AN1458(AN6572),AN1458S, AN6571

Dual Operational Amplifiers

■ Outline

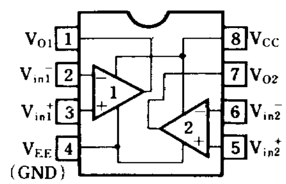
The AN1458(AN6572), the AN1458S, and the AN6571 are dual operational amplifiers with phase compensation circuits built-in and also an output short-circuit protection built-in, so that they are highly stable and can be used widely in various electronic circuits.

■ Features

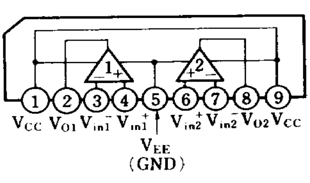
- Built-in phase compensation circuit
- Wide range of common-mode input voltage, no latch-up
- Built-in short-circuit protection
- Low input offset voltage : $V_{I(offset)}=0.5mV$ typ.
- Low input offset current : $I_{IO}=10nA$ typ.

■ Block Diagrams

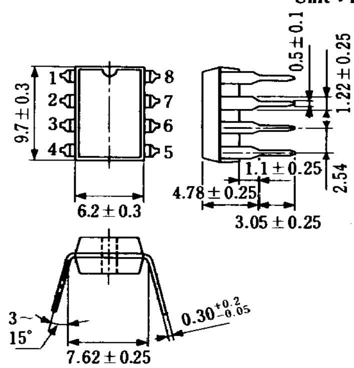
AN1458(AN6572), AN1458S



AN6571

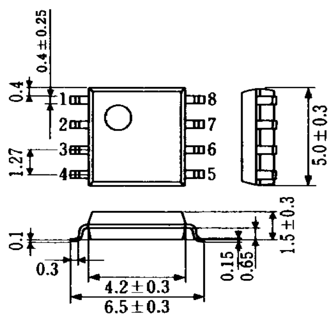


AN1458(AN6572) Unit : mm



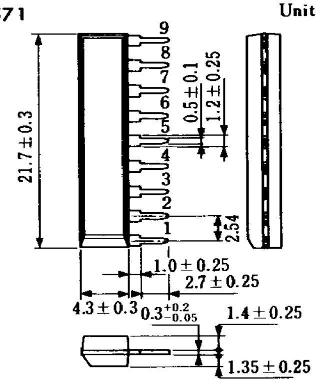
8-Lead DIL Plastic Package

AN1458S Unit : mm



8-Lead PANAFLAT Package(SO-8D)

AN6571 Unit : mm



9-Lead SIL Plastic Package (Slim)

■ Pin

<AN1458 (AN6572), AN1458S>

Pin No.	Pin Name
1	Ch. 1 Output
2	Ch. 1 Invert Input
3	Ch. 1 Non Invert Input
4	V_{EE} (GND)
5	Ch. 2 Non Invert Input
6	Ch. 2 Invert Input
7	Ch. 2 Output
8	Vcc

<AN6571>

Pin No.	Pin Name
1	Vcc
2	Ch. 1 Output
3	Ch. 1 Invert Input
4	Ch. 1 Non Invert Input
5	V_{EE} (GND)
6	Ch. 2 Non Invert Input
7	Ch. 2 Invert Input
8	Ch. 2 Output
9	Vcc

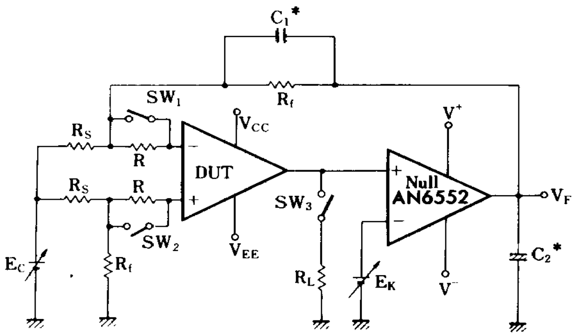
■ Absolute Maximum Ratings (Ta=25℃)

