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**CTS100LVEL32**

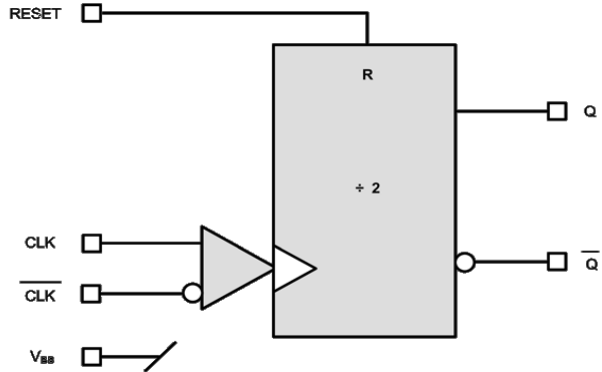
**LVPECL Divide by 2 Divider**  
**MLP8, MSOP8, SOIC8**

Not recommended for new designs

**FEATURES**

- 3.0+ GHz Toggle Frequency
- 470ps Propagation Delay
- Internal Input Pull-down Resistors
- 3.0V to 5.5V Power Supply
- RoHS Compliant Pb Free Packages

**BLOCK DIAGRAM**



**DESCRIPTION**

The CTS100LVEL32 is an integrated +2 divider. The reset pin is asynchronous and is asserted on the rising edge. Upon power-up, the internal flip-flop will attain a random logic state; the reset allows for the synchronization of multiple CTS100LVEL32's in a system.

The CTS100LVEL32 is a direct replacement for the On Semiconductor MC100EL/LVEL32.

**ENGINEERING NOTES**

The CTS100LVEL32 provides a  $V_{BB}$  output for single-ended use or a DC bias reference for AC coupling to the device. For single-ended input applications, the  $V_{BB}$  reference should be connected to one side of the CLK/ $\overline{CLK}$  differential input pair. The input signal is then fed to the other CLK/ $\overline{CLK}$  input. The  $V_{BB}$  pin should be used only as a bias for the CTS100LVEL32 as its sink/source capability is limited. When used, the  $V_{BB}$  pin should be bypassed to ground via a 0.01 $\mu$ F capacitor.

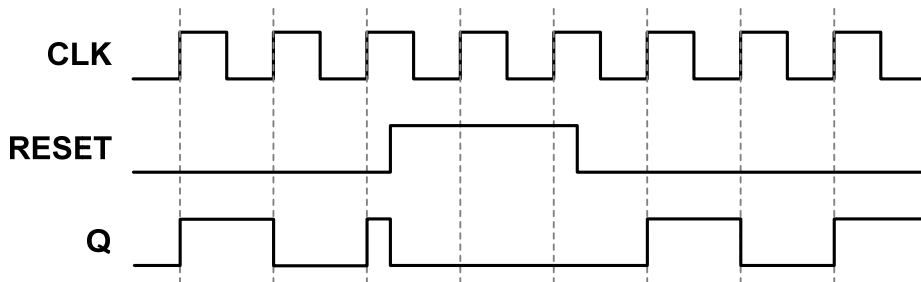
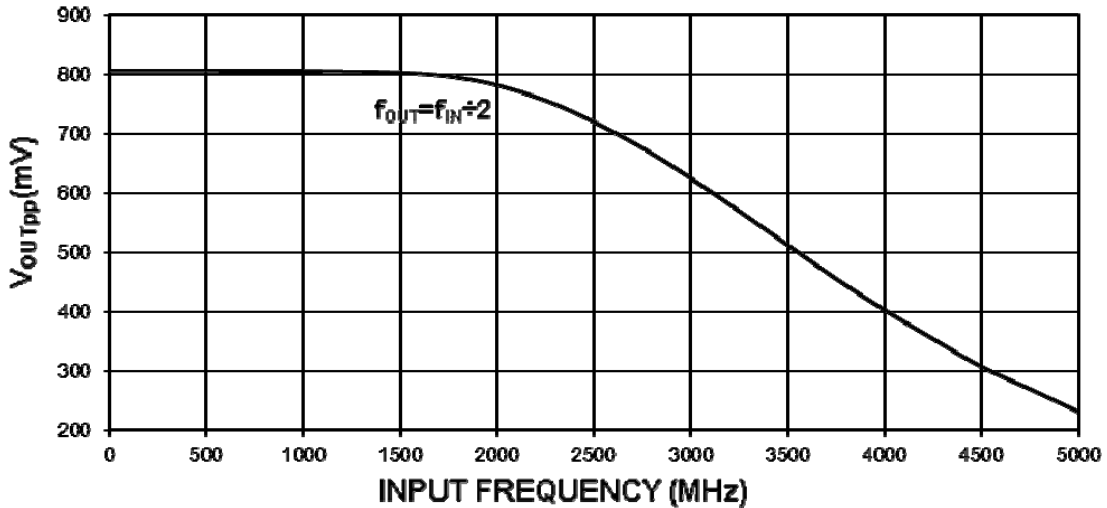


