

# MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

## ULM2003

### 产品规格手册

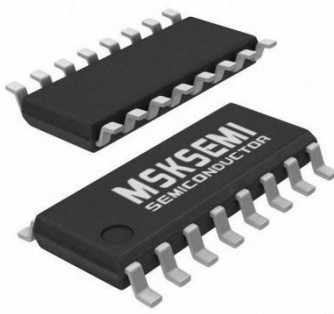
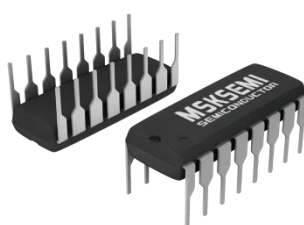
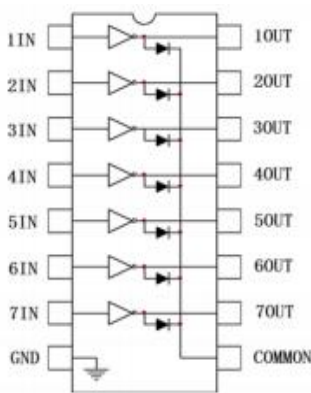

## 概述

ULN2003 是单片集成高耐压、大电流达林顿管阵列，电路内部包含 7 个独立的达林顿管驱动单路。电路内部设计有钳位二极管，可用于驱动继电器、步进电机等感性负载，将达林顿管并联可实现更高的输出电流能力。该电路可广泛应用于继电器驱动、照明驱动、显示屏驱动(LED)、步进电机驱动和逻辑缓冲器。ULN2003 的每一路达林顿管串联一个 2.7K 的基极电阻，在 5V 的工作电压下可直接与 TTL/CMOS 电路连接，可直接处理标准逻辑缓冲器所处理的数据。

## 特征

- 宽输入耐压：0~30V, Ta=25°C
- 输出最大电流：500mA, Ta=25°C
- 输出关闭状态耐压：50V Ta=25°C
- 输入兼容 TTL/CMOS 逻辑信号

## 参考信息

封装图		脚位信息	
			
SOP-16	DIP-16	管脚排列	引脚配置

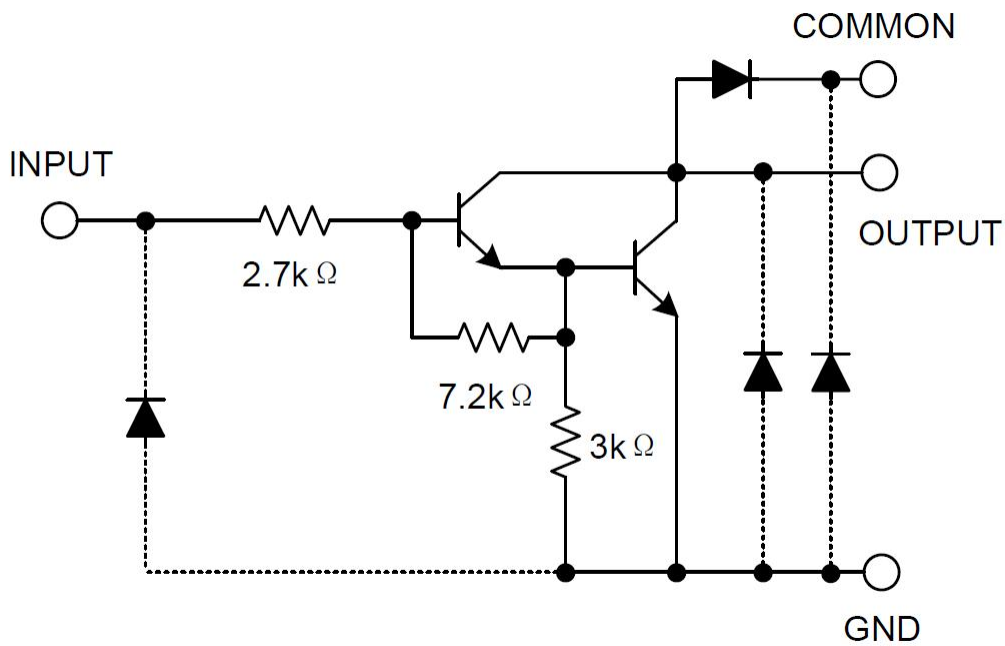
SOP16 DIP16	管脚 定义	管脚功 能描述	SOP16 DIP16	管脚 定义	管脚功 能描述
1	1IN	1 通道输入	16	10UT	1 通道输出
2	2IN	2 通道输入	15	20UT	2 通道输出
3	3IN	3 通道输入	14	30UT	3 通道输出
4	4IN	4 通道输入	13	40UT	4 通道输出
5	5IN	5 通道输入	12	50UT	5 通道输出
6	6IN	6 通道输入	11	60UT	6 通道输出
7	7IN	7 通道输入	10	70UT	7 通道输出
8	GND	接电源地	9	COMMON	钳位二极管公共端

