Peripheral/Power Drivers

LM3611, LM3612, LM3613, LM3614 dual peripheral drivers

general description

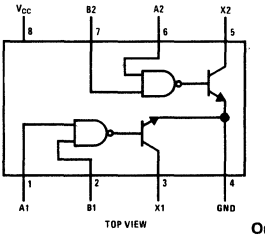
The LM3611 series of dual peripheral drivers was designed for those applications where a higher breakdown voltage is required than that provided by the LM75451 series. The pin outs for the circuits are identical to those of the LM75451 to LM75454. The LM3611 series parts feature high voltage outputs (80V breakdown in the "off" state) as well as high current (300 mA in the "on" state). Typical applications include power drivers, relay drivers, lamp drivers, MOS drivers, and memory drivers.

features

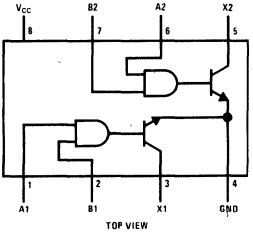
- 300 mA output current capability per driver
- High-voltage outputs 80V
- TTL or DTL compatible
- Input clamping diodes
- Choice of logic function

connection diagrams and truth tables

LM3611



LM3612



Order Number LM3611N or LM3612N
See Package 20

Positive logic AB=X

A	B	OUTPUT X*
0	0	0
1	0	0
0	1	0
1	1	1

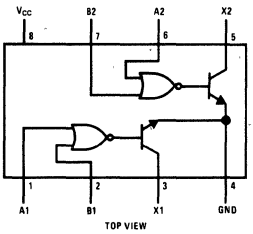
*"0" Output ≤ 0.7V
"1" Output ≤ 100μA

Positive logic $\overline{AB}$=X

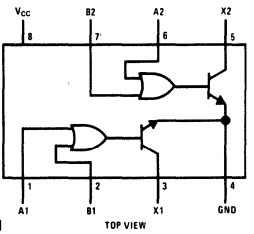
A	B	OUTPUT X*
0	0	1
1	0	1
0	1	1
1	1	0

*"0" Output ≤ 0.7V
"1" Output ≤ 100μA

LM3613



LM3614



Order Number LM3613N or LM3614N
See Package 20

Positive logic A + B = X

A	B	OUTPUT X*
0	0	0
1	0	1
0	1	1
1	1	1

*"0" Output ≤ 0.7V
"1" Output ≤ 100μA

Positive logic A + B = X

A	B	OUTPUT X*
0	0	1
1	0	0
0	1	0
1	1	0

*"0" Output ≤ 0,7V
"1" Output ≤ 100μA

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absolute maximum ratings (Note 1)

Supply Voltage, V_{CC}	7.0V
Input Voltage	5.5V
Output Voltage (Note 3)	80V
Continuous Output Current	300 mA
Continuous Total Power Dissipation (Note 2)	800 mW
Operating Free Air Temperature Range	0°C to +70°C
Storage Temperature Range	−65°C to +150°C
Lead Temperature (Soldering, 10 seconds)	300°C

electrical characteristics (LM3611 Dual AND Peripheral Driver)

The following apply at $0°C \leqq T_A \leqq +70°C$, V_{CC} = 5.0V +5% unless otherwise specified.

PARAMETER	LOGIC INPUT	OUTPUT	SUPPLY VOLTAGE	COMMENTS	MIN	TYP	MAX	UNITS
Logical "1" Input Voltage	V_{IN}		4 75V	Figure 1	2 0			V
Logical "0" Input Voltage	V_{IN}		4 75V	Figure 1			0 8	V
Logical "1" Input Current	2 4V		5.25V	Figure 2			40	μA
	5.5V		5.25V	Figure 2			1 0	mA
Logical "0" Input Current	0 4V		5 25V	Figure 3		−1.0	−1 6	mA
Output Low Voltage	0 8V	100 mA	4 75V	Figure 1		0 25	0 4	V
	0 8V	300 mA	4.75V	Figure 1		0 5	0 7	V
Output Leakage Current	2 0V	100μA	4.75V	Figure 1	80			V
	2 0V	100μA	0V	Figure 1	80			V
Supply Currents								
Output Low	0V		5 25V	Per Package Figure 4			69	mA
Output High	5 0V		5 25V	Per Package Figure 4			11	mA
Input Clamp Diode Voltage	−12 mA		5 0V	T_A = +25°C Figure 3			−1 5	V
Propagation Delay Times. The following apply for V_{CC} = 5 0V, T_A = 25°C								
Propagation to "1" (t_{pd1})			(Note 4)	Figure 6		130		ns
Propagation to "0" (t_{pd0})			(Note 4)	Figure 6		125		ns

electrical characteristics (LM3612 Dual NAND Peripheral Driver)

The following apply at $0°C \leqq T_A \leqq +70°C$, V_{CC} = 5.0V +5% unless otherwise specified.

