

Philips Components

Document No.	853-0610
ECN No.	99800
Date of Issue	June 14, 1990
Status	Product Specification
ECL Products	

100117

Triple 1-2-2 Input OR-AND/
OR-AND-INVERT Gate

FEATURES

- Typical propagation delay: 1.4ns for the data inputs, 0.75ns for the Enable Inputs
- Typical supply current ($-I_{EE}$): 57mA

DESCRIPTION

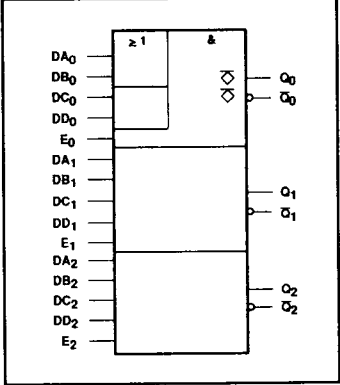
The 100117 has three OR/AND gates with True and Complementary outputs.

All unused inputs can be left open due to integrated pull-down resistors.

PIN DESCRIPTION

PINS	DESCRIPTION
DA ₀ - DA ₂ , DB ₀ - DB ₂ , DC ₀ - DC ₂ , DD ₀ - DD ₂	Data Inputs
E ₀ - E ₂	Enable Inputs
Q ₀ - Q ₂	True Data Outputs
$\bar{Q}_0$ - $\bar{Q}_2$	Complementary Data Outputs

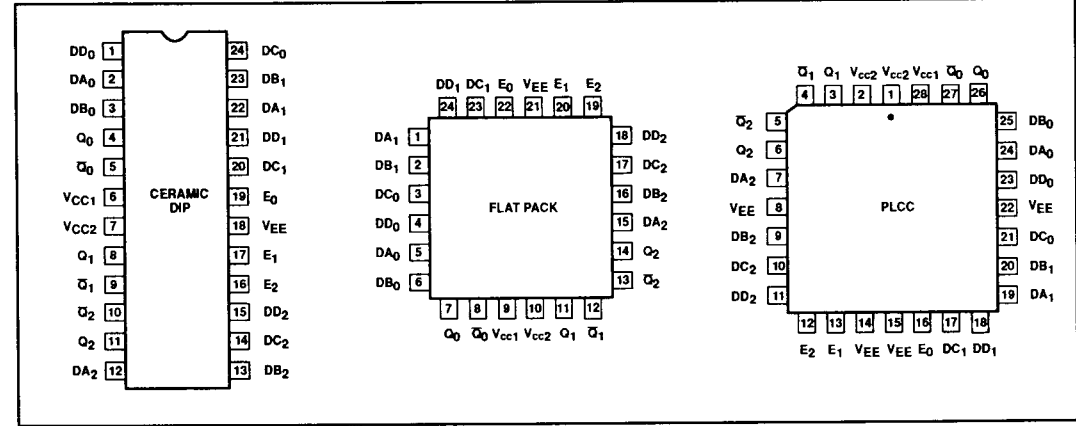
IEC/IEEE SYMBOL



ORDERING INFORMATION

DESCRIPTION	ORDER CODE
24-Pin Ceramic DIP (400 mils wide)	100117F
24-Pin Ceramic Flat Pack	100117Y
28-Pin PLCC	100117A

