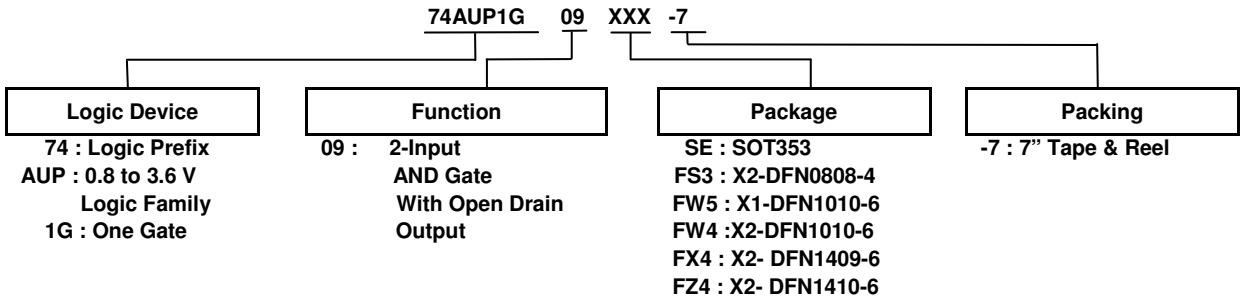
Ordering Information



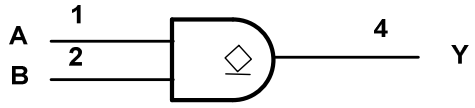
Device	Package Code	Package (Notes 4 & 5)	Package Size	7" Tape and Reel	
				Quantity	Part Number Suffix
74AUP1G09SE-7	SE	SOT353	2.0mm x 2.0mm x 1.1mm 0.65 mm lead pitch	3,000/Tape & Reel	-7
74AUP1G09FS3-7	FS3	X2-DFN0808-4	0.8mm x 0.8mm x 0.35mm 0.5 mm pad pitch (diamond)	5,000/Tape & Reel	-7
74AUP1G09FW5-7	FW5	X1-DFN1010-6	1.0mm x 1.0mm x 0.5mm 0.35 mm pad pitch	5,000/Tape & Reel	-7
74AUP1G09FW4-7	FW4	X2-DFN1010-6	1.0mm x 1.0mm x 0.4mm 0.35 mm pad pitch	5,000/Tape & Reel	-7
74AUP1G09FX4-7	FX4	X2-DFN1409-6 Chip Scale Alternative	1.4mm x 0.9mm x 0.4mm 0.5 mm pad pitch	5,000/Tape & Reel	-7
74AUP1G09FZ4-7	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 http://www.diodes.com/datasheets/ap02001.pdf.
5. The taping orientation is located on our website at http://www.diodes.com/datasheets/ap02007.pdf.

Pin Descriptions

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

Logic Diagram



Function Table

Inputs		Output
A	B	Y
L	L	L
L	H	L
H	L	L
H	H	Z

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
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 +4.6	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) (@T_A = +25°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	3.6	V
I_{OL}	Low-Level Output Current	V_{CC} = 0.8V	—	20	µA
		V_{CC} = 1.1V	—	1.1	mA
		V_{CC} = 1.4V	—	1.7	
		V_{CC} = 1.65V	—	1.9	
		V_{CC} = 2.3V	—	3.1	
		V_{CC} = 3.0V	—	4	
Δt/ΔV	Input Transition Rise or Fall Rate	V_{CC} = 0.8V to 3.6V	—	200	ns/V
T_A	Operating Free-Air Temperature		-40	125	°C

