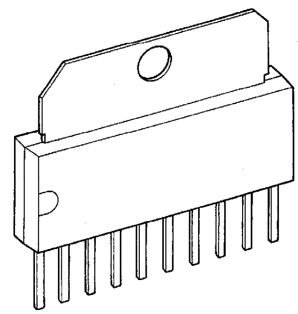
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

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.



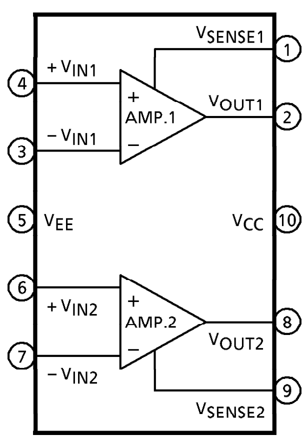
HSIP10-P-2.54

Weight : 2.47g (Typ.)

FEATURES

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

BLOCK DIAGRAM



PIN FUNCTION

PIN No.	SYMBOL	FUNCTIONAL DESCRIPTION
1	V_{SENSE1}	Amp.1 output current detection terminal
2	V_{OUT1}	Amp.1 output terminal
3	$-V_{IN1}$	Amp.1 input terminal (−)
4	$+V_{IN1}$	Amp.1 input terminal (+)
5	V_{EE}	Negative-side power supply terminal
6	$+V_{IN2}$	Amp.2 input terminal (+)
7	$-V_{IN2}$	Amp.2 input terminal (−)
8	V_{OUT2}	Amp.2 output terminal
9	V_{SENSE2}	Amp.2 output current detection terminal
10	V_{CC}	Positive-side power supply terminal

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}, V_{EE}	±18	V
Output Current	$I_{O\ (PEAK)}$	1.2 (Note)	A
Power Dissipation	P_D	12.5	W
Operating Temperature	T_{opr}	−30~75	°C
Storage Temperature	T_{stg}	−55~150	°C

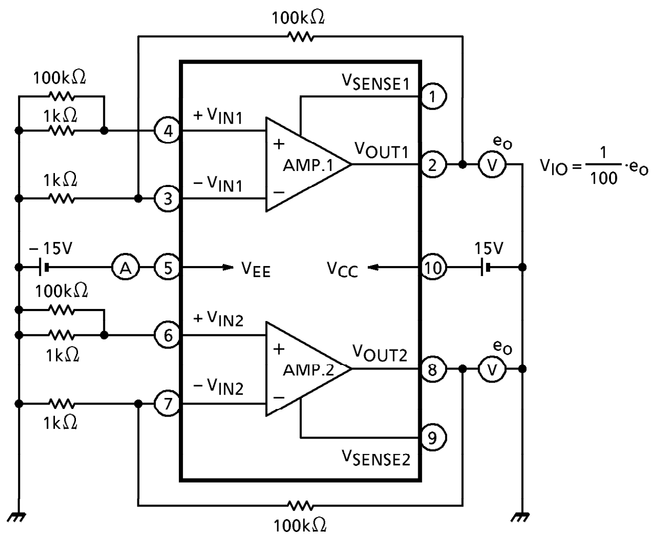
(Note) See $V_{CC}-I_{O\ (AVE)}$ MAX. Characteristics
Tc = 25°C

ELECTRICAL CHARACTERISTICS (Unless otherwise specified, V_{CC} = 15V, V_{EE} = −15V, Ta = 25°C)

