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FAIRCHILD SEMICONDUCTOR®

January 2010

FSA2271T 低电压并具有负电压能力的二通道单刀双掷 (0.4Ω) 模拟开关

特性

- 0.4Ω 典型导通电阻 +3.0V 供电电压
- 0.25Ω 最大R_{ON} 平坦度 +3.0V 供电电压
- -3db 带宽：> 50MHz
- 在扩展的控制信号电平范围内拥有低漏电流
- 无铅10-管脚 封装10引脚的 UMLP
- 共用端口的断电保护
- 宽广 的V_{CC} 操作范围: 1.65 到 4.3V
- 拥有噪音消除终端电阻
- ESD JEDEC: JESD22-A114 人体电流模式:
  - 电源接地: 16KV
  - I/O接地: 10kV
  - 所有管脚: 7kV
- ESD JEDEC: JESD22-A101充放电模式:
  - CDM: 2kV

应用

- 手机, PDA（掌上电脑, 数码相机和笔记本电脑
- 液晶显示器, 电视及机顶盒

总述

FSA2271T是一种具有负电压能力的高性能, 二通道单刀双掷模拟开关, 并且它拥有在V_{CC}=3.0V时候超低的 R_{ON} 0.4Ω（典型值）特点。 FSA2271T 可以在 V_{CC} 从1.65V到4.3V这么宽广的范围里工作,它装配了亚微米CMOS技术来达到快速的切换速度并被设计成先断后通的操作. 它的选择输入端口是TTL兼容的。

即使在控制电压低于 V_{CC} 情况下 FSA2271T 拥有非常低的静态电流, 这一特性可以用最小的电池消耗来实现与基带处理器通用 I/O 之间的直接接口从而满足手机的应用。

FSA2271T 集成了终端电阻当信号有超调或串扰耦合时可以消除噪音, 也就是说 ”爆音最小化”。

重要注解

欲知更多其它具体的操作信息, 请联系

analogswitch@fairchildsemi.com.

订货信息

订货编号	终端电阻	操作温度	Eco Status	封装描述
FSA2271TUMX	是	-40°C to 85°C	Green	10-引脚，方型，超薄模塑无脚封装， 1.4 x 1.8mm, 0.4mm (UMLP)窄间距

For Fairchild's definition of Eco Status, please visit http://www.fairchildsemi.com/company/green/rohs_green.html.

模拟符号

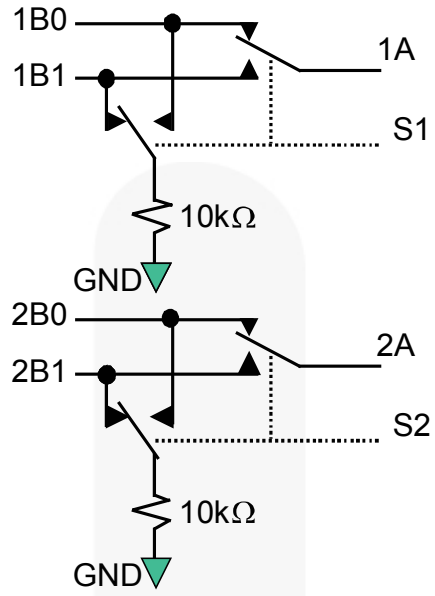


图1.FSA2271T

管脚分配图

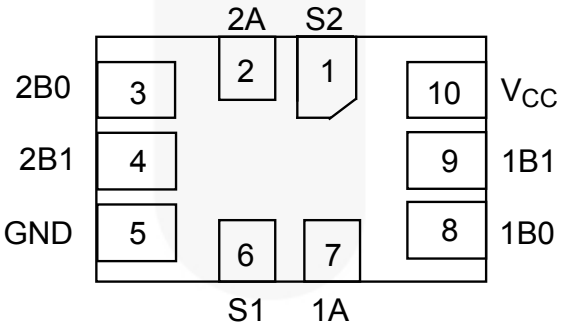


图2. 管脚分配图

管脚描述

管脚号	名称	描述
1, 6	S2, S1	开关选择脚
2, 7	2A, 1A	数据端口
3, 8	2B0, 1B0	数据端口
4, 9	2B1, 1B1	数据端口
5	GND	接地
10	V_{CC}	供电电压

真值表

控制输入, Sn	功能
逻辑低电平	nB0 连接 nA; nB1接地
逻辑高电平	nB1 连接nA; nB0 接地

最大绝对额定值

超出绝对最大额定值会破坏设备，设备会不工作或者说不建议设备在和超过建议的工作条件下被操作. 另外, 过长的暴露在超过建议工作条件下会影响设备的可靠性, 这种绝对最大额定值仅仅是极端额定值.