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

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

Symbol	Parameter	Test Conditions	V_{CC}	T_A = +25°C		T_A = -40°C to +85°C		Unit
				Min	Max	Min	Max	
V_{IH}	High-Level Input Voltage	—	0.8V to 1.65V	0.80 x V_{CC}	—	0.80 x V_{CC}	—	V
		—	1.65V to 1.95V	0.65 x V_{CC}	—	0.65 x V_{CC}	—	
		—	2.3V to 2.7V	1.6	—	1.6	—	
		—	3.0V to 3.6V	2.0	—	2.0	—	
V_{IL}	Low-Level Input voltage	—	0.8V to 1.65V	—	0.30 x V_{CC}	—	0.30 x V_{CC}	V
		—	1.65V to 1.95V	—	0.35 x V_{CC}	—	0.35 x V_{CC}	
		—	2.3V to 2.7V	—	0.7	—	0.7	
		—	3.0V to 3.6V	—	0.9	—	0.9	
V_{OL}	Low-Level Output 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	1.65V	—	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} = 4mA		—	0.44	—	0.45	
I_I	Input Current	A or B Input V_I = GND to 3.6V	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	—	± 0.5	μA
I_{OZ}	Z State Leakage Current	V_O = 3.6V V_i = 3.6V	3.6V	—	± 0.2	—	± 0.5	μA
ΔI_{OFF}	Delta Power Down Leakage Current	V_I or V_O = 0V to 3.6V	0V to 0.2V	—	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	Input at V_{CC} -0.6V	3.3V	—	40	—	50	μA

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

Symbol	Parameter	Test Conditions	V_{CC}	T_A = -40°C to +125°C		Unit
				Min	Max	
V_{IH}	High-Level Input Voltage	—	0.8V to 1.65V	0.80 x V_{CC}	—	V
		—	1.65V to 1.95V	0.70 x V_{CC}	—	
		—	2.3V to 2.7V	1.6	—	
		—	3.0V to 3.6V	2.0	—	
V_{IL}	Low-Level Input Voltage	—	0.8V to 1.65V	—	0.25 x V_{CC}	V
		—	1.65V to 1.95V	—	0.35 x V_{CC}	
		—	2.3V to 2.7V	—	0.7	
		—	3.0V to 3.6V	—	0.9	
V_{OL}	Low-Level Output Voltage	I_{OL} = 20 µA	0.8V to 3.6V	—	0.11	V
		I_{OL} = 1.1 mA	1.1V	—	0.3 x V_{CC}	
		I_{OL} = 1.7 mA	1.4V	—	0.41	
		I_{OL} = 1.9 mA	1.65V	—	0.39	
		I_{OL} = 2.3 mA	2.3V	—	0.36	
		I_{OL} = 3.1 mA		—	0.50	
		I_{OL} = 2.7 mA	3V	—	0.36	
		I_{OL} = 4 mA		—	0.50	
I_I	Input Current	A or B Input V_I = GND to 3.6V	0V to 3.6V	—	± 0.75	µA
I_{OFF}	Power Down Leakage Current	V_I or V_O = 0V to 3.6V	0	—	± 3.5	µA
I_{OZ}	Z State Leakage Current	V_O = 3.6V V_i = 3.6V	3.6V	—	± 1.5	µA
ΔI_{OFF}	Delta Power Down Leakage Current	V_I or V_O = 0V to 3.6V	0V to 0.2V	—	± 2.5	µA
I_{CC}	Supply Current	V_I = GND or V_{CC}, I_O = 0	0.8V to 3.6V	—	3.0	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_{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	—	13.5	—	—	—	—	—	ns
			1.2V ± 0.1V	1.9	4.6	10.4	1.8	11.4	1.8	12.6	
			1.5V ± 0.1V	1.5	3.3	6.5	1.4	7.4	1.4	8.2	
			1.8V ± 0.15V	1.2	2.9	5.1	1.1	5.9	1.1	6.5	
			2.5V ± 0.2V	1.0	2.4	4.4	0.9	4.6	0.9	4.9	
			3.3V ± 0.3V	0.9	2.3	4.0	0.8	4.5	0.8	4.9	

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	—	16.3	—	—	—	—	—	ns
			1.2V ± 0.1V	2.3	5.6	12.3	2.1	13.7	2.1	15.1	
			1.5V ± 0.1V	1.8	4.1	7.6	1.7	8.8	1.7	9.7	
			1.8V ± 0.15V	1.6	3.2	7.3	1.4	7.1	1.4	7.0	
			2.5V ± 0.2V	1.4	2.9	6.1	1.2	6.4	1.2	5.9	
			3.3V ± 0.3V	1.3	2.9	5.7	1.1	5.4	1.1	5.9	

