TOSHIBA

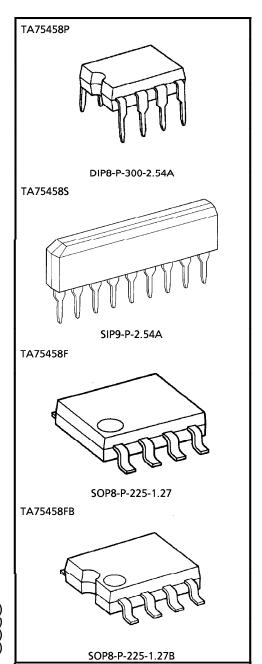
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA75458P, TA75458S, TA75458F, TA75458FB

DUAL OPERATIONAL AMPLIFIER

FEATURES

- Pair of Internally Compensated High Performance Amplifier
- No Frequency Compensation Required
- No Latch-up
- Short Circuit Protection
- Side Common Mode and Differential Voltage Range
- Low Power Consumption



Weight

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

SOP8-P-225-1.27 : 0.1g (Typ.)

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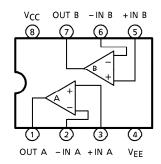
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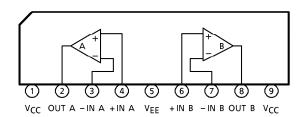
TOSHIBA

PIN CONNECTION (TOP VIEW)

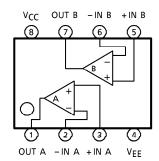
TA75458P



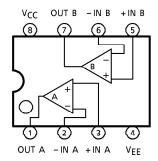
TA75458S



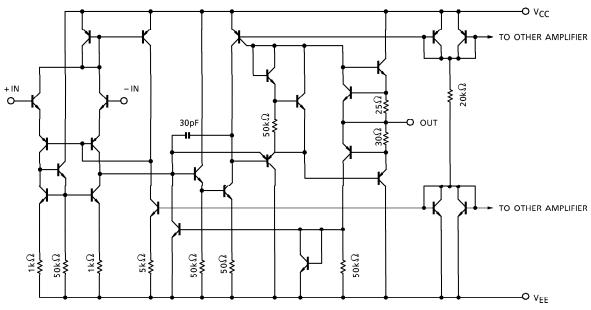
TA75458F



TA75458FB



EQUIVALENT CIRCUIT



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 The information contained herein is subject to change without notice.

MAXIMUM RATINGS (Ta = 25° C)

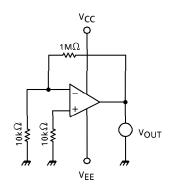
| CHARACTERISTIC | SYMBOL | TA75458P | TA75458S | TA75458F TA75458FB | UNIT |
|----------------------------|-----------------------------------|----------------------------------|----------------------|----------------------------------|------|
| Supply Voltage | V _{CC} , V _{EE} | + 18, - 18 | + 18, - 18 | + 18, - 18 | V |
| Differential Input Voltage | DVIN | ± 30 | ± 30 | ± 30 | V |
| Input Voltage | VIN | V _{CC} ~V _{EE} | $V_{CC} \sim V_{EE}$ | V _{CC} ~V _{EE} | ٧ |
| Power Dissipation | PD | 500 | 400 | 240 | mW |
| Operating Temperature | T _{opr} | - 40∼85 | - 40∼85 | - 30~75 | °C |
| Ambient Temperature | T _{stg} | - 55∼125 | - 55∼125 | - 55∼125 | °C |

ELECTRICAL CHARACTERISTICS ($V_{CC} = 15V$, $V_{EE} = -15V$, Ta = 25°C)

