

TC74AC280P, TC74AC280F, TC74AC280FN

9-Bit Parity Generator/Checker

The TC74AC280 is an advanced high speed CMOS 9-BIT PARITY GENERATOR fabricated with silicon gate and double-layer metal wiring C²MOS technology.

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

The TC74AC280 is composed of nine data inputs (A thru I) and odd/even parity outputs(Σ ODD and Σ EVEN).

The odd parity output is high when an odd number of data inputs are high. The even parity output is high when an even number of data inputs are high.

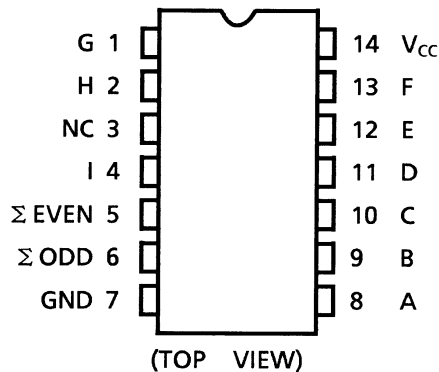
The word-length capability is easily expanded by cascading.

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

Features

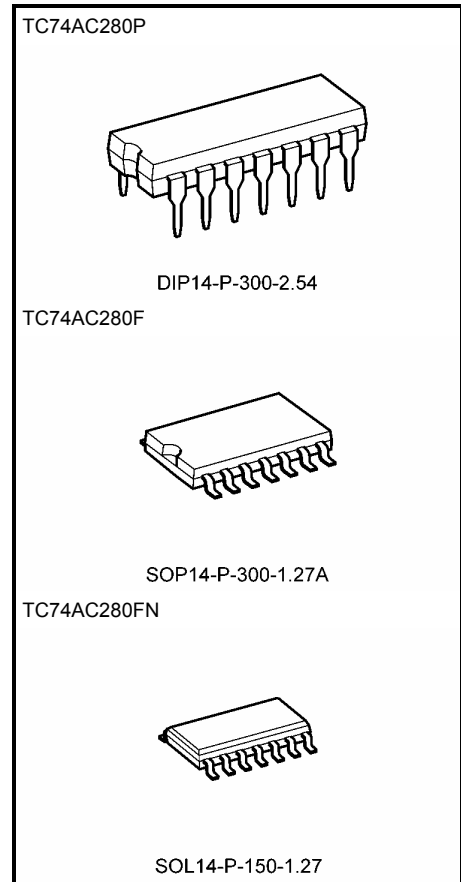
- High speed: $t_{pd} = 7.8$ ns (typ.) at $V_{CC} = 5$ V
- Low power dissipation: $I_{CC} = 8$ μ A (max) at $T_a = 25^\circ$ C
- High noise immunity: $V_{NIH} = V_{NIL} = 28\%$ V_{CC} (min)
- Symmetrical output impedance: $|I_{OH}| = I_{OL} = 24$ mA (min)
 Capability of driving 50 Ω transmission lines.
- Balanced propagation delays: $t_{pLH} \approx t_{pHL}$
- Wide operating voltage range: V_{CC} (opr) = 2~5.5 V
- Pin and function compatible with 74F280

Pin Assignment



NC: No connection

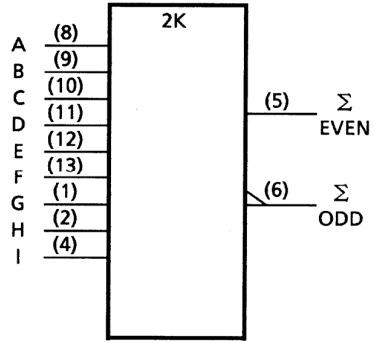
Note: xxxFN (JEDEC SOP) is not available in Japan.



Weight

| | |
|-------------------|-----------------|
| DIP14-P-300-2.54 | : 0.96 g (typ.) |
| SOP14-P-300-1.27A | : 0.18 g (typ.) |
| SOL14-P-150-1.27 | : 0.12 g (typ.) |

