Ordering Information

74 AUP1G 58 XXX -7

Logic Device	Function	Package	Packing
74 : Logic Prefix AUP : 0.8 to 3.6 V Logic Family 1G : One Gate	58 : 3-Input Configuable Multiple-Funtion Gate	W6 : SOT26 DW : SOT363 FW3 : DFN0910** FW4 : DFN1010 FZ4 : DFN1410	**-7 : 7" Tape & Reel**

Device	Package Code	Package (Notes 4 & 5)	Package Size	7" Tape and Reel	
				Quantity	Part Number Suffix
74AUP1G58W6-7	W6	SOT26	3.0mm x 2.8mm x 1.2mm 0.95 mm lead pitch	3,000/Tape & Reel	-7
74AUP1G58DW-7	DW	SOT363	2.0mm x 2.0mm x 1.1mm 0.65 mm lead pitch	3,000/Tape & Reel	-7
74AUP1G58FW3-7**	FW3	X2-DFN0910-6	0.9mm x 1.0mm x 0.35mm 0.3 mm lead pitch	5,000/Tape & Reel	-7
74AUP1G58FW4-7	FW4	X2-DFN1010-6	1.0mm x 1.0mm x 0.4mm 0.35 mm lead pitch	5,000/Tape & Reel	-7
74AUP1G58FZ4-7	FZ4	X2-DFN1410-6	1.4mm x 1.0mm x 0.4mm 0.5 mm lead 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 http://www.diodes.com/datasheets/ap02001.pdf.
5. The taping orientation is located on our website at http://www.diodes.com/datasheets/ap02007.pdf.
** The X2-DFN0910-6 is a future product.

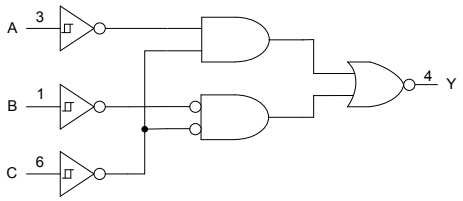
Pin Descriptions

Pin Name	Function
B	Data Input
GND	Ground
A	Data Input
Y	Data Output
V_{CC}	Supply Voltage
C	Data Input

