



SCCS059B - August 1994 - Revised September 2001

**CY74FCT16543T**  
**CY74FCT162543T**  
**CY74FCT162H543T**

## 16-Bit Latched Transceivers

### Features

- $I_{off}$  supports partial-power-down mode operation
- Edge-rate control circuitry for significantly improved noise characteristics
- Typical output skew < 250 ps
- ESD > 2000V
- TSSOP (19.6-mil pitch) and SSOP (25-mil pitch) packages
- Industrial temperature range of  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- $V_{CC} = 5\text{V} \pm 10\%$

#### *CY74FCT16543T Features:*

- 64 mA sink current, 32 mA source current
- Typical  $V_{OLP}$  (ground bounce) < 1.0V at  $V_{CC} = 5\text{V}$ ,  $T_A = 25^{\circ}\text{C}$

#### *CY74FCT162543T Features:*

- Balanced 24 mA output drivers
- Reduced system switching noise
- Typical  $V_{OLP}$  (ground bounce) < 0.6V at  $V_{CC} = 5\text{V}$ ,  $T_A = 25^{\circ}\text{C}$

#### *CY74FCT162H543T Features:*

- Bus hold retains last active state
- Eliminates the need for external pull-up or pull-down resistors

### Functional Description

The CY74FCT16543T and CY74FCT162543T are 16-bit, high-speed, low power latched transceivers that are organized as two independent 8-bit D-type latched transceivers containing two sets of eight D-type latches with separate Latch Enable (LEAB, LEAB) and Output Enable (OEAB, OEAB) controls for each set to permit independent control of inputting and outputting in either direction of data flow. For data flow from A to B, for example, the A-to-B input Enable (CEAB) must be LOW in order to enter data from A or to take data from B as indicated in the truth table. With CAEB LOW, a LOW signal on the A-to-B Latch Enable (LEAB) makes the A-to-B latches transparent; a subsequent LOW-to-HIGH transition of the LEAB signal puts the A latches in the storage mode and their outputs no longer change with the A inputs. With CEAB and OEAB both LOW, the three-state B output buffers are active and reflect the data present at the output of the A latches. Control of data from B to A is similar, but uses CEAB, LEAB, and OEAB inputs flow-through pinout and small shrink packaging and in simplifying board design.

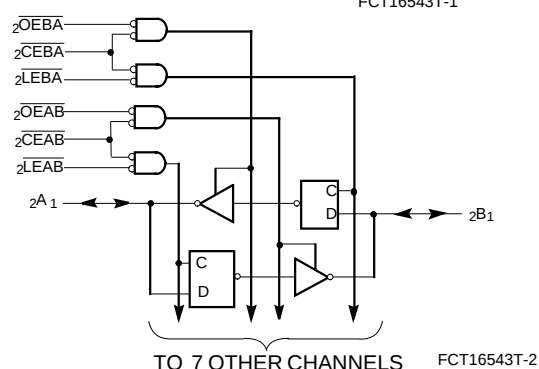
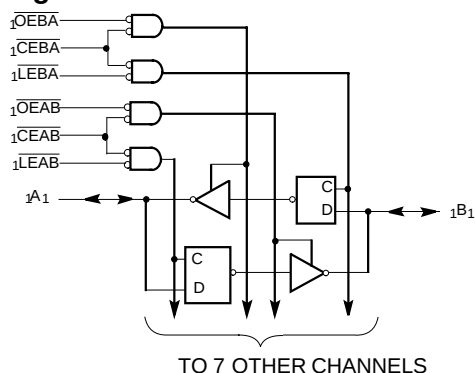
This device is fully specified for partial-power-down applications using  $I_{off}$ . The  $I_{off}$  circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

The CY74FCT16543T is ideally suited for driving high-capacitance loads and low-impedance backplanes.

The CY74FCT162543T has 24-mA balanced output drivers with current limiting resistors in the outputs. This reduces the need for external terminating resistors and provides for minimal undershoot and reduced ground bounce. The CY74FCT162543T is ideal for driving transmission lines.

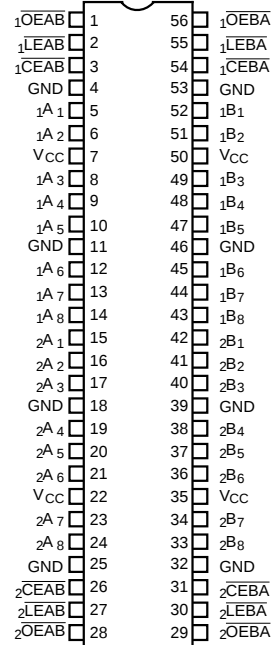
The CY74FCT162H543T is a 24-mA balanced output part that has "bus hold" on the data inputs. The device retains the input's last state whenever the input goes to high impedance. This eliminates the need for pull-up/down resistors and prevents floating inputs.

### Logic Block Diagrams



### Pin Configuration

#### Top View SSOP/TSSOP



### Pin Description

| Name | Description                                                     |
|------|-----------------------------------------------------------------|
| OEAB | A-to-B Output Enable Input (Active LOW)                         |
| OEBA | B-to-A Output Enable Input (Active LOW)                         |
| CEAB | A-to-B Enable Input (Active LOW)                                |
| CEBA | B-to-A Enable Input (Active LOW)                                |
| LEAB | A-to-B Latch Enable Input (Active LOW)                          |
| LEBA | B-to-A Latch Enable Input (Active LOW)                          |
| A    | A-to-B Data Inputs or B-to-A Three-State Outputs <sup>[9]</sup> |
| B    | B-to-A Data Inputs or A-to-B Three-State Outputs <sup>[9]</sup> |

### Function Table<sup>[1]</sup>

| Inputs |      |      | Latch Status | Output Buffers                   |
|--------|------|------|--------------|----------------------------------|
| CEAB   | LEAB | OEAB | A to B       | B                                |
| H      | X    | X    | Storing      | High Z                           |
| X      | H    | X    | Storing      | X                                |
| X      | X    | H    | X            | High Z                           |
| L      | L    | L    | Transparent  | Current A Inputs                 |
| L      | H    | L    | Storing      | Previous A Inputs <sup>[2]</sup> |

### Maximum Ratings<sup>[3, 4]</sup>

(Above which the useful life may be impaired. For user guidelines, not tested.)

