IR9358/IR9358N General-Purpose Dual Operational Amplifier

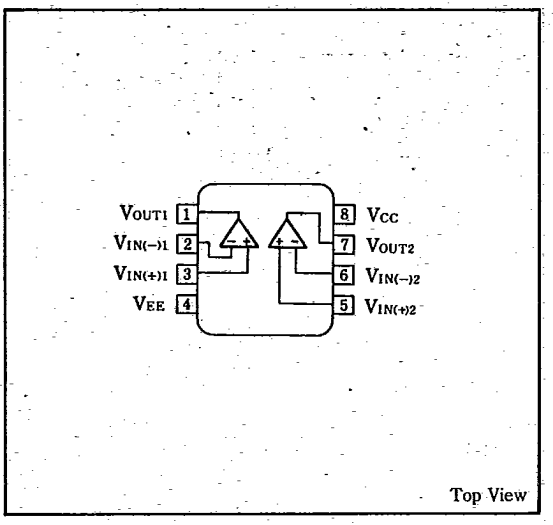
Description

The IR9358/IR9358N is an internal phase compensation type dual operational amplifier, which allows for single power supply operation in the wide range from 3V to 30V. In addition, like the conventional general-purpose amplifiers, it can be operated by either a positive or a negative power supply.

Features

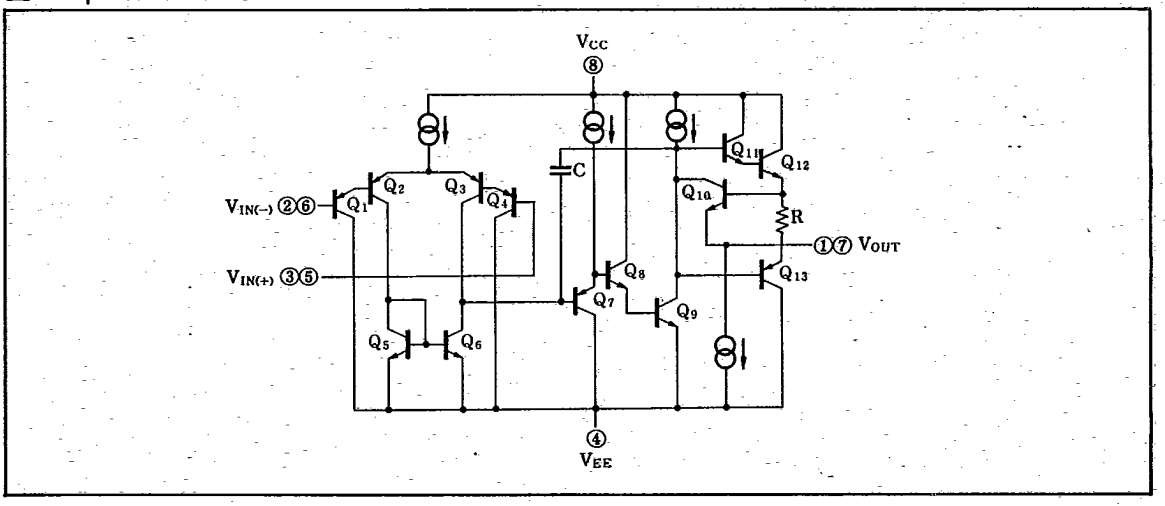
1. No phase compensation is required.
2. Wide operating supply voltage range:
   3～30V (single power supply)
   ±1.5～±15V (dual power supply)
3. Wide input voltage range and operation near at 0V is possible.
4. The output voltage ranges from 0V to V_{CC}－1.5V.
5. 8-pin dual-in-line package (IR9358),
   8-pin small outline package(IR9358N)

Pin Connections



Top View

Equivalent Circuit



General-Purpose Dual Operational Amplifier

IR9358/IR9358N

T-79-05-20

■ Absolute Maximum Ratings

(Ta=25℃)