表达符号	参数	条件	最小	最大	单位
V_{CC}	供电电压		-0.5	5.5	V
V_{SW}	开关输入输出电压(1)	1B0, 1B1, 2B0, 2B1, 1A, 2A 管脚	V_{CC} - 4.3V	V_{CC} + 0.3V	V
V_{CNTRL}	控制输入电压(1)	S1, S2	-0.5	V_{CC} + 0.3V	V
I_{IK}	输入钳位二极管电流			- 50	mA
I_{SW}	开关输入输出电流	续		350	mA
I_{SWPEAK}	峰值开关电流	脉冲持续时间1ms, <10%占空系统		500	mA
T_{STG}	保存温度范围		-65	+150	°C
T_J	最高结温			+150	°C
T_L	引线温度	焊接,10秒		+260	°C
ESD	人体电流模式 JEDEC: JESD22-A114	I/O 接地	10		kV
		电源接地	7		kV
		其它各管脚	16		kV
	充放电模式, JEDEC-JESD-C101		2		kV

注解：

1. 如输入及输出二极管电流额定值均到达时, 则可能会超出输入及输出的负额定值。

建议工作条件

推荐工作条件指定用于保证实现数据表规范的最佳性能, Fairchild 建议不得超出以上值或设计至最大绝对额定值。

表达符号	参数	最小	最大	单位
V_{CC}	供电电压	1.65	4.30	V
$V_{S1, S2}$	控制输入电压	0	V_{CC}	V
V_{SW}	开关输入输出电压	V_{CC} - 4.3V	V_{CC}	V
T_A	操作温度	-40	+85	°C

DC电气特性

若无另外规定，所有数值均在25ºC, V_{CC} = 3.3V下测定.

表达符号	参数	条件	V_{CC} (V)	T_A=+25ºC			T_A=-40 至 +85°C		单位
				最小	典型	最大	最小	最大	
V_{IH}	输入电压高电平		3.60 至 4.30				1.7		
			2.70 至 3.60				1.5		V
			2.30 至 2.70				1.4		
			1.65 至 1.95				0.9		
V_{IL}	输入电压低电平		3.60 至 4.30					0.7	V
			2.70 至 3.60					0.5	V
			2.30 至 2.70					0.4	
			1.65 至 1.95					0.4	
I_{IN}	控制输入漏电流 (S1,S2)	V_{IN}=0 to V_{CC}	1.65 至 4.30				-0.5	0.5	µA
$I_{A(ON)}$	nA端口导通漏电流	nA=0.5V, Vcc – 0.3V nB0or nB1=Vcc-0.5V, 0.5V或悬浮 图5	1.95 至 4.30				-1	1	µA
I_{OFF}	断电漏电流 (共同端1A, 2A)	共同端 (1A, 2A), V_{IN}=0V 至4.3V, V_{CC}=0V nB0, nB1=0V或悬浮	0					±45	µA
R_{ON}	开关导通电阻(2)	I_{ON}=100mA, nB0或 nB1=0.7V,3.6V, 4.3V 图3	4.30		0.3				Ω
		I_{ON}=100mA, nB0或 nB1=0.7V, 2.3V, 4.3V 图3	3.00		0.4			0.8	
		I_{ON}=100mA, nB0 或 nB1=0V,0.7V, 1.6V, 2.3V 图3	2.30		0.52				
		I_{ON}=100mA, nB0或 nB1=0V,0.7V, 1.65V 图3	1.65		1.00				
ΔR_{ON}	Δ导通电阻(3)	I_{ON}=100mA, nB0或 nB1=0.7V	4.30		0.04			0.13	Ω
			3.00		0.06			0.13	
			2.30		0.12				
			1.65		1.00				
$R_{FLAT(ON)}$	导通电阻平坦度(4)	I_{OUT}=100mA, nB0或 nB1=0V 至V_{CC}	4.30					0.25	Ω
			3.00					0.25	
			2.30		0.5				
			1.65		0.6				
R_{TERM}	内部终端电阻(5)				10				kΩ
I_{CC}	静态工作电流	V_{IN}=0 或 V_{CC}, I_{OUT}=0	4.30	-100		100	-500	500	nA
I_{CCT}	控制输入时I_{CC} 相应的增加量	输入为2.6V	4.30		3.0			10.0	µA
		输入为1.8V			7.0			15.0	

注解:

2.导通电阻由开关指定电流下A、B管脚之间的电压降决定.

