

Description

The Advanced Ultra Low Power (AUP) CMOS logic family is designed for low power and extended battery life in portable applications.

The 74AUP1G02 is a single 2-input positive NOR gate with a standard push-pull 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:

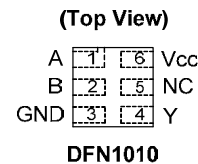
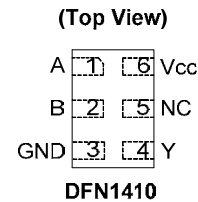
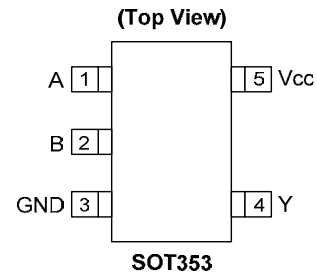
$$Y = \overline{A + B} \text{ or } Y = \overline{A} \bullet \overline{B}$$

Features

- Advanced Ultra Low Power (AUP) CMOS
- Supply Voltage Range from 0.8V to 3.6V
- ± 4mA Output Drive at 3.0V
- Low Static power consumption
 - I_{CC} < 0.9µA
- Low Dynamic Power Consumption
 - C_{PD} = 6.4pF (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
- Range of Package Options SOT353, DFN1410, and DFN1010
- Leadless packages per JESD30E
 - DFN1010 denoted as X2-DFN1010-6
 - DFN1014 denoted as X2-DFN1014-6
- **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> 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

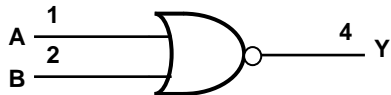
- Suited for battery and low power needs
- Wide array of products such as:
 - Tablets, E-readers
 - Cell Phones, Personal Navigation / GPS
 - MP3 players, Cameras, Video Recorders
 - PCs ultrabooks, notebooks, netbooks,
 - Computer peripherals, hard drives, CD/DVD ROM
 - TV, DVD, DVR, set top box

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

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	H
L	H	L
H	L	L
H	H	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 _{OH}	High-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	
I _{OL}	Low-Level Output Current	V _{CC} = 0.8V		20	uA
		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		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 _{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}	High-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	1.65V		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} = 4 mA			0.44		0.45	
I _I	Input Current	A or B Input V _I = GND to 3.6V	0 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 0.2V		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	One input at V _{CC} - 0.6V Other inputs at V _{CC} or GND	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		0.25 X V _{CC}	V
			1.65V to 1.95V		0.30 X V _{CC}	
			2.3V to 2.7V		0.7	
			3.0V to 3.6V		0.9	
V _{OH}	High-Level Output Voltage	I _{OH} = -20 μA	0.8V to 3.6V	V _{CC} - 0.11		V
		I _{OH} = -1.1 mA	1.1V	0.6 X V _{CC}		
		I _{OH} = -1.7 mA	1.4V	0.93		
		I _{OH} = -1.9 mA	1.65V	1.17		
		I _{OH} = -2.3 mA	2.3V	1.77		
		I _{OH} = -3.1 mA		1.67		
		I _{OH} = -2.7 mA	3V	2.40		
		I _{OH} = -4 mA		2.30		
V _{OL}	High-Level Input Voltage	I _{OL} = 20 μA	0.8V to 3.6V		0.11	V
		I _{OL} = 1.1 mA	1.1V		0.33 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	0 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
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 Other inputs at V _{CC} or GND	3.3V		75	μA

Switching Characteristics

 $C_L = 5\text{pF}$ see Figure 1

Parameter	From Input	TO OUTPUT	Vcc	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 or B	Y	0.8V		17.0						ns
			1.2V ± 0.1V	2.5	5.1	10.8	2.1	12.1	2.1	13.4	
			1.5V ± 0.1V	1.6	3.7	6.7	1.4	7.8	1.4	8.6	
			1.8V ± 0.15V	1.3	3.0	5.3	1.1	6.2	1.1	6.9	
			2.5V ± 0.2V	1.0	2.4	3.9	0.9	4.6	0.9	5.1	
			3.3V ± 0.3V	1.0	2.2	3.4	0.8	4.0	0.8	4.4	

