

## FEATURES

- Differential Linearity  $\pm 1/2$  LSB  $T_{min}$  to  $T_{max}$
- Microprocessor Compatible
- Low Glitch Energy
- Gain Error  $Temp_{co}$  (2 ppm/ $^{\circ}C$  max)
- Low Output Capacitance (50 pF)
- Low Sensitivity to Amplifier Offset (330 $\mu$ V/mV)
- Four Quadrant Multiplication
- Latch-Up Free
- TTL/5 V CMOS Compatible
- Low Power Consumption (20 mW)
- Guaranteed Monotonic
- Use MP7645B for New Designs

## GENERAL DESCRIPTION

The MP7645 is a precision 12-bit CMOS 4-quadrant multiplying DAC with an on-board data latch. The latch is loaded by a single 12-bit wide word. The MP7645 interfaces directly to most 12 or 16-bit bus systems. Data is loaded into the input latch under the control of  $\overline{CS}$  and  $\overline{WR}$  inputs. These control inputs are level triggered; tying these inputs low makes the input latch transparent allowing direct unbuffered operation of the DAC.

– Stability – The MP7645 incorporates a unique decoding technique yielding excellent accuracy and stability over temperature. Monotonicity is guaranteed over the entire temperature range including the industrial and military ranges. The MP7645 offers a superior alternative for the MP7545. The gain error specification of 2 ppm/ $^{\circ}C$  over a 100 $^{\circ}C$  temperature range equals 0.8 LSB of error.

- Digital Feedthrough – Almost directly related to output capacitance, the MP7645 has 5 to 8 times less digital feedthrough than similar buffered DACs, and additional digital buffering is not necessary.
- Low Output Capacitance - Due to smaller FET cell geometries, the output capacitance at 25/50 pF is 5 times less than standard R-2R CMOS DACs. Lower capacitance allows the MP7645 to achieve the fastest CMOS DAC settling times possible; less than 1  $\mu$ sec for full scale response to 0.01% when utilizing a high speed output amplifier. The MP7645 is more stable over a larger bandwidth than similar DACs.
- Low Sensitivity to Output Amplifier Offset – CMOS DACs must operate into virtual ground. The additional linearity error incurred by amplifier offset is reduced by a factor of at least 2 in the MP7645 over conventional DACs, to 330 $\mu$ V per millivolt offset. Trim pots can be eliminated by using a low offset amplifier such as an OP-07 or OP-27.

## SIMPLIFIED BLOCK DIAGRAM

