#### TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

# **TA7272P**

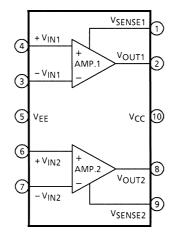
#### **DUAL POWER OPERATIONAL AMPLIFIER**

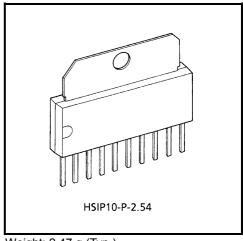
The TA7272P is a dual power operational amplifier. It is intended for use especially DC MOTOR positioning system applications, such as Arm Driver (for Audiodisk Players), head or voice coil motor drivers (for Floppy and Winchester Disk Drivers) and any other power driver applications.

#### **FEATURES**

- HSIP 10 Pin Power Package Capsealed.
- Build-in Over Current Protector.
- Few External Parts Required.
- Output Current Up to 1.2 A (PEAK)
- Excellent Crosstalk Characteristics.

### **BLOCK DIAGRAM**





Weight: 2.47 g (Typ.)

### **PIN FUNCTION**

PIN No.	SYMBOL	FUNCTIONAL DESCRIPTION		
1	V <sub>SENSE1</sub>	Amp.1 output current detection terminal		
2	V <sub>OUT1</sub>	Amp.1 output terminal		
3	-V <sub>IN1</sub>	Amp.1 input terminal (-)		
4	+V <sub>IN1</sub>	Amp.1 input terminal (+)		
5	V <sub>EE</sub>	Negative-side power supply terminal		
6	+V <sub>IN2</sub>	Amp.2 input terminal (+)		
7	-V <sub>IN2</sub>	Amp.2 input terminal (-)		
8	V <sub>OUT2</sub>	Amp.2 output terminal		
9	V <sub>SENSE2</sub>	Amp.2 output current detection terminal		
10	V <sub>CC</sub>	Positive-side power supply terminal		

### **MAXIMUM RATINGS (Ta = 25°C)**

CHARACTERISTIC	SYMBOL	RATING	UNIT	
Supply Voltage	$V_{CC,}V_{EE}$	±18	V	
Output Current	I <sub>O</sub> (PEAK)	1.2 (Note)	Α	
Power Dissipation	P <sub>D</sub>	12.5	W	
Operating Temperature	Topr	-30~75	°C	
Storage Temperature	T <sub>stg</sub>	-55~150	°C	

Note: See V<sub>CC</sub> - I<sub>O (AVE)</sub> MAX. Characteristics

Tc = 25°C

### **ELECTRICAL CHARACTERISTICS**

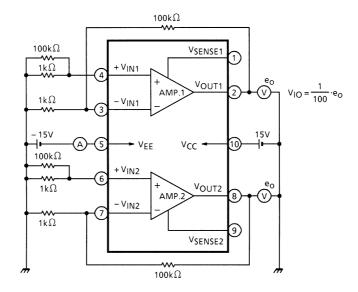
(Unless otherwise specified,  $V_{CC}$  = 15 V,  $V_{EE}$  = -15 V, Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CIR- CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Quiescent Current		Icc	1	_	_	20	35	mA
Input Off Set Current		I <sub>IO</sub>	2	_	_	2	100	nA
Input Bias Current		lı	2	_	_	50	300	nA
Input Off Set Voltage		V <sub>IO</sub>	1	_	_	1.0	7.0	mV
Output Voltage Swing	Upper	V <sub>OH</sub>	3	V <sub>CC</sub> = ± 15 V, I <sub>O</sub> = 300 mA	11.5	12.1	_	V
	Lower	V <sub>OL</sub>			-11.5	-12.3	_	
	Upper	V <sub>OH</sub>	- 3	V <sub>CC</sub> = ± 6 V, I <sub>O</sub> = 1 A	2.2	3.3	_	V
	Lower	V <sub>OL</sub>			-2.2	-3.7	_	
Open Loop Gain		G <sub>VO</sub>	4	_	_	90	_	dB
Input Common Mode Voltage Range		CMR	5	_	±13	±14	_	V
Common Mode Rejection Ratio		CMRR	5	V <sub>IN</sub> = −10~10 V	90	95	_	dB
Supply Voltage Rejection Ratio		SVRR	5	V <sub>CC</sub> = -V <sub>EE</sub> = 6~15V ± 1 V	_	45	125	μV/V
Slew Rate		SR	6	_	_	0.4	_	V / µs
Short Circuit Current		I <sub>SC</sub>	7	R <sub>SC</sub> = 0.68 Ω	0.8	1.0	_	Α
Cross Talk		C <sub>T</sub>	5	V <sub>IN</sub> = -14~14 V	_	60	_	dB

2

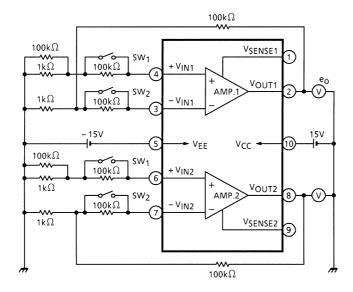
## TEST CIRCUIT 1

Icc, Vio



### **TEST CIRCUIT 2**

 $I_{I^+},\,I_{I^-},\,I_{IO}$ 



When SW1 and SW2 are closed, the measured value is VM1. When II + SW1 is closed and SW2 is open, the measured value is VM2.

