

DUAL OPERATIONAL AMPLIFIERS

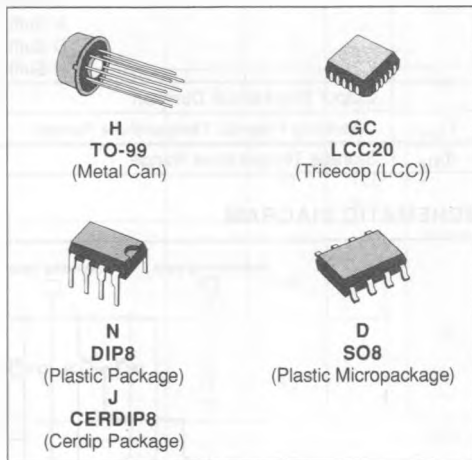
- LOW POWER CONSUMPTION
- LARGE INPUT VOLTAGE RANGE
- NO LATCH-UP
- HIGH GAIN
- SHORT-CIRCUIT PROTECTION
- NO FREQUENCY COMPENSATION REQUIRED

DESCRIPTION

The MC1458 is a high performance monolithic dual operational amplifier constructed on a single silicon chip. It is intended for a wide range of analog applications.

- Summing amplifier.
- Voltage follower.
- Integrator.
- Active filter.
- Function generator.

The high gain and wide range of operating voltages provide superior performance in integrator, summing amplifier, and general feed back applications. The internal compensation network (6 dB/octave) insures stability in closed loop applications.

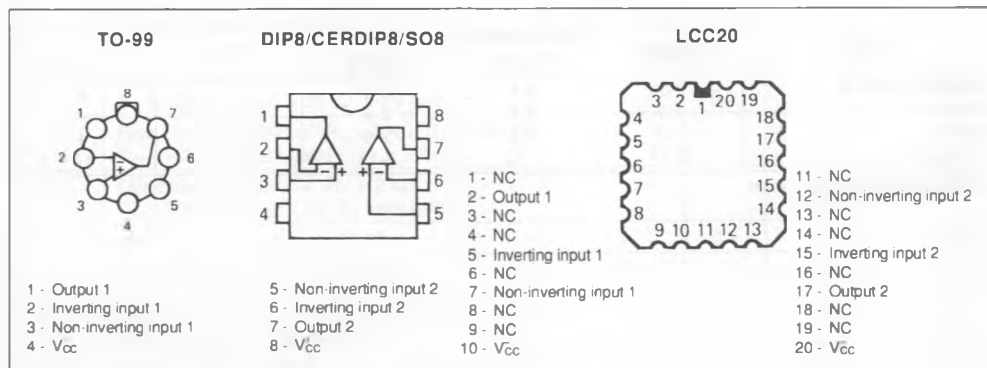


ORDER CODES

Part Number	Temperature Range	Package				
		H	N	J	D	GC
MC1458	0 to + 70 °C	•	•		•	
MC1458J	- 40 + 105 °C	•	•	•	•	
MC1558	- 55 to + 125 °C	•				•

Note : HI-Rel Versions Available
Example : MC1458H. MC1558GC.

