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SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

CD4051

产品规格手册

概述

CD4051B 是一款采用先进 CMOS 技术设计的单个 8 通道多路复用器。是一个单刀八掷配置形式的模拟开关。具有三个二进制通道控制输入 (A、B、C) 以及一个使能输入 INH。二进制输入信号，控制 8 个通道中的一个通道开启，其余通道关闭。

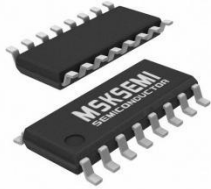

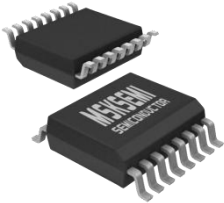
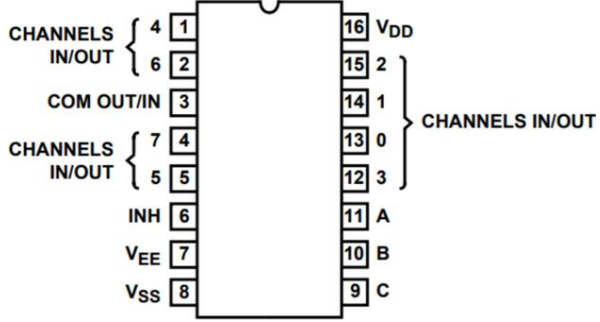
产品用途

- 模拟和数字多路复用与解复用
- 数字寻址信号的逻辑电平转换
- 信号选通
- 其它应用领域

特征

- 低输入电流: $I_{IN} \leq 1\mu A$, @ $V_{IN}=V_{DD}-V_{SS}=15V$, $T_a=25^\circ C$
- 低静态功耗: $I_{DD}=0.2\mu A$ (典型) @ $V_{DD}-V_{SS}=15V$, $T_a=25^\circ C$
- 低通电阻: 60Ω (典型) @ $V_{DD}-V_{SS}=V_{DD}-V_{EE}=15V$, $T_a=25^\circ C$
- 通道漏电流: $\pm 100nA$ (典型) @ $V_{DD}-V_{EE}=15V$
- 宽工作电压 $V_{DD}-V_{SS}$ 范围: $3V \sim 15V$
- 先断后通切换消除了通道重迭开启
- 单刀八掷配置形式的模拟开关
- 封装形式: DIP-16、SOP-16、TSSOP-16

参考信息

封装图			脚位信息
			
SOP-16	DIP-16	TSSOP-16	管脚功能定义

封装形式和管脚功能定义

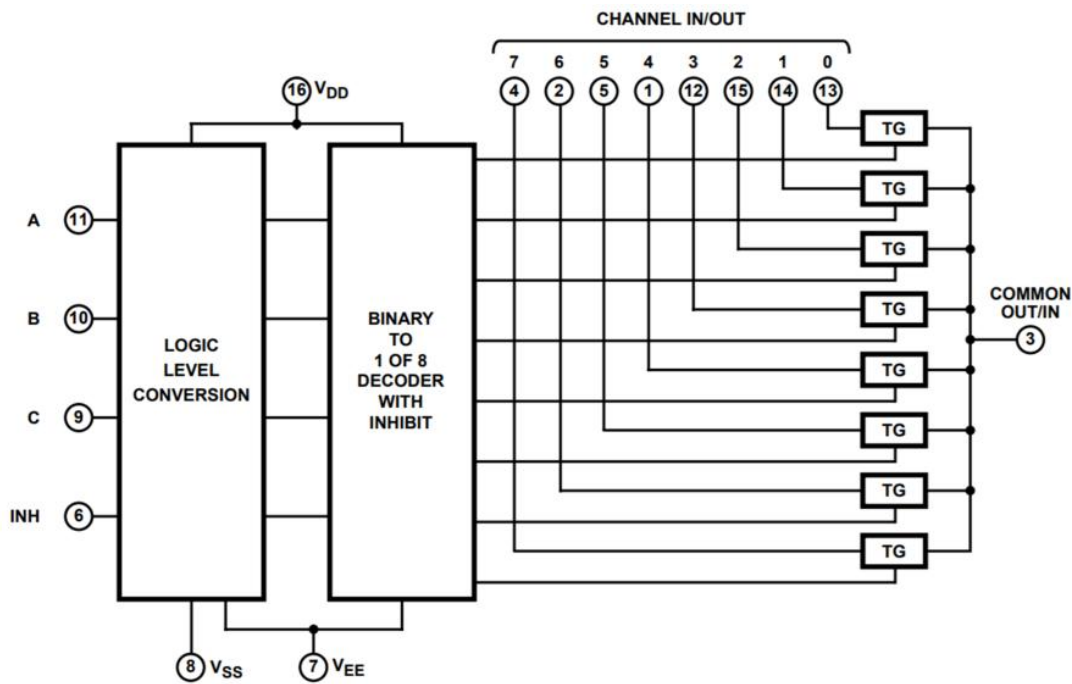
管脚序号	管脚定义	说明	管脚序号	管脚定义	说明
1	4	4 通道	16	VDD	电源正
2	6	6 通道	15	2	2 通道
3	COM OUT/IN	通道公共端	14	1	1 通道
4	7	7 通道	13	0	0 通道
5	5	5 通道	12	3	3 通道
6	INH	使能控制	11	A	通道控制输入 A
7	VEE	模拟开关负电源	10	B	通道控制输入 B
8	VSS	电源地	9	C	通道控制输入 C

