

## Radiation Hardened 16 Channel CMOS Analog Multiplexer with High-Z Analog Input Protection

Intersil's Satellite Applications Flow™ (SAF) devices are fully tested and guaranteed to 100kRAD Total Dose. These QML Class T devices are processed to a standard flow intended to meet the cost and shorter lead-time needs of large volume satellite manufacturers, while maintaining a high level of reliability.

The HS-1840ARH-T is a Radiation Hardened, monolithic 16 channel multiplexer constructed with the Intersil Rad-Hard Silicon Gate, Dielectric Isolation process. It is designed to provide a high input impedance to the analog source if device power fails (open), or the analog signal voltage inadvertently exceeds the supply by up to  $\pm 35V$ , regardless of whether the device is powered on or off. Selection of one of sixteen channels is controlled by a 4-bit binary address plus an Enable-Inhibit input, which conveniently controls the ON/OFF operation of several multiplexers in a system. All inputs have electrostatic discharge protection.

### Specifications

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

**Detailed Electrical Specifications for the HS-1840ARH-T are contained in SMD 5962-95630.** For more information, visit us on our website at: [www.intersil.com/](http://www.intersil.com/)

Intersil's Quality Management Plan (QM Plan), listing all Class T screening operations, is also available on our website.

[www.intersil.com/](http://www.intersil.com/)

### Ordering Information

ORDERING NUMBER	PART NUMBER	TEMP. RANGE (°C)
5962R9563002TXC	HS1-1840ARH-T	-55 to 125
HS1-1840ARH/Proto	HS1-1840ARH/Proto	-55 to 125
5962R9563002TYC	HS9-1840ARH-T	-55 to 125
HS9-1840ARH/Proto	HS9-1840ARH/Proto	-55 to 125

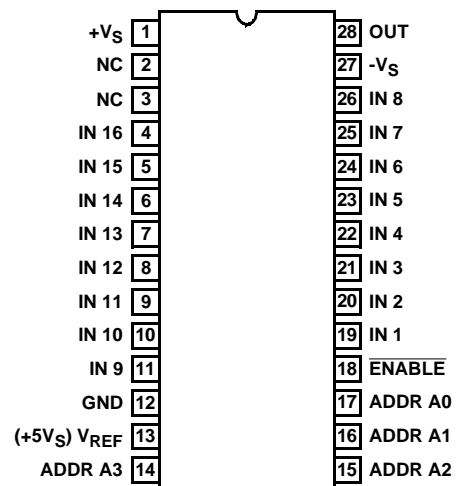
NOTE: **Minimum order quantity for -T is 150 units through distribution, or 450 units direct.**

### Features

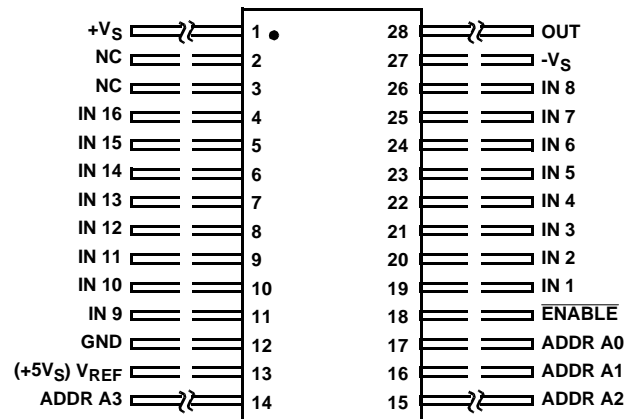
- QML Class T, Per MIL-PRF-38535
- Radiation Performance
  - Gamma Dose ( $\gamma$ )  $1 \times 10^5$  RAD(Si)
  - No Latch-Up, Dielectrically Isolated Device Islands
- Improved  $r_{DS(ON)}$  Linearity
- Improved Access Time 1.5 $\mu$ s (Max) Over Temp and Rad
- High Analog Input Impedance 500M $\Omega$  During Power Loss (Open)
- $\pm 35V$  Input Over Voltage Protection (Power On or Off)
- Excellent in Hi-Rel Redundant Systems
- Break-Before-Make Switching

