芯伯乐®
XINBOLE

Product Specification

XBLW LM193

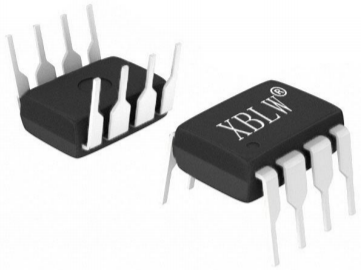
Dual Comparators

WEB | www.xinboleic.com

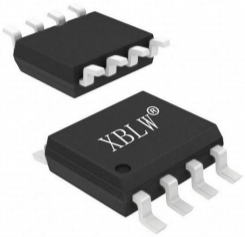


Descriptions

The LM193 series consists of two independent precision voltage comparators with an offset voltage specification as low as 2.0 mV max for two comparators which were designed specifically to operate from a single power supply over a wide range of voltages.Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage.These comparators also have a unique characteristic in that the input common-mode voltage range includes ground,even though operated from a single power supply voltage.It is mainly used in consumer and industrial electronic products.It is available in DIP-8 or SOP-8 package form.



DIP-8



SOP-8

Feature

- Wide Supply Voltage Range
  Single Supplies: 2.0V to 36V
  Dual Supplies: ± 1.0V to ± 18V
- Very Low Supply Current Drain (0.8mA)—Independent Of Supply Voltage
- Low Input Biasing Current:25 nA
- Low Input Offset Current:5.0 nA
- Maximum Offset Voltage:5.0mV
- Input Differential Voltage Range Is Same With Supply Voltage Range
- Compatible With TTL,DTL,ECL,MOS and CMOS

Applications

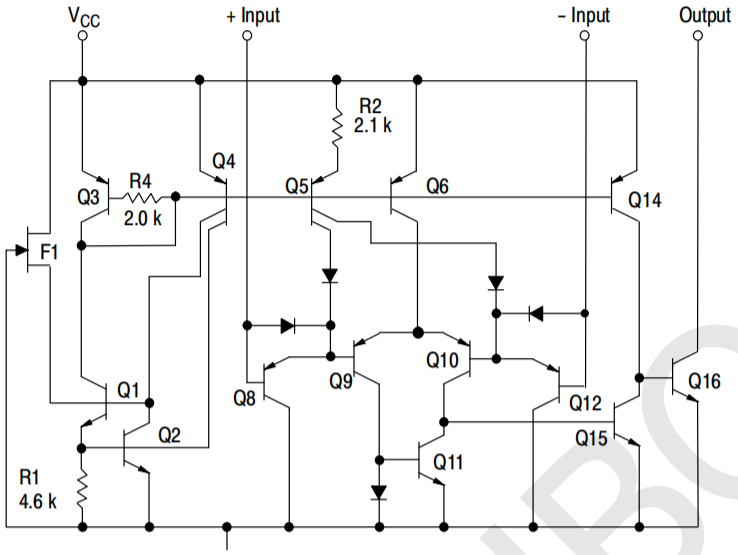
- Vacuum robot
- Single phase UPS
- Server PSU
- Cordless power tool
- Wireless infrastructure
- Applicances
- Building automation
- Factory automation & control
- Motor drives
- Infotainment & cluster

Ordering Information

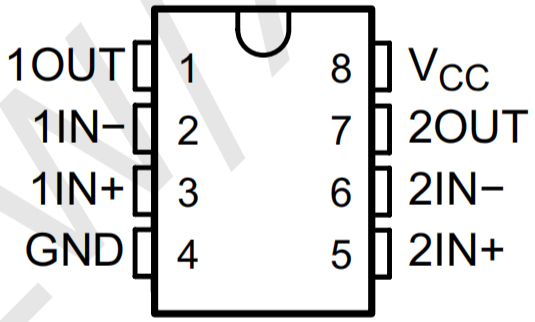
Product Model	Package Type	Marking	Packing	Packing Qty
XBLW LM193N	DIP-8	LM193N	Tube	2000pcs/Box
XBLW LM193DTR	SOP-8	LM193	Tape	2500pcs/Reel

