



SANYO Semiconductors

DATA SHEET

LA6358AM — Monolithic Digital IC

High-Performance Dual Operational Amplifier

Overview

The LA6358AM is a high-performance dual operational amplifier that can operate from a single voltage power supply (3 to 24 V) and over a wide operating temperature range (-40 to 125°C). It features a built-in phase correction circuit. It can also operate from a dual power supply with both positive and negative levels and features low power consumption. The LA6358AM can be used in a wide range of automotive and industrial applications as a transducer amplifier for all types of transducers, as a DC amplifier circuit, and for other purposes as well.

Functions

- Phase correction not required
- Wide operating supply voltage range 3.0 V to 24.0 V (single power supply systems)
±1.5 V to 12.0 V (dual power supply systems)
- The input voltage range extends to essentially the ground level, and furthermore the output voltage range for V_{OUT} is from 0 V to $V_{CC} - 1.8$ V.
- Low current drain: $I_{CC} = 0.5$ mA (typical) when $V_{CC} = +5$ V, $R_L = \infty$.

Specifications

Maximum Ratings at $T_a = -40^\circ\text{C}$ to $+125^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		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	$T_a \leq 25^\circ\text{C}$	300	mW
Operating temperature	T_{opr}		-40 to +125	°C
Storage temperature	T_{stg}		-55 to +150	°C

Recommended Operating Conditions at $T_a = -40^\circ\text{C}$ to $+125^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Supply voltage	V_{CC}		3		24	V

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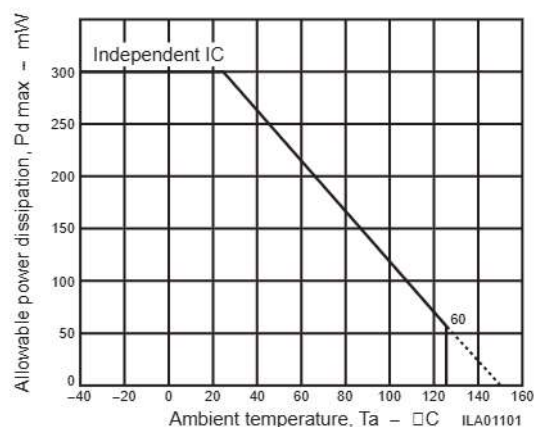
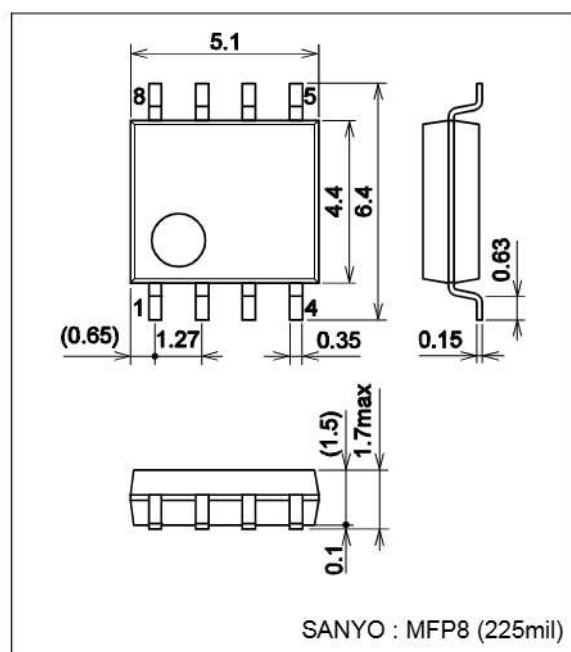
LA6358AM

Electrical Characteristics (Unless specified otherwise, the conditions are $T_a = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$, $V_{CC} = 5\text{ V}$)

