

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

March 1998

Features

- 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

Truth Table

CE1	CE2	B1 - B8	OF
0	1	Valid	Valid
1	1	Three-State	Valid
X	0	Three-State	Three-State

Description

The Harris 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). SMD numbers must be used when ordering.

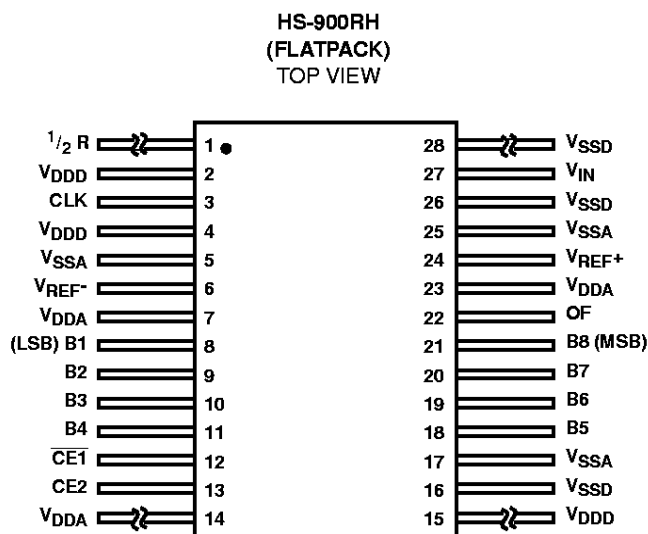
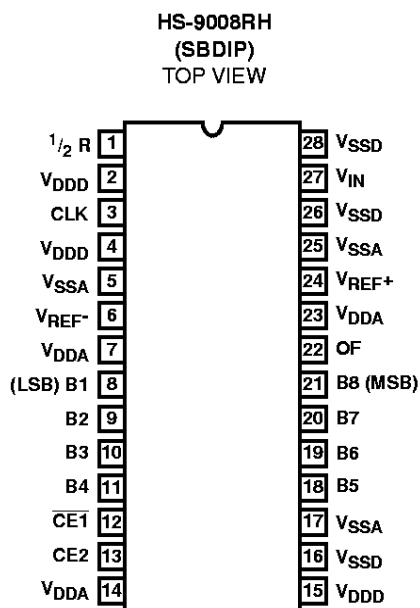
Detailed Electrical Specifications for this are contained in SMD 5962-96696. A "hot-link" is provided on our homepage with instructions for downloading.
<http://www.semi.harris.com/data/sm/index.htm>

Ordering Information

SMD PART NUMBER	HARRIS PART NUMBER	TEMP. RANGE (°C)	PACKAGE	CASE OUTLINE
5962R9669601QXC	HS1-9008RH-8	-55 to 125	28 Ld SBDIP	CDIP2-T28
5962R9669601VXC	HS1-9008RH-Q	-55 to 125	28 Ld SBDIP	CDIP2-T28
5962R9669601QYC	HS9-9008RH-8	-55 to 125	28 Ld Flatpack	CDFP3-F28
5962R9669601VYC	HS9-9008RH-Q	-55 to 125	28 Ld Flatpack	CDFP3-F28
N/A	HS1-9008RH/Sample	25	28 Ld SBDIP	CDIP2-T28
N/A	HS1-9008RH/Proto	-55 to 125	28 Ld SBDIP	CDIP2-T28
N/A	HS9-9008RH/Sample	25	28 Ld Flatpack	CDFP3-F28
N/A	HS9-9008RH/Proto	-55 to 125	28 Ld Flatpack	CDFP3-F28

