

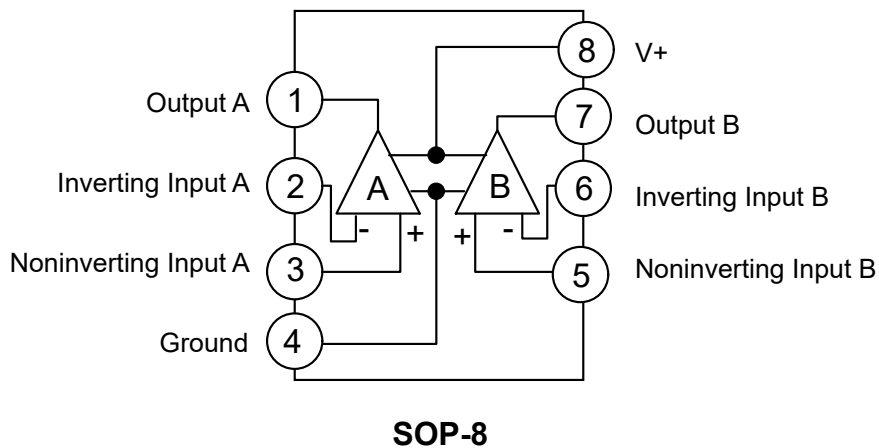
1. Description

The LM158 consists of two independent high-gain operational amplifiers. It can operate from either a single or dual power supply, and the current consumption is independent of the supply voltage. Applications include frequency converters, DC gain blocks, and all conventional operational amplifier circuits. Available in DIP8 or SOP8 packages.

2. Features

- Single or Dual Supply Operation
- Two Internally Compensated Operational Amplifiers in One Package
- Matched Logic Circuits
- Low Power Consumption
- Wide Frequency Range

3. Pinning Information





4. Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$, unless otherwise specified)

Parameter		Value	Units
Supply Voltage		32 or ± 16	V
Differential Input Voltage		± 32	V
Input Voltage		-0.32 to 32	V
Power Dissipation (Note 1)	DIP package	550	mW
	SOP package	530	mW
Output Short-Circuit Current to Ground (1 Amplifier) (Note 2) ($V + 15\text{V}$, $T_A=25^{\circ}\text{C}$)		Continuous	
Input Current ($V_{IN} < -0.3\text{V}$) (Note 3)		50	mA
Operating Temperature		-40 to 105	$^{\circ}\text{C}$
Storage Temperature		-65 to 150	$^{\circ}\text{C}$



5. Electrical Characteristics (Unless otherwise specified, $V^+=5V$)

Parameter		Conditions		Min	Typ	Max	Units
Input offset voltage		T _A =25°C			2	5	mV
Input bias current		T _A =25°C, I _{IN(+)} or I _{IN(-)} , V _{CM} =0V			45	150	nA
Input Offset Current		T _A =25°C, I _{IN(+)} - I _{IN(-)} , V _{CM} =0V			3	30	nA
Input common mode voltage range		T _A =25°C, V ⁺ =30V				V ⁺ -1.5	V
Power supply current		R _L =∞	V ⁺ =30V		1	2	mA
			V ⁺ =5V		0.5	1.2	mA
Large Signal Voltage Gain		V ⁺ =15V, T _A =25°C, R _L ≥2kΩ (for V _O =1~11V)		50	100		V/mV
CMRR		DC, T _A =25°C, V _{CM} =0~V ⁺ -1.5V			85		dB
PSRR		DC, T _A =25°C, V ⁺ =5~30V			100		dB
Coupling system between amplifiers number		T _A =25°C, f=1~20kHz (all inputs)			120		dB
Output source current		V _{IN(+)} =1V, V _{IN(-)} =0V, V ⁺ =15V V _O =2V, T _A =25°C		20	40		mA
Output suction current		V _{IN(-)} =1V, V _{IN(+)} =0V, V ⁺ =15V V _O =2V, T _A =25°C		10	20		mA
		V _{IN(-)} =1V, V _{IN(+)} =0V, V ⁺ =15V V _O =200mV, T _A =25°C		12	50		μA
Short circuit current to ground		V ⁺ =15V, T _A =25°C			40	60	mA
Output voltage swing		V _{OH}	V ⁺ =30V	R _L =2kΩ	26		V
				R _L =10kΩ	27	28	V
		V _{OL}	V ⁺ =5V, R _L =10kΩ			5	20