PARAMETER	LOGIC INPUT	OUTPUT	SUPPLY VOLTAGE	COMMENTS	MIN	TYP	MAX	UNITS
Logical "1" Input Voltage	V_{IN}		4 75V	Figure 1	2 0			V
Logical "0" Input Voltage	V_{IN}		4 75V	Figure 1			0.8	V
Logical "1" Input Current	2 4V		5.25V	Figure 2			40	μA
	5.5V		5 25V	Figure 2			1.0	mA
Logical "0" Input Current	0 4V		5 25V	Figure 3		−1.0	−1 6	mA
Output Low Voltage	2 0V	100 mA	4 75V	Figure 1		0.25	0 4	V
	2 0V	300 mA	4 75V	Figure 1		0 5	0 7	V
Output Leakage Current	0 8V	100μA	4 75V	Figure 1	80			V
	0 8V	100μA	0V	Figure 1	80			V
Supply Currents								
Output Low	5 0V		5.25V	Per Package Figure 4			71	mA
Output High	0V		5 25V	Per Package Figure 4			14	mA
Input Clamp Diode Voltage	−12 mA		5 0V	T_A = +25°C Figure 3			−1.5	V
Propagation Delay Times The following apply for V_{CC} = 5 0V, T_A = +25°C								
Propagation to "1" (t_{pd1})			(Note 4)	Figure 6		110		ns
Propagation to "0" (t_{pd0})			(Note 4)	Figure 6		110		ns

electrical characteristics (LM3613 Dual OR Peripheral Driver)

The following apply at $0°C \leq T_A \leq +70°C$, V_{CC} = 5.0V +5% unless otherwise specified.

PARAMETER	LOGIC INPUT	OUTPUT	SUPPLY VOLTAGE	COMMENTS	MIN	TYP	MAX	UNITS
Logical "1" Input Voltage	V_{IN}		4 75V	Figure 1	2 0			V
Logical "0" Input Voltage	V_{IN}		4.75V	Figure 1			0 8	V
Logical "1" Input Current	2 4V		5.25V	Figure 2			40	μA
	5.5V		5 25V	Figure 2			1 0	mA
Logical "0" Input Current	0.4V		5.25V	Figure 3		−1.0	−1 6	mA
Output Low Voltage	0 8V	100 mA	4 75V	Figure 1		0 25	0 4	V
	0.8V	300 mA	4 75V	Figure 1		0 5	0 7	V
Output Leakage Current	2 0V	100μA	4 75V	Figure 1	80			V
	2 0V	100μA	0V	Figure 1	80			V
Supply Currents								
Output Low	0V		5 25V	Per Package Figure 5			73	mA
Output High	5.0V		5 25V	Per Package Figure 5			14	mA
Input Clamp Diode Voltage	−12 mA		5 0V	T_A = +25°C			−1 5	V
Propagation Delay Times The following apply for V_{CC} = 5 0V, T_A = +25°C								
Propagation to "1" (t_{pd1})			(Note 4)	Figure 6		125		ns
Propagation to "0" (t_{pd0})			(Note 4)	Figure 6		125		ns

electrical characteristics (LM3614 Dual NOR Peripheral Driver)

The following apply at $0°C \leq T_A \leq +70°C$, V_{CC} = 5.0V +5% unless otherwise specified.

