

7597360 RAYTHEON CO.

57C 04646 D.

T-79-05-20

PRODUCT SPECIFICATIONSLINEAR INTEGRATED CIRCUITS**Raytheon****High-Gain
Dual Operational Amplifier****RC4558****Features**

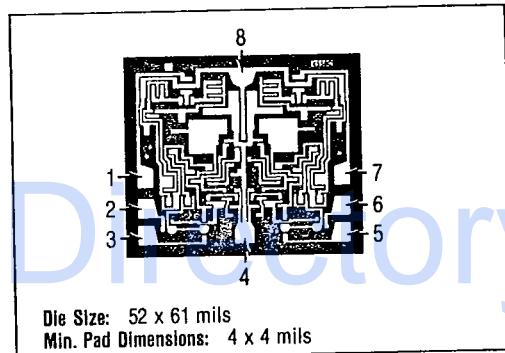
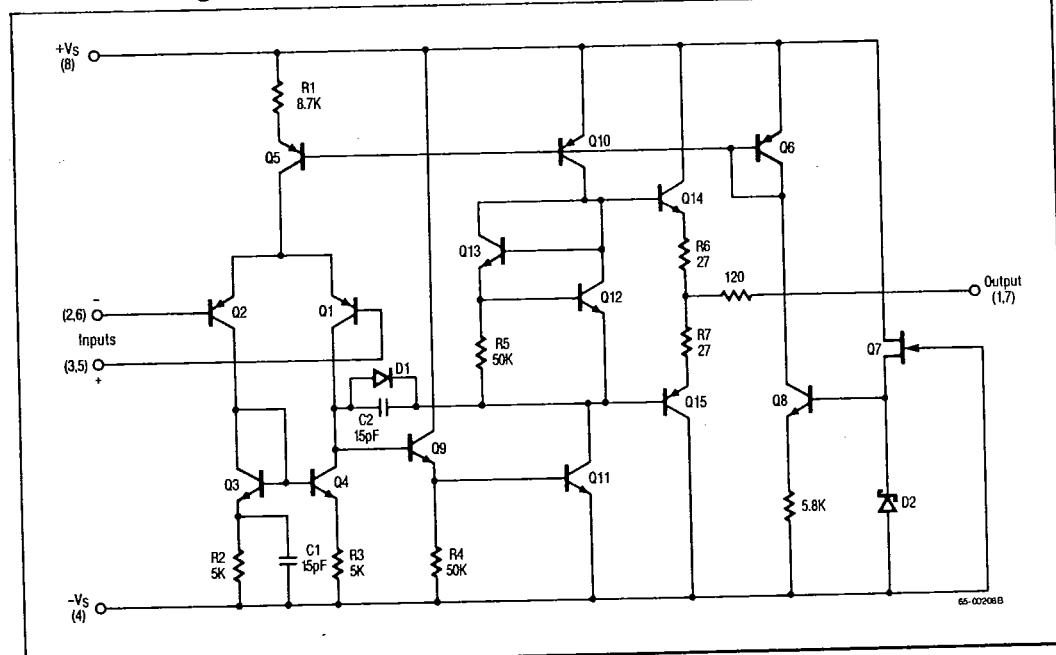
- 2.5MHz unity gain bandwidth guaranteed
- Supply voltage $\pm 22V$ for RM4558 and $\pm 15V$ for RC4558
- Short-circuit protection
- No frequency compensation required
- No latch-up
- Large common-mode and differential voltage ranges
- Low power consumption
- Parameter tracking over temperature range
- Gain and phase match between amplifiers

Description

The 4558 integrated circuit is a dual high-gain operational amplifier internally compensated and constructed on a single silicon chip 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 perfor-

mance characteristics. Excellent channel separation allows the use of the dual device in single 741 operational amplifier applications providing density. 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.

