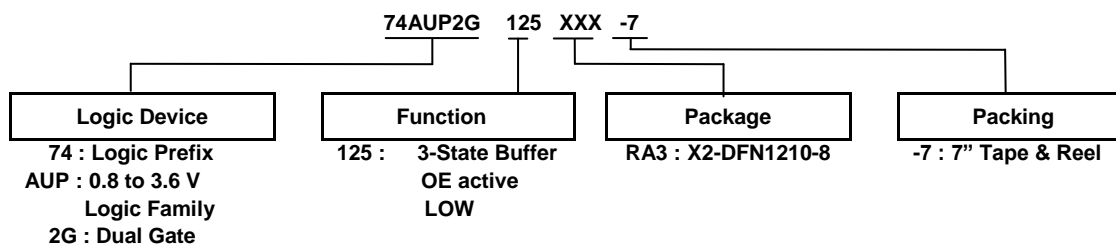


Ordering Information



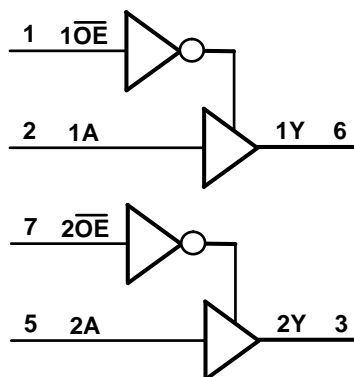
Device	Package Code	Package (Notes 4 & 5)	Package Size	7" Tape and Reel	
				Quantity	Part Number Suffix
74AUP2G125RA3-7	RA3	X2-DFN1210-8	1.2mm X 1.0 mm X 0.35mm 0.3 mm lead pitch	5,000/Tape & Reel	-7

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 NO.	Description
1 $\overline{\text{OE}}$	1	Output Enable active LOW
1A	2	Data Input
2Y	3	Data Output
GND	4	Ground
2A	5	Data Input
1Y	6	Data Output
2 $\overline{\text{OE}}$	7	Output Enable active LOW
V _{CC}	8	Supply Voltage

Logic Diagram



Function Table

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

Absolute Maximum Ratings (Notes 6 & 7)

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 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

- Notes:
- 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)

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	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	
Δt/ΔV	Input Transition Rise or Fall Rate	V _{CC} = 0.8V to 3.6V	—	200	ns/V
T _A	Operating Free-Air Temperature		-40	125	°C

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

Electrical Characteristics

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}	Low-Level Output 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} = 4mA		—	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 _{OZ}	Z-State Leakage Current	V _I or V _O = 0V to 3.6V	0 to 3.6V	—	0.2	—	± 0.5	μA
I _{OFF}	Power Down Leakage Current	V _I or V _O = 0V to 3.6V	0 V	—	± 0.2	—	± 0.5	μA
ΔI _{OFF}	Delta Power Down Leakage Current	V _I or V _O = 0V to 3.6V	0 V to 0.2V	—	0.2	—	0.6	μA
I _{CC}	Supply Current	V _I = GND or V _{CC} , I _O = 0	0.8 V to 3.6V	—	0.5	—	0.9	μA
ΔI _{CC}	Additional Supply Current	Data Input at V _{CC} - 0.6 V OE = GND I _O = 0 A	3.3V	—	40	—	50	μA
		OE Input at V _{CC} - 0.6 V Data Input = GND or V _{CC} I _O = 0 A	3.3V	—	110	—	120	μA
		OE Input at V _{CC} Data Input = GND to 3.6 V I _O = 0 A	0.8V to 3.6V	—	1	—	1	μA

Electrical Characteristics (cont.)

