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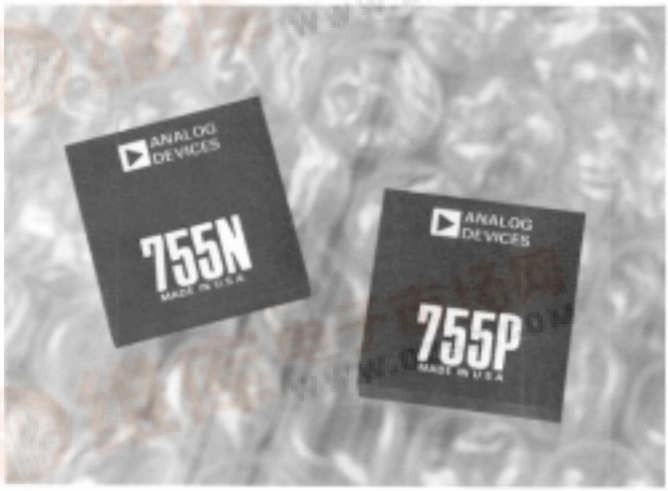
Intronics

6-Decade, High Accuracy Log, Antilog Amplifiers

Models 755N, 755P

FEATURES
Complete Log/Antilog Amplifier
External Components Not Required;
Internal Reference; Temperature Compensated
6 Decades Current Operation - 1nA to 1mA
½% max Error - 10nA to 100µA
1% max Error - 1nA to 1mA
4 Decades Voltage Operation - 1mV to 10V,
½% max Error - 1mV to 1V
1% max Error - 1mV to 10V

APPLICATIONS
Log Current or Voltage
Antilog Voltage
Data Compression or Expansion
Absorbence Measurements
Computing Powers and Log Ratios



GENERAL DESCRIPTION

Model 755 is a complete dc logarithmic amplifier consisting of an accurate temperature compensated antilog element, and a low bias current FET amplifier. In addition to offering 120dB of current logging (1nA to 1mA) and 80dB of voltage logging (1mV to 10V), the 755 features exceptionally low bias currents of 10pA and 15µV/°C voltage drift to satisfy most wide range applications. Conformance to ideal log operation is held to ±1% over its total 120dB current range (1nA to 1mA), with ±0.5% conformity guaranteed over an 80dB range (10nA to 100µA). Two models are available, model 755N and model 755P. The N version computes the log of positive input signals and the P version computes the log of negative input signals.

Advanced design techniques and improved component selection are used to obtain exceptionally good performance. For example, the use of monolithic devices greatly reduces the influence of temperature variations. Offering both log and antilog operation, model 755's price and performance are especially attractive as an alternative to in-house designs of OEM applications. This log design also improves significantly over competitive designs in price, performance, and package size.

MAJOR IMPROVEMENTS IN I_{OS}

For most low level applications, the input bias current I_{OS}, is especially critical, since it is the major source of error when processing low level currents. At 1nA of input current there is an error contribution of 1% for every 10pA of I_{OS}. Recognizing the importance of this parameter, bias current of model 755 is maintained below 10pA.

APPLICATIONS

When connected in the current or voltage logging configuration, as shown in Figure 1, the model 755 may be used in several key applications. A plot of input current versus output is also presented to illustrate the log amplifier's transfer characteristics.

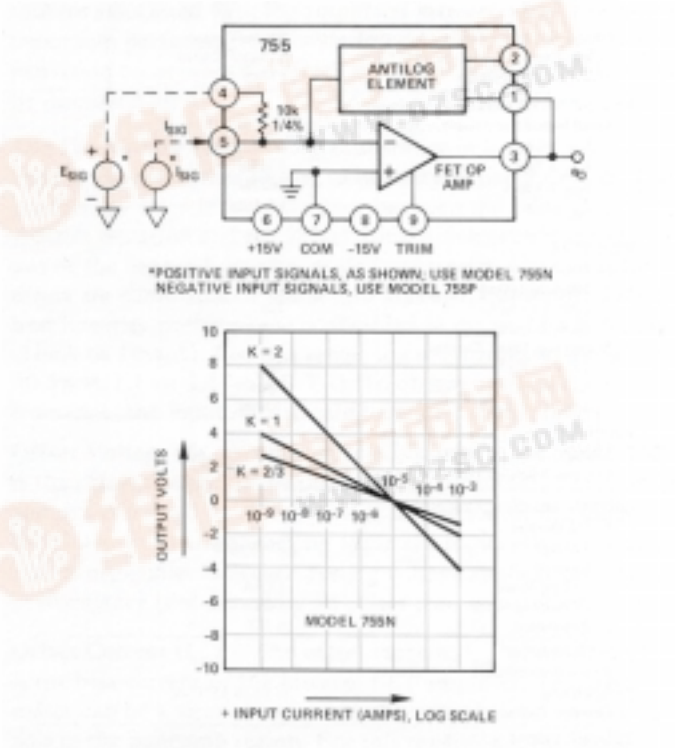


Figure 1. Functional Block Diagram and Transfer Function

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