

# 100395 Low Power 9-Bit ECL-to-TTL Translator with Registers

## General Description

The 100395 is a 9-bit translator for converting F100K logic levels to TTL logic levels. A HIGH on the output enable ( $\overline{OE}$ ) holds the TTL outputs in a high impedance state. Two separate clock inputs are available for multiplexing and system level testing.

The 100395 is designed with TTL 64 mA outputs for bus driving capability. 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.

## Features

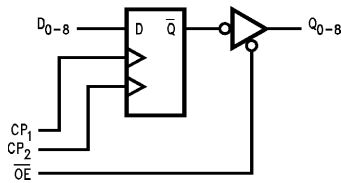
- 64 mA  $I_{OL}$  drive capability
- 2000V ESD protection
- -4.2V to -5.7V operating range
- Registered outputs
- TTL outputs

## Ordering Code:

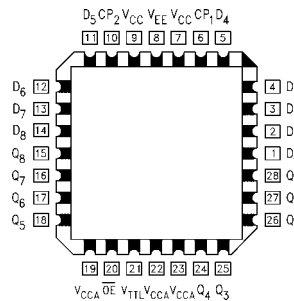
Order Number	Package Number	Package Description
100395QC	V28A	28-Lead Plastic Lead Chip Carrier (PLCC), JEDEC MO-047, 0.450 Square

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

## Logic Symbol



## Connection Diagram



## Pin Descriptions

Pin Names	Description
$D_0$ - $D_8$	Data Inputs (ECL)
$Q_0$ - $Q_8$	Data Outputs (TTL)
$\overline{OE}$	Output Enable (ECL)
$CP_1, CP_2$	Clock Inputs (ECL)

## Truth Table

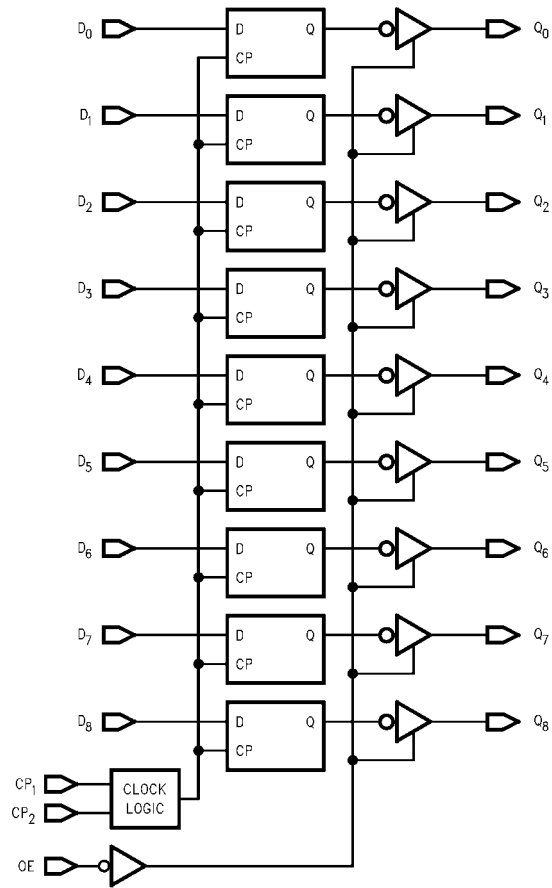
Inputs				Outputs
$CP_1$	$CP_2$	$\overline{OE}$	$D_N$	$Q_N$
↗	L	L	L	L
L	↗	L	L	L
↗	L	L	H	H
L	↗	L	H	H
H	X	X	X	NC
X	H	X	X	NC
L	L	X	X	NC
X	X	H	X	Z

H = HIGH Voltage Level  
L = LOW Voltage Level  
X = Don't Care

Z = High Impedance  
NC = No Change

100395

### Logic Diagram



**Absolute Maximum Ratings**(Note 1)

Storage Temperature ( $T_{STG}$ )	-65°C to +150°C
Maximum Junction Temperature ( $T_J$ )	+150°C
Case Temperature under Bias ( $T_C$ )	0°C to +85°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
ECL Input Voltage (DC)	$V_{EE}$ to +0.5V
TTL Input Voltage	-0.5V to +7.0V
Output Current	
(DC Output HIGH)	+130 mA
ESD (Note 2)	≥ 2000V