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	—	19.0	—	—	—	—	—	ns
			1.2V ± 0.1V	2.6	7.6	14.2	2.4	15.8	2.4	17.4	
			1.5V ± 0.1V	2.1	6.5	12.1	1.9	12.7	1.9	12.9	
			1.8V ± 0.15V	1.9	5.5	9.6	1.7	10.1	1.7	10.3	
			2.5V ± 0.2V	1.6	4.6	8.1	1.5	9.1	1.5	9.3	
			3.3V ± 0.3V	1.6	4.1	7.5	1.4	8.3	1.4	9.1	

C_L=30pF, See Figure 1

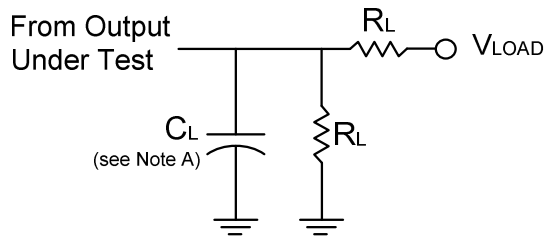
Parameter	From Input	TO OUTPUT	V_{CC}	T_A = +25°C			T_A = -40°C to +85°C		T_A = -40°C to +125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
t_{pd}	A	Y	0.8V	—	27	—	—	—	—	—	ns
			1.2V ± 0.1V	3.6	9.5	19.5	3.2	21.8	3.2	24	
			1.5V ± 0.1V	2.9	8.5	16.1	2.6	13.6	2.6	15	
			1.8V ± 0.15V	2.6	7.7	15.2	2.3	13.3	2.3	14.6	
			2.5V ± 0.2V	2.4	7	13.1	2.1	13.3	2.1	13.5	
			3.3V ± 0.3V	2.3	6.5	12.7	2.1	12.9	2.1	12.9	

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

Parameter		Test Conditions		V_{CC}	Typ	Unit
C_{pd}	Power Dissipation Capacitance	f = 1MHz No Load		0.8V	6.5	pF
				1.2V ± 0.1V	6.3	
				1.5V ± 0.1V	6.3	
				1.8V ± 0.15V	6.2	
				2.5V ± 0.2V	6.2	
				3.3V ± 0.3V	6.1	
C_i	Input Capacitance	V_i = V_{CC} or GND		0V or 3.3V	1.5	pF
θ_{JA}	Thermal Resistance Junction-to-Ambient	SOT353	(Note 9)	—	371	°C/W
		X2-DFN0808-4		—	430	
		X1-DFN1010-6		—	435	
		X2-DFN1010-6		—	445	
		X2-DFN1409-6		—	470	
		X2-DFN1410-6		—	460	
θ_{JC}	Thermal Resistance Junction-to-Case	SOT353	(Note 9)	—	143	°C/W
		X2-DFN0808-4		—	240	
		X1-DFN1010-6		—	250	
		X2-DFN1010-6		—	250	
		X2-DFN1409-6		—	275	
		X2-DFN1410-6		—	265	

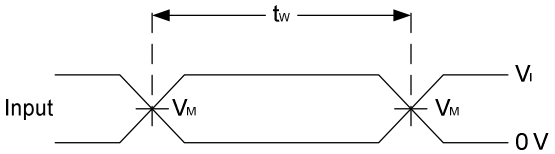
Note: 9. Test condition for each of the six package types: Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

Parameter Measurement Information

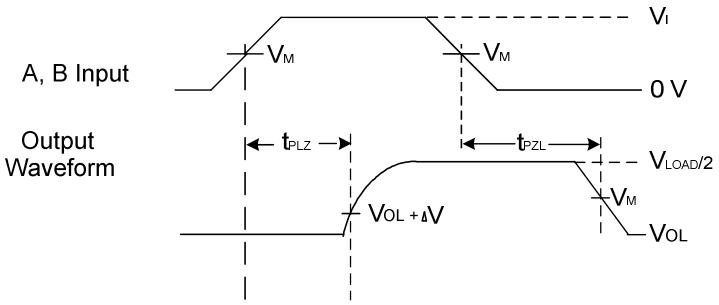


TEST	Condition
t_{PLZ} (see Notes D and E)	Vload
t_{PZL} (see Notes D and F)	Vload

