

Description

The 74LVC2G06 is a dual inverter gate with open drain outputs. The device is designed for operation with a power supply range of 1.65V to 5.5V. The input is tolerant to 5.5V allowing this device to be used in a mixed voltage environment. 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 open-drain output can be connected to other open drain outputs to implement active-low wired-OR or active-high wired-AND functions. The maximum sink current is 32mA.

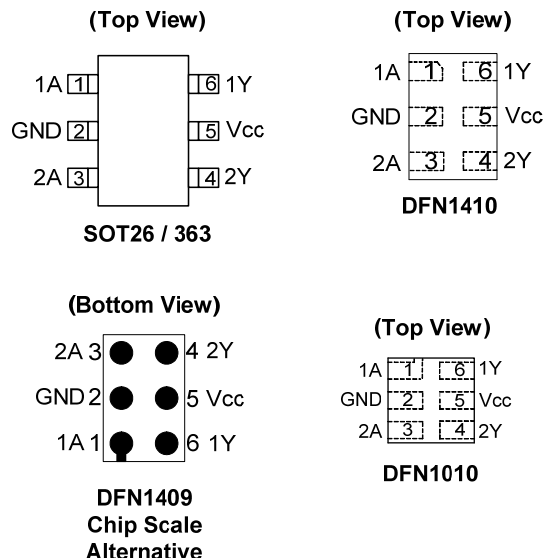
Features

- Wide Supply Voltage Range from 1.65V to 5.5V
- -24mA Output Drive at 3.0V
- CMOS Low Power Consumption
- IOFF Supports Partial-Power-Down Mode Operation
- Inputs accept up to 5.5V
- ESD Protection Tested 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
- DFN1409 package designed as a direct replacement for chip scale packaging.
- Range of Package Options SOT26, SOT353, DFN1010, DFN1409 and DFN1410
- Leadless packages per JESD30E
 - DFN1410 denoted as X2-DFN1410-6
 - DFN1409 denoted as X2-DFN1409-6
 - DFN1010 denoted as X2-DFN1010-6
- **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



Applications

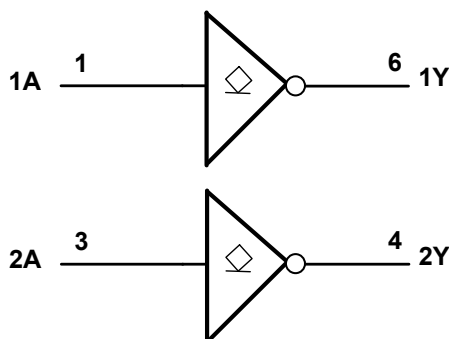
- Voltage Level Shifting
- General Purpose Logic
- Power Down Signal Isolation
- Wide array of products such as:
 - PCs, networking, notebooks, netbooks, tablets
 - Computer peripherals, hard drives, CD/DVD ROM
 - TV, DVD, DVR, set top box
 - Cell Phones, Personal Navigation / GPS
 - MP3 players, Cameras, Video Recorders

[Click here for ordering information, located at the end of datasheet](#)

Pin Descriptions

Pin Name	Pin NO.	Function
1A	1	Data Input
GND	2	Ground
2A	3	Data Input
2Y	4	Data Output Open Drain
V _{CC}	5	Supply Voltage
1Y	6	Data Output Open Drain

Logic Diagram



Function Table

Inputs	Output
A	Y
H	L
L	Z

Absolute Maximum Ratings (Note 4) (@T_A = +25°C, unless otherwise specified.)

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 +6.5	V
V _I	Input Voltage Range	-0.5 to +6.5	V
V _O	Voltage applied to output in high impedance or I _{OFF} state	-0.5 to +6.5	V
V _O	Voltage applied to output in high or low state	-0.3 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	-50	mA
	Continuous Current Through V _{DD} or GND	±100	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	1.65	5.5	V
		1.5		V
V _{IH}	High-Level Input Voltage	V _{CC} = 1.65V to 1.95V	0.65 X V _{CC}	V
		V _{CC} = 2.3V to 2.7V	1.7	
		V _{CC} = 3V to 3.6V	2	
		V _{CC} = 4.5V to 5.5V	0.7 X V _{CC}	
V _{IL}	Low-Level Input Voltage	V _{CC} = 1.65V to 1.95V	0.35 X V _{CC}	V
		V _{CC} = 2.3V to 2.7V	0.7	
		V _{CC} = 3V to 3.6V	0.8	
		V _{CC} = 4.5V to 5.5V	0.3 X V _{CC}	
V _I	Input Voltage	0	5.5	V
V _O	Output Voltage	0	V _{CC}	V
I _{OL}	Low-Level Output Current	V _{CC} = 1.65V	4	mA
		V _{CC} = 2.3V	8	
		V _{CC} = 3V	16	
			24	
		V _{CC} = 4.5V	32	
Δt/ΔV	Input transition rise or fall rate	V _{CC} = 1.8V ± 0.15V, 2.5V ± 0.2V	20	ns/V
		V _{CC} = 3.3V ± 0.3V	10	
		V _{CC} = 5V ± 0.5V	10	
T _A	Operating free-air temperature	-40	+125	°C

Note: 5. Unused inputs should be held at V_{CC} or Ground.

