M74LS15P

TRIPLE 3-INPUT POSITIVE AND GATE WITH OPEN COLLECTOR OUTPUT

DESCRIPTION

The M74LS15P is a semiconductor integrated circuit containing 3 triple-input positive AND and negative OR gates with open collector outputs.

FEATURES

- Usable in wire-AND connection
- High breakdown input voltage ($V_I \geqq 15V$)
- High breakdown output voltage ($V_O \geqq 7V$)
- Low power dissipation (P_d = 13mW typical)
- High speed (t_{pd} = 13ns typical)
- Wide operating temperature range (T_a = −20 ~ +75°C)

APPLICATION

General purpose, for use in industrial and consumer equipment.

FUNCTIONAL DESCRIPTION

With the use of Schottky TTL Technology and open collector outputs with a high breakdown voltage, the high-level output impedance can be selected freely by use of an external load resistor. This permits wire-AND connection which has been impossible with conventional gates.

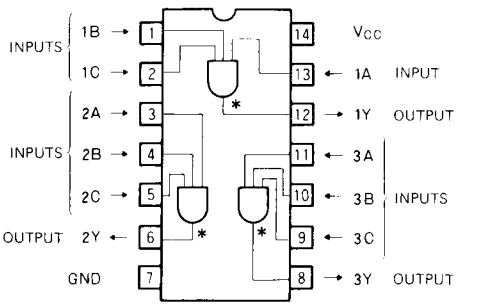
When inputs A, B and C are high, output Y is high and when one or more of the inputs is low, Y is low.

FUNCTION TABLE

A	N	Y
L	L	L
H	L	L
L	H	L
H	H	H

N = B · C

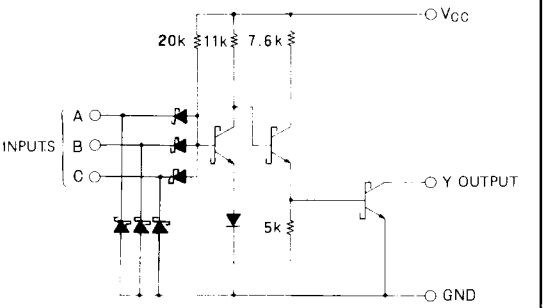
PIN CONFIGURATION (TOP VIEW)



* : OPEN COLLECTOR OUTPUT

Outline 14P4

CIRCUIT SCHEMATIC (EACH GATE)



UNIT : Ω

ABSOLUTE MAXIMUM RATINGS (Ta = −20 ~ +75°C, unless otherwise noted)

Symbol	Parameter	Conditions	Limits	Unit
V_{CC}	Supply voltage		−0.5 ~ +7	V
V_I	Input voltage		−0.5 ~ +15	V
V_O	Output voltage	High-level state	−0.5 ~ +7	V
Topr	Operating free-air ambient temperature range		−20 ~ +75	°C
Tstg	Storage temperature range		65 ~ +150	°C

TRIPLE 3-INPUT POSITIVE AND GATE WITH OPEN COLLECTOR OUTPUT

RECOMMENDED OPERATING CONDITIONS (Ta = −20 ~ +75°C, unless otherwise noted)

Symbol	Parameter		Limits			Unit
			Min	Typ	Max	
V_{CC}	Supply voltage		4.75	5	5.25	V
I_{OH}	High-level output current	V_O=5.5V	0		100	μA
I_{OL}	Low-level output current	V_{OL}≦0.4V	0		4	mA
		V_{OL}≦0.5V	0		8	mA

ELECTRICAL CHARACTERISTICS (Ta = −20 ~ +75°C, unless otherwise noted)

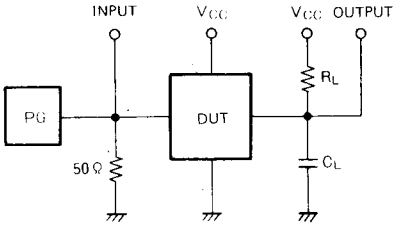
Symbol	Parameter	Conditions		Limits			Unit
				Min	Typ *	Max	
V_{IH}	High-level input voltage			2			V
V_{IL}	Low-level input voltage					0.8	V
V_{IC}	Input clamp voltage	V_{CC}=4.75V, I_{IC}=−18mA				−1.5	V
I_{OH}	High-level output current	V_{CC}=4.75V, V_I=2V, V_O=5.5V				100	μA
V_{OL}	Low-level output voltage	V_{CC}=4.75V, V_I=0.8V	I_{OL}= 4mA		0.25	0.4	V
			I_{OL}= 8mA		0.35	0.5	V
I_{IH}	High-level input current	V_{CC}=5.25V, V_I=2.7V				20	μA
		V_{CC}=5.25V, V_I=10V				0.1	mA
I_{IL}	Low-level input current	V_{CC}=5.25V, V_I=0.4V				−0.4	mA
I_{CCH}	Supply current, all outputs high	V_{CC}=5.25V, V_I=4.5V			1.8	3.6	mA
I_{CCL}	Supply current, all outputs low	V_{CC}=5.25V, V_I=0			3.3	6.6	mA

* : All typical values are at V_{CC}=5V, Ta=25°C.

