HARRIS SEMICONDUCTOR

# HS-6254RH

## PRELIMINARY

October 1997

## Radiation Hardened Ultra High Frequency NPN Transistor Array

### Features

- QML Qualified Per MIL-PRF-38535 Requirements
- Radiation Environment
  - Gamma Dose ($\gamma$) . . . . . $3 \times 10^5$ RAD(Si)
  - SEL Immune . . . . Bonded Wafer Dielectric Isolation
- Gain Bandwidth Product ($F_T$) (Typ) . . . . . 8GHz
- Current Gain ($h_{FE}$) (Typ) . . . . . 70
- Early Voltage ($V_A$) (Typ) . . . . . 50V
- Noise Figure (50$\Omega$) at 1GHz (Typ) . . . . . 3.5dB
- Collector-to-Collector Leakage (Typ) . . . . . <1pA

### Applications

- High Frequency Amplifiers and Mixers
  - Refer to Application Note 9315
- High Frequency Converters
- Synchronous Detectors

### Description

The HS-6254RH is a Radiation Hardened array of five NPN transistors on a common substrate. One of our bonded wafer, dielectrically isolated fabrication processes provides an immunity to Single Event Latch-up and the capability of highly reliable performance in any radiation environment.

The high $F_T$ (8GHz) and low noise figure (3.5dB) of these transistors make them ideal for use in high frequency amplifier and mixer applications. Monolithic construction of the five transistors provides the closest electrical and thermal matching possible. Access is provided to each terminal of the transistors for maximum application flexibility.

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

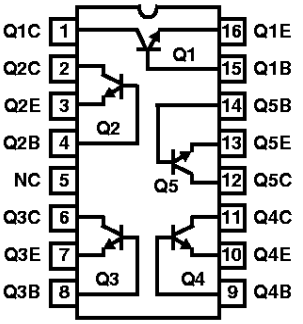
**Detailed Electrical Specifications for the HS-6254RH are contained in SMD 5962-97641. A "hot-link" is provided on our homepage with instructions for downloading. http://www.semi.harris.com/data/sm/index.htm**

### Ordering Information

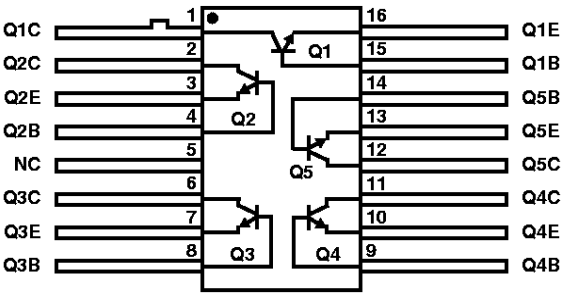
| SMD PART NUMBER | HARRIS PART NUMBER | TEMP. RANGE ($^oC$) | PACKAGE | CASE OUTLINE |
|---|---|---|---|---|
| 5962F9764101VEA | HS1-6254RH-Q | -55 to 125 | 16 Ld CERDIP | GDIP1-T16 |
| N/A | HS1-6254RH/Proto | -55 to 125 | 16 Ld CERDIP | GDIP1-T16 |
| N/A | HS1-6254RH/Sample | 25 | 16 Ld CERDIP | GDIP1-T16 |
| 5962F9764101VXC | HS9-6254RH-Q | -55 to 125 | 16 Ld Flatpack | CDFP4-F16 |
| N/A | HS9-6254RH/Proto | -55 to 125 | 16 Ld Flatpack | CDFP4-F16 |
| N/A | HS9-6254RH/Sample | 25 | 16 Ld Flatpack | CDFP4-F16 |

### Pinouts

**HS1-6254RH (CERDIP)**
TOP VIEW




**H9S-6254RH (FLATPACK)**
TOP VIEW

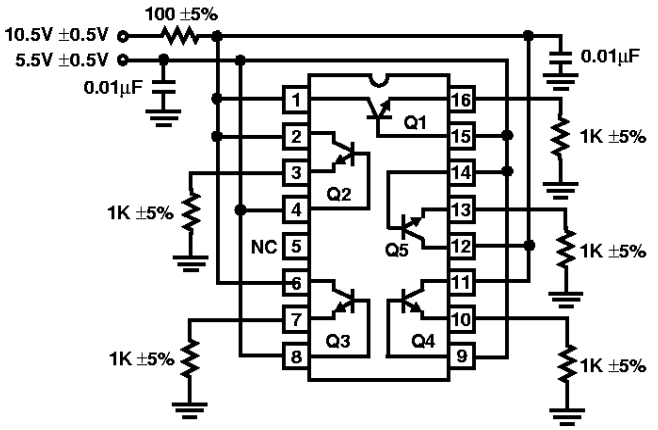



CAUTION: These devices are sensitive to electrostatic discharge. Users should follow proper IC Handling Procedures.

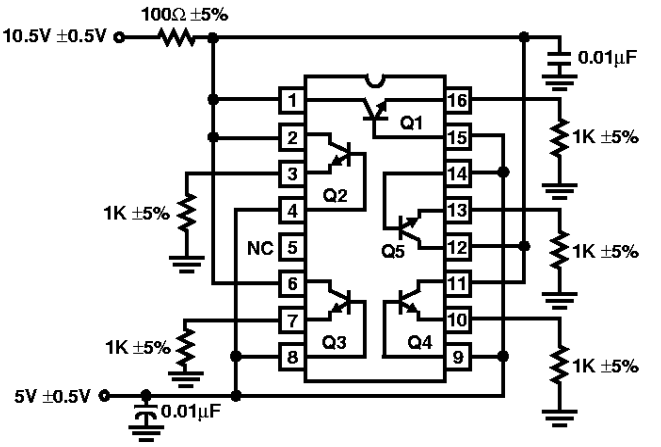


File Number **4425**

## Burn-In Circuit




## Irradiation Circuit




## Die Characteristics

**DIE DIMENSIONS:**

52 mils x 52.8 mils x 15 mils ±1 mil
1320µm x 1340µm x 381µm ±25.4µm

**METALLIZATION:**

Type: Metal 1: AlCu (2%)/TiW
Thickness: Metal 1: 8kÅ ±0.5kÅ

Type: Metal 2: AlCu (2%)
Thickness: Metal 2: 16kÅ ±0.8kÅ

**GLASSIVATION:**

Type: Nitride
Thickness: 4kÅ ±0.5kÅ

**WORST CASE CURRENT DENSITY:**

$3.04 \times 10^5 A/cm^2$

**TRANSISTOR COUNT:** 5

**SUBSTRATE POTENTIAL:** Floating

**BACKSIDE FINISH:** Silicon

**PROCESS:** Bonded Wafer, DI

## Metallization Mask Layout

Pad numbers correspond to the 16 lead pinout.