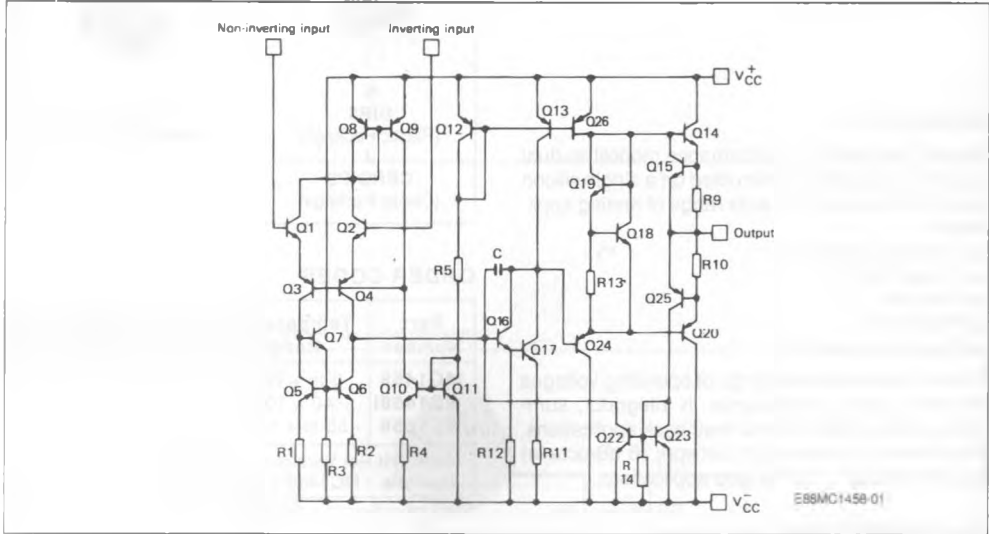
PIN CONNECTIONS (top views)



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	LM1458	LM1458I	LM1558	Unit
V _{CC}	Supply Voltage	± 22	± 22	± 22	V
V _I	Input Voltage	± 15	± 15	± 15	V
V _{ID}	Differential Input Voltage	± 30	± 30	± 30	V
P ₁₀₁	Power Dissipation	J Suffix GC Suffix H Suffix D Suffix N Suffix	660 660 660 300 500	665 660	mW
	Output Short-circuit Duration	Infinite			
T _{oper}	Operating Free-air Temperature Range	− 55 to + 125	− 40 to + 105	0 to + 70	°C
T _{stg}	Storage Temperature Range	− 65 to 150	− 65 to 150	− 65 to 150	°C

SCHEMATIC DIAGRAM



Case	Outputs	Non-inverting Inputs	Inverting Inputs	V _{CC}	V _{CC}
DIP8/CERDIP8	1-7	3-5	2-6	8	4
TO-99	1-7	3-5	2-6	8	4
SO8	1-7	3-5	2-6	8	4
LCC20*	2-17	7-12	5-15	20	10

* LCC20 : Other pins not connected.

ELECTRICAL CHARACTERISTICS

MC1458 : $0 \leq T_{amb} \leq + 70\text{ }^{\circ}\text{C}$ MC1458I : $- 40 \leq T_{amb} \leq + 105\text{ }^{\circ}\text{C}$ MC1558 : $- 55 \leq T_{amb} \leq + 125\text{ }^{\circ}\text{C}$

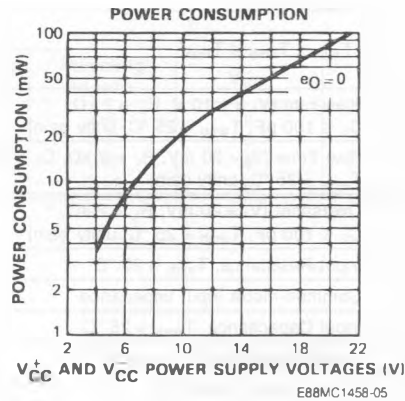
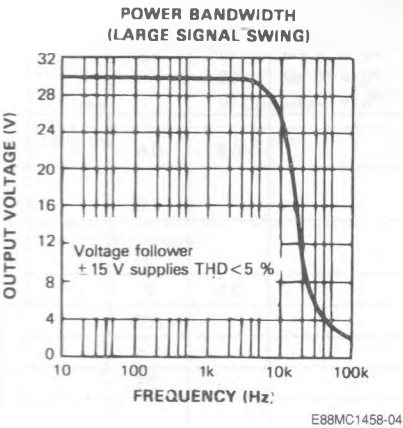
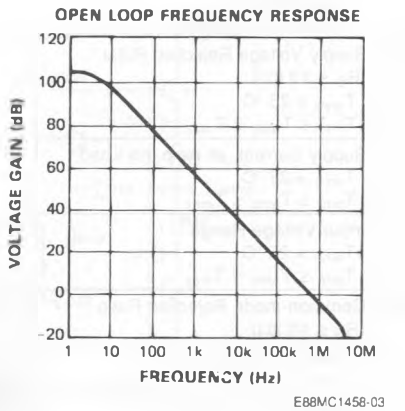
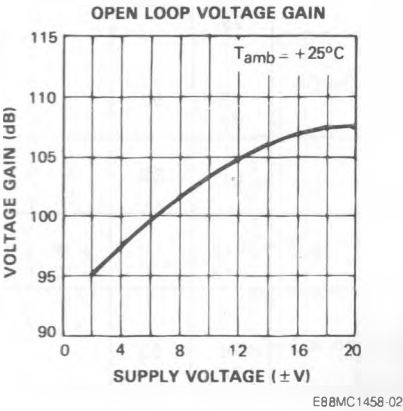
(unless otherwise specified)