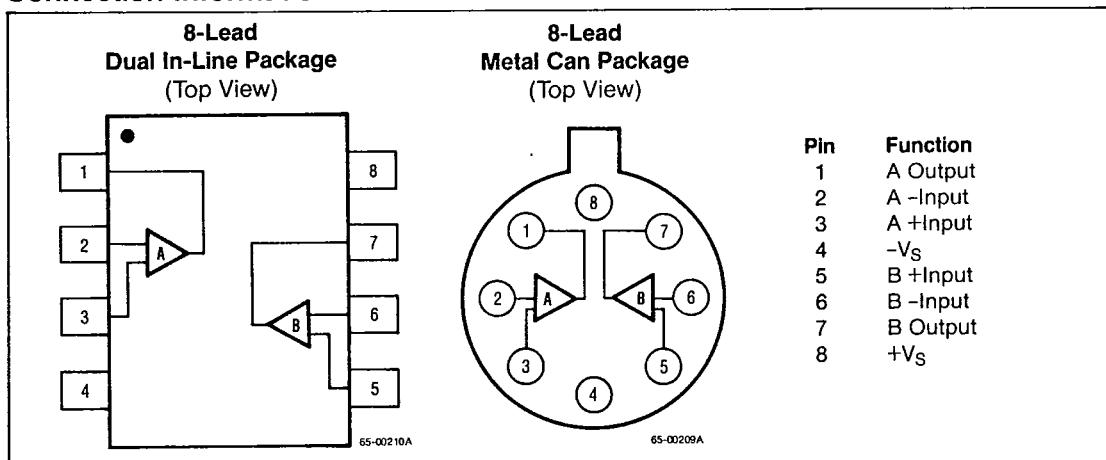
Mask Pattern**Schematic Diagram (1/2 Shown)****Raytheon**

65-1010A

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7597360 RAYTHEON CO,

57C 04647 D T-79-05-20

RC4558**High-Gain
Dual Operational Amplifier****Connection Information****Absolute Maximum Ratings**

Supply Voltage	
RM4558	$\pm 22V$
RC4558	$\pm 18V$
Differential Input Voltage	30V
Input Voltage ¹	$\pm 15V$
Operating Temperature Range	

RM4558	-55°C to +125°C
RV4558	-40°C to +85°C
RC4558	0°C to +70°C

Output Short Circuit Duration ²	Indefinite
Notes: 1. For supply voltages less than $\pm 15V$, the absolute maximum input voltage is equal to the supply voltage.	

2. Short circuit may be to ground on one amp only.
Rating applies to +75°C ambient temperature.

Ordering Information

Part Number	Package	Operating Temperature Range
RC4558DE	Ceramic	0°C to +70°C
RC4558M	Micro Plastic	0°C to +70°C
RC4558NB	Plastic	0°C to +70°C
RC4558T	Metal Can	0°C to +70°C
RV4558DE	Ceramic	-40°C to +85°C
RV4558NB	Plastic	-40°C to +85°C
RM4558DE	Ceramic	-55°C to +125°C
RM4558T	Metal Can	-55°C to +125°C

Thermal Characteristics

	8-Lead Micro-Pak	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°C	300mW	468mW	833mW	658mW
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°C Derate at	4.1mW per °C	6.25mW per °C	8.33mW per °C	5.26mW per °C

7597360 RAYTHEON CO.

57C 04648 D

T-79-05-20

High-Gain Dual Operational Amplifier

RC4558**Electrical Characteristics** ($V_S = \pm 15V$ and $T_A = +25^\circ C$ unless otherwise specified)

Parameters	Test Conditions	RM4558			RV/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 Rise Time	$V_{IN} = 20mV$		0.3			0.3		μS
	$R_L = 2k\Omega$		35			35		%
Overshoot	$C_L \leq 100pF$							
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 $-55^\circ C \leq T_A \leq \pm 125^\circ C$ for RM4558; $0^\circ C \leq T_A \leq \pm 70^\circ C$ for RC4558;
 $-40^\circ C \leq T_A \leq \pm 85^\circ C$ for RV4558

