

# Radiation Hardened Quad Voltage Comparator

## HS-139RH, HS-139EH

The Radiation Hardened HS-139RH, HS-139EH consists of four independent single or dual supply voltage comparators on a single monolithic substrate. The common mode input voltage range includes ground, even when operated from a single supply and the low supply current makes these comparators suitable for low power applications. These types were designed to directly interface with TTL and CMOS.

The HS-139RH, HS-139EH is fabricated on our dielectrically isolated Rad Hard Silicon Gate (RSG) process, which provides an immunity to Single Event Latch-up and the capability of highly reliable performance in any radiation environment.

**Specifications for Rad Hard QML devices are controlled by the Defense Logistics Agency Land and Maritime (DLA). The SMD numbers listed below must be used when ordering.**

Detailed Electrical Specifications for the HS-139RH, HS-139EH are contained in [SMD 5962-98613](#). A “hot-link” is provided on our homepage with instructions for downloading. [www.Intersil.com/spacedefense/newsafclast.asp](http://www.Intersil.com/spacedefense/newsafclast.asp)

## Features

- QML Qualified Per MIL-PRF-38535 Requirements
- Radiation Environment
  - Latch-up Free Under any Conditions
  - Total Dose (Max)..... 3 x 10<sup>5</sup> RAD(Si)
  - SEU LET Threshold..... 20MeV/cm<sup>2</sup>/mg
  - Low Dose Rate Effects Immunity
- 100V Output Voltage Withstand Capability
- ESD Protection to >3000V
- Differential Input Voltage Range Equal to the Supply Voltage
- Input Offset Voltage (V<sub>IO</sub>) ..... 2mV (Max)
- Quiescent Supply Current ..... 2mA (Max)
- Pb-Free (RoHS Compliant)

## Applications

- Pulse Generators
- Timing Circuitry
- Level Shifting
- Analog-to-Digital Conversion

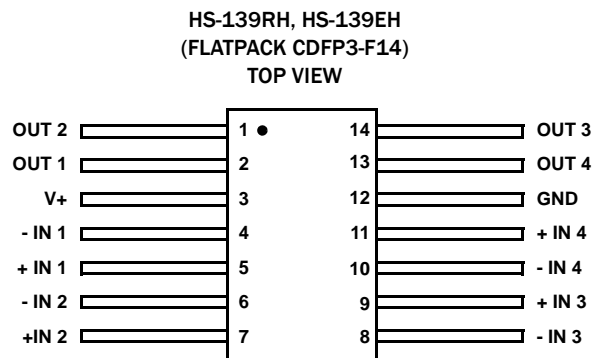
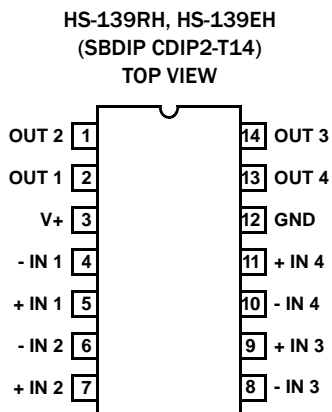
## Ordering Information

ORDERING NUMBER (Note)	INTERNAL MKT. NUMBER	PART MARKING	TEMP. RANGE (°C)	PACKAGE (RoHS Compliant)	PACKAGE DRAWING NUMBER
5962F9861303VCC	HS1-139EH-Q	Q 5962F98 61303VCC	-55 to +125	14 Ld SBDIP	D14.3
5962F9861301VCC	HS1-139RH-Q	Q 5962F98 61301VCC	-55 to +125	14 Ld SBDIP	D14.3
5962F9861301QCC	HS1-139RH-8	Q 5962F98 61301QCC	-55 to +125	14 Ld SBDIP	D14.3
HS1-139RH/PROTO	HS1-139RH/PROTO	HS1-139RH/PROTO	-55 to +125	14 Ld SBDIP	D14.3
5962F9861301VXC	HS9-139RH-Q	Q 5962F98 61301VXC	-55 to +125	14 Ld FLATPACK	K14.A
5962F9861301QXC	HS9-139RH-8	Q 5962F98 61301QXC	-55 to +125	14 Ld FLATPACK	K14.A
5962F9861302VXC	HS9-139EH-Q	Q 5962F98 61302VXC	-55 to +125	14 Ld FLATPACK	K14.A
HS9-139RH/PROTO	HS9-139RH/PROTO	HS9-139RH /PROTO	-55 to +125	14 Ld FLATPACK	K14.A

NOTE: These Intersil Pb-free Hermetic packaged products employ 100% Au plate - e4 termination finish, which is RoHS compliant and compatible with both SnPb and Pb-free soldering operations.

