TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

# TA75558P, TA75558S, TA75558F

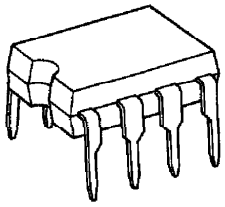
## DUAL OPERATIONAL AMPLIFIER

The TA75558P, TA75558S and TA75558F are Low-Noise Operational Amplifiers with High Speed and Wide Bandwidth.

### FEATURES

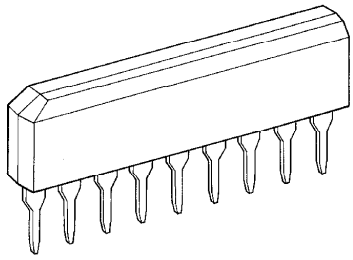
- Internal Frequency Compensation Type
- Pin Compatible with TA75458P, TA75458S and TA75458F
- Possible to Exchange the Position of 9 Pin for 1 Pin Because of Pin Connection Being Symmetric. (TA75558S Device Only)
- Wide Band Range : $f_T = 3MHz$ (Typ.)
- Suitable Application for Active Filter Equalizer Amplifier and Headphone Amplifier.

TA75558P



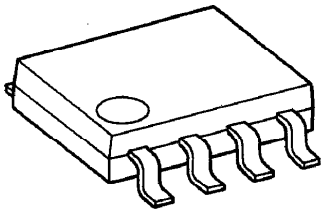
DIP8-P-300-2.54A

TA75558S



SIP9-P-2.54A

TA75558F



SOP8-P-225-1.27

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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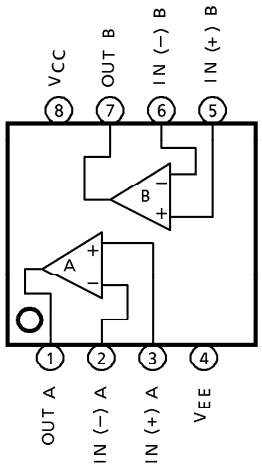
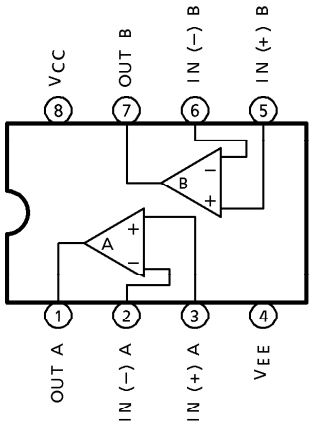
**PIN CONNECTION** (TOP VIEW)