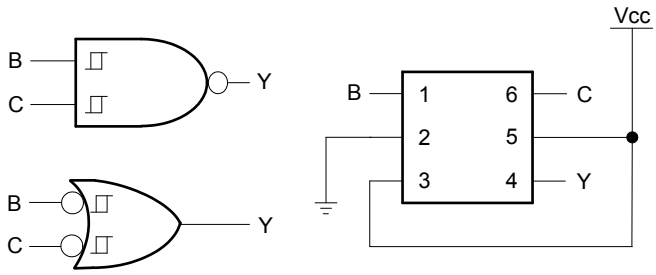
Function Table

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

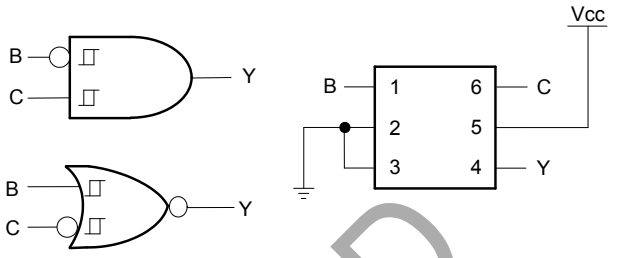
Logic Diagram



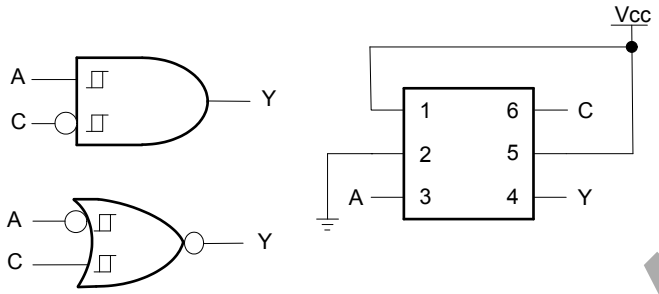
Logic Configurations



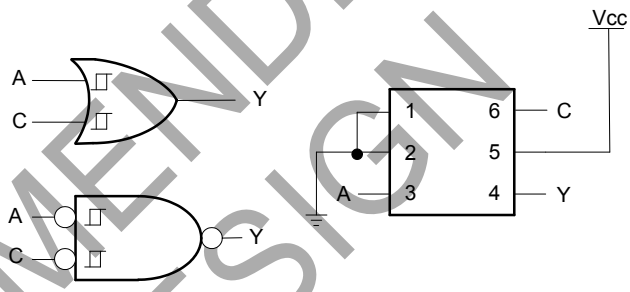
Configuration 1
2-Input NAND Gate
2-Input OR Gate with Both Inputs Inverted



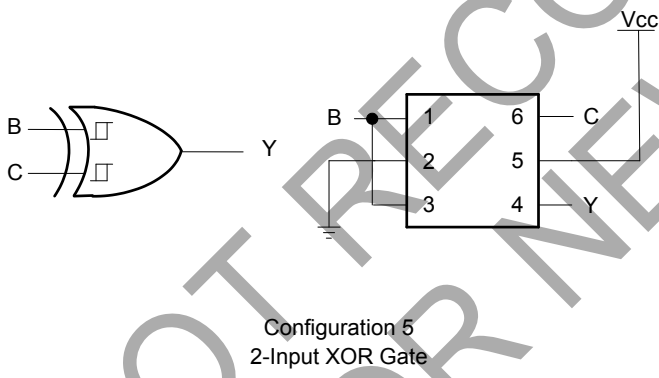
Configuration 2
2-Input AND Gate with B Input Inverted
2-Input NOR Gate with C input Inverted



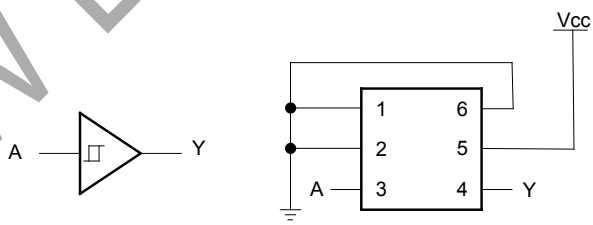
Configuration 3
2-Input AND Gate with C Input Inverted
2-Input NOR Gate with A Input Inverted



Configuration 4
2-Input OR Gate
2-Input NAND Gate with Both Inputs Inverted



Configuration 5
2-Input XOR Gate



Configuration 6
Buffer

Function Selection Table	
Logic Function	**Configuration**
2-Input NAND	1
2-Input NAND with both inputs inverted	4
2-Input AND with inverted input	2,3
2-Input NOR with inverted input	2,3
2-Input OR	4
2-Input OR with both inputs inverted	1
2-Input XOR	5
1-Input Buffer	6

Absolute Maximum Ratings (Notes 6 & 7)

Symbol	Description	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	°C
T_{STG}	Storage Temperature	-65 to +150	°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)

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	Active Mode	0	V_{CC}	V
		Power Down Mode	0	3.6	V
I_{OH}	High-level output current	V_{CC} = 0.8 V	-	-20	µA
		V_{CC} = 1.1 V	-	-1.1	mA
		V_{CC} = 1.4 V	-	-1.7	
		V_{CC} = 1.65 V	-	-1.9	
		V_{CC} = 2.3 V	-	-3.1	
		V_{CC} = 3.0 V	-	-4	
I_{OL}	Low-level output current	V_{CC} = 0.8 V	-	20	µA
		V_{CC} = 1.1 V	-	1.1	mA
		V_{CC} = 1.4 V	-	1.7	
		V_{CC} = 1.65 V	-	1.9	
		V_{CC} = 2.3 V	-	3.1	
		V_{CC} = 3.0 V	-	4	
T_A	Operating free-air temperature	-	-40	+125	°C

Note: 8. Unused inputs should be held at Vcc or Ground.

