

**SANYO**

No.3191A

**LA6358N,6358NS****High-Performance  
Dual Operational Amplifiers****Overview**

The LA6358N is an IC integrating two high-performance operational amplifiers in a single package. This operational amplifier contains an internal phase compensator and is designed to operate from a single power supply over a wide range of voltages. As with conventional general-purpose operational amplifiers, operation from dual power supplies is also possible and power dissipation is very low. This IC can be used widely in commercial and industrial applications including various transducer amplifiers and DC amplifiers.

**Features**

- Eliminates need for phase compensation
- Wide range of operating supply voltage : 3.0 to 30.0V (single power supply)  
±1.5 to ±15.0V (dual power supply)
- Input voltage swingable down to nearly ground level and output voltage range  $V_{OUT}$  of 0 to  $V_{CC} - 1.5V$
- Low current dissipation :  $I_{CC} = 0.5mA$  typ/ $V_{CC} = +5V, R_L = \infty$

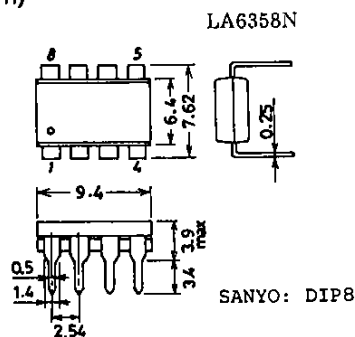
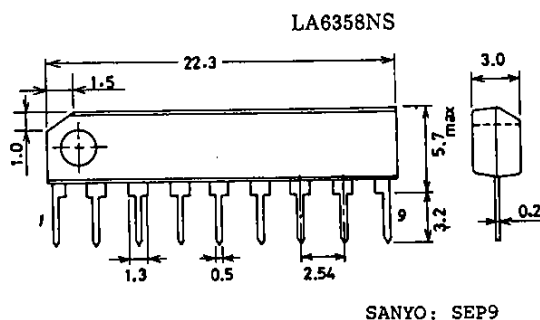
**Maximum Ratings at  $T_a = 25^\circ C$** 

			unit
Maximum Supply Voltage	$V_{CC}$	32	V
Differential Input Voltage	$V_{ID}$	32	V
Maximum Input Voltage	$V_{IN\ max}$	-0.3 to +32	V
Allowable Power Dissipation	$P_d\ max$	570	mW
Operating Temperature	$T_{opr}$	-30 to +85	$^\circ C$
Storage Temperature	$T_{stg}$	-55 to +125	$^\circ C$

**Operating Characteristics at  $T_a = 25^\circ C, V_{CC} = +5V$** 

			Test Circuit	min	typ	max	unit
Input Offset Voltage	$V_{IO}$		1		±2	±7	mV
Input Offset Current	$I_{IO}$	$I_{IN(+)} / I_{IN(-)}$	2		±5	±50	nA
Input Bias Current	$I_B$	$I_{IN(+)} / I_{IN(-)}$	3		45	250	nA
Common-Mode Input Voltage Range	$V_{ICM}$		4	0	$V_{CC} - 1.5$		V

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**Package Dimensions 3001B-D8IC**  
(unit : mm)**Package Dimensions 3017B-S9IC**  
(unit : mm)