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

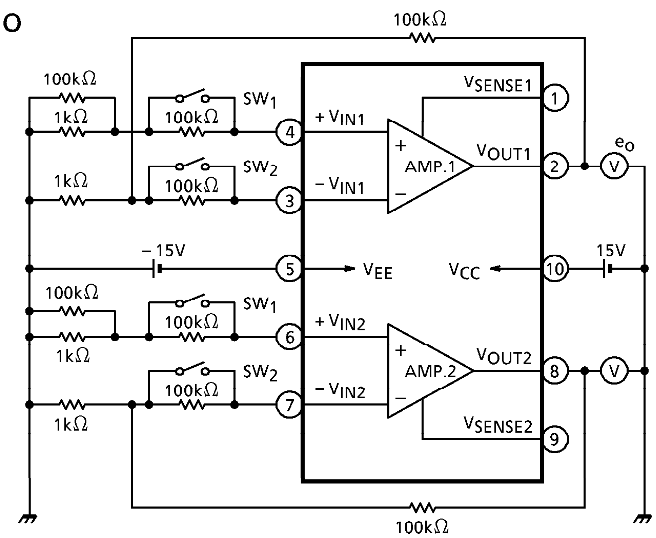
TEST CIRCUIT 1

I_{CC}, V_{IO}



TEST CIRCUIT 2

I_I+, I_I-, I_{IO}



When SW_1 and SW_2 are closed, the measured value is V_{M1}.

When I_I+ SW_1 is closed and SW_2 is open, the measured value is V_{M2}.

$$I_I+ = \frac{V_{M2} - V_{M1}}{100k} \cdot \frac{1}{100}$$

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

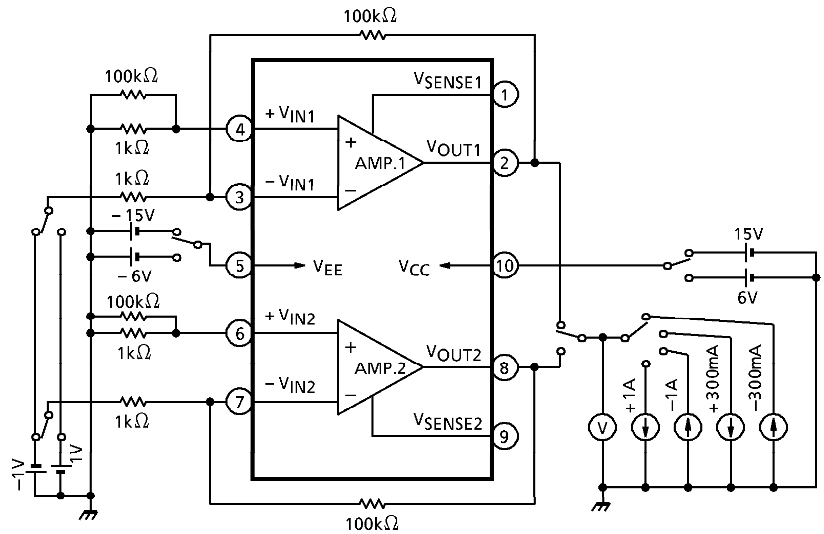
$$I_I+ = \frac{V_{M3} - V_{M1}}{100k} \cdot \frac{1}{100}$$

When I_{IO} SW_1, SW_2 is open, the measured value is V_{M4}.

