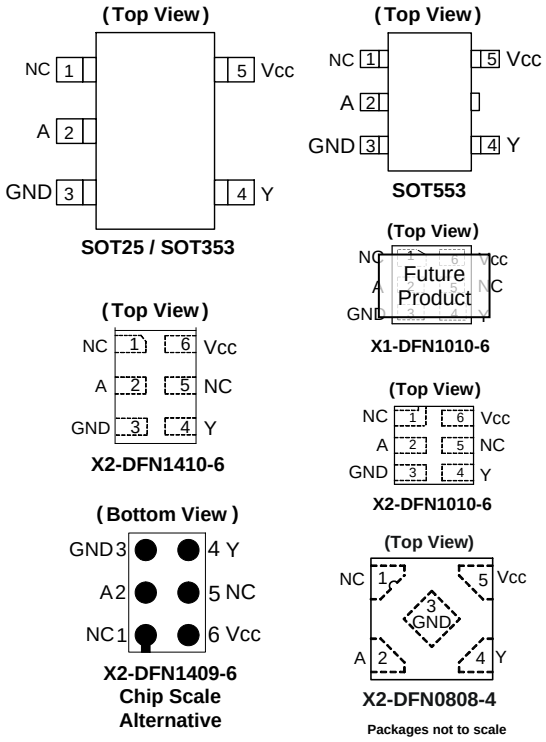
Description

The 74LVC1G17 is a single 1-input Schmitt-trigger buffer with a standard push-pull output. 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:

$$Y = A$$

Pin Assignments



Features

- Wide Supply Voltage Range from 1.65V to 5.5V
- ± 24mA Output Drive at 3.3V
- CMOS low power consumption
- I_{OFF} Supports Partial-Power-Down Mode Operation
- Inputs accept up to 5.5V
- ESD Protection Exceeds JESD 22
  - 200-V Machine Model (A115)
  - 2,000-V Human Body Model (A114)
  - Latch-Up Exceeds 100mA per JESD 78, Class I
- Range of Package Options
- **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, PDAs
  - Computer peripherals, hard drives, 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) 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 < 1000 ppm antimony compounds.

Ordering Information

74 LVC1G 17 XXX -7

Logic Device	Function	Package	Packing
74 : Logic Prefix LVC : 1.65 to 5.5 V Logic Family 1G : One Gate	17 : 1-Input Schmitt Trigger Buffer	W5 : SOT25 SE : SOT353 Z : SOT553 FS3 : X2-DFN0808-4 FW5 : X1-DFN1010-6 FW4 :X2-DFN1010-6 FX4 : X2- DFN1409-6 FZ4 : X2- DFN1410-6	-7 : 7" Tape & Reel

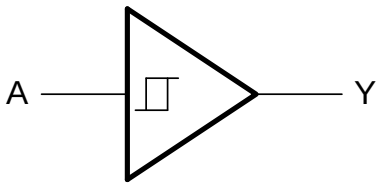
Device	Package Code	Package (Notes 4, 5)	Package Size	7" Tape and Reel	
				Quantity	Part Number Suffix
74LVC1G17W5-7	W5	SOT25	3.0mm X 2.8mm X 1.2mm 0.95 mm lead pitch	3,000/Tape & Reel	-7
74LVC1G17SE-7	SE	SOT353	2.0mm X 2.0mm X 1.1mm 0.65 mm lead pitch	3,000/Tape & Reel	-7
74LVC1G17Z-7	Z	SOT553	1.1.6mm X 1.6 mm X 0.62mm 0.5 mm lead pitch	4,000/Tape & Reel	-7
74LVC1G17FS3-7	FS3	X2-DFN0808-4	0.9mm X 0.9 mm X 0.35mm 0.5 mm pad pitch (diamond)	5,000/Tape & Reel	-7
74LVC1G17FW5-7 **(Future Product)**	FW5	X1-DFN1010-6 **(Future Product)**	1.0mm X 1.0mm X 0.5mm 0.35 mm pad pitch	5,000/Tape & Reel	-7
74LVC1G17FW4-7	FW4	X2-DFN1010-6	1.0mm X 1.0mm X 0.4mm 0.35 mm pad pitch	5,000/Tape & Reel	-7
74LVC1G17FX4-7	FX4	X2-DFN1409-6 **(Chip Scale Alternative)**	1.4mm X 0.9mm X 0.4mm 0.5 mm pad pitch	5,000/Tape & Reel	-7
74LVC1G17FZ4-7	FZ4	X2-DFN1410-6	1.4mm X 1.0mm X 0.4mm 0.5 mm pad pitch	5,000/Tape & Reel	-7

Notes: 4. Pad layout as shown on Diodes' suggested pad layout, which can be found on our website at http://www.diodes.com/package-outlines.html.
5. The taping orientation is located on our website at https://www.diodes.com/assets/Diodes-Packaging/ap02007.pdf.

