

Product Specification

XBLW LM2901

Quadruple Comparator

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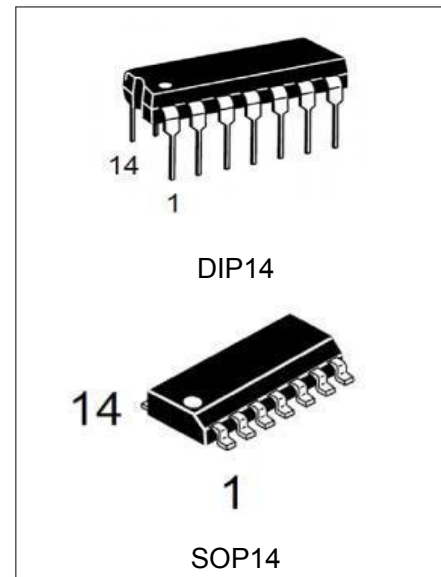


Description

The LM2901 is a four-comparator integrated circuit designed for level detection and low level detection in consumer and industrial electronics. Adopt DIP14, SOP14 package form.

Features

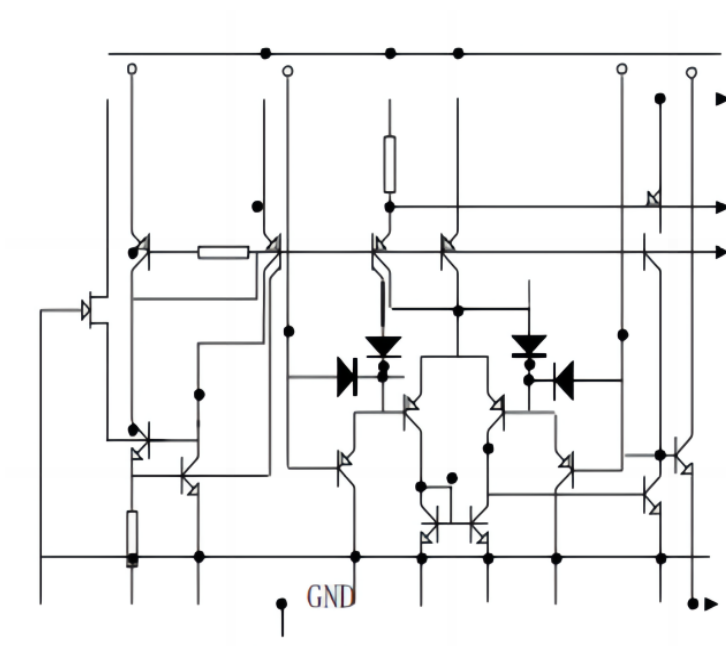
- Single or dual power supply operation
- Low input bias current: 25nA (typical)
- Low input offset current: $\pm 5.0\text{nA}$ (typical)
- Output saturation voltage: 130mV
- Compatible with TTL and CMOS



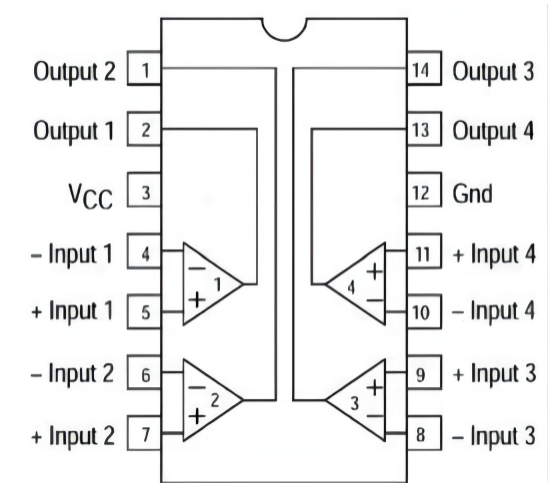
Ordering Information

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW LM2901N	DIP-14	LM2901N	Tube	1000Pcs/Box
XBLW LM2901DTR	SOP-14	LM2901	Tape	2500Pcs/Reel

