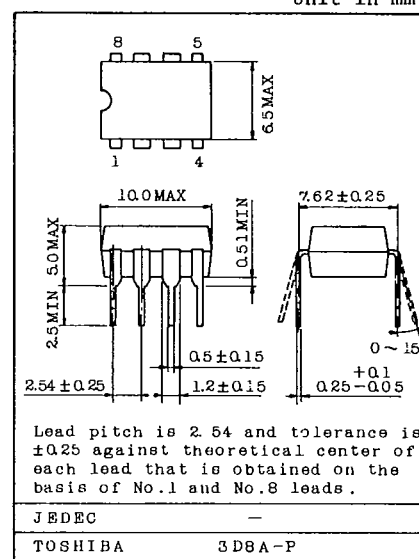


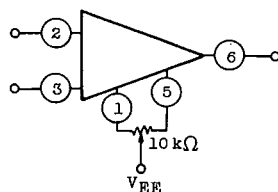
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SINGLE OPERATIONAL AMPLIFIER
OPERATIONAL AMPLIFIER
DC AMPLIFIER

- . High Gain : $G_V = 1 \times 10^5$ (Typ.)
- . Low Power Dissipation : $P_D = 50\text{mW}$ (Typ.)
- . High Common Mode Input Voltage : $CMV_{IN} = \pm 13\text{V}$ (Typ.)
- . High Differential Input Voltage: $DV_{IN} = 30$ (Typ.)
- . Low Input Offset Voltage : $V_{IO} = 1\text{mV}$ (Typ.)
- . No Frequency Compensation
- . Absence of Latch-up
- . Offset Null Capability
- . Short Circuit Protection

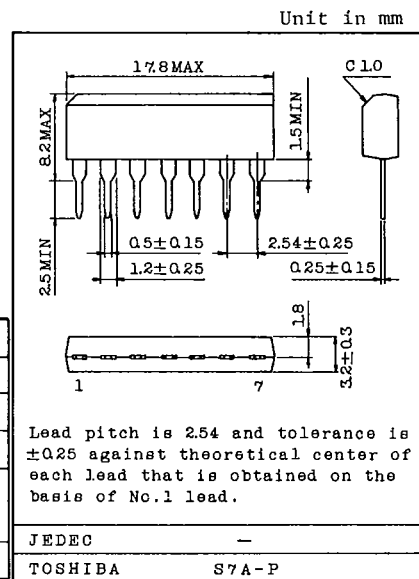


VOLTAGE OFFSET NULL CIRCUIT



MAXIMUM RATINGS (T_a=25°C)

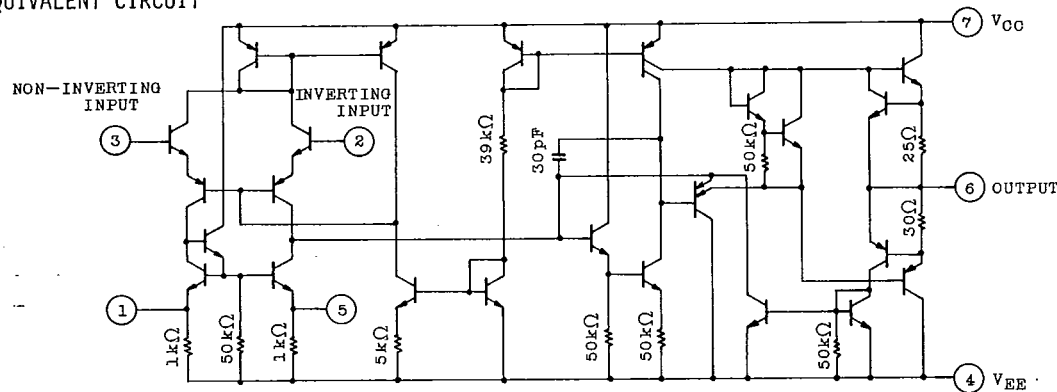
CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V_{CC}, V_{EE}	± 18	V
Differential Input Voltage		DV_{IN}	± 30	V
Input Voltage		V_{IN}	$V_{CC} \sim V_{EE}$	V
Power Dissipation	TA7504P	P_D	300	mW
	TA7504S		400	
Operating Temperature		T_{opr}	$-30 \sim 75$	$^{\circ}\text{C}$
Storage Temperature		T_{stg}	$-55 \sim 125$	$^{\circ}\text{C}$



