

Radiation Hardened Ultra High Frequency NPN/PNP Transistor Arrays

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 (γ) 3×10^5 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 Ω) at 1GHz 3.5dB (Typ)
- Collector-to-Collector Leakage <1pA (Typ)
- Complete Isolation Between Transistors

Applications

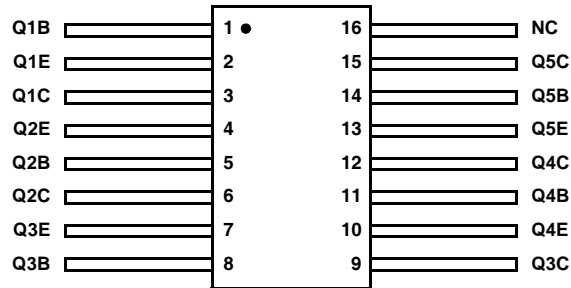
- High Frequency Amplifiers and Mixers
 - Refer to Application Note AN9315
- High Frequency Converters
- Synchronous Detector

Ordering Information

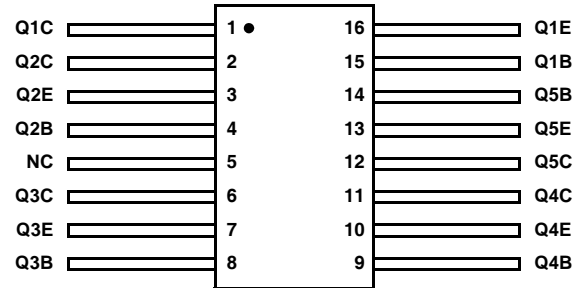
| ORDERING NUMBER | INTERNAL MKT. NUMBER | TEMP. RANGE (°C) |
|--------------------|----------------------|------------------|
| 5962F0721801V9A | ISL73096RHVX | -55 to +125 |
| 5962F0721801VXC | ISL73096RHVF | -55 to +125 |
| 5962F0721802V9A | ISL73127RHVX | -55 to +125 |
| 5962F0721802VXC | ISL73127RHVF | -55 to +125 |
| 5962F0721803V9A | ISL73128RHVX | -55 to +125 |
| 5962F0721803VXC | ISL73128RHVF | -55 to +125 |
| ISL73096RHF/PROTO | ISL73096RHF/PROTO | -55 to +125 |
| ISL73096RHX/SAMPLE | ISL73096RHX/SAMPLE | -55 to +125 |
| ISL73127RHF/PROTO | ISL73127RHF/PROTO | -55 to +125 |
| ISL73127RHX/SAMPLE | ISL73127RHX/SAMPLE | -55 to +125 |
| ISL73128RHF/PROTO | ISL73128RHF/PROTO | -55 to +125 |
| ISL73128RHX/SAMPLE | ISL73128RHX/SAMPLE | -55 to +125 |

Pinouts

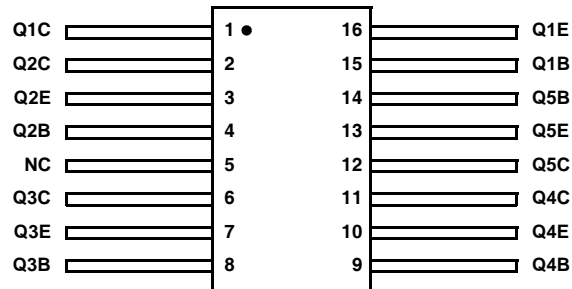
ISL73096RH
(16 LD FLATPACK) CDFP4-F16
TOP VIEW



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 ± 1 mil
 1340 μ m x 1320 μ m x 355.6 μ m $\pm 25.4\mu$ m

INTERFACE MATERIALS:

Glassivation:

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

Top Metallization:

Type: Metal 1: AlCu (2%)/TiW
 Thickness: Metal 1: 8k \AA $\pm 0.5\text{k}\text{\AA}$
 Type: Metal 2: AlCu (2%)
 Thickness: Metal 2: 16k \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 x 10⁵A/cm²

Transistor Count:

5

Metallization Mask Layout

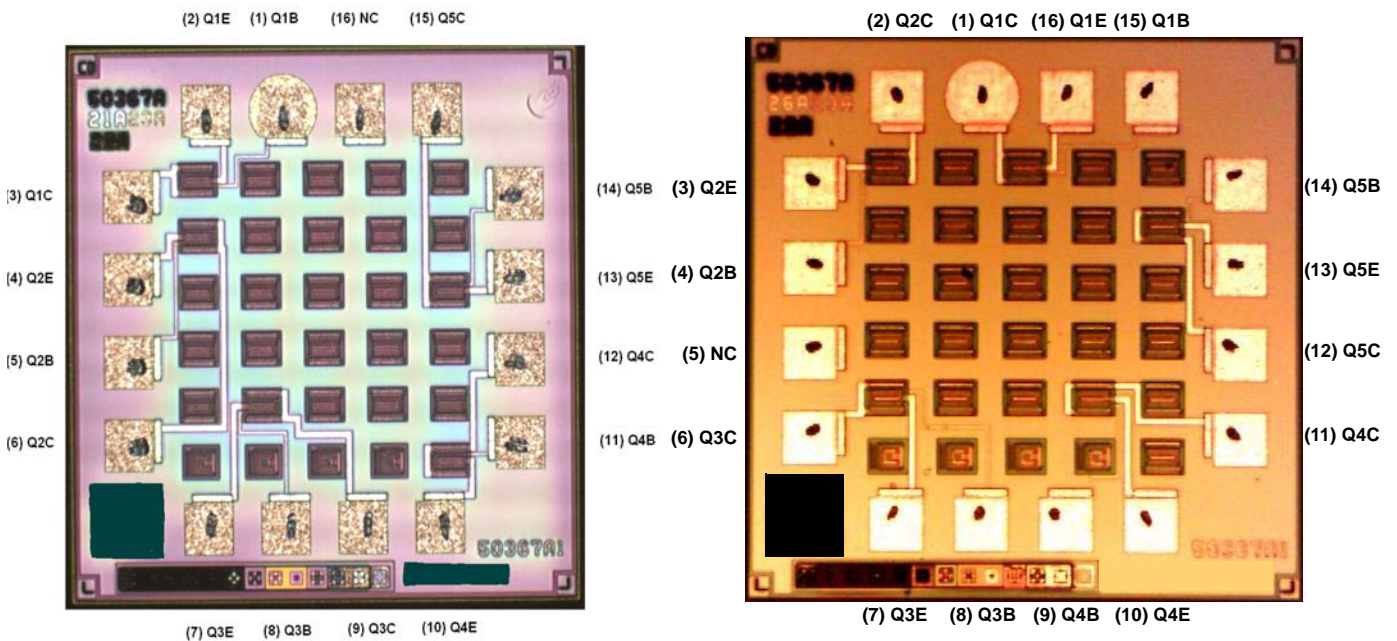


FIGURE 1. ISL73096RH, ISL73127RH

Metallization Mask Layout (Continued)

