



## 74LVCZ161284A

### LOW VOLTAGE HIGH SPEED IEEE1284 TRANSCEIVER WITH ERROR-FREE POWER-UP

- HIGH SPEED:  $t_{PD} = 9ns$  (MAX.) at  $V_{CC} = 3V$
- LOW POWER DISSIPATION:  
 $I_{CC}=20\mu A$  (MAX) at  $V_{CC}=3.6V$   $T_A=85^\circ C$
- TTL COMPATIBLE INPUTS  
 $V_{IH}=2V$  (MIN)  $V_{IL}=0.8$ (MAX)
- OPERATING VOLTAGE RANGE:  
 $V_{CC}(OPR) = 3.0V$  to  $3.6V$
- A PORT HAVE STANDARD 4mA TOTEM POLE OUTPUT
- B PORT HIGH DRIVE SOURCE/SINK CAPABILITY OF 14mA
- AUTO POWER-UP FEATURE TO PREVENT PRINTER ERRORS
- SUPPORT IEEE STD 1284-I (LEVEL 1 TYPE) AND IEEE STD 1284-II (LEVEL 2 TYPE) FOR BIDIRECTIONAL PARALLEL COMMUNICATIONS BETWEEN PERSONAL COMPUTER AND PRINTING PERIPHERALS
- TRANSLATION CAPABILITY ALLOW OUTPUTS ON CABLE SIDE TO INTERFACE WITH 5V SIGNAL
- PULL-UP RESISTOR INTEGRATED ON ALL OPEN-DRAIN OUTPUT ELIMINATE THE NEED FOR DISCRETE RESISTOR
- REPLACE THE FUNCTION OF TWO 74LVC1284 DEVICES

#### DESCRIPTION

The 74LVCZ161284A contains eight high speed non-inverting bidirectional buffers and eleven control/status non-inverting buffers with open drain outputs fabricated in silicon gate C<sup>2</sup>MOS technology. It's intended to provide a standard signaling method for a bi-direction parallel peripheral in an Extended Capabilities Port Mode (ECP). The HD (Active HIGH) input pin enables the Cable port to switch from Open Drain to a high drive totem pole output, capable of sourcing 14mA on all thirteen buffer and 84mA on PERI LOGIC OUTPUT buffer. The DIR input determines the direction of data flow on the bidirectional buffers. DIR (Active HIGH) enables data flow from A port to B port. DIR (Active LOW) enables data flow from B port to A port. The Y output (Y9-Y13) stay in the high state after power-on until an associated input A9-A13) goes high. When an associated input goes high, all Y outputs are active, and non



#### ORDER CODES

| PACKAGE | TUBE | T & R            |
|---------|------|------------------|
| TSSOP   |      | 74LVCZ161284ATTR |

#### PIN CONNECTION

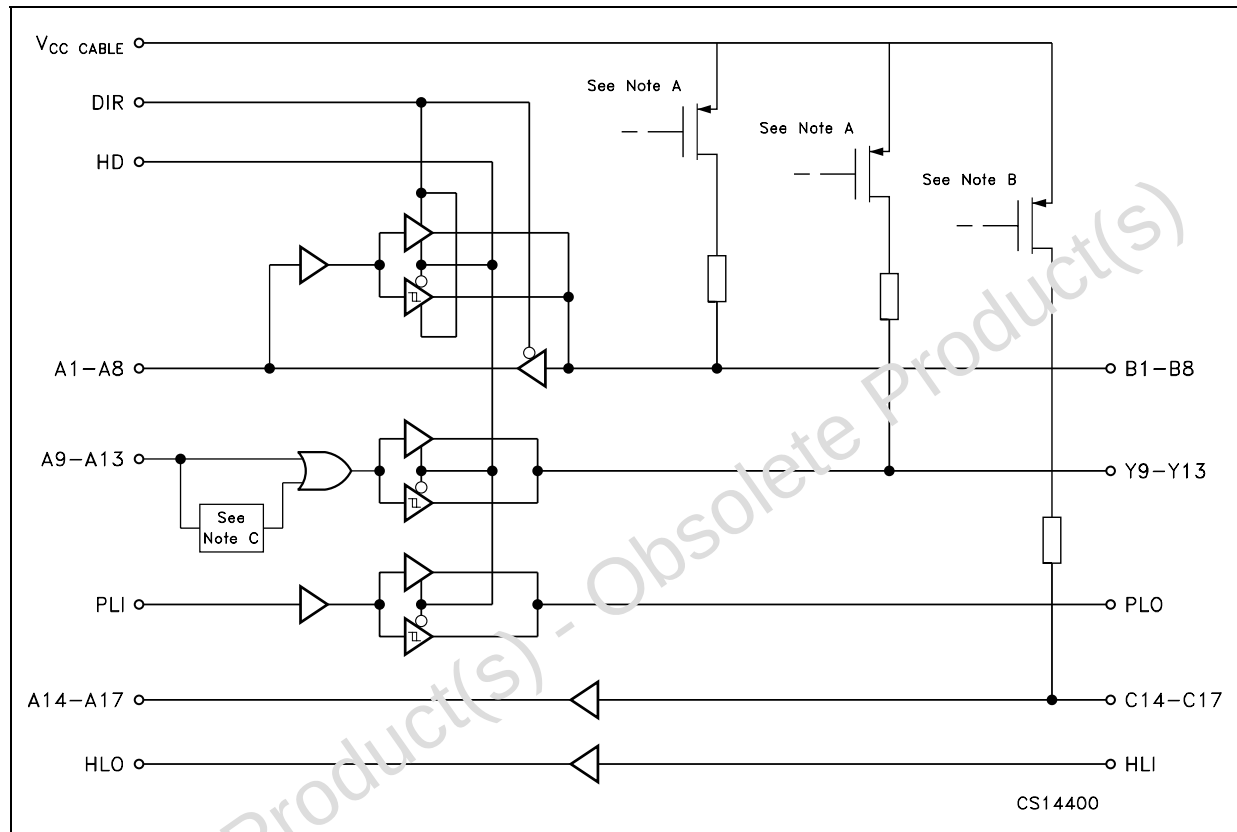
|                 |    |    |                        |
|-----------------|----|----|------------------------|
| HD              | 1  | 48 | DIR                    |
| A9              | 2  | 47 | Y9                     |
| A10             | 3  | 46 | Y10                    |
| A11             | 4  | 45 | Y11                    |
| A12             | 5  | 44 | Y12                    |
| A13             | 6  | 43 | Y13                    |
| V <sub>CC</sub> | 7  | 42 | V <sub>CC</sub> /CABLE |
| A1              | 8  | 41 | B1                     |
| A2              | 9  | 40 | B2                     |
| GND             | 10 | 39 | GND                    |
| A3              | 11 | 38 | B3                     |
| A4              | 12 | 37 | B4                     |
| A5              | 13 | 36 | B5                     |
| A6              | 14 | 35 | B6                     |
| GND             | 15 | 34 | GND                    |
| A7              | 16 | 33 | B7                     |
| A8              | 17 | 32 | B8                     |
| V <sub>CC</sub> | 18 | 31 | V <sub>CC</sub> /CABLE |
| PLI             | 19 | 30 | PLO                    |
| A14             | 20 | 29 | C14                    |
| A15             | 21 | 28 | C15                    |
| A16             | 22 | 27 | C16                    |
| A17             | 23 | 26 | C17                    |
| HLO             | 24 | 25 | HLI                    |

