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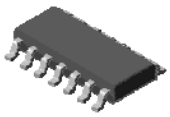
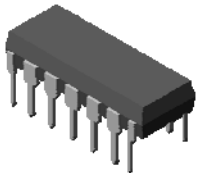
Low Power Quad Comparator SN339/P



SOP-14



DIP-14

Description

The SN339 consists of four independent voltage comparators designed to operate from a single power supply over a wide voltage range.

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 they are operated from a single power supply voltage.

Application

◈ A/D Converters
◈ Wide Range VCO
◈ MOS Clock Generator
◈ High Voltage Logic Gate
◈ Multi-Vibrators

ORDERING INFORMATION

Product Name.	Marking	Package Name
SN339	SN339	SOP-14
SN339P	SN339P	DIP-14

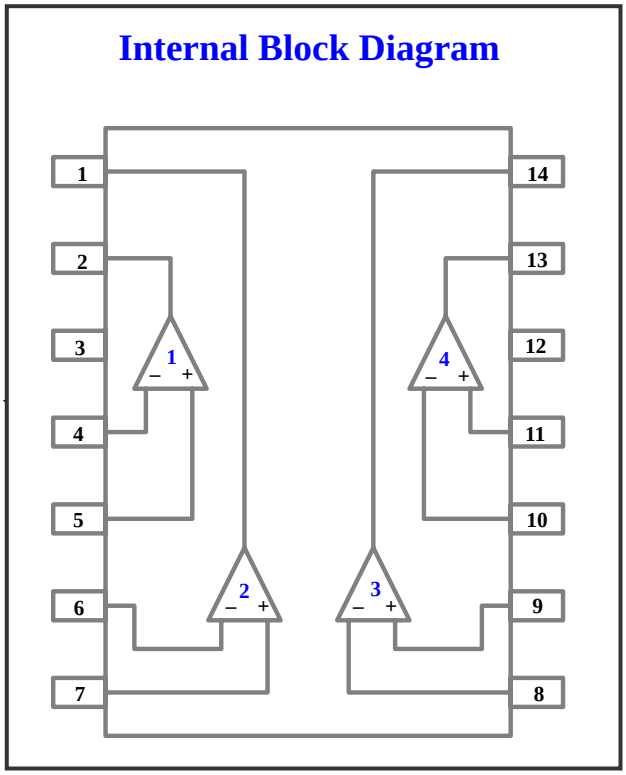
▲ **Marking Information**

① Device Code
② Year & Week Code

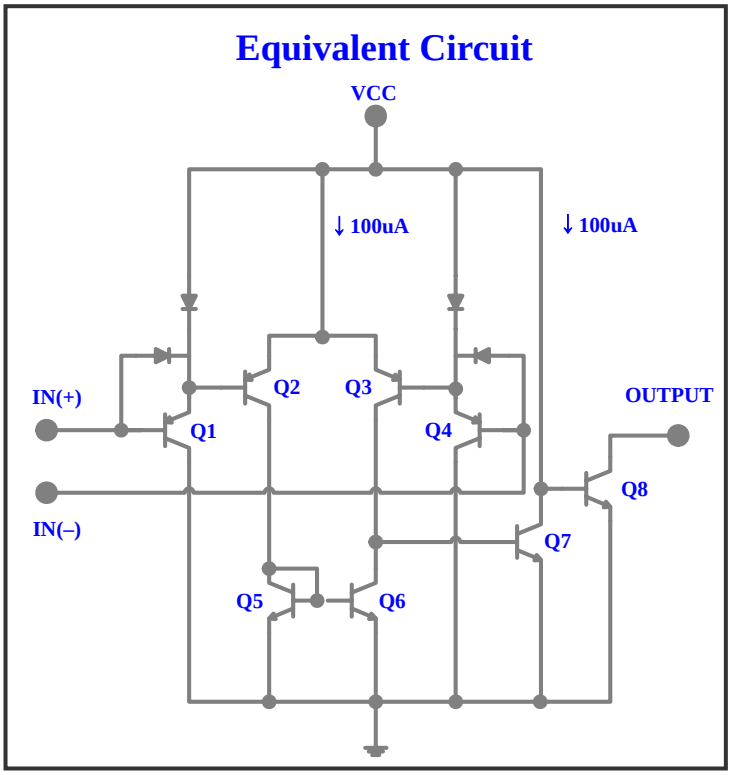
Features and Benefits

◈ Wide single supply voltage range [2.0V to 36V]
or dual supplies [±1.0V to ±18V]
◈ Very low supply current drain [Typ. 0.8mA]
◈ Low input biasing current [Typ. 25nA]
◈ Low input offset current and offset voltage
◈ Differential input voltage range equal to the Vcc
◈ Low output 250mV at 4mA saturation voltage
◈ Output voltage compatible with TTL, DTL, ECL even CMOS Logic systems

Internal Block Diagram



Equivalent Circuit



◈ Pin Description

No	Symbol	I/O	Description
1	Output2	O	Comparator 2's Output
2	Output1	O	Comparator 1's Output
3	V_{CC}	PWR	V_{CC} for Quad Comparators
4	IN1(-)	I	Comparator 1's Inverting Input