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} = -20μA	0.8V to 3.6V	V _{CC} - 0.11	—	V
		I _{OH} = -1.1mA	1.1V	0.6 X V _{CC}	—	
		I _{OH} = -1.7mA	1.4V	0.93	—	
		I _{OH} = -1.9mA	1.65V	1.17	—	
		I _{OH} = -2.3mA	2.3V	1.77	—	
		I _{OH} = -3.1mA		1.67	—	
		I _{OH} = -2.7mA	3V	2.40	—	
		I _{OH} = -4mA		2.30	—	
V _{OL}	Low-Level Output Voltage	I _{OL} = 20μA	0.8V to 3.6V	—	0.11	V
		I _{OL} = 1.1mA	1.1V	—	0.33 X V _{CC}	
		I _{OL} = 1.7mA	1.4V	—	0.41	
		I _{OL} = 1.9mA	1.65V	—	0.39	
		I _{OL} = 2.3mA	2.3V	—	0.36	
		I _{OL} = 3.1mA		—	0.50	
		I _{OL} = 2.7mA	3V	—	0.36	
		I _{OL} = 4mA		—	0.50	
I _I	Input Current	A or B Input, V _I = GND to 3.6V	0 to 3.6V	—	± 0.75	μA
I _{OZ}	Z-State Leakage Current	V _I or V _O = 0V to 3.6V	0 to 3.6V	—	± 1.5	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	Data Input at V _{CC} - 0.6 V OE = GND I _O = 0 A	3.3V	—	75	μA
		OE Input at V _{CC} - 0.6 V Data Input = GND or V _{CC} I _O = 0 A	3.3V	—	180	μA
		OE Input at V _{CC} Data Input = GND to 3.6 V I _O = 0 A	0.8V to 3.6V	—	1	μA

Operating and Package Characteristics (@T_A = +25°C, unless otherwise specified.)

Parameter		Test Conditions		V _{CC}	Typ	Unit
C _{pd}	Power Dissipation Capacitance per gate	f = 1MHz Output Enabled No Load		0.8V	6.5	pF
				1.2V ± 0.1V	6.3	
				1.5V ± 0.1V	6.3	
				1.8V ± 0.15V	6.2	
				2.5V ± 0.2V	6.2	
				3.3V ± 0.3V	6.1	
C _i	Input Capacitance	V _i = V _{CC} or GND		0V or 3.3V	1.5	pF
C _o	Output Capacitance	Output Enabled VO=Gnd		0 V	2.9	pF
		Output Disabled VO=Gnd or Vcc		0V or 3.6V	2.1	pF
θ _{JA}	Thermal Resistance Junction-to-Ambient	X2-DFN1210-8	(Note 9)	—	395	°C/W
θ _{JC}	Thermal Resistance Junction-to-Case	X2-DFN1210-8	(Note 9)	—	236	°C/W

Note: 9. Test condition, X2-DFN1210-8 device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

Switching Characteristics

 $C_L = 5\text{pF}$, See Figure 1

Parameter	From Input	To Output	V_{CC}	$T_A = +25^\circ\text{C}$			$T_A = -40^\circ\text{C to } +85^\circ\text{C}$		$T_A = -40^\circ\text{C to } +125^\circ\text{C}$		Unit
				Min	Typ	Max	Min	Max	Min	Max	
t_{pd}	A	Y	0.8V	—	20.6	—	—	—	—	—	ns
			$1.2\text{V} \pm 0.1\text{V}$	2.8	5.5	12.6	2.5	14.0	2.5	17	
			$1.5\text{V} \pm 0.1\text{V}$	2.2	3.9	7.3	2.0	7.5	2.0	8.1	
			$1.8\text{V} \pm 0.15\text{V}$	1.9	3.2	4.8	1.7	6.1	1.7	6.7	
			$2.5\text{V} \pm 0.2\text{V}$	1.6	2.6	3.6	1.4	4.3	1.4	4.9	
			$3.3\text{V} \pm 0.3\text{V}$	1.4	2.4	3.1	1.2	3.9	1.2	4.4	
t_{en}	$\overline{\text{OE}}$	Y	0.8V	—	69.9	—	—	—	—	—	ns
			$1.2\text{V} \pm 0.1\text{V}$	3.1	6.1	14.2	2.9	20	2.9	22.2	
			$1.5\text{V} \pm 0.1\text{V}$	2.5	4.2	7.9	2.3	9.2	2.3	10.0	
			$1.8\text{V} \pm 0.15\text{V}$	2.1	3.4	6.1	2.0	7.4	2.0	8.2	
			$2.5\text{V} \pm 0.2\text{V}$	1.8	2.6	4.4	1.7	5.4	1.7	6.0	
			$3.3\text{V} \pm 0.3\text{V}$	1.7	2.4	4.0	1.7	4.6	1.7	5.1	
t_{dis}	$\overline{\text{OE}}$	Y	0.8V	—	14.3	—	—	—	—	—	ns
			$1.2\text{V} \pm 0.1\text{V}$	2.7	4.3	9.4	2.7	10.6	2.7	11.8	
			$1.5\text{V} \pm 0.1\text{V}$	2.1	3.2	6.4	2.1	7.3	2.1	8.2	
			$1.8\text{V} \pm 0.15\text{V}$	2.0	3.0	5.5	2.0	6.3	2.0	7.1	
			$2.5\text{V} \pm 0.2\text{V}$	1.4	2.2	3.7	1.4	4.2	1.4	5.1	
			$3.3\text{V} \pm 0.3\text{V}$	1.7	2.5	4.4	1.7	4.6	1.7	5.4	

