

# MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

## 74HC4053-MS

产品规格手册

## 概述

74HC4053-MS 是一款采用先进 CMOS 技术设计的 3 路双通道多路模拟复用器。是一个单刀双掷配置形式的模拟开关。具有三个独立的通道控制输入 A、B、C 和一个使能输入 INH。通道控制输入信号 A、B、C，分别控制 3 路开关两个通道中的一个通道开启，另一通道关闭。

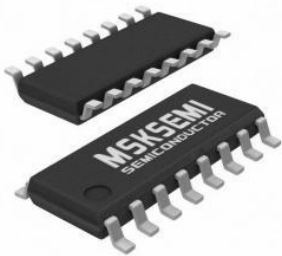
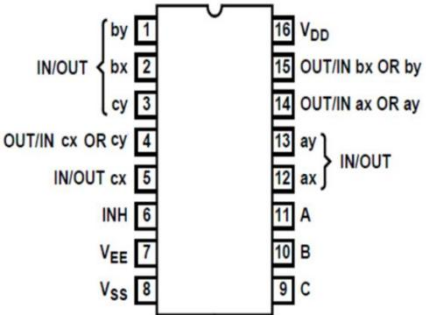
## 产品用途

- 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
- 路复用与解复用
- 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： $90\Omega$  (典型) @ $V_{DD}-V_{SS}=V_{DD}-V_{EE}=15V$ ,  $T_a=25^\circ C$
- 通道漏电流： $\pm 100pA$  (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
- 单刀双掷配置形式的模拟开关

## 参考信息

封装图	脚位信息
	
SOP-16	管脚功能定义

## 封装形式和管脚功能定义

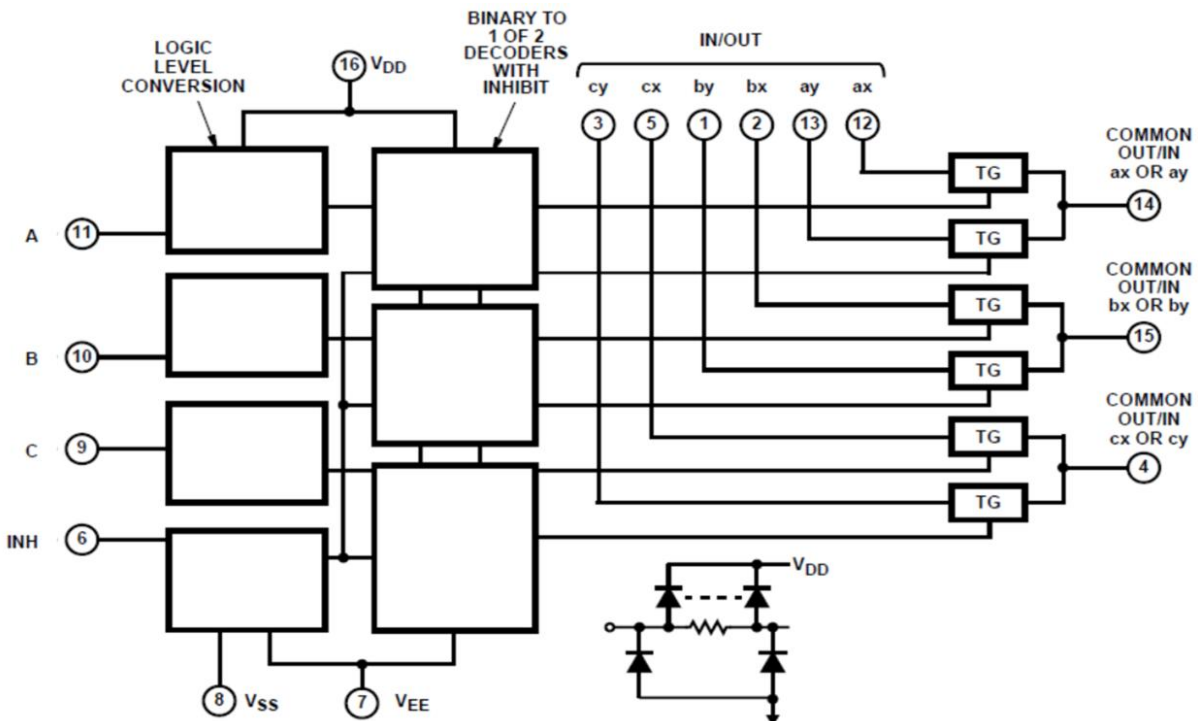
管脚序号	管脚定义	说明	管脚序号	管脚定义	说明
1	IN/OUT by	by 通道	16	VDD	电源正
2	IN/OUT bx	bx 通道	15	OUT/IN bx OR by	b 通道公共端
3	IN/OUT cy	cy 通道	14	OUT/IN ax OR ay	a 通道公共端
4	OUT/IN cx OR cy	c 通道公共端	13	IN/OUT ay	ay 通道
5	IN/OUT cx	cx 通道	12	IN/OUT ax	ax 通道
6	INH	使能控制	11	A	通道控制输入 A
7	VEE	模拟开关负电源	10	B	通道控制输入 B
8	VSS	电源地	9	C	通道控制输入 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	A or B or C	"ON" CHANNEL
0	0	ax or bx or cx
0	1	ay or by or cy
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		180		$\Omega$
				10		115		
				15		90		
$\Delta R_{ON}$	相邻通道导通电 阻差			5		15		$\Omega$
				10		10		
				15		5		
$I_{OFF}$	漏电流	输入输出通道关闭, $INH=V_{DD}$		18			$\pm 100$	nA
$I_{IN}$	输入电流	$V_{IN}=V_{DD}$ or $V_{SS}$		18		0.01	$\pm 0.1$	$\mu A$
$I_{DD}$	静态电流	$V_{IN}=V_{DD}$ or $V_{SS}$		5		0.01	5	$\mu A$
				10		0.01	10	$\mu A$
				15		0.01	20	$\mu A$
$C_{IN}$	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 <sub>pd</sub>	C <sub>L</sub> =50pF, R <sub>L</sub> =1k	5		100		ns
			10		50		ns
			15		30		ns
传输延迟时间 Inhibit-to-Signal OUT (Channel Turning OFF)	t <sub>pd</sub>	C <sub>L</sub> =50pF, R <sub>L</sub> =10k	5		100		ns
			10		50		ns
			15		30		ns