Electrical Characteristics

Symbol	Parameter	Test Conditions	V _{CC}	-40°C to +85°C		-40°C to +125°C		Unit
				Min	Max	Min	Max	
V _{OL}	Low-Level Output Voltage	I _{OL} = 100μA	1.65V to 5.5V		0.1		0.1	V
		I _{OL} = 4mA	1.65V		0.45		0.70	
		I _{OL} = 8mA	2.3V		0.3		0.45	
		I _{OL} = 16mA	3V		0.4		0.60	
		I _{OL} = 24mA			0.55		0.80	
		I _{OL} = 32mA	4.5V		0.55		0.80	
I _I	Input Current	V _I = 5.5V or GND	0 to 5.5V		± 5		± 20	μA
I _{oz}	Z State Leakage Current	V _O = 0 to 5.5V	3.6V		± 10		± 10	μA
I _{OFF}	Power Down Leakage Current	V _I or V _O = 5.5V	0V		± 10		± 20	μA
I _{CC}	Supply Current	V _I = 5.5V or GND, I _O = 0	1.65V to 5.5V		10		40	μA
ΔI _{CC}	Additional Supply Current	Input at V _{CC} -0.6V	3V to 5.5V		500		5000	μA

Package Characteristics (All typical values are at $V_{CC} = 3.3V$, $T_A = +25^{\circ}C$.)

Symbol	Parameter	Package	Conditions	Min	Typ	Max	Unit
C_I	Input Capacitance	Typical of all packages	$V_{CC} = 3.3V$ $V_I = V_{CC} - \text{or GND}$		3.5		pF
θ_{JA}	Thermal Resistance Junction-to-Ambient	SOT26	(Note 6)		204		$^{\circ}C/W$
		SOT363			371		
		X2-DFN1410-6			430		
		X2-DFN1409-6			450		
		X2-DFN1010-6			510		
θ_{JC}	Thermal Resistance Junction-to-Case	SOT26	(Note 6)		52		$^{\circ}C/W$
		SOT363			143		
		X2-DFN1410-6			190		
		X2-DFN1409-6			225		
		X2-DFN1010-6			250		

Note: 6. Test condition for SOT26, SOT363, X2-DFN1410-6, X2-DFN1409-6 and X2-DFN1010 -6: Device mounted on FR-4 substrate PC board, 2oz copper with minimum recommended pad layout.

Switching Characteristics

$T_A = -40^{\circ}C$ to $+85^{\circ}C$, $C_L = 30$ or $50pF$ (see Figure 1)

Parameter	From (Input)	TO (OUTPUT)	$V_{CC} = 1.8V \pm 0.15V$		$V_{CC} = 2.5V \pm 0.2V$		$V_{CC} = 3.3V \pm 0.3V$		$V_{CC} = 5V \pm 0.5V$		Unit
			Min	Max	Min	Max	Min	Max	Min	Max	
t_{pd}	A	Y	0.5	6.5	0.5	3.9	0.5	3.4	0.5	2.9	ns

$T_A = -40^{\circ}C$ to $+125^{\circ}C$, $C_L = 30$ or $50pF$ (see Figure 1)

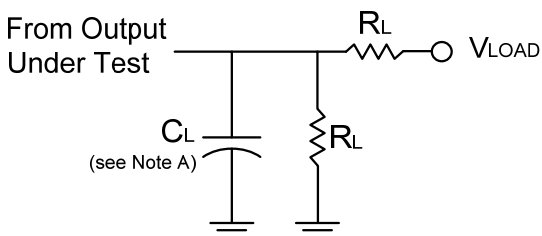
Parameter	From (Input)	TO (OUTPUT)	$V_{CC} = 1.8V \pm 0.15V$		$V_{CC} = 2.5V \pm 0.2V$		$V_{CC} = 3.3V \pm 0.3V$		$V_{CC} = 5V \pm 0.5V$		Unit
			Min	Max	Min	Max	Min	Max	Min	Max	
t_{pd}	A	Y	0.5	8.2	0.5	4.9	0.5	4.3	0.5	3.7	ns

