

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

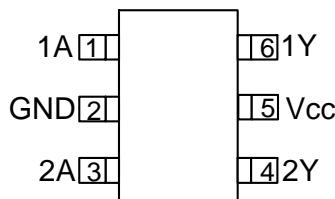
- Advanced Ultra Low Power (AUP) CMOS
- Supply Voltage Range from 0.8V to 3.6V
- $\pm 4\text{mA}$ Output Drive at 3.0V
- Low Static Power Consumption
- $I_{CC} < 0.9\mu\text{A}$
- Low Dynamic Power Consumption
- $C_{PD} = 4\text{pF}$ Typical at 3.6V
- Schmitt Trigger Action at All Inputs Make the Circuit 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)**

Notes:

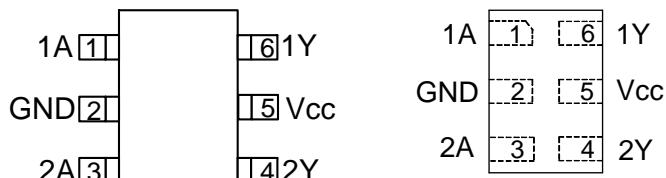
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green"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

Pin Assignments

(Top View)



(Top View)



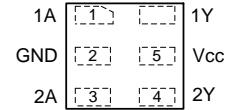
X2-DFN1410-6

SOT363

(Top View)



(Top View)

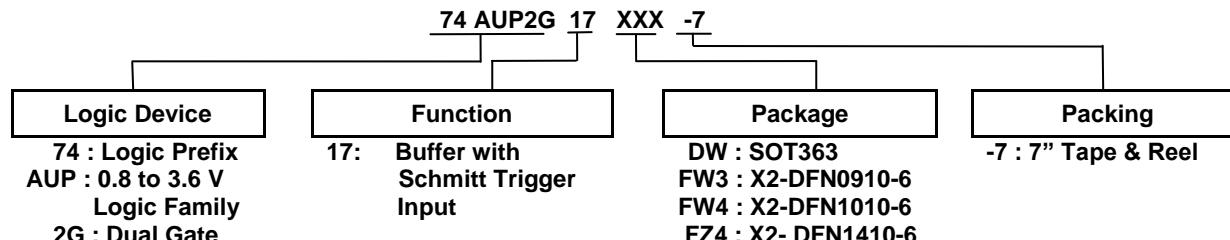


X2-DFN0910-6

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

Ordering Information



Part Number	Package Code	Package (Notes 4 & 5)	Package Size	7" Tape and Reel	
				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

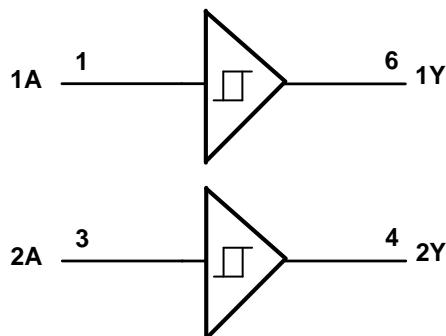
Notes:

- 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>.

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
H	H
L	L

Absolute Maximum Ratings (Notes 6 & 7) (@ $T_A = +25^\circ\text{C}$, 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
V_I	Input Voltage Range	-0.5 to +4.6	V
V_O	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
I_{OK}	Output Clamp Current ($V_O < 0$)	-50	mA
I_O	Continuous Output Current ($V_O = 0$ to V_{CC})	± 20	mA
I_{CC}	Continuous Current Through V_{CC}	50	mA
I_{GND}	Continuous Current Through GND	-50	mA
T_J	Operating Junction Temperature	-40 to +150	$^\circ\text{C}$
T_{STG}	Storage Temperature	-65 to +150	$^\circ\text{C}$

- Notes:
- 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.