3. Δ R_{ON}=R_{ONmax} – R_{ONmin}在相同V_{CC}、温度及电压下测得.

4. 平坦度定义为各种条件指定范围内导通电阻最大值与最小值之间的差值.

5. 由特性保证而非产品试验.

AC电气特性

若无另外规定, 所有数值均在25ºC, V_{CC} = 3.3V下测定.

表达符号	参数	条件	V_{CC} (V)	T_A=+25ºC			T_A= -40 至 +85°C		单位
				最小	典型	最大	最小	最大	
t_{ON}	开启时间	nB0 或nB1=1.5V, R_L=50Ω, C_L=35Pf 图4,10	3.60 至 4.30			60	15	65	ns
			2.70 至 3.60			65	15	70	
			2.30 至 2.70			80	15	85	
			1.65 至 1.95		100				
t_{OFF}	关闭时间	nB0 或nB1=1.5V, R_L=50Ω, C_L=35pF 图4,10	3.60 至 4.30			55	5	60	ns
			2.70 至 3.60			60	5	65	
			2.30 至 2.70			65	5	70	
			1.65 至 1.95		65				
t_{BBM}	先断后开时间	nB0 或nB1=1.5V, R_L=50Ω, C_L=35pF 图11	3.60 至 4.30		3		1		ns
			2.70 至 3.60		5		2		
			2.30 至 2.70		10		2		
			1.65 至 1.95		15		2		
Q	电荷注入	C_L=1.0nF, V_S=0V, R_S=0Ω 图14	1.65 至 4.30		25				pC
OIRR	断开隔离	f=100kHz, R_L=50Ω, C_L=0pF图12	1.65 至 4.30		-70				dB
Xtalk	非相邻通道串扰	f=100kHz, R_L=50Ω, C_L=0pF图13	1.65 至 4.30		-70				dB
BW	-3db 带宽	R_L=50Ω, C_L=0pF图9	1.65 至 4.30		>50				MHz
THD	总谐波失真	f=20Hz to 20kHz, R_L=32Ω, V_{IN}=2V_{pp} V_{BIAS}=0V 图15	1.65 至 4.30		0.06				%

电容

表达符号	参数	条件	V_{CC} (V)	T_A=+25ºC			T_A=-40°C +85°C		单位
				最小	典型	最大	最小	最大	
C_{IN}	控制管脚输入电容	f=1MHz, 图7	0		2.5				pF
C_{OFF}	B端口的断开电容	f=1MHz, 图7	3.3		30				pF
C_{ON}	A端口的导通电容	f=1MHz, 图8	3.3		120				pF

测试框图

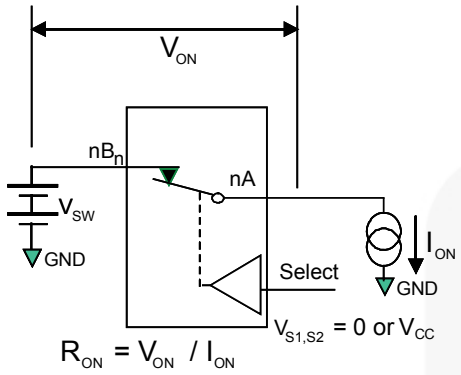


图3.导通电阻

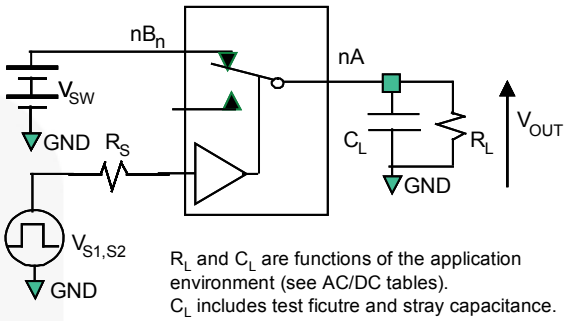


图4. 测试电路负载

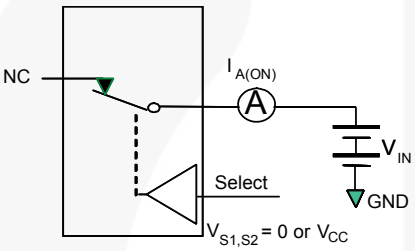
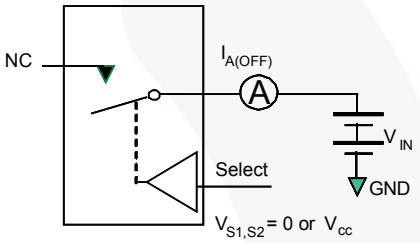


图5.导通漏电流



Each switch port is tested separately.