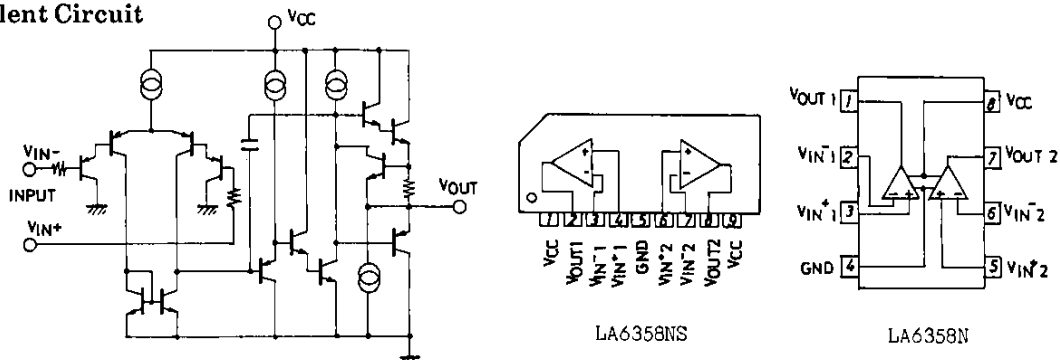
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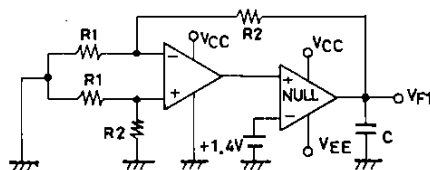
			Test Circuit	min	typ	max	unit
Common-Mode Rejection Ratio	CMR		4	65	80		dB
Large Signal Voltage Gain	VG	$V_{CC}=15V, R_L \geq 2k\Omega$	5	25	100		V/mV
Output Voltage Range	$V_{OUT}$			0	$V_{CC}-1.5$		V
Power Supply Rejection Ratio	SVR		6	65	100		dB
Channel Separation		$f=1k \text{ to } 20kHz$	7		120		dB
Current Dissipation	$I_{CC}$		8		0.5	1.2	mA
Output Current (Source)	$I_{O \text{ source}}$	$V_{IN+}=1V, V_{IN-}=0V$	9	20	40		mA
Output Current (Sink)	$I_{O \text{ sink}}$	$V_{IN+}=0V, V_{IN-}=1V$	10	10	20		mA

Equivalent Circuit



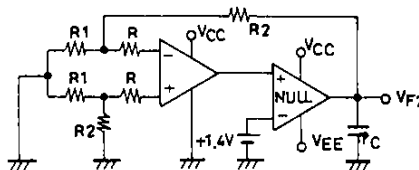
Test Circuits

1. Input Offset Voltage  $V_{IO}$



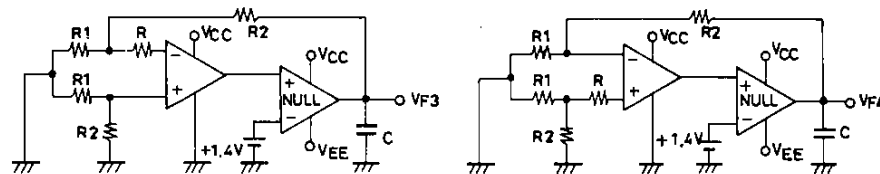
$$V_{IO} = \frac{VF1}{1 + R2/R1}$$

2. Input Offset Current  $I_{IO}$



$$I_{IO} = \frac{VF2 - VF1}{R(1 + R2/R1)}$$

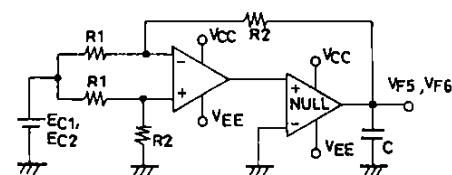
3. Input Bias Current  $I_B$



$$I_B = \frac{VF4 - VF3}{2R(1 + R2/R1)}$$

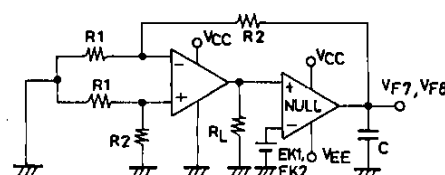
4. Common-mode Rejection Ratio CMR

Common-mode Input Voltage Range  $V_{ICM}$



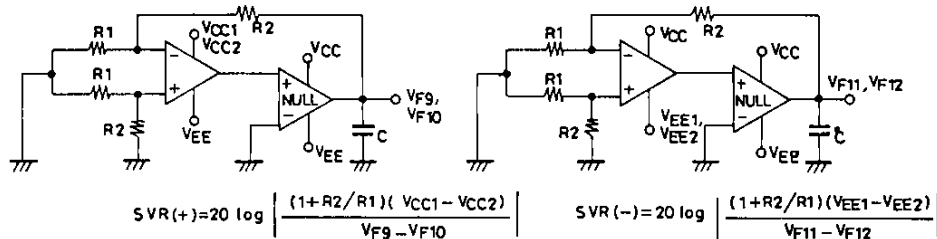
$$CMR = 20 \log \left| \frac{(EC1 - EC2)(1 + R2/R1)}{VF5 - VF6} \right|$$

