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10118
Gate

Dual 2-Wide 3-Input OR-AND Gate

FEATURES

- **Typical propagation delay: 2.3ns**
- **Typical supply current ($-I_{EE}$): 20mA**

DESCRIPTION

The 10118 is a dual 2-Wide 3-Input OR-AND Gate designed for use in data control as a general purpose logic element. All unused inputs can be left open due to integrated pull-down resistors, which avoid the need for a supply voltage.

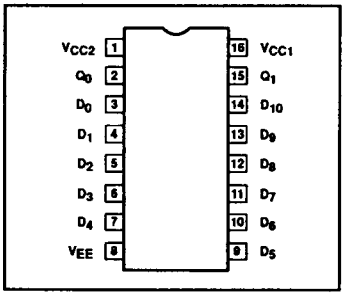
ORDERING INFORMATION

DESCRIPTION	ORDER CODE
16–Pin Plastic DIP	10118N
16–Pin Ceramic DIP	10118F

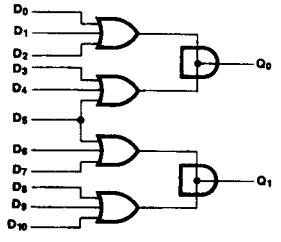
PIN DESCRIPTION

PINS	DESCRIPTION
$D_0 - D_{10}$	Data Inputs
Q_0, Q_1	Data Outputs

PIN CONFIGURATION

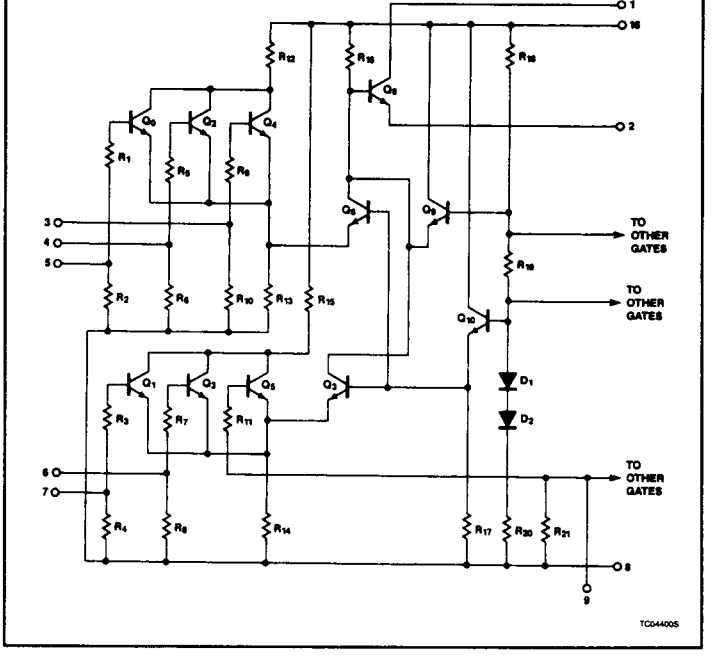


LOGIC DIAGRAM



$Q_0 = (D_0 + D_1 + D_2) \cdot (D_3 + D_4 + D_5)$
$Q_1 = (D_5 + D_6 + D_7) \cdot (D_8 + D_{10} + D_{11})$

SIMPLIFIED SCHEMATIC



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		$T_A = -30°C$	Apply V_{IHMAX} to all inputs.	−1060		−890	mV
			$T_A = +25°C$		−960		−810	mV
			$T_A = +85°C$		−890		−700	mV
V_{OHT}	High level output threshold voltage		$T_A = -30°C$	For Q_0 output, apply V_{IHT} to D_0 input with	−1080			mV
			$T_A = +25°C$	V_{ILMIN} applied to D_1 and D_2 inputs and	−980			mV
			$T_A = +85°C$	V_{IHMAX} applied to all other inputs.	−910			mV
V_{OLT}	Low level output threshold voltage		$T_A = -30°C$	For Q_0 output, apply V_{ILT} to D_0 input with			−1655	mV
			$T_A = +25°C$	V_{ILMIN} applied to D_1 and D_2 inputs and			−1630	mV
			$T_A = +85°C$	V_{IHMAX} applied to all other inputs.			−1595	mV
V_{OL}	Low level output voltage		$T_A = -30°C$	Apply V_{ILMIN} to all inputs.	−2000		−1675	mV
			$T_A = +25°C$		−1990		−1650	mV
			$T_A = +85°C$		−1920		−1615	mV
I_{IH}	High level input current	D_5 input	$T_A = -30°C$	Apply V_{IHMAX} to each input under test, one at a time, with V_{ILMIN} applied to all other inputs.			560	µA
			$T_A = +25°C$				350	µA
			$T_A = +85°C$				350	µA
		All other inputs	$T_A = -30°C$				390	µA
			$T_A = +25°C$				245	µA
			$T_A = +85°C$				245	µA
I_{IL}	Low level input current		$T_A = -30°C$	Apply V_{ILMIN} to each input under test, one at a time, with V_{IHMAX} applied to all other inputs.	0.5			µA
			$T_A = +25°C$		0.5			µA
			$T_A = +85°C$		0.3			µA
$-I_{EE}$	V_{EE} supply current		$T_A = -30°C$				29	mA
			$T_A = +25°C$			20	26	mA
			$T_A = +85°C$				29	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 $V_{CC1} = V_{CC2}$ = 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}	Propagation delay	Waveform 1	1.40	3.90	1.40	2.30	3.40	1.40	3.80	ns
t_{PHL}	D_n to Q_n		1.40	3.90	1.40	2.30	3.40	1.40	3.80	ns
t_{TLH}	Transition time	Waveform 1	0.80	4.10	1.50	2.50	4.00	1.50	4.60	ns
t_{THL}	20% to 80%, 80% to 20%		0.80	4.10	1.50	2.50	4.00	1.50	4.60	ns

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