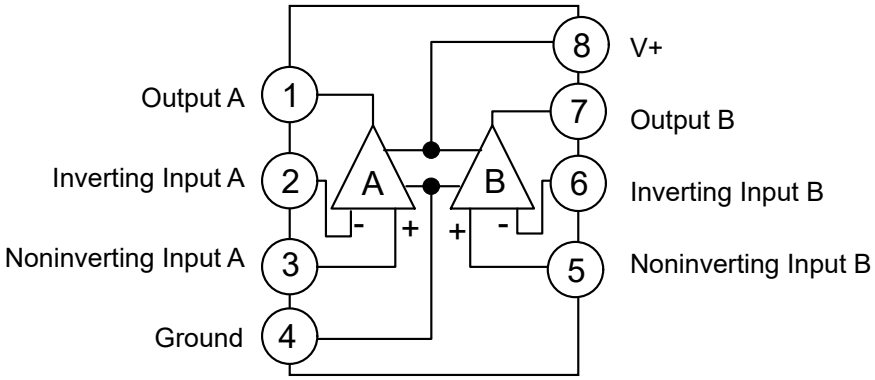
1.Description

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



SOP-8

4.Absolute Maximum Ratings (T_A=25°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 + 15V, T_A=25°C)		Continuous	
Input Current (VIN<-0.3V) (Note 3)		50	mA
Operating Temperature		-40 to 105	°C
Storage Temperature		-65 to 150	°C

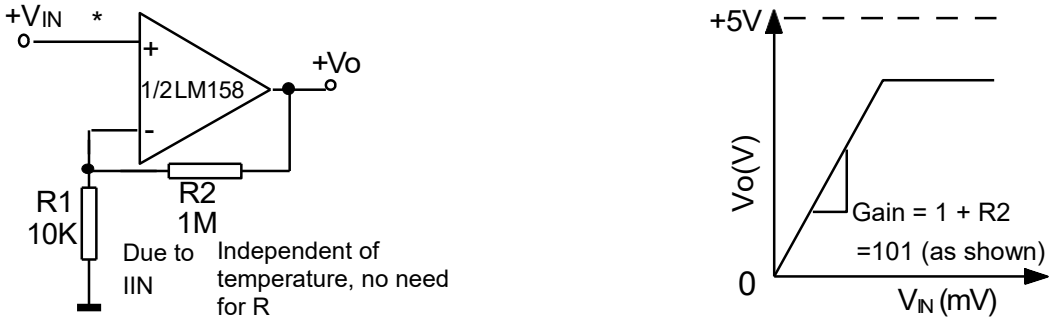
5.Electrical Characteristics (Unless otherwise specified, V+=5V)

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	mV

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

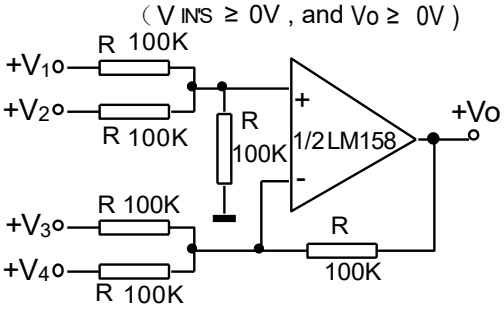
6.Typical Application

Non-inverting DC gain (0 V in = 0 V out)



DC Summing Amplifier

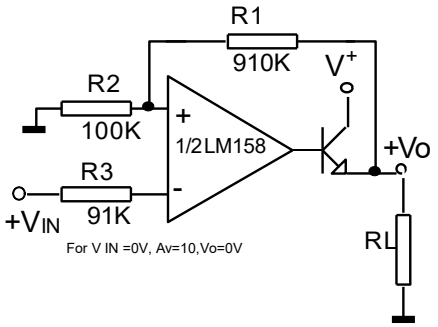
（V INS ≥ 0V , and Vo ≥ 0V）



Where:To keep Vo> 0V, Vo=V 1+ V2 +V 3+ V4

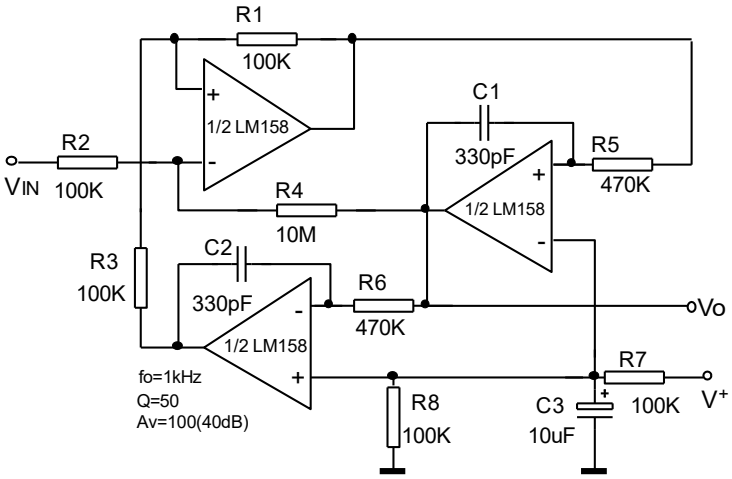
(V1+V2)≥(V3+V4)

