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74AUP2G07

DUAL BUFFERS WITH OPEN DRAIN OUTPUTS

Description

The Advanced Ultra Low Power (AUP) CMOS logic family is designed for low power and extended battery life in portable applications.

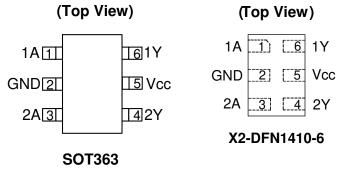
The 74AUP2G07 is composed of two buffers with open drain outputs designed for operation over a power supply range of 0.8V to 3.6V. The device is fully specified for partial power down applications using $l_{\rm OFF}$. The $l_{\rm OFF}$ circuitry disables the output preventing damaging current backflow when the device is powered down. The gates perform the positive Boolean function:

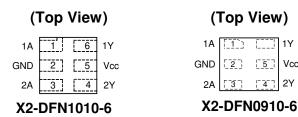
 $\boldsymbol{Y}=\boldsymbol{A}$

Features

- Advanced Ultra Low Power (AUP) CMOS
- Supply Voltage Range from 0.8V to 3.6V
- -4mA Output Drive at 3.0V
- Low Static Power Consumption
- I_{CC} < 0.9μA
- Low Dynamic Power Consumption
- C_{PD} = 1.2pF Typical at 3.6V
- Schmitt Trigger Action at All Inputs Make the Circuit Tolerant for Slower Input Rise and Fall Time. The Hysteresis is Typically 250mV at V_{CC} = 3.0V
- I_{OFF} Supports Partial-Power-Down Mode Operation
- ESD Protection per JESD 22
 - Exceeds 200-V Machine Model (A115)
 - Exceeds 2000-V Human Body Model (A114)
 - Exceeds 1000-V Charged Device Model (C101)
- Latch-Up Exceeds 100mA per JESD 78, Class I
- Leadless Packages per JESD30E
 - DFN1410 denoted as X2-DFN1410-6
 - DFN1010 denoted as X2-DFN1010-6
 - DFN0910 denoted as X2-DFN0910-6
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

Pin Assignments





Applications

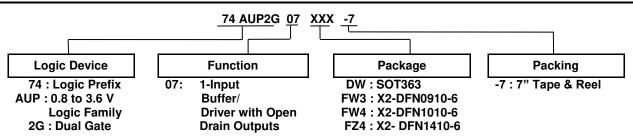
- Suited for Battery and Low Power Needs
- Wide array of products such as:
 - PCs, Networking, Notebooks, Netbooks, PDAs
 - Tablet Computers, E-readers
 - Computer Peripherals, Hard Drives, CD/DVD ROM
 - TV, DVD, DVR, Set-Top Box
 - Cell Phones, Personal Navigation / GPS
 - MP3 players, Cameras, Video 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/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



Part Number	Package	Package	Package	7" Tape and Reel		
Part Number	Code	(Notes 4 & 5)	Size	Quantity	Part Number Suffix	
74AUP2G07DW-7	DW	SOT363	2.0mm X 2.0mm X 1.1mm 0.65 mm lead pitch	3000/Tape & Reel	-7	
74AUP2G07FW3-7	FW3	X2-DFN0910-6	0.9mm X 1.0mm X 0.35mm 0.35 mm pad pitch	5000/Tape & Reel	-7	
74AUP2G07FW4-7	FW4	X2-DFN1010-6	1.0mm X 1.0mm X 0.4mm 0.35 mm pad pitch	5000/Tape & Reel	-7	
74AUP2G07FZ4-7	FZ4	X2-DFN1410-6	1.4mm X 1.0mm X 0.4mm 0.5 mm pad pitch	5000/Tape & Reel	-7	

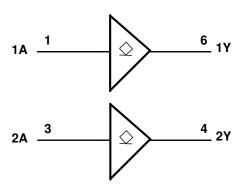
Notes:

- 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 NO	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
nA	nΥ
Н	Z
L	L



Absolute Maximum Ratings (Notes 6 & 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 +4.6	V
V_{I}	Input Voltage Range	-0.5 to +4.6	V
Vo	Voltage applied to Output in High or Low State	-0.5 to +4.6	V
I _{IK}	Input Clamp Current V _I < 0	-50	mA
I _{OK}	Output Clamp Current (V _O < 0)	-50	mA
Io	Continuous Output Current (V _O = 0 to V _{CC})	±20	mA
Icc	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:

Recommended Operating Conditions (Note 8) (@T_A = +25°C, unless otherwise specified.)

