

μ A1458 • μ A1558 Dual Internally Compensated Operational Amplifiers

Linear Division Operational Amplifiers

Description

The μ A1458, μ A1558 are a monolithic pair of internally frequency compensated high performance amplifiers constructed using the Fairchild Planar Epitaxial process. They are intended for a wide range of analog applications where board space or weight are important. High common mode voltage range and absence of latch up make the μ A1458, μ A1558 ideal for use as voltage followers. The high gain and wide range of operating voltage provide superior performance in integrator, summing amplifier and general feedback applications.

The μ A1458, μ A1558 are short circuit protected and require no external components for frequency compensation. The internal 6.0 db/octave roll off ensures stability in closed loop applications. For single amplifier performance, see the μ A741 data sheet.

The Fairchild μ A1458, μ A1558 slew rate has been improved to 0.8/ μ s typical.

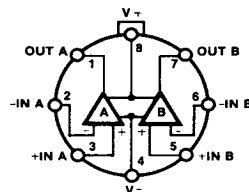
- No Frequency Compensation Required
- Short Circuit Protection
- Large Common Mode And Differential Voltage Ranges
- Low Power Consumption
- No Latch Up
- Mini-Dip Package

Absolute Maximum Ratings

Storage Temperature Range	
Metal Can and Ceramic DIP	-65°C to +175°C
Molded DIP and SO-8	-65°C to +150°C
Operating Temperature Range	
Extended (μ A1558M)	-55°C to +125°C
Commercial (μ A1458C)	0°C to +70°C
Lead Temperature	
Metal Can and Ceramic DIP (soldering, 60 s)	300°C
Molded DIP and SO-8 (soldering, 10 s)	265°C
Internal Power Dissipation ^{1, 2}	
8L-Metal Can	1.00 W
8L-Ceramic DIP	1.30 W
8L-Molded DIP	0.93 W
SO-8	0.81 W
Supply Voltage	
μ A1558	± 22 V
μ A1458	± 18 V
Differential Input Voltage	
Common Mode Input Swing ³	± 30 V
Output Short Circuit Duration ⁴	Indefinite

- Notes**
1. T_J Max = 150°C for the Molded DIP and SO-8, and 175°C for the Metal Can and Ceramic DIP.
 2. Ratings apply to ambient temperature at 25°C. Above this temperature, derate the 8L-Metal Can at 6.7 mW/°C, the 8L-Ceramic DIP at

Connection Diagram 8-Lead Metal Package (Top View)



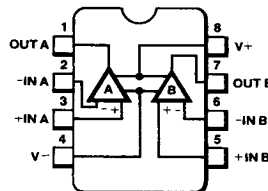
CD00471F

Lead 4 connected to case.

Order Information

Device Code	Package Code	Package Description
μ A1458HC	5W	Metal
μ A1458CHC	5W	Metal
μ A1558HM	5W	Metal

Connection Diagram 8-Lead DIP and SO-8 Package (Top View)



