



# PM-7628

## DUAL 8-BIT BUFFERED MULTIPLYING CMOS D/A CONVERTER

Precision Monolithics Inc.

### FEATURES

- On-Chip Latches For Both DACs
- +5V To +15V Single Supply Operation
- DACs Matched To 1%
- Four-Quadrant Multiplication
- TTL/CMOS Compatible From +5V To +15V
- 8-Bit Endpoint Linearity ( $\pm 1/2$  LSB)
- Full Temperature Operation
- Low Power Consumption
- Microprocessor Compatible (60ns write time)
- Improved ESD and Latch-Up Resistance
- Automatically Insertable Cerdip and Plastic Packages
- Available in Surface Mount SO, PLCC, and LCC Packages
- Improved AD7628

### APPLICATIONS

- Disk Drives
- Digital Gain/Attenuation Control
- Digitally-Controlled Filter Parameters
- Digitally-Controlled Audio Circuits
- X-Y Graphics
- Digital/Synchro Conversion
- Robotics
- Ideal For Battery-Operated Equipment

### ORDERING INFORMATION<sup>†</sup>

RELATIVE ACCURACY	GAIN ERROR $T_A = 25^\circ\text{C}$	PACKAGE: 20-Pin DIP	
		MILITARY* TEMP $-55^\circ\text{C}$ TO $+125^\circ\text{C}$	EXTENDED INDUSTRIAL TEMP $-40^\circ\text{C}$ TO $+85^\circ\text{C}$
$\pm 1/2$ LSB	$\pm 2$ LSB	PM7628AR	PM7628ER
$\pm 1/2$ LSB	$\pm 2$ LSB	PM7628ARC/883	PM7628HP
$\pm 1/2$ LSB	$\pm 2$ LSB	—	PM7628HPC <sup>††</sup>
$\pm 1/2$ LSB	$\pm 2$ LSB	—	PM7628HS <sup>††</sup>

\* For devices processed in total compliance to MIL-STD-883, add /883 after part number. Consult factory for 883 data sheet.

<sup>†</sup> Burn-in is available on commercial and industrial temperature range parts in cer-dip, plastic dip, and TO-can packages. For ordering information, see 1988 Data Book, Section 2.

<sup>††</sup> For availability and burn-in information on SO and PLCC packages, contact your local sales office.

### GENERAL DESCRIPTION

The PM-7628 is an improved version of the AD7628 offering TTL compatibility from +5 to +15 volts and faster AC timing. It contains two 8-bit multiplying CMOS digital-to-analog converters that are fabricated in a single chip. This monolithic construction offers excellent DAC-to-DAC matching and tracking over temperature.

The PM-7628 consists of two thin-film R-2R resistor-ladder networks, two tracking span resistors, two data latches, one input buffer, and control logic circuitry.

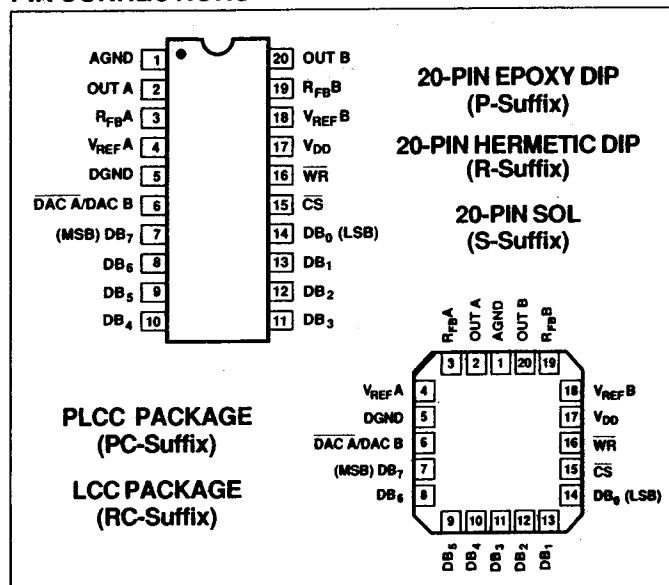
The PM-7628's digital inputs are bus compatible with most 8-bit microprocessors, including the 6800, 8080, 8085, and Z80. Data loading is similar to that of a RAM's write cycle. Digital input data is directed into one of the DAC data latches determined by the DAC selection control line DAC A/DAC B.

Operating from a single +5V to +15V power supply, the PM-7628 dissipates only 12mW of power in a space saving 20-pin 0.3" DIP, and 20-terminal surface mount packages. The PM-7628 features circuitry designed to protect against damage from electrostatic discharges.

