

## HS-9008RH

Radiation Hardened CMOS 8-Bit Flash Analog-to-Digital Converter

FN3279  
Rev 4.00  
March 10, 2005

The Intersil HS-9008RH is a CMOS 8-Bit Flash Converter designed for space applications where relatively low power, exceptional accuracy and very fast conversion speeds are a necessity.

The HS-9008RH design differs substantially from most other available Flash Converters as it employs fully differential analog input sampling networks and amplifiers, as well as regenerative, offset nulled (error correcting) comparators. These circuit techniques improve noise performance and render the circuit much less sensitive to process and radiation induced device parametric shifts. Outstanding integral and differential linearity error is achieved through the use of a metal film resistor network which exhibits >10-bit linearity without trim. As a result of these innovations, the device operates with a single fixed reference supply as opposed to the multiple, adjustable references used in similar devices.

This combination of features makes the HS-9008RH one of the best 8-Bit Flash Converters available in the Commercial, Military or Rad Hard markets.

**Specifications for Rad Hard QML devices are controlled by the Defense Supply Center in Columbus (DSCC). The SMD numbers listed here must be used when ordering.**

**Detailed Electrical Specifications for these devices are contained in SMD 5962-96696. A "hot-link" is provided on our homepage for downloading.**

<http://www.intersil.com/spacedefense/space.htm>

### Ordering Information

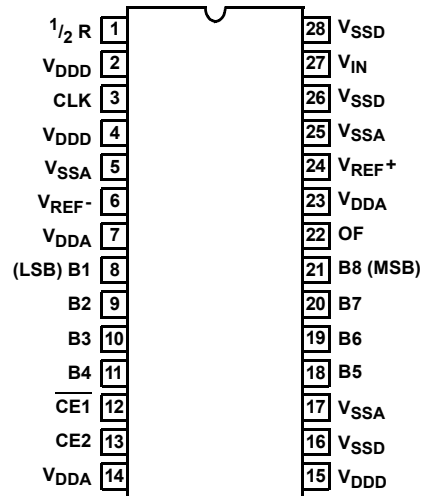
ORDERING NUMBER	INTERNAL MKT. NUMBER	TEMP. RANGE (°C)
5962F9669601QXC	HS1-9008RH-8	-55 to 125
5962F9669601QYC	HS9-9008RH-8	-55 to 125
5962F9669601VXC	HS1-9008RH-Q	-55 to 125
5962F9669601VYC	HS9-9008RH-Q	-55 to 125
HS1-9008RH/Proto	HS1-9008RH/Proto	-55 to 125
HS9-9008RH/Proto	HS9-9008RH/Proto	-55 to 125
HS0-9008RH-Q	HS0-9008RH-Q	25

### Features

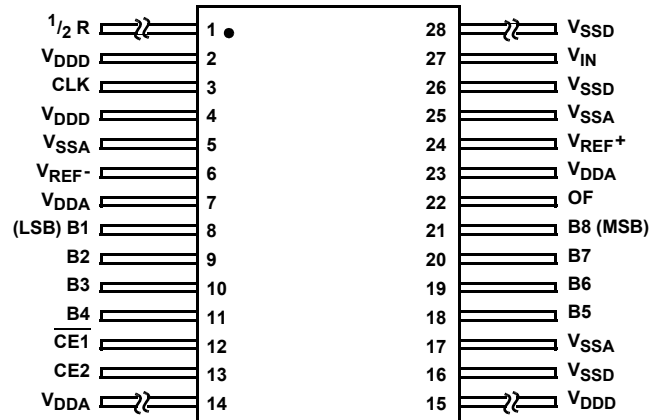
- Electrically Screened to SMD # 5962-96696
- QML Qualified per MIL-PRF-38535 Requirements
- Excellent Noise Rejection - Fully Differential Design
- Superior Linearity . . . . . 0.5 LSB Typ
- Single Reference Supply
- Low Power . . . . . 330mW Typ
- Sampling Rate (50ns Conversion Time) . . . . . 20MHz
- Total Dose Hardness . . . . . 300kRAD
- Available with QML Class V or Class Q Screening

