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XINBOLE

Product Specification

XBLW LM2902

Four Amplifier Integrated Circuit

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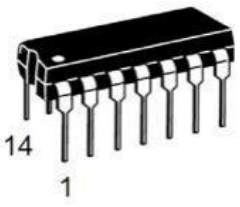
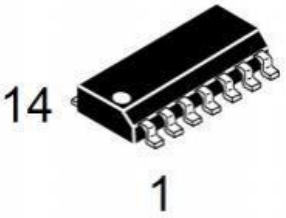
Description

This circuit is high performance, with four independent operational amplifiers, including phase compensation circuit, suitable for receivers and tone systems as tone equalization network, but also for other applications. Using DIP-14 package, power consumption 720mW, and SOP-14 package , power consumption 400mW.



DIP14

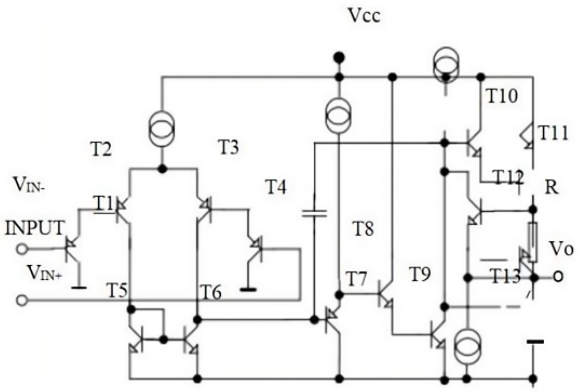


SOP14

Features

- No external phase compensation circuit required
- Wide power supply voltage range: single power supply,Vcc=3~32V, dual power supply, Vcc=± 1.5V~16V
- Low power consumption current:Icc=0.6mA (typical) (RL= ∞)
- The input voltage range can be close to the ground level

Internal circuit diagram



Brief introduction of principle

The LM2902 is composed of four identical operational amplifiers. The unit circuit is shown in the figure. Its working principle is briefly described as follows: the input signal is added to the T1 and T4 bases, and the difference is enlarged; T8, T9 in the compound amplification form the intermediate stage; The output stage consists of T10 to T13. T12 is a protective tube. When the output current is too large, the voltage drop on R will increase, resulting in T12 saturation conduction and T12 collector potential decrease.
Close to 1/2Vcc, the push-pull tubes T10, T11 and T13 are cut off, thus providing protection. Capacitor C is the phase compensation capacitor.

Ordering Information

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW LM2902N	DIP-14	LM2902N	Tube	1000Pcs/Box
XBLW LM2902DTR	SOP-14	LM2902	Tape	2500Pcs/Reel

Pin end function symbol

Export end serial number	Function	Symbol	Export end serial number	Function	Symbol
1	Output 1	OUT1	8	Output 3	OUT3
2	Inverting input 1	IN-（1）	9	Inverting input3	IN-（3）
3	Positive input1	IN+（1）	10	Positive input3	IN+（3）
4	Power source	Vcc	11	Earthing	GND
5	Positive input2	IN+（2）	12	Positive input4	IN+（4）
6	Invertinginput 2	IN-（2）	13	Inverting inpu4	IN-（4）
7	Output 2	OUT2	14	Output 4	OUT4

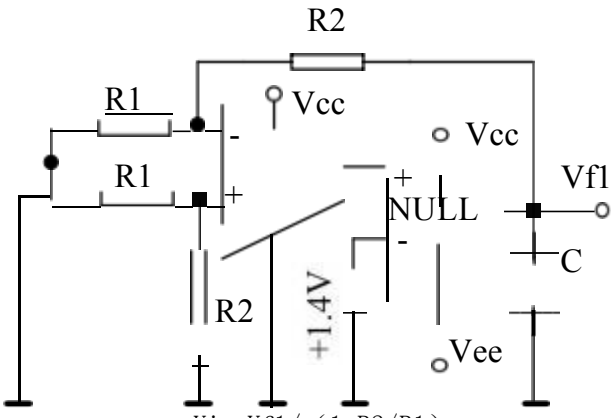
Limit parameter (absolute maximum rating, Tamb=25℃ if no other provisions are made)

Parameter	Symbol	Test condition	Valuation	Unit
Supply voltage	Vcc		32	V
Differential input voltage	V_{ID}		32	V
Maximum input voltage	V_{IN}		-0.3~32	V
Allowable power consumption	P_D	DIP SOP	720 400	mW
Operating temperature	Topr		-20~+85	℃
Storage temperature	Tstg		-55~+125	℃

