

Description

The LM358 contains two independent high gain operational amplifiers with internal compensation.

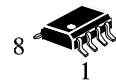
The two op-amps operate over a wide voltage range from a single power supply. Also use a split power supply. The device has low power supply voltage. The low power drain also makes the LM358 a good choice for battery operation.

When your project calls for a traditional op-amp function, now you can streamline your design with a simple any digital system or personal computer application, without requiring an extra 15V power supply just to have the interface electronics you need.

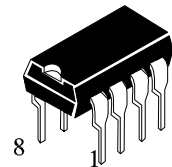
The LM358 is a versatile, rugged workhorse with a thousand-and-one use, from amplifying signals from a variety of transducers to dc gain blocks, or any op-amp function. The attached pages offer some recipes that will have your project cooking in no time.

Features

- Internally frequency compensated for unity gain
- Large DC voltage gain: 100dB Wide power supply range: 3V ~ 32V (or $\pm 1.5V \sim \pm 16V$)
- Input common-mode voltage range includes ground
- Large output voltage swing: 0V DC to $V_{CC} - 1.5V$ DC
- Power drain suitable for battery operation
- Differential input voltage range equal to the power supply
- Low input offset voltage and offset current



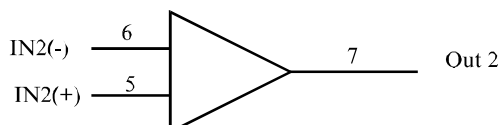
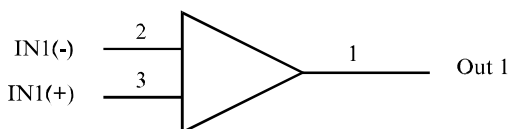
SOP - 8



DIP - 8
Package

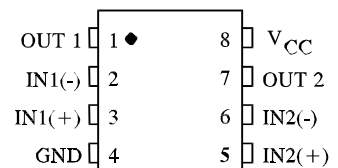
Internal Block Diagram

Logic Diagram



PIN 4 = GND
PIN 8 = V_{CC}

Pin Assignment



Electrical Characteristics

at specified free-air temperature, $V_{CC} = 5\text{ V}$ (unless otherwise noted)

Symbol	Parameter	Test conditions*		LM358			Units
				Min	Typ	Max	
V_{IO}	Input offset voltage	$V_{CC} = 5\text{ V to MAX,}$ $V_{IC} = V_{ICR\text{ min,}}$ $V_O = 1.4\text{ V}$	25 °C		3	7	mV
			Full range			9	
αV_{IO}	Average temperature coefficient of input offset voltage		Full range		7		$\mu\text{V}/^\circ\text{C}$
I_{IO}	Input offset current	$V_O = 1.4\text{ V}$	25 °C		2	50	nA
			Full range			150	
αI_{IO}	Average temperature coefficient of input offset current		Full range		10		$\text{pA}/^\circ\text{C}$
I_{IB}	Input bias current	$V_O = 1.4\text{ V}$	25 °C		-20	-250	nA
			Full range			-500	
V_{ICR}	Common-mode input voltage range	$V_{CC} = 5\text{ V to MAX}$	25 °C	0 to $V_{CC} - 1.5$			V
			Full range	0 to $V_{CC} - 2$			
V_{OH}	High-level output voltage	$R_L \geq 2\text{ k}\Omega$	25 °C	$V_{CC} - 1.5$			V
		$V_{CC} = \text{MAX, } R_L = 2\text{ k}\Omega$	Full range	26			
		$V_{CC} = \text{MAX, } R_L \geq 10\text{ k}\Omega$	Full range	27	28		
	V_{OL} Low-level output voltage	$R_L \geq 10\text{ k}\Omega$	Full range		5	20	mV
A_{VD}	Large-signal differential voltage amplification	$V_{CC} = 15\text{ V,}$ $V_O = 1\text{ V to } 11\text{ V,}$ $R_L \geq 2\text{ k}\Omega$	25 °C	25	100		V/mV
			Full range	15			
CMRR	Common-mode rejection ratio	$V_{CC} = 5\text{ V to MAX,}$ $V_{IC} = V_{ICR\text{ min}}$	25 °C	65	80		dB
k_{SVR}	Supply voltage rejection ratio ($\Delta V_{CC}/\Delta V_{IO}$)	$V_{CC} = 5\text{ V to MAX}$	25 °C	65	100		dB
V_{O1}/V_{O2}	Crosstalk attenuation	$f = 1\text{ kHz to } 20\text{ kHz}$	25 °C		120		dB
I_O	Output current	$V_{CC} = 15\text{ V,}$ $V_{ID} = 1\text{ V, } V_O = 0$	25 °C	-20	-30		mA
			Full range	-10			
		$V_{CC} = 15\text{ V,}$ $V_{ID} = -1\text{ V, } V_O = 15\text{ V}$	25 °C	10	20		μA
			Full range	5			
I_{OS}	Short-circuit output current	V_{CC} at 5 V, GND at -5 V, $V_O = 0$	25 °C		± 40	± 60	mA
I_{CC}	Supply current (two amplifiers)	$V_O = 2.5\text{ V, No load}$	Full range		0.7	1.2	mA
		$V_{CC} = \text{MAX,}$ $V_O = 0.5V_{CC}, \text{ No load}$	Full range		1	2	