5. Voltage Gain VG

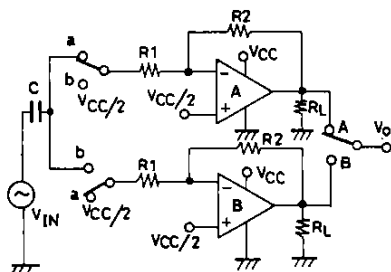


$$VG = \frac{(EK1 - EK2)(1 + R2/R1)}{VF8 - VF7}$$

6. Supply Voltage Rejection SVR



7. Channel Separation CS



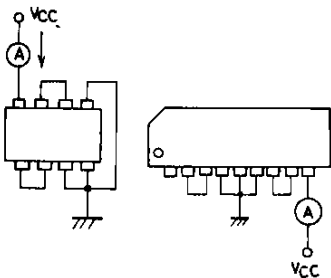
SW : a

$CS(A \rightarrow B) + 20 \log \frac{R_2 V_{OA}}{R_1 V_{OB}}$

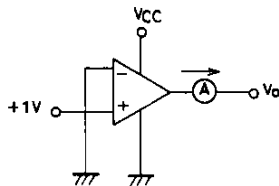
SW : b

$CS(B \rightarrow A) + 20 \log \frac{R_2 V_{OB}}{R_1 V_{OA}}$

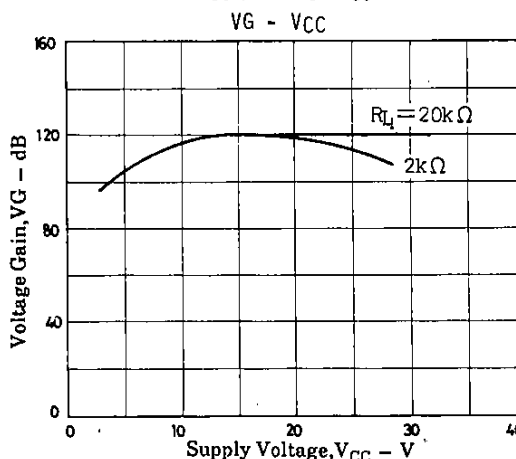
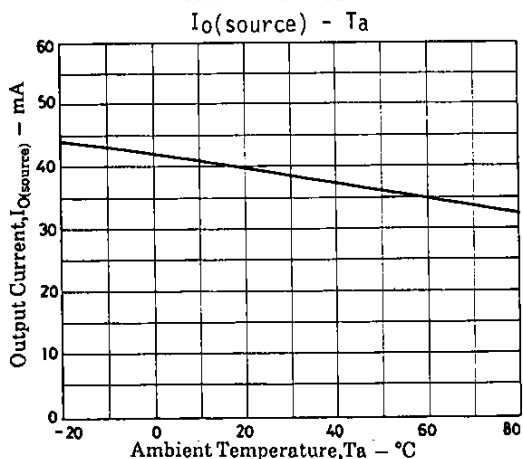
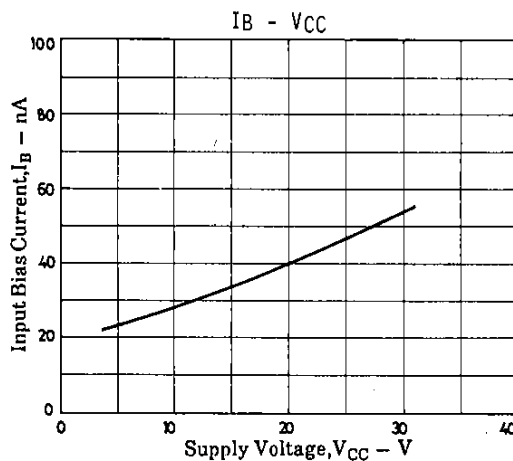
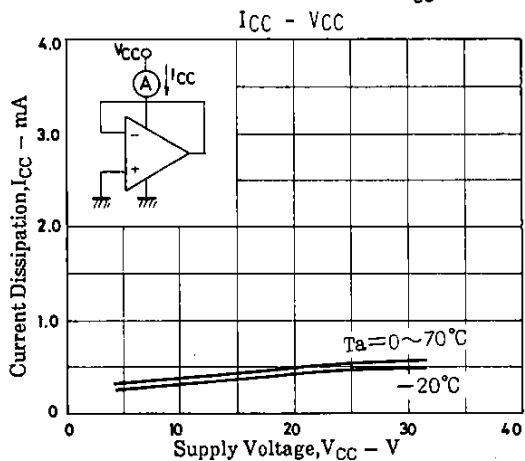
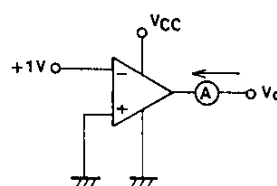
8. Current Dissipation I<sub>CC</sub>