Figure 1 - Timing Diagram



**Figure 2 - Typical Large Signal Output Swing**  
Measured with 750mV input, output terminated to V<sub>CC</sub>-2V via 50Ω resistors.

## ELECTRICAL SPECIFICATIONS

Absolute Maximum Ratings are those values beyond which device life may be impaired.

| Symbol              | Characteristic                                | Condition            | Rating      | Unit |
|---------------------|---|----------------------|-------------|------|
| V <sub>CC</sub>     | PECL Power Supply                             | V <sub>EE</sub> = 0V | 0 to + 6.0  | V    |
| V <sub>I,PECL</sub> | PECL Input Voltage                            | V <sub>EE</sub> = 0V | 0 to + 6.0  | V    |
| V <sub>EE</sub>     | ECL Power Supply                              | V <sub>CC</sub> = 0V | -6.0 to 0   | V    |
| V <sub>I,ECL</sub>  | ECL Input Supply                              | V <sub>CC</sub> = 0V | -6.0 to 0   | V    |
| I <sub>OUT</sub>    | Output Current                                | Continuous           | 50          | mA   |
|                     |   | Surge                | 100         |      |
| T <sub>A</sub>      | Operating Temperature Range                   | -                    | -40 to +85  | °C   |
| T <sub>STG</sub>    | Storage Temperature Range                     | -                    | -65 to +150 | °C   |
| ESD <sub>HBM</sub>  | Human Body Model Electro Static Discharge     | -                    | 2500        | V    |
| ESD <sub>MM</sub>   | Machine Model Electro Static Discharge        | -                    | 200         | V    |
| ESD <sub>CDM</sub>  | Charged Device Model Electro Static Discharge | -                    | 2000        | V    |

**ECL DC Characteristics (VEE = -3.0V to -5.5V, VCC = GND)**

| Symbol          | Characteristic                   | -40°C |       | 0°C   |       | 25°C  |       | 85°C  |       | Unit |
|-----------------|----------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|------|
|                 |                                  | Min   | Max   | Min   | Max   | Min   | Max   | Min   | Max   |      |
| V <sub>OH</sub> | Output HIGH Voltage <sup>1</sup> | -1085 | -880  | -1025 | -880  | -1025 | -880  | -1025 | -880  | mV   |
| V <sub>OL</sub> | Output LOW Voltage <sup>1</sup>  | -1830 | -1555 | -1810 | -1620 | -1810 | -1620 | -1810 | -1620 | mV   |
| V <sub>IH</sub> | Input HIGH Voltage               | -1165 | -880  | -1165 | -880  | -1165 | -880  | -1165 | -880  | mV   |
| V <sub>IL</sub> | Input LOW Voltage                | -1810 | -1475 | -1810 | -1475 | -1810 | -1475 | -1810 | -1475 | mV   |
| V <sub>BB</sub> | Reference Voltage                | -1380 | -1260 | -1380 | -1260 | -1380 | -1260 | -1380 | -1260 | mV   |
| I <sub>IH</sub> | Input HIGH Current               |       | 150   |       | 150   |       | 150   |       | 150   | μA   |
| I <sub>IL</sub> | Input LOW Current CLK            | -150  |       | -150  |       | -150  |       | -150  |       | μA   |
|                 | Input LOW Current RESET          | 0.5   |       | 0.5   |       | 0.5   |       | 0.5   |       |      |
| I <sub>EE</sub> | Power Supply Current             |       | 30    |       | 30    |       | 30    |       | 35    | mA   |

<sup>1</sup> Specified with each output terminated through 50Ω resistors to V<sub>CC</sub> -2V.