CS14380

inverting signals of the associated inputs are driven through Y outputs. This special feature prevents printer system errors caused by deasserting the BUSY signal in the cable at

power-on. It is available in the commercial temperature range.

## LOGIC DIAGRAM

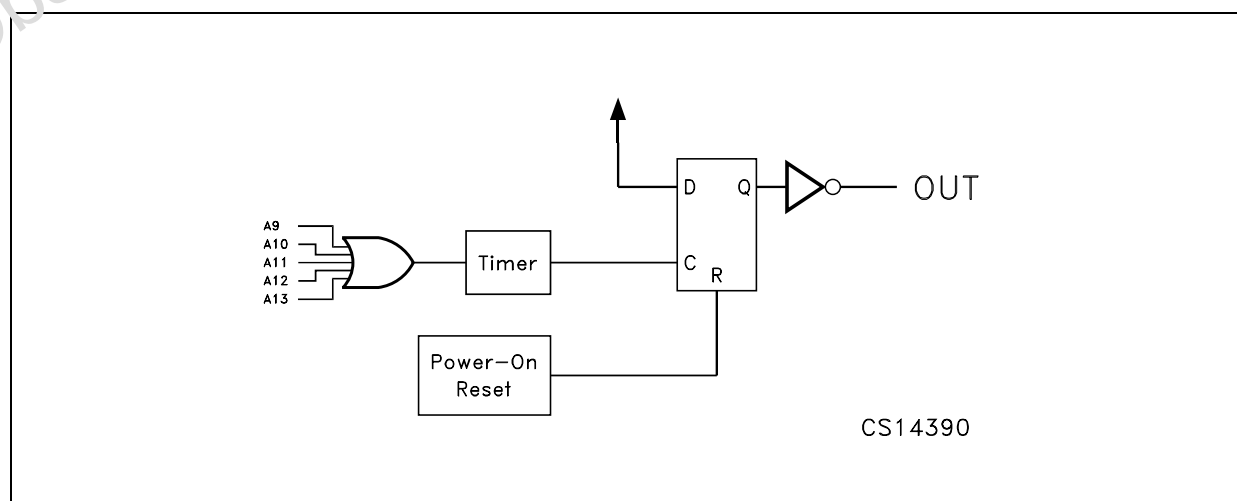


NOTE A: The PMOS transistors prevent backdriving current from the signal pins to V<sub>CC/CABLE</sub> when V<sub>CC/CABLE</sub> is open or at GND. The PMOS transistor is turned off when the associated driver is in the low state.

NOTE B: The PMOS transistor prevents backdriving current from the signal pins to V<sub>CC/CABLE</sub> when V<sub>CC/CABLE</sub> is open or at GND.

NOTE C: Active input detection circuit forces Y9-Y13 to the low state after power-on until one of the A9-A13 goes high. See below.

## ACTIVE INPUT DETECTION CIRCUIT



**PIN DESCRIPTION**

| PIN N°                         | SYMBOL                | NAME AND FUNCTION          |
|--------------------------------|-----------------------|----------------------------|
| 1                              | HD                    | High Drive Enable Input    |
| 2, 3, 4, 5, 6                  | A9 to A13             | Side A Input               |
| 8, 9, 11, 12, 13, 14, 16, 17   | A1 to A8              | Side A Input or Output     |
| 19                             | PLI                   | Peripheral Logic Input     |
| 20, 21, 22, 23                 | A14 to A17            | Side A Output              |
| 24                             | HLO                   | Host Logic Output          |
| 25                             | HLI                   | Host Logic Input           |
| 29, 28, 27, 26                 | C14 to C17            | Side Cable Output          |
| 30                             | PLO                   | Peripheral Logic Output    |
| 41, 40, 38, 37, 36, 35, 33, 32 | B1 to B8              | Side Cable Input or Output |
| 47, 46, 45, 44, 43             | Y9 to Y13             | Side Cable Output          |
| 48                             | DIR                   | Direction Control Input    |
| 10, 15, 34, 39                 | GND                   | Ground (0V)                |
| 7, 18                          | V <sub>CC</sub>       | Positive Supply Voltage    |
| 31, 42                         | V <sub>CC/CABLE</sub> | Cable Power Supply         |

**TRUTH TABLE**

| INPUT |    | OUTPUT                                                                  | OUTPUT                          |
|-------|----|-------------------------------------------------------------------------|---------------------------------|
| DIR   | HD |                                                                         |                                 |
| L     | L  | B1-B8 Data to A1-A8<br>A9-A13 Data to Y9-Y13<br>C14-C17 Data to A14-A17 | Y9-Y13 and PLO Open Drain       |
| L     | H  |                                                                         | Y9-Y13 and PLO Totem Pole       |
| H     | L  | A1-A8 Data to B1-B8<br>A9-A13 Data to Y9-Y13<br>C14-C17 Data to A14-A17 | B1-B8 Y9-Y13 and PLO Open Drain |
| H     | H  |                                                                         | B1-B8 Y9-Y13 and PLO Totem Pole |

