

TC74HC280P 9-BIT ODD/EVEN PARITY GENERATOR/CHECKER

The TC74HC280 is a high speed CMOS 9-BIT PARITY GENERATOR fabricated with silicon gate CMOS technology.

It achieves the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation.

It is composed of nine data inputs (A thru I) and odd/even parity outputs (Σ ODD and Σ EVEN).

The nine input data control the output conditions.

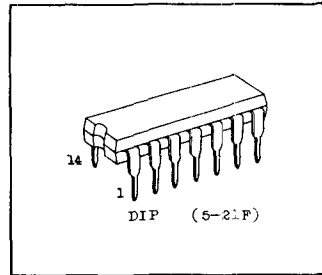
When the number of high level inputs is odd, Σ ODD output is kept high and Σ EVEN output low. On the contrary, when the number is even, Σ EVEN output is kept high and Σ ODD low. This IC facilitates operation of either odd or even parity application.

The word-length capability is easily expanded by cascading.

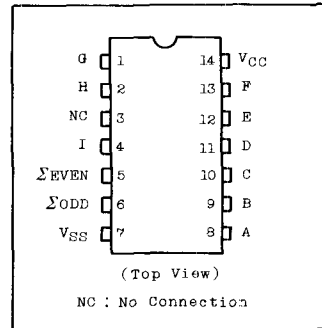
All inputs are equipped with protection circuits against static discharge or transient excess voltage.

FEATURES:

- High Speed..... $t_{pd}=33ns$ (Typ.) at $V_{CC}=5V$
- Low Power Dissipation..... $I_{CC}=4\mu A$ (Max.) at $T_a=25^\circ C$
- High Noise Immunity..... $V_{NIH}=V_{NIL}=28\% V_{CC}$ (Min.)
- Output Drive Capability.....10 LSTTL Loads
- Symmetrical Output Impedance.. $|I_{OH}|=I_{OL}=4mA$ (Min.)
- Balanced Propagation Delays... $t_{pLH}\cong t_{pHL}$
- Wide Operating Voltage Range.. $V_{CC}(opr)=2V\sim 6V$
- Pin and Function Compatible with 74LS280