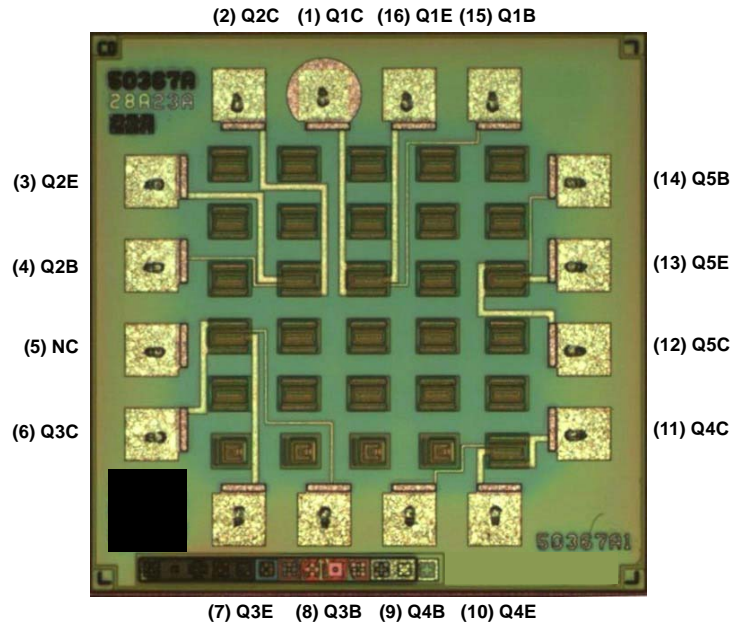


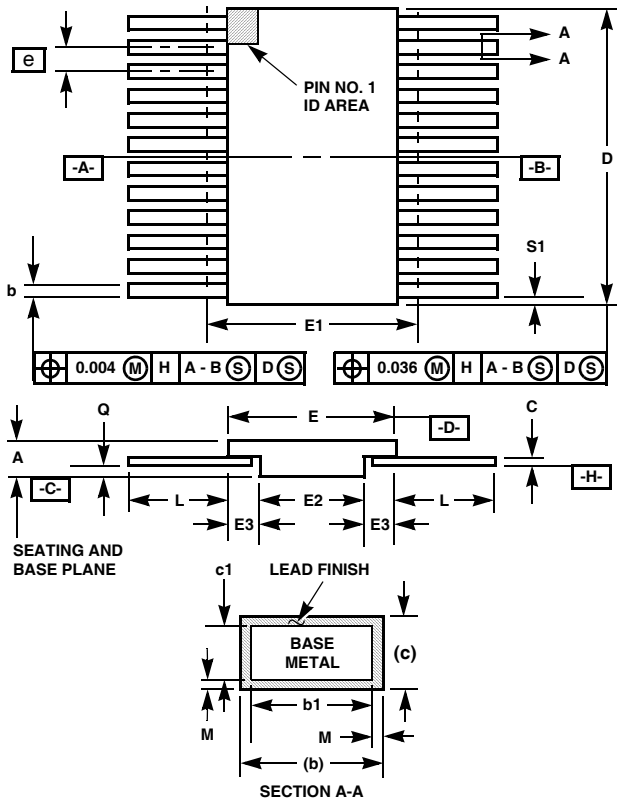
FIGURE 2. ISL73128RH

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Intersil Corporation's quality certifications can be viewed at www.intersil.com/design/quality

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Ceramic Metal Seal Flatpack Packages (Flatpack)



**K16.A MIL-STD-1835 CDFP4-F16 (F-5A, CONFIGURATION B)
16 LEAD CERAMIC METAL SEAL FLATPACK PACKAGE**

| SYMBOL | INCHES | | MILLIMETERS | | NOTES |
|--------|-----------|--------|-------------|-------|-------|
| | MIN | MAX | MIN | MAX | |
| A | 0.045 | 0.115 | 1.14 | 2.92 | - |
| b | 0.015 | 0.022 | 0.38 | 0.56 | - |
| b1 | 0.015 | 0.019 | 0.38 | 0.48 | - |
| c | 0.004 | 0.009 | 0.10 | 0.23 | - |
| c1 | 0.004 | 0.006 | 0.10 | 0.15 | - |
| D | - | 0.440 | - | 11.18 | 3 |
| E | 0.245 | 0.285 | 6.22 | 7.24 | - |
| E1 | - | 0.315 | - | 8.00 | 3 |
| E2 | 0.130 | - | 3.30 | - | - |
| E3 | 0.030 | - | 0.76 | - | 7 |
| e | 0.050 BSC | | 1.27 BSC | | - |
| k | 0.008 | 0.015 | 0.20 | 0.38 | 2 |
| L | 0.250 | 0.370 | 6.35 | 9.40 | - |
| Q | 0.026 | 0.045 | 0.66 | 1.14 | 8 |
| S1 | 0.005 | - | 0.13 | - | 6 |
| M | - | 0.0015 | - | 0.04 | - |
| N | 16 | | 16 | | - |

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NOTES:

1. Index area: A notch or a pin one identification mark shall be located adjacent to pin one and shall be located within the shaded area shown. The manufacturer's identification shall not be used as a pin one identification mark. Alternately, a tab (dimension k) may be used to identify pin one.
2. If a pin one identification mark is used in addition to a tab, the limits of dimension k do not apply.
3. This dimension allows for off-center lid, meniscus, and glass overrun.
4. Dimensions b1 and c1 apply to lead base metal only. Dimension M applies to lead plating and finish thickness. The maximum limits of lead dimensions b and c or M shall be measured at the centroid of the finished lead surfaces, when solder dip or tin plate lead finish is applied.
5. N is the maximum number of terminal positions.
6. Measure dimension S1 at all four corners.
7. For bottom-brazed lead packages, no organic or polymeric materials shall be molded to the bottom of the package to cover the leads.
8. Dimension Q shall be measured at the point of exit (beyond the meniscus) of the lead from the body. Dimension Q minimum shall be reduced by 0.0015 inch (0.038mm) maximum when solder dip lead finish is applied.
9. Dimensioning and tolerancing per ANSI Y14.5M - 1982.
10. Controlling dimension: INCH