Internal circuit diagram



Pin arrangement diagram



Pin end function symbol

Export end serial number	Function	Symbol	Export end serial number	Function	Symbol
1	Output 2	OUT2	8	Inverting input3	IN3 (-)
2	Output 1	OUT1	9	Positive input3	IN3 (+)
3	Power source	Vcc	10	Inverting input4	IN4 (-)
4	Inverting input 1	IN1 (-)	11	Positive input4	IN4 (+)
5	Positive input 1	IN1 (+)	12	Earthing	GND
6	Inverting input2	IN2 (-)	13	Output 4	OUT4
7	Positive input2	IN2 (+)	14	Output 3	OUT3

Limit parameter (absolute maximum rating, Tamb=25°C if no other provisions are made)

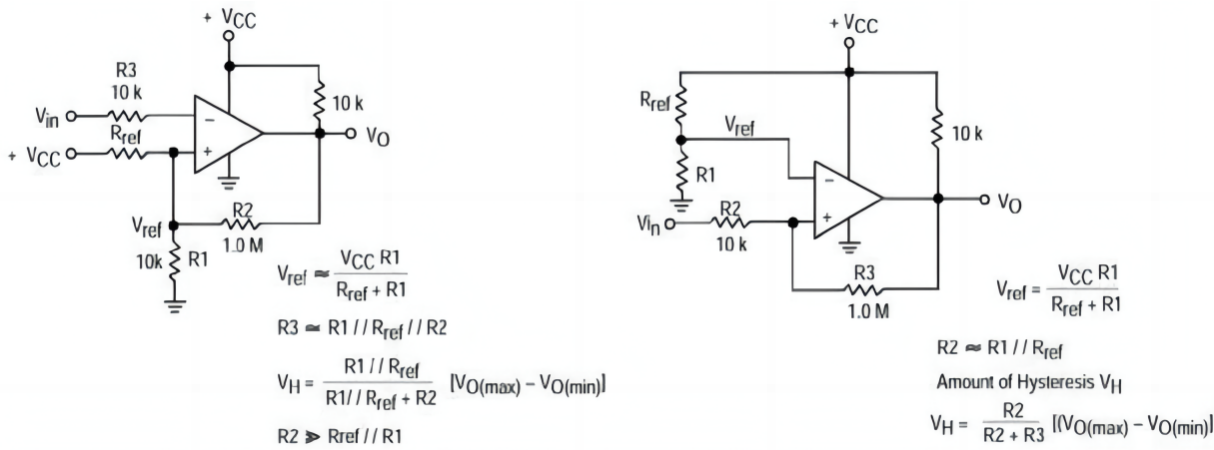
Parameter	Symbol	Number value	Single bit
Supply voltage	Vcc	36 或 ±18	V
Input differential voltage range	VIDR	36	V
Input common-mode voltage range	VICMR	-0.3~Vcc	V
Output current	ISC	50	mA
Power consumption (*)	PD	1.0	W
Operating ambient temperature	Tamb	-20~+85	°C
Storage temperature	Tstg	-65~150	°C

Note (*): When used above 25 °C, power consumption is reduced by 8mW for every 1 °C increase.

