Total Quad Operational Amplifiers

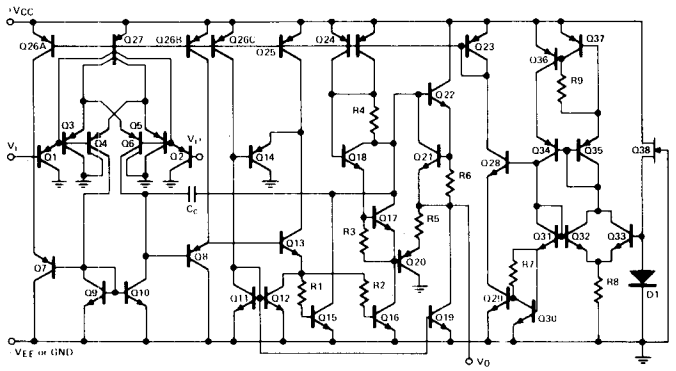
GENERAL DESCRIPTION

The 3403A high performance quad op-amp features improved large signal bandwidth and worst case DC specs equal to or better than the standard 741 type general purpose op-amp. The device uses a newly developed type of ground-sensing differential input stage which provides increased slew rate.

DESIGN FEATURES

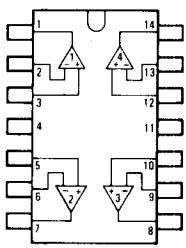
- Class AB Output State; No Crossover Distortion
- Output Voltage Swings to Ground in Single Supply Operations
- High Slew Rate 1.2 V/μs
- Single or Split Supply Operation
- Wide Supply Operation 2.5 V to +36 V or ±1.25 V to ±18 V
- Pin Compatible with LM324 and 3403
- Low Power Consumption 0.8 mA/amplifier

SCHEMATIC DIAGRAM (1/4 Shown)



CONNECTION INFORMATION

DB and DC
Dual In-line Packages
(Top View)



PIN	FUNCTION
1	OUTPUT 1
2	-INPUT 1
3	+INPUT 1
4	V^+
5	+INPUT 2
6	-INPUT 2
7	OUTPUT 2
8	OUTPUT 3
9	-INPUT 3
10	+INPUT 3
11	GROUND
12	+INPUT 4
13	-INPUT 4
14	OUTPUT 4

Order Part Nos.:
RC3403ADB, RC3403ADC, RV3403ADB,
RV3403ADC, RM3503ADC

ABSOLUTE MAXIMUM RATINGS

Supply Voltage, V^+ . . . . . 36 V or ±18 V
Differential Input Voltage . . . . . 36 V
Input Voltage . . . . . -0.3 V to +36 V
Power Dissipation
"DB" package . . . . 500 MW (molded DIP epoxy "B")
"DC" package . . . . . 650 mW (hermetic DIP)

Operating Temperature Range
RM3503A . . . . . -55°C to +125°C
RC3403A . . . . . 0°C to +70°C
RV3403A . . . . . -40°C to +85°C
Storage Temperature Range . . . . . -65°C to +150°C
Lead Temperature (Soldering, 60s) . . . . . 300°C

ELECTRICAL CHARACTERISTICS (T_A = 25°C, V_{CC} = ±15V unless otherwise noted)

PARAMETER	CONDITIONS	RM3503A			RC/RV3403A			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
Input Offset Voltage	R_S = 0		2	4		2	5	mV
Input Offset Current	I_{in-} or I_{in+}		±30	±50		±30	±50	nA
Input Bias Current	I_{in-} or I_{in+}		-100	-200		-100	-200	nA
Input Common Mode Voltage Range		0		V^+ - 2	0		V^+ - 2	V
Supply Current	R_L = ∞ on all op-amps		3	4		3	5	mA
Large Signal Voltage Gain	R_L > 2KΩ	50	100		25*	100		V/mV
Output Voltage Swing	R_L = 2KΩ	±13	±14		±13	±14		V
Common Mode Rejection Ratio	DC	80	90		80	90		dB
Channel Separation	±1kHz to 20 kHz (in ref)		-120			-120		dB
Output Source Current	V_{IN+} = 1 V, V_{IN-} = 0 V	20	40		20	40		mA
Output sink current		10	20		10	20		mA
Small signal bandwidth			2			2		MHz
Slew Rate	A_V = 1, -10<V_i<+10		1.2			1.2		V/μs
Distortion (Crossover)	f = 20 kHz, VO = $10V_{pp}$		1			1		%
Power Bandwidth	VO = $10V_{pp}$		40			40		kHz
Power Supply Rejection Ratio			20	45		20	100	μV/V

