100325 Low Power Hex ECL-to-TTL Translator

Check for Samples: 100325

FEATURES

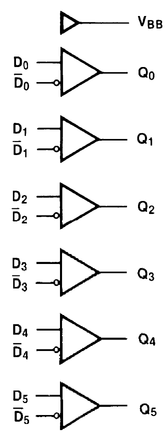
- **Pin/function compatible with 100125**
- **Meets 100125 AC specifications**
- **50% power reduction of the 100125**
- **Differential inputs with built in offset**
- **Standard FAST® outputs**
- **2000V ESD protection**
- **-4.2V to -5.7V operating range**
- **Available to Microcircuit Drawing**
  - **(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 kO 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
$\overline{D}_0$–$\overline{D}_5$	Inverting Data Inputs
Q_0–Q_5	Data Outputs

Connection Diagram

Figure 1. 24-Pin DIP

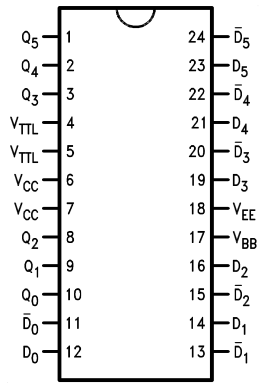
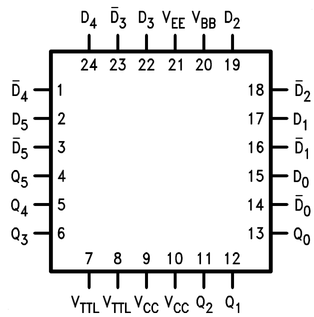


Figure 2. 24-Pin Quad Cerpak



Truth Table
(1)

Inputs		Outputs
D_n	$\overline{D}_n$	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 (1)

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 (2)	=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 OperatingConditions

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°C to +125°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°C to +125°C	I_{VBB} = -3 µA, V_{EE} = -4.2V		
						(1)(2)(3) I_{VBB} = -2.1 mA	V_{EE} = -5.7V	
		-1396	-1260		-55°C	I_{VBB} = -3 mA		
V_{IH}	Input HIGH Voltage	-1165	-870	mV	-55°C to +125°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°C to +125°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°C to +125°C	I_{OH} = -2.0 mA	V_{IN} = $V_{IH (Max)}$ or $V_{IL (Min)}$	(1) (2) (3)
		2.4			-55°C			
V_{OL}	Output LOW Voltage		0.5	mV	-55°C to +125°C	I_{OL} = 20 mA		
V_{DIFF}	Input Voltage Differential	150		mV	-55°C to +125°C	Required for Full Output Swing		(1) (2) (3)
V_{CM}	Common Mode Voltage	-2000	-500	mV	-55°C to +125°C			(1) (2) (3) (4)
I_{IH}	Input HIGH Current		350	µA	0°C to +125°C	V_{IN} = $V_{IH (Max)}$, $\overline{D_0}$–$\overline{D_5}$ = V_{BB} , $\overline{D_0}$–$\overline{D_5}$ = $V_{IL (Min)}$		(1) (2) (3)
			500		-55°C			
I_{IL}	Input LOW Current	0.50		µA	-55°C to +125°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°C to +125°C	V_{OUT} = GND Test One Output at a Time		(1) (2) (3)
I_{CEX}	Output HIGH Leakage Current		250	µA	-55°C to +125°C	V_{OUT} = 5.5V		(1) (2) (3)
I_{EE}	V_{EE} Power Supply Current	-35	-12	mA	-55°C to +125°C	D_0–D_5 = V_{BB}		(1) (2) (3)
I_{TTL}	V_{TTL} Power Supply Current		65	mA	-55°C to +125°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°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°C, +25°C, and +125°C, Subgroups 1, 2, 3, 7, and 8.
(3) Sample tested (Method 5005, Table I) on each manufactured lot at -55°C, + 25°C, and +125°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°C		T_C = +25°C		T_C = +125°C		Units	Conditions	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°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°C, temperature only, Subgroup A9.
(3) Sample tested (Method 5005, Table I) on each manufactured lot at +25°C, Subgroup A9, and at +125°C and -55°C temperatures, Subgroups A10 and A11.

