

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA75070P

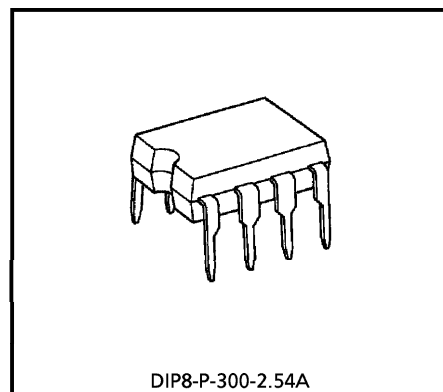
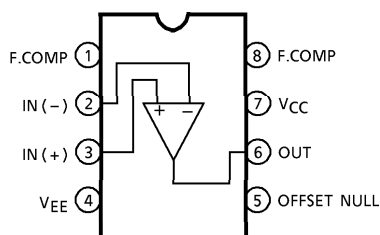
SINGLE OPERATIONAL AMPLIFIER

The TA75070P is a Low-Noise J-FET input operational amplifier with low input bias and offset current, fast slew rate and wide bandwidth. The TA75070P is pin compatible with the TA7506P and 301A allowing designers to immediately upgrade the overall performance of existing designs. The TA75070P is an excellent choice for active filters, integrators and sample-and-hold circuits.

FEATURES

- Low Input Bias Current : 200pA Max.
- Low Input Offset Current : 50pA Max.
- High Slew Rate : $13V / \mu s (A_V = 1)$
- Low Noise : $18nV / \sqrt{Hz}$
- Wide Supply Voltage Range : $\pm 4 \sim \pm 18V$
- Output Short Circuit Protection
- Offset Null Capability

PIN CONNECTION (TOP VIEW)

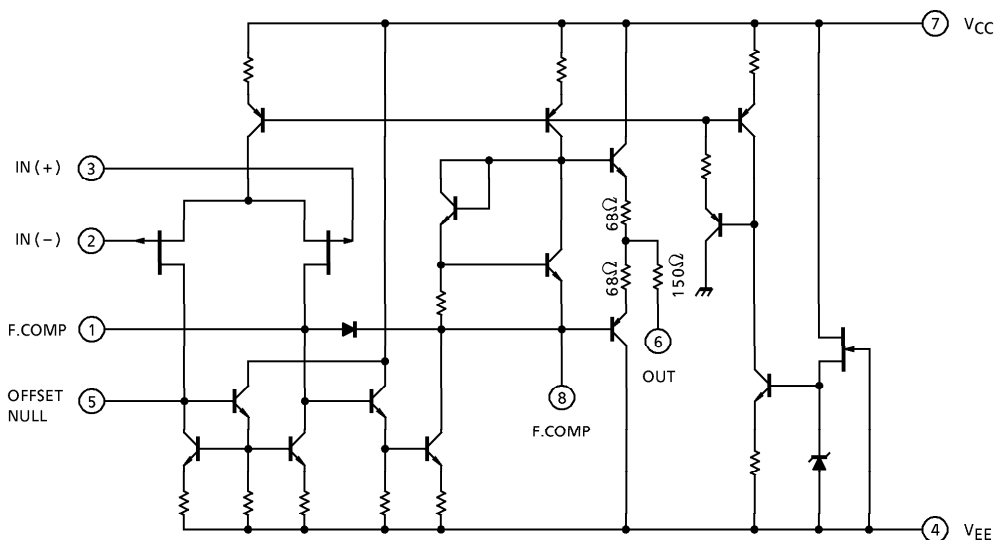


Weight : 0.5g (Typ.)

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EQUIVALENT CIRCUIT



MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|----------------------------|------------------|----------|------|
| Supply Voltage | V _{CC} | + 18 | V |
| | V _{EE} | - 18 | V |
| Differential Input Voltage | DV _{IN} | ± 30 | V |
| Input Voltage | V _{IN} | ± 15 | V |
| Power Dissipation | P _D | 500 | mW |
| Operating Temperature | T _{opr} | - 40~85 | °C |
| Storage Temperature | T _{stg} | - 55~125 | °C |