## ABSOLUTE MAXIMUM RATINGS

| Symbol                | Parameter                                                   |                           | Value                   | Unit |
|-----------------------|-------------------------------------------------------------|---------------------------|-------------------------|------|
| $V_{CC}$              | Supply Voltage                                              |                           | -0.5 to +4.6            | V    |
| $V_{CCcable}$         | Cable Supply Voltage (must be $\geq V_{CC}$ )               |                           | -0.5 to +7.0            | V    |
| $V_{IA}$              | DC Input Voltage A1-A13, $PL_{IN}$ , DIR, $HD_{IN}$         |                           | -0.5 to $+V_{CC} + 0.5$ | V    |
| $V_{IB}$              | DC Input Voltage B1-B8, C14-C17, $HL_{IN}$                  |                           | -0.5 to +5.5            | V    |
| $V_{IBp}$             | DC Input Voltage B1-B8, C14-C17, $HL_{IN}$ (40ns transient) |                           | -2 to +7                | V    |
| $V_{OA}$              | DC Output Voltage A1-A8, A14-A17, $HL_{IN}$                 |                           | -0.5 to $+V_{CC} + 0.5$ | V    |
| $V_{OB}$              | DC Output Voltage B1-B8, Y9-Y13, $PL_{IN}$                  |                           | -0.5 to +5.5            | V    |
| $V_{OBp}$             | DC Output Voltage B1-B8, Y9-Y13, $PL_{IN}$ (40ns transient) |                           | -2 to +7                | V    |
| $I_{IK}$              | DC Input Diode Current DIR, HD A9-A13, $PL_{IN}$ C14-C17    |                           | - 20                    | mA   |
| $I_{OK}$              | DC Output Diode Current                                     | A1-A8, A14-A17, $HL_{IN}$ | $\pm 50$                | mA   |
|                       |                                                             | B1-B8, Y9-Y13, $PL_{IN}$  | - 50                    |      |
| $I_O$                 | DC Output Current                                           | A1-A8, $HL_{IN}$          | $\pm 25$                | mA   |
|                       |                                                             | B1-B8, Y9-Y13             | $\pm 50$                |      |
|                       |                                                             | $PL_O = \text{LOW}$       | 84                      |      |
|                       |                                                             | $PL_O = \text{HIGH}$      | -50                     |      |
| $I_{CC}$ or $I_{GND}$ | DC $V_{CC}$ or Ground Current per Supply Pin                |                           | $\pm 200$               | mA   |
| $T_{stg}$             | Storage Temperature                                         |                           | -65 to +150             | °C   |
| $T_L$                 | Lead Temperature (10 sec)                                   |                           | 300                     | °C   |

Absolute Maximum Rating are those value beyond which damage to the device may occur. Functional operation under these condition is not implied

## RECOMMENDED OPERATING CONDITIONS

| Symbol        | Parameter                 | Value         | Unit |
|---------------|---------------------------|---------------|------|
| $V_{CC}$      | Supply Voltage            | 3.0 to 3.6    | V    |
| $V_{CCcable}$ | Cable Supply Voltage      | 3.0 to 5.5    | V    |
| $V_I$         | Input Voltage             | 0 to $V_{CC}$ | V    |
| $V_O$         | Open Drain Output Voltage | 0 to 5.5      | V    |
| $T_{op}$      | Operating Temperature     | -40 to 85     | °C   |

## DC SPECIFICATIONS

| Symbol           | Parameter                             |                                    | Test Condition         |                             |                                                    | Value        |      | Unit |
|------------------|---------------------------------------|------------------------------------|------------------------|-----------------------------|----------------------------------------------------|--------------|------|------|
|                  |                                       |                                    | V <sub>CC</sub><br>(V) | V <sub>CCcable</sub><br>(V) |                                                    | -40 to 85 °C |      |      |
|                  |                                       |                                    |                        |                             |                                                    | Min.         | Max. |      |
| V <sub>IH</sub>  | High Level Input Voltage              | An, Bn, PL <sub>IN</sub> , DIR, HD | 3.0 to 3.6             | 3.0 to 5.5                  |                                                    | 2            |      | V    |
|                  |                                       | Cn                                 |                        |                             |                                                    | 2.3          |      |      |
|                  |                                       | HL <sub>IN</sub>                   |                        |                             |                                                    | 2.6          |      |      |
| V <sub>IL</sub>  | Low Level Input Voltage               | An, Bn, PL <sub>IN</sub> , DIR, HD |                        |                             |                                                    |              | 0.8  | V    |
|                  |                                       | Cn                                 |                        |                             |                                                    |              | 0.8  |      |
|                  |                                       | HL <sub>IN</sub>                   |                        |                             |                                                    |              | 1.6  |      |
| V <sub>OH</sub>  | High Level Output Voltage             | An, HL                             | 3.0                    | 3.0                         | I <sub>O</sub> =-50μA                              | 2.8          |      | V    |
|                  |                                       |                                    | 3.0                    | 3.0                         | I <sub>O</sub> =-4mA                               | 2.4          |      |      |
|                  |                                       | Bn, Yn                             | 3.0                    | 3.0                         | I <sub>O</sub> =-14mA                              | 2.0          |      |      |
|                  |                                       | Bn, Yn                             | 3.0                    | 4.5                         | I <sub>O</sub> =-14mA                              | 2.23         |      |      |
|                  |                                       | PL                                 | 3.15                   | 3.15                        | I <sub>O</sub> =-500μA                             | 3.1          |      |      |
| V <sub>OL</sub>  | Low Level Output Voltage              | An, HL                             | 3.0                    | 3.0                         | I <sub>O</sub> =50μA                               |              | 0.2  | V    |
|                  |                                       |                                    | 3.0                    | 3.0                         | I <sub>O</sub> =-4mA                               |              | 0.4  |      |
|                  |                                       | Bn, Yn                             | 3.0                    | 3.0                         | I <sub>O</sub> =14mA                               |              | 0.8  |      |
|                  |                                       | Bn, Yn                             | 3.0                    | 4.5                         | I <sub>O</sub> =14mA                               |              | 0.77 |      |
|                  |                                       | PL                                 | 3.0                    | 3.0                         | I <sub>O</sub> =84mA                               |              | 0.95 |      |
|                  |                                       | PL                                 | 3.0                    | 4.5                         | I <sub>O</sub> =84mA                               |              | 0.90 |      |
| I <sub>I</sub>   | Input Current                         | Cn                                 | 3.6                    | 3.6                         | V <sub>I</sub> = V <sub>CC</sub>                   |              | 50   | μA   |
|                  |                                       |                                    | 3.6                    | 3.6                         | V <sub>I</sub> =GND (Pull-up res)                  |              | -3.5 | mA   |
|                  |                                       | All input except B or C            | 3.6                    | 5.0                         | V <sub>I</sub> = V <sub>CC</sub> or GND            |              | ± 1  | μA   |
| I <sub>CC</sub>  | Quiescent Supply Current              |                                    | 3.6                    | 5.0                         | V <sub>I</sub> = V <sub>CC</sub> I <sub>O</sub> =0 |              | 0.8  | mA   |
|                  |                                       |                                    |                        |                             | V <sub>I</sub> =GND (12xPull-up)                   |              | 45   |      |
| I <sub>OZ</sub>  | High Impedance Output Leakage Current | Bn                                 | 3.6                    | 5.0                         | V <sub>O</sub> = V <sub>CC</sub>                   |              | 20   | μA   |
|                  |                                       |                                    | 3.6                    | 3.6                         | V <sub>O</sub> =GND (Pull-up res)                  |              | -3.5 | mA   |
|                  |                                       | A1-A8                              | 3.6                    | 5.0                         | V <sub>O</sub> = V <sub>CC</sub> or GND            |              | ± 20 | μA   |
|                  |                                       | Open Drain Y Output                | 3.6                    | 3.6                         | V <sub>O</sub> =GND (Pull-up res)                  |              | -3.5 | mA   |
| I <sub>OFF</sub> | Power Off Leakage Current             | B, Y output (to GND)               | 0                      | 5.0                         | V <sub>I</sub> or V <sub>O</sub> = 0 to 7V         |              | 100  | μA   |
|                  |                                       | B, Y output (to V <sub>CC</sub> )  | 0                      | 5.0                         | V <sub>I</sub> or V <sub>O</sub> = 0 to 7V         |              | 10   | μA   |
| V <sub>hys</sub> | Input Hysteresis                      | An, Bn, PL <sub>IN</sub> , DIR, HD | 3.3                    | 5.0                         |                                                    | 0.4          |      | V    |
|                  |                                       | Cn                                 | 3.3                    | 5.0                         |                                                    | 0.8          |      |      |
|                  |                                       | HL <sub>IN</sub>                   | 3.3                    | 5.0                         |                                                    | 0.2          |      |      |
| Z <sub>O</sub>   | Output Impedance                      | B1-B8, Y9-Y13                      | 3.3                    | 5.0                         | V <sub>B</sub> = V <sub>OH</sub>                   | 30           | 55   | Ω    |
| R <sub>P</sub>   | Pull-up Resistance                    | B1-B8, Y9-Y13, C14-C17             | 3.3                    | 5.0                         | V <sub>B</sub> = V <sub>OH</sub>                   | 1150         | 1650 | Ω    |