Input Offset Voltage	$R_S \leq 10k\Omega$			6.0			7.5	mV
Input Offset Current RC4558 RV4558				500 500			300 500	nA nA
Input Bias Current RC4558 RV4558				1500 1500			800 1500	nA nA
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	$R_L = \infty$		120	200		120	200	mW

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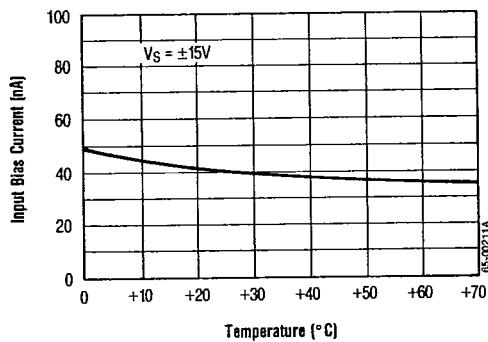
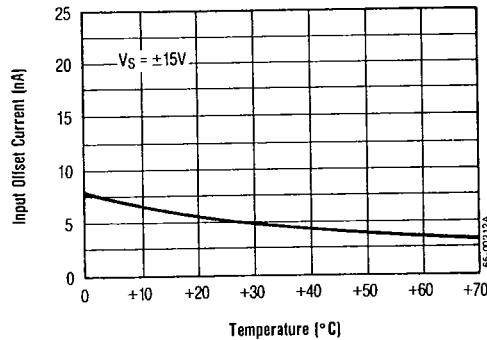
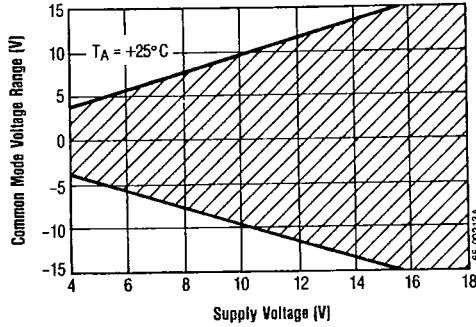
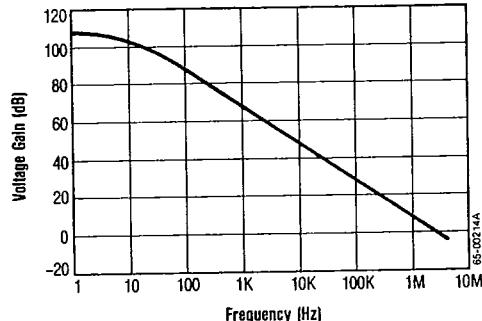
57C 04649 D

RC4558**High-Gain
Dual Operational Amplifier**

T-79-05-20

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

Parameters	Test Conditions	RM4558 Typ	RC4558 Typ	Units
Voltage Gain	$R_L \geq 2k\Omega$	± 1.0	± 1.0	dB
Input Bias Current	$R_L \geq 2k\Omega$	± 15	± 15	nA
Input Offset Current	$R_L \geq 2k\Omega$	± 7.5	± 7.5	nA

Typical Performance Characteristics**Input Bias Current as a Function
of Ambient Temperature****Input Offset Current as a Function
of Ambient Temperature****Common Mode Range as a Function
of Supply Voltage****Open Loop Voltage Gain as a
Function of Frequency**

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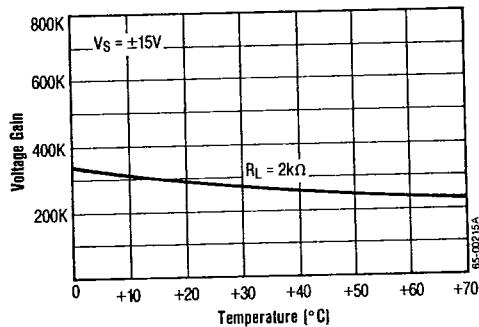
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RC4558