Pin Descriptions

Pin Name	Description
A	Data Input
GND	Ground
Y	Data Output
V_{CC}	Supply Voltage

Logic Diagram



Function Table

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

Absolute Maximum Ratings (Notes 6 & 7)

Symbol	Description	Rating	Unit
ESD HBM	Human Body Model ESD Protection	2	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	-0.5 to V_{CC} +0.5	V
I_{IK}	Input Clamp Current $V_I < 0$	-50	mA
I_{OK}	Output Clamp Current	-50	mA
I_O	Continuous Output Current	±50	mA
I_{CC}, I_{GND}	Continuous Current through V_{CC} or GND	±100	mA
T_J	Operating Junction Temperature	-40 to 150	°C
T_{STG}	Storage Temperature	-65 to 150	°C

Notes: 6. 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.
7. 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)

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} = 2.7V	—	-12	
		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} = 2.7V	—	12	
		V_{CC} = 3V	—	16	
			—	24	
		V_{CC} = 4.5V	—	32	
T_A	Operating Free-Air Temperature	—	-40	+125	°C

Note: 8. Unused inputs should be held at V_{CC} or Ground.

Electrical Characteristics T_A = -40°C to +85°C (All typical values are at V_{CC} = 3.3V, T_A = +25°C)

Symbol	Parameter	Test Conditions	V_{CC}	Min	Typ.	Max	Unit
V_{T+}	Positive-going Input Threshold Voltage	—	1.65V	0.70	—	1.20	—
		—	2.3V	1.11	—	1.60	—
		—	3V	1.50	—	2.00	—
		—	4.5V	2.16	—	2.74	—
		—	5.5V	2.61	—	3.33	—
V_{T-}	Negative-going Input Threshold Voltage	—	1.65V	0.30	—	0.72	—
		—	2.3V	0.58	—	1.00	—
		—	3V	0.80	—	1.30	—
		—	4.5V	1.21	—	1.95	—
		—	5.5V	1.45	—	2.35	—
ΔV_T	Hysteresis (V_{T+} - V_{T-})	—	1.65V	0.30	—	0.62	—
		—	2.3V	0.40	—	0.80	—
		—	3V	0.35	—	1.00	—
		—	4.5V	0.55	—	1.10	—
		—	5.5V	0.60	—	1.20	—
V_{OH}	High Level Output Voltage	I_{OH} = -100µA	1.65V to 5.5V	V_{CC} – 0.1	—	—	V
		I_{OH} = -4mA	1.65V	1.2	—	—	
		I_{OH} = -8mA	2.3V	1.9	—	—	
		I_{OH} = -12mA	2.7V	2.2	—	—	
		I_{OH} = -16mA	3V	2.4	—	—	
		I_{OH} = -24mA		2.3	—	—	
		I_{OH} = -32mA	4.5V	3.8	—	—	
V_{OL}	Low-Level Output Voltage	I_{OL} = 100µA	1.65V to 5.5V	—	—	0.1	V
		I_{OL} = 4mA	1.65V	—	—	0.45	
		I_{OL} = 8mA	2.3V	—	—	0.3	
		I_{OL} = 12mA	2.7V	—	—	0.4	
		I_{OL} = 16mA	3V	—	—	0.4	
		I_{OL} = 24mA		—	—	0.55	
		I_{OL} = 32mA	4.5V	—	—	0.55	
I_I	Input Current	V_I = 5.5 V or GND	0 to 5.5V	—	—	± 5	µA
I_{OFF}	Power Down Leakage Current	V_I or V_O = 5.5V	0	—	—	± 10	µA
I_{CC}	Supply Current	V_I = 5.5V of GND I_O = 0	1.65V to 5.5V	—	—	10	µA
ΔI_{CC}	Additional Supply Current	Input at V_{CC} –0.6V	3V to 5.5V	—	—	500	µA