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

TEST CIRCUIT 3

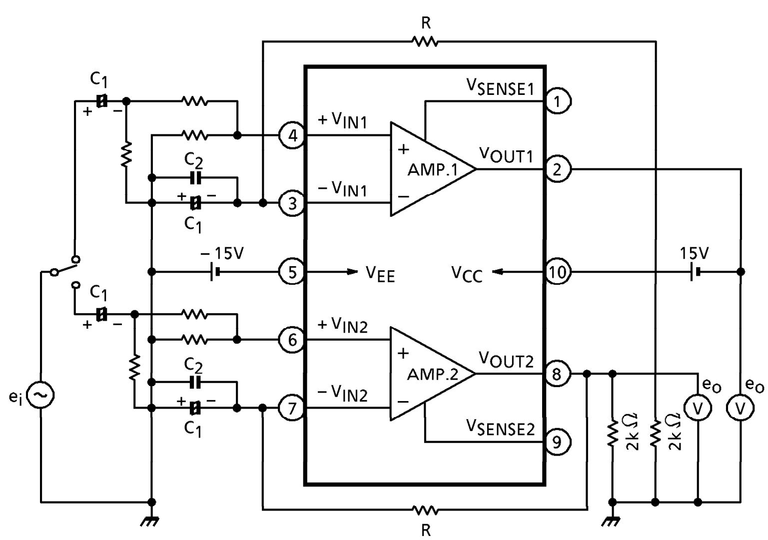
V_{OH}, V_{OL}



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

TEST CIRCUIT 4

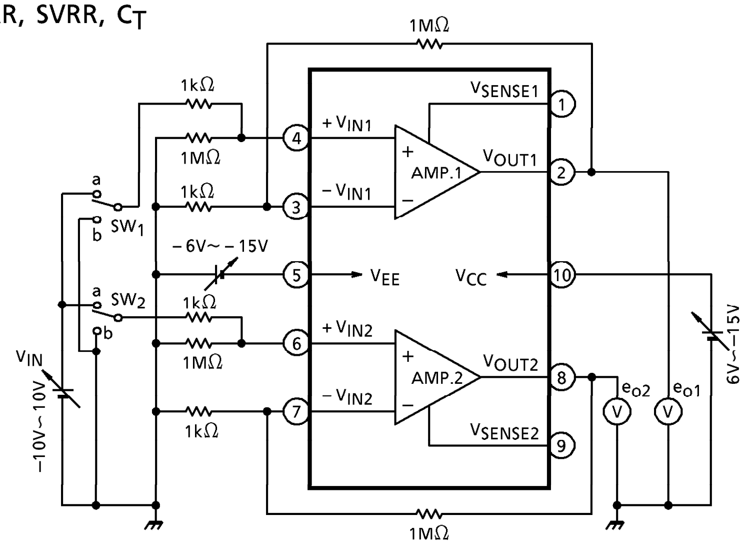
G_{VO}



$G_{VO} = 20\ell og\ e_o / e_i$
$R \gg 1 / WC1$
C_1 : obstruction direct current short-circuit
C_2 : radio frequency short-circuit.
Mica or Titanium capacitor use.

TEST CIRCUIT 5

CMR, CMRR, SVRR, C_T



CMR : V_{IN} valve where a change in V_{IN} does not couse e_o to operate.

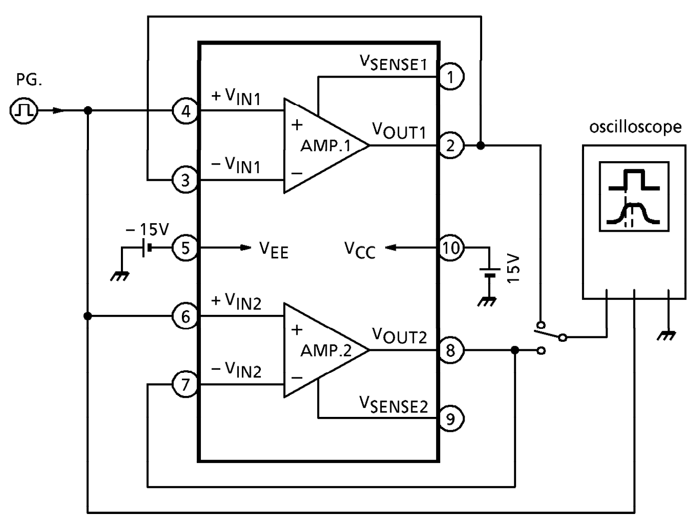
$$CMRR = 20\ell og_{10}\frac{\Delta e_o}{\Delta V_{IN}}$$

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

$$C_T = 20\ell og_{10}\frac{\Delta e_{o1}}{\Delta V_{IN}}\ (SW_1 : b,\ SW_2 : a) \text{ or } = 20\ell og_{10}\frac{\Delta e_{o2}}{\Delta V_{IN}}\ (SW_1 : a,\ SW_2 : b)$$

