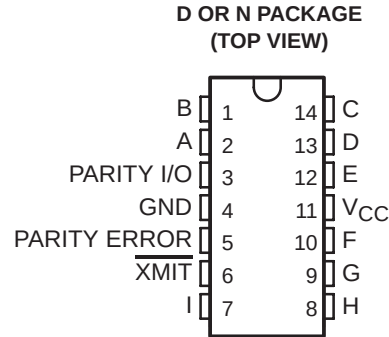


# 74ACT11286

## 9-BIT PARITY GENERATOR/CHECKER WITH BUS DRIVER PARITY I/O PORTS

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- Inputs Are TTL-Voltage Compatible
- Generates Either Odd or Even Parity for Nine Data Lines
- Cascadable for n-Bits Parity
- Center-Pin  $V_{CC}$  and GND Configurations Minimize High-Speed Switching Noise
- **EPIC™** (Enhanced-Performance Implanted CMOS) 1- $\mu$ m Process
- 500-mA Typical Latch-Up Immunity at 125°C
- Package Options Include Plastic Small-Outline (D) Packages and Standard Plastic 300-mil DIPs (N)



### description

The 74ACT11286 universal 9-bit parity generator/checker features a local output for parity checking and a bus-driving parity I/O port for parity generation/checking. The word-length capability is easily expanded by cascading.

The  $\overline{XMIT}$  control input is implemented specifically to accommodate cascading. When the  $\overline{XMIT}$  is low, the parity tree is disabled and the PARITY ERROR output remains at a high logic level, regardless of the input levels. When  $\overline{XMIT}$  is high, the parity tree is enabled. PARITY ERROR indicates a parity error when either an even number of inputs (A through I) are high and PARITY I/O is forced to a low logic level, or when an odd number of inputs are high and PARITY I/O is forced to a high logic level.

The I/O control circuitry is designed so that the I/O port remains in the high-impedance state during power up or power down, to prevent bus glitches.

The 74ACT11286 is characterized for operation from -40°C to 85°C.

FUNCTION TABLE

| NUMBER OF INPUTS<br>(A-I) THAT<br>ARE HIGH | $\overline{XMIT}$<br>INPUT | PARITY<br>I/O | PARITY<br>ERROR<br>OUTPUT |
|--------------------------------------------|----------------------------|---------------|---------------------------|
| 0, 2, 4, 6, 8                              | L                          | H             | H                         |
| 1, 3, 5, 7, 9                              | L                          | L             | H                         |
| 0, 2, 4, 6, 8                              | h                          | h             | H                         |
|                                            | h                          | L             | L                         |
| 1, 3, 5, 7, 9                              | h                          | h             | L                         |
|                                            | h                          | L             | H                         |

h = high input level, H = high output level, L = low input level,  
L = low output level



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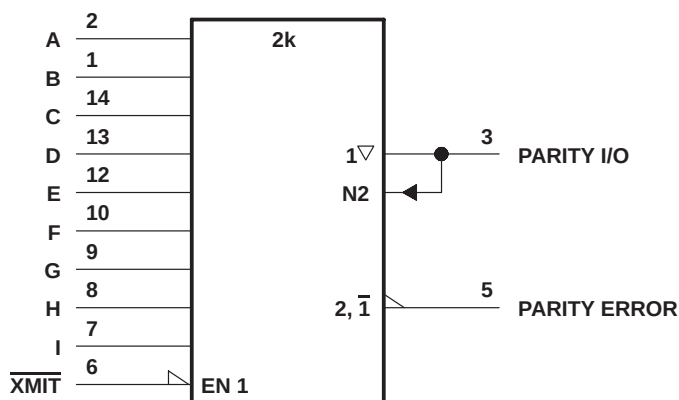
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# 74ACT11286

