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December 2014

FSA2380 — 低导通电阻 (0.75欧姆) 3:1 负电压音频源开关

特点

- 在扩展控制电压范围内（V_{IN}=2.6 V，V_{CC}=4.3 V）最大 I_{CCT} 电流为 10 µA
- C_{ON} 电容 70 pF（典型值）
- 典型导通电阻（R_{ON}）为 0.75 Ω
- 1Bn、2Bn 端口的负向音频电压可达–2V
- -3 db 带宽: >120 MHz
- 低功耗（最大 1 µA）
- 1A/2A 管脚（I_{IN}< 2 µA）具有断电功能
- 无铅封装 14 管脚 TSSOP 及 DQFN

应用

- 手机、PDA、数码像机, 及笔记本电脑
- 液晶监控器、电视机及机顶盒

总述

FSA2380是一种双刀三掷（DP3T）多路转换开关，它在单对选择脚的控制下可访问3组双通道的数据或声频源。FAS2380在其管脚1A和2A上具有一个专用电路可实现电源关断功能。 去除V_{CC}上的电源且在1A/2A管脚上保持电压，可实现最小的电流泄漏至数据管脚1A/2A内。 同时FSA2380具有静态电流非常低及断电的特点从而可延长电池寿命。低静态电流特点可服务于移动手持装置，通过它可以直接与基带处理器通用I/O口直接连接。 典型应用包括在便携式及消费应用装置中，如手机、数码像机及带HUB或控制器的笔记本内用作开关。

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订货信息

元件编号	表面标记	封装说明
FSA2380BQX	2380	14-引脚DQFN封闭，2.5 x 3.0 mm, JEDEC MO-241
FSA2380MTCX	FSA2380	14-管脚缩小薄型（TSSOP), 4.4 mm 宽, JEDEC MO-153

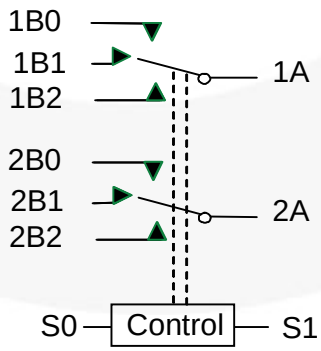

图1. FSA2380 模拟表达符号

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管脚分配图

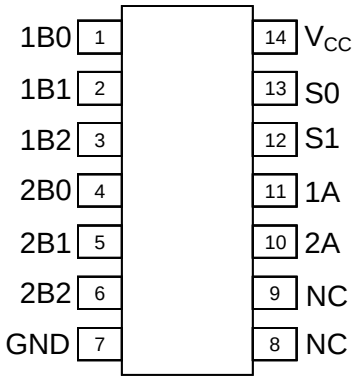

图2. TSSOP-14 (俯视图)

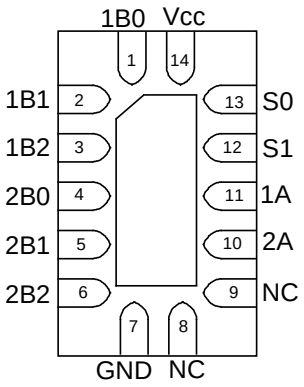

图3. DQFN-14(俯视图)

管脚描述

名称	描述
S0, S1	开关控制选择
1A, 2A	数据总线（共用）
1Bn, 2Bn	多路源输入

真值表

S1	S0	功能
低电平	低电平	断开(Hi-Z)
低电平	高电平	1B0 = 1A; 2B0 = 2A
高电平	低电平	1B1 = 1A; 2B1 = 2A
高电平	高电平	1B2 = 1A; 2B2 = 2A