Switching Waveform

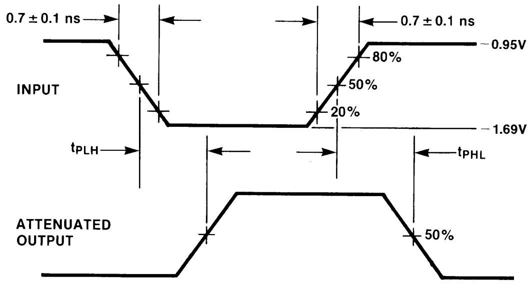
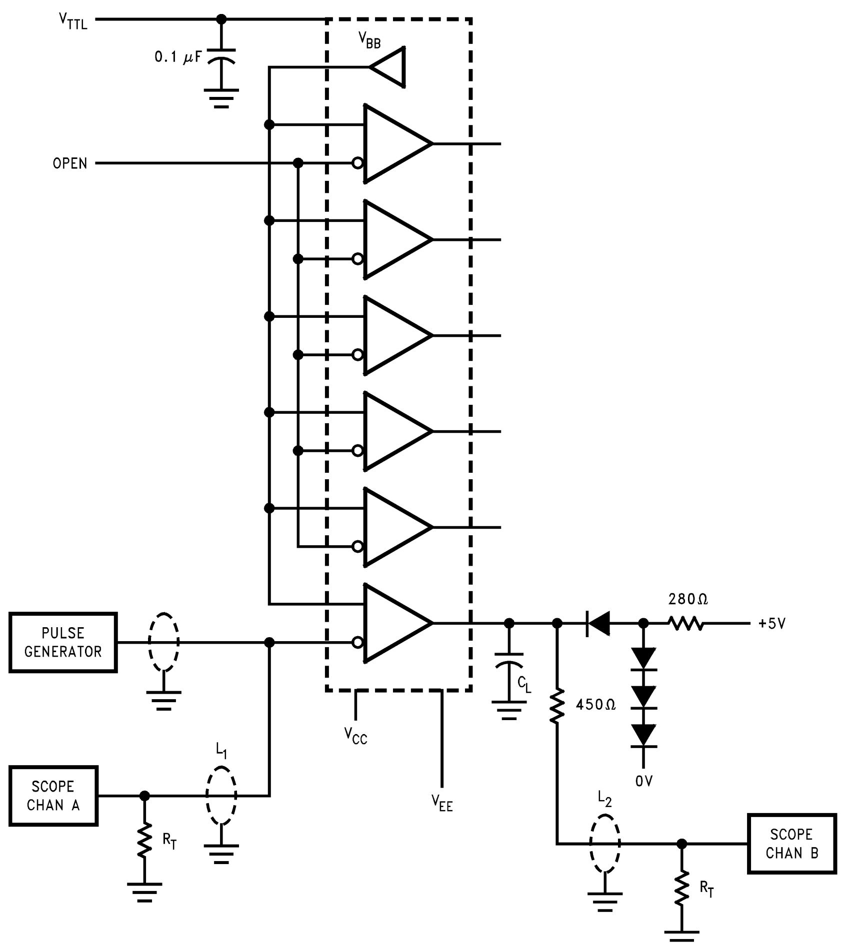