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



Voltage Waveform Pulse Duration



Voltage Waveform Propagation Delay Times
Inverting and Non Inverting Outputs

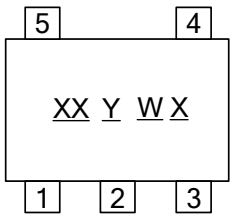
Figure 1 Load Circuit and Voltage Waveforms

Notes: A. Includes test lead and test apparatus capacitance.
B. All pulses are supplied at pulse repetition rate ≤ 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) SOT353

(Top View)

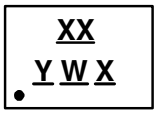


XX : Identification code
Y : Year 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week; z represents
52 and 53 week
X : A~Z : Internal code

Part Number	Package	Identification Code
74AUP1G09SE	SOT353	XR

(2) X2-DFN0808-4, X1-DFN1010-6, X2-DFN1010-6, X2-DFN1409-6 and X2-DFN1410-6

(Top View)

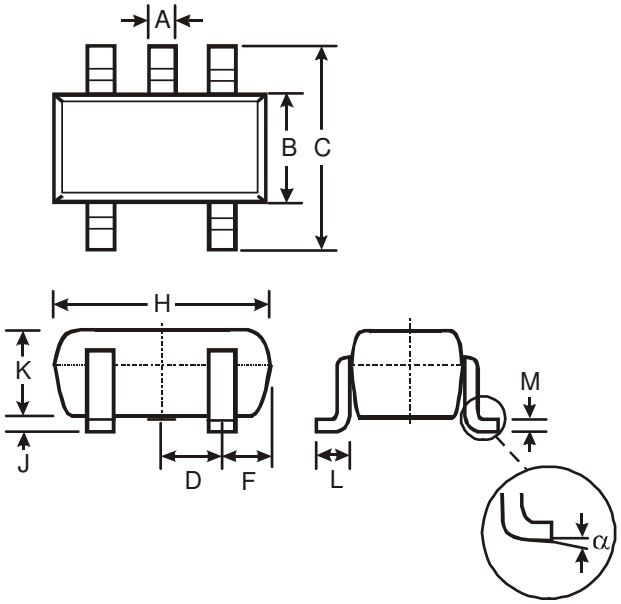


XX : Identification Code
Y : Year : 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week; z represents
52 and 53 week
X : A~Z : Internal code

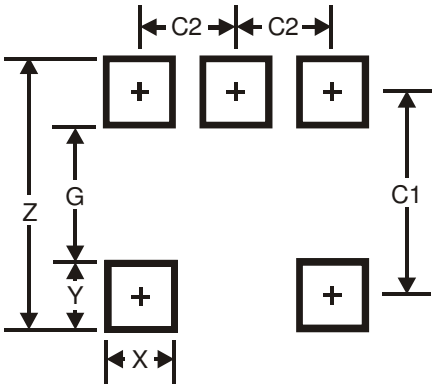
Part Number	Package	Identification Code
74AUP1G09FS3	X2-DFN0808-4	YU
74AUP1G09FW5	X1-DFN1010-6	Q8
74AUP1G09FW4	X2-DFN1010-6	XR
74AUP1G09FX4	X2-DFN1409-6	HG
74AUP1G09FZ4	X2-DFN1410-6	XR

