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September 2012

74AUP1G96 TinyLogic[®] Low Power Universal Configurable **Two-Input Logic Gate (Open Drain Output)**

Description

Features

FAIRCHILD SEMICONDUCTOR

- 0.8 V to 3.6V V_{CC} Supply Operation
- 3.6 V Over-Voltage Tolerant I/Os at V_{CC} from 0.8 V to 3.6 V
- Extremely High Speed tPD - 3.2 ns: Typical at 3.3 V
- Power-Off High-Impedance Inputs and Outputs
- Low Static Power Consumption - I_{CC}=0.9 µA Maximum
- Low Dynamic Power Consumption - C_{PD}=3.0 pF Typical at 3.3 V
- Ultra-Small MicroPak™ Packages

The 74AUP1G96 is a universal configurable. two-input logic gate with an open-drain output that provides a high-performance and low-power solution for batterypowered portable applications. This product is designed for a wide low voltage operating range (0.8 V to 3.6 V) and guarantees very low static and dynamic power consumption across the entire voltage range. All inputs are implemented with hysteresis to allow for slower transition input signals and better switching noise immunity.

The 74AUP1G96 provides for multiple functions as determined by various configurations of the three inputs. The potential logic functions provided are MUX, AND, OR, NAND, and, NOR inverter and buffer (see Figure 2 to Figure 8).

Ordering Infor	mation		
Part Number	Top Mark	Package	Packing Method
74AUP1G96L6X	AP	6-Lead, MicroPak™ 1.0 x 1.45mm, JEDEC MO-252	5000 Units on Tape & Reel
74AUP1G96FHX	AP	6-Lead, MicroPak2™, 1x1mm Body, .35mm Pitch	5000 Units on Tape & Reel

74AUP1G96 — TinyLogic[®] Low Power Universal Configurable Two-Input Logic Gate (Open Drain Output)

Pin Configurations

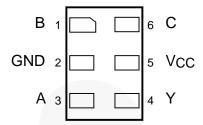


Figure 1. MicroPak[™] (Top Through View)

Pin Definitions

Pin #	Name	Description
1	В	Data Input
2	GND	Ground
3	A	Data Input
4	Y	Output (Open Drain)
5	V _{cc}	Supply Voltage
6	С	Data Input

Function Table

	Inputs		Y=Output
С	В	Α	
L	L	L	H ⁽¹⁾
L	L	Н	H ⁽¹⁾
L	Н	L	L
L	Н	Н	L
н	L	L	H ⁽¹⁾
н	L	Н	L
н	Н	L	H ⁽¹⁾
Н	Н	Н	L

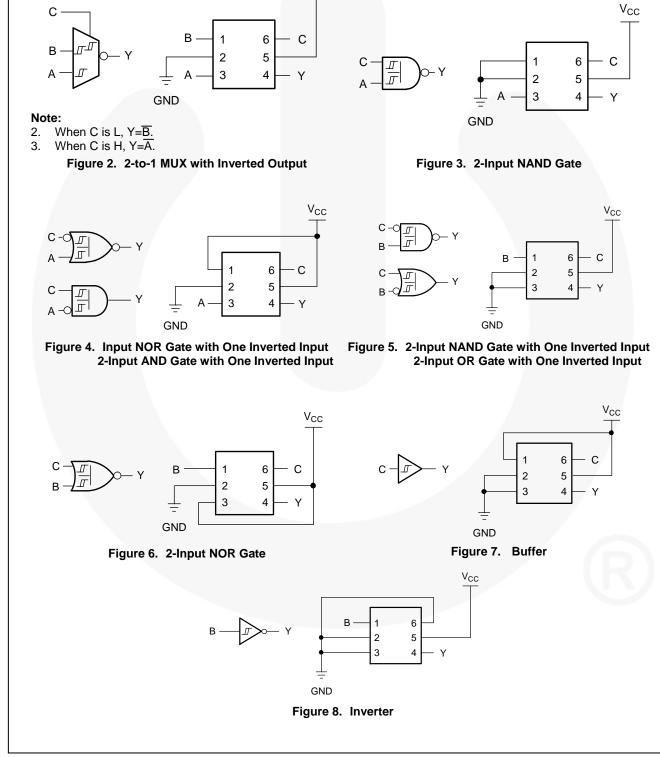
H = HIGH Logic Level

L = LOW Logic Level

Note:

1. High impedance output state, open drain.

2-Input Logic Function	Connection Configuration
2-to-1 MUX with Inverted Output	Figure 2
2-Input NAND Gate	Figure 3
2-Input NOR Gate with One Inverted Input	Figure 4
2-Input AND Gate with One Inverted Input	Figure 4
2-Input NAND Gate with One Inverted Input	Figure 5
2-Input OR Gate with One Inverted Input	Figure 5
2-Input NOR Gate	Figure 6
Buffer	Figure 7
Inverter	Figure 8



implementation is next to the board-level physical

implementation of how the pins of the function should be

connected.