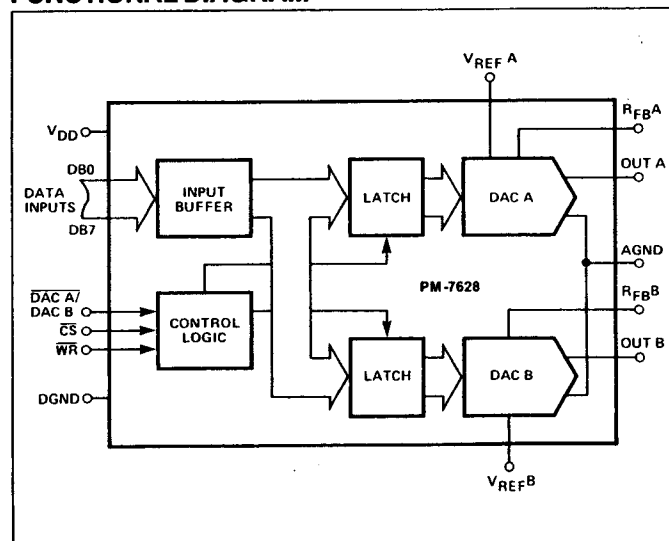
### CROSS REFERENCE

PMI	ADI	TEMPERATURE RANGE
PM7628AR	AD7628TQ	MILITARY
PM7628ARC/883	AD7628TE	
PM7628ER	AD7628BQ	INDUSTRIAL
PM7628HP	AD7628KN	COMMERCIAL
PM7628HPC	AD7628KP	

### PIN CONNECTIONS



### FUNCTIONAL DIAGRAM



**ABSOLUTE MAXIMUM RATINGS**(T<sub>A</sub> = +25°C, unless otherwise noted.)

V <sub>DD</sub> to AGND	0V, +17V
V <sub>DD</sub> to DGND	0V, +17V
AGND to DGND	0V, V <sub>DD</sub>
Digital Input Voltage to DGND	-0.3V, V <sub>DD</sub> +0.3V
V <sub>PIN2</sub> , V <sub>PIN20</sub> to AGND	-0.3V, V <sub>DD</sub>
V <sub>REFA</sub> , V <sub>REFB</sub> to AGND	±25V
V <sub>RFB</sub> , V <sub>RFB</sub> to AGND	±25V
Power Dissipation (Any Package) to +75°C	450mW
Derate Above +75°C by	6mW/°C
Operating Temperature Range	
AR, ARC Versions	-55°C to +125°C
ER, HP, HPC, HS Versions	-40°C to +85°C
Dice Junction Temperature	+150°C

Storage Temperature	-65°C to +150°C
Lead Temperature (Soldering, 60 sec)	+300°C

**CAUTION:**

1. Do not apply voltages higher than V<sub>DD</sub> or less than GND potential on any terminal except V<sub>REF</sub>.
2. The digital control inputs are zener-protected; however, permanent damage may occur on unprotected units from high-energy electrostatic fields. Keep units in conductive foam at all times until ready to use.
3. Do not insert this device into powered sockets; remove power before insertion or removal.
4. Use proper anti-static handling procedures.
5. Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device.

**ELECTRICAL CHARACTERISTICS:** at V<sub>DD</sub> = +5V ± 5%; V<sub>REFA</sub> = V<sub>REFB</sub> = +10V; I<sub>OUTA</sub> = I<sub>OUTB</sub> = 0V; T<sub>A</sub> = Full Temperature Range specified under Absolute Maximum Ratings, unless otherwise noted.

ELECTRICAL CHARACTERISTICS						
specified under Absolute Maximum Ratings, unless otherwise noted.						
PARAMETER	SYMBOL	CONDITIONS	MIN	PM-7628 TYP	MAX	UNITS
<b>STATIC ACCURACY</b>						
(Note 1)						
Resolution	N		8	—	—	Bits
Relative Accuracy (Note 2)	INL		—	—	±1/2	LSB
Differential Nonlinearity (Note 3)	DNL		—	—	±1	LSB
Full Scale Gain Error (Note 4)	G <sub>FSE</sub>	T <sub>A</sub> = +25°C T <sub>A</sub> = Full Temp. Range	— —	±0.5 ±1.0	±2 ±3	LSB
Gain Temperature Coefficient (Δ Gain / Δ Temperature) (Notes 4, 10)	TCG <sub>FS</sub>		—	—	±0.007	%/°C
Output Leakage Current I <sub>OUTA</sub> (Pin 2) I <sub>OUTB</sub> (Pin 20) (Note 5)	I <sub>LKG</sub>	T <sub>A</sub> = +25°C T <sub>A</sub> = Full Temp. Range	— —	±5 —	±50 ±200	nA
Input Resistance (V <sub>REFA</sub> , V <sub>REFB</sub> ) (Note 6)	R <sub>IN</sub>		8	—	15	kΩ
Input Resistance Match (V <sub>REFA</sub> /V <sub>REFB</sub> )	$\frac{\Delta R_{IN}}{R_{IN}}$		—	±0.1	±1	%