

MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

74HC595D(MS)

产品规格手册

产品简介

74HC595 是一款 8 位 CMOS 移位寄存器。8 位并行输出端口为可控的三态输出，一个串行输出端口， 可以实现多级芯片串行控制，组成 8n 位（n 为芯片数量）并行输出。

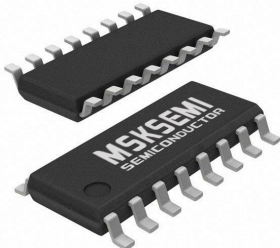
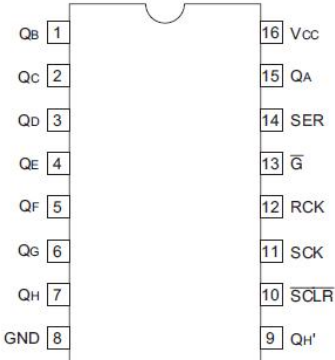
产品用途

- LED 数码管驱动
- 自动化工程控制
- 其它应用领域

产品特点

- 低输入电流：≤1uA
- 可控的三态输出设计
- CMOS 串行输出，可用于多个设备的级联
- 低功耗： Icc≤5.0 μA, @ VCC=6V
- 标准串行（SPI）接口
- 封装形式：SOP16

封装形式和管脚功能定义

封装图	脚位信息	封装形式	SOP16			
		管脚序号	管脚定义	功能说明		
		15	Q _A	Q _A ~Q _H 八位数据并行输出端		
		1~7	Q _B ~Q _G			
		8	GND	电源地		
		9	Q' _H	串行数据输出管脚		
		10	$\overline{\text{SCLR}}$	移位寄存器清零端		
		11	SCK	数据输入时钟端		
		12	RCK	输出存储器锁存时钟端		
		13	$\overline{\text{G}}$	输出使能端		
		14	SER	数据输入端		
		SOP-16		16	VCC	电源端