测试方法

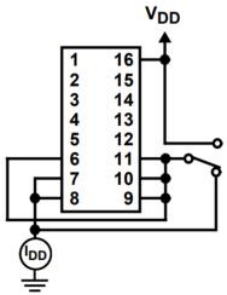


Fig.1 静态电流

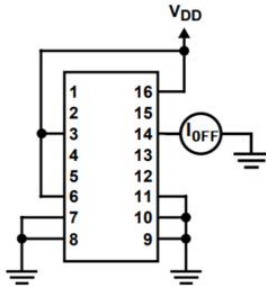


Fig.2 相邻通道关闭漏电流

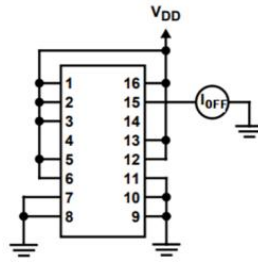


Fig.3 所有通道关闭漏电流

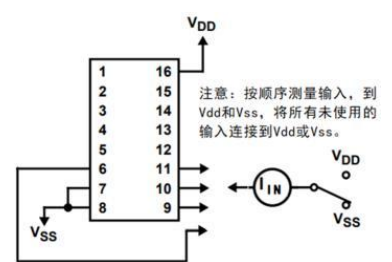


Fig.4 输入电流

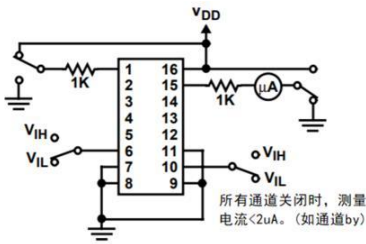


Fig.5 输入逻辑电平电压

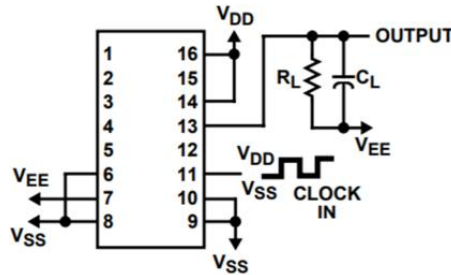


Fig.6 传播延迟-通道控制输入 to 开关输出

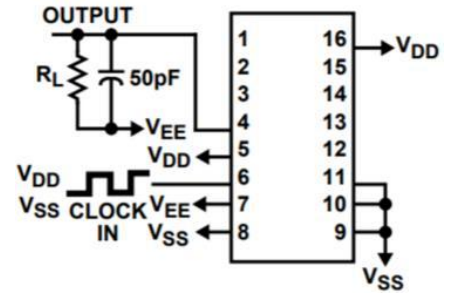


Fig.7 传播延迟-使能输入 to 开关输出