 $C_L = 10\text{pF}$, See Figure 1

Parameter	From Input	To Output	V_{CC}	$T_A = +25^\circ\text{C}$			$T_A = -40^\circ\text{C to } +85^\circ\text{C}$		$T_A = -40^\circ\text{C to } +125^\circ\text{C}$		Unit
				Min	Typ	Max	Min	Max	Min	Max	
t_{pd}	A	Y	0.8V	—	24.0	—	—	—	—	—	ns
			$1.2\text{V} \pm 0.1\text{V}$	3.2	6.4	14.8	3.0	16.6	3.0	18.2	
			$1.5\text{V} \pm 0.1\text{V}$	2.1	4.5	8.8	1.9	9.1	1.9	9.4	
			$1.8\text{V} \pm 0.15\text{V}$	1.9	3.8	5.5	1.7	6.8	1.7	7.6	
			$2.5\text{V} \pm 0.2\text{V}$	2.1	3.2	4.2	1.6	5.3	1.6	5.9	
			$3.3\text{V} \pm 0.3\text{V}$	1.8	3.0	3.8	1.6	4.6	1.6	5.2	
t_{en}	$\overline{\text{OE}}$	Y	0.8V	—	73.7	—	—	—	—	—	ns
			$1.2\text{V} \pm 0.1\text{V}$	3.6	6.9	16.2	3.4	22.8	3.4	25.2	
			$1.5\text{V} \pm 0.1\text{V}$	2.3	4.8	9.2	2.2	10.3	2.2	11.3	
			$1.8\text{V} \pm 0.15\text{V}$	2.0	3.9	7.0	1.9	8.2	1.9	8.9	
			$2.5\text{V} \pm 0.2\text{V}$	1.8	3.2	5.2	1.7	6.4	1.7	7.1	
			$3.3\text{V} \pm 0.3\text{V}$	1.7	3.0	5.1	1.7	5.6	1.7	6.2	
t_{dis}	$\overline{\text{OE}}$	Y	0.8V	—	32.7	—	—	—	—	—	ns
			$1.2\text{V} \pm 0.1\text{V}$	3.4	5.4	11.4	3.4	12.7	3.4	14.3	
			$1.5\text{V} \pm 0.1\text{V}$	2.2	4.1	7.9	2.2	8.9	2.2	10.2	
			$1.8\text{V} \pm 0.15\text{V}$	2.2	4.2	7.0	1.9	8.0	1.9	8.9	
			$2.5\text{V} \pm 0.2\text{V}$	1.7	3.0	4.8	1.7	5.7	1.7	6.4	
			$3.3\text{V} \pm 0.3\text{V}$	2.1	3.8	6.5	1.7	6.8	1.7	7.7	

Switching Characteristics (cont.)

