High Temperature Electronics
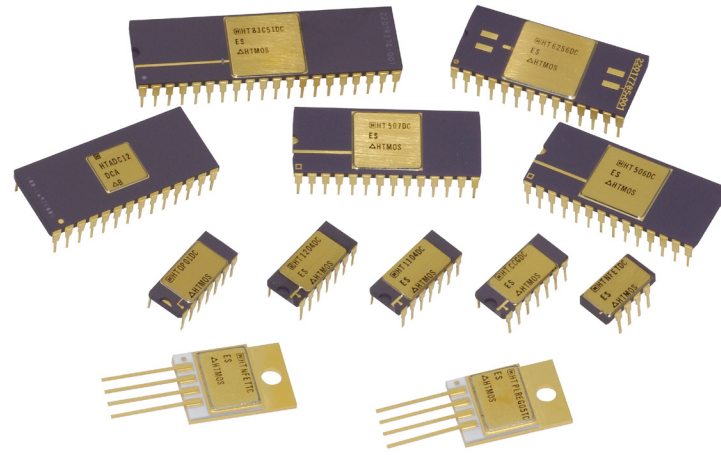
225 °C

Extraordinary performance
in high temperature applications

Honeywell High Temperature Electronics

Honeywell offers a large family of high temperature electronic components on Silicon On Insulator (SOI) CMOS technology to provide extraordinary performance in high temperature applications. Designed to operate continuously for at least 5 years at 225°C, the high temperature standard electronic product family is targeted at sensor signal conditioning, data acquisition, and control applications in harsh environments. These products offer significant reliability and performance advantages over traditional silicon integrated circuits when the operating temperatures are greater than 150°C.
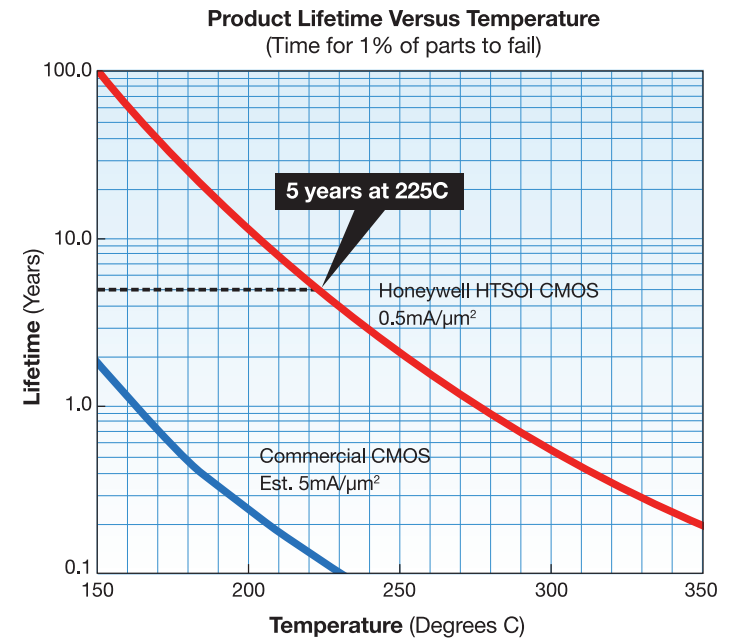
Reliability

High temperature, long life operation is defined by Honeywell as five years at 225°C. Brief excursions to higher temperatures are possible, but for a reduced period of time. Operation at lower temperatures extends product reliability.
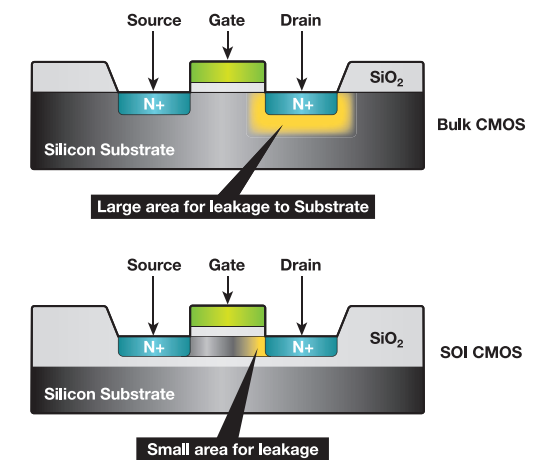
High Reliability in Harsh Environments

