Data Sheet August 1999 File Number 4014.1

Radiation Hardened, Very Wideband, High Input Impedance Uncompensated Operational Amplifiers

HS-2620RH and HS-2622RH are radiation hardened bipolar operational amplifiers that feature very high input impedance coupled with wideband AC performance. The high resistance of the input stage is complemented by low offset voltage (4mV Max at 25^{o}C for HS-2620RH) and low bias and offset current (15nA Max at 25^{o}C for HS-2620RH) to facilitate accurate signal processing. Offset voltage can be reduced further by means of an external nulling potentiometer. Closed loop gains greater than 5, the 25V/µs minimum slew rate at 25^{o}C and the 100kV/V minimum open loop gain at 25^{o}C, enables the HS-2620RH to perform high gain amplification of very fast, wideband signals. These dynamic characteristics, coupled with fast settling times, make these amplifiers ideally suited to pulse amplification designs as well as high frequency or video applications. The frequency response of the amplifier can be tailored to exact design requirements by means of an external bandwidth control capacitor. Other high performance designs such as high gain, low distortion audio amplifiers, high-Q and wideband active filters and high speed comparators are excellent uses of this part.

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 5962-95688. A “hot-link” is provided on our homepage for downloading.
www.intersil.com/spacedefense/space.asp

Features

- Electrically Screened to SMD # 5962-95688
- QML Qualified per MIL-PRF-38535 Requirements
- High Input Impedance (HS-2620RH) . . . . . 65MΩ (Min)
- High Gain (HS-2620RH) . . . . . 100kV/V (Min), 150kV/V (Typ)
- High Slew Rate (HS-2620RH) . . . . . 25V/µs (Min), 35V/µs (Typ)
- Low Input Bias Current (HS-2620RH) . . . . . 15nA (Max), 5nA (Typ)
- Low Input Offset Voltage (HS-2620RH) . . . . . 4mV (Max)
- Wide Gain Bandwidth Product (AV ≥ 5) . . . . . 100MHz (Typ)
- Output Short Circuit Protection
- Total Dose . . . . . 1 x 10^{4} RAD(Si)

Applications

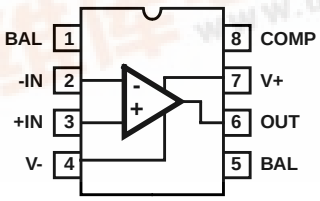
- Video and RF Amplifiers
- Pulse Amplifiers
- Audio Amplifiers and Filters
- High-Q Active Filters
- High Speed Comparators

Ordering Information

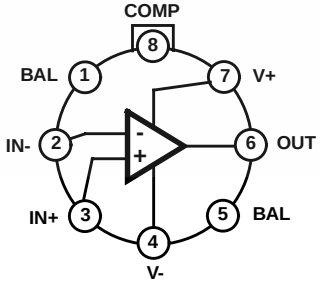
ORDERING NUMBER	INTERNAL MKT. NUMBER	TEMP. RANGE (^{o}C)
5962D9568801VGA	HS2-2620RH-Q	-55 to 125
5962D9568801VPA	HS7-2620RH-Q	-55 to 125
5962D9568801VPC	HS7B-2620RH-Q	-55 to 125
5962D9568802VGA	HS2-2622RH-Q	-55 to 125
5962D9568802VPA	HS7-2622RH-Q	-55 to 125
5962D9568802VPC	HS7B-2622RH-Q	-55 to 125

