



# Radiation Hardened Ultra High Frequency NPN / PNP Transistor Arrays

## ISL73096RH, ISL73127RH, ISL73128RH

The ISL73096RH, ISL73127RH and ISL73128RH are radiation hardened bipolar transistor arrays. The ISL73096RH consists of three NPN transistors and two PNP transistors on a common substrate. The ISL73127RH consists of five NPN transistors on a common substrate. The ISL73128RH consists of five PNP 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 gain-bandwidth product and low noise figure of these transistors make them ideal for use in high frequency amplifier and mixer applications. Monolithic construction of the NPN and PNP 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). The SMD numbers listed here must be used when ordering.**

**Detailed Electrical Specifications for these devices are contained in SMD 5962-07218. A "hot-link" is provided on our website for downloading.**

### Features

- Electrically Screened to SMD # 5962-07218
- QML Qualified per MIL-PRF-38535 Requirements
- Radiation Environment
  - Gamma Dose ( $\gamma$ ) . . . . .  $3 \times 10^5$  RAD(Si)
  - SEL Immune . . Bonded Wafer Dielectric Isolation
- NPN Gain Bandwidth Product ( $F_T$ ) . . . 8GHz (Typ)
- NPN Current Gain ( $h_{FE}$ ) . . . . . 130 (Typ)
- NPN Early Voltage ( $V_A$ ) . . . . . 50V (Typ)
- PNP Gain Bandwidth Product ( $F_T$ ) . . . 5.5GHz (Typ)
- PNP Current Gain ( $h_{FE}$ ) . . . . . 60 (Typ)
- PNP Early Voltage ( $V_A$ ) . . . . . 20V (Typ)
- Noise Figure (50 $\Omega$ ) at 1GHz . . . . . 3.5dB (Typ)
- Collector-to-Collector Leakage . . . . . <1pA (Typ)
- Complete Isolation Between Transistors

### Applications

- High Frequency Amplifiers and Mixers
  - Refer to Application Note AN1503
- High Frequency Converters
- Synchronous Detector

## Ordering Information

| ORDERING NUMBER    | PART NUMBER               | TEMP. RANGE (°C) | PACKAGE (Pb-free) |
|--------------------|---------------------------|------------------|-------------------|
| 5962F0721801V9A    | ISL73096RHVX              | -55 to +125      | DIE               |
| 5962F0721801VXC    | ISL73096RHVF (Notes 1, 2) | -55 to +125      | 16 LD FLATPACK    |
| 5962F0721802V9A    | ISL73127RHVX              | -55 to +125      | DIE               |
| 5962F0721802VXC    | ISL73127RHVF (Notes 1, 2) | -55 to +125      | 16 LD FLATPACK    |
| 5962F0721803V9A    | ISL73128RHVX              | -55 to +125      | DIE               |
| 5962F0721803VXC    | ISL73128RHVF (Notes 1, 2) | -55 to +125      | 16 LD FLATPACK    |
| ISL73096RHF/PROTO  | ISL73096RHF/PROTO         | -55 to +125      |                   |
| ISL73096RHX/SAMPLE | ISL73096RHX/SAMPLE        | -55 to +125      | DIE               |
| ISL73127RHF/PROTO  | ISL73127RHF/PROTO         | -55 to +125      |                   |
| ISL73127RHX/SAMPLE | ISL73127RHX/SAMPLE        | -55 to +125      | DIE               |

## Ordering Information (Continued)

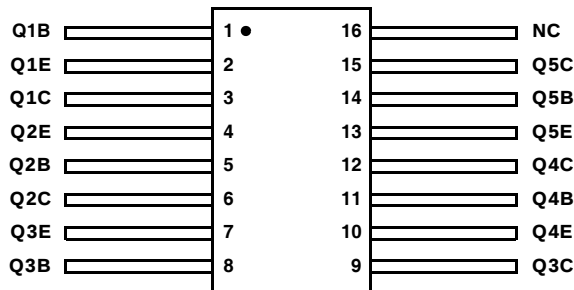
| ORDERING NUMBER    | PART NUMBER        | TEMP. RANGE (°C) | PACKAGE (Pb-free) |
|--------------------|--------------------|------------------|-------------------|
| ISL73128RHF/PROTO  | ISL73128RHF/PROTO  | -55 to +125      |                   |
| ISL73128RHX/SAMPLE | ISL73128RHX/SAMPLE | -55 to +125      | DIE               |