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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		最小值	最大值	单位
V_{CC}	供电电压		-0.5	6.0	V
V_{SW}	开关输入/输出电压	1Bn, 2Bn	V_{CC}-5.5	V_{CC}+0.3	V
		1A, 2A Pins	V_{CC}-5.5	V_{CC}+0.3	V
V_{CNTRL}	控制输入电压 (1) S0, S1端口		-0.5	6.0	V
I_{IK}	输入钳位二极管电流		-50		mA
I_{SW}	开关I/O 电流(连续)			350	mA
I_{SWPEAK}	峰值开关电流（脉冲持续时间1ms, <10%占空系数）			500	mA
P_D	功耗 at 85°C	DQFN-14		2.5	μW
		TSSOP-14		2.5	μW
T_{STG}	保存温度范围		-65	+150	°C
T_J	最高结点温度			+150	°C
T_L	导线温度（焊接，10秒）			+260	°C
ESD	人体电流模式(JEDEC: JESD22-A114)	所有管脚		5500	kV
		I/O to GND		8000	
		VCC to GND		8000	
	充放电模式 (JEDEC-JESD-C101)			2000	kV

注:

1. 如输入及输出二极管电流额定值均达到时则可能会超出输入及输出负额定值。

推荐工作条件

推荐工作条件表中定义的是实际元件工作的条件。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		最小值	最大值	单位
V_{CC}	供电电压		2.7	5.0	V
V_{CNTRL}	控制输入电压($V_{S0:S1}$)		0	V_{CC}	V
V_{SW}	开关输入/输出电压		V_{CC}-5.5	V_{CC}	
T_A	操作温度		-40	85	ºC
θ_{JA}	热阻(大气)	DQFN-14		145	ºC / W
		TSSOP-14			

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DC 电气特性

如未另外说明均为25ºC下的标准值.

表达符号	参数	条件	V_{CC} (V)	T_A = - 40°C to +85°C			单位
				最小	典型	最大	
	模拟信号范围			V_{CC} - 5.5		V_{CC}	V
V_{IK}	钳位二极管电压					1.2	V
V_{IH}	控制输入高电平		2.7 至 3.6	1.2			V
			3.6 至 4.3	1.5			
V_{IL}	控制输入低电平		2.7 至 3.6			0.5	
			3.6 至 4.3			0.7	
I_{IN}	控制输入漏电流	V_{IN} = 0 至 V_{CC}	4.3			±1	µA
I_{OFF}	断开漏电流(共用端口 1A, 2A)	共用端口(1A, 2A) V_{SW} = 0 至 4.3 V V_{CC} = 0 V	0			±10	µA
$I_{NO(OFF)}$	1Bn, 2Bn端口的断开漏电流	1Bn, 2Bn = 0.3 V, V_{CC} – 0.3 V, 1A, 2A = 0.3 V, V_{CC} -0.3 V 或浮动	4.3	-50	10	50	nA
$I_{NC(ON)}$	1Bn, 2Bn端口的导通漏电流	1Bn, 2Bn = 浮动 V_{CC} – 0.3 V 或浮动 1A, 2A = 0.3 V, V_{CC} –0.3V	4.3	-50	10	50	nA
R_{ON}	开关导通电阻(2)	1Bn or 2Bn = 0V, 0.7 V, 2.0 V, 2.7 V; I_{ON} = -100 mA 见图7, 图8	2.7		0.75	2.00	Ω
ΔR_{ON}	Δ导通电阻(3)	1Bn or 2Bn = 0.7 V, V_{CC}, I_{ON} = -100mA	2.7		0.50		Ω
$R_{FLAT(ON)}$	导通电阻平坦度(4)	1Bn or 2Bn = 0 V, 0.7 V, 2.0 V, 2.7 V; I_{ON} = -100mA 见图7, 图8	2.7 至 4.3		0.23	0.40	Ω
I_{CC}	静态工作电流	V_{SW} = 0 or V_{CC} -0.3 I_{OUT} = 0	4.3		22	500	nA
I_{CCT}	不同控制电压及V_{CC}增加时I_{CC}相应的增加量	V_{CNTRL} = 2.6 V	4.3		2.0	10.0	µA
		V_{CNTRL} = 1.8 V			6.5	15.0	

注：

2. 在开关指定电流下，通过测量管脚1Bn(2Bn)和1A(2A)之间的电压降获得。导通电阻由两管脚上较低的电压决定。

3. 由特性保证。

4. 平坦度定义为指定范围内导通电阻最大值与最小值之间的差值。

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AC 电气特性

如未另外说明，均为温度25ºC，V_{CC} = 3.3V下的标准值.

