AN6574, AN6574S

Low Noise, High Slew Rate Operational Amplifiers

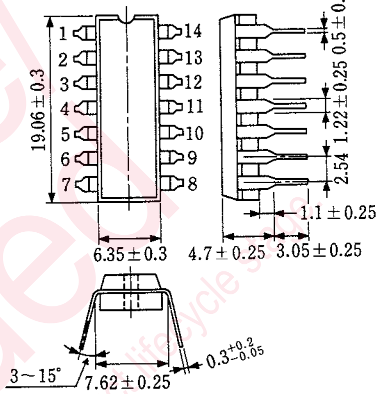
■ Outline

The AN6574 and the AN6574S are low noise, high slew rate quadruple operational amplifiers with phase compensation circuits built-in. They are wideband with high stability and suited for application to various electronic circuits such as active filters and audio preamplifiers.

■ Features

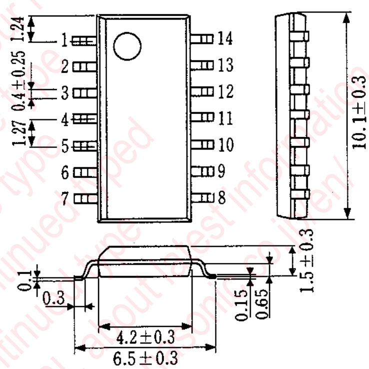
- Phase compensation circuit
- High gain : $G_V = 110dB$ typ.
- Low noise : $V_{nI} = 0.9\mu V_{rms}$typ.
- High slew rate : $SR = 6V/\mu s$ typ.
- High stability.

AN6574 Unit : mm



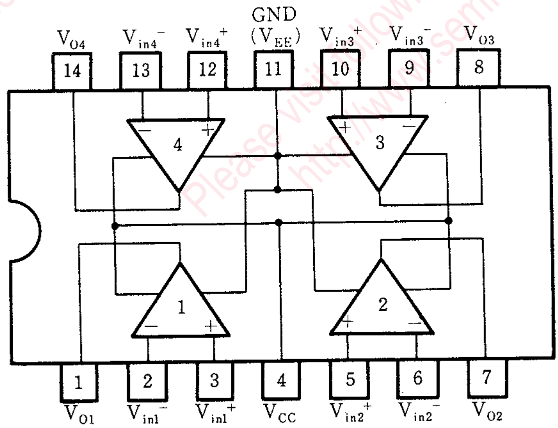
14-Lead DIL Plastic Package

AN6574S Unit : mm



14-Lead PANAFLAT Package(SO-14D)

■ Block Diagram



Panasonic

■ Pin

Pin No.	Pin Name	Pin No.	Pin Name
1	Ch. 1 Output	8	Ch. 3 Output
2	Ch. 1 Invert Input	9	Ch. 3 Invert Input
3	Ch. 1 Non Invert Input	10	Ch. 3 Non Invert Input
4	V_{CC}	11	GND(V_{EE})
5	Ch. 2 Non Invert Input	12	Ch. 4 Non Invert Input
6	Ch. 2 Invert Input	13	Ch. 4 Invert Input
7	Ch. 2 Output	14	Ch. 4 Output

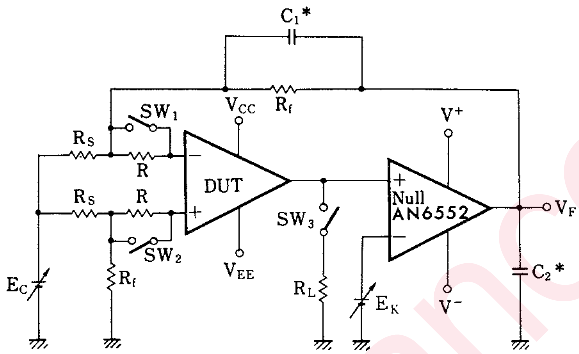
■ Absolute Maximum Ratings (Ta=25℃)