极限值

参数	符号	极限值	单位
直流电源电压	$V_{DD}-V_{SS}$	-0.5~18	V
模拟电源电压	$V_{DD}-V_{EE}$	18	V
直流输入电压	V_{IN}	-0.5+ V_{SS} ~ $V_{DD}+0.5V$	V
功耗	P_D	500	mW
工作温度	T_A	-40~85	°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。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



真值表

INPUTS				OUTPUTS
INH	C	B	A	"ON" CHANNEL (S)
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1		×	×	None

×:任意值

推荐工作条件

项目	符号	最小值	典型值	最大值	单位
直流电源电压	$V_{DD}-V_{SS}$	3		15	V
控制输入电压	V_{IS}	0		$V_{DD}-V_{SS}$	V
模拟电源电压	$V_{DD}-V_{EE}$	0		15	V
模拟输入输出电压	V_{IN} 、 V_{OUT}	0		$V_{DD}-V_{EE}$	V
工作温度	T_A	-40		85	°C

电学特性

直流电学特性: ($V_{IS}=V_{IN}-V_{SS}$, $V_{EE}=V_{SS}$, $R_L = 3k\Omega$, $T_A=25^\circ C$ 除非特别指定)

符号	项目	测试条件		VDD (V)	最小值	典型值	最大值	单位
V_{IH}	高电平有效 输入电压	$V_{IH}=V_{DD}$ through 1k	$V_{EE}=V_{SS}$, $R_L=1k\Omega$ to V_{SS} ,	5	3.5			V
				10	7			V
				15	11			V
V_{IL}	低电平有效 输入电压	$V_{IL}=V_{DD}$ through 1k	$I_{IS}<2\mu A$ on all OFF Channels	5			1.5	V
				10			3	V
				15			4	V
R_{ON}	导通电阻	$0 \leq V_{IS} \leq V_{DD}$		5		150		Ω
				10		80		
				15		60		
ΔR_{ON}	相邻通道导通电 阻差			5		15		Ω
				10		10		
				15		5		
I_{OFF}	漏电流	输入输出通道关闭, $INH=V_{DD}$		18			±100	nA
I_{IN}	输入电流	$V_{IN}=V_{DD}$ or V_{SS}		18		0.01	±0.1	uA
I_{DD}	静态电流	$V_{IN}=V_{DD}$ or V_{SS}		5		0.01	5	uA
				10		0.01	10	uA
				15		0.01	20	uA
C_{IN}	输入电容	任意输入端				5	7.5	pF
C_{IS}	通道输入电容					5		pF
C_{OS}	输出电容					9		pF
C_{IOS}	导通电容					0.2		pF

交流电学特性: ($V_{SS}=V_{EE}$, $T_A=25^\circ C$, $t_r=t_f=20ns$, t_{pd} 包含 t_{PHL} 、 t_{PLH} , 见测试方法, 除非特别指定)

项目	符号	测试条件	VDD	最小值	典型值	最大值	单位
传输延迟时间 Signal Input to Output	t_{pd}	$V_{IS}=V_{DD}$, $R_L=200k$, $CL=50pF$	5		15		ns
			10		10		ns
			15		7		ns
传输延迟时间 Address-to-Signal OUT (Channels ON or OFF)	t_{pd}	$CL=50pF$, $R_L=10k$	5		100		ns
			10		80		ns
			15		50		ns

