Micropower Operational Amplifier 4132

DESIGN FEATURES

- 10 nA Maximum Input Bias Current
- 2 nA Maximum Input Offset Current
- 3 mV Maximum Input Offset Voltage
- 35 μA Maximum Current Drain at ±20V
- 20 MΩ Input Impedance
- ±10V Min Into a 5 KΩ Load
- 3 dB Gain Variation from ±3V to ±20V
- 94 dB Minimum Gain ±3V to ±20V, -55°C to +125°C

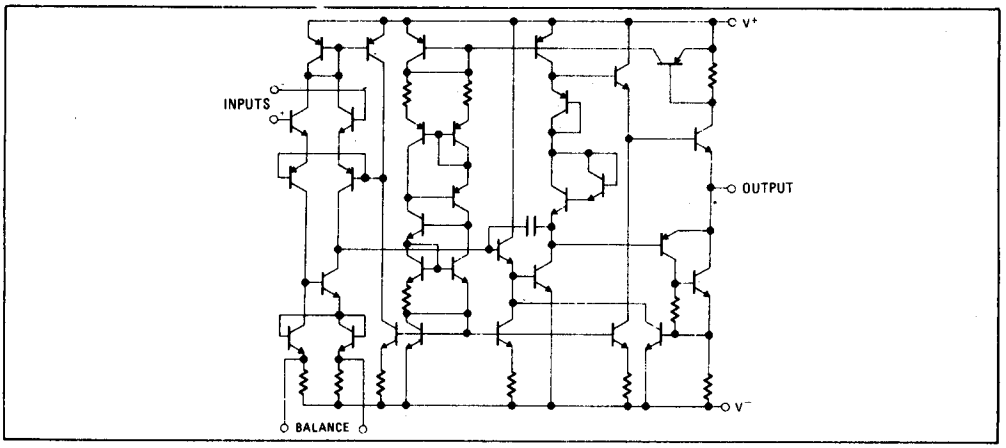
GENERAL DESCRIPTION

The RM4132/RC4132 are high performance, high gain, micropower, internally compensated operational amplifiers fabricated on a single silicon chip using the planar epitaxial process.

Designed for applications where power supply current is at a premium (such as in battery operated equipments), 4132 characteristics are very similar to those of the Raytheon 4131 general purpose operational amplifier.

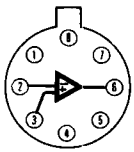
The RM4132 is pin compatible with the 709, 741, and 4131, and features high common mode and differential voltage range, 20 MΩ input impedance, optimum performance over a wide range of supply voltages, freedom from latch-up, and operation over the full military temperature range. The RC4132 operates over the commercial range of 0°C to +70°C.

SCHEMATIC DIAGRAM



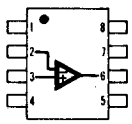
CONNECTION INFORMATION

TE (TO-99)
Metal Can Package
(Top View)



Order Part Nos.:
RM4132T, RC4132T

NB
Dual In-line Package
(Top View)



Order Part Nos.:
RC4132NB, RM4132DE,
RC4132DE

PIN	FUNCTION
1	BAL
2	-INPUT
3	+INPUT
4	V^-
5	BAL
6	OUTPUT
7	V^+
8	NC

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	RM4132: ±22V RC4132: ±18V
Internal Power Dissipation (Note 1)	500 mW
Differential Input Voltage	±30V
Input Voltage (Note 2)	±15V
Storage Temperature Range	-65°C to +150°C
Operating Temperature Range	
RM4132	-55°C to +125°C
RC4132	0°C to +70°C
Lead Temperature (Soldering, 60s)	300°C
Output Short-Circuit Duration (Note 3)	Indefinite

ELECTRICAL CHARACTERISTICS

($\pm 3V \leq V_S \leq \pm 20V$, RM4132: $-55°C \leq T_A \leq +125°C$; RC4132: $0°C \leq T_A \leq +70°C$ Unless otherwise specified)

