



**THE DATASHEET OF
74LVC2G14FW4-7**



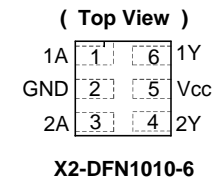
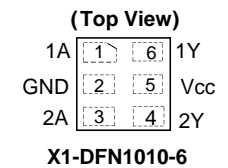
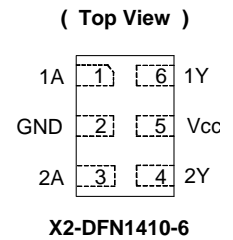
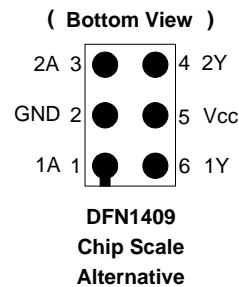
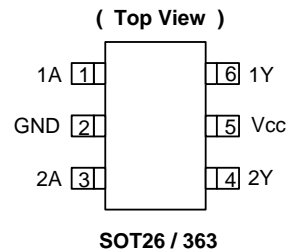
Description

The 74LVC2G14 is a dual Schmitt trigger inverter gate with standard push-pull outputs. The device is designed for operation with a power supply range of 1.65V to 5.5V. The inputs are 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 gate performs the positive Boolean function:

$$Y = \overline{A}$$

Pin Assignments



Features

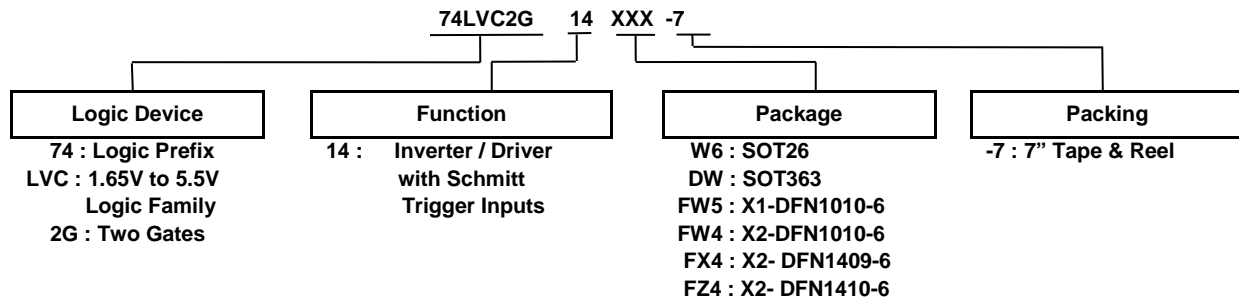
- Wide Supply Voltage Range from 1.65V to 5.5V
- ±24mA Output Drive at 3.0V
- CMOS Low Power Consumption
- IOFF Supports Partial-Power-Down Mode Operation
- Inputs Accept up to 5.5V
- ESD Protection Tested per JESD 22
 - Exceeds 200V Machine Model (A115)
 - Exceeds 2000V Human Body Model (A114)
 - Exceeds 1000V 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, SOT363, X1-DFN1010-6, X2-DFN1010-6, X2-DFN1409-6, and X2-DFN1410-6
- Leadless Packages Named per JESD30E
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

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, SSD, CD/DVD ROM
 - TV, DVD, DVR, Set Top Box
 - Cell Phones, Personal Navigation / GPS
 - MP3 Players, Cameras, Video Recorders

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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.

Ordering Information



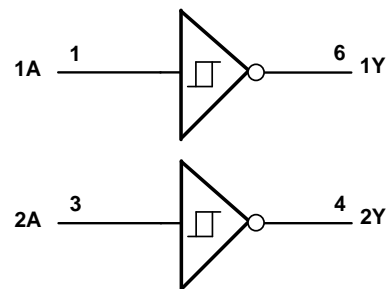
Part Number	Package Code	Package (Note 4)	Package Size	7" Tape and Reel (Note 5)	
				Quantity	Part Number Suffix
74LVC2G14W6-7	W6	SOT26	2.8mm × 2.2mm × 1.1mm 0.95mm lead pitch	3000/Tape & Reel	-7
74LVC2G14DW-7	DW	SOT363	2.0mm × 2.0mm × 1.1mm 0.65mm lead pitch	3000/Tape & Reel	-7
74LVC2G14FW5-7	FW5	X1-DFN1010-6	1.0mm × 1.0mm × 0.5mm 0.35mm pad pitch	5000/Tape & Reel	-7
74LVC2G14FW4-7	FW4	X2-DFN1010-6	1.0mm × 1.0mm × 0.4mm 0.35mm pad pitch	5000/Tape & Reel	-7
74LVC2G14FX4-7	FX4	X2-DFN1409-6 Chip Scale Alternative	1.4mm × 0.9mm × 0.4mm 0.5mm pad pitch	5000/Tape & Reel	-7
74LVC2G14FZ4-7	FZ4	X2-DFN1410-6	1.4mm × 1.0mm × 0.4mm 0.5mm pad pitch	5000/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	Pin Number	Function
1A	1	Data Input
GND	2	Ground
2A	3	Data Input
2Y	4	Data Output
V _{CC}	5	Supply Voltage
1Y	6	Data Output