**Electrical characteristics (if not otherwise specified, $V_{CC}=5V$,
 $T_{amb}=25^{\circ}C$)**

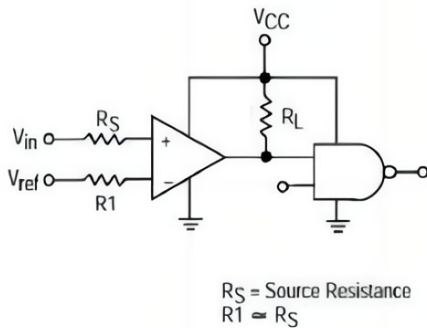
Peculiarity	Test condition	Symbol	Norm value			Single bit
			MIN	TYP	MAX	
Input offset voltage		V_{IO}		± 2.0	± 5.0	mV
	$0^{\circ}C \leq T_a \leq 70^{\circ}C$				± 9.0	
Input offset current		I_{IO}		± 5.0	± 50	nA
	$0^{\circ}C \leq T_a \leq 70^{\circ}C$				± 150	
Input bias current		I_{IB}		25	250	nA
	$0^{\circ}C \leq T_a \leq 70^{\circ}C$				400	
Input common-mode voltage range		V_{ICR}	0		$V_{CC}-1.5$	V
	$0^{\circ}C \leq T_a \leq 70^{\circ}C$		0		$V_{CC}-2.0$	
Supply current	$R_L = \infty$	I_{CC}		0.8	2.0	mA
	$R_L = \infty, V_{CC} = 30V$				1.0	
Voltage gain	$R_L > 15K, V_{CC} = 15V$	G_V	50	200		V/mV
Large signal response time	$V_{IN} = \text{TTL Logical swing}, V_{REF} = 1.4V, V_{RL} = 5.0V, R_L = 5.1K$	t_{RES}		300		ns
Response time	$V_{RL} = 5.0V, R_L = 5.1K$	t_{RES}		1.3		ns
Input differential voltage		V_{ID}			V_{CC}	V
Output dip current	$V_{IN} (-) > 1.0V, V_{IN} (+) = 0V, V_O < 1.5V$	I_{SINK}	6.0	16		mA
Output saturation voltage	$V_{IN} (-) > 1.0V, V_{IN} (+) = 0V, I_{SINK} < 4.0mA$	V_{SAT}		130	400	mV
	$V_{IN} (-) > 1.0V, V_{IN} (+) = 0V, I_{SINK} < 4.0mA, 0^{\circ}C \leq T_a \leq 70^{\circ}C$				700	
Output leakage current	$V_{IN} (+) > 1.0V, V_{IN} (-) = 0V, V_O = 5.0V$	I_{OL}		0.1		nA
	$V_{IN} (+) > 1.0V, V_{IN} (-) = 0V, V_O = 30V, 0^{\circ}C \leq T_a \leq 70^{\circ}C$				1000	

Application drawing

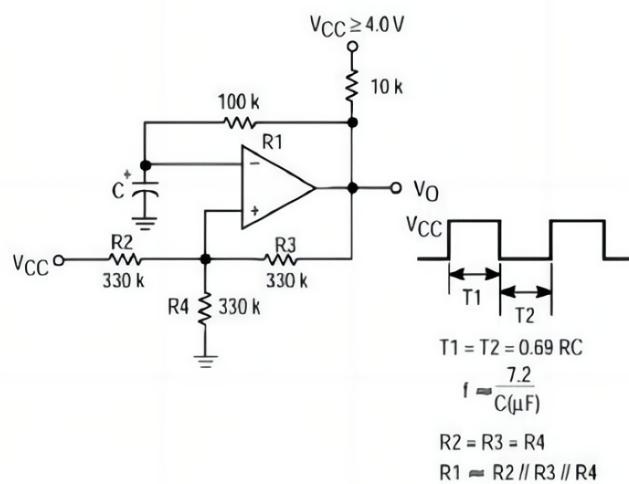


Inverse comparator with hysteresis

Positive phase comparator with lag

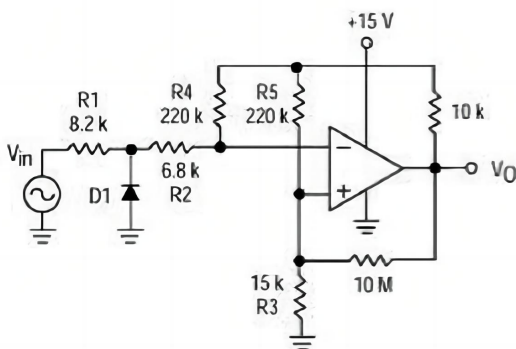


Logic	Device	V _{CC} (V)	R _L kΩ
CMOS	1/4 MC14001	+15	100
TTL	1/4 MC7400	+5.0	10

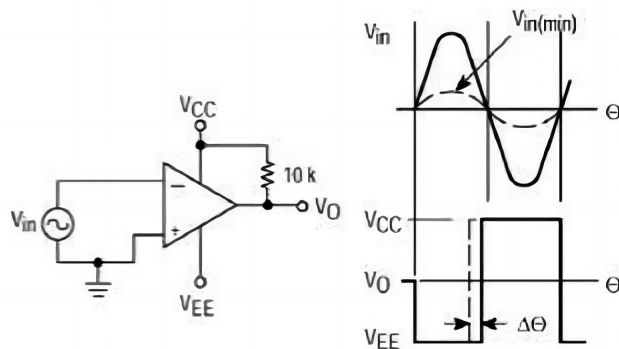


Logical driver

Square wave oscillator



$V_{in(min)} \approx 0.4$ V peak for 1% phase distortion ($\Delta\theta$).