5	IN1(+)	I	Comparator 1's Non- Inverting Input
6	IN2(-)	I	Comparator 2's Inverting Input
7	IN2(+)	I	Comparator 2's Non- Inverting Input
8	IN3(-)	I	Comparator 3's Inverting Input
9	IN3(+)	I	Comparator 3's Non- Inverting Input
10	IN3(-)	I	Comparator 4's Inverting Input
11	IN3(+)	I	Comparator 4's Non- Inverting Input
12	GND	GND	Ground
13	Output4	O	Comparator 4's Output
14	Output3	O	Comparator 3's Output

Absolute maximum ratings

Characteristic	Symbol		Ratings	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	SOP-14	800	mW
		DIP-14	1300	
Junction Temperature	Tj		150	°C
Operating temperature	T_{opr}		-40 ~ +85	°C
Storage temperature	T_{stg}		-55 ~ 150	°C

Electrical Characteristics

(Unless otherwise specified. V_{CC} = 5V, V_{EE} = GND and 0 °C ≤ Ta ≤ +70 °C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Input Offset Voltage	V_{IOS}	V_O = 1.4V, Rs = 0Ω	-	±2	±5	mV
Input Offset Current	I_{IOS}	-	-	±5	±50	nA
Input Bias Current	I_{IB}	-	-	25	250	nA
Input Common Mode Voltage Range	V_{ICR}	-	0	-	V_{CC}–1.5	V
Supply Current	I_{CC}	V_{CC} = 5V, R_L = ∞, All Channel	-	0.8	2	mA
Large Signal Voltage Gain	A_V	V_{CC} = 15V , R_L = 15 KΩ	-	200	-	V/mV
Output Voltage (‘L’ Level)	V_{SAT}	V_{IN+}= 0V, V_{IN-}= 1V I_{SINK}≤ 4mA	-	130	400	mV
Response Time	t_{RES}	V_{RC} = 5V, R_L = 5.1KΩ	-	1.3	-	uS
Output Sink Current	I_{SINK}	V_O≤1.5V, V_{IN+} = 0V, V_{IN-} = 1V	6	16	-	mA
Output Leakage Current	I_{Leak}	V_O = 5V V_{IN+} = 1V, V_{IN-} = 0V	-	0.1	-	nA