**LVPECL DC Characteristics (VEE = GND, VCC = +3.3V)**

| Symbol          | Characteristic                     | -40°C |      | 0°C  |      | 25°C |      | 85°C |      | Unit |
|-----------------|------------------------------------|-------|------|------|------|------|------|------|------|------|
|                 |                                    | Min   | Max  | Min  | Max  | Min  | Max  | Min  | Max  |      |
| V <sub>OH</sub> | Output HIGH Voltage <sup>1,2</sup> | 2215  | 2420 | 2275 | 2420 | 2275 | 2420 | 2275 | 2420 | mV   |
| V <sub>OL</sub> | Output LOW Voltage <sup>1,2</sup>  | 1470  | 1745 | 1490 | 1680 | 1490 | 1680 | 1490 | 1680 | mV   |
| V <sub>IH</sub> | Input HIGH Voltage <sup>1</sup>    | 2135  | 2420 | 2135 | 2420 | 2135 | 2420 | 2135 | 2420 | mV   |
| V <sub>IL</sub> | Input LOW Voltage <sup>1</sup>     | 1490  | 1825 | 1490 | 1825 | 1490 | 1825 | 1490 | 1825 | mV   |
| V <sub>BB</sub> | Reference Voltage <sup>1</sup>     | 1920  | 2040 | 1920 | 2040 | 1920 | 2040 | 1920 | 2040 | mV   |
| I <sub>IH</sub> | Input HIGH Current                 |       | 150  |      | 150  |      | 150  |      | 150  | μA   |
| I <sub>IL</sub> | Input LOW Current CLK              | -150  |      | -150 |      | -150 |      | -150 |      | μA   |
|                 | Input LOW Current RESET            | 0.5   |      | 0.5  |      | 0.5  |      | 0.5  |      |      |
| I <sub>EE</sub> | Power Supply Current               |       | 30   |      | 30   |      | 30   |      | 35   | mA   |

<sup>1</sup> For supply voltages other than 3.3V, use the ECL table values and ADD supply voltage value.

<sup>2</sup> Specified with each output terminated through 50Ω resistors to V<sub>CC</sub> -2V.

**PECL DC Characteristics (VEE = GND, VCC = +5.0V)**

| Symbol          | Characteristic                     | -40°C |      | 0°C  |      | 25°C |      | 85°C |      | Unit |
|-----------------|------------------------------------|-------|------|------|------|------|------|------|------|------|
|                 |                                    | Min   | Max  | Min  | Max  | Min  | Max  | Min  | Max  |      |
| V <sub>OH</sub> | Output HIGH Voltage <sup>1,2</sup> | 3915  | 4120 | 3975 | 4120 | 3975 | 4120 | 3975 | 4120 | mV   |
| V <sub>OL</sub> | Output LOW Voltage <sup>1,2</sup>  | 3170  | 3445 | 3190 | 3380 | 3190 | 3380 | 3190 | 3380 | mV   |
| V <sub>IH</sub> | Input HIGH Voltage <sup>1</sup>    | 3835  | 4120 | 3835 | 4120 | 3835 | 4120 | 3835 | 4120 | mV   |
| V <sub>IL</sub> | Input LOW Voltage <sup>1</sup>     | 3190  | 3525 | 3190 | 3525 | 3190 | 3525 | 3190 | 3525 | mV   |
| V <sub>BB</sub> | Reference Voltage <sup>1</sup>     | 3620  | 3740 | 3620 | 3740 | 3620 | 3740 | 3620 | 3740 | mV   |
| I <sub>IH</sub> | Input HIGH Current                 |       | 150  |      | 150  |      | 150  |      | 150  | μA   |
| I <sub>IL</sub> | Input LOW Current CLK              | -150  |      | -150 |      | -150 |      | -150 |      | μA   |
|                 | Input LOW Current RESET            | 0.5   |      | 0.5  |      | 0.5  |      | 0.5  |      |      |
| I <sub>EE</sub> | Power Supply Current               |       | 30   |      | 30   |      | 30   |      | 35   | mA   |

<sup>1</sup> For supply voltages other than 3.3V, use the ECL table values and ADD supply voltage value.

<sup>2</sup> Specified with each output terminated through 50Ω resistors to V<sub>CC</sub> -2V.