ELECTRICAL CHARACTERISTICS GUARANTEED OVER TEMPERATURE

Range: RM3503A: -55°C to +125°C
RC3403A: 0°C to +70°C
RV3403A: -40°C to +85°C

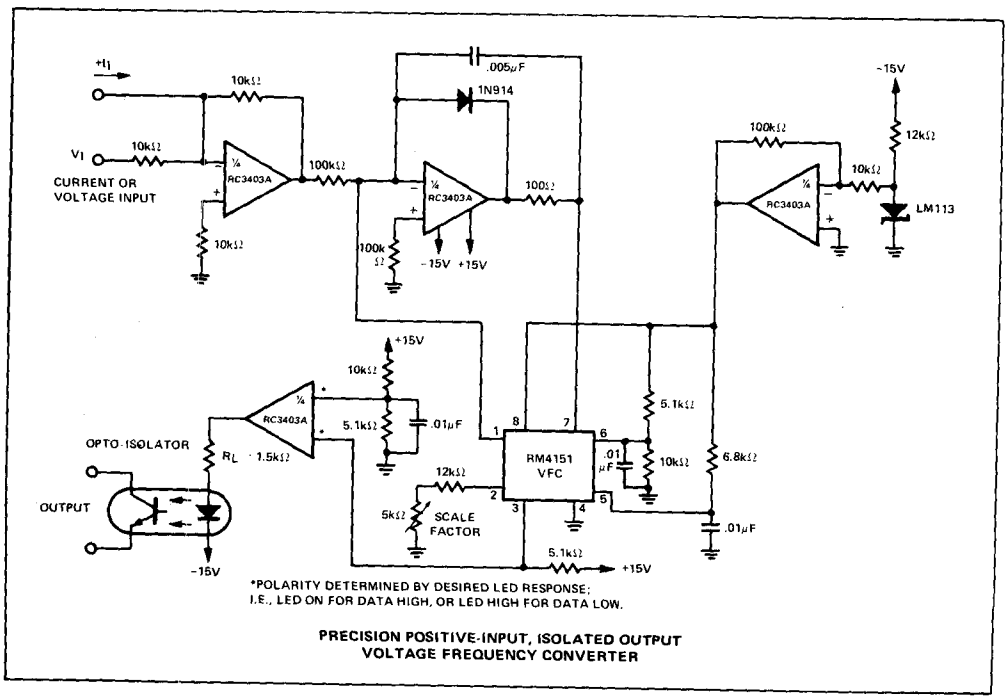
PARAMETER	RM3503A		RC3403A		RV3403A		UNITS
	MIN	MAX	MIN	MAX	MIN	MAX	
Input Offset Voltage	–	6.0	–	10.0	–	10.0	mV
Input Offset Current	–	200	–	200	–	200	nA
Input Bias Current	–	-1500	–	-800	–	-1500	nA
Large Signal Voltage Gain	25	–	15	–	15	–	V/mV
Output Voltage Swing	±10	–	±10	–	±10	–	V

LOW VOLTAGE ELECTRICAL CHARACTERISTICS (V_{CC} = +5V, V_{EE} = GND, T_A = +25°C unless otherwise noted.)