 $C_L = 10\text{pF}$ see Figure 1

Parameter	From Input	TO OUTPUT	Vcc	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 or B	Y	0.8V		20.4						ns
			1.2V ± 0.1V	2.4	6.0	12.8	2.2	14.3	2.2	15.8	
			1.5V ± 0.1V	1.9	4.3	7.9	1.7	9.2	1.7	10.2	
			1.8V ± 0.15V	1.6	3.6	6.2	1.5	7.3	1.5	8.1	
			2.5V ± 0.2V	1.4	3.0	4.7	1.2	5.6	1.2	6.2	
			3.3V ± 0.3V	1.3	2.7	4.2	1.2	5.0	1.2	5.5	

 $C_L = 15\text{pF}$ see Figure 1

Parameter	From Input	TO OUTPUT	Vcc	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 or B	Y	0.8V		23.9						ns
			1.2V ± 0.1V	3.4	6.8	14.6	3.1	16.4	3.1	18.1	
			1.5V ± 0.1V	2.3	4.8	8.9	2.0	10.4	2.0	11.5	
			1.8V ± 0.15V	1.9	4.0	7.0	1.7	8.3	1.7	9.2	
			2.5V ± 0.2V	1.7	3.4	5.4	1.5	6.3	1.5	7.0	
			3.3V ± 0.3V	1.6	3.2	4.8	1.4	5.7	1.4	6.3	

 $C_L = 30\text{pF}$ see Figure 1

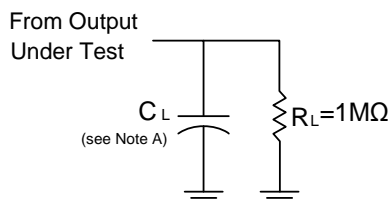
Parameter	From Input	TO OUTPUT	Vcc	T _A = +25°C			T _A = -40°C to +85°C		T _A = -40°C to +125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
t _{pd}	A or B	Y	0.8V		34.2						ns
			1.2V ± 0.1V	4.6	19.0	22.0	4.1	22.4	4.1	24.7	
			1.5V ± 0.1V	3.4	6.4	11.8	2.9	13.9	2.9	15.3	
			1.8V ± 0.15V	2.6	5.3	9.3	2.3	11.1	2.3	12.3	
			2.5V ± 0.2V	2.4	4.5	7.1	2.1	8.5	2.1	9.4	
			3.3V ± 0.3V	2.0	2.9	6.4	2.1	7.7	2.1	8.5	

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

Parameter		Test Conditions	Vcc	Typ	Unit
C_{pd}	Power Dissipation Capacitance	f = 1MHz No Load	0.8V	6.8	pF
			1.2V ± 0.1V	6.7	
			1.5V ± 0.1V	6.6	
			1.8V ± 0.15V	6.2	
			2.5V ± 0.2V	6.5	
			3.3V ± 0.3V	6.4	
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	$^\circ\text{C/W}$
		X2-DFN1410-6		430	
		X2-DFN1010-6		445	
θ_{JC}	Thermal Resistance Junction-to-Case	SOT353	(Note 6)	143	$^\circ\text{C/W}$
		X2-DFN1410-6		190	
		X2-DFN1010-6		250	

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

Parameter Measurement Information



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

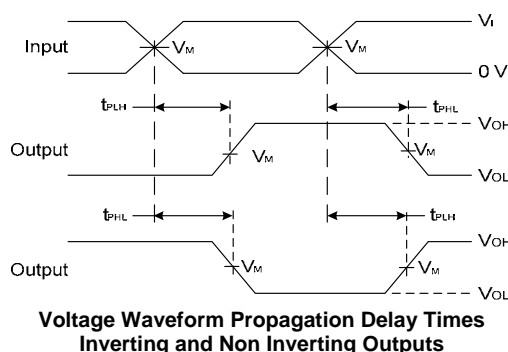
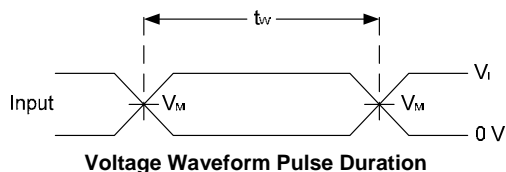
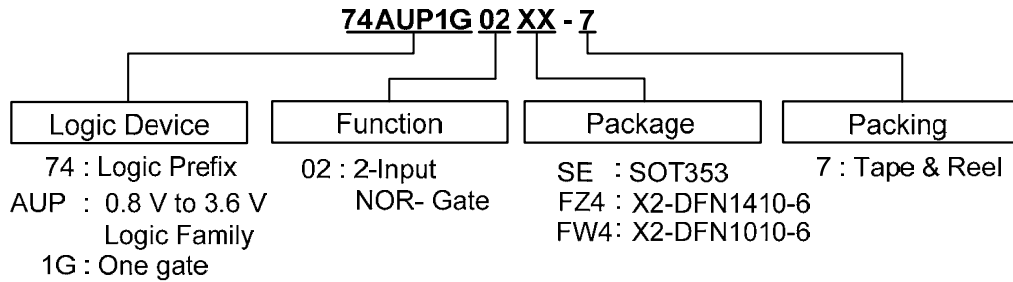