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Scematic Diagram



Pin Diagram



(Top View)

Pins Configurations

No.	Description	Symbol	No.	Description	Symbol
1	OUTPUT 1	OUT1	5	NONINVERTING INPUT 2	IN2+
2	INVERTING INPUT 1	IN1-	6	INVERTING INPUT 2	IN2-
3	NONINVERTING INPUT 1	IN1+	7	OUTPUT 2	OUT2
4	GROUND	GND	8	POWER SUPPLY	Vcc

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Absolute Maximum Ratings

TA=25℃,unless otherwise noted

Parameter		Symbol	Value		Unit
			Min.	Max.	
Supply Voltage	Dual	Vcc	·	±18	V
	Single			36	
Differential Input Voltage		V_{IDR}		36	V
Input Common Mode Voltage Range		V_{ICR}	-0.3	36	V
Output Leakage Current		I_{OG}		20	mA
Maximum Operation Junction Temperature		$T_{J(MAX)}$		125	℃
Power Dissipation		P_D		570	mW
Operation Temperature		Tamb	-40	125	℃
Storage Temperature		Tstg	-65	150	℃

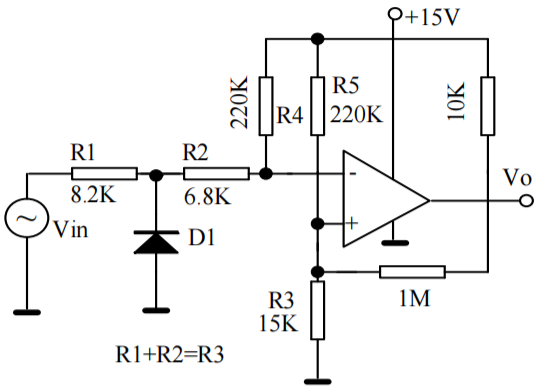
Electrical Characteristics

TA=25℃,V_{CC}=5V, unless otherwise noted

Charateristics	Test Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
Input Offset Voltage	Ta=25℃	V_{IO}		2	5	mV
	0℃ = Ta ≤70℃				9	
Input Offset Current	Ta=25℃	I_{IO}		5	50	nA
	0℃ ≤Ta ≤70℃				150	
Input Bias Current	Ta=25℃	I_{IB}		25	250	nA
	0℃ ≤ Ta ≤70℃				400	
Input Common Mode Voltage Range	Ta=25℃	V_{ICR}	0		Vcc-1.5	V
	0℃ ≤ Ta ≤70℃		0		Vcc-2.0	
Supply Current	R_L=∞ Dual Comparator	Icc		0.4	1.0	mA
	R_L=∞ Dual Comparator，Vcc=30V				2.5	
Voltage Gain	R_L > 15KΩ , Vcc=15V	Gv	50	200		V/ mV
Large Signal Response Time	V_{IN}=TTL Logic Swing , V_{REF}=1.4V , V_{RL}=5.0V， R_L=5.1KΩ	t_{RES}		300		ns
Response Time	V_{RL}=5.0V， R_L=5.1KΩ	t_{RES}		1.3		us
Input Differential Voltage		V_{ID}			Vcc	V
Output Sink Current	$V_{IN(-)}$≥ 1.0V， $V_{IN(+)}$ =0V， Vo ≤1.5V	I_{SINK}	6.0	16		mA
Output Saturation Voltage	$V_{IN(-)}$ ≥ 1.0V， $V_{IN(+)}$ =0V， I_{SINK} ≤ 4.0mA	V_{SAT}		150	400	mV
	$V_{IN(-)}$ ≥ 1.0V， $V_{IN(+)}$ =0V， I_{SINK} ≤4.0mA 0℃ = Ta ≤ 70℃				700	
Output Leakage Current	$V_{IN(+)}$ ≥1.0V， $V_{IN(-)}$ =0V， Vo=5.0V	I_{OL}		0.1		nA
	$V_{IN(+)}$ ≥ 1.0V， $V_{IN(-)}$ =0V， Vo=30V 0℃ ≤ Ta ≤ 70℃				1000	