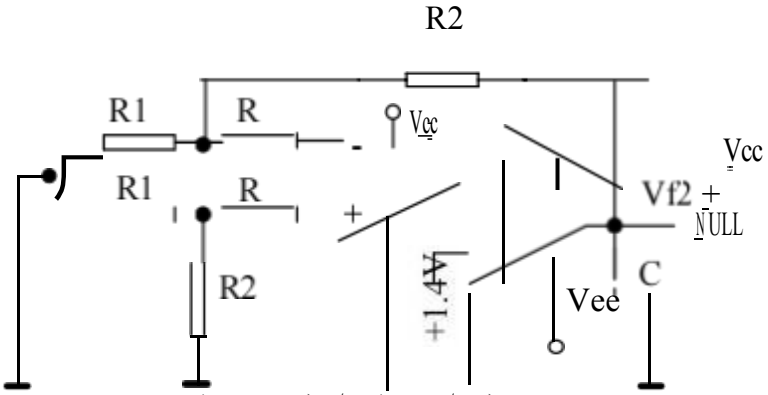
Electrical characteristics (if not otherwise specified, Vcc=5V, Tamb=25℃)

Parameter	Symbol	Test condition	MIN	TYP	MAX	Unit
Offset input voltage	V_{IO}			±2	±5	mV
Input offset current	I_{IO}	Iin(+)/Iin(-)		±5	±50	nA
Input bias current	I_{BA}			45	250	nA
Common-mode input voltage range	V_{ICM}		0		Vcc-1.5	V
Common mode rejection ratio	K_{CMR}		65	80		dB
Strong signal voltage gain	G_V	Vcc=15V,RL ≥2 kΩ	25	100		V/mV
Output voltage range	Vo		0		Vcc-1.5	V
Power ripple rejection ratio	PSRR		65	100		dB
Channel separation	C_S	f=1kHz~20kHz		120		dB
Static current consumption (1)	Icc	Vcc=5V		0.6	2	mA
Static current consumption (2)	Icc	Vcc=30V		1.5	3	mA
Output pull current	Io	$Vin+=1V,Vin^-=0V$	20	35		mA
Output filling current	Io	$Vin+=0V,Vin^-=1V$	10	13		mA

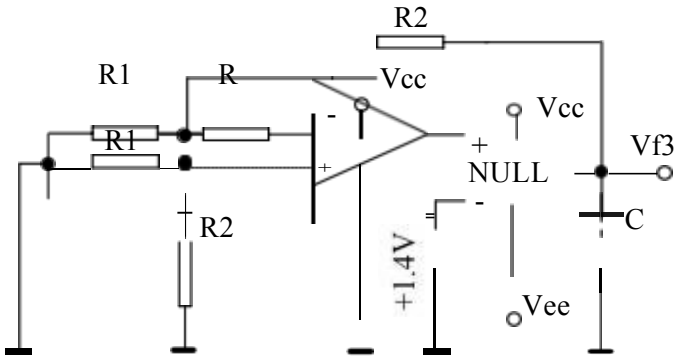
Test schematic diagram (note: NULL refers to zero amplifier)