SOT353 Package Outline Dimensions and Suggested Pad Layout

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



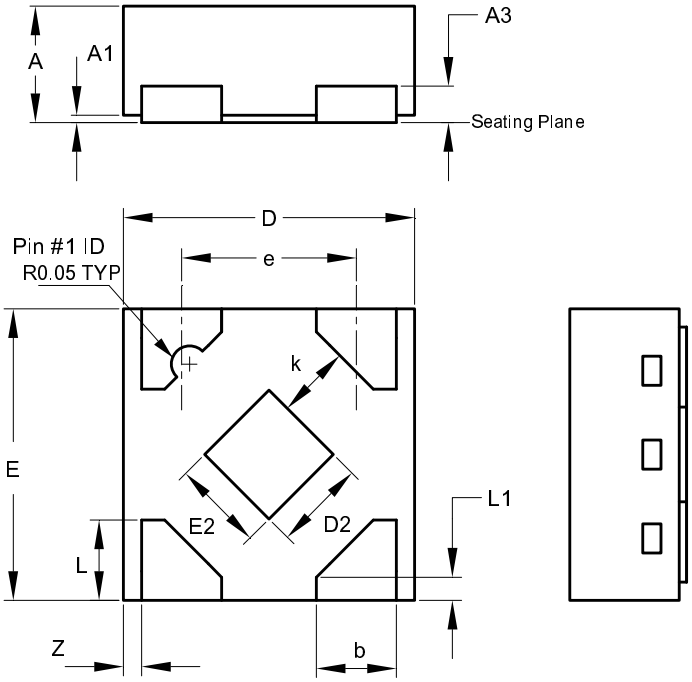
SOT353			
Dim	**Min**	**Max**	**Typ**
A	0.10	0.30	0.25
B	1.15	1.35	1.30
C	2.00	2.20	2.10
D		0.65 Typ	
F	0.40	0.45	0.425
H	1.80	2.20	2.15
J	0	0.10	0.05
K	0.90	1.00	1.00
L	0.25	0.40	0.30
M	0.10	0.22	0.11
α	0°	8°	-
All Dimensions in mm			



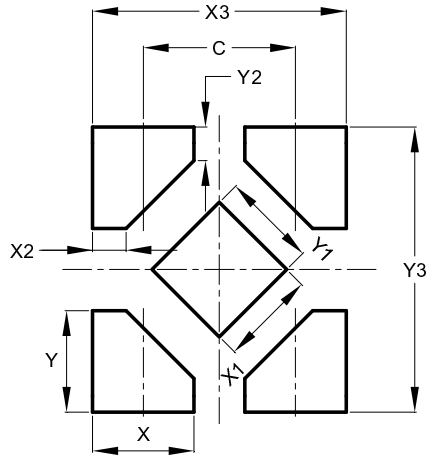
Dimensions	Value (in mm)
Z	2.5
G	1.3
X	0.42
Y	0.6
C1	1.9
C2	0.65

X2-DFN0808-4 Package Outline Dimensions and Suggested Pad Layout

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



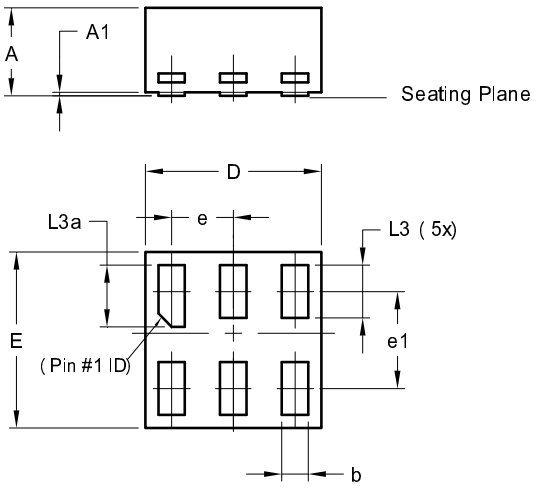
X2-DFN0808-4			
Dim	**Min**	**Max**	**Typ**
A	0.25	0.35	0.30
A1	0	0.04	0.02
A3	-	-	0.13
b	0.17	0.27	0.22
D	0.75	0.85	0.80
D2	0.15	0.35	0.25
E	0.75	0.85	0.80
E2	0.15	0.35	0.25
e	-	-	0.48
K	0.20	-	-
L	0.17	0.27	0.22
L1	0.02	0.12	0.07
Z	-	-	0.05
All Dimensions in mm			