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

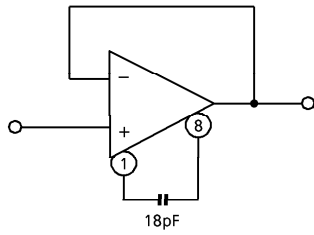
| CHARACTERISTIC | SYMBOL | TEST CIR-CUIT | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|--|---------------------|---------------|--|----------|-----------|------|--------------------|
| Input Offset Voltage | V_{IO} | — | $R_g \leq 10k\Omega$ | — | 3 | 10 | mV |
| TC of Input Offset Voltage | TCV_{IO} | — | — | — | 10 | — | $\mu V / ^\circ C$ |
| Input Offset Current | I_{IO} | — | — | — | 5 | 50 | pA |
| Input Bias Current | I_I | — | — | — | 30 | 200 | pA |
| Common Mode Input Voltage | CMV_{IN} | — | — | ± 11 | ± 12 | — | V |
| Maximum Output Voltage | V_{OM} | — | $R_L = 10k\Omega$ | 24 | — | — | V_{p-p} |
| | V_{OMR} | — | $R_L = 2k\Omega$ | 20 | 24 | — | |
| Voltage Gain (Open Loop) | G_V | — | $V_{OUT} = \pm 10V$, $R_L = 2k\Omega$ | 25 | 200 | — | V / mV |
| Unity Gain Cross Frequency | f_T | — | Open Loop, $R_L = 10k\Omega$ | — | 3 | — | MHz |
| Input Resistance | R_{IN} | — | — | — | 10^{12} | — | Ω |
| Common Mode Input Signal Rejection Ratio | $CMRR$ | — | $R_g \leq 10k\Omega$ | 70 | 76 | — | dB |
| Supply Voltage Rejection Ratio | $SVRR$ | — | $R_g \leq 10k\Omega$ | 70 | 76 | — | dB |
| Supply Current | I_{CC} , I_{EE} | — | Non Load | — | 1.4 | 2.5 | mA |

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

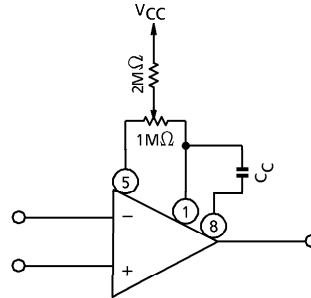
| CHARACTERISTIC | SYMBOL | TEST CIR-CUIT | TEST CONDITION | MIN. | TYP. | MAX. | UNIT | |
|--------------------------------|----------|---------------|---|-----------------------|------|------|----------------|----------------|
| Slew Rate | SR | — | $V_{IN} = 10V_{p-p}$, $R_L = 2k\Omega$, $C_L = 100pF$ | — | 13 | — | V / μs | |
| Equivalent Input Noise Voltage | V_{NI} | — | $R_S = 100\Omega$ | $f = 1kHz$ | — | 18 | — | $nV \sqrt{Hz}$ |
| | | | | $f = 10Hz \sim 10kHz$ | — | 4 | — | μV_{rms} |
| Equivalent Input Noise Current | I_{NI} | — | $R_S = 100\Omega$, $f = 1kHz$ | — | 0.01 | — | $pA \sqrt{Hz}$ | |
| Total Harmonic Distortion | THD | — | $V_{OUT} = 10V_{rms}$, $R_S \leq 1k\Omega$, $R_L \geq 2k\Omega$, $f = 1kHz$ | — | 0.01 | — | % | |

