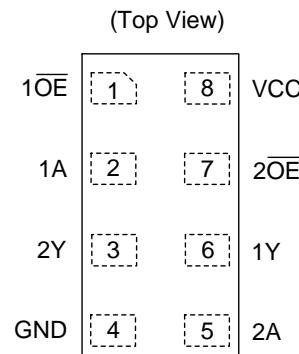


Description

The 74LVC2G125 is a dual buffer gate with 3-state outputs. The device is designed for operation over a power supply range of 1.65V to 5.5V. 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.

Pin Assignments



X2-DFN2010-8

X2-DFN1410-8

X2-DFN1210-8

Features

- Wide Supply Voltage Range from 1.65 to 5.5V
- $\pm 24\text{mA}$ Output Drive at 3.3V
- CMOS Low Power Consumption
- I_{OFF} Supports Partial-Power-Down Mode Operation
- Inputs accept up to 5.5V
- Schmitt Trigger Action at all inputs makes the circuit tolerant for slower input rise and fall times. The hysteresis is typically 100mV at $V_{CC} = 3.0\text{V}$.
- ESD Protection Exceeds JESD 22
 - 2000-V Human Body Model (A114)
 - Exceeds 1000-V Charged Device Model (C101)
- 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
 - Tablet Computers, E-readers
 - Computer Peripherals, Hard Drives, CD/DVD ROMs
 - TVs, DVDs, DVRs, Set Top Boxes
 - 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/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.

Ordering Information (Note 4)

74LVC2G 125 XXX -7			
Logic Device	Function	Package	Packing
74 : Logic Prefix LVC : 1.65V to 5.5V Logic Family 2G : Dual Gate	125: 3-State Buffer OE - Low	HD4 : X2-DFN2010-8 HK3 : X2-DFN1410-8 RA3 : X2-DFN1210-8	-7 : 7" Tape & Reel

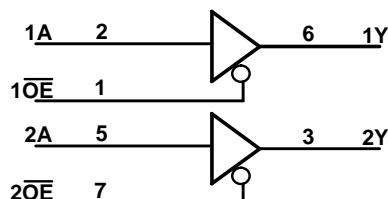
Device	Package Code	Package (Note 5)	Package Size	7" Tape and Reel (Note 6)	
				Quantity	Part Number Suffix
74LVC2G125HD4-7	HD4	X2-DFN2010-8	1.95mm x 1.0mm x 0.4mm 0.5 mm lead pitch	5,000/Tape & Reel	-7
74LVC2G125HK3-7	HK3	X2-DFN1410-8	1.35mm x 1.0mm x 0.35mm 0.4 mm lead pitch	5,000/Tape & Reel	-7
74LVC2G125RA3-7	RA3	X2-DFN1210-8	1.2mm x 1.0mm x 0.35mm 0.3 mm lead pitch	5,000/Tape & Reel	-7

Notes: 4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

5. Pad layout as shown in Diodes Incorporated's package outline PDFs, which can be found on our website at <http://www.diodes.com/package-outlines.html>.
 6. The taping orientation is located on our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Pin Descriptions

Pin Name	Pin No.	Description
1 \overline{OE}	1	Output Enable for buffer 1
1A	2	Data Input
2Y	3	Data Output
GND	4	Ground
2A	5	Data Input
1Y	6	Data Output
2 \overline{OE}	7	Output Enable for buffer 2
V_{CC}	8	Supply Voltage

Logic Diagram

Function Table

Inputs		Output
\overline{OE}	A	Y
L	H	H
L	L	L
H	X	Z

Absolute Maximum Ratings (Notes 7 & 8)

