



概述:

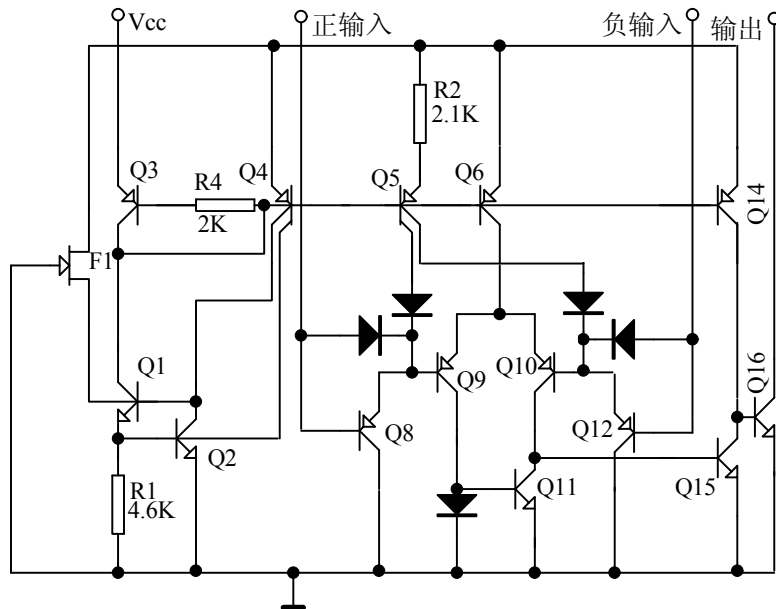
LM393P是由两个独立、精确的电压比较器组成，其失调电压不超过 2.0mV。可在单电源下或双电源下工作。并且其电流大小不受电源电压幅度大小影响。这些比较器有一个独特的性能，就是即使在单电源下工作时，其输入共模电压范围也能达到零电平。主要用于消费类和工业类电子产品中。

采用 DIP-8和 SOP-8 封装形式。

主要特点:

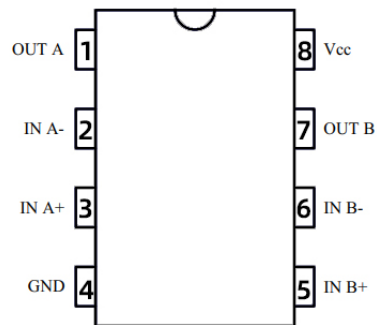
- 工作电源电压范围宽： 单电源： 2.0V~36V
双电源： $\pm 1.0V\sim\pm 18V$
- 电源电流小： 0.8mA 与电源电压无关
- 输入偏置电流低： 25nA
- 输入失调电流低： 5.0nA
- 输入失调电压低： 5.0mV
- 输入共模电压范围可达零电平
- 输入差分电压的范围与电源电压的范围一致。
- 可与 TTL、DTL、ECL、MOS 和 CMOS 兼容。

内部电路图





引出端功能符号



引出端序号	功 能	符 号	引出端序号	功 能	符 号
1	比较器 1 输出	OUT A	5	比较器 2 正相输入	IN B+
2	比较器 1 反相输入	IN A-	6	比较器 2 反相输入	IN B-
3	比较器 1 正相输入	IN A+	7	比较器 2 输出	OUT B
4	地	GND	8	电源	Vcc

极限值（绝对最大额定值，若无其它规定， $T_{amb}=25^{\circ}\text{C}$ ）

参 数 名 称		符 号	数 值		单 位
			最 小	最 大	
电源电压	双电源电压	Vcc	-	± 18	V
	单电源电压			36	
输入差分电压		V _{IDR}		36	V
输入共模电压		V _{ICR}	-0.3	36	V
输出对地短路电流		I _{OG}		20	mA
最大工作结温		T _{J (MAX)}		125	$^{\circ}\text{C}$
功耗 (*)		P _D		570	mW
工作环境温度		T _{amb}	0	70	$^{\circ}\text{C}$
贮存温度		T _{stg}	-65	150	$^{\circ}\text{C}$

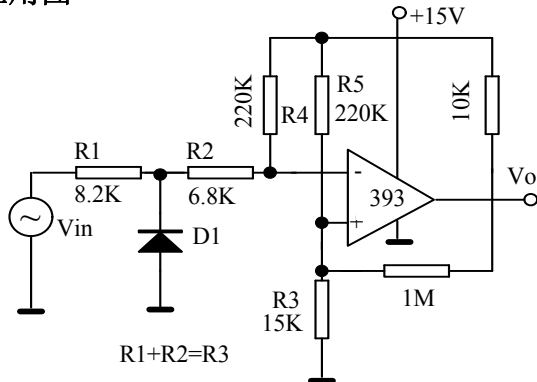


电特性 (若无其它规定, $V_{CC}=5V$, $T_{amb}=25^{\circ}C$)

