

## Radiation Hardened 3-to-8 Line Decoder/Demultiplexer

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 ..... 15ns

### 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.**

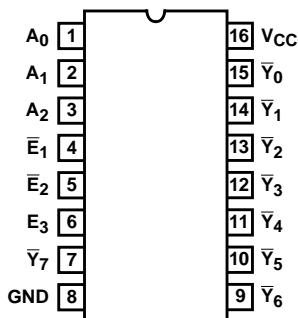
Detailed Electrical Specifications for the ACS138 are contained in SMD 5962-98534. A "hot-link" is provided on our homepage with instructions for downloading. <http://www.intersil.com/data/sm/index.htm>

### Ordering Information

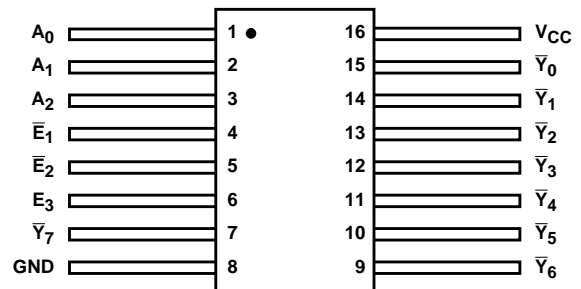
SMD PART NUMBER	INTERSIL PART NUMBER	TEMP. RANGE (°C)	PACKAGE	CASE OUTLINE
5962F9853401VEC	ACS138DMSR-02	-55 to 125	16 Ld SBDIP	CDIP2-T16
N/A	ACS138D/Sample-02	25	16 Ld SBDIP	CDIP2-T16
5962F9853401VXC	ACS138KMSR-02	-55 to 125	16 Ld Flatpack	CDFP4-F16
N/A	ACS138K/Sample-02	25	16 Ld Flatpack	CDFP4-F16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

### Pinouts

ACS138 (SBDIP)  
TOP VIEW



ACS138 (FLATPACK)  
TOP VIEW



# ACS138MS

## 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

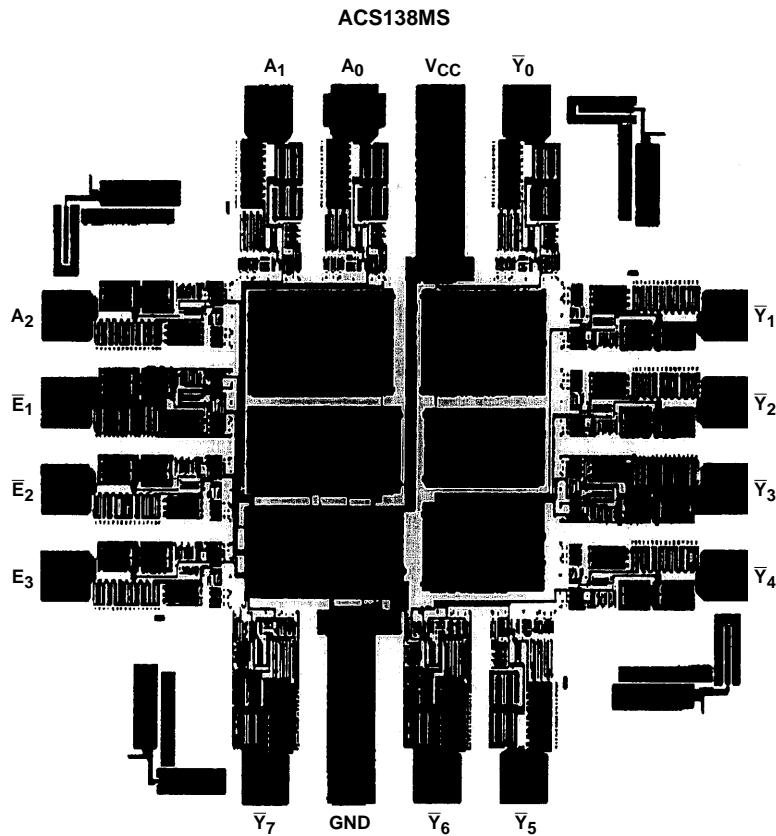
### SPECIAL INSTRUCTIONS:

Bond V<sub>CC</sub> First

### ADDITIONAL INFORMATION:

Worst Case Density: <2.0 x 10<sup>5</sup> A/cm<sup>2</sup>  
Transistor Count: 220

## Metallization Mask Layout



All Intersil semiconductor products are manufactured, assembled and tested under **ISO9000** quality systems certification.

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