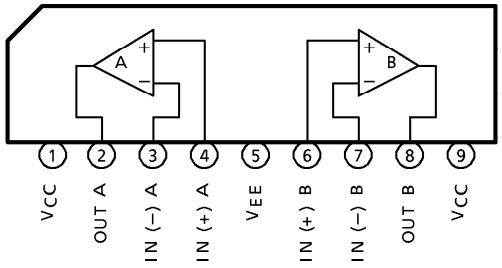
TA75558F



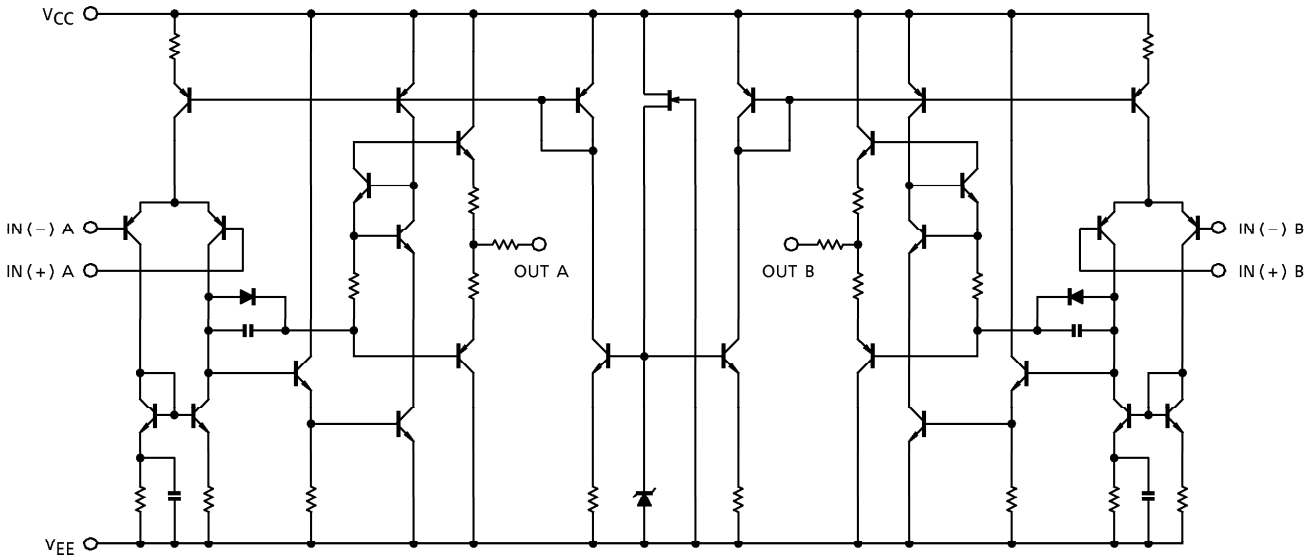

TA75558P




TA75558S




**EQUIVALENT CIRCUIT**



**MAXIMUM RATINGS** (Ta = 25°C)

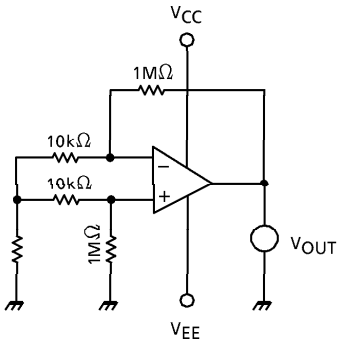
| CHARACTERISTIC | SYMBOL | TA75558P TA75558S | TA75558F | UNIT |
|---|---|---|---|---|
| Supply Voltage | $V_{CC}$ | + 18 | + 18 | V |
| | $V_{EE}$ | − 18 | − 18 | |
| Differential Input Voltage | $DV_{IN}$ | ± 30 | ± 30 | V |
| Input Voltage | $V_{IN}$ | $V_{CC}$~$V_{EE}$ | $V_{CC}$~$V_{EE}$ | V |
| Power Dissipation | $P_D$ | 500 | 240 | mW |
| Operating Temperature | $T_{opr}$ | − 40~85 | − 30~70 | °C |
| Storage Temperature | $T_{stg}$ | − 55~125 | − 55~125 | °C |

**ELECTRICAL CHARACTERISTICS** ($V_{CC}$ = 15V、$V_{EE}$ = − 15V、Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CIR-CUIT | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Input Offset Voltage | $V_{IO}$ | 1 | $R_g \leqq 10k\Omega$ | — | 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 | $V_{OUT}$ = ± 10V, $R_L = 2k\Omega$ | 86 | 100 | — | dB |
| Common Mode Input Signal Rejection Ratio | CMRR | 3 | $R_g \leqq 10k\Omega$ | 70 | 90 | — | dB |
| Supply Voltage Rejection Ratio | SVRR | 1 | $R_g \leqq 10k\Omega$ | — | 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 | — | — | 4.0 | 6.0 | mA |
| Equivalent Input Noise Voltage | $V_{NI}$ | — | $R_S$ = 1kΩ, f = 30Hz~30kHz | — | 2.5 | — | $\mu V_{rms}$ |

**TEST CIRCUIT**

(1) $V_{IO}$, $S_{VRR}$

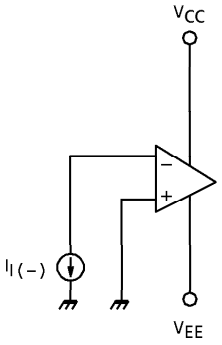


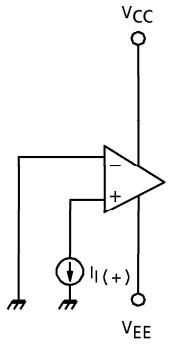

- $V_{IO} = V_{OUT} / 100$
- SVRR = 20ℓog E (dB)

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

$V_{OUT1}$ : $V_{OUT}$ ($V_{CC}$, $V_{EE}$ = ± 8V)
$V_{OUT2}$ : $V_{OUT}$ ($V_{CC}$, $V_{EE}$ = ± 18V)
$V_{CC1}$ : $V_{CC}$ = − 8V
$V_{EE1}$ : $V_{EE}$ = − 8V
$V_{CC2}$ : $V_{CC}$ = + 18V
$V_{EE2}$ : $V_{EE}$ = − 18V