## 9-BIT PARITY GENERATOR/CHECKER WITH BUS DRIVER PARITY I/O PORTS

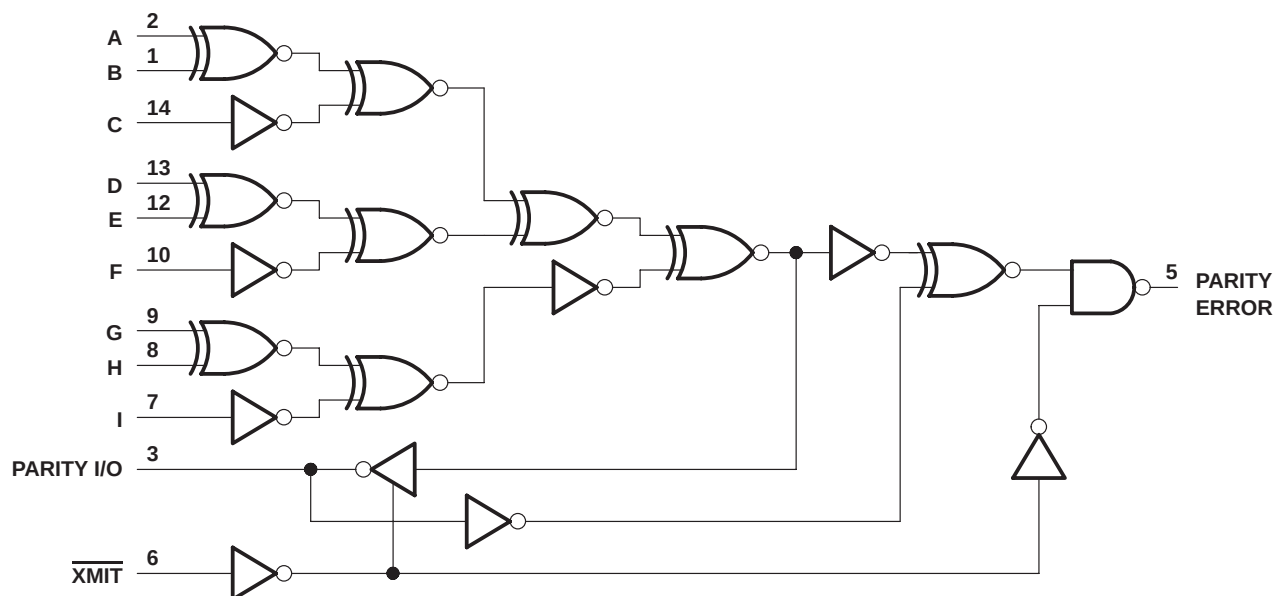
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### logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

### logic diagram (positive logic)



**absolute maximum ratings over operating free-air temperature range (unless otherwise noted)<sup>†</sup>**

|                                                                                              |                            |
|----------------------------------------------------------------------------------------------|----------------------------|
| Supply voltage range, $V_{CC}$                                                               | –0.5 V to 7 V              |
| Input voltage range, $V_I$ (see Note 1)                                                      | –0.5 V to $V_{CC} + 0.5$ V |
| Output voltage range, $V_O$ (see Note 1)                                                     | –0.5 V to $V_{CC} + 0.5$ V |
| Input clamp current, $I_{IK}$ ( $V_I < 0$ or $V_I > V_{CC}$ )                                | ±20 mA                     |
| Output clamp current, $I_{OK}$ ( $V_O < 0$ or $V_O > V_{CC}$ )                               | ±50 mA                     |
| Continuous output current, $I_O$ ( $V_O = 0$ to $V_{CC}$ )                                   | ±50 mA                     |
| Continuous current through $V_{CC}$ or GND                                                   | ±100 mA                    |
| Maximum power dissipation at $T_A = 55^\circ\text{C}$ (in still air) (see Note 2): D package | 1.25 W                     |
| N package                                                                                    | 1.1 W                      |
| Storage temperature range, $T_{stg}$                                                         | –65°C to 150°C             |

<sup>†</sup> Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

- NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.  
2. The maximum package power dissipation is calculated using a junction temperature of 150°C and a board trace length of 750 mils, except for the N package, which has a trace length of zero.

**recommended operating conditions**

|                                                        | MIN | MAX      | UNIT |
|--------------------------------------------------------|-----|----------|------|
| $V_{CC}$ Supply voltage                                | 4.5 | 5.5      | V    |
| $V_{IH}$ High-level input voltage                      | 2   |          | V    |
| $V_{IL}$ Low-level input voltage                       |     | 0.8      | V    |
| $V_I$ Input voltage                                    | 0   | $V_{CC}$ | V    |
| $V_O$ Output voltage                                   | 0   | $V_{CC}$ | V    |
| $I_{OH}$ High-level output current                     |     | –24      | mA   |
| $I_{OL}$ Low-level output current                      |     | 24       | mA   |
| $\Delta t/\Delta v$ Input transition rise or fall rate | 0   | 10       | ns/V |
| $T_A$ Operating free-air temperature                   | –40 | 85       | °C   |