Electrical Characteristics (@T_A = -40°C to +125°C. All typical values are at V_{CC} = 3.3V, T_A = +25°C)

Symbol	Parameter	Test Conditions	V_{CC}	Min	Typ.	Max	Unit
V_{T+}	Positive-Going Input Threshold Voltage	—	1.65V	0.70	—	1.20	—
		—	2.3V	1.11	—	1.60	—
		—	3 V	1.50	—	2.00	—
		—	4.5V	2.16	—	2.74	—
		—	5.5V	2.61	—	3.33	—
V_{T-}	Negative-Going Input Threshold Voltage	—	1.65V	0.30	—	0.75	—
		—	2.3V	0.58	—	1.03	—
		—	3V	0.80	—	1.33	—
		—	4.5V	1.21	—	1.95	—
		—	5.5V	1.45	—	2.35	—
ΔV_T	Hysteresis (V_{T+} - V_{T-})	—	1.65V	0.30	—	0.62	—
		—	2.3V	0.37	—	0.80	—
		—	3V	0.32	—	1.00	—
		—	4.5V	0.50	—	1.20	—
		—	5.5V	0.55	—	1.40	—
V_{OH}	High Level Output Voltage	I_{OH} = -100µA	1.65V to 5.5V	V_{CC} – 0.1	—	—	V
		I_{OH} = -4mA	1.65V	0.95	—	—	
		I_{OH} = -8mA	2.3V	1.7	—	—	
		I_{OH} = -12mA	2.7V	1.9	—	—	
		I_{OH} = -16mA	3V	2.2	—	—	
		I_{OH} = -24mA		2.0	—	—	
		I_{OH} = -32mA	4.5V	3.4	—	—	
V_{OL}	High-Level Input Voltage	I_{OL} = 100µA	1.65V to 5.5V	—	—	0.1	V
		I_{OL} = 4mA	1.65V	—	—	0.7	
		I_{OL} = 8mA	2.3V	—	—	0.45	
		I_{OL} = 12mA	2.7V	—	—	0.6	
		I_{OL} = 16mA	3V	—	—	0.6	
		I_{OL} = 24mA		—	—	0.8	
		I_{OL} = 32mA	4.5V	—	—	0.8	
I_I	Input Current	V_I = 5.5 V or GND	0 to 5.5V	—	—	± 100	µA
I_{OFF}	Power Down Leakage Current	V_I or V_O = 5.5V	0	—	—	± 200	µA
I_{CC}	Supply Current	V_I = 5.5V of GND I_O = 0	1.65V to 5.5V	—	—	200	µA
ΔI_{CC}	Additional Supply Current	Input at V_{CC} – 0.6 V	3V to 5.5V	—	—	5,000	µA

Package Characteristics (All typical values are at V_{CC} = 3.3V, T_A = +25°C)

Symbol	Parameter	Test Conditions	V_{CC}	Min	Typ.	Max	Unit
θ_{JA}	Thermal Resistance Junction-to-Ambient	SOT25	(Note 9)	—	204	—	°C/W
		SOT353		—	371	—	
		SOT553		—	231	—	
		X2-DFN0808-4		—	400	—	
		X1-DFN1010-6		—	435	—	
		X2-DFN1010-6		—	445	—	
		X2-DFN1409-6		—	470	—	
		X2-DFN1410-6		—	460	—	
θ_{JC}	Thermal Resistance Junction-to-Case	SOT25	(Note 9)	—	52	—	°C/W
		SOT353		—	143	—	
		SOT553		—	105	—	
		X2-DFN0808-4		—	225	—	
		X1-DFN1010-6		—	250	—	
		X2-DFN1010-6		—	250	—	
		X2-DFN1409-6		—	275	—	
		X2-DFN1410-6		—	265	—	

Note: 9. Test condition for each of the 8 package types: 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 = 15pF as noted (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	1.0	9.9	0.7	5.5	0.7	4.6	0.7	4.4	ns

T_A = -40°C to +85°C, C_L = 30 or 50pF as noted (See Figure 2)

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	1.0	11	0.7	6.5	0.7	5.5	0.7	5	ns

T_A = -40°C to +125°C, C_L = 15 pF as noted (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	1.0	12.5	0.7	7.5	0.7	6.5	0.7	5.5	ns

T_A = -40°C to +125°C, C_L = 30 or 50pF as noted (See Figure 2)

