

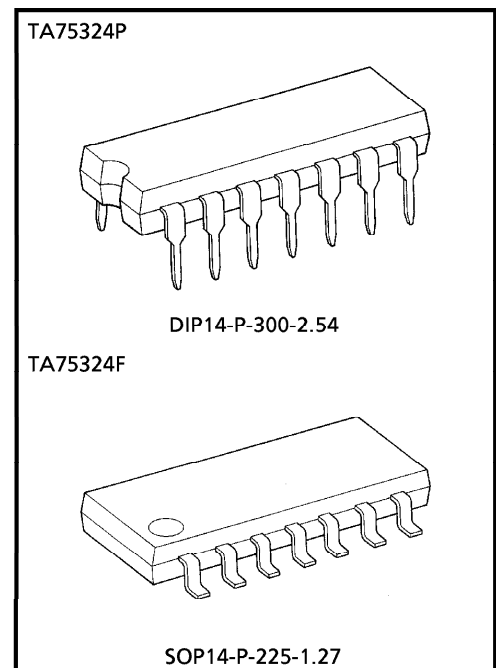
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA75324P, TA75324F

QUAD OPERATIONAL AMPLIFIER

FEATURES

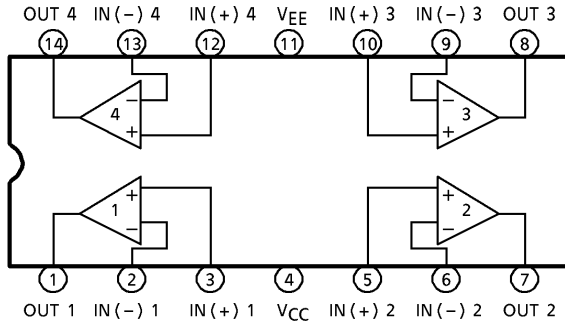
- In the Linear Mode the Input Common Mode Voltage Range Includes Ground.
- Four Internally Compensated OP Amp is Single Package.
- Low power Dissipation and Power Drain Suitable for Battery Operation.
- Differential Input Voltage Range Equal to the Power Supply Voltage.
- Wide Power Supply Voltage Range and Signal Power Supply.
- Large Output Voltage Swing : $0V \sim V_{CC} - 1.5V$
- Low Input Biasing Current : $I_I = 45nA$ (Typ.)



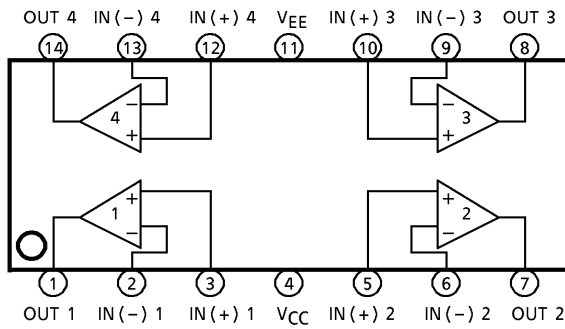
Weight
DIP14-P-300-2.54 : 1.0g (Typ.)
SOP14-P-225-1.27 : 0.2g (Typ.)

PIN CONNECTION (TOP VIEW)

