

**ACS138MS**

Radiation Hardened 3-to-8 Line Decoder/Demultiplexer

FN4461  
Rev.0.00  
December 1997

**Features**

- QML Qualified Per MIL-PRF-38535 Requirements
- 1.25Micron Radiation Hardened SOS CMOS
- Radiation Environment
  - Latch-up Free Under any Conditions
  - Total Dose .....  $3 \times 10^5$  RAD(Si)
  - SEU Immunity .....  $<1 \times 10^{-10}$  Errors/Bit/Day
  - SEU LET Threshold. ....  $>100\text{MeV}/(\text{mg}/\text{cm}^2)$
- Input Logic Levels ...  $V_{IL} = (0.3V)(V_{CC})$ ,  $V_{IH} = (0.7V)(V_{CC})$
- Output Current .....  $\pm 12\text{mA}$
- Quiescent Supply Current .....  $20\mu\text{A}$
- Propagation Delay .....  $15\text{ns}$

**Applications**

- Memory Decoding
- Data Routing
- Code Conversion

**Description**

The Radiation Hardened ACS138MS is an Inverting 3-to-8 Line Decoder/Demultiplexer with three binary select inputs ( $A_0$ ,  $A_1$  and  $A_2$ ). If the device is enabled, these inputs determine which one of the eight normally high outputs will go low.

Two active low and one active high enable inputs ( $\bar{E}_1$ ,  $\bar{E}_2$  and  $E_3$ ) are provided to make cascaded decoder designs easier to implement.

The ACS138MS is fabricated on a CMOS Silicon on Sapphire (SOS) process, which provides an immunity to Single Event Latch-up and the capability of highly reliable performance in any radiation environment. These devices offer significant power reduction and faster performance when compared to ALSTTL types.

**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.**

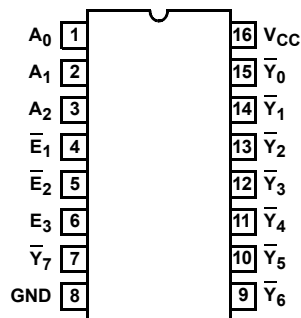
**Detailed Electrical Specifications for the ACS138 are contained in SMD 5962-98534.**

**Ordering Information**

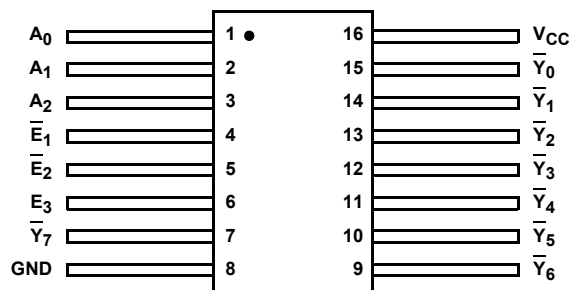
SMD PART NUMBER	INTERSIL PART NUMBER	TEMP. RANGE (°C)	PACKAGE	CASE OUTLINE
5962F9853401VEC	ACS138DMSR-02	-55 to 125	16 Ld SBDIP	CDIP2-T16
N/A	ACS138D/Sample-02	25	16 Ld SBDIP	CDIP2-T16
5962F9853401VXC	ACS138KMSR-02	-55 to 125	16 Ld Flatpack	CDFP4-F16
N/A	ACS138K/Sample-02	25	16 Ld Flatpack	CDFP4-F16
N/A	ACS138HMSR-02	25	Die	N/A

**Pinouts**

ACS138 (SBDIP)  
TOP VIEW



ACS138 (FLATPACK)  
TOP VIEW



## Die Characteristics

### DIE DIMENSIONS:

Size: 2390 $\mu$ m x 2390 $\mu$ m (94 mils x 94 mils)  
 Thickness: 525 $\mu$ m  $\pm$ 25 $\mu$ m (20.6 mils  $\pm$ 1 mil)  
 Bond Pad: 110 $\mu$ m x 110 $\mu$ m (4.3 x 4.3 mils)