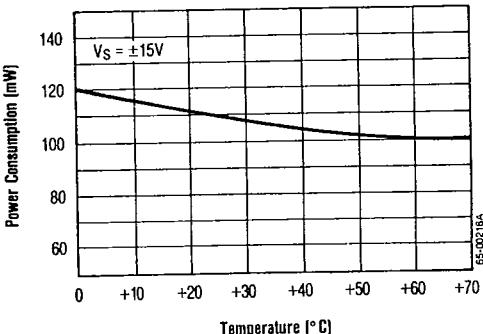
High-Gain Dual Operational Amplifier

Typical Performance Characteristics (Continued)

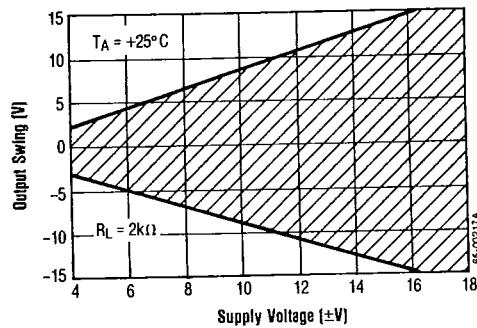
**Open Loop Gain as a Function
of Temperature**



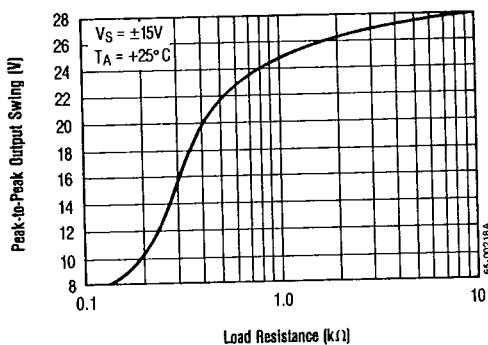
**Power Consumption as a Function
of Ambient Temperature**



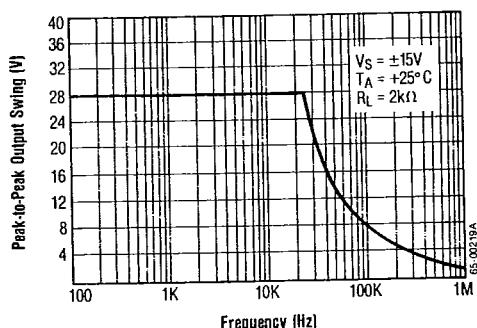
**Typical Output Voltage as a Function
of Supply Voltage**



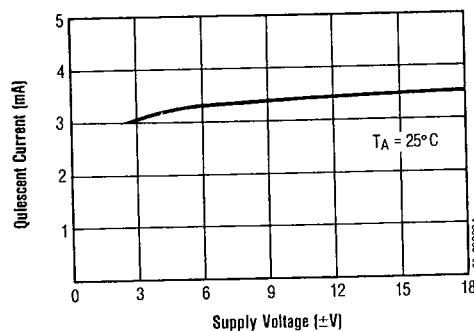
**Output Voltage Swing as a Function
of Load Resistance**