HS-9008RH

Pinouts

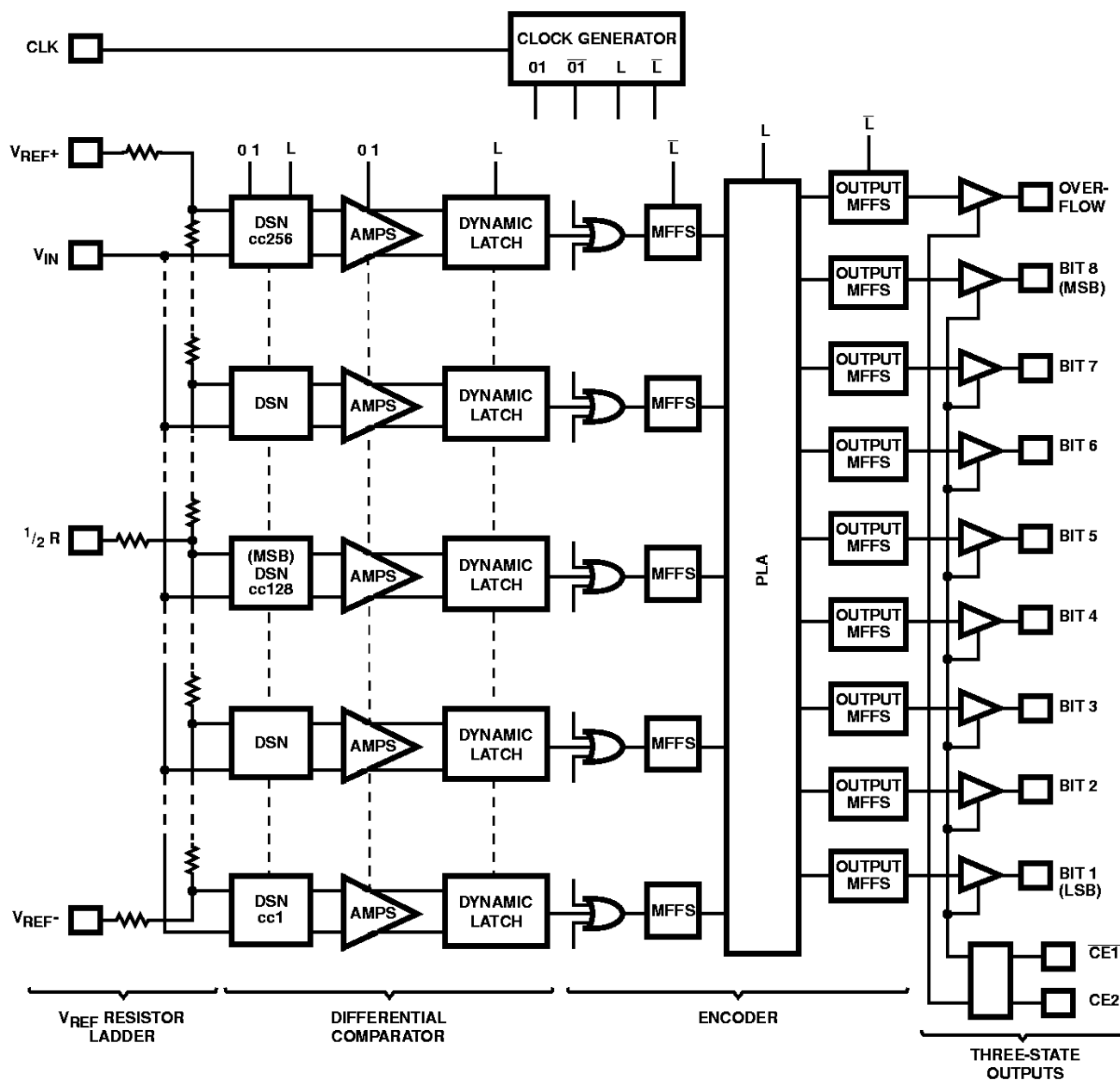


Pin Description

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	VSSD	Digital Ground

SBDIP/ FLATPACK PACKAGE PIN	NAME	DESCRIPTION
2, 4, 15	VDDD	Digital Supply
13	CE2	Three-State Output Enable
12	CE1	Three-State Output Enable
6	VREF-	Negative Reference Input
27	VIN	Analog Signal In
5, 17, 25	VSSA	Analog Ground
3	CLK	Clock Input
1	1/2 R	Reference Midpoint
24	VREF+	Positive Reference Input
7, 14, 23	VDDA	Analog Supply

Functional Diagram



Metallization Mask Layout

DIE DIMENSIONS:

180 mils x 197 mils x 21 ± 1 mils

METALLIZATION:

Metal 1 - Type: Moly/TiW
Thickness: $5.8\text{k}\text{\AA} \pm 10\%$
Metal 2- Type: Al/Si/Cu
Thickness: $10\text{k}\text{\AA} \pm 10\%$

SUBSTRATE POTENTIAL (Powered Up):

V_{DD}

BACKSIDE FINISH:

Silicon

PASSIVATION:

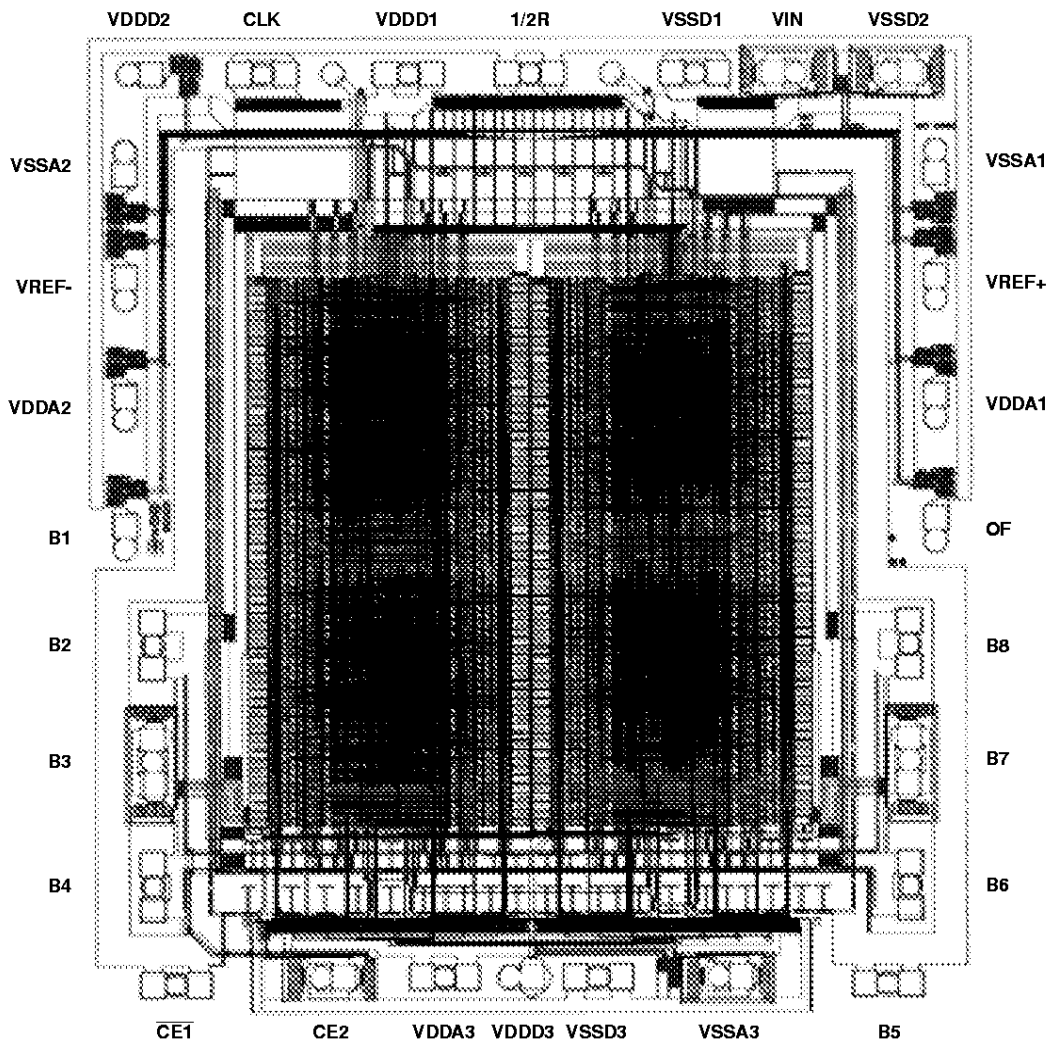
Type: SiO_2
Thickness: $8\text{k}\text{\AA} \pm 1\text{k}\text{\AA}$

WORST CASE CURRENT DENSITY:

Metal 1 - Designs using the Harris AVLSI-1RA process take advantage of the superior current carrying capabilities of Moly.TiW. The current density limit established by Harris Reliability is $5.0 \times 10^5 \text{ A/cm}^2$
Metal 2 - $1.63 \times 10^5 \text{ A/cm}^2$

PROCESS:

AVLSI1RA



All Harris Semiconductor products are manufactured, assembled and tested under **ISO9000** quality systems certification.

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