Raytheon

General Purpose Dual 741 Operational Amplifier

RC1458
RM1558

Features

- Short circuit protection
- No frequency compensation required
- No latch-up
- Large common mode and differential voltage ranges
- Low power consumption
- Parameter tracking over temperature range
- Gain and phase match between amplifiers

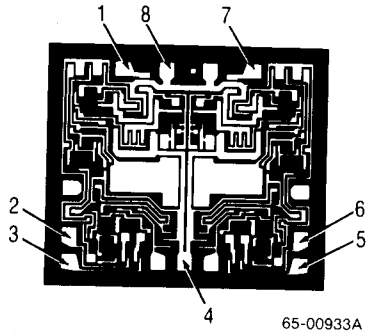
Description

The RC1458 and RM1558 integrated circuits are high gain operational amplifiers internally compensated and constructed on a single silicon chip using an advanced epitaxial process.

The military version (RM1558) operates over a temperature range from -55°C to +125°C. The commercial version (RC1458) operates from 0°C to +70°C.

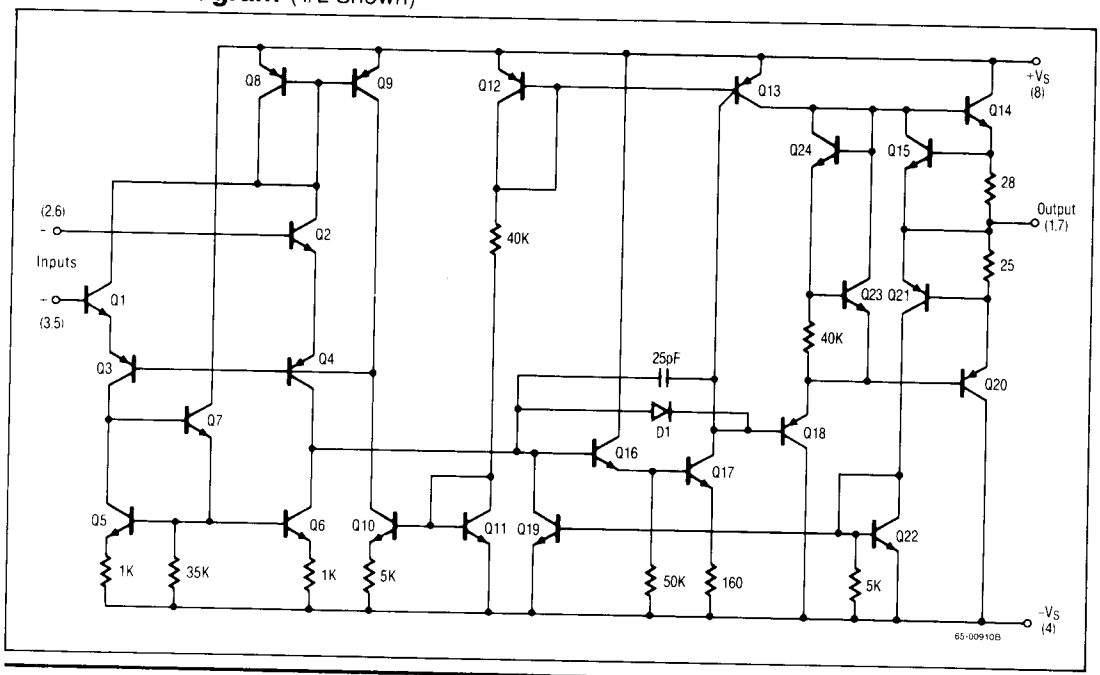
Combining all of the features of the 741 with the close parameter matching and tracking of a dual device on a monolithic chip results in unique performance characteristics. It is especially well suited for applications where gain and phase matched channels are mandatory.