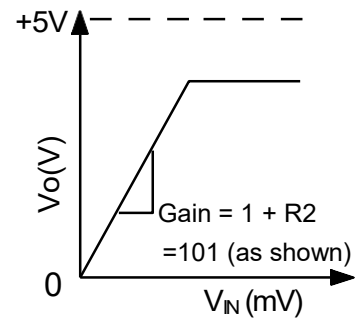
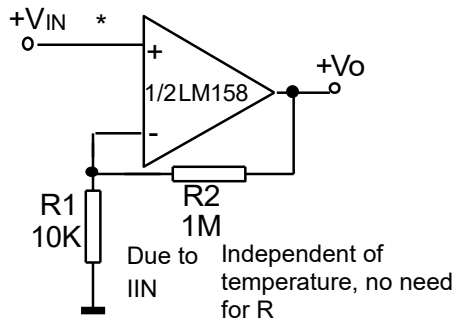


Parameter		Conditions	Min	Typ	Max	Units
Slew rate	SR	$V_{CC}^{+}=15V$, $V_i=0.5$ to $3V$, $R_L=2\text{ k}\Omega$ $C_L=100\text{pF}$, unity gain	0.3	0.6		$V/\mu s$
Gain bandwidth product	GBP	$V_{CC}^{+}=30V$, $f=100\text{kHz}$, $V_{in}=10\text{mV}$ $R_L=2\text{k}\Omega$, $C_L=100\text{pF}$	0.7	1.1		MHz
Total harmonic distortion	THD	$f=1\text{kHz}$, $A_v=20\text{dB}$, $R_L=2\text{k}\Omega$, $V_o=2V_{pp}$ $C_L=100\text{pF}$, $V_o=2V_{pp}$		0.02		%
Equivalent input noise voltage	e_n	$f=1\text{kHz}$, $R_s=100\Omega$, $V_{CC}^{+}=30V$		55		$nV/\sqrt{\text{Hz}}$



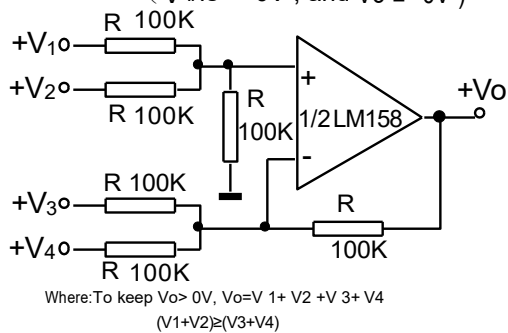
6. Typical Application

Non-inverting DC gain ($0\text{ V in} = 0\text{ V out}$)

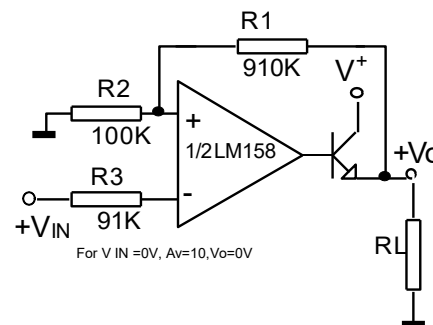


DC Summing Amplifier

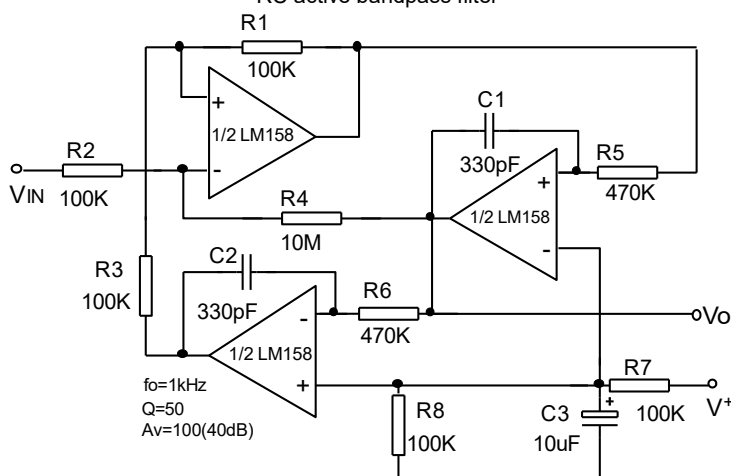
($V_{INs} \geq 0\text{ V}$, and $V_o \geq 0\text{ V}$)



