Diffused Junction P-to-P Power Driver (11-40 bases)

This power driver is used when it is required to drive from 11 to 40 bases (logic circuits of the type shown in the above application). It provides an in-phase P line output for a P line input. This driver is not designed to drive widely separated circuits. Because of the driving requirements of this circuit, a special coupling network is built into its input. This network converts an input current into the P line signal levels required. In order to keep skew of the output signal to a minimum, the length of the output lines should be as equal as possible and the number of circuits driven by each line should be equal to within one circuit. For example, a load of 33 circuits is divided so that each of three outputs drives eight circuits and one output drives nine.

Circuit Description

In the state shown, TX1 is cut off and the input current to the power driver is zero. Divider current through the coupling network (392 ohms, 3.65K, 5.23K) establishes a −P input level of −6.8v. This input level forward-biases T1. In the status shown, T1 conducts and the back current for a maximum of 40 TX3's flows from −12v, through T1, the base-collector diode of TX3's, into an N line coupling network. The emitter of T1 clamps to the −6.8v input level and outputs B, C, D and F are at a −P level of −6.6v. Current through T1 develops a voltage drop across its 150 ohm collector resistor which raises the base potential of T2 above −12v. Thus, T1 and T2 conduct in parallel to set the −P level.

When the input to the converter falls, TX1 is forward-biased and 6.7ma flows out of the coupling network, through TX1 to +30v. Current flow out of the network causes the input level to rise to −4.7v. When the input level rises above −6v, T4 is forward-biased and T1 and T2 are cut off. The emitter of T4 follows its base above −6v, which forward-biases the TX3 load transistors. Load current flows from −36v through the emitter-base diodes of TX3's and T4 to ground. Current flow through the 150 ohm collector resistor of T4 feeds a below-ground signal to T5, which forward-biases T5. Thus, T4 and T5 conduct in parallel and set the +P output level at −5v.

The input network peaking coil compensates for line capacitance so that optimum square-wave response is realized. The 33 ohm output resistance is an oscillation suppressor which is necessary because of the inductive coupling network used. The effect of output capacitance is reduced by using 300$\mu\mu$fd bypass capacitors which cause T5 to be overdriven on the leading edge of a positive-going signal and T2 to be overdriven on the leading edge of a negative-going signal.