



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.

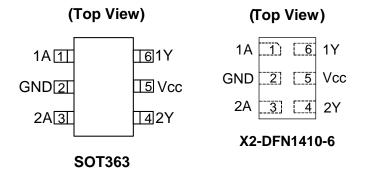
The 74AUP2G17 is composed of two Schmitt trigger buffers with standard push-pull outputs designed for operation over a power supply range of 0.8V to 3.6V. The device is fully specified for partial power down applications using I_{OFF} . The I_{OFF} circuitry disables the output preventing damaging current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





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

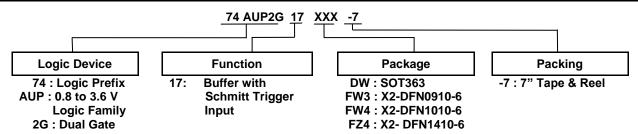
Notes: 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.

- 2. 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.

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Ordering Information



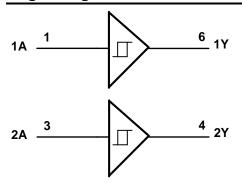
Part Number	Package	Package	Package	7" Tape and Reel			
Part Number	Code	(Notes 4 & 5)	Size	Quantity	Part Number Suffix		
74AUP2G17DW-7	DW	SOT363	2.0mm x 2.0mm x 1.1mm 0.65 mm lead pitch	3,000/Tape & Reel	-7		
74AUP2G17FW3-7	FW3	X2-DFN0910-6	0.9mm x 1.0mm x 0.35mm 0.35 mm pad pitch	5,000/Tape & Reel	-7		
74AUP2G17FW4-7	FW4	X2-DFN1010-6	1.0mm x 1.0mm x 0.4mm 0.35 mm pad pitch	5,000/Tape & Reel	-7		
74AUP2G17FZ4-7	FZ4	X2-DFN1410-6	1.4mm x 1.0mm x 0.4mm 0.5 mm pad pitch	5,000/Tape & Reel	-7		

Notes:

Pin Descriptions

Pin Name	Pin NO	Function			
1A	1	Data Input			
GND	2	Ground			
2A	3	Data Input			
2Y	4	Data Output			
V_{CC}	5	Supply Voltage			
1Y	6	Data Output			

Logic Diagram



Function Table Diagram

Inputs	Output
nA	nY
Н	Н
L	L

^{4.} Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at https://www.diodes.com/design/support/packaging/diodes-packaging/diodes-package-outlines/.

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



Absolute Maximum Ratings (Notes 6 & 7) (@T_A = +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			
Vcc	Supply Voltage Range	-0.5 to +4.6	V			
Vı	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				
I _{IK}	Input Clamp Current V _I < 0	-50	mA			
lok	Output Clamp Current (V _O < 0)	-50	mA			
lo	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			

Notes:

Recommended Operating Conditions (Note 8) (@TA = +25°C, unless otherwise specified.)

Symbol	Para	meter	Min	Max	Unit
V _{CC}	Operating Voltage	_	0.8	3.6	V
VI	Input Voltage	•	0	3.6	V
Vo	Output Voltage		0	V _{CC}	V
		V _{CC} = 0.8V	_	-20	μΑ
		V _{CC} = 1.1V	_	-1.1	
	High-Level	V _{CC} = 1.4V	_	-1.7	
Іон	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	μΑ
		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:

8. Unused inputs should be held at V_{CC} or Ground.

^{6.} 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.

^{7.} Forcing the maximum allowed voltage could cause a condition exceeding the maximum current or conversely forcing the maximum current could cause a condition exceeding the maximum voltage. The ratings of both current and voltage must be maintained within the controlled range.