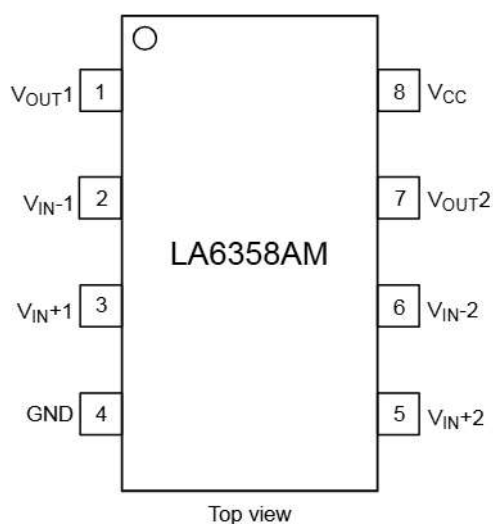
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Input offset voltage	V_{IO}			± 2	± 7	mV
Input offset current	I_{IO}	I_{IN+}/I_{IN-}		± 5	± 50	nA
Input bias current	I_B	I_{IN+}/I_{IN-}		45	250	nA
Common-mode input voltage range	V_{ICM}		0		$V_{CC}-1.8$	V
Common-mode rejection ratio	CMR	$V_{CC} = 30\text{ V}$	65	80		dB
Large-amplitude voltage gain	VG	$V_{CC} = 15\text{ V}$, $R_L \geq 2\text{ k}\Omega$	25	100		V/mV
Output voltage range	V_{OUT}		0		$V_{CC}-1.8$	V
Supply voltage rejection ratio	SVR		65	100		dB
Channel separation	CH sep	$f = 1\text{ k}$ to 20 kHz		120		dB
Current drain	I_{CC}			0.5	1.2	mA
Output current (source)	I_O source	$V_{IN+} = 1\text{ V}$, $V_{IN-} = 0\text{ V}$	10	20		mA
Output current (sink)	I_O sink	$V_{IN+} = 0\text{ V}$, $V_{IN-} = 1\text{ V}$	7	20		mA

