Description

The 74LVC2G17 is a dual Schmitt trigger buffer 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:

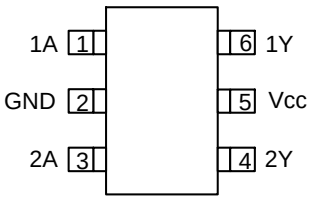
$Y = A$

Features

- Wide Supply Voltage Range from 1.65V to 5.5V
- ±24mA Output Drive at 3.0V
- CMOS Low Power Consumption
- I_{OFF} Supports Partial-Power-Down Mode Operation
- Inputs Accept up to 5.5V
- ESD Protection Tested per JESD 22
- Exceeds 2000V Human Body Model (A114)
- Exceeds 1000V Charged Device Model (C101)
- Latch-up Exceeds 100mA per JESD 78, Class I
- X2-DFN1409-6 Package Designed as a Direct Replacement for Chip Scale Packaging
- Range of Package Options SOT26, SOT363, X1-DFN1010-6 (Type B), 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)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

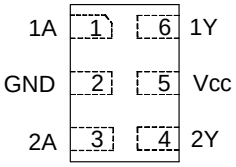
Pin Assignments

(Top View)



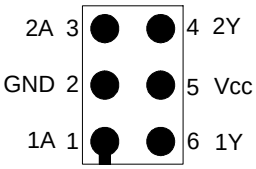
SOT26/SOT363

(Top View)



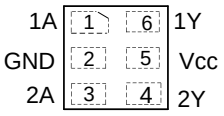
X2-DFN1410-6

(Bottom View)



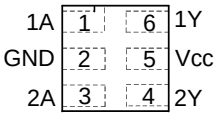
X2-DFN1409-6
Chip Scale
Alternative

(Top View)



X1-DFN1010-6 (Type B)

(Top View)



X2-DFN1010-6

Applications

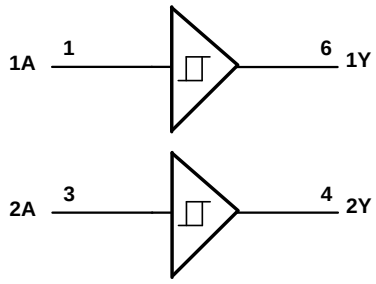
- Voltage level shifting
- General-purpose logics
- Power down signal isolations
- Wide array of products such as:
  - PCs, networking, notebooks, netbooks, tablets
  - Computer peripherals, hard drives, SSD, CD/DVD ROM
  - TV, DVD, DVR, set-top boxes
  - Cell phones, personal navigations/GPS
  - MP3 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.

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	H
L	L

Absolute Maximum Ratings (Notes 4 & 5) (@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 +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 greater than those listed under *Absolute Maximum Ratings* can cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions* is not implied. Exposure to *Absolute Maximum Ratings* for extended periods can affect device reliability.

5. 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 6) (@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	
			—	-24	
		V_{CC} = 4.5V	—	-32	
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	
T_A	Operating Free-Air Temperature	—	-40	+125	°C

Note: 6. 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	1.2	V
			2.3V	0.25	1.10	0.25	1.3	
			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	—	2.2	—	
		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 7)	—	204	—	°C/W
		SOT363		—	371	—	
		X2-DFN1410-6		—	430	—	
		X2-DFN1409-6		—	450	—	
		X1-DFN1010-6 (Type B)		—	495	—	
		X2-DFN1010-6		—	510	—	
θ_{JC}	Thermal Resistance Junction-to-Case	SOT26	(Note 7)	—	52	—	°C/W
		SOT363		—	143	—	
		X2-DFN1410-6		—	190	—	
		X2-DFN1409-6		—	225	—	
		X1-DFN1010-6 (Type B)		—	245	—	
		X2-DFN1010-6		—	250	—	

Note: 7. 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 = 30pF 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	10.5	0.5	6.5	0.5	5.7	0.5	4.3	ns

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

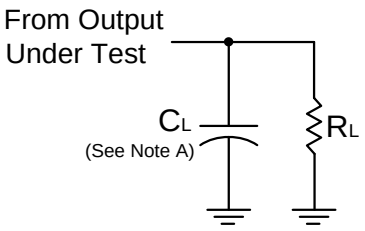
Parameter	From (Input)	To (Output)	V_{CC} = 1.8V ± 0.15V		V_{CC} = 2.5V ± 0.2V		V_{CC} = 3.3V ± 0.3V		V_{CC} = 5V ± 0.5V		Unit
			Min	Max	Min	Max	Min	Max	Min	Max	
t_{PD}	A	Y	0.5	13.1	0.5	8.5	0.5	7.1	0.5	5.4	ns