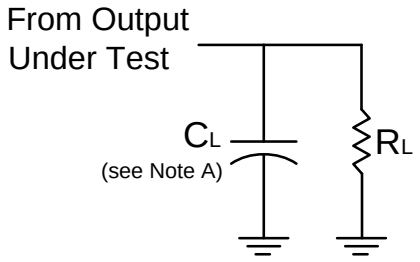
Parameter	From Input	To Output	V_{CC} = 1.8V ± 0.15V		V_{CC} = 2.5V ± 0.2V		V_{CC} = 3.3V ± 0.3V		V_{CC} = 5V ± 0.5V		Unit
			Min	Max	Min	Max	Min	Max	Min	Max	
t_{PD}	A	Y	1.0	14.0	0.7	8.5	0.7	7.0	0.7	6.5	ns

Operating Characteristics

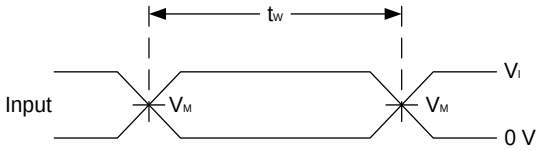
T_A = +25°C

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 = 10 MHz	20	22	23	25	pF

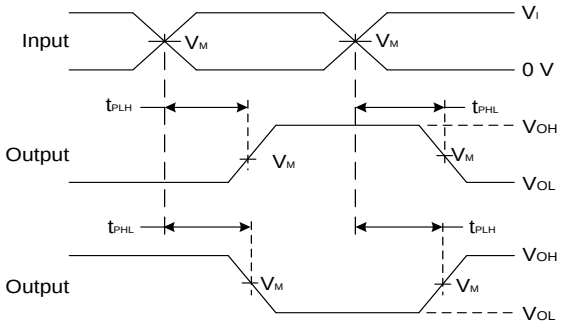
Parameter Measurement Information



V_{CC}	Inputs		V_M	C_L	R_L
	V_I	t_R/t_F			
1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	15pF	1MΩ
2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	15pF	1MΩ
3.3V±0.3V	3V	≤2.5ns	1.5V	15pF	1MΩ
5V±0.5V	V_{CC}	≤2.5ns	$V_{CC}/2$	15pF	1MΩ



Voltage Waveform Pulse Duration

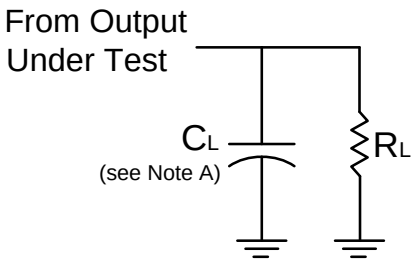


Voltage Waveform Propagation Delay Times Inverting and Non Inverting Outputs

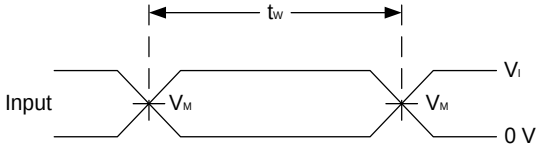
Figure 1. Load Circuit and Voltage Waveforms

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}.

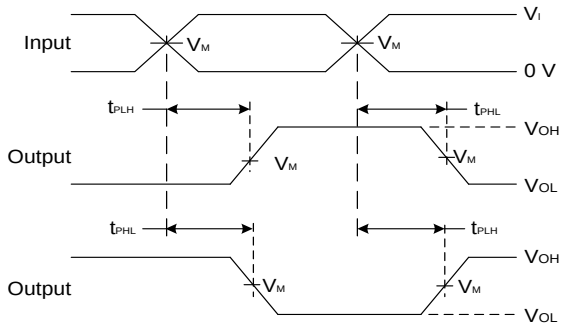
Parameter Measurement Information (Continued)



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



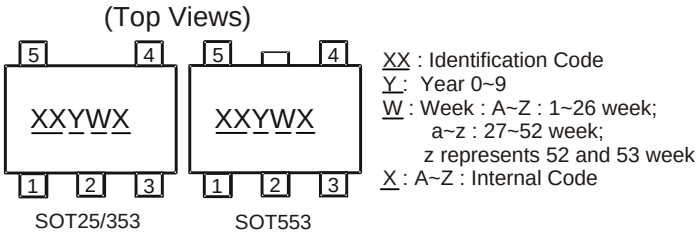
Voltage Waveform Propagation Delay Times Inverting and Non Inverting Outputs

Figure 2. 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}.

