

**10-bit D/A Converter  
with Input Register**

**FEATURES**

- Complete With Internal:  
Input Register  
Output Op Amp  
Reference
- $\pm 1/2$ LSB Linearity and  
Monotonicity Guaranteed  
Over Temperature
- Small 18-Pin DIP
- 40nsec Setup Time
- Adjustment-Free
- $\pm 0.1\%$  FSR Unadjusted  
Absolute Accuracy  
Over Temperature
- 10 $\mu$ sec Max Settling Time  
(20V step to  $\pm 1/2$ LSB)
- Full Mil Operation  
-55°C to +125°C
- MIL-PRF-38534 Screening  
Optional.

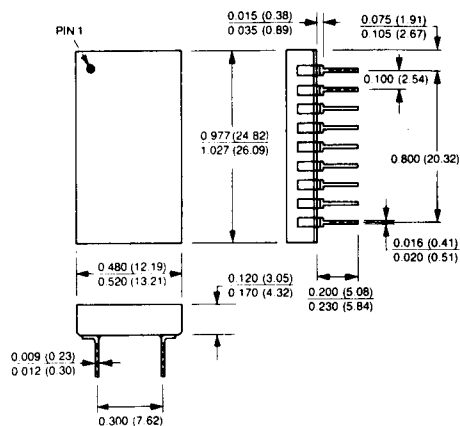
**DESCRIPTION**

The MN3040 is a fast, 10-bit digital-to-analog converter with a fast TTL input register for easy interfacing and rapid throughputs in microprocessor-based systems. It is packaged in a hermetically sealed, ceramic, 18-pin dual-in-line and is complete with internal reference and output amplifier. Two output ranges are available (0 to -10V and  $\pm 10$ V), and performance features include the following: fast output settling (typically 5 $\mu$ sec for a 20V change),  $\pm 0.1\%$ FSR overall accuracy, and  $\pm 1/2$ LSB linearity and monotonicity guaranteed over the entire operating temperature range. Maximum power consumption is 715 mW.

The MN3040 is actively laser trimmed as a complete device for linearity, gain and offset, eliminating the need for external adjusting potentiometers. Units are available for either 0°C to +70°C or -55°C to +125°C ("H" models) operation, and Micro Networks 100% tests and guarantees both linearity and accuracy at room temperature and at both operating temperature extremes. For military/aerospace or harsh-environment commercial/industrial applications, "H/B CH" models are fully screened to MIL-PRF-38534.

The MN3040's digital inputs are TTL compatible, and its internal input register facilitates interfacing to microprocessor and minicomputer data buses. Applications include microprocessor-based data distribution systems, programmable power supplies, low-resolution displays and servo drivers.

**18 PIN DIP**



**Dimensions in Inches  
(millimeters)**

**MN3040 10-Bit D/A CONVERTER with INPUT REGISTER**

**ABSOLUTE MAXIMUM RATINGS**

Operating Temperature	-55°C to +125°C
Specified Temperature	0°C to +70°C (Standard)
	-55°C to +125°C ("H" Models)
Storage Temperature	-65°C to +150°C
+15V Supply (Pin 8)	+18 Volts
-15V Supply (Pin 9)	-18 Volts
+5V Supply (Pin 7)	-0.5 to +7 Volts
Digital Inputs (Pins 1-5, 14-18)	-0.5 to +5.5 Volts
Register Enable (Pin 6)	-0.5 to +5.5 Volts
Output Current	(Note 1)

**ORDERING INFORMATION**

PART NUMBER _____	MN3040H/B CH
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.	
Add "CH" to "/B" models for 100% screening according to MIL-PRF-38534.	

**SPECIFICATIONS (T<sub>A</sub> = +25°C, Supply Voltages ±15V and +5V, unless otherwise specified)**

DIGITAL INPUTS	MIN.	TYP.	MAX.	UNITS
Logic Coding: Unipolar (0 to -10V) Range Bipolar (-10 to +10V) Range	Complementary Binary Complementary Offset Binary			
Logic Levels: Logic "1" Logic "0"	2.0		0.7	Volts Volts
Input Currents Data Inputs: Logic "1" (V <sub>IN</sub> = 2.4 Volts) Logic "0" (V <sub>IN</sub> = 0.3 Volts) Register Enable: Logic "1" (V <sub>IN</sub> = 2.4 Volts) Logic "0" (V <sub>IN</sub> = 0.3 Volts)			30 - 0.6 60 - 1.2	μA mA μA mA
Register Enable (Note 2): Pulse Width Setup Time Digital Data to Enable	60 40			nSec nSec
<b>ANALOG OUTPUTS</b>				
Output Impedance Output Load Current	±4	0.5		Ω mA
<b>TRANSFER CHARACTERISTICS</b>				
Linearity Error (Notes 3, 5): 0°C to +70°C -55°C to +125°C ("H" Models)		±¼	±½ ±½	LSB LSB
Monotonicity	Guaranteed Over Temperature			
Absolute Accuracy Error (Notes 4, 5): +25°C 0°C to +70°C -55°C to +125°C ("H" Models)		± 0.05 ± 0.1 ± 0.2	±0.1 ±0.4 ±0.4	%FSR %FSR %FSR
Gain Error Gain Drift		± 0.1 ±15		% ppm/°C
<b>DYNAMIC CHARACTERISTICS</b>				
Settling Time (20V Change to ±1/2 LSB) Output Slew Rate		5 15	10	μSec V/μSec
<b>POWER SUPPLY REQUIREMENTS</b>				
Power Supply Range: +15V Supply -15V Supply +5V Supply	+14.00 -14.00 + 4.75	+15.00 -15.00 + 5.00	+17.00 -17.00 + 5.25	Volts Volts Volts
Power Supply Rejection: +15V Supply -15V Supply		± 0.005 ± 0.005		%FSR/%Vs %FSR/%Vs
Current Drain, Output Unloaded: +15V Supply -15V Supply +5V Supply		13 - 7 30	20 -11 50	mA mA mA
Power Consumption		450	715	mW

**SPECIFICATIONS NOTES**

- The output is short circuit protected to ground or either supply.
- Converter analog output will follow digital input when Register Enable is a logic "0". Digital input data will be latched and analog output voltage constant when Register Enable is a logic "1". The minimum Register Enable pulse width to latch new digital input data is 60 nSec. See Timing Diagram.
- Micro Networks tests and guarantees maximum Linearity Error at room temperature and at both extremes of the specified operating temperature range.
- The Absolute Accuracy Error specification applies over the converter's entire output range. See Absolute Accuracy Error section below for an explanation of how Micro Networks Corporation tests and specifies Absolute Accuracy Error and Gain Error.
- 1 LSB for a 10 bit converter corresponds to 0.098% FSR. See Note 6.
- FSR stands for Full Scale Range and is equal to the peak to peak voltage of the selected output range. For the ±10V output range, FSR is 20 volts, and 1 LSB is equal to 19.5 mV. For the 0 to -10V range, FSR is 10 volts, and 1 LSB is equal to 9.8mV.