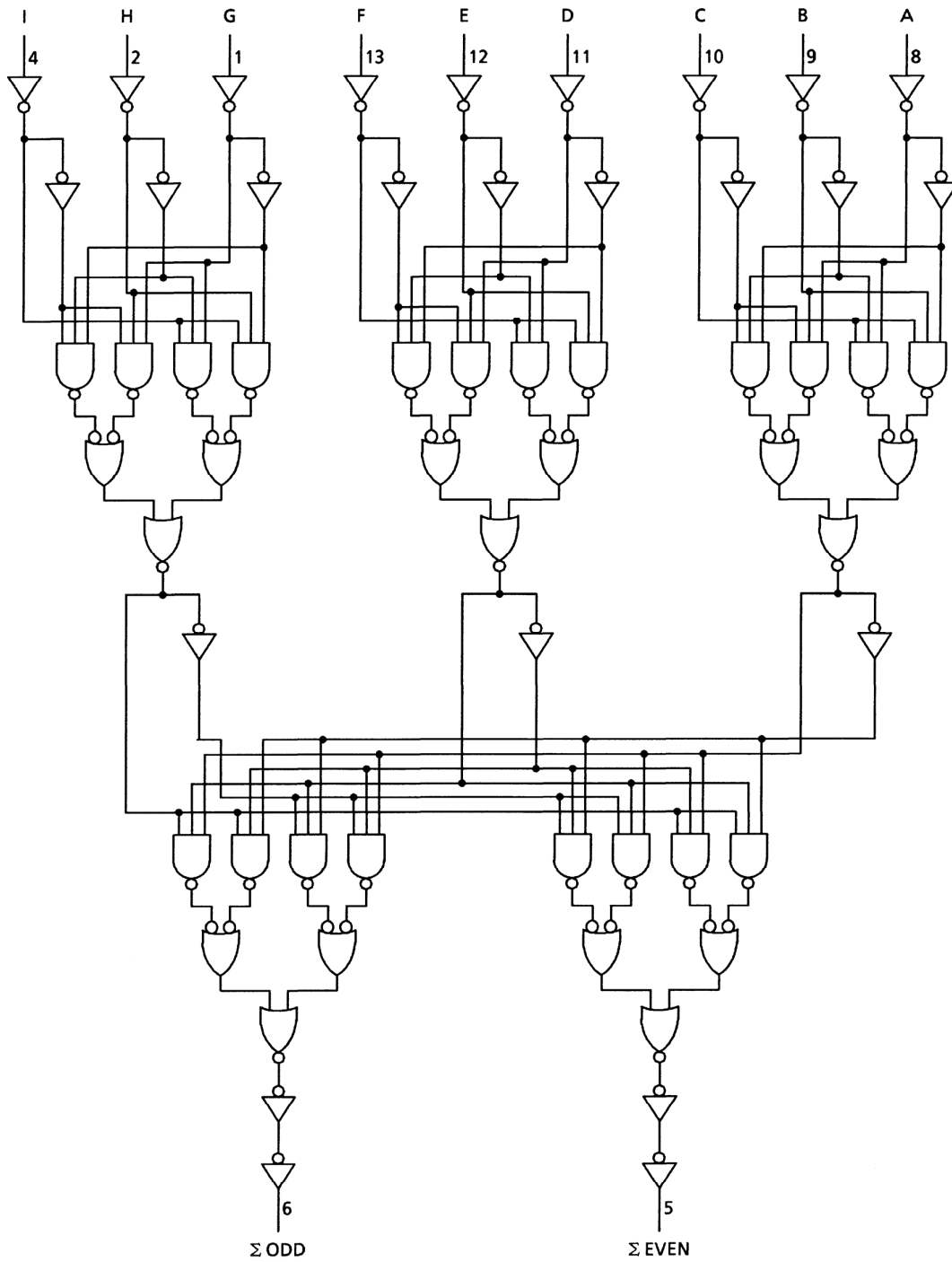
IEC Logic Symbol



Truth Table

| Number of Inputs A Through I that are High | Outputs | |
|---|---------------|--------------|
| | Σ EVEN | Σ ODD |
| 0, 2, 4, 6, 8 | H | L |
| 1, 3, 5, 7, 9 | L | H |

System Diagram



Absolute Maximum Ratings (Note 1)

| Characteristics | Symbol | Rating | Unit |
|-----------------------------|-----------|------------------------------|------|
| Supply voltage range | V_{CC} | -0.5~7.0 | V |
| DC input voltage | V_{IN} | -0.5~ $V_{CC} + 0.5$ | V |
| DC output voltage | V_{OUT} | -0.5~ $V_{CC} + 0.5$ | V |
| Input diode current | I_{IK} | ± 20 | mA |
| Output diode current | I_{OK} | ± 50 | mA |
| DC output current | I_{OUT} | ± 50 | mA |
| DC V_{CC} /ground current | I_{CC} | ± 100 | mA |
| Power dissipation | P_D | 500 (DIP) (Note 2)/180 (SOP) | mW |
| Storage temperature | T_{stg} | -65~150 | °C |

Note 1: Exceeding any of the absolute maximum ratings, even briefly, lead to deterioration in IC performance or even destruction.

Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 2: 500 mW in the range of $T_a = -40\sim 65^\circ\text{C}$. From $T_a = 65$ to 85°C a derating factor of $-10\text{ mW}/^\circ\text{C}$ should be applied up to 300 mW.

Operating Ranges (Note)

| Characteristics | Symbol | Rating | Unit |
|--------------------------|-----------|---|------|
| Supply voltage | V_{CC} | 2.0~5.5 | 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 | dt/dV | 0~100 ($V_{CC} = 3.3 \pm 0.3\text{ V}$) 0~20 ($V_{CC} = 5 \pm 0.5\text{ V}$) | ns/V |

Note: The operating ranges must be maintained to ensure the normal operation of the device. Unused inputs must be tied to either VCC or GND.

Electrical Characteristics

DC Characteristics

| Characteristics | Symbol | Test Condition | V _{CC} (V) | Ta = 25°C | | | Ta = -40~85°C | | Unit | |
|---------------------------|-----------------|--|--|-----------|------|------|---------------|------|------|---|
| | | | | Min | Typ. | Max | Min | Max | | |
| High-level input voltage | V _{IH} | — | 2.0 | 1.50 | — | — | 1.50 | — | V | |
| | | | 3.0 | 2.10 | — | — | 2.10 | — | | |
| | | | 5.5 | 3.85 | — | — | 3.85 | — | | |
| Low-level input voltage | V _{IL} | — | 2.0 | — | — | 0.50 | — | 0.50 | V | |
| | | | 3.0 | — | — | 0.90 | — | 0.90 | | |
| | | | 5.5 | — | — | 1.65 | — | 1.65 | | |
| High-level output voltage | V _{OH} | V _{IN} = V _{IH} or V _{IL} | I _{OH} = -50 μA | 2.0 | 1.9 | 2.0 | — | 1.9 | — | V |
| | | | | 3.0 | 2.9 | 3.0 | — | 2.9 | — | |
| | | | I _{OH} = -4 mA I _{OH} = -24 mA I _{OH} = -75 mA (Note) | 3.0 | 2.58 | — | — | 2.48 | — | |
| | | | | 4.5 | 3.94 | — | — | 3.80 | — | |
| Low-level output voltage | V _{OL} | V _{IN} = V _{IH} or V _{IL} | I _{OL} = 50 μA | 2.0 | — | 0.0 | 0.1 | — | 0.1 | V |
| | | | | 3.0 | — | 0.0 | 0.1 | — | 0.1 | |
| | | | I _{OL} = 12 mA I _{OL} = 24 mA I _{OL} = 75 mA (Note) | 3.0 | — | — | 0.36 | — | 0.44 | |
| | | | | 4.5 | — | — | 0.36 | — | 0.44 | |
| Input leakage current | I _{IN} | V _{IN} = V _{CC} or GND | 5.5 | — | — | ±0.1 | — | ±1.0 | μA | |
| | | | 5.5 | — | — | 8.0 | — | 80.0 | μA | |

Note: This spec indicates the capability of driving 50 Ω transmission lines.

One output should be tested at a time for a 10 ms maximum duration.

AC Characteristics (C_L = 50 pF, R_L = 500 Ω, input: t_r = t_f = 3 ns)

| Characteristics | Symbol | Test Condition | V _{CC} (V) | Ta = 25°C | | | Ta = -40~85°C | | Unit |
|-------------------------------|---------------------------|----------------|---------------------|-----------|------|------|---------------|------|------|
| | | | | Min | Typ. | Max | Min | Max | |
| Propagation delay time | t _{pLH} | — | 3.3 ± 0.3 | — | 12.9 | 21.9 | 1.0 | 25.0 | ns |
| | t _{pHL} | | 5.0 ± 0.5 | — | 8.5 | 12.7 | 1.0 | 14.5 | |
| Input capacitance | C _{IN} | — | — | 5 | 10 | — | 10 | pF | |
| Power dissipation capacitance | C _{PD} (Note) | — | — | 80 | — | — | — | pF | |