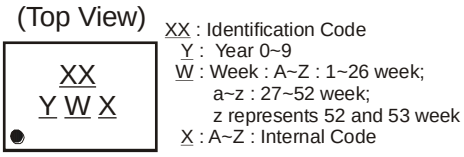
Marking Information

(1) SOT25, SOT353 and SOT553



Part Number	Package	Identification Code
74LVC1G17W5-7	SOT25	UR
74LVC1G17SE-7	SOT353	UR
74LVC1G17Z-7	SOT553	UR

(2) DFN packages

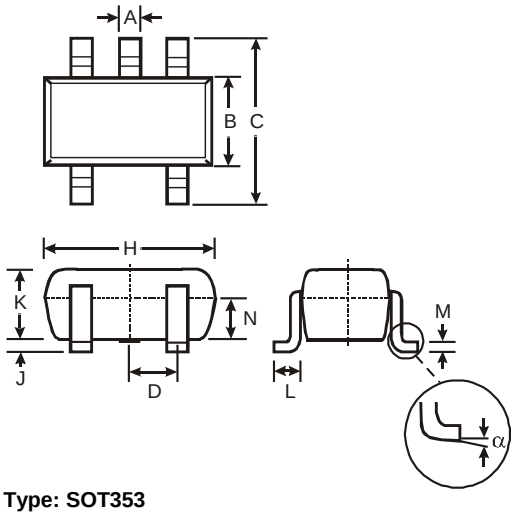


Part Number	Package	Identification Code
74LVC1G17FS3-7	X2-DFN0808-4	WR
74LVC1G17FW5-7	X1-DFN1010-6	V9
74LVC1G17FW4-7	X2-DFN1010-6	UR
74LVC1G17FX4-7	X2-DFN1409-6	MH
74LVC1G17FZ4-7	X2-DFN1410-6	UR

Package Outline Dimensions

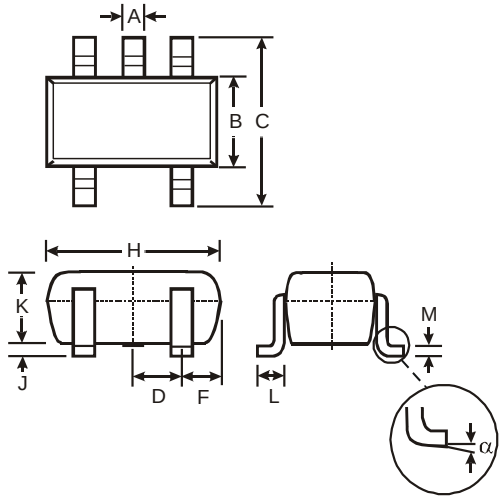
Please see http://www.diodes.com/package-outlines.html for the latest version.

(1) Package Type: SOT25



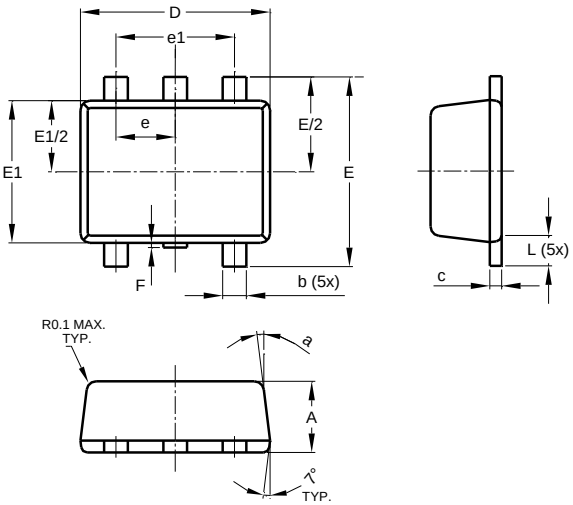
SOT25			
Dim	**Min**	**Max**	**Typ**
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	—	—	0.95
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
N	0.70	0.80	0.75
α	0°	8°	—
All Dimensions in mm			