The logical

Vcc

Logic Configurations

for a

Figure 2 through Figure 8 show the logical functions that

can be implemented using the 74AUP1G98. The

diagrams show the DeMorgan's equivalent logic duals

given two-input function.

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Para	imeter	Min.	Max.	Unit
Vcc	Supply Voltage		-0.5	4.6	V
V _{IN}	DC Input Voltage		-0.5	4.6	V
V _{OUT} ⁽²⁾	DC Output Voltage		-0.5	4.6	V
I _{IK}	DC Input Diode Current	V _{IN} < 0 V		-50	mA
Ι _{ΟΚ}	DC Output Diode Current	V _{OUT} < 0 V		-50	mA
I _{OL}	DC Output Sink Current		+50	mA	
I _{CC} or I _{GND}	DC V _{CC} or Ground Current per Supply Pin			±50	mA
T _{STG}	Storage Temperature Range		-65	+150	°C
TJ	Junction Temperature Under Bi	as		+150	°C
TL	Junction Lead Temperature, So	oldering 10s		+260	°C
PD	Power Dissipation at +85°C	MicroPak-6™		130	mW
. 5		MicroPak2 [™] -6		120	
ESD	Human Body Model, JEDEC:JE	SD22-A114		4000	V
230	Charged Device Model, JEDEC	:JESD22-C101		2000	v

Note:

2. Io absolute maximum rating must be observed.

Recommended Operating Conditions⁽³⁾

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to Absolute Maximum Ratings.

Symbol	Parameter	Condition	Min.	Max.	Unit	
Vcc	Supply Voltage		0.8	3.6	V	
VIN	Input Voltage		0	3.6	V	
V _{OUT}	Output Voltage		0	3.6	V	
	Qutput Current	V _{CC} =3.0 V to 3.6 V		±4.0		
		V _{CC} =2.3 V to 2.7 V		±3.1	mA	
		V _{CC} =1.65 V to 1.95 V		±1.9		
I _{OL}		V _{CC} =1.4 V to 1.6 V	/	±1.7		
		V _{CC} =1.1 V to 1.3 V		±1.1		
		V _{CC} =0.8 V		±20.0	μA	
T _A	Operating Temperature, Free Air		-40	+85	°C	
θ_{JA}	Thermal Resistance	MicroPak-6™		500	°C/W	
VJA		MicroPak2 [™] -6		560		

Note:

3. Unused inputs must be held HIGH or LOW. They may not float.

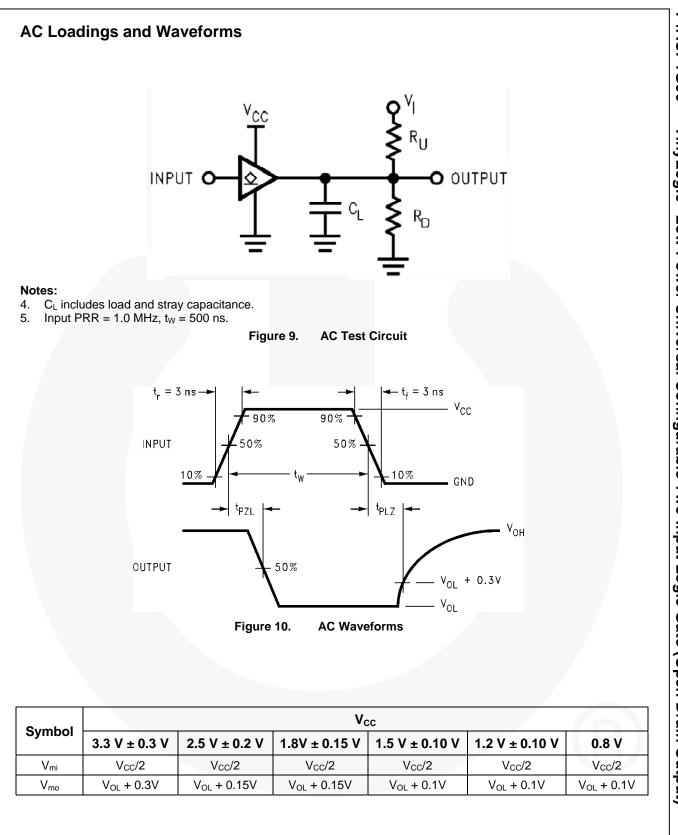
				$T_A =$	25°C	T _A =-40	to 85°C	Unit	
Symbol	Parameter	V _{cc}	Condition	Min.	Max.	Min. Max.		Unit	
		0.80		0.30	0.60	0.30	0.60		
		1.10		0.53	0.90	0.53	0.90		
VP	Positive Threshold Voltage	1.40		0.74	1.11	0.74	1.11	v	
VР		1.65		0.91	1.29	0.91	1.29	v	
	-	2.30		1.37	1.77	1.37	1.77	-	
		3.00		1.88	2.29	1.88	2.29		
		0.80		0.10	0.60	0.10	0.60		
		1.10		0.26	0.65	0.26	0.65		
Negative V _N Threshold Voltage		1.40		0.39	0.75	0.39	0.75	v	
		1.65		0.47	0.84	0.47	0.84	v	
		2.30		0.69	1.04	0.69	1.04	-	
		3.00		0.88	1.24	0.88	1.24		
		0.80		0.07	0.50	0.07	0.50		
		1.10		0.08	0.46	0.08	0.46	- V	
Vн	Hysteresis	1.40		0.18	0.56	0.18	0.56		
	Voltage	1.65		0.27	0.66	0.27	0.66		
		2.30		0.53	0.92	0.53	0.92		
		3.00		0.79	1.31	0.79	1.31		
		$0.80 \leq V_{CC} \leq 3.60$	I _{OL} =20 μA		0.10		0.10	v	
		$1.10 \leq V_{CC} \leq 1.30$	I _{OL} =1.1 mA		0.30 x V _{CC}		0.30 x V _{CC}		
		$1.40 \leq V_{CC} \leq 1.60$	I _{OL} =1.7 mA		0.31		0.37		
Vol	LOW Level Output Voltage	$1.65 \leq V_{CC} \leq 1.95$	I _{OL} =1.9 mA		0.31		0.35		
	Output voitage	$2.30 \leq V_{CC} \leq 2.70$	I _{OL} =3.1 mA		0.44		0.45		
		$2.70 \leq V_{CC} \leq 3.60$	I _{OL} =4.0 mA		0.44		0.45		
l _{in}	Input Leakage Current	0 V to 3.6 V	$0 \leq V_{IN} \leq 3.6 \ V$		±0.1		±0.5	μA	
I _{OFF}	Power Off Leakage Current	0 V	$\begin{array}{l} 0 \leq (V_{\text{IN}}, \ V_{\text{O}}) \\ \leq 3.6 \ V \end{array}$		0.2		0.6	μA	
ΔI_{OFF}	Additional Power Off Leakage Current	0 V to 0.2 V	V_{IN} or $V_O=0$ V to 3.6 V		0.2		0.6	μA	
	Quiescent	0.8 V to 3.6 V	V_{IN} - V_{CC} or GND		0.5		0.9		
I _{CC}	Supply Current	0.0 V 10 3.0 V	$V_{CC} \leq V_{IN} \leq 3.6~V$				±0.9	μA	
ΔI_{CC}	Increase in I _{CC} per Input	3.3 V	V _{IN} =V _{CC} -0.6 V		40.0		50.0	μA	