$$I_{I} + = \frac{V_{M2} - V_{M1}}{100 \,\mathrm{k}} \cdot \frac{1}{100}$$

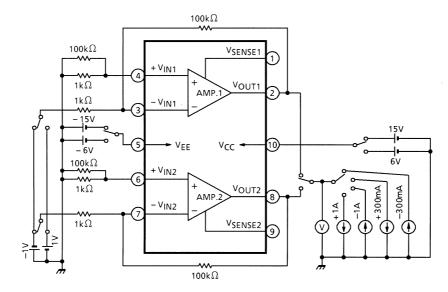
When  $I_I$  –  $SW_1$  is open and  $SW_2$  is closed, the measured value is  $V_{M3}$ .

$$I_{I+} = \frac{V_{M3} - V_{M1}}{100 \,\mathrm{k}} \cdot \frac{1}{100}$$

When IIO  $SW_1$ ,  $SW_2$  is open, the measured value is  $V_{M4}$ .

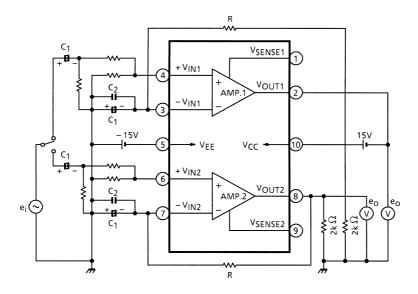
$$I_{IO} = \frac{V_{M4} - V_{M1}}{100 \,\mathrm{k}} \cdot \frac{1}{100}$$

# TEST CIRCUIT 3 V<sub>OH</sub>, V<sub>OL</sub>



Set  $V_{CC}$  =  $-V_{EE}$  = 15 V, then  $I_{O}$  = 300 mA Set  $V_{CC}$  =  $-V_{EE}$  = 6 V, then  $I_{O}$  = 1 A

# TEST CIRCUIT 4 G<sub>VO</sub>



4

 $\mathrm{GVO} = 20~\mathrm{log~e_o} \, / \, \mathrm{e_i}$ 

 $R \gg 1 / WC1$ 

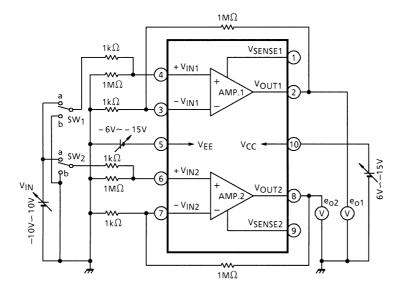
 $C_1$ : obstruction direct current short-circuit

C2: radio frequency short-circuit.

Mica or Titanium capacitor use.

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### TEST CIRCUIT 5 CMR, CMRR, SVRR, CT



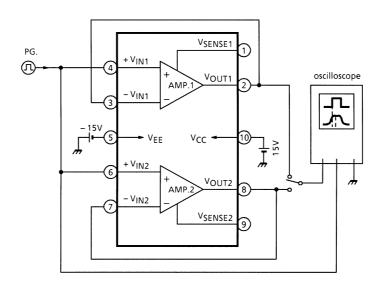
CMR:  $V_{\mbox{\scriptsize IN}}$  valve where a change in  $V_{\mbox{\scriptsize IN}}$  does not couse  $e_0$  to operate.

$$CMRR = 20log_{10} \frac{\Delta e_0}{\Delta V_{IN}}$$

$$SVRR = 20 log_{10} \ \frac{\Delta e_o}{\Delta V_{CC}} \ or = 20 log_{10} \ \frac{\Delta e_o}{\Delta V_{EE}} \ (V_{IN} = 0 \ V)$$

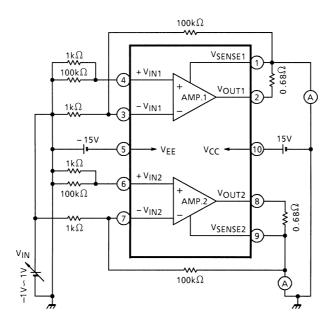
$$\mathrm{C_{T}} = 20 \log_{10} \ \frac{\Delta \mathrm{e_{o1}}}{\Delta \mathrm{V_{IN}}} (\mathrm{SW_{1}} : \mathrm{b, SW_{2}} : \mathrm{a}) \ \mathrm{or} = 20 \log_{10} \ \frac{\Delta \mathrm{e_{o2}}}{\Delta \mathrm{V_{IN}}} \ (\mathrm{SW_{1}} : \mathrm{a, SW_{2}} : \mathrm{b})$$