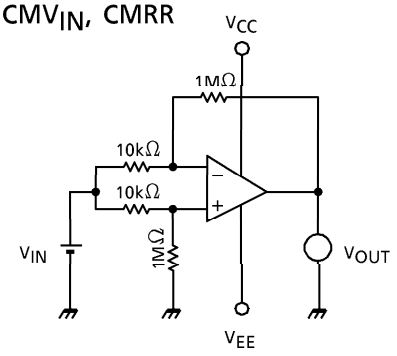
(2) $I_I$, $I_{IO}$



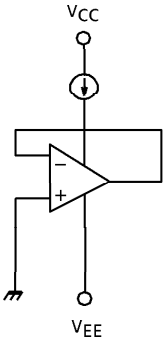

$I_{IO} = |I_I(-) - I_I(+)|$

(3) $CMV_{IN}$, CMRR



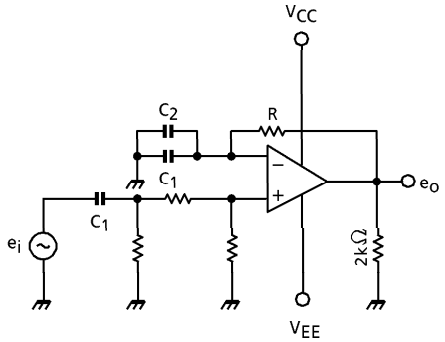

- CMRR = 20ℓog $G_D / G_C$ (dB)
  $G_D$ : DIFFERENTIAL VOLTAGE GAIN
  $G_C$ : COMMON MODE VOLTAGE GAIN
- $CMV_{IN}$ : $V_{IN}$ = − 12V, 12V SUPPLIES

(4) $I_{CC}$



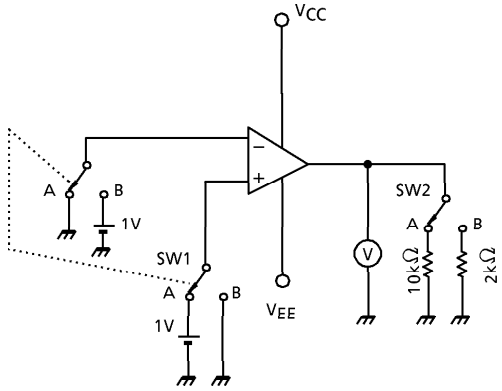

- $I_{CC}$ : $V_{CC}$, $V_{EE}$ = ± 15V

(5) $G_V$, $f_T$



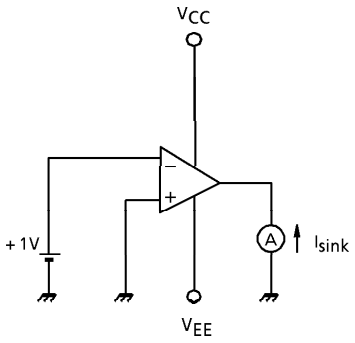

- $G_V = 20\ell og\ e_o / e_i$ (dB)
  $R \gg 1 / W_{C1}$
  $C_1$ : COUPLING CONDENSER
  $C_2$ : HIGH FREQUENCY BYPASS CONDENSER
- $f_T$ : INPUT FREQUENCY AT $e_i = e_o$

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

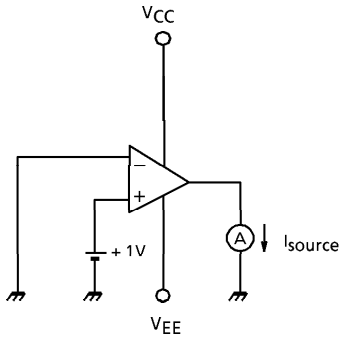



- $V_{OM}$ : (+) : SW1 IS SIDE A, SW2 IS SIDE A
  (−) : SW1 IS SIDE B, SW2 IS SIDE A
- $V_{OMR}$ : (+) : SW1 IS SIDE A, SW2 IS SIDE B
  (−) : SW1 IS SIDE B, SW2 IS SIDE B