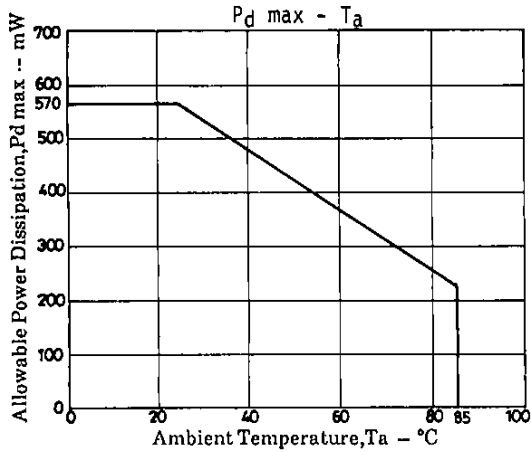
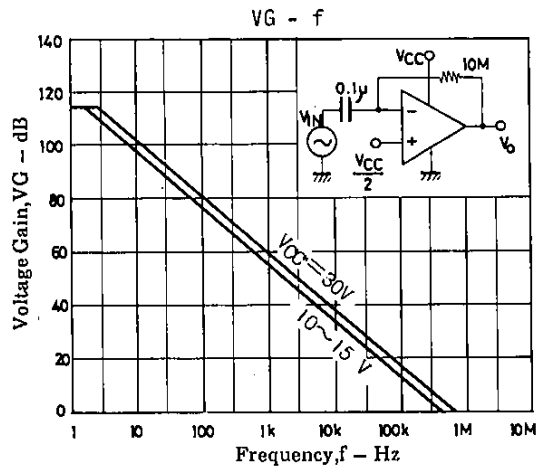
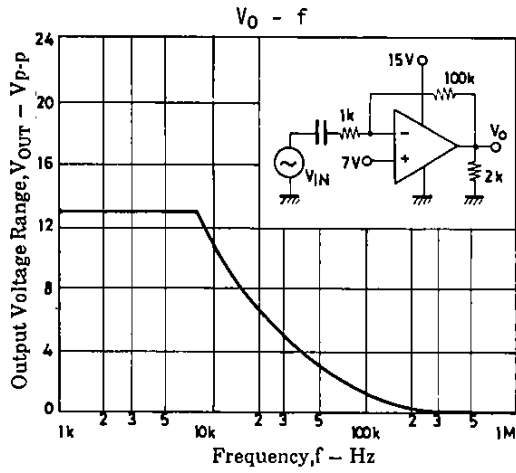


9. Output Current I<sub>O source</sub>



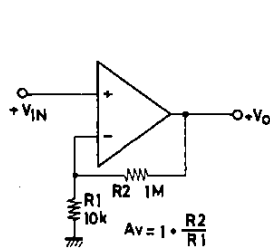
10. Output Current I<sub>O sink</sub>



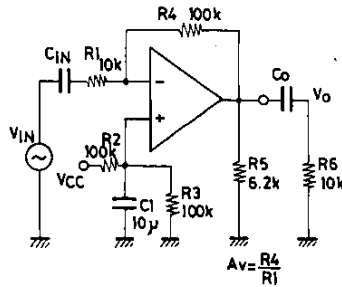


Sample Application Circuits

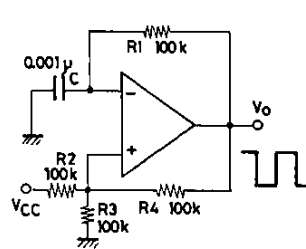
Noninverting DC amplifier



Inverting AC amplifier



Rectangular wave oscillator



Unit (resistance:Ω capacitance:F)

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