Pinouts

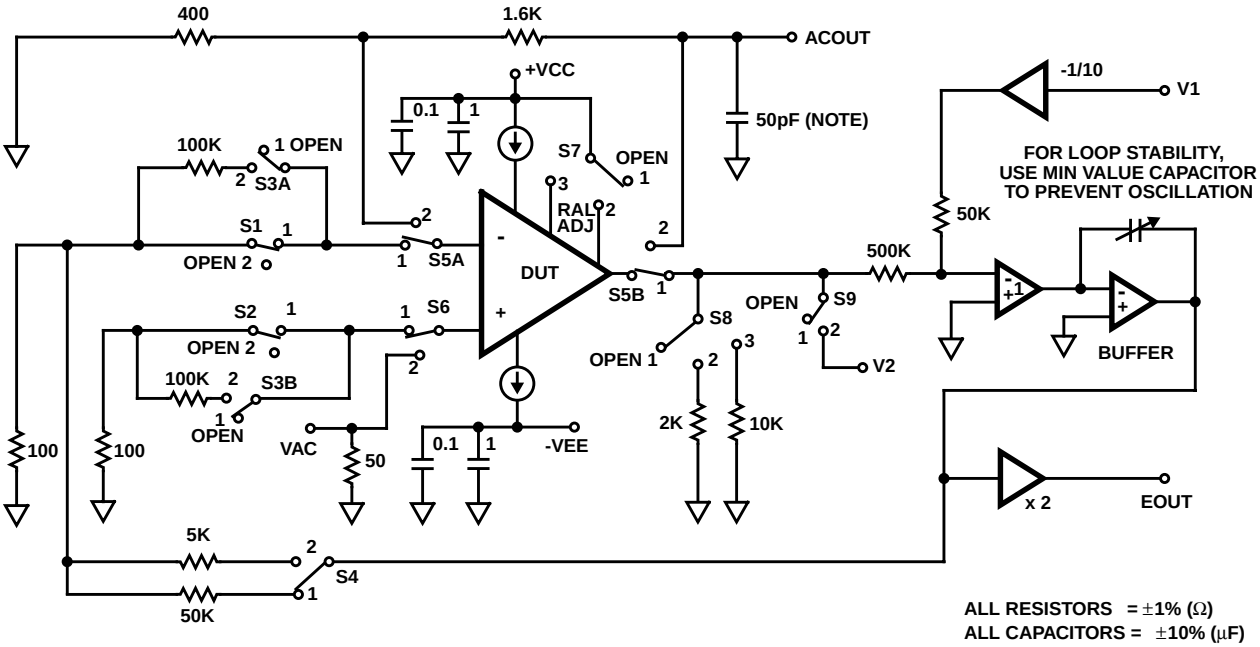
HS7-2620RH, HS7-2622RH (CERDIP) GDIP1-T8
OR
HS7B-2620RH, HS7B-2622RH (SBDIP) CDIP2-T8
TOP VIEW



HS2-2620RH, HS2-2622RH (CAN) MACY1-X8
TOP VIEW



Test Circuit



NOTE: Includes stray capacitances.

FIGURE 1. TEST LOOP FOR THE HS-2620RH AND THE HS-2622RH

Test Circuits and Waveforms

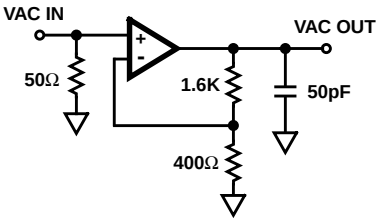


FIGURE 2. SIMPLIFIED TEST CIRCUIT

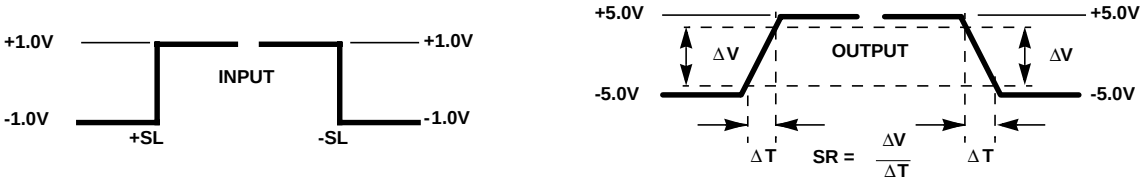
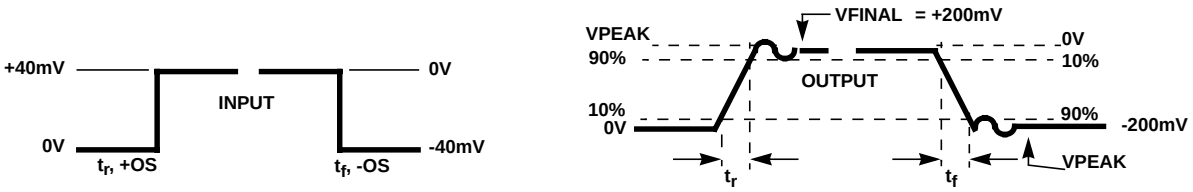


FIGURE 3. SLEW RATE WAVEFORM

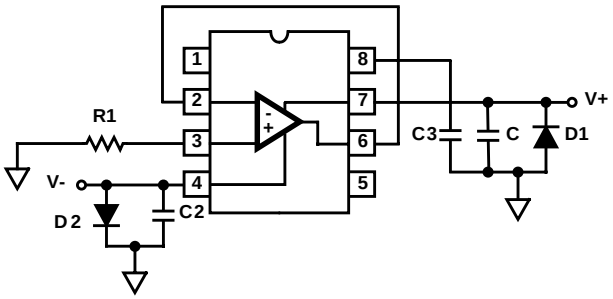


NOTE: Measured on both positive and negative transitions. Capacitance at Compensation pin should be minimized.