Operating Characteristics

$T_A = +25^{\circ}C$

Parameter		Test Conditions	$V_{CC} = 1.8V$	$V_{CC} = 2.5V$	$V_{CC} = 3.3V$	$V_{CC} = 5V$	Unit
			Typ	Typ	Typ	Typ	
C_{pd}	Power dissipation capacitance	$f = 10 \text{ MHz}$	3	3	4	6	pF

Parameter Measurement Information



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

V_{CC}	Inputs		V_M	V_{LOAD}	C_L	R_L	V_{Δ}
	V_I	t_r/t_f					
$1.8V \pm 0.15V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	1k Ω	0.15V
$2.5V \pm 0.2V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	500 Ω	0.15V
$3.3V \pm 0.3V$	3V	$\leq 2.5ns$	1.5 V	6 V	50pF	500 Ω	0.3V
$5V \pm 0.5V$	V_{CC}	$\leq 2.5ns$	$V_{CC}/2$	$2 \times V_{CC}$	50pF	500 Ω	0.3V

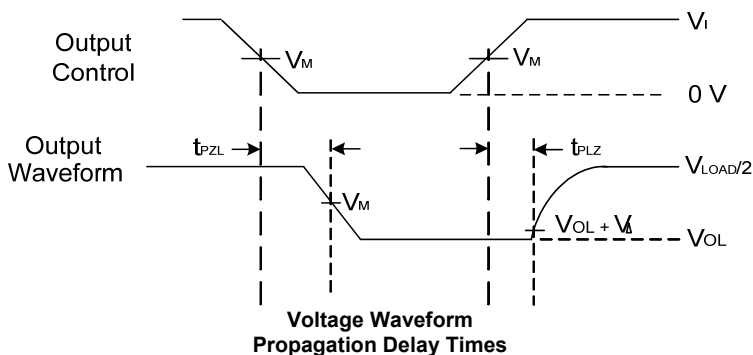
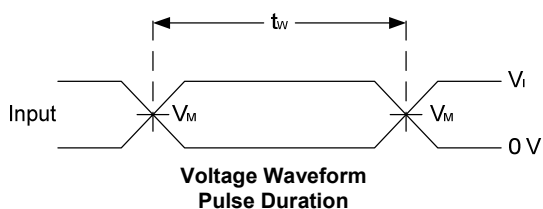
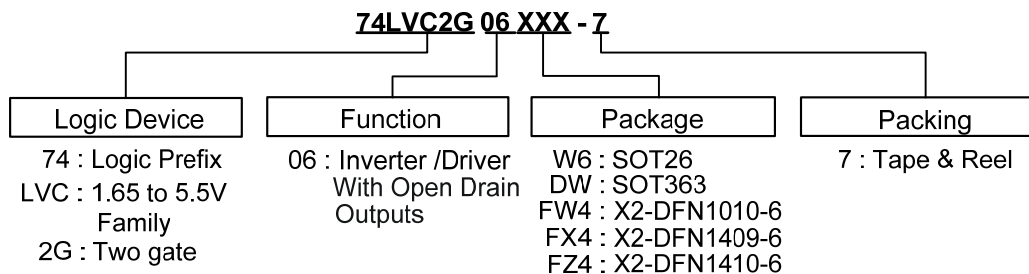


Figure 1. Load Circuit and Voltage Waveforms

- Notes:
- A. Includes test lead and test apparatus capacitance.
 - B. All pulses are supplied at pulse repetition rate ≤ 10 MHz
 - C. The inputs are measured one at a time with one transition per measurement.
 - D. For the open drain device t_{PLZ} and t_{PZL} are the same as t_{PD} .
 - E. t_{PZL} is measured at V_M .
 - F. t_{PLZ} is measured at $V_{OL} + V_{\Delta}$.

Ordering Information

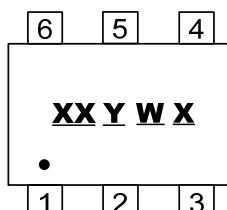


Device	Package Code	Packaging (Note 7)	7" Tape and Reel	
			Quantity	Part Number Suffix
74LVC2G06W6-7	W6	SOT26	3000/Tape & Reel	-7
74LVC2G06DW-7	DW	SOT363	3000/Tape & Reel	-7
74LVC2G06FW4-7	FW4	X2-DFN1010-6	5000/Tape & Reel	-7
74LVC2G06FX4-7	FX4	X2-DFN1409-6	5000/Tape & Reel	-7
74LVC2G06FZ4-7	FZ4	X2-DFN1410-6	5000/Tape & Reel	-7