**AC Characteristics (VEE = -3.0V to -5.5V; VCC=GND or VEE=GND; VCC = +3.0V to +5.5V)**

| Symbol                             | Characteristic             | -40°C            |     |                  | 0°C              |     |                  | 25°C             |     |                  | 85°C             |     |                  | Unit |
|------------------------------------|----------------------------|------------------|-----|------------------|------------------|-----|------------------|------------------|-----|------------------|------------------|-----|------------------|------|
|                                    |                            | Min              | Typ | Max              | Min              | Typ | Max              | Min              | Typ | Max              | Min              | Typ | Max              |      |
| f <sub>MAX</sub>                   | Maximum Toggle Frequency   | 2.6              |     |                  | 2.6              |     |                  | 2.6              |     |                  | 2.6              |     |                  | GHz  |
| t <sub>PLH</sub> /t <sub>PHL</sub> | CLK to Q̄                  | 360              | 450 | 540              | 370              | 460 | 550              | 380              | 470 | 560              | 400              | 490 | 580              | ps   |
|                                    | RESET to Q̄                | 390              | 540 | 690              | 440              | 540 | 640              | 440              | 540 | 640              | 450              | 550 | 650              | ps   |
| t <sub>SKEW</sub>                  | Duty Cycle Skew            |                  | 5   | 20               |                  | 5   | 20               |                  | 5   | 20               |                  | 5   | 20               | ps   |
| V <sub>PP</sub> (AC)               | Input Swing                |                  |     |                  |                  |     |                  |                  |     |                  |                  |     |                  |      |
|                                    | Differential               | 150              |     | 1000             | 150              |     | 1000             | 150              |     | 1000             | 150              |     | 1000             | mV   |
|                                    | Single Ended               | 300              |     | 2000             | 300              |     | 2000             | 300              |     | 2000             | 300              |     | 2000             | mV   |
| V <sub>CMR</sub>                   | Common Mode Range          | V <sub>EE+</sub> |     | V <sub>CC-</sub> | V <sub>EE+</sub> |     | V <sub>CC-</sub> | V <sub>EE+</sub> |     | V <sub>CC-</sub> | V <sub>EE+</sub> |     | V <sub>CC-</sub> |      |
|                                    | V <sub>PP</sub> < 500mV    | 1.2              |     | 0.4              | 1.1              |     | 0.4              | 1.1              |     | 0.4              | 1.1              |     | 0.4              | V    |
|                                    | V <sub>PP</sub> ≥ 500mV    | 1.4              |     | 0.4              | 1.3              |     | 0.4              | 1.3              |     | 0.4              | 1.3              |     | 0.4              | V    |
| t <sub>R</sub> /t <sub>F</sub>     | Output Rise/Fall (20%-80%) | 100              |     | 260              | 100              |     | 260              | 100              |     | 260              | 100              |     | 260              | ps   |

**CTS100LVEL32**

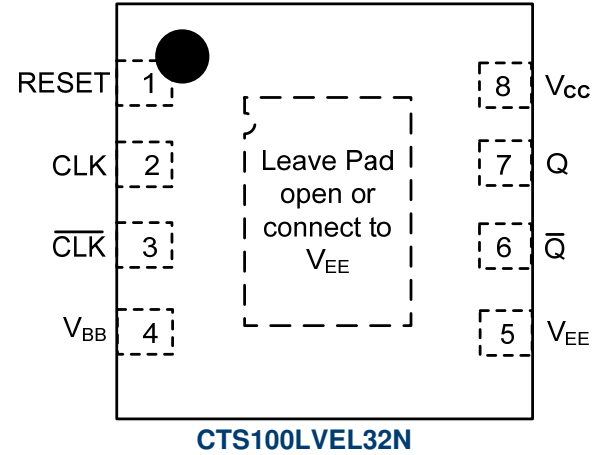
**LVPECL Divide by 2 Divider**  
**MLP8, MSOP8, SOIC8**

