

RC4558

Dual High-Gain Operational Amplifier

Description

The 4558 integrated circuit is a dual high-gain operational amplifier internally compensated and constructed on a single silicon IC using an advanced epitaxial process.

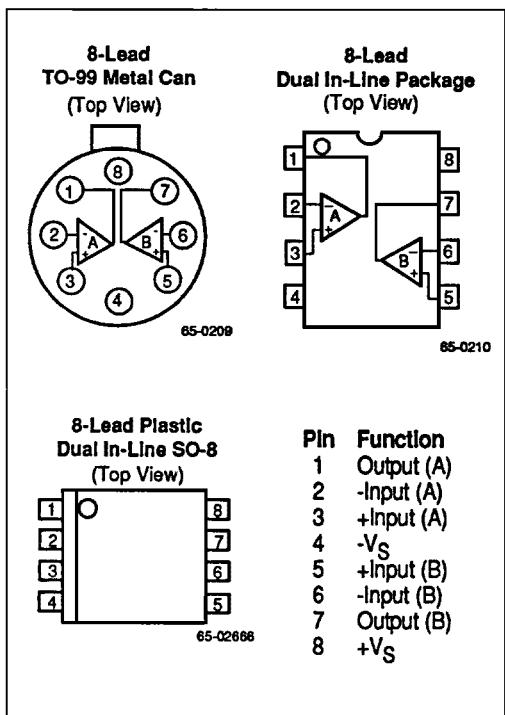
Combining the features of the 741 with the close parameter matching and tracking of a dual device on a monolithic chip results in unique performance characteristics. Excellent channel separation allows the use of this dual device in dense single 741 operational amplifier applications. It is especially well suited for applications in differential-in, differential-out as well as in potentiometric amplifiers and where gain and phase matched channels are mandatory.

Features

- ◆ 2.5 MHz unity gain bandwidth
- ◆ Supply voltage $\pm 22V$ for RM4558 and $\pm 18V$ for RC/RV4558
- ◆ 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

RC4558

Connection Information



Ordering Information

Part Number	Package	Operating Temperature Range
RC4558M	M	0°C to +70°C
RC4558N	N	0°C to +70°C
RM4558D	D	-55°C to +125°C
RM4558D/883B	D	-55°C to +125°C
RM4558T	T	-55°C to +125°C

Notes:

/883B suffix denotes Mil-Std-883, Level B processing
N = 8-lead plastic DIP
D = 8-lead ceramic DIP
T = 8-lead metal can (TO-99)
M = 8-lead plastic SOIC

Absolute Maximum Ratings

Supply Voltage

RM4558 ±22V
RC4558 ±18V

Input Voltage¹ ±15V

Differential Input Voltage 30V

Output Short Circuit Duration² Indefinite

Operating Temperature Range

RM4558 -55°C to +125°C

RC4558 0°C to +70°C

Lead Soldering Temperature

(SO-8; 10 sec) +260°C

Lead Soldering Temperature

(DIP, TO-99; 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 on one op amp only. Rating applies to +75°C ambient temperature.

Thermal Characteristics

	8-Lead Small Outline	8-Lead Plastic DIP	8-Lead Ceramic DIP	8-Lead TO-99 Metal Can
Max. Junction Temp.	+125°C	+125°C	+175°C	+175°C
Max. P_D $T_A < 50^\circ\text{C}$	300 mW	468 mW	833 mW	658 mW
Therm. Res θ_{JC}	—	—	45°C/W	50°C/W
Therm. Res. θ_{JA}	240°C/W	160°C/W	150°C/W	190°C/W
For $T_A > 50^\circ\text{C}$ Derate at	4.17 mW/°C	6.25 mW/°C	8.33 mW/°C	5.26 mW/°C

Matching Characteristics(V_S = ±15V, T_A = +25°C unless otherwise specified)

Parameter	Test Conditions	RM/RC4558 Typ	Units
Voltage Gain	R _L ≥ 2 kΩ	±1.0	dB
Input Bias Current	R _L ≥ 2 kΩ	±15	nA
Input Offset Current	R _L ≥ 2 kΩ	±7.5	nA