**Recommended Operating Conditions**

Case Temperature ( $T_C$ )	0°C to +85°C
Supply Voltage	
$V_{EE}$	-5.7V to -4.2V
$V_{TTL}$	+4.5V to +5.5V

**Note 1:** The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the Electrical Characteristics tables are not guaranteed at the absolute maximum rating. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

**Note 2:** ESD testing conforms to MIL-STD-883, Method 3015.

**Commercial Version****DC Electrical Characteristics** (Note 3)

$V_{EE} = -4.2V$  to  $-5.7V$ ,  $V_{CC} = V_{CCA} = GND$ ,  $T_C = 0^\circ C$  to  $+85^\circ C$

Symbol	Parameter	Min	Typ	Max	Units	Conditions
$V_{OH}$	Output HIGH Voltage	2.4			V	$I_{OH} = -15$ mA $V_{IN} = V_{IH}$ (Max)
$V_{OL}$	Output LOW Voltage			0.55	V	$I_{OL} = 64$ mA or $V_{IL}$ (Min)
$V_{IH}$	Input HIGH Voltage	-1165		-870	mV	Guaranteed HIGH Signal for All Inputs
$V_{IL}$	Input LOW Voltage	-1830		-1475	mV	Guaranteed LOW Signal for All Inputs
$I_{IL}$	Input LOW Current	0.5			μA	$V_{IN} = V_{IL}$ (Min)
$I_{IH}$	Input HIGH Current			240	μA	$V_{IN} = V_{IH}$ (Max)
$I_{OZL}$	3-STATE Current Output HIGH			-50	μA	$V_{OUT} = +0.4V$
$I_{OZH}$	3-STATE Current Output LOW			+50	μA	$V_{OUT} = +2.7V$
$I_{CEX}$	Output HIGH Leakage Current			250	μA	$V_{OUT} = V_{CC}$
$I_{OS}$	Output Short-Circuit Current	-100		-225	mA	
$I_{EE}$	$V_{EE}$ Power Supply Current	-67		-29	mA	Inputs OPEN
$I_{CCH}$	$V_{TTL}$ Power Supply Current HIGH			29	mA	
$I_{CCL}$	$V_{TTL}$ Power Supply Current LOW			65	mA	
$I_{CCZ}$	$V_{TTL}$ Power Supply Current 3-STATE			49	mA	

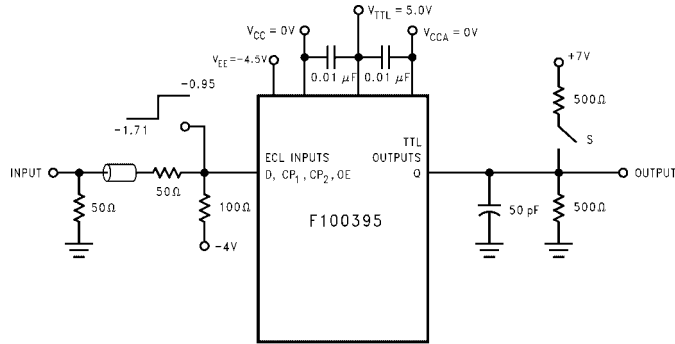
**Note 3:** The specified limits represent the "worst case" value for the parameter. Since these values normally occur at the temperature extremes, additional noise immunity and guardbanding can be achieved by decreasing the allowable system operating ranges. Conditions for testing shown in the tables are chosen to guarantee operation under "worst case" conditions.

**PLCC AC Electrical Characteristics**

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

Symbol	Parameter	$T_C = 0^\circ C$		$T_C = +25^\circ C$		$T_C = +85^\circ C$		Units	Conditions
		Min	Max	Min	Max	Min	Max		
$t_{PLH}$	Propagation Delay	2.30	5.00	2.30	5.00	2.30	5.00	ns	Figures 1, 2
$t_{PHL}$	Clock to Output	3.00	5.60	3.00	5.60	3.40	6.40		
$t_{PZL}$	Output Enable Time	3.20	7.60	3.20	7.60	3.20	7.60	ns	Figures 1, 3
$t_{PZH}$	$\overline{OE} \downarrow$ to $Q_N$	2.40	5.60	2.40	5.60	2.40	5.60		
$t_{PLZ}$	Output Disable Time	3.20	7.60	3.20	7.60	3.20	7.60	ns	Figures 1, 3
$t_{PHZ}$	$\overline{OE} \uparrow$ to $Q_N$	2.40	5.60	2.40	5.60	2.40	5.60		
$t_H$	Data to CP $\overline{EN}$	1.5		1.5		1.5		ns	Figures 1, 2
	Hold Time	1.5		1.5		1.5			
$t_S$	Data to CP $\overline{EN}$	0.5		0.5		0.5		ns	Figures 1, 2
	Setup Time	0.5		0.5		0.5			
$t_{PW(H)}$	Clock Pulse Width	2.0		2.0		2.0		ns	Figures 1, 2

