Data Sheet July 1999 File Number 4606.1

Radiation Hardened Low Noise Quad Operational Amplifier

Intersil's Satellite Applications Flow™ (SAF) devices are fully tested and guaranteed to 100kRAD total dose. These QML Class T devices are processed to a standard flow intended to meet the cost and shorter lead-time needs of large volume satellite manufacturers, while maintaining a high level of reliability.

The HS-5104ARH-T is a radiation hardened, monolithic quad operational amplifier that provides highly reliable performance in harsh radiation environments. Its excellent noise characteristics coupled with a unique array of dynamic specifications make this amplifier well-suited for a variety of satellite system applications. Dielectrically isolated, bipolar processing makes this device immune to Single Event Latch-up.

The HS-5104ARH-T shows almost no change in offset voltage after exposure to 100K RAD(Si) gamma radiation, with only a minor increase in current. Complementing these specifications is a post radiation open loop gain in excess of 40K.

This quad operational amplifier is available in an industry standard pinout, allowing for immediate interchangeability with most other quad operational amplifiers.

Specifications

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 HS-5104ARH-T are contained in SMD 5962-95690. A "hot-link" is provided from our website for downloading**.**
www.intersil.com/spacedefense/newsafclasst.asp

Intersil's Quality Management Plan (QM Plan), listing all Class T screening operations, is also available on our website.
www.intersil.com/quality/manuals.asp

Ordering Information

ORDERING NUMBER	PART NUMBER	TEMP. RANGE (^{o}C)
5962R9569001TCC	HS1-5104ARH-T	-55 to 125
HS1-5104ARH/Proto	HS1-5104ARH/Proto	-55 to 125
5962R9569001TXC	HS9-5104ARH-T	-55 to 125
HS9-5104ARH/Proto	HS9-5104ARH/Proto	-55 to 125

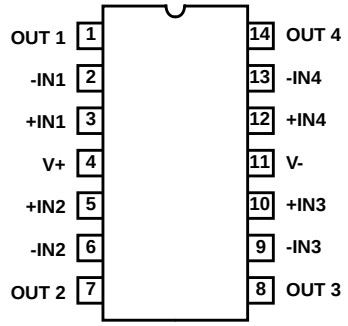
NOTE: ***Minimum order quantity for -T is 150 units through distribution, or 450 units direct.***

Features

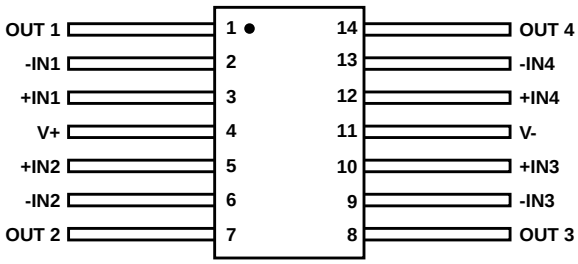
- QML Class T, Per MIL-PRF-38535
- Radiation Performance
  - Gamma Dose (γ) 1 x 10^5 RAD(Si)
  - No Latch-Up, Dielectrically Isolated Device Islands
- Low Noise
  - At 1kHz . . . . . 4.3nV/$\sqrt{Hz}$ (Typ)
  - At 1kHz . . . . . 0.6pA/$\sqrt{Hz}$ (Typ)
- Low Offset Voltage . . . . . 3.0mV (Max)
- High Slew Rate . . . . . 2.0V/μs (Typ)
- Gain Bandwidth Product . . . . . 8.0MHz (Typ)

Pinouts

HS1-5104ARH-T (SBDIP), CDIP2-T14
TOP VIEW



HS9-5104ARH-T (FLATPACK), CDFP3-F14
TOP VIEW



Die Characteristics

DIE DIMENSIONS:

(2420µm x 2530µm x 483µm ±25.4µm)

95 x 99 x 19mils ±1mil

METALLIZATION:

Type: Al Si Cu

Thickness: 16.0kÅ ±2kÅ

SUBSTRATE POTENTIAL:

Unbiased (DI)

BACKSIDE FINISH:

Silicon

PASSIVATION:

Type: Nitride (Si_3N_4) over Silox (S_iO_2)

Nitride Thickness: 3.5kÅ ±1.5kÅ

Silox Thickness: 12.0kÅ ±2kÅ

WORST CASE CURRENT DENSITY:

< 2.0e5 A/cm^2

TRANSISTOR COUNT:

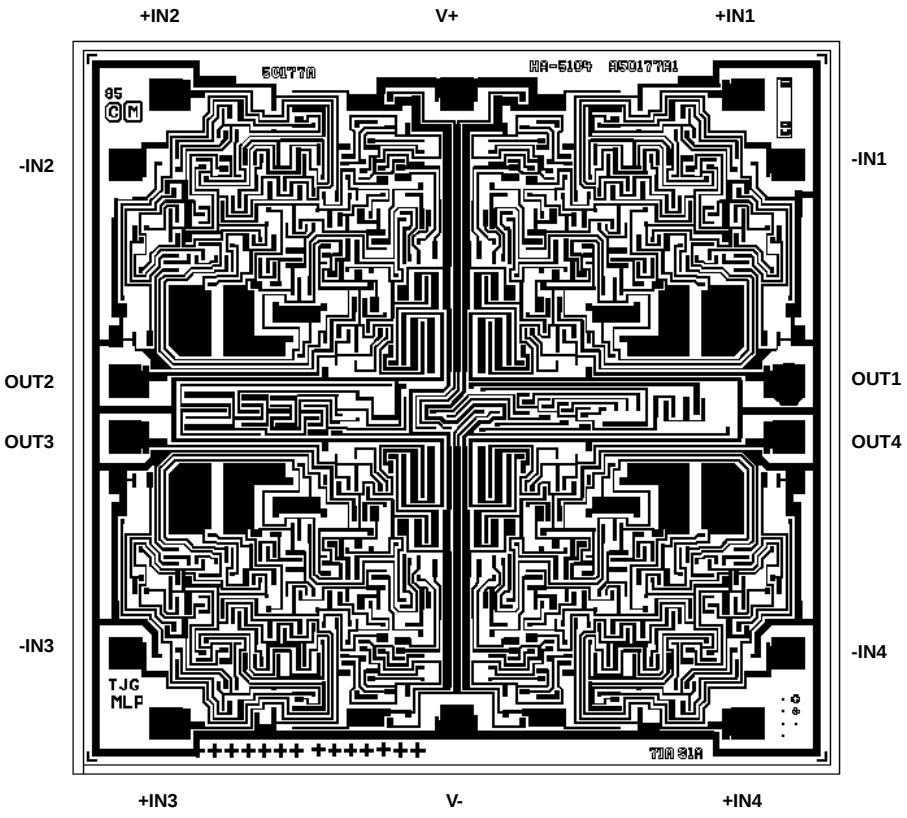
175

PROCESS:

Bipolar DI

Metallization Mask Layout

HS-5104ARH-T



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