交流电学特性: (Continues,)

项目	符号	测试条件	VDD	最小值	典型值	最大值	单位
传输延迟时间 Inhibit-to-Signal OUT (Channel Turning ON)	t _{pd}	C _L =50pF, R _L =1k	5		100		ns
			10		50		ns
			15		30		ns
传输延迟时间 Inhibit-to-Signal OUT (Channel Turning OFF)	t _{pd}	C _L =50pF, R _L =10k	5		100		ns
			10		50		ns
			15		30		ns

测试方法

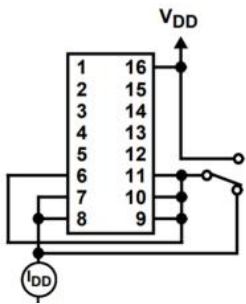


Fig.1 静态电流

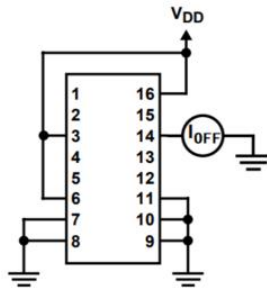


Fig.2 相邻通道关闭漏电流

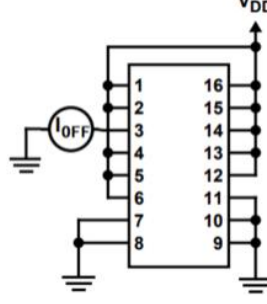


Fig.3 所有通道关闭漏电流

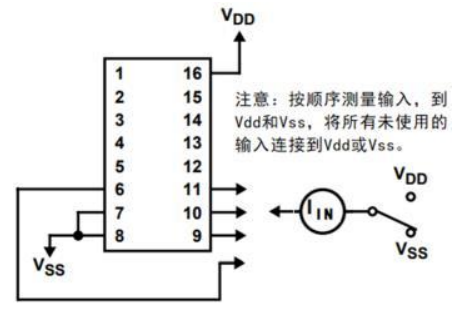


Fig.4 输入电流

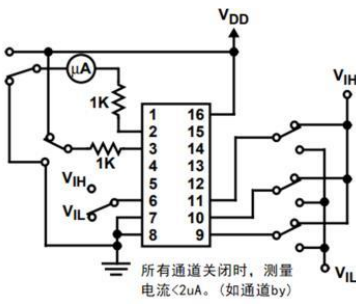


Fig.5 输入逻辑电平电压

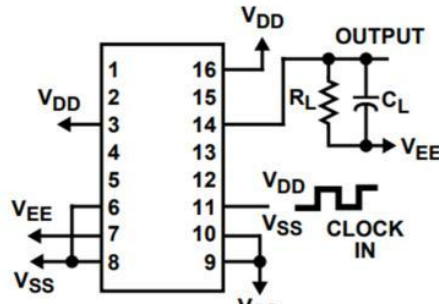


Fig.6 传播延迟-通道控制输入 to 开关输出

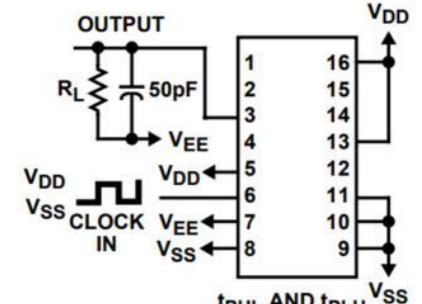


Fig.7 传播延迟-使能输入 to 开关输出

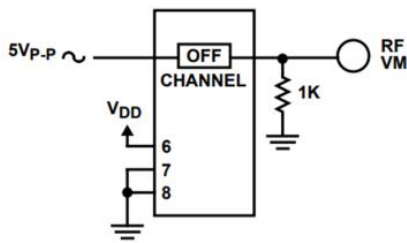


Fig.8 所有通道关闭信号串扰

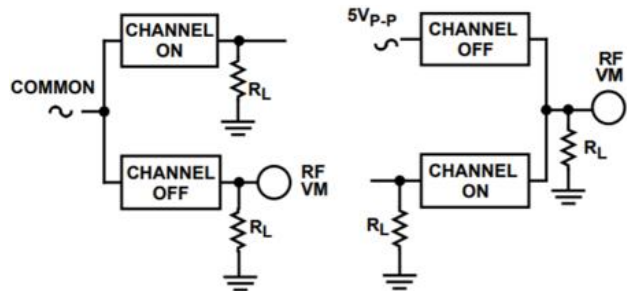
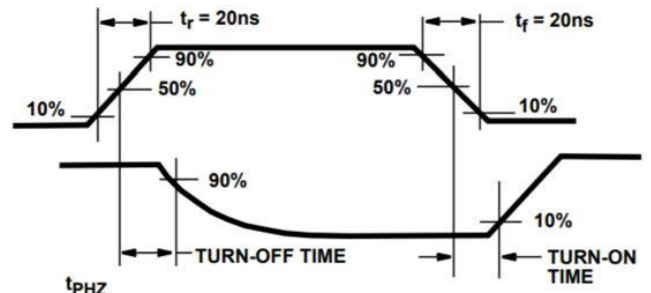
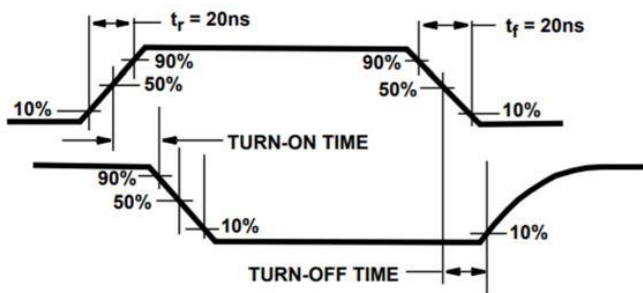