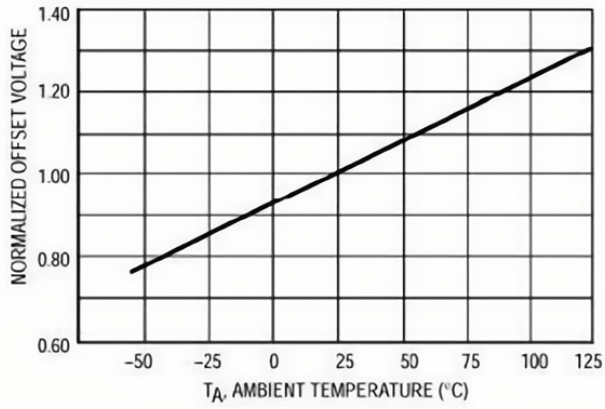


Zero-crossing detector (single-supply application)

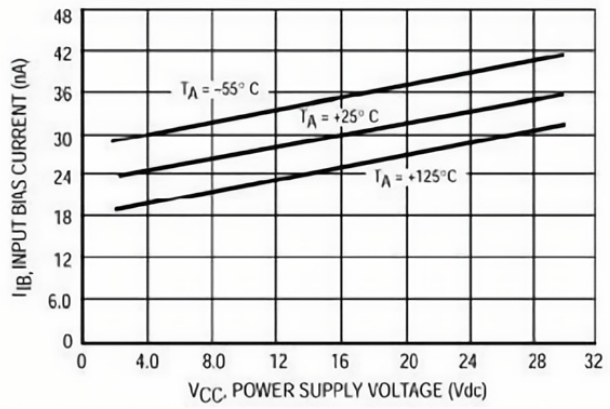
Zero-crossing detector (dual power supply application)

