



74AUP2G17

DUAL SCHMITT TRIGGER BUFFERS

Description

The Advanced Ultra Low Power (AUP) CMOS logic family is designed for low power and extended battery life in portable applications.

The 74AUP2G17 is composed of two Schmitt trigger buffers with standard push-pull outputs designed for operation over a power supply range of 0.8V to 3.6V. The device is fully specified for partial power down applications using I_{OFF}. The I_{OFF} circuitry disables the output preventing damaging current backflow when the device is powered down. The gates perform the positive Boolean function:

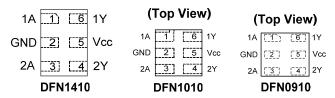
Y = A

Features

- Advanced Ultra Low Power (AUP) CMOS
- Supply Voltage Range from 0.8V to 3.6V
- ± 4mA Output Drive at 3.0V
- Low Static power consumption
- I_{CC} < 0.9µA
- Low Dynamic Power Consumption
- C_{PD} = 4pF Typical at 3.6V
- Schmitt Trigger Action at All Inputs Make the Circuit Tolerant for Slower Input Rise and Fall Time.
- I_{OFF} Supports Partial-Power-Down Mode Operation
- ESD Protection per JESD 22
 - Exceeds 200-V Machine Model (A115)
 - Exceeds 2000-V Human Body Model (A114)
 - Exceeds 1000-V Charged Device Model (C101)
- Latch-Up Exceeds 100mA per JESD 78, Class I
- Leadless packages per JESD30E
 - DFN1410 denoted as X2-DFN1410-6
 - DFN1010 denoted as X2-DFN1010-6
 - DFN0910 denoted as X2-DFN0910-6
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

Pin Assignments

(Top View)



Applications

- Suited for battery and low power needs
- Wide array of products such as:
 - PCs, networking, notebooks, netbooks, PDAs
 - Tablet Computers, E-readers
 - Computer peripherals, hard drives, CD/DVD ROM
 - TV, DVD, DVR, set top box
 - Cell Phones, Personal Navigation / GPS
 - MP3 players ,Cameras, Video Recorders

Notes:

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
- 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

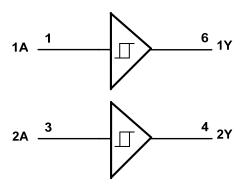
Click here for ordering information, located at the end of datasheet



Pin Descriptions

Pin Name	Pin NO	Function
1A	1	Data Input
GND	2	Ground
2A	3	Data Input
2Y	4	Data Output
Vcc	5	Supply Voltage
1Y	6	Data Output

Logic Diagram



Function Table Diagram

Inputs	Output
nA	nY
Н	Н
L	L



Absolute Maximum Ratings (Note 4) (@TA = +25°C, unless otherwise specified.)

Symbol	Parameter	Rating	Unit
ESD HBM	Human Body Model ESD Protection	2	kV
ESD CDM	Charged Device Model ESD Protection	1	kV
ESD MM	Machine Model ESD Protection	200	V
V _{CC}	Supply Voltage Range	-0.5 to +4.6	V
VI	Input Voltage Range	-0.5 to +4.6	V
Vo	Voltage Applied to Output in High or Low State	-0.5 to V _{CC} +0.5	V
lık	Input Clamp Current V _I < 0	50	mA
I _{OK}	Output Clamp Current (V _O < 0)	-50	mA
Io	Continuous Output Current (V _O = 0 to V _{CC})	±20	mA
Icc	Continuous Current Through V _{CC}	50	mA
I _{GND}	Continuous Current Through GND	-50	mA
TJ	Operating Junction Temperature	-40 to +150	°C
T _{STG}	Storage Temperature	-65 to +150	°C

Note:

Recommended Operating Conditions (Note 5) (@TA = +25°C, unless otherwise specified.)

Symbol		Parameter	Min	Max	Unit
Vcc	Operating Voltage		0.8	3.6	V
Vı	Input Voltage	•	0	3.6	V
Vo	Output Voltage		0	Vcc	V
		V _{CC} = 0.8V		-20	μΑ
		V _{CC} = 1.1V		-1.1	
	High-Level	V _{CC} = 1.4V		-1.7	
I _{OH}	Output Current	V _{CC} = 1.65V		-1.9	mA
		V _{CC} = 2.3V		-3.1	
		V _{CC} = 3.0V		-4	
		V _{CC} = 0.8V		20	μA
		V _{CC} = 1.1V		1.1	
	Low-Level	V _{CC} = 1.4V		1.7	
I_{OL}	Output Current	V _{CC} = 1.65V		1.9	mA
		V _{CC} = 2.3V		3.1	
		V _{CC} = 3.0V		4	
T _A	Operating Free-Air Temperature		-40	+125	°C

Note:

5. Unused inputs should be held at $V_{\text{\footnotesize CC}}$ or Ground.

^{4.} Stresses beyond the absolute maximum may result in immediate failure or reduced reliability. These are stress values and device operation should be within recommend values.



Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Ch al	Danamatan	Took Conditions	V	T _A = -	+25°C	T _A = -40°C	C to +85°C	Unit
Symbol	Parameter	Test Conditions	V _{CC}	Min	Max	Min	Max	
			0.8V	0.3	0.6	0.3	0.6	
			1.1V	0.53	0.9	0.53	0.9	
V_{T+}	Positive-going Input		1.4V	0.74	1.11	0.74	1.11	V
V T+	Threshold Voltage		1.65V	0.91	1.29	0.91	1.29	V
			2.3V	1.37	1.77	1.37	1.77	
			3.0V	1.88	2.29	1.88	2.29	
			0.8V	0.1	0.6	0.1	0.6	
			1.1V	0.26	0.65	0.26	0.65	
V_{T-}	Negative-going Input		1.4V	0.39	0.75	0.39	0.75	V
	Threshold Voltage		1.65V	0.47	0.84	0.47	0.84	
			2.3V	0.69	1.04	0.69	1.04	
			3.0V	0.88	1.24	0.88	1.24	
			0.8V	0.07	0.5	0.07	0.5	
			1.1V	0.08	0.46	0.08	0.46	
ΔV_T	Hysteresis		1.4V	0.18	0.56	0.18	0.56	V
	(V _{T+} - V _{T-)}		1.65V	0.27	0.66	0.27	0.66	
			2.3V	0.53	0.92	0.53	0.92	
			3.0V	0.79	1.31	0.79	1.31	
		I _{OH} = -20μA	0.8V to 3.6V	V _{CC} – 0.1		V _{CC} – 0.1		
		I _{OH} = -1.1mA	1.1V	0.75 X V _{CC}		0.7 X V _{CC}		
		I _{OH} = -1.7mA	1.4V	1.11		1.03		v
V_{OH}	High-Level Output	I _{OH} = -1.9mA	1.65V	1.32		1.30		
• 011	Voltage	I_{OH} = -2.3mA	2.3V	2.05		1.97		
		I _{OH} = -3.1mA	2.01	1.9		1.85		
		$I_{OH} = -2.7 \text{mA}$	3V	2.72		2.67		
		$I_{OH} = -4mA$	3 V	2.6		2.55		
		I _{OL} = 20μA	0.8V to 3.6V		0.1		0.1	
		I _{OL} = 1.1mA	1.1V		0.3 X V _{CC}		0.3 X V _{CC}	
		I _{OL} = 1.7mA	1.4V		0.31		0.37	
.,	Low-Level Output	I _{OL} = 1.9mA	1.65V		0.31		0.35	.,
V_{OL}	Voltage	I _{OL} = 2.3mA			0.31		0.33	V
		I _{OL} = 3.1mA	2.3V		0.44		0.45	
		I _{OL} = 2.7mA			0.31		0.33	
		I _{OL} = 4mA	- 3V		0.44		0.45	
lı	Input Current	V _I = GND to 3.6V	0 to 3.6V		± 0.1		±0.5	μA
l _{OFF}	Power Down Leakage Current	V_1 or $V_0 = 0V$ to 3.6V	0V		± 0.2		±0.5	μA
Δl _{OFF}	Delta Power Down Leakage Current	V_1 or $V_0 = 0V$ to 3.6V	0V to 0.2V		± 0.2		±0.6	μA
I _{CC}	Supply Current	$V_I = GND \text{ or } V_{CC}, I_O = 0$	0.8V to 3.6V		0.5		0.9	μA
ΔI _{CC}	Additional Supply Current	Input at V _{CC} -0.6V	3.3V		40		50	μΑ



Electrical Characteristics (cont.) (@TA = +25°C, unless otherwise specified.)