CD00650F

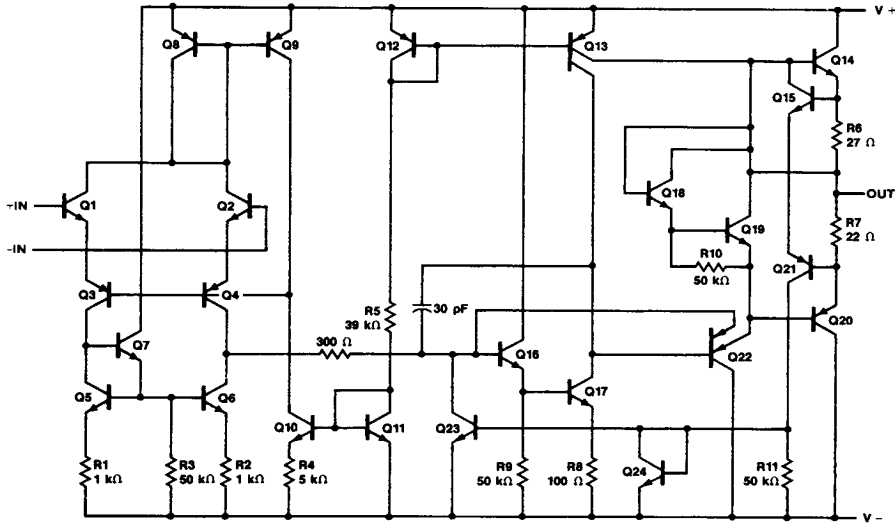
Order Information

Device Code	Package Code	Package Description
μ A1458RC	6T	Ceramic DIP
μ A1458SC	KC	Molded Surface Mount
μ A1458TC	9T	Molded DIP
μ A1458CRC	6T	Ceramic DIP
μ A1458CTC	9T	Molded DIP
μ A1558RM	6T	Ceramic DIP

8.7 mW/°C, the 8L-Molded DIP at 7.5 mW/°C, and the SO-8 at 6.5 mW/°C.

3. For supply voltages less than ± 15 V, the absolute maximum input voltage is equal to the supply voltage.
4. Short circuit may be to ground or either supply. Rating applies to +125°C case temperature or 70°C ambient temperature.

Equivalent Circuit (1/2 of Circuit)



EQ00011F

μA1458 and μA1458C

Electrical Characteristics $T_A = 25^\circ\text{C}$, $V_{CC} = \pm 15\text{ V}$, unless otherwise specified.

Symbol	Characteristic	Condition	μA1458			μA1458C			Unit
			Min	Typ	Max	Min	Typ	Max	
V_{IO}	Input Offset Voltage	$R_S \leq 10\text{ k}\Omega$		2.0	6.0		2.0	10	mV
I_{IO}	Input Offset Current			0.03	0.2		0.03	0.3	μA
I_{IB}	Input Bias Current			0.2	0.5		0.2	0.7	μA
Z_I	Input Impedance		0.3	1.0			1.0		MΩ
I_{CC}	Supply Current			2.3	5.6		2.3	8.0	mA
P_c	Power Consumption	$V_O = 0\text{ V}$		70	170		70	240	mW
CMR	Common Mode Rejection		70	90		60	90		dB
V_{IR}	Input Voltage Range		± 12	± 13		± 11	± 13		V
PSRR	Power Supply Rejection Ratio	$R_S \leq 10\text{ k}\Omega$		30	150		30		μV/V
I_{OS}	Output Short Circuit Current			20			20		mA
A_{VS}	Large Signal Voltage Gain	$V_O = \pm 10\text{ V}$, $R_L \geq 2.0\text{ k}\Omega$	20	100		20	100		V/mV
V_{OP}	Output Voltage Swing	$R_L = 10\text{ k}\Omega$	± 12	± 14		± 11	± 14		V
f_c	Unity Gain Crossover Frequency			1.1			1.1		MHz
SR	Slew Rate	$A_V = 1.0$		0.8			0.8		V/μs

The following specifications apply for $0^\circ\text{C} \leq T_A \leq +70^\circ\text{C}$

V_{IO}	Input Offset Voltage	$R_S \leq 10\text{ k}\Omega$			7.5			12	mV
$\Delta V_{IO}/\Delta T$	Input Offset Voltage Temperature Sensitivity	$R_S = 50\ \Omega$		15			15		μV/°C
I_{IO}	Input Offset Current				0.3			0.4	μA
I_{IB}	Input Bias Current				0.8			1.0	μA
A_{VS}	Large Signal Voltage Gain	$V_O = \pm 10\text{ V}$, $R_L \geq 2.0\text{ k}\Omega$	15			15			V/mV
V_{OP}	Output Voltage Swing	$R_L = 2.0\text{ k}\Omega$	± 10	± 13		± 9.0	± 13		V

μA1558

Electrical Characteristics $T_A = 25^\circ\text{C}$, $V_{CC} = \pm 15\text{ V}$, unless otherwise specified.

