

RadHard-by-Design RHD5905 Quad Operational Amplifier Instrumentation Differential Amplifier with Enable

www.aeroflex.com/RHDseries

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FEATURES

- Single power supply operation (3.3V to 5.0V) or dual power supply operation (± 1.65 to $\pm 2.5V$)
- Radiation performance
 - Total dose: $>1\text{Mrad}(\text{Si})$; Dose rate = 50 - 300 rads(Si)/s
 - ELDRS Immune
 - SEL Immune $>100\text{ MeV}\cdot\text{cm}^2/\text{mg}$
 - Neutron Displacement Damage $>10^{14}\text{ neutrons}/\text{cm}^2$
- Differential Outputs
- Rail-to-Rail input and output range
- Enable pin to Enable/Disable amplifiers in pairs.
- Short Circuit Tolerant
- Full military temperature range
- Designed for aerospace and high reliability space applications
- Packaging – Hermetic ceramic SOIC
 - 20-pin, 0.30"W x 0.50" L x 0.12"Ht SOIC
 - Typical Weight 1.6 grams

GENERAL DESCRIPTION

Aeroflex's RHD5905 is a radiation hardened, single supply, differential, instrumentation, quad operational amplifier with enable in a 20-pin SOIC package. The RHD5905 design uses specific circuit topology and layout methods to mitigate total ionizing dose effects and single event latchup. These characteristics make the RHD5905 especially suited for the harsh environment encountered in Deep Space missions. It is guaranteed operational from -55°C to $+125^{\circ}\text{C}$. Available screened in accordance with MIL-PRF-38534 Class K, the RHD5905 is ideal for demanding military and space applications.

ORGANIZATION AND APPLICATION

The RHD5905 amplifiers are capable of rail-to-rail input and outputs. Performance characteristics listed are for general purpose operational 5V CMOS amplifier applications. The amplifiers will drive substantial resistive or capacitive loads and are unity gain stable under normal conditions. Resistive loads in the low kohm range can be handled without gain derating and capacitive loads of several nF can be tolerated. CMOS device drive has a negative temperature coefficient and the devices are therefore inherently tolerant to momentary shorts, although on chip thermal shutdown is not provided. All inputs and outputs are diode protected.

The devices will not latch with SEU events to above $100\text{ MeV}\cdot\text{cm}^2/\text{mg}$. Total dose degradation is minimal to above $1\text{Mrad}(\text{Si})$. Displacement damage environments to neutron fluence equivalents in the mid 10^{14} neutrons per cm^2 range are readily tolerated. There is no sensitivity to low-dose rate (ELDRS) effects. SEU effects are application dependant.

The RHD5905 is configured with enable/disable control. Pairs of amplifiers are put in a power-down condition with their outputs in a high impedance state. Several useful operational amplifier configurations are supported where more than one amplifier can feed an output with others disabled.

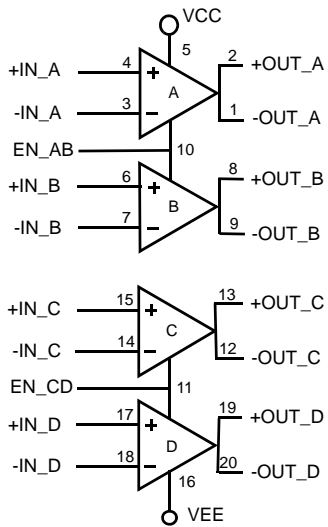
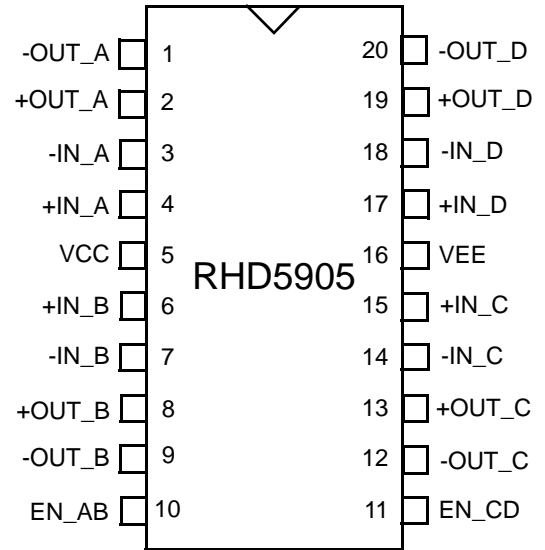


FIGURE 1: BLOCK DIAGRAM



20-Pin SOIC

FIGURE 2: PACKAGE PIN-OUT

Notes:

1. Package and lid are electrically isolated from signal pads.
2. EN_AB enables amplifiers A & B. EN_CD enables amplifiers C & D.