Symbol	Parameter	Test Conditions	V	T _A = -40°C	to +125°C	Unit
Symbol	Parameter	rest Conditions	V _{CC}	Min	Max	
			0.8V	0.3	0.62	
			1.1V	0.53	0.92	
V_{T+}	Positive-Going Input Threshold		1.4V	0.74	1.13	V
V T+	Voltage		1.65V	0.91	1.31	V
			2.3V	1.37	1.80	
			3.0V	1.88	2.32	
			0.8V	0.1	0.6	
			1.1V	0.26	0.65	
V_{T-}	Negative-Going Input Threshold		1.4V	0.39	0.75	V
	Voltage		1.65V	0.47	0.84	·
			2.3V	0.69	1.04	
			3.0V	0.88	1.24	
			0.8V	0.07	0.5	
			1.1V	0.08	0.46	
ΔV_{T}	Hysteresis		1.4V	0.18	0.56	V
Δν	(V _{T+} - V _{T-)}		1.65V	0.27	0.66	·
			2.3V	0.53	0.92	
			3.0V	0.79	1.31	
		I _{OH} = -20μA	0.8V to 3.6V	V _{CC} – 0.11		
		$I_{OH} = -1.1$ mA	1.1V	0.6 X V _{CC}		
		I _{OH} = -1.7mA	1.4V	0.93		
\ /	Lligh Lovel Output Voltage	I _{OH} = -1.9 mA	1.65V	1.17		V
V_{OH}	High-Level Output Voltage	I _{OH} = -2.3mA	0.01/	1.77		V
		I _{OH} = -3.1mA	2.3V	1.67		
		I _{OH} = -2.7mA		2.40		
		I _{OH} = -4mA	3V	2.30		
		I _{OL} = 20μA	0.8V to 3.6V		0.11	
		I _{OL} = 1.1mA	1.1V		0.33 X V _{CC}	
		I _{OL} = 1.7mA	1.4V		0.41	
V	Low Lovel Output Voltage	I _{OL} = 1.9mA	1.65V		0.39	V
V_{OL}	Low-Level Output Voltage	I _{OL} = 2.3mA	2.21/		0.36	V
		I _{OL} = 3.1mA	2.3V		0.50	
		I _{OL} = 2.7mA	21.6		0.36	
		I _{OL} = 4mA	3V		0.50	
l _l	Input Current	V _I = GND to 3.6V	0V to 3.6V		± 0.75	μA
I _{OFF}	Power Down Leakage Current	V _I or VO = 0V to 3.6V	0V		± 1.0	μA
ΔI_{OFF}	Delta Power Down Leakage Current	V _I or VO = 0V to 3.6V	0V to 0.2V		± 2.5	μA
Icc	Supply Current	$V_I = GND \text{ or } V_{CC}, I_O = 0$	0.8V to 3.6V		1.4	μA
ΔI _{CC}	Additional Supply Current	Input at V _{CC} -0.6V	3.3V		75	μA



Switching Characteristics

 C_L = 5pF see Figure 1

Parameter From		то	Vaa	7	T _A = +25°C		T _A = -40°C to +85°C		T _A = -40°C to +125°C		Unit
Farailletei	Input	OUTPUT	V _{CC}	Min	Тур	Max	Min	Max	Min	Max	Oilit
			V8.0		19.9						
			1.2V ± 0.1V	2.7	5.9	11.0	2.4	11.1	2.4	11.2	ns
4	٨		1.5V ± 0.1V	2.6	4.3	6.6	2.4	7.1	2.4	7.4	
t _{pd}	Α	,	1.8V ± 0.15V	2.1	3.7	5.4	2.0	6.0	2.0	6.2	
			2.5V ± 0.2V	1.2	2.4	3.9	1.1	4.5	1.1	5.0	
			$3.3V \pm 0.3V$	1.1	2.1	3.2	1.0	3.9	1.0	4.3	

C_L = 10pF see Figure 1

Parameter From		то	TO V	7	Γ _A = +25°(3	T _A = -40°C to +85°C		T _A = -40°C to +125°C		Unit
Parameter	Input	OUTPUT	Vcc	Min	Тур	Max	Min	Max	Min	Max	Ullit
			V8.0		23.4						
		Y	1.2V ± 0.1V	2.9	6.8	12.7	2.8	12.8	2.8	12.9	- ns
	٨		1.5V ± 0.1V	2.8	5.0	7.7	2.6	8.2	2.6	8.6	
t _{pd}	Α		1.8V ± 0.15V	2.7	4.2	6.2	2.5	6.7	2.5	7.1	
			2.5V ± 0.2V	1.6	2.9	4.6	1.5	5.4	1.5	6.0	
			$3.3V \pm 0.3V$	1.5	2.7	3.8	1.4	4.5	1.4	5.0	