Parameter	Symbol	Condition		Rating	Unit
Supply voltage	V_{CC}-V_{EE}			36	V
Differential input voltage	V_{ID}			±36	V
In-phase input voltage	V_{ICM}			−0.3～36	V
Power dissipation	P_D	Ta≦25℃	IR9358	625	mW
			IR9358N	400	
P_D derating ratio	ΔP_D/℃	Ta>25℃	IR9358	6.25	mW/℃
			IR9358N	4	
Operating temperature	T_{opr}			−40～+85	℃
Storage temperature	T_{stg}			−55～+150	℃

■ Electrical Characteristics

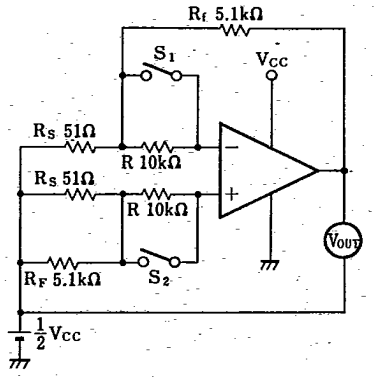
(V_{CC}=5V, V_{EE}=GND, Ta=25℃)

Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Input offset voltage	V_{IO}			2	7	mV
Input bias current	I_B			45	150	nA
Input offset current	I_{IO}			5	50	nA
In-phase input voltage	V_{ICM}	V_{CC}=30V, V_{EE}=GND	0		V_{CC}−1.5	V
Supply current	I_{CC}	V_{IN}=0V, R_L=∞		0.7	1.2	mA
Large amplitude voltage gain	A_V	DC, R_L≧2kΩ	86	100		dB
Power fluctuation rejection ratio	SVR	DC	70	100		dB
In-phase signal rejection ratio	CMR	DC	70	85		dB
Maximum output voltage	V_{OM}	R_L=2kΩ	0		V_{CC}−1.5	V
Output short-circuit current	I_{SOU}	$V_{IN(+)}$=1V, $V_{IN(-)}$=0V	20	40		mA
	I_{SINK}	$V_{IN(-)}$=1V, $V_{IN(+)}$=0V	10	20		mA

Note 1 The input bias current flows from the IC since the first stage is structured with a PNP transistor.
Note 2 The input voltage must not be decreased below −0.3V from the pin 4 (V_{EE}).

■ Test Circuits

(1) V_{IO}, I_B, I_{IO}



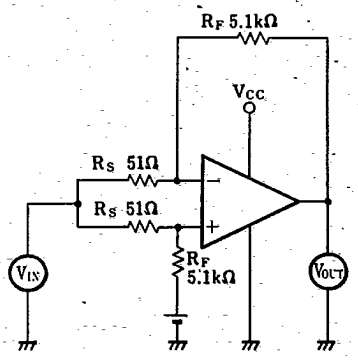
S_1	S_2	V_{OUT}
ON	ON	V_{O1}
ON	OFF	V_{O2}
OFF	ON	V_{O3}
OFF	OFF	V_{O4}

$$V_{IO}=\frac{V_{O1}}{1+R_F/R_S}$$

$$I_B=\frac{|V_{O2}-V_{O3}|}{2\cdot R(1+R_F/R_S)}$$

$$I_{IO}=\frac{V_{O4}-V_{O1}}{R(1+R_F/R_S)}$$

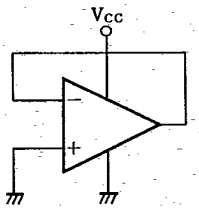
(2) V_{ICM} CMR



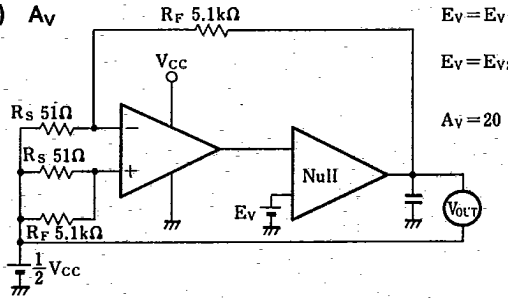
V_{ICM} : V_{IN}=0V, V_{CC}−1.5V is applied.