Storage Temperature .....Com'l -55°C to +125°C

Ambient Temperature with

Power Applied .....Com'l -55°C to +125°C

DC Input Voltage .....-0.5V to +7.0V

DC Output Voltage .....-0.5V to +7.0V

DC Output Current

(Maximum Sink Current/Pin) .....-60 to +120 mA

Power Dissipation .....1.0W

Static Discharge Voltage.....>2001V  
(per MIL-STD-883, Method 3015)

### Operating Range

| Range      | Ambient Temperature | V <sub>CC</sub> |
|------------|---------------------|-----------------|
| Industrial | -40°C to +85°C      | 5V ± 10%        |

**Electrical Characteristics** Over the Operating Range

| Parameter        | Description                                             | Test Conditions                                            | Min. | Typ. <sup>[5]</sup> | Max. | Unit |
|------------------|---------------------------------------------------------|------------------------------------------------------------|------|---------------------|------|------|
| V <sub>IH</sub>  | Input HIGH Voltage                                      |                                                            | 2.0  |                     |      | V    |
| V <sub>IL</sub>  | Input LOW Voltage                                       |                                                            |      |                     | 0.8  | V    |
| V <sub>H</sub>   | Input Hysteresis <sup>[6]</sup>                         |                                                            |      | 100                 |      | mV   |
| V <sub>IK</sub>  | Input Clamp Diode Voltage                               | V <sub>CC</sub> =Min., I <sub>IN</sub> =−18 mA             |      | −0.7                | −1.2 | V    |
| I <sub>IH</sub>  | Input HIGH Current                                      | V <sub>CC</sub> =Max., V <sub>I</sub> =V <sub>CC</sub>     |      |                     | ±1   | μA   |
| I <sub>IL</sub>  | Input LOW Current                                       | V <sub>CC</sub> =Max., V <sub>I</sub> =GND                 |      |                     | ±1   | μA   |
| I <sub>OZH</sub> | High Impedance Output Current (Three-State Output pins) | V <sub>CC</sub> =Max., V <sub>OUT</sub> =2.7V              |      |                     | ±1   | μA   |
| I <sub>OZL</sub> | High Impedance Output Current (Three-State Output pins) | V <sub>CC</sub> =Max., V <sub>OUT</sub> =0.5V              |      |                     | ±1   | μA   |
| I <sub>OS</sub>  | Short Circuit Current <sup>[7]</sup>                    | V <sub>CC</sub> =Max., V <sub>OUT</sub> =GND               | −80  | −140                | −200 | mA   |
| I <sub>O</sub>   | Output Drive Current <sup>[7]</sup>                     | V <sub>CC</sub> =Max., V <sub>OUT</sub> =2.5V              | −50  |                     | −180 | mA   |
| I <sub>OFF</sub> | Power-Off Disable                                       | V <sub>CC</sub> =0V, V <sub>OUT</sub> ≤4.5V <sup>[8]</sup> |      |                     | ±1   | μA   |

**Notes:**

1. A-to-B data flow shown; B-to-A flow control is the same, except using  $\overline{\text{CEBA}}$ ,  $\overline{\text{LEBA}}$ , and  $\overline{\text{OEBA}}$ .
2. Data prior to LEAB LOW-to-HIGH Transition  
H = HIGH Voltage Level. L = LOW Voltage Level.  
X = Don't Care. Z = High Impedance.
3. Operation beyond the limits set forth may impair the useful life of the device. Unless otherwise noted, these limits are over the operating free-air temperature range.
4. Unused inputs must always be connected to an appropriate logic voltage level, preferably either V<sub>CC</sub> or ground.
5. Typical values are at V<sub>CC</sub>= 5.0V, T<sub>A</sub>= +25°C ambient.
6. This parameter is specified but not tested.
7. Not more than one output should be shorted at a time. Duration of short should not exceed one second. The use of high-speed test apparatus and/or sample and hold techniques are preferable in order to minimize internal chip heating and more accurately reflect operational values. Otherwise prolonged shorting of a high output may raise the chip temperature well above normal and thereby cause invalid readings in other parametric tests. In any sequence of parameter tests, I<sub>OS</sub> tests should be performed last.
8. Tested at +25°C.
9. On the 74FCT162H543T, these pins have bus hold.

**Output Drive Characteristics for CY74FCT16543T**

| Parameter       | Description         | Test Conditions                                | Min. | Typ. <sup>[5]</sup> | Max. | Unit |
|-----------------|---------------------|------------------------------------------------|------|---------------------|------|------|
| V <sub>OH</sub> | Output HIGH Voltage | V <sub>CC</sub> =Min., I <sub>OH</sub> =-3 mA  | 2.5  | 3.5                 |      | V    |
|                 |                     | V <sub>CC</sub> =Min., I <sub>OH</sub> =-15 mA | 2.4  | 3.5                 |      |      |
|                 |                     | V <sub>CC</sub> =Min., I <sub>OH</sub> =-32 mA | 2.0  | 3.0                 |      |      |
| V <sub>OL</sub> | Output LOW Voltage  | V <sub>CC</sub> =Min., I <sub>OL</sub> =64 mA  |      | 0.2                 | 0.55 | V    |

**Output Drive Characteristics for CY74FCT162543T, CY74FCT162H543T**

| Parameter        | Description                        | Test Conditions                                                                                   | Min. | Typ. <sup>[5]</sup> | Max. | Unit |
|------------------|------------------------------------|---------------------------------------------------------------------------------------------------|------|---------------------|------|------|
| I <sub>ODL</sub> | Output LOW Current <sup>[7]</sup>  | V <sub>CC</sub> =5V, V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub> , V <sub>OUT</sub> =1.5V | 60   | 115                 | 150  | mA   |
| I <sub>ODH</sub> | Output HIGH Current <sup>[7]</sup> | V <sub>CC</sub> =5V, V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub> , V <sub>OUT</sub> =1.5V | -60  | -115                | -150 | mA   |
| V <sub>OH</sub>  | Output HIGH Voltage                | V <sub>CC</sub> =Min., I <sub>OH</sub> =-24 mA                                                    | 2.4  | 3.3                 |      | V    |
| V <sub>OL</sub>  | Output LOW Voltage                 | V <sub>CC</sub> =Min., I <sub>OL</sub> =24 mA                                                     |      | 0.3                 | 0.55 | V    |

**Capacitance<sup>[6]</sup>** (T<sub>A</sub> = +25°C, f = 1.0 MHz)

| Parameter        | Description        | Test Conditions       | Typ. <sup>[5]</sup> | Max. | Unit |
|------------------|--------------------|-----------------------|---------------------|------|------|
| C <sub>IN</sub>  | Input Capacitance  | V <sub>IN</sub> = 0V  | 4.5                 | 6.0  | pF   |
| C <sub>OUT</sub> | Output Capacitance | V <sub>OUT</sub> = 0V | 5.5                 | 8.0  | pF   |