真值表（“↑” 表示上升沿；“↓” 表示下降沿）

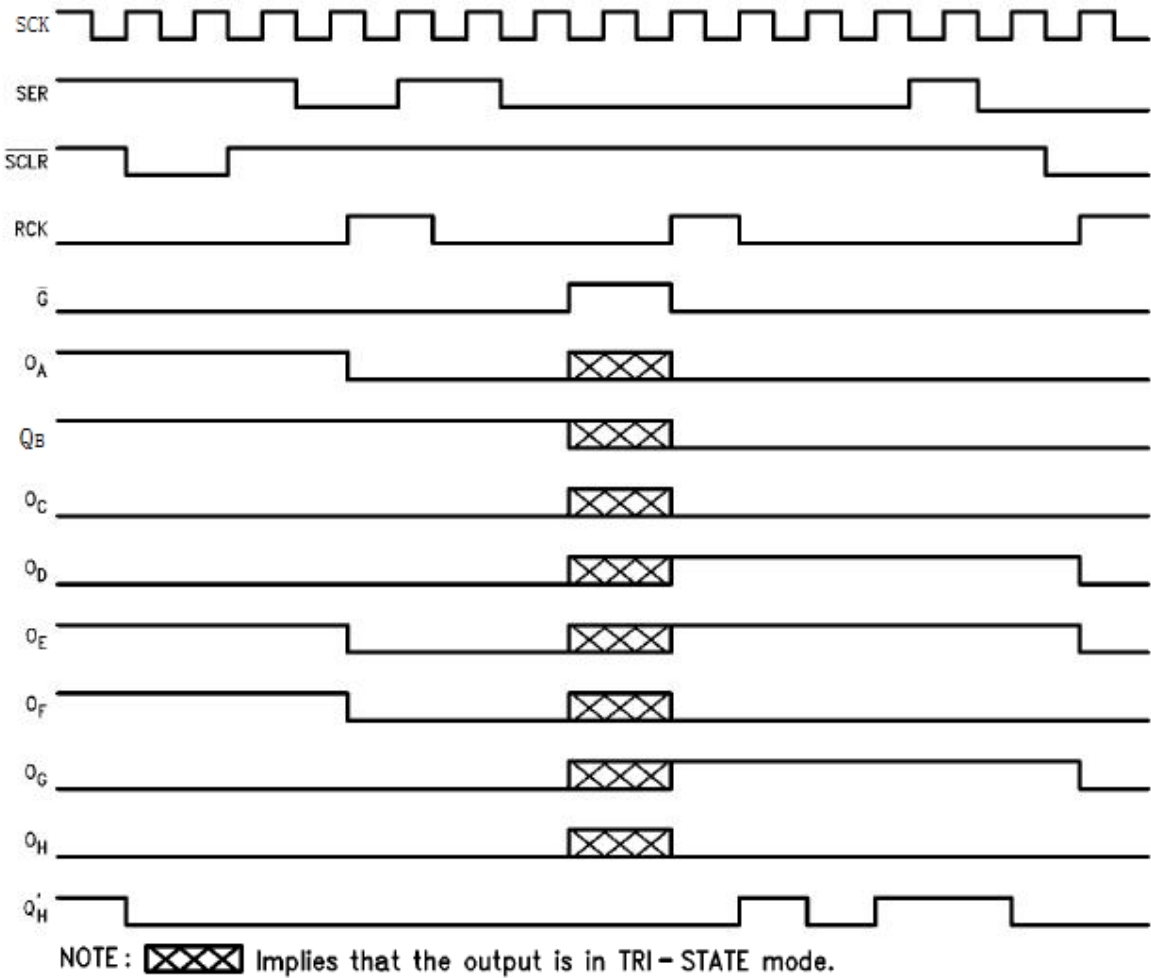
输入管脚					输出管脚
SER	RCK	SCK	SCLR	—	
X	X	X	X	H	QA~QH 输出端高阻态
X	X	X	X	L	QA~QH 输出端输出有效值 L 或 H
X	X	X	L	L	移位寄存器清零，QH=0
L	X	↑	H	L	移位寄存器存储 L 值，QH 输出 Qn-1
H	X	↑	H	L	移位寄存器存储 H 值，QH 输出 Qn-1
X	X	↓	H	L	移位寄存器状态保持不变
X	↑	X	H	L	8 位锁存移位寄存器中的状态值并行输出
X	↓	X	H	L	存储器输出状态保持不变

