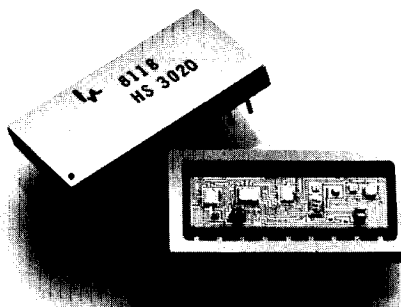


HS 3020

8-Bit DAC with Input Registers

FEATURES

- $\pm 1/2$ LSB Linearity
- ± 1 LSB Absolute Accuracy
- 4 Output Ranges
- Internal References and Output Amplifier
- Pin Compatible with MN 3020
- Input Register
- MIL-STD-883 Rev. C Processing Available

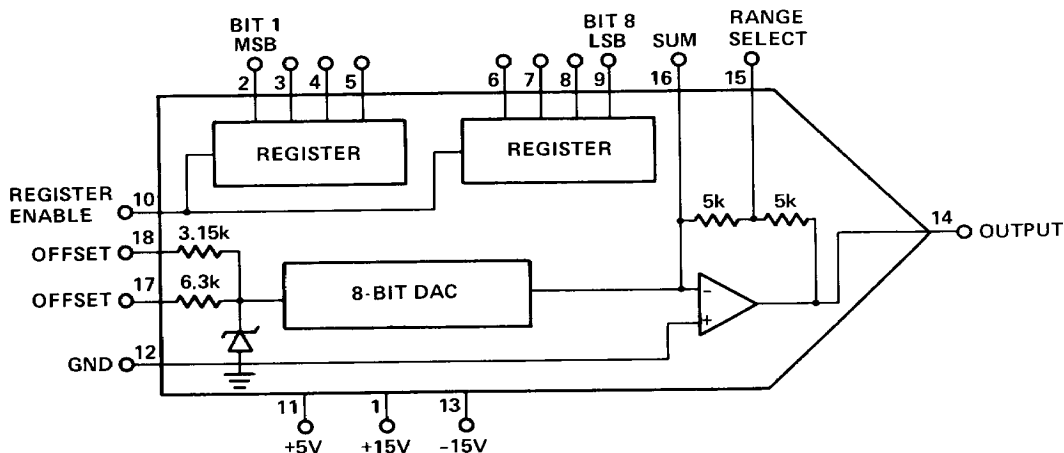


DESCRIPTION

The HS 3020 is an 8-Bit Digital-to-Analog Converter. It contains an internal reference, an input register and an output amplifier. It is packaged in a ceramic 18-pin DIP which is hermetically-sealed. The HS 3020's hybrid construction utilizes a precision network, a low drift reference, an input register and a fast settling output amplifier.

Hybrid Systems guarantees linearity and accuracy not only at room temperature but also at the extremes of the operating range of -55°C to $+125^{\circ}\text{C}$.

FUNCTIONAL DIAGRAM



SPECIFICATIONS

(Typical @ +25°C and nominal power supplies unless otherwise noted)

MODEL	HS 3020
TYPE	D/A Converter
DIGITAL INPUT	
Resolution	8 Bits
Coding	Straight Binary/Offset Binary
Logic Levels (Data Inputs)	
Logic "1" (at 30μA)	+2V min, +5.5V max
Logic "0" (at -6mA)	-0.5V D.C. min, +0.7V max
Register Enable Logic	
Logic "1" (at 40μA)	+2V min, +5.5V max
Logic "0" (at -8mA)	-0.5V min, +0.7V max
Pulse Width	60nSec min
Setup Time	40nSec min

ACCURACY

Linearity Error	
0°C to +70°C	±1/4 LSB typ ±1/2 LSB max
-55°C to +125°C	±1/2 LSB max
Monotonicity	Guaranteed Over Temperature
Absolute Accuracy Error	
0°C to +70°C	±1/2 LSB typ ±1 LSB max
-55°C to +125°C	±1 LSB max
Unipolar Offset Error	
-55°C to +125°C	±1 LSB max
Bipolar Offset Error	
-55°C to +125°C	±1 LSB max
Offset Drift ¹	
Unipolar + Range	±2ppm of F.S.R./°C typ
Unipolar - Range	±10ppm of F.S.R./°C typ
Bipolar + Range	±10ppm of F.S.R./°C typ
Bipolar - Range	±15ppm/°C typ
Gain Drift ¹	

