

# MC100EPT25

## Differential LVECL/ECL to LVTTTL Translator

The MC100EPT25 is a Differential LVECL/ECL to LVTTTL translator. This device requires +3.3V, -3.3V to -5.2V, and ground. The small outline 8-lead SOIC package and the single gate of the EPT25 make it ideal for applications which require the translation of a clock or data signal.

The VBB output allows the EPT25 to also be used in a single-ended input mode. In this mode the VBB output is tied to the D input for a non-inverting buffer or the  $\bar{D}$  input for an inverting buffer. If used, the VBB pin should be bypassed to ground via a 0.01mF capacitor.

- 1.1ns Typical Propagation Delay
- 275MHz Fmax (Clock bit stream, not pseudo-random)
- Differential LVECL/ECL inputs
- Small Outline SOIC Package
- 24mA TTL outputs
- Flow Through Pinouts
- Internal Input Resistors: Pulldown on D, Pulldown and Pullup on  $\bar{D}$
- Q Output will default LOW with inputs open or at GND
- ESD Protection: >4000V HBM, >200V MM
- VBB Output
- New Differential Input Common Mode Range
- Moisture Sensitivity Level 1, Indefinite Time Out of Drypack.  
For Additional Information, See Application Note AND8003/D
- Flammability Rating: UL-94 code V-0 @ 1/8",  
Oxygen Index 28 to 34
- Transistor Count = 111 devices

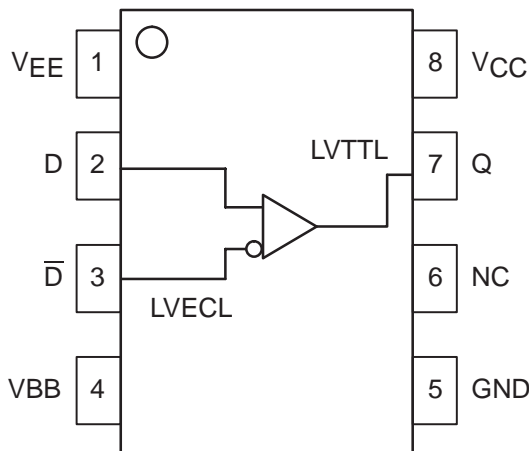


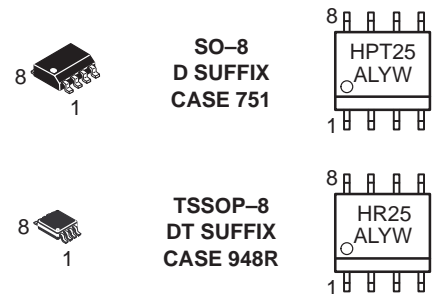
Figure 1. 8-Lead Pinout (Top View) and Logic Diagram



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### MARKING DIAGRAMS\*



A = Assembly Location  
L = Wafer Lot  
Y = Year  
W = Work Week

\*For additional information, see Application Note AND8002/D

### PIN DESCRIPTION

| PIN          | FUNCTION                      |
|--------------|-------------------------------|
| Q            | LVTTTL Output                 |
| D, $\bar{D}$ | Differential LVECL Input Pair |
| VCC          | Positive Supply               |
| VBB          | Output Reference Voltage      |
| GND          | Ground                        |
| VEE          | Negative Supply               |

### ORDERING INFORMATION

| Device         | Package | Shipping        |
|----------------|---------|-----------------|
| MC100EPT25D    | SO-8    | 98 Units / Rail |
| MC100EPT25DR2  | SO-8    | 2500 / Reel     |
| MC100EPT25DT   | TSSOP-8 | 98 Units / Rail |
| MC100EPT25DTR2 | TSSOP-8 | 2500 / Reel     |