Symbol	Description	Rating	Unit
ESD HBM	Human Body Model ESD Protection	2	kV
ESD CDM	Charged Device Model ESD Protection	1	kV
V _{CC}	Supply Voltage	-0.5 to +6.5	V
V _I	Input Voltage	-0.5 to +6.5	V
V _O	Output Voltage -Active Mode	-0.5 to V _{CC} +0.5	V
	Output Voltage Power Down Mode	-0.5 to +6.5	V
I _{IK}	Input Clamp Current V _I <0	-50	mA
I _{OK}	Output Clamp Current (V _O < 0 OR V _O > V _{CC})	±50	mA
I _O	Continuous Output Current (V _O = 0 to V _{CC})	±50	mA
I _{CC}	Continuous Current Through V _{CC}	100	mA
I _{GND}	Continuous Current Through GND	-100	mA
T _J	Operating Junction Temperature	-40 to +150	°C
T _{STG}	Storage Temperature	-65 to +150	°C

Notes:

- 7. Stresses beyond the absolute maximum may result in immediate failure or reduced reliability. These are stress values and device operation should be within recommended values.
- 8. 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 9)

Symbol	Parameter	Min	Max	Unit
V _{CC}	Operating Voltage	Operating	1.65	5.5
		Data Retention Only	1.5	—
V _I	Input Voltage	0	5.5	V
V _O	Output Voltage Active Mode	0	V _{CC}	V
	Output Voltage Power-Down Mode	0	5.5	
I _{OH}	High-Level Output Current	V _{CC} = 1.65V	—	mA
		V _{CC} = 2.3V	—	
		V _{CC} = 2.7V	—	
		V _{CC} = 3.0V	—	
		V _{CC} = 4.5V	—	
		V _{CC} = 1.65V	—	
I _{OL}	Low-Level Output Current	V _{CC} = 2.3V	—	mA
		V _{CC} = 2.7V	—	
		V _{CC} = 3.0V	—	
		V _{CC} = 4.5V	—	
		V _{CC} = 1.65V	—	
Δt/ΔV	Input Transition Rise or Fall Rate	V _{CC} = 1.65V to 2.7V	—	ns/V
		V _{CC} = 2.7V to 5.5V	—	
T _A	Operating Free-Air Temperature	-40	+125	°C

Note: 9. Unused inputs should be held at V_{CC} or Ground.

Electrical Characteristics (All typical values are at $T_A = +25^\circ\text{C}$)