Electrical Characteristics

Symbol	Parameter	Test Conditions	Vcc	T_A = +25°C		T_A =-40 to +85°C		Unit
				Min	Max	Min	Max	
V_{T+}	Positive-Going Input Threshold Voltage	-	0.8V	0.3	0.65	0.3	0.7	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} = -20µA	0.8V to 3.6V	V_{CC} – 0.1	-	V_{CC} – 0.1	-	V
		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	-	
		I_{OH} = -1.9mA	1.65V	1.32	-	1.3	-	
		I_{OH} = -2.3mA	2.3V	2.05	-	1.97	-	
		I_{OH} = -3.1mA		1.9	-	1.85	-	
		I_{OH} = -2.7mA	3V	2.72	-	2.67	-	
		I_{OH} = -4mA		2.6	-	2.55	-	
V_{OL}	Low-Level Input Voltage	I_{OL} = 20µA	0.8V to 3.6V	-	0.1	-	0.1	V
		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	
		I_{OL} = 1.9mA	1.65 V	-	0.31	-	0.35	
		I_{OL} = 2.3mA	2.3V	-	0.31	-	0.33	
		I_{OL} = 3.1mA		-	0.44	-	0.45	
		I_{OL} = 2.7mA	3V	-	0.31	-	0.33	
		I_{OL} = 4 mA		-	0.44	-	0.45	
I_I	Input Current	A or B Input V_I =GND to 3.6 V	0V to 3.6V	-	± 0.1	-	± 0.5	µA
I_{OFF}	Power Down Leakage Current	V_I or V_O = 0V to 3.6V	0	-	± 0.2	-	± 0.6	µA
ΔI_{OFF}	Delta Power Down Leakage Current	V_I or V_O = 0V to 3.6V	0V to 0.2 V	-	± 0.2	-	± 0.6	µA
I_{CC}	Supply Current	V_I = GND or V_{CC} I_O=0	0.8V to 3.6V	-	0.5	-	0.9	µA
ΔI_{CC}	Additional Supply Current	One input at V_{CC} – 0.6 V Other inputs at V_{CC} or GND	3.3V	-	40	-	50	µA

Electrical Characteristics (continued)

Symbol	Parameter	Test Conditions	Vcc	T_A =-40 to +125°C		Unit
				Min	Max	
V_{T+}	Positive-Going Input Threshold Voltage	-	0.8V	0.3	0.7	V
		-	1.1V	0.53	0.92	
		-	1.4V	0.74	1.13	
		-	1.65V	0.91	1.31	
		-	2.3V	1.37	1.8	
		-	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} = -20µA	0.8V to 3.6V	V_{CC} – 0.11	-	V
		I_{OH} = -1.1mA	1.1V	0.6 x V_{CC}	-	
		I_{OH} = -1.7mA	1.4V	0.93	-	
		I_{OH} = -1.9mA	1.65V	1.17	-	
		I_{OH} = -2.3mA	2.3V	1.77	-	
		I_{OH} = -3.1mA		1.67	-	
		I_{OH} = -2.7mA	3V	2.40	-	
		I_{OH} = -4mA		2.30	-	
V_{OL}	Low-Level Input Voltage	I_{OL} = 20µA	0.8V to 3.6V	-	0.11	V
		I_{OL} = 1.1mA	1.1V	-	0.33 x V_{CC}	
		I_{OL} = 1.7mA	1.4V	-	0.41	
		I_{OL} = 1.9mA	1.65 V	-	0.39	
		I_{OL} = 2.3mA	2.3V	-	0.36	
		I_{OL} = 3.1mA		-	0.50	
		I_{OL} = 2.7mA	3V	-	0.36	
		I_{OL} = 4mA		-	0.50	
I_I	Input Current	A or B Input V_I =GND to 3.6 V	0V to 3.6V	-	± 0.75	µA
I_{OFF}	Power Down Leakage Current	V_I or V_O = 0V to 3.6V	0	-	± 1.0	µA
ΔI_{OFF}	Delta Power Down Leakage Current	V_I or V_O = 0V to 3.6V	0V to 0.2 V	-	± 2.5	µA
I_{CC}	Supply Current	V_I = GND or V_{CC} I_O=0	0.8V to 3.6V	-	1.4	µA
ΔI_{CC}	Additional Supply Current	One input at V_{CC} – 0.6 V Other inputs at V_{CC} or GND	3.3V	-	75	µA