### METALLIZATION: Al

Metal 1 Thickness: 0.7 $\mu$ m  $\pm$ 0.1 $\mu$ m  
 Metal 2 Thickness: 1.0 $\mu$ m  $\pm$ 0.1 $\mu$ m

### SUBSTRATE POTENTIAL:

Unbiased Insulator

### PASSIVATION

Type: Phosphorous Silicon Glass (PSG)  
 Thickness: 1.30 $\mu$ m  $\pm$ 0.15 $\mu$ m

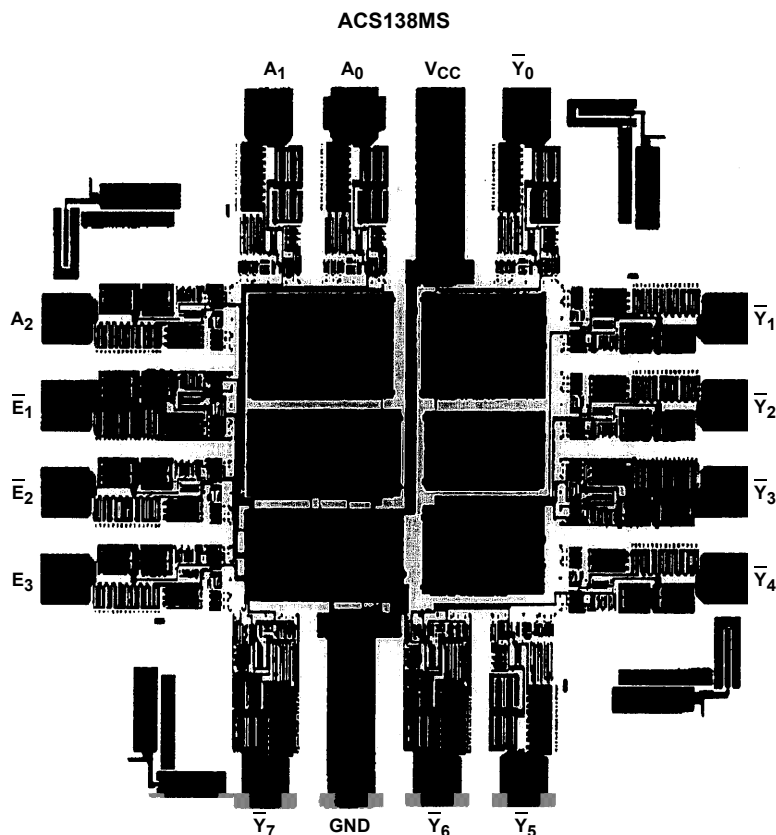
### SPECIAL INSTRUCTIONS:

Bond V<sub>CC</sub> First

### ADDITIONAL INFORMATION:

Worst Case Density: <math>2.0 \times 10^5 A/cm^2</math>  
 Transistor Count: 220

## Metallization Mask Layout



© Copyright Intersil Americas LLC 1999. All Rights Reserved.

All trademarks and registered trademarks are the property of their respective owners.

For additional products, see [www.intersil.com/en/products.html](http://www.intersil.com/en/products.html)

Intersil products are manufactured, assembled and tested utilizing ISO9001 quality systems as noted in the quality certifications found at [www.intersil.com/en/support/qualandreliability.html](http://www.intersil.com/en/support/qualandreliability.html)

*Intersil products are sold by description only. Intersil may modify the circuit design and/or specifications of products at any time without notice, provided that such modification does not, in Intersil's sole judgment, affect the form, fit or function of the product. Accordingly, the reader is cautioned to verify that datasheets are current before placing orders. Information furnished by Intersil is believed to be accurate and reliable. However, no responsibility is assumed by Intersil or its subsidiaries for its use; nor for any infringements of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Intersil or its subsidiaries.*

For information regarding Intersil Corporation and its products, see [www.intersil.com](http://www.intersil.com)