Symbol	Pa	rameter	Min	Max	Unit	
V _{CC}	Operating Voltage	_	0.8	3.6	V	
VI	Input Voltage		0	3.6	V	
Vo	Output Voltage		0	3.6	V	
		$V_{CC} = 0.8V$	_	20	μΑ	
	Lavel and Ortant Correct	V _{CC} = 1.1V	_	1.1		
		V _{CC} = 1.4V	_	1.7		
loL	Low-Level Output Current	V _{CC} = 1.65V	_	1.9	mA	
		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.

^{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.



Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Symbol	Parameter	Test Conditions	Vcc	T _A = -	+25°C	T _A = -40	to +85°C	Unit
Syllibol	raiailletei	rest Conditions	V CC	Min	Max	Min	Max	Onit
		_	0.8V to 1.65V	0.80 X V _{CC}	_	0.80 X V _{CC}	_	
V _{IH}	High-Level Input	_	1.65V to 1.95V	0.65 X V _{CC}	_	0.65 X V _{CC}	_	٧
VIH	Voltage	_	2.3V to 2.7V	1.6	_	1.6	_	V
		_	3.0V to 3.6V	2.0	_	2.0	_	
		_	0.8V to 1.65V	_	0.30 X V _{CC}	_	0.30 X V _{CC}	
VIL	Low-Level Input	_	1.65V to 1.95V	_	0.35 X V _{CC}	_	0.35 X V _{CC}	V
V IL	voltage	_	2.3V to 2.7V	_	0.7	_	0.7	V
		_	3.0V to 3.6V	_	0.9	_	0.9	
		$I_{OL} = 20\mu A$	0.8V to 3.6V	_	0.1	_	0.1	
		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	
.,	Low-Level Output	I _{OL} = 1.9mA	1.65V	_	0.31	_	0.35	V
V_{OL}	Voltage	I _{OL} = 2.3mA	0.01/	_	0.31	_	0.33	V
		I _{OL} = 3.1mA	2.3V	_	0.44	_	0.45	
		I _{OL} = 2.7mA	01/	_	0.31	_	0.33	
		I _{OL} = 4mA	3V	_	0.44	_	0.45	
l _l	Input Current	A or B Input, $V_I = GND$ to 3.6V	0V to 3.6V	_	±0.1	_	±0.5	μA
I _{OZ}	Z State Leakage Current	$V_O = 3.6V, V_i = 3.6V$	3.6V	_	±0.1	_	±0.5	μΑ
l _{OFF}	Power Down Leakage Current	V_I or $V_O = 0V$ to 3.6V	0V	_	±0.2	_	±0.6	μΑ
ΔI _{OFF}	Delta Power Down Leakage Current	V_I or $V_O = 0V$ to 3.6V	0V to 0.2V	_	±0.2	_	±0.6	μΑ
Icc	Supply Current	$V_I = GND \text{ or } V_{CC}, I_O = 0$	0.8V to 3.6V	_	0.5	_	0.9	μΑ
Δlcc	Additional Supply Current	One input at V _{CC} -0.6V Other inputs at V _{CC} or GND	3.3V	_	40	_	50	μΑ



Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Symbol	Parameter	Test Conditions	V	T _A = -40°C	to +125°C	Unit
Symbol	Faranietei	rest Conditions	V _{CC}	Min	Max	Oilit
		_	0.8V to 1.65V	0.80 X V _{CC}	_	
V _{IH}	High-Level Input Voltage	_	1.65V to 1.95V	0.70 X V _{CC}	_	V
VIH	Tright-Level input voltage	_	2.3V to 2.7V	1.6	_	V
		_	3.0V to 3.6V	2.0	_	
		_	0.8V to 1.65V	_	0.25 X V _{CC}	
VIL	Low-Level Input voltage	_	1.65V to 1.95V	_	0.30 X V _{CC}	V
VIL	Low-Level Input voltage	_	2.3V to 2.7V	_	0.7	V
		_	3.0V to 3.6V	_	0.9	
		$I_{OL} = 20\mu A$	0.8V to 3.6V	_	0.11	
	V Love Love LO dove Vellore	$I_{OL} = 1.1 mA$	1.1V	_	0.33 X V _{CC}	
		$I_{OL} = 1.7 \text{mA}$	1.4V	_	- 0.41	
.,		$I_{OL} = 1.9 mA$	1.65V	_	0.39	V
V _{OL}	Low-Level Output Voltage	$I_{OL} = 2.3 \text{mA}$	0.01/	_	0.36	V
		I _{OL} = 3.1mA	2.3V	_	0.50	
		$I_{OL} = 2.7 \text{mA}$	0)/	_	0.36	
		I _{OL} = 4mA	3V	_	0.50	
II	Input Current	A or B Input, V _I = GND to 3.6V	0V to 3.6V	_	± 0.75	μΑ
loz	Z State Leakage Current	V _O = 3.6V, V _i = 3.6V	3.6V	_	± 0.75	μΑ
I _{OFF}	Power Down Leakage Current	V_I or $V_O = 0V$ to 3.6V	0V	_	± 0.75	μA
ΔI _{OFF}	Delta Power Down Leakage Current	V_1 or $V_0 = 0V$ to 3.6V	0V to 0.2V	_	± 2.5	μΑ
Icc	Supply Current	$V_I = GND \text{ or } V_{CC}, I_O = 0$	0.8V to 3.6V	_	1.4	μA
ΔI _{CC}	Additional Supply Current	Input at V _{CC} -0.6V Other inputs at V _{CC} or GND	3.3V	_	75	μΑ