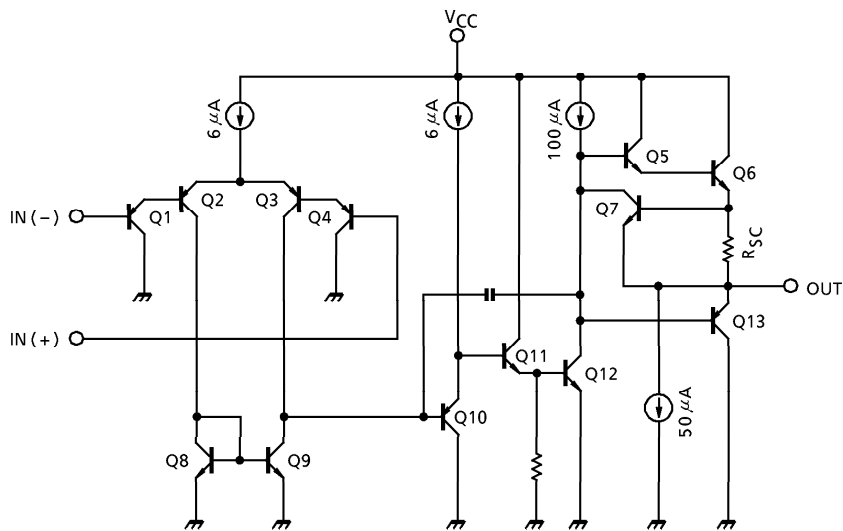
TA75324P



TA75324F



EQUIVALENT CIRCUIT



MAXIMUM RATINGS (Ta = 25°C)

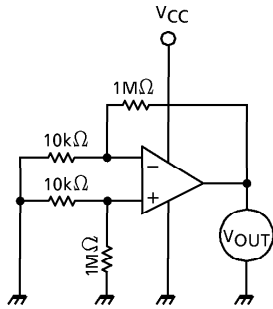
| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|----------------------------|------------------|----------------|------|
| Supply Voltage | V_{CC}, V_{EE} | ± 18 OR 36 | V |
| Differential Input Voltage | DV_{IN} | ± 36 | V |
| Input Voltage | V_{IN} | - 0.3~36 | V |
| Power Dissipation | TA75324P | 625 | mW |
| | TA75324F | 280 | |
| Operating Temperature | T_{opr} | - 40~85 | °C |
| Storage Temperature | T_{stg} | - 55~125 | °C |

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

| CHARACTERISTIC | SYMBOL | TEST CIR-CUIT | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|--------------------------------|------------------|---------------|-------------------------------------|------|------|----------------|------|
| Input Offset Voltage | V_{IO} | 1 | $R_g \leq 10k\Omega$ | — | 2 | 10 | mV |
| Input Offset Current | I_{IO} | 2 | — | — | 5 | 100 | nA |
| Input Bias Current | I_I | 2 | — | — | 45 | 250 | 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 | $R_L = \infty, \text{ ALL OF Amps}$ | — | 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 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 | $IN(-) = 0V_{DC}, IN(+) = 1V_{DC}$ | 20 | 40 | — | mA |
| Sink Current | I_{sink} | 6 | $IN(-) = 1V_{DC}, IN(+) = 0V_{DC}$ | 10 | 20 | — | mA |

TEST CIRCUIT

(1) V_{IO} , SVRR

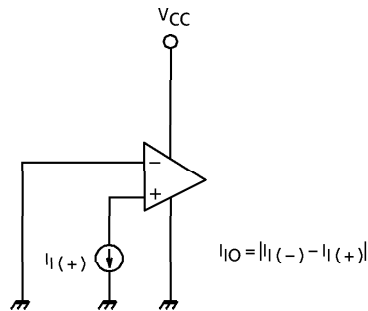
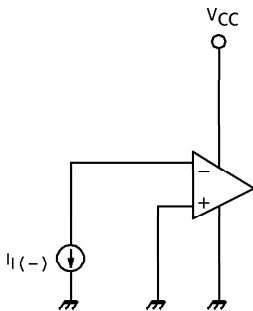


- $V_{IO} = V_{OUT} / 100$
- $SVRR = 20 \log E \text{ (dB)}$

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

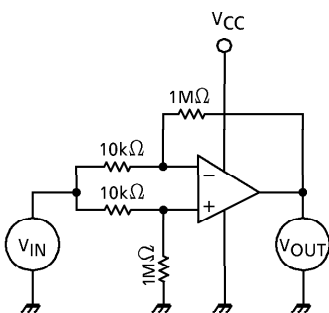
V_{OUT1} : V_{OUT} ($V_{CC1} = 5V$)
 V_{OUT2} : V_{OUT} ($V_{CC2} = 10V$)