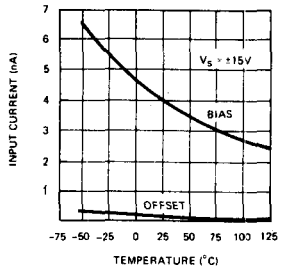
PARAMETER	CONDITIONS	RM4132 MIN	RM4132 TYP	RM4132 MAX	RC4132 MIN	RC4132 TYP	RC4132 MAX	UNITS
Input Offset Voltage	$R_S \leq 10\ k\Omega$ 25°C		0.7	3.0 4.0		1.5	5.0 6.0	mV
Input Offset Current	25°C		0.3	2.0 4.0		1.0	5.0 7.5	nA
Input Bias Current	25°C		4.0	10 20		10	25 35	nA
Input Resistance	25°C		20			10		MΩ
Large-Signal Voltage Gain	$R_L \geq 5\ k\Omega$, Note 4	50	160		50	160		V/mV
Output Voltage Swing	$V_S = \pm 15V$, $R_L = 10\ K$	±12	±14		±12	±14		V
	$V_S = \pm 15V$, $R_L = 5\ K$	±10	±13		±10	±13		V
Input Voltage Range	$V_S = \pm 20V$	±15			±15			V
Common Mode Rejection Ratio	$R_S \leq 10\ k\Omega$	80	94		70	90		dB
Supply Voltage Rejection Ratio	$R_S \leq 10\ k\Omega$	80	94		70	90		dB
Supply Current	$T_A = 25°C$			45			50	μA
Average Temperature Coefficient of Input Offset Voltage			3.0	15		3.0	20	uV/°C
Average Temperature Coefficient of Input Offset Current	25°C ≤ T_A ≤ 125°C		2	20				pA/°C
	-55°C ≤ T_A ≤ 25°C		4	40				pA/°C
	25°C ≤ T_A ≤ 70°C					4	40	pA/°C
	0°C ≤ T_A ≤ 25°C					10	100	pA/°C
Slew Rate (unity gain)	25°C, $R_L = 5\ K$		0.13			0.13		V/μs
Bandwidth (unity gain)	25°C, $R_L = 5\ K$		150			150		kHz

NOTES:

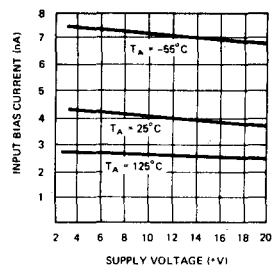
1. Rating applies for case temperatures to 125°C; derate linearly at 6.5 mW/°C for ambient temperatures above +75°C.
2. For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.
3. Short-circuit may be to ground or either supply. Rating applies to +125°C case temperature or +75°C ambient temperature.
4. V_{OUT} = guaranteed minimum output swing.