$$CMR=20\log\frac{V_{IN}\cdot R_F}{V_{OUT}\cdot R_S}$$

(3) I_{CC}



(4) A_V

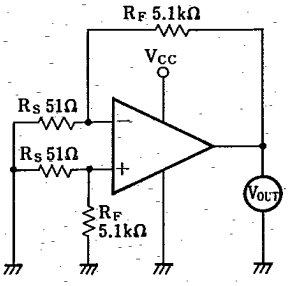


$E_V=E_{V1} \rightarrow V_{OUT}=V_{O5}$

$E_V=E_{V2} \rightarrow V_{OUT}=V_{O6}$

$$A_V=20\log\frac{(E_{V1}-E_{V2})(1+R_F/R_S)}{(V_{O6}-V_{O5})}$$

(5) SVR

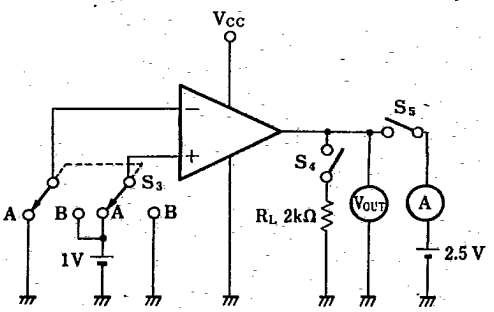


V_{CC1}=5V, $V_{OUT}=V_{O7}$

V_{CC2}=10V, $V_{OUT}=V_{O8}$

$$SVR=20\log\frac{(V_{O7}-V_{O8})(1+R_F/R_S)}{V_{CC1}-V_{CC2}}$$

(6) V_{OM}, I_{SOU}, I_{SINK}



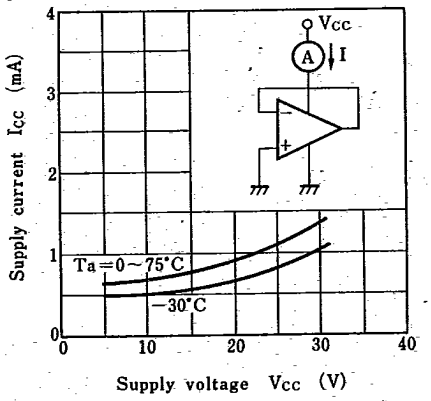
$V_{OM(H)}$ S_3=A S_4=ON S_5=OFF

$V_{OM(L)}$ S_3=B S_4=ON S_5=OFF

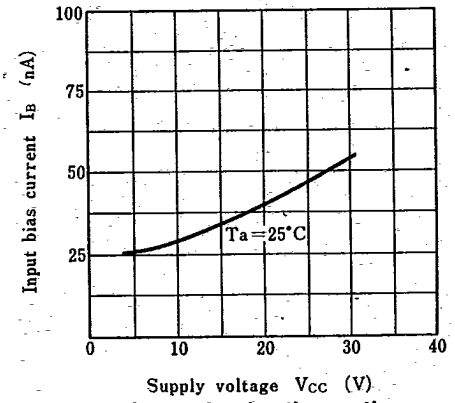
I_{SOU}, I_{SINK} S_4=OFF S_5=ON

■ Electrical Characteristic Curves

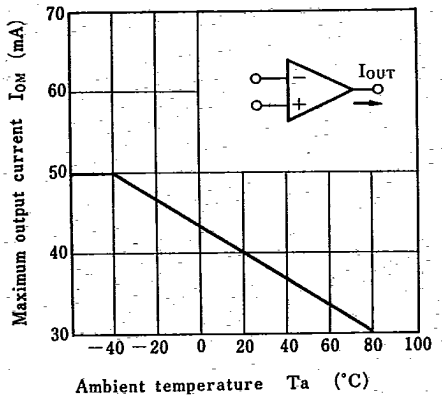
Supply current—Supply voltage Characteristics