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

	Parameter	Test Conditions	V _{CC}	Тур	Unit
			V8.0	0.5	
			1.2V ± 0.1V	0.6	
_	Power Dissipation Capacitance	f = 1MHz	1.5V ± 0.1V	0.7	pF
$C_{\sf pd}$	Power Dissipation Capacitance	No Load	1.8V ± 0.15V	0.7	ρг
			2.5V ± 0.2V	1.0	İ
			$3.3V \pm 0.3V$	1.2	
CI	Input Capacitance	V _I = V _{CC} or GND	0V or 3.3V	2.0	pF
Co	Output Capacitance	$V_O = V_{CC}$ or GND	0V	2.0	pF



Switching Characteristics

 $C_L = 5pF$ see Figure 1

Parameter	From Input	TO OUTPUT	V	T _A = +25°C			T _A = -40°C to +85°C		T _A = -40°C to +125°C		Unit
			V _{CC}	Min	Тур	Max	Min	Max	Min	Max	Oilit
			0.8V	_	12.8	_	_	_	_	_	
			1.2V ± 0.1V	2.6	5.8	11.3	2.3	12.5	2.3	15.9	
	Α	V	1.5V ± 0.1V	1.8	3.6	6.4	1.6	7.4	1.6	8.2	no
t _{pd}	A	-	1.8V ± 0.15V	1.5	2.9	5	1.4	5.9	1.4	6.5	ns
			2.5V ± 0.2V	1.2	2.4	3.9	1.1	4.5	1.1	5	
			$3.3V \pm 0.3V$	0.9	3	3.5	0.8	3.9	0.8	4.3	

C_L = 10pF see Figure 1

Parameter	From	TO OUTPUT	V	T _A = +25°C			T _A = -40°C to +85°C		$T_A = -40^{\circ}C \text{ to } +125^{\circ}C$		Unit
Farameter Ir	Input		Vcc	Min	Тур	Max	Min	Max	Min	Max	Uiiit
			V8.0	_	14.5	_		_	_	_	
			1.2V ± 0.1V	3.1	7	13.4	2.9	15.1	2.9	19.2	- ns
	Α		1.5V ± 0.1V	2.3	4.8	7.5	2.1	8.7	2.1	10.5	
t _{pd} A	^	,	1.8V ± 0.15V	2	3.8	4.8	1.8	7	1.8	7.7	
			2.5V ± 0.2V	1.6	3.1	4.6	1.5	5.4	1.5	6	
			$3.3V \pm 0.3V$	1.2	4.3	4.9	1.1	5.4	1.1	5.9	

C_L = 15pF see Figure 1

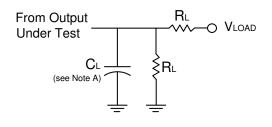
Parameter	From	TO OUTPUT	V	T _A = +25°C			$T_A = -40^{\circ}C \text{ to } +85^{\circ}C$		$T_A = -40^{\circ}C \text{ to } +125^{\circ}C$		Unit
In	Input		V _{CC}	Min	Тур	Max	Min	Max	Min	Max	Oilit
			V8.0	_	16.2	_	_	_	_	_	
		Y	1.2V ± 0.1V	3.5	8.2	14.3	3.3	17.4	3.3	22.5	- ns
	_		1.5V ± 0.1V	2.6	6.2	8.6	2.4	10.5	2.4	13.7	
t _{pd}	Α		1.8V ± 0.15V	2.3	5	6.7	2.1	8	2.1	9.8	
			2.5V ± 0.2V	2.1	3.9	5.1	1.8	6.1	1.8	6.8	
			3.3V ± 0.3V	1.6	5.6	6.4	1.4	7.1	1.4	7.8	