(2) I_I , I_{IO}



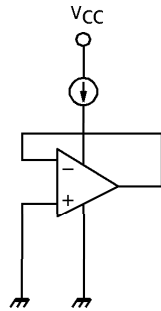
$$I_{IO} = |I_1(-) - I_1(+)|$$

(3) CMV_{IN} , CMRR



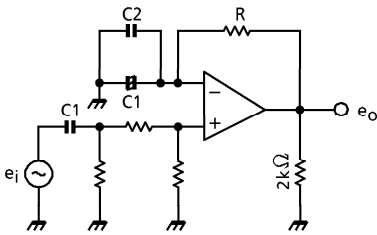
- $CMRR = 20 \log \cdot G_D / G_C \text{ (dB)}$
 G_D : DIFFERENTIAL VOLTAGE GAIN
 G_C : COMMON MODE VOLTAGE GAIN
- CMV_{IN} : $V_{IN} = 0V$, $V_{CC} - 1.5V$ SUPPLES

(4) I_{CC}



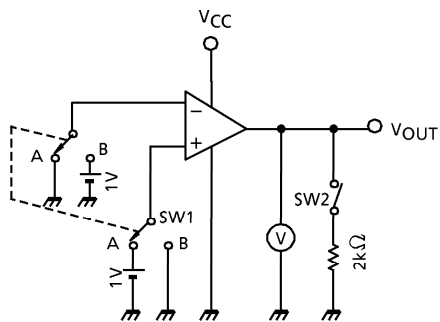