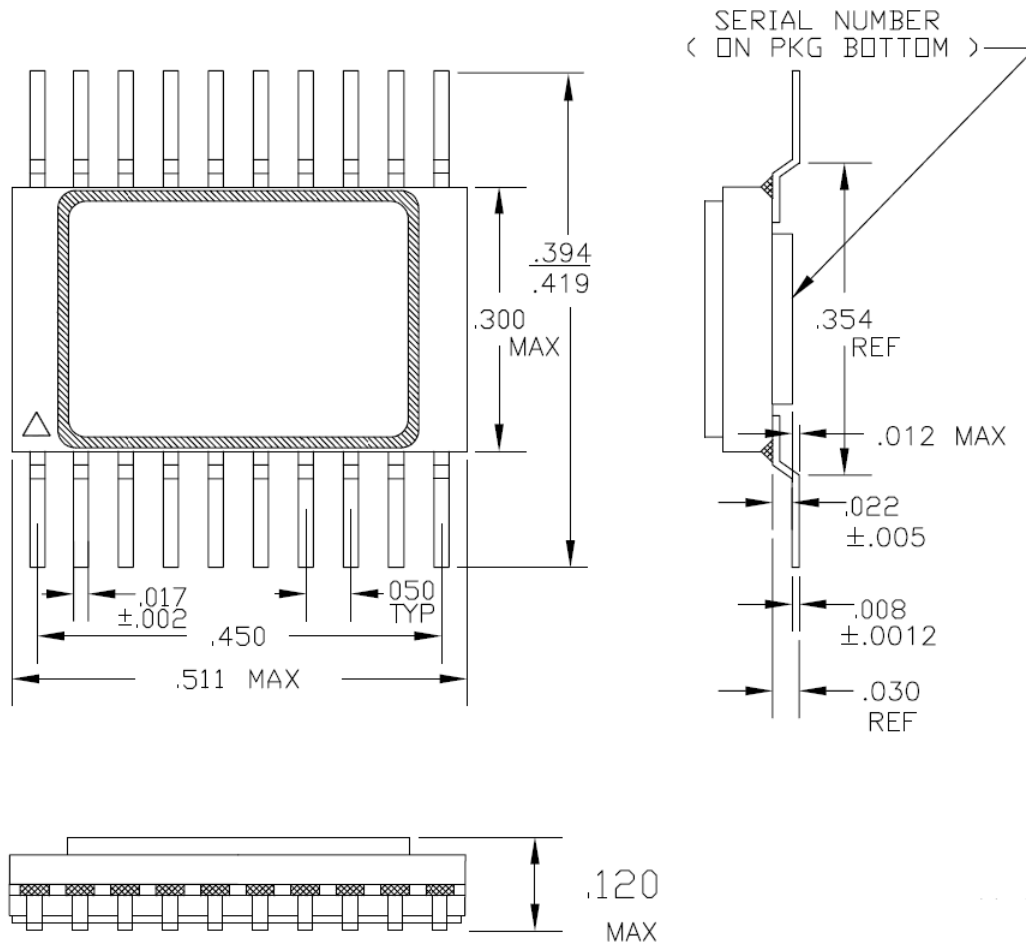


FIGURE 3: PACKAGE OUTLINE

ORDERING INFORMATION

Model	DSCC SMD #	Screening	Package
RHD5905-7	-	Commercial Flow, +25°C testing only	20-pin SOIC Package
RHD5905-S	-	Military Temperature, -55°C to +125°C Screened in accordance with the individual Test Methods of MIL-STD-883 for Space Applications	
RHD5905-201-1S	Pending	DSCC SMD Pending	
RHD5905-201-2S	Pending		
RHD5905-901-1S	Pending	DSCC SMD and Radiation Certification Pending	
RHD5905-901-2S	Pending		

EXPORT CONTROL:

This product is controlled for export under the International Traffic in Arms Regulations (ITAR). A license from the U.S. Department of State is required prior to the export of this product from the United States.

EXPORT WARNING:

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