Mask Pattern



Die Size: 62 x 72 mils
Min. Pad Dimension: 4 x 4 mils

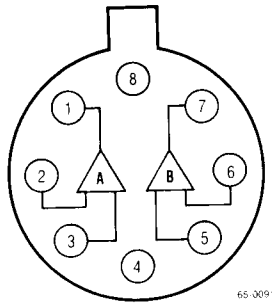
Schematic Diagram (1/2 Shown)



General Purpose Dual 741 Operational Amplifier

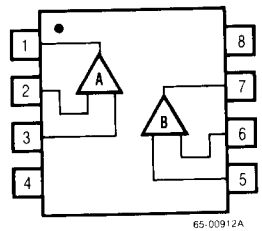
Connection Information

8-Lead Metal Can TO-99 (Top View)



65-00911A

8-Lead Dual In-Line Package (Top View)



65-00912A

Pin	Function
1	Output (A)
2	-Input (A)
3	+Input (A)
4	$-V_S$
5	+Input (B)
6	-Input (B)
7	Output (B)
8	$+V_S$

Absolute Maximum Ratings

Supply Voltage
- RM1558 ..... ±22V
- RC1458 ..... ±18V

Differential Input Voltage 30V

Input Voltage[1] ..... ±15V

Output Short Circuit Duration[2] ..... Indefinite

Storage Temperature Range ..... -65°C to +150°C

Operating Temperature Range
- RM1558 ..... -55°C to +125°C
- RC1458 ..... 0°C to +70°C

Lead Soldering Temperature (60 Sec) ..... +300°C

Notes:
1. For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.
2. Short circuit may be to ground or either supply.

Thermal Characteristics

	8-Lead Plastic DIP	8-Lead Ceramic DIP	8-Lead TO-99 Metal Can
Max. Junc. Temp.	125°C	175°C	175°C
Max. P_D $T_A < 50°C$	468mW	833mW	658mW
Therm. Res. θ_{JC}	—	45°C/W	50°C/W
Therm. Res. θ_{JA}	160°C/W	150°C/W	190°C/W
For $T_A > 50°C$ Derate at	6.25mW per °C	8.33mW per °C	5.26mW per °C

Ordering Information

Part Number	Package	Operating Temperature Range
RC1458DE	Ceramic	0°C to +70°C
RC1458H	TO-99	0°C to +70°C
RC1458T	TO-99	0°C to +70°C
RC1458NB	Plastic	0°C to +70°C
RV1458NB	Plastic	-40°C to +85°C
RM1558DE	Ceramic	-55°C to +125°C
RM1558DE/883B*	Ceramic	-55°C to +125°C
RM1558T	TO-99	-55°C to +125°C
RM1558T/883B*	TO-99	-55°C to +125°C

*MIL-STD-883, Level B Processing

Electrical Characteristics ($V_S = \pm 15V$ and $T_A = +25°C$ unless otherwise specified)

Parameters	Test Conditions	RM1558			RC1458			Units
		Min	Typ	Max	Min	Typ	Max	
Input Offset Voltage	$R_S \leq 10k\Omega$		1.0	5.0		2.0	6.0	mV
Input Offset Current			30	200		30	200	nA
Input Bias Current			200	500		200	500	nA
Input Resistance (Differential Mode)		0.3	1.0		0.3	1.0		MΩ
Large Signal Voltage Gain	$R_L \geq 2k\Omega$, $V_{OUT} = \pm 10V$	50	200		20	200		V/mV
Output Voltage Swing	$R_L \geq 10k\Omega$	±12	±14		±12	±14		V
	$R_L \geq 2k\Omega$	±10	±13		±10	±13		
Input Voltage Range		±12	±13		±12	±13		V
Common Mode Rejection Ratio	$R_S \leq 10k\Omega$	70	90		70	90		dB
Power Supply Rejection Ratio	$R_S \leq 10k\Omega$	76	90		76	90		dB
Power Consumption			100	150		100	170	mW
Transient Response Rise Time	$V_{IN} = 20mV$, $R_L = 2k\Omega$		0.3			0.3		μS
Overshoot	$C_L \leq 100pF$		5.0			5.0		%
Slew Rate	$R_L \geq 2k\Omega$		0.5			0.5		V/μS
Channel Separation	f = 1kHz		98			98		dB