# MC100EPT25

## MAXIMUM RATINGS\*

| Symbol        | Parameter  | Value         | Unit |
|---------------|--|---------------|------|
| $V_{CC}$      | Power Supply (Referenced to GND, $V_{EE} = -3.3V$ )              | 0 to 3.8      | VDC  |
| $V_{EE}$      | Power Supply (Referenced to GND, $V_{CC} = +3.3V$ )              | -6.0 to 0     | VDC  |
| $V_I$         | Input Voltage ( $V_I$ not more positive than GND)                | 0 to 3.8      | VDC  |
| $I_{out}$     | Output Current<br>Continuous<br>Surge                            | 50<br>100     | mA   |
| $I_{BB}$      | $V_{BB}$ Sink/Source Current†                                    | ± 0.5         | mA   |
| $T_A$         | Operating Temperature Range                                      | -40 to +85    | °C   |
| $T_{stg}$     | Storage Temperature  | -65 to +150   | °C   |
| $\theta_{JA}$ | Thermal Resistance (Junction-to-Ambient)<br>Still Air<br>500lfpm | 190<br>130    | °C/W |
| $\theta_{JC}$ | Thermal Resistance (Junction-to-Case)                            | 41 to 44 ± 5% | °C/W |
| $T_{sol}$     | Solder Temperature (<2 to 3 Seconds: 245°C desired)              | 265           | °C   |

\* Maximum Ratings are those values beyond which damage to the device may occur.

† Use for inputs of same package only.

## DC CHARACTERISTICS, ECL/LVECL ( $V_{CC} = +3.3V$ ; $V_{EE} = -5.5V$ to $-3.0V$ , GND = 0V)

| Symbol      | Characteristic                                    | -40°C        |             |       | 25°C         |       |       | 85°C         |       |       | Unit |
|-------------|---|--------------|-------------|-------|--------------|-------|-------|--------------|-------|-------|------|
|             |   | Min          | Typ         | Max   | Min          | Typ   | Max   | Min          | Typ   | Max   |      |
| $I_{EE}$    | Power Supply Current<br>(Note 1.)                 | 8.0          | 16          | 25    | 8.0          | 16    | 25    | 8.0          | 16    | 25    | mA   |
| $V_{IH}$    | Input HIGH Voltage Single Ended<br>(Note 4.)      | -1165        |             | -880  | -1165        |       | -880  | -1165        |       | -880  | mV   |
| $V_{IL}$    | Input LOW Voltage Single Ended<br>(Note 4.)       | -1810        |             | -1625 | -1810        |       | -1625 | -1810        |       | -1625 | mV   |
| $V_{BB}$    | Output Voltage Reference                          | -1550        | -1450       | -1350 | -1550        | -1450 | -1350 | -1550        | -1450 | -1350 | mV   |
| $V_{IHCMR}$ | Input HIGH Voltage Common Mode<br>Range (Note 3.) | $V_{EE}+2.0$ |             | 0.0   | $V_{EE}+2.0$ |       | 0.0   | $V_{EE}+2.0$ |       | 0.0   | V    |
| $I_{IH}$    | Input HIGH Current                                |              |             | 150   |              |       | 150   |              |       | 150   | μA   |
| $I_{IL}$    | Input LOW Current                                 | D<br>D       | 0.5<br>-150 |       | 0.5<br>-150  |       |       | 0.5<br>-150  |       |       | μA   |

NOTE: 100EP circuits are designed to meet the DC specifications shown in the above table after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500lfpm is maintained.

1. ( $V_{CC} = +3.3V$ , GND = 0V,  $V_{EE} = -3.3V$ ), all other pins floating.
2. All loading with 500 ohms to GND,  $C_L = 20pF$ .
3.  $V_{IHCMR}$  min varies 1:1 with  $V_{EE}$ , max varies 1:1 with  $V_{CC}$ .
4. Input and output parameters vary 1:1 with  $V_{CC}$ .