极限参数

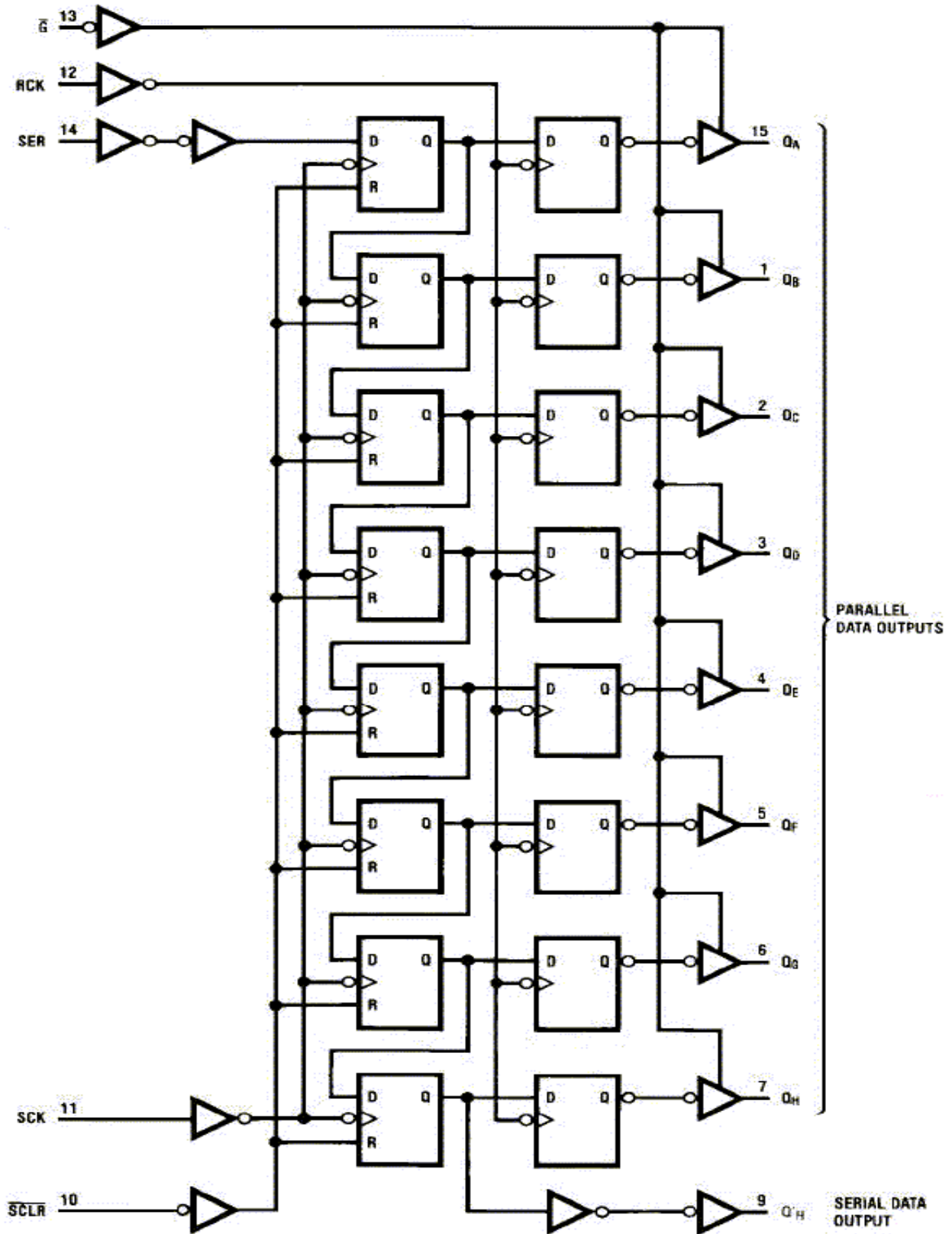
参数	符号	极限值	单位
工作电压	V_{CC}	- 0.5 to 6.5	V
输入/输出电压	V_{IN} 、 V_{OUT}	- 0.5 to $V_{CC}+0.5$	V
输入/输出钳位电流	I_{IK} 、 I_{OK}	± 20	mA
输出电流	I_{OUT}	± 35	mA
VCC、GND 电流	I_{CC} 、 I_{GND}	± 70	mA
耗散功率	P_D	500	mW
工作温度	T_A	0-70	°C
存储温度	T_S	-65-150	°C
引脚焊接温度	T_W	260, 10s	°C

注：极限参数是指无论在任何条件下都不能超过的极限值。万一超过此极限值，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。

时序图



原理逻辑图



工作条件

项目	符号	最小值	典型值	最大值	单位
电源电压	V_{CC}	2	5	6	V
输入输出电压	V_{IN} 、 V_{out}	0		V_{CC}	V
输入上升/ 下降时间	t_r t_f	$V_{CC}=2.0V$		1000	ns
		$V_{CC}=4.5V$		500	ns
		$V_{CC}=6.0V$		400	ns