### Pinouts

HS-9008RH (SBDIP) CDIP2-T28  
TOP VIEW



HS-900RH (FLATPACK) CDFP3-F28  
TOP VIEW



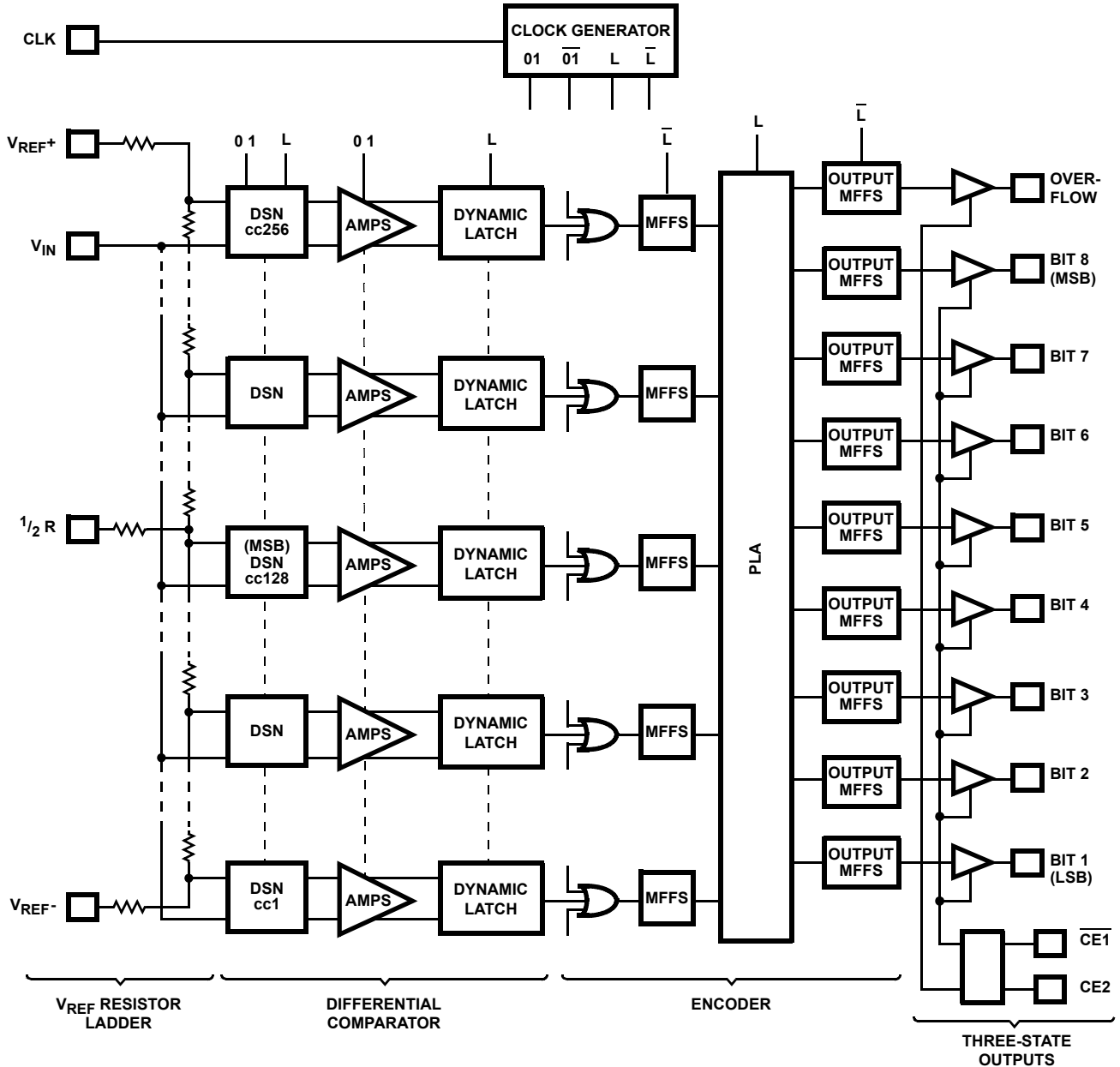
**Pin Descriptions**

SBDIP/ FLATPACK PACKAGE PIN	NAME	DESCRIPTION
8	B1	(LSB) Output Data Bits
9	B2	Output Data Bits
10	B3	Output Data Bits
11	B4	Output Data Bits
18	B5	Output Data Bits
19	B6	Output Data Bits
20	B7	Output Data Bits
21	B8	(MSB) Output Data Bits
22	OF	Overflow
16, 26, 28	V <sub>SSD</sub>	Digital Ground
2, 4, 15	V <sub>DDD</sub>	Digital Supply
13	CE2	Three-State Output Enable
12	$\overline{\text{CE1}}$	Three-State Output Enable
6	V <sub>REF-</sub>	Negative Reference Input
27	V <sub>IN</sub>	Analog Signal In
5, 17, 25	V <sub>SSA</sub>	Analog Ground
3	CLK	Clock Input
1	1/2 R	Reference Midpoint
24	V <sub>REF+</sub>	Positive Reference Input
7, 14, 23	V <sub>DDA</sub>	Analog Supply

TRUTH TABLE

$\overline{\text{CE1}}$	CE2	B1 - B8	OF
0	1	Valid	Valid
1	1	Three-State	Valid
X	0	Three-State	Three-State

**Functional Diagram**



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**Die Characteristics**

**DIE DIMENSIONS:**

180 mils x 197 mils x 21 ±1 mils

**INTERFACE MATERIALS:**

**Glassivation:**

Type: SiO<sub>2</sub>  
 Thickness: 8kÅ ±1kÅ

**Top Metallization:**

Metal 1 - Type: Moly/TiW  
 Thickness: 5.8kÅ ±10%  
 Metal 2- Type: Al/Si/Cu  
 Thickness: 10kÅ ±10%

**Backside Finish:**

Silicon

**ASSEMBLY RELATED INFORMATION:**

**Substrate Potential (Powered Up):**

V<sub>DD</sub>

**ADDITIONAL INFORMATION:**

**Worst Case Current Density:**

Metal 1 - Designs using the Intersil AVLSI-1RA process take advantage of the superior current carrying capabilities of Moly.TiW. The current density limit established by Intersil Reliability is 5.0 x 10<sup>5</sup> A/cm<sup>2</sup>  
 Metal 2 - 1.63 x 10<sup>5</sup> A/cm<sup>2</sup>

**Process:**

AVLSI1RA

**Metallization Mask Layout**

HS-9008RH