- $I_{CC} : (V_{CC} = 5V)$

(5) G_V



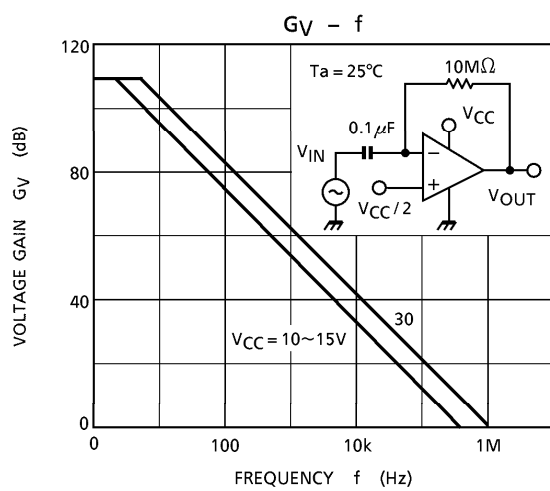
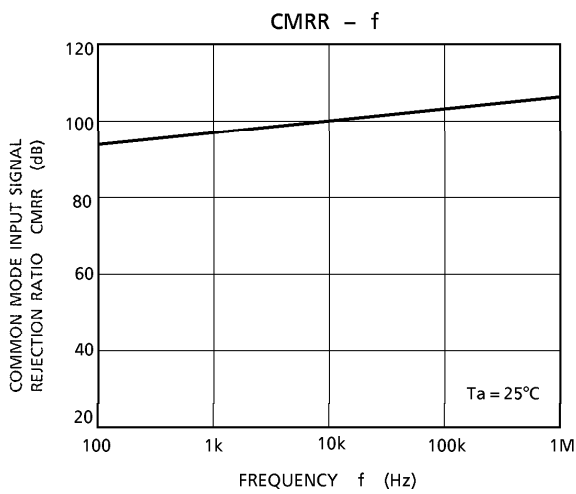
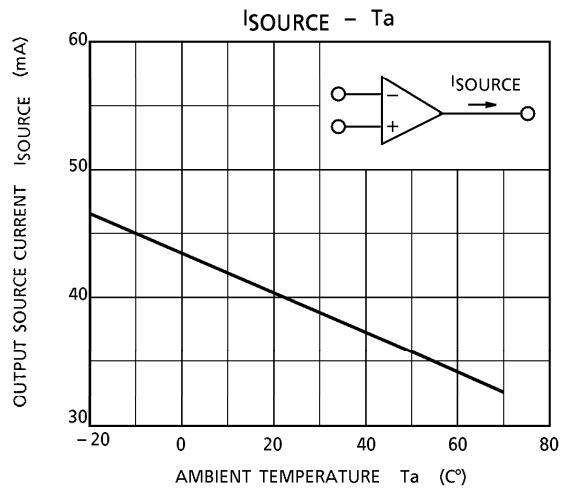
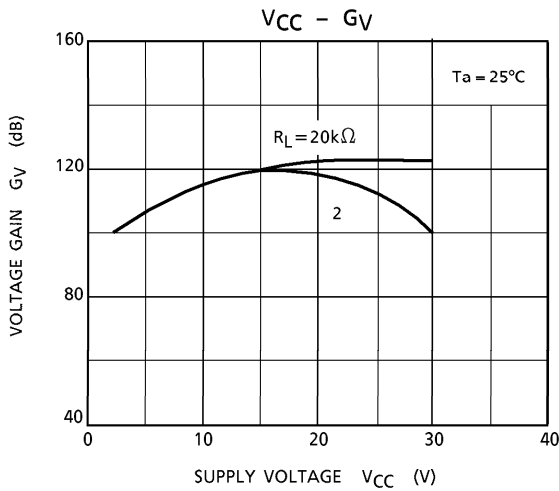
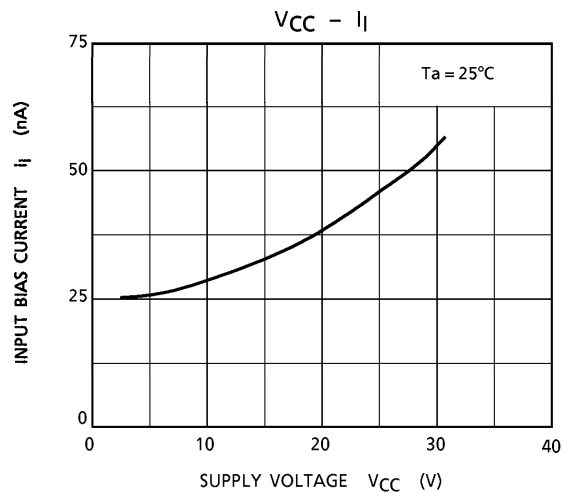
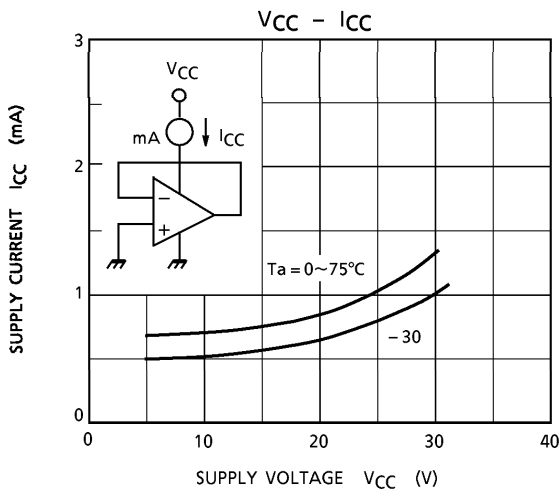
- $G_V = 20 \log e_o / e_i$ (dB)
 $R \gg 1 / \omega C_1$
 C1 : COUPLING CONDENSER
 C2 : HIGH FREQUENCY BYPASS CONDENSER