Electrical Characteristic Curves

Fig. 1 V_{CC}-I_{CC}

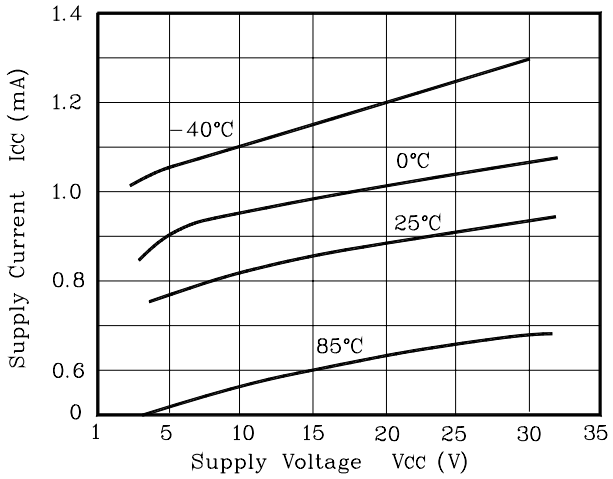


Fig. 2 V_{CC}-I_{IB}

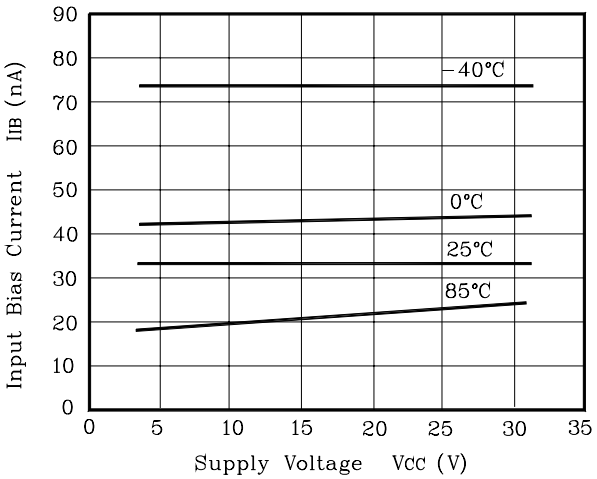


Fig. 3 V_{OL}-I_{SINK}

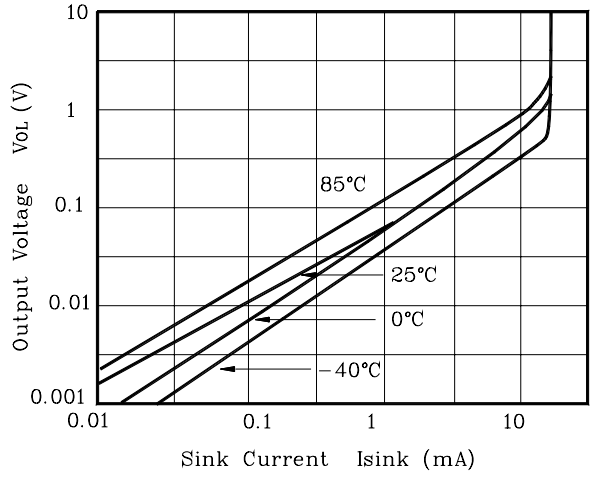