Note: C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

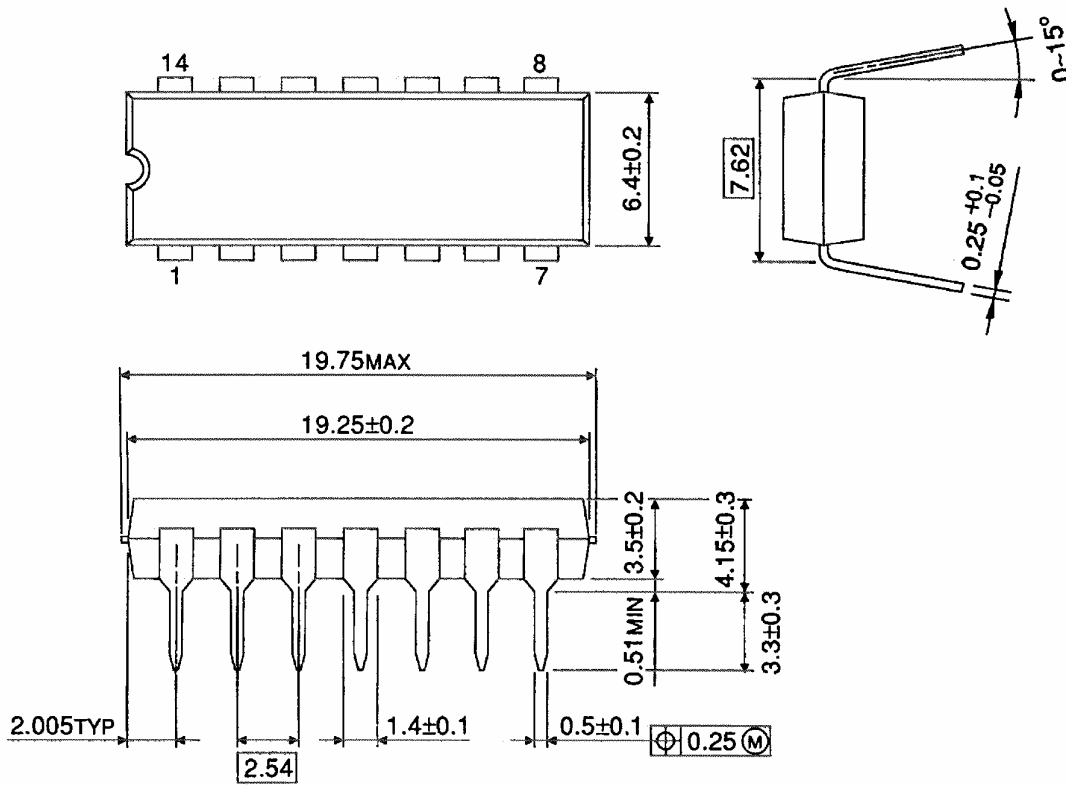
Average operating current can be obtained by the equation:

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

Package Dimensions

DIP14-P-300-2.54

Unit : mm

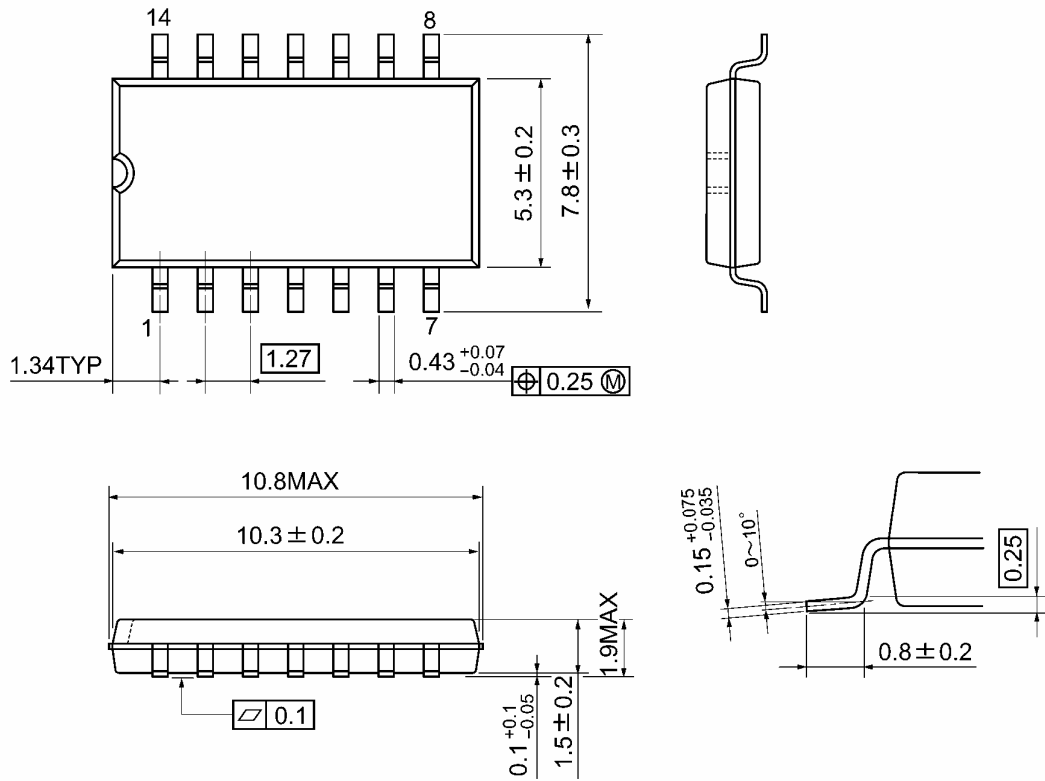


Weight: 0.96 g (typ.)

Package Dimensions

SOP14-P-300-1.27A

Unit: mm

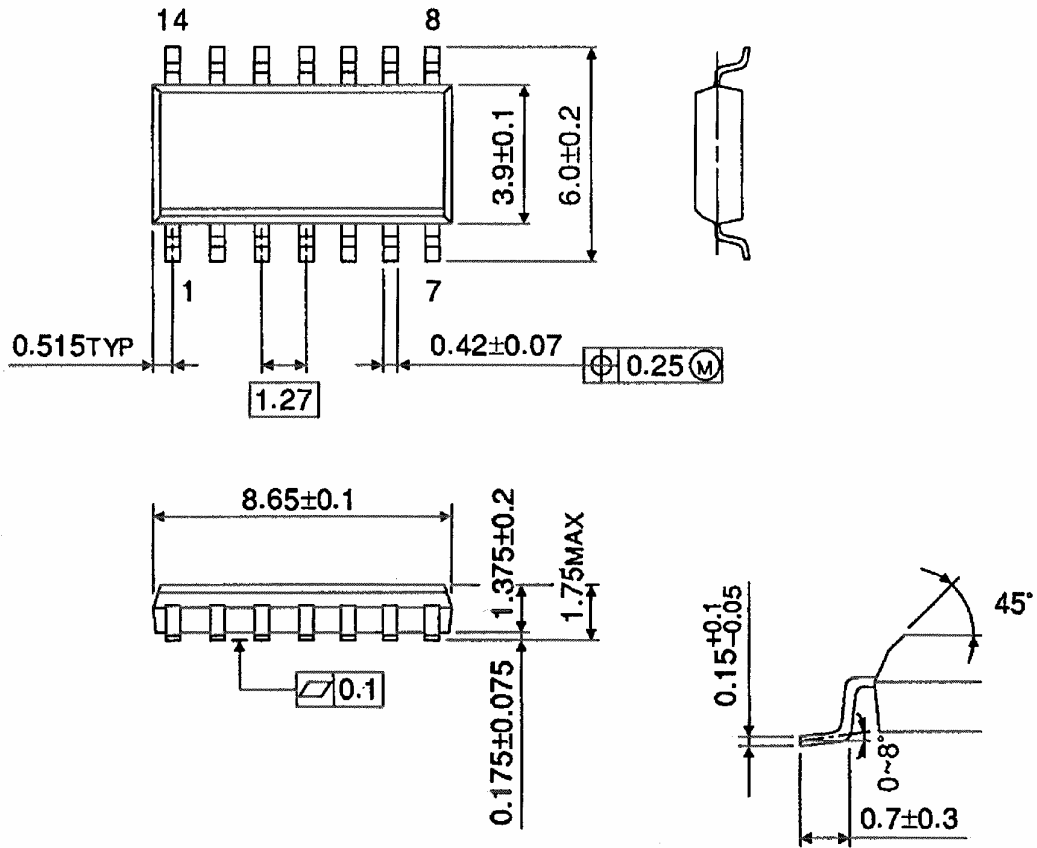


Weight: 0.18 g (typ.)

Package Dimensions (Note)

SOL14-P-150-1.27

Unit : mm



Note: This package is not available in Japan.

Weight: 0.12 g (typ.)

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20070701-EN GENERAL

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