DBL 393

DUAL VOLTAGE COMPARATOR

8 DIP	Unit: mm

Specially designed to offer a versatility as high as possible

□ FEATURES
- O Very low supply current drain(0.8mA)
- O Allows sensing near ground
- O Logic output compatible with TTL, DTL, ECL, MOS and CMOS
- O Low input biasing current
- O Low input offset current
- O Low output saturation voltage
- O Wide supply voltage range :
    - Single : 2V~36V
    - Dual : ±1V~ ±18V
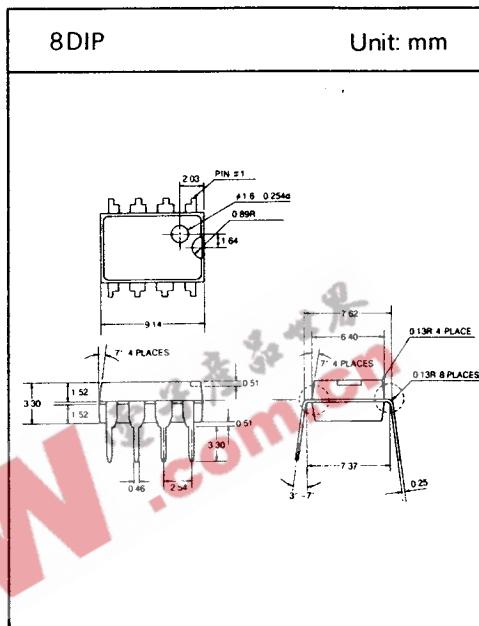
□ APPLICATIONS
- O High precision comparators
- O Driving logic systems
- O Various multivibrators
- O Generators and Oscillators

□ MAXIMUM RATINGS

| Characteristic	Symbol	Rating	Unit
Supply Voltage	V_{CC}	36 or ±18	V
Differential Input Voltage	V_{IND}	36	V
Input Voltage	V_{IN}	−0.3~+36	V
Power Dissipation	P_D	570	mW
Operating Temperature	T_{opr}	0~−70	°C
Storage Temperature	T_{stg}	−55~+150	°C

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☐ BLOCK DIAGRAM
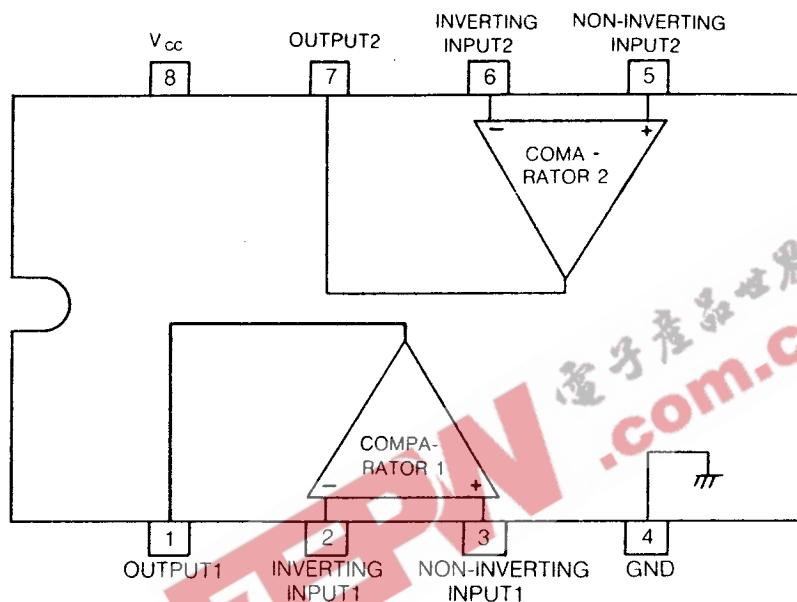
☐ EQUIVALENT CIRCUIT (One section)
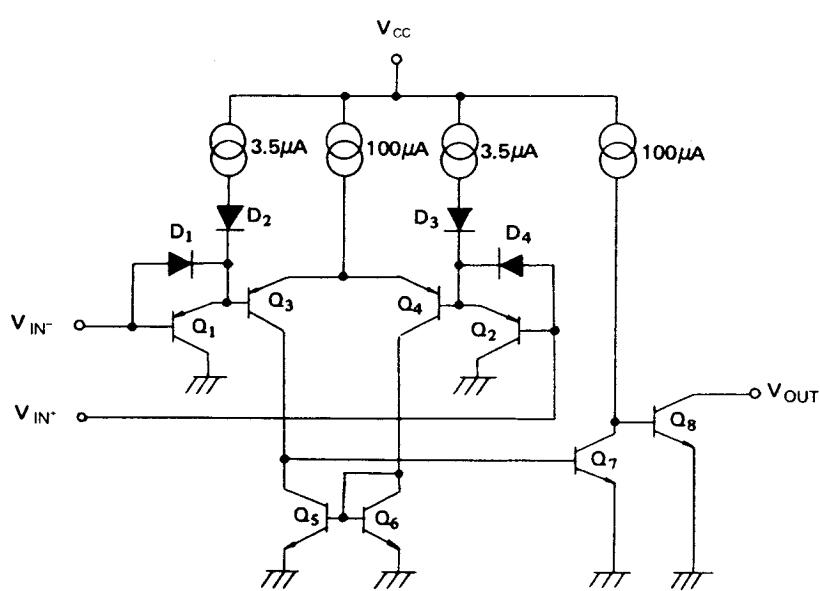
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□ **APPLICATION CIRCUITS (V$_{CC}$ =15V)**

