74AUP1G07

SINGLE BUFFER/DRIVER WITH OPEN DRAIN OUTPUT

Description

The Advanced Ultra Low Power (AUP) CMOS logic family is designed for low power and extended battery life in portable applications.
The 74AUP1G07 is a single buffer gate with an open drain output designed for operation over a power supply range of 0.8V to 3.6V.

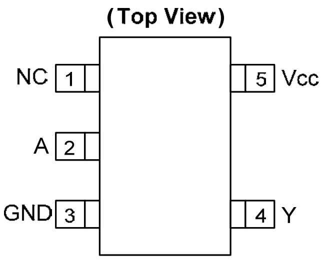
The device is fully specified for partial power down applications using I_{OFF}. The I_{OFF} circuitry disables the output preventing damaging current backflow when the device is powered down. The gate performs the positive Boolean function:

$$Y = A$$

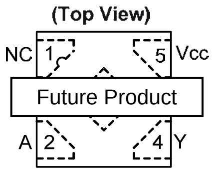
Features

- Advanced Ultra Low Power (AUP) CMOS
- Supply Voltage Range from 0.8V to 3.6V
- 4 mA Output Drive at 3.0V
- Low Static power consumption
  - $I_{CC} < 0.9\mu A$
- Low Dynamic Power Consumption
  - C_{PD} = 6pF (Typical at 3.6V)
- Schmitt Trigger Action at All Inputs Make the Circuit Tolerant for Slower Input Rise and Fall Time. The hysteresis is typically 250 mV at V_{CC} = 3.0V
- I_{OFF} Supports Partial-Power-Down Mode Operation
- ESD Protection Exceeds JESD 22
  - 2000-V Human Body Model (A114-A)
  - Exceeds 1000-V Charged Device Model (C101C)
- Latch-Up Exceeds 100mA per JESD 78, Class II
- Leadless packages named per JESD30E
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Pin Assignments



SOT353



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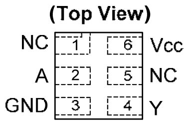

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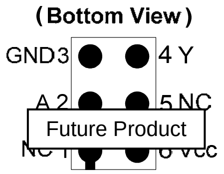

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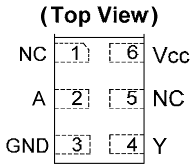
Chip Scale
Alternative



X2-DFN1410-6

Packages not to scale

Applications

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

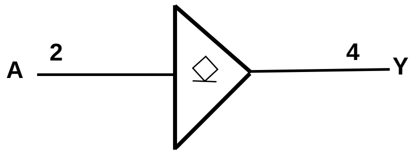
Notes: 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined 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	Function
NC	No Connection
A	Data Input
GND	Ground
Y	Data Output
V_{CC}	Supply Voltage

Logic Diagram



Function Table

Inputs	Output
A	**Y**
H	Z
L	L

Absolute Maximum Ratings (Note 4) (@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 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

Note: 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.

Recommended Operating Conditions (Note 5) (@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	V_{CC}	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: 5. 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 (cont.) (@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		0.25X 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} = 20μA	0.8V to 3.6V		0.11	V
		I_{OL} = 1.1mA	1.1V		0.3 X V_{CC}	
		I_{OL} = 1.7mA	1.4V		0.41	
		I_{OL} = 1.9mA	1.65V		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 3.6V	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		11.6						ns
			1.2V ± 0.1V	2.0	4.1	7.5	2.0	9.1	2.0	10.0	
			1.5V ± 0.1V	1.5	3.0	5.1	1.5	6.1	1.5	6.7	
			1.8V ± 0.15V	1.2	2.7	4.0	1.2	5.0	1.2	5.5	
			2.5V ± 0.2V	1.0	2.3	3.2	1.0	4.0	1.0	4.4	
			3.3V ± 0.3V	0.8	2.2	2.8	0.8	3.3	0.8	3.6	