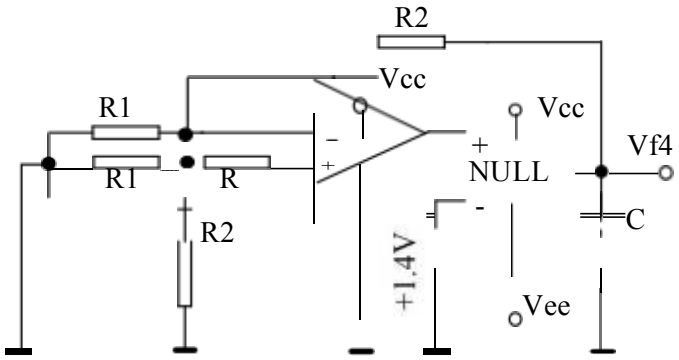


Vio=Vf1/ (1+R2/R1)
Input offset voltage Vio test diagram

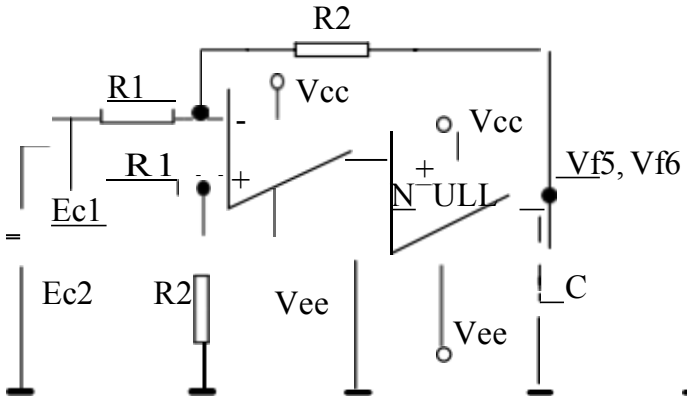


Iio= (Vf2-Vf1) /R (1+R2/R1)
Input offset current Iio test diagram

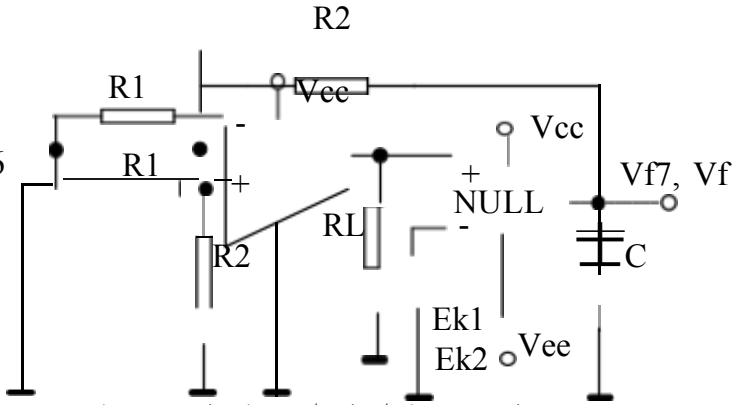




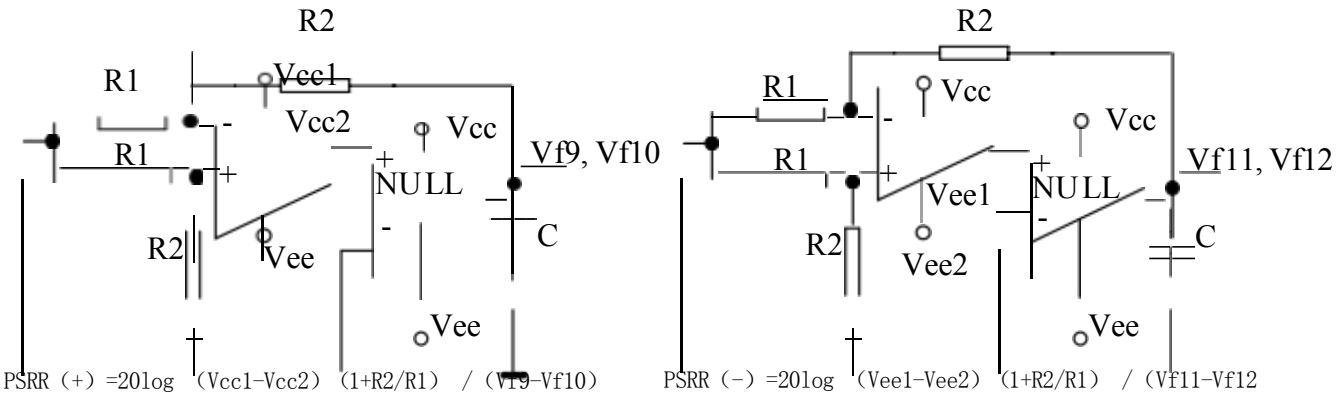
IBA= (Vf4-Vf3) /2R (1+R2/R1)
Input bias current IBA test diagram