Fig. 4 P_D-Ta

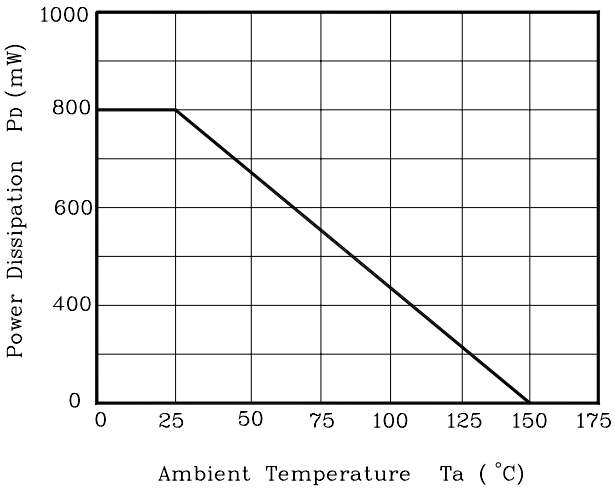


Fig. 5 V_{IN},V_{OUT}-t_{rsp}

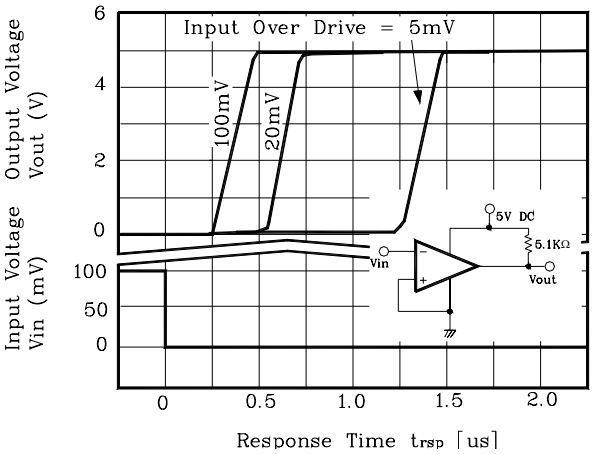
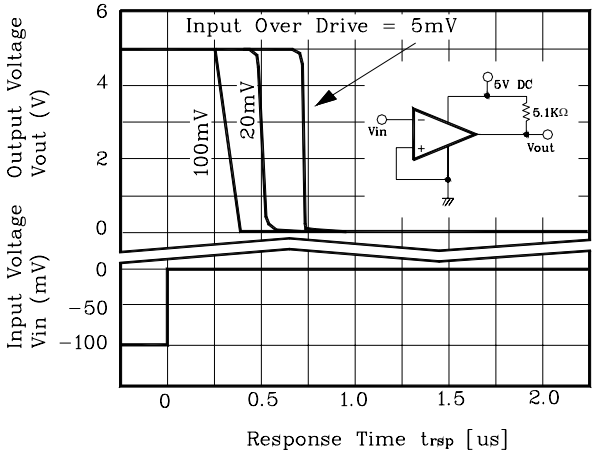
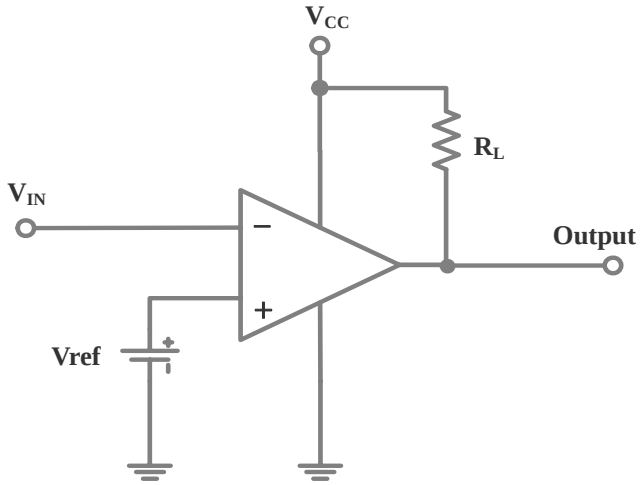