Operating Characteristics

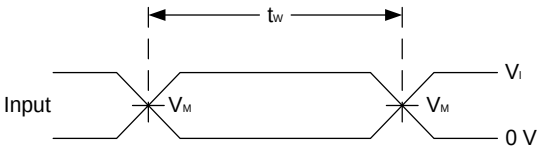
T_A = +25°C

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}	Power Dissipation Capacitance	f = 10MHz	17	19	20	21	pF

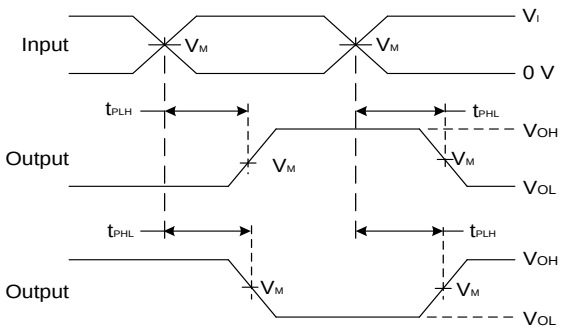
Parameter Measurement Information



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



Voltage Waveform Pulse Duration

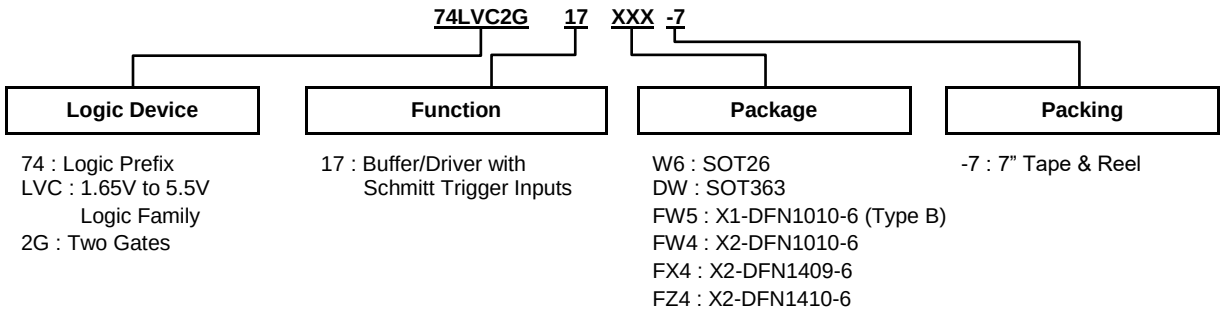


Voltage Waveform Propagation Delay Times
Inverting and Non Inverting Outputs

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}.

Ordering Information

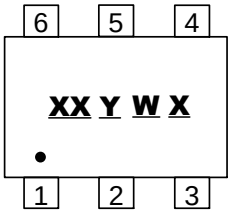


Part Number	Part Number Suffix	Package Code	Package (Note 8)	Package Size	Packing (Note 9)	
					Qty.	Carrier
74LVC2G17W6-7	-7	W6	SOT26	2.8mm x 2.2mm x 1.1mm 0.95mm Lead Pitch	3000	Tape & Reel
74LVC2G17DW-7	-7	DW	SOT363	2.0mm x 2.0mm x 1.1mm 0.65mm Lead Pitch	3000	Tape & Reel
74LVC2G17FW5-7	-7	FW5	X1-DFN1010-6 (Type B)	1.0mm x 1.0mm x 0.5mm 0.35mm Pad Pitch	5000	Tape & Reel
74LVC2G17FW4-7	-7	FW4	X2-DFN1010-6	1.0mm x 1.0mm x 0.4mm 0.35mm Pad Pitch	5000	Tape & Reel
74LVC2G17FX4-7	-7	FX4	X2-DFN1409-6 Chip Scale Alternative	1.4mm x 0.9mm x 0.4mm 0.5mm Pad Pitch	5000	Tape & Reel
74LVC2G17FZ4-7	-7	FZ4	X2-DFN1410-6	1.4mm x 1.0mm x 0.4mm 0.5mm Pad Pitch	5000	Tape & Reel

Notes: 8. Pad layout as shown on Diodes Incorporated's website at http://www.diodes.com/package-outlines.html.
9. The taping orientation is located on our website at https://www.diodes.com/assets/Packaging-Support-Docs/ap02007.pdf.

