



## Descriptions

The LM2901DR2G is a quad voltage integrated comparators mainly obtained in consumer and industrial electronics products, and designed for use in level detection, low-level sensing.

It is available in SOP-14(SOIC-14) package.

## Feature

- Wide Supply Voltage Range  
Single Supplies: 2.0V to 36V  
Dual Supplies:  $\pm 1.0V$  to  $\pm 18V$
- Single or Split Supply Operation
- Low Input Biasing Current: 25 nA (Typ)
- Low Input Offset Current: 5.0 nA (Typ)
- Low Output Saturation Voltage: 130 mV (Typ)
- Output Voltage Compatible With TTL, CMOS Logic Systems

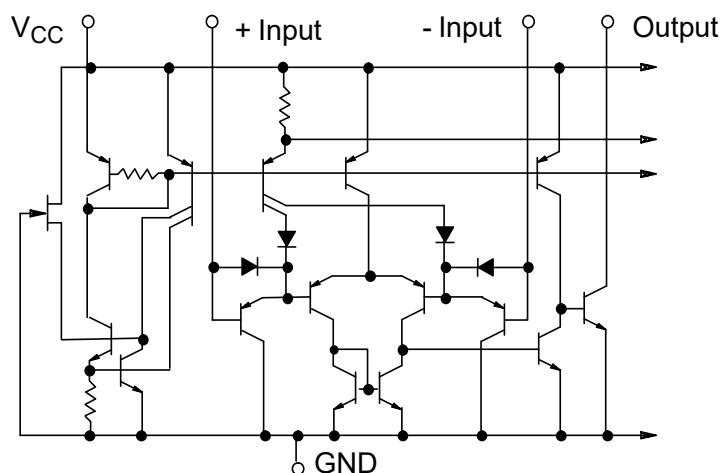
## Applications

- Vacuum robot
- Single phase UPS
- Server PSU
- Cordless power tool
- Wireless infrastructure
- Appliances
- Building automation
- Factory automation & control
- Motor drives
- Infotainment & cluster

## Ordering Information

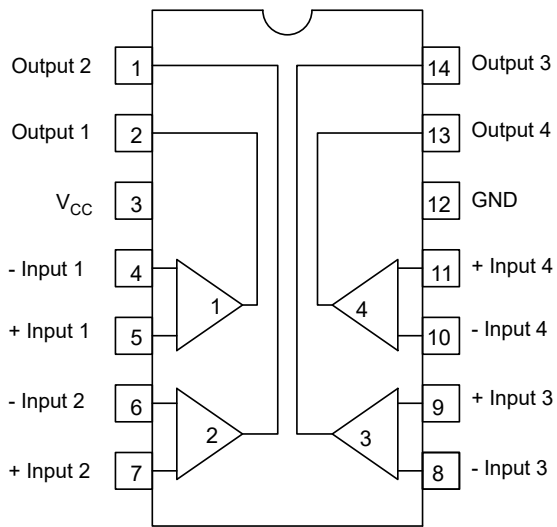
Product Model	Package Type	Packing	Packing Qty
LM2901DR2G	SOP-14(SOIC-14)	Tape	2500Pcs/Reel

## Schematic Diagram

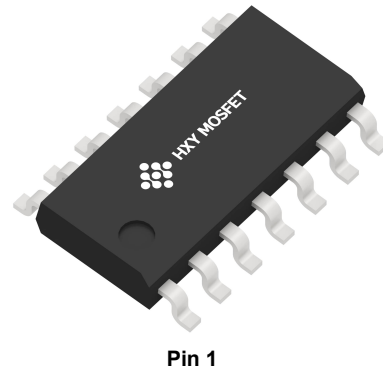




## Pin Diagram



(Top View)