# HS-139RH, HS-139EH

## Pin Configurations



## Die Characteristics

### DIE DIMENSIONS:

3750 $\mu$ m x 2820 $\mu$ m (148 mils x 111 mils)  
483 $\mu$ m  $\pm$ 25.4 $\mu$ m (19 mils  $\pm$ 1 mil)

### INTERFACE MATERIALS:

#### Glassivation:

Type: Silox (SiO<sub>2</sub>)  
Thickness: 8.0k $\text{\AA}$   $\pm$ 1.0k $\text{\AA}$

#### Top Metallization:

Type: AlSiCu  
Thickness: 16.0k $\text{\AA}$   $\pm$ 2k $\text{\AA}$

#### Substrate:

Radiation Hardened Silicon Gate, Dielectric Isolation

### Backside Finish:

Silicon

### ASSEMBLY RELATED INFORMATION:

#### Substrate Potential:

Unbiased (DI)

### ADDITIONAL INFORMATION:

#### Worst Case Current Density:

$<2.0 \times 10^5$  A/cm<sup>2</sup>

### Transistor Count:

49

# HS-139RH, HS-139EH

## Metallization Mask Layout

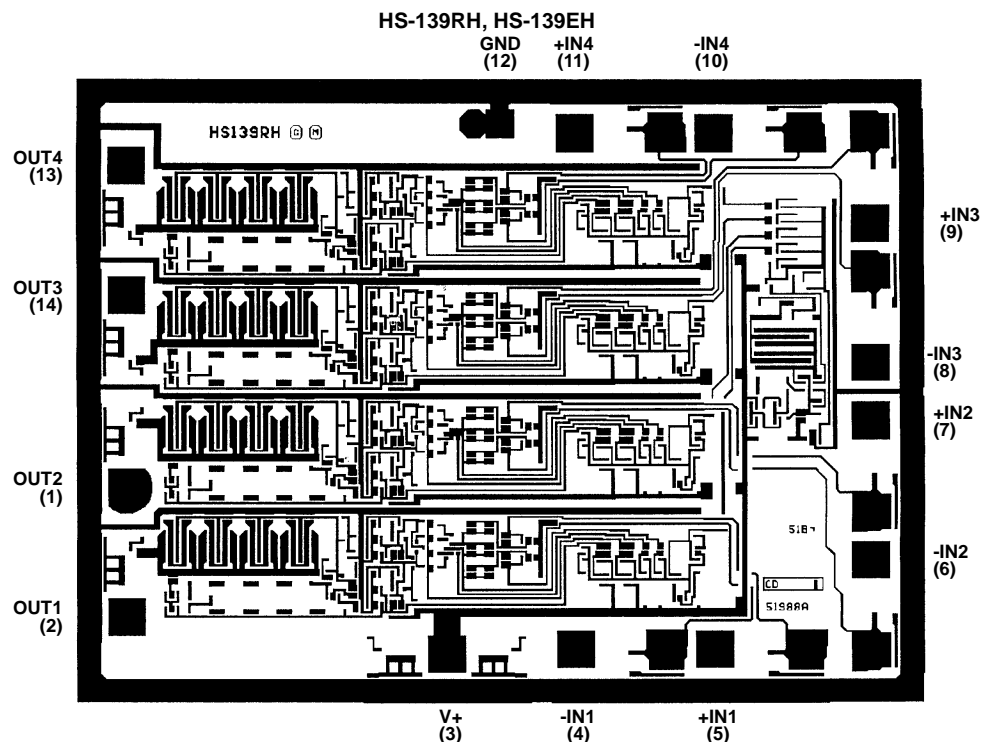


TABLE 1. HS-139RH, HS-139EH PAD COORDINATES

PIN NUMBER	PAD NAME	RELATIVE TO PIN 1	
		X COORDINATES	Y COORDINATES
1	OUT 2	0	0
2	OUT 1	0	-535
3	V+	1323	-688
4	-IN 1	1862	-670
5	+IN 1	2439	-670
6	-IN 2	3084	-299
7	+IN 2	3084	278
8	-IN 3	3084	518
9	+IN 3	3084	1095
10	-IN 4	2439	1466
11	+IN 4	1862	1466
12	GND	1550	1503
13	OUT 4	0	1331
14	OUT 3	0	796

NOTE: Dimensions in microns

For additional products, see [www.intersil.com/product\\_tree](http://www.intersil.com/product_tree)

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