电学特性

直流电学特性： $T_A=25^{\circ}C$

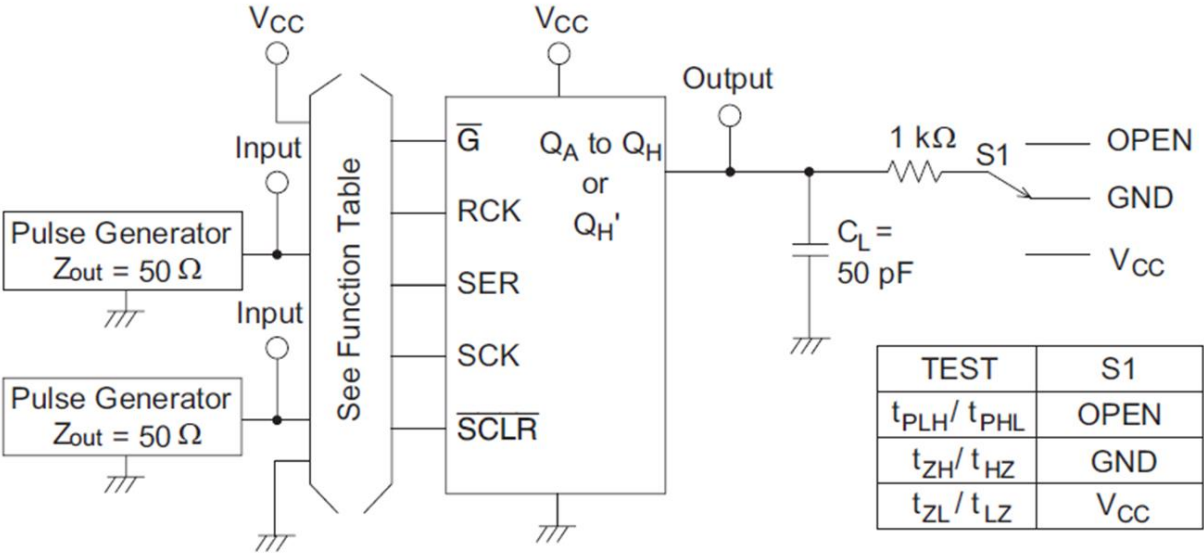
符号	项目		测试条件		VCC(V)	最小值	典型值	最大值	单位	
V _{IH}	高电平有效输入电压				2.0	1.5			V	
					4.5	3.15			V	
					6.0	4.2			V	
V _{IL}	低电平有效输入电压				2.0			0.5	V	
					4.5			1.35	V	
					6.0			1.8	V	
V _{OH}	高电平 输出电压	Q _A to Q _H Q' _H	V _I = V _{IH} or V _{IL}	I _{OH} =20μA	2.0	1.9			V	
					4.5	4.4			V	
					6.0	5.9			V	
		Q _A to Q _H		I _{OH} =6.0mA	4.5	3.9	4.3		V	
				I _{OH} =7.8mA	6.0	5.2	5.8		V	
		Q' _H		I _{OH} =4.0mA	4.5	3.9	4.2		V	
				I _{OH} =5.2mA	6.0	5.2	5.7		V	
V _{OL}	低电平 输出电压	Q _A to Q _H Q' _H	V _I = V _{IH} or V _{IL}	I _{OH} =20μA	2.0			0.1	V	
					4.5			0.1	V	
					6.0			0.1	V	
		Q _A to Q _H		I _{OH} =6.0mA	4.5		0.2	0.4	V	
				I _{OH} =7.8mA	6.0		0.25	0.4	V	
		Q' _H		I _{OH} =4.0mA	4.5		0.2	0.5	V	
				I _{OH} =5.2mA	6.0		0.15	0.5	V	
I _{OZ}	关闭状态输出电流		V _{OUT} =V _{CC} or GND, V _I =V _{IH} or V _{IL}		6.0			10	uA	
I _{IN}	输入电流		V _I =V _{CC} or GND		6.0			1	uA	
I _{CC}	工作电流		V _I =V _{CC} or GND,I _{OUT} =0μA		6.0			5	uA	
V _{CC}	工作电压					2		6	V	

交流电学特性： Ta=25℃ VCC=5.0V， tr=tf≤20ns 见测试方法。

符号	项目	测试条件	最小值	典型值	最大值	单位
f _{Max}	SCK 最高工作频率			10		MHZ
t _{PLH} , t _{PLH}	传输延迟时间 SCK to Q' _H	CL=50pF		100		ns
	传输延迟时间 RCK to Q _A thru Q _H	CL=50pF		100		ns
	传输延迟时间 SCLR to Q' _H	CL=50pF		50		ns
t _{ZH} , t _{ZL}	输出启用时间 to Q _A thru Q _H	RL=1kΩ CL=50pF		17		ns
t _{HZ} , t _{LZ}	输出禁用时间 to Q _A thru Q _H	RL=1kΩ CL=50pF		15		ns
t _{SU}	最小存储时间 SER to SCK			20		ns
t _{SU}	最小存储时间 SCK to RCK			20		ns
T _{rem}	最小清除时间 SCLR to SCK			10		ns
t _W	最小脉冲宽度 SCK or SCLR			20		ns
t _H	最小保持时间 SER to SCK			5		ns
t _{TLH} , t _{THL}	输出上升/下降沿时间 Q _A thru Q _H , Q' _H			100		ns