Pin 1

## Pins Configurations

No.	Description	Symbol	No.	Description	Symbol
1	OUTPUT 2	OUT2	8	INVERTING INPUT 3	IN3(-)
2	OUTPUT 1	OUT1	9	NONINVERTING INPUT 3	IN3(+)
3	POWER SUPPLY	Vcc	10	INVERTING INPUT 4	IN4(-)
4	INVERTING INPUT 1	IN1(-)	11	NONINVERTING INPUT 4	IN4(+)
5	NONINVERTING INPUT 1	IN1(+)	12	GROUND	GND
6	INVERTING INPUT 2	IN2(-)	13	OUTPUT 4	OUT4
7	NONINVERTING INPUT 2	IN2(+)	14	OUTPUT 3	OUT3



## Absolute Maximum Ratings

TA=25°C, unless otherwise noted

Parameter	Symbol	Value	Unit
Supply Voltage	V <sub>CC</sub>	36 or ±18	V
Input Differential Voltage Range	V <sub>IDR</sub>	36	V
Input common-mode Voltage Range	V <sub>ICMR</sub>	-0.3 ~ V <sub>CC</sub>	V
Output Current	I <sub>SC</sub>	50	mA
Power Dissipation(Note *)	P <sub>D</sub>	1.0	W
Ambient Temperature	T <sub>amb</sub>	-20 ~ 85	°C
Storage Temperature	T <sub>stg</sub>	-65 ~ 150	°C

Note \*: When used above 25°C, the power consumption decreases by 8mW for every 1°C increase.

## Electrical Characteristics

TA=25°C, V<sub>CC</sub>=5V, unless otherwise noted

Characteristics	Test Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
Input Offset Voltage	Ta=25°C	V <sub>IO</sub>		2.0	7.0	mV
	0°C ≤ Ta ≤ 70°C				9.0	
Input Offset Current	Ta=25°C	I <sub>IO</sub>		5.0	50	nA
	0°C ≤ Ta ≤ 70°C				150	
Input Bias Current	Ta=25°C	I <sub>IB</sub>		25	250	nA
	0°C ≤ Ta ≤ 70°C				400	
Input Common Mode Voltage Range	Ta=25°C	V <sub>ICR</sub>	0		V <sub>CC</sub> -1.5	V
	0°C ≤ Ta ≤ 70°C		0		V <sub>CC</sub> -2.0	
Supply Current	R <sub>L</sub> =∞	I <sub>CC</sub>		0.8	2.0	mA
	R <sub>L</sub> =∞ V <sub>CC</sub> =30V			1.0	2.5	
Voltage Gain	R <sub>L</sub> > 15K, V <sub>CC</sub> =15V	G <sub>V</sub>	50	200		V/ mV
Large Signal Response Time	V <sub>IN</sub> =TTL Logic Swing, V <sub>REF</sub> =1.4V, V <sub>RL</sub> =5.0V, R <sub>L</sub> =5.1K	t <sub>RES</sub>		300		ns
Response Time	V <sub>RL</sub> =5.0V, R <sub>L</sub> =5.1K	t <sub>RES</sub>		1.3		us
Input Differential Voltage		V <sub>ID</sub>			V <sub>CC</sub>	V
Output Sink Current	V <sub>IN(-)</sub> ≥ 1.0V, V <sub>IN(+)</sub> = 0V, V <sub>O</sub> ≤ 1.5V	I <sub>SINK</sub>	6.0	16		mA
Output Saturation Voltage	V <sub>IN(-)</sub> ≥ 1.0V, V <sub>IN(+)</sub> = 0V, I <sub>SINK</sub> ≤ 4.0mA	V <sub>SAT</sub>		130	400	mV
	V <sub>IN(-)</sub> ≥ 1.0V, V <sub>IN(+)</sub> = 0V, I <sub>SINK</sub> ≤ 4.0mA 0°C ≤ Ta ≤ 70°C				700	
Output Leakage Current	V <sub>IN(+)</sub> ≥ 1.0V, V <sub>IN(-)</sub> = 0V, V <sub>O</sub> = 5V	I <sub>OL</sub>		0.1		nA
	V <sub>IN(+)</sub> ≥ 1.0V, V <sub>IN(-)</sub> = 0V, V <sub>O</sub> = 30V 0°C ≤ Ta ≤ 70°C				1000	



