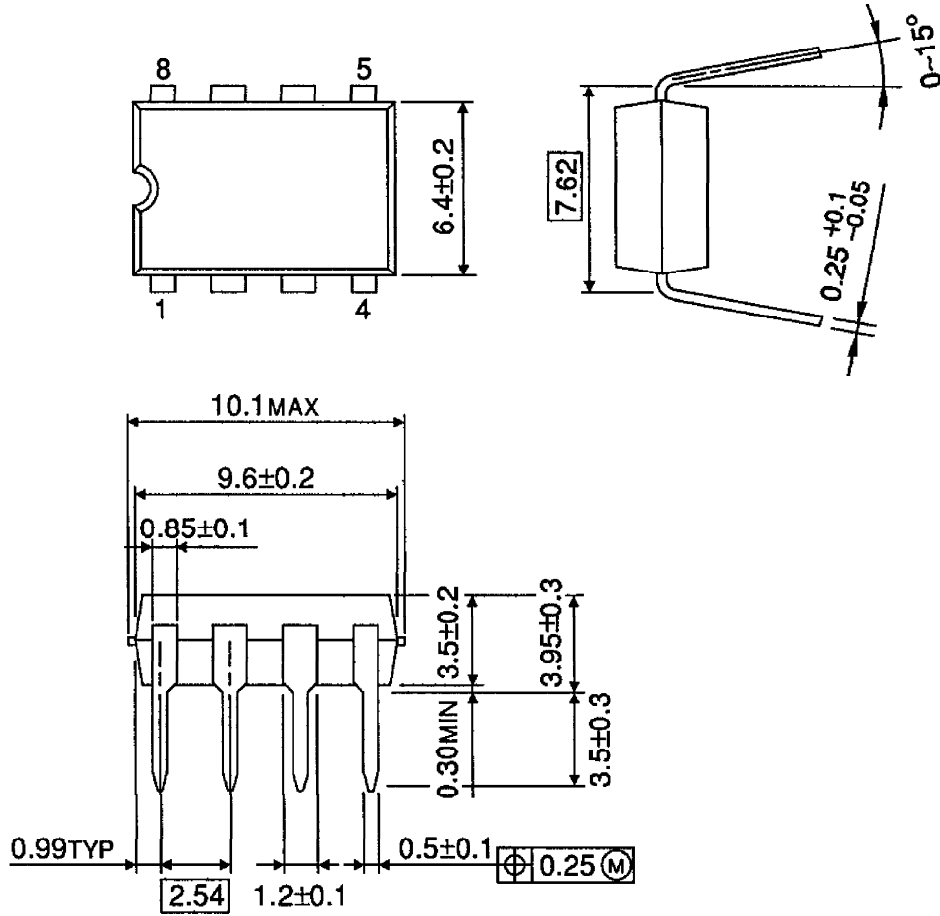






OUTLINE DRAWING  
DIP8-P-300-2.54A

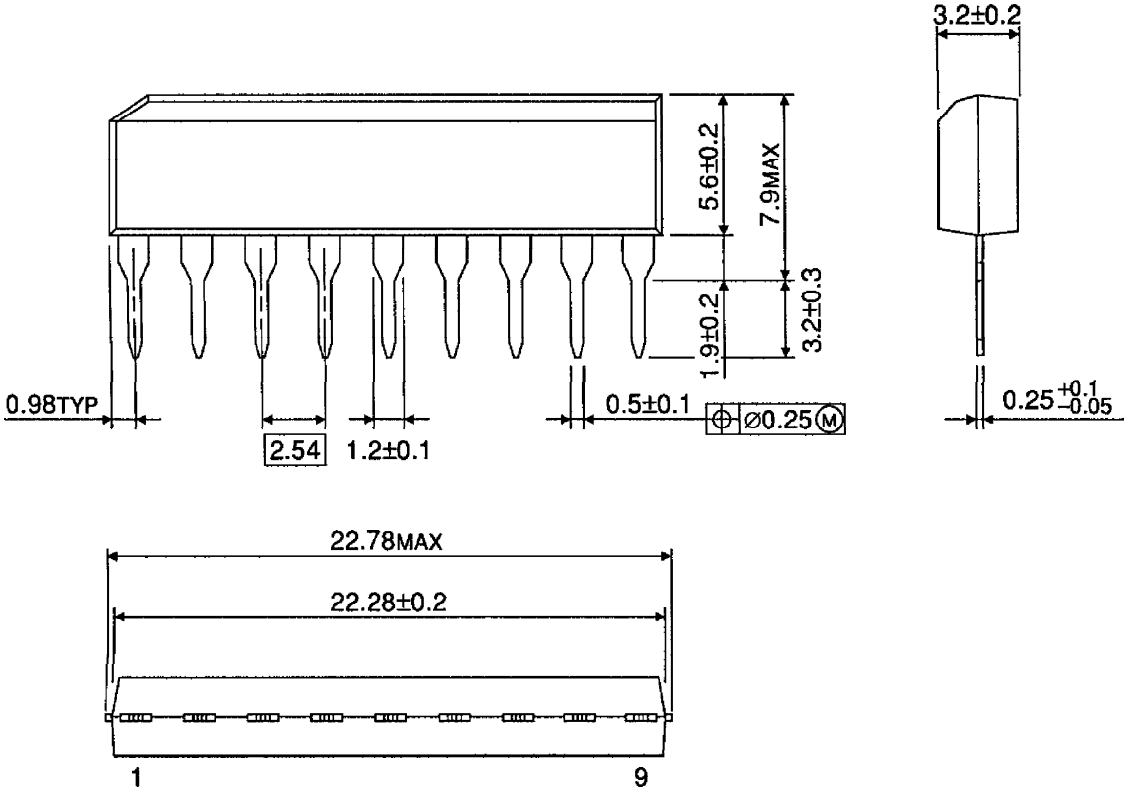
Unit : mm



Weight : 0.5g (Typ.)