 $C_L = 30pF$ see Figure 1

Parameter	From Input	TO OUTPUT	Vcc	T _A = +25°C			T _A = -40°C to +85°C		T _A = -40°C to +125°C		Unit
raiailletei			A CC	Min	TYP	Min	Min	Max	Min	Max	Oilit
			V8.0	_	19.8	_	_	_	_		
			1.2V ± 0.1V	4.8	9.8	18.4	4.4	18.4	4.4	25.8	- ns
	Α	V	1.5V ± 0.1V	3.6	8.2	13.9	3.2	13.9	3.2	18	
t _{pd}	^	'	1.8V ± 0.15V	3.2	7.8	12.2	2.9	12.2	2.9	15.2	
			2.5V ± 0.2V	2.4	7.5	9.9	2.6	9.9	2.6	11.4	
			$3.3V \pm 0.3V$	1.8	9.2	10.6	2.1	11.6	2.1	12.8	

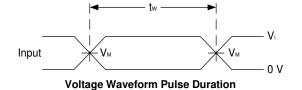


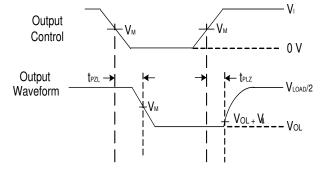
Parameter Measurement Information



TEST	Condition
t _{PLZ} (See Notes D & E) t _{PZL} (See Notes D & F)	Vload Vload
tPZL(See Notes D & 1)	Vioda

V	Inp	uts	V		V			
V _{CC}	VI	t _r /t _f	V _M	V _{LOAD}	C∟	R_L	V Δ	
0.8V	Vcc	≤3ns	V _{CC} /2	2 X V _{CC}	5, 10, 15, 30pF	5 kΩ	0.1V	
1.2V±0.1V	V _{CC}	≤3ns	V _{CC} /2	2 X V _{CC}	5, 10, 15, 30pF	5 kΩ	0.1V	
1.5V±0.1V	V _{CC}	≤3ns	V _{CC} /2	2 X V _{CC}	5, 10, 15, 30pF	5 kΩ	0.15V	
1.8V±0.15V	Vcc	≤3ns	V _{CC} /2	2 X V _{CC}	5, 10, 15, 30pF	5 kΩ	0.15V	
2.5V±0.2V	Vcc	≤3ns	V _{CC} /2	2 X V _{CC}	5, 10, 15, 30pF	5 kΩ	0.15V	
3.3V±0.3V	V _{CC}	≤3ns	V _{CC} /2	2 X V _{CC}	5, 10, 15, 30pF	5 kΩ	0.3V	





Voltage Waveform Propagation Delay Times

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. The inputs are measured one at a time with one transition per measurement.
- D. For the open drain device t_{PLZ} and t_{PZL} are the same as t_{PD}.
- E. t_{PZL} is measured at V_M.
- D. t_{PLZ} is measured at V_{OL} + V_{Δ} .



Marking Information

(1) SOT363

5

2

XX: Identification code Y: Year 0~9

XX Y W X

W : Week : A~Z : 1~26 week; a~z : 27~52 week; z represents

52 and 53 week

 \underline{X} : A~Z: Internal Code

Part Number	Package	Identification Code
74AUP2G07DW-7	SOT363	SP

(2) X2-DFN1410-6, X2-DFN1010-6, X2-DFN0910-6

(Top View)

 $\frac{XX}{Y}$: Identification Code $\frac{X}{Y}$: Year : 0~9

<u>W</u>: Week: A~Z: 1~26 week; a~z: 27~52 week; z represents

52 and 53 week

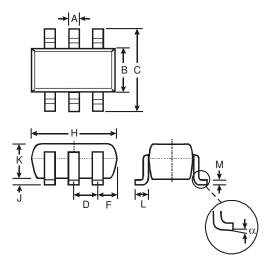
X: A~Z: Internal code

Part Number	Package	Identification Code
74AUP2G07FZ4	X2-DFN1410-6	RP
74AUP2G07FW4	X2-DFN1010-6	SP
74AUP2G07FW3	X2-DFN0910-6	MP