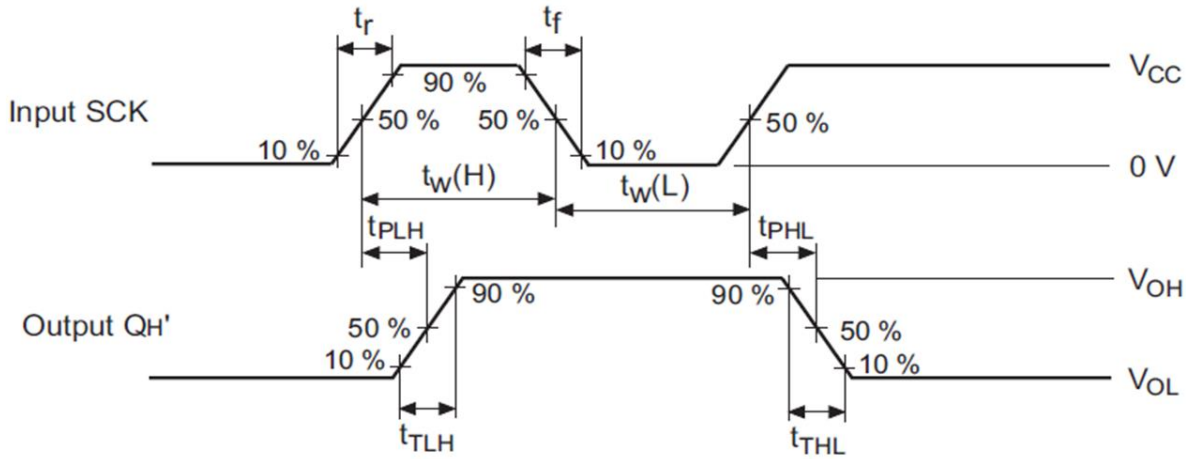
■测试方法

1、接线图



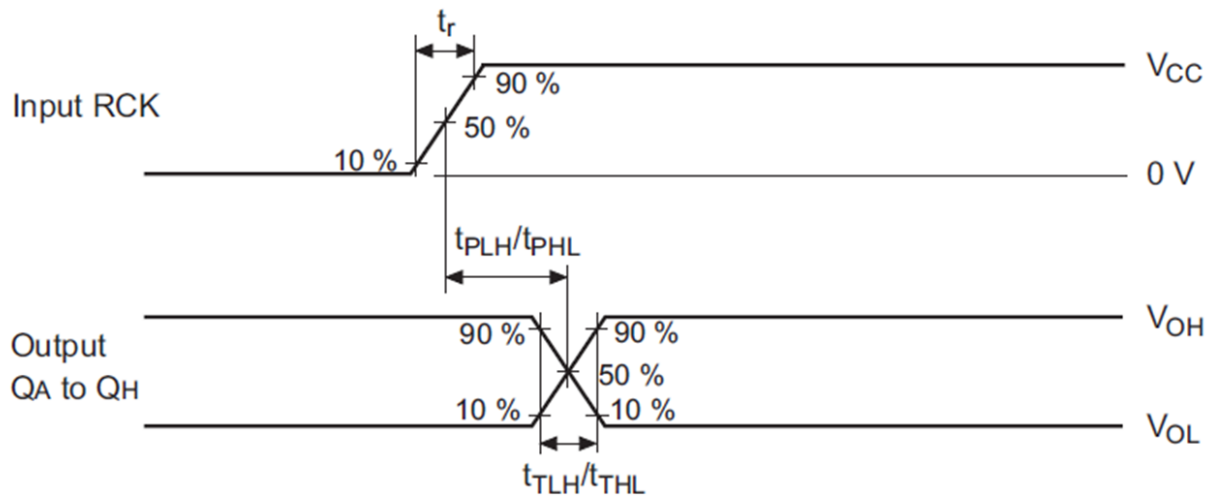
2、波形测量示意图

• Waveform – 1 (SCK to QH')