**9-BIT PARITY GENERATOR/CHECKER  
WITH BUS DRIVER PARITY I/O PORTS**

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electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

| PARAMETER          |                   | TEST CONDITIONS                                               | V <sub>CC</sub> | T <sub>A</sub> = 25°C |     |     | MIN  | MAX | UNIT |
|--------------------|-------------------|---------------------------------------------------------------|-----------------|-----------------------|-----|-----|------|-----|------|
|                    |                   |                                                               |                 | MIN                   | TYP | MAX |      |     |      |
| V <sub>OH</sub>    |                   | I <sub>OH</sub> = -50 µA                                      | 4.5 V           | 4.4                   |     |     | 4.4  |     | V    |
|                    |                   |                                                               | 5.5 V           | 5.4                   |     |     | 5.4  |     |      |
|                    |                   | I <sub>OH</sub> = -24 mA                                      | 4.5 V           | 3.94                  |     |     | 3.8  |     |      |
|                    |                   |                                                               | 5.5 V           | 4.94                  |     |     | 4.8  |     |      |
|                    |                   | I <sub>OH</sub> = -75 mA†                                     | 5.5 V           |                       |     |     | 3.85 |     |      |
| V <sub>OL</sub>    |                   | I <sub>L</sub> = 50 µA                                        | 4.5 V           | 0.1                   |     |     | 0.1  |     | V    |
|                    |                   |                                                               | 5.5 V           | 0.1                   |     |     | 0.1  |     |      |
|                    |                   | I <sub>OL</sub> = 24 mA                                       | 4.5 V           | 0.36                  |     |     | 0.44 |     |      |
|                    |                   |                                                               | 5.5 V           | 0.36                  |     |     | 0.44 |     |      |
|                    |                   | I <sub>OL</sub> = 75 mA†                                      | 5.5 V           |                       |     |     | 1.65 |     |      |
| I <sub>OZ</sub>    | PARITY I/O        | V <sub>O</sub> = V <sub>CC</sub> or GND                       | 5.5 V           | ±0.5                  |     |     | ±5   |     | µA   |
| I <sub>I</sub>     | Except PARITY I/O | V <sub>I</sub> = V <sub>CC</sub> or GND                       | 5.5 V           | ±0.1                  |     |     | ±1   |     | µA   |
| I <sub>CC</sub>    |                   | V <sub>I</sub> = V <sub>CC</sub> or GND, I <sub>O</sub> = 0   | 5.5 V           | 8                     |     |     | 80   |     | µA   |
| ΔI <sub>CC</sub> ‡ |                   | One input at 3.4 V,<br>Other inputs at GND or V <sub>CC</sub> | 5.5 V           | 0.9                   |     |     | 1    |     | mA   |
| C <sub>i</sub>     |                   | V <sub>I</sub> = V <sub>CC</sub> or GND                       | 5 V             | 3.5                   |     |     |      |     | pF   |
| C <sub>O</sub>     | PARITY I/O        | V <sub>O</sub> = V <sub>CC</sub> or GND                       | 5 V             | 8                     |     |     |      |     | pF   |

† Not more than one output should be tested at a time, and the duration of the test should not exceed 10 ms.

‡ This is the increase in supply current for each input that is at one of the specified TTL voltage levels rather than 0 V to V<sub>CC</sub>.