TA7504P/SELECTRICAL 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}	1	$R_g \leq 10k\Omega$	-	1	5	mV
Input Offset Current	I_{IO}	2	-	-	30	200	nA
Input Bias Current	I_I	2	-	-	200	500	nA
Common Mode Input Voltage	CMV_{IN}	3	-	± 12	± 13	-	V
Maximum Output Voltage	V_{OM}	4	$R_L \geq 10k\Omega$	± 12	± 14	-	V
	V_{OMR}		$R_L \geq 2k\Omega$	± 10	± 13	-	
Maximum Output Voltage Swing	V_{Op-p}	5	$R_L=10k\Omega$, $f=1kHz$	24	28	-	V
Output Short Circuit Current	I_{OS}	4	-	-	± 20	-	mA
Input Impedance	Z_{IN}	-	$f=1kHz$	0.3	1	-	$M\Omega$
Output Impedance	Z_{OUT}	-	$f=1kHz$	-	60	-	Ω
Voltage Gain	G_v	-	$R_L=2k\Omega$, $V_{OUT}=\pm 10V$ $f=10kHz$	20	100	-	$\times 10^3$
Common Mode Input Signal Rejection Ratio	$CMRR$	3	$CMV_{IN}=\pm 10V$, $f=100Hz$	70	90	-	dB
Supply Voltage Rejection Ratio	$SVRR$	1	$R_g \leq 10k\Omega$	-	30	150	$\mu V/V$
Power Dissipation	P_D	6	-	-	50	85	mW
Temperature Coefficient of Input Offset Voltage	$\Delta V_{IO}/\Delta T$	1	$R_g \leq 10k\Omega$, $T_a=-30 \sim 75^{\circ}C$	-	5	50	$\mu V/^{\circ}C$
Slew Rate	SR	7	$R_L=2k\Omega$	-	0.5	-	$V/\mu s$
Rise Time	t_r	8	$C_L=100pF$, $R_L=2k\Omega$	-	0.3	-	μs
Over Short	e_{over}			-	5	-	%
Input Noise Voltage	e_{np-p}	9	$R_g=10k\Omega$, $f=0 \sim 100Hz$	-	6	-	μV

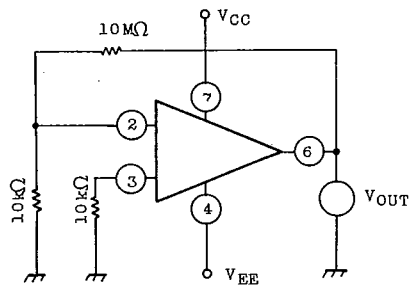
EQUIVALENT CIRCUIT



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TA7504P/S

TEST CIRCUIT

(1) V_{IO} , $\Delta V_{IO}/\Delta T$, SVRR

$$V_{IO} = V_{OUT}/1000$$

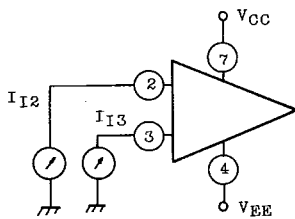
$$SVRR = \frac{V_{OUT} - V_{OUT2}}{1000 \times 5}$$

$$V_{OUT1} ; (V_{CC}, -V_{EE} = 17.5(V))$$

$$V_{OUT2} ; (V_{CC}, -V_{EE} = 12.5(V))$$

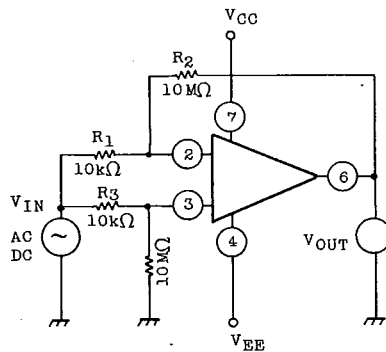
$$\Delta V_{IO}/\Delta T = |V_{IO}(25^{\circ}C) - V_{IO}(-30^{\circ}C)| / 55$$

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

(2) I_I , I_{IO} 

$$I_{IO} = |I_{I2} - I_{I3}|$$

$$I_I = \frac{I_{I2} + I_{I3}}{2}$$

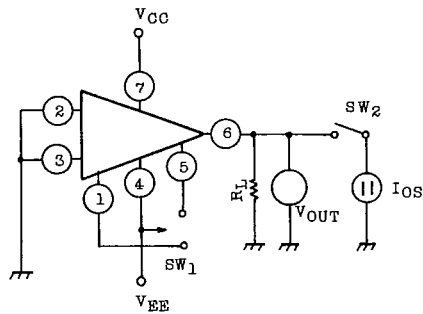
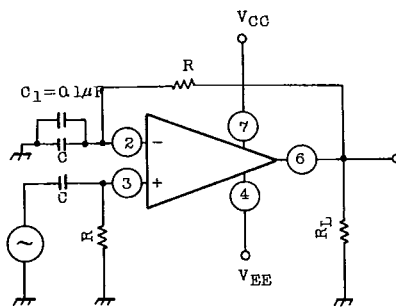
(3) CMV_{IN} , CMRR

