

MAXIM

3³/₄ Digit DMM Circuit

MAX133/MAX134

General Description

The MAX133 and MAX134 are integrating A/D converters for 3³/₄ digit multimeters and data acquisition systems such as data loggers and weigh scales. The A/D's internal resolution is $\pm 40,000$ counts. An extra digit is supplied as a guard digit to allow autozero or tare of a 4000 count displayed reading to 1/10 of a displayed count. The conversion time is 50ms.

The MAX133 and MAX134 differ only in their microprocessor interface. The MAX133 has a 4 bit multiplexed address/data bus while the MAX134 has 3 separate address lines and a 4 bit bidirectional data bus. Both devices can be used with 4, 8, and 16 bit microprocessors.

When controlled by a microprocessor, the MAX133 and MAX134 can perform auto-ranging measurements from $\pm 400.0\text{mV}$ to $\pm 4000\text{V}$ full scale. External attenuator resistors are required, but range switching is performed by the A/D.

The power supply is typically a 9V battery or $\pm 5\text{V}$. Operating current is typically $100\mu\text{A}$ while standby current in only $25\mu\text{A}$.

Applications

- Digital Panel Meters
- Weigh Scales
- Data Loggers
- Data Acquisition Systems

Features

- 40,000 Count Resolution
- 0.025% Accuracy
- 20 Conversions per Second
- Microprocessor Interface
- 100 μA Operating Supply Current
- Low External Component Count
- 5 μV Resolution
- Demonstration Kit Available
MAX134/DEMO

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ABSOLUTE MAXIMUM RATINGS

Supply Voltage		Reference Input Voltage	V ⁺ to V ⁻
V ⁺ to V ⁻	+15V	Digital Inputs	(DGND - 0.3V) to (V ⁺ + 0.3V)
V ⁺ to DGND	+6V	Power Dissipation	800mW
V ⁻ to DGND	-9V	Storage Temperature	-65°C to +160°C
Analog Input Voltage (any input) (Note 1)	V ⁺ to V ⁻	Lead Temperature (Soldering 10 sec)	+300°C

Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions above those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum ratings conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

(V⁺ = 9V, T_A = +25°C, Test Circuit unless otherwise indicated)

PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNITS
ANALOG					
Zero Input Reading	Read Zero Mode, DC Volts Zero Input Offset Reading will be corrected Digitally in the μ P			$\pm$ 5000	Count
Δ Zero Input Reading	Difference between 1000VDC Scale, V _{IN} = 0				

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ELECTRICAL CHARACTERISTICS (continued)

(V+ = 9V, TA = +25°C, Test Circuit unless otherwise indicated)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
POWER SUPPLY AND DIGITAL SECTION						
Digital Ground Voltage	DGND	Referenced to V+ 5µA < ISINK < 500µA	-4.5	-5	-5.5	V
Analog COMMON Voltage		(V+ - Common) 250kΩ between V+ and COMMON	2.8	3.0	3.3	V
Analog COMMON Sink Impedance		ΔV, ICOMMON = 10µA to ICOMMON = 2mA		4	20	Ω
Analog Common Source Capability		For ΔVCOMMON < 0.5V		1		µA
Tempco of Common				80		ppm/°C
Output High	VOH	D0-3, Data Ready IOUT = -100µA	V+ - 0.5			V
Output Low	VOL	D0-3, Data Ready IOUT = 400µA			0.4	V
Input High	VIH	D0-3, A0-3, Data Ready, RD, WR	70	45		% (V+ - DGND)
Input Low	VIL	D0-3, A0-3, Data				