图6.断开漏电流(每个端口分别测试)

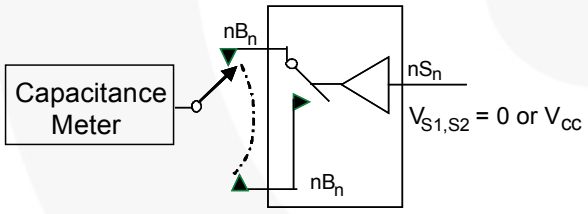


图7.通道断开电容

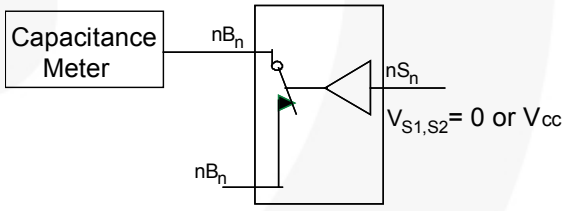


图8.通道导通电容

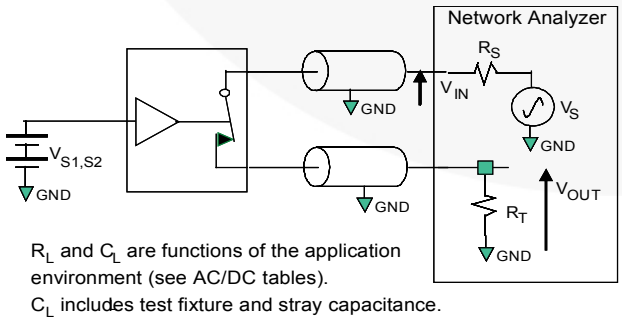


图9.带宽

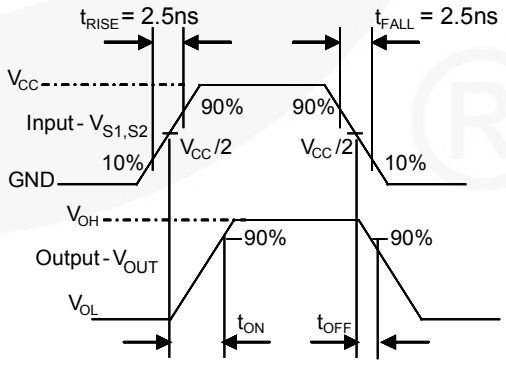
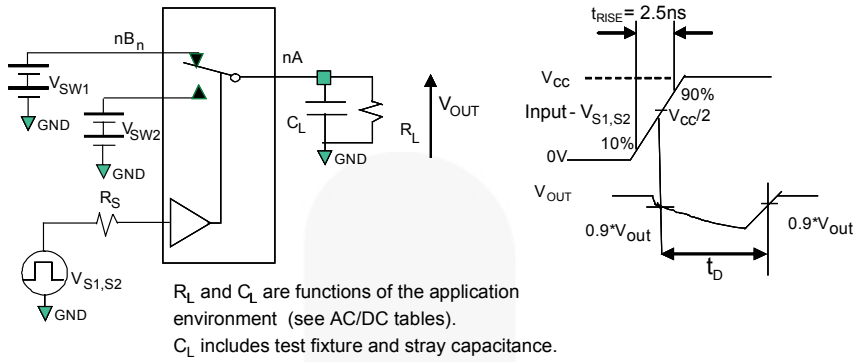


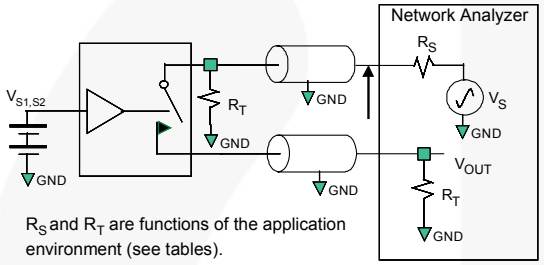
图10.开启/关闭波形

测试框图 （续）



R_L and C_L are functions of the application environment (see AC/DC tables).
C_L includes test fixture and stray capacitance.

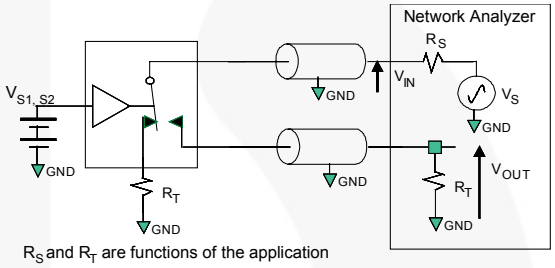
图11.先断后开间隔时间



R_S and R_T are functions of the application environment (see tables).