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	AN1458 (AN6572), AN6571	P_D	500	mW
	AN1458S		360	
Operating Ambient Temperature		T_{opr}	−20～+75	℃
Storage Temperature	AN1458 (AN6572), AN6571	T_{stg}	−55～+150	℃
	AN1458S		−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	$R_S \leqq 10k\Omega$		0.5	4	mV
Input Offset Current	I_{IO}	1			10	100	nA
Input Bias Current	I_{Bias}	1			50	250	nA
Voltage Gain	G_V	1	$R_L \geqq 2k\Omega$, $V_O = \pm 10V$	86	106		dB
Maximum Output Voltage	$V_{O(max.)}$	2	$R_L \geqq 10k\Omega$	±12	±14		V
		2	$R_L \geqq 2k\Omega$	±10	±13		V
Common-Mode Input Voltage Width	V_{CM}	3		±12	±13		V
Common-Mode Rejection Ratio	CMR	1	$R_S \leqq 10k\Omega$	70	90		dB
Supply Voltage Rejection Ratio	SVR	1	$R_S \leqq 2k\Omega$		3	150	μV/V
Supply Current	I_{CC}	4	$R_L = \infty$			5.6	mA
Power Consumption	P_C	4	$R_L = \infty$			170	mW
Output Short-Circuit Current	$I_{O(short)}$	2			±20		mA
Slew Rate	SR	5			0.7		V/μs

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



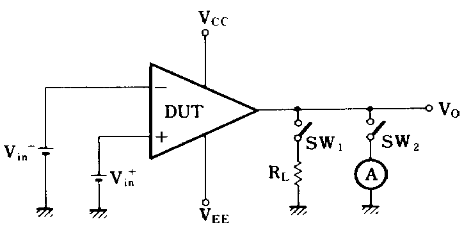
$V_{CC}=15V$
$V_{EE}=-15V$
$R_S=50\Omega$
$R=10k\Omega$
$R_f=20k\Omega$
$V^+=15V$
$V^-=-15V$

* 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, 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_3 set to OFF, $E_C=E_K=0V$, the SW_1 set to ON and the SW_2 set to OFF. 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 $G_V=20\log\left(\frac{8000}{\lvert V_{F5}-V_{F}'_5\rvert}\right)$
Common-Mode Rejection Ratio	V_{F6} is measured with both the SW_1 and SW_2 set to ON, the SW_3 set to OFF, $E_K=0V$ and $E_C=5V$. $V_F'_6$ is measured with $E_C=-5V$. Can be given by. $CMR=20\log\left(\frac{4000}{\lvert V_{F6}-V_F'_6\rvert}\right)$
Supply Voltage Rejection Ratio I	V_{F7} is measured with both 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 both 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 $SVR(-)=\frac{\lvert V_{F8}-V_{F2}\rvert}{2\times10^3}$

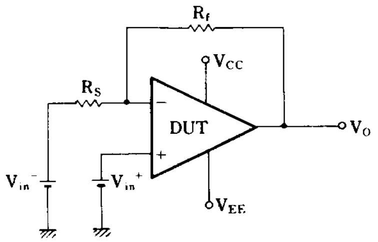
Note) When not specified in the above table, $V_{CC}=15V$ and $V_{EE}=-15V$.

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



$V_{CC}=15V$
$V_{EE}=-15V$
$R_L=2k\Omega$ or $10k\Omega$
$V_{O(max.)}$: SW_1 : ON, SW_2 : OFF
$I_{O(short)}$: SW_1 : OFF, SW_2 : ON

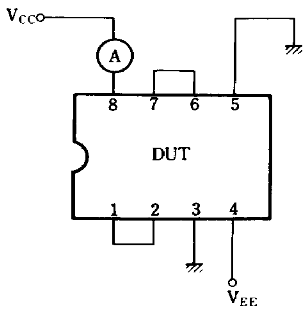
Test Circuit 3 (V_{CM})



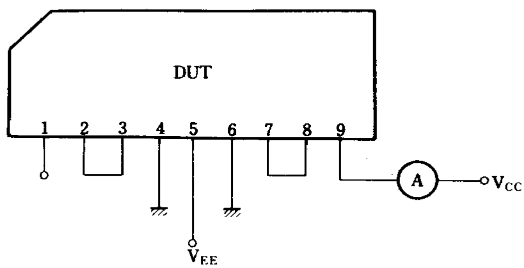
$V_{CC}=15\,V$
$V_{EE}=-15\,V$
$R_S=200\,\Omega$
$R_f=2\,k\Omega$

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 (I_{CC}, P_C)