Recommended Operating Conditions (Note 8) (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Symbol	Parameter		Min	Max	Unit
V_{CC}	Operating Voltage	—	0.8	3.6	V
V_I	Input Voltage	—	0	3.6	V
V_O	Output Voltage	—	0	V_{CC}	V
I_{OH}	High-Level Output Current	$V_{CC} = 0.8\text{V}$	—	-20	μA
		$V_{CC} = 1.1\text{V}$	—	-1.1	mA
		$V_{CC} = 1.4\text{V}$	—	-1.7	
		$V_{CC} = 1.65\text{V}$	—	-1.9	
		$V_{CC} = 2.3\text{V}$	—	-3.1	
		$V_{CC} = 3.0\text{V}$	—	-4	
I_{OL}	Low-Level Output Current	$V_{CC} = 0.8\text{V}$	—	20	μA
		$V_{CC} = 1.1\text{V}$	—	1.1	mA
		$V_{CC} = 1.4\text{V}$	—	1.7	
		$V_{CC} = 1.65\text{V}$	—	1.9	
		$V_{CC} = 2.3\text{V}$	—	3.1	
		$V_{CC} = 3.0\text{V}$	—	4	
T_A	Operating Free-Air Temperature	—	-40	+125	$^\circ\text{C}$

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

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Symbol	Parameter	Test Conditions	V _{CC}	$T_A = +25^\circ\text{C}$		$T_A = -40^\circ\text{C} \text{ to } +85^\circ\text{C}$		Unit
				Min	Max	Min	Max	
V_{T+}	Positive-going Input Threshold Voltage	—	0.8V	0.3	0.65	0.3	0.65	V
			1.1V	0.53	0.9	0.53	0.9	
			1.4V	0.74	1.11	0.74	1.11	
			1.65V	0.91	1.29	0.91	1.29	
			2.3V	1.37	1.77	1.37	1.77	
			3.0V	1.88	2.29	1.88	2.29	
V_{T-}	Negative-going Input Threshold Voltage	—	0.8V	0.1	0.6	0.1	0.6	V
			1.1V	0.26	0.65	0.26	0.65	
			1.4V	0.39	0.75	0.39	0.75	
			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	
ΔV_T	Hysteresis ($V_{T+} - V_{T-}$)	—	0.8V	0.07	0.5	0.07	0.5	V
			1.1V	0.08	0.46	0.08	0.46	
			1.4V	0.18	0.56	0.18	0.56	
			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	
V_{OH}	High-Level Output Voltage	$I_{OH} = -20\mu\text{A}$	0.8V to 3.6V	$V_{CC} - 0.1$	—	$V_{CC} - 0.1$	—	V
		$I_{OH} = -1.1\text{mA}$	1.1V	$0.75 \times V_{CC}$	—	$0.7 \times V_{CC}$	—	
		$I_{OH} = -1.7\text{mA}$	1.4V	1.11	—	1.03	—	
		$I_{OH} = -1.9\text{mA}$	1.65V	1.32	—	1.30	—	
		$I_{OH} = -2.3\text{mA}$	2.3V	2.05	—	1.97	—	
		$I_{OH} = -3.1\text{mA}$		1.9	—	1.85	—	
		$I_{OH} = -2.7\text{mA}$	3V	2.72	—	2.67	—	
		$I_{OH} = -4\text{mA}$		2.6	—	2.55	—	
V_{OL}	Low-Level Output Voltage	$I_{OL} = 20\mu\text{A}$	0.8V to 3.6V	—	0.1	—	0.1	V
		$I_{OL} = 1.1\text{mA}$	1.1V	—	$0.3 \times V_{CC}$	—	$0.3 \times V_{CC}$	
		$I_{OL} = 1.7\text{mA}$	1.4V	—	0.31	—	0.37	
		$I_{OL} = 1.9\text{mA}$	1.65V	—	0.31	—	0.35	
		$I_{OL} = 2.3\text{mA}$	2.3V	—	0.31	—	0.33	
		$I_{OL} = 3.1\text{mA}$		—	0.44	—	0.45	
		$I_{OL} = 2.7\text{mA}$	3V	—	0.31	—	0.33	
		$I_{OL} = 4\text{mA}$		—	0.44	—	0.45	
I_I	Input Current	$V_I = \text{GND to } 3.6\text{V}$	0 to 3.6V	—	± 0.1	—	± 0.5	μA
I_{OFF}	Power Down Leakage Current	$V_I \text{ or } V_O = 0\text{V to } 3.6\text{V}$	0V	—	± 0.2	—	± 0.5	μA
ΔI_{OFF}	Delta Power Down Leakage Current	$V_I \text{ or } V_O = 0\text{V to } 3.6\text{V}$	0V to 0.2V	—	± 0.2	—	± 0.6	μA
I_{CC}	Supply Current	$V_I = \text{GND or } V_{CC}, I_O = 0$	0.8V to 3.6V	—	0.5	—	0.9	μA
ΔI_{CC}	Additional Supply Current	Input at $V_{CC} - 0.6\text{V}$	3.3V	—	40	—	50	μA