(2) Package Type: SOT353



SOT353		
Dim	**Min**	**Max**
A	0.10	0.30
B	1.15	1.35
C	2.00	2.20
D	0.65 Typ	
F	0.40	0.45
H	1.80	2.20
J	0	0.10
K	0.90	1.00
L	0.25	0.40
M	0.10	0.22
α	0°	8°
All Dimensions in mm		

(3) Package Type: SOT553

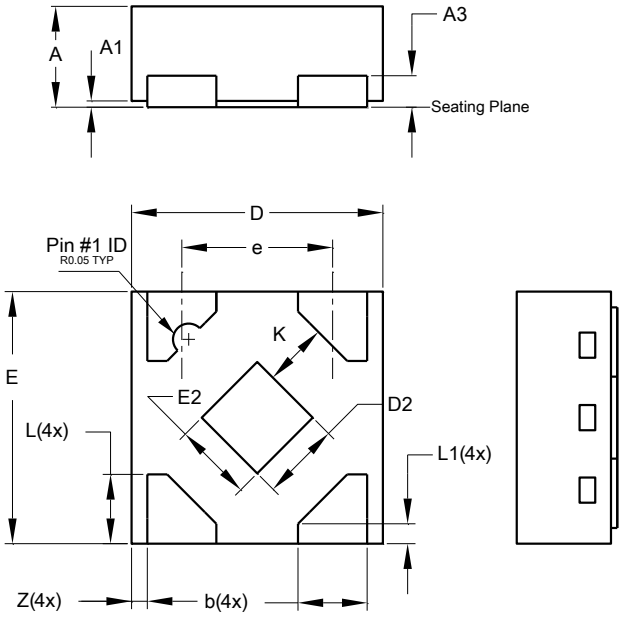


SOT553			
Dim	**Min**	**Max**	**Typ**
A	0.55	0.62	0.60
b	0.15	0.30	0.20
c	0.10	0.18	0.15
D	1.50	1.70	1.60
E	1.55	1.70	1.60
E1	1.10	1.25	1.20
e	0.50 BSC		
e1	1.00 BSC		
F	0.00	0.10	—
L	0.10	0.30	0.20
a	6°	8°	7°
All Dimensions in mm			

Package Outline Dimensions (Continued)

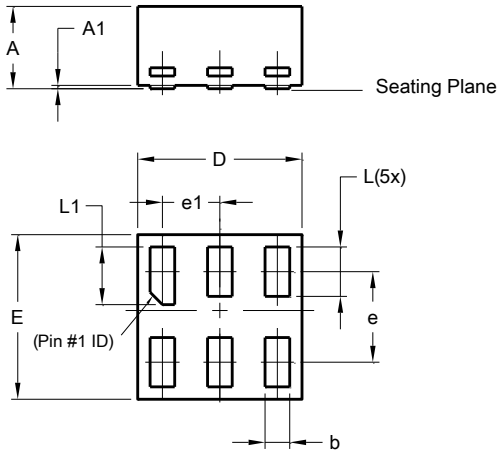
Please see http://www.diodes.com/package-outlines.html for the latest version.

(4) Package Type 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			

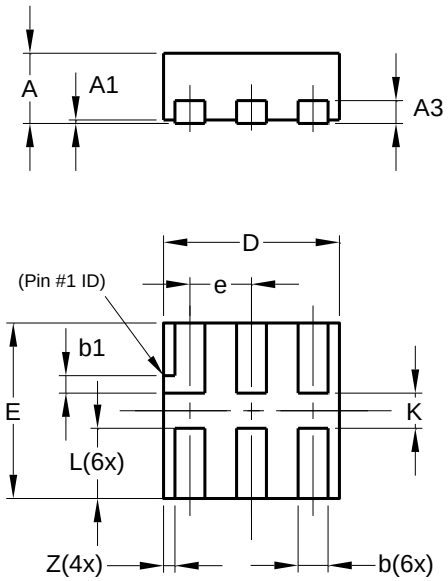
(5) Package Type: X1-DFN1010-6



X1-DFN1010-6			
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	0.55 BSC		
e1	0.35 BSC		
L	0.27	0.35	0.30
L1	0.32	0.40	0.35
All Dimensions in mm			

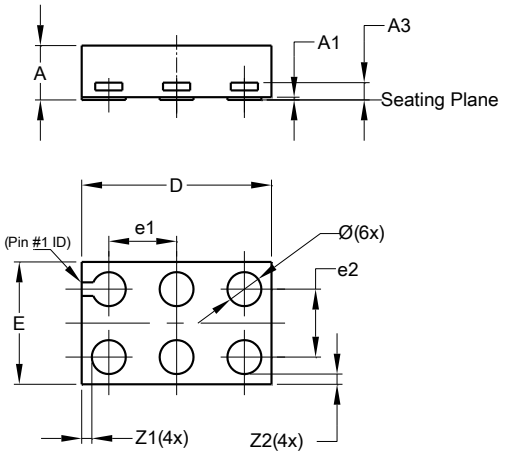
Package Outline Dimensions (Cont.)