### NOTES:

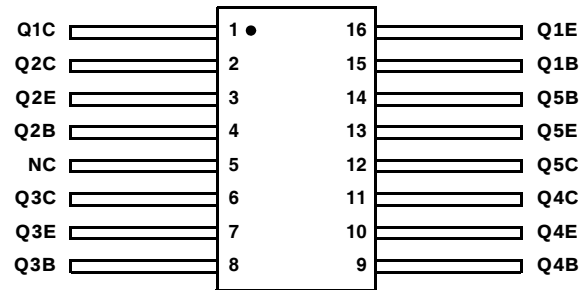
- These Intersil Pb-free Hermetic packaged products employ 100% Au plate - e4 termination finish, which is RoHS compliant and compatible with both SnPb and Pb-free soldering operations.
- For Moisture Sensitivity Level (MSL), please see device information page for [ISL73096RH](#), [ISL73127RH](#), [ISL73128RH](#). For more information on MSL please see techbrief [TB363](#).

## Pin Configurations

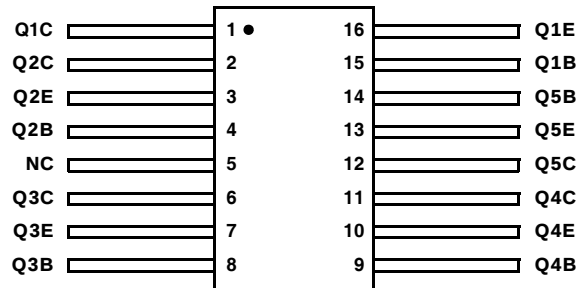
**ISL73096RH**  
**(16 LD FLATPACK) CDFP4-F16**  
TOP VIEW



**ISL73127RH**  
**(16 LD FLATPACK) CDFP4-F16**  
TOP VIEW



**ISL73128RH**  
**(16 LD FLATPACK) CDFP4-F16**  
TOP VIEW



## Die Characteristics

### DIE DIMENSIONS:

52.8 mils x 52.0 mils x 14 mils  $\pm 1$  mil  
 $1340\mu\text{m} \times 1320\mu\text{m} \times 355.6\mu\text{m} \pm 25.4\mu\text{m}$

### INTERFACE MATERIALS:

#### Glassivation:

Type: Nitride  
 Thickness:  $4\text{k}\text{\AA} \pm 0.5\text{k}\text{\AA}$

#### Top Metallization:

Type: Metal 1: AlCu (2%)/TiW  
 Thickness: Metal 1:  $8\text{k}\text{\AA} \pm 0.5\text{k}\text{\AA}$   
 Type: Metal 2: AlCu (2%)  
 Thickness: Metal 2:  $16\text{k}\text{\AA} \pm 0.8\text{k}\text{\AA}$