### Test Circuit



**Notes:**

$V_{CC} = 0V$ ,  $V_{CCA} = 0V$ ,  $V_{EE} = -4.5V$ ,  $V_{TTL} = +5V$ .

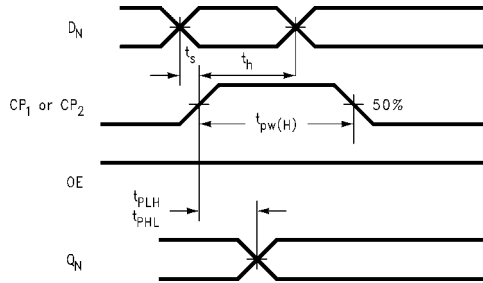
All unused outputs are loaded with 500Ω to GND. Decoupling capacitors are necessary in the test and end application environment. When  $V_{CC}$  and  $V_{CCA}$  are common to a single power plane, typically 0.0V, decouple  $V_{TTL}$  to that plane with one 0.01 μF capacitor.

**FIGURE 1. AC Test Circuit**

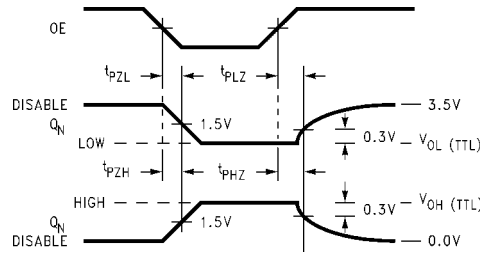
**Switch Positions for Parameter Testing**

Parameter	S-Position
$t_{PLH}$ , $t_{PHL}$	Open
$t_{PHZ}$ , $t_{PZH}$	Open
$t_{PLZ}$ , $t_{PZL}$	Closed

### Switching Waveforms

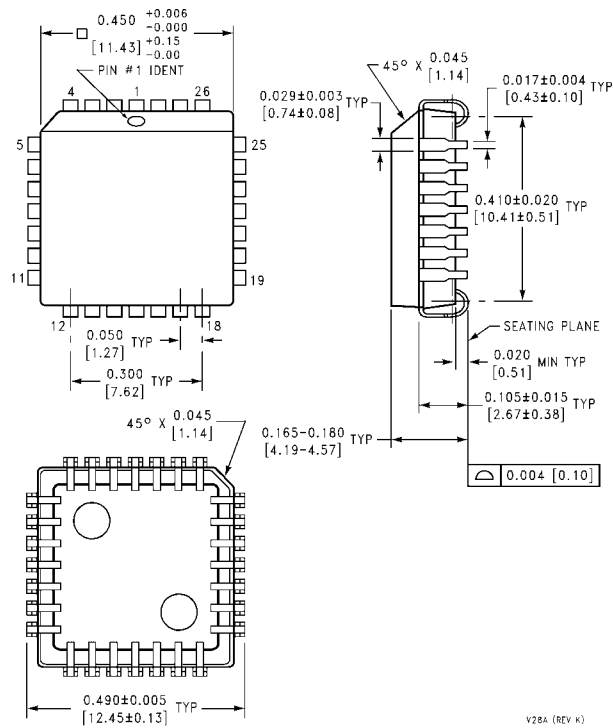


**FIGURE 2. Propagation Delay and Transition Times**



**FIGURE 3. Enable and Disable Waveforms, OE to Q<sub>N</sub>**

**Physical Dimensions** inches (millimeters) unless otherwise noted



**28-Lead Plastic Lead Chip Carrier (PLCC), JEDEC MO-047, 0.450 Square  
Package Number V28A**

V28A (REV K)

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