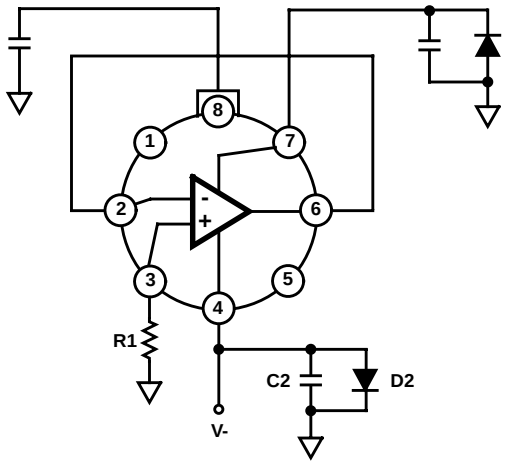
FIGURE 4. OVERSHOOT, RISE AND FALL TIME WAVEFORMS

Burn-In Circuits

HS7-2620RH CERDIP
HS7-2622RH CERDIP



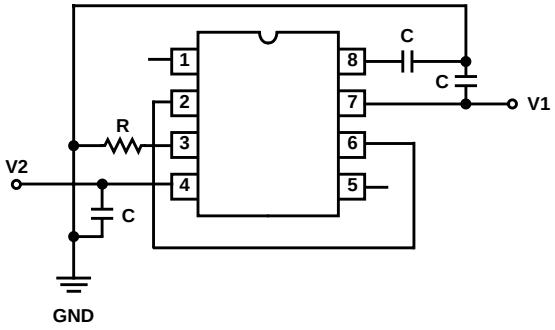
HS2-2620RH (TO-99) METAL CAN
HS2-2622RH (TO-99) METAL CAN



NOTES:

1. R1 = 1MΩ, ±5%, 1/4W (Min)
2. C1 = C2 = 0.01µF/Socket (Min) of 0.1µF/Row (Min)
3. C3 = 0.01µF/Socket (10%)
4. D1 = D2 = IN4002 or Equivalent/Board
5. I(V+) - (V -)I = 31V ±1V