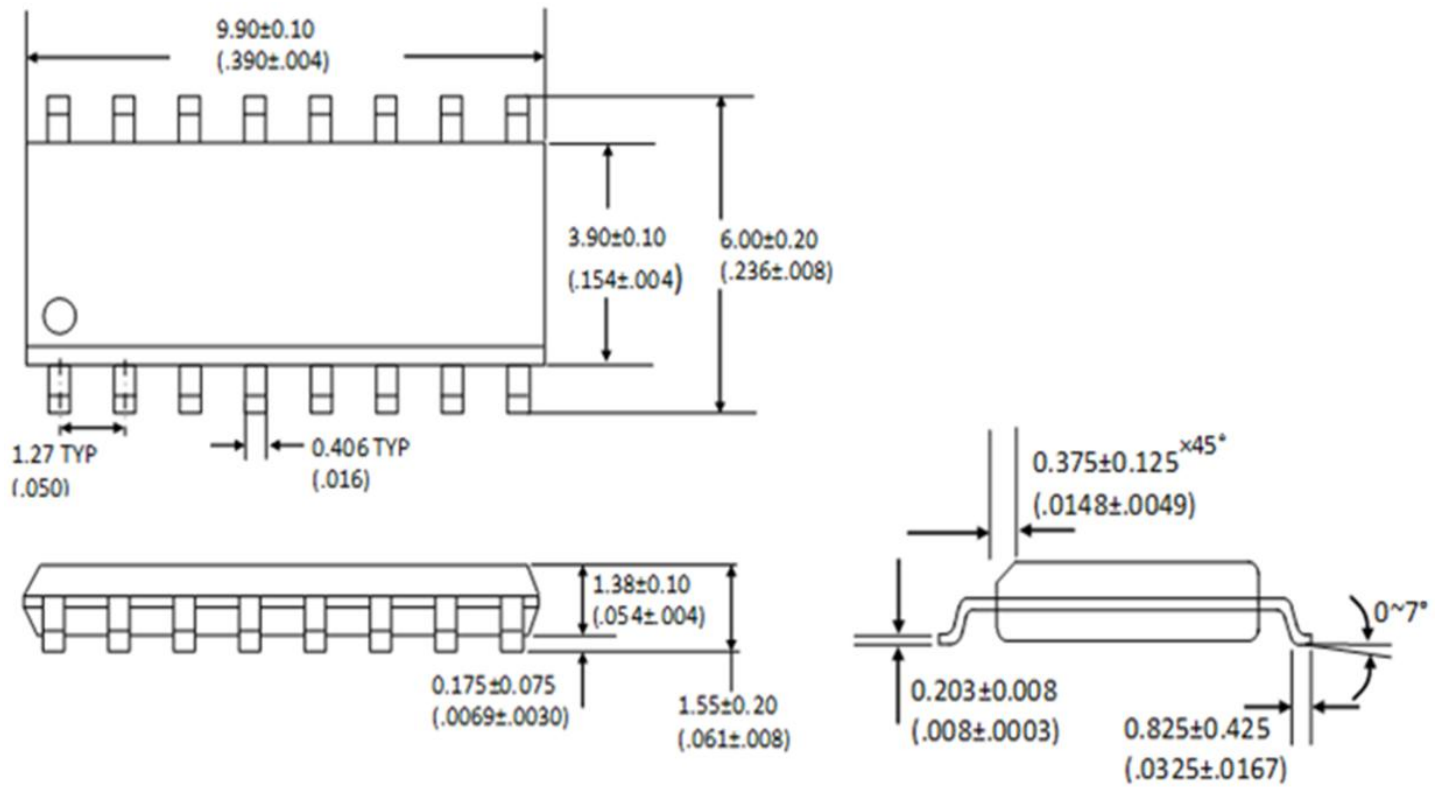
Fig.9 同一通道信号串扰

波形测量示意图



SOP-16 包装数据

单位：毫米 / 英寸

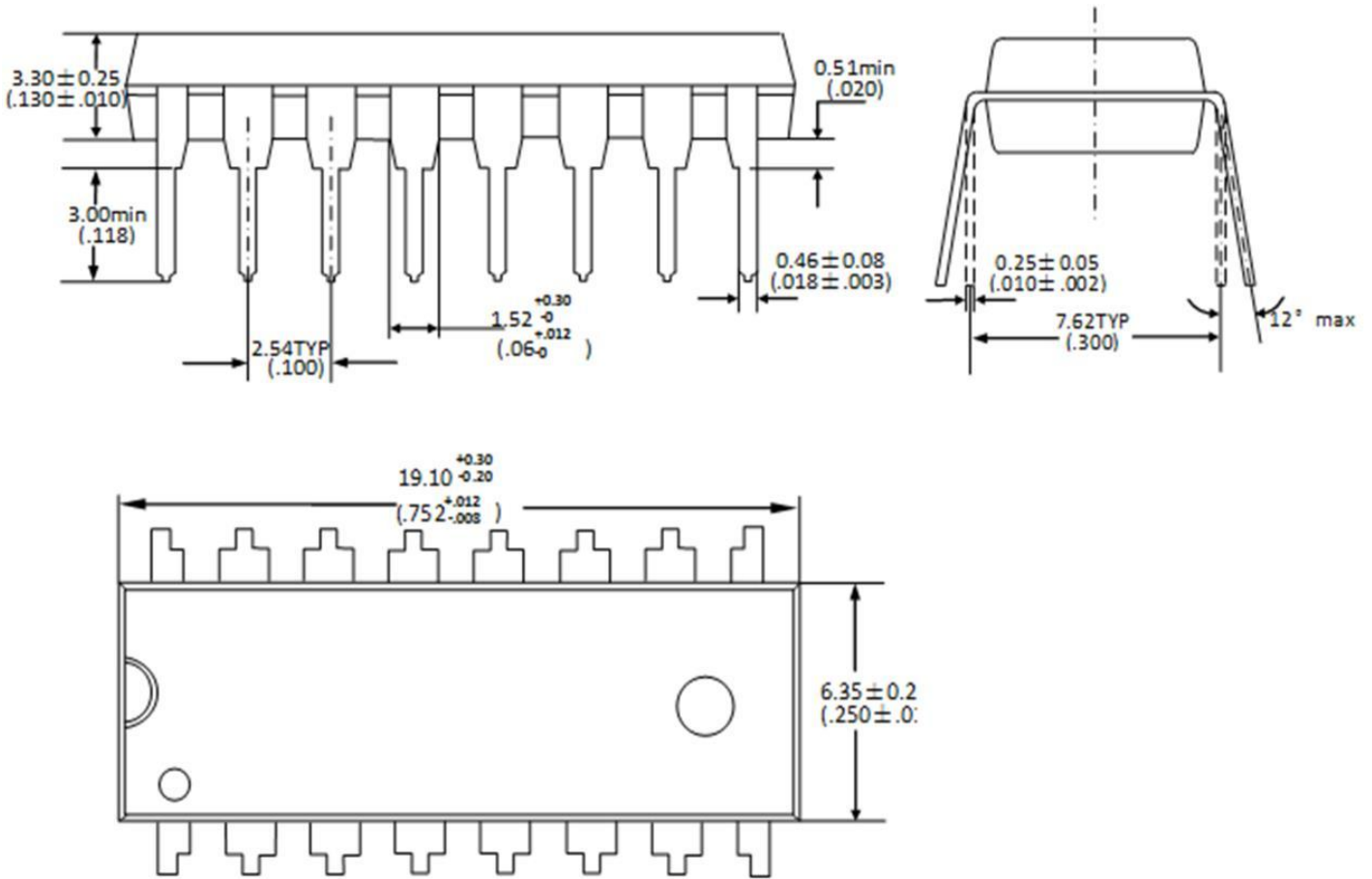


卷轴规格

P/N	PKG	QTY
CD4051BM-MS	SOP-16	2500

DIP-16 包装数据

单位：毫米 / 英寸

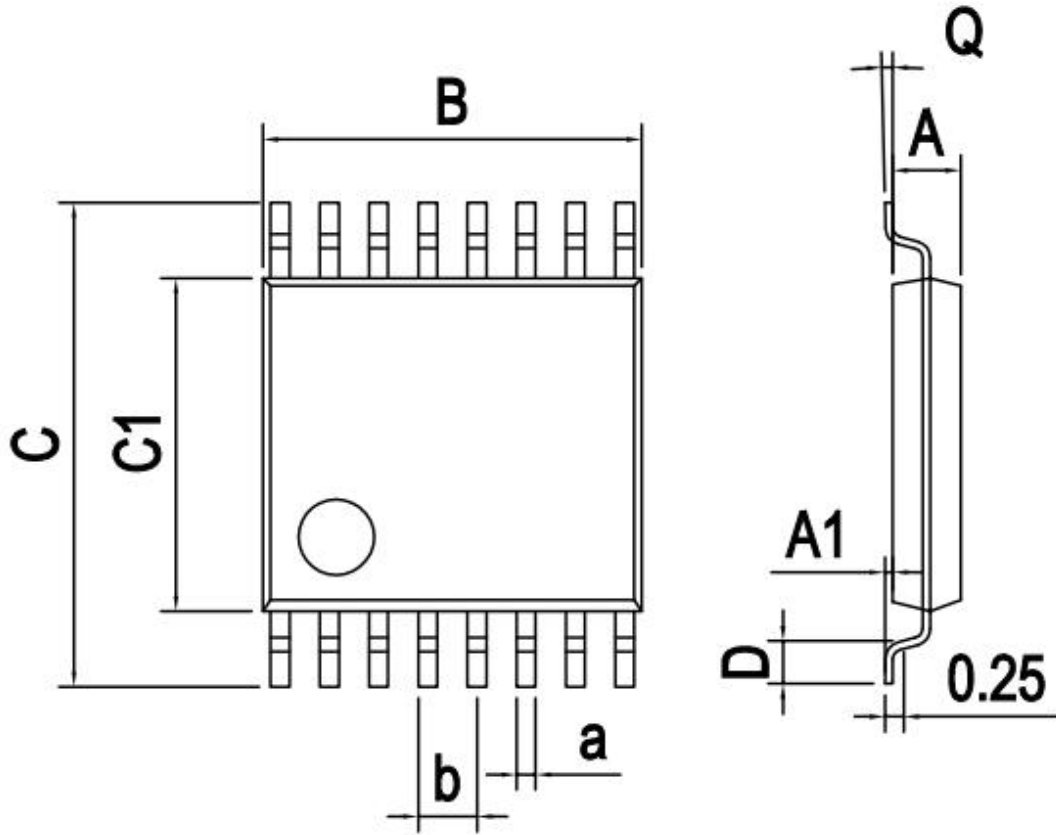


卷轴规格

P/N	PKG	QTY
CD4051BE-MS	DIP-16	1000

TSSOP-16 包装数据

单位：毫米 / 英寸



Dimensions In Millimeters					
Symbol :	Min :	Max :	Symbol :	Min :	Max :
A	0.800	1.000	D	0.400	0.850
A1	0.050	0.150	Q	0°	8°
B	4.900	5.100	a	0.240 TYP	
C	6.250	6.550	b	0.650 TYP	
C1	4.300	4.500			

卷轴规格

P/N	PKG	QTY
CD4051BMT-MS	TSSOP-16	2500

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[NLAS3799BMNR2G](#) [NLAS5123MNR2G](#) [ISL84684IR](#) [PI5A4157CEX](#) [PI5A4599BCEX](#) [NLAS4717EPFCT1G](#) [PI5A3167CCEX](#)
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[WS4612EAA-5/TR](#) [TS5A3157DBVR\(UMW\)](#) [SN74LVC1G66DBVR](#)