TYPICAL APPLICATION

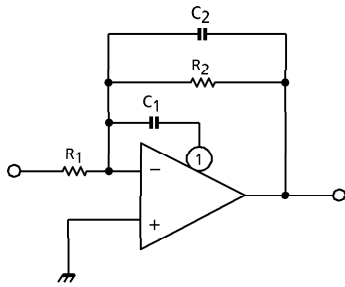
(1) UNITY-GAIN BUFFER



(2) OFFSET NULL CIRCUIT



(3) FEED FORWARD COMPENSATION

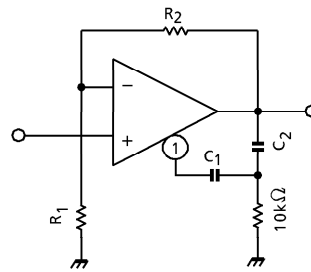


$$C_1 = 500\text{pF}$$

$$C_2 = \frac{1}{2\pi f_o R_2}$$

$$f_o \approx 3\text{MHz}$$

(4) TWO POLE COMPENSATION

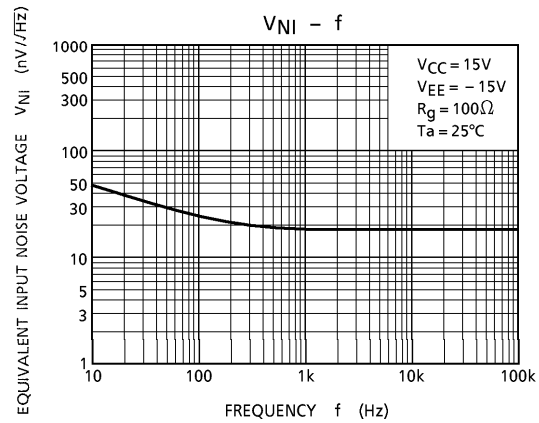
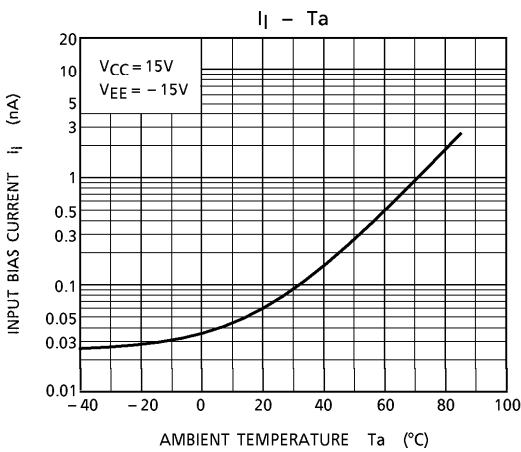
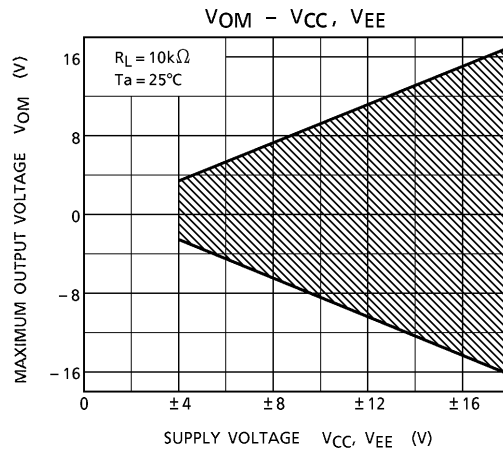
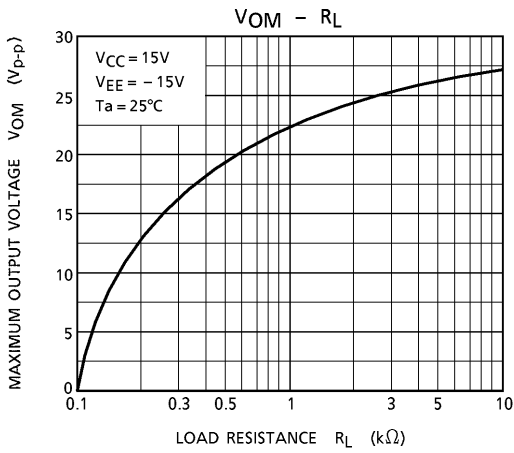
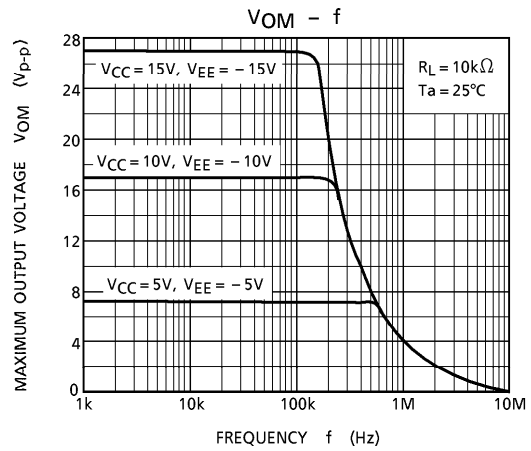
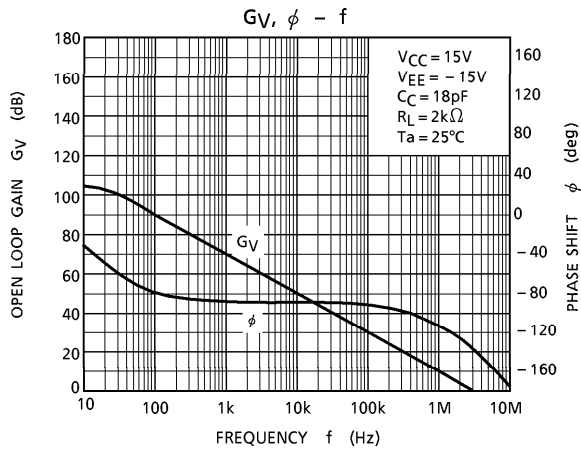