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

Symbol	Parameter	Test Conditions	Vac	T _A = -	+25°C	$T_A = -40^{\circ}C$	C to +85°C	Unit	
Symbol	Parameter	rest Conditions	Vcc	Min	Max	Min	Max		
			0.8V	0.3	0.65	0.3	0.65		
			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 +	Threshold Voltage		1.65V	0.91	1.29	0.91	1.29	ľ	
			2.3V	1.37	1.77	1.37	1.77		
			3.0V	1.88	2.29	1.88	2.29		
			V8.0	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		
	Hysteresis		1.1V	0.08	0.46	0.08	0.46		
ΔV_T		_	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	_		
		$I_{OH} = -1.1 \text{mA}$	1.1V	0.75 x V _{CC}	_	0.7 x V _{CC}	_		
		$I_{OH} = -1.7 \text{mA}$	1.4V	1.11	_	1.03	_		
Vон	High-Level Output	$I_{OH} = -1.9 \text{mA}$	1.65V	1.32		1.30	_	V	
VOH	Voltage	$I_{OH} = -2.3 \text{mA}$	2.3V	2.05	_	1.97	_	ľ	
		$I_{OH} = -3.1 \text{mA}$	2.5 V	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}	1	
		I _{OL} = 1.7mA	1.4V	_	0.31	_	0.37	1	
	Low-Level Output	I _{OL} = 1.9mA	1.65V	_	0.31	_	0.35	1	
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		
l _l	Input Current	$V_I = GND \text{ to } 3.6V$	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	μΑ	
ΔI_{OFF}	Delta Power Down Leakage Current	V_1 or $V_0 = 0V$ to 3.6V	0V to 0.2V	_	± 0.2	_	±0.6	μA	
Icc	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.) (@T_A = +25°C, unless otherwise specified.)

Symbol	Parameter	Test Conditions	V	T _A = -40°C	to +125°C	Unit
Symbol	Parameter	rest Conditions	Vcc	Min	Max	
			0.8V	0.3	0.67	
			1.1V	0.53	0.92	
V_{T+}	Positive-Going Input Threshold		1.4V	0.74	1.13	V
V +	Voltage	_	1.65V	0.91	1.31	l 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	ľ
			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
	(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} = -1.1mA	1.1V	0.6 x V _{CC}	_	
		I _{OH} = -1.7mA	1.4V	0.93	_	
Vон	High-Level Output Voltage	I _{OH} = -1.9 mA	1.65V	1.17	_	V
VOH	Trigit Level Output Voltage	$I_{OH} = -2.3 \text{mA}$	2.3V	1.77	_	·
		I _{OH} = -3.1mA	2.50	1.67	_	
		I _{OH} = -2.7mA	3V	2.40	_	
		I _{OH} = -4mA		2.30	_	
		I _{OL} = 20μA	0.8V to 3.6V	_	0.11	
		I _{OL} = 1.1mA	1.1V	_	0.33 x V _{CC}	
		$I_{OL} = 1.7 \text{mA}$	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	
		$I_{OL} = 2.7 \text{mA}$	0)/	_	0.36	
		I _{OL} = 4mA	3V	_	0.50	
lı	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
I _{CC}	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 Input	TO OUTPUT	V	7	Γ _A = +25°(2	T _A = -40°C to +85°C		$T_A = -40^{\circ}C \text{ to } +125^{\circ}C$		Unit
			Vcc	Min	Тур	Max	Min	Max	Min	Max	Offic
			V8.0	_	19.9	_	_	_	_	_	
			1.2V ± 0.1V	2.7	5.9	11.0	2.4	11.1	2.4	11.2	ns
	٨	V	1.5V ± 0.1V	2.6	4.3	6.6	2.4	7.1	2.4	7.4	
t _{pd}	Α	Y	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	TO OUTPUT	V	7	Γ _A = +25°(;	$T_A = -40^{\circ}C \text{ to } +85^{\circ}C$		$T_A = -40^{\circ}C \text{ to } +125^{\circ}C$		Unit
Faranieter	Input		V _{CC}	Min	Тур	Max	Min	Max	Min	Max	Ullit
			V8.0	_	23.4	_	_	_	_	_	
			1.2V ± 0.1V	2.9	6.8	12.7	2.8	12.8	2.8	12.9	ns
	٨	V	1.5V ± 0.1V	2.8	5.0	7.7	2.6	8.2	2.6	8.6	
t _{pd}	Α	Ť	1.8V ± 0.15V	2.7	4.2	6.2	2.5	6.7	2.5	7.1	
		_	$2.5V \pm 0.2V$	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	TO OUTPUT	V	7	Γ _A = +25°(;	$T_A = -40$ °C to +85°C		$T_A = -40^{\circ}C \text{ to } +125^{\circ}C$		Unit
Input	Input		V _{CC}	Min	Тур	Max	Min	Max	Min	Max	Oilit
			V8.0	_	26.9	_	_	_	_	_	
			1.2V ± 0.1V	3.3	7.6	14.3	3.0	17.4	3.0	18.5	ns
	۸	V	1.5V ± 0.1V	3.3	5.5	8.6	2.9	9.4	2.9	9.8	
t _{pd}	Α	Y	1.8V ± 0.15V	2.8	4.7	7.0	2.8	7.7	2.8	8.1	
			$2.5V \pm 0.2V$	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

