

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 .....  $>100$ MeV/(mg/cm<sup>2</sup>)
- Input Logic Levels .....  $V_{IL} = 0.8V, V_{IH} = (V_{CC}/2)$
- Output Current .....  $\pm 12mA$
- Quiescent Supply Current .....  $20\mu A$
- Propagation Delay ..... 20ns

**Applications**

- Memory Decoding
- Data Routing
- Code Conversion

**Description**

The Radiation Hardened ACTS138MS is an Inverting 3-to-8 Line Decoder/Demultiplexer with three TTL level 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 ACTS138MS 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.**

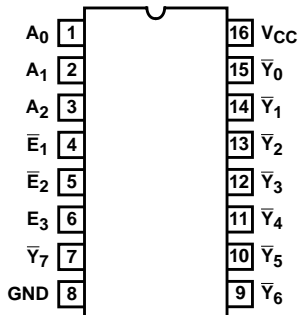
**Detailed Electrical Specifications for the ACTS138 are contained in SMD 5962-98535. A "hot-link" is provided on our homepage with instructions for downloading. <http://www.intersil.com/data/sm/index.htm>**

**Ordering Information**

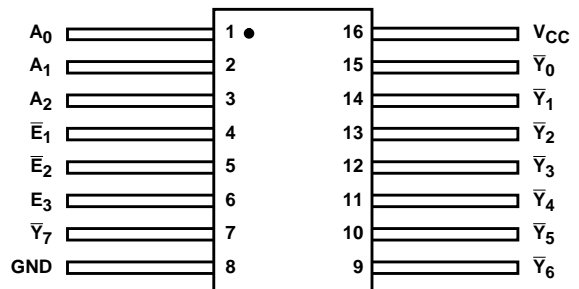
SMD PART NUMBER	INTERSIL PART NUMBER	TEMP. RANGE (°C)	PACKAGE	CASE OUTLINE
5962F9853501VEC	ACTS138DMSR-02	-55 to 125	16 Ld SBDIP	CDIP2-T16
N/A	ACTS138D/Sample-02	25	16 Ld SBDIP	CDIP2-T16
5962F9853501VXC	ACTS138KMSR-02	-55 to 125	16 Ld Flatpack	CDFP4-F16
N/A	ACTS138K/Sample-02	25	16 Ld Flatpack	CDFP4-F16
N/A	ACTS138HMSR-02	25	Die	N/A

**Pinouts**

**ACTS138 (SBDIP)**  
TOP VIEW



**ACTS138 (FLATPACK)**  
TOP VIEW



# ACTS138MS

## 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

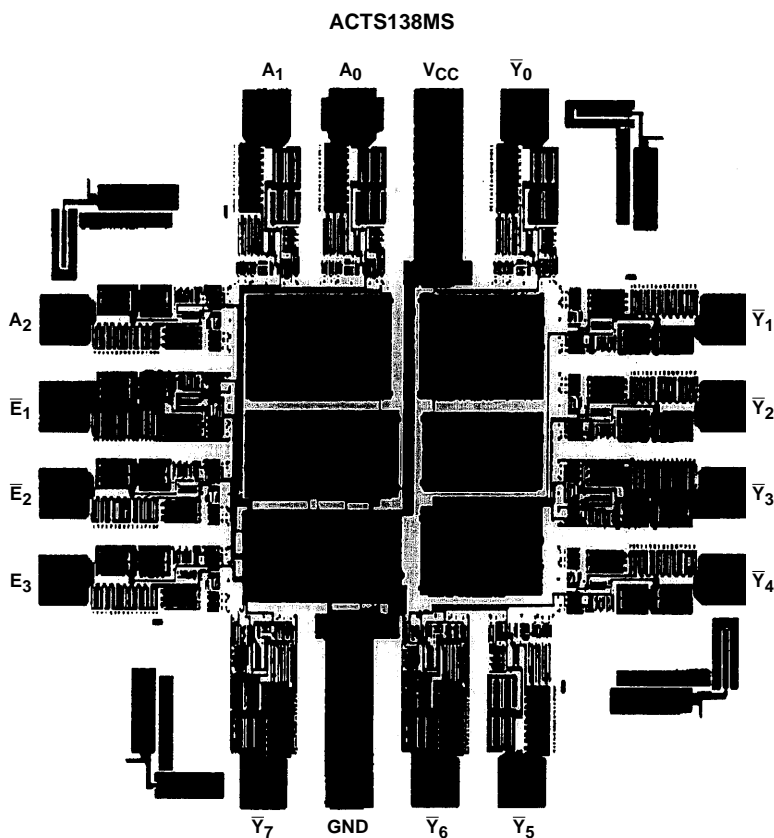
### SPECIAL INSTRUCTIONS:

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: 256

## Metallization Mask Layout



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

*Intersil products are sold by description only. Intersil Corporation reserves the right to make changes in circuit design and/or specifications at any time without notice. Accordingly, the reader is cautioned to verify that data sheets 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 web site <http://www.intersil.com>