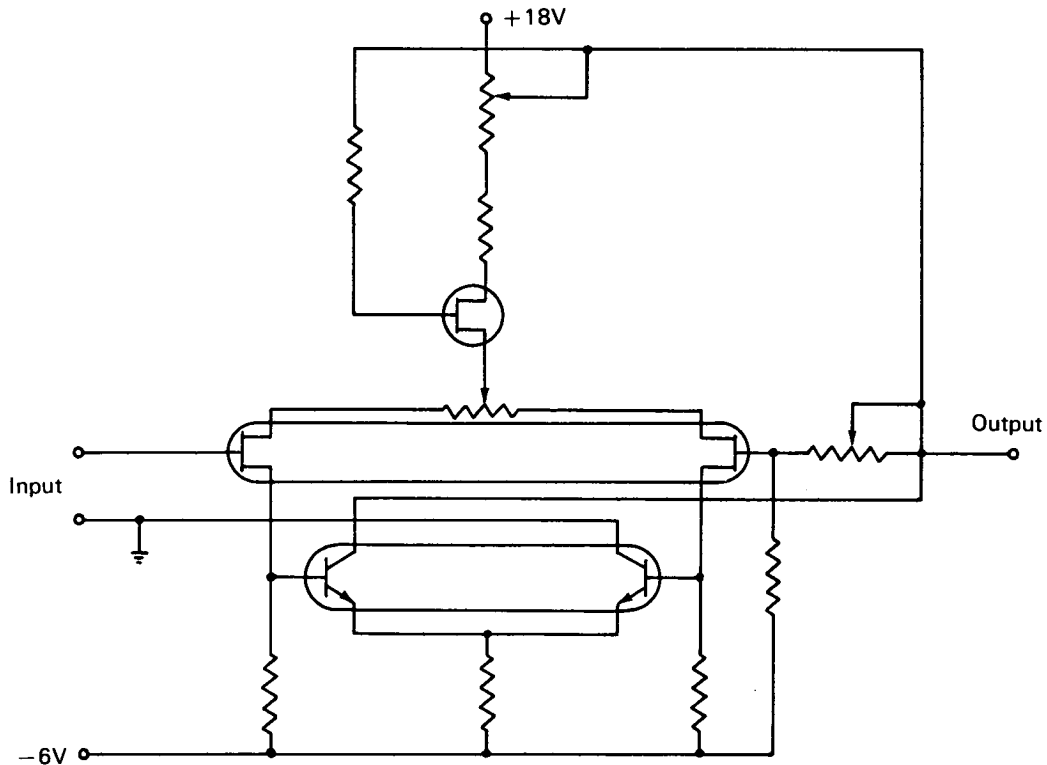


NASA TECH BRIEF



NASA Tech Briefs are issued to summarize specific innovations derived from the U.S. space program, to encourage their commercial application. Copies are available to the public at 15 cents each from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151.

Field Effect Transistors Improve Buffer Amplifier



The problem:

To achieve a buffer amplifier with an input current of 0.1 microamp maximum at -20°C , it is necessary to use a Darlington connection at the input differential stage to the amplifier. Such an arrangement causes collector current to be so low that serious degradation in the gain-bandwidth product of the transistors results in poor performance of the buffer amplifier. Therefore, a basic tradeoff must be made between input current and bandwidth for any stable dc amplifier using bipolar transistors.

The solution:

A unity gain buffer amplifier with a field effect transistor (FET) differential input stage that responds much faster than bipolar transistors when operated at low current levels. The circuit illustrated uses a dual FET in a unity gain buffer amplifier having extremely high input impedance, low bias current requirements, and wide bandwidth. Input bias current is less than 10^{-8} amps maximum and bandwidth exceeds 2 mc while measured offset stability is -4mv at -20°C and $+5\text{mv}$ at 85°C .

(continued overleaf)

Notes:

1. Adequate gain stability will be realized with this circuit only through use of a very stable constant current source.
2. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B67-10334

Patent status:

No patent action is contemplated by NASA.

Source: Dynatronics, Inc.
under contract to
Marshall Space Flight Center
(M-FS-916)