

## 100325 Low Power Hex ECL-to-TTL Translator

Check for Samples: [100325](#)

### FEATURES

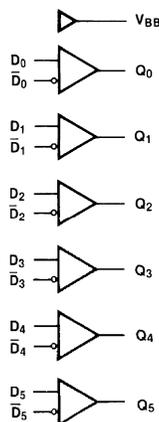
- Pin/function compatible with 100125
- Meets 100125 AC specifications
- 50% power reduction of the 100125
- Differential inputs with built in offset
- Standard FAST<sup>®</sup> outputs
- 2000V ESD protection
- -4.2V to -5.7V operating range
- Available to Microcircuit Drawing
  - (SMD) 5962-9153101

### DESCRIPTION

The 100325 is a hex translator for converting F100K logic levels to TTL logic levels. Differential inputs allow each circuit to be used as an inverting, non-inverting or differential receiver. An internal reference voltage generator provides  $V_{BB}$  for single-ended operation, or for use in Schmitt trigger applications. All inputs have 50 k $\Omega$  pull-down resistors. When the inputs are either unconnected or at the same potential the outputs will go low.

When used in single-ended operation the apparent input threshold of the true inputs is 20 mV to 40 mV higher (positive) than the threshold of the complementary inputs. The  $V_{EE}$  and  $V_{TTL}$  power may be applied in either order.

### Logic Diagram



Pin Names	Description
$D_0$ – $D_5$	Data Inputs
$\bar{D}_0$ – $\bar{D}_5$	Inverting Data Inputs
$Q_0$ – $Q_5$	Data Outputs

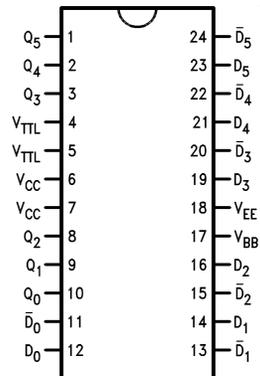


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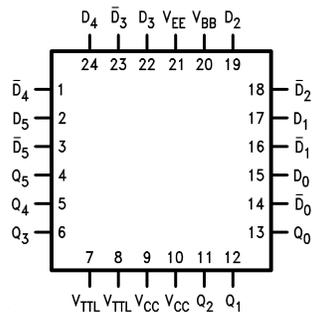
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## Connection Diagram

**Figure 1. 24-Pin DIP**



**Figure 2. 24-Pin Quad Cerpak**



**Truth Table**  
(1)

Inputs		Outputs
$D_n$	$\bar{D}_n$	$Q_n$
L	H	L
H	L	H
L	L	L
H	H	L
Open	Open	L
$V_{EE}$	$V_{EE}$	L
L	$V_{BB}$	L
H	$V_{BB}$	H
$V_{BB}$	L	H
$V_{BB}$	H	L

- (1) H = HIGH Voltage Level  
L = LOW Voltage Level



These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

### Absolute Maximum Ratings <sup>(1)</sup>

Above which the useful life may be impaired.

Storage Temperature ( $T_{STG}$ )	-65°C to +150°C
Maximum Junction Temperature ( $T_J$ )	
Ceramic	+175°C
$V_{EE}$ Pin Potential to Ground Pin	-7.0V to +0.5V
$V_{TTL}$ Pin Potential to Ground Pin	-0.5V to +6.0V
Input Voltage (DC)	$V_{EE}$ to +0.5V
Voltage Applied to Output	
in HIGH State (with $V_{CC} = 0V$ )	-0.5V to $V_{CC}$
Current Applied to Output	
in LOW State (Max)	twice the rated $I_{OL}$ (mA)
ESD <sup>(2)</sup>	=2000V

(1) Absolute maximum ratings are those values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

(2) ESD testing conforms to MIL-STD-883, Method 3015.

