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ECL Products	

10107
Gate

Triple 2-Input Exclusive-OR/Exclusive-NOR Gate

FEATURES

- **Typical propagation delay: 2.8ns**
- **Typical supply current ($-I_{EE}$): 22mA**

DESCRIPTION

The 10107 is a three gate array designed to provide the positive Exclusive-OR and NOR functions. All unused inputs can be left open due to pull-down resistors which avoid the need for a supply voltage.

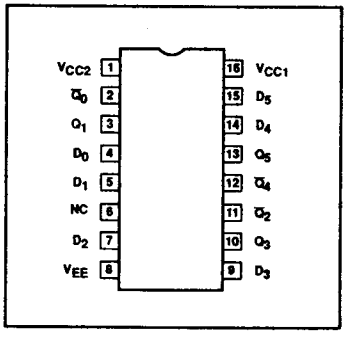
ORDERING INFORMATION

DESCRIPTION	ORDER CODE
16–Pin Plastic DIP	10107N
16–Pin Ceramic DIP	10107F
16–Pin SO	10107D

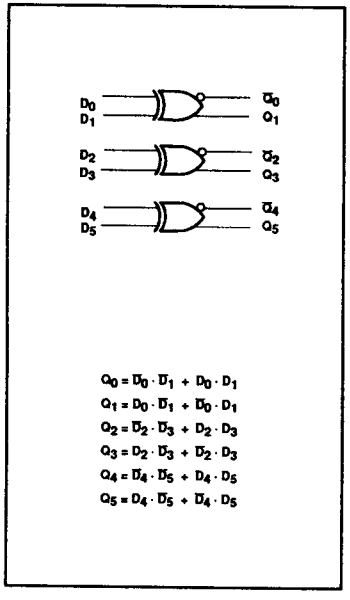
PIN DESCRIPTION

PINS	DESCRIPTION
$D_0 - D_5$	Data Inputs
Q_1, Q_3, Q_5	Data Outputs (OR)
$\overline{Q}_0, \overline{Q}_2, \overline{Q}_4$	Data Outputs (NOR)

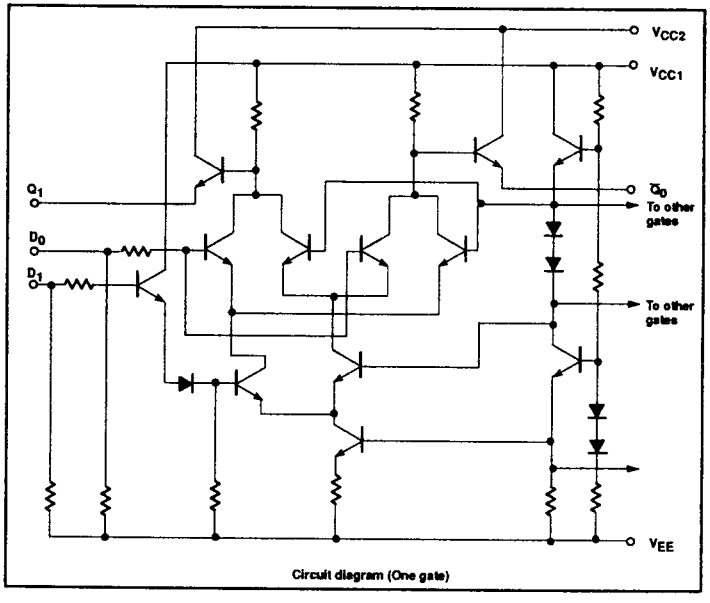
PIN CONFIGURATION



LOGIC DIAGRAM



SIMPLIFIED SCHEMATIC



Circuit diagram (One gate)

ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER		LIMITS	UNIT
V_{EE}	Supply voltage		–8.0	V
V_{IN}	Input voltage (V_{IN} should never be more negative than V_{EE})		0 to V_{EE}	V
I_O	Output source current (continuous)		–50	mA
T_S	Storage temperature range		–55 to +150	°C
T_J	Maximum junction temperature	Ceramic Package	+165	°C
		Plastic Package	+150	°C

NOTE:
Operation beyond the limits set forth in this table may impair the useful life of the device. Unless otherwise noted, these limits are specified over the operating ambient temperature range.

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 (negative)			–5.2		V
V_{IH}	High level input voltage	T_A = –30°C			–890	mV
		T_A = +25°C			–810	mV
		T_A = +85°C			–700	mV
V_{IHT}	High level input threshold voltage	T_A = –30°C	–1205			mV
		T_A = +25°C	–1105			mV
		T_A = +85°C	–1035			mV
V_{ILT}	Low level input threshold voltage	T_A = –30°C			–1500	mV
		T_A = +25°C			–1475	mV
		T_A = +85°C			–1440	mV
V_{IL}	Low level input voltage	T_A = –30°C	–1890			mV
		T_A = +25°C	–1850			mV
		T_A = +85°C	–1825			mV
T_A	Operating ambient temperature range		–30	+25	+85	°C

NOTE:
When operating at other than the specified V_{EE} voltage (–5.2V), the DC and AC Electrical Characteristics will vary slightly from specified values.