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		14.7						ns
			1.2V ± 0.1V	2.5	5.1	9.0	2.5	11.2	2.5	12.3	
			1.5V ± 0.1V	2.0	3.8	6.1	2.0	7.4	2.0	8.1	
			1.8V ± 0.15V	1.7	3.6	4.8	1.7	6.1	1.7	6.7	
			2.5V ± 0.2V	1.4	3.3	4.5	1.4	4.8	1.4	5.3	
			3.3V ± 0.3V	1.2	3.1	4.2	1.2	4.5	1.2	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		17.7						ns
			1.2V ± 0.1V	2.9	6.1	10.4	2.9	13.1	2.9	14.5	
			1.5V ± 0.1V	2.3	4.5	6.8	2.3	8.6	2.3	9.4	
			1.8V ± 0.15V	2.1	4.4	6.7	2.1	7.8	2.1	8.6	
			2.5V ± 0.2V	1.7	4.2	5.9	1.7	6.8	1.7	6.9	
			3.3V ± 0.3V	1.5	4.0	5.7	1.5	6.1	1.5	6.7	

C_L = 30pF see Figure 1

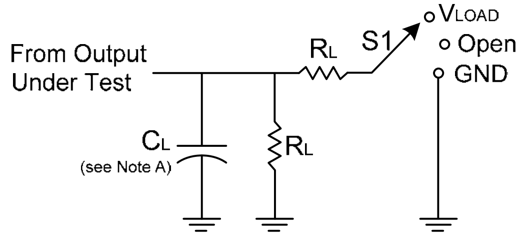
Parameter	From Input	TO OUTPUT	V_{CC}	T_A = +25°C			T_A = -40°C to +85°C		T_A = -40°C to +125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
t_{pd}	A	Y	0.8V		24.6						ns
			1.2V ± 0.1V	3.9	9.0	15.6	3.9	18.8	3.9	20.7	
			1.5V ± 0.1V	3.2	7.5	13.4	3.2	13.7	3.2	13.7	
			1.8V ± 0.15V	2.9	6.8	12.4	2.9	12.6	2.9	12.6	
			2.5V ± 0.2V	2.5	6.5	10.7	2.5	10.9	2.5	12.1	
			3.3V ± 0.3V	2.3	6.4	9.7	2.3	10.4	2.3	11.4	

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	2.6	pF
				1.2V ± 0.1V	2.8	
				1.5V ± 0.1V	2.9	
				1.8V ± 0.15V	3.1	
				2.5V ± 0.2V	3.6	
				3.3V ± 0.3V	4.2	
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 6)		371	°C/W
		X2-DFN0808-4			430	
		X2-DFN1010-6			445	
		X2-DFN1409-6			470	
		X2-DFN1410-6			460	
θ_{JC}	Thermal Resistance Junction-to-Case	SOT353	(Note 6		143	°C/W
		X2-DFN0808-4			240	
		X2-DFN1010-6			250	
		X2-DFN1409-6			275	
		X2-DFN1410-6			265	

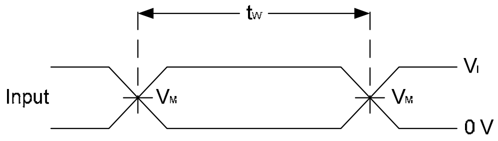
Note: 6. Test condition for , SOT353, X2-DFN0808-4:, X2-DFN1010-6 X2-DFN1409-6 and X2-DFN1410-6: Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

Parameter Measurement Information

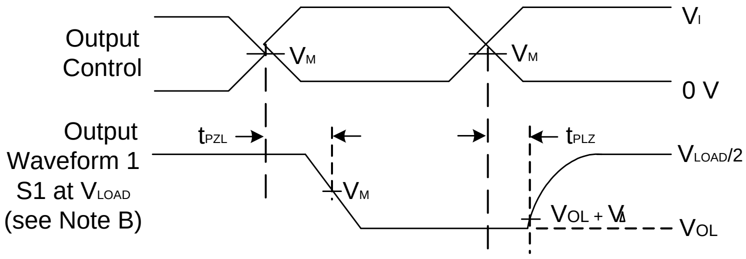


TEST	S1	R_L
t_{PLZ}/t_{PZL}	Vload	5kΩ

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



Voltage Waveform Pulse Duration



Voltage Waveform Enable and Disable Times
Low and High Level Enabling

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. For the open drain device the specified propagation delay t_{PD} is the same as t_{PLZ} and t_{PZL}.