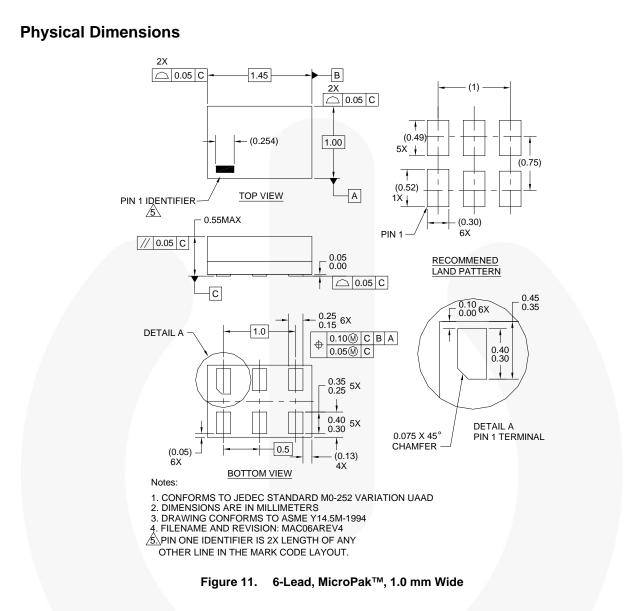
					T _A =25°C			T _A =-40 to 85°C	
Symbol	Parameter	V _{cc}	Condition	Min.	Тур.	Max.	Min.	Max.	Unit
		0.80			30				
		$1.10 \le V_{CC} \le 1.30$	C -15 pE	1.0	10.1	18.9	1.0	19.9	
	Propagation	$1.40 \le V_{CC} \le 1.60$	- C _L =15 pF, R _∪ =R _D =5 KΩ	1.0	6.6	11.4	1.0	12.2	
t _{PZL} , t _{PLZ}	Delay	$1.65 \le V_{CC} \le 1.95$	$V_{I} = 2 \times (V_{CC})$	1.0	6.3	8.7	1.0	9.7	
		$2.30 \leq V_{CC} \leq 2.70$	(See Figure 9)	1.0	4.7	6.9	1.0	7.5	
		$3.00 \leq V_{CC} \leq 3.60$		1.0	4.6	6.8	1.0	7.4	
C _{IN}	Input Capacitance	0			0.8				pF
COUT	Output Capacitance	0			1.7				pF
		0.80			3.0				
		$1.10 \leq V_{CC} \leq 1.30$			3.1				
<u> </u>	Power	$1.40 \le V_{CC} \le 1.60$	V _{IN} =0 V or V _{CC} ,		3.2				pF
. –	Dissipation Capacitance	$1.65 \le V_{CC} \le 1.95$	f=10 MHz		3.4				
		$2.30 \leq V_{CC} \leq 2.70$			3.8				
		$3.00 \le V_{CC} \le 3.60$]		4.4				

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trical Characteristics





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Package Designator	Tape Section	Cavity Number	Cavity Status	Cover Type Status	
	Leader (Start End)	125 (Typical)	Empty	Sealed	
L6X	Carrier	5000	Filled	Sealed	
	Trailer (Hub End)	75 (Typical)	Empty	Sealed	

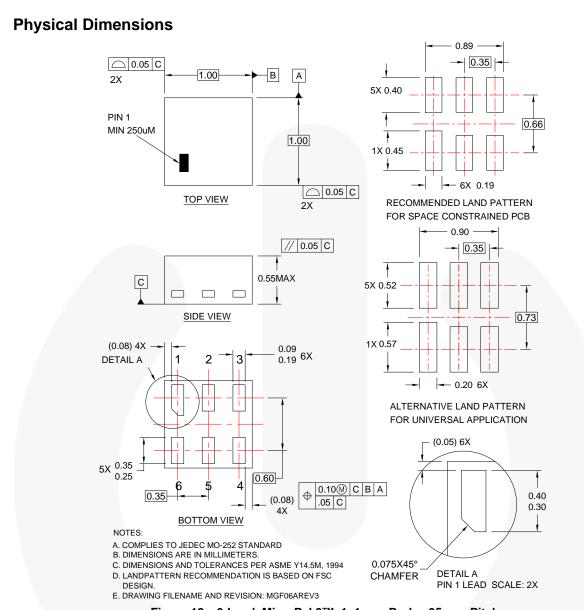


Figure 12. 6-Lead, MicroPak2™, 1x1 mm Body, .35 mm Pitch

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Package Designator Tape Section		Cavity Number	Cavity Status	Cover Type Status	
	Leader (Start End)	125 (Typical)	Empty	Sealed	
FHX	Carrier	5000	Filled	Sealed	
	Trailer (Hub End)	75 (Typical)	Empty	Sealed	

74AUP1G96 — TinyLogic[®] Low Power Universal Configurable Two-Input Logic Gate (Open Drain Output)

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Rev. 162

74AUP1G96

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