Package Characteristics

Symbol	Parameter	Package	Test Conditions	Min	Typ.	Max	Unit
θ_{JA}	Thermal Resistance Junction-to-Ambient	SOT26	(Note 9)	-	166	-	°C/W
		SOT363		-	371	-	
		X2-DFN0910-6		-	450	-	
		X2-DFN1010-6		-	445	-	
		X2-DFN1410-6		-	430	-	
θ_{JC}	Thermal Resistance Junction-to-Case	SOT26	(Note 9)	-	46	-	°C/W
		SOT363		-	143	-	
		X2-DFN0910-6		-	255	-	
		X2-DFN1010-6		-	250	-	
		X2-DFN1410-6		-	190	-	

Note: 9. Test condition for each of the 8 package types: Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

Operating Characteristics (@T_A = +25°C, unless otherwise noted.)

Parameter		Test Conditions	Vcc	TYP	Unit
C_{pd}	Power Dissipation Capacitance	f = 1MHz No Load	0.8 V	4	pF
			1.2V ± 0.1V	4	
			1.5V ± 0.1V	4	
			1.8V ± 0.15V	4	
			2.5V ± 0.2V	4.4	
			3.3 ± 0.3V	4.8	
C_I	Input Capacitance	V_i = V_{CC} or GND	0 V or 3.3V	1.1	pF
C_O	Output Capacitance	V_0= V_{CC} or GND	0 V	2.0	pF

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, B, or C	Y	0.8 V	-	28	-	-	-	-	-	ns
			1.2 V ± 0.1 V	2.8	7.5	14.7	2.3	14.9	2.3	15.2	
			1.5 V ± 0.1 V	2.1	4.8	7.7	1.6	8.3	1.6	8.6	
			1.8 V ± 0.15 V	1.5	4	6.3	1	7	1	7.3	
			2.5 V ± 0.2 V	1.1	3.2	4.6	0.6	5.2	0.6	5.4	
			3.3 V ± 0.3 V	1	2.9	4	0.5	4.2	0.5	4.4	

Switching Characteristics (continued)

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, B, or C	Y	0.8 V	-	32	-	-	-	-	-	ns
			1.2 V ± 0.1 V	3.2	8.4	16.5	2.7	17	2.7	17.3	
			1.5 V ± 0.1 V	2	5.4	8.8	1.5	9.5	1.5	9.8	
			1.8 V ± 0.15 V	1.1	4.5	7.2	0.6	8	0.6	8.3	
			2.5 V ± 0.2 V	1	3.8	5.3	0.5	5.9	0.5	6.2	
			3.3 V ± 0.3 V	1	3.5	4.7	0.5	4.9	0.5	5.1	

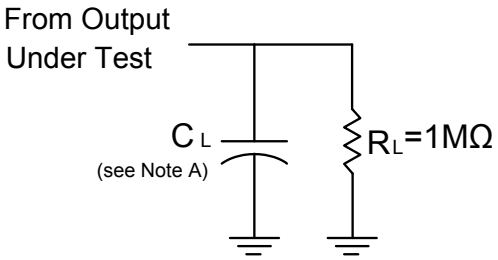
C_L=15pF, See Figure 1

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, B, or C	Y	0.8 V	-	36	-	-	-	-	-	ns
			1.2 V ± 0.1 V	3.6	9.5	18.4	3.3	19.8	3.3	20	
			1.5 V ± 0.1 V	2.9	5.9	11.1	2.4	12	2.4	11	
			1.8 V ± 0.15 V	2.2	5	9	1.7	9.9	1.7	9.2	
			2.5 V ± 0.2 V	1.7	4.2	6.7	1.2	7.5	1.2	6.9	
			3.3 V ± 0.3 V	1.4	3.9	5.9	0.9	6.3	0.9	5.8	