Logic Diagram



Function Table

Inputs	Output
A	Y
H	L
L	H

Absolute Maximum Ratings (Notes 6 and 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
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:
- 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.
 - 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	Operating	1.65	5.5	V
		Data Retention Only	1.5	—	V
V _I	Input Voltage	0	5.5	V	
V _O	Output Voltage	0	V _{CC}	V	
I _{OH}	High-Level Output Current	V _{CC} = 1.65V	—	-4	mA
		V _{CC} = 2.3V	—	-8	
		V _{CC} = 3V	—	-16	
		V _{CC} = 4.5V	—	-24	
I _{OL}	Low-Level Output Current	V _{CC} = 1.65V	—	4	mA
		V _{CC} = 2.3V	—	8	
		V _{CC} = 3V	—	16	
		V _{CC} = 4.5V	—	24	
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	—	5	
T _A	Operating Free-air Temperature	—	-40	+125	°C

- Note:
- 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}	-40°C to +85°C		-40°C to +125°C		Unit
				Min	Max	Min	Max	
V _{T+}	Positive-going Input Threshold Voltage	—	1.8V	0.70	1.50	0.70	1.70	V
			2.3V	1.00	1.80	1.00	2.00	
			3V	1.30	2.20	1.30	2.40	
			4.5V	1.90	3.10	1.90	3.30	
			5.5V	2.20	3.60	2.20	3.80	
V _{T-}	Negative-Going Input Threshold Voltage	—	1.8V	0.25	0.90	0.25	1.10	V
			2.3V	0.40	1.15	0.4	1.35	
			3V	0.60	1.50	0.6	1.7	
			4.5V	1.00	2.00	1	2.2	
			5.5V	1.20	2.30	1.2	2.5	
ΔV _T	Hysteresis (V _{T+} - V _{T-})	—	1.8V	0.15	1.00	0.15	1.20	V
			2.3V	0.25	1.10	0.25	1.30	
			3V	0.40	1.20	0.40	1.40	
			4.5V	0.60	1.50	0.60	1.70	
			5.5V	0.70	1.70	0.70	1.90	
V _{OH}	High-Level Output Voltage	I _{OH} = -100μA	1.65V to 5.5V	V _{CC} - 0.1	—	V _{CC} - 0.1	—	V
		I _{OH} = -4mA	1.65V	1.2	—	0.95	—	
		I _{OH} = -8mA	2.3V	1.9	—	1.7	—	
		I _{OH} = -16mA	3V	2.4	—	1.9	—	
		I _{OH} = -24mA		2.3	—	2.0	—	
		I _{OH} = -32mA	4.5V	3.8	—	3.4	—	
V _{OL}	Low-Level Output Voltage	I _{OL} = 100μA	1.65V to 5.5V	—	0.1	—	0.10	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 _{OFF}	Power Down Leakage Current	V _I or V _O = 5.5V	0	—	± 10	—	±20	μA
I _{CC}	Supply Current	V _I = 5.5V or GND, I _O = 0	1.65V to 5.5V	—	10	—	40	μA

Package Characteristics (@T_A = +25°C, V_{CC} = 3.3V, unless otherwise specified.)

Symbol	Parameter	Package	Conditions	Min	Typ	Max	Unit
C _I	Input Capacitance	Typical of all packages	V _{CC} = 3.3V V _I = V _{CC} or GND	—	3.5	—	pF
θ _{JA}	Thermal Resistance Junction-to-Ambient	SOT26	(Note 9)	—	204	—	°C/W
		SOT363		—	371	—	
		X2-DFN1410-6		—	430	—	
		X2-DFN1409-6		—	450	—	
		X1-DFN1010-6		—	495	—	
		X2-DFN1010-6		—	510	—	
θ _{JC}	Thermal Resistance Junction-to-Case	SOT26	(Note 9)	—	52	—	°C/W
		SOT363		—	143	—	
		X2-DFN1410-6		—	190	—	
		X2-DFN1409-6		—	225	—	
		X1-DFN1010-6		—	245	—	
		X2-DFN1010-6		—	250	—	

Note: 9. Test condition for all packages: Device mounted on FR-4 substrate PC board, 2oz copper with minimum recommended pad layout.