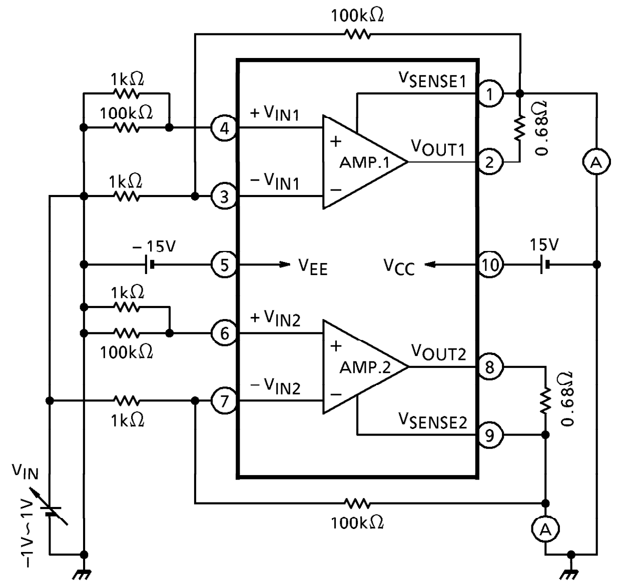
TEST CIRCUIT 6

SR



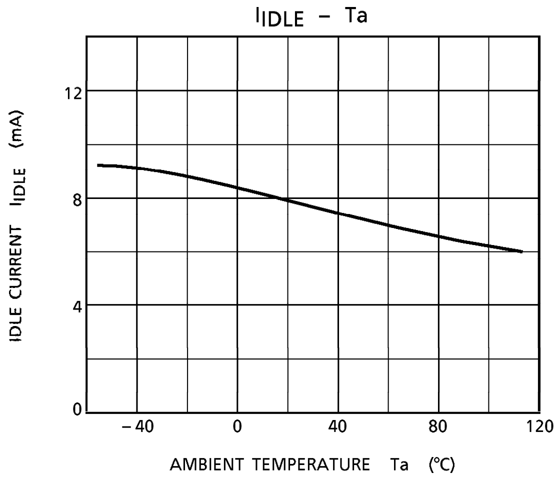
TEST CIRCUIT 7

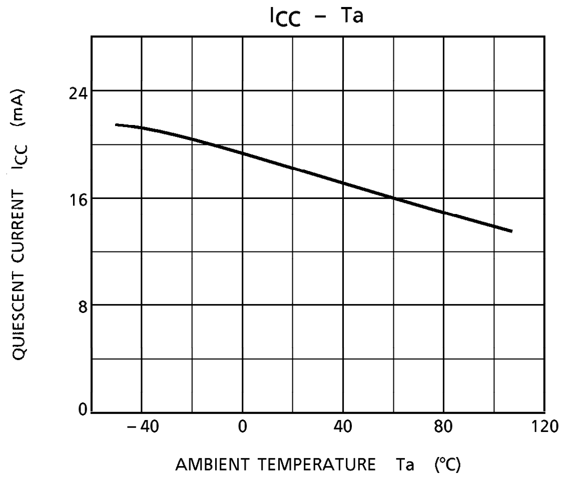
I_{SC}

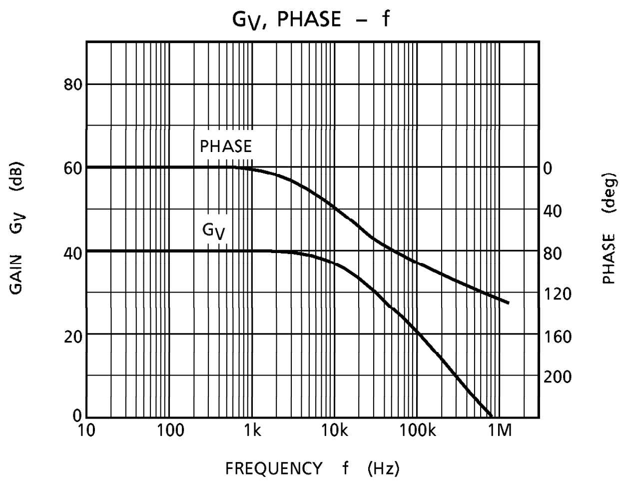


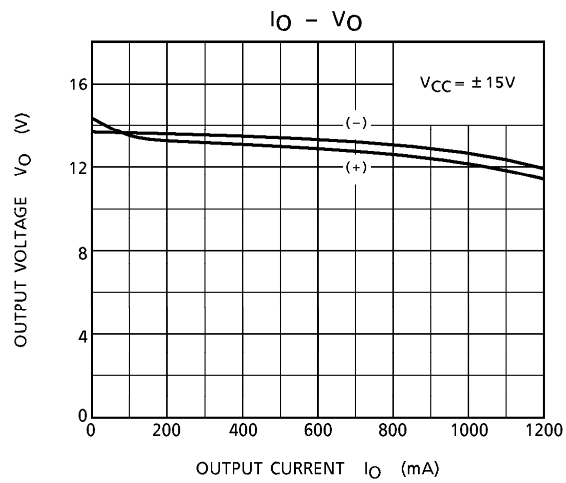
$I_{SC} = V_M / 0.68\Omega$