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## TTL OUTPUT DC CHARACTERISTICS ( $V_{CC} = 3.3V \pm 0.3V$ ; $GND = 0V$ ; $V_{EE} = -3.3V \pm 0.3V$ ; $T_A = -40^\circ C$ to $85^\circ C$ )

| Symbol    | Characteristic                                      | Min  | Typ | Max | Unit |
|-----------|---|------|-----|-----|------|
| $I_{CCH}$ | Power Supply Current (Outputs set to HIGH)          | 6.0  | 10  | 14  | mA   |
| $I_{CCL}$ | Power Supply Current (Outputs set to LOW)           | 7.0  | 12  | 17  | mA   |
| $V_{OH}$  | Output HIGH Voltage ( $I_{OH} = -3.0mA$ ) (Note 5.) | 2.2  |     |     | V    |
| $V_{OL}$  | Output LOW Voltage ( $I_{OL} = 24mA$ ) (Note 5.)    |      |     | 0.5 | V    |
| $I_{OS}$  | Output Short Circuit Current                        | -130 |     | -60 | mA   |

NOTE: 100EP circuits are designed to meet the DC specifications shown in the above table after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500lfpm is maintained.

5. All loading with 500 ohms to GND,  $CL = 20pF$ .

## AC CHARACTERISTICS ( $V_{CC} = 3.3V \pm 0.3V$ ; $GND = 0V$ )

| Symbol                                   | Characteristic  | $-40^\circ C$ |                 |             | $25^\circ C$ |                 |             | $85^\circ C$ |                 |             | Unit |
|--|---|---------------|-----------------|-------------|--------------|-----------------|-------------|--------------|-----------------|-------------|------|
|  |   | Min           | Typ             | Max         | Min          | Typ             | Max         | Min          | Typ             | Max         |      |
| $f_{max}$                                | Maximum Toggle Frequency  | 275           |                 |             | 275          |                 |             | 275          |                 |             | MHz  |
| $t_{PLH}$ ,<br>$t_{PHL}$                 | Propagation Delay to Output Differential  | 800           | 1200            | 1800        | 800          | 1100            | 1600        | 800          | 1100            | 1600        | ns   |
| $t_{SK+ +}$<br>$t_{SK- -}$<br>$t_{SKPP}$ | Output-to-Output Skew++<br>Output-to-Output Skew--<br>Part-to-Part Skew (Note 6.) |               | 60<br>25<br>500 |             |              | 60<br>25<br>500 |             |              | 60<br>25<br>500 |             | ps   |
| $t_{JITTER}$                             | Cycle-to-Cycle Jitter   |               | TBD             |             |              | TBD             |             |              | TBD             |             | ps   |
| $V_{PP}$                                 | Input Voltage Swing (Differential) (Note 7.)                                      | 100           | 800             | 1200        | 100          | 800             | 1200        | 100          | 800             | 1200        | mV   |
| $t_r$<br>$t_f$                           | Output Rise/Fall Times $Q, \bar{Q}$<br>(0.8V – 2.0V)                              | 450<br>900    | 600<br>1160     | 750<br>1400 | 450<br>900   | 600<br>1100     | 750<br>1400 | 450<br>900   | 600<br>1100     | 750<br>1400 | ps   |

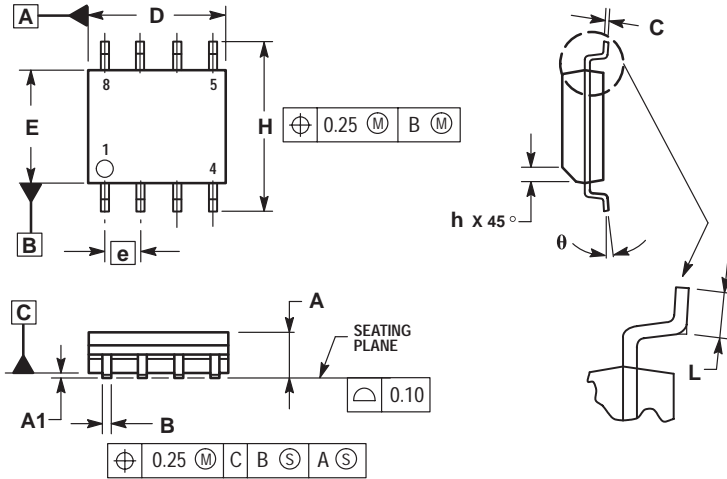
6. Skews are measured between outputs under identical conditions.