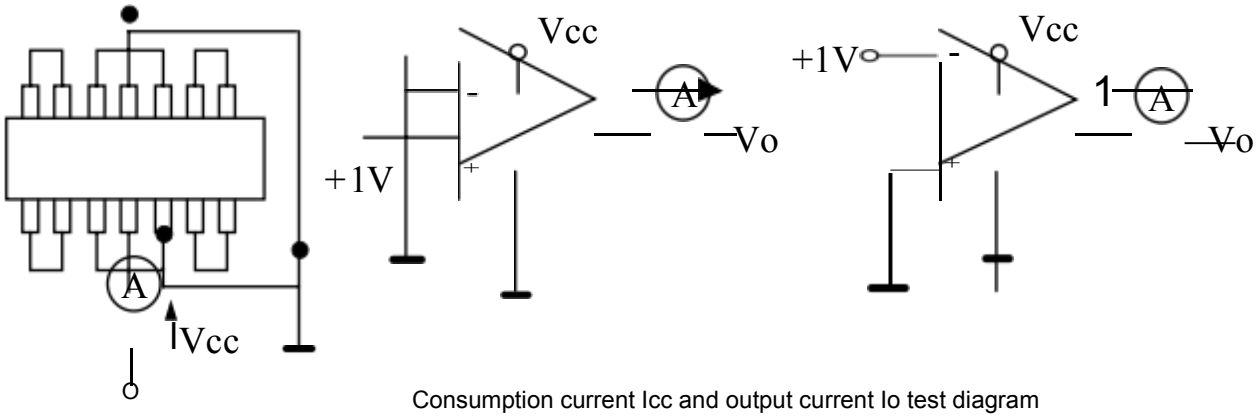
CMR=20log (Ec1-Ec2) (1+R2/R1) / (Vf5-Vf6
Common mode rejection ratio CMR and common mode input voltage range VICMtest diagram



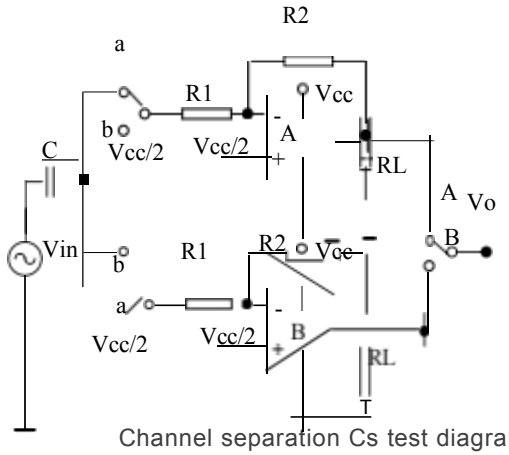
Gv= (Ek1-Ek2) (1+R2/R1) / (Vf8-Vf7)
Voltage gain Gv test diagram



Power ripple rejection ratio PSRR test diagram



Consumption current Icc and output current Io test diagram



Channel separation Cs test diagram

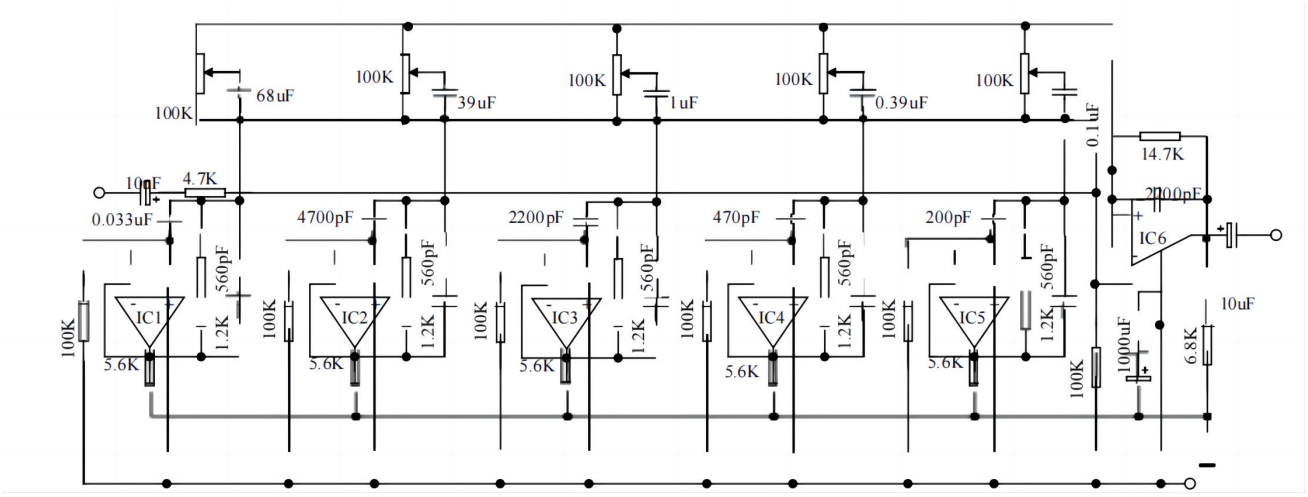
SW: A

Cs (A B) =20log (R2*VOA) / (R1*VOB)