**Power Supply Characteristics**

| Parameter        | Description                                      | Test Conditions                                                                                                                                                         | Typ. <sup>[5]</sup> | Max.                 | Unit   |
|------------------|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------------------|--------|
| I <sub>CC</sub>  | Quiescent Power Supply Current                   | V <sub>CC</sub> =Max.<br>V <sub>IN</sub> ≤0.2V,<br>V <sub>IN</sub> ≥V <sub>CC</sub> -0.2V                                                                               | 5                   | 500                  | μA     |
| ΔI <sub>CC</sub> | Quiescent Power Supply Current (TTL inputs HIGH) | V <sub>CC</sub> =Max.<br>V <sub>IN</sub> =3.4V <sup>[10]</sup>                                                                                                          | 0.5                 | 1.5                  | mA     |
| I <sub>CCD</sub> | Dynamic Power Supply Current <sup>[11]</sup>     | V <sub>CC</sub> =Max., One Input Toggling, 50% Duty Cycle, Outputs Open, OE=GND<br>V <sub>IN</sub> =V <sub>CC</sub> or V <sub>IN</sub> =GND                             | 60                  | 100                  | μA/MHz |
| I <sub>C</sub>   | Total Power Supply Current <sup>[12]</sup>       | V <sub>CC</sub> =Max., f <sub>1</sub> =10 MHz, 50% Duty Cycle, Outputs Open, One Bit Toggling, OE=GND<br>V <sub>IN</sub> =V <sub>CC</sub> or V <sub>IN</sub> =GND       | 0.6                 | 1.5                  | mA     |
|                  |                                                  | V <sub>IN</sub> =3.4V or V <sub>IN</sub> =GND                                                                                                                           | 0.9                 | 2.3                  | mA     |
|                  |                                                  | V <sub>CC</sub> =Max., f <sub>1</sub> =2.5 MHz, 50% Duty Cycle, Outputs Open, Sixteen Bits Toggling, OE=GND<br>V <sub>IN</sub> =V <sub>CC</sub> or V <sub>IN</sub> =GND | 2.4                 | 4.5 <sup>[13]</sup>  | mA     |
|                  |                                                  | V <sub>IN</sub> =3.4V or V <sub>IN</sub> =GND                                                                                                                           | 6.4                 | 16.5 <sup>[13]</sup> | mA     |

**Notes:**

10. Per TTL driven input (V<sub>IN</sub>=3.4V); all other inputs at V<sub>CC</sub> or GND.
11. This parameter is not directly testable, but is derived for use in Total Power Supply calculations.
12.
  - I<sub>C</sub> = I<sub>QUIESCENT</sub> + I<sub>INPUTS</sub> + I<sub>DYNAMIC</sub>
  - I<sub>C</sub> = I<sub>CC</sub> + ΔI<sub>CC</sub>D<sub>H</sub>N<sub>T</sub> + I<sub>CCD</sub>(f<sub>0</sub>/2 + f<sub>1</sub>N<sub>1</sub>)
  - I<sub>CC</sub> = Quiescent Current with CMOS input levels
  - ΔI<sub>CC</sub> = Power Supply Current for a TTL HIGH input (V<sub>IN</sub>=3.4V)
  - D<sub>H</sub> = Duty Cycle for TTL inputs HIGH
  - N<sub>T</sub> = Number of TTL inputs at D<sub>H</sub>
  - I<sub>CCD</sub> = Dynamic Current caused by an input transition pair (HLH or LHL)
  - f<sub>0</sub> = Clock frequency for registered devices, otherwise zero
  - f<sub>1</sub> = Input signal frequency
  - N<sub>1</sub> = Number of inputs changing at f<sub>1</sub>
- All currents are in milliamps and all frequencies are in megahertz.
13. Values for these conditions are examples of the I<sub>CC</sub> formula. These limits are specified but not tested.

**Switching Characteristics** Over the Operating Range<sup>[14]</sup>

| Parameter                            | Description                                                             | CY74FCT16543T<br>CY74FCT162543T |      | CY74FCT16543AT<br>CY74FCT162543AT |      | Unit | Fig. No. <sup>[15]</sup> |
|--------------------------------------|-------------------------------------------------------------------------|---------------------------------|------|-----------------------------------|------|------|--------------------------|
|                                      |                                                                         | Min.                            | Max. | Min.                              | Max. |      |                          |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation Delay<br>Transparent Mode<br>A to B or B to A               | 1.5                             | 8.5  | 1.5                               | 6.5  | ns   | 1, 3                     |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation Delay<br>LEBA to A, LEAB to B                               | 1.5                             | 12.5 | 1.5                               | 8.0  | ns   | 1, 5                     |
| t <sub>PZH</sub><br>t <sub>PZL</sub> | Output Enable Time<br>OEBA or OEAB to A or B<br>CEBA or CEAB to A or B  | 1.5                             | 12.0 | 1.5                               | 9.0  | ns   | 1, 7, 8                  |
| t <sub>PHZ</sub><br>t <sub>PLZ</sub> | Output Disable Time<br>OEBA or OEAB to A or B<br>CEBA or CEAB to A or B | 1.5                             | 9.0  | 1.5                               | 7.5  | ns   | 1, 7, 8                  |
| t <sub>SU</sub>                      | Set-up Time HIGH or LOW<br>A or B to LEAB or LEBA                       | 2.0                             | —    | 2.0                               | —    | ns   | 4                        |
| t <sub>H</sub>                       | Hold Time HIGH or LOW<br>A or B to LEAB or LEBA                         | 2.0                             | —    | 2.0                               | —    | ns   | 4                        |
| t <sub>W</sub>                       | LEBA or LEAB Pulse Width LOW                                            | 4.0                             | —    | 4.0                               | —    | ns   | 5                        |
| t <sub>SK(O)</sub>                   | Output Skew <sup>[16]</sup>                                             | —                               | 0.5  | —                                 | 0.5  | ns   | —                        |

| Parameter                            | Description                                                             | CY74FCT16543CT<br>CY74FCT162543CT<br>CY74FCT162H543CT |      | Unit | Fig. No. <sup>[15]</sup> |
|--------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------|------|------|--------------------------|
|                                      |                                                                         | Min.                                                  | Max. |      |                          |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation Delay<br>Transparent Mode<br>A to B or B to A               | 1.5                                                   | 5.1  | ns   | 1, 3                     |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation Delay<br>LEBA to A, LEAB to B                               | 1.5                                                   | 5.6  | ns   | 1, 5                     |
| t <sub>PZH</sub><br>t <sub>PZL</sub> | Output Enable Time<br>OEBA or OEAB to A or B<br>CEBA or CEAB to A or B  | 1.5                                                   | 7.8  | ns   | 1, 7, 8                  |
| t <sub>PHZ</sub><br>t <sub>PLZ</sub> | Output Disable Time<br>OEBA or OEAB to A or B<br>CEBA or CEAB to A or B | 1.5                                                   | 6.5  | ns   | 1, 7, 8                  |
| t <sub>SU</sub>                      | Set-up Time HIGH or LOW<br>A or B to LEAB or LEBA                       | 2.0                                                   | —    | ns   | 4                        |
| t <sub>H</sub>                       | Hold Time HIGH or LOW<br>A or B to LEAB or LEBA                         | 2.0                                                   | —    | ns   | 4                        |
| t <sub>W</sub>                       | LEBA or LEAB Pulse Width LOW                                            | 4.0                                                   | —    | ns   | 5                        |
| t <sub>SK(O)</sub>                   | Output Skew <sup>[16]</sup>                                             | —                                                     | 0.5  | ns   | —                        |

**Notes:**

14. Minimum limits are specified but not tested on Propagation Delays.

15. See "Parameter Measurement Information" in the General Information section.

16. Skew between any two outputs of the same package switching in the same directional. This parameter is ensured by design.