Item		Symbol	Rating	Unit
Voltage	Supply Voltage	V_{CC}	±18	V
	Differential Input Voltage	V_{ID}	±30	V
	Common-Mode Input Voltage	V_{ICM}	±15	V
Power Dissipation	AN6574	P_D	570	mW
	AN6574S		380	
Operating Ambient Temperature		T_{opr}	−20～+75	℃
Storage Temperature	AN6574	T_{stg}	−55～+150	℃
	AN6574S		−55～+125	

■ Electrical Characteristics (V_{CC}=15V, V_{EE}=−15V, Ta=25℃)

Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Input Offset Voltage	$V_{I(offset)}$	1	$R_S \leqq 10k\Omega$		0.3	5	mV
Input Offset Current	I_{IO}	1			5	200	nA
Input Bias Current	I_{Bias}	1			300	1000	nA
Voltage Gain	G_V	1	$R_L \geqq 2k\Omega$, $V_O \pm 10V$	90	110		dB
Maximum Output Voltage	$V_{O(max.)}$	2	$R_L \geqq 10k\Omega$	±12	±13.5		V
Maximum Output Voltage	$V_{O(max.)}$	2	$R_L \geqq 2k\Omega$	±10	±13.4		V
Common-Mode Input Voltage Width	V_{CM}	3		±12	±14		V
Common-Mode Rejection Ratio	CMR	1		80	100		dB
Supply Voltage Rejection Ratio	SVR	1			10	100	μV/V
Power Consumption	P_C	4	$R_L = \infty$		210	360	mW
Slew Rate	SR	5	$R_L \geqq 2k\Omega$		6		V/μs
Zero-Cross Frequency	$f_{(T)}$	6	$A_V = 1$		7		MHz
Input Referred Noise Voltage	V_{ni}	7	$R_S = 1k\Omega$, DIN/AUDIO		0.9		μV_{rms}

Test Circuit 1 ($V_{I(offset)}$, I_{IO}, I_{Bias}, G_V, CMR, SVR)

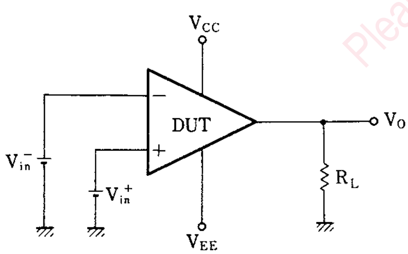


$R_S=50\Omega$
$R=10k\Omega$
$R_f=20k\Omega$
$R_L=10k\Omega$
$V_{CC}=15V$
$V_{EE}=-15V$
$V^+=15V$
$V^-=-15V$

* C_1 and C_2 are capacitors for the prevention of oscillation.

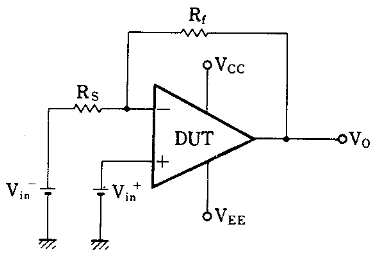
Item	Measurement Conditions
Input Offset Voltage	V_{F1} is measured with the SW_1, SW_2 and SW_3 set to OFF and $E_C=E_K=0V$. Can be given by $V_{I(offset)}=\frac{V_{F1}}{400}(V)$
Input Offset Current	V_{F2} is measured with the SW_1 and SW_2 set to ON, and the SW_3 set to OFF and $E_C=E_K=0V$. Can be given by $I_{IO}=\frac{\lvert V_{F2}-V_{F1}\rvert}{4\times10^6}(A)$
Input Bias Current	V_{F3} is measured with the SW_1 set to ON, the SW_2 set to OFF, SW_3 set to OFF and $E_C=E_K=0V$. V_{F4} is measured with the SW_1 and SW_2 reversed. Can be given by $I_{Bias}=\frac{\lvert V_{F3}-V_{F4}\rvert}{8\times10^6}(A)$
Voltage Gain	V_{F5} is measured with the SW_1' SW_2 and SW_3 set to ON, $E_C=0V$ and $E_K=10V$. V_{F5}' is measured with $E_K=-10V$. Can be given by $G_V=20\log\left(\frac{8000}{\lvert V_{F5}-V_{F5}'\rvert}\right)$
Common-Mode Rejection Ratio	V_{F6} is measured with the SW_1 and SW_2 set to ON, the SW_3 set to OFF, $E_K=0V$ and $E_C=5V$. V_{F6}' is measured with $E_C=-5V$. Can be given by $CMR=20\log\left(\frac{4000}{\lvert V_{F6}-V_{F6}'\rvert}\right)$
Supply Voltage Rejection Ratio I	V_{F7} is measured with the SW_1 and SW_2 set to ON, the SW_3 set to OFF, $E_K=E_C=0V$ and $V_{CC}=10V$. Can be given by $SVR(+)=\frac{\lvert V_{F7}-V_{F2}\rvert}{2\times10^3}$
Supply Voltage Rejection Ratio II	V_{F8} is measured with the SW_1 and SW_2 set to ON, the SW_3 set to OFF, $E_K=E_C=0V$ and $V_{EE}=-10V$. Can be given by $SVR(-)=\frac{\lvert V_{F8}-V_{F2}\rvert}{2\times10^3}$