- All characteristics are measured under open-loop conditions with zero common-mode input voltage unless otherwise specified. "MAX" V_{CC} for testing purposes is 30 V. Full range is 0 °C to 70 °C.

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{CC}	Power Supply Voltages Single Supply Split Supplies	32 ± 16	V
V_{IDR}	Input Differential Voltage Range (1)	± 32	V
V_{ICR}	Input Common Mode Voltage Range	-0.3 to 32	V
t_s	Short-Circuit duration of Output	100	ms
I_{IN}	Input Current, per pin (2)	50	mA
T_J	Junction Temperature Plastic Packages	150	$^{\circ}\text{C}$
T_{stg}	Storage Temperature ($T_A = +25^{\circ}\text{C}$) Plastic Packages	-55 to +125	$^{\circ}\text{C}$
T_L	Lead Temperature, 1mm from Case for 10 Seconds	260	$^{\circ}\text{C}$

Maximum Ratings are those values beyond which damage to the device may occur. Functional operation should be restricted to the Recommended Operating Conditions.

Notes:

1. Split Power Supplies.
2. $V_{IN} < -0.3\text{V}$. This input current will only exist when voltage at any of the input leads is driven negative.

Typical Performance Characteristics

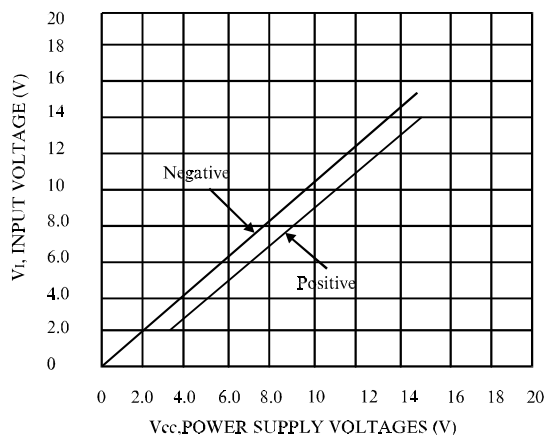


Figure 1. Input Voltage Range

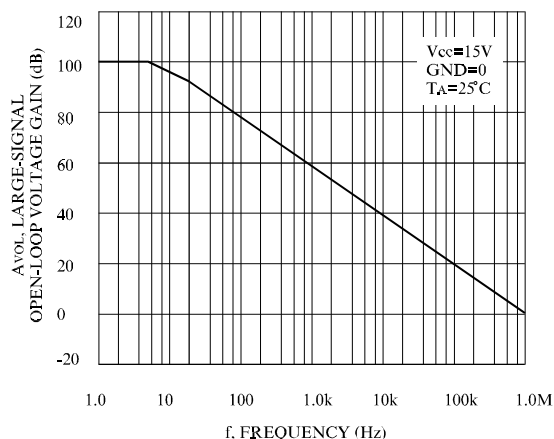


Figure 2. Open-Loop Frequency

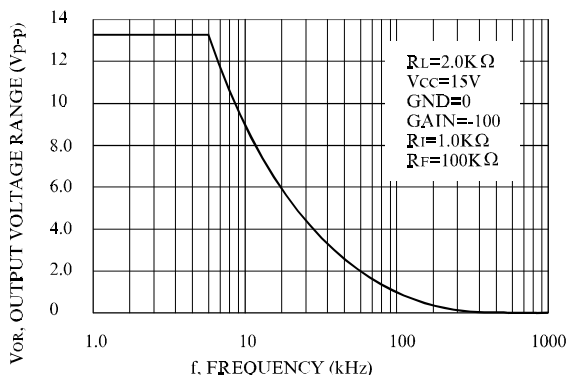


Figure 3. Large-Signal Frequency Response

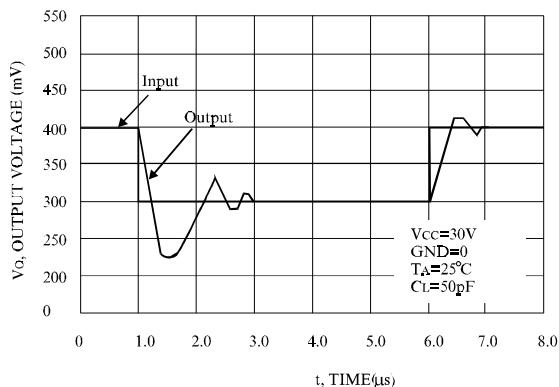


Figure 4. Small-Signal Voltage Follower Pulse Response (Noninverting)

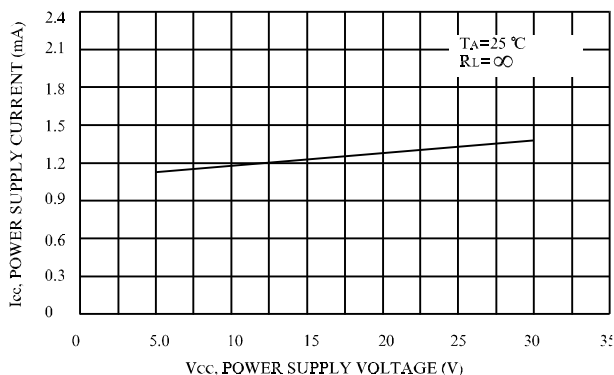


Figure 5. Power Supply Current versus Power Supply Voltage

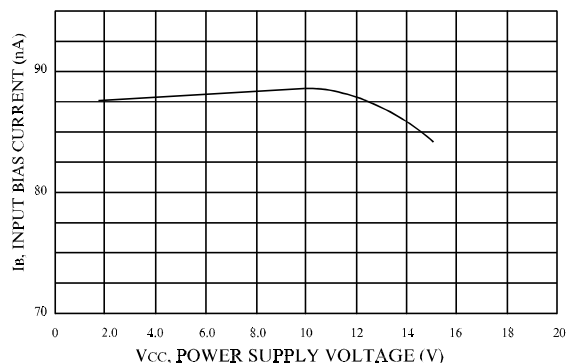


Figure 6. Input Bias Current versus Power Supply Voltage

Ordering Information

ORDERING NUMB	PACKAGE	MARKING
LM358	DIP - 8 / SOP - 8	LM358

Address : 北京市海淀区永定路 88 号长银大厦 6A06--6A07

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