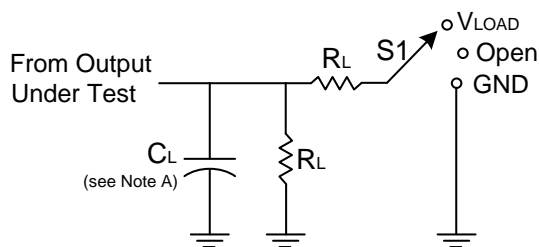
 $C_L = 15\text{pF}$, See Figure 1

Parameter	From Input	To Output	V _{CC}	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	Y	0.8V	—	27.4	—	—	—	—	—	ns
			1.2V ± 0.1V	3.6	7.2	15.8	3.3	22.4	3.3	22.5	
			1.5V ± 0.1V	3.0	5.1	8.8	2.5	9.8	2.5	10.9	
			1.8V ± 0.15V	2.2	4.3	6.3	2.0	7.9	2.0	8.8	
			2.5V ± 0.2V	2.0	3.7	4.9	1.8	6.0	1.8	6.7	
			3.3V ± 0.3V	2.0	3.5	4.4	1.8	5.4	1.8	6.1	
t _{en}	OE	Y	0.8V	—	77.5	—	—	—	—	—	ns
			1.2V ± 0.1V	4.0	7.7	18.2	3.7	21.8	3.7	23.5	
			1.5V ± 0.1V	3.0	5.3	10.1	2.5	11.8	2.5	12.8	
			1.8V ± 0.15V	2.3	4.4	7.8	2.1	9.2	2.1	10.2	
			2.5V ± 0.2V	2.1	3.6	6.0	2.0	7.3	2.0	8.2	
			3.3V ± 0.3V	2.0	3.5	5.7	1.9	6.4	1.9	7.2	
t _{dis}	OE	Y	0.8V	—	60.8	—	—	—	—	—	ns
			1.2V ± 0.1V	4.3	6.5	13.9	3.7	15.5	3.7	15.7	
			1.5V ± 0.1V	3.0	5.0	8.8	2.5	9.7	2.5	9.8	
			1.8V ± 0.15V	3.0	5.3	8.8	2.1	10.3	2.1	10.5	
			2.5V ± 0.2V	2.1	3.8	8.2	2.0	8.4	2.0	8.6	
			3.3V ± 0.3V	2.9	5.0	8.6	1.9	9.2	1.9	9.4	

 $C_L = 30\text{pF}$, See Figure 1

Parameter	From Input	To Output	V _{CC}	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	Y	0.8V	—	37.4	—	—	—	—	—	ns
			1.2V ± 0.1V	4.8	9.5	21	4.4	24.9	4.4	25	
			1.5V ± 0.1V	4.0	6.7	10.8	3.0	13.0	3.0	14.5	
			1.8V ± 0.15V	2.9	5.6	8.4	2.6	10.3	2.6	11.5	
			2.5V ± 0.2V	2.7	4.8	6.3	2.5	7.8	2.5	8.7	
			3.3V ± 0.3V	2.7	4.6	6	2.5	7.5	2.5	8.3	
t _{en}	OE	Y	0.8V	—	88.9	—	—	—	—	—	ns
			1.2V ± 0.1V	5.2	9.9	23.8	4.8	27.4	4.8	30.4	
			1.5V ± 0.1V	4.0	6.8	13.0	3.1	15.1	3.1	16.9	
			1.8V ± 0.15V	3.0	5.6	10.2	2.8	12.2	2.8	13.6	
			2.5V ± 0.2V	2.7	4.8	7.8	2.6	9.4	2.6	10.6	
			3.3V ± 0.3V	2.7	4.6	7.8	2.6	9.0	2.6	10.0	
t _{dis}	OE	Y	0.8V	—	49.9	—	—	—	—	—	ns
			1.2V ± 0.1V	6.0	9.9	16.0	4.8	17.8	4.8	19.8	
			1.5V ± 0.1V	4.4	7.7	11.5	3.1	13.0	3.1	14.5	
			1.8V ± 0.15V	5.1	8.7	13.3	2.8	14.9	2.8	16.6	
			2.5V ± 0.2V	3.6	6.2	9.1	2.6	10.3	2.6	11.5	
			3.3V ± 0.3V	5.2	8.7	13.7	2.6	14.0	2.6	17.0	

Parameter Measurement Information



TEST	S1	R_L
t_{PLH}/t_{PHL}	Open	1M Ω
t_{PLZ}/t_{PZL}	Vload	5K Ω
t_{PHZ}/t_{PZH}	GND	5K Ω

V_{CC}	Inputs		V_M	V_{LOAD}	C_L	V_{Δ}
	V_I	t_r/t_f				
0.8V	V_{CC}	$\leq 3ns$	$V_{CC}/2$	$2 \times V_{CC}$	5, 10, 15, 30pF	0.1 V
1.2V $\pm 0.1V$	V_{CC}	$\leq 3ns$	$V_{CC}/2$	$2 \times V_{CC}$	5, 10, 15, 30pF	0.1 V
1.5V $\pm 0.1V$	V_{CC}	$\leq 3ns$	$V_{CC}/2$	$2 \times V_{CC}$	5, 10, 15, 30pF	0.1 V
1.8V $\pm 0.15V$	V_{CC}	$\leq 3ns$	$V_{CC}/2$	$2 \times V_{CC}$	5, 10, 15, 30pF	0.15 V
2.5V $\pm 0.2V$	V_{CC}	$\leq 3ns$	$V_{CC}/2$	$2 \times V_{CC}$	5, 10, 15, 30pF	0.15 V
3.3V $\pm 0.3V$	V_{CC}	$\leq 3ns$	$V_{CC}/2$	$2 \times V_{CC}$	5, 10, 15, 30pF	0.3V