RC4558

Electrical Characteristics

($V_S = \pm 15V$ and $T_A = +25^\circ C$ unless otherwise specified)

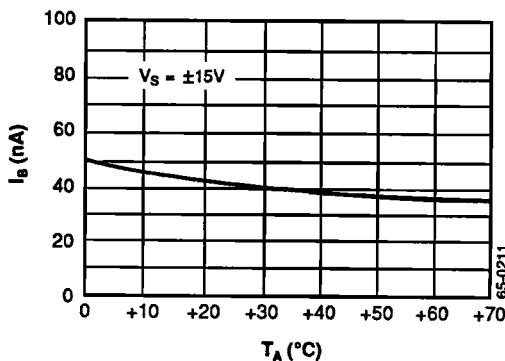
Parameters	Test Conditions	RM4558			RC4558			Units
		Min	Typ	Max	Min	Typ	Max	
Input Offset Voltage	$R_S \leq 10k\Omega$		1.0	5.0		2.0	6.0	mV
Input Offset Current			5.0	200		5.0	200	nA
Input Bias Current			40	500		40	500	nA
Input Resistance		0.3	1.0		0.3	1.0		MΩ
Large Signal Voltage Gain	$R_L \geq 2k\Omega, V_{OUT} = \pm 10V$	50	300		20	300		V/mV
Output Voltage Swing	$R_L \geq 10k\Omega$	±12	±14		±12	±14		V
	$R_L \geq 2k\Omega$	±10	±13		±10	±13		V
Input Voltage Range		±12	±13		±12	±13		V
Common Mode Rejection Ratio	$R_S \leq 10k\Omega$	70	100		70	100		dB
Power Supply Rejection Ratio	$R_S \leq 10k\Omega$	76	100		76	100		dB
Power Consumption	$R_L = \infty$		100	170		100	170	mW
Transient Response	$V_{IN} = 20 mV$							
Rise Time	$R_L = 2k\Omega$		0.3			0.3		μS
Overshoot	$C_L \leq 100pF$		35			35		%
Slew Rate	$R_L \geq 2k\Omega$		0.8			0.8		V/μS
Channel Separation	$F = 10kHz, R_S = 1k\Omega$		90			90		dB
Unity Gain Bandwidth (Gain = 1)		2.5	3.0		2.0	3.0		MHz

The following specifications apply for $RM = -55^\circ C \leq T_A \leq +125^\circ C$, $RC = 0^\circ C \leq T_A \leq +70^\circ C$

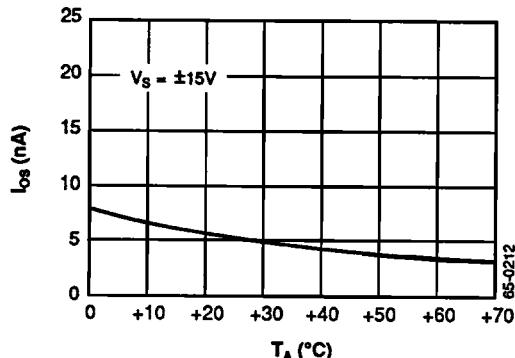
Input Offset Voltage	$R_S \leq 10k\Omega$			6.0			7.5	mV
Input Offset Current				500			300	nA
RC4558								
Input bias Current				1500			800	nA
RC4558								
Large Signal Voltage Gain	$R_L \geq 2k\Omega, V_{OUT} = \pm 10$	25			15			V/mV
Output Voltage Swing	$R_L \geq 2k\Omega$	±10			±10			V
Power Consumption	$R_L = \infty$		120	200		120	200	mW