Ordering Information

74AUP1G 07 XX - 7

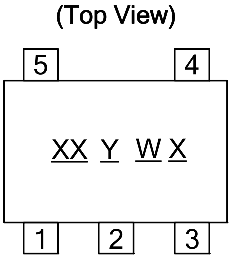
Logic Device	Function	Package	Packing
74 : Logic Prefix AUP : 0.8 V to 3.6 V Logic Family 1G : One gate	07 : 1- Input Buffer - Gate With Open Drain	SE : SOT353 FS3 : X2-DFN0808-4 FW4 : X2-DFN1010-6 FX4 : X2-DFN1409-6 FZ4 : X2-DFN1410-6	7 : Tape & Reel

Device	Package Code	Packaging	7" Tape and Reel (Note 7)	
			Quantity	Part Number Suffix
74AUP1G07SE-7	SE	SOT353	3000/Tape & Reel	-7
74AUP1G07FS3-7**	FS3	X2-DFN0808-4	5000/Tape & Reel	-7
74AUP1G07FW4-7	FW4	X2-DFN1010-6	5000/Tape & Reel	-7
74AUP1G07FX4-7**	FX4	X2-DFN1409-6	5000/Tape & Reel	-7
74AUP1G07FZ4-7	FZ4	X2-DFN1410-6	5000/Tape & Reel	-7

Note: 7. The taping orientation is located on our website at http://www.diodes.com/datasheets/ap02007.pdf
** Future Products – Contact your Diodes sales representative for availability.

Marking Information

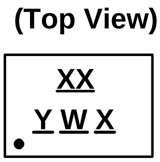
(1) SOT353



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
74AUP1G07SE	SOT353	XN

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



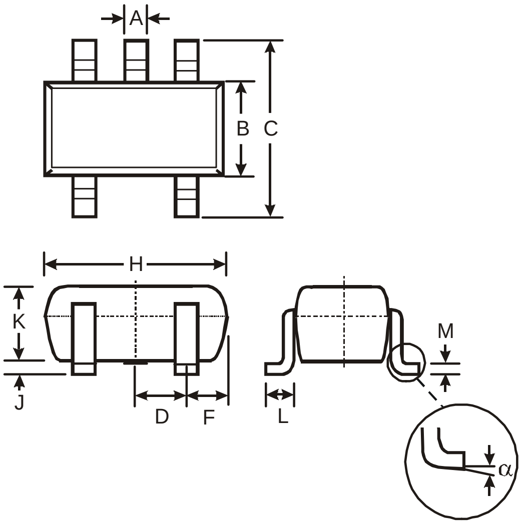
XX : Identification Code
Y : Year : 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week; z represents 52 and 53 week
X : A~Z : Internal code

Part Number	Package	Identification Code
74AUP1G07FS3	X2-DFN0808-4	YN
74AUP1G07FW4	X2-DFN1010-6	XN
74AUP1G07FX4	X2-DFN1409-6	HE
74AUP1G07FZ4	X2-DFN1410-6	XN

Package Outline Dimensions (All dimensions in mm.)

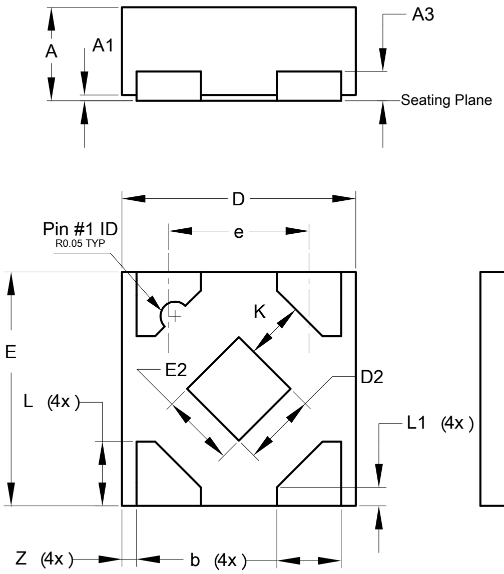
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.