### Recommended Operating Conditions

Case Temperature ( $T_C$ )	
Military	-55°C to +125°C
Supply Voltage ( $V_{EE}$ )	-5.7V to -4.2V

### Military Version DC Electrical Characteristics

 $V_{EE} = -4.2V$  to  $-5.7V$ ,  $V_{CC} = V_{CCA} = GND$ ,  $T_C = -55^{\circ}C$  to  $+125^{\circ}C$ ,  $C_L = 50$  pF,  $V_{TTL} = +4.5V$  to  $+5.5V$ 

Symbol	Parameter	Min	Max	Units	$T_C$	Conditions	Notes
$V_{BB}$	Output Reference Voltage	-1380	-1260	mV	$0^{\circ}C$ to $+125^{\circ}C$	$I_{VBB} = -3 \mu A$ , $V_{EE} = -4.2V$ (1)(2)(3) $I_{VBB} = -2.1$ mA	$V_{EE} = -5.7V$
		-1396	-1260		$-55^{\circ}C$	$I_{VBB} = -3$ mA	
$V_{IH}$	Input HIGH Voltage	-1165	-870	mV	$-55^{\circ}C$ to $+125^{\circ}C$	Guaranteed HIGH Signal for All Inputs (with One Input Tied to $V_{BB}$ )	(1) (2) (3) (4)
$V_{IL}$	Input LOW Voltage	-1830	-1475	mV	$-55^{\circ}C$ to $+125^{\circ}C$	Guaranteed LOW Signal for All Inputs (with One Input Tied to $V_{BB}$ )	(1) (2) (3) (4)
$V_{OH}$	Output HIGH Voltage	2.5		mV	$0^{\circ}C$ to $+125^{\circ}C$	$I_{OH} = -2.0$ mA	$V_{IN} = V_{IH (Max)}$ OR $V_{IL (Min)}$
		2.4			$-55^{\circ}C$		
$V_{OL}$	Output LOW Voltage		0.5	mV	$-55^{\circ}C$ to $+125^{\circ}C$	$I_{OL} = 20$ mA	(1) (2) (3)
$V_{DIFF}$	Input Voltage Differential	150		mV	$-55^{\circ}C$ to $+125^{\circ}C$	Required for Full Output Swing	(1) (2) (3)
$V_{CM}$	Common Mode Voltage	-2000	-500	mV	$-55^{\circ}C$ to $+125^{\circ}C$		(1) (2) (3) (4)
$I_{IH}$	Input HIGH Current		350	$\mu A$	$0^{\circ}C$ to $+125^{\circ}C$	$V_{IN} = V_{IH (Max)}$ , $D_0-D_5 = V_{BB}$ , $D_0-D_5 = V_{IL (Min)}$	(1) (2) (3)
			500		$-55^{\circ}C$		
$I_{IL}$	Input LOW Current	0.50		$\mu A$	$-55^{\circ}C$ to $+125^{\circ}C$	$V_{IN} = V_{IL (Min)}$ , $D_0-D_5 = V_{BB}$	(1) (2) (3)
$I_{OS}$	Output Short Circuit Current	-150	-60	mA	$-55^{\circ}C$ to $+125^{\circ}C$	$V_{OUT} = GND$ Test One Output at a Time	(1) (2) (3)
$I_{CEX}$	Output HIGH Leakage Current		250	$\mu A$	$-55^{\circ}C$ to $+125^{\circ}C$	$V_{OUT} = 5.5V$	(1) (2) (3)
$I_{EE}$	$V_{EE}$ Power Supply Current	-35	-12	mA	$-55^{\circ}C$ to $+125^{\circ}C$	$D_0-D_5 = V_{BB}$	(1) (2) (3)
$I_{TTL}$	$V_{TTL}$ Power Supply Current		65	mA	$-55^{\circ}C$ to $+125^{\circ}C$	$D_0-D_5 = V_{BB}$	(1) (2) (3)

- (1) F100K 300 Series cold temperature testing is performed by temperature soaking (to guarantee junction temperature equals  $-55^{\circ}C$ ), then testing immediately without allowing for the junction temperature to stabilize due to heat dissipation after power-up. This provides "cold start" specs which can be considered a worst case condition at cold temperatures.
- (2) Screen tested 100% on each device at  $-55^{\circ}C$ ,  $+25^{\circ}C$ , and  $+125^{\circ}C$ , Subgroups 1, 2, 3, 7, and 8.
- (3) Sample tested (Method 5005, Table I) on each manufactured lot at  $-55^{\circ}C$ ,  $+25^{\circ}C$ , and  $+125^{\circ}C$ , Subgroups A1, 2, 3, 7, and 8.
- (4) Guaranteed by applying specified input condition and testing  $V_{OH}/V_{OL}$ .