PARAMETER	CONDITIONS	RM3503A			RC/RV3403A			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
Input Offset Voltage	$R_S = 0\Omega$		2.0	5.0		2.0	10	mV
Input Offset Current	$I_{in-} - I_{in+}$		30	50		30	50	nA
Input Bias Current	$I_{in-} + I_{in+}/2$		-100	-200		-100	-200	nA
Large Signal Voltage Gain	$R_L \geq 2K\Omega$	20	200		20	200		V/mW
Power Supply Rejection Ratio				50			150	μV/V
Output Voltage Range[1]	$R_L = 10K\Omega$	3.5			3.5			V_{p-p}
Power Supply Current	$R_L = \infty$, all amplifiers		2.5	4.0		2.5	5.0	mA
Channel Separation	1KHz≤f≤2MHz (input referred)		-120			-120		dB

[1] Output will swing to ground.

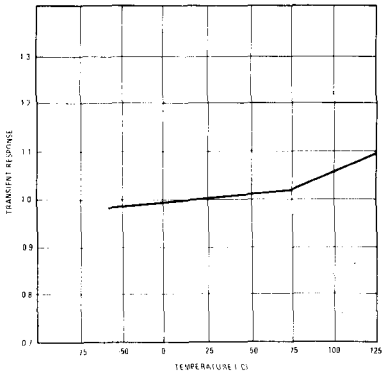
3403A TYPICAL APPLICATIONS



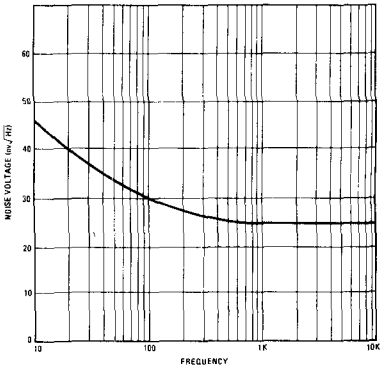
PRECISION POSITIVE-INPUT, ISOLATED OUTPUT VOLTAGE FREQUENCY CONVERTER

TYPICAL ELECTRICAL DATA

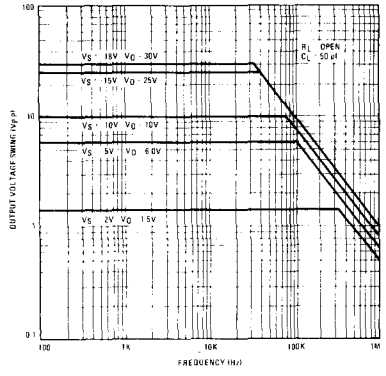
TRANSIENT RESPONSE VERSUS TEMPERATURE



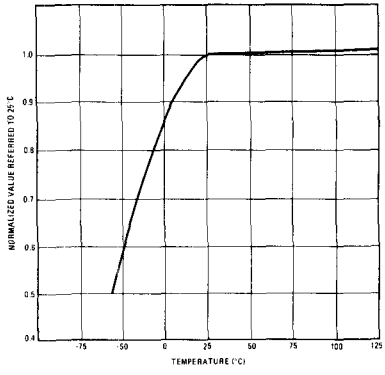
NOISE VERSUS FREQUENCY



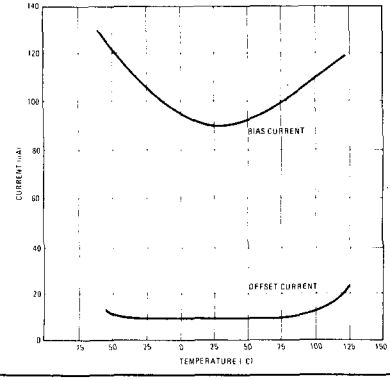
OUTPUT VOLTAGE SWING VERSUS FREQUENCY



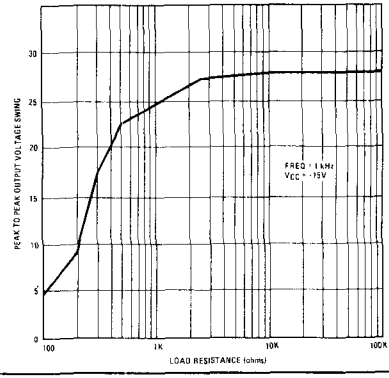
SLEW RATE VERSUS TEMPERATURE



INPUT CURRENTS VERSUS TEMPERATURE



OUTPUT VOLTAGE SWING VERSUS LOAD RESISTANCE



RAYTHEON