**Ordering Information CY74FCT16543**

| Speed (ns) | Ordering Code          | Package Name | Package Type            | Operating Range |
|------------|------------------------|--------------|-------------------------|-----------------|
| 5.1        | CY74FCT16543CTPVC/PVCT | O56          | 56-Lead (300-Mil) SSOP  | Industrial      |
| 6.5        | CY74FCT16543ATPACT     | Z56          | 56-Lead (240-Mil) TSSOP | Industrial      |
| 8.5        | CY74FCT16543TPVC/PVCT  | O56          | 56-Lead (300-Mil) SSOP  | Industrial      |

**Ordering Information CY74FCT162543**

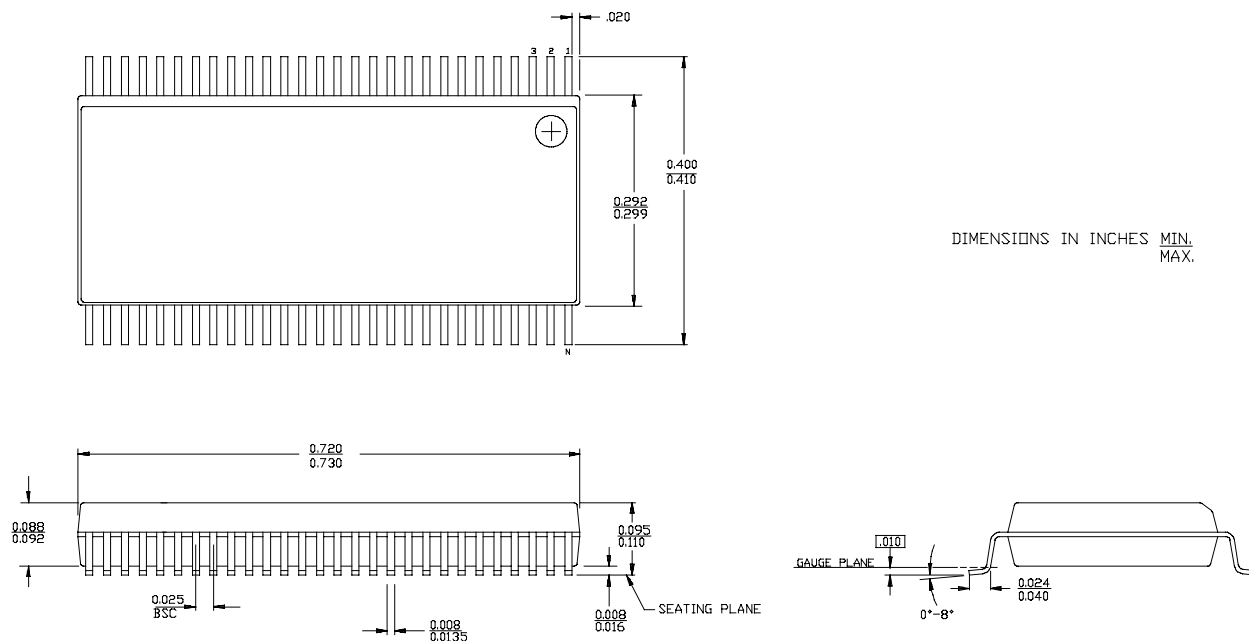
| Speed (ns) | Ordering Code          | Package Name | Package Type            | Operating Range |
|------------|------------------------|--------------|-------------------------|-----------------|
| 5.1        | 74FCT162543CTPACT      | Z56          | 56-Lead (240-Mil) TSSOP | Industrial      |
|            | CY74FCT162543CTPVC     | O56          | 56-Lead (300-Mil) SSOP  |                 |
|            | 74FCT162543CTPVCT      | O56          | 56-Lead (300-Mil) SSOP  |                 |
| 6.5        | 74FCT162543ATPACT      | Z56          | 56-Lead (240-Mil) TSSOP | Industrial      |
| 8.5        | CY74FCT162543TPVC/PVCT | O56          | 56-Lead (300-Mil) SSOP  | Industrial      |

**Ordering Information CY74FCT162H543T**

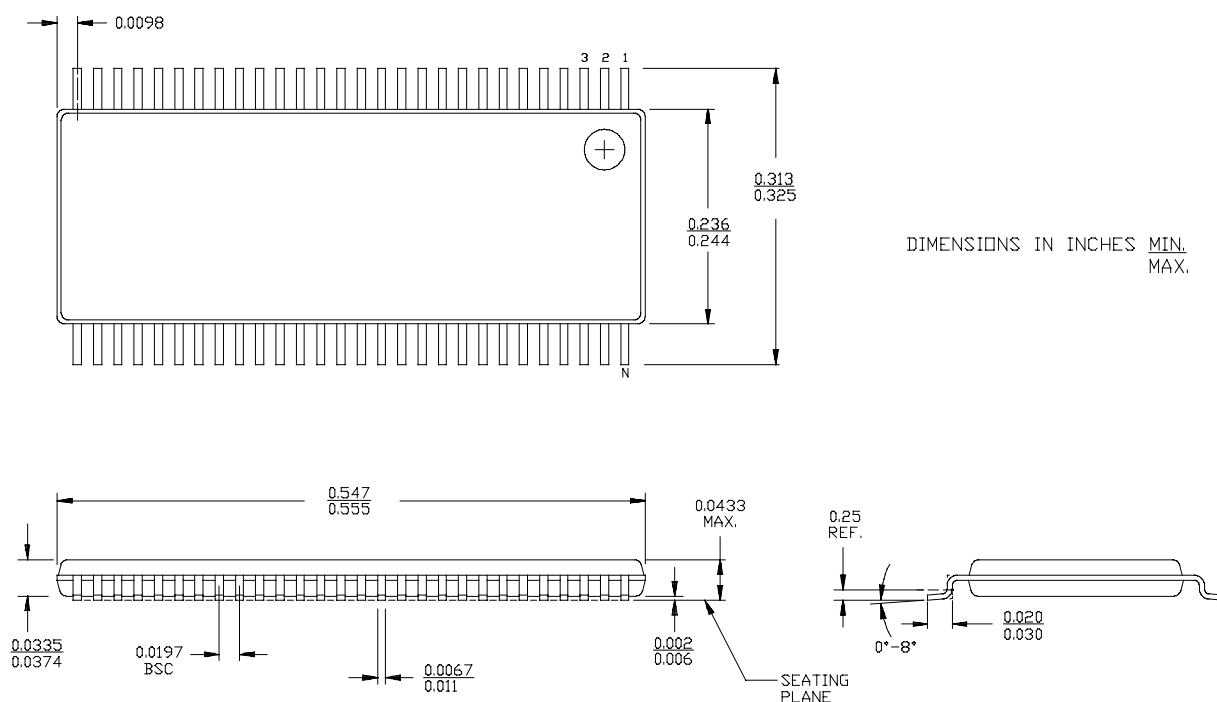
| Speed (ns) | Ordering Code      | Package Name | Package Type            | Operating Range |
|------------|--------------------|--------------|-------------------------|-----------------|
| 5.1        | 74FCT162H543CTPACT | Z56          | 56-Lead (240-Mil) TSSOP | Industrial      |