SW: B

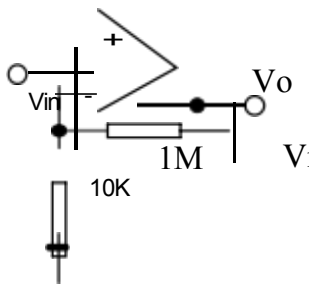
Cs (B A) =20log (R2*VOB) / (R1*VOA)

Application drawing

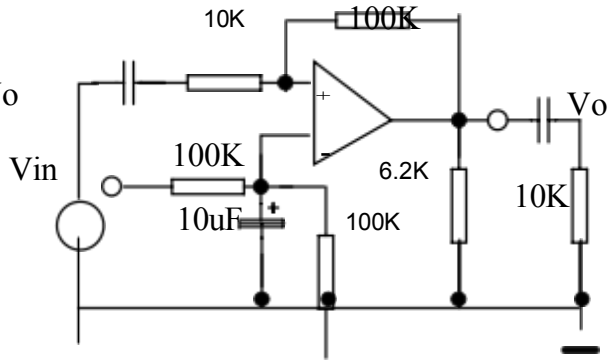


The LM2902 is used in five-frequency tone control circuits

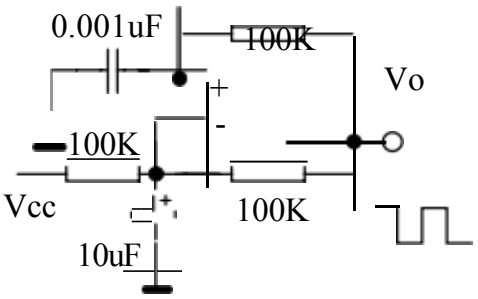
Dc amplifier



Inverter amplifier

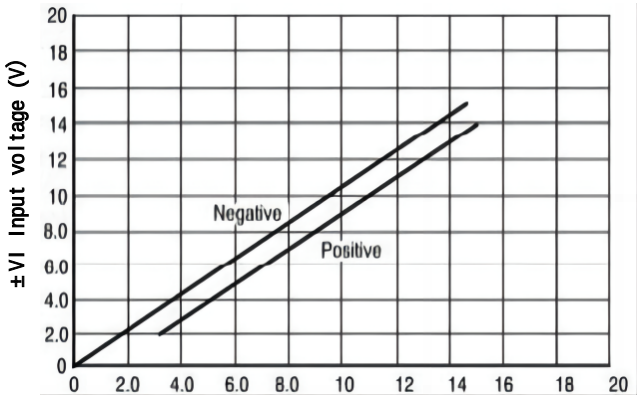


Rectangular wave generator