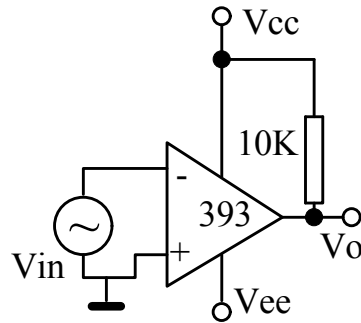
特性	测试条件	符 号	规 范 值			单 位
			最 小	典 型	最 大	
输入失调电压	$T_a=25^{\circ}C$	V_{IO}		± 1.0	± 5.0	mV
	$0^{\circ}C \leq T_a \leq 70^{\circ}C$				± 9.0	
输入失调电流	$T_a=25^{\circ}C$	I_{IO}		± 5.0	± 50	nA
	$0^{\circ}C \leq T_a \leq 70^{\circ}C$				± 150	
输入偏置电流	$T_a=25^{\circ}C$	I_{IB}		25	250	nA
	$0^{\circ}C \leq T_a \leq 70^{\circ}C$				400	
输入共模电压范围	$T_a=25^{\circ}C$	V_{ICR}	0		$V_{CC}-1.5$	V
	$0^{\circ}C \leq T_a \leq 70^{\circ}C$		0		$V_{CC}-2.0$	
电源电流	$R_L=\infty$ 双比较器	I_{CC}		0.4	1.0	mA
	$R_L=\infty$ 双比较器, $V_{CC}=30V$				2.5	
电压增益	$R_L \geq 15K\Omega$, $V_{CC}=15V$	G_V	50	200		V/mV
大信号响应时间	$V_{IN}=\text{TTL}$ 逻辑摆幅, $V_{REF}=1.4V$, $V_{RL}=5.0V$, $R_L=5.1K\Omega$	t_{RES}		300		ns
响应时间	$V_{RL}=5.0V$, $R_L=5.1K\Omega$	t_{RES}		1.3		ns
输入差分电压		V_{ID}			V_{CC}	V
输出陷电流	$V_{IN(-)} \geq 1.0V$, $V_{IN(+)}=0V$, $V_o \leq 1.5V$	I_{SINK}	6.0	16		mA
输出饱和电压	$V_{IN(-)} \geq 1.0V$, $V_{IN(+)}=0V$, $I_{SINK} \leq 4.0mA$	V_{SAT}		150	400	mV
	$V_{IN(-)} \geq 1.0V$, $V_{IN(+)}=0V$, $I_{SINK} \leq 4.0mA$ $0^{\circ}C \leq T_a \leq 70^{\circ}C$				700	
输出漏电流	$V_{IN(+)} \geq 1.0V$, $V_{IN(-)}=0V$, $V_o=5.0V$	I_{OL}		0.1		nA
	$V_{IN(+)} \geq 1.0V$, $V_{IN(-)}=0V$, $V_o=30V$ $0^{\circ}C \leq T_a \leq 70^{\circ}C$				1000	



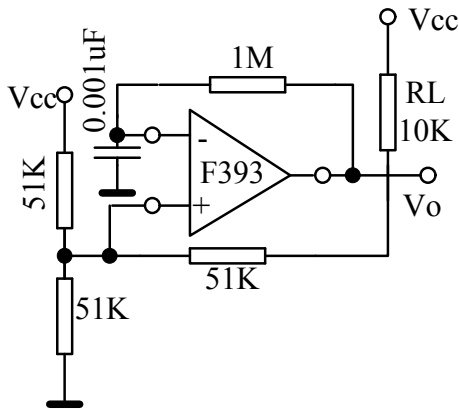
应用图



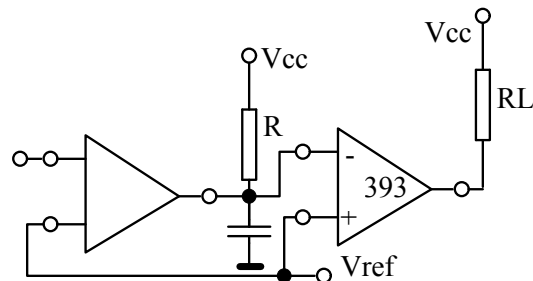
过零检波器(单电源应用)



过零检波器(双电源应用)



方波振荡器



延时发生器

使用说明:

LM393P是高增益、宽频带器件，象大多数比较器一样，如果输出端到输入端有寄生电容而产生耦合，则很容易产生振荡。这种现象仅仅出现在当比较器改变状态时，输出电压过渡的间隙。电源加旁路滤波并不能解决这个问题，标准PC板的设计对减小输入—输出寄生电容耦合是有助的。减小输入电阻至小于 $10K\Omega$ 将减小反馈信号，而且增加甚至很小的正反馈量（滞回 $1.0\sim 10mV$ ）能导致快速转换，使得不可能产生由于寄生电容引起的振荡。除非利用滞后，否则直接插入IC并在引脚上加上电阻将引起输入—输出在很短的转换周期内振荡，如果输入信号是脉冲波形，并且上升和下降时间相当快，则滞回将不需要。

