

IR9393/IR9393N Dual Comparator

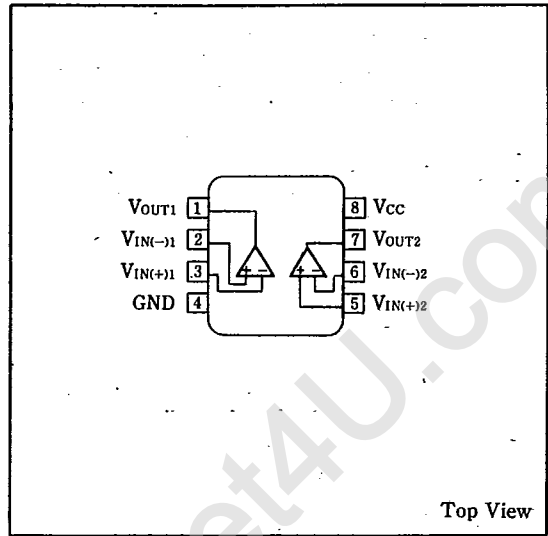
■ Description

The IR9393/IR9393N is a high performance dual comparator, which operates from a single power supply to a wide range of voltages. It's output is compatible with DTL, TTL and MOS logic circuits.

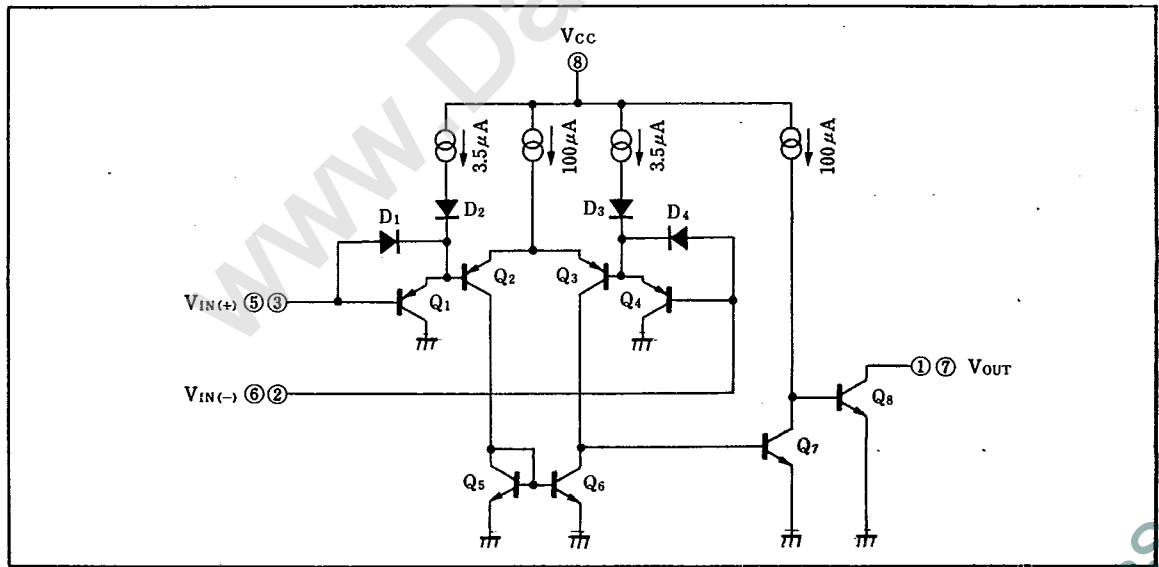
■ Features

1. Single supply or dual supply
2. Wide range of supply voltage
 2~36V :single supply
 ±1~±18V :dual supply
3. Low supply current drain independent of supply voltage 0.4mA (TYP.)
4. Wide common-mode input voltage range
 0~(V_{CC}-1.5V): single supply
5. 8-pin dual-in-line package (IR9393)
 8-pin small-outline package (IR9393N)

■ Pin Connections



■ Equivalent Circuit



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Dual Comparator

IR9393/IR9393N

Absolute Maximum Ratings

(Ta=25°C)

Parameter	Symbol	Condition	Rating	Unit	
Supply voltage	$V_{CC}-V_{EE}$		36	V	
Differential input voltage	V_{ID}		36	V	
Input voltage	V_{IN}		-0.3~+36	V	
Power dissipation	P_D	$T_a \leq 25^\circ C$	IR9393	570	mW
			IR9393N	230	
P_D derating ratio	$\Delta P_D/^\circ C$	$T_a > 25^\circ C$	IR9393	5.7	mW/°C
			IR9393N	2.3	
Operating temperature	T_{opr}		-30~+85	°C	
Storage temperature	T_{stg}		-55~+150	°C	