Note: 7. The taping orientation is located on our website at <http://www.diodes.com/datasheets/ap02007.pdf>

Marking Information

(1) SOT26, SOT363

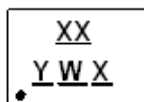


XX : Identification code
 Y : Year 0~9
 W : Week : A~Z : 1~26 week;
 a~z : 27~52 week; z represents
 52 and 53 week
 X : A~Z : Internal Code

Part Number	Package	Identification Code
74LVC2G06W6	SOT26	Z3
74LVC2G06DW	SOT363	Z3

(2) X2-DFN1010-6, X2-DFN1409-6, X2-DFN1410-6

(Top View)



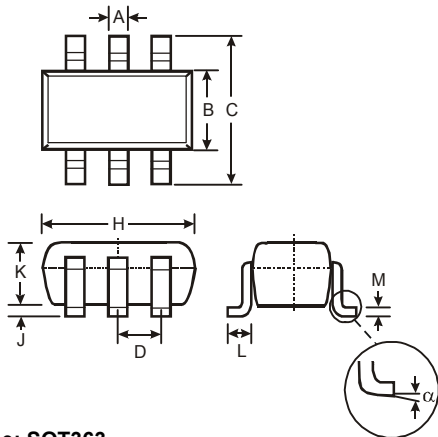
XX : Identification Code
 Y : Year : 0~9
 W : Week : A~Z : 1~26 week;
 a~z : 27~52 week; z represents
 52 and 53 week
 X : A~Z : Internal code

Part Number	Package	Identification Code
74LVC2G06FW4	X2-DFN1010-6	Z3
74LVC2G06FX4	X2-DFN1409-6	X3
74LVC2G06FZ4	X2-DFN1410-6	Z3

Package Outline Dimensions (All dimensions in mm.)

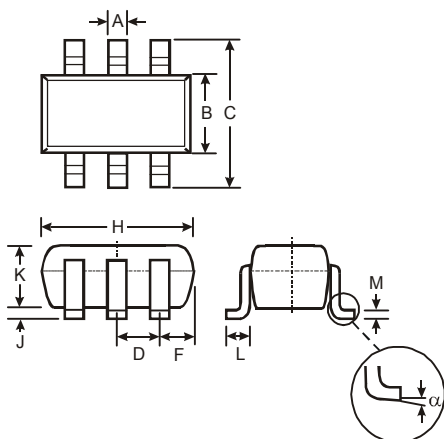
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.

(1) Package Type: SOT26



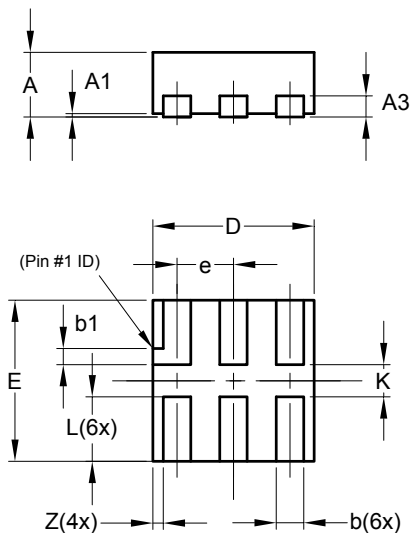
SOT26			
Dim	Min	Max	Typ
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	—	—	0.95
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
α	0°	8°	—
All Dimensions in mm			

(2) Package Type: SOT363



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			

(3) Package Type: X2-DFN1010-6

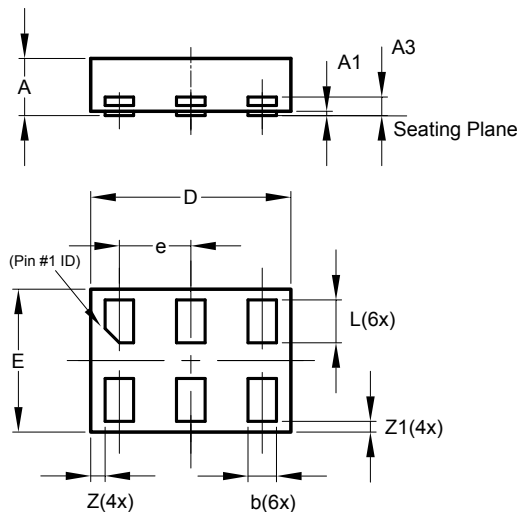


X2-DFN1010-6			
Dim	Min	Max	Typ
A	—	0.40	0.39
A1	0.00	0.05	0.02
A3	—	—	0.13
b	0.14	0.20	0.17
b1	0.05	0.15	0.10
D	0.95	1.05	1.00
E	0.95	1.05	1.00
e	—	—	0.35
L	0.35	0.45	0.40
K	0.15	—	—
Z	—	—	0.065
All Dimensions in mm			