Characteristic Curve

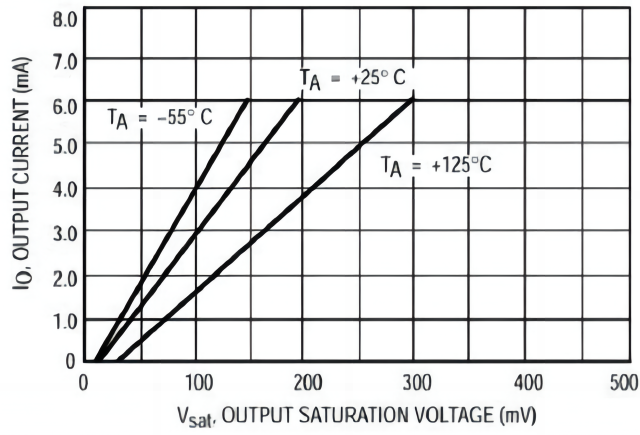
Normal input offset voltage



Input bias current

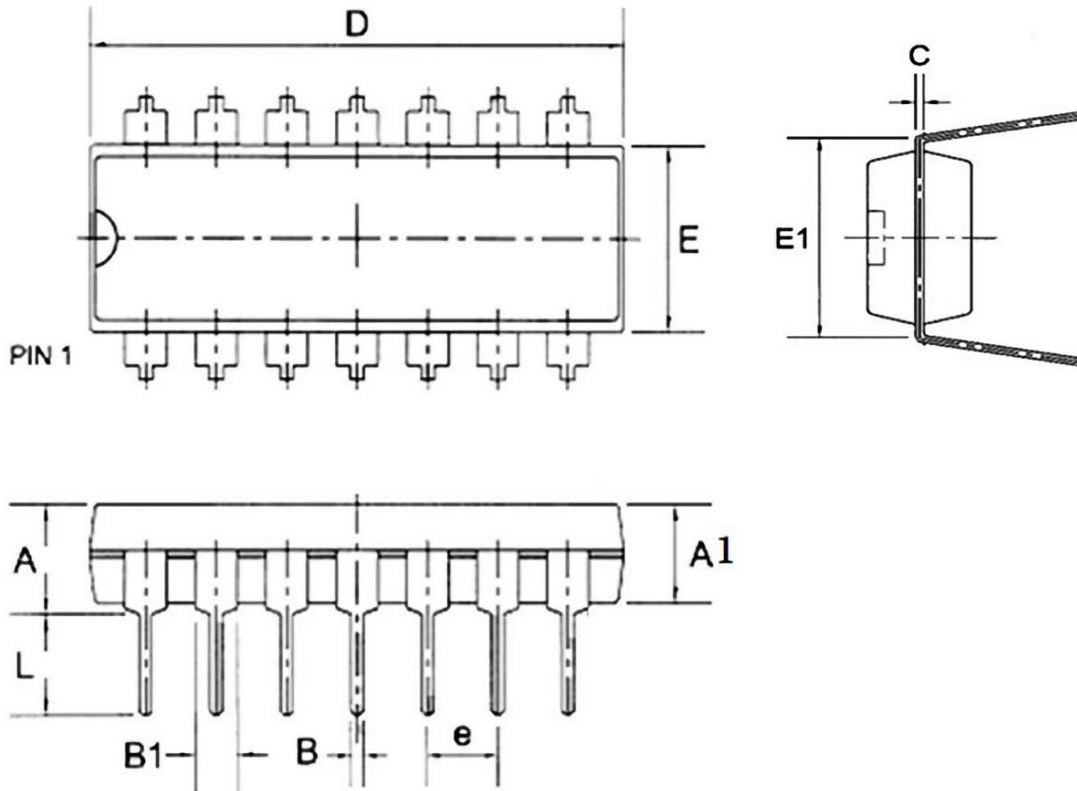


Output trap current and output saturation voltage



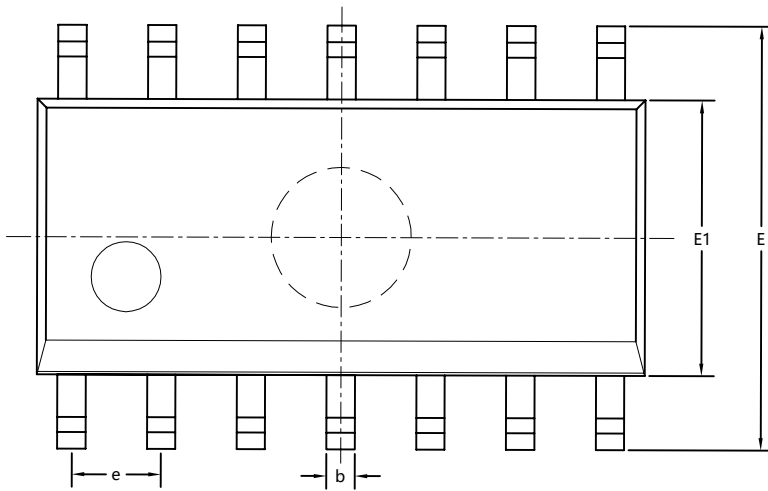
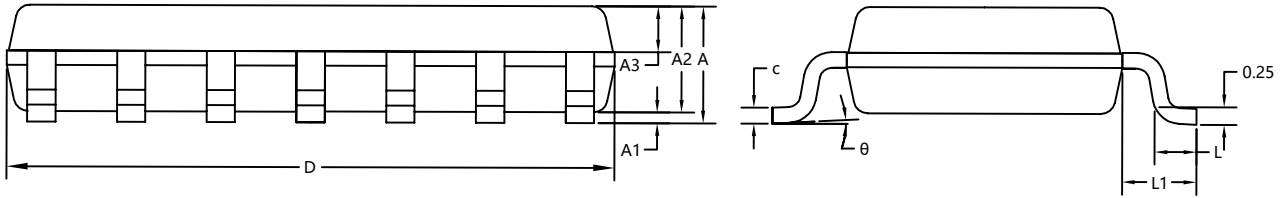
Packaging information:

DIP14



Symbol	Dimensions in Millimeters		
	Min	Nom	Max
A	--	--	4.31
A1	3.15	3.30	3.65
B	--	0.46	--
B1	--	1.60	--
C	--	0.25	--
D	19.00	19.30	19.60
E	6.20	6.40	6.60
E1	--	7.60	--
e	--	2.54	--
L	3.00	3.35	3.60

SOP14



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	1.50	1.60	1.70
A1	0.10	0.15	0.25
A2	1.40	1.45	1.50
A3	0.60	0.65	0.70
b	0.35	0.40	0.45
c	0.15	0.20	0.25
D	8.50	8.60	8.70
E	5.80	6.00	6.20
E1	3.85	3.90	3.95
e	1.27BSC		
L	0.50	0.60	0.70
L1	1.05REF		
θ	0°	4°	8°

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