

Theory of Operation

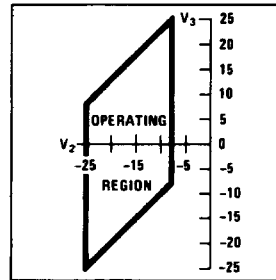
The two input diodes perform the AND function on TTL input voltage levels. When at least one input voltage is a logical "0", current from V_{CC} (nominally 5.0V) passes through R_1 and out the input(s) which is at the low voltage. Other than small leakage currents, this current drawn from V_{CC} through the 20 k Ω resistor is the only source of power dissipation in the logical "1" output state.

When both inputs are at logical "1" levels, current passes through R_1 and diverts to transistor Q_1 , turning it on and thus pulling current through R_2 . Current is then supplied to the PNP transistor, Q_2 . The voltage losses caused by current through Q_1 , D_3 , and Q_2 necessitate that node P reach a voltage sufficient to overcome these losses before current begins to flow. To achieve this voltage at node P, the inputs must be raised to a voltage level which is one diode potential lower than node P. Since these levels are exactly the same as those experienced with conventional TTL, the interfacing with these types of circuits is achieved.

Transistor Q_2 provides "constant current switching" to the output due to the common base connection of Q_2 . When at least one input is at the logical "0" level, no current is delivered to Q_2 , so that its collector supplies essentially zero current to the output stage. But when both inputs are raised to a logical "1" level current is supplied to Q_2 .

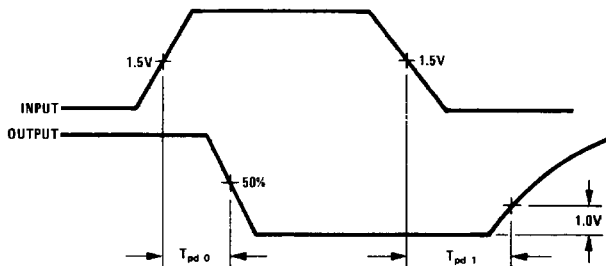
Selecting Power Supply Voltage

The graph shows the boundary conditions which must be used for proper operation of the unit. The range of operation for power supply V_2 is shown on the X axis. It must be between -25V and -8V. The allowable range for power supply V_3 is governed by supply V_2 . With a value chosen for V_2 , V_3 may be selected as any value along a vertical line passing through the V_2 value and terminated by the boundaries of the operating region. A voltage difference between power supplies of at least 5V should be maintained for adequate signal swing.



TL/F/5827-5

Switching Time Waveforms



TL/F/5827-6

This datasheet has been downloaded from:

www.DatasheetCatalog.com

Datasheets for electronic components.

National Semiconductor was acquired by Texas Instruments.

http://www.ti.com/corp/docs/investor_relations/pr_09_23_2011_national_semiconductor.html

This file is the datasheet for the following electronic components:

DS8800H - <http://www.ti.com/product/ds8800h?HQS=TI-null-null-dscatalog-df-pf-null-ww>



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