(1) SOT353



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			

(2) X2-DFN0808-4

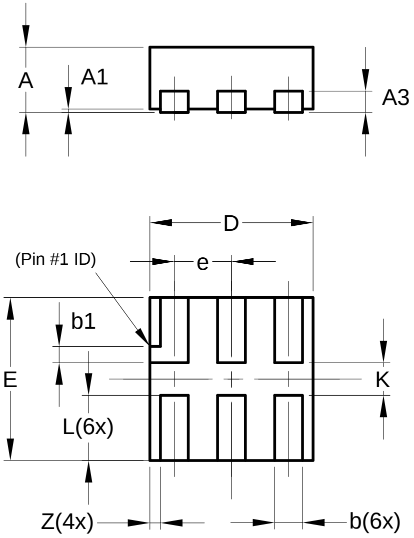


X2-DFN0808-4			
Dim	**Min**	**Max**	**Typ**
A	0.25	0.35	0.30
A1	0	0.04	0.02
A3	-	-	0.13
b	0.17	0.27	0.22
D	0.75	0.85	0.80
D2	0.15	0.35	0.25
E	0.75	0.85	0.80
E2	0.15	0.35	0.25
e	-	-	0.48
K	0.20	-	-
L	0.17	0.27	0.22
L1	0.02	0.12	0.07
Z	-	-	0.05
All Dimensions in mm			

Package Outline Dimensions (cont.) (All dimensions in mm.)

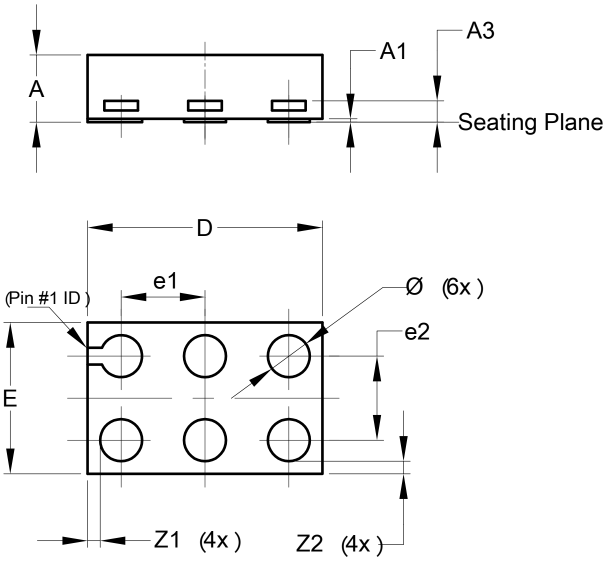
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.

(3) X2-DFN1010-6



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			

(4) X2-DFN1409-6

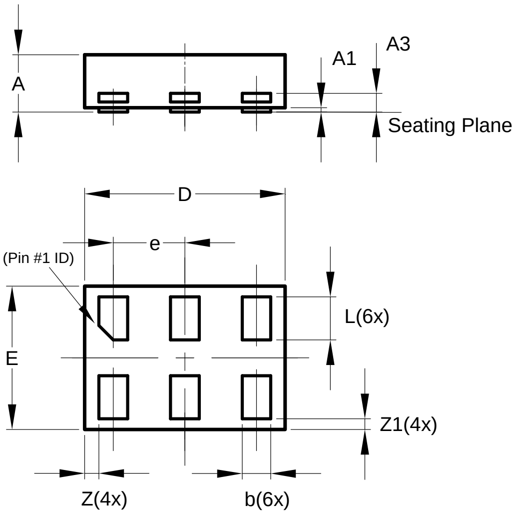


X2-DFN1409-6			
Dim	**Min**	**Max**	**Typ**
A	-	0.40	0.39
A1	0	0.05	0.02
A3	-	-	0.13
Ø	0.20	0.30	0.25
D	1.35	1.45	1.40
E	0.85	0.95	0.90
e1	-	-	0.50
e2	-	-	0.50
Z1	-	-	0.075
Z2	-	-	0.075
All Dimensions in mm			

Package Outline Dimensions (cont.) (All dimensions in mm.)