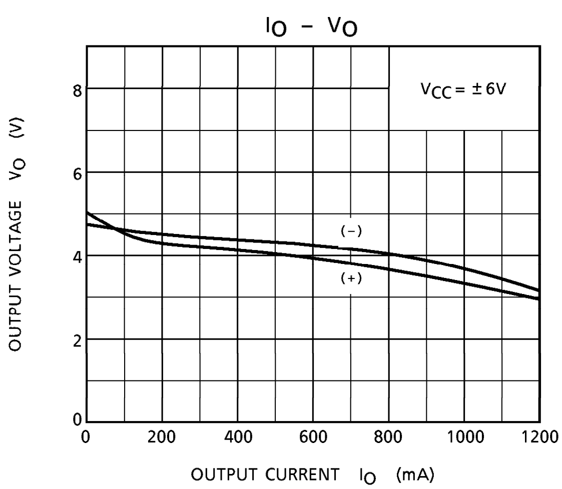
V_M : V_{IN} detection resistance voltage when a change in V_{IN} triggers the current delimiter.

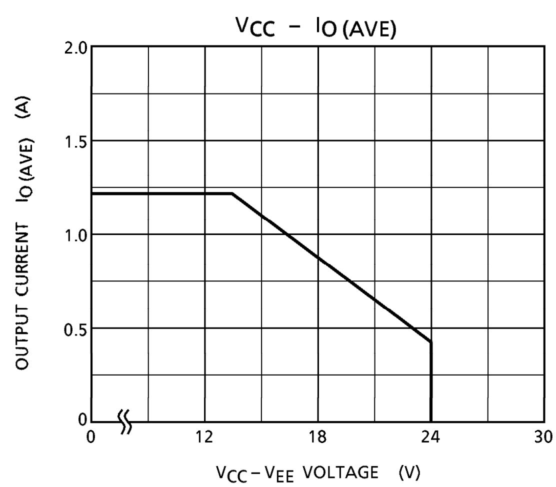

IIDLE – Ta
IDLE CURRENT IIDLE (mA)
12
8
4
0
– 40
0
40
80
120
AMBIENT TEMPERATURE Ta (°C)

