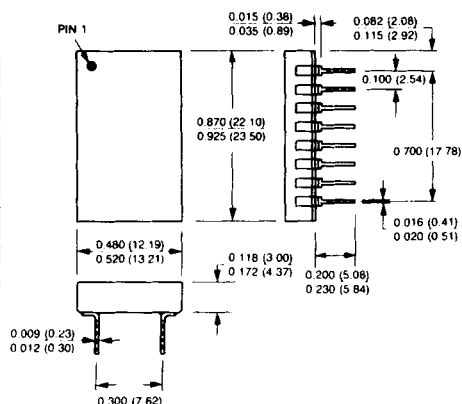


**FEATURES**

- Complete D/A Converter:  
Internal Reference  
Internal Output Op Amp
- Small 16-Pin DIP
- 2.5  $\mu$ sec Max Settling Time  
(20V Step to  $\pm 1/2$ LSB)
- $\pm 1/2$ LSB Linearity and  
Monotonicity Guaranteed  
Over Temperature
- $\pm 1/2$ LSB Absolute Accuracy
- Full Mil Operation  
-55°C to +125°C

**16 PIN DIP**

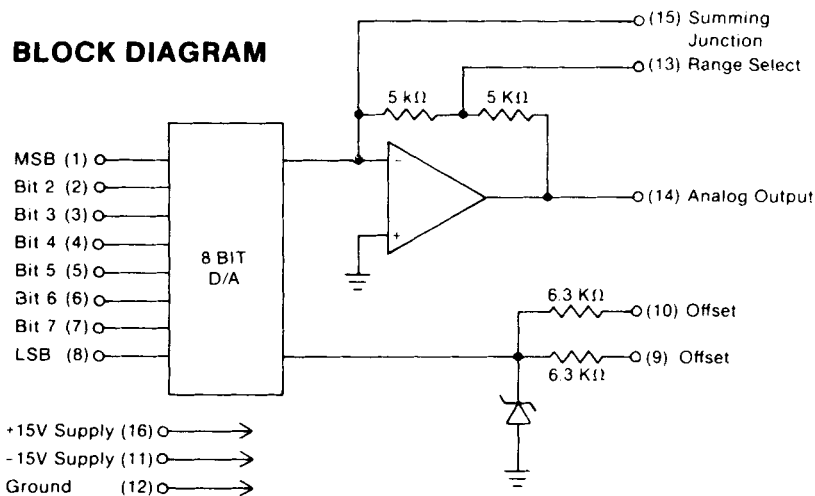


**DESCRIPTION**

MN3014 is a complete, high-speed (2.5 $\mu$ sec), adjustment-free, 8-bit digital-to-analog converter. It contains an internal reference and output amplifier and is housed in a 16-pin, hermetically sealed, ceramic dual-in-line package. MN3014 is available for either 0°C to +70°C or -55°C to +125°C operation and features the following: 570mW maximum power consumption, 4 user-selectable output ranges,  $\pm 1/2$  LSB linearity guaranteed over temperature,  $\pm 1/2$ LSB absolute accuracy guaranteed at +25°C and  $\pm 2$ LSB's guaranteed over temperature. MN3014 settles to within  $\pm 1/2$ LSB for a 20 Volt step in 2.5 $\mu$ sec maximum. For military/aerospace or harsh-environment commercial/industrial applications, "H/B" models are Environmentally Stress Screened.

MN3014 was designed for applications in which adjustment-free operation and fast settling time are required and where space, weight and size are at a premium. Use of these units minimizes design and purchasing time and assures field interchangeability without the need for adjustment or recalibration.

**BLOCK DIAGRAM**



**MN3014 HIGH-SPEED 8-Bit D/A CONVERTER**

**ABSOLUTE MAXIMUM RATINGS**

Operating Temperature	0°C to +70°C -55°C to +125°C ("H" Models)
Storage Temperature	-65°C to +150°C
+15V Supply (Pin 16)	+18 Volts
-15V Supply (Pin 11)	-18 Volts
Digital Inputs (Pins 1-8)	-10 to +18 Volts

**ORDERING INFORMATION**

PART NUMBER	_____	MN3014H/B
Standard part is specified for 0°C to +70°C operation.		
Add "H" for specified -55°C to +125°C operation.		
Add "B" to "H" models for Environmental Stress Screening.		