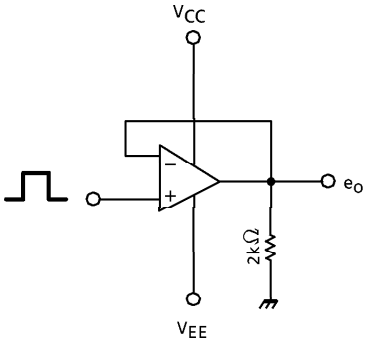
(7) $I_{sink}$

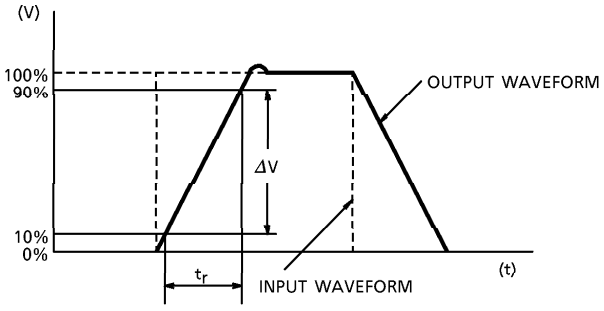



(8) $I_{source}$



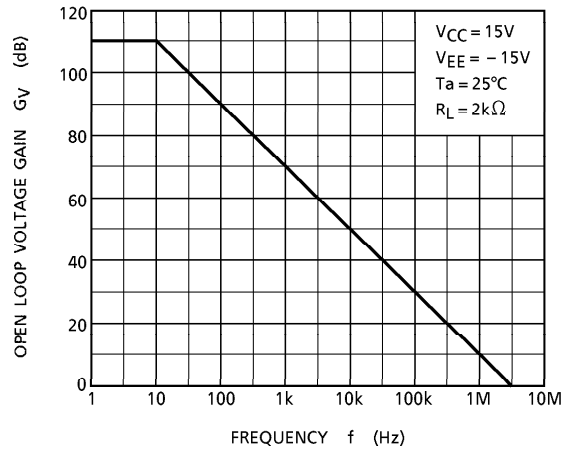

(9) SR



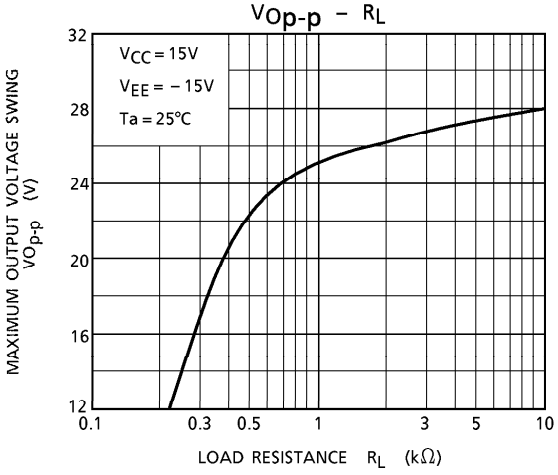



## CHARACTERISTIC

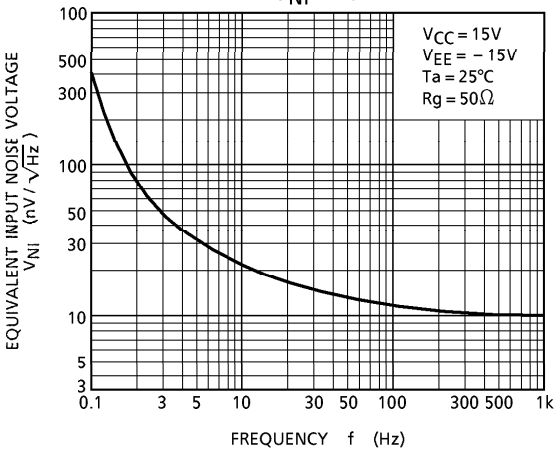
$G_V$ – f



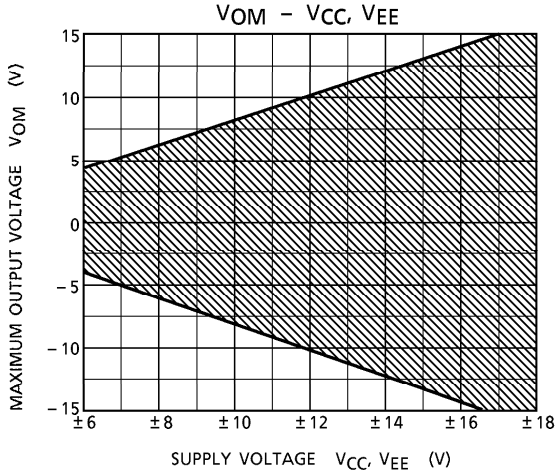

$V_{Op\text{-}p}$ – $R_L$



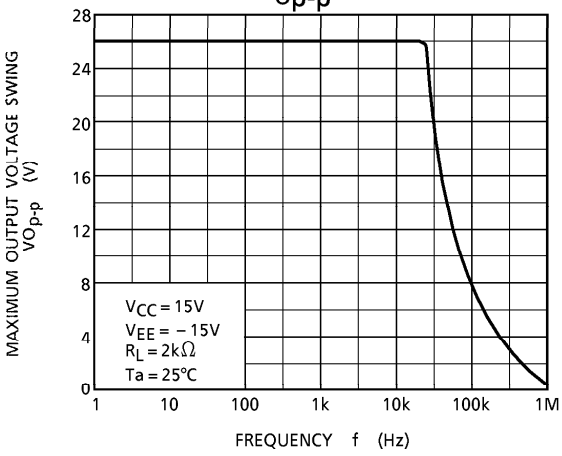