Electrical Characteristics (cont.) (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Symbol	Parameter	Test Conditions	V_{CC}	$T_A = -40^\circ\text{C} \text{ to } +125^\circ\text{C}$		Unit
				Min	Max	
V_{T+}	Positive-Going Input Threshold Voltage	—	0.8V	0.3	0.67	V
			1.1V	0.53	0.92	
			1.4V	0.74	1.13	
			1.65V	0.91	1.31	
			2.3V	1.37	1.80	
			3.0V	1.88	2.32	
V_{T-}	Negative-Going Input Threshold Voltage	—	0.8V	0.1	0.6	V
			1.1V	0.26	0.65	
			1.4V	0.39	0.75	
			1.65V	0.47	0.84	
			2.3V	0.69	1.04	
			3.0V	0.88	1.24	
ΔV_T	Hysteresis ($V_{T+} - V_{T-}$)	—	0.8V	0.07	0.5	V
			1.1V	0.08	0.46	
			1.4V	0.18	0.56	
			1.65V	0.27	0.66	
			2.3V	0.53	0.92	
			3.0V	0.79	1.31	
V_{OH}	High-Level Output Voltage	$I_{OH} = -20\mu\text{A}$	0.8V to 3.6V	$V_{CC} - 0.11$	—	V
		$I_{OH} = -1.1\text{mA}$	1.1V	$0.6 \times V_{CC}$	—	
		$I_{OH} = -1.7\text{mA}$	1.4V	0.93	—	
		$I_{OH} = -1.9\text{mA}$	1.65V	1.17	—	
		$I_{OH} = -2.3\text{mA}$	2.3V	1.77	—	
		$I_{OH} = -3.1\text{mA}$		1.67	—	
		$I_{OH} = -2.7\text{mA}$	3V	2.40	—	
		$I_{OH} = -4\text{mA}$		2.30	—	
V_{OL}	Low-Level Output Voltage	$I_{OL} = 20\mu\text{A}$	0.8V to 3.6V	—	0.11	V
		$I_{OL} = 1.1\text{mA}$	1.1V	—	$0.33 \times V_{CC}$	
		$I_{OL} = 1.7\text{mA}$	1.4V	—	0.41	
		$I_{OL} = 1.9\text{mA}$	1.65V	—	0.39	
		$I_{OL} = 2.3\text{mA}$	2.3V	—	0.36	
		$I_{OL} = 3.1\text{mA}$		—	0.50	
		$I_{OL} = 2.7\text{mA}$	3V	—	0.36	
		$I_{OL} = 4\text{mA}$		—	0.50	
I_I	Input Current	$V_I = \text{GND to } 3.6\text{V}$	0V to 3.6V	—	± 0.75	μA
I_{OFF}	Power Down Leakage Current	$V_I \text{ or } VO = 0\text{V to } 3.6\text{V}$	0V	—	± 1.0	μA
ΔI_{OFF}	Delta Power Down Leakage Current	$V_I \text{ or } VO = 0\text{V to } 3.6\text{V}$	0V to 0.2V	—	± 2.5	μA
I_{CC}	Supply Current	$V_I = \text{GND or } V_{CC}, I_O = 0$	0.8V to 3.6V	—	1.4	μA
ΔI_{CC}	Additional Supply Current	Input at $V_{CC} - 0.6\text{V}$	3.3V	—	75	μA

Switching Characteristics

C_L = 5pF see Figure 1

Parameter	From Input	TO OUTPUT	V _{CC}	T _A = +25°C			T _A = -40°C to +85°C		T _A = -40°C to +125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
t _{pd}	A	Y	0.8V	—	19.9	—	—	—	—	—	ns
			1.2V ± 0.1V	2.7	5.9	11.0	2.4	11.1	2.4	11.2	
			1.5V ± 0.1V	2.6	4.3	6.6	2.4	7.1	2.4	7.4	
			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 ± 0.3V	1.1	2.1	3.2	1.0	3.9	1.0	4.3	

C_L = 10pF see Figure 1

Parameter	From Input	TO OUTPUT	V _{CC}	T _A = +25°C			T _A = -40°C to +85°C		T _A = -40°C to +125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
t _{pd}	A	Y	0.8V	—	23.4	—	—	—	—	—	ns
			1.2V ± 0.1V	2.9	6.8	12.7	2.8	12.8	2.8	12.9	
			1.5V ± 0.1V	2.8	5.0	7.7	2.6	8.2	2.6	8.6	
			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 ± 0.3V	1.5	2.7	3.8	1.4	4.5	1.4	5.0	