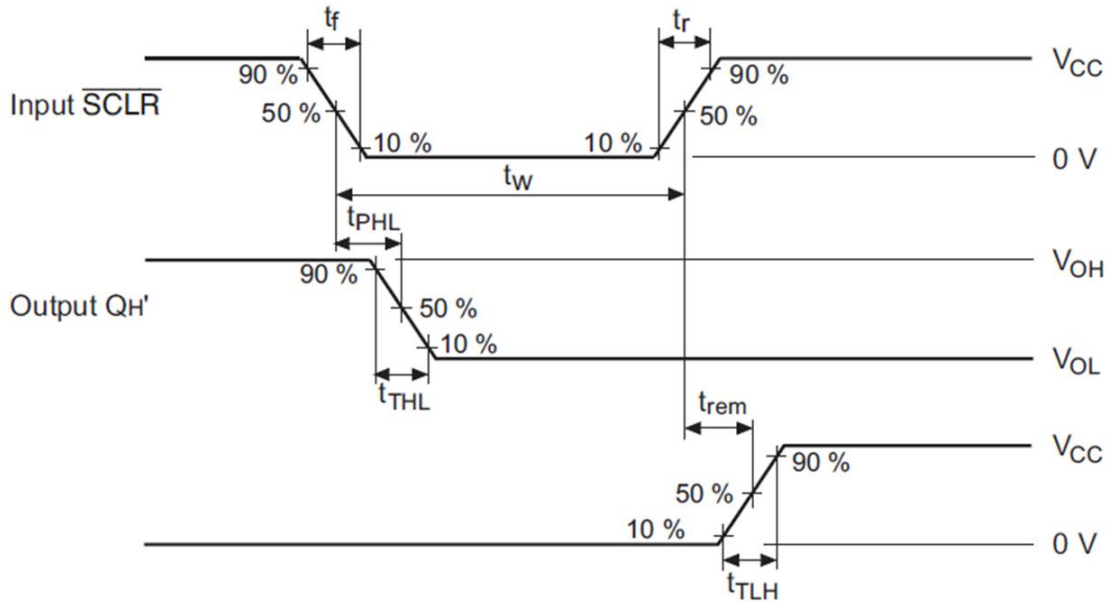
Note : 1. Input waveform : PRR $\leq$ 1 MHz, duty cycle 50%

• Waveform – 2 (RCK to Q)



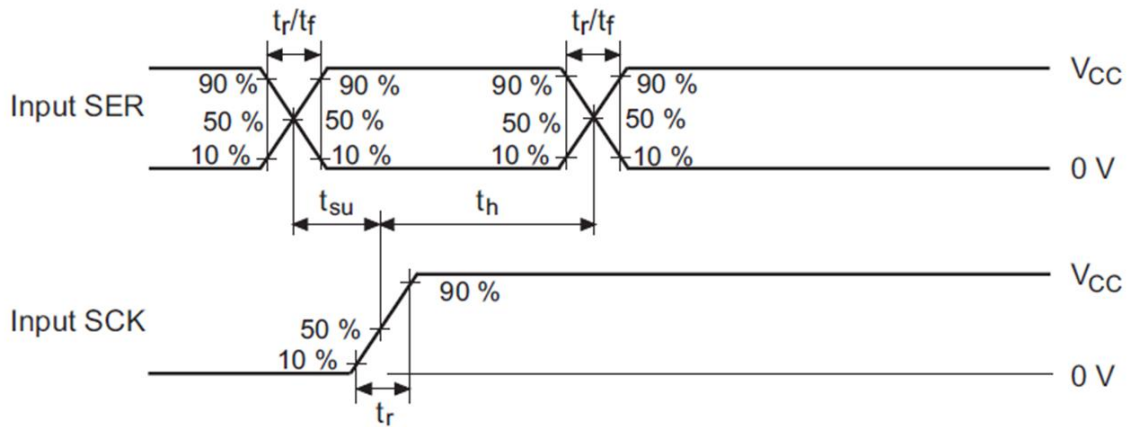
Note : 1. Input waveform : PRR $\leq$ 1 MHz, duty cycle 50%

• Waveform – 3 ($\overline{\text{SCLR}}$ to QH')