Fig. 6 V_{IN},V_{OUT}-t_{rsp}

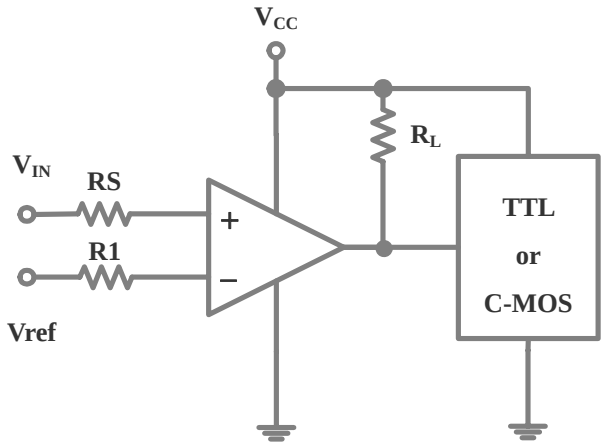


Typical Applications

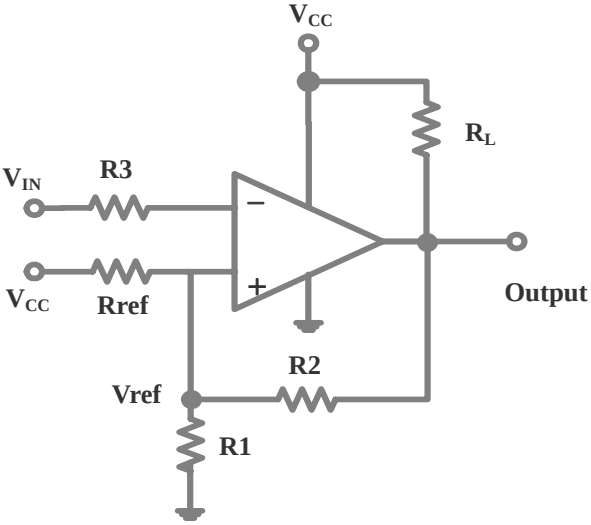
Basic Comparator



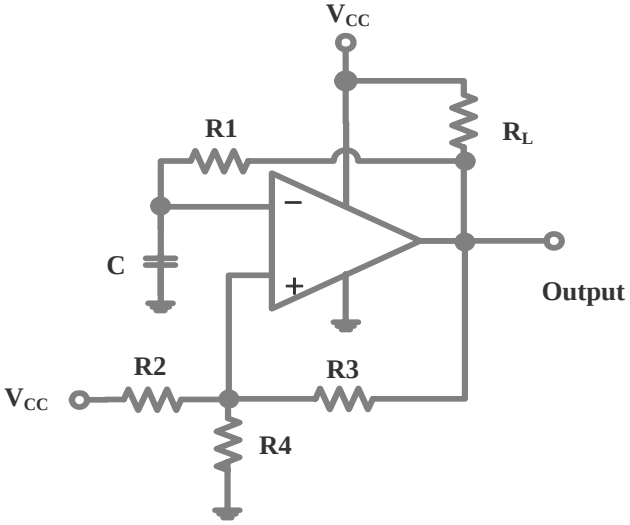
Driving Logic or C-MOS



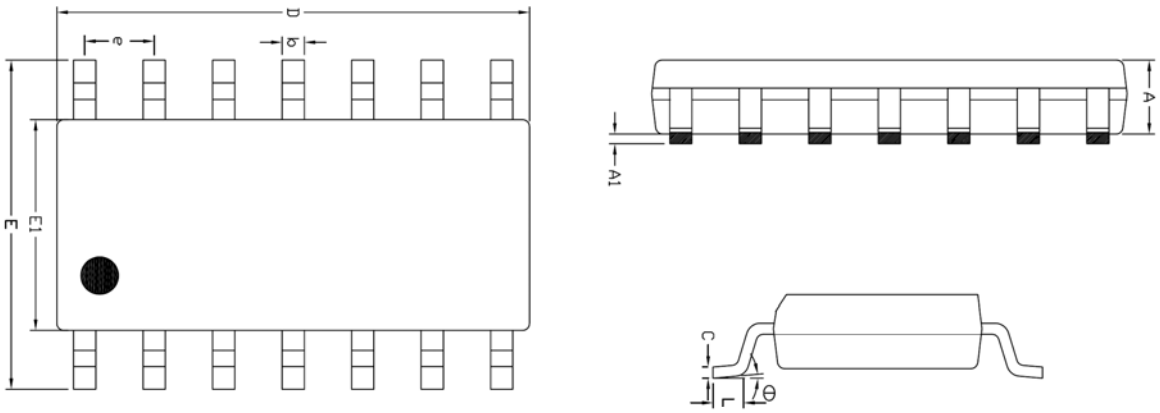
Comparator with Hysteresis Circuit



Square-wave Oscillator

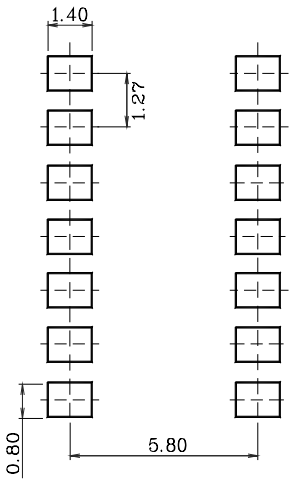


Outline Dimension (Unit : mm)