**SPECIFICATIONS (T<sub>A</sub> = 25°C, Supply Voltages ±15V, unless otherwise specified).**

DIGITAL INPUTS	MIN.	TYP.	MAX.	UNITS
Logic Levels: Logic "1" Logic "0"	2.0		0.8	Volts Volts
Input Currents: Logic "1" (V <sub>in</sub> = 2.0 to +18 Volts) Logic "0" (V <sub>in</sub> = -10 to +0.8 Volts)			10 10	μA μA
<b>ANALOG OUTPUTS</b>				
Unipolar Output Ranges Bipolar Output Ranges		0 to +10, 0 to -10 ±5, ±10		Volts Volts
Output Impedance Output Load Current	± 4	0.5		Ω mA
<b>TRANSFER CHARACTERISTICS</b>				
Linearity Error (Note 1): 0°C to +70°C -55°C to +125°C		± ¼	± ½ ± ½	LSB LSB
<b>Monotonicity</b>		<b>Guaranteed Over Temperature</b>		
Full Scale Absolute Accuracy Error (Notes 2, 3): +25°C -55°C to +125°C (Note 4)		± ¼	± ½ ± 2	LSB LSB
Zero Error (Note 5): +25°C -55°C to +125°C (Note 4)		± ¼	± ½ ± 1	LSB LSB
<b>DYNAMIC CHARACTERISTICS</b>				
Settling Time (20 volt change to ±1/2 LSB): MN3014			2.5	μSec
Output Slew Rate: MN3014		20		V/μSec
<b>POWER SUPPLIES</b>				
Power Supply Range: +15V Supply -15V Supply	+14.55 -14.55	+15.00 -15.00	+15.45 -15.45	Volts Volts
Power Supply Rejection (Note 6): +15V Supply -15V Supply		± 0.03 ± 0.01		% FSR / % V <sub>S</sub> % FSR / % V <sub>S</sub>
Current Drain, Output Unloaded: +15V Supply -15V Supply		18 -10	24 -14	mA mA
Power Consumption		420	570	mW

**SPECIFICATION NOTES:**

- Micro Networks tests and guarantees maximum linearity error at room temperature and both extremes of the specified operating temperature range.
- The Absolute Accuracy Error of a voltage output D/A is the difference between the actual output voltage that appears following the application of a given digital input code and the ideal or expected output voltage for that code. Absolute Accuracy Error includes gain, offset, linearity, and noise errors and encompasses the drifts of these errors when specified over temperature. For the MN3014, the Full Scale Absolute Accuracy Error is the Absolute Accuracy Error measured when the digital input is 1111 1111 for the 0 to +10V range, 0000 0000 for the 0 to -10V range, and both 1111 1111

and 0000 0000 for the bipolar ranges (See Note 5).

- For an 8 bit converter, 1 LSB corresponds to 0.39% FSR. FSR stands for Full Scale Range and is equivalent to the peak to peak voltage of the selected output range. For the ±10V output range, FSR is 20V and 1 LSB = 78 mV. For the other output ranges, FSR is 10V and 1 LSB = 39 mV.
- For Commercial Models, this specification applies over the 0°C to +70°C temperature range. See Ordering Information.
- Zero Error is the Absolute Accuracy Error measured when the output of the converter is supposed to be zero volts (see Note 2).
- The MN3014 will operate over a power supply range of ±14V to ±18V with reduced accuracy.

DIGITAL INPUT	ANALOG OUTPUT (DC VOLT)					
	MSB	LSB	0 to +10V	0 to -10V	±5V	±10V
0000 0000			0.000	-9.961	-5.000	-10.000
0000 0001			+0.039	-9.922	-4.961	- 9.922
0111 1111			+4.961	-5.000	-0.039	- 0.078
1000 0000			+5.000	-4.961	0.000	0.000
1111 1110			+9.922	-0.039	+4.922	+ 9.844
1111 1111			+9.961	0.000	+4.961	+ 9.922
CONNECT PIN to PIN			9 to 12 10 to 12 13 to 15	9 to 15 10 to 15 13 to 15	9 to 12 10 to 15 13 to 15	9 to 12 10 to 15 10 to 15

**LAYOUT CONSIDERATIONS**—Proper attention to layout and decoupling is necessary to obtain specified accuracies.

The unit's ground pin (Pin 12) should be connected to system analog ground, preferably through a large ground plane beneath the package. Power supplies should be decoupled with 1 μF capacitors paralleled with 0.01 μF ceramic capacitors as shown in the diagram.