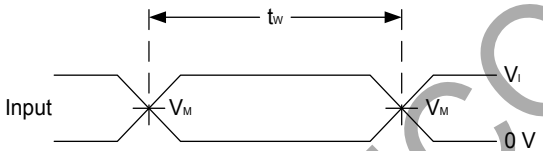
C_L=30pF, See Figure 1

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, B, or C	Y	0.8 V	-	46	-	-	-	-	-	ns
			1.2 V ± 0.1 V	4.5	12	23.7	4.1	25	4.1	25.5	
			1.5 V ± 0.1 V	3.8	7.5	13.9	3.5	15.4	3.5	14.1	
			1.8 V ± 0.15 V	3.2	6.3	11.4	2.7	12.8	2.7	11.9	
			2.5 V ± 0.2 V	2.5	5.3	8.6	2	9.6	2	8.9	
			3.3 V ± 0.3 V	2.1	5	7.5	1.6	8.1	1.6	7.4	

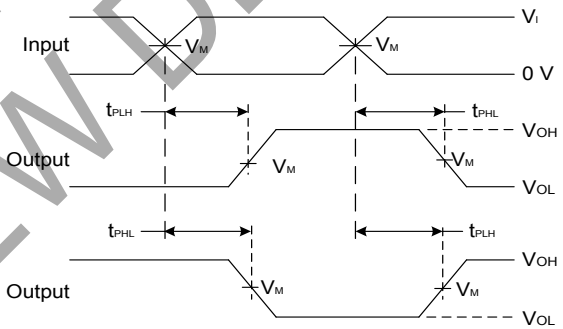
Parameter Measurement Information



V_{CC}	Inputs		V_M	C_L
	V_I	t_r/t_f		
0.8 V	V_{CC}	≤3ns	$V_{CC}/2$	5, 10, 15, 30 pF
1.2V±0.1V	V_{CC}	≤3ns	$V_{CC}/2$	5, 10, 15, 30 pF
1.5V±0.1V	V_{CC}	≤3ns	$V_{CC}/2$	5, 10, 15, 30 pF
1.8V±0.15V	V_{CC}	≤3ns	$V_{CC}/2$	5, 10, 15, 30 pF
2.5V±0.2V	V_{CC}	≤3ns	$V_{CC}/2$	5, 10, 15, 30 pF
3.3V±0.3V	V_{CC}	≤3ns	$V_{CC}/2$	5, 10, 15, 30 pF



Voltage Waveform Pulse Duration



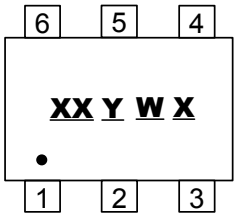
Voltage Waveform Propagation Delay Times Inverting and Non Inverting Outputs

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 ≤ 10 MHz.
C. Inputs are measured separately one transition per measurement.
D. t_{PLH} and t_{PHL} are the same as t_{PD}.

Marking Information

(1) SOT26, SOT363

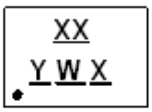


XX : Identification code
Y : Year 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week; z represents
52 and 53 week
X : A~Z : Internal Code

Part Number	Package	Identification Code
74AUP1G58W6	SOT26	AX
74AUP1G58DW	SOT363	BW

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

(Top View)

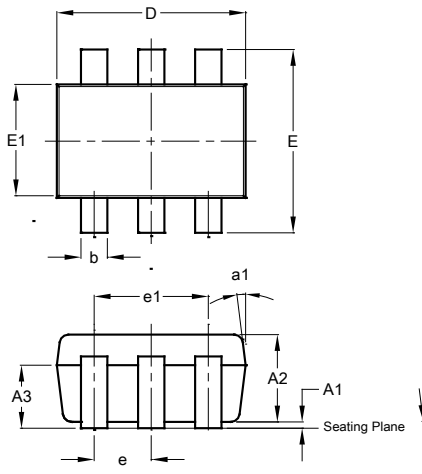


XX : Identification Code
Y : Year : 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week; z represents
52 and 53 week
X : A~Z : Internal code

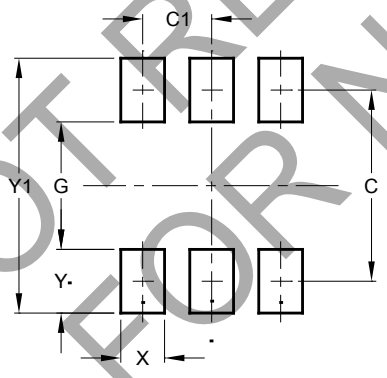
Part Number	Package	Identification Code
74AUP1G58FW3	X2-DFN0910-6	AX
74AUP1G58FW4	X2-DFN1010-6	BW
74AUP1G58FZ4	X2-DFN1410-6	NS