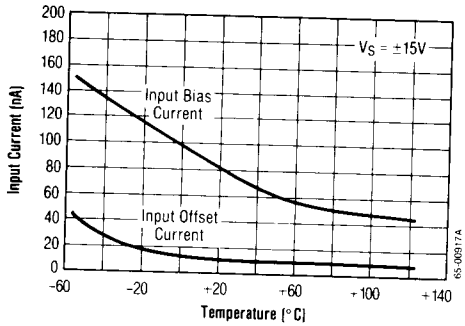
Electrical Characteristics (Continued)

($-55°C \leq T_A \leq +125°C$ for RM1558; $0°C \leq T_A \leq +70°C$ for RC1458)

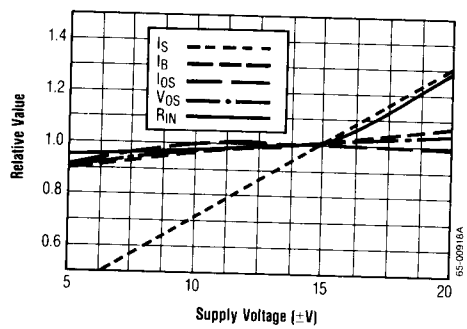
Parameters	Test Conditions	RM1558			RC1458			Units
		Min	Typ	Max	Min	Typ	Max	
Input Offset Voltage	$R_L \geq 10k\Omega$			6.0			7.5	mV
Input Offset Current	+125°C, +70°C			200			300	nA
	-55°C, 0°C			500			300	
Input Bias Current	+125°C, +70°C			500			800	nA
	-55°C, +70°C			1500			800	
Large Signal Voltage Gain	$R_L \geq 2k\Omega$ $V_{OUT} = \pm 10V$	25			15			V/mV
Output Voltage Swing	$R_L \geq 2k\Omega$	±10			±10			V
Power Consumption	$V_S = \pm 15V$ $T_A = +125°C, +70°C$			150			150	mW
	$T_A = -55°C, 0°C$			200			200	
Input Voltage Range		±12			±12			V

Typical Performance Characteristics

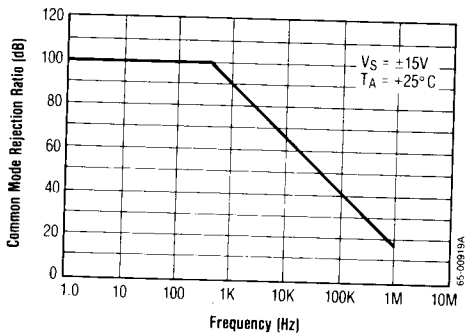
Input Bias and Offset Currents vs. Ambient Temperature



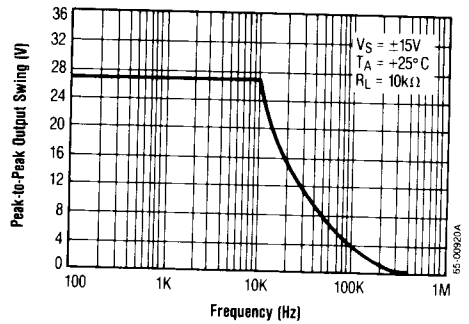
DC Parameters vs. Supply Voltage



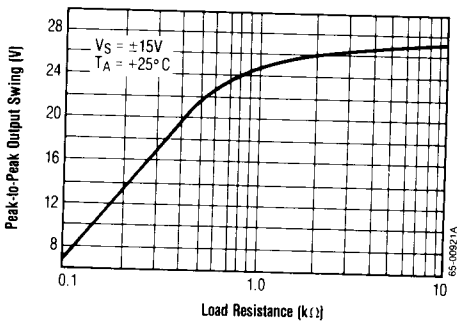
Common Mode Rejection Ratio vs. Frequency