PIN ASSIGNMENT

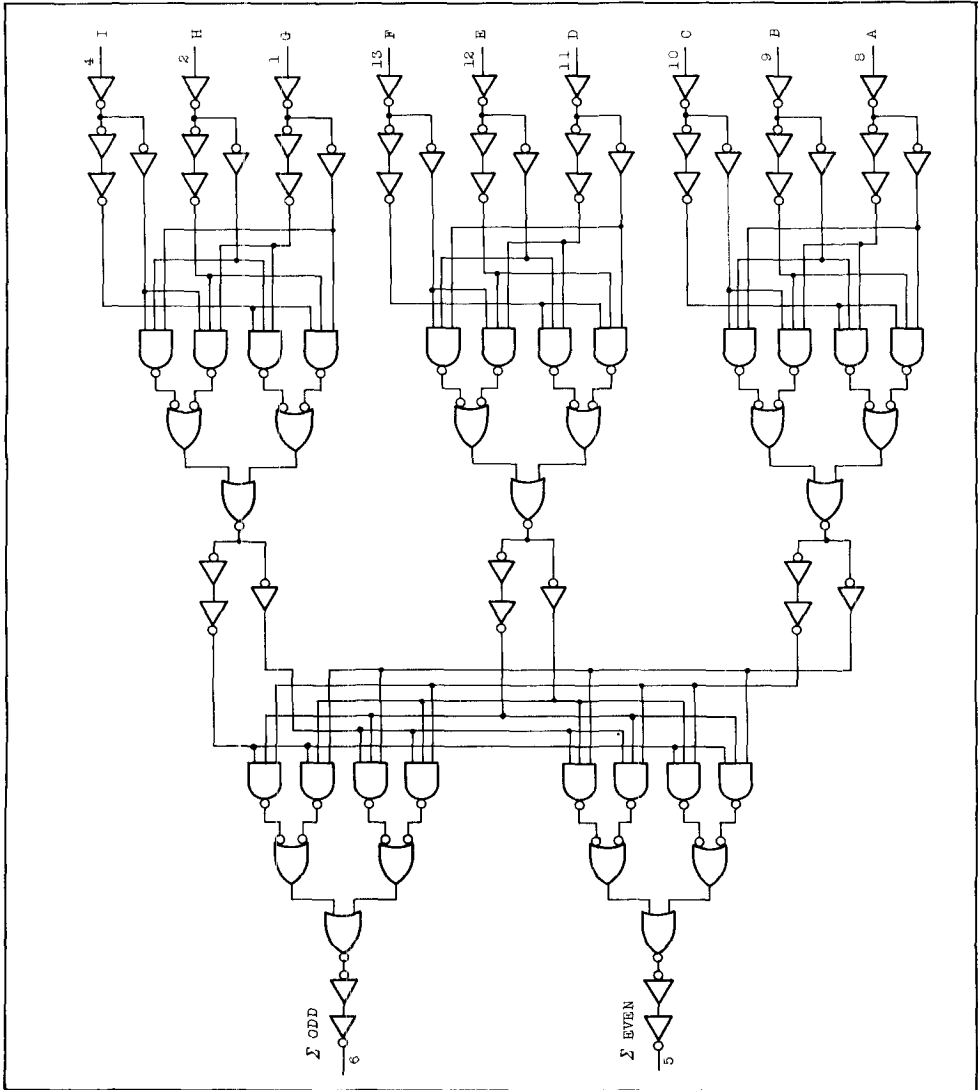


TRUTH TABLE

| NUMBER OF INPUTS A THRU I THAT ARE HIGH | OUTPUTS | |
|---|---------------|--------------|
| | Σ EVEN | Σ ODD |
| 0, 2, 4, 6, 8 | H | L |
| 1, 3, 5, 7, 9 | L | H |

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LOGIC DIAGRAM



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RECOMMENDED OPERATING CONDITIONS

| PARAMETER | SYMBOL | LIMIT | UNIT |
|--------------------------|------------|----------------------------|------|
| Supply Voltage | V_{CC} | 2 ~ 6 | V |
| Input Voltage | V_{IN} | 0 ~ V_{CC} | V |
| Output Voltage | V_{OUT} | 0 ~ V_{CC} | V |
| Operating Temperature | T_{opr} | -40 ~ 85 | °C |
| Input Rise and Fall Time | t_r, t_f | 0 ~ 1000 ($V_{CC}=2.0V$) | ns |
| | | 0 ~ 500 ($V_{CC}=4.5V$) | |
| | | 0 ~ 400 ($V_{CC}=6.0V$) | |

DC ELECTRICAL CHARACTERISTICS

| PARAMETER | SYMBOL | TEST CONDITION | $T_a=25^\circ C$ | | | | $T_a=-40\sim 85^\circ C$ | | UNIT | |
|---------------------------|----------|-----------------------------|-------------------|------|------|-----------|--------------------------|-----------|---------|---|
| | | | V_{CC} | MIN. | TYP. | MAX. | MIN. | MAX. | | |
| High-Level Input Voltage | V_{IH} | | 2.0 | 1.5 | - | - | 1.5 | - | V | |
| | | | 4.5 | 3.15 | - | - | 3.15 | - | | |
| | | | 6.0 | 4.2 | - | - | 4.2 | - | | |
| Low-Level Input Voltage | V_{IL} | | 2.0 | - | - | 0.5 | - | 0.5 | V | |
| | | | 4.5 | - | - | 1.35 | - | 1.35 | | |
| | | | 6.0 | - | - | 1.8 | - | 1.8 | | |
| High-Level Output Voltage | V_{OH} | $V_{IN}=V_{IH}$ or V_{IL} | $I_{OH}=-20\mu A$ | 2.0 | 1.9 | 2.0 | - | 1.9 | - | V |
| | | | | 4.5 | 4.4 | 4.5 | - | 4.4 | - | |
| | | | | 6.0 | 5.9 | 6.0 | - | 5.9 | - | |
| | | | | 4.5 | 4.18 | 4.31 | - | 4.13 | - | |
| Low-Level Output Voltage | V_{OL} | $V_{IN}=V_{IH}$ or V_{IL} | $I_{OL}=20\mu A$ | 2.0 | - | 0.0 | 0.1 | - | 0.1 | V |
| | | | | 4.5 | - | 0.0 | 0.1 | - | 0.1 | |
| | | | | 6.0 | - | 0.0 | 0.1 | - | 0.1 | |
| | | | | 4.5 | - | 0.17 | 0.32 | - | 0.37 | |
| Input Leakage Current | I_{IN} | $V_{IN}=V_{CC}$ or GND | 6.0 | - | - | ± 0.1 | - | ± 1.0 | μA | |
| | | | 6.0 | - | - | 4.0 | - | 40.0 | | |
| Quiescent Supply Current | I_{CC} | $V_{IN}=V_{CC}$ or GND | 6.0 | - | - | 4.0 | - | 40.0 | | |

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AC ELECTRICAL CHARACTERISTICS (C_L=50pF, Input t_r=t_f=6ns)