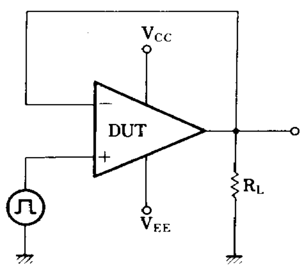


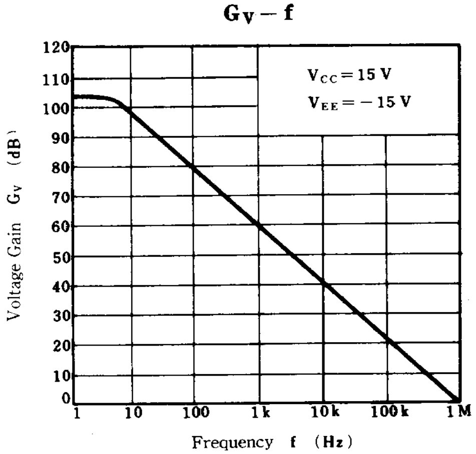
(AN1458(AN6572)
AN1458S)

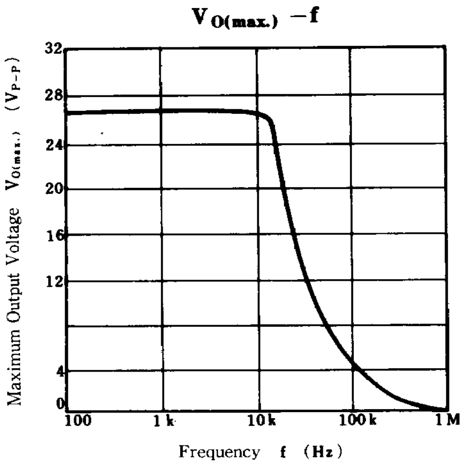


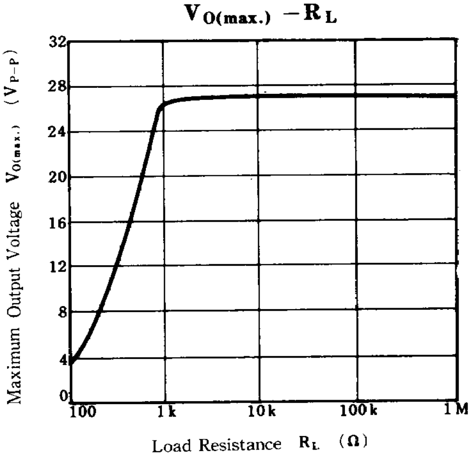
(AN6571)

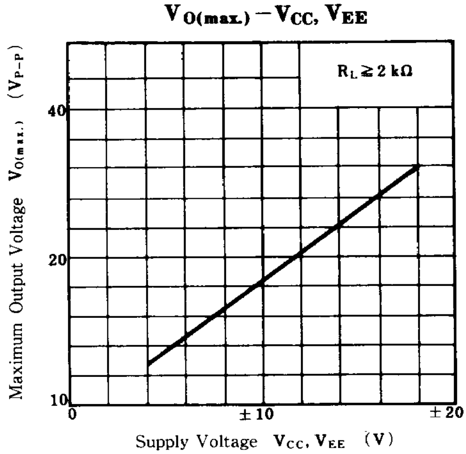
Test Circuit 5 (SR)

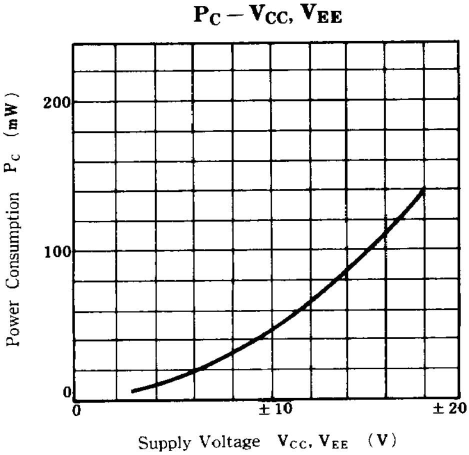


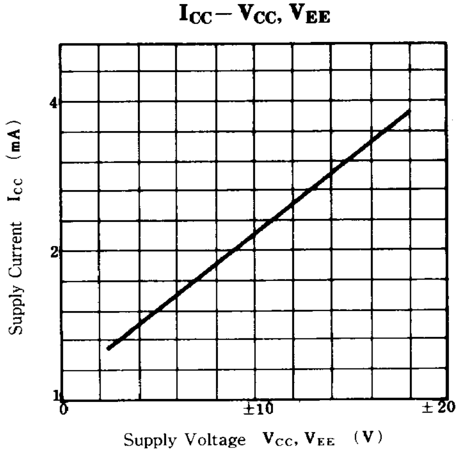

$G_V - f$
$V_{CC} = 15$ V
$V_{EE} = -15$ V
Voltage Gain G_V (dB)
120
110
100
90
80
70
60
50
40
30
20
10
0
1
10
100
1k
10k
100k
1M
Frequency f (Hz)