$$CMV_{IN} : V_{OUT} = \pm 10(V_{DC}), V_{IN} \text{ MEASURED}$$

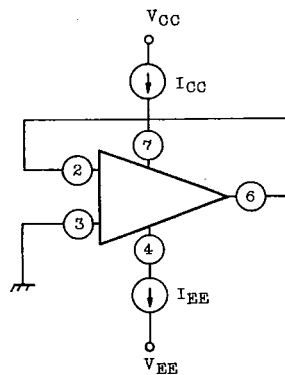
$$CMRR : V_{IN} = 7.07(V_{rms}), V_{OUT} \text{ MEASURED}$$

$$CMRR = 20 \log \frac{V_{IN}}{\frac{V_{OUT}}{1000}} = 20 \log \frac{7070}{V_{OUT}} \text{ (dB)}$$

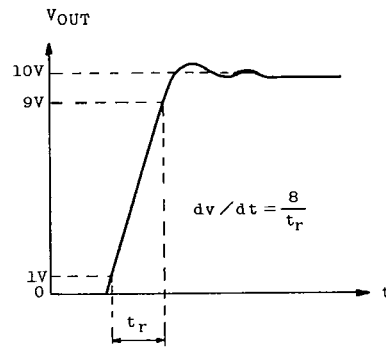
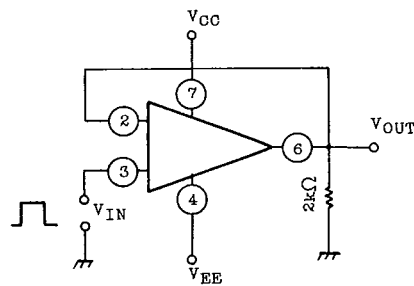
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TA7504P/S(4) V_{OM} , V_{OMR} , I_{OS}  V_{OM}, V_{OMR} : SW₂ : OPEN CIRCUITSW₁ : TERMINAL 1 OR 5 I_{OS} : SW₂ : SHORT CIRCUITSW₁ : TERMINAL 1 OR 5(5) G_V , V_{Op-p} 

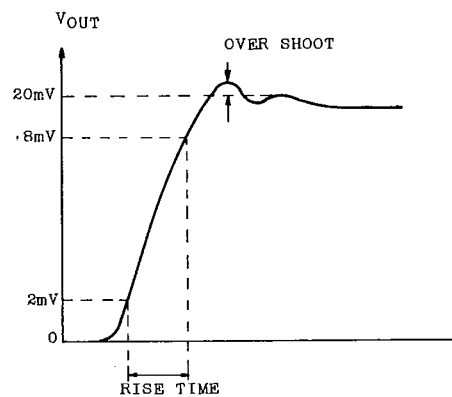
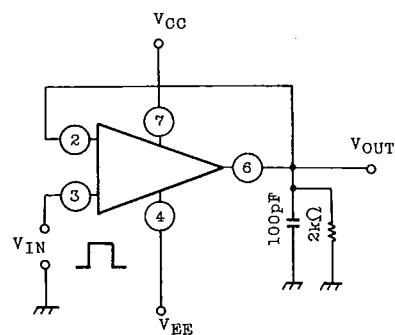
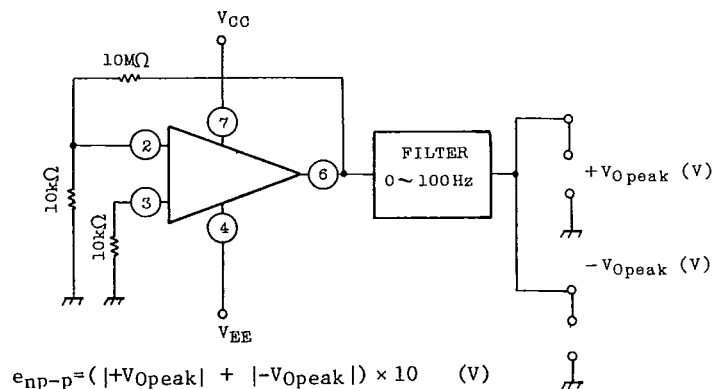
C : DC COUPLE

C_I : HF BYPASS $\omega \gg 1/RC$ $G_V = V_{OUT}/V_{IN}$ (6) P_D  $P_D = (V_{CC} - V_{EE}) I_{CC}$ $= (V_{CC} - V_{EE}) I_{EE}$

(7) SR



(8) RESPONSE TIME

(9) e_{np-p} 

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TA7504P/S