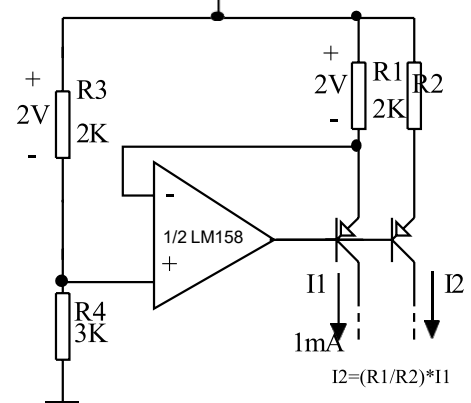
Power Amplifier



RC active bandpass filter



Fixed Current Source





7.1 Typical Characteristic

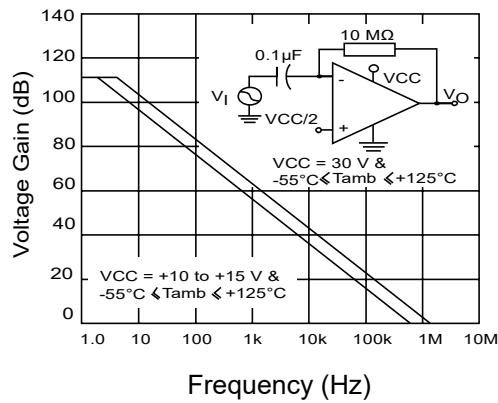


Figure 1: Open-loop frequency response

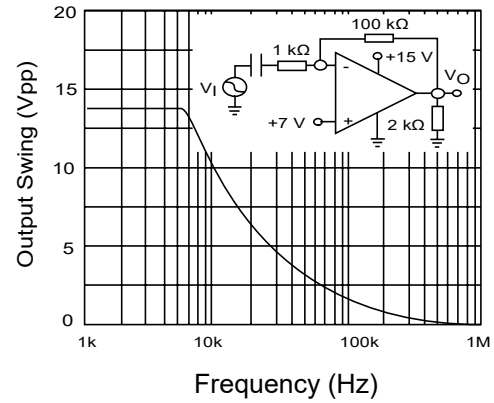


Figure 2: Large signal frequency response

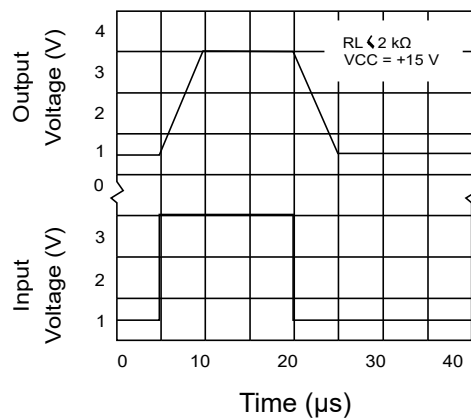
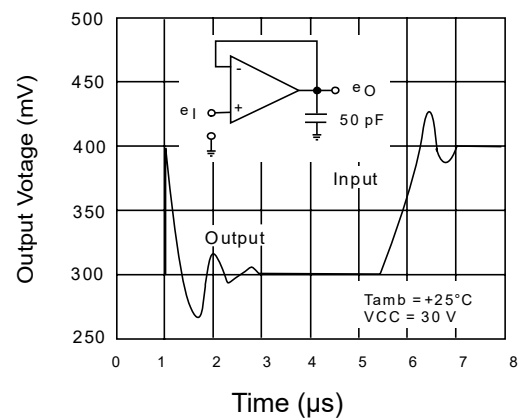
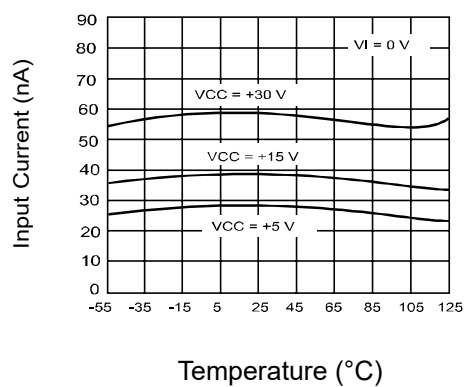
Figure 3: Voltage follower pulse response with $V_{CC} = 15\text{ V}$ Figure 4: Voltage follower pulse response with $V_{CC} = 30\text{ V}$ 