### Pinouts

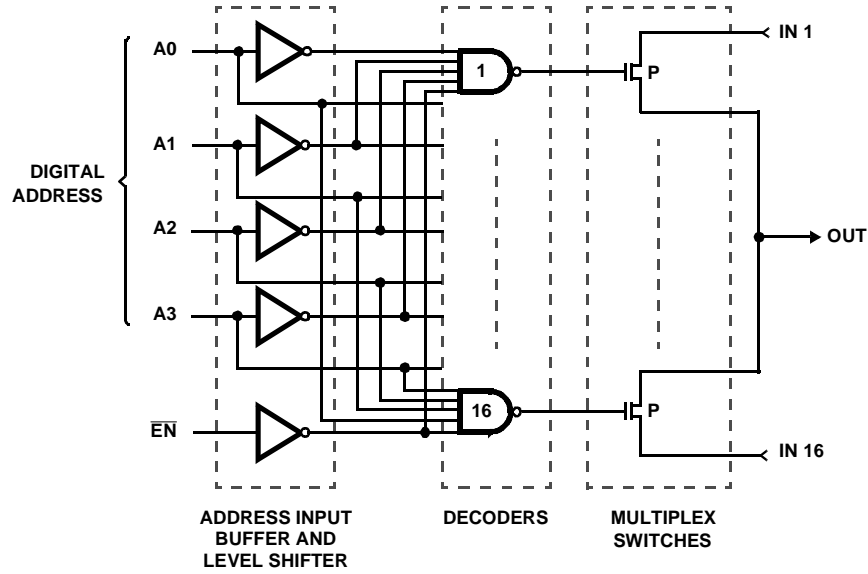
**HS1-1840ARH-T (SBDIP), CDIP2-T28**  
TOP VIEW



**HS9-1840ARH-T (FLATPACK) CDFP3-F28**  
TOP VIEW



Functional Diagram



TRUTH TABLE

A3	A2	A1	A0	$\overline{EN}$	"ON" CHANNEL
X	X	X	X	H	None
L	L	L	L	L	1
L	L	L	H	L	2
L	L	H	L	L	3
L	L	H	H	L	4
L	H	L	L	L	5
L	H	L	H	L	6
L	H	H	L	L	7
L	H	H	H	L	8
H	L	L	L	L	9
H	L	L	H	L	10
H	L	H	L	L	11
H	L	H	H	L	12
H	H	L	L	L	13
H	H	L	H	L	14
H	H	H	L	L	15
H	H	H	H	L	16

**Die Characteristics**

**DIE DIMENSIONS:**

(2820 $\mu$ m x 4080 $\mu$ m x 483 $\mu$ m  $\pm$ 25.4 $\mu$ m)  
 111 x 161 x 19mils  $\pm$ 1mil

**METALLIZATION:**

Type: Al Si Cu  
 Thickness: 16.0k $\text{\AA}$   $\pm$ 2k $\text{\AA}$

**SUBSTRATE POTENTIAL:**

Unbiased (DI)

**BACKSIDE FINISH:**

Silicon

**PASSIVATION:**

Type: Nitride (Si<sub>3</sub>N<sub>4</sub>) over Silox (SiO<sub>2</sub>)  
 Nitride Thickness: 4.0k $\text{\AA}$   $\pm$ 0.5k $\text{\AA}$   
 Silox Thickness: 12.0k $\text{\AA}$   $\pm$ 1.3k $\text{\AA}$