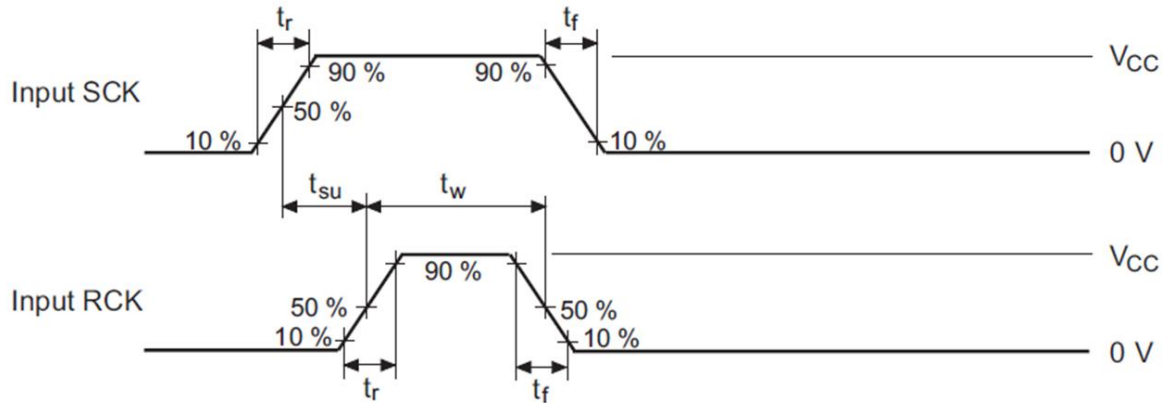
Note : 1. Input waveform : PRR $\leq$ 1 MHz, duty cycle 50%

• Waveform – 4 (SER to SCK)



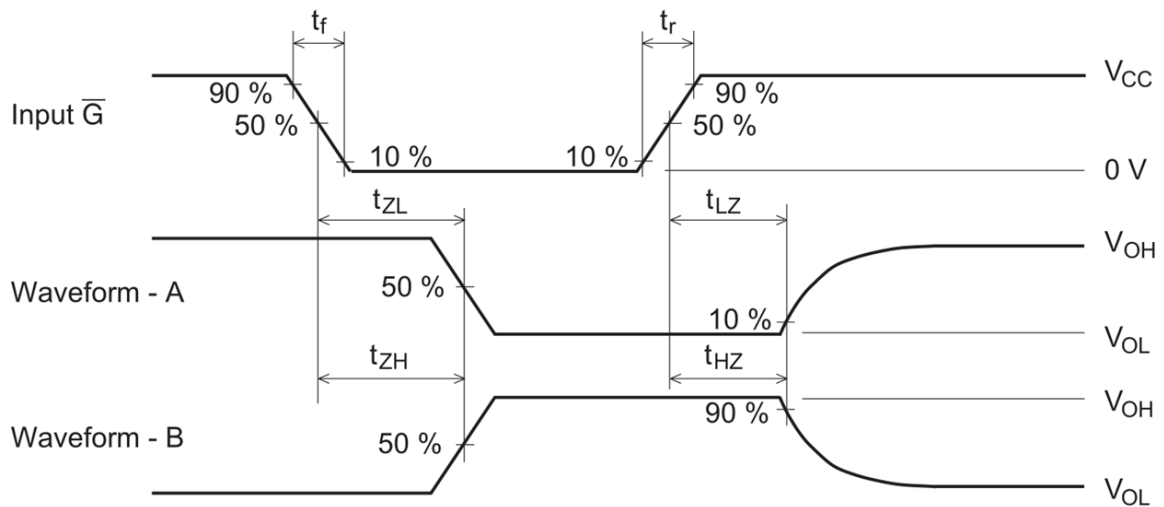
Note : 1. Input waveform : PRR $\leq$ 1 MHz, duty cycle 50%

• Waveform – 5 (SCK to RCK)