Electrical Characteristics

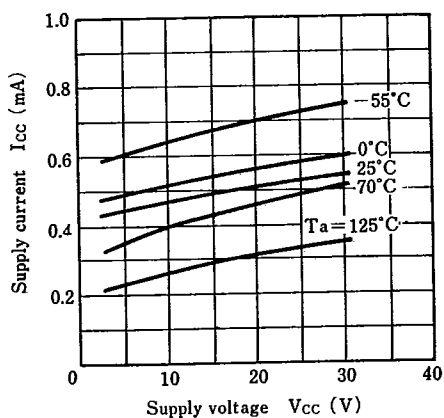
(V_{CC}=5V, Ta=25°C)

Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit	Note
Input offset voltage	V_{IO}	$V_{OUT}=1.4V, V_{REF}=1.4V, R_S=0\Omega$		±1	±5	mV	
Input offset current	I_{IO}	$V_{OUT}=1.4V$		±5	±50	nA	
Input bias current	I_B	$V_{OUT}=1.4V$		25	250	nA	1
In-phase input voltage	V_{ICM}		0		$V_{CC}-1.5$	V	
Major amplitude voltage gain	A_V	$R_L=15k\Omega$		106		dB	
Supply current	I_{CC}	$R_L=\infty$		0.4	1	mA	
Response time		$R_L=5.1k\Omega, V_{RL}=5V$		1.3		μs	2
Output sink current	I_{sink}	$V_{REF}=0V, V_{IN}=1V, V_{OUT} \leq 1.5V$	6	16		mA	
Output saturation voltage	V_{SAT}	$V_{REF}=0V, V_{IN}=1V, I_{sink}=3mA$		0.25	0.4	V	
Output leakage current	I_{OL}	$V_{IN}=0V, V_{REF}=1V, V_{OUT}=5V$		0.1		nA	
Differential input voltage	V_{ID}	$V_{CC}=5\sim 30V$ Keep $V_{IN'S} \geq 0V_{DC}$ (or V_{EE} if used)			V_{CC}	V	3

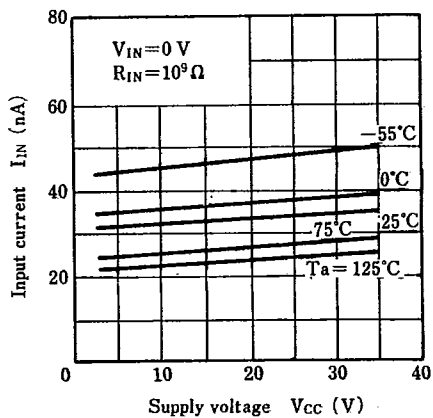
- Note 1) Determined by the flow-out current (input stage organized as PNP transistor)
- Note 2) The value when the input amplitude is 100mV and the overdrive is 5mV. By increasing the amount of overdrive, reduction of the response time is possible.
- Note 3) The input voltage is allowed to exceed V_{CC} . When either of the input terminal voltages is within the in-phase voltage range, the comparator comes in the right output state. But make sure that the input should never be allowed to exceed the maximum rated voltage.

Electrical Characteristic Curves (Unless otherwise specified, Ta=25°C)

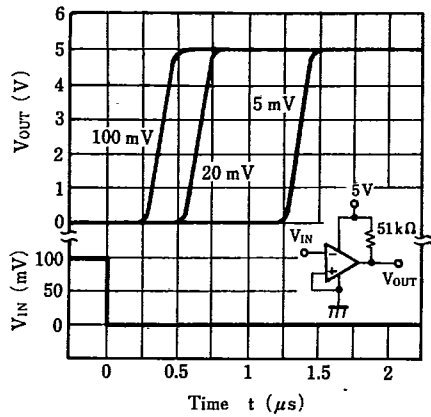
Supply current—Supply voltage Characteristics



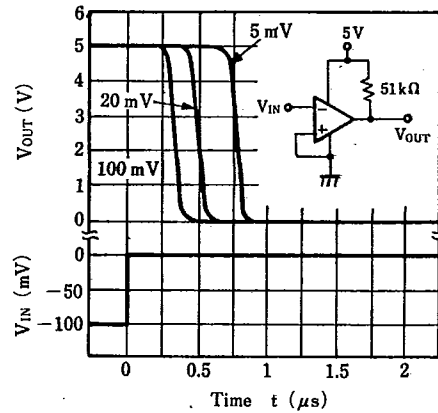
Input current—Supply voltage Characteristics