Symbol	Parameter	Test Conditions	V_{CC}	-40°C to +85°C			-40°C to +125°C		Unit
				Min	Typ.	Max	Min	Max	
V_{IH}	High-Level Input Voltage	—	$V_{CC} = 1.65\text{V to } 1.95\text{V}$	$0.65 \times V_{CC}$	—	—	$0.65 \times V_{CC}$	—	V
			$V_{CC} = 2.3\text{V to } 2.7\text{V}$	1.7	—	—	1.7	—	
			$V_{CC} = 2.7\text{V to } 3.6\text{V}$	2.0	—	—	2.0	—	
			$V_{CC} = 4.5\text{V to } 5.5\text{V}$	$0.7 \times V_{CC}$	—	—	$0.7 \times V_{CC}$	—	
V_{IL}	Low-Level Input Voltage	—	$V_{CC} = 1.65\text{V to } 1.95\text{V}$	—	—	$0.35 \times V_{CC}$	—	$0.35 \times V_{CC}$	V
			$V_{CC} = 2.3\text{V to } 2.7\text{V}$	—	—	0.7	—	0.7	
			$V_{CC} = 2.7\text{V to } 3.6\text{V}$	—	—	0.8	—	0.8	
			$V_{CC} = 4.5\text{V to } 5.5\text{V}$	—	—	$0.3 \times V_{CC}$	—	$0.3 \times V_{CC}$	
V_{OH}	High-Level Output Voltage	$I_{OH} = -100\mu\text{A}$	1.65V to 5.5V	$V_{CC} - 0.1$	V_{CC}	—	$V_{CC} - 0.1$	—	V
		$I_{OH} = -4\text{mA}$	1.65V	1.2	1.53	—	0.95	—	
		$I_{OH} = -8\text{mA}$	2.3V	1.9	2.13	—	1.7	—	
		$I_{OH} = -12\text{mA}$	2.7	2.2	2.5	—	1.9	—	
		$I_{OH} = -16\text{mA}$	3V	2.4	2.7	—	2.2	—	
		$I_{OH} = -24\text{mA}$		2.3	2.6	—	2.0	—	
		$I_{OH} = -32\text{mA}$	4.5V	3.8	4.1	—	3.4	—	
V_{OL}	Low-Level Output Voltage	$I_{OL} = 100\mu\text{A}$	1.65V to 5.5V	—	0	0.1	—	0.1	V
		$I_{OL} = 4\text{mA}$	1.65V	—	0.08	0.45	—	0.7	
		$I_{OL} = 8\text{mA}$	2.3V	—	0.14	0.3	—	0.45	
		$I_{OL} = 12\text{mA}$	2.7V	—	0.19	0.4	—	0.6	
		$I_{OL} = 16\text{mA}$	3V	—	0.25	0.4	—	0.6	
		$I_{OL} = 24\text{mA}$		—	0.37	0.55	—	0.8	
		$I_{OL} = 32\text{mA}$	4.5V	—	0.43	0.55	—	0.8	
I_I	Input Current	$V_I = 5.5\text{V or GND}$	0V to 5.5V	—	± 0.1	± 5	—	± 20	μA
I_{OZ}	Z-State Leakage Current	$V_I = V_{IH}$ or V_{IL} $V_O = 5.5\text{V or GND}$	3.6V	—	± 0.1	± 10	—	± 20	μA
I_{OFF}	Power Down Leakage Current	V_I or $V_O = 5.5\text{V}$	0V	—	± 0.1	± 10	—	± 20	μA
I_{CC}	Supply Current	$V_I = 5.5\text{V or GND}$ $I_O=0\text{A}$	1.65V to 5.5V	—	0.1	10	—	40	μA
ΔI_{CC}	Additional Supply Current	One input at $V_{CC} - 0.6\text{V}$ Other inputs at V_{CC} or GND	2.3V to 5.5V	—	5	500	—	5,000	μA
C_I	Input Capacitance	$V_I = V_{CC}$ or GND	3.3V	—	2.5	—	—	—	pF

Operating Characteristics

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 output enabled	17	17	17	17	pF
		f = 10MHz output disabled	5	5	5	5	pF

Package Characteristics

Symbol	Parameter	Package	Test Conditions	Min	Typ.	Max	Unit
θ _{JA}	Thermal Resistance Junction-to-Ambient	X2-DFN2010-8	(Note 10)	—	313	—	°C/W
		X2-DFN1410-8		—	321	—	
		X2-DFN1210-8		—	395	—	
θ _{JC}	Thermal Resistance Junction-to-Case	X2-DFN2010-8	(Note 10)	—	145	—	°C/W
		X2-DFN1410-8		—	166	—	
		X2-DFN1210-8		—	236	—	

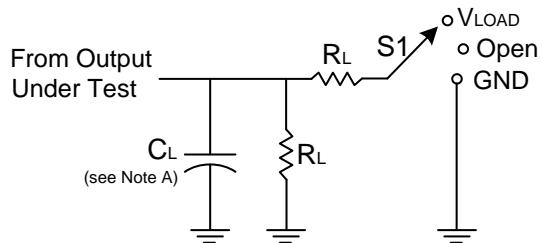
Note: 10. Test condition for each package type: Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

Switching Characteristics

Typical Values at T_A = +25°C and nominal voltages 1.8V, 2.5V, 2.7V, 3.3V, and 5.0V. See Figure 1.