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Applications

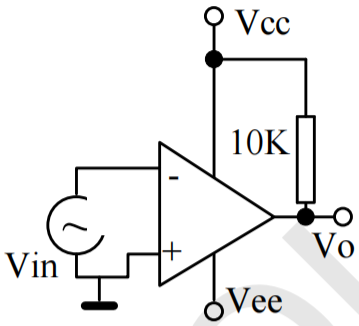


D1 prevents input from going negative by more than 0.6 V.

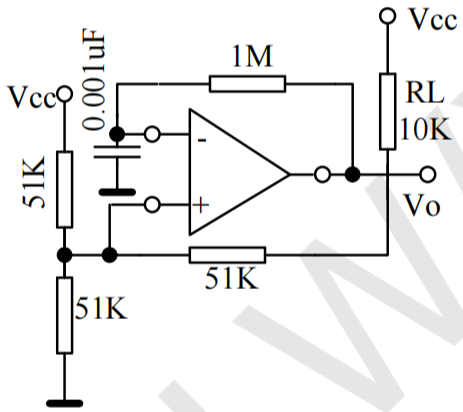
$R1 + R2 = R3$

$R3 \leq \frac{R5}{10}$ for small error in zero crossing.

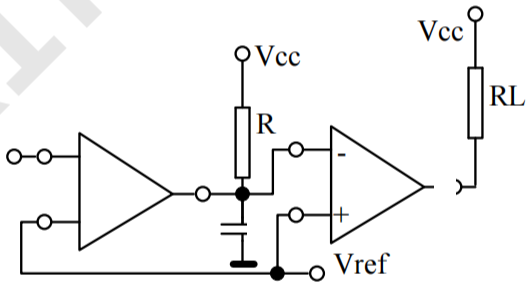
Zero Crossing Detector (Single Supply)



Zero Crossing Detector (Split Supply)



Square wave oscillator



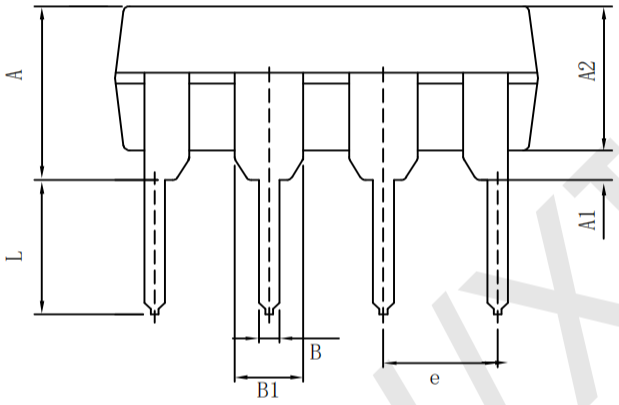
Time Delay Generator

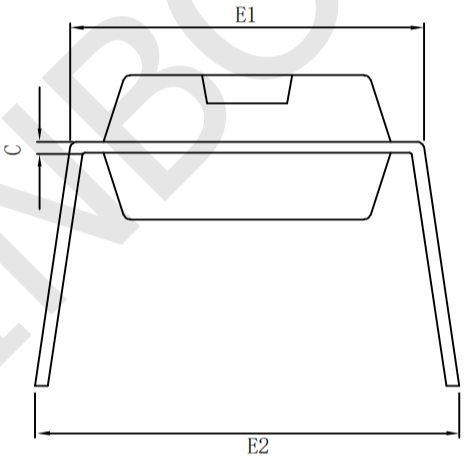
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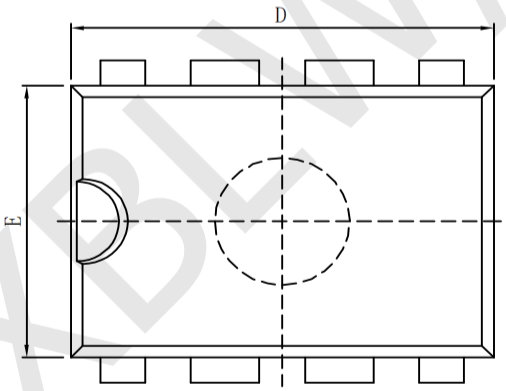
Package Information