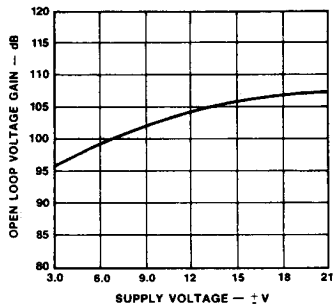
Symbol	Characteristic	Condition	μA1558			Unit
			Min	Typ	Max	
V_{IO}	Input Offset Voltage	$R_S \leq 10\text{ k}\Omega$		1.0	5.0	mV
I_{IO}	Input Offset Current			0.03	0.2	μA
I_{IB}	Input Bias Current			0.2	0.5	μA
Z_I	Input Impedance		0.3	1.0		MΩ
I_{CC}	Supply Current			2.3	5.0	mA
P_C	Power Consumption	$V_O = 0\text{ V}$		70	150	mW
CMR	Common Mode Rejection		70	90		dB
V_{IR}	Input Voltage Range		± 12	± 13		V
PSRR	Power Supply Rejection Ratio	$R_S \leq 10\text{ k}\Omega$		30	150	μV/V
I_{OS}	Output Short Circuit Current			20		mA
A_{VS}	Large Signal Voltage Gain	$V_O = \pm 10\text{ V}$, $R_L \geq 2.0\text{ k}\Omega$	50	200		V/mV
V_{OP}	Output Voltage Swing	$R_L = 10\text{ k}\Omega$	± 12	± 14		V
fc	Unity Gain Crossover Frequency			1.1		MHz
SR	Slew Rate	$A_V = 1.0$		0.8		V/μs

The following specifications apply for $-55^\circ\text{C} \leq T_A \leq +125^\circ\text{C}$

V_{IO}	Input Offset Voltage	$R_S \leq 10\text{ k}\Omega$			6.0	mV
$\Delta V_{IO}/\Delta T$	Input Offset Voltage Temperature Sensitivity	$R_S = 50\ \Omega$		15		μV/°C
I_{IO}	Input Offset Current				0.5	μA
I_{IB}	Input Bias Current				1.5	μA
A_{VS}	Large Signal Voltage Gain	$V_O = \pm 10\text{ V}$, $R_L \geq 2.0\text{ k}\Omega$	25			V/mV
V_{OP}	Output Voltage Swing	$R_L = 2.0\text{ k}\Omega$	± 10	± 13		V

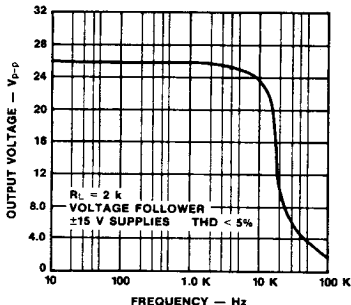
Typical Performance Curves $T_A = 25^\circ\text{C}$, $V_{CC} = \pm 15\text{ V}$, unless otherwise specified

Voltage Gain vs Supply Voltage



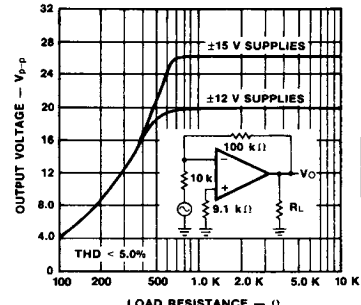
PC02411F

Power Bandwidth (Large Signal Swing vs Frequency)