4. AND Gate

D=A·B·C

5. OR Gate

D=A+B+C
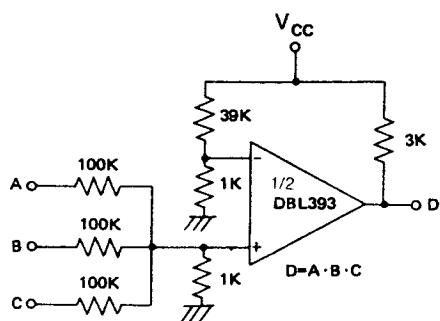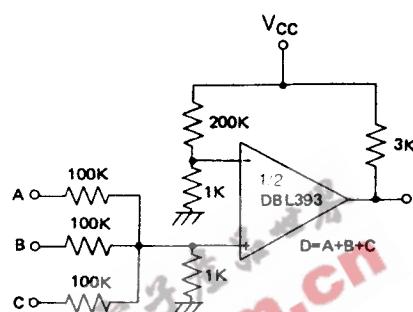
6. Squarewave Oscillator
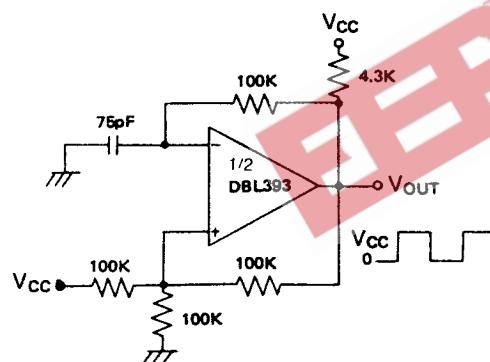
7. Pulse Generator
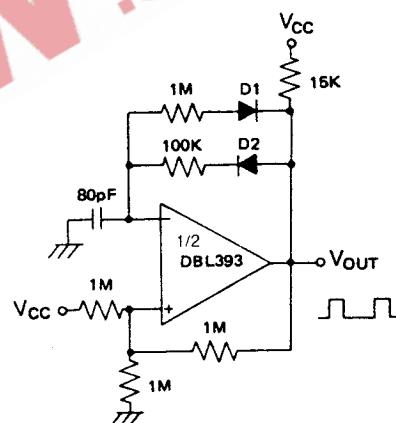
8. One-Shot Multivibrator with Input Lock Out