## Applications

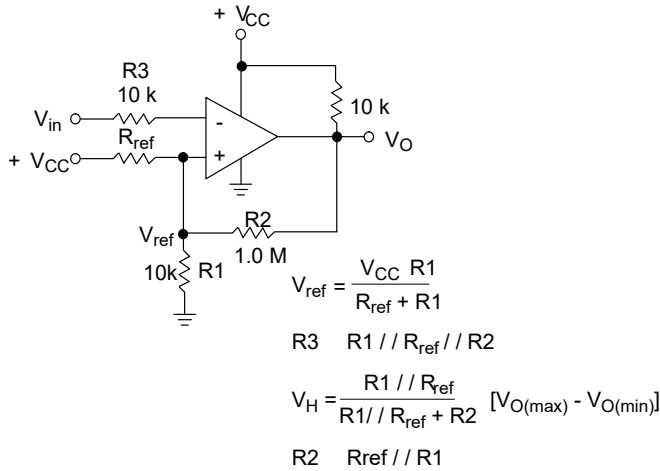


Figure 1. Inverting Comparator with Hysteresis

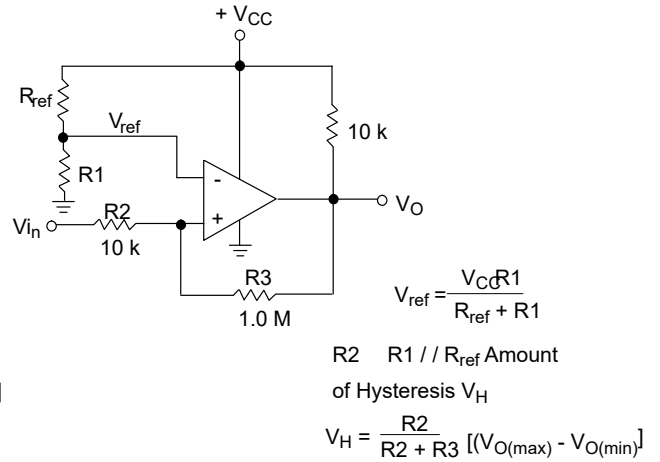
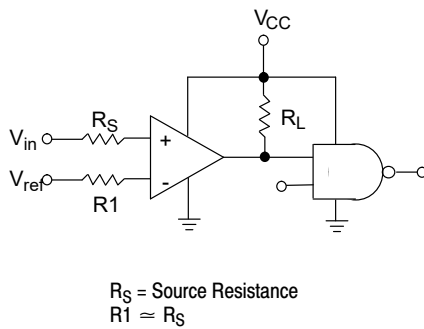


Figure 2. Noninverting Comparator with Hysteresis



Logic	Device	V <sub>CC</sub> (V)	R <sub>L</sub> kΩ
CMOS	1/4 MC14001	+15	100
TTL	1/4 MC7400	+5.0	10

