

Diffused Junction N-to-P Buffer Converter

This circuit is designed to act as a buffer stage between a line driver and local logic blocks. It accepts an N line input and provides an in-phase P line output. A CB circuit does not provide a termination for the line driver because several of these circuits are usually driven by the same driver. Therefore, a CB \bar{T} block or an R block must be tied to the output of the line driver to terminate it and to develop N line signal levels.

Circuit Description

This circuit configuration is that of a one-way AND circuit; i.e., the input transistor T5 has its base-to-emitter NP diode returned to a positive supply. Its emitter output drives into a grounded base amplifier T4 which is referenced to ground. Thus, T4 is forward-biased only when its emitter is above ground. Because the transistors used have a forward emitter-to-base drop of 0.2v, a -N input will pull the emitter line below ground and reverse bias T4 as shown. In this state, output G is at a -P level of -6.5v because of divider current through its coupling network.

When the input to T5 rises to a +N level the emitter of T4 attempts to rise above ground, but in so doing it becomes forward-biased and clamps to its base potential. In this state, output G rises to a +P level of -5.4v because

of current flow (6.6ma) out of its coupling network through T4 to +30v.

The input levels shown are developed in the 107 ohm, 715 ohm coupling network. In the state shown, the line driver is supplying 23ma of current into the network to develop a -N level of -1.2v. When the input current is reduced to zero, divider current through the network establishes the +N level.

The peaking coil compensates for output capacitance, so that optimum square-wave response is realized. The 82 ohm base resistor is an oscillation suppressor which is necessary because of the inductive coupling networks used.

This circuit is essentially a differential amplifier so that, if unwanted power line signals are induced in the coaxial line these signals do not get through the amplifier. The amplifier blocks such signals because magnetically induced signals appear at input B and C in-phase and cancellation results.

Application

For some applications, the circuit driven by this logic block requires a coupling network other than the 187 ohm, 2.15K resistors shown. In such cases cap code YT is used (see chart).