TYPICAL ELECTRICAL DATA

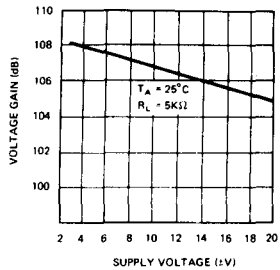
Input Current



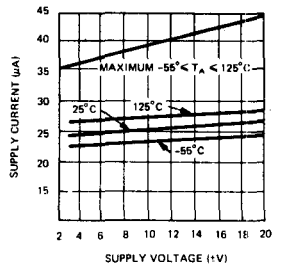
Input Bias Current



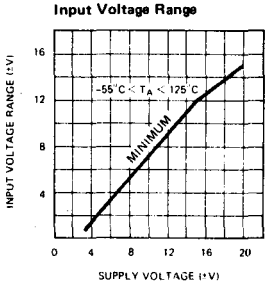
Voltage Gain



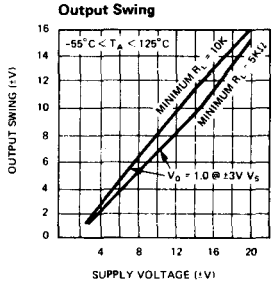
Supply Current



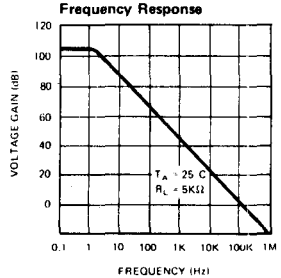
Input Voltage Range



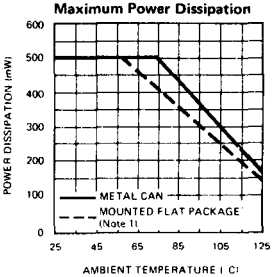
Output Swing



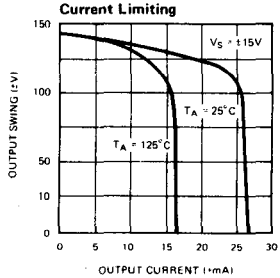
Open Loop Frequency Response



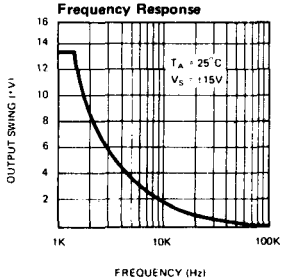
Maximum Power Dissipation



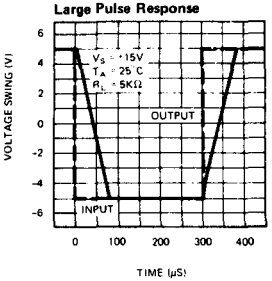
Current Limiting



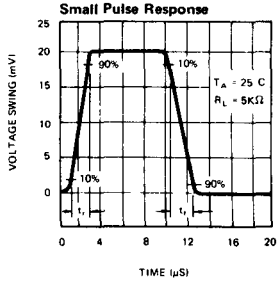
Large Signal Frequency Response



Voltage Follower Large Pulse Response

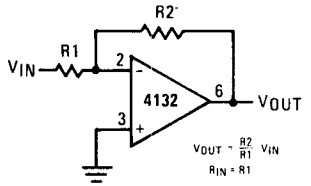


Voltage Follower Small Pulse Response

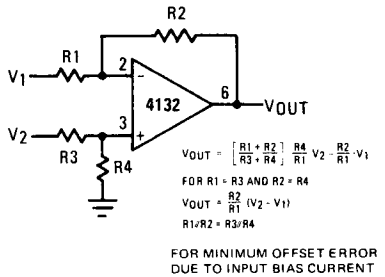


TYPICAL APPLICATIONS

Inverting Amplifier

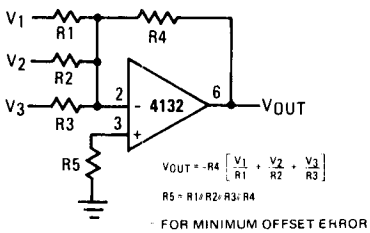


Difference Amplifier



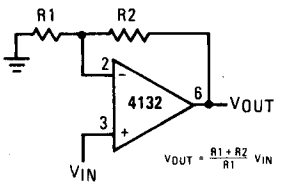
FOR MINIMUM OFFSET ERROR
DUE TO INPUT BIAS CURRENT

Inverting Summing Amplifier

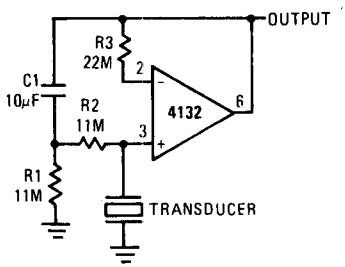


FOR MINIMUM OFFSET ERROR
DUE TO INPUT BIAS CURRENT

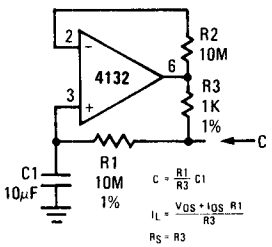
Non-Inverting Amplifier



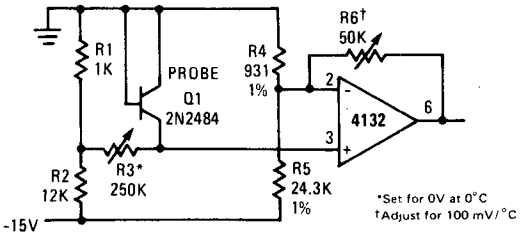
Amplifier for Piezoelectric Transducers



Capacitance Multiplier



Temperature Probe



*Set for 0V at 0°C
†Adjust for 100 mV/°C

RAYTHEON