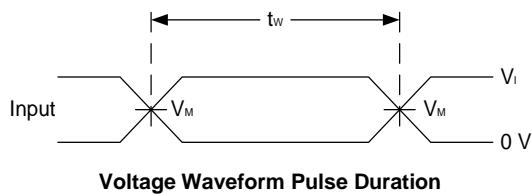
Parameter	From Input	To Output	V _{CC}	T _A = -40°C to +85°C			Unit		
				Min	Typ	Max			
t _{pd}	A	Y	1.8V ± 0.15V	1.0	3.7	9.1	1.0	11.4	ns
			2.5V ± 0.2V	0.5	2.5	4.8	0.5	6.0	
			2.7V	1.0	2.7	4.8	1.0	6.0	
			3.3V ± 0.3V	0.5	2.3	4.4	0.5	5.5	
			5.0V ± 0.5V	0.5	1.9	3.7	0.5	4.6	
t _{en}	OE	Y	1.8V ± 0.15V	1.5	4.3	9.9	1.5	12.4	ns
			2.5V ± 0.2V	1.0	2.8	5.6	1.0	7.0	
			2.7V	1.5	3.3	5.7	1.5	7.1	
			3.3V ± 0.3V	0.5	2.4	5.0	0.5	5.9	
			5.0V ± 0.5V	0.5	2.0	3.8	0.5	4.8	
t _{dis}	OE	Y	1.8V ± 0.15V	1.0	3.5	11.6	1.0	14.1	ns
			2.5V ± 0.2V	0.5	1.8	5.8	0.5	7.6	
			2.7V	1.0	2.7	4.8	1.0	6.2	
			3.3V ± 0.3V	1.0	2.7	4.6	1.0	5.9	
			5.0V ± 0.5V	0.5	1.8	3.4	0.5	4.6	

Parameter Measurement Information

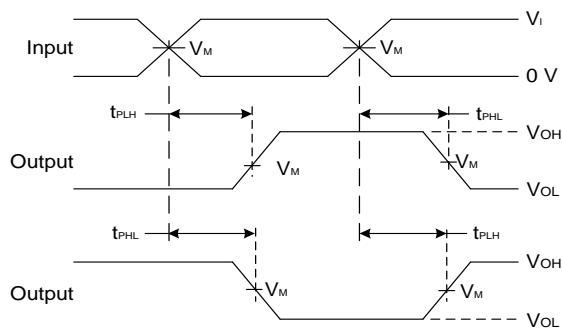


TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

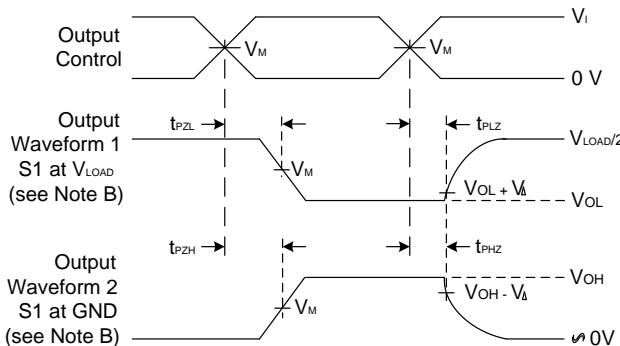
V _{CC}	Inputs		V _M	V _{LOAD}	C _L	R _L	V _Δ
	V _I	t _r /t _f					
1.8V±0.15V	V _{CC}	≤2ns	V _{CC} /2	2 × V _{CC}	30pF	1kΩ	0.15V
2.5V±0.2V	V _{CC}	≤2ns	V _{CC} /2	2 × V _{CC}	30pF	500Ω	0.15V
2.7V	2.7V	≤2.5ns	1.5V	6V	50pF	500Ω	0.3V
3.3V±0.3V	3V	≤2.5ns	1.5V	6V	50pF	500Ω	0.3V
5V±0.5V	V _{CC}	≤2.5ns	V _{CC} /2	2 × V _{CC}	50pF	500Ω	0.3V



Voltage Waveform Pulse Duration



Voltage Waveform Propagation Delay Times Inverting and Non Inverting Outputs

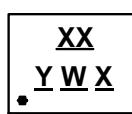


Voltage Waveform Enable and Disable Times Low and High Level Enabling

Figure 1. Load Circuit and V

Figure 1. Load Circuit and Voltage Waveforms

Marking Information

(Top View)