7. 200mV input guarantees full logic swing at the output.

# MC100EPT25

## PACKAGE DIMENSIONS

SO-8  
D SUFFIX  
PLASTIC SOIC PACKAGE  
CASE 751-06  
ISSUE T



### NOTES:

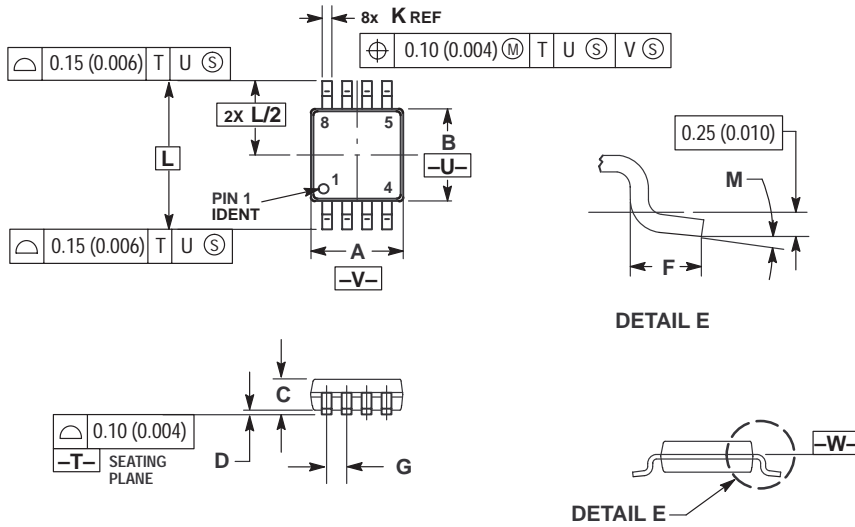
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. DIMENSIONS ARE IN MILLIMETER.
3. DIMENSION D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 TOTAL IN EXCESS OF THE B DIMENSION AT MAXIMUM MATERIAL CONDITION.

| DIM      | MILLIMETERS |      |
|----------|-------------|------|
|          | MIN         | MAX  |
| A        | 1.35        | 1.75 |
| A1       | 0.10        | 0.25 |
| B        | 0.35        | 0.49 |
| C        | 0.19        | 0.25 |
| D        | 4.80        | 5.00 |
| E        | 3.80        | 4.00 |
| e        | 1.27 BSC    |      |
| H        | 5.80        | 6.20 |
| h        | 0.25        | 0.50 |
| L        | 0.40        | 1.25 |
| $\theta$ | 0°          | 7°   |

# MC100EPT25

## PACKAGE DIMENSIONS

TSSOP-8  
DT SUFFIX  
PLASTIC TSSOP PACKAGE  
CASE 948R-02  
ISSUE A



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
5. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
6. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE -W-.

| DIM | MILLIMETERS |      | INCHES    |       |
|-----|-------------|------|-----------|-------|
|     | MIN         | MAX  | MIN       | MAX   |
| A   | 2.90        | 3.10 | 0.114     | 0.122 |
| B   | 2.90        | 3.10 | 0.114     | 0.122 |
| C   | 0.80        | 1.10 | 0.031     | 0.043 |
| D   | 0.05        | 0.15 | 0.002     | 0.006 |
| F   | 0.40        | 0.70 | 0.016     | 0.028 |
| G   | 0.65 BSC    |      | 0.026 BSC |       |
| K   | 0.25        | 0.40 | 0.010     | 0.016 |
| L   | 4.90 BSC    |      | 0.193 BSC |       |
| M   | 0°          | 6°   | 0°        | 6°    |

**Notes**

**Notes**

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