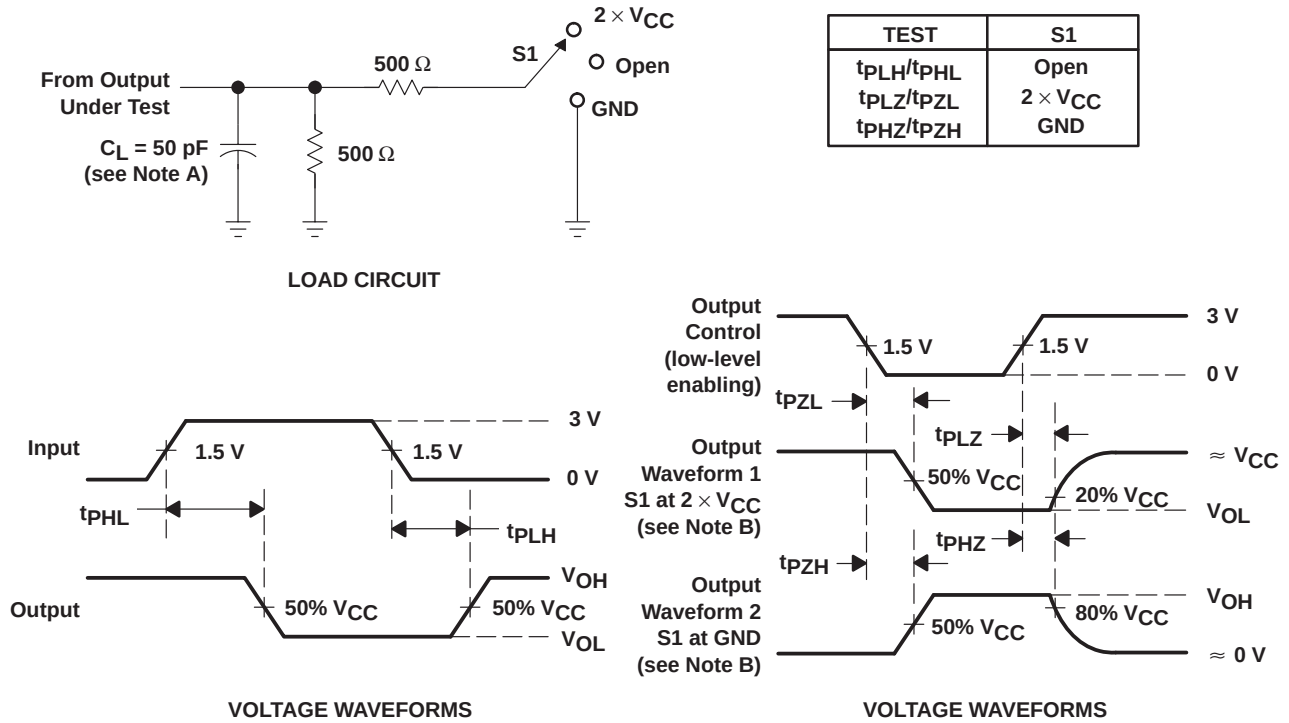
switching characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Figure 1)

| PARAMETER        | FROM<br>(INPUT)          | TO<br>(OUTPUT) | T <sub>A</sub> = 25°C |     |      | MIN | MAX  | UNIT |
|------------------|--------------------------|----------------|-----------------------|-----|------|-----|------|------|
|                  |                          |                | MIN                   | TYP | MAX  |     |      |      |
| t <sub>PLH</sub> | Any A-I                  | PARITY I/O     | 2.7                   | 6.1 | 9    | 2.7 | 10.4 | ns   |
| t <sub>PHL</sub> |                          |                | 3.6                   | 7.3 | 10.8 | 3.6 | 12   |      |
| t <sub>PLH</sub> | Any A-I                  | PARITY ERROR   | 3                     | 6.9 | 9.7  | 3   | 11.3 | ns   |
| t <sub>PHL</sub> |                          |                | 3.9                   | 7.7 | 11.4 | 3.9 | 12.9 |      |
| t <sub>PLH</sub> | PARITY I/O               | PARITY ERROR   | 2.2                   | 4.6 | 6.8  | 2.2 | 7.7  | ns   |
| t <sub>PHL</sub> |                          |                | 3.1                   | 5.6 | 8.3  | 3.1 | 9.1  |      |
| t <sub>PZH</sub> | $\overline{\text{XMIT}}$ | PARITY I/O     | 1.8                   | 4.2 | 6.3  | 1.8 | 7.3  | ns   |
| t <sub>PZL</sub> |                          |                | 3                     | 6.3 | 9.4  | 3   | 11.4 |      |
| t <sub>PHZ</sub> | $\overline{\text{XMIT}}$ | PARITY I/O     | 4.7                   | 6.5 | 7.9  | 4.7 | 8.5  | ns   |
| t <sub>PLZ</sub> |                          |                | 4.1                   | 6   | 7.3  | 4.1 | 7.8  |      |

operating characteristics, V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C

| PARAMETER       |                               | TEST CONDITIONS  |                                   | TYP | UNIT |
|-----------------|-------------------------------|------------------|-----------------------------------|-----|------|
| C <sub>pd</sub> | Power dissipation capacitance | Outputs enabled  | C <sub>L</sub> = 50 pF, f = 1 MHz | 56  | pF   |
|                 |                               | Outputs disabled |                                   | 50  |      |

## PARAMETER MEASUREMENT INFORMATION



- NOTES: A.  $C_L$  includes probe and jig capacitance.  
 B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.  
 C. All input pulses are supplied by generators having the following characteristics:  $PRR \leq 1$  MHz,  $Z_O = 50 \Omega$ ,  $t_r = 3$  ns,  $t_f = 3$  ns.  
 D. The outputs are measured one at a time with one transition per measurement.