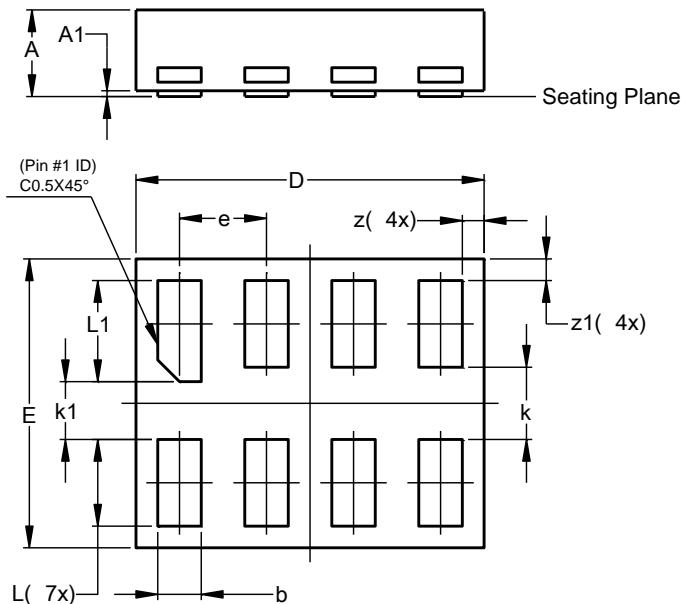
XX : Identification Code
Y : Year : 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week; z represents
52 and 53 week
X : Internal Code

Part Number	Package	Identification Code
74LVC2G125HD4-7	X2-DFN2010-8	9U
74LVC2G125HK3-7	X2-DFN1410-8	9V
74LVC2G125RA3-7	X2-DFN1210-8	9W

X2-DFN1210-8 Package Outline Dimensions

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

X2-DFN1210-8



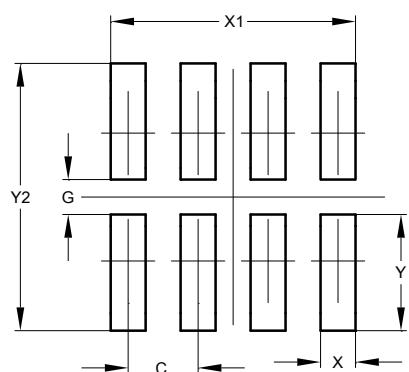
X2-DFN1210-8			
Dim	Min	Max	Typ
A	-	0.35	0.30
A1	0	0.03	0.02
b	0.10	0.20	0.15
D	1.15	1.25	1.20
E	0.95	1.05	1.00
e	-	-	0.30
k	-	-	0.25
k1	-	-	0.20
L	0.25	0.35	0.30
L1	0.30	0.40	0.35
z	0.050	0.100	0.075
z1	0.050	0.100	0.075

