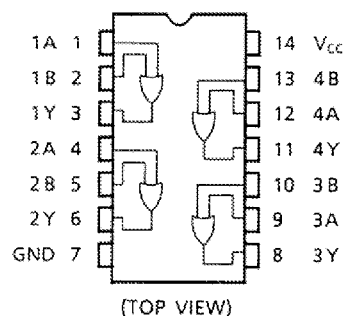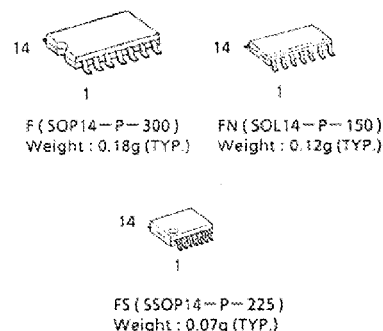# TOSHIBA

QUAD 2 - Input OR Gate

The TC74LVQ32 is a high speed CMOS 2-INPUT OR GATE fabricated with silicon gate and double-layer metal wiring C²MOS technology.
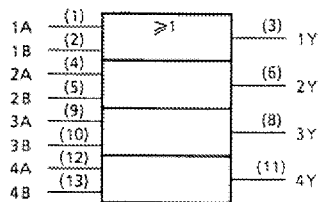
Designed for use in 3.3 Volt systems, it achieves high speed operation while maintaining the CMOS low power dissipation. The internal circuit is composed of 2 stages including buffer output, which provide high noise immunity and stable output. All inputs are equipped with protection circuits against static discharge or transient excess voltage.

Features

- High Speed: t_{pd} = 4.1ns (Typ.) at V_{CC} = 3.3V
- Low Power Dissipation: I_{CC} = 2.5μA (Max.) at Ta = 25°C
- Input Voltage Level:
  - V_{IL} = 0.8V (Max.) at V_{CC} = 3V
  - V_{IH} = 2.0V (Min.) at V_{CC} = 3V
- Symmetrical Output Impedance: $|I_{OH}|$ = I_{OL} = 12mA (Min.)
- Balanced Propagation Delays: t_{pLH} = t_{pHL}
- Pin and Function Compatible with 74HC32

F (SOP14 — P — 300)
Weight : 0.18g (TYP.)

FN (SOL14 — P — 150)
Weight : 0.12g (TYP.)

FS (SSOP14 — P — 225)
Weight : 0.07g (TYP.)

1A	1	14 V_{CC}
1B	2	13 4B
1Y	3	12 4A
2A	4	11 4Y
2B	5	10 3B
2Y	6	9 3A
GND	7	8 3Y

(TOP VIEW)

Pin Assignment

IEC Logic Symbol

Truth Table

Inputs		Outputs
A	**B**	**Y**
L	L	L
L	H	H
H	L	H
H	H	H

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Supply Voltage Range	V_{CC}	-0.5 ~ 7.0	V
DC Input Voltage	V_{IN}	-0.5 ~ V_{CC} + 0.5	V
DC Output Voltage	V_{OUT}	-0.5 ~ V_{CC} + 0.5	V
Input Diode Current	I_{IK}	±20	mA
Output Diode Current	I_{OK}	±50	mA
DC Output Current	I_{OUT}	±50	mA
DC V_{CC}/Ground Current	I_{CC}	±100	mA
Power Dissipation	P_D	180	mW
Storage Temperature	T_{stg}	-65 ~ 150	°C
Lead Temperature 10sec	T_L	300	°C

Recommended Operating Conditions

Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC}	2.0 ~ 3.6	V
Input Voltage	V_{IN}	0 ~ V_{CC}	V
Output Voltage	V_{OUT}	0 ~ V_{CC}	V
Operating Temperature	T_{opr}	-40 ~ 85	°C
Input Rise and Fall Time	dt/dv	0 ~ 100	ns/V

DC Electrical Characteristics

Parameter	Symbol	Test Condition		V_{CC} (V)	Ta = 25°C			Ta = -40 ~ 85°C		Unit
					Min	Typ.	Max.	Min.	Max.	
High-Level Input Voltage	V_{IH}	–		3.0	2.0	–	–	2.0	–	V
Low-Level Input Voltage	V_{IL}	–		3.0	–	–	0.8	–	0.8	V
High-Level Output Voltage	V_{OH}	V_{IN} = V_{IH} or V_{IL}	I_{OH} = -50µA	3.0	2.9	3.0	–	2.9	–	V
			I_{OH} = -12mA	3.0	2.58	–	–	2.48	–	
Low-Level Output Voltage	V_{OL}	V_{IN} = V_{IL}	I_{OL} = 50µA	3.0	–	0.0	0.1	–	0.1	V
			I_{OL} = 12mA	3.0	–	–	0.36	–	0.44	
Input Leakage Current	I_{IN}	V_{IN} = V_{CC} or GND		3.6	–	–	±0.1	–	±1.0	µA
Quiescent Supply Current	I_{CC}	V_{IN} = V_{CC} or GND		3.6	–	–	2.5	–	25.0	µA

TOSHIBA CORPORATION

AC Electrical Characteristics (Input t_r = t_f = 3ns, C_L = 50pF, R_L = 500Ω)

Parameter	Symbol	Test Condition	V_{CC} (V)	Ta = 25°C			Ta = -40 ~ 85°C		Unit
				Min	Typ.	Max.	Min.	Max.	
Propagation Delay Time	t_{pLH} t_{pHL}		2.7 3.3±0.3	– –	5.4 4.5	12.7 9.0	1.0 1.0	15.0 10.0	ns
Output to Output Skew	t_{osLH} t_{osHL}	(Note 1)	2.7 3.3±0.3	– –	– –	1.5 1.5	– –	1.5 1.5	
Input Capacitance	C_{IN}	(Note 2)		–	5	10	–	10	pF
Power Dissipation Capacitance	C_{PD}	(Note 3)		–	24	–	–	–	

Note (1) Parameter guaranteed by design. t_{osLH} = | t_{pLHm} - t_{pLHn} |, t_{osHL} = | t_{pHLm} - t_{pHLn} |
Note (2) Parameter guaranteed by design.
Note (3) C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption.
Average operating current can be obtained by the equation:
I_{CC} (opr) = C_{PD} • V_{CC} • f_{IN} + I_{CC}/4 (per Gate)

Noise Characteristics (Input t_r = t_f = 3ns, C_L = 50pF, R_L = 500Ω)

Parameter	Symbol	Test Condition	V_{CC}	Ta = 25°C		Unit
				Typ.	Max.	
Quiet Output Maximum Dynamic V_{OL}	V_{OLP}	–	3.3	0.3	0.8	V
Quiet Output Minimum Dynamic V_{OL}	V_{OLV}	–	3.3	-0.3	-0.8	V
Minimum High Level Dynamic Input Voltage	V_{IHD}	–	3.3	–	2.0	V
Maximum Low Level Dynamic Input Voltage	V_{ILD}	–	3.3	–	0.8	V