| | | | TEST | | | | | | |
|------------------------------------|-------------------------------|--------------------------|--------------|---|------|------|----------|---------------------------------------|--|
| CHARACTERISTIC | | SYMBOL | CIR- CUIT | TEST CONDITION | MIN. | TYP. | MAX. | UNIT | |
| Input Offset Voltage | | V _{IO} | 1 | $R_g \le 10k\Omega$ | _ | 1 | 5 | mV | |
| Input Offset Current | | lo | 2 | | _ | 20 | 200 | nA | |
| Input Bias Current | | Ц | 2 | | _ | 80 | 500 | nA | |
| Common Mode Input | | CMVIN | 3 | | ± 12 | ± 13 | | V | |
| Voltage | | | | | - 12 | | | \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ | |
| Maximum Output Voltage | | Vом | 4 | $R_L = 10k\Omega$ | ± 12 | ± 14 | _ | V | |
| | | VOMR | 4 | $R_L = 2k\Omega$ | ± 10 | ± 13 | <u> </u> | | |
| Source Current | | I _{source} | 4 | | _ | 20 | _ | mA | |
| Sink Current | | l _{sink} | 4 | | _ | 20 | _ | mA | |
| Differential Input Impedance | Parallel Input Resistance | z _{Di} | _ | f=20Hz Open Loop | 0.3 | 1.0 | _ | МΩ | |
| | Parallel Input Capacitance | Ci | _ | T = 20112 Open Loop | _ | 6.0 | _ | pF | |
| Output Impedance | | Zo | _ | f = 20Hz | _ | 75 | _ | Ω | |
| Voltage Gain (Open Loop) | | GV | 7 | $V_{OUT} = \pm 10V$, $R_L = 2k\Omega$ | 86 | 100 | _ | dB | |
| Common Mo Rejection Ra | de Input Signal tio | CMRR | 3 | f = 100Hz | 70 | 90 | _ | dB | |
| Supply Voltage Rejection Ratio | | SVRR | 1 | $R_g \le 10 k\Omega$ | _ | 30 | 150 | μ V / V | |
| Power Bandwidth | | fW | _ | $G_V = 1$, $R_L = 2k\Omega$ $V_{OUT} = 20V_{p-p}$ | _ | 14 | _ | kHz | |
| Slew Rate | | SR | 6 | $G_V = 1$, $R_L = 2k\Omega$ | _ | 0.8 | _ | V/μs | |
| Unity Gain Cross Frequency | | f _T | 7 | Open Loop | _ | 1.1 | _ | MHz | |
| Power Dissipation | | P_{D} | 5 | V _O = 0V | _ | 70 | 170 | mW | |
| Input Offset Voltage Drift | | $\Delta V_{IO}/\Delta T$ | 1 | $R_g \le 10 k\Omega$, $Ta = -30 \sim 75$ °C | _ | _ | 50 | μ V / °C | |
| Supply Current | | ICC, IEE | 5 | - | _ | 2.3 | 5.6 | mA | |

TEST CIRCUIT

(1) V_{IO} , ΔV_{IO} / ΔT , SVRR



$$V_{IO} = V_{OUT} / 100 (V)$$

$$\Delta V_{IO} / \Delta T = \{V_{IO} (25^{\circ}C) - V_{IO} (-30^{\circ}C)\} / 55 (V / {^{\circ}C})$$

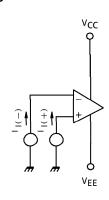
$$\Delta V_{|O} / \Delta T = \{V_{|O} (75^{\circ}C) - V_{|O} (25^{\circ}C)\} / 50 (V / {^{\circ}C})$$

$$SVRR = (V_{IO1} - V_{IO2}) / 5 (\mu V / V)$$

 V_{IO1} : V_{CC} , AT $V_{EE} = \pm 17.5V$

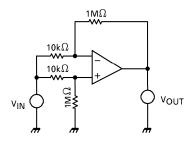
 V_{IO2} : V_{CC} , At $V_{EE} = \pm 12.5V$

(2) ||, ||0



$$|IO = |II(+) - II(-)|$$

(3) CMV_{IN}, CMRR



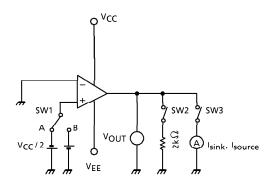
 CMV_{IN} : $V_{OUT} = \pm 1V (DC)$

V_{IN} = MEASURE

CMRR: RATIO OF Gdiff vs GCM

 $CMRR = 20 \ell og \frac{G_{diff}}{G_{CM}} (dB)$

(4) VOM, VOMR, Isink, Isource



V_{OM}(+) : SW1 IS SIDE B, SW2 OFF, SW3 OFF

 $V_{\mbox{OM}}\,(\,\text{-}\,)$: SW1 IS SIDE A, SW2 OFF, SW3 OFF

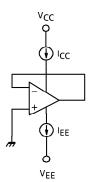
 $\mbox{V}_{\mbox{OMR}}\,\mbox{(+)}$: SW1 IS SIDE B, SW2 ON, SW3 OFF

 $V_{\mbox{OMR}}$ (–) : SW1 IS SIDE A, SW2 ON, SW3 OFF

 I_{sink} : SW1 IS SIDE A, SW2 OFF, SW3 ON

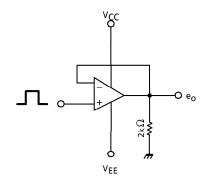
I_{source}: SW1 IS SIDE B, SW2 OFF, SW3 ON

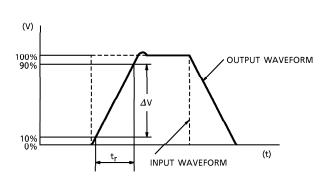
(5) I_{CC}, I_{EE}, P_D



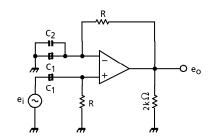
$$P_D = V_{CC} \cdot I_{CC} + V_{EE} \cdot I_{EE}$$
 (W)