C_L = 15pF see Figure 1

Parameter From		то	V	7	Γ _A = +25°(;	T _A = -40°C to +85°C		T _A = -40°C to +125°C		Unit
Parameter	Input C	OUTPUT	Vcc	Min	Тур	Max	Min	Max	Min	Max	Ullit
			V8.0		26.9						
			1.2V ± 0.1V	3.3	7.6	14.3	3.0	17.4	3.0	18.5	
	٨		1.5V ± 0.1V	3.3	5.5	8.6	2.9	9.4	2.9	9.8	
t _{pd}	Α	ľ	1.8V ± 0.15V	2.8	4.7	7.0	2.8	7.7	2.8	8.1	ns
			2.5V ± 0.2V	2.1	3.3	5.1	1.8	6.1	1.8	6.8	
			$3.3V \pm 0.3V$	2.0	3.1	4.2	1.8	5.0	1.8	5.5	

C_L = 30pF see Figure 1

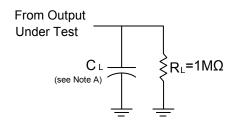
Parameter From		то	V	7	Γ _A = +25°(2	T _A = -40°C to +85°C		T _A = -40°C to +125°C		Unit
rarameter	Input OUTPUT	OUTPUT	V _{CC}	Min	Тур	Max	Min	Max	Min	Max	Ullit
			0.8V		37.3						
			1.2V ± 0.1V	4.0	9.8	18.7	3.9	19.6	3.9	20.0]
4			1.5V ± 0.1V	3.7	7.1	11.2	3.6	12.3	3.6	12.9	
t _{pd}	Α	Y	1.8V ± 0.15V	3.6	6.0	9.1	3.6	10.0	3.6	10.6	ns
			2.5V ± 0.2V	2.4	4.5	6.5	2.3	7.6	2.3	8.4	
			3.3V ± 0.3V	2.2	4.2	5.4	2.1	6.2	2.1	6.9	



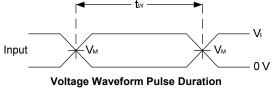
Operating and Package Characteristics (@T_A = +25°C, unless otherwise specified.)

	Parameter	Test Conditions	Vcc	Тур	Unit
			0.8V	5.1	
	Power Dissipation		1.2V ± 0.1V	5.2	
_		f = 1MHz	1.5V ± 0.1V	5.2	
C_{pd}	Capacitance	No Load	1.8V ± 0.15V	5.5	- pF
			2.5V ± 0.2V	5.7	
			$3.3V \pm 0.3V$	6.0	
C _I	Input Capacitance	$V_i = V_{CC}$ or GND	0V or 3.3V	2.0	pF
Co	Output Capacitance	$V_O = V_{CC}$ or GND	0V	2.0	pF

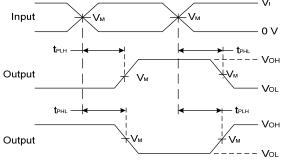
Parameter Measurement Information



Vcc	In	puts	V _M	Cı
	VI	t _r /t _f	- 101	
1.2V ± 0.1V	V _{CC}	≤3ns	V _{CC} /2	5, 10, 15, 30pF
1.5V ± 0.1V	V _{CC}	≤3ns	V _{CC} /2	5, 10, 15, 30pF
1.8V ± 0.15V	V _{CC}	≤3ns	V _{CC} /2	5, 10, 15, 30pF
2.5V ± 0.2V	V _{CC}	≤3ns	V _{CC} /2	5, 10, 15, 30pF
3.3V ± 0.3V	V _{CC}	≤3ns	V _{CC} /2	5, 10, 15, 30pF
0V or 3.3V	V _{CC}	≤3ns	V _{CC} /2	5, 10, 15, 30pF







Voltage Waveform Propagation Delay Times Inverting and Non Inverting Outputs

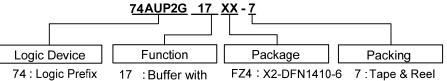
Figure 1 Load Circuit and Voltage Waveforms

Notes: A. Includes test lead and test apparatus capacitance.