C_L = 15pF see Figure 1

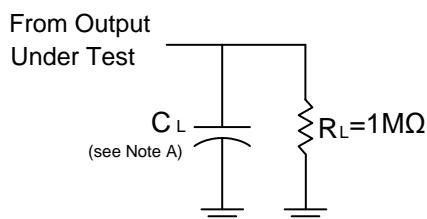
Parameter	From Input	TO OUTPUT	V _{CC}	T _A = +25°C			T _A = -40°C to +85°C		T _A = -40°C to +125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
t _{pd}	A	Y	0.8V	—	26.9	—	—	—	—	—	ns
			1.2V ± 0.1V	3.3	7.6	14.3	3.0	17.4	3.0	18.5	
			1.5V ± 0.1V	3.3	5.5	8.6	2.9	9.4	2.9	9.8	
			1.8V ± 0.15V	2.8	4.7	7.0	2.8	7.7	2.8	8.1	
			2.5V ± 0.2V	2.1	3.3	5.1	1.8	6.1	1.8	6.8	
			3.3V ± 0.3V	2.0	3.1	4.2	1.8	5.0	1.8	5.5	

C_L = 30pF see Figure 1

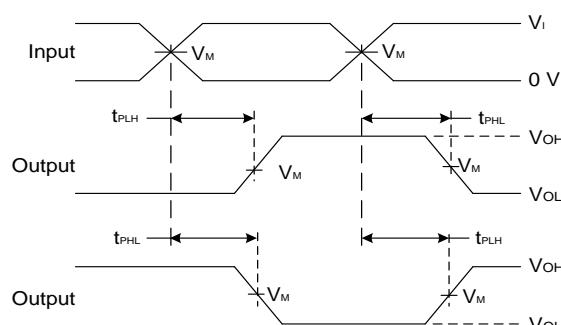
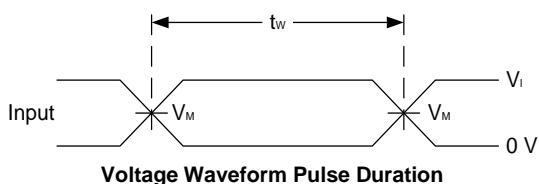
Parameter	From Input	TO OUTPUT	V _{CC}	T _A = +25°C			T _A = -40°C to +85°C		T _A = -40°C to +125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
t _{pd}	A	Y	0.8V	—	37.3	—	—	—	—	—	ns
			1.2V ± 0.1V	4.0	9.8	18.7	3.9	19.6	3.9	20.0	
			1.5V ± 0.1V	3.7	7.1	11.2	3.6	12.3	3.6	12.9	
			1.8V ± 0.15V	3.6	6.0	9.1	3.6	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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Parameter		Test Conditions	V _{CC}	Typ	Unit
C _{pd}	Power Dissipation Capacitance No Load	f = 1MHz No Load	0.8V	5.1	pF
			1.2V ± 0.1V	5.2	
			1.5V ± 0.1V	5.2	
			1.8V ± 0.15V	5.5	
			2.5V ± 0.2V	5.7	
			3.3V ± 0.3V	6.0	
C _I	Input Capacitance	V _I = V _{CC} or GND	0V or 3.3V	2.0	pF
C _O	Output Capacitance	V _O = V _{CC} or GND	0V	2.0	pF

Parameter Measurement Information


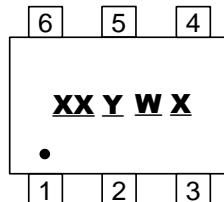
V _{CC}	Inputs		V _M	C _L
	V _I	t _f /t _f		
1.2V ± 0.1V	V _{CC}	≤3ns	V _{CC} /2	5, 10, 15, 30pF
1.5V ± 0.1V	V _{CC}	≤3ns	V _{CC} /2	5, 10, 15, 30pF
1.8V ± 0.15V	V _{CC}	≤3ns	V _{CC} /2	5, 10, 15, 30pF
2.5V ± 0.2V	V _{CC}	≤3ns	V _{CC} /2	5, 10, 15, 30pF
3.3V ± 0.3V	V _{CC}	≤3ns	V _{CC} /2	5, 10, 15, 30pF
0V or 3.3V	V _{CC}	≤3ns	V _{CC} /2	5, 10, 15, 30pF