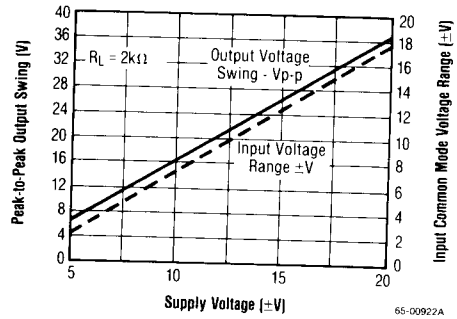
Output Voltage Swing vs. Frequency



Output Voltage Swing vs. Load Resistance

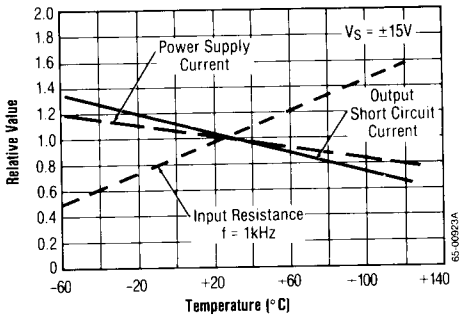


Output Swing and Input Range vs. Supply Voltage

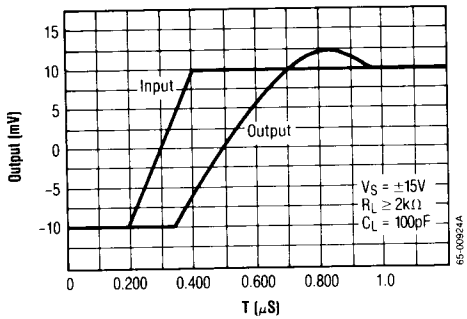


Typical Performance Characteristics (Continued)

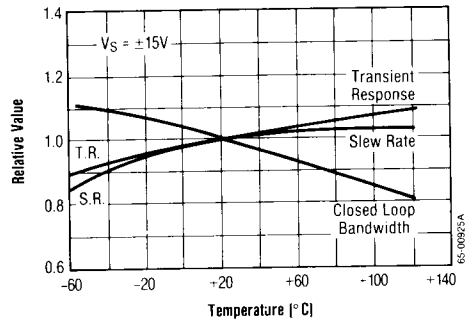
Normalized DC Parameter vs. Ambient Temperature



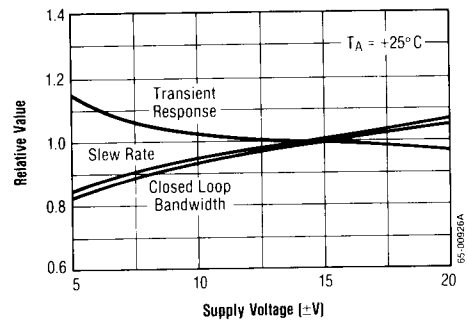
Transient Response



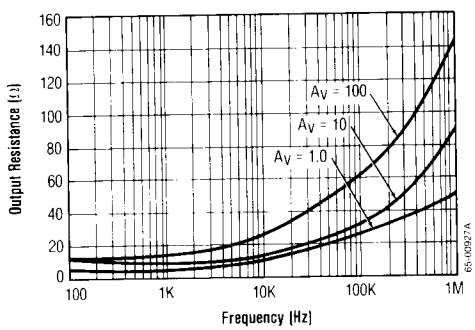
Frequency Characteristics vs. Ambient Temperature

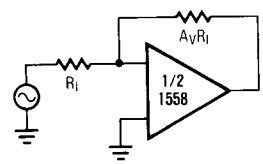


Frequency Characteristics vs. Supply Voltage



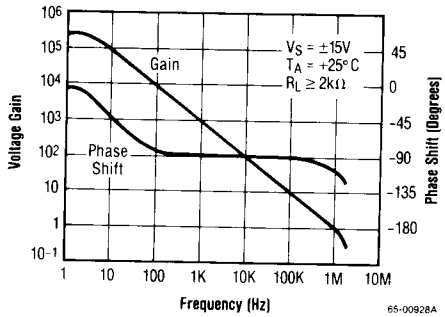
Output Resistance vs. Frequency



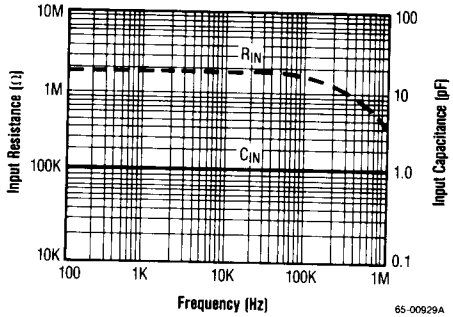


Typical Performance Characteristics (Continued)