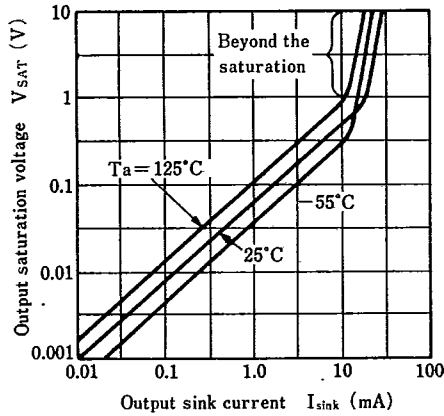
Response time (positive) Characteristics



Response time (negative) Characteristics

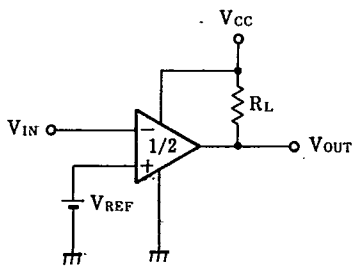


Output saturation voltage — Output sink current Characteristics

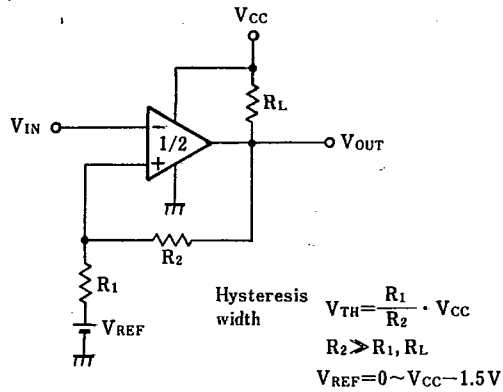


Application Circuit Example

(1)



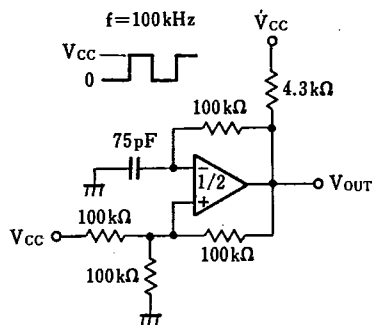
(2)



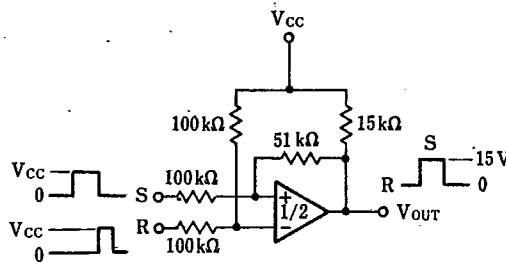
Dual Comparator

IR9393/IR9393N

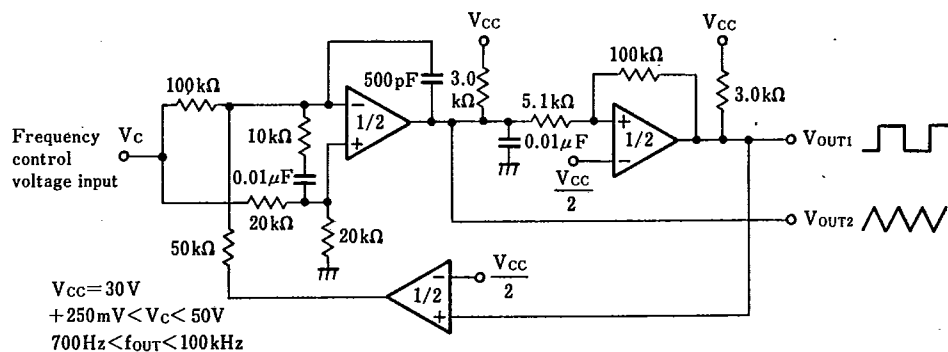
(3) Rectangular generator



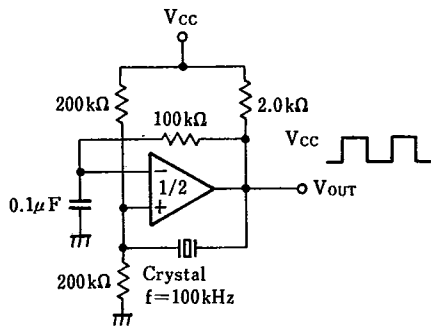
(4) Bistable multi-vibrator



(5) Double digit high frequency VCO



(6) Crystal control oscillator



(7) Inverted comparator with hysteresis