## AC ELECTRICAL CHARACTERISTICS

| Symbol                                 | Parameter                                      |                                       | Test Condition         |                             |                                                    | Value        |      | Unit |
|----------------------------------------|------------------------------------------------|---------------------------------------|------------------------|-----------------------------|----------------------------------------------------|--------------|------|------|
|                                        |                                                |                                       | V <sub>CC</sub><br>(V) | V <sub>CCcable</sub><br>(V) |                                                    | -40 to 85 °C |      |      |
|                                        |                                                |                                       |                        |                             |                                                    | Min.         | Max. |      |
| t <sub>PLH</sub><br>t <sub>PHL</sub>   | Propagation Delay Time                         | A1-A8 to B1-B8, A9-A13 to Y9-Y13      | 3.0 to 3.6             | 3.0 to 5.5                  | R <sub>L</sub> =500Ω C <sub>L</sub> =50pF          | 1            | 7.5  | ns   |
|                                        |                                                | B1-B8 to A1-A8, C14-C17 to A14-A17    |                        |                             | R <sub>L</sub> =500Ω C <sub>L</sub> =50pF          | 1            | 9.0  | ns   |
|                                        |                                                | PL <sub>IN</sub> to PL <sub>OUT</sub> |                        |                             | R <sub>L</sub> =500Ω C <sub>L</sub> =50pF          | 1            | 7.0  | ns   |
|                                        |                                                | HL <sub>IN</sub> to HL <sub>OUT</sub> |                        |                             | R <sub>L</sub> =500Ω C <sub>L</sub> =50pF          | 1            | 11.0 | ns   |
| t <sub>PZH</sub><br>t <sub>PZL</sub>   | Enable Delay Time                              | DIR to A                              | 3.0 to 3.6             | 3.0 to 5.5                  | R <sub>L</sub> =500Ω C <sub>L</sub> =50pF          | 1            | 12   | ns   |
|                                        |                                                | HD to Bn, Y9-Y13                      |                        |                             | R <sub>L</sub> =500Ω C <sub>L</sub> =50pF          | 1            | 8.5  | ns   |
| t <sub>PLZ</sub><br>t <sub>PHZ</sub>   | Disable Delay Time                             | DIR to A                              | 3.0 to 3.6             | 3.0 to 5.5                  | R <sub>L</sub> =500Ω C <sub>L</sub> =50pF          | 1            | 8.5  | ns   |
|                                        |                                                | DIR to A                              |                        |                             | R <sub>L</sub> =500Ω C <sub>L</sub> =50pF          | 1            | 8.5  | ns   |
|                                        |                                                | HD to Bn, Y9-Y13                      |                        |                             | R <sub>L</sub> =500Ω C <sub>L</sub> =50pF          | 1            | 8.5  | ns   |
| t <sub>r</sub> t <sub>f</sub>          | Rise and Fall Time<br>B1-B8, Y9-Y13 Open Drain |                                       | 3.0 to 3.6             | 3.0 to 5.5                  | R <sub>L</sub> =500Ω C <sub>L</sub> =50pF          | 1            | 120  | ns   |
| t <sub>OSLH</sub><br>t <sub>OSHL</sub> | Output To Output Skew Time (note1, 2)          |                                       | 3.0 to 3.6             | 3.0 to 5.5                  | R <sub>PULL-UP</sub> =500Ω<br>C <sub>L</sub> =50pF | 1            | 2    | ns   |