Typical Performance Characteristics

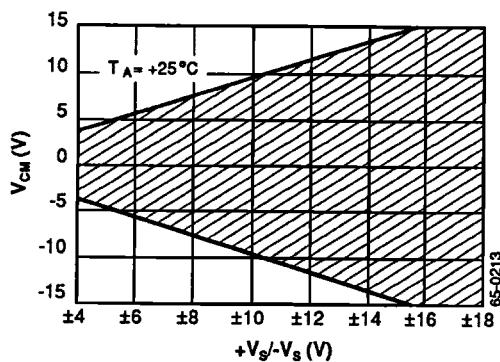
Input Bias Current vs. Temperature



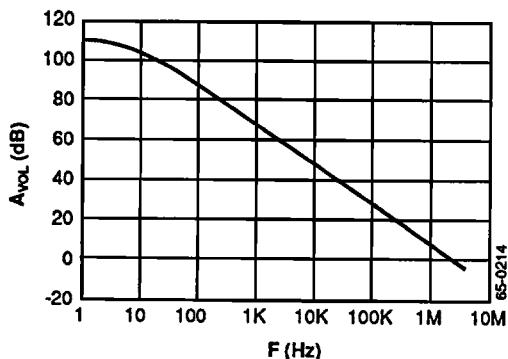
Input Offset Current vs. Temperature



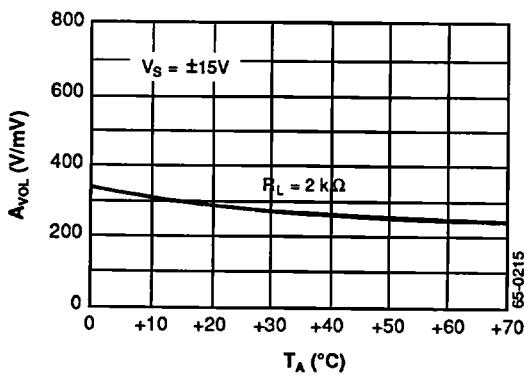
Input Common Mode Voltage Range vs. Supply Voltage



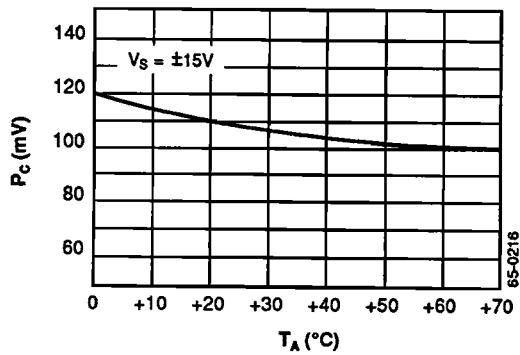
Open Loop Voltage Gain vs. Frequency



Open Loop Voltage Gain vs. Temperature



Power Consumption vs. Temperature

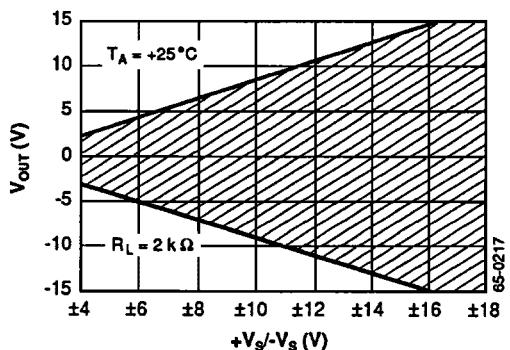


Linear

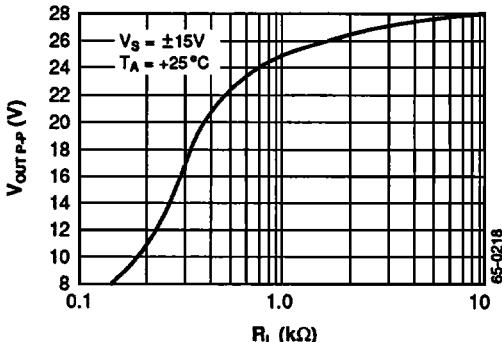
RC4558

Typical Performance Characteristics (Continued)