**Output Voltage Swing as a Function
of Frequency**



**Quiescent Current as a Function
of Supply Voltage**



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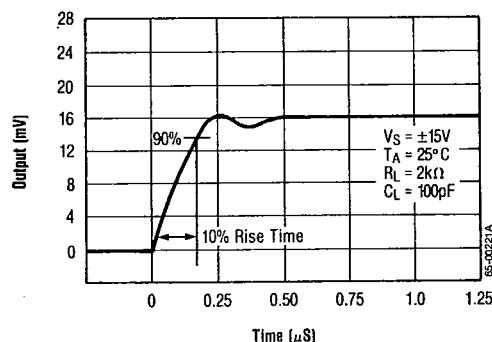
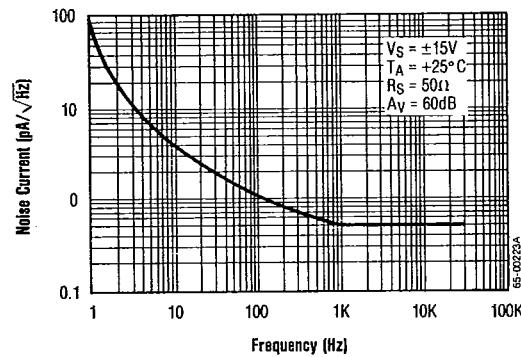
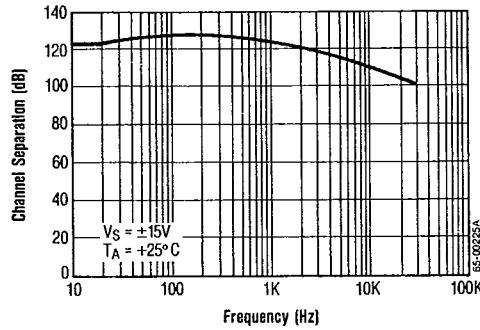
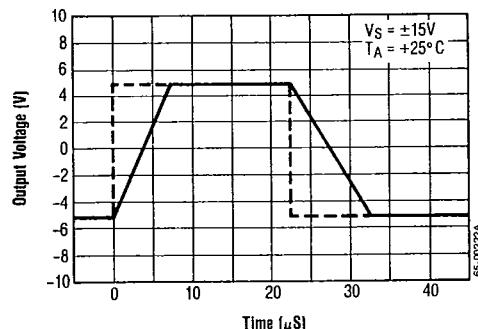
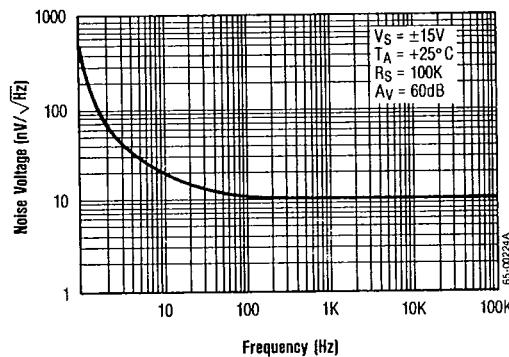
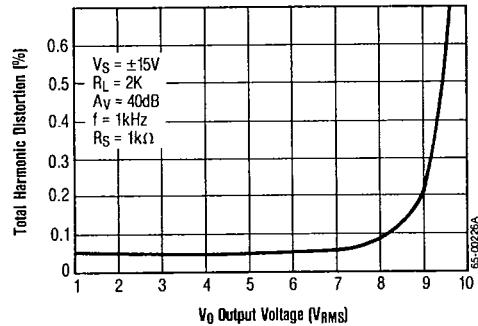
57C 04651 D

High-Gain Dual Operational Amplifier

T-79-05-20

RC4558

Typical Performance Characteristics (Continued)

Transient Response**Input Noise Current
as a Function of Frequency****Channel Separation****Voltage Follower
Large Signal Pulse Response****Input Noise Voltage
as a Function of Frequency****Total Harmonic Distortion
vs. Output Voltage**

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57C 04652 D

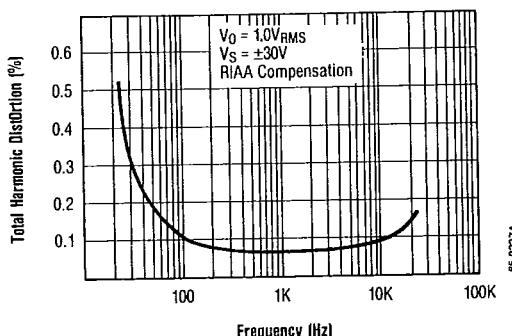
High-Gain Dual Operational Amplifier

RC4558

T-79-05-20

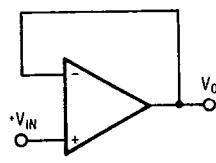
Typical Performance Characteristics (Continued)