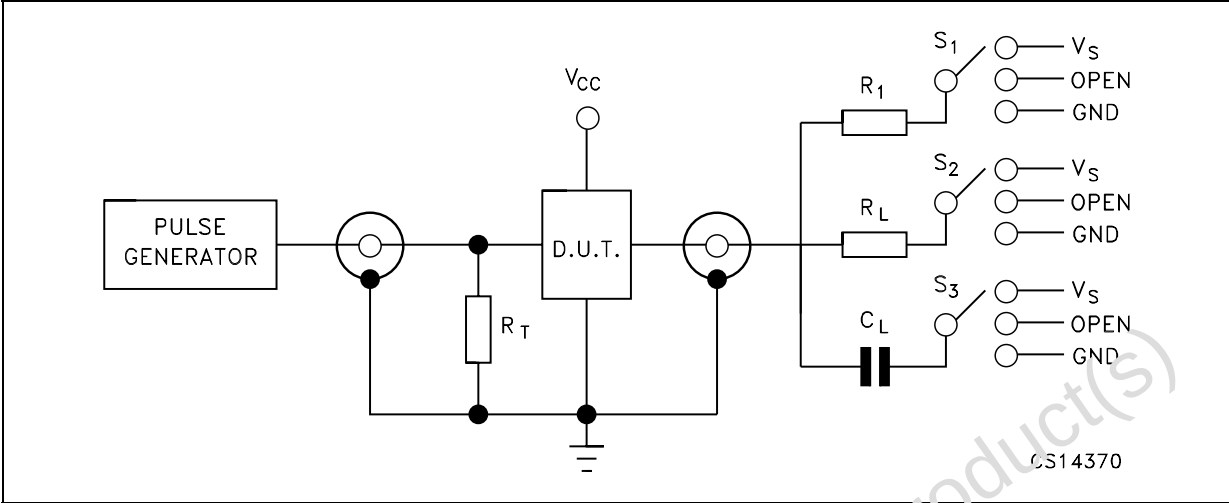
1) Skew is defined as the absolute value of the difference between the actual propagation delay for any two outputs of the same device switching in the same direction, either HIGH or LOW (t<sub>OSLH</sub> = |t<sub>PLHm</sub> - t<sub>PLHn</sub>|, t<sub>OSHL</sub> = |t<sub>PHLm</sub> - t<sub>PHLn</sub>|)

2) Parameter guaranteed by design

## CAPACITANCE CHARACTERISTICS

| Symbol           | Parameter                                                                                                     | Test Condition         |                              | Value                  |      |      | Unit |
|------------------|---------------------------------------------------------------------------------------------------------------|------------------------|------------------------------|------------------------|------|------|------|
|                  |                                                                                                               | V <sub>CC</sub><br>(V) | V <sub>CC/CABLE</sub><br>(V) | T <sub>A</sub> = 25 °C |      |      |      |
|                  |                                                                                                               |                        |                              | Min.                   | Typ. | Max. |      |
| C <sub>IN</sub>  | Control Input Capacitance<br>(F <sub>D</sub> , DIR, A9-A13, C14-C17,<br>F <sub>LIN</sub> , H <sub>LIN</sub> ) | Open                   | Open                         |                        | 4    |      | pF   |
| C <sub>I/O</sub> | I/O Pin Capacitance                                                                                           | 3.3                    | 5.0                          |                        | 6    |      | pF   |

