Data Sheet August 1999 File Number 4349.1

Rad Hard Dual, Wideband, High Input Impedance Uncompensated Operational Amplifier

The HS-22620RH is a radiation hardened, dual bipolar operational amplifier that features very high input impedance coupled with wideband AC performance. The high resistance of the input stage is complemented by low offset voltage (6mV Max at 25^{o}C) and low bias current (50nA Max at 25^{o}C) to facilitate accurate signal processing. Offset voltage can be reduced further by means of an external nulling potentiometer. The stable closed loop gains greater than 10, the 20V/µs minimum slew rate at 25^{o}C and the 80kV/V minimum open loop gain at 25^{o}C, enable the HS-22620RH 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.

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 5962-97512. A "hot-link" is provided on our homepage for downloading.
www.intersil.com/spacedefense/space.asp

Features

- Electrically Screened to SMD # 5962-97512
- QML Qualified per MIL-PRF-38535 Requirements
- High Input Impedance . . . . . 65MΩ (Min)
- High Gain . . . . . 80kV/V (Min)
- High Slew Rate . . . . . 20V/µs (Min)
- Low Input Bias Current . . . . . 50nA (Max)
- Low Input Offset Voltage . . . . . 6mV (Max)
- Wide Gain Bandwidth Product ($A_V \geq 10$) . . . . .100MHz (Typ)
- Output Short Circuit Protection
- Total Dose . . . . . .3 x 10^5 RAD(Si)

Applications

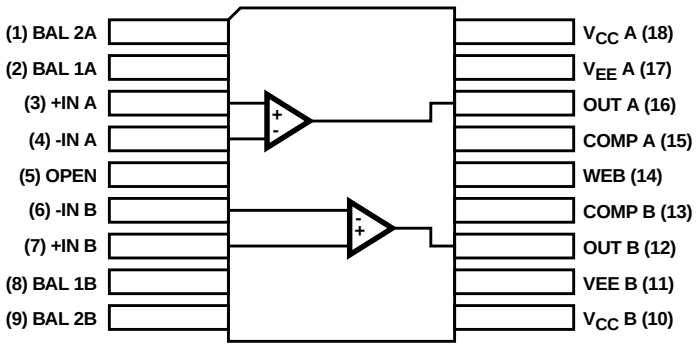
- Video and RF Amplifiers
- Pulse Amplifiers
- High-Q Active Filters
- High Speed Comparators

Ordering Information

ORDERING NUMBER	INTERNAL MKT. NUMBER	TEMP. RANGE (^{o}C)
5962F9751201V9A	HS0-22620RH-Q	25
5962F9751201VXC	HS9-22620RH-Q	-55 to 125
HS9-22620RH/PROTO	HS9-22620RH/PROTO	-55 to 125

Pinout

HS-22620RH
(FLATPACK)
TOP VIEW



NOTE: Refer to SMD, Figure 1

Test Circuits and Waveforms

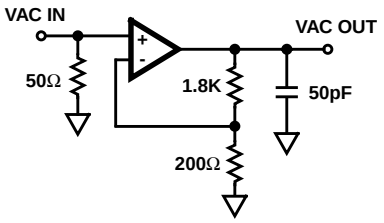
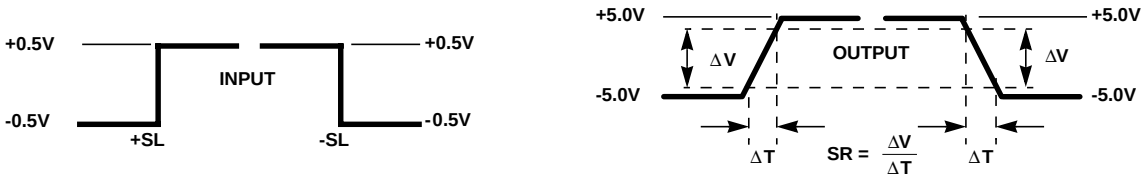
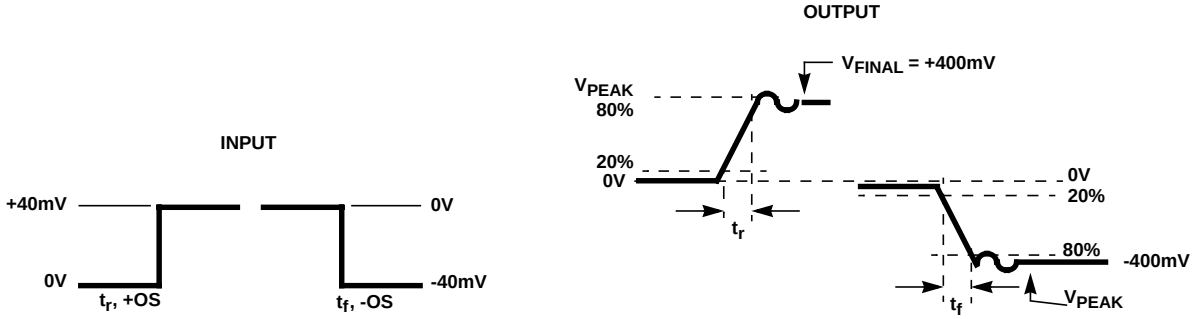


FIGURE 1. SIMPLIFIED TEST CIRCUIT (APPLIES TO SMD TABLE 1)



NOTE: Includes stray capacitances.