表达符号	参数	条件	V_{CC} (V)	T_A = - 40°C 至 +85°C			单位
				最小值	典型值	最大值	
t_{ON}	开启时间S[0:1]至输出	V_{Bn} = 1.5 V, R_L = 50 Ω, C_L = 35 pF 图10, 图12	2.7 至 4.3		30	60	ns
t_{OFF}	关闭时间S[0:1] 至输出	V_{Bn} = 1.5 V, R_L = 50 Ω, C_L = 35 pF 图10, 图12	2.7至 4.3		22	45	ns
t_{PD}	传播延迟(5)	R_L = 50 Ω, C_L = 5 pF 图13	3.3		0.25		ns
t_{BBM}	先断后通(5)	R_L = 50 Ω, C_L = 5 pF V_{IN1} = V_{IN2} = V_{IN3} = 1.5 V 图11	2.7 至 4.3	1	6		ns
Q	电荷注入	R_{GEN} = 0 Ω, C_L = 100 pF, R_L = OPEN 图14	2.7 至 4.3		9		pC
O_{IRR}	断开隔离	f = 100 kHz, R_L = 50 Ω 图4, 图16	2.7 至 4.3		-68		dB
Xtalk	非相邻串扰	f = 100 kHz, R_L = 50 Ω 图5, 图17	2.7 至 4.3		-60		dB
THD	总谐波失真	f = 20 Hz to 20 kHz, R_L = 600 Ω,V_{SW} = 0.5 V_{pp} 图20	2.7 至 4.3		0.01		%
BW	-3db 带宽	R_L = 50 Ω, C_L = 0, 5 pF 图6, 图15	2.7 至 4.3		120		MHz

注:

5. 由特性保证而非产品试验。

电容

表达符号	参数	条件	T_A = - 40°C 至+85°C	单位
			典型值	
C_{IN}	控制脚输入电容	V_{CC} = 0 V	2.75	pF
C_{ON}	A/B 导通电容	V_{CC} = 3.3 V; S[0:1] = 01 10, 11; f = 1 MHz 图19	70	pF
C_{OFFA}	端口1A, 2A 断开电容	V_{CC} = 3.3 V, S[0:1] = 00 图18	42	pF
C_{OFFB}	端口 1Bn, 2Bn 断开电容	V_{CC} = 3.3 V, S[0:1] = 00 图18	20	pF