SOT26 Package Outline Dimensions and Suggested Pad Layout

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



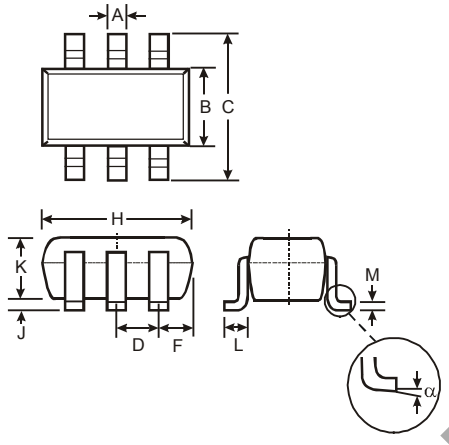
SOT26			
Dim	**Min**	**Max**	**Typ**
A1	0.013	0.10	0.05
A2	1.00	1.30	1.10
A3	0.70	0.80	0.75
b	0.35	0.50	0.38
c	0.10	0.20	0.15
D	2.90	3.10	3.00
e	-	-	0.95
e1	-	-	1.90
E	2.70	3.00	2.80
E1	1.50	1.70	1.60
L	0.35	0.55	0.40
a	-	-	8°
a1	-	-	7°
All Dimensions in mm			



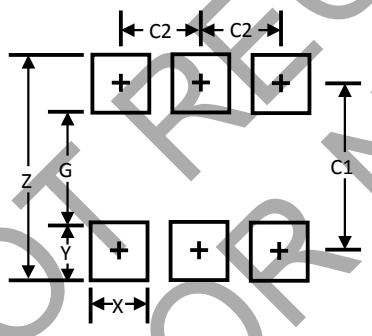
Dimensions	Value (in mm)
C	2.40
C1	0.95
G	1.60
X	0.55
Y	0.80
Y1	3.20

SOT363 Package Outline Dimensions and Suggested Pad Layout

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



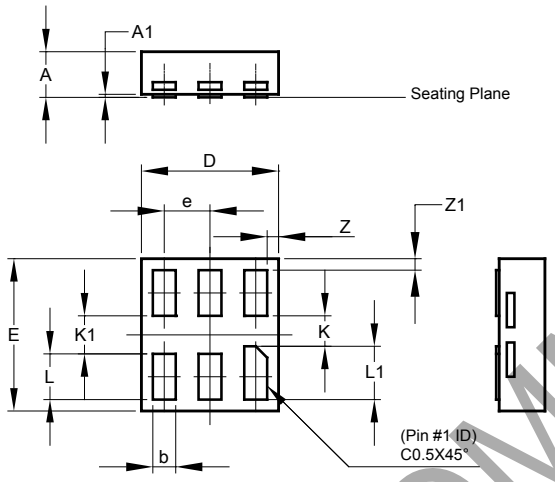
SOT363			
Dim	**Min**	**Max**	**Typ**
A	0.10	0.30	0.25
B	1.15	1.35	1.30
C	2.00	2.20	2.10
D	0.65 Typ		
F	0.40	0.45	0.425
H	1.80	2.20	2.15
J	0	0.10	0.05
K	0.90	1.00	1.00
L	0.25	0.40	0.30
M	0.10	0.22	0.11
α	0°	8°	-
All Dimensions in mm			



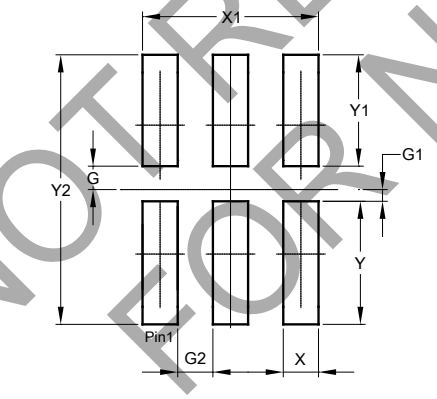
Dimensions	Value (in mm)
Z	2.5
G	1.3
X	0.42
Y	0.6
C1	1.9
C2	0.65