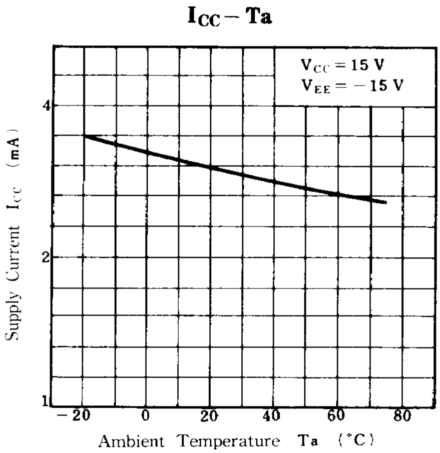

$V_{O(max.)} - f$
Maximum Output Voltage $V_{O(max.)}$ (V_{P-P})
32
28
24
20
16
12
4
0
100
1k
10k
100k
1M
Frequency f (Hz)

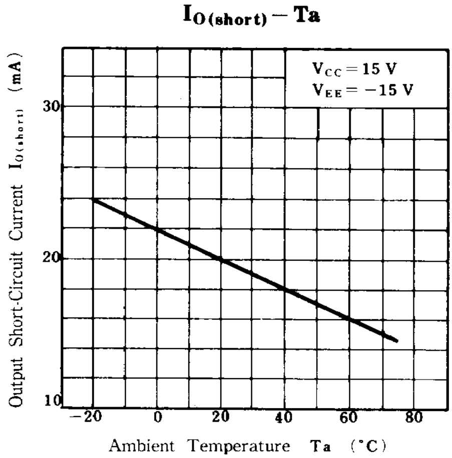

$V_{O(max.)} - R_L$
Maximum Output Voltage $V_{O(max.)}$ (V_{P-P})
32
28
24
20
16
12
8
4
0
100
1k
10k
100k
1M
Load Resistance R_L (Ω)

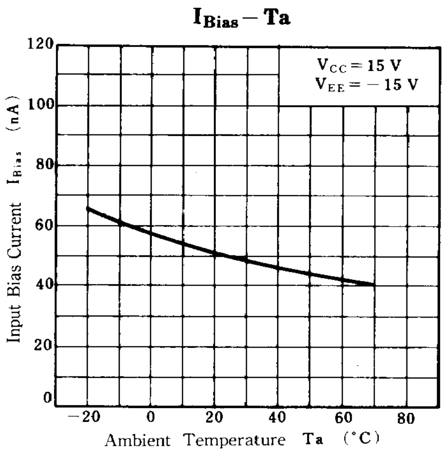

$V_{O(max.)} - V_{CC}, V_{EE}$
$R_L \geqq 2$ kΩ
Maximum Output Voltage $V_{O(max.)}$ (V_{P-P})
40
20
10
0
±10
±20
Supply Voltage V_{CC}, V_{EE} (V)


$P_C - V_{CC}, V_{EE}$
Power Consumption P_C (mW)
200
100
0
0
±10
±20
Supply Voltage V_{CC}, V_{EE} (V)


$I_{CC} - V_{CC}, V_{EE}$
Supply Current I_{CC} (mA)
4
2
1
0
±10
±20
Supply Voltage V_{CC}, V_{EE} (V)

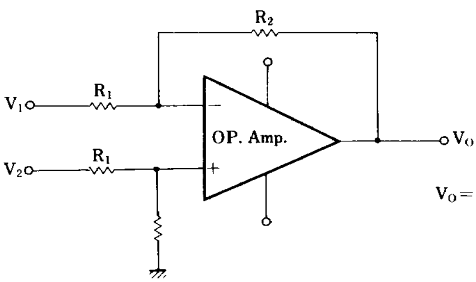






■ Application Circuit

Differential Amplifier Circuit



$$V_O = \frac{R_2}{R_1}(V_2 - V_1)$$