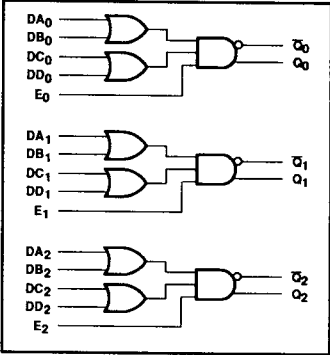
PIN CONFIGURATIONS



Gate

100117

LOGIC DIAGRAM

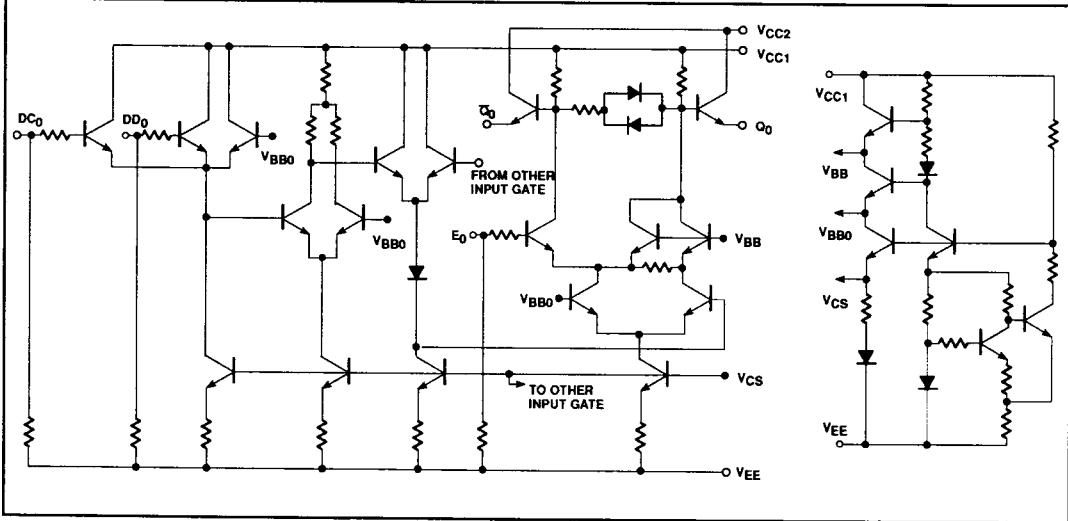


FUNCTION TABLE

INPUTS					OUTPUTS	
E_n	DA_n	DB_n	DC_n	DD_n	Q_n	$\bar{Q}_n$
L	X	X	X	X	L	H
X	X	X	L	X	L	H
X	L	X	X	X	L	H
H	H	X	X	X	L	H
H	X	X	X	X	L	H
H	X	H	X	X	L	H
H	X	X	H	X	L	H
H	H	H	X	X	L	H

NOTES:
H = High voltage level
L = Low voltage level
X = Don't care

SIMPLIFIED SCHEMATIC



ABSOLUTE MAXIMUM RATINGS $V_{CC1} = V_{CC2} = \text{ground}$, $T_A = 0^\circ\text{C}$ to $+85^\circ\text{C}$ unless otherwise specified.

SYMBOL	PARAMETER	LIMITS	UNIT
V_{EE}	Supply voltage range	-7.0 to +0.5	V
V_{IN}	Input voltage (V_{IN} should never be more negative than V_{EE})	V_{EE} to +0.5	V
I_O	Output source current (continuous)	-55	mA
T_S	Storage temperature range	-65 to +150	$^\circ\text{C}$
T_J	Maximum junction temperature	+150	$^\circ\text{C}$

NOTE:
Operation beyond the limits set forth in this table may impair the useful life of the device.

Gate

100117

DC OPERATING CONDITIONS

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			MIN.	NOM.	MAX.	
V_{CC1}, V_{CC2}	Circuit ground		0	0	0	V
V_{EE}	Supply voltage		-4.8	-4.5	-4.2	V
V_{EE}	Supply voltage when operating with the 10K or 10KH ECL family		-5.7			V
V_{IH}	High level input voltage	$V_{EE} = -4.2V$	-1150		-880	mV
		$V_{EE} = -4.5V$	-1165			
		$V_{EE} = -4.8V$	-1165			
V_{IL}	Low level input voltage	$V_{EE} = -4.2V$	-1810		-1475	mV
		$V_{EE} = -4.5V$			-1475	mV
		$V_{EE} = -4.8V$			-1490	mV
T_A	Operating ambient temperature range		0	+25	+85	°C

NOTE:

When operating at other than the specified V_{EE} voltages (-4.2V, -4.5V, -4.8V), the DC and AC electrical characteristics will vary slightly from their specified values.

DC ELECTRICAL CHARACTERISTICS $V_{CC1} = V_{CC2} = \text{ground}$, $V_{EE} = -4.8V$ to $-4.2V$, $T_A = 0^\circ\text{C}$ to $+85^\circ\text{C}$ unless otherwise specified^{1,3,4}

