FAIRCHILD

A Schlumberger Company

μA1458 • μA1558 Dual Internally Compensated Operational Amplifiers

Description

The μA1458, μA1558 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 μA1458, μA1558 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 μA1458, μA1558 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 μA741 data sheet.*

The Fairchild μA1458, μA1558 slew rate has been improved to 0.8/μs typical.

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

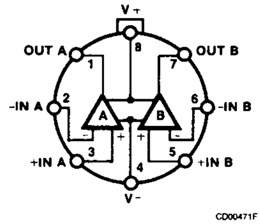
Absolute Maximum Ratings

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 (μA1558M)	−55°C to +125°C
Commercial (μA1458C)	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	
μA1558	±22 V
μA1458	±18 V
Differential Input Voltage	±30 V
Common Mode Input Swing[3]	±15 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 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.

Connection Diagram 8-Lead Metal Package (Top View)

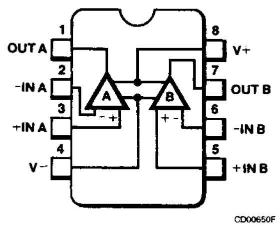


Lead 4 connected to case.

Order Information

Device Code	Package Code	Package Description
μA1458HC	5W	Metal
μA1458CHC	5W	Metal
μA1558HM	5W	Metal

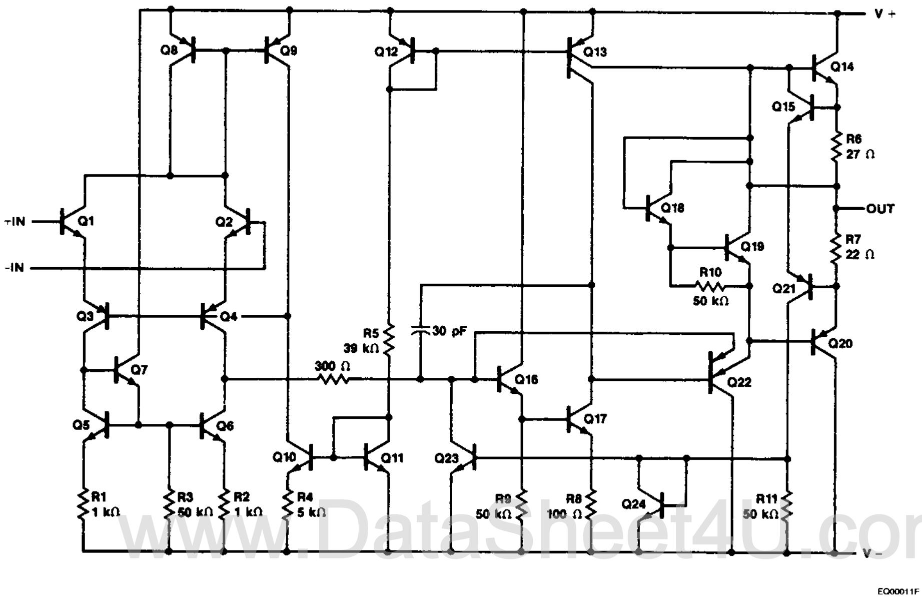
Connection Diagram 8-Lead DIP and SO-8 Package (Top View)



Order Information

Device Code	Package Code	Package Description
μA1458RC	6T	Ceramic DIP
μA1458SC	KC	Molded Surface Mount
μA1458TC	9T	Molded DIP
μA1458CRC	6T	Ceramic DIP
μA1458CTC	9T	Molded DIP
μA1558RM	6T	Ceramic DIP

Equivalent Circuit (1/2 of Circuit)



μA1458 and μA1458C
Electrical Characteristics $T_A = 25°C$, $V_{CC} = \pm 15$ V, unless otherwise specified.