Marking Information

(1) SOT26, SOT363



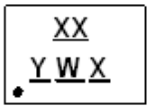
XX: Identification Code
Y: Year 0 to 9 (ex: 2 = 2022)
W: Week: A to Z: Week 1 to 26;
a to z: Week 27 to 52; z Represents Week 52 and 53
X: A to Z: Internal Code

Part Number	Package	Identification Code
74LVC2G17W6-7	SOT26	Z6
74LVC2G17DW-7	SOT363	Z6

Marking Information (continued)

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

(Top View)



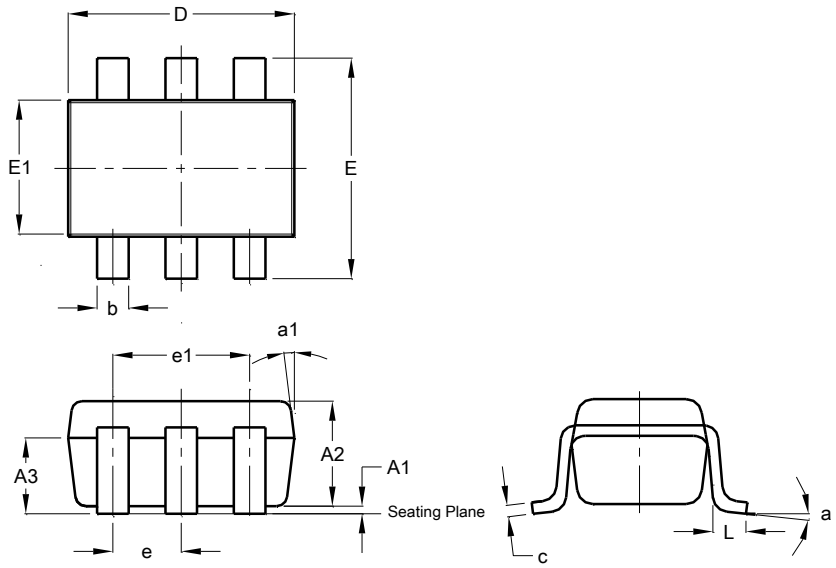
XX: Identification Code
Y: Year 0 to 9 (ex: 2 = 2022)
W: Week: A to Z: Week 1 to 26;
a to z: Week 27 to 52; z Represents Week 52 and 53
X: A to Z: Internal Code

Part Number	Package	Identification Code
74LVC2G17FW4-7	X2-DFN1010-6	Z6
74LVC2G17FW5-7	X1-DFN1010-6 (Type B)	W6
74LVC2G17FX4-7	X2-DFN1409-6	X6
74LVC2G17FZ4-7	X2-DFN1410-6	Z6

Package Outline Dimensions

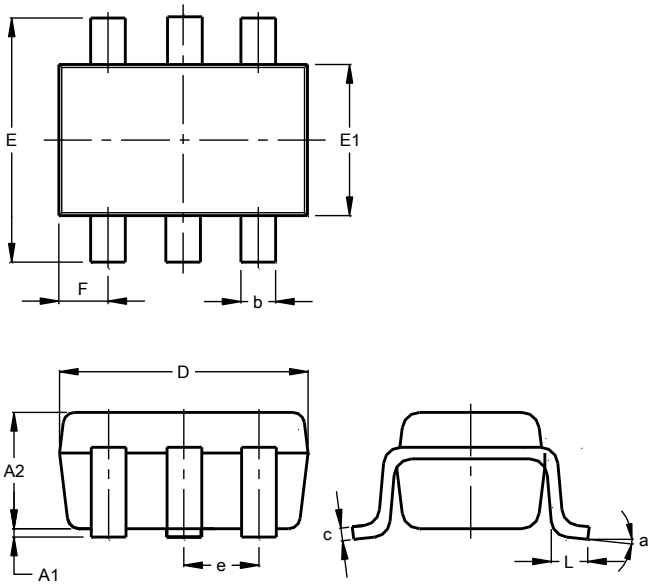
Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT26