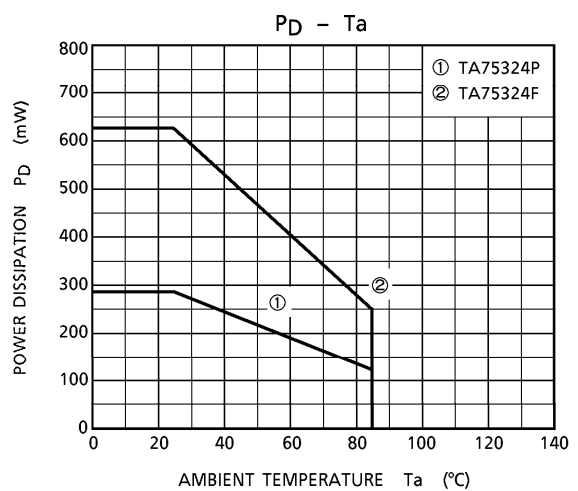
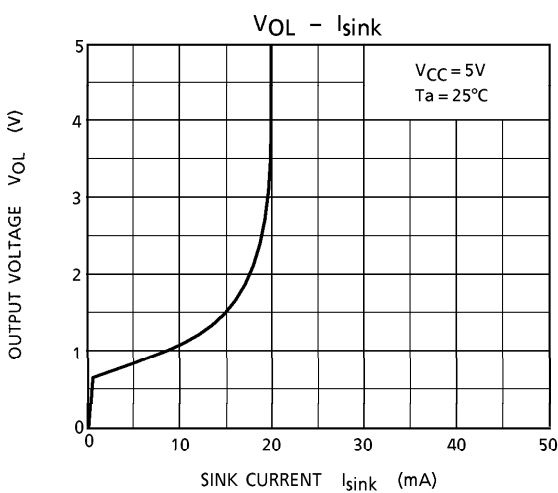
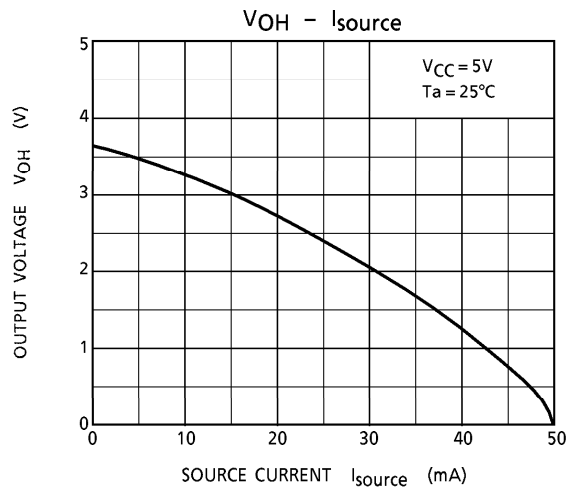
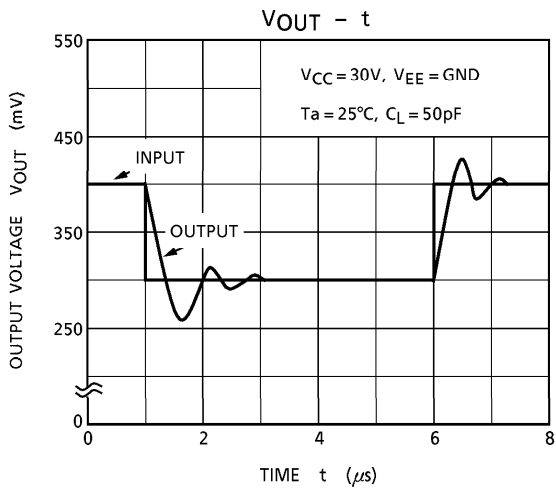
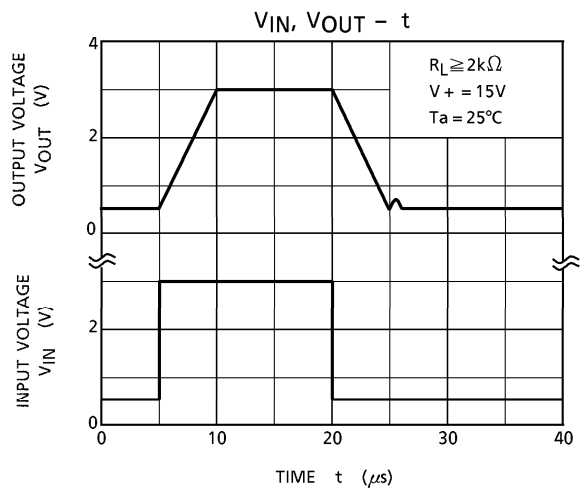
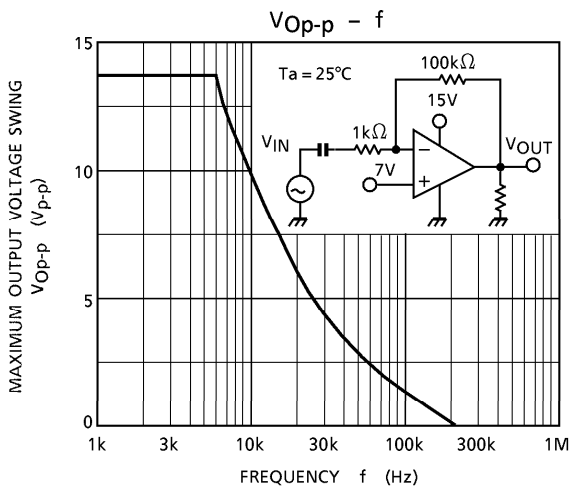
(6) V_{Op-p} , I_{source} , I_{sink}