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

(5) X2-DFN1410-6

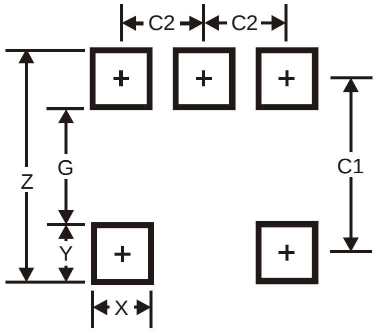


X2-DFN1410-6			
Dim	**Min**	**Max**	**Typ**
A	—	0.40	0.39
A1	0.00	0.05	0.02
A3	—	—	0.13
b	0.15	0.25	0.20
D	1.35	1.45	1.40
E	0.95	1.05	1.00
e	—	—	0.50
L	0.25	0.35	0.30
Z	—	—	0.10
Z1	0.045	0.105	0.075
All Dimensions in mm			

Suggested Pad Layout

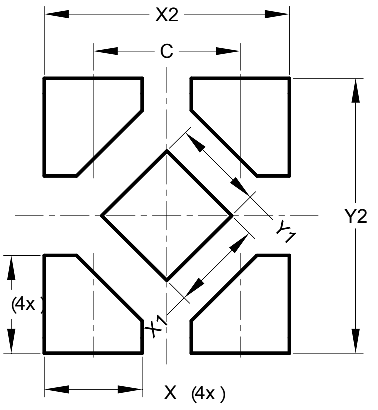
Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version

(1) SOT353



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

(2) X2-DFN0808-4

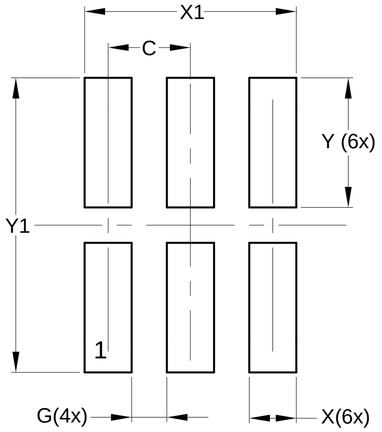


Dimensions	Value (in mm)
C	0.480
X	0.320
X1	0.300
X2	0.800
Y	0.320
Y1	0.300
Y2	0.900

Suggested Pad Layout

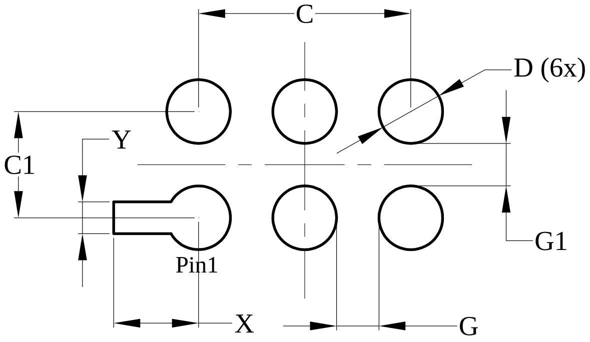
Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version

(3) X2-DFN1010-6



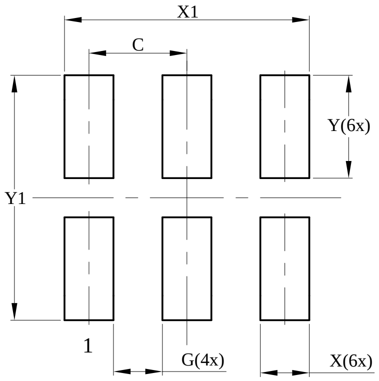
Dimensions	Value (in mm)
C	0.350
G	0.150
X	0.200
X1	0.900
Y	0.550
Y1	0.350

(4) X2-DFN1409-6



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

(5) X2-DFN1410-6



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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