Figure 3. Driving Logic

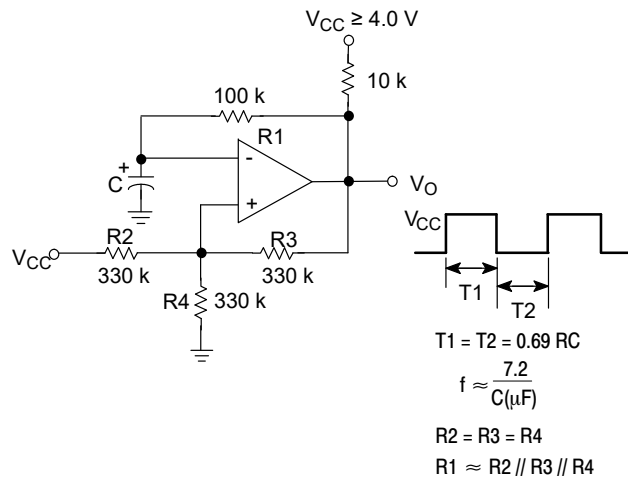


Figure 4. Squarewave Oscillator

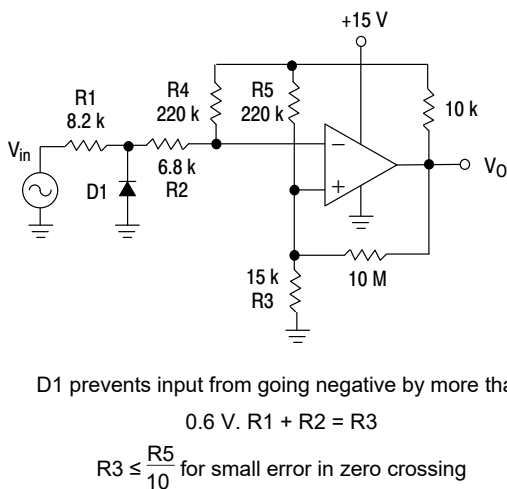


Figure 5. Zero Crossing Detector (Single Supply)

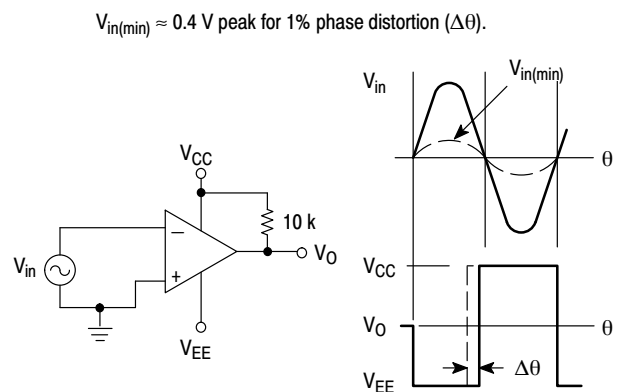


Figure 6. Zero Crossing Detector (Split Supplies)



## Typical Characteristics Curves

( $V_{CC} = 15\text{ Vdc}$ ,  $T_A = +25^\circ\text{C}$  (each comparator) unless otherwise noted.)