Distortion vs. Frequency

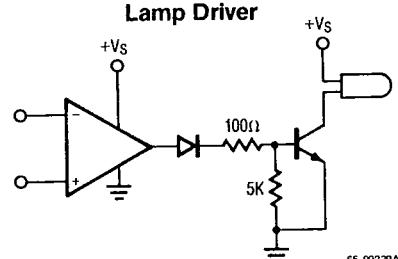


Typical Applications

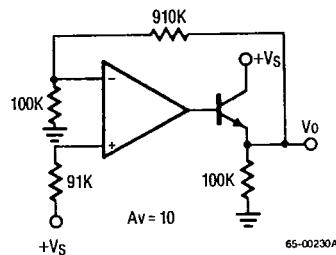
Voltage Follower



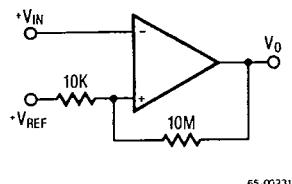
Lamp Driver



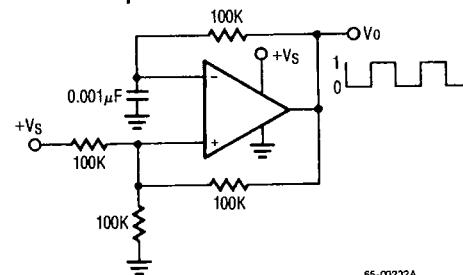
Power Amplifier



Comparator With Hysteresis



Squarewave Oscillator



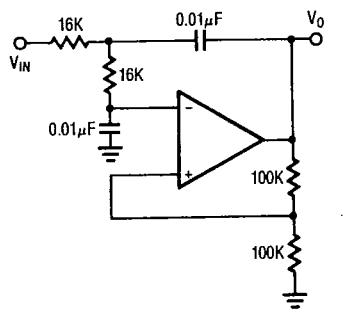
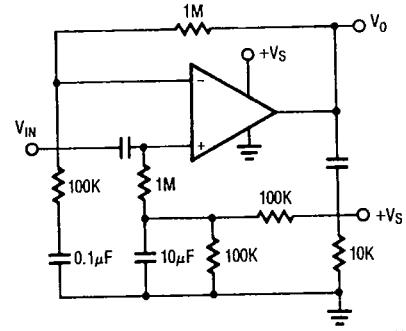
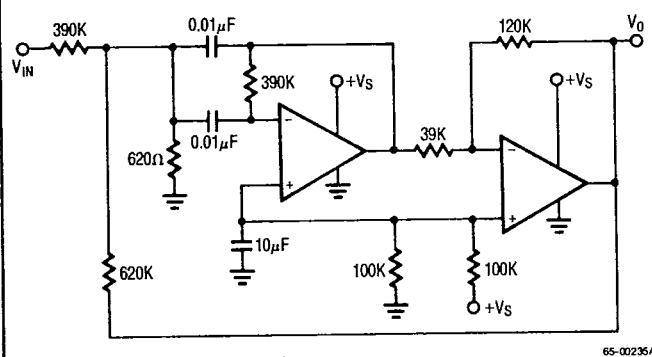
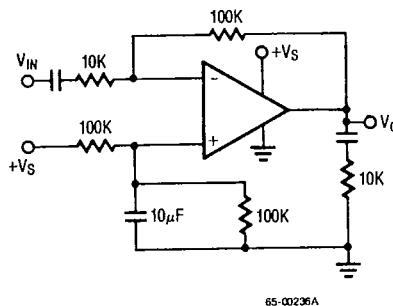
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High-Gain Dual Operational Amplifier

RC4558

T-79-05-20

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)**