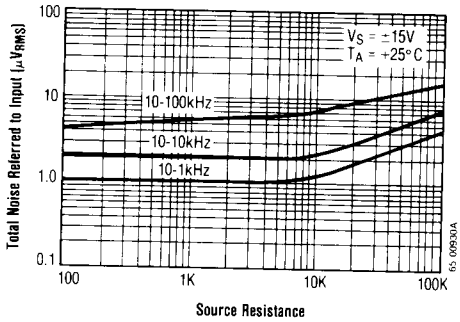
Open Loop Transfer Characteristics vs. Frequency



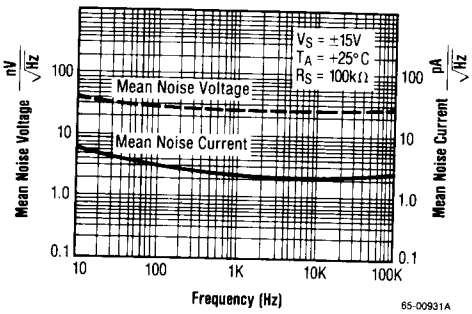
Input Resistance and Input Capacitance vs. Frequency



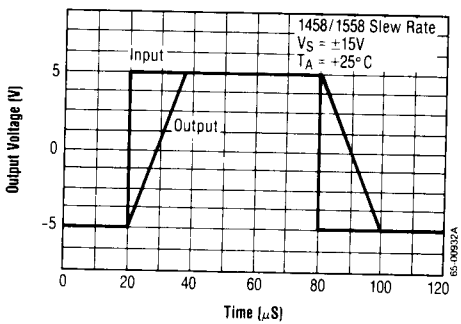
Broadband Noise for Various Bandwidths

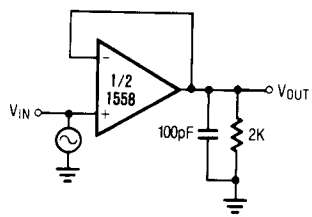