Package Dimensions

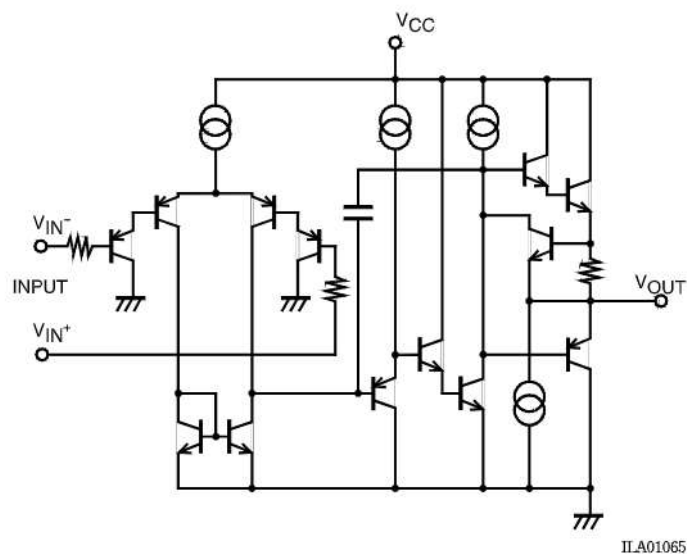
unit: mm
3032C



Pin Assignment

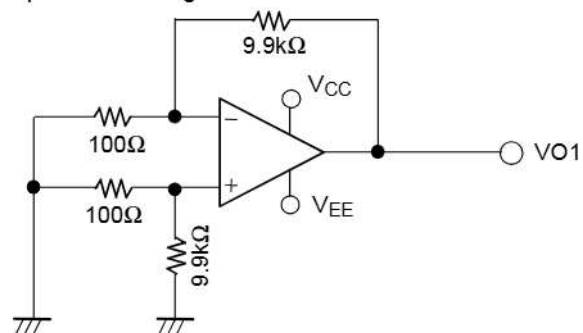


Equivalent Circuit



Test Circuits

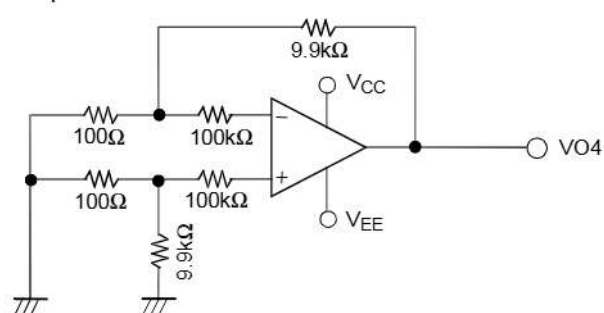
1. Input offset voltage VIO



$$V_{CC}/V_{EE} = \pm 15V$$

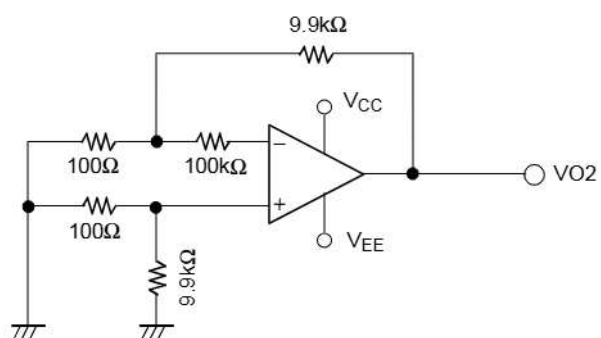
$$VIO = VO1/100$$

2. Input offset current IIO



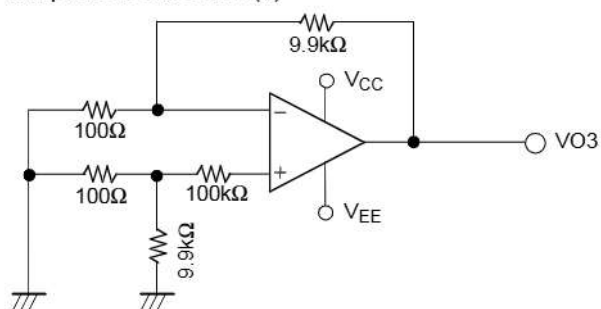
$$IIO = \frac{|VO4 - VO1|}{100k\Omega \times 100}$$

3. Input bias current IB (-)



$$IB(-) = \frac{|VO2 - VO1|}{100k\Omega \times 100}$$

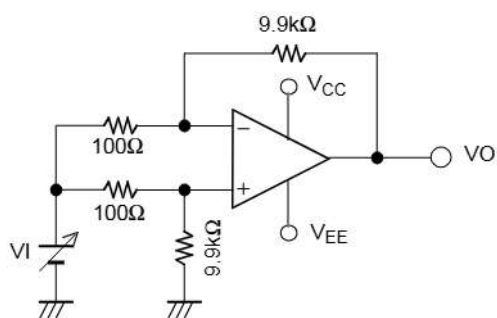
4. Input bias current IB (+)



$$IB(+) = \frac{|VO3 - VO1|}{100k\Omega \times 100}$$

5. Common-mode rejection ratio CMR

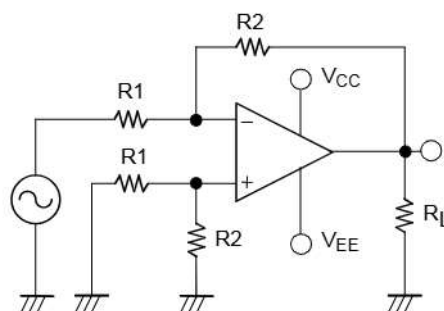
Common-mode input voltage range VICN



CMR $V_I = \pm 7.5V$

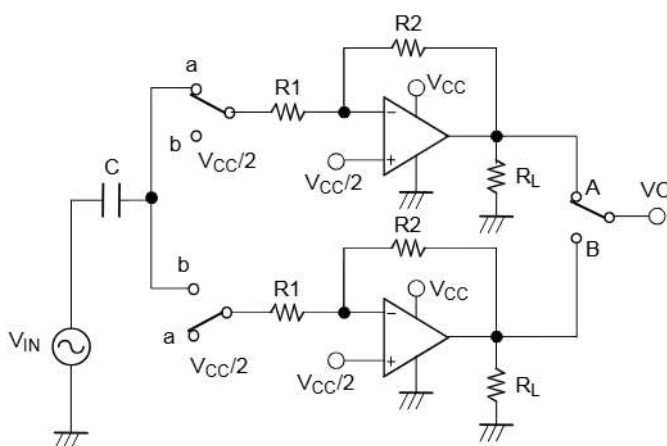
$$CMR = 20 \log \frac{15 \times 100}{|\Delta VO|}$$