Not recommended for new designs

**Pin Description and Configuration**

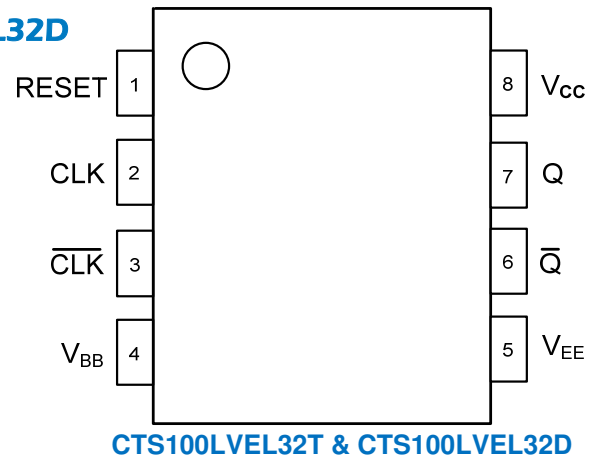
**Pin Assignments for CTS100LVEL32N**

| Pin | Name                    | Type   | Function              |
|-----|-------------------------|--------|-----------------------|
| 1   | RESET                   | Input  | Asynchronous Reset    |
| 2   | CLK                     | Input  | Clock Input           |
| 3   | $\overline{\text{CLK}}$ | Input  | Inverting Clock Input |
| 4   | $V_{\text{BB}}$         | Output | Reference Voltage     |
| 5   | $V_{\text{EE}}$         | Power  | Negative Supply       |
| 6   | $\overline{Q}$          | Output | Inverting PECL Output |
| 7   | Q                       | Output | PECL Output           |
| 8   | $V_{\text{CC}}$         | Power  | Positive Supply       |

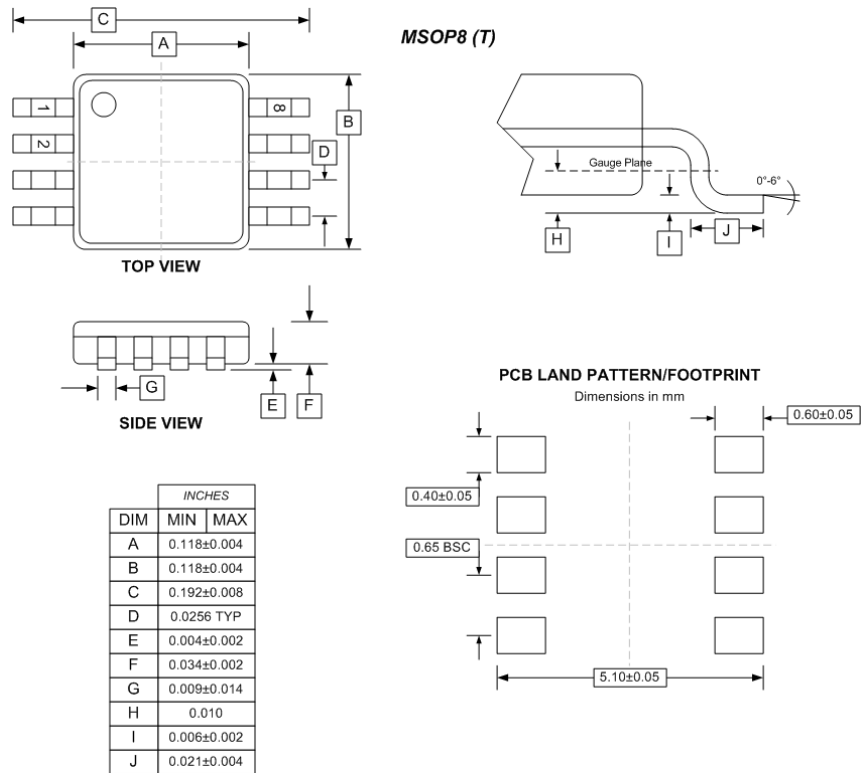
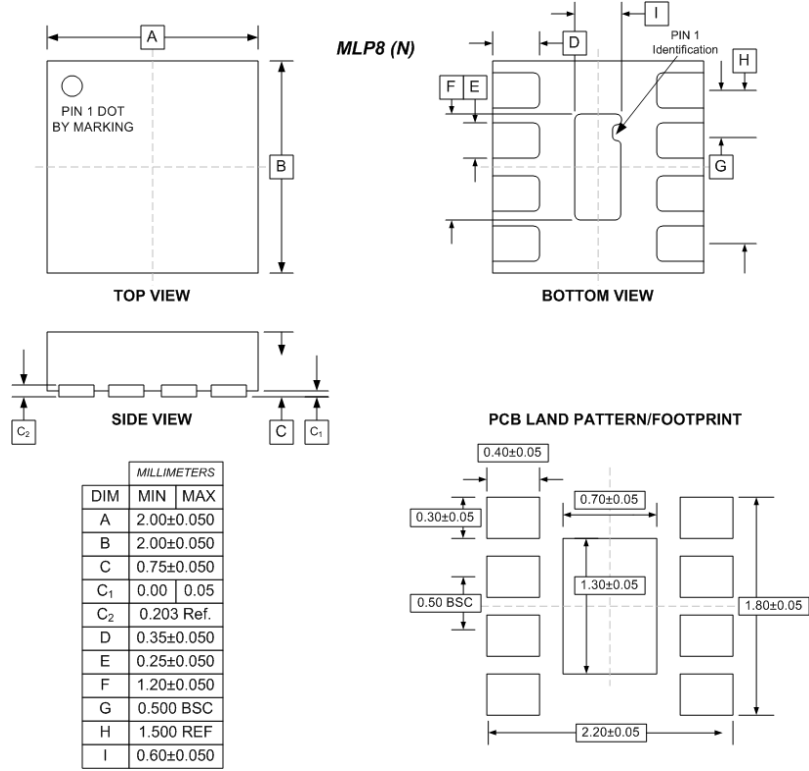