SWITCHING CHARACTERISTICS (V_{CC}=5V, Ta=25°C, unless otherwise noted)

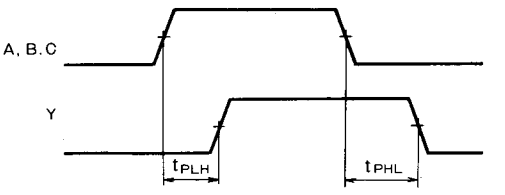
Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
t_{PLH}	Low-to-high-level output propagation time	R_L=2KΩ		15	35	ns
t_{PHL}	High-to-low-level output propagation time	C_L=15pF (Note)		10	35	ns

Note: Measurement circuit



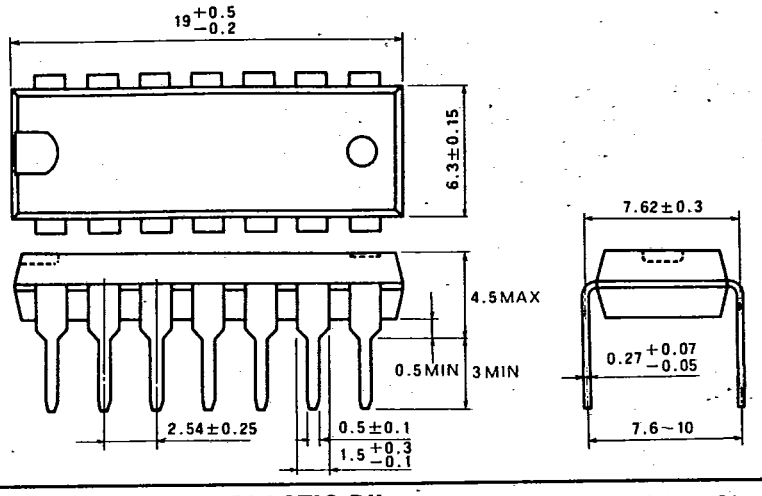
(1) The pulse generator (PG) has the following characteristics:
PRR = 1MHz, t_r = 6ns, t_f = 6ns, t_W = 500ns,
V_P = 3V_{P-P}, Z_O = 50Ω.
(2) C_L includes probe and jig capacitance.

TIMING DIAGRAM (Reference level = 1.3V)



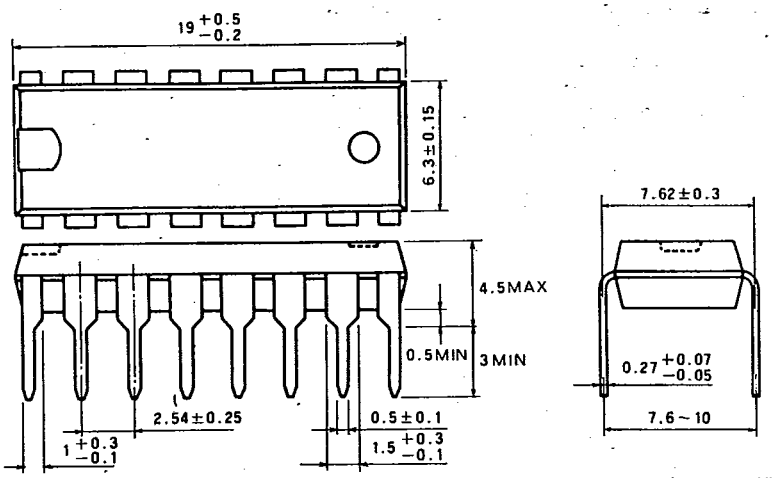
TYPE 14P4 14-PIN MOLDED PLASTIC DIL

Dimension in mm



TYPE 16P4 16-PIN MOLDED PLASTIC DIL

Dimension in mm



TYPE 20P4 20-PIN MOLDED PLASTIC DIL

Dimension in mm