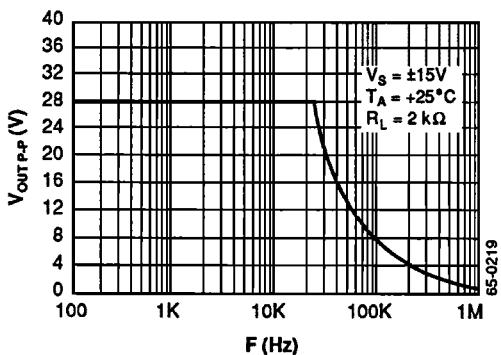
Output Voltage Swing vs. Supply Voltage



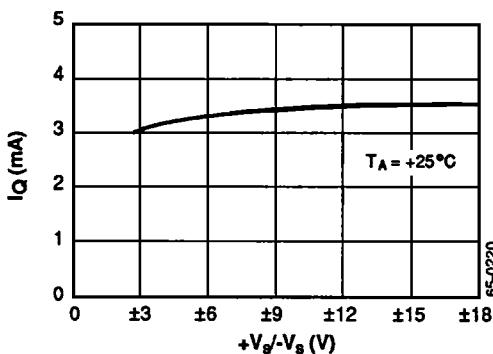
Output Voltage Swing vs. Load Resistance