Switching Characteristics

T_A = -40°C to +85°C, C_L = 30 or 50pF (see Figure 1)

Parameter	From (Input)	TO (OUTPUT)	V _{CC} = 1.8V ± 0.15V		V _{CC} = 2.5V ± 0.2V		V _{CC} = 3.3V ± 0.3V		V _{CC} = 5V ± 0.5V		Unit
			Min	Max	Min	Max	Min	Max	Min	Max	
t _{PD}	A	Y	0.5	11.0	0.5	6.5	0.5	6.0	0.5	4.3	ns

T_A = -40°C to +125°C, C_L = 30 or 50pF (see Figure 1)

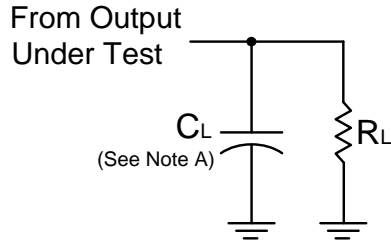
Parameter	From (Input)	TO (OUTPUT)	V _{CC} = 1.8V ± 0.15V		V _{CC} = 2.5V ± 0.2V		V _{CC} = 3.3V ± 0.3V		V _{CC} = 5V ± 0.5V		Unit
			Min	Max	Min	Max	Min	Max	Min	Max	
t _{PD}	A	Y	0.5	12.0	0.5	7.2	0.5	6.7	0.5	4.7	ns

Operating Characteristics

T_A = +25°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}	f = 10MHz	17	19	20	21	pF

Parameter Measurement Information



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

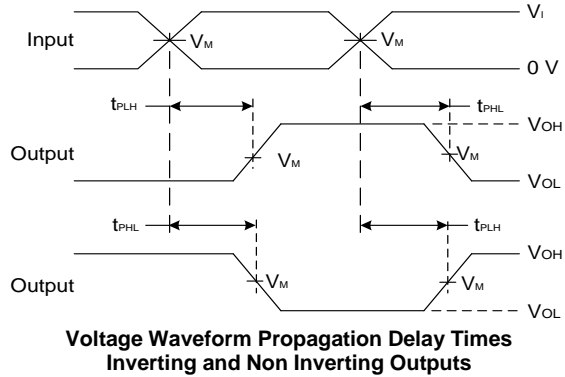
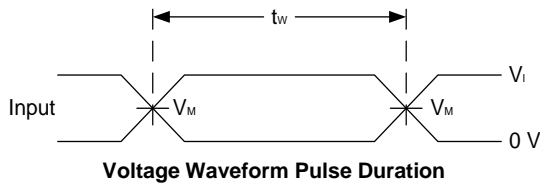
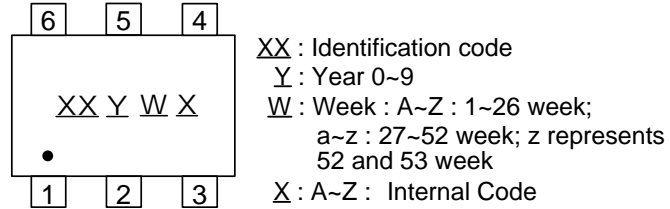


Figure 1 Load Circuit and Voltage Waveforms

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

Marking Information

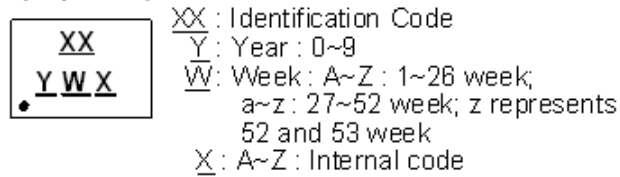
(1) SOT26, SOT363



Part Number	Package	Identification Code
74LVC2G14W6-7	SOT26	Z5
74LVC2G14DW-7	SOT363	Z5

(2) X1-DFN1010-6, X2-DFN1010-6, X2-DFN1409-6, X2-DFN1410-6

(Top View)