Symbol	Characteristic	Condition	μA1458 Min	μA1458 Typ	μA1458 Max	μA1458C Min	μA1458C Typ	μA1458C Max	Unit
V_{IO}	Input Offset Voltage	$R_S \leqslant 10$ kΩ		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	$V_O = 0$ 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	$R_S \leqslant 10$ kΩ		30	150		30		μV/V
I_{OS}	Output Short Circuit Current			20			20		mA
A_{VS}	Large Signal Voltage Gain	$V_O = \pm 10$ V, $R_L \geqslant 2.0$ kΩ	20	100		20	100		V/mV
V_{OP}	Output Voltage Swing	$R_L = 10$ kΩ	±12	±14		±11	±14		V
fc	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 $0°C \leqslant T_A \leqslant +70°C$

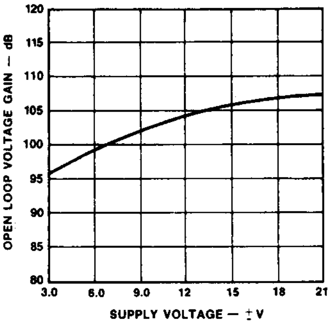
Symbol	Characteristic	Condition	μA1458 Min	μA1458 Typ	μA1458 Max	μA1458C Min	μA1458C Typ	μA1458C Max	Unit
V_{IO}	Input Offset Voltage	$R_S \leqslant 10$ kΩ			7.5			12	mV
$\Delta V_{IO}/\Delta T$	Input Offset Voltage Temperature Sensitivity	$R_S = 50$ Ω		15			15		μV/°C
I_{IO}	Input Offset Current				0.3			0.4	μA
I_{IB}	Input Bias Current				0.8			1.0	μA
A_{VS}	Large Signal Voltage Gain	$V_O = \pm 10$ V, $R_L \geqslant 2.0$ kΩ	15			15			V/mV
V_{OP}	Output Voltage Swing	$R_L = 2.0$ kΩ	±10	±13		±9.0	±13		V

μA1558
Electrical Characteristics $T_A = 25°C$, $V_{CC} = \pm 15$ V, unless otherwise specified.

Symbol	Characteristic	Condition	μA1558 Min	Typ	Max	Unit
V_{IO}	Input Offset Voltage	$R_S \leqslant 10$ kΩ		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	$V_O = 0$ V		70	150	mW
CMR	Common Mode Rejection		70	90		dB
V_{IR}	Input Voltage Range		± 12	± 13		V
PSRR	Power Supply Rejection Ratio	$R_S \leqslant 10$ kΩ		30	150	μV/V
I_{OS}	Output Short Circuit Current			20		mA
A_{VS}	Large Signal Voltage Gain	$V_O = \pm 10$ V, $R_L \geqslant 2.0$ kΩ	50	200		V/mV
V_{OP}	Output Voltage Swing	$R_L = 10$ kΩ	± 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 $-55°C \leqslant T_A \leqslant +125°C$						
V_{IO}	Input Offset Voltage	$R_S \leqslant 10$ kΩ			6.0	mV
$\Delta V_{IO}/\Delta T$	Input Offset Voltage Temperature Sensitivity	$R_S = 50$ Ω		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	$V_O = \pm 10$ V, $R_L \geqslant 2.0$ kΩ	25			V/mV
V_{OP}	Output Voltage Swing	$R_L = 2.0$ kΩ	± 10	± 13		V

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

Voltage Gain vs Supply Voltage



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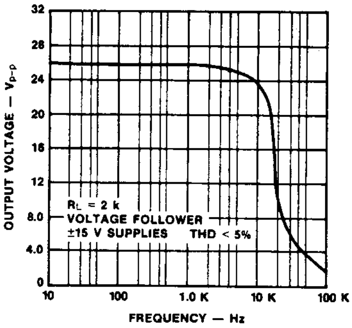
Power Bandwidth (Large Signal Swing vs Frequency)



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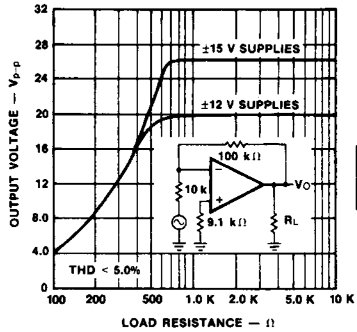
Output Voltage Swing vs Load Resistance



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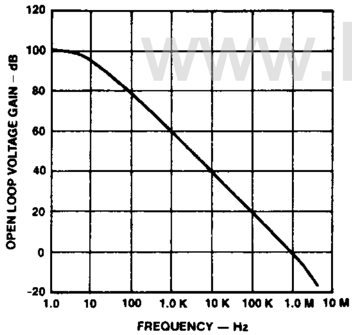
Open Loop Frequency Response