#### Substrate:

UHF-1X Bonded Wafer, DI

#### Backside Finish:

Silicon

### ASSEMBLY RELATED INFORMATION:

#### Substrate Potential:

Floating

### ADDITIONAL INFORMATION:

#### Worst Case Current Density:

$3.04 \times 10^5 \text{A/cm}^2$

#### Transistor Count:

5

## Metallization Mask Layout

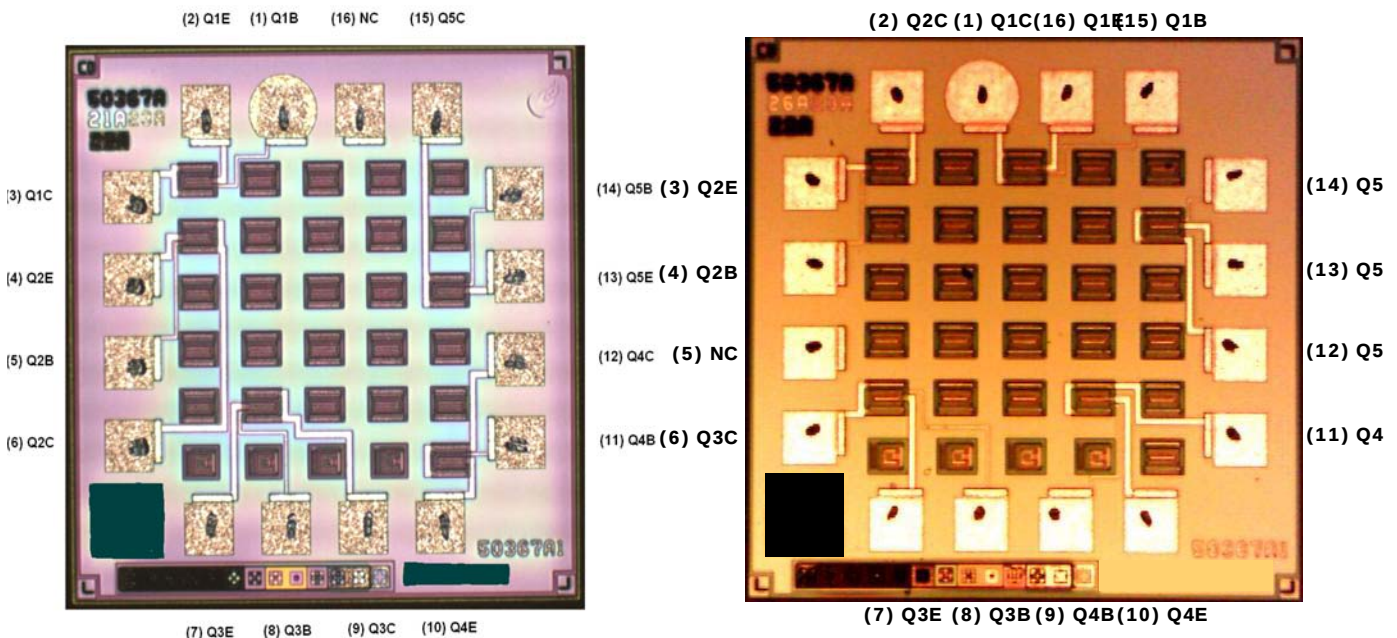


FIGURE 1. ISL73096RH, ISL73127RH

For additional products, see [www.intersil.com/product\\_tree](http://www.intersil.com/product_tree)

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## Metallization Mask Layout (Continued)

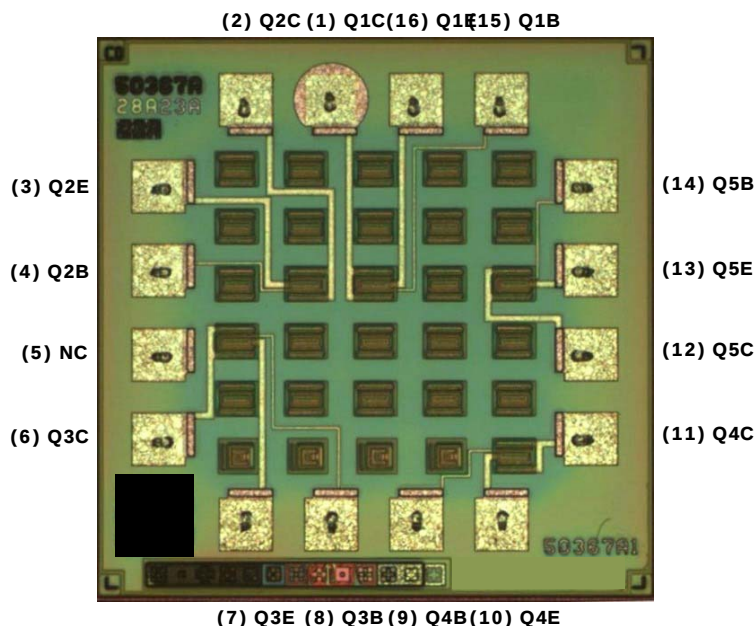


FIGURE 2. ISL73128RH

## Revision History

The revision history provided is for informational purposes only and is believed to be accurate, but not warranted. Please go to web to make sure you have the latest Rev.

| DATE     | REVISION | CHANGE                                                                                                                                                                                                                                                                                                 |
|----------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11/12/09 | FN6475.3 | Converted to new Intersil template. Changed App Note Reference from "AN9315" to "AN1503" to reflect new app note for the radiation hardened product. Updated ordering information with package column, notes to match lead finish and MSL note.                                                        |
| 03/23/09 | FN6475.2 | Under Pinouts, changed DIP symbols to flatpack symbols. Changed (16 LD SBDIP) CDIP2-T16 to (16 LD Flatpack) CDFP4-F16.<br>Under Ordering Information, added the following flatpack device types:<br>5962F0721801VXC (ISL73096RHVF), 5962F0721802VXC (ISL73127RHVF) and 5962F0721803VXC (ISL73128RHVF). |
| 12/2007  | FN6475.1 | Added ISL73127RH & ISL73128RH device types.                                                                                                                                                                                                                                                            |
| 03/29/07 | FN6475.0 | Initial Release.                                                                                                                                                                                                                                                                                       |

## Products

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\*For a complete listing of Applications, Related Documentation and Related Parts, please see the respective device information page on [intersil.com](http://intersil.com): [ISL73096](http://intersil.com/ISL73096), [ISL73127RH](http://intersil.com/ISL73127RH), [ISL73128RH](http://intersil.com/ISL73128RH)

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FITs are available from our website at <http://rel.intersil.com/reports/search.php>