

RC5532/RC5532A

High Performance Dual Low Noise Operational Amplifier

Features

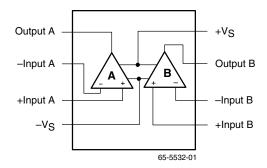
- Small signal bandwidth 10 MHz
- Output drive capability 600Ω , 10 VRMS
- Input noise voltage 5 nV/ $\sqrt{\text{Hz}}$
- DC voltage gain 50,000
- AC voltage gain 2200 at 10 KHz
- Power bandwidth 140 KHz
- Slew rate $-8 \text{ V/}\mu\text{S}$
- Large supply voltage range ±3V to ±20V

Description

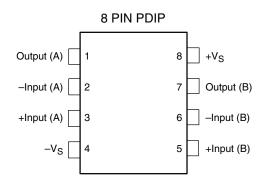
The RC5532 is a high performance, dual low noise operational amplifier. Compared to standard dual operational amplifiers, such as the RC747, it shows better noise performance, improved output drive capability, and considerably higher small-signal and power bandwidths.

This makes the device especially suitable for application in high quality and professional audio equipment, instrumentation, control circuits, and telephone channel amplifiers. The op amp is internally compensated for gains equal to one. If very low noise is of prime importance, it is recommended that the RC5532A version be used which has guaranteed noise specifications.

Block Diagram



Pin Assignments



Absolute Maximum Ratings

(beyond which the device may be damaged)¹

Parameter	Min.	Тур.	Max.	Units	
Supply Voltage				±22	V
Input Voltage				±Vs	V
Differential Input Voltage				0.5	V
P _D T _A < 50°C	PDIP			468	mW
Junction Temperature	PDIP			125	°C
Storage Temperature		-65		150	°C
Operating Temperature	RC5532/A	0		70	°C
Lead Soldering Temperature (10 sec)				300	°C

Notes:

- 1. Functional operation under any of these conditions is NOT implied.
- 2. For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.
- 3. Short circuit to ground on one amplifier only.

Operating Conditions

Parameter			Min.	Тур.	Max.	Units
θЈА	Thermal resistance	PDIP		160		°C/W
For T _A	> 50°C Derate at	PDIP		6.25		mW/°C

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PRODUCT SPECIFICATION RC5532/RC5532A

DC Electrical Characteristics

(VS = ± 15 V and TA = +25°C unless otherwise noted)

		RO	RC5532/5532A			
Parameters	Test Conditions	Min.	Тур.	Max.	Units	
Input Offset Voltage			0.5	4.0	mV	
	Over Temperature			5.0	mV	
Input Offset Current			10	150	nA	
	Over Temperature			200	nA	
Input Bias Current			200	800	nA	
	Over Temperature			1000	nA	
Supply Current			6.0	16	mA	
	Over Temperature			22	mA	
Input Voltage Range		±12	±13		V	
Common Mode Rejection Ratio		70	100		dB	
Power Supply Rejection Ratio		80	100		dB	
Large Signal	$RL \ge 2 \text{ K}\Omega$, $VOUT = \pm 10V$	25	100		V/mV	
Voltage Gain	Over Temperature	15	50			
	$R_L \ge 600\Omega$, $V_{OUT} = \pm 10V$	15	50			
	Over Temperature	10				
Output Voltage Swing	R _L ≥ 600Ω	±12	±13		V	
	$R_L = 600\Omega$, $V_S = \pm 18V$	±15	±16			
	$R_L \ge 2k\Omega$				1	
Input Resistance (Diff. Mode)			300		ΚΩ	
Short Circuit Current			38		mA	

Notes:

1. Diodes protect the inputs against over-voltage. Therefore, unless current-limiting resistors are used, large currents will flow if the differential input voltage exceeds 0.6V. Maximum input current should be limited to ±10mA.

Electrical Characteristics

(Vs = ± 15 V and TA = +25°C)

		RC/RM5532A			
Parameters	Test Conditions	Min.	Тур.	Max.	Units
Input Noise Voltage Density	Fo = 30 Hz		8.0	12	nV/√ Hz
	F _O = 1 kHz		5.0	6.0	
Input Noise Current Density	F _O = 30 Hz		2.7		pA/√ Hz
	Fo = 1 kHz		0.7		
Channel Separation	$F = 1 \text{ kHz}, R_S = 5 \text{ k}\Omega$		110		dB

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^{2.} Over Temperature: RC = 0° C \leq TA \leq 70 $^{\circ}$ C

AC Electrical Characteristics

(Vs = ± 15 V and TA = +25°C)

Parameters	Test Conditions	Min.	Тур.	Max.	Units
Output Resistance	$AV = 30$ dB Closed Loop, $F = 10$ kHz, $R_L = 600\Omega$		0.3		Ω
Overshoot	Unity Gain, $V_{IN} = 100 \text{ mV}_{p-p}$ $C_L = 100 \text{ pF}, R_L = 600\Omega$		10		%
Gain	F = 10 KHz		2.2		V/mV
Gain Bandwidth Product	$C_L = 100 \text{ pF}, R_L = 600\Omega$		10		MHz
Slew Rate			8.0		V/µS
Power Bandwidth	V _{OUT} = ±10V		140		KHz
	Vout = $\pm 14V$, RL = 600Ω , Vs = $\pm 18V$		100		KHz