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

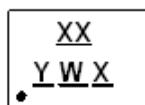


XX : Identification code
Y : Year 0~9
W : Week : A~Z : 1~26 week;
 a~z : 27~52 week; z represents
 52 and 53 week
X : A~Z : Internal Code

Part Number	Package	Identification Code
74AUP2G17DW-7	SOT363	SS

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

(Top View)

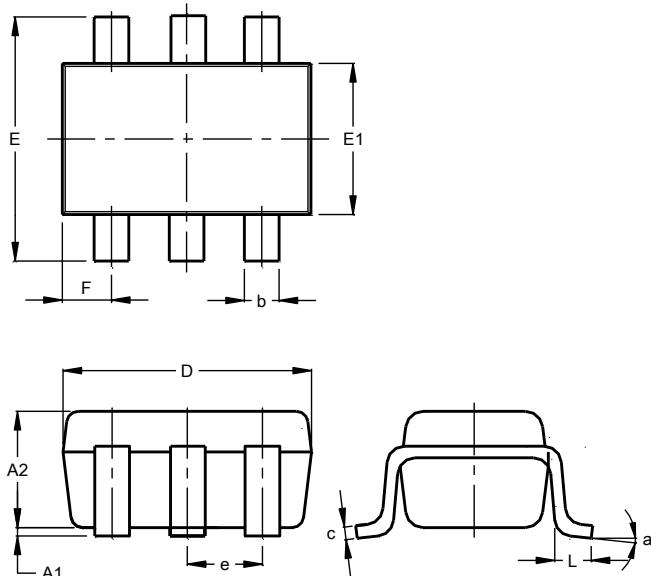


XX : Identification Code
Y : Year : 0~9
W : Week : A~Z : 1~26 week;
 a~z : 27~52 week; z represents
 52 and 53 week
X : A~Z : Internal code

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

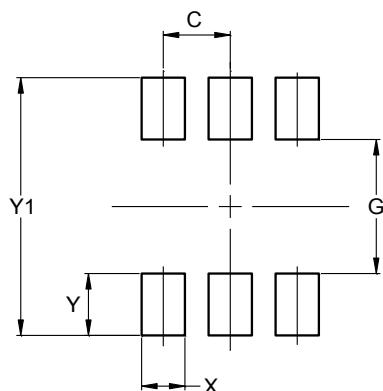
SOT363 Package Outline Dimensions and Suggested Pad Layout

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



SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	1.00
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--

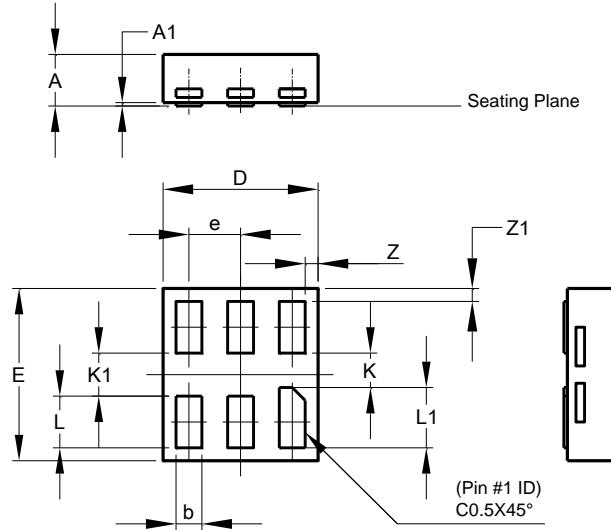
All Dimensions in mm



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

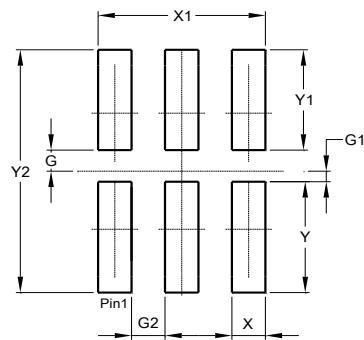
X2-DFN0910-6 Package Outline Dimensions and Suggested Pad Layout

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



X2-DFN0910-6			
Dim	Min	Max	Typ
A	-	0.35	0.30
A1	0	0.03	0.02
b	0.10	0.20	0.15
D	0.85	0.95	0.90
E	0.95	1.05	1.00
e	-	-	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
Z1	-	-	0.075