 $V_{CC} = \pm 15\text{ V}$ $V_{CC} = \pm 15\text{ V}$ $V_{CC} = \pm 15\text{ V}$

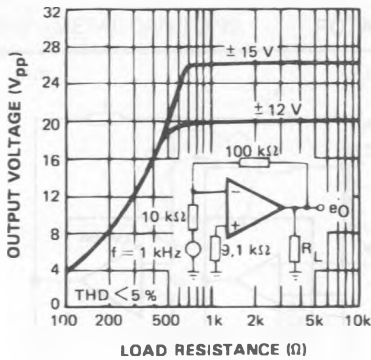
Symbol	Parameter	MC1458 / 1458I / 1558			Unit
		Min.	Typ.	Max.	
V_{IO}	Input Offset Voltage $R_S \leq 10\text{ k}\Omega$ $T_{amb} = 25\text{ }^{\circ}\text{C}$ $T_{min} \leq T_{amb} \leq T_{max}$		1	5 6	mV
I_{IO}	Input Offset Current $T_{amb} = 25\text{ }^{\circ}\text{C}$ $T_{min} \leq T_{amb} \leq T_{max}$		2	20 40	nA
I_{IB}	Input Bias Current $T_{amb} = 25\text{ }^{\circ}\text{C}$ $T_{min} \leq T_{amb} \leq T_{max}$		30	100 200	nA
A_{VD}	Large Signal Voltage Gain ($V_O = \pm 10\text{ V}$, $R_L = 2\text{ k}\Omega$) $T_{amb} = 25\text{ }^{\circ}\text{C}$ $T_{min} \leq T_{amb} \leq T_{max}$	50 25	200		V/mV
SVR	Supply Voltage Rejection Ratio ($R_S \leq 10\text{ k}\Omega$) $T_{amb} = 25\text{ }^{\circ}\text{C}$ $T_{min} \leq T_{amb} \leq T_{max}$	77 77	90		dB
I_{CC}	Supply Current, all Amp. no Load $T_{amb} = 25\text{ }^{\circ}\text{C}$ $T_{min} \leq T_{amb} \leq T_{max}$		2.3	5 6	mA
V_I	Input Voltage Range $T_{amb} = 25\text{ }^{\circ}\text{C}$ $T_{min} \leq T_{amb} \leq T_{max}$	- 12 - 12		+ 12 + 12	V
CMR	Common-mode Rejection Ratio ($R_S \leq 10\text{ k}\Omega$) $T_{amb} = 25\text{ }^{\circ}\text{C}$ $T_{min} \leq T_{amb} \leq T_{max}$	70 70	90		dB
I_{OS}	Output Short-circuit Current $T_{amb} = 25\text{ }^{\circ}\text{C}$	10	20	35	mA
$\pm V_{OPP}$	Output Voltage Swing $T_{amb} = 25\text{ }^{\circ}\text{C}$ $T_{min} \leq T_{amb} \leq T_{max}$	$R_L = 10\text{ k}\Omega$ 12 $R_L = 2\text{ k}\Omega$ 10 $R_L = 10\text{ k}\Omega$ 12 $R_L = 2\text{ k}\Omega$ 10	14 13		V
S_{VO}	Slew-rate ($V_I = \pm 10\text{ V}$, $R_L = 2\text{ k}\Omega$, $C_L \leq 100\text{ pF}$, $T_{amb} = 25\text{ }^{\circ}\text{C}$, unity gain)	0.2	0.8		V/ μ s
t_r	Rise Time ($V_I = 20\text{ mV}$, $R_L = 2\text{ k}\Omega$, $C_L \leq 100\text{ pF}$, $T_{amb} = 25\text{ }^{\circ}\text{C}$, unity gain)		0.3		μ s
K_{OV}	Overshoot ($V_I = 20\text{ mV}$, $R_L = 2\text{ k}\Omega$, $C_L \leq 100\text{ pF}$, $T_{amb} = 25\text{ }^{\circ}\text{C}$, unity gain)		5		%
R_I	Input Resistance, $T_{amb} = 25\text{ }^{\circ}\text{C}$	0.3	2		M Ω
Z_{ic}	Common-mode Input Impedance		200		M Ω
C_I	Input Capacitance, $T_{amb} = 25\text{ }^{\circ}\text{C}$		1.4		pF
R_O	Output Resistance, $T_{amb} = 25\text{ }^{\circ}\text{C}$		75		Ω
B_{om}	Large Signal Bandwidth ($R_L = 2\text{ k}\Omega$, $V_O \geq \pm 10\text{ V}$, $A_{VD} = 1$, THD $\leq 5\%$)		14		KHz

ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	MC1458 / 1458I / 1558			Unit
		Min.	Typ.	Max.	
B	Unity Gain Bandwidth ($V_I = 10\text{ mV}$, $R_L = 2\text{ k}\Omega$, $C_L \leq 100\text{ pF}$, $T_{amb} = 25\text{ }^\circ\text{C}$)		1		MHz
GPB	Gain Bandwidth Product ($V_I = 10\text{ mV}$, $R_L = 2\text{ k}\Omega$, $C_L \leq 100\text{ pF}$, $f = 100\text{ KHz}$, $T_{amb} = 25\text{ }^\circ\text{C}$)	0.4	1		MHz
THD	Total Harmonic Distortion ($f = 1\text{ KHz}$, $A_V = 20\text{ dB}$, $R_L = 2\text{ k}\Omega$, $V_O = 2\text{ V}_{PP}$, $C_L \leq 100\text{ pF}$, $T_{amb} = 25\text{ }^\circ\text{C}$)		0.02		%
V_n	Equivalent Input Noise Voltage ($f = \text{KHz}$, $R_g = 100\text{ }\Omega$)		45		$\text{nV}/\sqrt{\text{Hz}}$
ϕM	Phase Margin		65		Degrees
Am	Gain Margin		11		dB

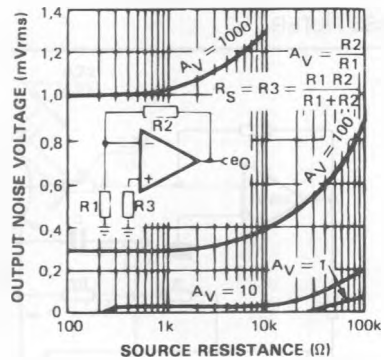


OUTPUT VOLTAGE SWING



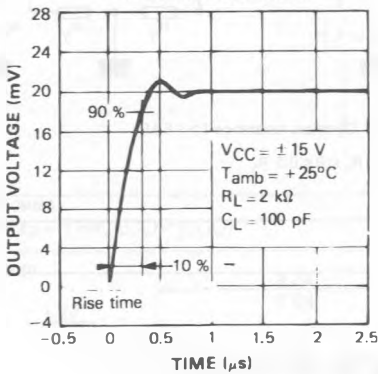
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OUTPUT NOISE VOLTAGE