$V_{NI}$ – f



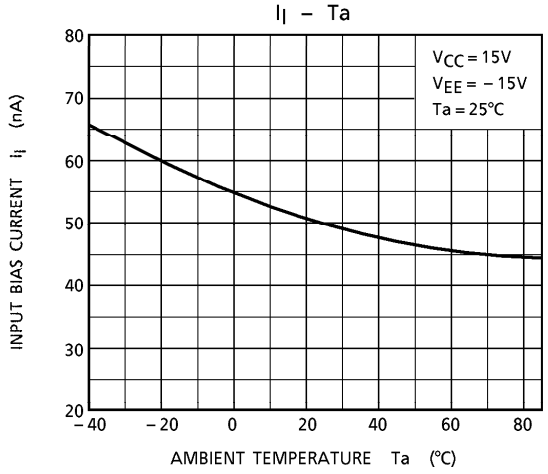

$V_{OM}$ – $V_{CC}$, $V_{EE}$

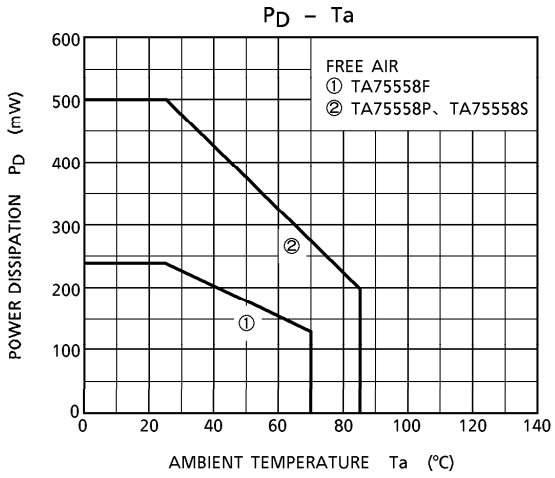



$V_{Op\text{-}p}$ – f




$I_I$ – Ta

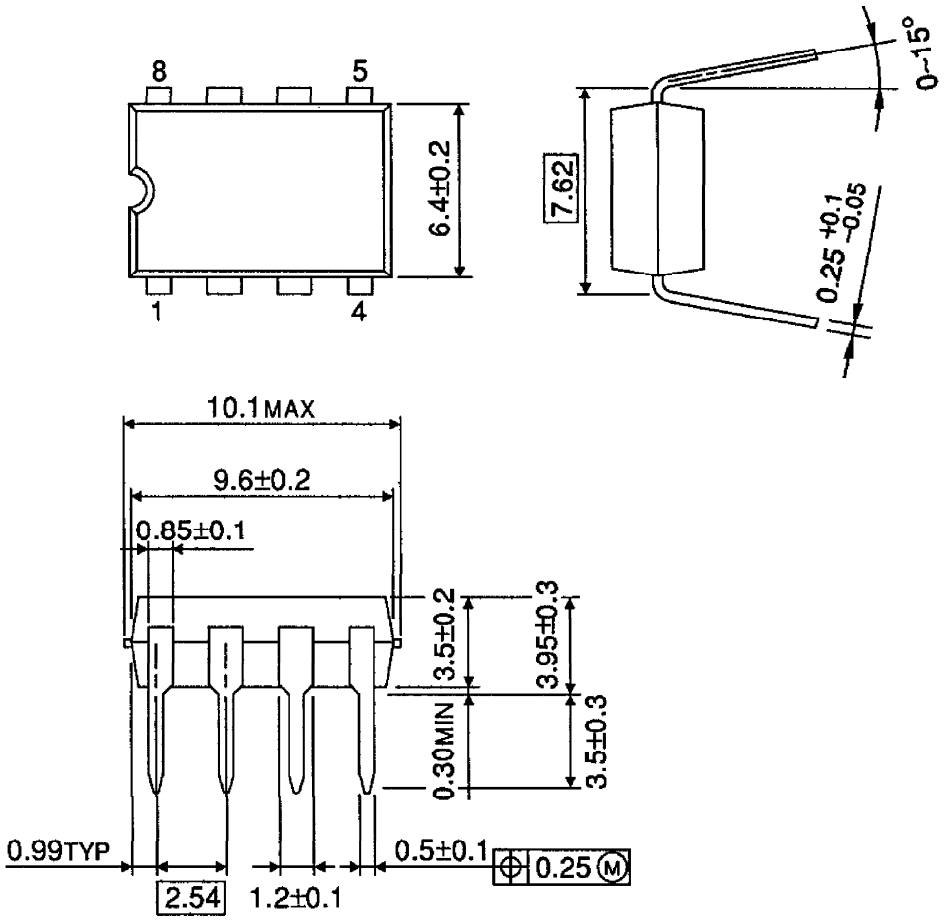



$P_D$ – Ta
FREE AIR
① TA75558F
② TA75558P、TA75558S
POWER DISSIPATION $P_D$ (mW)
600
500
400
300
200
100
0
0
20
40
60
80
100
120
140
AMBIENT TEMPERATURE Ta (°C)