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典型特性

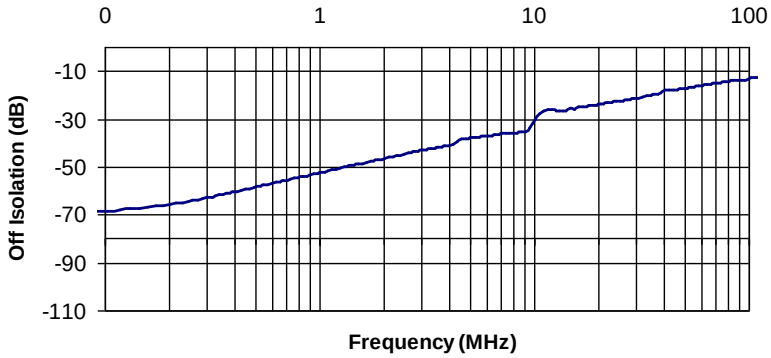


图4. 断开隔离度V_{CC} = 3.3 V,C_L = 0 pF

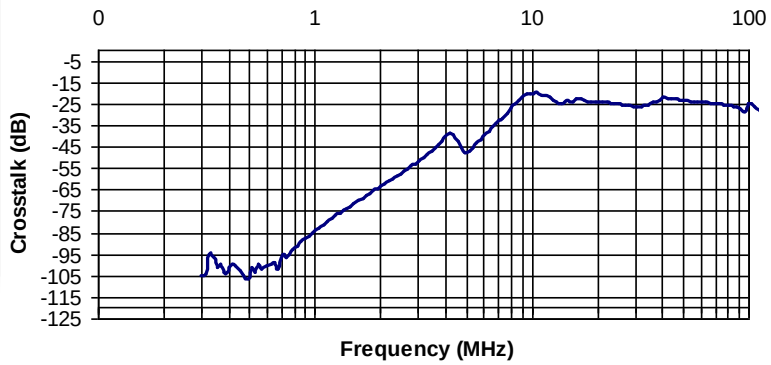


图5. 非相邻串扰 V_{CC} = 3.3 V,C_L = 0 pF

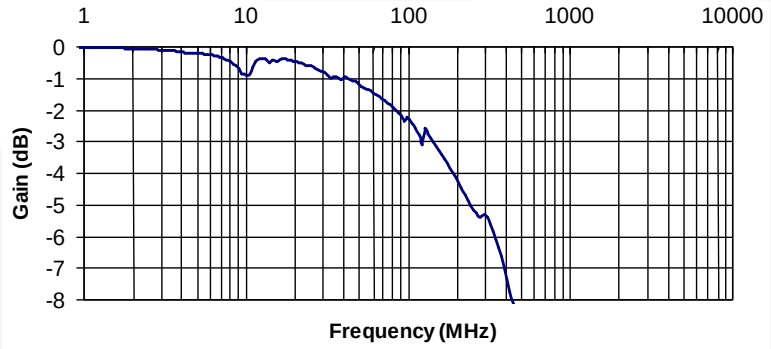


图6. 带宽 V_{CC} = 3.3 V,C_L = 0 pF

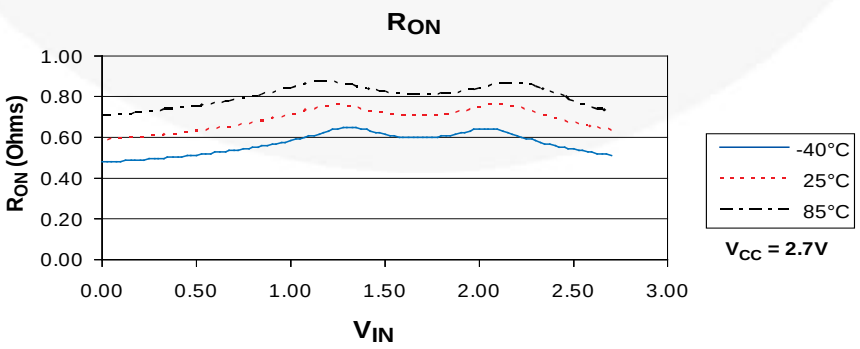


图7. 开关导通电阻R_{ON}, V_{CC} = 2.7 V

测试图

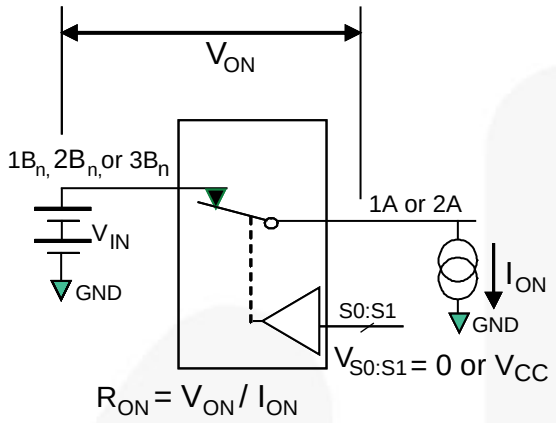
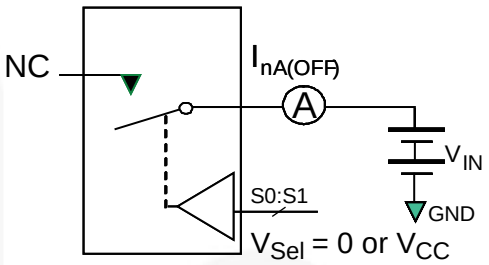
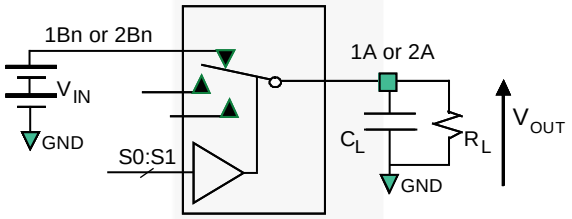