## 极限值

极限参数	符号	极限值	单位
输入电压	V <sub>IN</sub>	30	V
输出电压	V <sub>CE</sub>	50	V
集电极电流	I <sub>C</sub>	500	mA
基极电流	I <sub>B</sub>	25	mA
工作温度	T <sub>A</sub>	-40~85	°C
存储温度	T <sub>S</sub>	-65~150	°C
焊接温度	T <sub>W</sub>	260, 10s	°C

注：极限参数是指无论在任何条件下都不能超过的极限值。如果超过此极限值，将有可能造成产品劣化等物理性损伤；同时在接近极限参数下，不能保证芯片可以正常工作。

## 原理逻辑图

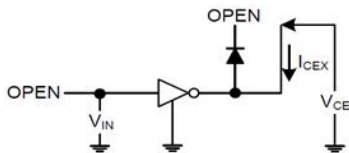


电学特性 (直流电学特性:  $T_A=25^{\circ}\text{C}$ )

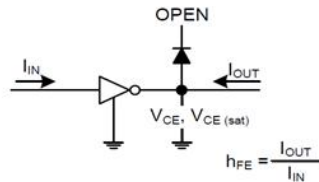
符号	项目	测试条件		测试电路	最小值	典型值	最大值	单位	
ICEX	输出高 漏电流	VCE =50V	Ta=25°C	1	-	0	50	μA	
			Ta=85°C		-	0	100	μA	
VCE (SAT)	输出低 电平电压	IOUT =350mA, IIN=500 μA	2	-	-	1.0	1.6	V	
						IOUT =200mA, IIN=350 μA	0.9	1.3	V
						IOUT =100mA, IIN=250 μA	0.8	1.1	V
IIN(ON)	输入电流	VIN=3.85V, IOUT =350mA		3	-	0.7	1.35	mA	
IIN(OFF)		IOUT =500 μA, Ta=85°C		4	50	63	-	μA	
VIN(ON)	输入电压	VCE =2V	5	-	-	1.8	2.4	V	
						IOUT =250mA	1.85	2.7	V
						IOUT =300mA	1.9	3.0	V
IR	钳位二极管 反向漏电流	VR=50V	6	-	-	0	50	μA	
						Ta=85°C	0	100	μA
VF	钳位二极管压降	IF=350mA	Ta=25°C	7	-	1.7	2.0	V	
tON	开启延迟时间	VOUT=50V, RL=125 Ω, CL=15pF		8	-	0.1	1	μs	
tOFF	关断延迟时间	VOUT=50V, RL=125 Ω, CL=15pF							

测试方法

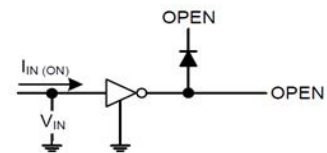
1. ICEX



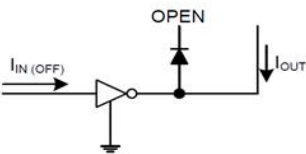
2. VCE (sat), hFE



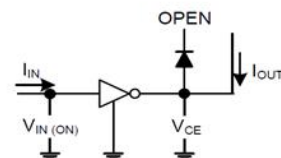
3. IIN(ON)



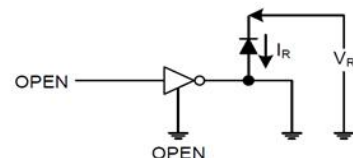
4. IIN(OFF)



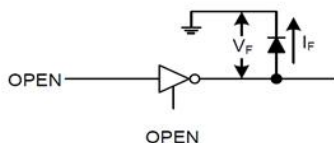
5. VIN(ON)