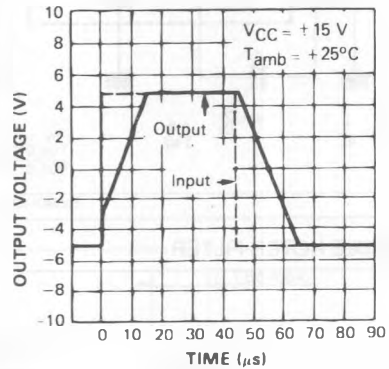


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TRANSIENT RESPONSE

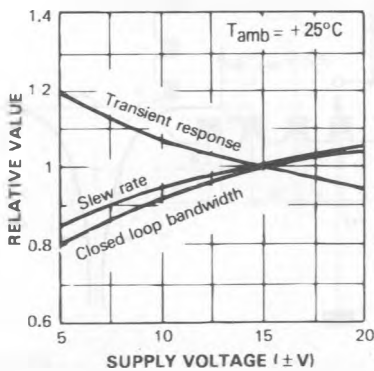


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VOLTAGE FOLLOWER
LARGE SIGNAL PULSE RESPONSE

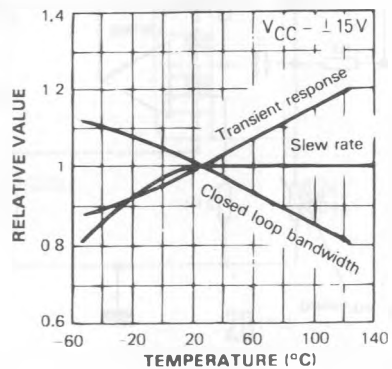
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FREQUENCY CHARACTERISTICS



E88MC1458-10

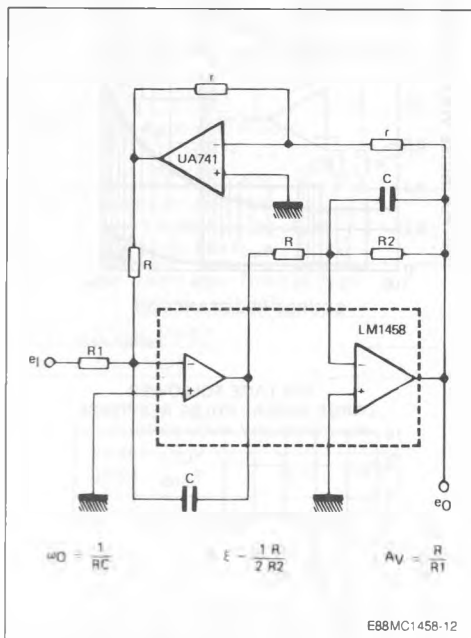
FREQUENCY CHARACTERISTICS



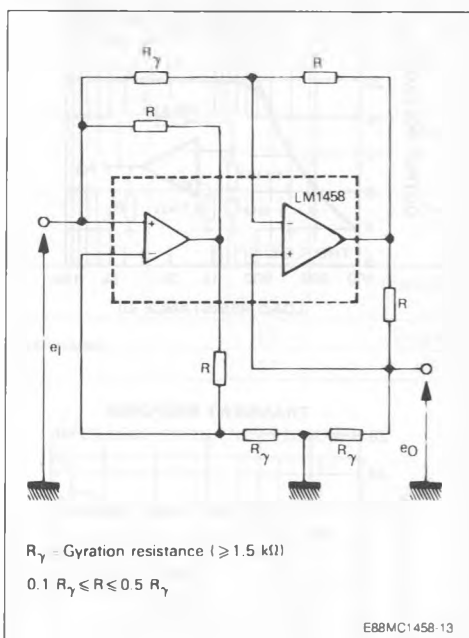
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TYPICAL APPLICATIONS

LOW PASS FILTER



GYRATOR



TURNABLE NOTCH FILTER