(6) Package Type X2-DFN1010-6



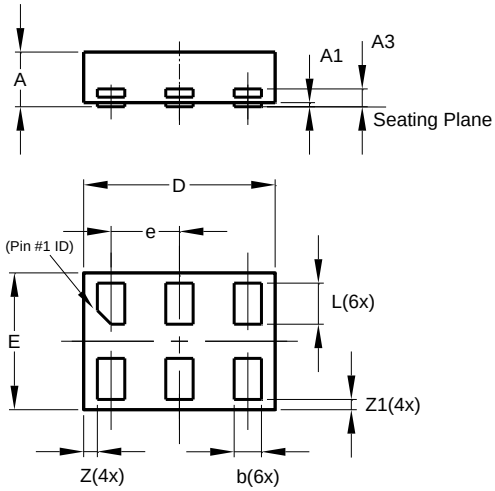
X2-DFN1010-6			
Dim	**Min**	**Max**	**Typ**
A	—	0.40	0.39
A1	0.00	0.05	0.02
A3	—	—	0.13
b	0.14	0.20	0.17
b1	0.05	0.15	0.10
D	0.95	1.05	1.00
E	0.95	1.05	1.00
e	—	—	0.35
L	0.35	0.45	0.40
K	0.15	—	—
Z	—	—	0.065
All Dimensions in mm			

(7) Package Type: X2-DFN1409-6 6 (Chip Scale Alternative)



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			

(8) Package Type: X2-DFN1410-6

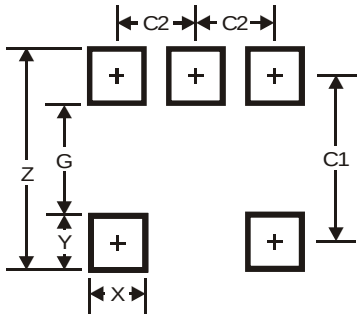


X2-DFN1410-6			
Dim	**Min**	**Max**	**Typ**
A	—	0.40	0.39
A1	0.00	0.05	0.02
A3	—	—	0.13
b	0.15	0.25	0.20
D	1.35	1.45	1.40
E	0.95	1.05	1.00
e	—	—	0.50
L	0.25	0.35	0.30
Z	—	—	0.10
Z1	0.045	0.105	0.075
All Dimensions in mm			

Suggested Pad Layout

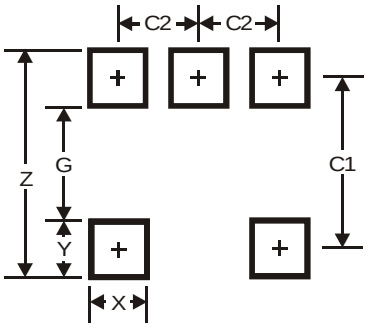
Please see http://www.diodes.com/package-outlines.html for the latest version.

(1) Package Type: SOT25



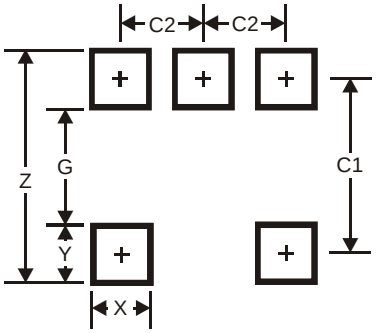
Dimensions	Value (in mm)
Z	3.20
G	1.60
X	0.55
Y	0.80
C1	2.40
C2	0.95