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1. Basic Comparator
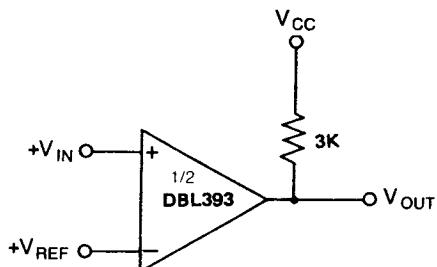
2. Driving CMOS
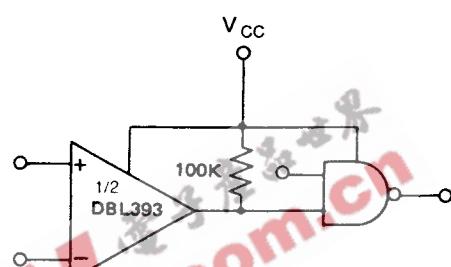
3. Two Decade High Frequency V.C.O
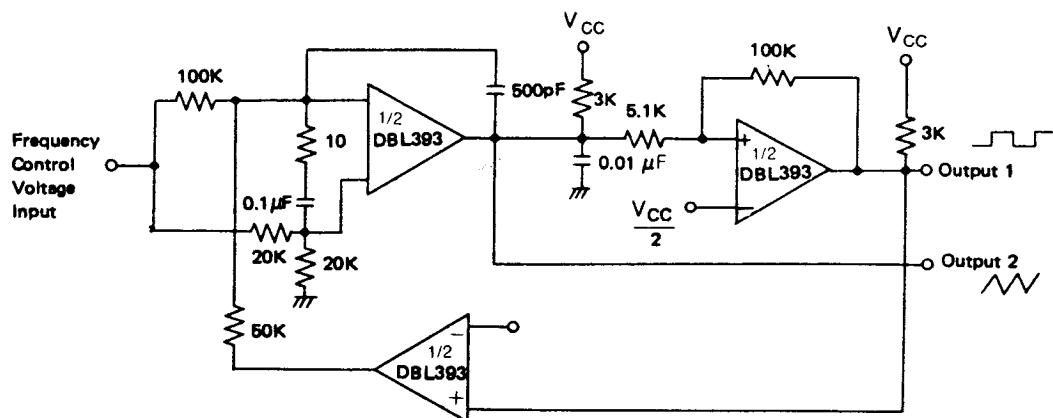
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☐ ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, $V_{CC} = 5V$ and $0°C \leq Ta \leq 70°C$

Characteristic	Symbol	Test Condition		Min.	Typ.	Max.	Unit
Input Offset Voltage	V_{IOS}	$V_{OUT} = 1.4V$, $5V \leq V_{CC} \leq 30V$	$Ta = 25°C$	—	±1	±5	mV
		$Rg = 0\,\Omega$, $0V \leq V_{IC} \leq V_{CC} - 1.5V$		—	—	9	mV
Input Offset Current	I_{IOS}	—	$Ta = 25°C$	—	±5	±50	nA
				—	—	±150	nA
Input Bias Current	I_{IB}	—	$Ta = 25°C$	—	25	250	nA
				—	—	400	nA
Input Common Mode Voltage Range	V_{ICR}	—	$Ta = 25°C$	0	—	V_{CC}-1.5	V
				0	—	V_{CC} -2	V
Supply Current	I_{CC}	$R_L = \infty$, $V_{CC} = 30V$,		—	—	2.5	mA
Voltage Gain	G_V	$R_L \geq 15K\,\Omega$, $V_{CC} = 15V$, $Ta = 25°C$		50	200	—	V/mV
Response Time — Large Signal	t_R	$V_{RL} = 5V$ $R_L = 5.1K\,\Omega$ $Ta = 25°C$	$V_{IN} = $ TTL Logic swing $V_{REF} = 1.4V$	—	300	—	nS
Response Time — Small Signal			$V_{IN} = 100mV$ Input step with 5mV overdrive	—	1.3	—	µS
Output sink Current	I_{SINK}	$V_{IN-} \geq 1V$, $V_{IN+} = 0V$, $V_{OUT} \leq 1.5V$, $Ta = 25°C$		6	16	—	mA
Output Leakage Current	I_{LEAK}	$V_{IN+} \geq 1V$ $V_{IN-} = 0V$	$V_{OUT} = 5V$ $Ta = 25°C$	—	0.1	—	nA
			$V_{OUT} = 30V$	—	—	1	µA
Saturation Voltage	V_{SAT}	$V_{IN-} \geq 1V$, $V_{IN+} = 0V$	$Ta = 25°C$	—	250	400	mV
		$I_{SINK} \leq 4mA$		—	—	700	mV
Differential Input Voltage	V_{IND}	Keep all $V_{IN'S} \geq 0V$		—	—	36	V