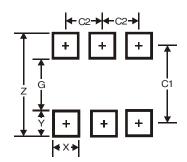


SOT363 Package Outline Dimensions and Suggested Pad Layout

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



	SOT363				
Dim	Min	Max	Тур		
Α	0.10	0.30	0.25		
В	1.15	1.35	1.30		
С	2.00	2.20	2.10		
D		0.65 Ty	þ		
F	0.40	0.45	0.425		
Н	1.80	2.20	2.15		
J	0	0.10	0.05		
Κ	0.90	1.00	1.00		
L	0.25	0.40	0.30		
М	0.10	0.22	0.11		
α	0°	8°	-		
All Dimensions in mm					

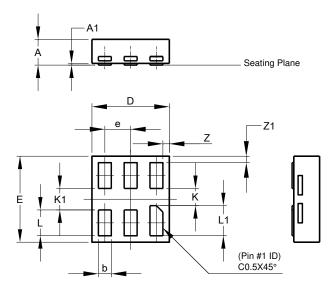


Dimensions	Value	
Dimensions	(in mm)	
Z	2.5	
G	1.3	
Х	0.42	
Υ	0.6	
C1	1.9	
C2	0.65	

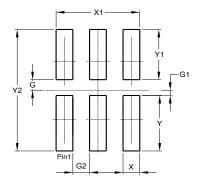


X2-DFN0910-6 Package Outline Dimensions and Suggested Pad Layout

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



X2-DFN0910-6					
Dim	Min	Max	Тур		
Α	-	0.35	0.30		
A 1	0	0.03	0.02		
b	0.10	0.20	0.15		
D	0.85	0.95	0.90		
Е	0.95	1.05	1.00		
е	-	-	0.30		
K	0.20	-	-		
K1	0.25	-	-		
L	0.25	0.35	0.30		
L1	0.30	0.40	0.35		
Z	-	-	0.075		
Z 1	-	-	0.075		
All Dimensions in mm					

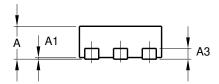


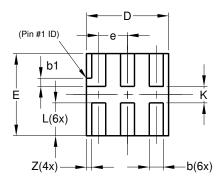
Dimensions	Value (in mm)
G	0.100
G1	0.050
G2	0.150
X	0.150
X1	0.750
Υ	0.525
Y1	0.475
Y2	1.150



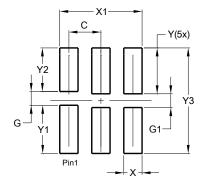
X2-DFN1010-6 Package Outline Dimensions and Suggested Pad Layout

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





	X2-DFN1010-6				
Dim	Min	Max	Тур		
Α		0.40	0.39		
A1	0.00	0.05	0.02		
А3	_	_	0.13		
b	0.14	0.20	0.17		
b1	0.05	0.15	0.10		
D	0.95	1.05	1.00		
Е	0.95	1.05	1.00		
е	_	_	0.35		
L	0.35	0.45	0.40		
K	0.15		_		
Z			0.065		
All Dimensions in mm					

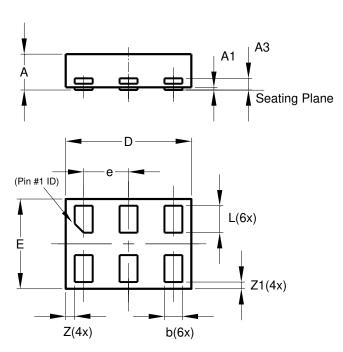


Dimensions	Value (in mm)
С	0.350
G	0.150
G1	0.150
Х	0.200
X1	0.900
Υ	0.500
Y1	0.525
Y2	0.475
Y3	1.150

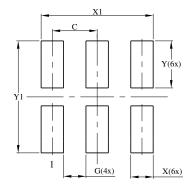


X2-DFN1410-6 Package Outline Dimensions and Suggested Pad Layout

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



	X2-DFN1410-6				
Dim	Min	Max	Тур		
Α		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		
Е	0.95	1.05	1.00		
е			0.50		
L	0.25	0.35	0.30		
Z			0.10		
Z1	0.045	0.105	0.075		
All Dimensions in mm					



Dimensions	Value
	(in mm)
С	0.500
G	0.250
X	0.250
X1	1.250
Y	0.525
Y1	1.250



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