**Figure 1. Load Circuit and Voltage Waveforms**

## PACKAGING INFORMATION

| Orderable Device | Status<br>(1) | Package Type | Package<br>Drawing | Pins | Package<br>Qty | Eco Plan<br>(2)            | Lead/Ball Finish<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples                 |
|------------------|---------------|--------------|--------------------|------|----------------|----------------------------|-------------------------|----------------------|--------------|-------------------------|-------------------------|
| 74ACT11286D      | ACTIVE        | SOIC         | D                  | 14   | 50             | Green (RoHS<br>& no Sb/Br) | CU NIPDAU               | Level-1-260C-UNLIM   | -40 to 85    | ACT11286                | <a href="#">Samples</a> |

(1) The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSOLETE:** TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

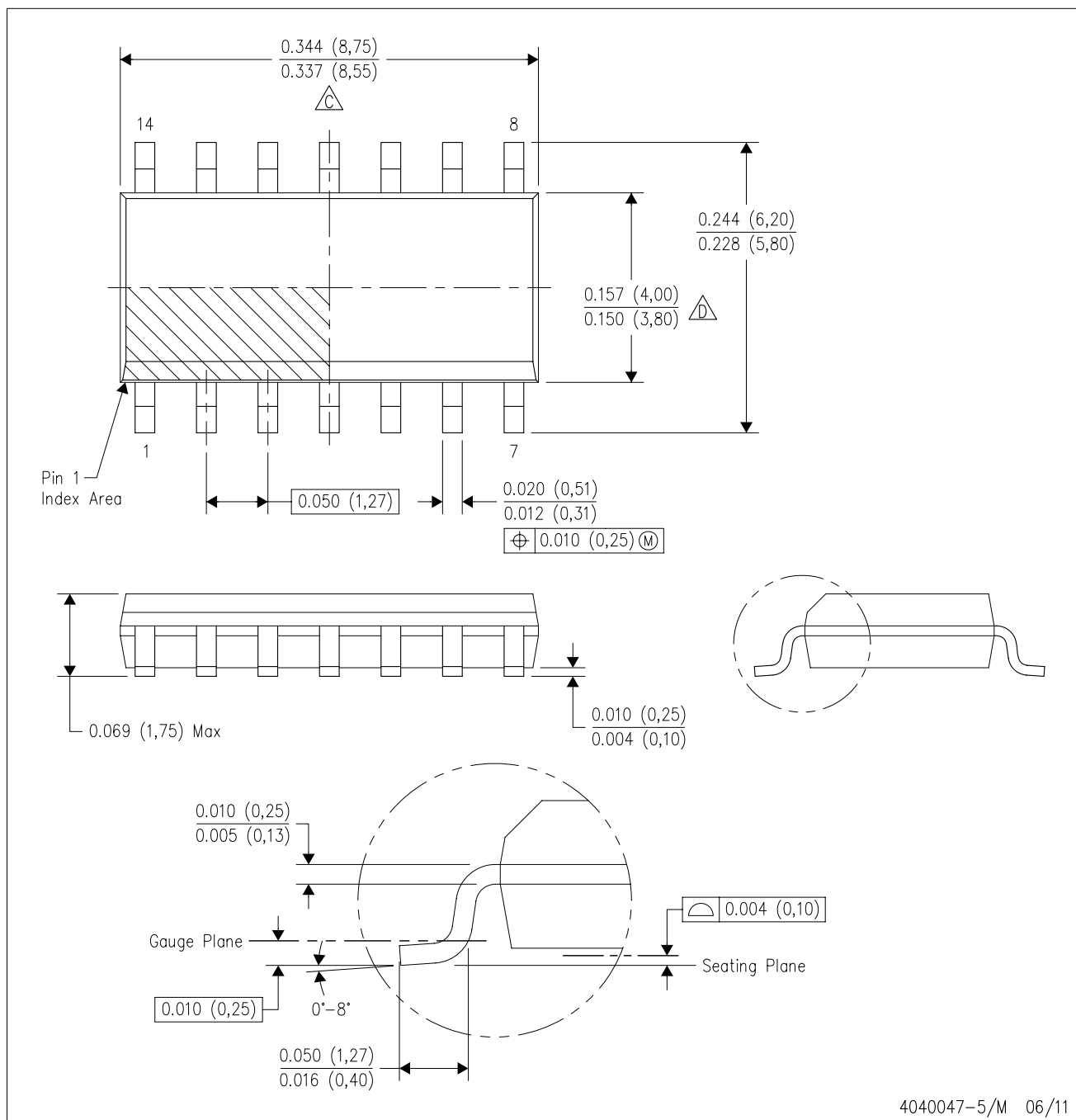
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D (R-PDSO-G14)