- DIP-8

Symbol \ Size	Dimensions In Millimeters		Symbol \ Size	Dimensions In Inches	
	Min(mm)	Max(mm)		Min(in)	Max(in)
A	3.710	4.310	A	0.146	0.170
A1	0.510		A1	0.020	
A2	3.200	3.600	A2	0.126	0.142
B	0.380	0.570	B	0.015	0.022
B1	1.524(BSC)		B1	0.060(BSC)	
C	0.204	0.360	C	0.008	0.014
D	9.000	9.400	D	0.354	0.370
E	6.200	6.600	E	0.244	0.260
E1	7.320	7.920	E1	0.288	0.312
e	2.540(BSC)		e	0.100(BSC)	
L	3.000	3.600	L	0.118	0.142
E2	8.400	9.000	E2	0.331	0.354



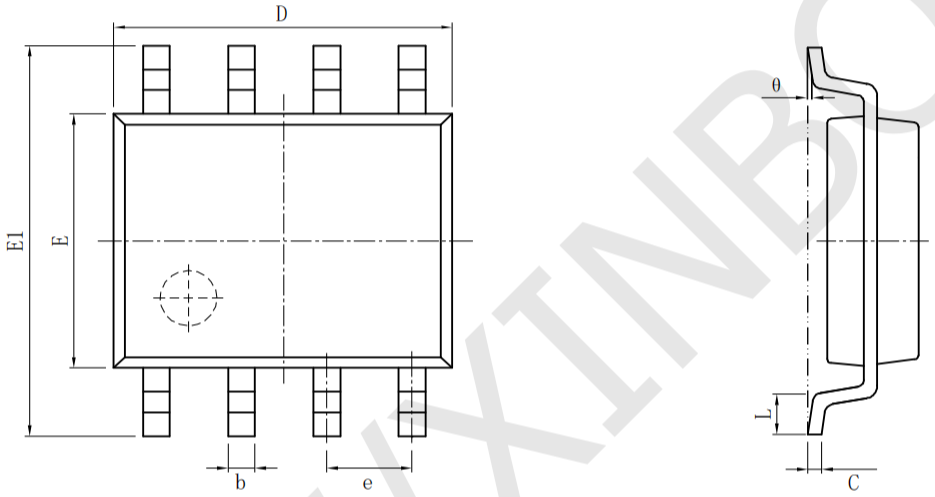


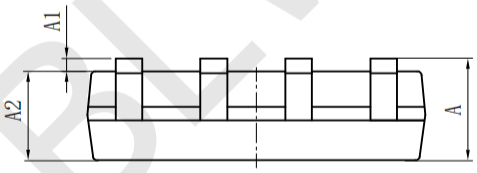


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- SOP-8

Size / Symbol	Dimensions In Millimeters		Size / Symbol	Dimensions In Inches	
	Min(mm)	Max(mm)		Min(in)	Max(in)
A	1.350	1.750	A	0.053	0.069
A1	0.100	0.250	A1	0.004	0.010
A2	1.350	1.550	A2	0.053	0.061
b	0.330	0.510	b	0.013	0.020
c	0.170	0.250	c	0.006	0.010
D	4.700	5.100	D	0.185	0.200
E	3.800	4.000	E	0.150	0.157
E1	5.800	6.200	E1	0.228	0.224
e	1.270(BSC)		e	0.050(BSC)	
L	0.400	1.270	L	0.016	0.050
θ	0°	8°	θ	0°	8°





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