

**USI 6000 CMOS Analog – Digital
Silicon Gate, Semi-Custom Arrays****Features**

- Kit library available.
- Advanced CMOS silicon gate technology.
- 2 to 10 Volt power supply.
- Extremely low power consumption
- High noise immunity.
- TTL compatible inputs and outputs.
- Protection network on all inputs.
- CAD available for quick design.
- Dedicated flip-flops.
- Up to 740 logic gates.
- Up to 55 input/output pads.

Description

The USI 6000 family of Gate arrays allow the conversion of your analog or analog-digital sub-system into a single IC.

The USI 6000 series Gate Arrays are integrated circuit products that contain matrices of transistor Pairs and dedicated flip-flops designed for high speed digital logic as well as circuit elements optimized for analog circuit applications. These circuit elements include PMOS and NMOS transistors tailored for precision analog performance. MOS capacitors, bipolar NPN common collector transistors. Zener diodes, high valued P-resistors and precision polysilicon resistors. These general purpose chips may be custom engineered through generation of a proprietary metal mask used in conjunction with an inventory of preprocessed wafers.

The USI 6000 family of Gate Arrays is intended to implement systems requiring A/D, D/A and precision analog signal processing and interfacing. A wide range of circuits, including those listed below can be implemented on these arrays.

Operational amplifiers
Comparators
Analog multiplexers
Zener and Band gap voltage reference.
A/D and D/A converters.
Voltage and crystal controlled oscillators.
Voltage to current converters.
Phase locked loops.
Switched capacitor filters.

DC to DC converters
Absolute value detectors.
Gain controlled amplifiers.
Sample and hold amplifiers.
Voltage to frequency converters.
Instrumentation amplifiers.
Current sources, current mirrors.
Active RC filters/

KITS AVAILABLE – Most of these circuits are available in kit form. Ask for list of available kits.

ANALOG FUNCTIONS

OPERATIONAL AMPLIFIERS, COMPARATORS	Operating range Input offset voltage. Open loop voltage gain. Unity Gain Bandwidth. P-P Noise Slew Rate	$\pm 1V$ to $\pm 5V$. Typical 3mV 80 db min. 5 MHz internal compensation. 2 MHz external compensation. 50 micro volts. 10V per microsecond.
ANALOG MULTIPLEXERS	Internal compensation possible Operates from single lithium cell. N-channel and P-channel input. 100 Ohm ON resistance @ 10V supply voltage.	
ZENER AND BANDGAP REFERENCES	Zener Voltage. Bandgap reference	5.7 volts. $\pm 25V \pm 10\%$
A/D AND D/A CONVERTERS	12 bit dual slope A/D Converter. 5 bit flash A/D converter 8 bit D/A converter	see available kits.
OSCILLATORS	Crystal controlled oscillator With feedback resistor and Capacitor on chip. R-C Oscillators.	
PHASE LOCKED LOOP		D.C. to 3 MHz.
SWITCHED CAPACITOR FILTERS	Frequency range Minimum of 2 sec order Filters (low or bandpass). Filters with no external components. Bandwidth (Maximum)	50 KHz
D.C TO D.C. CONVERTERS	Voltage inverter Voltage tripler.	
GAIN CONTROLLED AMPLIFIER	Dynamic range of gain control.	60 dB max.
SAMPLE AND HOLD AMPLIFIERS	Sample rate with internal capacitors.	0.5 MHz max.
VOLTAGE TO FREQUENCY CONVERTERS	Frequency range	to 3 MHz max
INSTRUMENTATION AMPLIFIERS	Low Noise Unity Gain Bandwidth	50 micro volts P-P 0.5 MHz max
CURRENT SOURCES CURRENT MIRRORS	Matching	within 3%.
ACTIVE FILTERS	Bandwidth (Maximum)	50 KHz.
RESISTORS	P-well resistors(20 elements) Polysilicon resistors (100 elements)	30 KOhms (typical) 80 Ohms Typ.
CAPACITORS	Unit capacity (80 elements)	1.5pF
VERTICAL N-P-N TRANSISTORS	Beta (@ 1ma)	100

USI 6000 FAMILY KITS

The following is a list of the blocks available as various kits, using the USI6000 family of products. These kits may be used to establish a basic set of parameters around which the user's sub system may be specified. They do not necessarily represent the maximum performance attainable, as they are intended to demonstrate a general capability and allow a potential user an opportunity to evaluate an integrable solution to his requirements.

USI6001 Kit 1.	Voltage Splitter for DC-DC converter use.
USI6001 Kit 2.	Medium performance (12 micron gate) Op Amp.
USI6001 Kit 3.	High performance (24 micron gate) Op Amp.
USI6001 Kit 4.	12 micron N-channel devices with P-well contacts to determine MOS characteristics. 12 micron N-channel current mirror.
USI6001 Kit 5.	24 micron N-channel devices with P-well contacts to determine MOS characteristics. 24 micron N-channel current mirror.
USI6001 Kit 6.	Second-order low pass switched capacitor filter.
USI6001 Kit 7.	High Speed Comparator.
USI6001 Kit 8.	Bandgap reference.
USI6001 Kit 9.	Eight bit monotonic DAC.
USI6001 Kit 10.	High impedance N-channel and P-channel devices.
USI6001 Kit 11.	High speed differential amplifier with fixed gain.
USI6001 Kit 12.	4 bit flash converter,
USI6001 Kit 13.	12 micron P-channel devices with substrate contact to determine MOS characteristics. 12 micron P-channel current mirror.
USI6001 Kit 14.	24 micron P-channel devices with substrate contact to determine MOS characteristics. 24 micron P-channel current mirror.
USI6001 Kit 15.	Voltage Controlled Oscillator. (VCO).
USI6001 Kit 16.	Triple P-channel Op Amp.
USI6001 Kit 17 .	Quad P-channel Op Amp.
USI6001 Kit 18.	Triple P-channel Op Amp.
USI6001 Kit 19.	Quad N-channel Op Amp.
USI6001 Kit 20.	Quad comparator.
USI6001 Kit 21.	Second-order high-pass switched capacitor filter.

USI6000 ANALOG/DIGITAL PRODUCT MANUAL

NOTE: THIS MANUAL IS SHORTLY BEING PLACED ON THE WEB SITE, HOWEVER BEFORE THAT HAPPENS IT WILL BE SOME TIME, AS IT IS BULKY. IN THE MEANTIME, IT IS AVAILABLE ON DEMAND. IN CASE YOU REQUIRE THE SAME, OR ANY SPECIFIC PART/SECTION, PLEASE SEND US AN EMAIL, AND WE SHALL HAVE IT WITH YOU IN THE SHORTEST POSSIBLE TIME. HOWEVER, FOR YOUR FACILITATION THE INDEX TO THE SAME IS PLACED HERE.

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