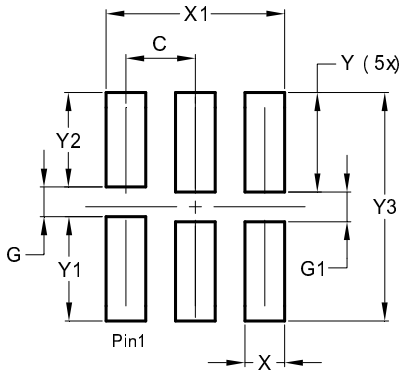
Dimensions	Value
C	0.480
X	0.320
X1	0.300
X2	0.106
X3	0.800
Y	0.320
Y1	0.300
Y2	0.106
Y3	0.900

X1-DFN1010-6 Package Outline Dimensions and Suggested Pad Layout

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



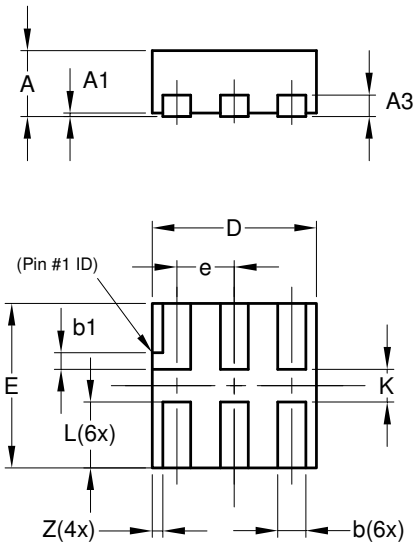
X1-DFN1010-6			
Dim	**Min**	**Max**	**Typ**
A	-	0.50	0.39
A1	-	0.04	-
b	0.12	0.20	0.15
D	0.95	1.050	1.00
E	0.95	1.050	1.00
e	0.35 BSC		
e1	0.55 BSC		
L3	0.27	0.30	0.30
L3a	0.32	0.40	0.35
All Dimensions in mm			



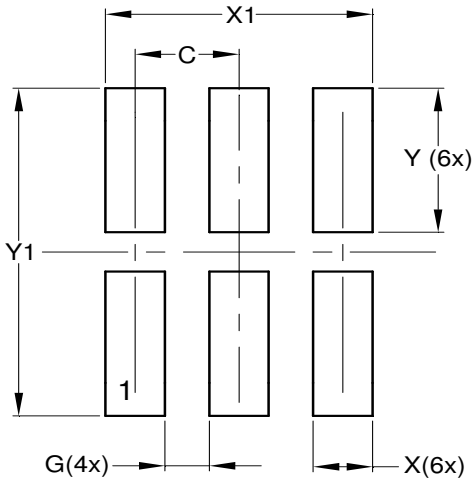
Dimensions	Value (in mm)
C	0.350
G	0.150
G1	0.150
X	0.200
X1	0.900
Y	0.500
Y1	0.525
Y2	0.475
Y3	1.150

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.



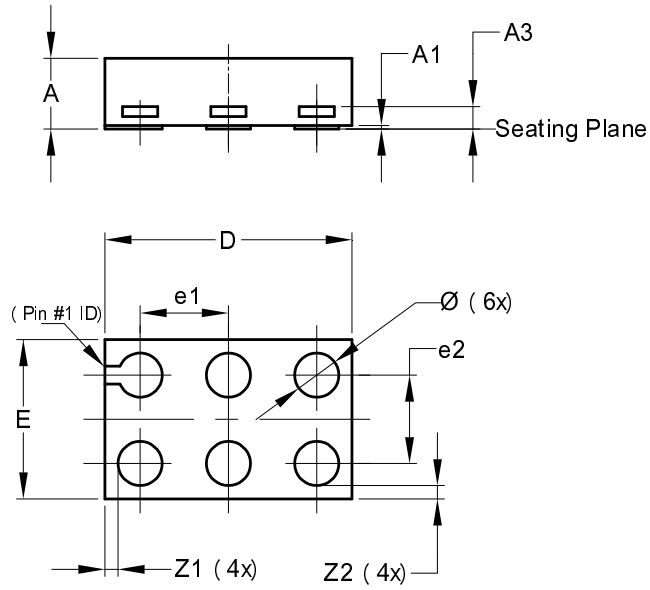
X2-DFN1010-6			
Dim	**Min**	**Max**	**Typ**
A	—	0.40	0.39
A1	0.00	0.05	0.02
A3	—	—	0.13
b	0.14	0.20	0.17
b1	0.05	0.15	0.10
D	0.95	1.05	1.00
E	0.95	1.05	1.00
e	—	—	0.35
L	0.35	0.45	0.40
K	0.15	—	—
Z	—	—	0.065
All Dimensions in mm			