Test Circuits

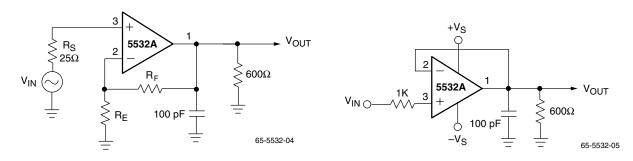


Figure 1. Closed Loop Frequency Response

Figure 2. Follower, Transient Response

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Typical Performance Characteristics

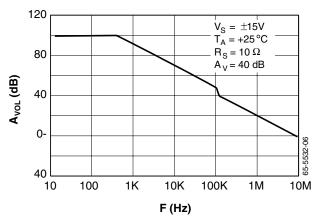


Figure 3. Open Loop Gain vs. Frequency

40

30

20

10

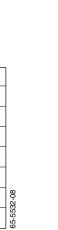
0

100

1K

10K

V_{OUT p-P}(V)



 $V_S = \pm 15V$

10M

100M

Figure 5. Output Voltage Swing vs. Frequency

100K

F (Hz)

1M

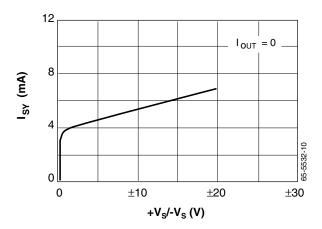


Figure 7. Supply Current vs. Supply Voltage

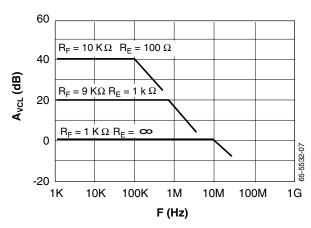


Figure 4. Closed Loop Gain vs. Frequency

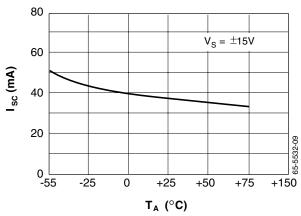


Figure 6. Short Circuit Current vs. Temperature

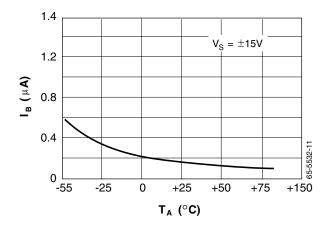
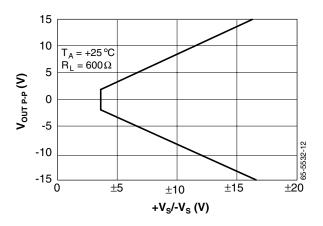


Figure 8. Input Bias Current vs. Temperature

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Typical Performance Characteristics (continued)



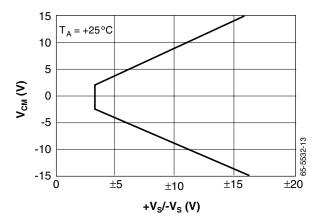
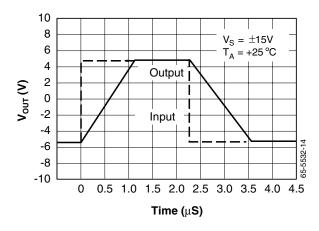


Figure 9. Output Voltage Swing vs. Supply Voltage

Figure 10. Common Mode Input Range vs. Supply Voltage



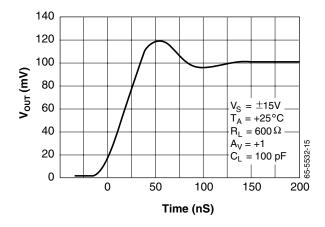


Figure 11. Follower Large Signal Pulse Response

Figure 12. Transient Response Output Voltage vs. Time

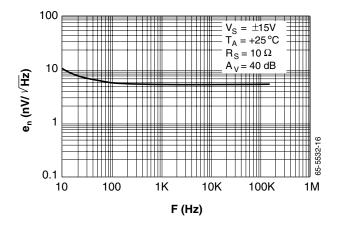


Figure 13. Input Noise Density vs. Frequency

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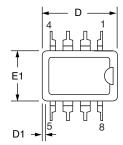
Mechanical Dimensions (continued)

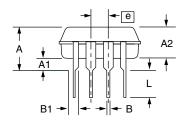
8-Lead Plastic DIP Package

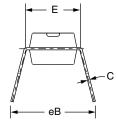
Cumbal	Inches		Millim	Notes	
Symbol	Min.	Max.	Min.	Max.	Notes
Α	_	.210	_	5.33	
A1	.015	_	.38	_	
A2	.115	.195	2.93	4.95	
В	.014	.022	.36	.56	
B1	.045	.070	1.14	1.78	
С	.008	.015	.20	.38	4
D	.348	.430	8.84	10.92	2
D1	.005		.13	_	
Е	.300	.325	7.62	8.26	
E1	.240	.280	6.10	7.11	2
е	.100	BSC	2.54 BSC		
eB	_	.430	_	10.92	
L	.115	.160	2.92	4.06	
N	8	8°	8°		5

Notes:

- 1. Dimensioning and tolerancing per ANSI Y14.5M-1982.
- 2. "D" and "E1" do not include mold flashing. Mold flash or protrusions shall not exceed .010 inch (0.25mm).
- 3. Terminal numbers are for reference only.
- 4. "C" dimension does not include solder finish thickness.
- 5. Symbol "N" is the maximum number of terminals.







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Ordering Information

Product Number	Temperature Range	Screening	Package
RC5532N/RC5532AN	0°C to +70°C	Commercial	8 Pin Plastic DIP

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