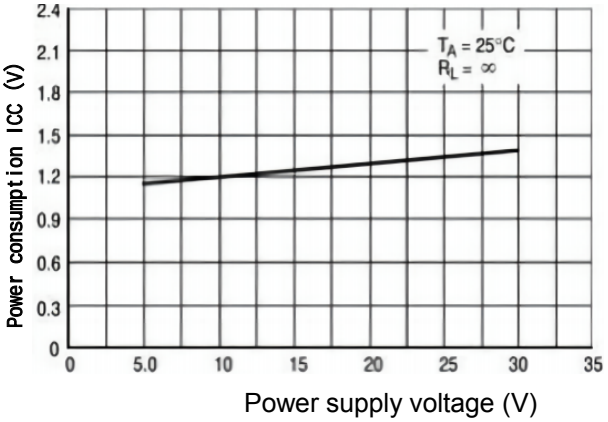


Other applications of LM2902

Characteristic Curve



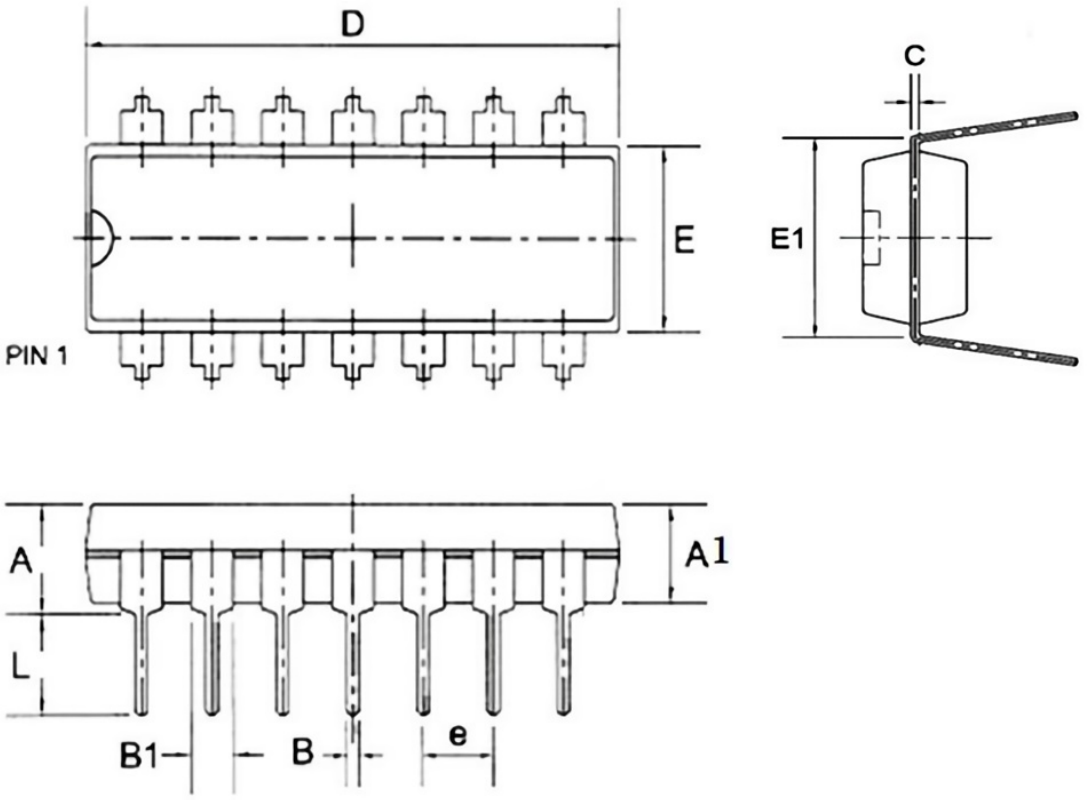
Input voltage range



Power consumption

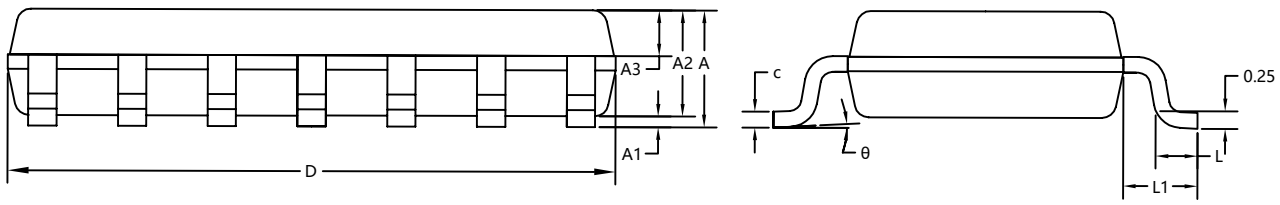
Package information:

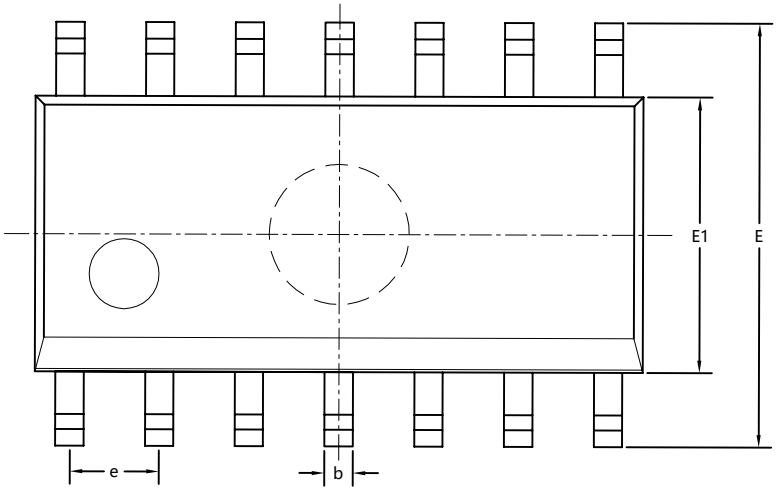
DIP14



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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