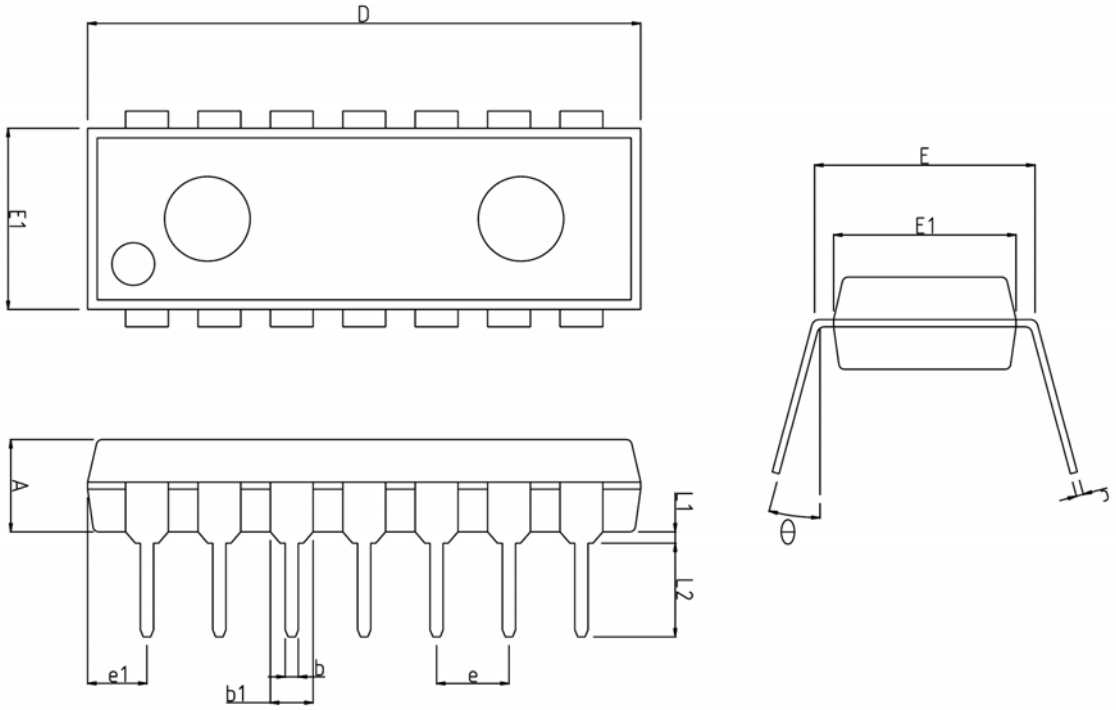


SYMBOL	MILLIMETER(mm)			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	1.245	–	1.445	
A1	0.125	0.175	0.275	
b	0.320	0.420	0.520	
c	0.170	0.220	0.270	
D	8.536	8.636	8.736	
E	5.870	6.020	6.170	
E1	3.761	3.861	3.961	
e	1.270 BSC			
L	0.462	0.562	0.662	
θ	0 °	–	8 °	

※ Recommend PCB solder land (Unit : mm)



Outline Dimension (Unit : mm)



SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	3.05	3.25	3.45	
b	0.36	0.46	0.56	
b1	1.40	1.50	1.60	
c	0.20	0.25	0.35	
D	19.20	19.40	19.60	
E	7.37	7.62	7.87	
E1	6.20	6.40	6.60	
e	2.54 TYP			
e1	2.08 TYP			
L1	0.20	–	–	
L2	3.00	3.30	3.60	
θ	0°	–	15°	

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