

**NEW PRODUCT**

**M74AS32P**

T-43-15

**QUADRUPLE 2-INPUT POSITIVE OR GATE**

**DESCRIPTION**

The M74AS32P is a semiconductor integrated circuit consisting of four 2-input positive-logic OR gates, usable as negative-logic AND gates.

**FEATURES**

- High speed
- Low output impedance
- Wide operating temperature range ( $T_a = -20 \sim +75^\circ\text{C}$ )

**APPLICATION**

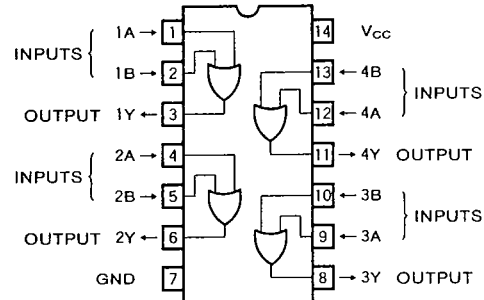
General purpose, for use in industrial and consumer digital equipment.

**FUNCTIONAL DESCRIPTION**

Employing PNP transistors in the inputs and active pull-up in the outputs, the M74AS32P achieves high speed and high fan-out. To reduce problems in high-speed switching, it has Miller-killer circuit, clamp diodes (both input and output) and undershoot recovery circuit.

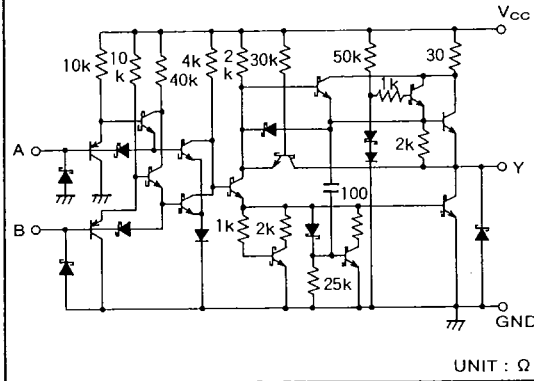
When both A and B inputs are low-level, output Y is low-level, and when at least one of the inputs is high, the output is high.

**PIN CONFIGURATION (TOP VIEW)**



Outline 14P4

**CIRCUIT SCHEMATIC (EACH GATE)**



**FUNCTION TABLE**

Inputs		Output
A	B	Y
L	L	L
H	L	H
L	H	H
H	H	H

**ABSOLUTE MAXIMUM RATINGS** ( $T_a = -20 \sim +75^\circ\text{C}$ , unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
$V_{CC}$	Supply voltage		-0.5 ~ +7	V
$V_I$	Input voltage		-0.5 ~ +7	V
$V_O$	Output voltage	High-level state	-0.5 ~ $V_{CC}$	V
$T_{opr}$	Operating free-air ambient temperature range		-20 ~ +75	$^\circ\text{C}$
$T_{stg}$	Storage temperature range		-65 ~ +150	$^\circ\text{C}$

**RECOMMENDED OPERATING CONDITIONS**

Symbol	Parameter	Limits			Unit
		Min	Typ	Max	
$V_{CC}$	Supply voltage	4.5	5	5.5	V
$V_{IH}$	High-level input voltage	2			V
$V_{IL}$	Low-level input voltage			0.8	V
$I_{OH}$	High-level output current	0		-2	mA
$I_{OL}$	Low-level output current	0		20	mA
$T_{opr}$	Operating free-air ambient temperature range	-20		+75	$^\circ\text{C}$

**QUADRUPLE 2-INPUT POSITIVE OR GATE**

**ELECTRICAL CHARACTERISTICS** ( $T_a = -20 \sim +75^\circ\text{C}$ , unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ*	Max	
$V_{IC}$	Input clamp voltage	$V_{CC}=4.5\text{V}, I_{IC}=-18\text{mA}$			-1.2	V
$V_{OH}$	High-level output voltage	$V_{CC}=4.5\text{V}\sim 5.5\text{V}, I_{OH}=-2\text{mA}$	$V_{CC}-2$			V
$V_{OL}$	Low-level output voltage	$V_{CC}=4.5\text{V}, I_{OL}=20\text{mA}$			0.5	V
$I_I$	Input current at maximum voltage	$V_{CC}=5.5\text{V}, V_I=7\text{V}$			0.1	mA
$I_{IH}$	High-level input current	$V_{CC}=5.5\text{V}, V_I=2.7\text{V}$			20	$\mu\text{A}$
$I_{IL}$	Low-level input current	$V_{CC}=5.5\text{V}, V_I=0.4\text{V}$			-0.5	mA
$I_O$	Output current	$V_{CC}=5.5\text{V}, V_O=2.25\text{V}$	-30		-112	mA
$I_{CCH}$	Supply current, all outputs high	$V_{CC}=5.5\text{V}, V_I=4.5\text{V}$		7.3	12	mA
$I_{CCL}$	Supply current, all outputs low	$V_{CC}=5.5\text{V}, V_I=0\text{V}$		16.5	26.6	mA