Power Amplifier

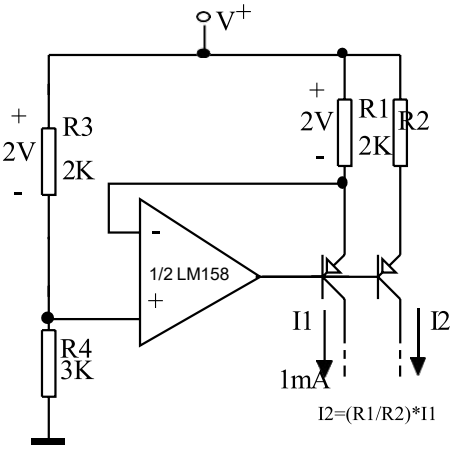


For V IN =0V, Av=10,Vo=0V

RC active bandpass filter



Fixed Current Source



I2=(R1/R2)*I1

7.1 Typical Characteristic

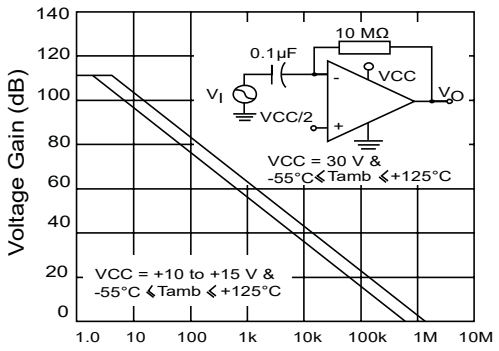


Figure 1: Open-loop frequency response

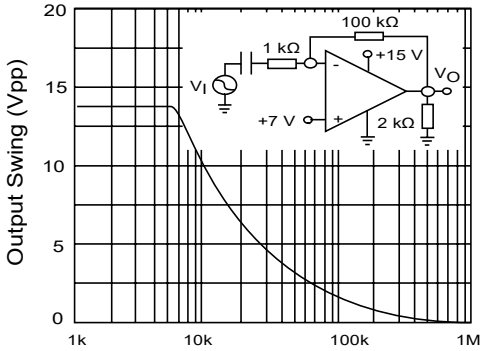


Figure 2: Large signal frequency response

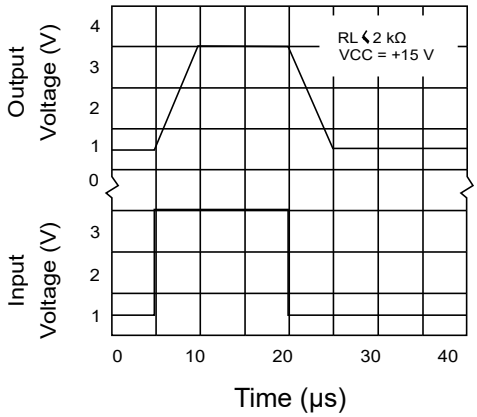


Figure 3: Voltage follower pulse response with V_{CC} = 15 V

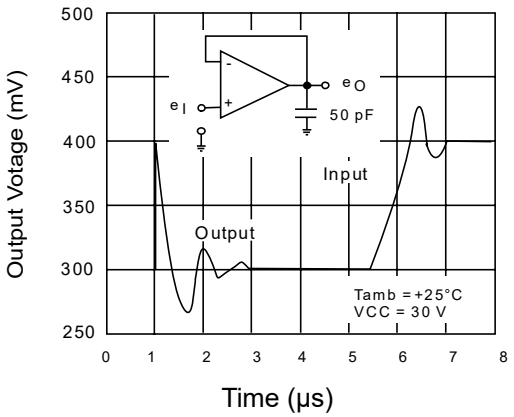


Figure 4: Voltage follower pulse response with V_{CC} = 30 V

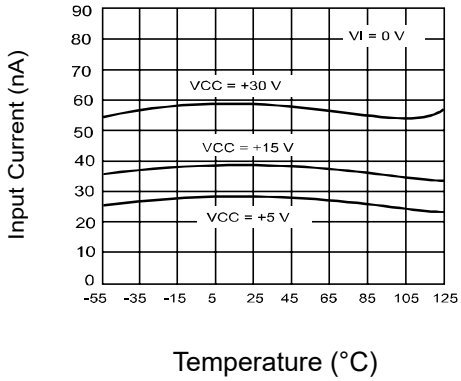


Figure 5: Input current

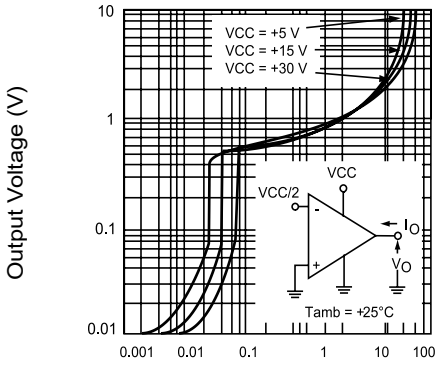