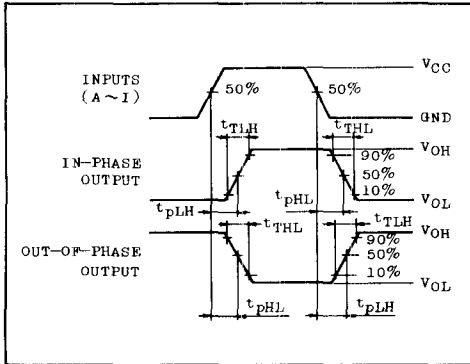
| PARAMETER | SYMBOL | TEST CONDITION | Ta=25°C | | | | Ta=-40~85°C | | UNIT |
|-------------------------------|--------------------------------------|----------------|-----------------|------|------|------|-------------|------|------|
| | | | V _{CC} | MIN. | TYP. | MAX. | MIN. | MAX. | |
| Output Transition Time | t _{TLH} t _{THL} | | 2.0 | - | 30 | 75 | - | 90 | ns |
| | | | 4.5 | - | 8 | 15 | - | 18 | |
| | | | 6.0 | - | 7 | 13 | - | 16 | |
| Propagation Delay Time | t _{pLH} t _{pHL} | | 2.0 | - | 150 | 295 | - | 355 | ns |
| | | | 4.5 | - | 39 | 59 | - | 71 | |
| | | | 6.0 | - | 34 | 51 | - | 62 | |
| Input Capacitance | C _{IN} | | - | 5 | 10 | - | 10 | pF | |
| Power Dissipation Capacitance | C _{PD} (1) | | - | 110 | - | - | - | | |

Note (1) C_{PD} is defined as the value of internal equivalent capacitance of IC which is calculated from the operating current consumption without load (refer to Test Circuit).

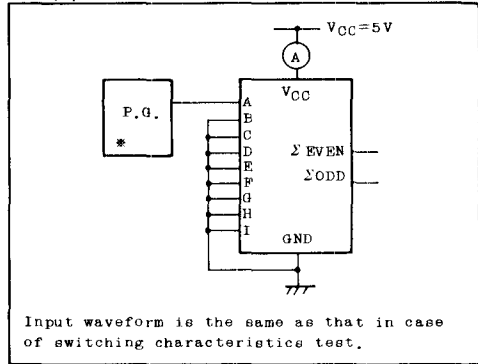
Average operating current can be obtained by the equation hereunder.

$$I_{CC(opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}$$

SWITCHING CHARACTERISTICS TEST WAVEFORM

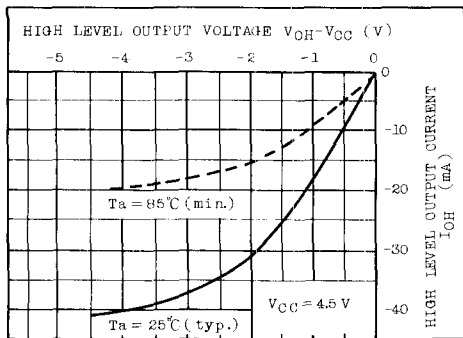


I_{CC(opr)} TEST CIRCUIT

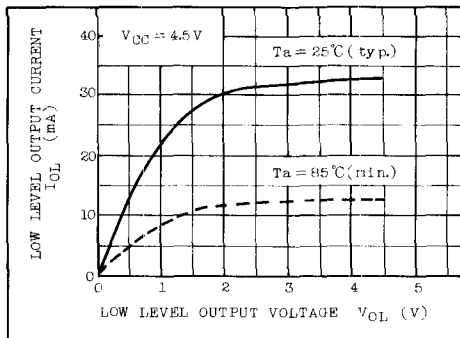


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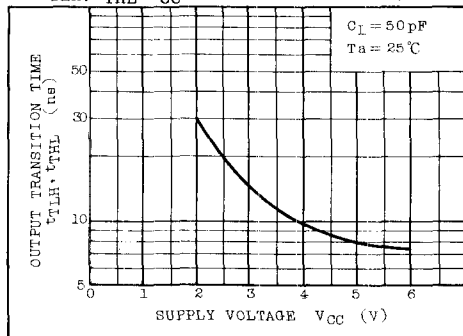
I_{OH} CHARACTERISTICS



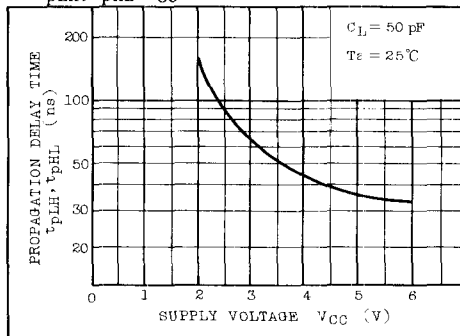
I_{OL} CHARACTERISTICS



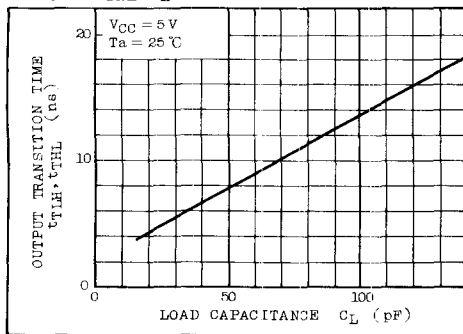
$t_{TLH}, t_{THL}-V_{CC}$ CHARACTERISTICS (TYP.)



$t_{PLH}, t_{PHL}-V_{CC}$ CHARACTERISTICS (TYP.)



$t_{TLH}, t_{THL}-C_L$ CHARACTERISTICS (TYP.)



$t_{PLH}, t_{PHL}-C_L$ CHARACTERISTICS (TYP.)