**Package Diagrams**

**56-Lead Shrunk Small Outline Package O56**



**56-Lead Thin Shrunk Small Outline Package Z56**



**PACKAGING INFORMATION**

| Orderable Device   | Status <sup>(1)</sup> | Package Type | Package Drawing | Pins | Package Qty | Eco Plan <sup>(2)</sup> | Lead/Ball Finish | MSL Peak Temp <sup>(3)</sup> |
|--------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| 74FCT162543ATPACT  | ACTIVE                | TSSOP        | DGG             | 56   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| 74FCT162543CTPACT  | ACTIVE                | TSSOP        | DGG             | 56   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| 74FCT162543CTPVC4  | ACTIVE                | SSOP         | DL              | 56   | 20          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| 74FCT162543CTPVCT  | ACTIVE                | SSOP         | DL              | 56   | 1000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| 74FCT162543ETPACT  | OBSOLETE              | TSSOP        | DGG             | 56   |             | TBD                     | Call TI          | Call TI                      |
| 74FCT162543ETPVCT  | OBSOLETE              | SSOP         | DL              | 56   |             | TBD                     | Call TI          | Call TI                      |
| 74FCT162543TPVC4   | ACTIVE                | SSOP         | DL              | 56   | 20          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| 74FCT162543TPVCT4  | ACTIVE                | SSOP         | DL              | 56   | 1000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| 74FCT162H543CTPACT | ACTIVE                | TSSOP        | DGG             | 56   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| 74FCT16543ATPACTE4 | ACTIVE                | TSSOP        | DGG             | 56   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| 74FCT16543ATPACTG4 | ACTIVE                | TSSOP        | DGG             | 56   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| 74FCT16543CTPVC4   | ACTIVE                | SSOP         | DL              | 56   | 20          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| 74FCT16543CTPVCT4  | ACTIVE                | SSOP         | DL              | 56   | 1000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| 74FCT16543TPVC4    | ACTIVE                | SSOP         | DL              | 56   | 20          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| 74FCT16543TPVCT4   | ACTIVE                | SSOP         | DL              | 56   | 1000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| CY74FCT162543CTPVC | ACTIVE                | SSOP         | DL              | 56   | 20          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| CY74FCT162543ETPAC | OBSOLETE              | TSSOP        | DGG             | 56   |             | TBD                     | Call TI          | Call TI                      |
| CY74FCT162543ETPVC | OBSOLETE              | SSOP         | DL              | 56   |             | TBD                     | Call TI          | Call TI                      |
| CY74FCT162543TPVC  | ACTIVE                | SSOP         | DL              | 56   | 20          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| CY74FCT162543TPVCT | ACTIVE                | SSOP         | DL              | 56   | 1000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| CY74FCT16543ATPACT | ACTIVE                | TSSOP        | DGG             | 56   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| CY74FCT16543CTPVC  | ACTIVE                | SSOP         | DL              | 56   | 20          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| CY74FCT16543CTPVCT | ACTIVE                | SSOP         | DL              | 56   | 1000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| CY74FCT16543ETPAC  | OBSOLETE              | TSSOP        | DGG             | 56   |             | TBD                     | Call TI          | Call TI                      |
| CY74FCT16543ETPACT | OBSOLETE              | TSSOP        | DGG             | 56   |             | TBD                     | Call TI          | Call TI                      |
| CY74FCT16543ETPVC  | OBSOLETE              | SSOP         | DL              | 56   |             | TBD                     | Call TI          | Call TI                      |
| CY74FCT16543ETPVCT | OBSOLETE              | SSOP         | DL              | 56   |             | TBD                     | Call TI          | Call TI                      |
| CY74FCT16543TPVC   | ACTIVE                | SSOP         | DL              | 56   | 20          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |

| Orderable Device   | Status <sup>(1)</sup> | Package Type | Package Drawing | Pins | Package Qty | Eco Plan <sup>(2)</sup> | Lead/Ball Finish | MSL Peak Temp <sup>(3)</sup> |
|--------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| CY74FCT16543TPVCT  | ACTIVE                | SSOP         | DL              | 56   | 1000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| FCT162543ATPACTE4  | ACTIVE                | TSSOP        | DGG             | 56   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| FCT162543ATPACTG4  | ACTIVE                | TSSOP        | DGG             | 56   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| FCT162543CTPACTE4  | ACTIVE                | TSSOP        | DGG             | 56   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| FCT162543CTPACTG4  | ACTIVE                | TSSOP        | DGG             | 56   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| FCT162543CTPVCTG4  | ACTIVE                | SSOP         | DL              | 56   | 1000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| FCT162H543CTPACTE4 | ACTIVE                | TSSOP        | DGG             | 56   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| FCT162H543CTPACTG4 | ACTIVE                | TSSOP        | DGG             | 56   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |

<sup>(1)</sup> 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.

<sup>(2)</sup> 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)

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

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**TAPE AND REEL INFORMATION**



\*All dimensions are nominal

| Device             | Package Type | Package Drawing | Pins | SPQ  | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|--------------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| 74FCT162543ATPACT  | TSSOP        | DGG             | 56   | 2000 | 330.0              | 24.4               | 8.6     | 15.6    | 1.8     | 12.0    | 24.0   | Q1            |
| 74FCT162543CTPACT  | TSSOP        | DGG             | 56   | 2000 | 330.0              | 24.4               | 8.6     | 15.6    | 1.8     | 12.0    | 24.0   | Q1            |
| 74FCT162543CTPVCT  | SSOP         | DL              | 56   | 1000 | 330.0              | 32.4               | 11.35   | 18.67   | 3.1     | 16.0    | 32.0   | Q1            |
| 74FCT162H543CTPACT | TSSOP        | DGG             | 56   | 2000 | 330.0              | 24.4               | 8.6     | 15.6    | 1.8     | 12.0    | 24.0   | Q1            |
| CY74FCT162543TPVCT | SSOP         | DL              | 56   | 1000 | 330.0              | 32.4               | 11.35   | 18.67   | 3.1     | 16.0    | 32.0   | Q1            |
| CY74FCT16543ATPACT | TSSOP        | DGG             | 56   | 2000 | 330.0              | 24.4               | 8.6     | 15.6    | 1.8     | 12.0    | 24.0   | Q1            |
| CY74FCT16543CTPVCT | SSOP         | DL              | 56   | 1000 | 330.0              | 32.4               | 11.35   | 18.67   | 3.1     | 16.0    | 32.0   | Q1            |
| CY74FCT16543TPVCT  | SSOP         | DL              | 56   | 1000 | 330.0              | 32.4               | 11.35   | 18.67   | 3.1     | 16.0    | 32.0   | Q1            |