- V_{Op-p}
 $V_{OH} : SW1 \text{ IS SIDE A, SW2 ON}$
 $V_{OL} : SW1 \text{ IS SIDE B, SW2 ON}$
- I_{source}
 $SW1 \text{ IS SIDE A, SW2 OFF}$
 $V_{OUT} \rightarrow 0V \text{ MEASURE}$
- I_{sink}
 $SW1 \text{ IS SIDE B, SW2 OFF}$
 $V_{OUT} \rightarrow 5V \text{ MEASURE}$

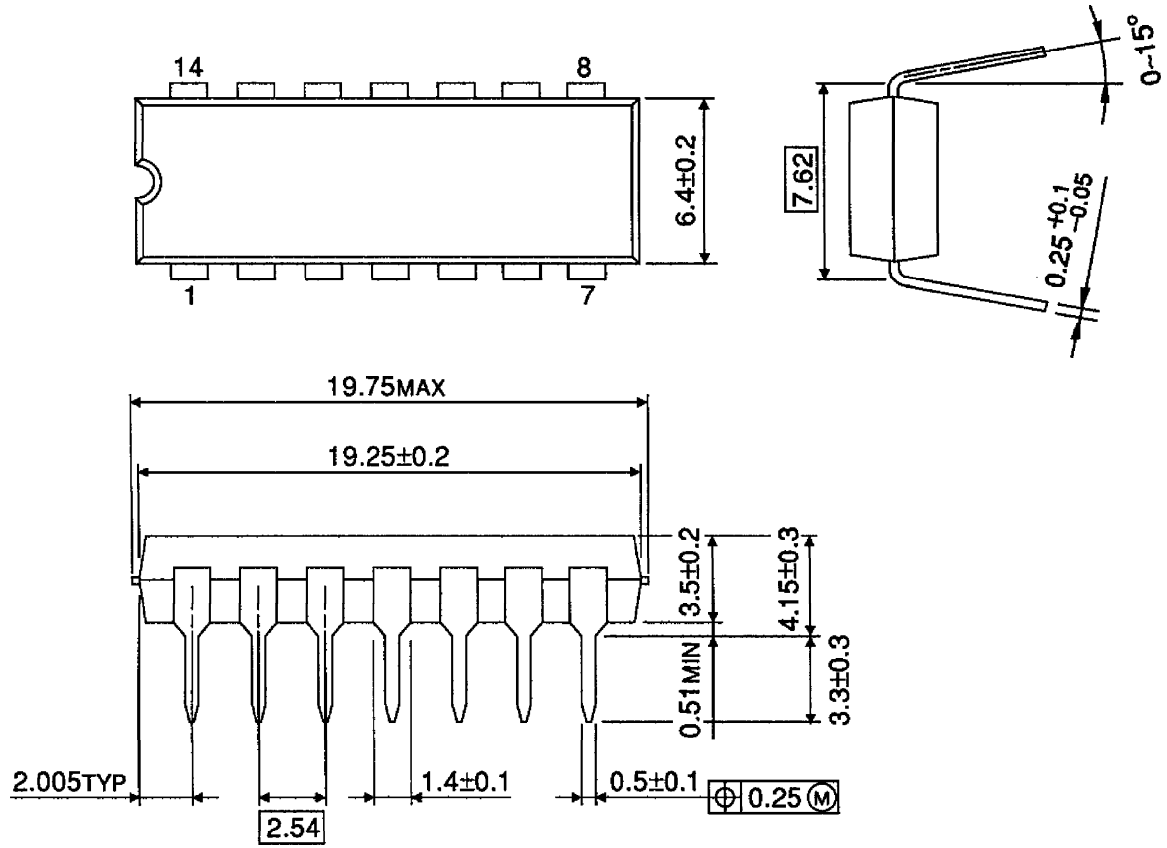
CHARACTERISTICS





PACKAGE DIMENSIONS
DIP14-P-300-2.54