Figure 1. Load Circuit and Voltage Waveforms

- Notes:
- A. Includes test lead and test apparatus capacitance.
 - B. All pulses are supplied at pulse repetition rate ≤ 10 MHz.
 - C. Inputs are measured separately one transition per measurement.
 - D. t_{PLH} and t_{PHL} are the same as t_{PD} .

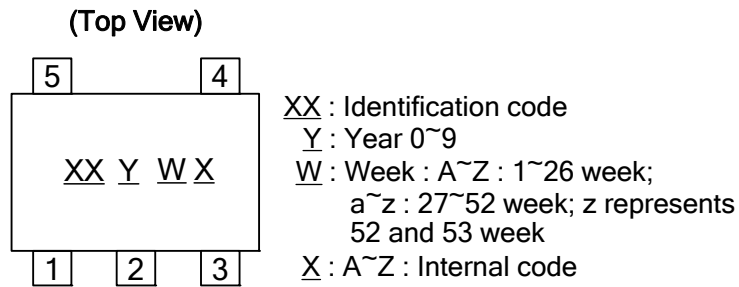
Ordering Information



Device	Package Code	Packaging	7" Tape and Reel	
			Quantity	Part Number Suffix
74AUP1G02SE-7	SE	SOT353	3000/Tape & Reel	-7
74AUP1G02FZ4-7	FZ4	X2-DFN1410-6	5000/Tape & Reel	-7
74AUP1G02FW4-7	FW4	X2-DFN1010-6	5000/Tape & Reel	-7

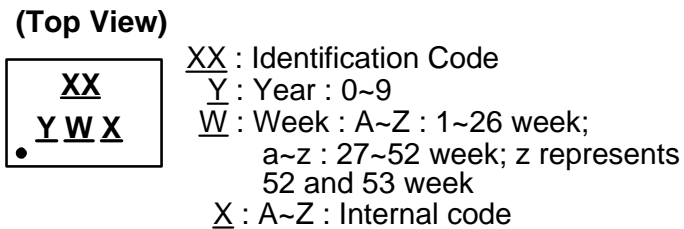
Marking Information

(1) SOT353



Part Number	Package	Identification Code
74AUP1G02SE	SOT353	XJ

(2) X2-DFN1410-6 and X2-DFN1010-6

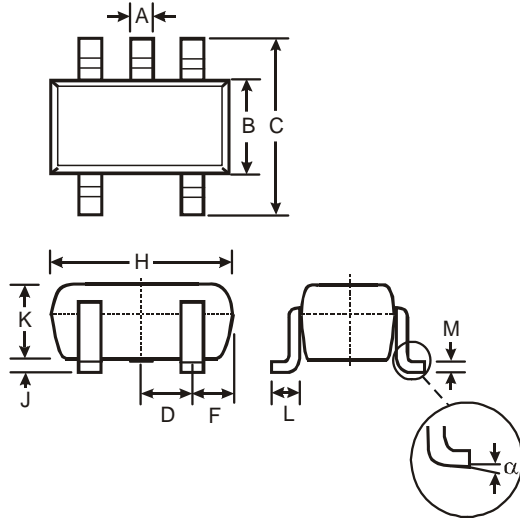


Part Number	Package	Identification Code
74AUP1G02FZ4	X2-DFN1410-6	XJ
74AUP1G02FW4	X2-DFN1010-6	XJ

Package Outline Dimensions (All dimensions in mm.)

