



FEATURES

- 10-Bit Resolution
- Linearity: 8, 9, & 10 Bit
- Non-Linearity Tempco: 0.2 ppm of FSR/°C, max.
- Low Power Dissipation: 20 mW
- Current Settling Time: 500 ns
- See MP7533 for New Design
- Feedthrough Error: 1mV p-p @ 10 kHz, max.
- TTL/CMOS Compatible
- Low Cost
- CDIP & PDIP Packages Available

GENERAL DESCRIPTION

The MP7530 is a low cost, monolithic 10-bit multiplying Digital-to-Analog Converter packaged in a 16-pin DIP. This device uses advanced CMOS and thin film technologies providing up to 10-bit accuracies with TTL/CMOS compatibility.

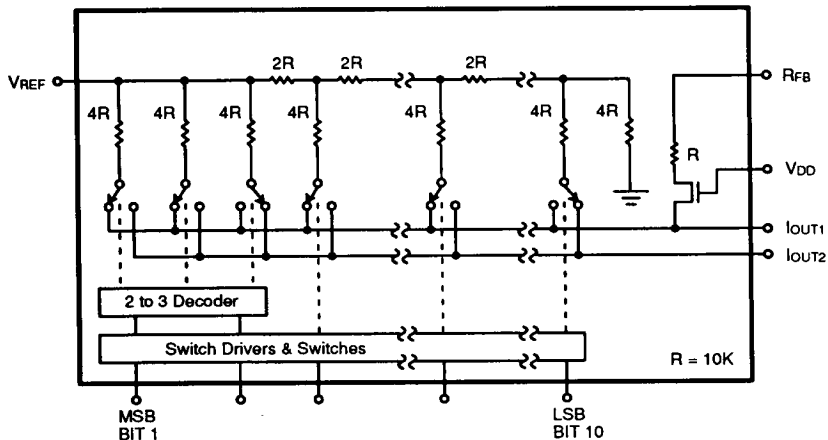
The MP7530 operates from a +5 V to +15 V supply and dissi-

pates only 20 mW, including the ladder network.

Typical MP7530 applications include: digital/analog multiplication, CRT character generation, programmable power supplies, digitally controlled gain circuits, etc.

Specified for operation over the commercial/industrial (-40 to +85°C) temperature range, the MP7530 is available in Plastic and Ceramic dual-in-line packages.

SIMPLIFIED BLOCK DIAGRAM

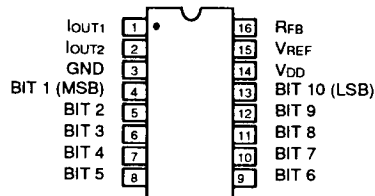


3 Segment D/A Converter with Termination to DGND  
Logical "1" at Digital Input Steers Current to IOUT1

## ORDERING INFORMATION

Package Type	Temperature Range	Part No.	Relative Accuracy	Differential Non-Linearity	Gain Error
Plastic Dip	-40 to +85°C	MP7530JN	±2 LSB	±1 LSB	±0.3% FSR
Plastic Dip	-40 to +85°C	MP7530KN	±1 LSB	±1 LSB	±0.3% FSR
Plastic Dip	-40 to +85°C	MP7530LN	±1/2 LSB	±1 LSB	±0.3% FSR
Ceramic Dip	-40 to +85°C	MP7530JD	±2 LSB	±1 LSB	±0.3% FSR
Ceramic Dip	-40 to +85°C	MP7530KD	±1 LSB	±1 LSB	±0.3% FSR
Ceramic Dip	-40 to +85°C	MP7530LD	±1/2 LSB	±1 LSB	±0.3% FSR

## PIN CONFIGURATION



16 Pin CDIP, PDIP (0.300")

## PIN OUT DEFINITIONS

PIN NO.	NAME	DESCRIPTION
1	IOUT1	Current Output 1
2	IOUT2	Current Output 2
3	GND	Ground
4	BIT 1	Data Input Bit 1 (MSB)
5	BIT 2	Data Input Bit 2
6	BIT 3	Data Input Bit 3
7	BIT 4	Data Input Bit 4
8	BIT 5	Data Input Bit 5