Test Circuit 2 ($V_{O(max.)}$)



$V_{CC}=15V$
$V_{EE}=-15V$
$R_L=2k\Omega$ or $10k\Omega$
$V_{in}^-=0V$ or $1V$
$V_{in}^+=1V$ or $0V$

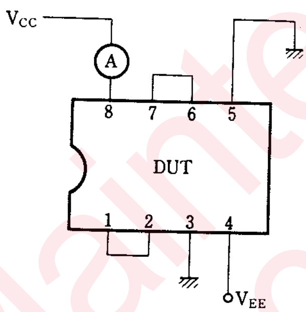
Test Circuit 3 (V_{CM})



$V_{CC}=15\,V$
$V_{EE}=-15\,V$
$R_S=200\,\Omega$
$R_f=2\,k\Omega$

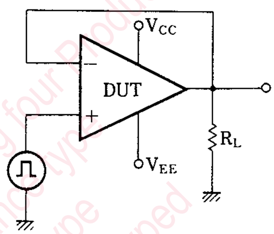
Note) Apply a voltage of $|V_{in}^{+}|>12V$ and check $V_O=V_{in}^{+}+\frac{R_f}{R_s}(V_{in}^{+}-V_{in}^{-})$

Test Circuit 4 (P_C)



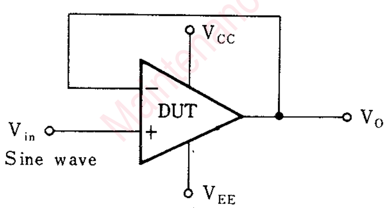
$V_{CC}=15V$
$V_{EE}=-15V$

Test Circuit 5 (SR)

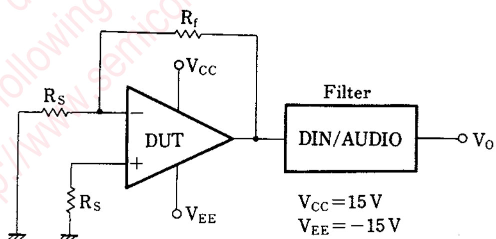


$V_{CC}=15\,V$
$V_{EE}=-15\,V$
$R_L=2\,k\Omega$

Test Circuit 6 ($f_{(T)}$)



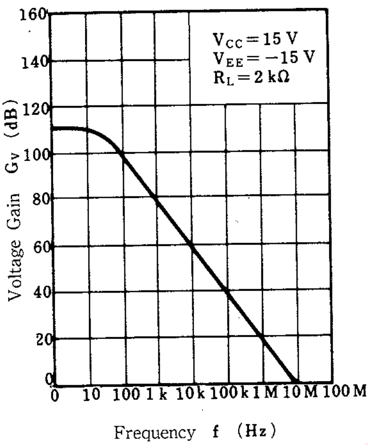
Test Circuit 7 (V_{ni})



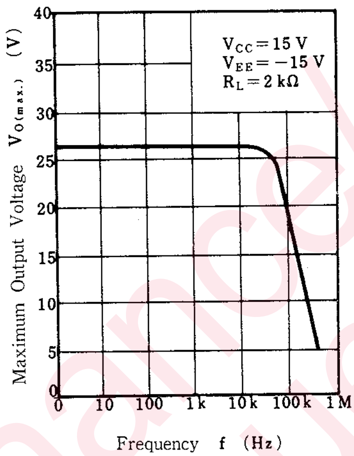
$V_{CC}=15\,V$
$V_{EE}=-15\,V$
$R_f=9.1\,k\Omega$
$R_S=1\,k\Omega$

Note) An input referred noise voltage $V_{ni}=\frac{V_O}{(1+R_f/R_s)}$ is given.