OUTLINE DRAWING  
SIP9-P-2.54A

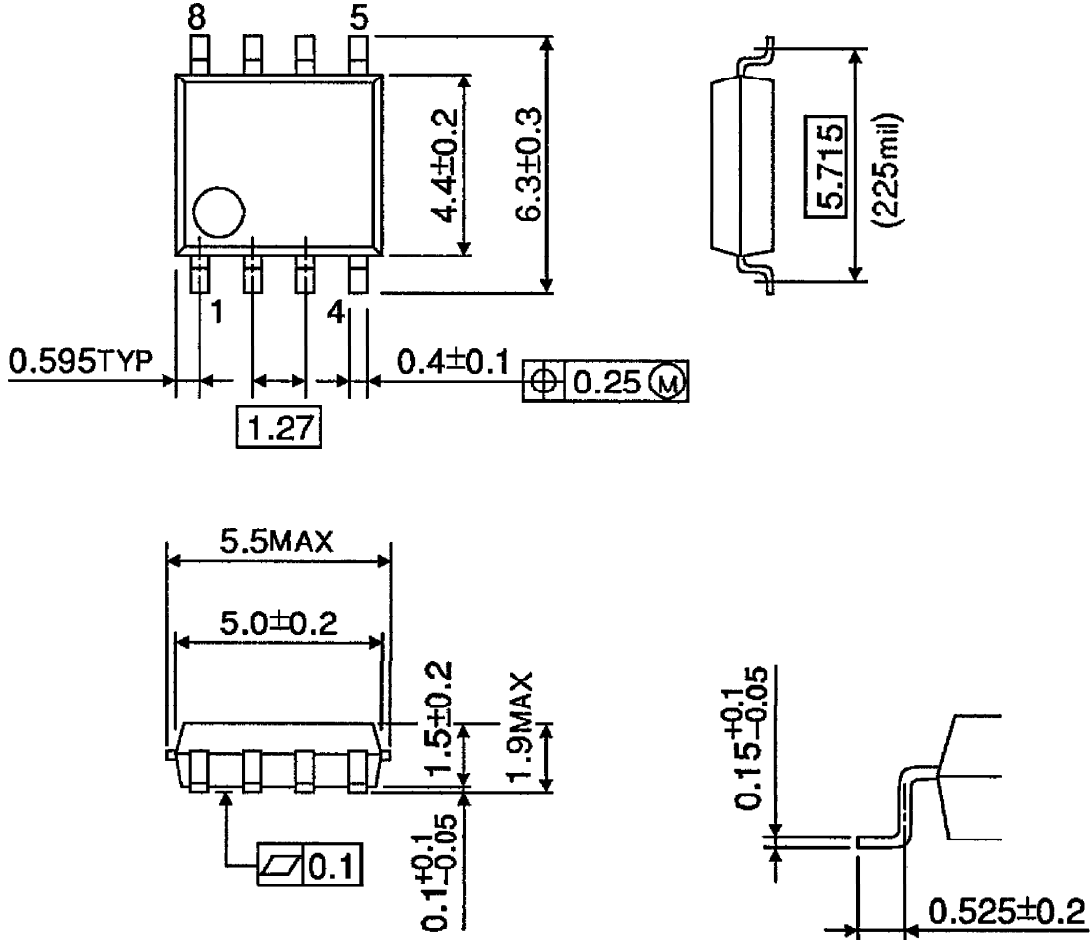
Unit : mm



Weight : 0.9g (Typ.)

OUTLINE DRAWING  
SOP8-P-225-1.27

Unit : mm



Weight : 0.1g (Typ.)