**TAPE AND REEL BOX DIMENSIONS**



\*All dimensions are nominal

| Device             | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|--------------------|--------------|-----------------|------|------|-------------|------------|-------------|
| 74FCT162543ATPACT  | TSSOP        | DGG             | 56   | 2000 | 346.0       | 346.0      | 41.0        |
| 74FCT162543CTPACT  | TSSOP        | DGG             | 56   | 2000 | 346.0       | 346.0      | 41.0        |
| 74FCT162543CTPVCT  | SSOP         | DL              | 56   | 1000 | 346.0       | 346.0      | 49.0        |
| 74FCT162H543CTPACT | TSSOP        | DGG             | 56   | 2000 | 346.0       | 346.0      | 41.0        |
| CY74FCT162543TPVCT | SSOP         | DL              | 56   | 1000 | 346.0       | 346.0      | 49.0        |
| CY74FCT16543ATPACT | TSSOP        | DGG             | 56   | 2000 | 346.0       | 346.0      | 41.0        |
| CY74FCT16543CTPVCT | SSOP         | DL              | 56   | 1000 | 346.0       | 346.0      | 49.0        |
| CY74FCT16543TPVCT  | SSOP         | DL              | 56   | 1000 | 346.0       | 346.0      | 49.0        |

## DGG (R-PDSO-G\*\*)

## PLASTIC SMALL-OUTLINE PACKAGE

48 PINS SHOWN

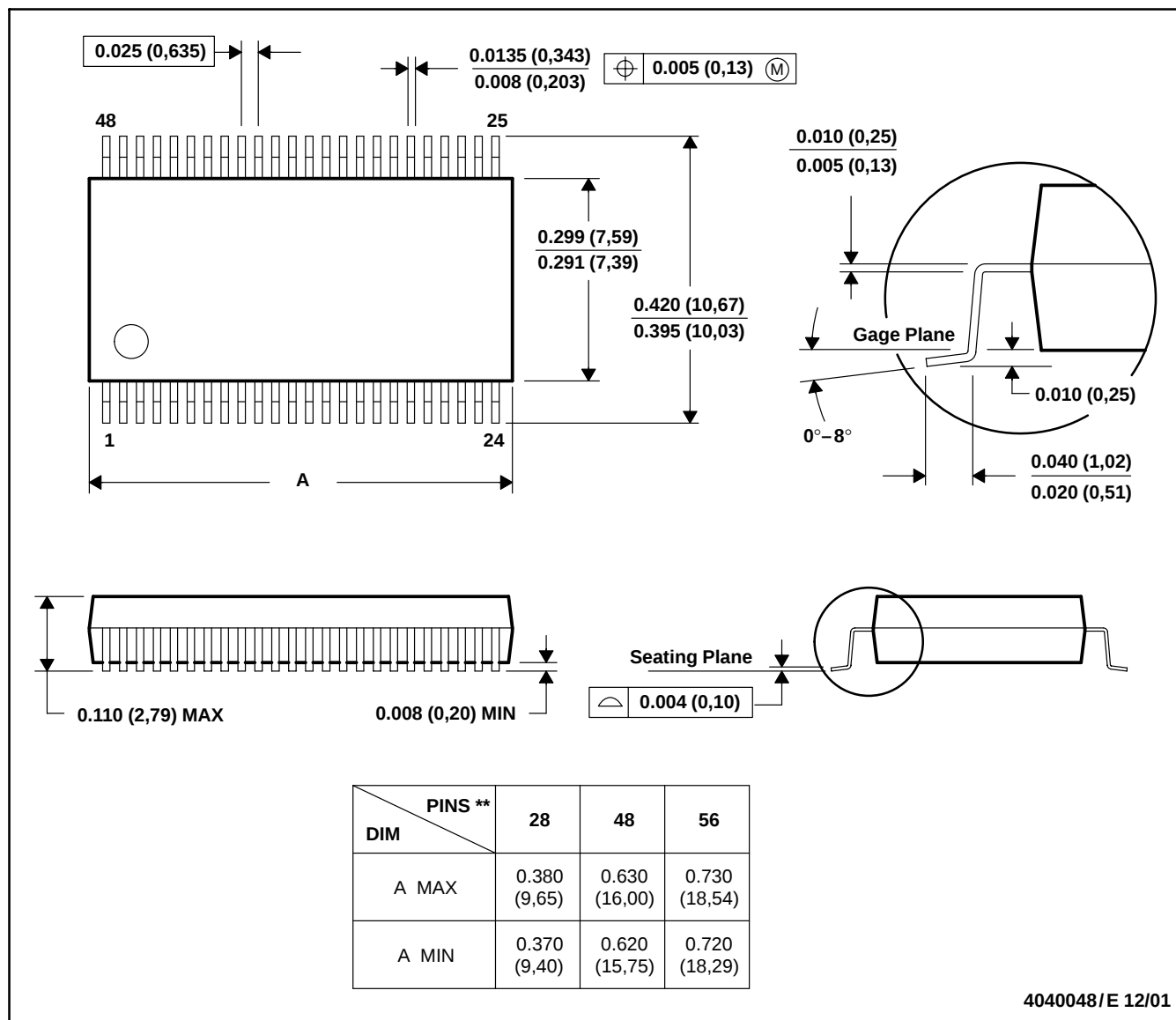


- NOTES: A. All linear dimensions are in millimeters.  
 B. This drawing is subject to change without notice.  
 C. Body dimensions do not include mold protrusion not to exceed 0,15.  
 D. Falls within JEDEC MO-153

DL (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE PACKAGE

48 PINS SHOWN



- NOTES: A. All linear dimensions are in inches (millimeters).  
 B. This drawing is subject to change without notice.  
 C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).  
 D. Falls within JEDEC MO-118

## PACKAGING INFORMATION

| Orderable part number              | Status<br>(1) | Material type<br>(2) | Package   Pins   | Package qty   Carrier | RoHS<br>(3) | Lead finish/<br>Ball material<br>(4) | MSL rating/<br>Peak reflow<br>(5) | Op temp (°C) | Part marking<br>(6) |
|------------------------------------|---------------|----------------------|------------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|---------------------|
| <a href="#">74FCT162543ATPACT</a>  | Obsolete      | Production           | TSSOP (DGG)   56 | -                     | -           | Call TI                              | Call TI                           | -40 to 85    | FCT162543A          |
| <a href="#">74FCT162543CTPACT</a>  | Obsolete      | Production           | TSSOP (DGG)   56 | -                     | -           | Call TI                              | Call TI                           | -40 to 85    | FCT162543C          |
| <a href="#">CY74FCT162543TPVC</a>  | Obsolete      | Production           | SSOP (DL)   56   | -                     | -           | Call TI                              | Call TI                           | -40 to 85    | FCT162543           |
| <a href="#">CY74FCT16543ATPACT</a> | Obsolete      | Production           | TSSOP (DGG)   56 | -                     | -           | Call TI                              | Call TI                           | -40 to 85    | FCT16543A           |
| <a href="#">CY74FCT16543CTPVC</a>  | Obsolete      | Production           | SSOP (DL)   56   | -                     | -           | Call TI                              | Call TI                           | -40 to 85    | FCT16543C           |
| <a href="#">CY74FCT16543CTPVCT</a> | Obsolete      | Production           | SSOP (DL)   56   | -                     | -           | Call TI                              | Call TI                           | -40 to 85    | FCT16543C           |

<sup>(1)</sup> **Status:** For more details on status, see our [product life cycle](#).