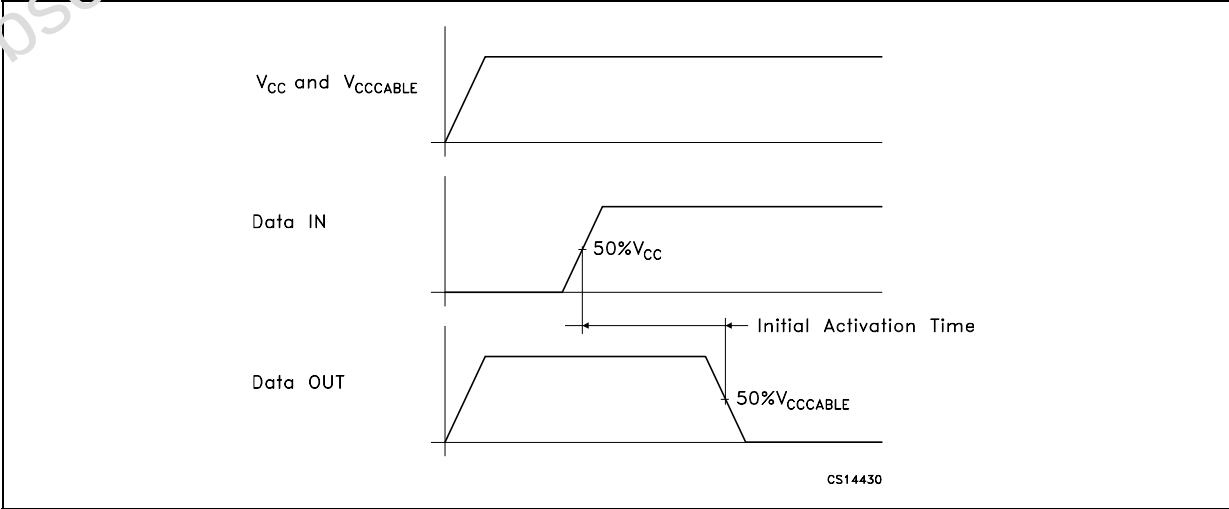
TEST CIRCUIT

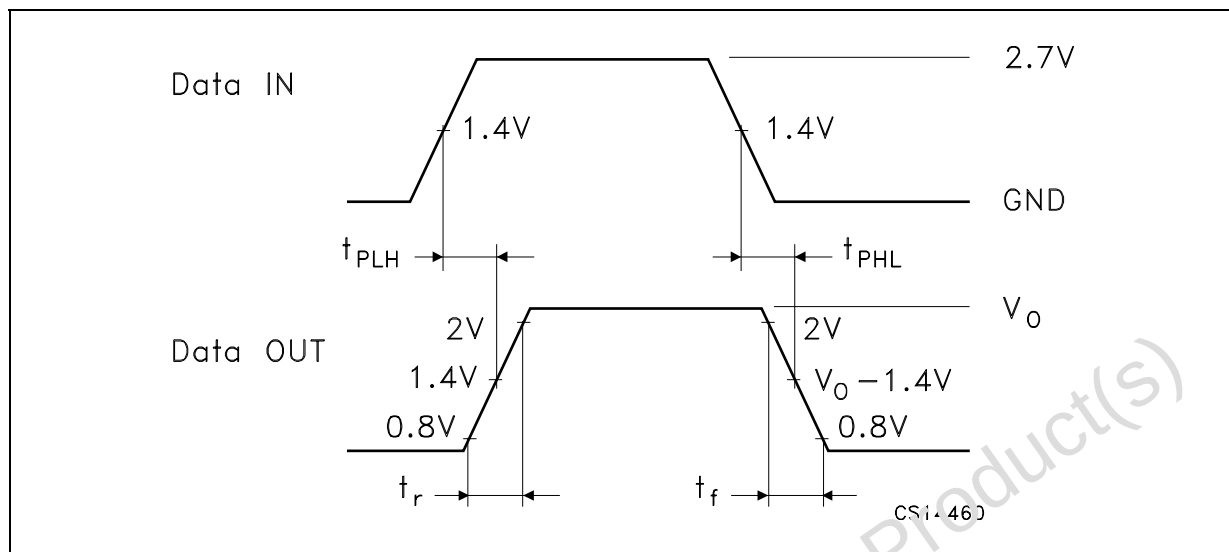
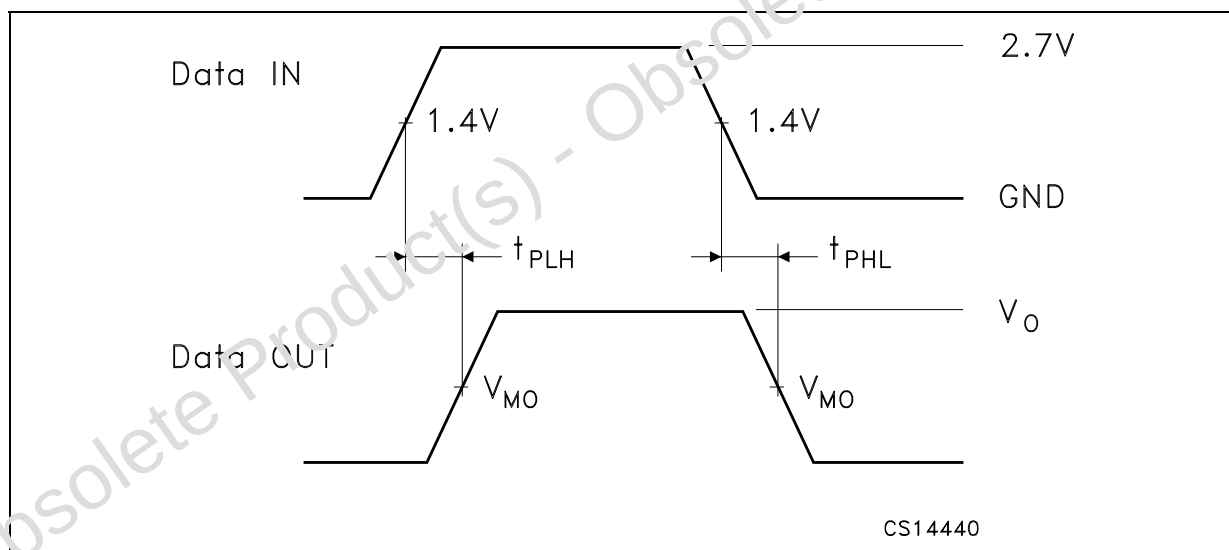


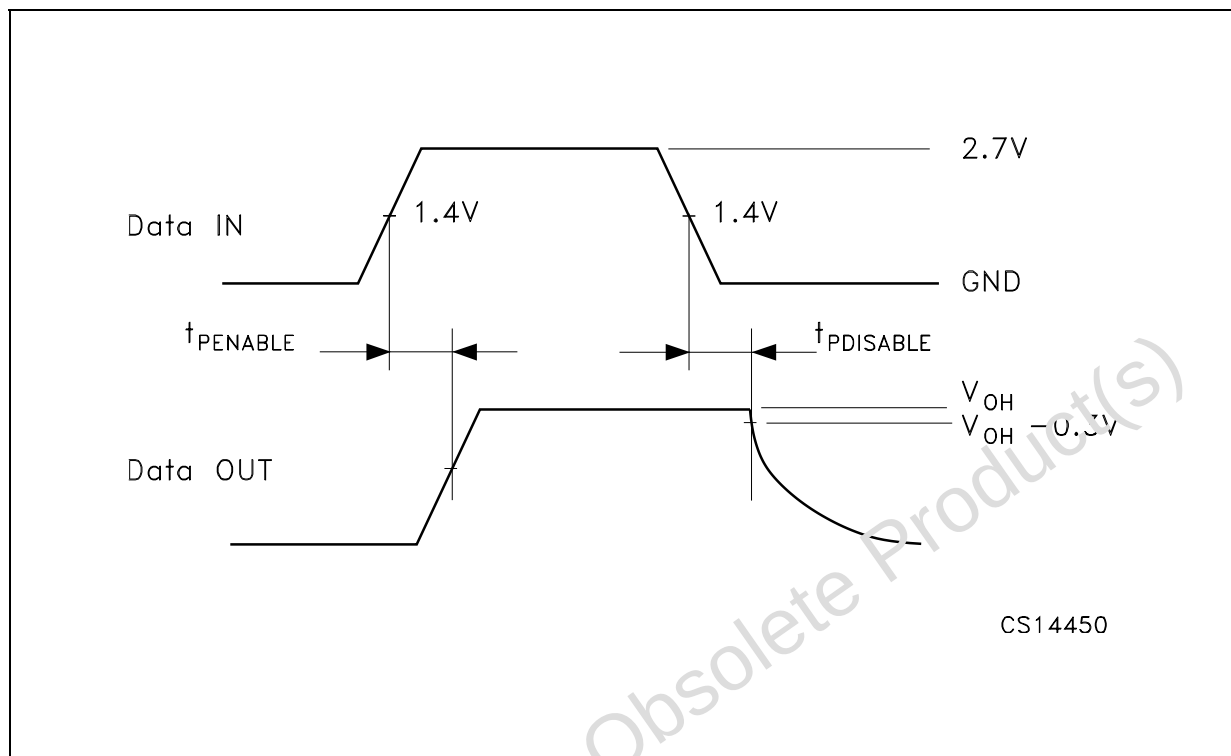
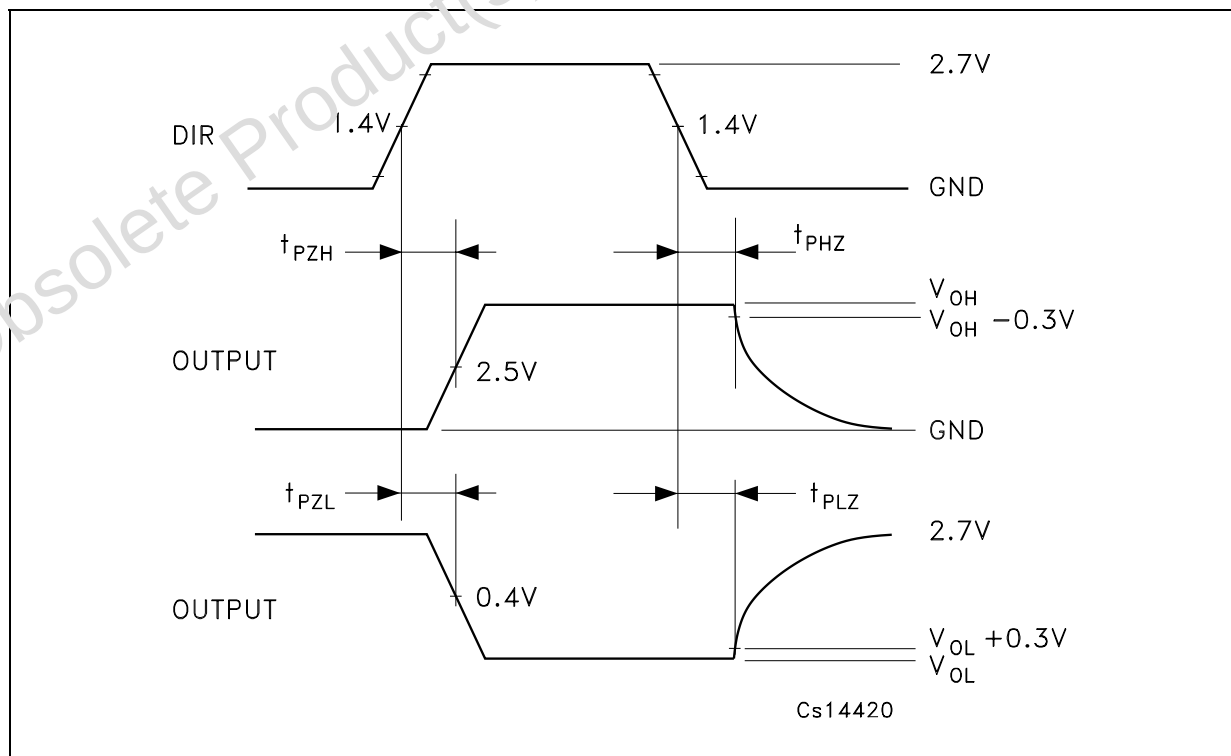
| TEST                                                                                                       | S1   | S2       | S3       |
|------------------------------------------------------------------------------------------------------------|------|----------|----------|
| $t_{PHL}$ (A1-A8 to B1-B8, A9-A13 to Y9-Y13, $PLH_{IN}$ to PLH) (see waveform 2)                           | Open | $V_{CC}$ | $V_{CC}$ |
| $t_{PLH}$ (A1-A8 to B1-B8, A9-A13 to Y9-Y13, $PLH_{IN}$ to PLH, HD to B1-B8, Y9-Y13, PLH) (see waveform 2) | Open | GND      | GND      |
| $t_{PHL}$ , $t_{PLH}$ (B1-B8 to A1-A8, C14-C17 to A14-A17, $HLH_{IN}$ to HLH) (see waveform 3)             | Open | GND      | GND      |
| $t_r$ , $t_f$ (A1-A8 to B1-B8, A9-A13 to Y9-Y13) (see waveform 2)                                          | Open | $V_{CC}$ | GND      |
| $t_{PLZ}$ (DIR to A1-A8) (see waveform 5)                                                                  | 6V   | GND      | GND      |
| $t_{PHZ}$ (DIR to A1-A8) (see waveform 5)                                                                  | Open | GND      | GND      |
| $t_{PZL}$ (DIR to A1-A8) (see waveform 4)                                                                  | 1.4V | GND      | GND      |
| $t_{PZH}$ (DIR to A1-A8) (see waveform 4)                                                                  | 4.4V | GND      | GND      |
| $t_{PLZ}$ (DIR to B1-B8) (see waveform 5)                                                                  | 6V   | GND      | GND      |
| $t_{PHZ}$ (DIR to B1-B8) (see waveform 5)                                                                  | Open | GND      | GND      |