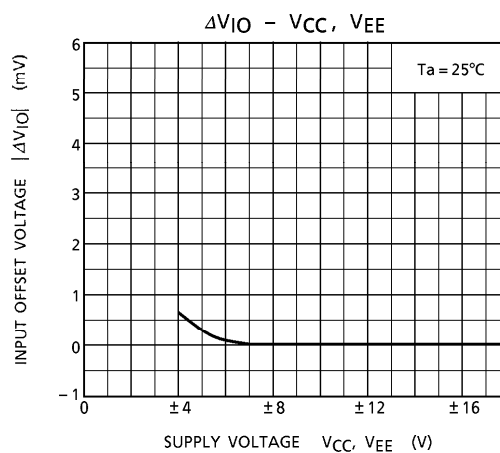
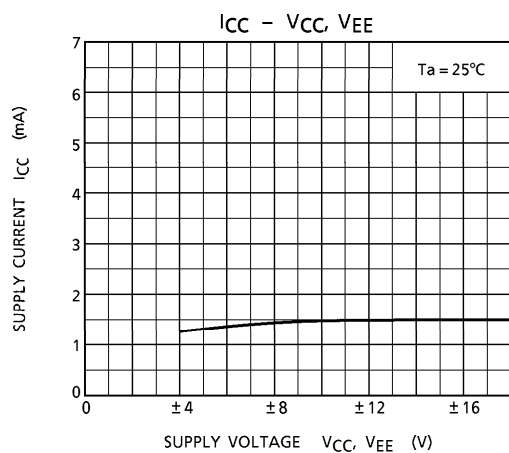
$$C_1 > \frac{R_1}{R_1 + R_2} C_S$$

$$C_S = 18\text{pF}$$

$$C_2 = 10C_1$$

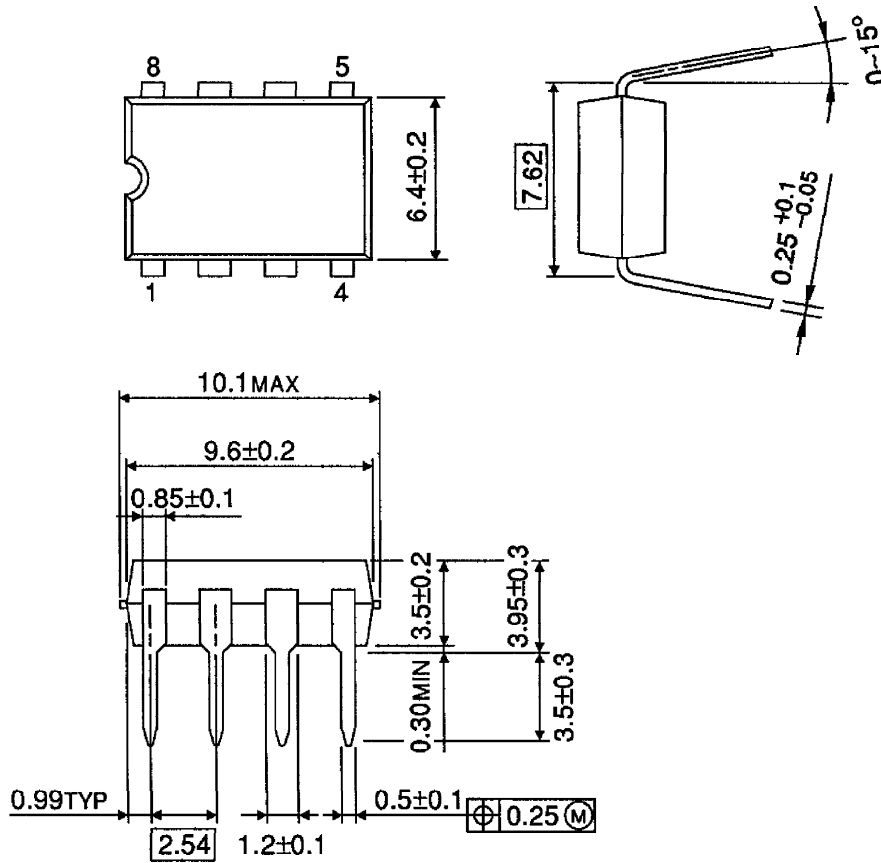
CHARACTERISTICS





OUTLINE DRAWING
DIP8-P-300-2.54A

Unit : mm



Weight : 0.5g (Typ.)