PARAMETER	LOGIC INPUT	OUTPUT	SUPPLY VOLTAGE	COMMENTS	MIN	TYP	MAX	UNITS
Logic "1" Input Voltage	V_{IN}		4.75V	Figure 1	2 0			V
Logical "0" Input Voltage	V_{IN}		4 75V	Figure 1			0 8	V
Logical "1" Input Current	2 4V		5 25V	Figure 2			40	μA
	5 5V		5.25V	Figure 2			1.0	mA
Logical "0" Input Current	0 4V		5 25V	Figure 3		−1.0	−1 6	mA
Output Low Voltage	2 0V	100 mA	4 75V	Figure 1		0.25	0 4	V
	2.0V	300 mA	4 75V	Figure 1		0 5	0.7	V
Output Leakage Current	0 8V	100μA	4 75V	Figure 1	80			V
	0 8V	100μA	0V	Figure 1	80			V
Supply Currents								
Output Low	5 0V		5.25V	Per Package Figure 5			79	mA
Output High	0V		5 25V	Per Package Figure 5			17	mA
Input Clamp Diode Voltage	−12 mA		5.0V	T_A = +25°C Figure 3			−1 5	V
Propagation Delay Times The following apply for V_{CC} = 5.0V, T_A = +25°C								
Propagation to "1" (t_{pd1})			(Note 4)	Figure 6		220		ns
Propagation to "0" (t_{pd0})			(Note 4)	Figure 6		150		ns

Note 1: All voltage values are with respect to ground. Positive current is defined to be current into referenced pin.

Note 2: Maximum junction temperature is 150°C. For operating at elevated temperatures, the package must be derated based on a thermal resistance, θ_{JA}, of 110°C/W.

Note 3: Maximum voltage to be applied to either output in the off state.

Note 4: Delay is measured with a 50Ω load to 10V, 15 pF load capacitance, measured from 1.5V input to 50% point on output.

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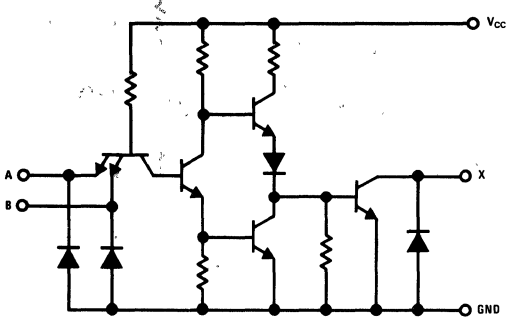
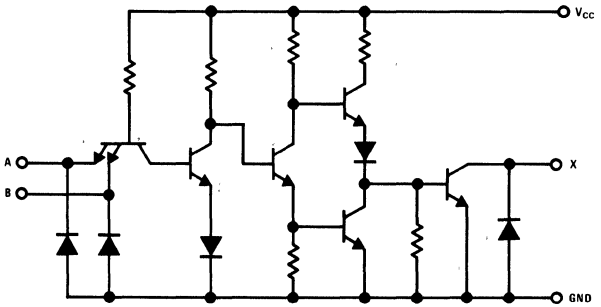
schematic diagrams (each driver)

LM3611 Dual AND Peripheral Driver



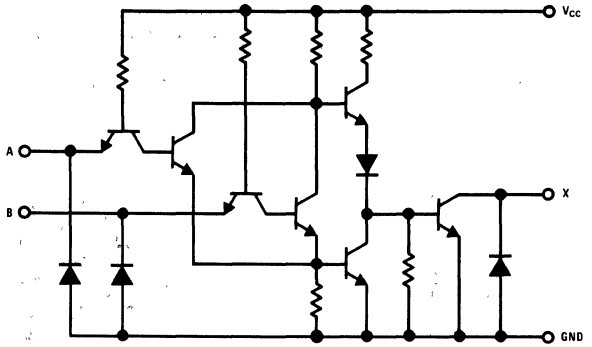
NOTE 1/2 OF UNIT SHOWN

LM3612 Dual NAND Peripheral Driver



NOTE 1/2 OF UNIT SHOWN

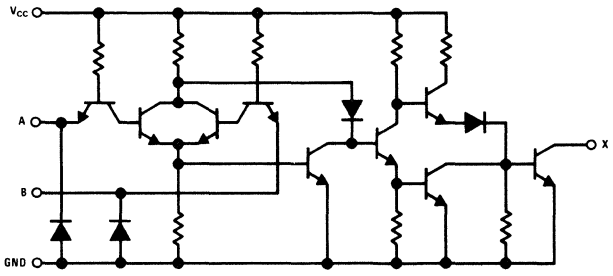
LM3613 Dual OR Peripheral Driver



NOTE 1/2 OF UNIT SHOWN

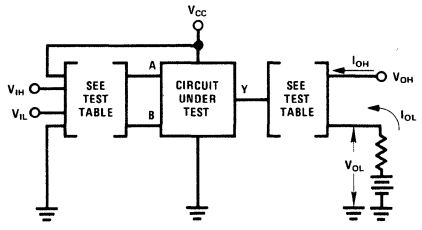
schematic diagrams (con't)