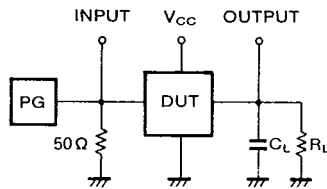
\*: All typical values are at  $V_{CC}=5\text{V}, T_a=25^\circ\text{C}$ .

**SWITCHING CHARACTERISTICS**

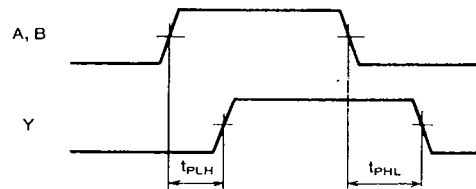
Symbol	Parameter	Test conditions/Limits								Unit
		$V_{CC}=4.5\sim 5.5\text{V}$ (Note 1)								
		$C_L=50\text{pF}$								
		$R_L=500\Omega$								
		$T_a=0\sim 70^\circ\text{C}$			$T_a=-20\sim +75^\circ\text{C}$					
		Inputs	Output	Min	Typ*	Max	Min	Typ*	Max	
$t_{PLH}$	Propagation time	A, B	Y	1		5.8	1		6.5	ns
$t_{PHL}$				1		5.8	1		6.5	

\*: All typical values are at  $V_{CC}=5\text{V}, T_a=25^\circ\text{C}$ .

Note 1: Measurement circuit



**TIMING DIAGRAM (Reference level=1.3V)**



(1) The pulse generator (PG) has the following characteristics:

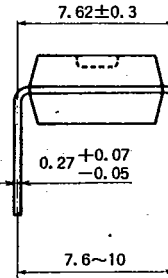
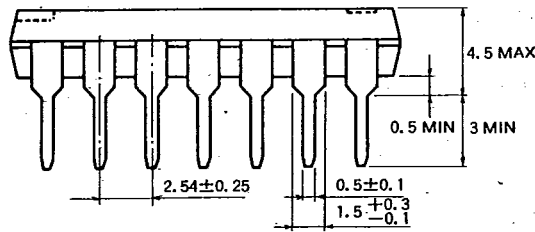
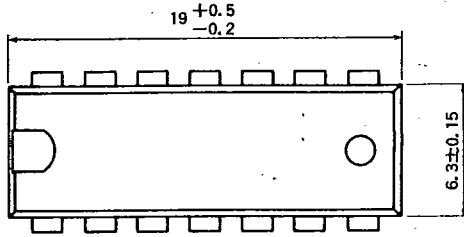
- $PRR \leq 1\text{MHz}$
- $t_r=2\text{ns}, t_f=2\text{ns}$
- $V_{IH}=3.5\text{V}, V_{IL}=0.3\text{V}$
- duty cycle=50%
- $Z_o=50\Omega$

(2)  $C_L$  includes probe and jig capacitance.

T-90-20

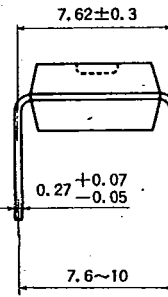
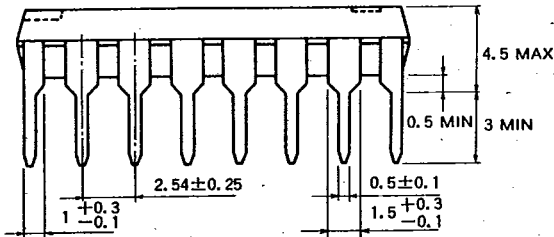
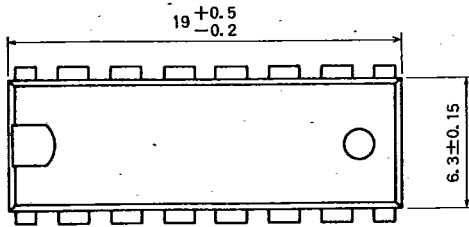
TYPE 14P4 14-PIN MOLDED PLASTIC DIP

Dimension in mm



TYPE 16P4 16-PIN MOLDED PLASTIC DIP

Dimension in mm



T-90-20