**Pin Assignments for CTS100LVEL32T & CTS100LVEL32D**

| Pin | Name                    | Type   | Function              |
|-----|-------------------------|--------|-----------------------|
| 1   | RESET                   | Input  | Asynchronous Reset    |
| 2   | CLK                     | Input  | Clock Input           |
| 3   | $\overline{\text{CLK}}$ | Input  | Inverting Clock Input |
| 4   | $V_{\text{BB}}$         | Output | Reference Voltage     |
| 5   | $V_{\text{EE}}$         | Power  | Negative Supply       |
| 6   | $\overline{Q}$          | Output | Inverting PECL Output |
| 7   | Q                       | Output | PECL Output           |
| 8   | $V_{\text{CC}}$         | Power  | Positive Supply       |



PACKAGE DIMENSIONS



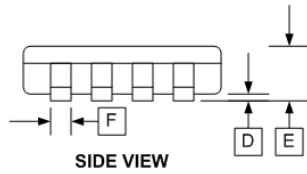
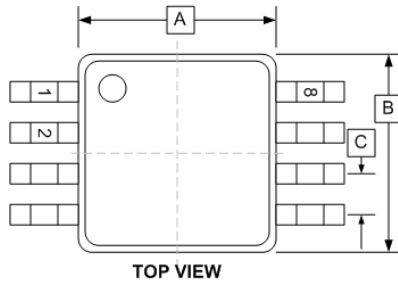
CTS100LVEL32

LVPECL Divide by 2 Divider

MLP8, MSOP8, SOIC8

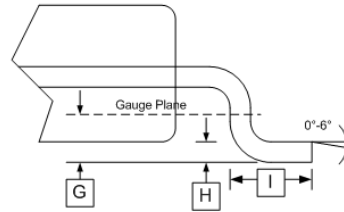
Not recommended for new designs

**PACKAGE DIMENSIONS**

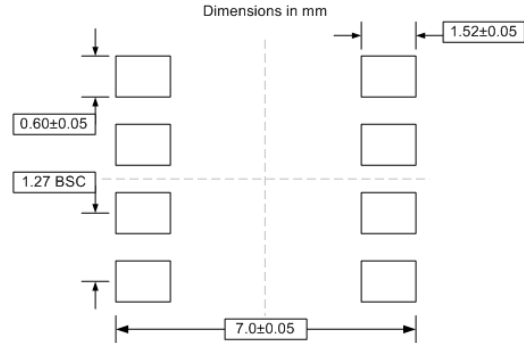


| DIM | mm       |      |
|-----|----------|------|
|     | MIN      | MAX  |
| A   | 3.81     | 3.99 |
| B   | 4.80     | 4.98 |
| C   | 1.27 BSC |      |
| D   | 0.10     | 0.25 |
| E   | 1.37     | 1.68 |
| F   | 0.36     | 0.48 |
| G   | 0.25     |      |
| H   | 0.19     | 0.25 |
| I   | 0.41     | 0.86 |

SOIC8 (D)



PCB LAND PATTERN/FOOTPRINT



**PART ORDERING INFORMATION**

| Part Number    | Package | Marking                 |
|----------------|---------|-------------------------|
| CTS100LVEL32NG | MLP8    | C2G / YWW               |
| CTS100LVEL32TG | MSOP8   | HL32G / YYWW            |
| CTS100LVEL32DG | SOIC8   | CTS100G / LVEL32 / YYWW |