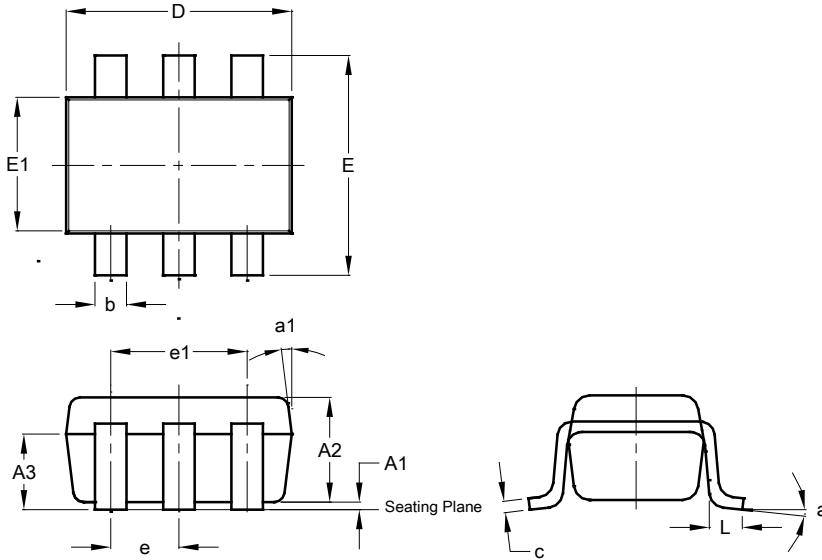


Part Number	Package	Identification Code
74LVC2G14FW4-7	X2-DFN1010-6	Z5
74LVC2G14FW5-7	X1-DFN1010-6	W5
74LVC2G14FX4-7	X2-DFN1409-6	X5
74LVC2G14FZ4-7	X2-DFN1410-6	Z5

Package Outline Dimensions

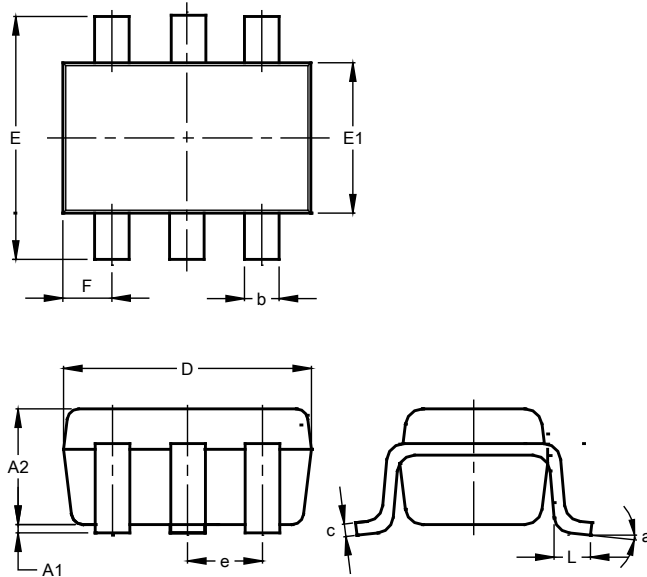
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT26 (SC74R)



SOT26 (SC74R)			
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			

SOT363

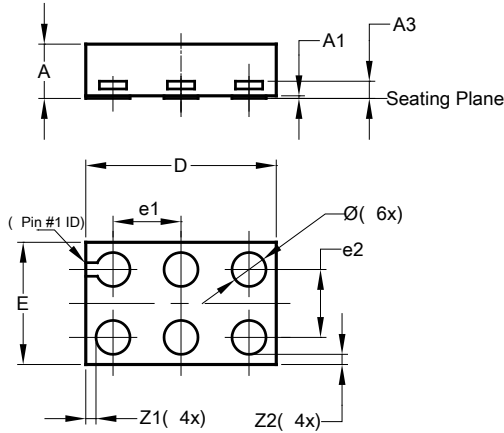


SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

Package Outline Dimensions (continued)

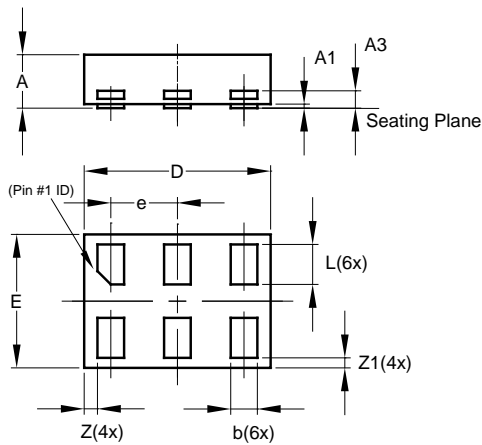
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