图8. 导通电阻



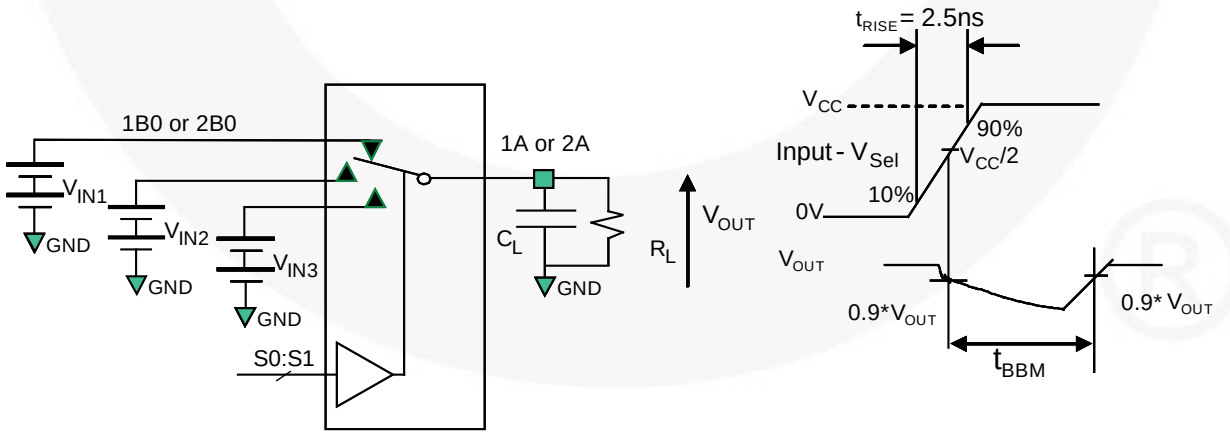
**Each switch port is tested separately

图9. 断开漏电流 (开关端分开测试)



RL and CL are functions of the application environment (see AC Tables for specific values)
CL includes test fixture and stray capacitance

图10. AC 试验电路负载



RL and CL are functions of the application environment (see AC Tables for specific values)
CL includes test fixture and stray capacitance

图11. 先断后通间隔时间

测试图(续)