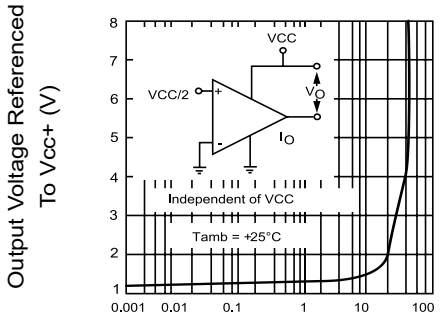


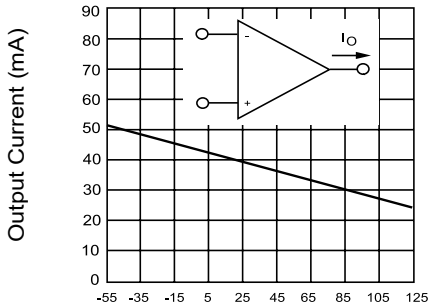
Figure 6: Output voltage vs sink current

7.2 Typical Characteristic



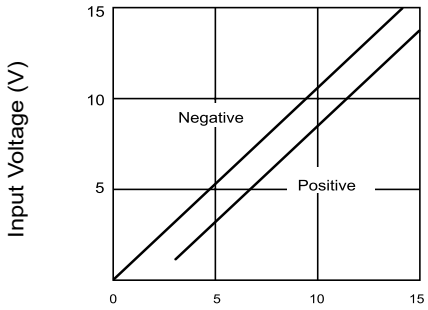
Output Source Current (mA)

Figure 7: Output voltage vs source current



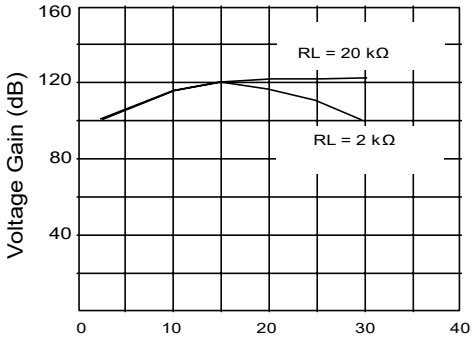
Temperature (°C)

Figure 8: Current limiting



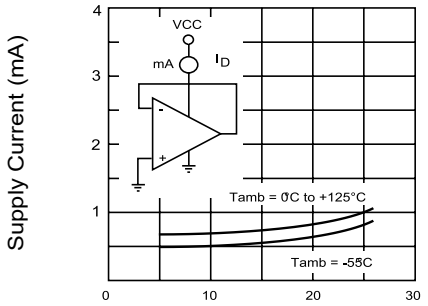
Power Supply Voltage (±V)

Figure 9: Input voltage range



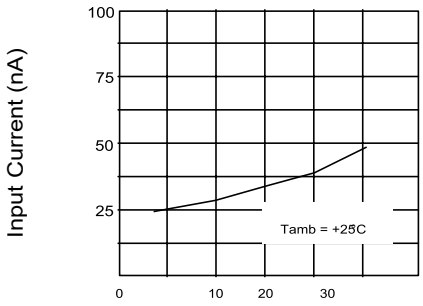
Positive Supply Voltage (V)

Figure 10: Open-loop gain



Positive Supply Voltage (V)

Figure 11: Supply current



Positive Supply Voltage (V)