**OUTLINE DRAWING**

DIP8-P-300-2.54A

Unit : mm

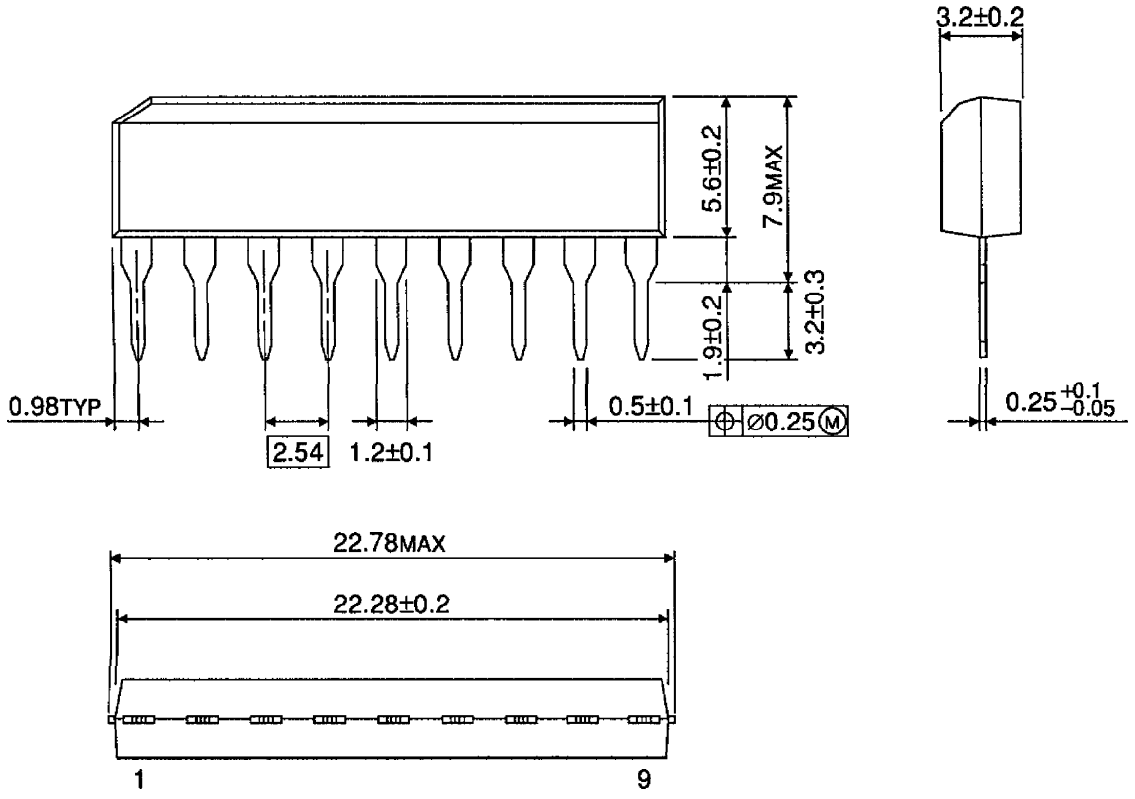



Weight : 0.5g (Typ.)

**OUTLINE DRAWING**

SIP9-P-2.54A