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

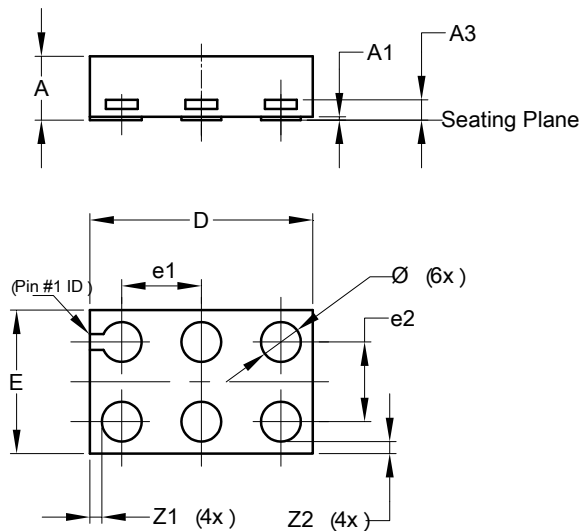
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.

(4) Package Type 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			

(5) Package Type: X2-DFN1409-6 Chip Scale Replacement

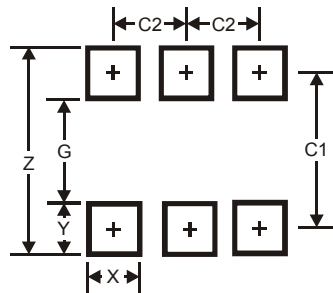


X2-DFN1409-6			
Dim	Min	Max	Typ
A	—	0.40	0.39
A1	0	0.05	0.02
A3	—	—	0.13
Ø	0.20	0.30	0.25
D	1.35	1.45	1.40
E	0.85	0.95	0.90
e1	—	—	0.50
e2	—	—	0.50
Z1	—	—	0.075
Z2	—	—	0.075
All Dimensions in mm			

Suggested Pad Layout

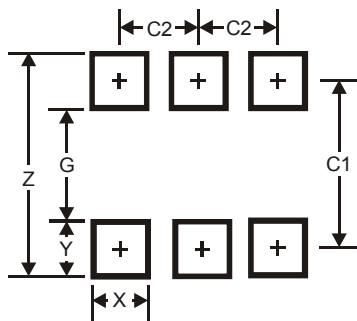
Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.

(1) Package Type: SOT26



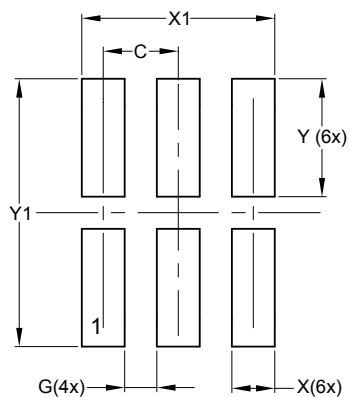
Dimensions	Value (in mm)
Z	3.20
G	1.60
X	0.55
Y	0.80
C1	2.40
C2	0.95

(2) Package Type: SOT363



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

(3) Package Type: X2-DFN1010-6

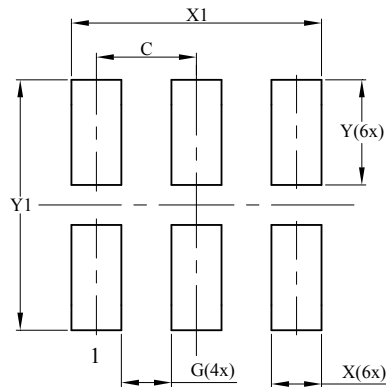


Dimensions	Value (in mm)
C	0.350
G	0.150
X	0.200
X1	0.900
Y	0.550
Y1	1.250

Suggested Pad Layout (cont.)

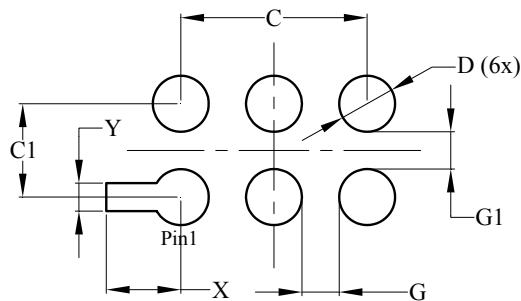
Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.

(4) Package Type 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

(5) Package Type: X2-DFN1409-6 Chip Scale Replacement



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

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