PLASTIC SMALL OUTLINE



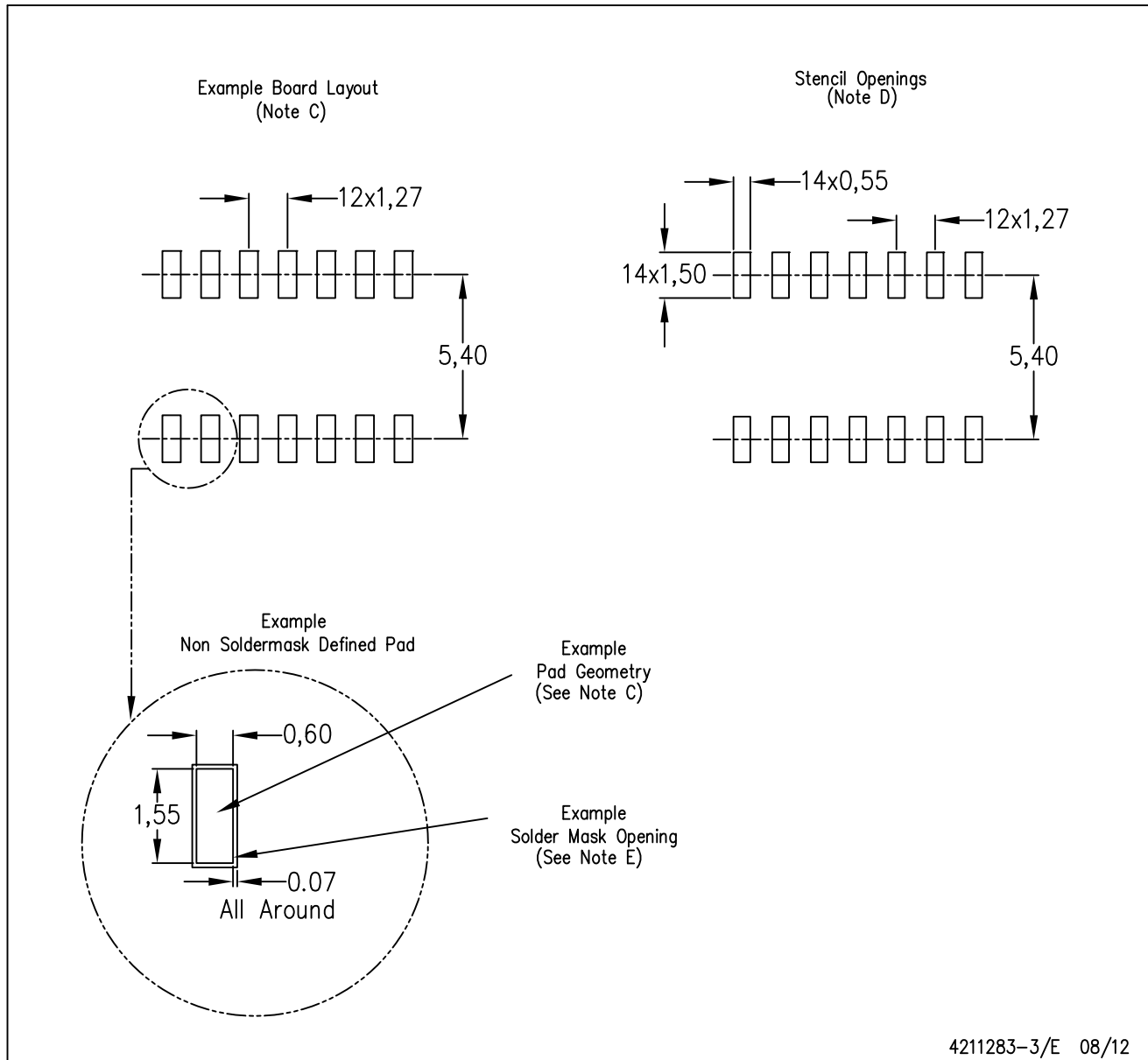
## NOTES:

- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
- D. Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
- E. Reference JEDEC MS-012 variation AB.



D (R-PDSO-G14)

PLASTIC SMALL OUTLINE



- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Publication IPC-7351 is recommended for alternate designs.
  - D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
  - E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

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