Input Noise Voltage and Current vs. Frequency



Voltage Follower Large Signal Pulse Response





Typical Applications

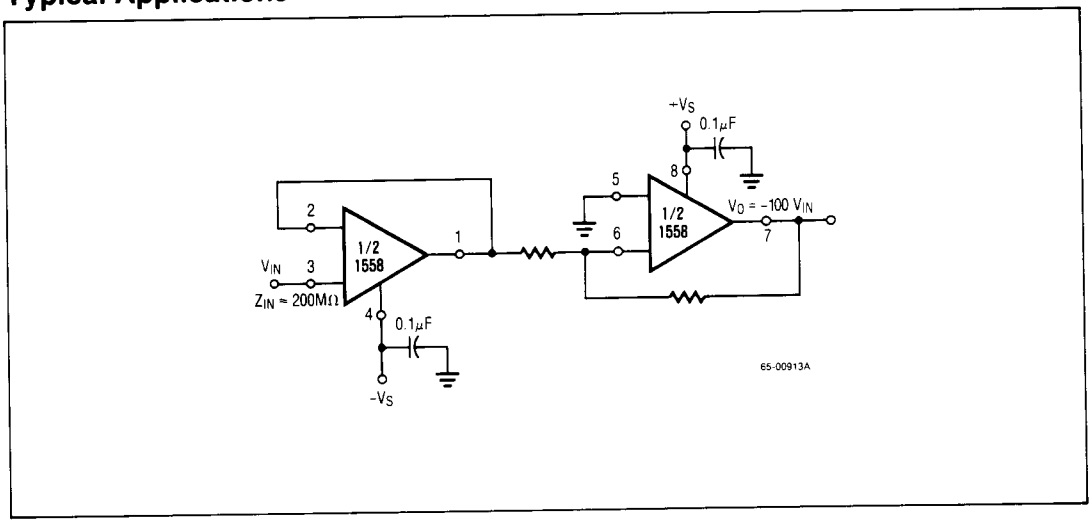


Figure 1. High-Impedance, High-Gain Inverting Amplifier

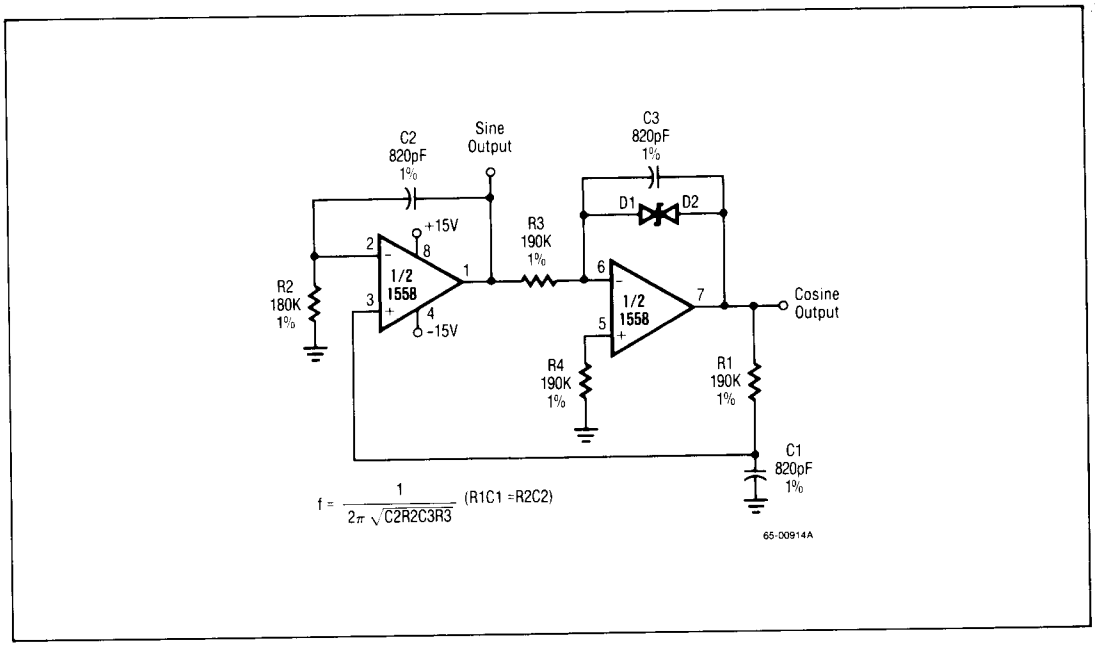


Figure 2. Quadrature Oscillator

Typical Applications (Continued)