SOT26			
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

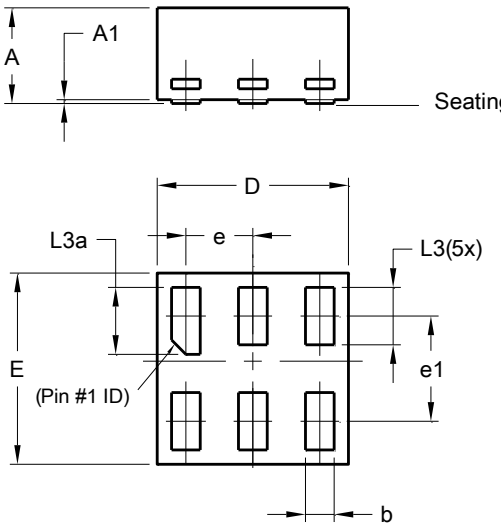


SOT363			
Dim	**Min**	**Max**	**Typ**
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

Package Outline Dimensions (continued)

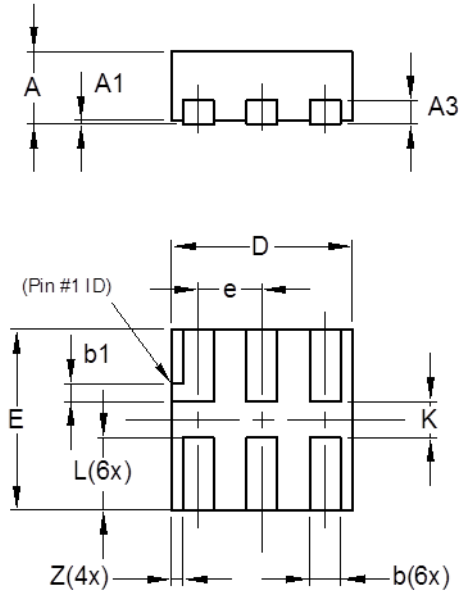
Please see http://www.diodes.com/package-outlines.html for the latest version.

X1-DFN1010-6 (Type B)



X1-DFN1010-6 (Type B)			
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			

X2-DFN1010-6

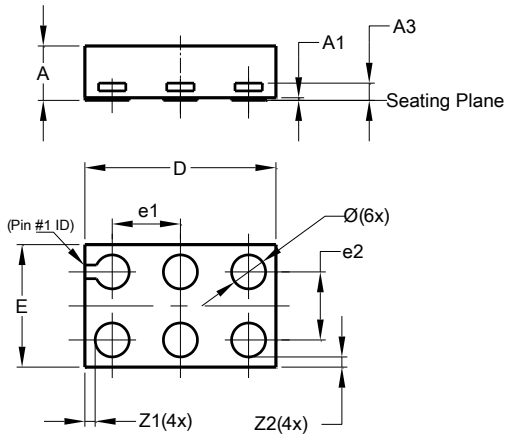


X2-DFN1010-6			
Dim	**Min**	**Max**	**Typ**
A	—	0.40	0.39
A1	0.00	0.05	0.02
A3	—	—	0.13
b	0.14	0.20	0.17
b1	0.05	0.15	0.10
D	0.95	1.05	1.00
E	0.95	1.05	1.00
e	—	—	0.35
L	0.35	0.45	0.40
K	0.15	—	—
Z	—	—	0.065
All Dimensions in mm			

Package Outline Dimensions (continued)

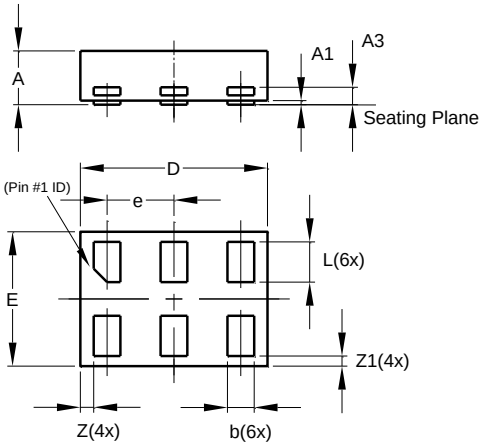
Please see http://www.diodes.com/package-outlines.html for the latest version.