SYMBOL	PARAMETER	TEST CONDITIONS ²			LIMITS			UNIT
					MIN.	TYP.	MAX.	
V _{OH}	High level output voltage	Outputs loaded with 50Ω to -2.0V ±0.010V	Inputs at V _{IHMAX} or V _{ILMIN} .	V _{EE} = -4.2V	-1020		-870	mV
				V _{EE} = -4.5V	-1025	-955	-880	mV
				V _{EE} = -4.8V	-1035		-880	mV
V _{OHT}	High level output threshold voltage		Apply V _{IHMIN} or V _{ILMAX} to one input at a time, other inputs at V _{IHMAX} or V _{ILMIN} .	V _{EE} = -4.2V	-1030			mV
				V _{EE} = -4.5V	-1035			mV
				V _{EE} = -4.8V	-1045			mV
V _{OLT}	Low level output threshold voltage		Apply V _{IHMIN} or V _{ILMAX} to one input at a time, other inputs at V _{IHMAX} or V _{ILMIN} .	V _{EE} = -4.2V			-1595	mV
				V _{EE} = -4.5V			-1610	mV
				V _{EE} = -4.8V			-1610	mV
V _{OL}	Low level output voltage		Inputs at V _{IHMAX} or V _{ILMIN} .	V _{EE} = -4.2V	-1810		-1605	mV
				V _{EE} = -4.5V	-1810	-1705	-1620	mV
				V _{EE} = -4.8V	-1830		-1620	mV
I _{IH}	High level input current	One input under test at V _{IHMAX} . Other inputs at V _{ILMIN} .					260	μA
I _{IL}	Low level input current	One input under test at V _{ILMIN} . Other inputs at V _{IHMAX} .			0.5			μA
-I _{EE}	V _{EE} supply current	All inputs at V _{IHMAX} .			37	57	79	mA

NOTES:

- The specified limits represent the worst case values for the parameter. Since these worst case values normally occur at the supply voltage and temperature extremes, additional noise immunity can be achieved by decreasing the allowable operating condition ranges.
- Conditions for testing shown in the tables are not necessarily worst case. For worst case testing guidelines, refer to DC Testing, Chapter 1, Section 3.
- The specified limits shown in the DC electrical characteristics table can be met only after thermal equilibrium has been established. Thermal equilibrium is established by applying power for at least 2 minutes, while maintaining transverse airflow of 2.5 meters/sec (500 linear feet/min) over the device, mounted either in a test socket or on a printed circuit board. Test voltage values are given in the DC operating conditions table.
- The device can function down to $V_{EE} = -5.7V$, allowing operation with either the 10K or the 10KH family. Correction factors can be used to calculate new DC limits for the extended V_{EE} range. For more information, see Chapters 5 and 10, Section 4.

Gate

100117

AC ELECTRICAL CHARACTERISTICS

Ceramic DIP $V_{CC1} = V_{CC2} = \text{ground}$, $V_{EE} = -4.8\text{V}$ to -4.2V

SYMBOL	PARAMETER	TEST CONDITION	LIMITS						UNIT
			T _A = 0°C		T _A = +25°C		T _A = +85°C		
			MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
t _{PLH} t _{PHL}	Propagation delay D _{A_n} , D _{B_n} , D _{C_n} , D _{D_n} , to Q _n , Q̄ _n	Waveform 1	0.90 0.90	2.60 2.60	0.90 0.90	2.50 2.50	0.90 0.90	2.60 2.60	ns ns
t _{PLH} t _{PHL}	Propagation delay E _n to Q _n , Q̄ _n		0.45 0.45	1.40 1.40	0.45 0.45	1.30 1.30	0.45 0.45	1.40 1.40	ns ns
t _{TLH} t _{THL}	Transition time Q _n , Q̄ _n		0.45 0.45	1.20 1.20	0.45 0.45	1.10 1.10	0.45 0.45	1.20 1.20	ns ns

NOTE:

For AC test setup information, see AC Testing, Chapter 2, Section 3.

AC ELECTRICAL CHARACTERISTICS

Ceramic DIP $V_{CC1} = V_{CC2} = \text{ground}$, $V_{EE} = -5.2\text{V} \pm 5\%$

SYMBOL	PARAMETER	TEST CONDITION	LIMITS						UNIT
			$T_A = 0^{\circ}\text{C}$		$T_A = +25^{\circ}\text{C}$		$T_A = +85^{\circ}\text{C}$		
			MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
t_{PLH} t_{PHL}	Propagation delay DA_n, DB_n, DC_n, DD_n , to $Q_n, \bar{Q}_n$	Waveform 1	0.90 0.90	2.60 2.60	0.90 0.90	2.50 2.50	0.90 0.90	2.60 2.60	ns ns
t_{PLH} t_{PHL}	Propagation delay E_n to $Q_n, \bar{Q}_n$		0.45 0.45	1.40 1.40	0.45 0.45	1.30 1.30	0.45 0.45	1.40 1.40	ns ns
t_{TLH} t_{THL}	Transition time $Q_n, \bar{Q}_n$		0.45 0.45	1.20 1.20	0.45 0.45	1.10 1.10	0.45 0.45	1.20 1.20	ns ns

NOTE:

For AC test setup information, see AC Testing, Chapter 2, Section 3.