<sup>(2)</sup> **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

<sup>(3)</sup> **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

<sup>(4)</sup> **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

<sup>(5)</sup> **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

<sup>(6)</sup> **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

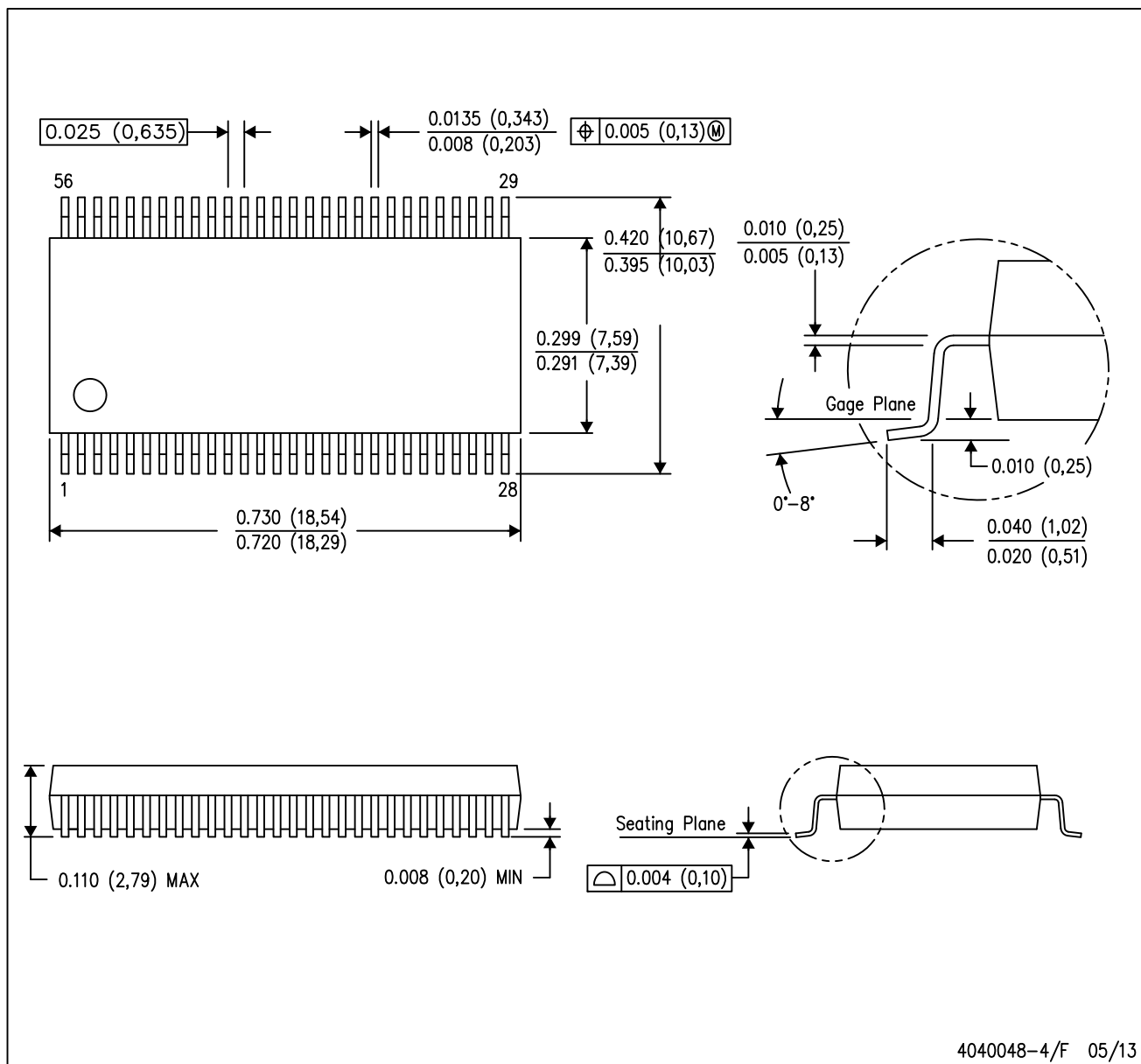
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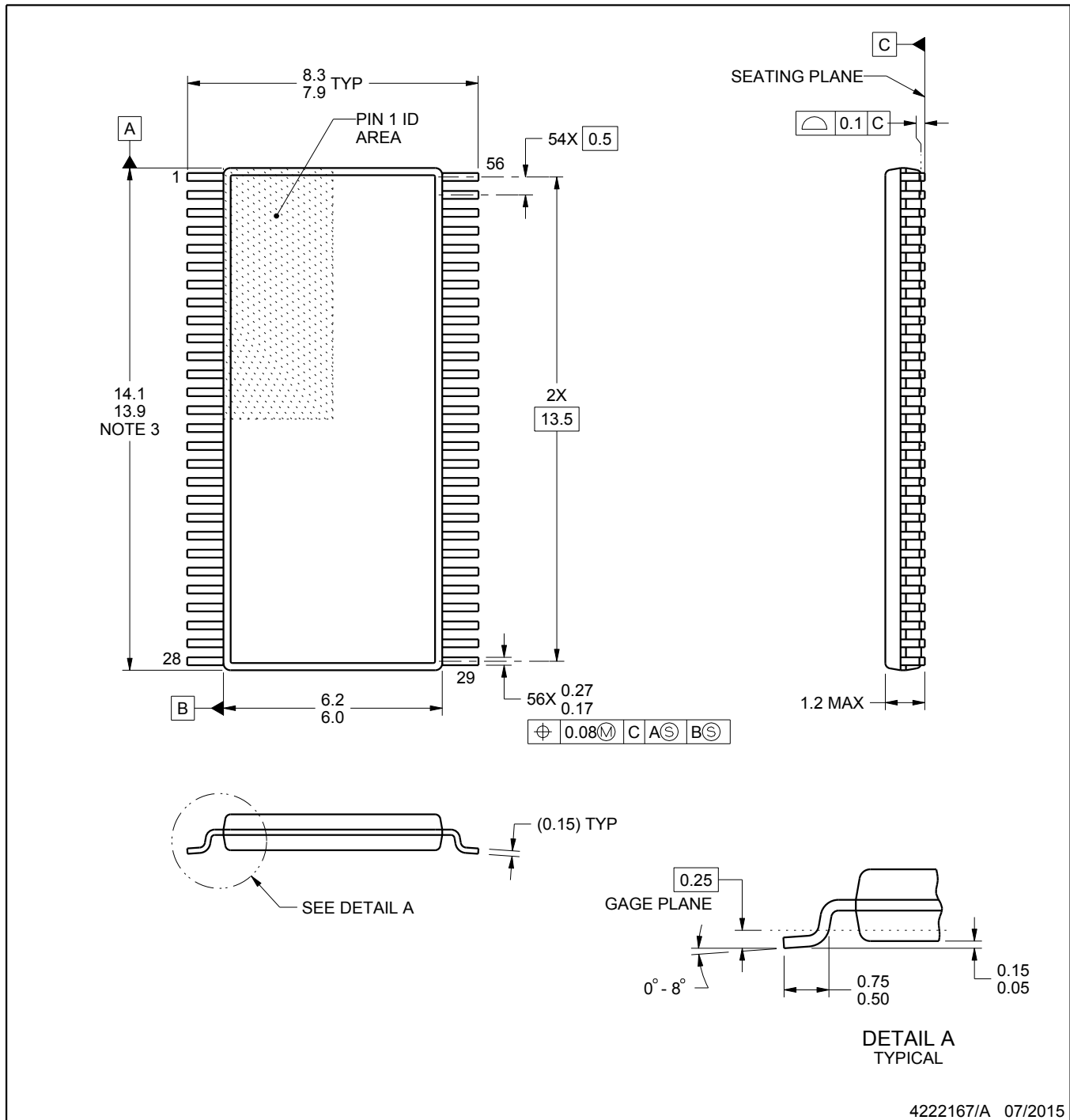