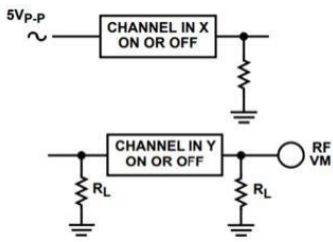


Fig.8 相邻通道之间信号串扰

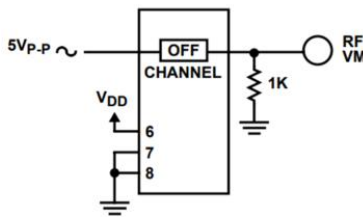


Fig.9 所有通道关闭信号串扰

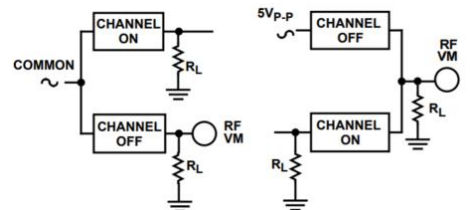
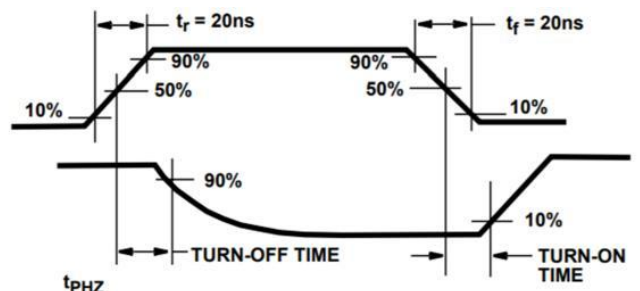
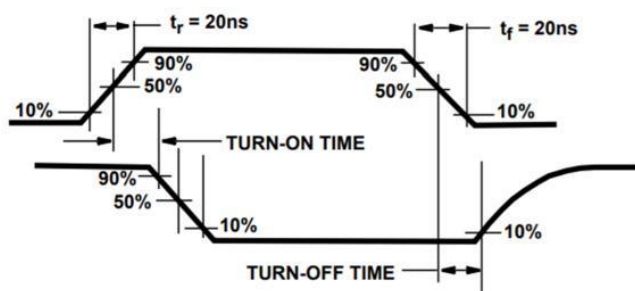


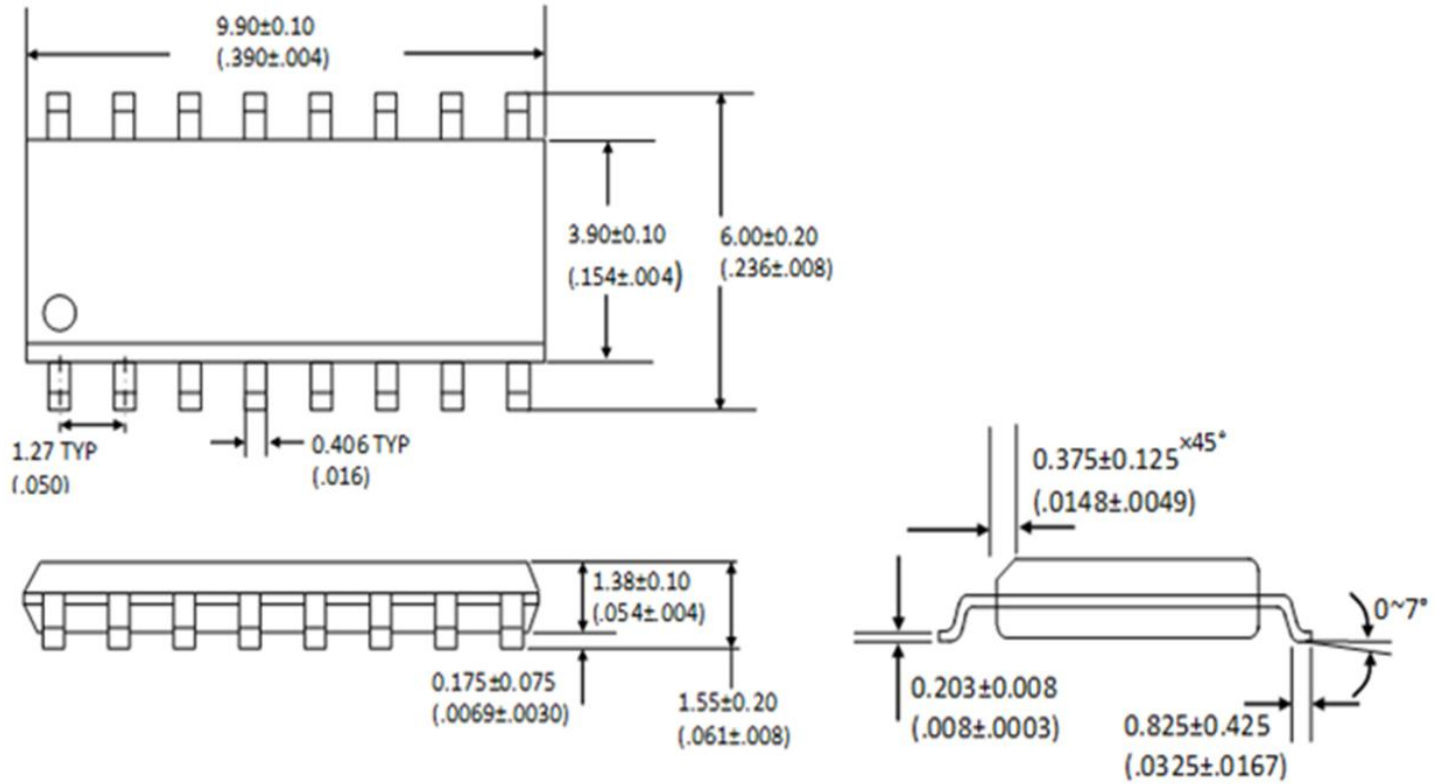
Fig.10 同一通道信号串扰

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
74HC4053-MS	SOP-16	2500

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