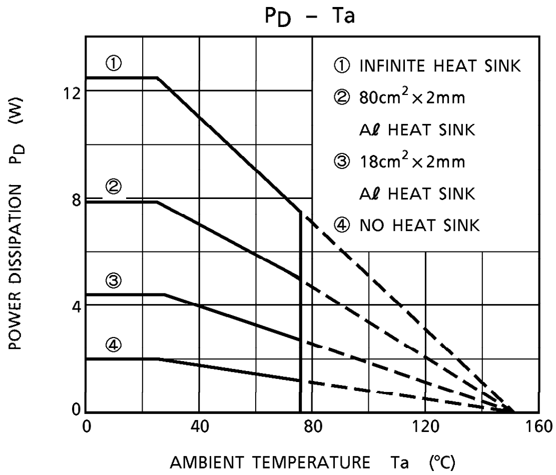

ICC – Ta
QUIESCENT CURRENT ICC (mA)
24
16
8
0
– 40
0
40
80
120
AMBIENT TEMPERATURE Ta (°C)


GV, PHASE – f
GAIN GV (dB)
PHASE (deg)
PHASE
GV
80
60
40
20
0
0
40
80
120
160
200
10
100
1k
10k
100k
1M
FREQUENCY f (Hz)

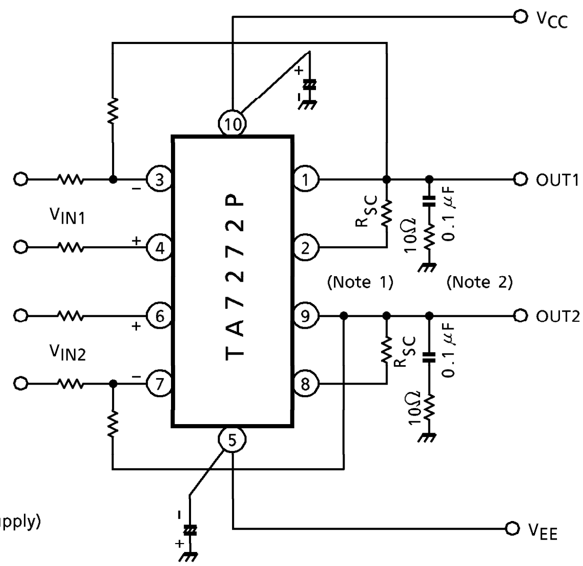

IO – VO
VCC = ± 15V
(–)
(+)
OUTPUT VOLTAGE VO (V)
16
12
8
4
0
0
200
400
600
800
1000
1200
OUTPUT CURRENT IO (mA)


IO – VO
VCC = ± 6V
(–)
(+)
OUTPUT VOLTAGE VO (V)
8
6
4
2
0
0
200
400
600
800
1000
1200
OUTPUT CURRENT IO (mA)


VCC – IO (AVE)
OUTPUT CURRENT IO (AVE) (A)
2.0
1.5
1.0
0.5
0
0
12
18
24
30
VCC – VEE VOLTAGE (V)



APPLICATION CIRCUIT 1

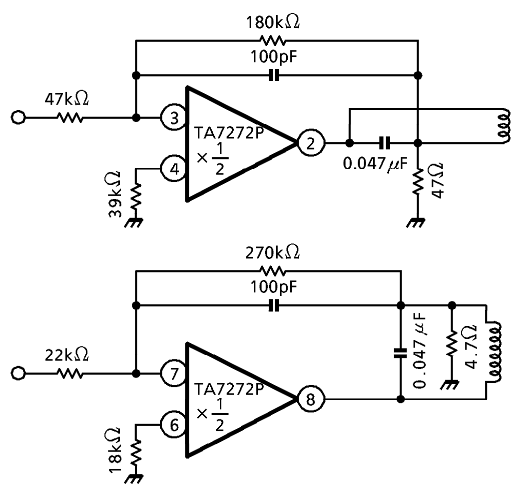


(Usable at a Single Power Supply)