$C_L$  = 50 pF or equivalent (includes jig and probe capacitance)  
 $R_L$  =  $R_1$  = 500 $\Omega$  or equivalent  
 $R_T$  =  $Z_{OUT}$  of pulse generator (typically 50 $\Omega$ )

WAVEFORM 1: ERROR-FREE CIRCUIT TIMING CHART (f=1MHz; 50% duty cycle)

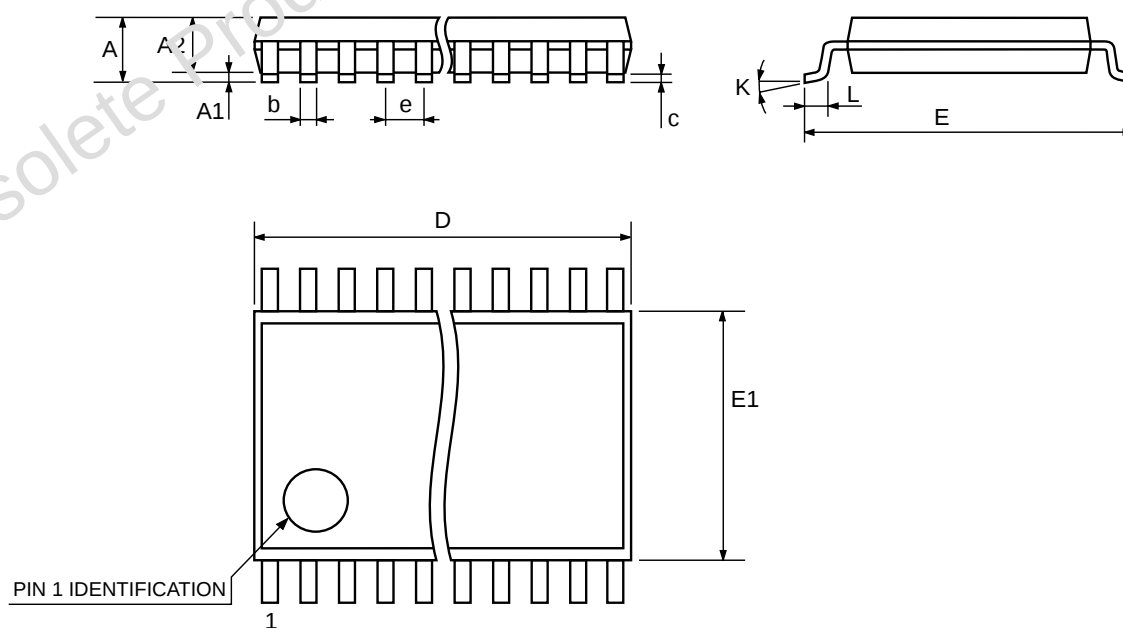


**WAVEFORM 2: PROPAGATION DELAY INPUT A<sub>n</sub> TO OUTPUT** (f=1MHz; 50% duty cycle)**WAVEFORM 3: PROPAGATION DELAY INPUT B<sub>n</sub> TO OUTPUT** (f=1MHz; 50% duty cycle) $V_{MO} = 50\%V_{CC}$