* V_{IC} : Input Common Mode Voltage

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☐ TYPICAL PERFORMANCE CHARACTERISTICS

$I_{CC}-V_{CC}$

$I_{IN}-V_{CC}$

$V_{OUT}-I_{OUT}$

$V_{OUT}, V_{IN}-t_R$

$V_{OUT}, V_{IN}-t_R$
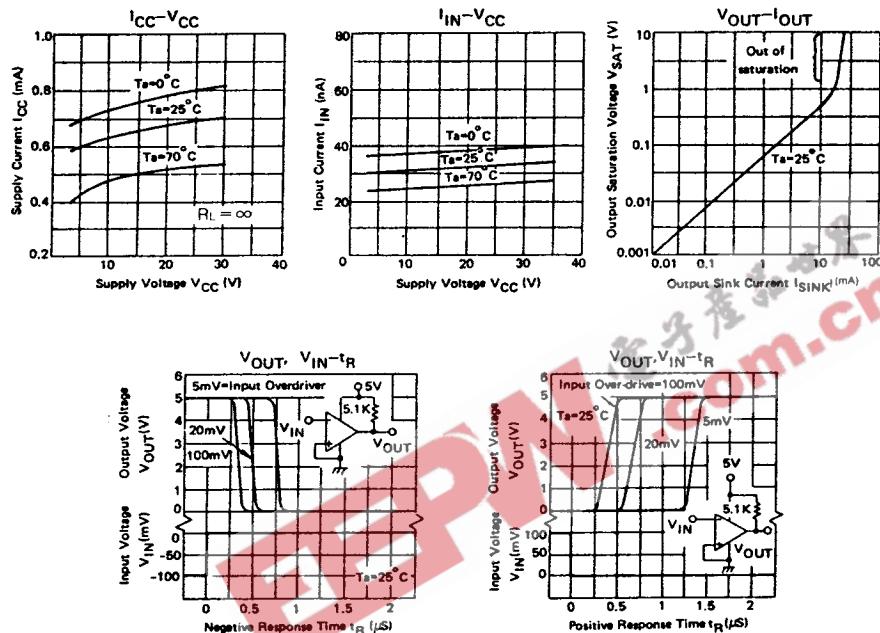
☐ APPLICATION INFORMATION

During the output voltage transition intervals as the comparator changes states, the DBL393 can easily oscillate if the output lead is inadvertently allowed to capacitively couple to the inputs via stray capacitance. PC board layout is helpful as it reduces stray input-output coupling. Reducing the input resistors to less than 10K Ω reduces the feedback signal levels and finally. Adding even a small amount (1 to 10mV) of positive feedback(hysteresis)causes such a rapid transition that oscillations due to stray feedback are not possible. It is good design practice to ground all pins of any unused comparator

The differential input voltage may be larger than V_{CC} without damaging the device. Because input voltages more negative than $-0.3V$ (at 25°C) should not be used, an input clamp diode can be used as protection. The output of the DBL393 is the uncommitted collector of a grounded-emitter NPN output transistor. Many collectors can be tied together to provide an wired-OR output function.

When the output sink current limit (approximately 16mA) is exceeded, the output transistor will come out of saturation and output voltage will rise very rapidly. Under this limit, the output saturation voltage is limited by the approximately 60 Ω saturation resistance of the output transistor.