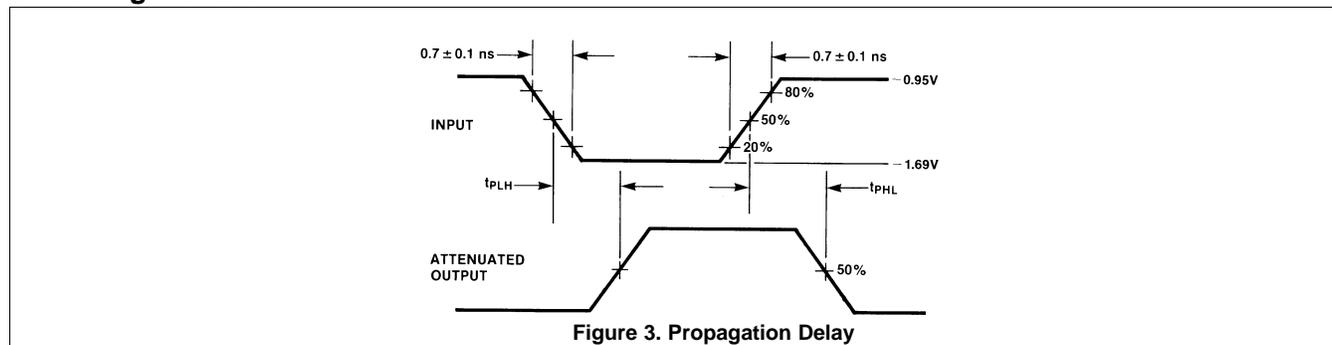
## AC Electrical Characteristics

 $V_{EE} = -4.2V$  to  $-5.7V$ ,  $V_{CC} = GND$ ,  $V_{TTL} = +4.5V$  to  $+5.5V$ 

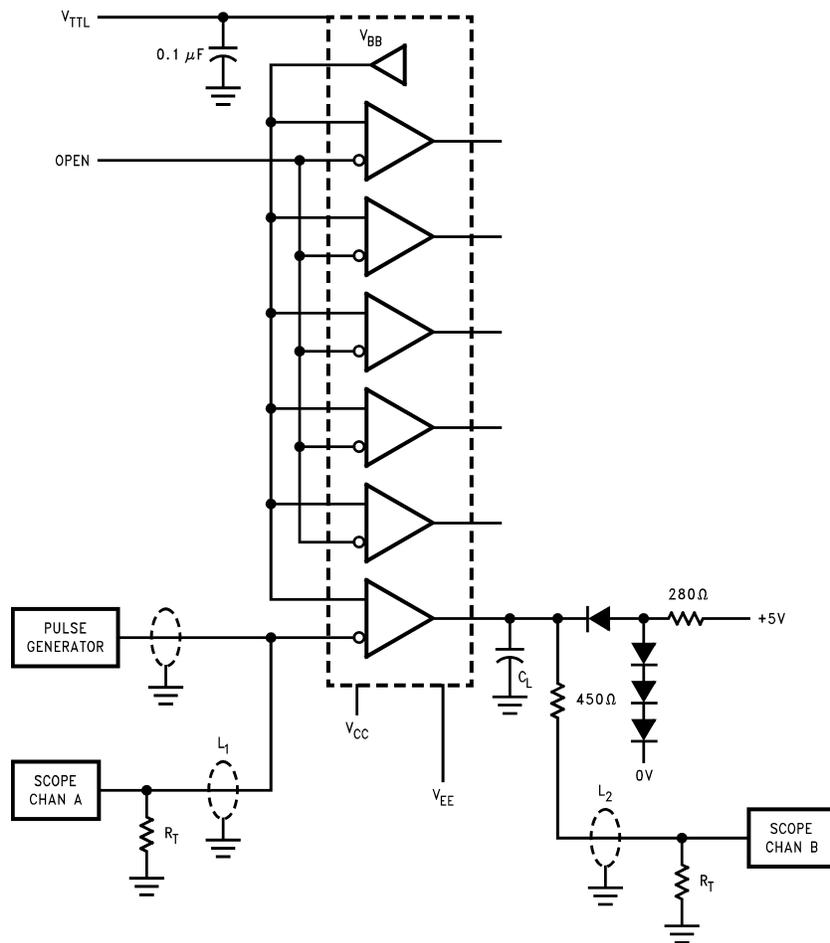
Symbol	Parameter	$T_C = -55^\circ C$		$T_C = +25^\circ C$		$T_C = +125^\circ C$		Units	Condition s	Notes
		Min	Max	Min	Max	Min	Max			
$t_{PLH}$ $t_{PHL}$	Propagation Delay Data to Output	1.50	5.00	1.60	4.70	1.70	5.70	ns	$C_L = 50$ pF	(1) (2) (3)