PC02421F

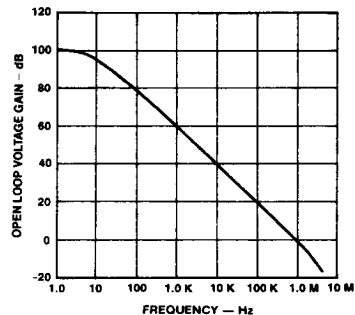
Output Voltage Swing vs Load Resistance



7

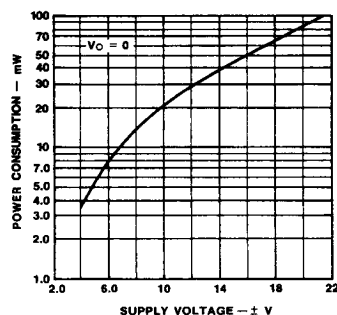
PC02431F

Open Loop Frequency Response



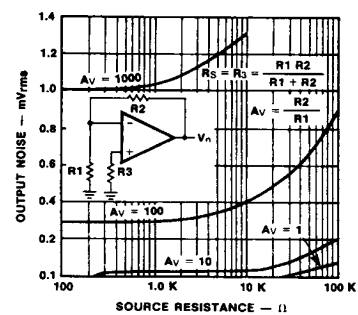
PC02441F

Power Consumption vs Supply Voltage



PC02451F

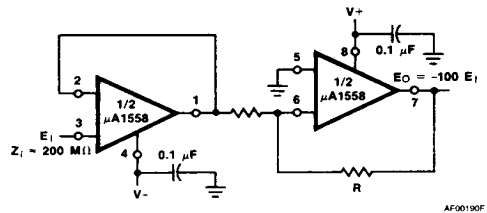
Output Noise vs Source Resistance



PC02461F

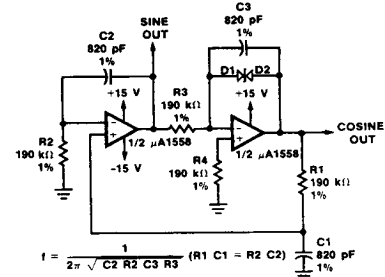
Typical Applications

High Impedance, High Gain Inverting Amplifier



AF00190F

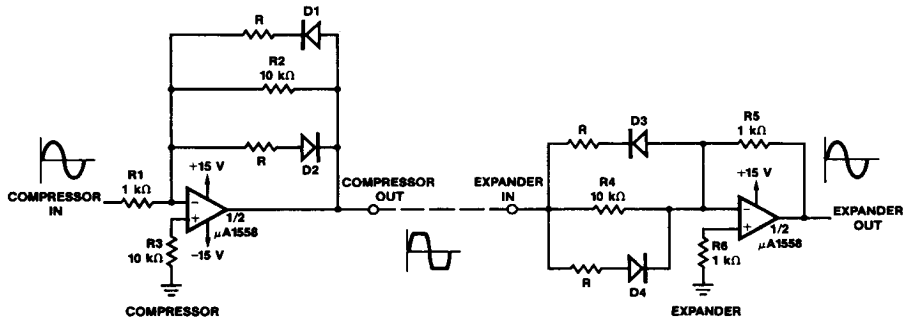
Quadrature Oscillator



AF00201F

Typical Applications (Cont.)

Compressor/Expander Amplifiers

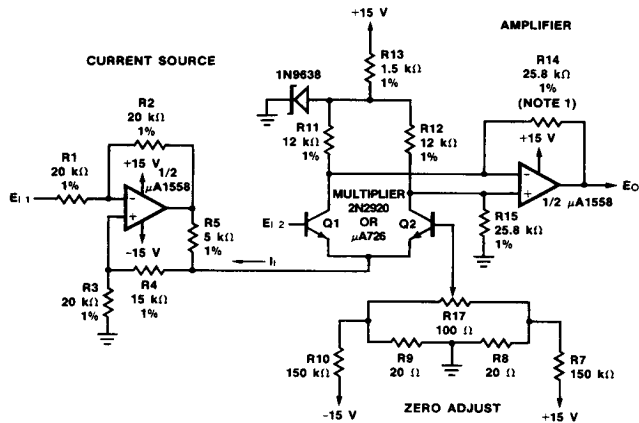


AF00211F

Notes

Maximum compression expansion ratio = R_1/R ($10 \text{ k}\Omega > R \geq 0$)
 Diodes D1 through D4 are matched FD666 or equivalent

Analog Multiplier



AF00220F

Note

1. Matched to 0.1%
 $E_o = 100 E_{i1} \times E_{i2}$