AC ELECTRICAL CHARACTERISTICS

Flat Pack and PLCC $V_{CC1} = V_{CC2} = \text{ground}$, $V_{EE} = -4.8\text{V}$ to -4.2V

SYMBOL	PARAMETER	TEST CONDITION	LIMITS						UNIT
			T _A = 0°C		T _A = +25°C		T _A = +85°C		
			MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
t _{PLH} t _{PHL}	Propagation delay D _{A_n} , D _{B_n} , D _{C_n} , D _{D_n} , to Q _n , Q̄ _n	Waveform 1	0.90 0.90	2.40 2.40	0.90 0.90	2.30 2.30	0.90 0.90	2.40 2.40	ns ns
t _{PLH} t _{PHL}	Propagation delay E _n to Q _n , Q̄ _n		0.45 0.45	1.20 1.20	0.45 0.45	1.10 1.10	0.45 0.45	1.20 1.20	ns ns
t _{TLH} t _{THL}	Transition time Q _n , Q̄ _n		0.45 0.45	1.20 1.20	0.45 0.45	1.10 1.10	0.45 0.45	1.20 1.20	ns ns

NOTE:

For AC test setup information, see AC Testing, Chapter 2, Section 3.

Gate

100117

AC ELECTRICAL CHARACTERISTICS

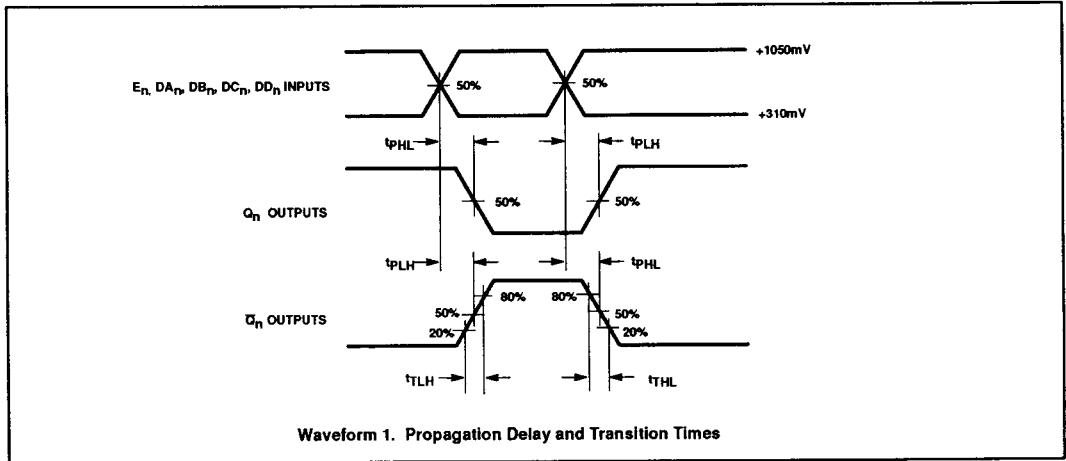
Flat Pack and PLCC $V_{CC1} = V_{CC2} = \text{ground}$, $V_{EE} = -5.2V \pm 5\%$

SYMBOL	PARAMETER	TEST CONDITION	LIMITS						UNIT
			T _A = 0°C		T _A = +25°C		T _A = +85°C		
			MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
t _{PLH} t _{PHL}	Propagation delay D _{A_n} , D _{B_n} , D _{C_n} , D _{D_n} , to Q _n , Q̄ _n	Waveform 1	0.90 0.90	2.40 2.40	0.90 0.90	2.30 2.30	0.90 0.90	2.40 2.40	ns ns
t _{PLH} t _{PHL}	Propagation delay E _n to Q _n , Q̄ _n		0.45 0.45	1.20 1.20	0.45 0.45	1.10 1.10	0.45 0.45	1.20 1.20	ns ns
t _{TLH} t _{THL}	Transition time Q _n , Q̄ _n		0.45 0.45	1.20 1.20	0.45 0.45	1.10 1.10	0.45 0.45	1.20 1.20	ns ns

NOTE:

For AC test setup information, see AC Testing, Chapter 2, Section 3.

AC WAVEFORMS



NOTE:

All power and signal voltages shifted up 2.0V for AC bench test purposes.