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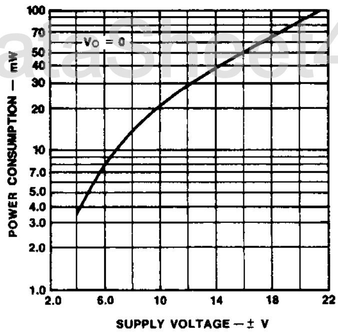
Power Consumption vs Supply Voltage



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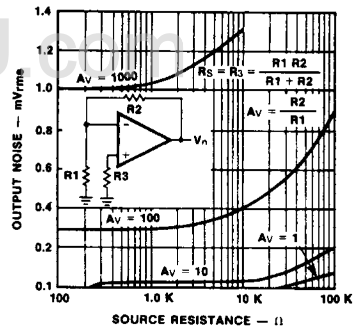
Output Noise vs Source Resistance



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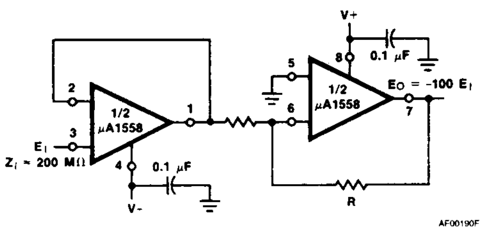
Typical Applications

High Impedance, High Gain Inverting Amplifier



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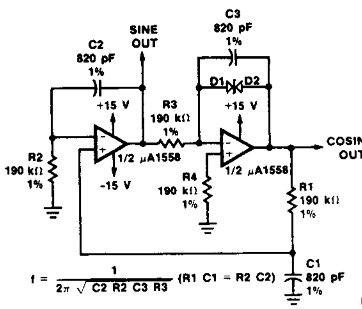
Quadrature Oscillator



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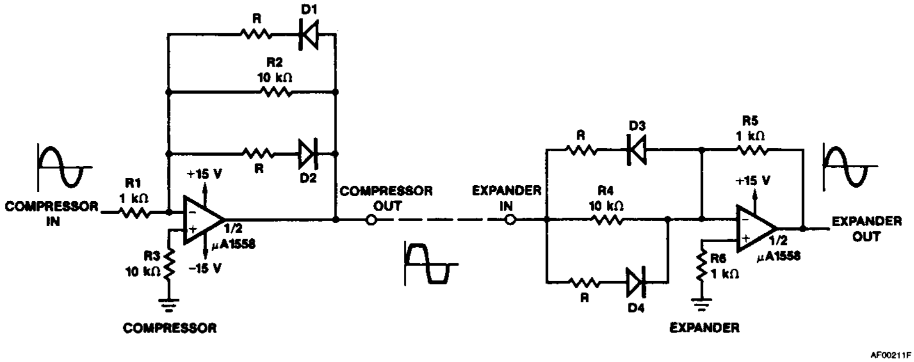
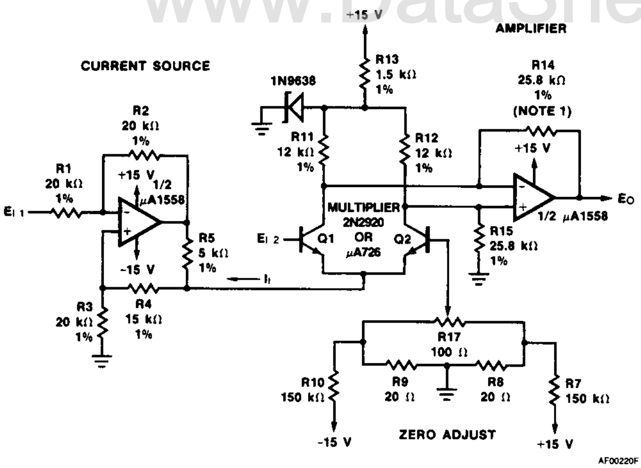
Typical Applications (Cont.)

Compressor/Expander Amplifiers



Notes
Maximum compression expansion ratio = R_1/R (10 kΩ > R ⩾ 0)
Diodes D1 through D4 are matched FD6666 or equivalent

Analog Multiplier



Note
1. Matched to 0.1%
$E_O = 100\ E_{I1} \times E_{I2}$