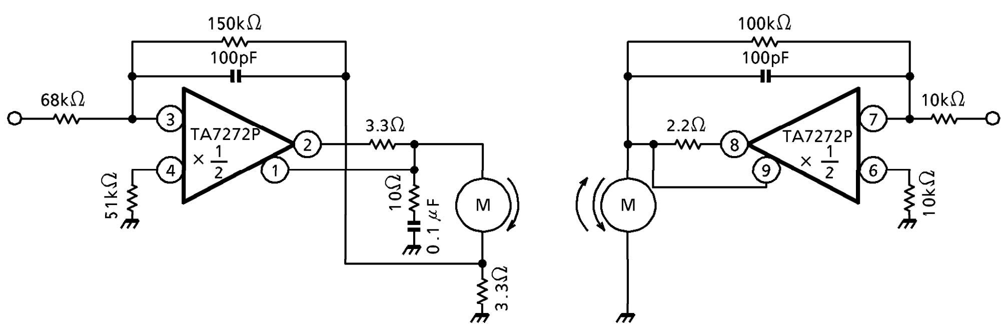
(Note 1) $I_{SC} \fallingdotseq \frac{0.7\ (V)}{R_{SC}\ (\Omega)}$ (A)

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

APPLICATION CIRCUIT 2 (Actuator)



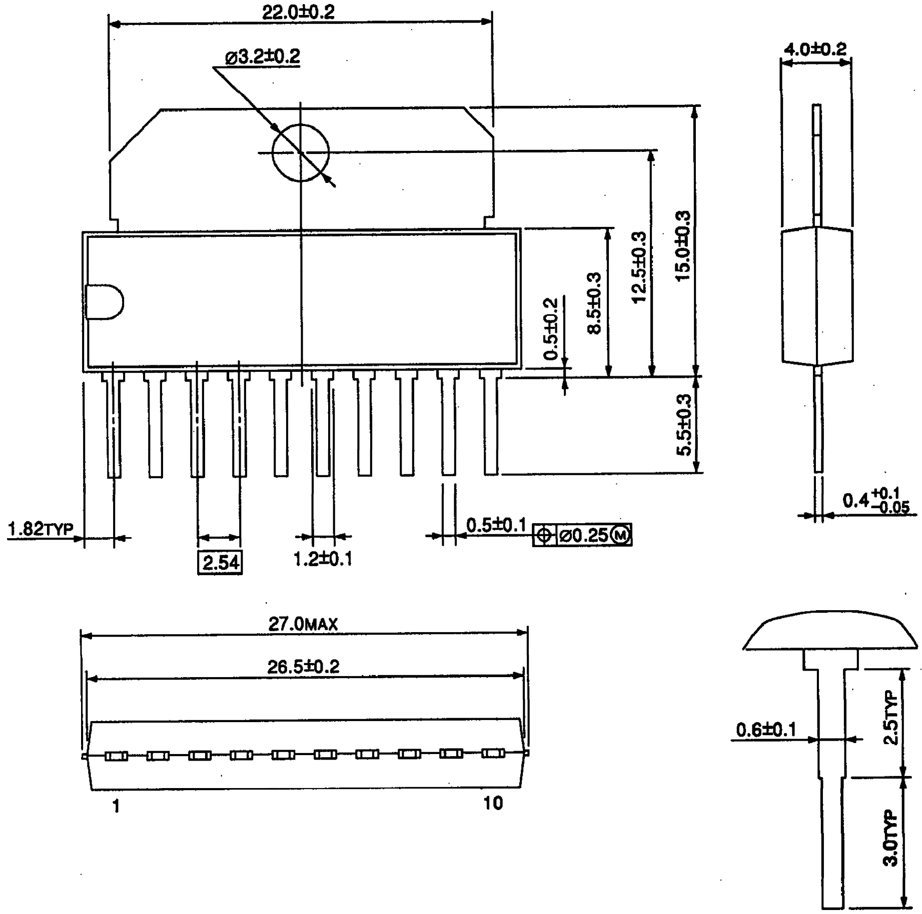
APPLICATION CIRCUIT 3 (Speed and carriage control)



(Note) Utmost care is necessary in the design of the output line, V_{CC}, V_{EE} and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.

OUTLINE DRAWING

HSIP10-P-2.54 Unit : mm



Weight : 2.47g (Typ.)