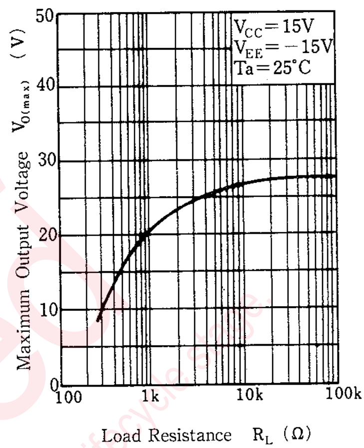
G_V — f



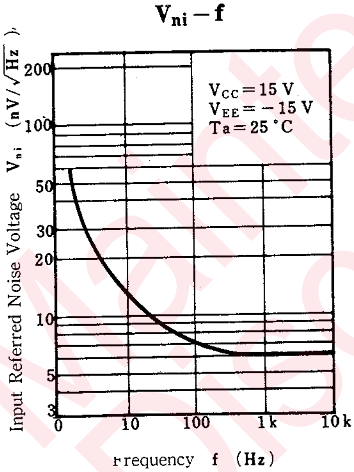
$V_{O(max.)}$ — f



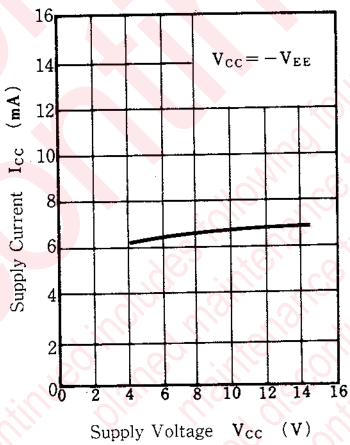
$V_{O(max.)}$ — R_L



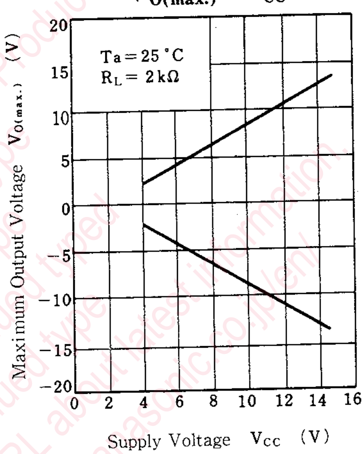
V_{ni} — f



I_{CC} — V_{CC}

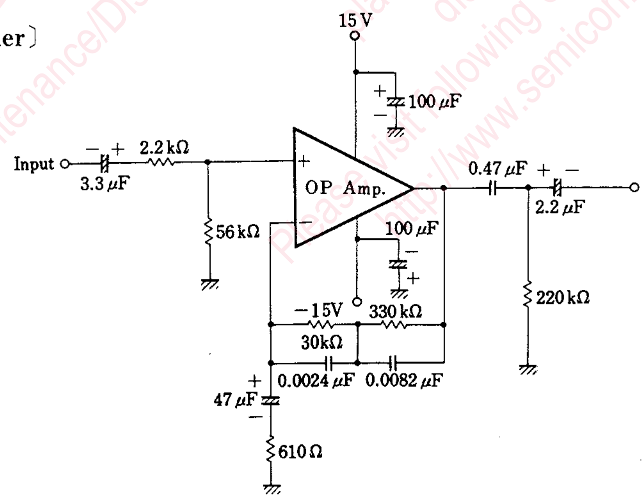


$V_{O(max.)}$ — V_{CC}



■ Application Circuit

〔RIAA Amplifier〕



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