6. Voltage gain VG



$$VG = \frac{R2}{R1}$$

7. Channel separation CH sep



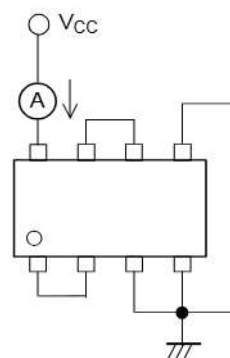
When the switch is in the "a" position

$$CH \text{ sep}(A \rightarrow B) = 20 \log \frac{R2VOA}{R1VOB}$$

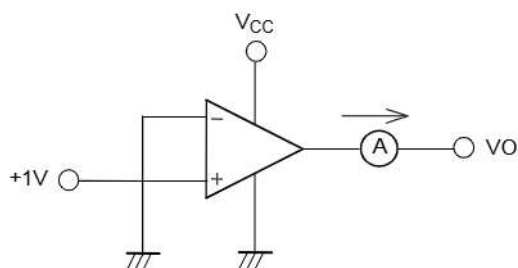
When the switch is in the "b" position

$$CH \text{ sep}(B \rightarrow A) = 20 \log \frac{R2VOB}{R1VOA}$$

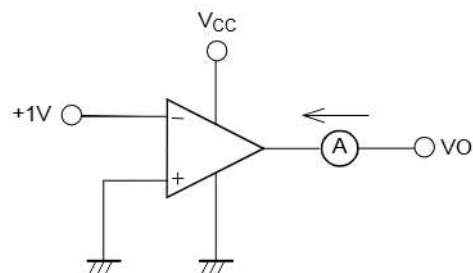
8. Current drain I_{CC}



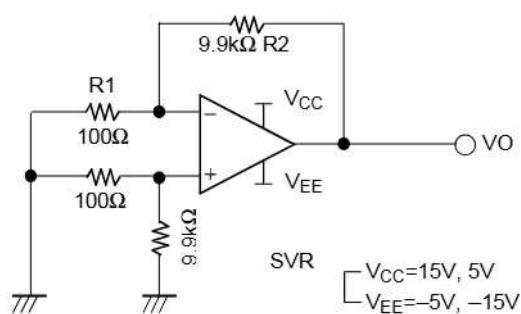
9. Output current I_O source



10. Output current I_O sink

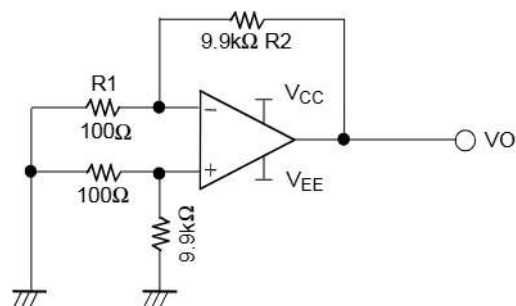