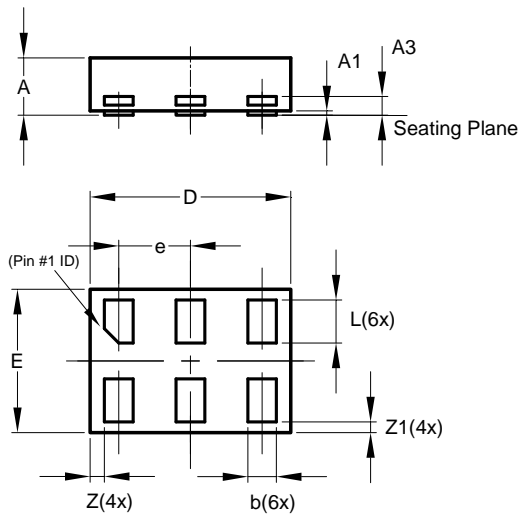
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.

(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
	0°	8°	-
All Dimensions in mm			

(2) X2-DFN1410-6

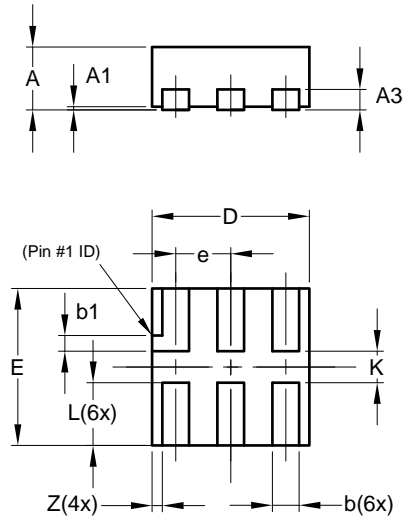


X2-DFN1410-6			
Dim	Min	Max	Typ
A	—	0.40	0.39
A1	0.00	0.05	0.02
A3	—	—	0.13
b	0.15	0.25	0.20
D	1.35	1.45	1.40
E	0.95	1.05	1.00
e	—	—	0.50
L	0.25	0.35	0.30
Z	—	—	0.10
Z1	0.045	0.105	0.075
All Dimensions in mm			

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

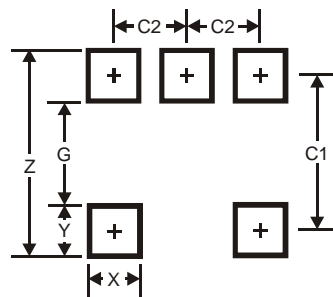


X2-DFN1010-6			
Dim	Min	Max	Typ
A	—	0.40	0.39
A1	0.00	0.05	0.02
A3	—	—	0.13
b	0.14	0.20	0.17
b1	0.05	0.15	0.10
D	0.95	1.05	1.00
E	0.95	1.05	1.00
e	—	—	0.35
L	0.35	0.45	0.40
K	0.15	—	—
Z	—	—	0.065
All Dimensions in mm			

Suggested Pad Layout

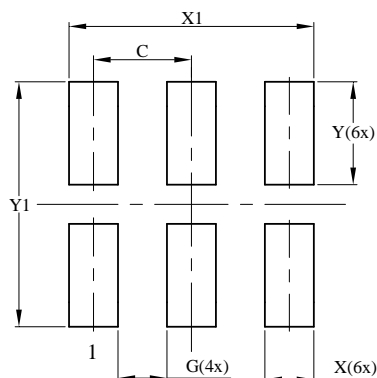
Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version

(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-DFN1410-6

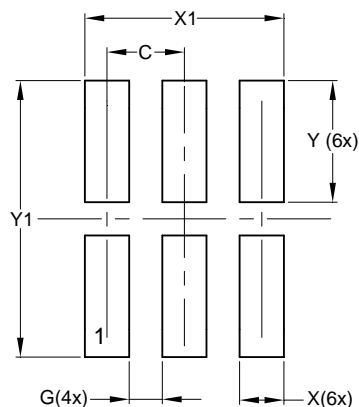


Dimensions	Value (in mm)
C	0.500
G	0.250
X	0.250
X1	1.250
Y	0.525
Y1	1.250

Suggested Pad Layout (cont.)

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	1.250

IMPORTANT NOTICE

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2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

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Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



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