- B. All pulses are supplied at pulse repetition rate ≤ 10MHz.
- C. Inputs are measured separately one transition per measurement.
- D. t_{PLH} and t_{PHL} are the same as t_{PD}



Ordering Information



AUP : 0.8 V to 3.6 V Logic Family

2G: Dual Gate

FW4: X2-DFN1010-6 FW3: X2-DFN0910-6 Schmitt Trigger Input

Part Number	Package Code	Packaging	7" Tape and Reel (Note 6)	
Part Number	Package Code		Quantity	Part Number Suffix
74AUP2G17FZ4-7	FZ4	X2-DFN1410-6	5000/Tape & Reel	-7
74AUP2G17FW4-7	FW4	X2-DFN1010-6	5000/Tape & Reel	-7
74AUP2G17FW3-7	FW3	X2-DFN0910-6	5000/Tape & Reel	-7
				•

6. The taping orientation is located on our website at http://www.diodes.com/datasheets/ap02007.pdf Note:

Marking Information

(1) X2-DFN1410-6, X2-DFN1010-6, X2-DFN0910-6

(Top View)

 $\frac{XX}{Y}$: Identification Code $\frac{X}{Y}$: Year: 0~9

₩: Week: A~Z: 1~26 week; a~z: 27~52 week; z represents

52 and 53 week X: A~Z: Internal code

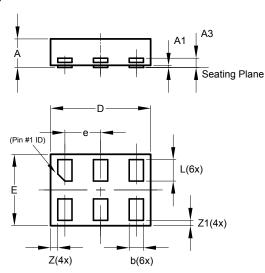
Part Number	Package	Identification Code
74AUP2G17FZ4	X2-DFN1410-6	RS
74AUP2G17FW4	X2-DFN1010-6	SS
74AUP2G17FW3	X2-DFN0910-6	MS



Package Outline Dimensions (All dimensions in mm.)

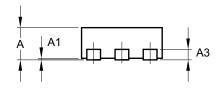
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.

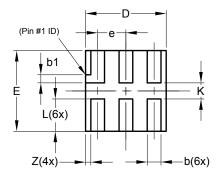
(1) Package Type X2-DFN1410-6



X2-DFN1410-6			
Dim	Min	Max	Тур
Α	_	0.40	0.39
A1	0.00	0.05	0.02
А3			0.13
b	0.15	0.25	0.20
D	1.35	1.45	1.40
Е	0.95	1.05	1.00
е	_	_	0.50
L	0.25	0.35	0.30
Z	-	-	0.10
Z 1	0.045	0.105	0.075
All Dimensions in mm			

(2) Package Type: X2-DFN1010-6





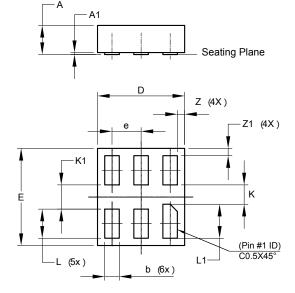
X2-DFN1010-6			
Dim	Min	Max	Тур
Α	-	0.40	0.39
A1	0.00	0.05	0.02
A3	_	_	0.13
b	0.14	0.20	0.17
b1	0.05	0.15	0.10
D	0.95	1.05	1.00
Е	0.95	1.05	1.00
е	-		0.35
١	0.35	0.45	0.40
K	0.15		
Z			0.065
All Dimensions in mm			



Package Outline Dimensions (All dimensions in mm.)

Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.

(3) Package Type: X2-DFN0910-6



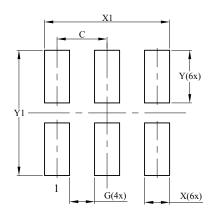
X2-DFN0910-6			
Dim	Min	Max	Тур
Α	ı	0.35	0.30
A1	0	0.03	0.02
b	0.10	0.20	0.15
D	0.85	0.95	0.90
Е	0.95	1.05	1.00
е	-	-	0.30
K	0.20	-	-
K1	0.25	-	-
L	0.25	0.35	0.30
L1	0.30	0.40	0.35
Z	-	-	0.075
Z 1	-	-	0.075
All Dimensions in mm			



Suggested Pad Layout

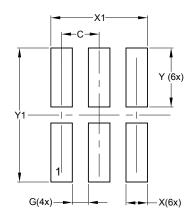
Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.

(1) Package Type X2-DFN1410-6



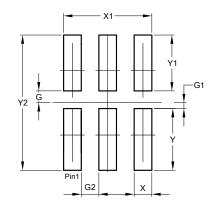
Dimensions	Value (in mm)
С	0.500
G	0.250
Х	0.250
X1	1.250
Y	0.525
Y1	1.250

(2) Package Type: X2-DFN1010-6



Dimensions	Value (in mm)
С	0.350
G	0.150
Х	0.200
X1	0.900
Y	0.550
Y1	1.250

(3) Package Type: X2-DFN0910-6



Dimensions	Value (in mm)
G	0.100
G1	0.050
G2	0.150
Х	0.150
X1	0.750
Υ	0.525
Y1	0.475
Y2	1 150



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