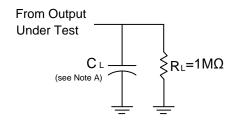
Parameter From Input	From	то	V	1	Γ _A = +25°(;	$T_A = -40^{\circ}C \text{ to } +85^{\circ}C$		$T_A = -40$ °C	to +125°C	Unit
	OUTPUT	V _{CC}	Min	Тур	Max	Min	Max	Min	Max	Oilit	
			V8.0	_	37.3	_	_	_	_	_	
		A Y	1.2V ± 0.1V	4.0	9.8	18.7	3.9	19.6	3.9	20.0	ns
	۸		1.5V ± 0.1V	3.7	7.1	11.2	3.6	12.3	3.6	12.9	
t _{pd}	А		1.8V ± 0.15V	3.6	6.0	9.1	3.6	10.0	3.6	10.6	
			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	



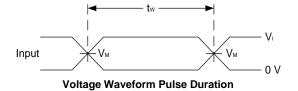
Operating and Package Characteristics (@T_A = +25°C, unless otherwise specified.)

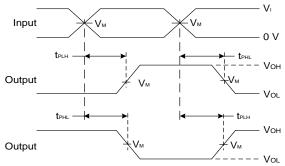
	Parameter	Test Conditions	Vcc	Тур	Unit
			0.8V	5.1	
			1.2V ± 0.1V	5.2	
_	Power Dissipation	f = 1MHz	1.5V ± 0.1V	5.2	
C_{pd}	Capacitance	No Load	1.8V ± 0.15V	5.5	pF
			2.5V ± 0.2V	5.7	
			3.3V ± 0.3V	6.0]
Cı	Input Capacitance	V _i = V _{CC} or GND	0V or 3.3V	2.0	pF
Co	Output Capacitance	$V_O = V_{CC}$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

Parameter Measurement Information



Vcc	Inputs		V	
VCC	VI	t _r /t _f	V _M	CL
1.2V ± 0.1V	V _{CC}	≤3ns	V _{CC} /2	5, 10, 15, 30pF
1.5V ± 0.1V	Vcc	≤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	Vcc	≤3ns	V _{CC} /2	5, 10, 15, 30pF
3.3V ± 0.3V	Vcc	≤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 $t_{PD.}$



Marking Information

(1) SOT363

5 4

XXYWX

2 3 XX: Identification code

Y: Year 0~9

W: Week: A~Z: 1~26 week;

a~z: 27~52 week; z represents 52 and 53 week

 \underline{X} : A~Z: Internal Code

Part Number	Package	Identification Code
74AUP2G17DW-7	SOT363	SS

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

(Top View)

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

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

a~z: 27~52 week; z represents

...

Output

Description

Output

Description

Descript

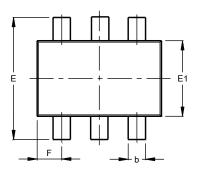
52 and 53 week X: A~Z: Internal code

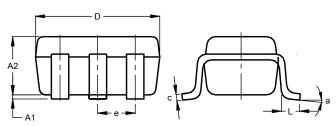
Part Number	Package	Identification Code
74AUP2G17FZ4-7	X2-DFN1410-6	RS
74AUP2G17FW4-7	X2-DFN1010-6	SS
74AUP2G17FW3-7	X2-DFN0910-6	MS



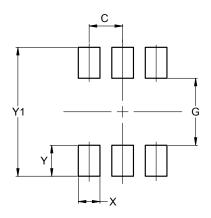
SOT363 Package Outline Dimensions and Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.