**WAVEFORM 4: DATA TO OUTPUT ENABLE AND DISABLE TIME** ( $f=1\text{MHz}$ ; 50% duty cycle)**WAVEFORM 5: DIR TO OUTPUT ENABLE AND DISABLE TIME** ( $f=1\text{MHz}$ ; 50% duty cycle)

## TSSOP48 MECHANICAL DATA

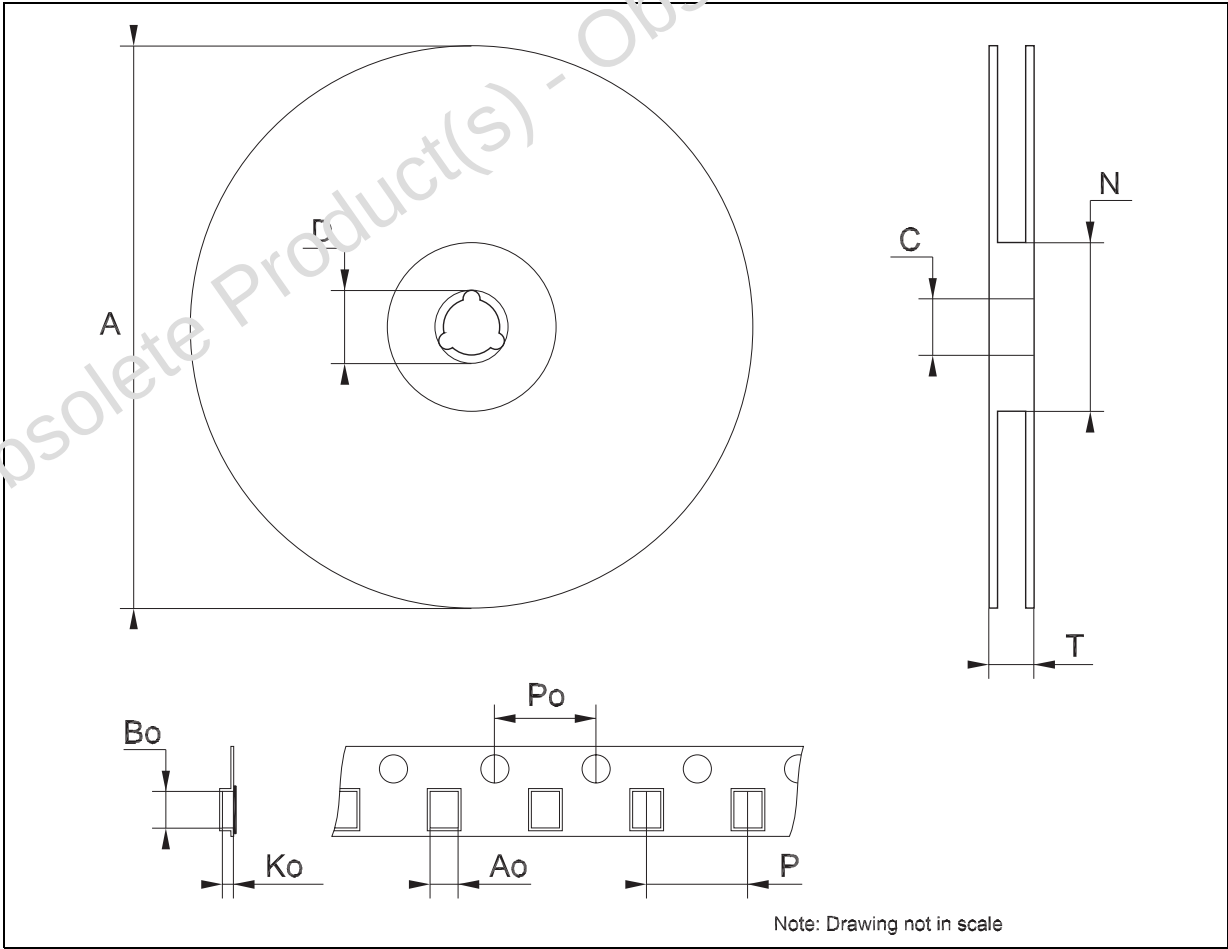
| DIM. | mm.  |         |      | inch   |            |        |
|------|------|---------|------|--------|------------|--------|
|      | MIN. | TYP     | MAX. | MIN.   | TYP.       | MAX.   |
| A    |      |         | 1.2  |        |            | 0.047  |
| A1   | 0.05 |         | 0.15 | 0.002  |            | 0.006  |
| A2   |      | 0.9     |      |        | 0.035      |        |
| b    | 0.17 |         | 0.27 | 0.0067 |            | 0.011  |
| c    | 0.09 |         | 0.20 | 0.0035 |            | 0.0079 |
| D    | 12.4 |         | 12.6 | 0.488  |            | 0.496  |
| E    |      | 8.1 BSC |      |        | 0.318 BSC  |        |
| E1   | 6.0  |         | 6.2  | 0.236  |            | 0.244  |
| e    |      | 0.5 BSC |      |        | 0.0197 BSC |        |
| K    | 0°   |         | 8°   | 0°     |            | 8°     |
| L    | 0.45 |         | 0.75 | 0.018  |            | 0.030  |



7065588D

Tape & Reel TSSOP48 MECHANICAL DATA

| DIM. | mm.  |     |      | inch  |      |        |
|------|------|-----|------|-------|------|--------|
|      | MIN. | TYP | MAX. | MIN.  | TYP. | MAX.   |
| A    |      |     | 330  |       |      | 12.992 |
| C    | 12.8 |     | 13.2 | 0.504 |      | 0.519  |
| D    | 20.2 |     |      | 0.795 |      |        |
| N    | 60   |     |      | 2.362 |      |        |
| T    |      |     | 30.4 |       |      | 1.197  |
| Ao   | 8.7  |     | 8.9  | 0.343 |      | 0.350  |
| Bo   | 13.1 |     | 13.3 | 0.516 |      | 0.524  |
| Ko   | 1.5  |     | 1.7  | 0.059 |      | 0.067  |
| Po   | 3.9  |     | 4.1  | 0.153 |      | 0.161  |
| P    | 11.9 |     | 12.1 | 0.468 |      | 0.476  |



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