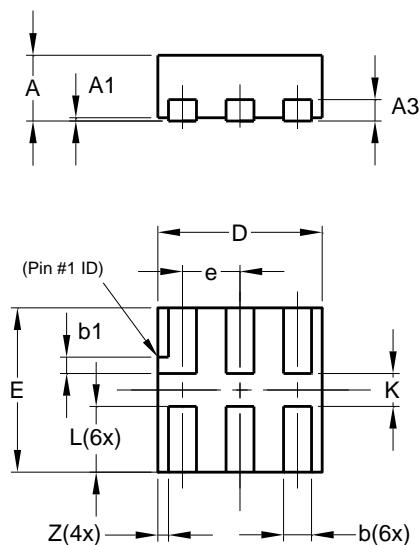
All Dimensions in mm



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

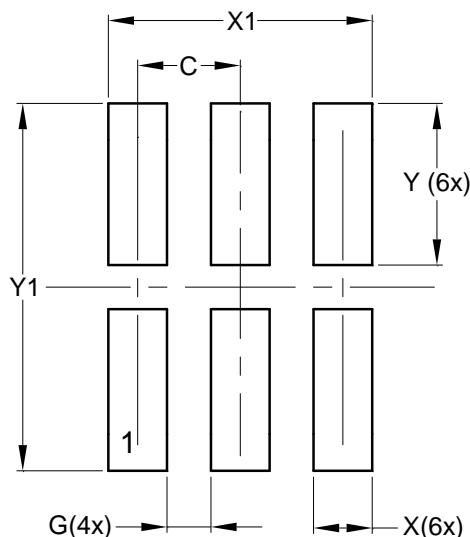
X2-DFN1010-6 Package Outline Dimensions and Suggested Pad Layout

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



X2-DFN1010-6			
Dim	Min	Max	Typ
A	—	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
E	0.95	1.05	1.00
e	—	—	0.35
L	0.35	0.45	0.40
K	0.15	—	—
Z	—	—	0.065

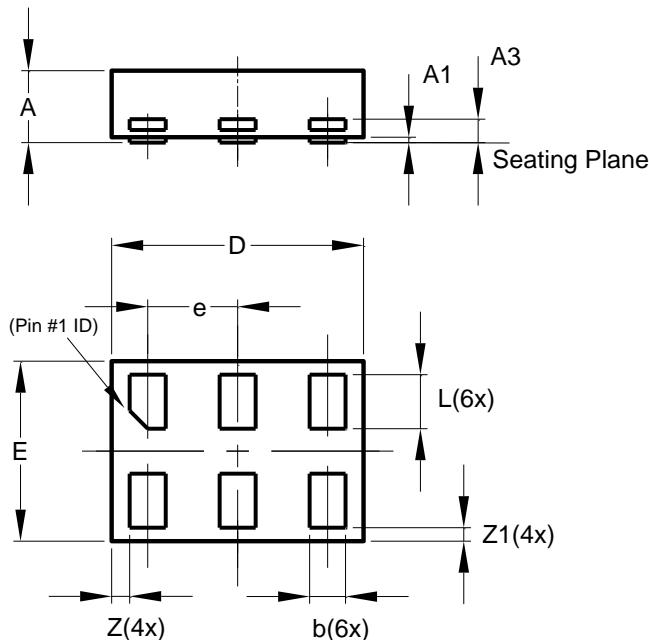
All Dimensions in mm



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

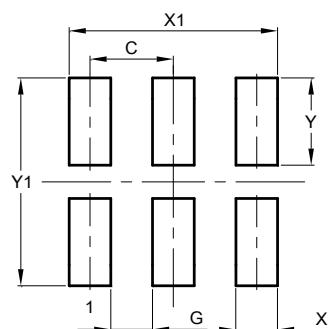
X2-DFN1410-6 Package Outline Dimensions and Suggested Pad Layout

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



X2-DFN1410-6			
Dim	Min	Max	Typ
A	—	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
E	0.95	1.05	1.00
e	—	—	0.50
L	0.25	0.35	0.30
Z	—	—	0.10
Z1	0.045	0.105	0.075

All Dimensions in mm



Dimensions	Value (in mm)
C	0.500
G	0.250
X	0.250
X1	1.250
Y	0.525
Y1	1.250

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