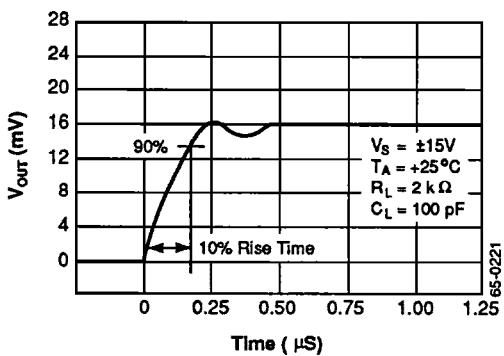
Output Voltage Swing vs. Frequency



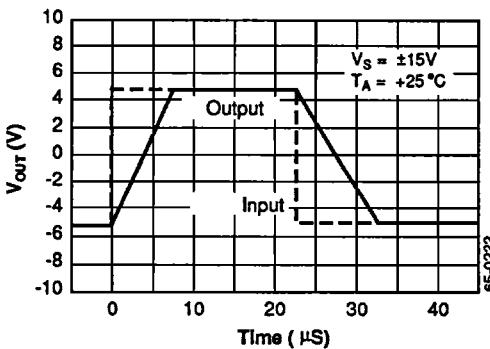
Quiescent Current vs. Supply Voltage



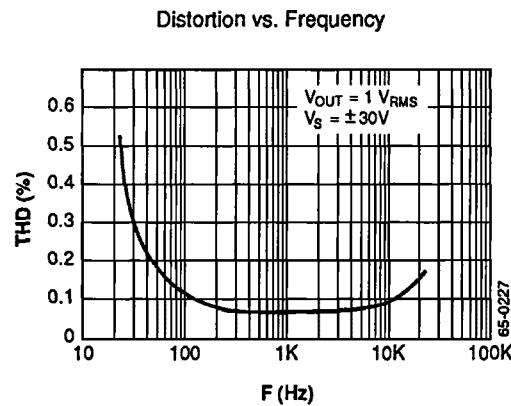
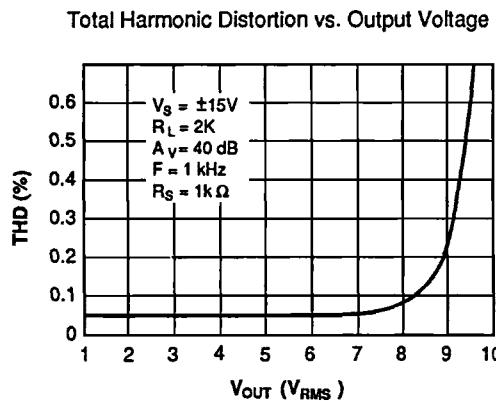
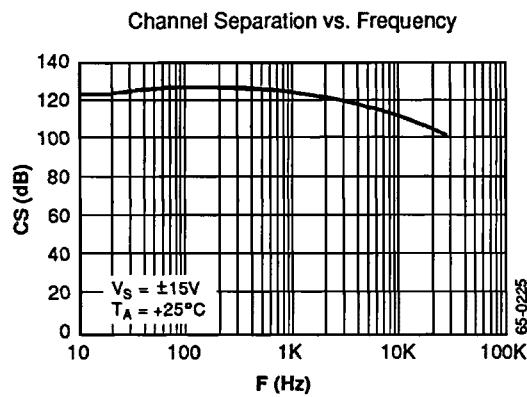
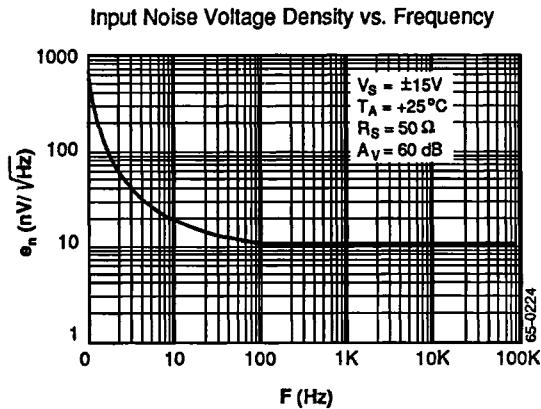
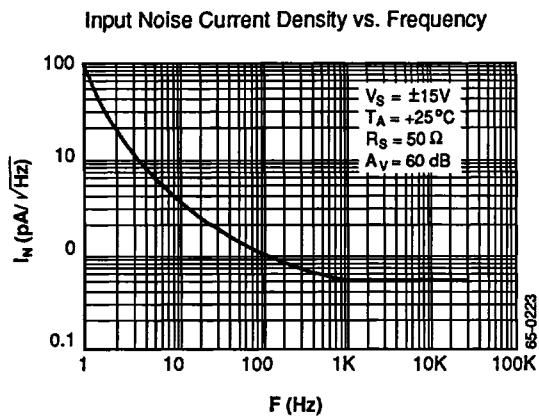
Transient Response
Output Voltage vs. Time



Follower Large Signal Pulse Response
Output Voltage vs. Time



Typical Performance Characteristics (Continued)