### TEST CIRCUIT 6 SR



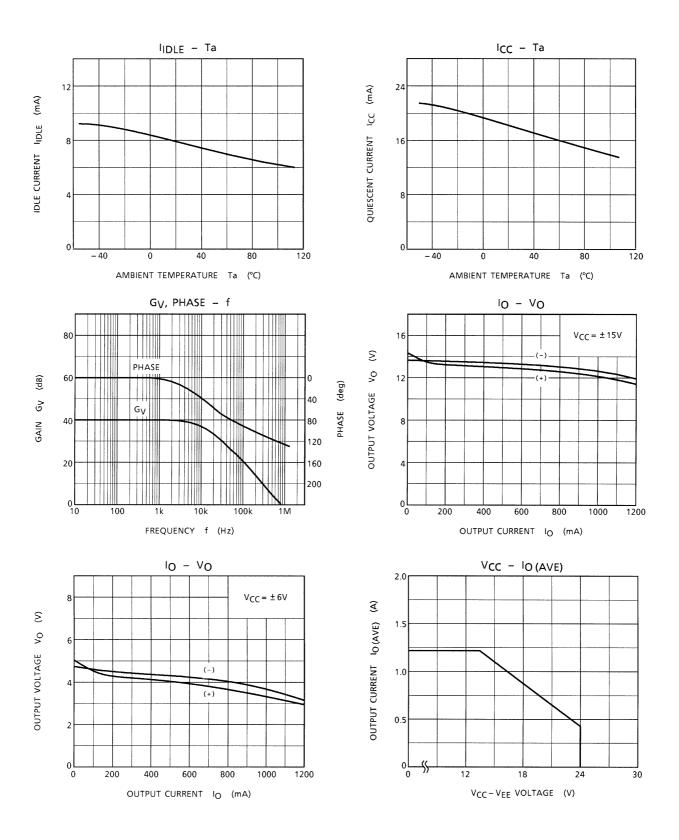
5

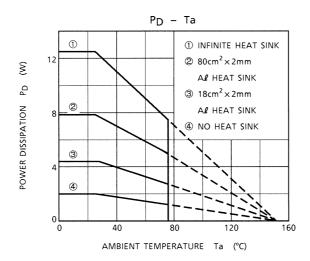
# TEST CIRCUIT 7 Isc



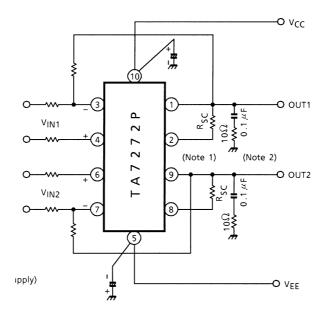
Isc = V<sub>M</sub> / 0.68  $\Omega$ 

V<sub>M</sub>: V<sub>IN</sub> detection resistance voltage when a change in V<sub>IN</sub> triggers the current delimiter.





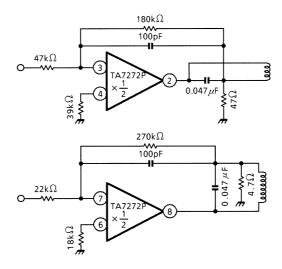
### **APPLICATION CIRCUIT 1**



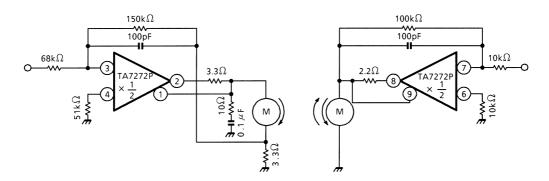
Note 1: 
$$I_{SC} \approx \frac{0.7 \text{ (V)}}{R_{SC}(\Omega)}$$
 (A)

Note 2: When crossover distortion becomes, noticeable at frequencies higher than 80 kHz, change the valve of the capacitor, which functions as a compensating circuit, to about 0.33  $\mu$ F, In this case, resistor is not needed.

### **APPLICATION CIRCUIT 2 (Actuator)**



### **APPLICATION CIRCUIT 3 (Speed and carriage control)**

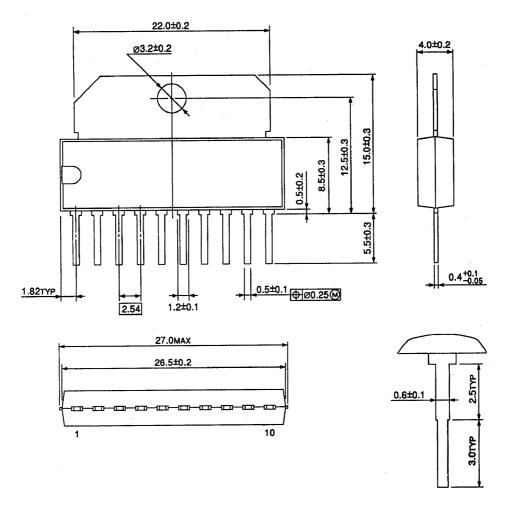


Note: Utmost care is necessary in the design of the output line, V<sub>CC</sub>, V<sub>EE</sub> and GND line since IC may be destroyed due to short–circuit between outputs, air contamination fault, or fault by improper grounding.



### **PACKAGE DIMENSIONS**

HSIP10-P-2.54 Unit: mm



Weight: 2.47 g (Typ.)

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