FIGURE 2. SLEW RATE WAVEFORM

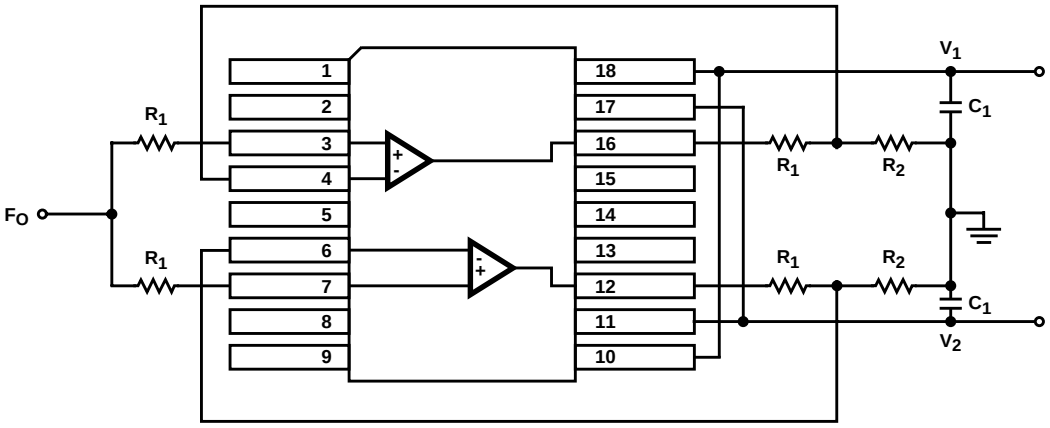


NOTE: Measured on both positive and negative transitions. Capacitance at Compensation pin should be minimized.

FIGURE 3. OVERSHOOT, RISE AND FALL TIME WAVEFORMS

Dynamic Burn-In Circuit

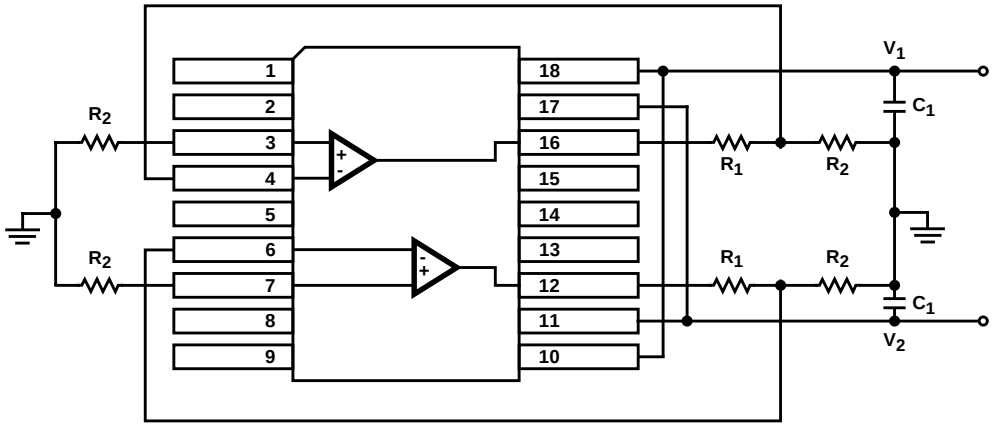
HS9-22620RH-Q FLATPACK



NOTES:

1. V_1 = +15V ±0.5V.
2. V_2 = -15V ±0.5V.
3. R_1 = 2.2kΩ, 1/8W min (5%).
4. R_2 = 50Ω, 1/8W min (2%).
5. C_1 = 0.1µF, 10%, one cap per V per socket.
6. F_0 = 10kHz, ±10%, 50% duty cycle.
7. V_{IH} = +100mV ±10mV.
8. V_{IL} = -100mV ±10mV.

Radiation Exposure Circuit



NOTES:

9. V_1 = +15V ±0.5V.
10. V_2 = -15V ±0.5V.
11. R_1 = 2.2kΩ, 1/8W min (5%).
12. R_2 = 50Ω, 1/8W min (2%).
13. C_1 = 0.1µF, ±10%, one cap per V per socket.

Die Characteristics

DIE DIMENSIONS:

145 mils x 116 mils x 19 mils ±1 mil
3670µm x 2950µm 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: 14kÅ ±2kÅ

Substrate:

Bipolar Bonded Wafer (EBHF)

Backside Finish:

Silicon

ASSEMBLY RELATED INFORMATION:

Substrate Potential (Powered Up):

Unbiased Silicon
(WEB pad provided for substrate tie-off.)

ADDITIONAL INFORMATION:

Worst Case Current Density:

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

Transistor Count:

184

Metallization Mask Layout

HS-22620RH