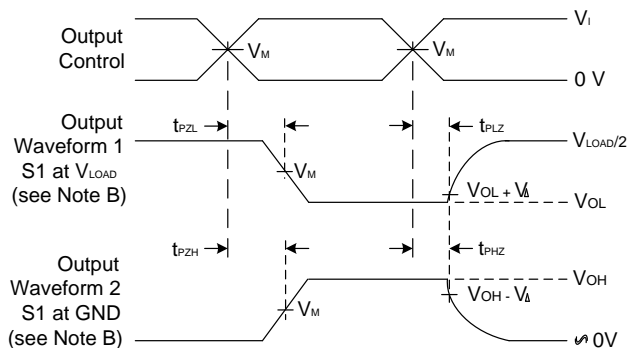
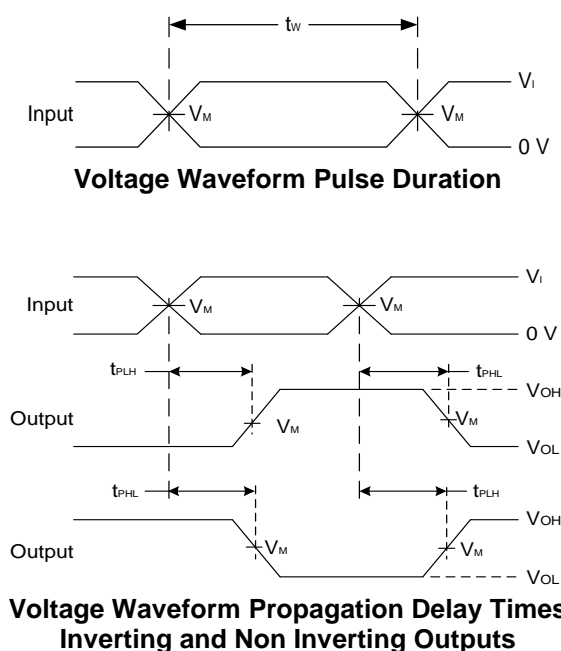


Figure 1 Load Circuit and Voltage Waveforms

- 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_{PLZ} and t_{PHZ} are the same as t_{dis} .
 - E. t_{PZL} and t_{PZH} are the same as t_{EN} .
 - F. t_{PLH} and t_{PHL} are the same as t_{PD} .

Marking Information

X2-DFN1210-8

(Top View)

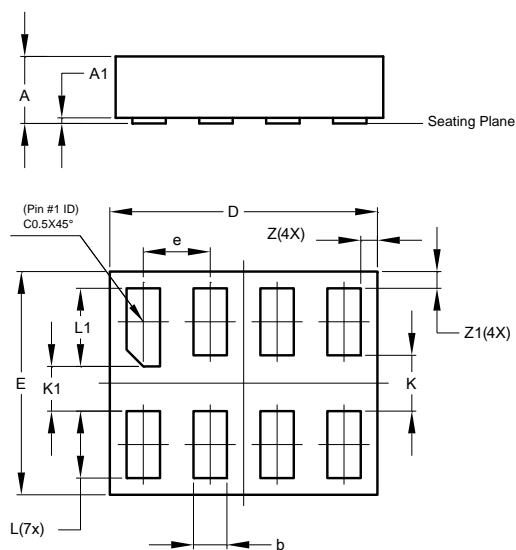
XX	Y	W	X
----	---	---	---

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 : week : A~Z : Internal code

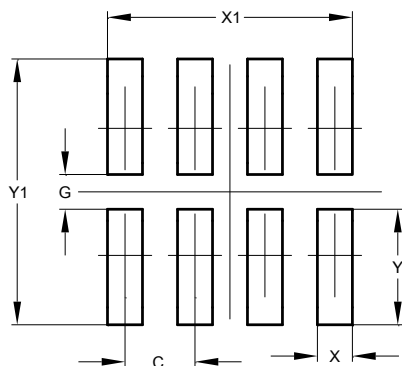
Part Number	Package	Identification Code
74AUP2G125RA3-7	X2-DFN1210-8	JT

X2-DFN1210-8 Package Outline Dimensions and Suggested Pad Layout

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



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			



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

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