DC ELECTRICAL CHARACTERISTICS

$V_{CC1} = V_{CC2}$ = ground, $V_{EE} = -5.2V \pm 0.010V$, $T_A = -30°C$ to $+85°C$ output loading 50Ω to $-2.0V \pm 0.010V$ unless otherwise specified[1,3]

SYMBOL	PARAMETER		TEST CONDITIONS[2]		LIMITS MIN.	LIMITS TYP.	LIMITS MAX.	UNIT
V_{OH}	High level output voltage		$T_A = -30°C$	For $\overline{Q}_n$ outputs, apply V_{ILMIN} to all inputs. For Q_n outputs, apply V_{IHMAX} to each input (D_1, D_2, D_5),	-1060		-890	mV
			$T_A = +25°C$	one at a time, w/ V_{ILMIN} applied to all other inputs. For Q_n outputs apply V_{IHMAX} to each input	-960		-810	mV
			$T_A = +85°C$	(D_0, D_3, D_4), one at a time, w/ V_{ILMIN} applied to all inputs. For $\overline{Q}_n$ outputs, apply V_{IHMAX} to all inputs.	-890		-700	mV
V_{OHT}	High level output threshold voltage		$T_A = -30°C$	For Q_n outputs, apply V_{IHT} to one gate input	-1080			mV
			$T_A = +25°C$	with V_{ILMIN} applied to the other gate input. For $\overline{Q}_n$ outputs, apply V_{IHT} to one gate input	-980			mV
			$T_A = +85°C$	with V_{ILMAX} applied to the other gate input.	-910			mV
V_{OLT}	Low level output threshold voltage		$T_A = -30°C$	For Q_n outputs, apply V_{ILT} to one gate input			-1655	mV
			$T_A = +25°C$	with V_{ILMIN} applied to the other gate input. For $\overline{Q}_n$ outputs, apply V_{IHT} to one gate input			-1630	mV
			$T_A = +85°C$	with V_{ILMIN} applied to the other gate input.			-1595	mV
V_{OL}	Low level output voltage		$T_A = -30°C$	For $\overline{Q}_n$ outputs, apply V_{ILMIN} to all inputs. For $\overline{Q}_n$ outputs, apply V_{IHMAX} to each input (D_1, D_2, D_5),	-1890		-1675	mV
			$T_A = +25°C$	one at a time, w/ V_{ILMIN} applied to all other inputs. For $\overline{Q}_n$ outputs apply V_{IHMAX} to each input	-1850		-1650	mV
			$T_A = +85°C$	(D_0, D_3, D_4), one at a time, w/ V_{ILMIN} applied to all inputs. For Q_n outputs, apply V_{IHMAX} to all inputs.	-1825		-1615	mV
I_{IH}	High level input current	D_0	$T_A = -30°C$	Apply V_{IHMAX} to each input under test,			425	µA
		D_3, D_4	$T_A = +25°C$	one at a time, with			265	µA
		inputs	$T_A = +85°C$	V_{ILMIN} applied to all other inputs.			265	µA
		D_1	$T_A = -30°C$	Apply V_{IHMAX} to each input under test,			350	µA
		D_2, D_5	$T_A = +25°C$	one at a time, with			220	µA
		inputs	$T_A = +85°C$	V_{ILMIN} applied to all other inputs.			220	µA
I_{IL}	Low level input current		$T_A = -30°C$	Apply V_{ILMIN} to each input under	0.5			µA
			$T_A = +25°C$	test, one at a time, with	0.5			µA
			$T_A = +85°C$	V_{IHMAX} applied to all other inputs.	0.3			µA
$-I_{EE}$	V_{EE} supply current		$T_A = -30°C$	Apply V_{IHMAX} to D_1, D_2, D_5			31	mA
			$T_A = +25°C$				28	mA
			$T_A = +85°C$				31	mA
$\frac{\Delta V_{OH}}{\Delta V_{EE}}$	High level output voltage compensation		$T_A = +25°C$			0.016		V/V
$\frac{\Delta V_{OL}}{\Delta V_{EE}}$	Low level output voltage compensation					0.250		V/V
$\frac{\Delta V_{BB}}{\Delta V_{EE}}$	Reference bias voltage compensation					0.148		V/V

NOTES:

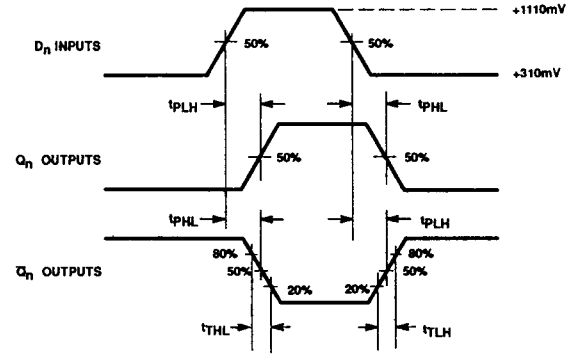
1. The specified limits represent the worst case values for the parameter. Since these worst case values normally occur at the supply voltage and temperature extremes, additional noise immunity can be achieved by decreasing the allowable operating condition ranges.
2. Conditions for testing shown in the tables are not necessarily worst case. For worst case testing guidelines, refer to DC Testing, Chapter 1, Section 3.
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.

AC ELECTRICAL CHARACTERISTICS $V_{CC1} = V_{CC2} = \text{ground}, V_{EE} = -5.2V \pm 0.010V$

SYMBOL	PARAMETER	TEST CONDITION	LIMITS							UNIT
			$T_A = -30°C$		$T_A = +25°C$			$T_A = +85°C$		
			MIN.	MAX.	MIN.	TYP.	MAX.	MIN.	MAX.	
t_{PLH} t_{PHL}	Propagation delay D_n to Q_n, $\overline{Q}_n$	Waveform 1	1.10 1.10	3.80 3.80	1.10 1.10	2.80 2.80	3.70 3.70	1.10 1.10	4.00 4.00	ns ns
t_{TLH} t_{THL}	Transition time 20% to 80%, 80% to 20%	Waveform 1	1.10 1.10	3.50 3.50	1.10 1.10	2.50 2.50	3.50 3.50	1.10 1.10	3.80 3.80	ns ns

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

AC WAVEFORMS



Waveform 1. Propagation Delay and Transition Times