All Dimensions in mm

Suggested Pad Layout

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

X2-DFN1210-8

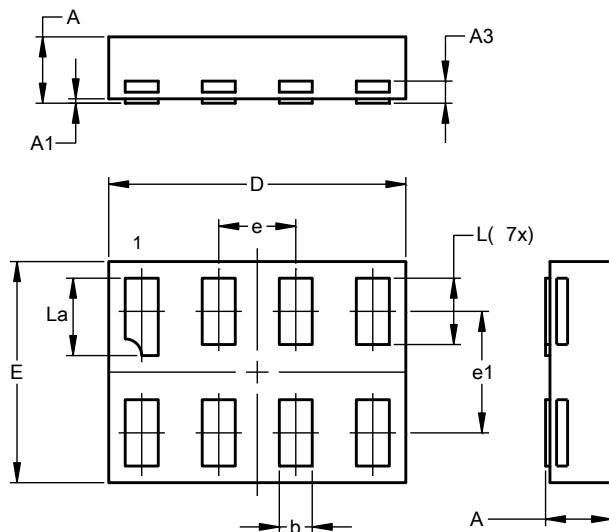


Dimensions	Value (in mm)
C	0.300
G	0.150
X	0.150
X1	1.050
Y	0.500
Y1	1.150

X2-DFN1410-8 Package Outline Dimensions

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

X2-DFN1410-8



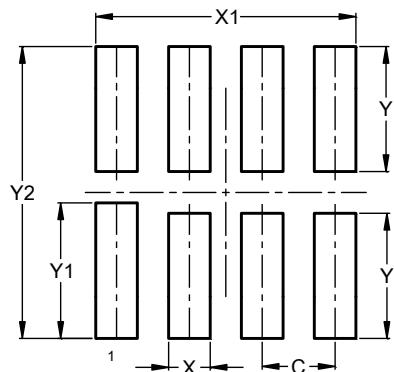
X2-DFN1410-8			
Dim	Min	Max	Typ
A	0.30	0.35	0.33
A1	0.00	0.03	0.02
A3	--	--	0.10
b	0.12	0.20	0.15
D	1.30	1.40	1.35
E	0.95	1.05	1.00
e	--	--	0.35
e1	--	--	0.55
L	0.27	0.35	0.30
L1	0.32	0.40	0.35

All Dimensions in mm

Suggested Pad Layout

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

X2-DFN1410-8

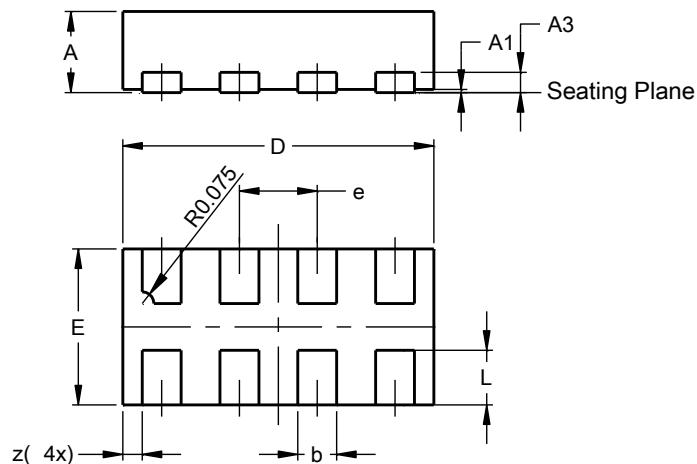


Dimensions	Value (in mm)
C	0.350
X	0.200
X1	1.250
Y	0.600
Y1	0.650
Y2	1.400

X2-DFN2010-8 Package Outline Dimensions

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

X2-DFN2010-8



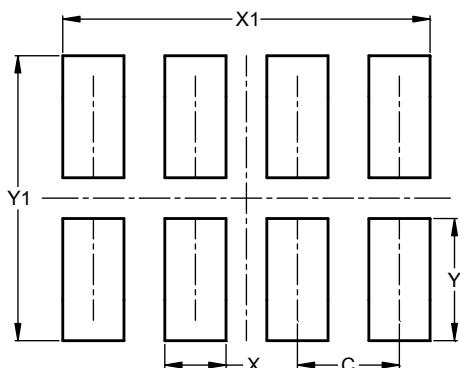
X2-DFN2010-8			
Dim	Min	Max	Typ
A	--	0.40	--
A1	0.00	0.05	0.02
A3	--	--	0.13
b	0.20	0.30	0.25
D	1.950	2.05	2.00
E	0.95	1.05	1.00
e	--	--	0.50
L	0.30	0.40	0.35
z	--	--	0.125

All Dimensions in mm

Suggested Pad Layout

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

X2-DFN2010-8



Dimensions	Value (in mm)
C	0.500
X	0.300
X1	1.800
Y	0.600
Y1	1.400

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