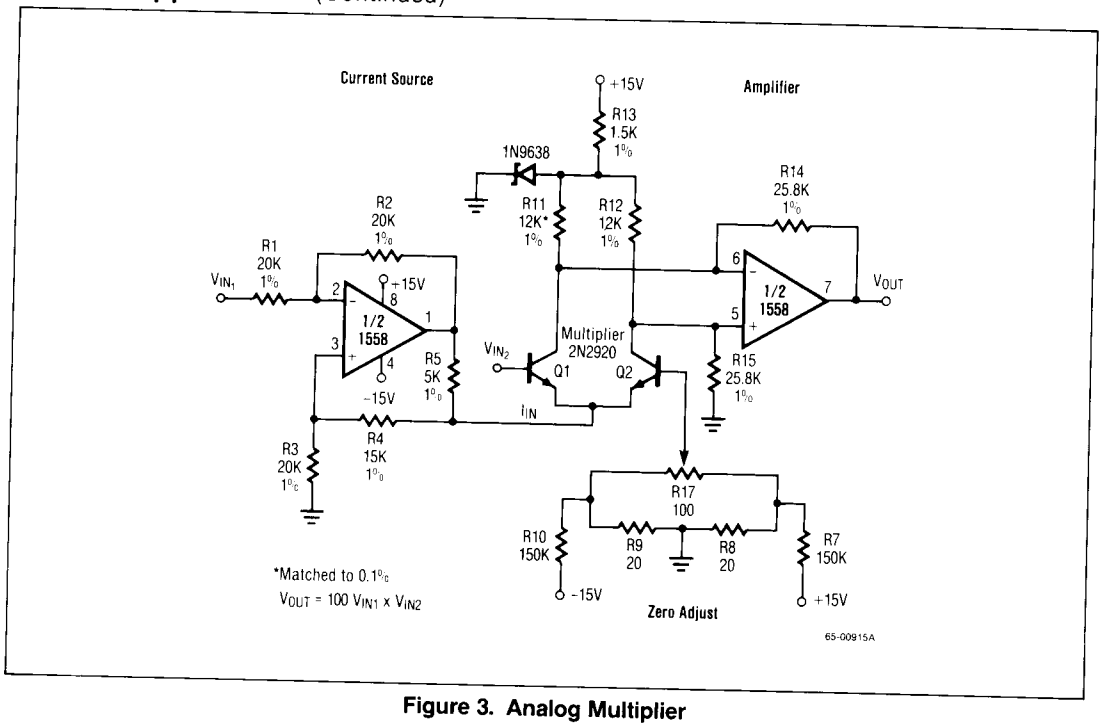


Figure 3. Analog Multiplier

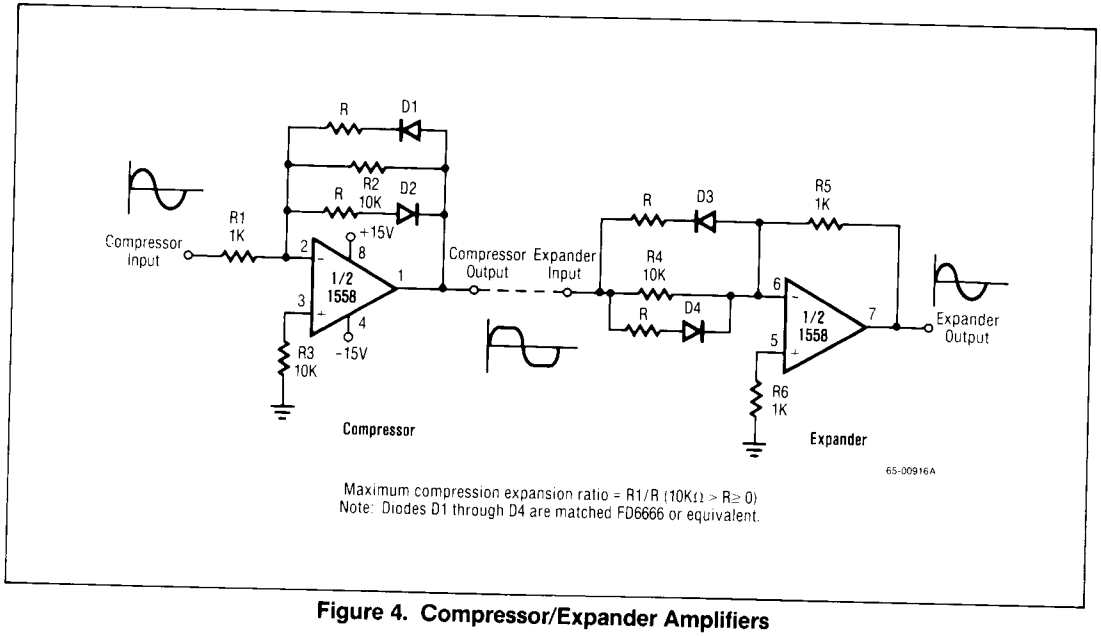


Figure 4. Compressor/Expander Amplifiers