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

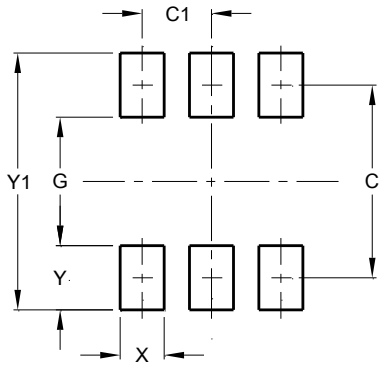


X2-DFN1410-6			
Dim	**Min**	**Max**	**Typ**
A	—	0.40	0.39
A1	0.00	0.05	0.02
A3	—	—	0.13
b	0.15	0.25	0.20
D	1.35	1.45	1.40
E	0.95	1.05	1.00
e	—	—	0.50
L	0.25	0.35	0.30
Z	—	—	0.10
Z1	0.045	0.105	0.075
All Dimensions in mm			

Suggested Pad Layout

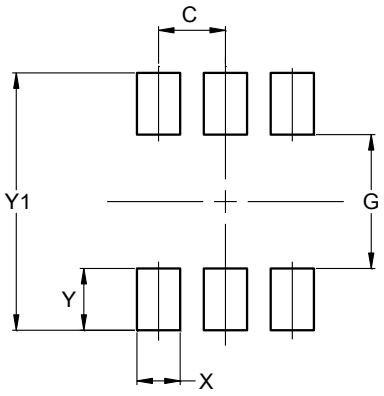
Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT26



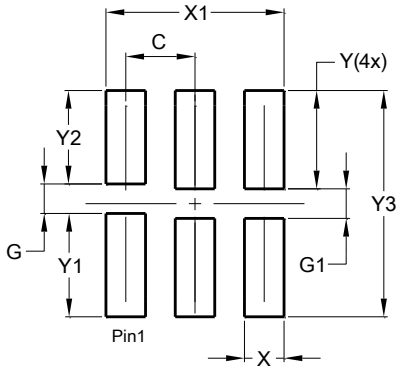
Dimensions	Value (in mm)
C	2.40
C1	0.95
G	1.60
X	0.55
Y	0.80
Y1	3.20

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)

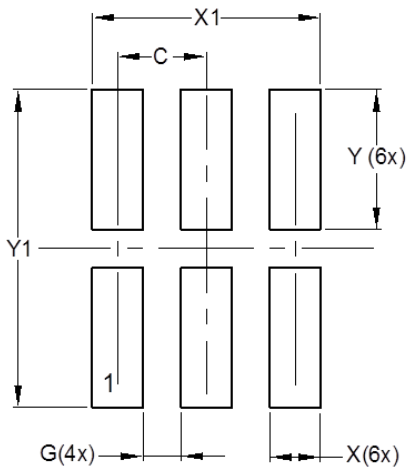


Dimensions	Value (in mm)
C	0.350
G	0.150
G1	0.150
X	0.200
X1	0.900
Y	0.500
Y1	0.525
Y2	0.475
Y3	1.150

Suggested Pad Layout (continued)

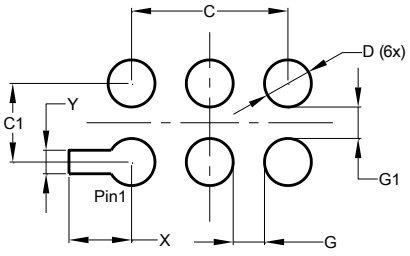
Please see http://www.diodes.com/package-outlines.html for the latest version.

X2-DFN1010-6



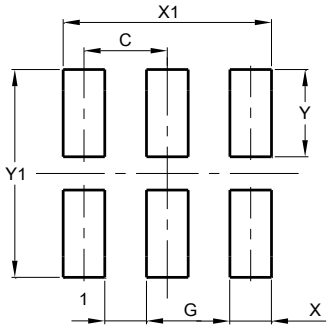
Dimensions	Value (in mm)
C	0.350
G	0.150
X	0.200
X1	0.900
Y	0.550
Y1	1.250

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

Mechanical Data

SOT26

- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.016 grams (Approximate)

SOT363

- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.006 grams (Approximate)

X1-DFN1010-6 (Type B)

- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - NiPdAu Nickel Palladium Gold, Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.001 grams (Approximate)

X2-DFN1010-6

- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - NiPdAu Nickel Palladium Gold, Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.001 grams (Approximate)

X2-DFN1409-6

- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - NiPdAu Nickel Palladium Gold, Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.002 grams (Approximate)

X2-DFN1410-6

- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - NiPdAu Nickel Palladium Gold, Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.002 grams (Approximate)

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