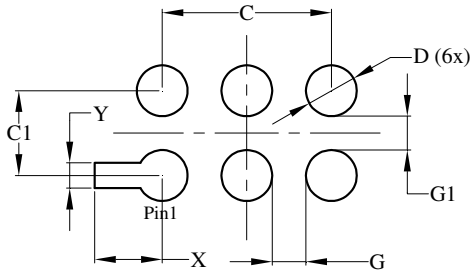
Dimensions	Value (in mm)
C	0.350
G	0.150
X	0.200
X1	0.900
Y	0.550
Y1	1.250

X2-DFN1409-6 Package Outline Dimensions and Suggested Pad Layout

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



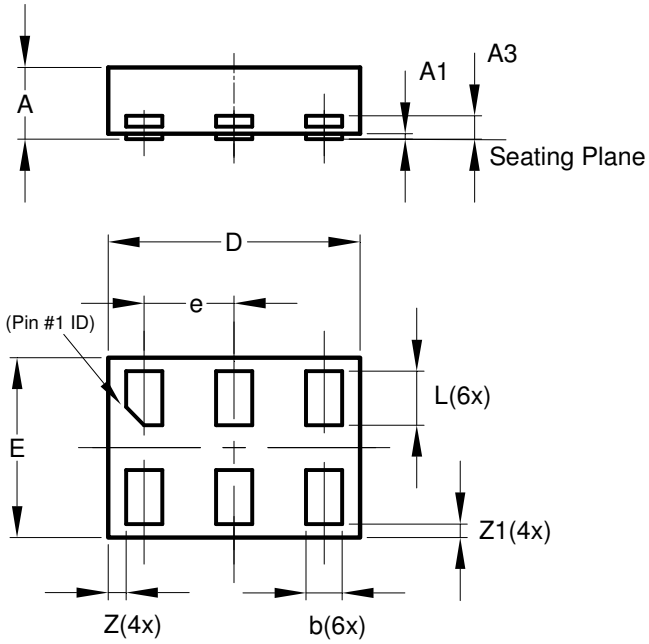
X2-DFN1409-6			
Dim	**Min**	**Max**	**Typ**
A	-	0.40	0.39
A1	0	0.05	0.02
A3	-	-	0.13
Ø	0.20	0.30	0.25
D	1.35	1.45	1.40
E	0.85	0.95	0.90
e1	-	-	0.50
e2	-	-	0.50
Z1	-	-	0.075
Z2	-	-	0.075
All Dimensions in mm			



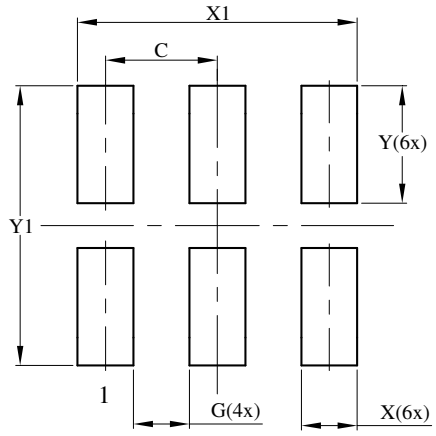
Dimensions	Value (in mm)
C	1.000
C1	0.500
D	0.300
G	0.200
G1	0.200
X	0.400
Y	0.150

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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