High temperature components offers longer life leading to systems with higher reliability and lower maintenance costs. The high temperature product line has been developed for high temperature operation in instrumentation and distributed control applications such as: Downhole Petroleum and Geothermal Exploration and Production, Permanent Well Instrumentation and Monitoring, Gas Turbine Engines, Distributed Engine Controls, Diesel Engine Propulsion, and Power Generation.

Product Lifetime Versus Temperature
(Time for 1% of parts to fail)

- 5 years at 225C
- Honeywell HTSOI CMOS 0.5mA/µm²
- Commercial CMOS Est. 5mA/µm²

SOI CMOS technology delivers low leakage, low noise and high performance which is ideal for analog, mixed signal and digital electronics in high temperature environments.

At high temperatures, the overriding limitation for semiconductors is leakage current of the individual transistors. There are two main leakage paths to address: leakage from the drain to the source, and leakage from the drain to the bulk substrate. With bulk CMOS, there is a large area directly from the drain to the substrate. The use of SOI CMOS eliminates this current path. The silicon dioxide (SiO$_2$) insulates the drain from the bulk substrate. The difference is illustrated below.

Honeywell's High Temperature Electronics Products

Analog-to-Digital Converters	Part Number	Description	Voltage	Resolution (bits)	Sample Rate	On-Chip Voltage Ref	Package	ECCN No.
	HTADC12	12 bit A/D Converter	5V	12	100k SPS	2.5V	28L DIP	3A001(a.2.c)
							14L DIP	

Amplifiers	Part Number	Description	Voltage	Input Offset Voltage	Gain Bandwidth	Application	Package	ECCN No.
	HTOP01	Dual Precision Operational Amplifier	5V	100uV	2.0 MHz	Precision, Auto-zeroing	14L DIP	EAR99
	HT1104	Quad Operational Amplifier	10V	7mV	1.4MHz	General Purpose	14L DIP	EAR99

Power Regulators	Part Number	Description	Input Voltage	Output Voltage	Max. Output Current	Dropout Voltage	Package	ECCN No.
	HTPLREG	Positive Linear Regulator	8V - 25V	5V	500 mA	<3.0V	4L Power Tab	EAR99
			13V - 28V	10V				
			15V - 28V	12V				
			18V - 28V	15V				

Analog Switch	Part Number	Description	Voltage	Input Voltage	On Resistance	Turn On Time	Package	ECCN No.
	HT1204	Quad Analog Switch	10V	VSS to VDD	100 ohms	<200 ns	14L DIP	EAR99

Clock Generator	Part Number	Description	Voltage	Input Frequency	Frequency Dividers	Current	Package	ECCN No.
	HTCCG	Crystal Clock Generator	5V	8MHz to 40MHz	2, 4, 8, 16	5mA	14L DIP	EAR99

Power FETs	Part Number	Description	Voltage	Current	RDS (on)	VGS	Package	ECCN No.
	HTNFET	N-Channel Power FET	60V max	1.0A	0.4 ohms	<2.4V	14L DIP	EAR99
							4L Power Tab	

Multiplexers	Part Number	Description	Voltage	On Resistance	Analog Input Voltage	Channel Match	Package	ECCN No.
	HT506	Single 16 Channel Analog Multiplexer	5V	100 ohms	0V - 10V, -5V to +5V	2%	28L DIP	EAR99
	HT507	Dual 8 Channel Analog Multiplexer	5V	100 ohms			28L DIP	EAR99