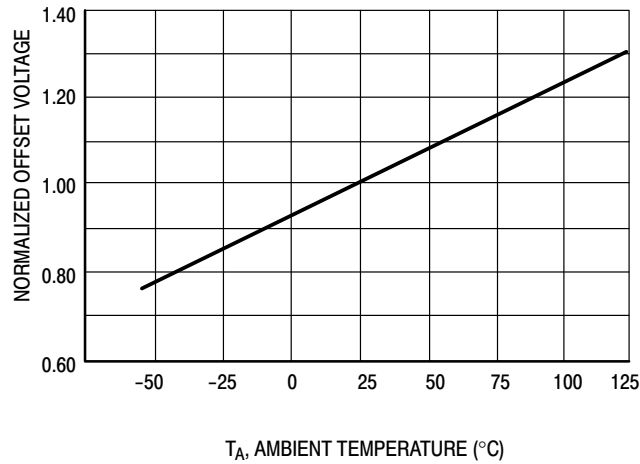


Figure 7. Normalized Input Offset Voltage

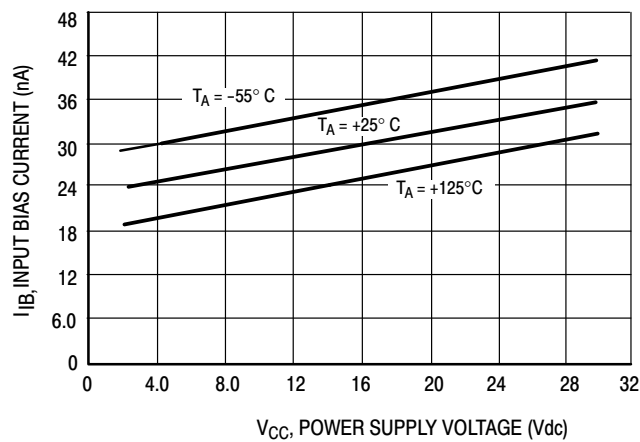


Figure 8. Input Bias Current

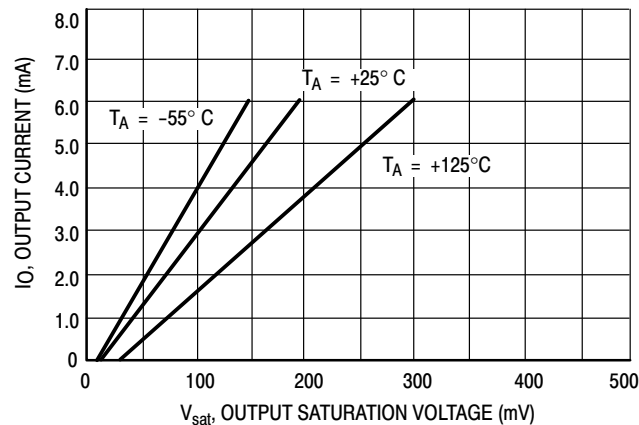
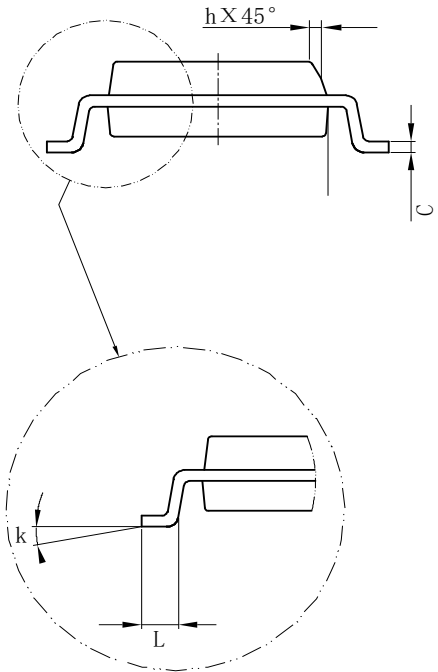
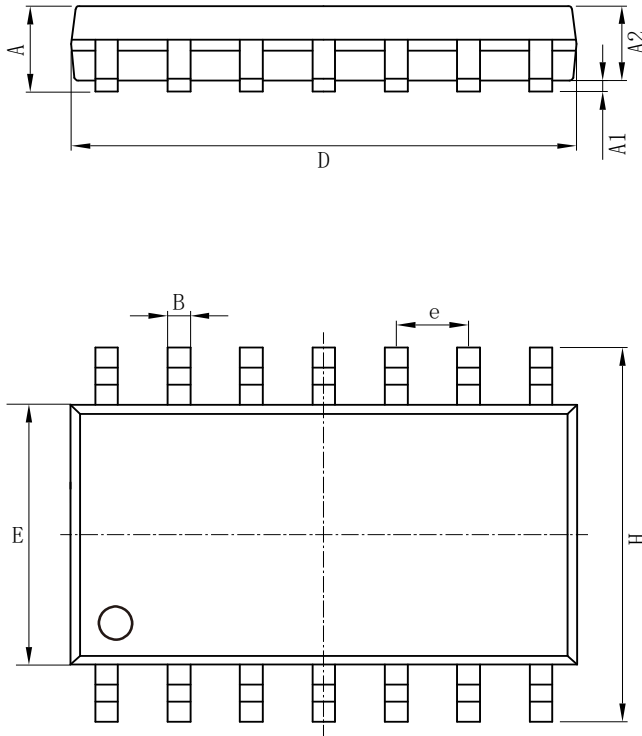


Figure 9. Output Sink Current versus Output Saturation Voltage



## Package Information

### SOP-14(SOIC-14)



Size Symbol	Dimensions In Millimeters		Size Symbol	Dimensions In Inches	
	Min( mm )	Max( mm )		Min( in )	Max( in )
A	1.350	1.750	A	0.050	0.068
A1	0.100	0.250	A1	0.004	0.009
A2	1.100	1.650	A2	0.040	0.060
B	0.330	0.510	B	0.010	0.020
C	0.190	0.250	C	0.007	0.009
D	8.550	8.750	D	0.330	0.340
E	3.800	4.000	E	0.150	0.150
e	1.27		e	0.05	
H	5.800	6.200	H	0.220	0.240
h	0.250	0.500	h	0.009	0.020
L	0.400	1.270	L	0.015	0.050
k	8°(max)		k	8°(max)	



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