Off-Isolation = 20 Log (V_{OUT} / V_{IN})

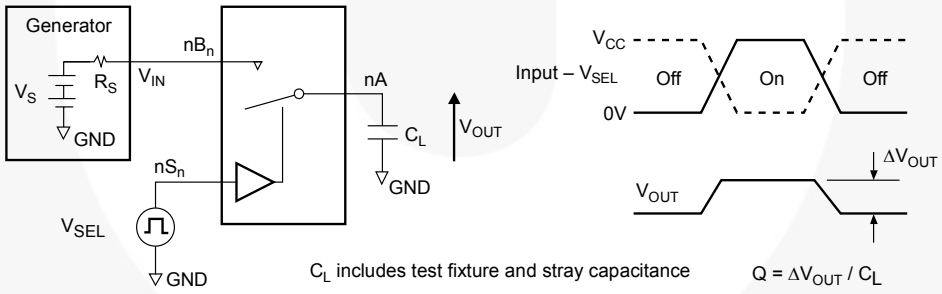
图12.通道隔离度



R_S and R_T are functions of the application environment (see tables).

Crosstalk = 20 Log (V_{OUT} / V_{IN})

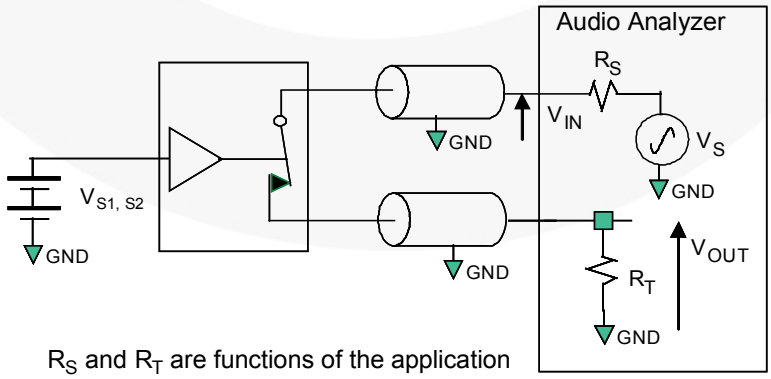
图13.相邻通道串扰



C_L includes test fixture and stray capacitance

Q = ΔV_{OUT} / C_L

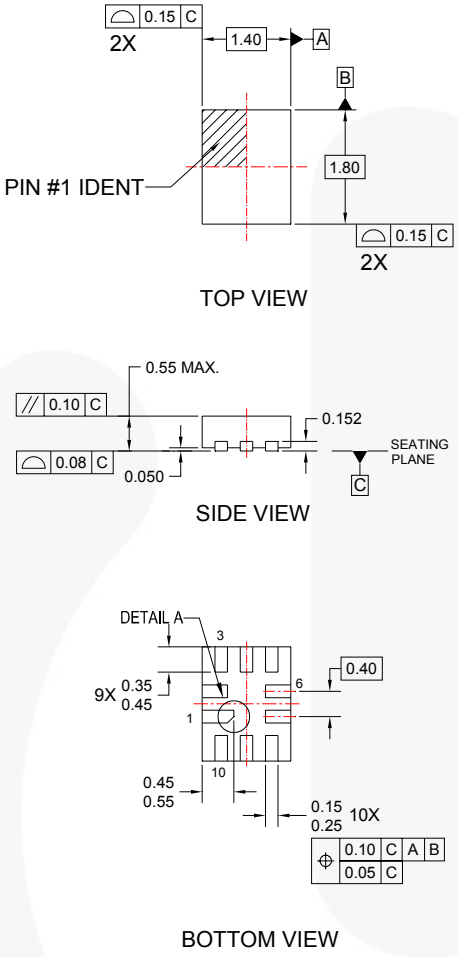
图14.电荷注入测试



R_S and R_T are functions of the application environment (see AC tables for specific values).

图15.总谐波失真

物理尺寸



NOTES:

A. DIMENSIONS ARE IN MILLIMETERS.

B. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994

C. DRAWING FILENAME: UMLP10Arev2

图16. 10-引脚, 方型, 超薄模塑无脚封装 (UMLP)

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the power franchise
TinyBoost™
TinyBuck™
TinyCalc™
TinyLogic®
TINYOPTO™
TinyPower™
TinyPWM™
TinyWire™
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2. A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, www.fairchildsemi.com, under Sales Support.

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufacturers of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed applications, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handling and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address any warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

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