	SOT363				
Dim	Min	Max	Тур		
A1	0.00	0.10	0.05		
A2	0.90	1.00	1.00		
b	0.10	0.30	0.25		
С	0.10	0.22	0.11		
D	1.80	2.20	2.15		
Е	2.00	2.20	2.10		
E1	1.15	1.35	1.30		
е	().650 E	SC		
F	0.40	0.45	0.425		
L	0.25	0.40	0.30		
а	0°	8°			
All Dimensions in mm					

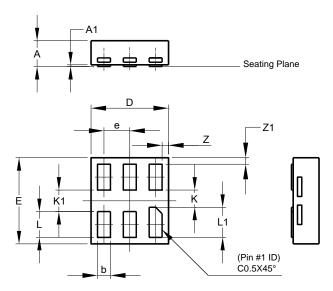


Dimensions	Value (in mm)
С	0.650
G	1.300
X	0.420
Y	0.600
Y1	2.500

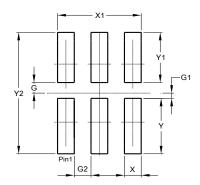


X2-DFN0910-6 Package Outline Dimensions and Suggested Pad Layout

 $Please see \ http://www.diodes.com/package-outlines.html \ for \ the \ latest \ version.$



X2-DFN0910-6				
Dim	Min	Max	Тур	
Α	-	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	-	-	
K 1	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				

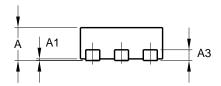


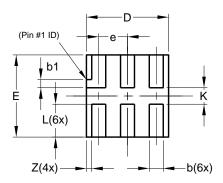
Dimensions	Value (in mm)
G	0.100
G1	0.050
G2	0.150
Х	0.150
X1	0.750
Y	0.525
Y1	0.475
Y2	1.150



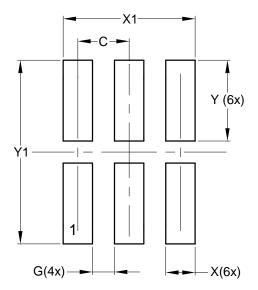
X2-DFN1010-6 Package Outline Dimensions and Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.





X2-DFN1010-6				
Dim	Min	Max	Тур	
Α		0.40	0.39	
A1	0.00	0.05	0.02	
А3		_	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	
L	0.35	0.45	0.40	
K	0.15	_		
Ζ			0.065	
All Dimensions in mm				

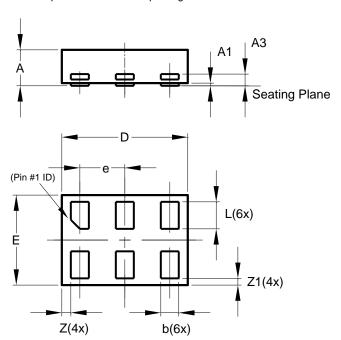


Dimensions	Value (in mm)
C	0.350
G	0.150
Х	0.200
X1	0.900
Y	0.550
Y1	1 250

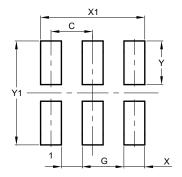


X2-DFN1410-6 Package Outline Dimensions and Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.



	X2-DFN1410-6				
Dim	Min	Max	Тур		
Α	_	0.40	0.39		
A1	0.00	0.05	0.02		
A3	_	_	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		
Ζ	-		0.10		
Z 1	0.045	0.105	0.075		
All Dimensions in mm					



Dimensions	Value	
Dimensions	(in mm)	
C	0.500	
G	0.250	
Х	0.250	
X1	1.250	
Υ	0.525	
Y1	1.250	



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