CONVERSION SPEED

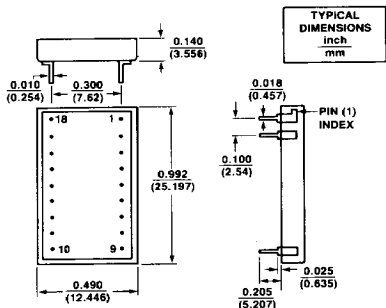
Settling Time (10V change to ±1/2 LSB)	3.0μs max
Output Slew Rate	20V/μs typ

ANALOG OUTPUTS

Output Impedance	0.05Ω typ
Output Current	±5mA min
Short Circuit Duration	Indefinite to Common

POWER SUPPLIES

Power Supply Range	
+15V	+14V to +18V
-15V	-14V to -18V
+5V	+4.75V to +5.25V
Power Supply Rejection	
+15V	±0.03% F.S.R./%Vs
-15V	±0.01% F.S.R./%Vs
Current Drain (Output Unloaded)	
+15V	20mA max
-15V	13mA max
+5V	37mA max
Power Consumption	680mW
Package Outline	



NOTE

- Over specified operating temperature range

PIN DESIGNATIONS

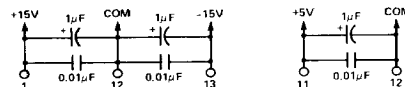
PIN	FUNCTION	PIN	FUNCTION
1	+15V	18	Unipolar Offset
2	Bit 1 (MSB)	17	Bipolar Offset
3	Bit 2	16	Summing Junction
4	Bit 3	15	Range Select
5	Bit 4	14	Analog Output
6	Bit 5	13	-15V
7	Bit 6	12	Ground
8	Bit 7	11	+5V Supply
9	Bit 8	10	Register Enable

OUTPUT RANGE CONNECTIONS

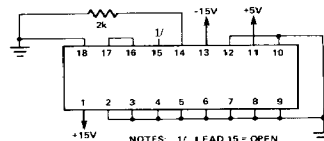
DIGITAL INPUT	ANALOG OUTPUT (DC VOLTS)			
	UNIPOLAR POSITIVE	UNIPOLAR NEGATIVE	BIPOLAR ±5	BIPOLAR ±10
MSB LSB				
00000000	0.000	-9.961	-5.000	-10.000
00000001	+0.039	-9.922	-4.961	-9.922
01111111	+4.961	-5.000	-0.039	-0.078
10000000	+5.000	-4.961	-0.000	0.000
11111110	+9.922	-0.039	+4.922	+9.844
11111111	+9.961	0.000	+4.961	+9.922
CONNECT PIN TO PIN	14 to 15 17 to GND 18 to GND	14 to 15 16 to 18 17 to GND	14 to 15 16 to 17 18 to GND	16 to 17 18 to GND

APPLICATIONS INFORMATION

RECOMMENDED POWER SUPPLY BY-PASS CIRCUIT



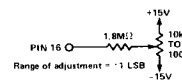
BURN-IN AND LIFE TEST CIRCUIT



OPTIONAL OFFSET ADJUSTMENT

A constant offset voltage can be added to or subtracted from the output of the HS 3020 for the purpose of increasing accuracy at and around a particular output level.

Connect the offset potentiometer as shown; apply the desired input code, adjust the offset potentiometer until the desired output level is achieved.



REGISTER ENABLE

When the Register Enable (Pin 10) is high (hold mode) the digital data in the input register will be latched, and when the Register Enable is low (track mode), the converter's output will follow its input. In order to latch new digital data into the register, the Register Enable must go low for a minimum of 60nSec and digital input data must be valid for a minimum of 40 nSec prior to Register Enable going high again.

ORDERING INFORMATION

MODEL	DESCRIPTION
HS 3020B	ML, 8 BIT D/A, -55° to +125°C
HS 3020C	COMM, 8 BIT D/A, 0° to +70°C

Specifications subject to change without notice.