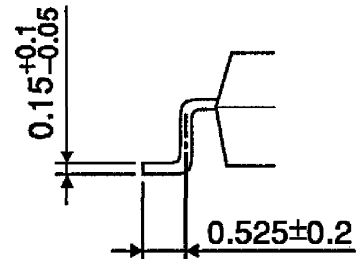
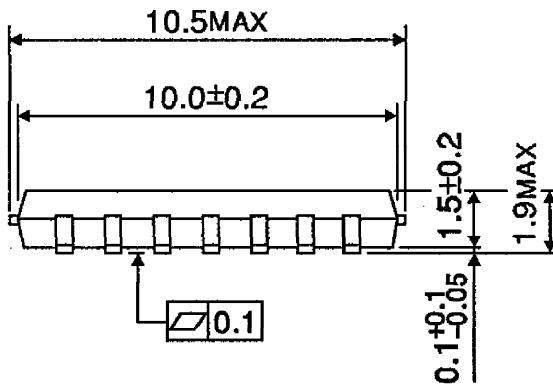
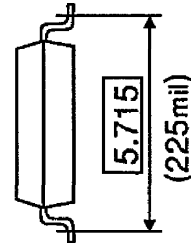
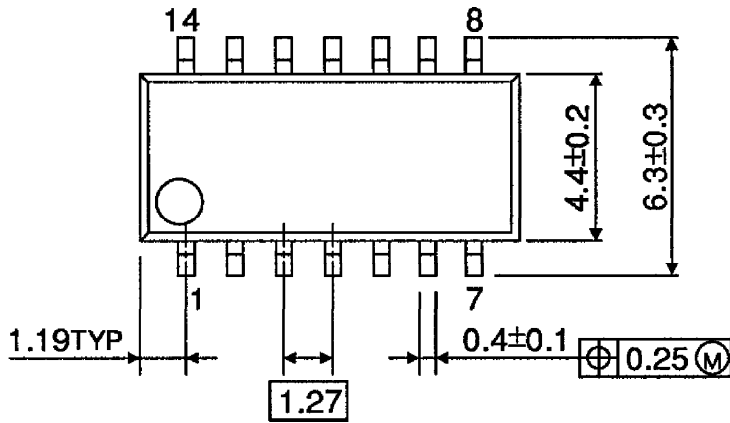
Unit : mm



Weight : 1.0g (Typ.)

PACKAGE DIMENSIONS
SOP14-P-225-1.27

Unit : mm



Weight : 0.2g (Typ.)

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000707EBA

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