

## Radiation Hardened Dual J-K Flip-Flop

January 1996

### Features

- Devices QML Qualified in Accordance with MIL-PRF-38535
- Detailed Electrical and Screening Requirements are Contained in SMD# 5962-96714 and Harris' QM Plan
- 1.25 Micron Radiation Hardened SOS CMOS
- Total Dose ..... >300K RAD (Si)
- Single Event Upset (SEU) Immunity: <math> < 1 \times 10^{-10}</math> Errors/Bit/Day (Typ)
- SEU LET Threshold ..... >100 MEV-cm<sup>2</sup>/mg
- Dose Rate Upset ..... >10<sup>11</sup> RAD (Si)/s, 20ns Pulse
- Dose Rate Survivability ..... >10<sup>12</sup> RAD (Si)/s, 20ns Pulse
- Latch-Up Free Under Any Conditions
- Military Temperature Range ..... -55°C to +125°C
- Significant Power Reduction Compared to ALSTTL Logic
- DC Operating Voltage Range ..... 4.5V to 5.5V
- Input Logic Levels
  - VIL = 0.8V Max
  - VIH = VCC/2 Min
- Input Current ≤ 1μA at VOL, VOH
- Fast Propagation Delay ..... 26ns (Max), 16ns (Typ)

### Description

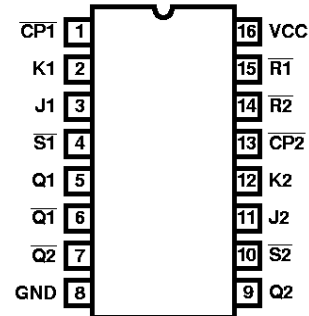
The Harris ACTS112MS is a Radiation Hardened Dual J-K Flip-Flop with Set and Reset. The output change states on the negative transition of the clock (CP1N or CP2N).

The ACTS112MS utilizes advanced CMOS/SOS technology to achieve high-speed operation. This device is a member of radiation hardened, high-speed, CMOS/SOS Logic Family.

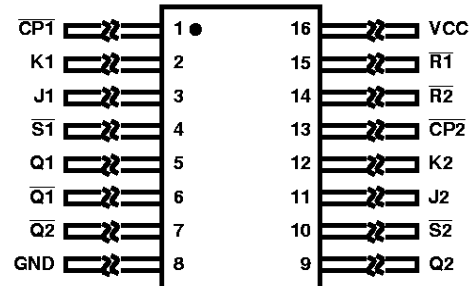
The ACTS112MS is supplied in a 16 lead Ceramic Flatpack (K suffix) or a Ceramic Dual-In-Line Package (D suffix).

### Pinouts

16 PIN CERAMIC DUAL-IN-LINE  
MIL-STD-1835, DESIGNATOR CDIP2-T16,  
LEAD FINISH C  
TOP VIEW



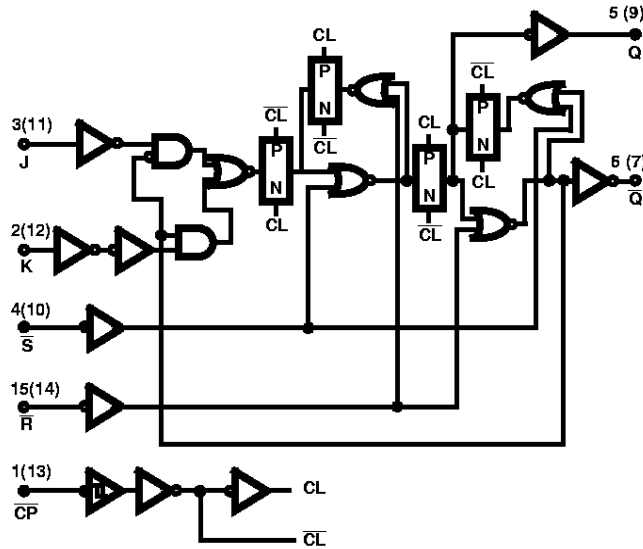
16 PIN CERAMIC FLATPACK  
MIL-STD-1835, DESIGNATOR CDFP4-F16,  
LEAD FINISH C  
TOP VIEW



### Ordering Information

| PART NUMBER     | TEMPERATURE RANGE | SCREENING LEVEL       | PACKAGE                  |
|-----------------|-------------------|-----------------------|--------------------------|
| 5962F9671401VEC | -55°C to +125°C   | MIL-PRF-38535 Class V | 16 Lead SBDIP            |
| 5962F9671401VXC | -55°C to +125°C   | MIL-PRF-38535 Class V | 16 Lead Ceramic Flatpack |
| ACTS112D/Sample | 25°C              | Sample                | 16 Lead SBDIP            |
| ACTS112K/Sample | 25°C              | Sample                | 16 Lead Ceramic Flatpack |
| ACTS112HMSR     | 25°C              | Die                   | Die                      |

Functional Diagram



TRUTH TABLE

| INPUTS |   |    |   |   | OUTPUTS    |            |
|--------|---|----|---|---|------------|------------|
| S      | R | CP | J | K | Q          | Q̄         |
| L      | H | X  | X | X | H          | L          |
| H      | L | X  | X | X | L          | H          |
| L      | L | X  | X | X | H (Note 2) | H (Note 2) |
| H      | H |    | L | L | No Change  |            |
| H      | H |    | H | L | H          | L          |
| H      | H |    | L | H | L          | H          |
| H      | H |    | H | H | Toggle     |            |
| H      | H | H  | X | X | No Change  |            |

NOTE:

1. H = High Steady State, L = Low Steady State, X = Immaterial, = High-to-Low Transition
2. Output States Unpredictable if S̄ and R̄ Go High Simultaneously after Both being Low at the Same Time

# ACTS112MS

## Die Characteristics

### DIE DIMENSIONS:

88 mils x 88 mils  
2.24mm x 2.24mm

### METALLIZATION:

Type: AlSi  
Metal 1 Thickness:  $7.125k\text{\AA} \pm 1.125k\text{\AA}$   
Metal 2 Thickness:  $9k\text{\AA} \pm 1k\text{\AA}$

### GLASSIVATION:

Type: SiO<sub>2</sub>  
Thickness:  $8k\text{\AA} \pm 1k\text{\AA}$

### WORST CASE CURRENT DENSITY:

$<2.0 \times 10^5 \text{A/cm}^2$

### BOND PAD SIZE:

$110\mu\text{m} \times 110\mu\text{m}$   
4.3 mils x 4.3 mils

## Metallization Mask Layout