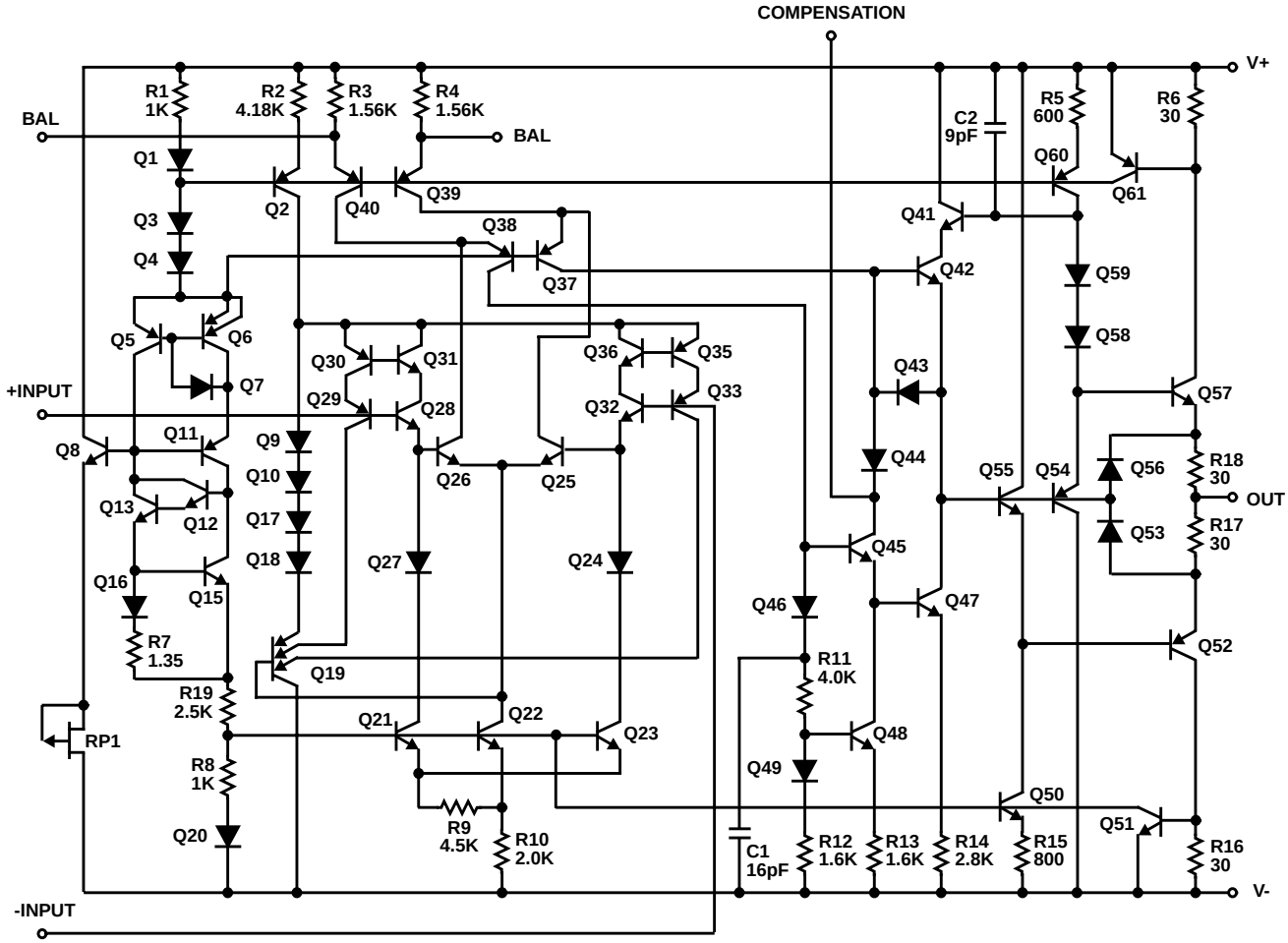
Irradiation Circuit



NOTES:

6. V1 = +15V ±10%
7. V2 = -15V ±10%
8. R = 1MΩ ±5%
9. C = 0.1µF ±10%

Schematic Diagram



Die Characteristics

DIE DIMENSIONS:

69 mils x 66 mils x 19 mils ±1 mil
1750µm x 1420µm x 483µm ±25.4µm

INTERFACE MATERIALS:

Glassivation:

Type: Nitride (S13N4) over Silox (SiO2, 5% Phos.)
Silox Thickness: 12kÅ ±2kÅ
Nitride Thickness: 3.5kÅ ±1.5kÅ

Top Metallization:

Type: Al, 1% Cu
Thickness: 18kÅ ±2kÅ

Substrate:

Linear Bipolar, DI

Backside Finish:

Silicon

ASSEMBLY RELATED INFORMATION:

Substrate Potential (Powered Up)**:**

Unbiased

ADDITIONAL INFORMATION:

Worst Case Current Density:

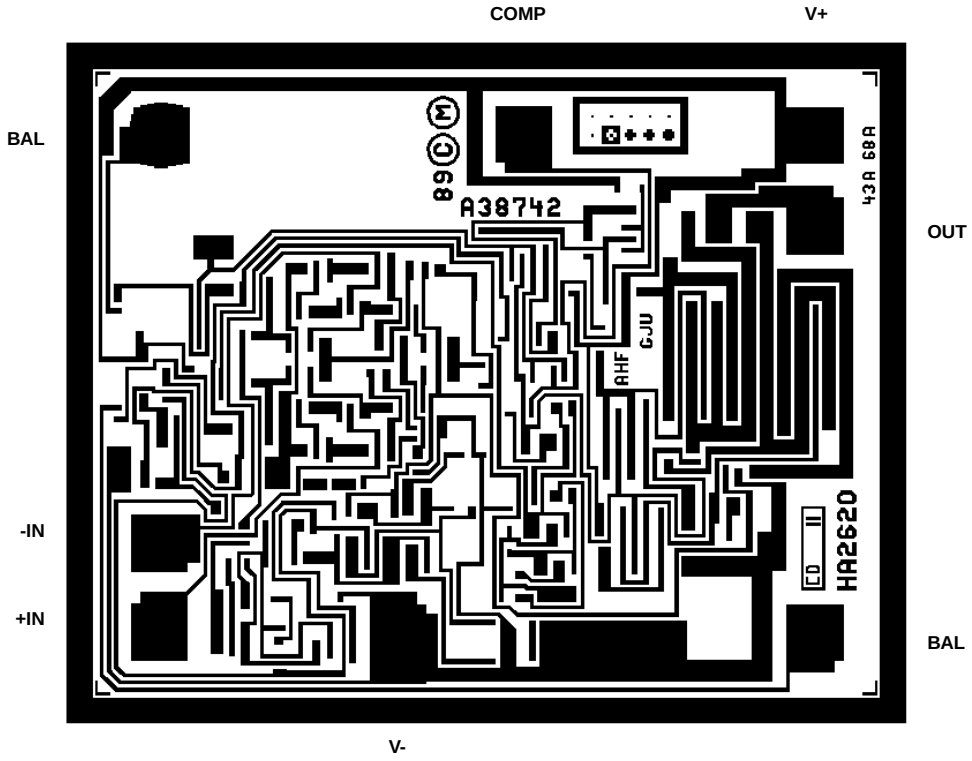
$<2 \times 10^5$ A/cm^2

Transistor Count:

HS-2620RH: 140
HS-2622RH: 140

Metallization Mask Layout

HS-2620RH, HS-2622RH



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