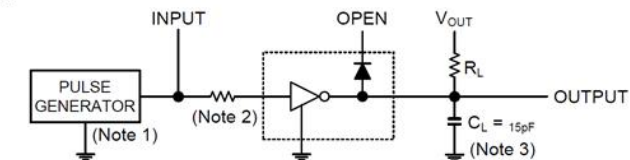
6. IR



7. VF

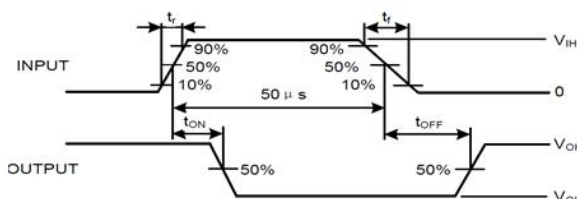


8. tON, tOFF



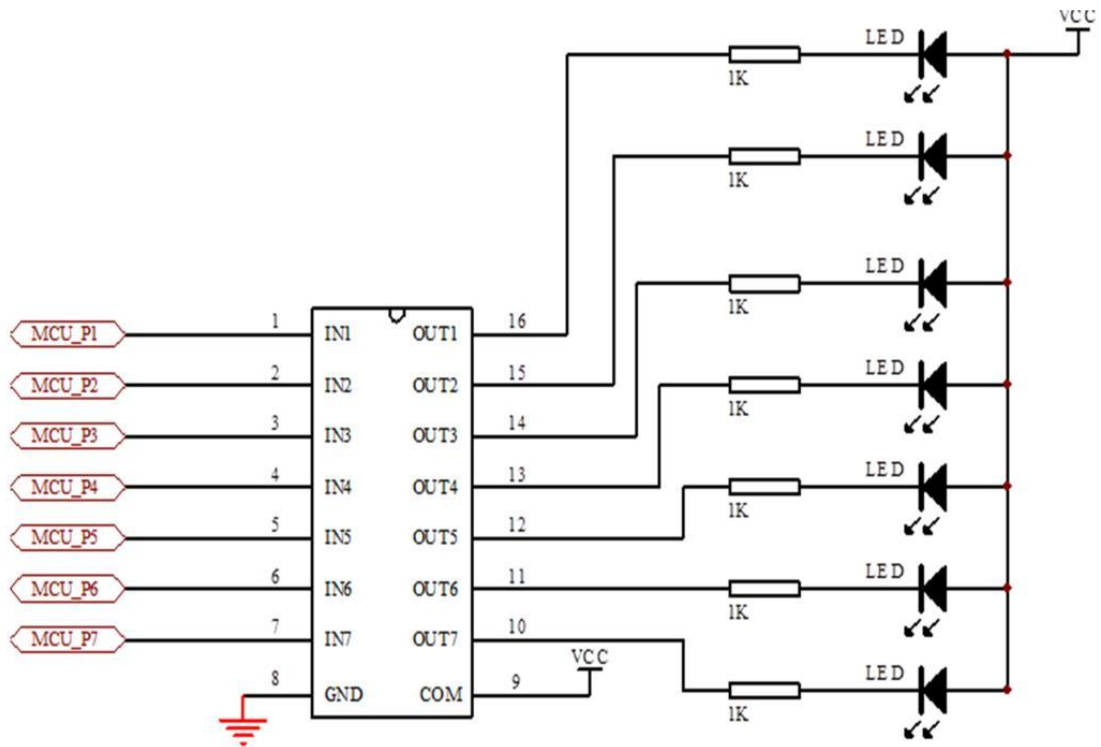
8. tON, tOFF 注:

- (1) 脉冲宽度为 50US, 占空比为 10%, 输出负载 125 Ω, tr<=20ns, tf<=20ns;
- (2) R=0, VIH=3V;
- (3) CL 包括探针和测试夹具的电容。