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			

X2-DFN1410-6

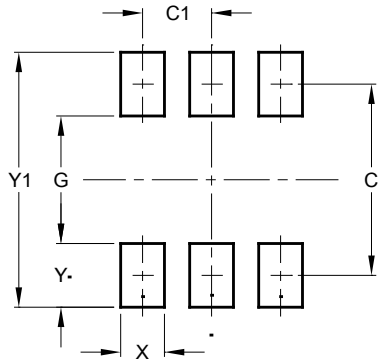


X2-DFN1410-6			
Dim	Min	Max	Typ
A	—	0.40	0.39
A1	0.00	0.05	0.02
A3	—	—	0.13
b	0.15	0.25	0.20
D	1.35	1.45	1.40
E	0.95	1.05	1.00
e	—	—	0.50
L	0.25	0.35	0.30
Z	—	—	0.10
Z1	0.045	0.105	0.075
All Dimensions in mm			

Suggested Pad Layout

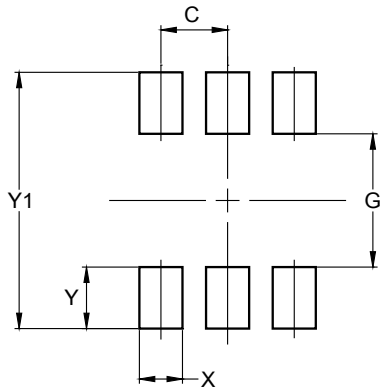
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT26 (SC74R)



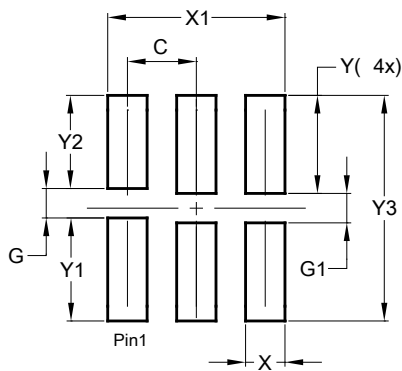
Dimensions	Value (in mm)
C	2.40
C1	0.95
G	1.60
X	0.55
Y	0.80
Y1	3.20

SOT363



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.420
Y	0.600
Y1	2.500

X1-DFN1010-6 (Type B)

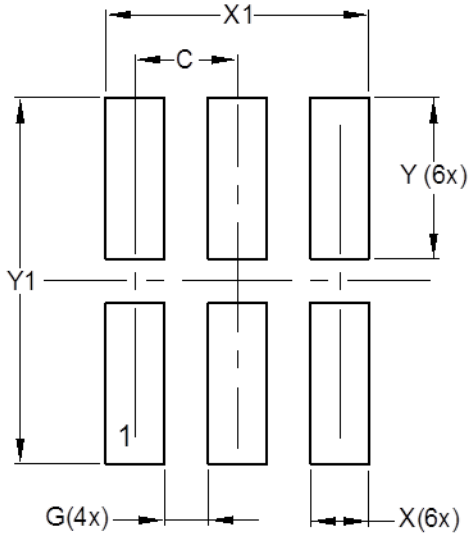


Dimensions	Value (in mm)
C	0.350
G	0.150
G1	0.150
X	0.200
X1	0.900
Y	0.500
Y1	0.525
Y2	0.475
Y3	1.150

Suggested Pad Layout (continued)

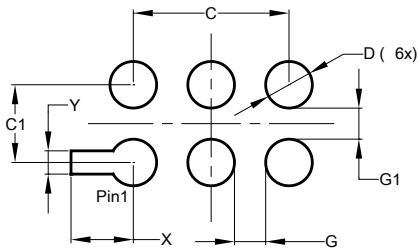
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

X2-DFN1010-6



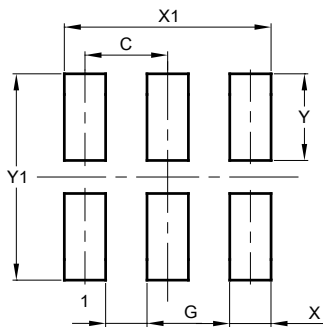
Dimensions	Value (in mm)
C	0.350
G	0.150
X	0.200
X1	0.900
Y	0.550
Y1	1.250

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

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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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.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

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