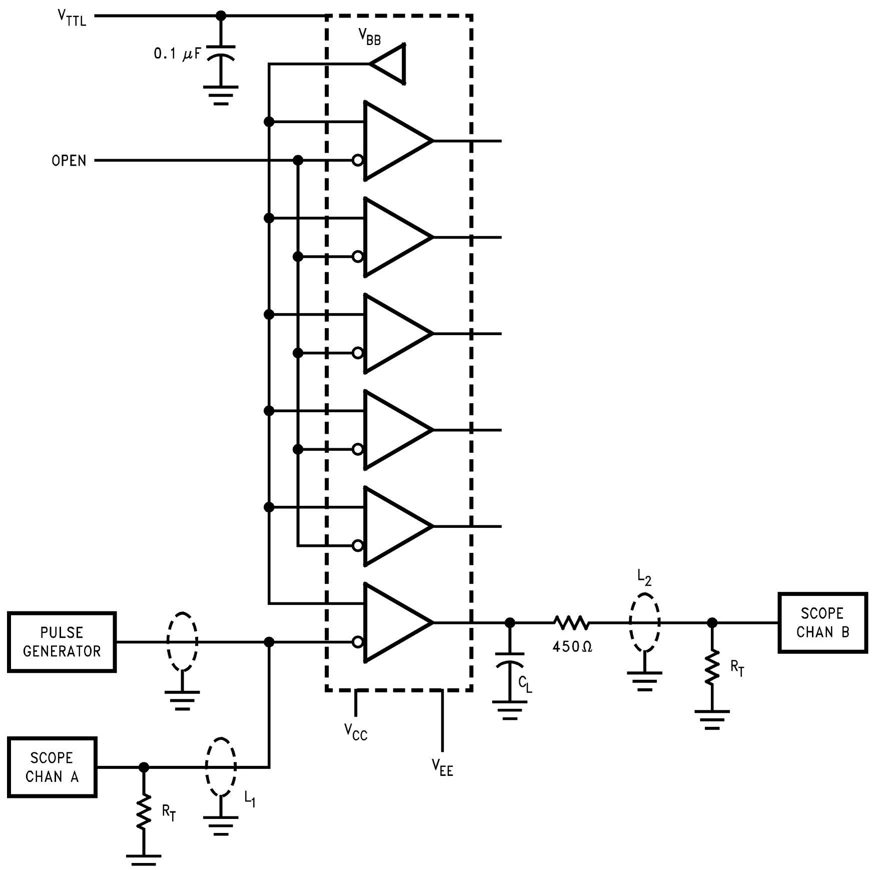
Figure 3. Propagation Delay

Test Circuits



Notes:
V_{CC} = 0V, V_{EE} = -4.5V, V_{TTL} = +5V
L1 and L2 = equal length 50O impedance lines
R_T = 50O terminator internal to scope
Decoupling 0.1 µF from GND to V_{CC}, V_{EE} and V_{TTL}
All unused outputs are loaded with 500O 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 50O impedance lines

R_T = 50O terminator internal to scope

Decoupling 0.1 µF from GND to V_{CC}, V_{EE} and V_{TTL}

All unused outputs are loaded with 500O to GND

C_L = Fixture and stray capacitance = 50 pF

Figure 5. AC Test Circuit for 50 pF Loading

Products		**Applications**	
Audio	www.ti.com/audio	Automotive and Transportation	www.ti.com/automotive
Amplifiers	amplifier.ti.com	Communications and Telecom	www.ti.com/communications
Data Converters	dataconverter.ti.com	Computers and Peripherals	www.ti.com/computers
DLP® Products	www.dlp.com	Consumer Electronics	www.ti.com/consumer-apps
DSP	dsp.ti.com	Energy and Lighting	www.ti.com/energy
Clocks and Timers	www.ti.com/clocks	Industrial	www.ti.com/industrial
Interface	interface.ti.com	Medical	www.ti.com/medical
Logic	logic.ti.com	Security	www.ti.com/security
Power Mgmt	power.ti.com	Space, Avionics and Defense	www.ti.com/space-avionics-defense
Microcontrollers	microcontroller.ti.com	Video and Imaging	www.ti.com/video
RFID	www.ti-rfid.com		
OMAP Applications Processors	www.ti.com/omap	**TI E2E Community**	e2e.ti.com
Wireless Connectivity	www.ti.com/wirelessconnectivity		

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265