Figure 5: Input current

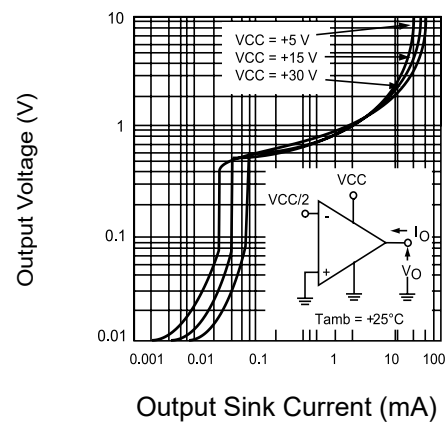


Figure 6: Output voltage vs sink current



7.2 Typical Characteristic

Figure 7: Output voltage vs source current	Figure 8: Current limiting
Figure 9: Input voltage range	Figure 10: Open-loop gain
Figure 11: Supply current	Figure 12: Input current

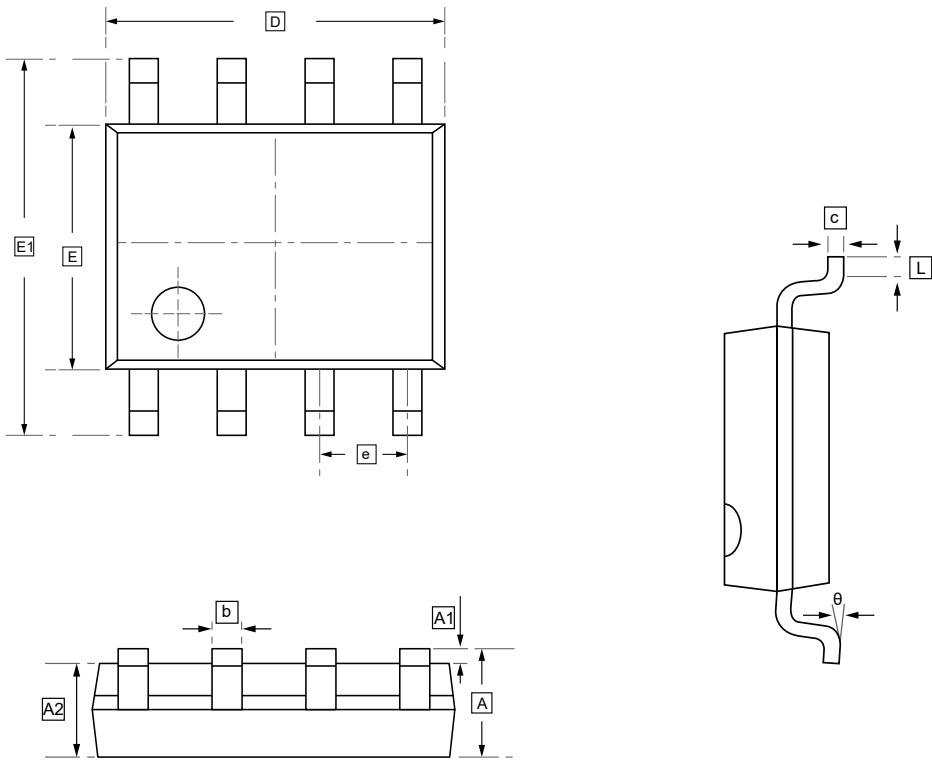


7.3 Typical Characteristic

Gain Bandwidth Product (MHz) Temperature (°C)	Power Supply Rejection Ratio (dB) Temperature (°C)
Figure 13: Gain bandwidth product	Figure 14: Power supply rejection ratio
Common Mode Rejection Ratio (dB) Temperature (°C)	Phase margin at Vcc = 15 V and Vicm = 7.5 V vs. Iout and capacitive load value lout (µA) Source for positive values/Sink for negative values
Figure 15: Common-mode rejection ratio	Figure 16: Phase margin vs. capacitive load



8.SOP-8 Package Outline Dimensions

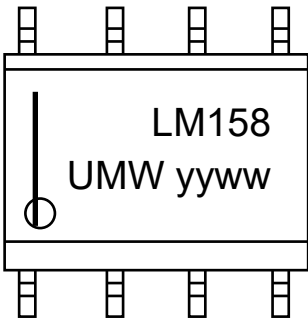


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E	E1	e	L	θ
Min	1.350	0.000	1.350	0.330	0.170	4.700	3.800	5.800	1.270	0.400	0°
Max	1.750	0.100	1.550	0.510	0.250	5.100	4.000	6.200	BSC	1.270	8°



9.Ordering Information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW LM158DR	SOP-8	2500	Tape and reel



10.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

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