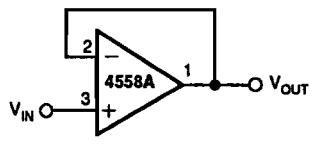


Linear

RC4558

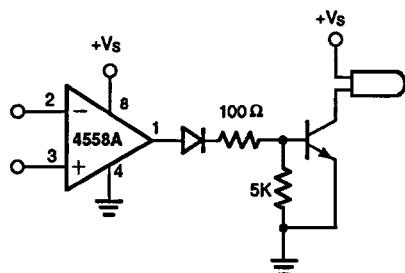
Typical Applications

Voltage Follower



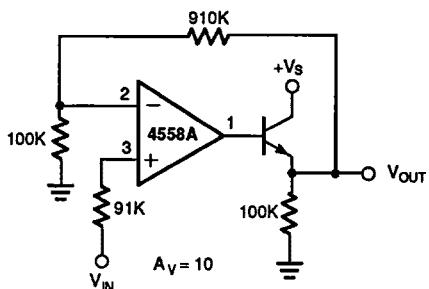
65-0228

Lamp Driver



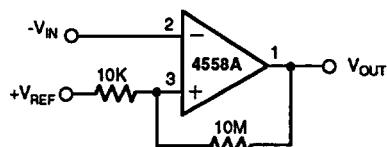
65-0229

Power Amplifier



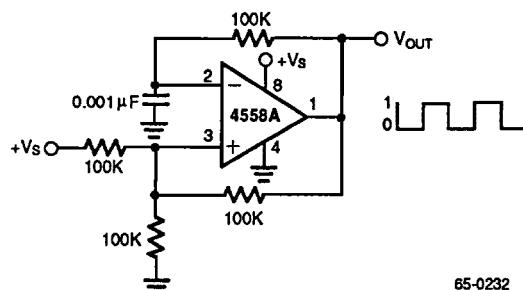
65-0230

Comparator With Hysteresis



65-0231

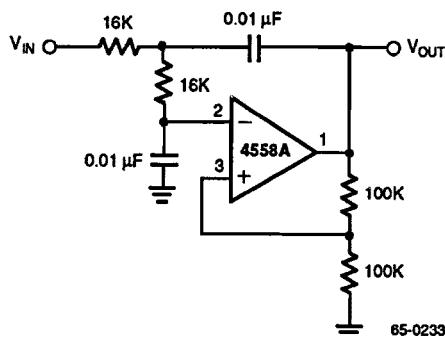
Squarewave Oscillator



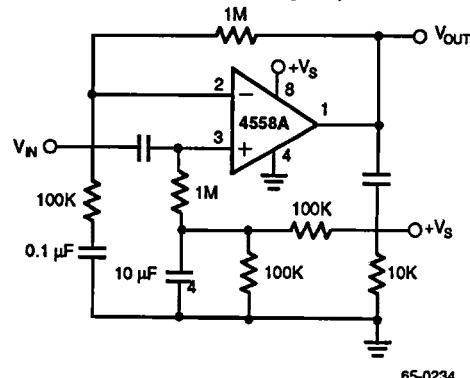
65-0232

Typical Applications (Continued)

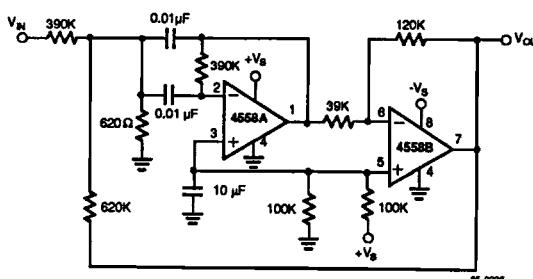
DC Coupled 1kHz Low-Pass Active Filter



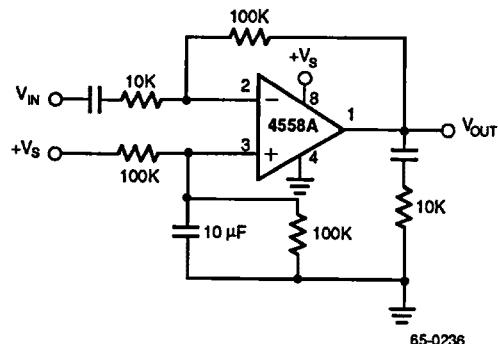
AC Coupled Non-Inverting Amplifier



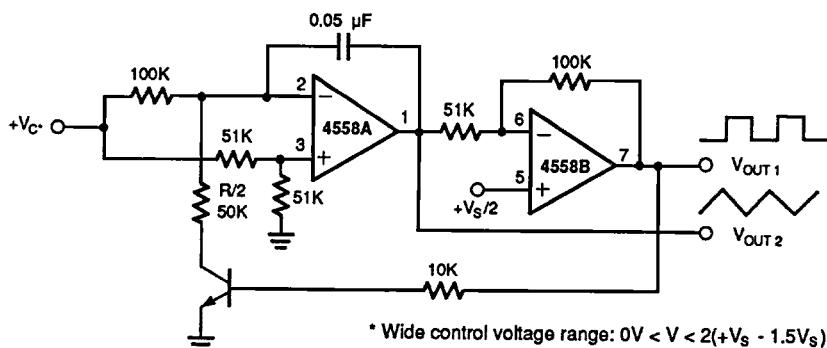
1kHz Bandpass Active Filter



AC Coupled Inverting Amplifier



Voltage Controlled Oscillator (VCO)



* Wide control voltage range: $0V < V < 2(+V_S - 1.5V_S)$

RC4558

Schematic Diagram