(2) Package Type: SOT353



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: SOT553

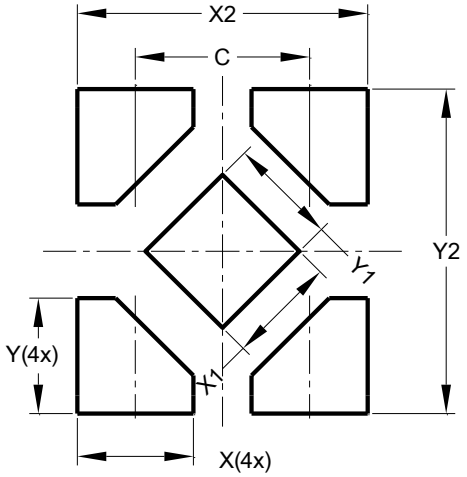


Dimensions	Value (in mm)
Z	2.2
G	1.2
X	0.375
Y	0.5
C1	1.7
C2	0.5

Suggested Pad Layout (Continued)

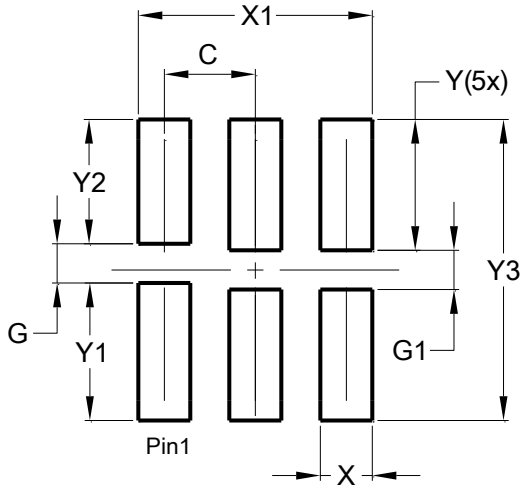
Please see http://www.diodes.com/package-outlines.html for the latest version.

(4) Package Type 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

(5) Package Type X1-DFN1010-6

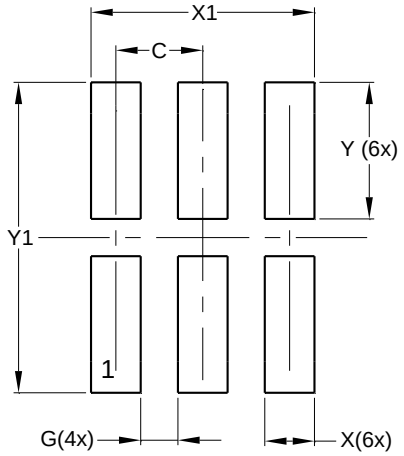


Dimensions	Value (in mm)
C	0.350
G	0.150
G1	0.150
X	0.200
X1	0.900
Y	0.500
Y1	0.525
Y2	0.475
Y3	1.150

Suggested Pad Layout (Cont.)

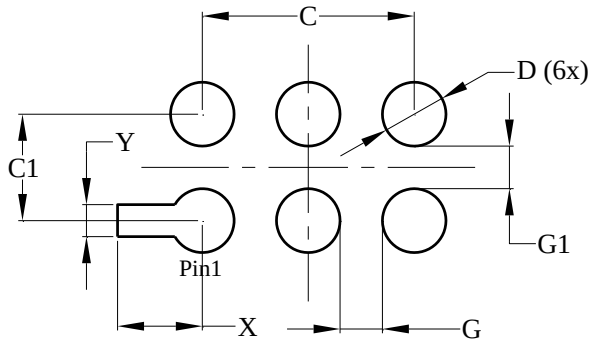
Please see http://www.diodes.com/package-outlines.html for the latest version.

(6) Package Type X2-DFN1010-6



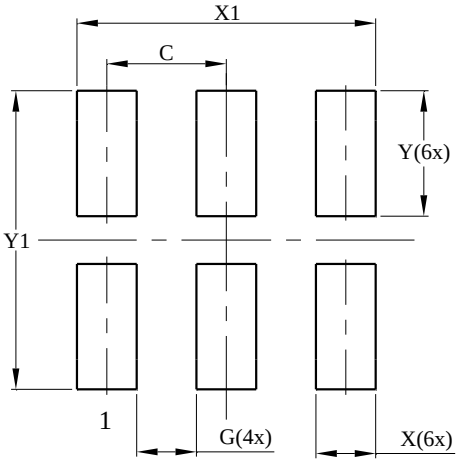
Dimensions	Value (in mm)
C	0.350
G	0.150
X	0.200
X1	0.900
Y	0.550
Y1	1.250

(7) Package Type: X2-DFN1409-6 (Chip Scale Alternative)



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

(8) 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

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