Microcontroller	Part Number	Description	Voltage	Configuration	Clock Frequency	Current	Package	ECCN No.
	HT83C51	83C51 Micontroller	5V	8 bit	16MHz	70mA @ 16MHz	40 Pin DIP	3A001(a.2.c)

Memory	Part Number	Description	Voltage	Configuration	Maximum Access/Clock	Current	Package	ECCN No.
	HT6256	SRAM	5V	32k x 8	≤50 ns	60mA at 20MHz	28L DIP	3A001(a.2.c)

Digital Gate Array	Part Number	Description	Voltage	Max. # of Gates	Max. # of Signal I/O	Embedded Cells	Package	
	HT2000	Digital Gate Array with SRAM	5V	275k	320	SRAM	Ceramic	
		VDS Design Toolkits VHDL, Verilog			I/O: CMOS, TTL, Bidirectional, Tri-state, Pull up, pull down	Pin Grid Array, Flatpack, Quad Flatpack		

Bulk CMOS
- Large area for leakage to Substrate

SOI CMOS
- Small area for leakage

Features and Benefits of SOI Technology include:

- 5 volt digital capability and analog up to 25V
- High Temperature Operation 225°C continuous and excursions to 300°C
- Complete oxide isolation of all transistors
- Very low static power at high temperatures
- Better Isolation For Mixed Signal ASICs
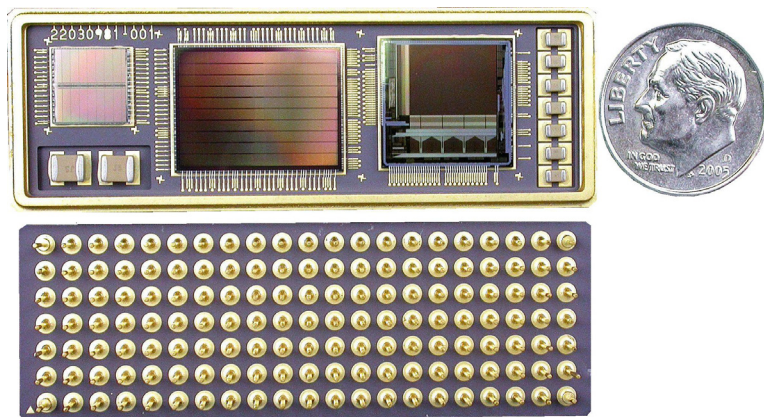- Improved Sensor Accuracy And Stability

High Temperature Gate Array HT2000 Family

Honeywell's HT2000 family of gate arrays are high temperature sea-of-transistor gate arrays, fabricated on Honeywell's 0.8µm HTMOS™ process. Designers can choose from a wide variety of I/O types, ranging from 128 to 336 I/O, and 40K to 390K available gates (raw). Each HT2000 design is founded on Honeywell's HTMOS™ ASIC library of logic elements, gate array RAM, and selectable I/O pads. The HT2000 family of gate arrays is the right choice for your high temperature applications demanding high integration and small size.

High Temperature Gate Array HT2000 Family					
Product	Total Gates	Maximum Packaged Signal I/O	Maximum Available Signal I/O	Usable Gates 3 Metal Layers	Usable Gates 4 Metal Layers
HT2040	40,112	128	128	27,000	37,000
HT2080	84,512	172	176	52,000	72,000
HT2160	159,528	240	240	91,000	126,000
HT2300	295,392	320	336	156,000	216,000
HT2400	389,120	320	338	200,000	275,000

High Temperature Multichip Modules

To reduce size and power in your application, Honeywell can combine a large number of integrated circuits and passives into one comprehensive multichip package using our MultiChip Module (MCM) technology. Our MCMs allow the user to integrate ASICs, memory and other solid state or passive devices into a single or double sided MCM. Quality and reliability of components in this space saving package is not compromised.

Find out more

For product specifications and further information visit our website at www.hightempsolutions.com or contact us at 1-800-323-8295

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