11. Supply voltage rejection ratio SVR (+)

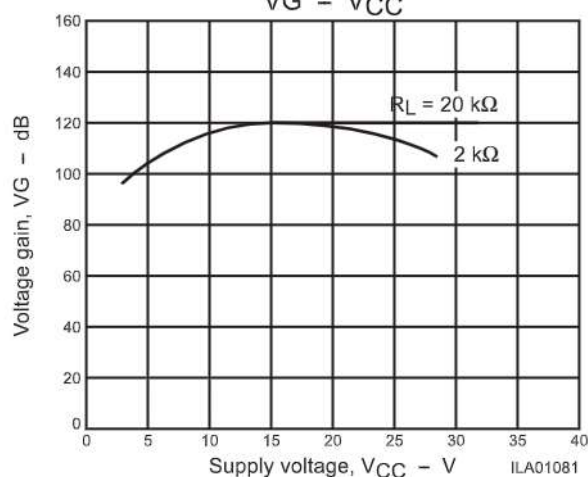
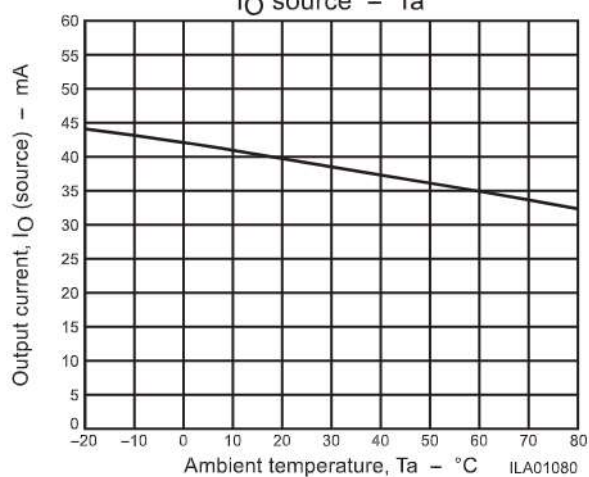
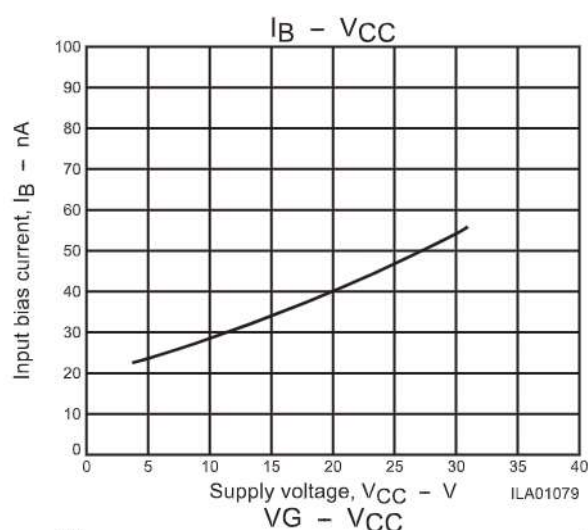
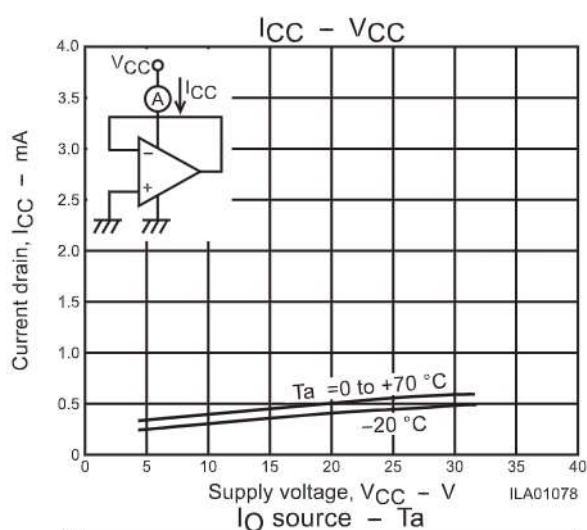


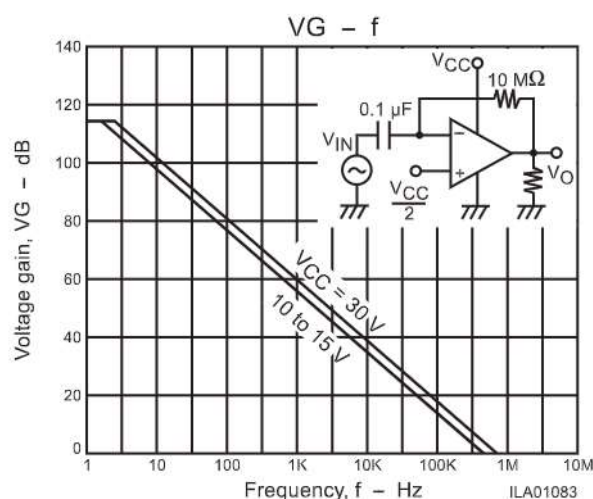
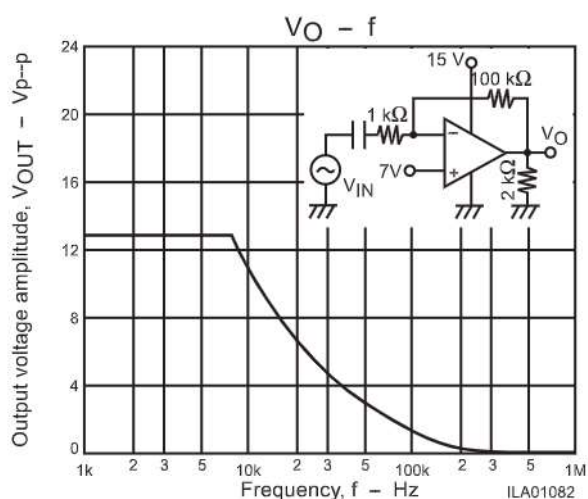
$$SVR(+) = 20 \log \left| \frac{\Delta V_{CC} \times 100}{\Delta V_O} \right|$$

12. Supply voltage rejection ratio SVR (-)



$$SVR(-) = 20 \log \left| \frac{\Delta V_{EE} \times 100}{\Delta V_O} \right|$$





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