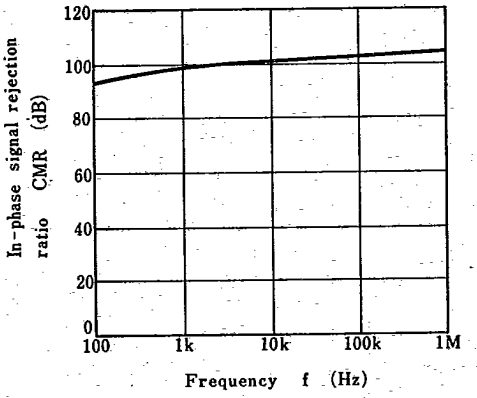
Input bias current—Supply voltage Characteristics



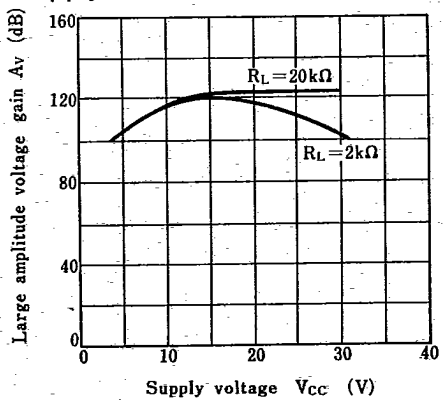
Maximum output current—Ambient temperature Characteristics



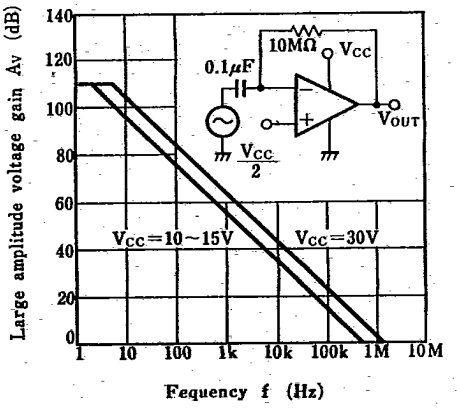
In-phase signal rejection ratio —Frequency Characteristics



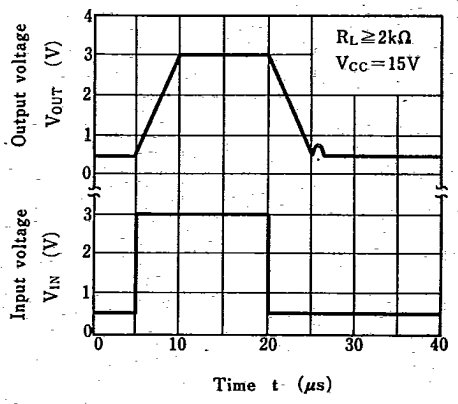
Large amplitude voltage gain— Supply voltage Characteristics



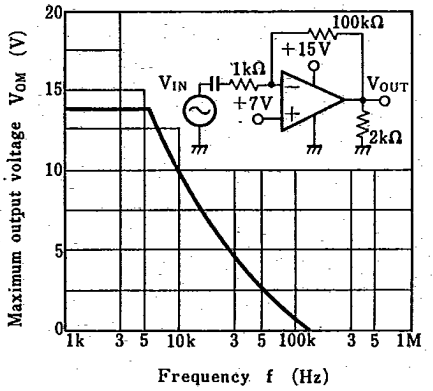
Large amplitude voltage gain— Frequency Characteristics



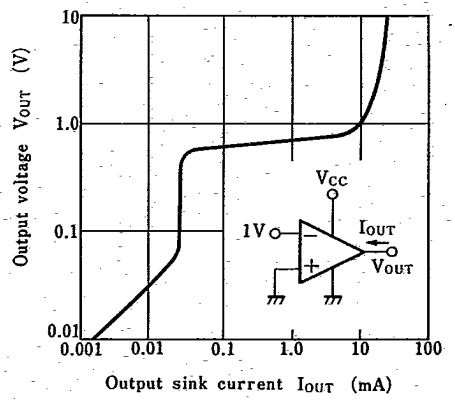
Pulse response Characteristics



Maximum output voltage —Frequency Characteristics



Output valtage—Output sink current Characteristics



Voltage difference between power and output —Output source current Characteristics