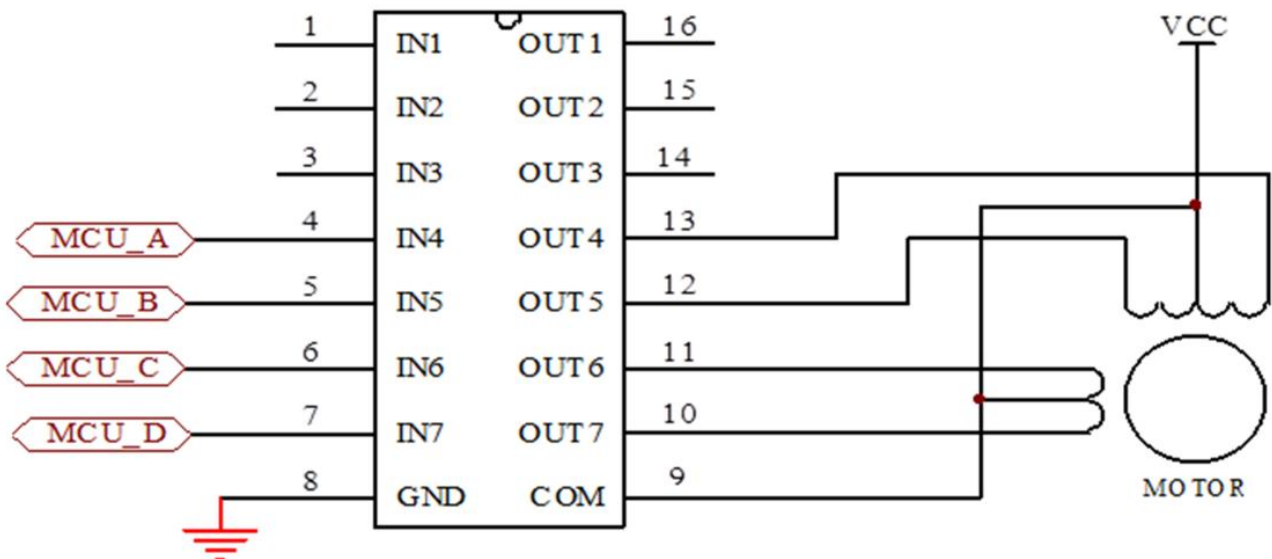
## 典型应用线路

### 1. LED 驱动电路

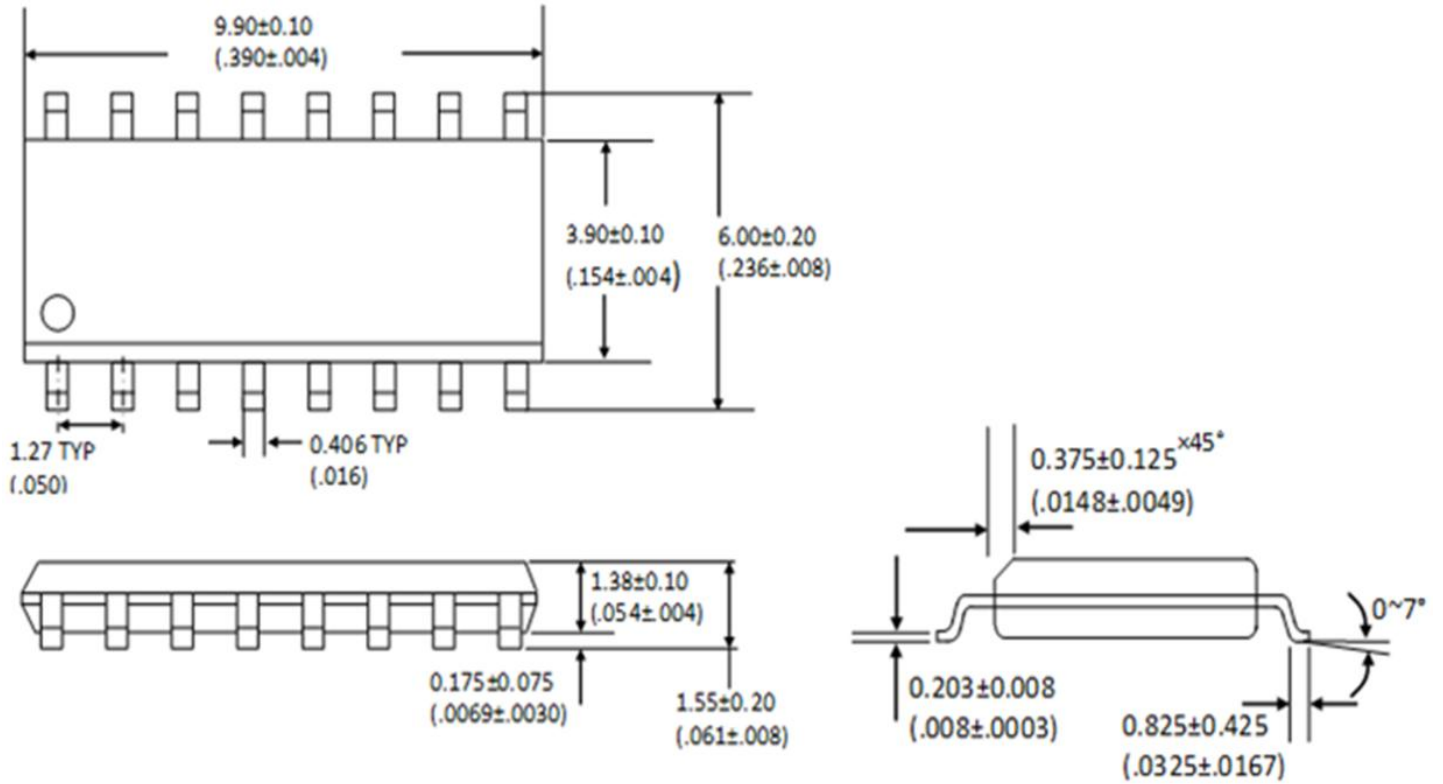


注：1K 的电阻可根据 VCC 的电压和所需 LED 的电流进行调整。

### 2. 步进电机驱动电路



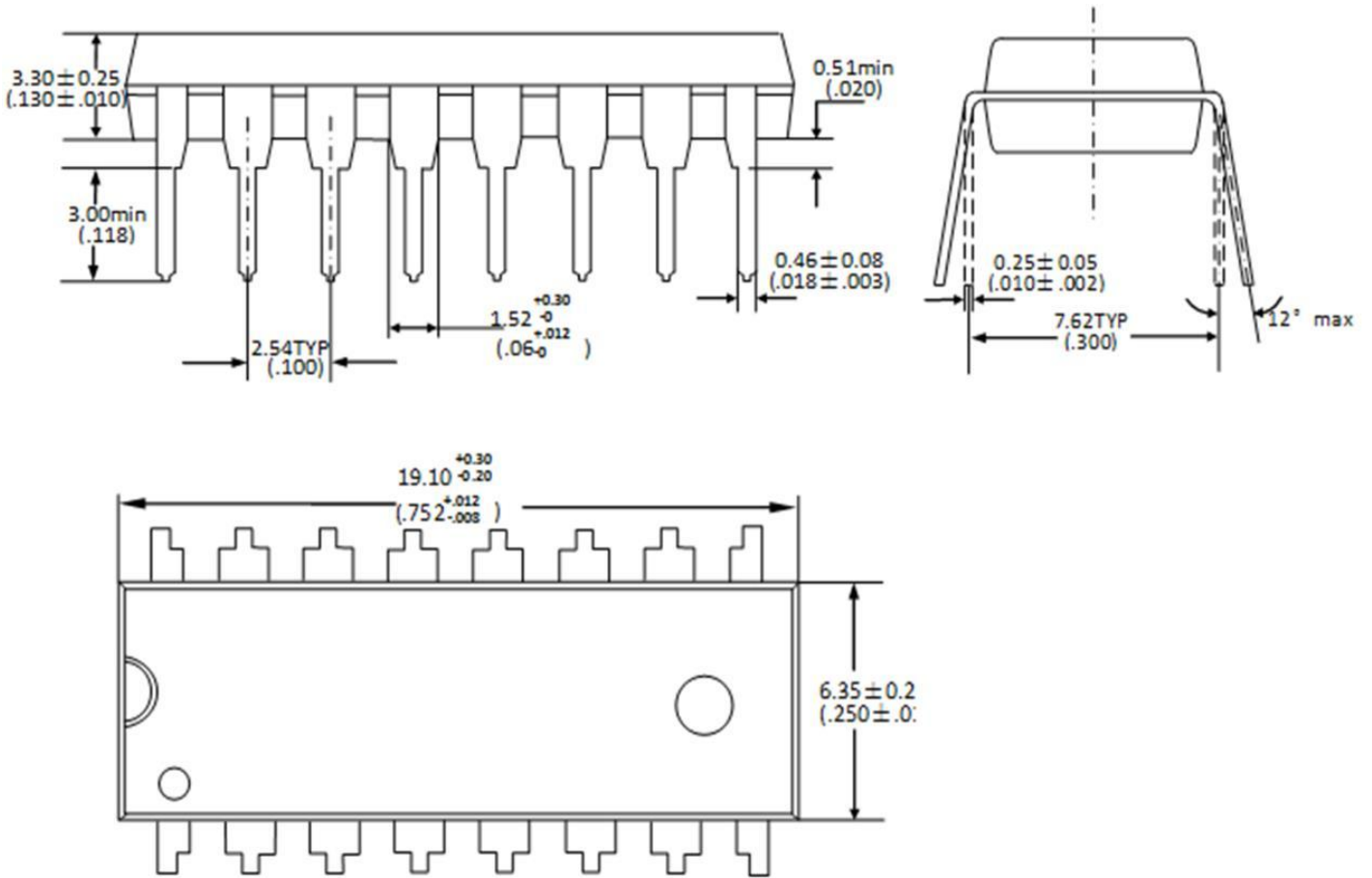
SOP-16 包装数据



卷轴规格

P/N	PKG	QTY
ULN2003	SOP-16	4000

DIP-16 包装数据



卷轴规格

P/N	PKG	QTY
ULN2003	DIP-16	1000

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