**WORST CASE CURRENT DENSITY:**

< 2.0e5 A/cm<sup>2</sup>

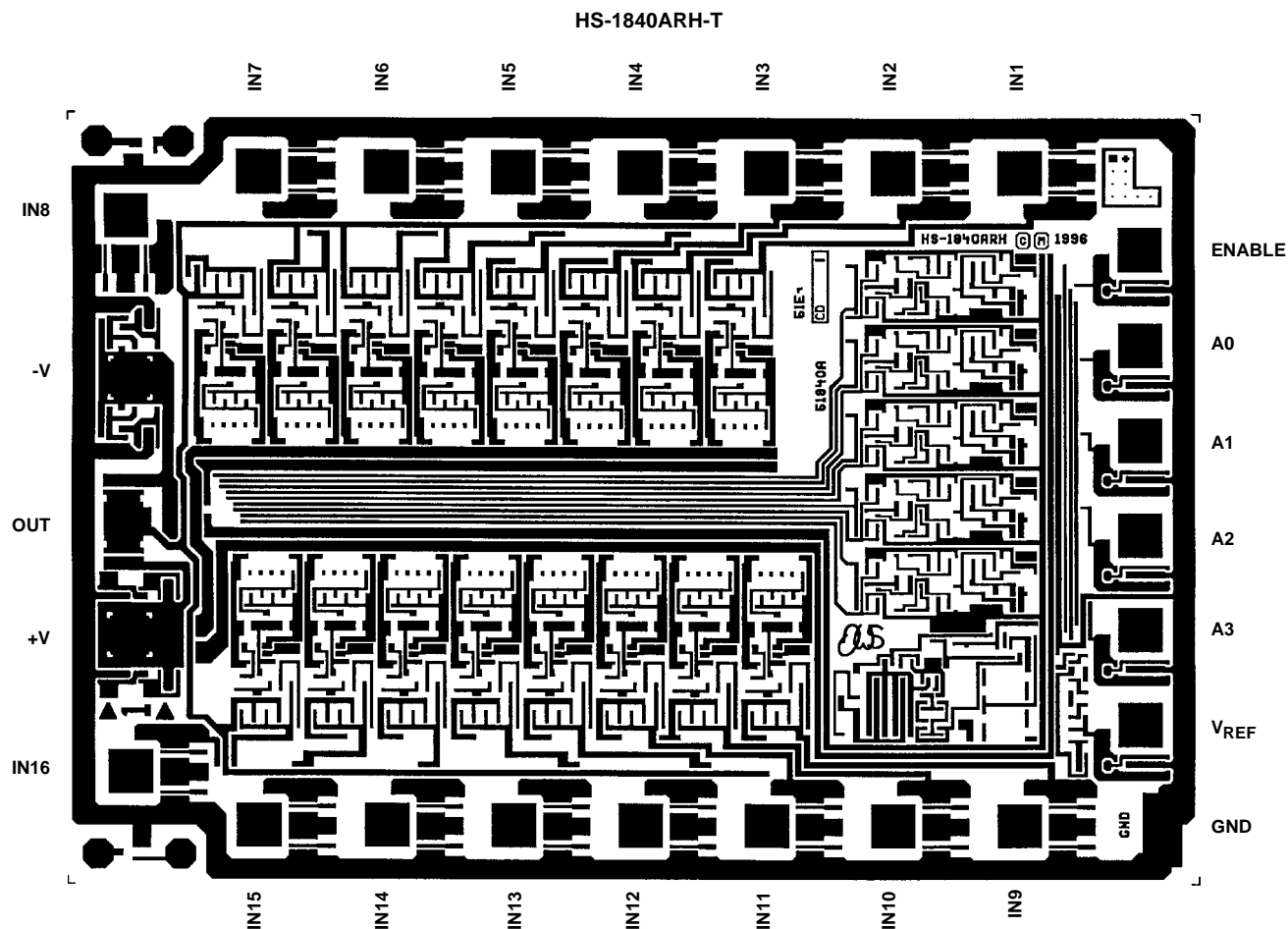
**TRANSISTOR COUNT:**

407

**PROCESS:**

Radiation Hardened Silicon Gate, Dielectric Isolation

**Metallization Mask Layout**



All Intersil U.S. products are manufactured, assembled and tested utilizing ISO9000 quality systems.  
 Intersil Corporation's quality certifications can be viewed at [www.intersil.com/design/quality](http://www.intersil.com/design/quality)

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