比较器的所有没有用的引脚必须接地。

LM393P偏置网络确立了其静态电流与电源电压范围 $2.0\sim 30V$ 无关。

通常电源不需要加旁路电容。

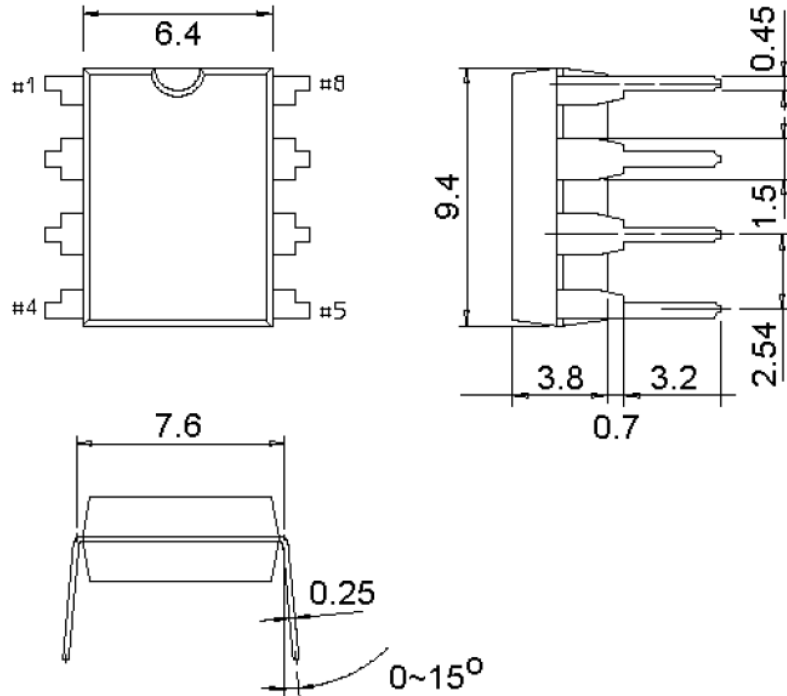
差分输入电压可以大于 V_{cc} 并不损坏器件。保护部分必须能阻止输入电压向负端超过 $-0.3V$ 。

LM393P的输出部分是集电极开路，发射极接地的NPN输出晶体管，可以用多集电极输出提供或功能。输出负载电阻能衔接在可允许电源电压范围内的任何电源电压上，不受 V_{cc} 端电压值的限制。此输出能作为一个简单的对地SPS开路（当不用负载电阻没被运用），输出部分的陷电流被可能得到的驱动和器件的 β 值所限制。当达到极限电流（ $16mA$ ）时，输出晶体管将退出而且输出电压将很快上升。输出饱和电压被输出晶体管大约 60Ω 的 γ_{SAT} 限制。当负载电流很小时，输出晶体管的低失调电压（约 $1.0mV$ ）允许输出箝位在零电平。

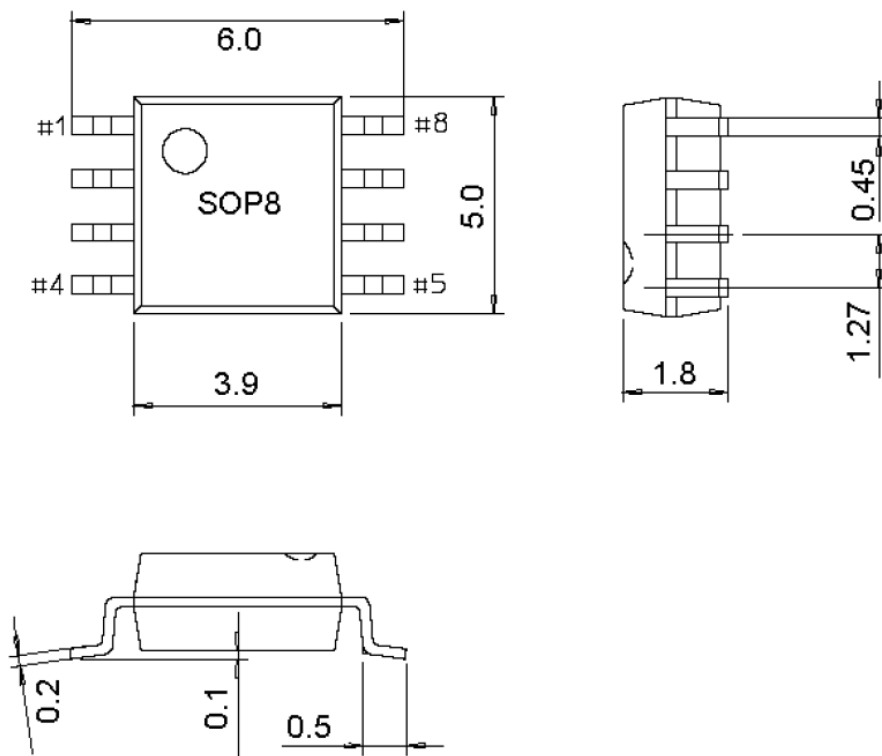


封装信息：

DIP-8



SOP-8





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