- (1) F100K 300 Series cold temperature testing is performed by temperature soaking (to guarantee junction temperature equals  $-55^\circ C$ ), then testing immediately after power-up. This provides “cold start” specs which can be considered a worst case condition at cold temperatures.
- (2) Screen tested 100% on each device at  $+25^\circ C$ , temperature only, Subgroup A9.
- (3) Sample tested (Method 5005, Table I) on each manufactured lot at  $+25^\circ C$ , Subgroup A9, and at  $+125^\circ C$  and  $-55^\circ C$  temperatures, Subgroups A10 and A11.

### Switching Waveform

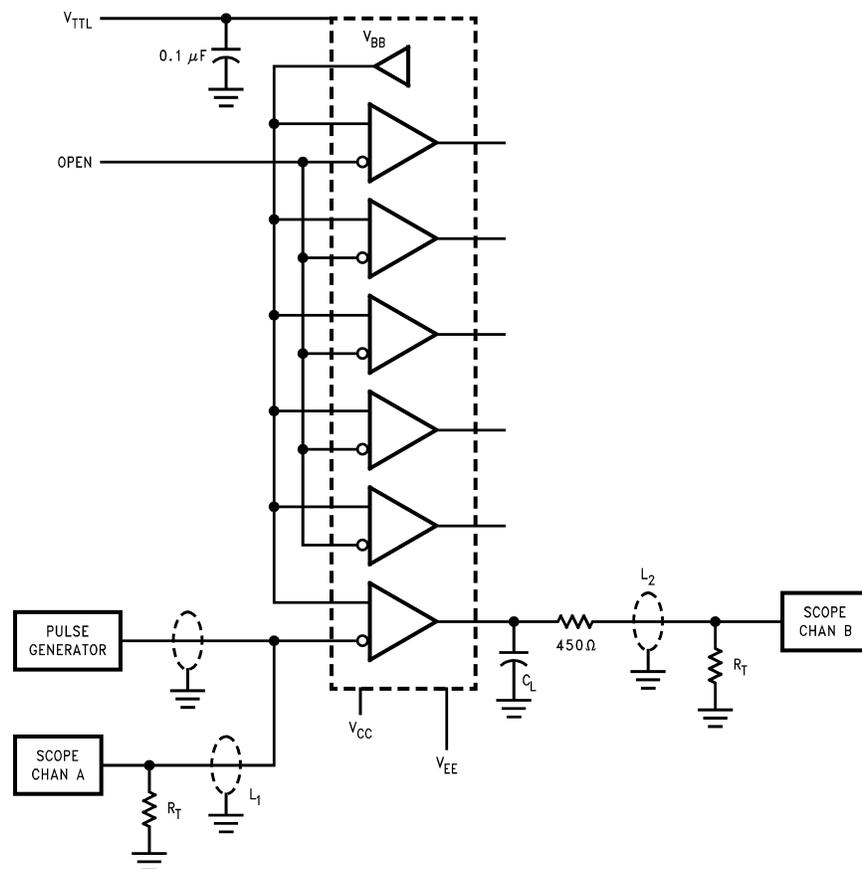


Test Circuits



**Notes:**  
 $V_{CC} = 0V$ ,  $V_{EE} = -4.5V$ ,  $V_{TTL} = +5V$   
 $L_1$  and  $L_2$  = equal length 500 impedance lines  
 $R_T$  = 50Ω terminator internal to scope  
 Decoupling 0.1  $\mu F$  from GND to  $V_{CC}$ ,  $V_{EE}$  and  $V_{TTL}$   
 All unused outputs are loaded with 500Ω to GND  
 $C_L$  = Fixture and stray capacitance = 15 pF

Figure 4. AC Test Circuit for 15 pF Loading

**Notes:**

- $V_{CC} = 0V$ ,  $V_{EE} = -4.5V$ ,  $V_{TTL} = +5V$
- $L1$  and  $L2$  = equal length 500 impedance lines
- $R_T = 500$  terminator internal to scope
- Decoupling  $0.1 \mu F$  from GND to  $V_{CC}$ ,  $V_{EE}$  and  $V_{TTL}$
- All unused outputs are loaded with  $500\Omega$  to GND
- $C_L$  = Fixture and stray capacitance =  $50 \text{ pF}$

**Figure 5. AC Test Circuit for 50 pF Loading**

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