LM3614 Dual NOR Peripheral Driver



NOTE 1/2 OF UNIT SHOWN

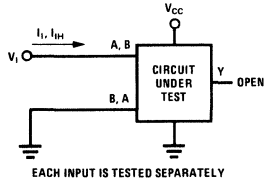
test circuits



CIRCUIT	INPUT UNDER TEST	OTHER INPUT	OUTPUT	
			APPLY	MEASURE
LM3611	V_{IH} V_{IL}	V_{IH} V_{CC}	I_{OH} I_{OL}	V_{OH} V_{OL}
LM3612	V_{IH} V_{IL}	V_{IH} V_{CC}	I_{OL} I_{OH}	V_{OL} V_{OH}
LM3613	V_{IH} V_{IL}	GND V_{IL}	I_{OH} I_{OL}	V_{OH} V_{OL}
LM3614	V_{IH} V_{IL}	GND V_{IL}	I_{OL} I_{OH}	V_{OL} V_{OH}

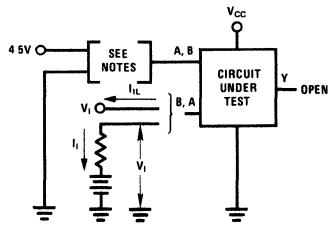
NOTE: Each input is tested separately.

FIGURE 1. V_{IH}, V_{IL}, I_{OH}, V_{OL}



EACH INPUT IS TESTED SEPARATELY

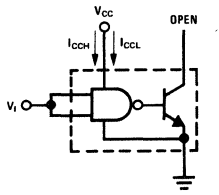
FIGURE 2. I_I, I_{IH}



NOTE A EACH INPUT IS TESTED SEPARATELY.

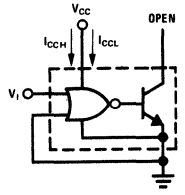
NOTE B WHEN TESTING LM3613 AND LM3614 INPUT NOT UNDER TEST IS GROUNDED. FOR ALL OTHER CIRCUITS IT IS AT 4.5V

FIGURE 3. V_I, I_{IL}



BOTH GATES ARE TESTED SIMULTANEOUSLY

FIGURE 4. I_{CCH}, I_{CCL} for AND, NAND Circuits



BOTH GATES ARE TESTED SIMULTANEOUSLY.

FIGURE 5. I_{CCH}, I_{CCL} for OR, NOR Circuits

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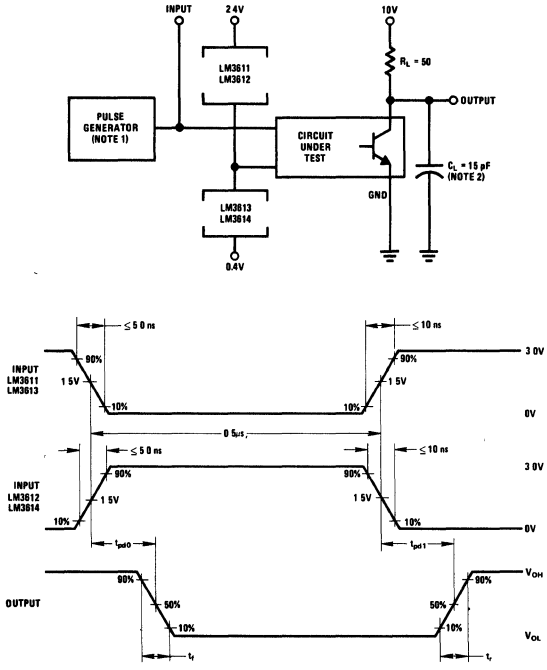
test circuit and switching time waveforms



NOTE 1 THE PULSE GENERATOR HAS THE FOLLOWING CHARACTERISTICS PRR = 1.0 MHz, $Z_{OUT} \approx 50\Omega$

NOTE 2 C_L INCLUDES PROBE AND JIG CAPACITANCE

FIGURE 6. Switching Times of Complete Drivers