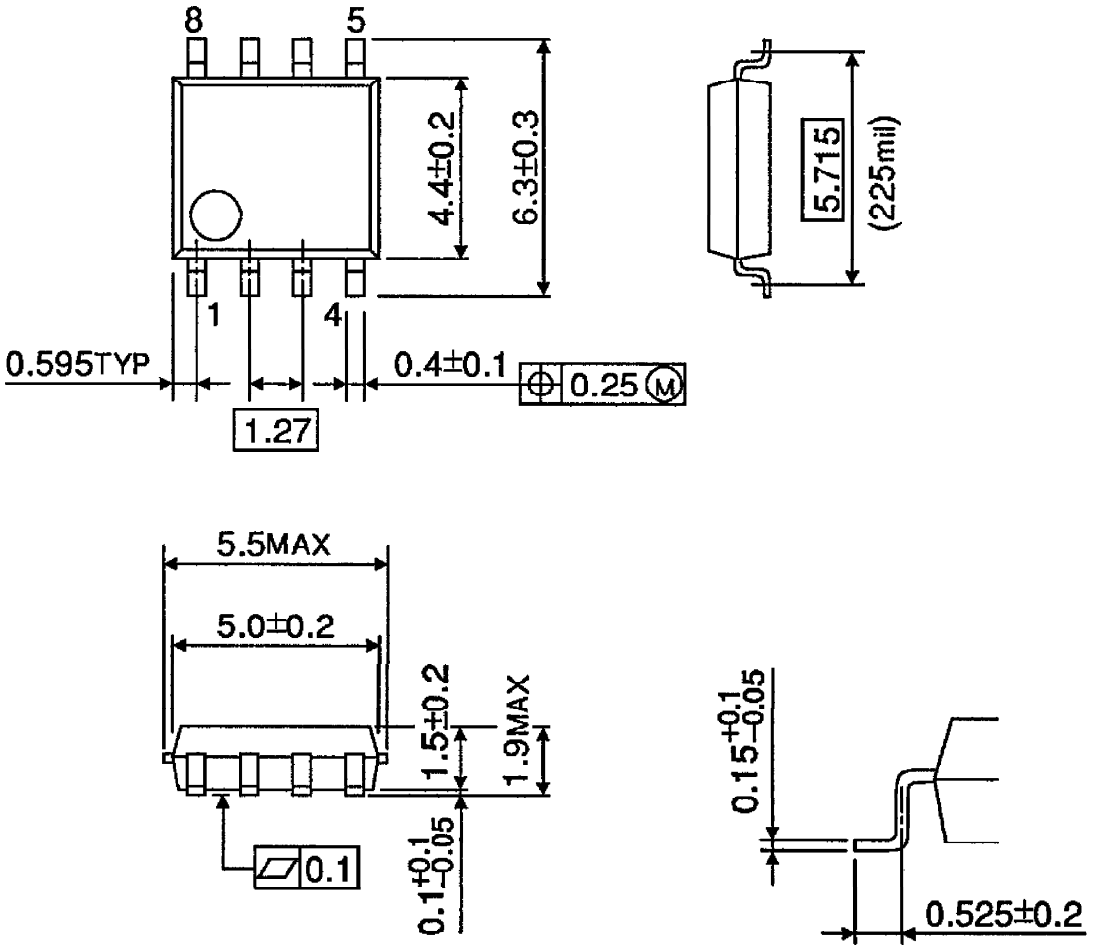
Unit : mm




Weight : 0.9g (Typ.)

**OUTLINE DRAWING**

SOP8-P-225-1.27 Unit : mm




Weight : 0.1g (Typ.)