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

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



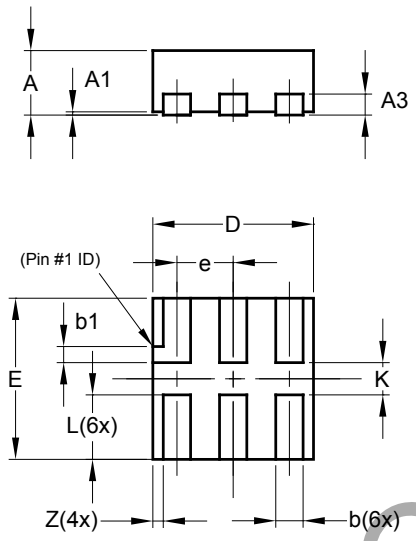
X2-DFN0910-6			
Dim	**Min**	**Max**	**Typ**
A	-	0.35	0.30
A1	0	0.03	0.02
b	0.10	0.20	0.15
D	0.85	0.95	0.90
E	0.95	1.05	1.00
e	-	-	0.30
K	0.20	-	-
K1	0.25	-	-
L	0.25	0.35	0.30
L1	0.30	0.40	0.35
Z	-	-	0.075
Z1	-	-	0.075
All Dimensions in mm			



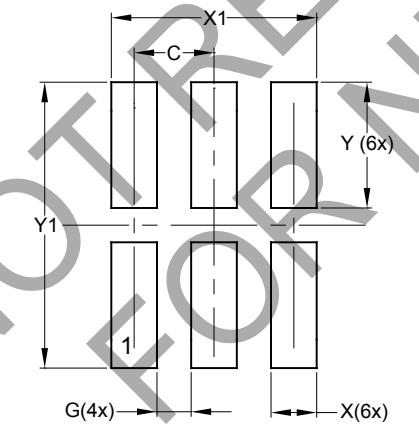
Dimensions	Value (in mm)
G	0.100
G1	0.050
G2	0.150
X	0.150
X1	0.750
Y	0.525
Y1	0.475
Y2	1.150

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

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



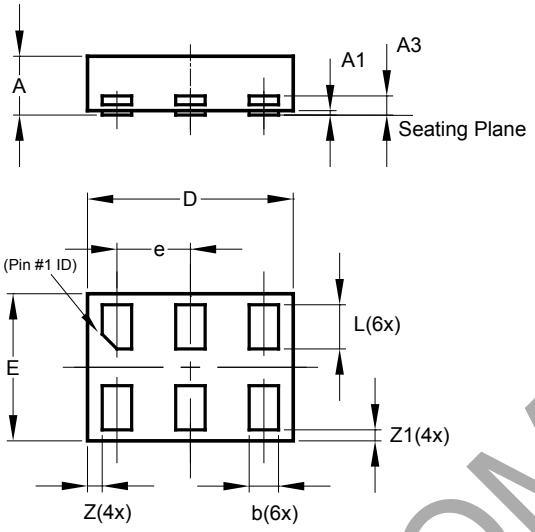
X2-DFN1010-6			
Dim	**Min**	**Max**	**Typ**
A	—	0.40	0.39
A1	0.00	0.05	0.02
A3	—	—	0.13
b	0.14	0.20	0.17
b1	0.05	0.15	0.10
D	0.95	1.05	1.00
E	0.95	1.05	1.00
e	—	—	0.35
L	0.35	0.45	0.40
K	0.15	—	—
Z	—	—	0.065
All Dimensions in mm			



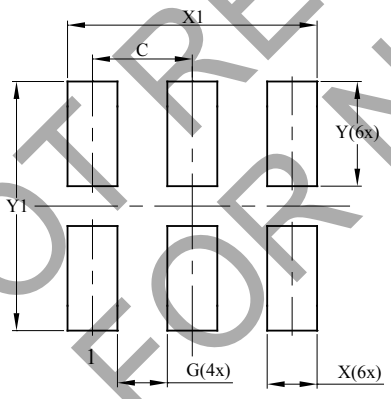
Dimensions	Value (in mm)
C	0.350
G	0.150
X	0.200
X1	0.900
Y	0.550
Y1	1.250

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

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