Note : 1. Input waveform : PRR $\leq$ 1 MHz, duty cycle 50%

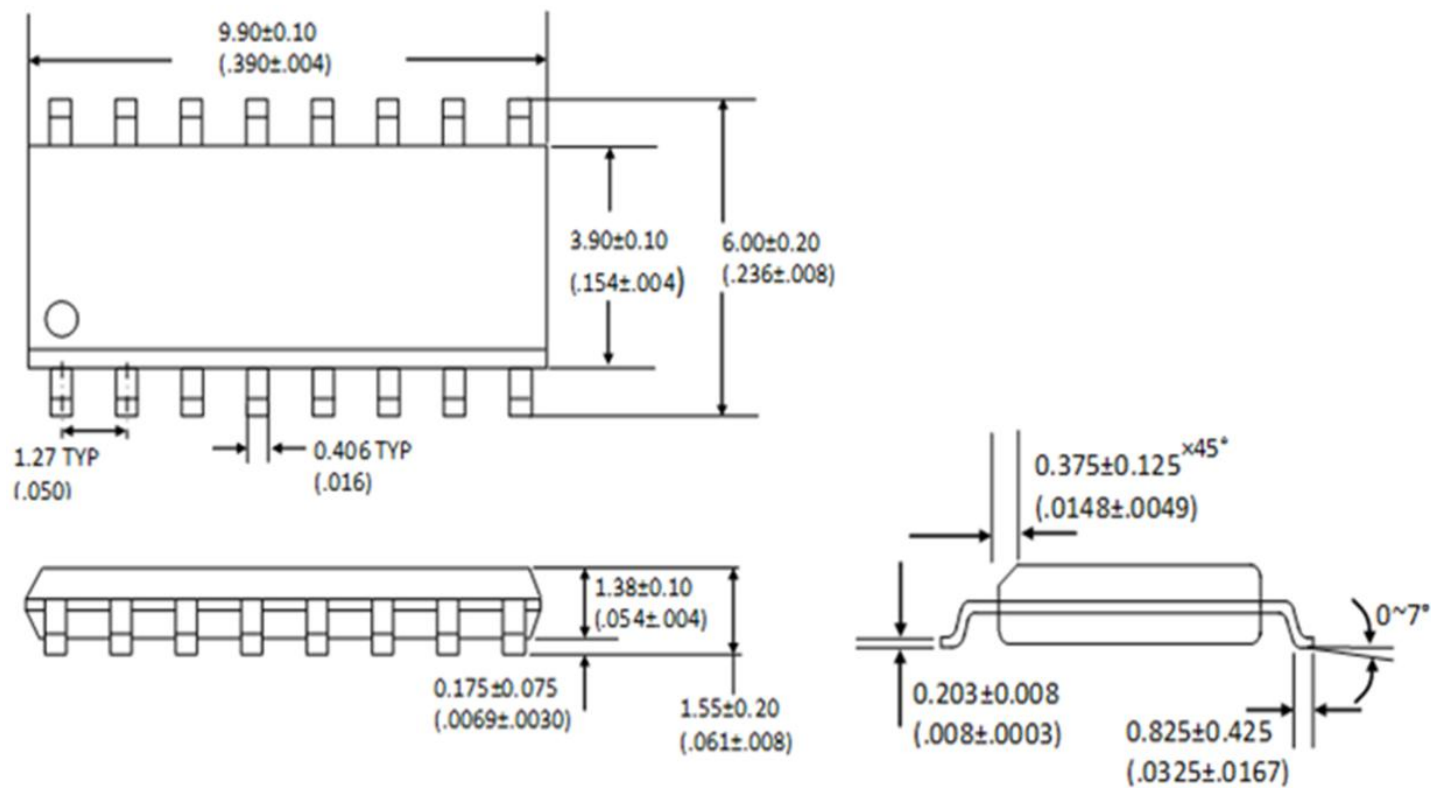
• Waveform – 6 (t_{ZL} , t_{ZH} , t_{LZ} , t_{HZ})



- Notes :
1. Input waveform : PRR $\leq$ 1 MHz, duty cycle 50%
 2. Waveform - A is for an output with internal conditions such that the output is low except when disabled by the output control.
 3. Waveform - B is for an output with internal conditions such that the output is high except when disabled by the output control.
 4. The output are measured one at a time with one transition per measurement.

SOP-16 包装数据

单位：毫米 / 英寸



卷轴规格

P/N	PKG	QTY
74HC595D (MS)	SOP-16	4000

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