DL (R-PDSO-G56)

PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion not to exceed  $0.006$  (0,15).
  - D. Falls within JEDEC MO-118



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## NOTES:

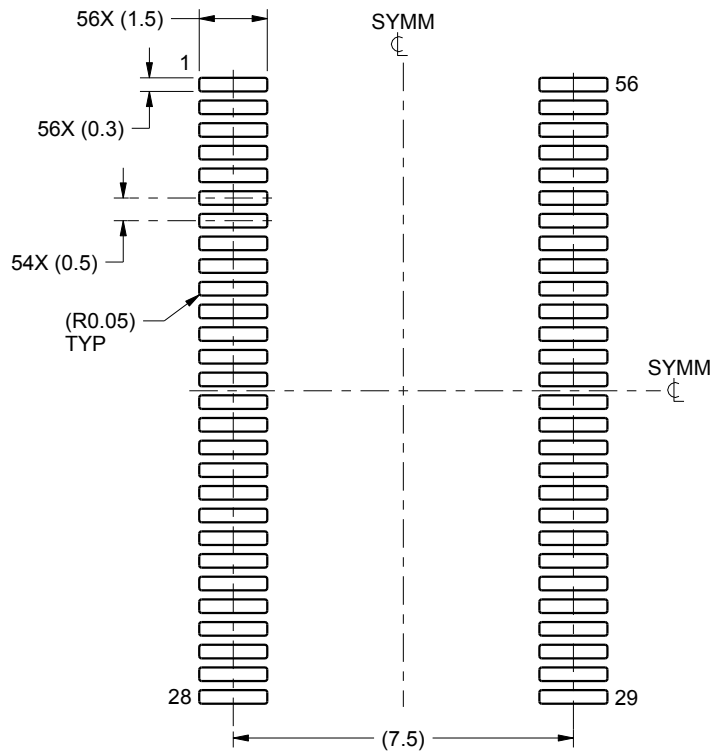
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. Reference JEDEC registration MO-153.

# EXAMPLE BOARD LAYOUT

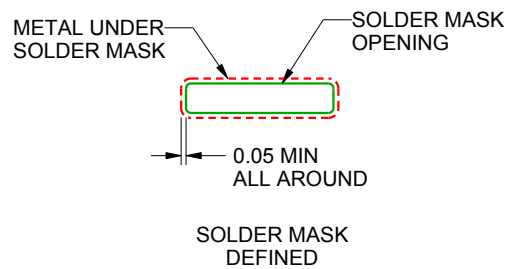
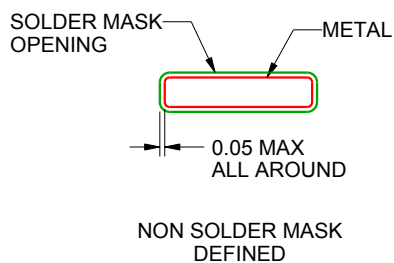
DGG0056A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE  
SCALE:6X



SOLDER MASK DETAILS

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NOTES: (continued)

5. Publication IPC-7351 may have alternate designs.

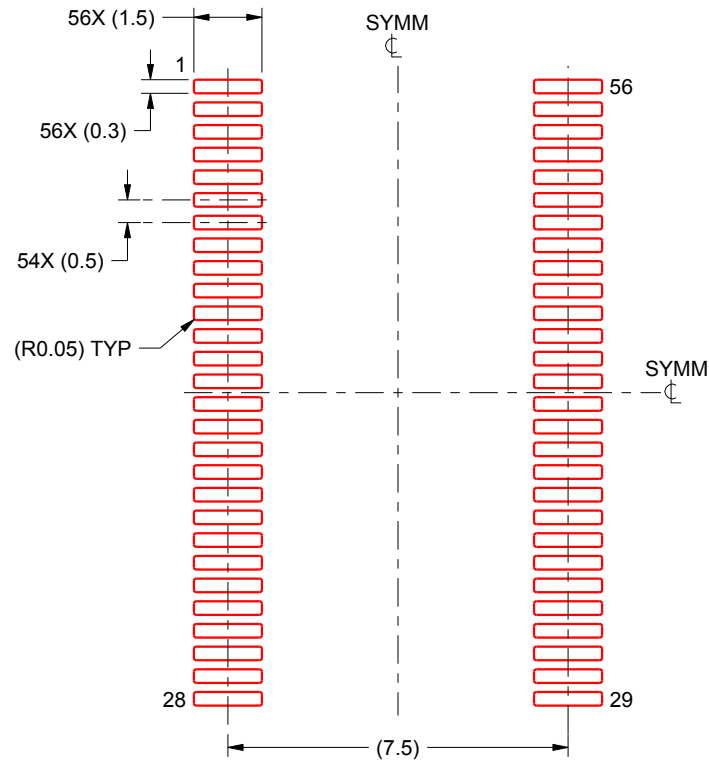
6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# EXAMPLE STENCIL DESIGN

DGG0056A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL  
SCALE:6X

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NOTES: (continued)

7. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
8. Board assembly site may have different recommendations for stencil design.

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