(6) SR





(7) G_V, f_T



 G_V

 $R \gg 1 / WC_1$

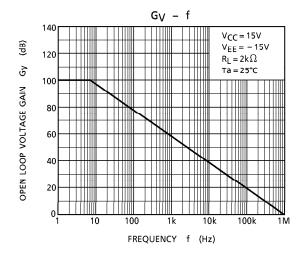
C₁: COUPLING CONDENSER

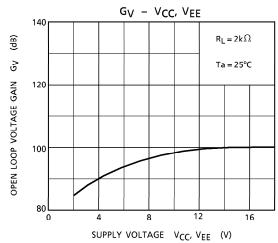
 ${
m C_2}: {
m HIGH} {
m FREQUENCY} {
m BYPASS} {
m CONDENSER} \ {
m 0.1} \mu {
m F}$

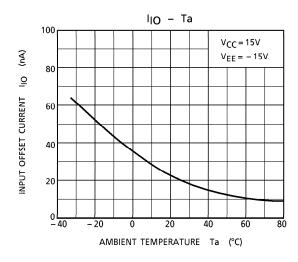
 $G_V = 20 \ell og e_O / e_i (dB)$

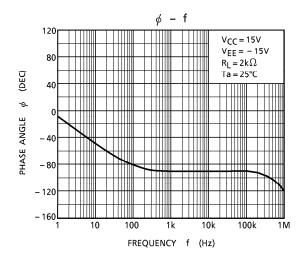
 f_T INPUT FREQUENCY AT $e_i = e_o$

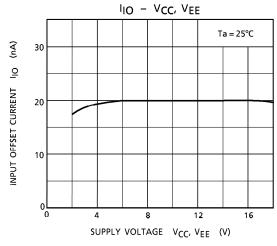
CHARACTERISTICS

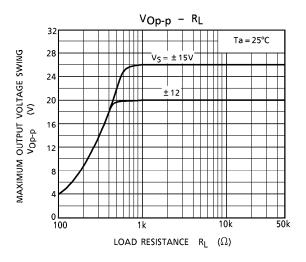


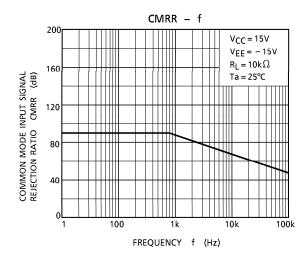


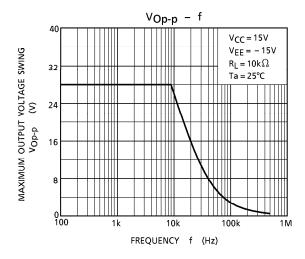


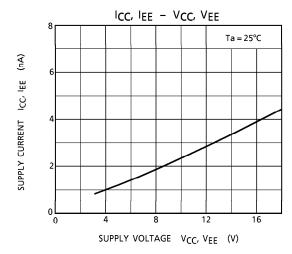


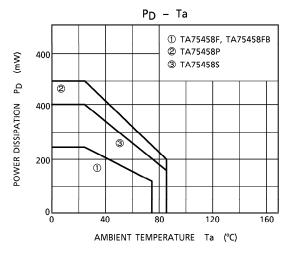










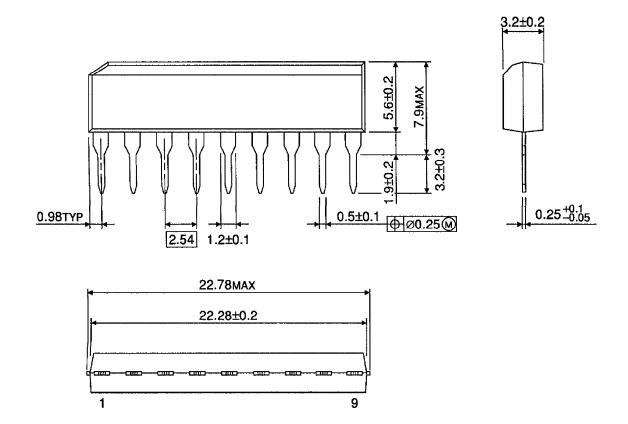


OUTLINE DRAWING DIP8-P-300-2.54A Unit : mm 10.1MAX 9.6±0.2 0.99TYP 2.54 1.2±0.1

Weight: 0.5g (Typ.)

OUTLINE DRAWING

SIP9-P-2.54A Unit: mm

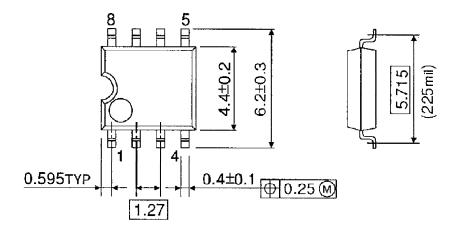


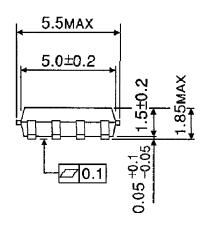
Weight: 0.9g (Typ.)

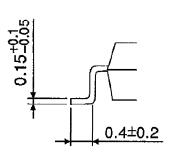
Weight: 0.1g (Typ.)

OUTLINE DRAWING

SOP8-P-225-1.27B Unit: mm







Weight: 0.1g (Typ.)