PIN NO.	NAME	DESCRIPTION
9	BIT 6	Data Input Bit 6
10	BIT 7	Data Input Bit 7
11	BIT 8	Data Input Bit 8
12	BIT 9	Data Input Bit 9
13	BIT 10	Data Input Bit 10 (LSB)
14	VDD	Positive Power Supply
15	VREF	Reference Input Voltage
16	RFB	Internal Feedback Resistor



**ELECTRICAL CHARACTERISTICS**

(VDD = + 15 V, VREF = +10 V unless otherwise noted) (5)

Parameter	Symbol	25°C			Tmin to Tmax		Units	Test Conditions/Comments
		Min	Typ	Max	Min	Max		
<b>STATIC PERFORMANCE (1)</b>								
Resolution (All Grades)	N	10			10		Bits	FSR = Full Scale Range
Integral Non-Linearity (Relative Accuracy)	INL						LSB	Best Fit Straight Line Spec. (Max INL – Min INL) / 2
J				±2			±2	
K				±1			±1	
L				±1/2			±1/2	
Differential Non-Linearity	DNL						LSB	All grades monotonic over full temperature range.
J				±1			±1	
K				±1			±1	
L				±1			±1	
Gain Error	GE			0.3%			% FSR	Using Internal RFB
Gain Temperature Coefficient (2)	TCGE						2 ppm/°C	ΔGain/ΔTemperature
Power Supply Rejection Ratio	PSRR		30	50			50 ppm/%	ΔGain/ΔVDD  ΔVDD = ± 5%
Output Leakage Current	IOUT			10			300 nA	
<b>REFERENCE INPUT</b>								
Input Resistance	RIN	5	10	20	5	20	KΩ	
<b>DIGITAL INPUTS (3)</b>								
Logical "1" Voltage	V <sub>IH</sub>	2.4			2.4		V	
Logical "0" Voltage	V <sub>IL</sub>			0.8		0.8	V	
Input Leakage Current	I <sub>LKG</sub>			±1			±1 μA	
<b>ANALOG OUTPUTS (2)</b>								
Output Capacitance	C <sub>OUT1</sub>		52				pF	DAC Inputs all 1's DAC Inputs all 0's DAC Inputs all 1's DAC Inputs all 0's
	C <sub>OUT1</sub>		26				pF	
	C <sub>OUT2</sub>		13				pF	
	C <sub>OUT2</sub>		45				pF	
<b>POWER SUPPLY (4)</b>								
Functional Voltage Range (2)	V <sub>DD</sub>	+5		+15			V	All digital inputs = 0 V or all = 5 V
Supply Current	I <sub>DD</sub>			2			2 mA	
Total Dissipation			20				mW	

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**NOTES:**

- (1) Full Scale Range (FSR) is 10V for unipolar mode and ±10V for bipolar.
- (2) Guaranteed but not production tested
- (3) Digital input levels should not go below ground or exceed the positive supply voltage, otherwise damage may occur.
- (4) Specified values guarantee functionality. Refer to other parameters for accuracy.
- (5) Guaranteed but not tested at temperature.

Specifications are subject to change without notice

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**ABSOLUTE MAXIMUM RATINGS (1, 2) (TA = +25°C unless otherwise noted)**

V <sub>DD</sub> to GND	.....	+17 V	Storage Temperature	.....	-65°C to +150°C
Digital Input Voltage to GND	....	GND -0.5 to V <sub>DD</sub> +0.5 V	Lead Temperature (Soldering, 10 seconds)	.....	+300°C
I <sub>OUT1</sub> , I <sub>OUT2</sub> to GND	.....	GND -0.5 to V <sub>DD</sub> +0.5 V	Package Power Dissipation Rating to 75°C		
V <sub>REF</sub> to GND	.....	±25 V	CDIP, PDIP	.....	450mW
V <sub>RFB</sub> to GND	.....	±25 V	Derates above 75°C	.....	6mW/°C

**NOTES:**

- (1) Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation at or above this specification is not implied. Exposure to maximum rating conditions for extended periods may affect device reliability.
  - (2) Any input pin which can see a value outside the absolute maximum ratings should be protected by Schottky diode clamps (HP5082-2835) from input pin to the supplies. *All inputs have protection diodes* which will protect the device from short transients outside the supplies range.
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**APPLICATION NOTES**

*Refer to Applications Section for Additional Information*