Figure 12: Input current

7.3 Typical Characteristic

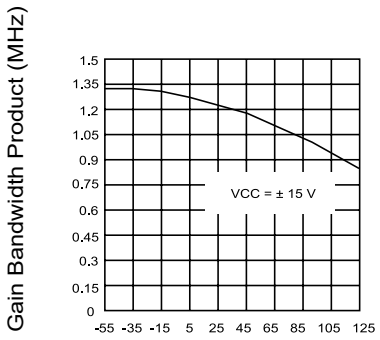


Figure 13: Gain bandwidth product

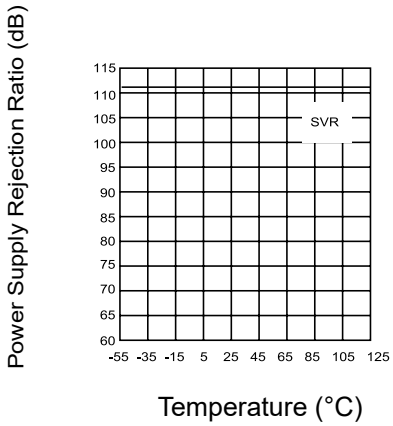


Figure 14: Power supply rejection ratio

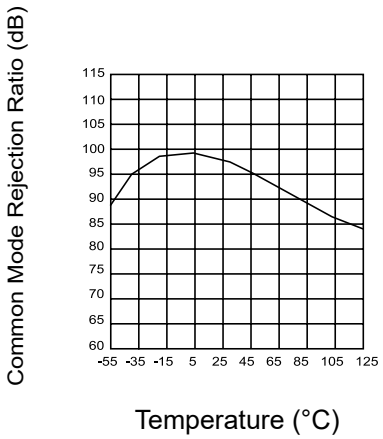


Figure 15: Common-mode rejection ratio

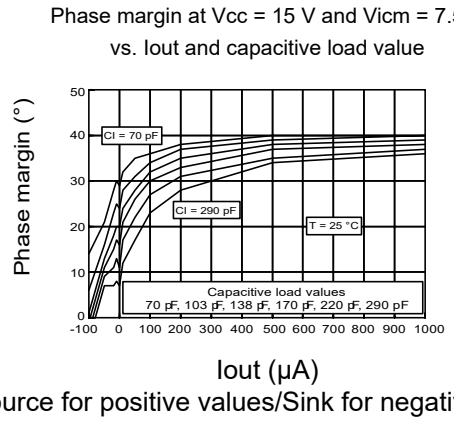
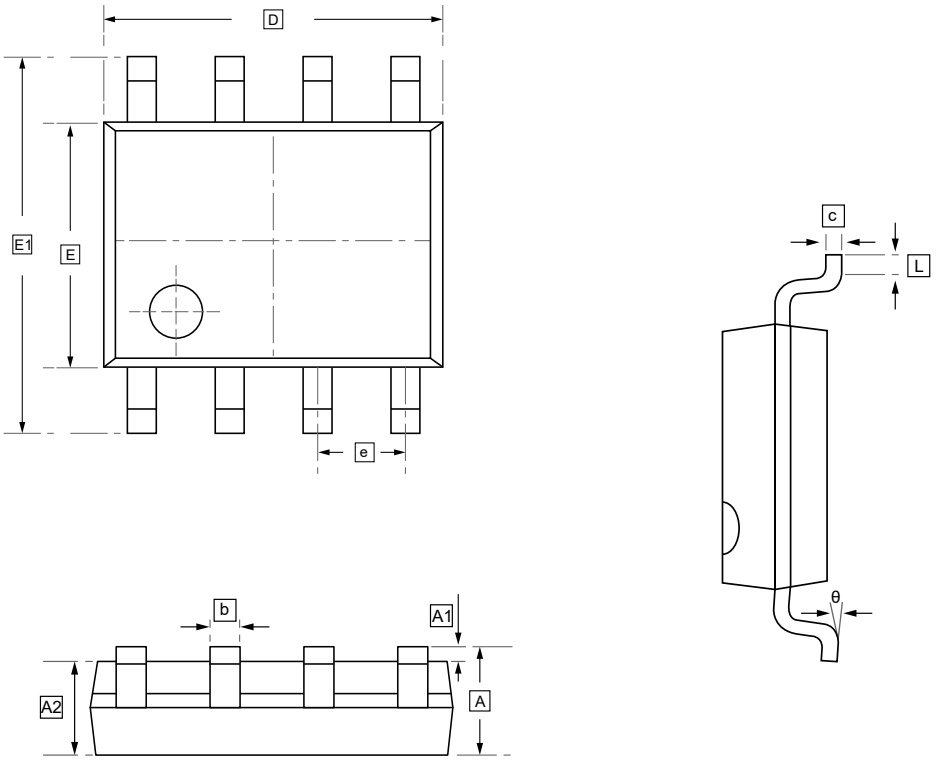


Figure 16: Phase margin vs. capacitive load

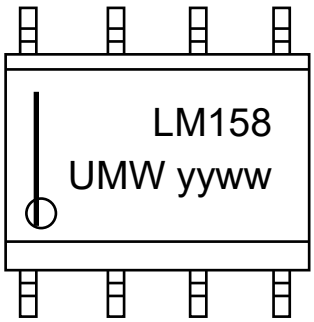
8.SOP-8 Package Outline Dimensions



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

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