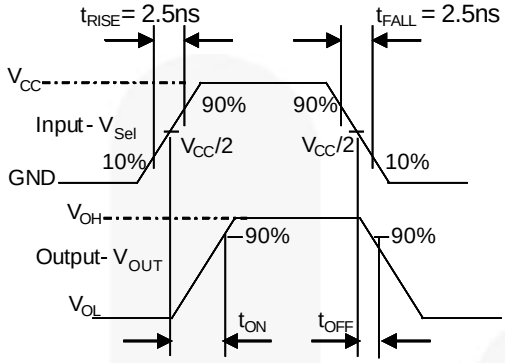


图12. 启动/关闭波形

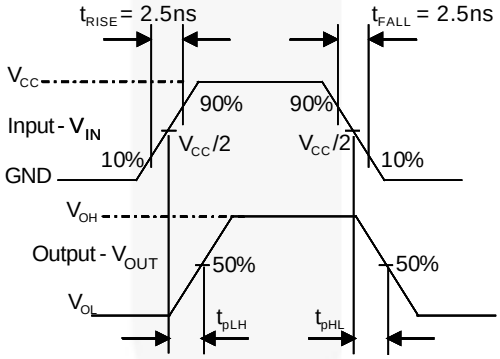


图13. 开关传播延迟波形

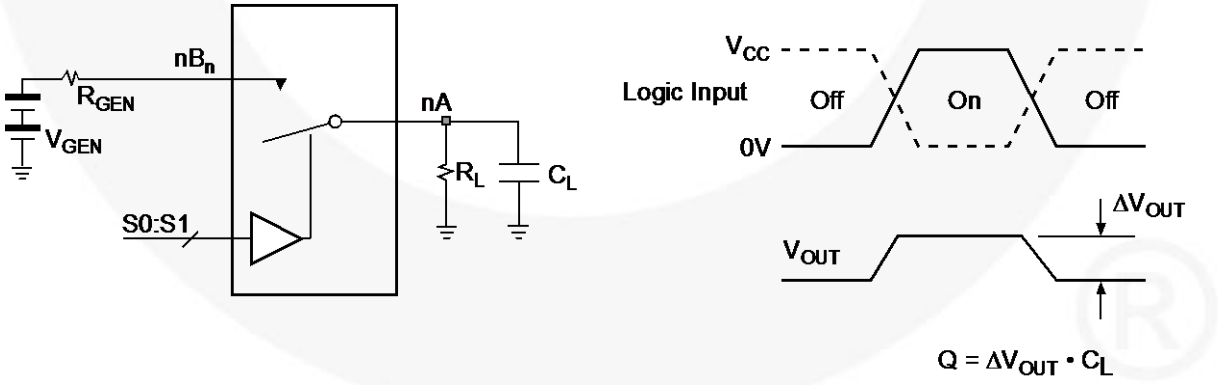
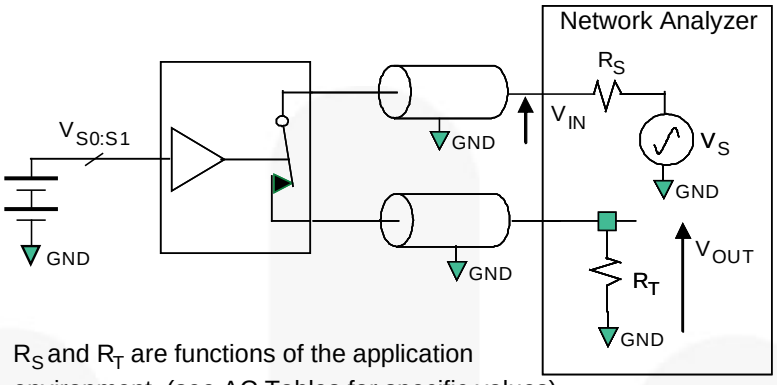


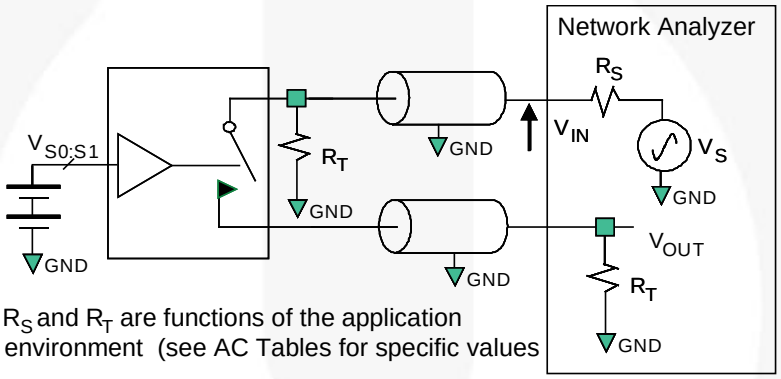
图14. 电荷注入试验

测试图(续)



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

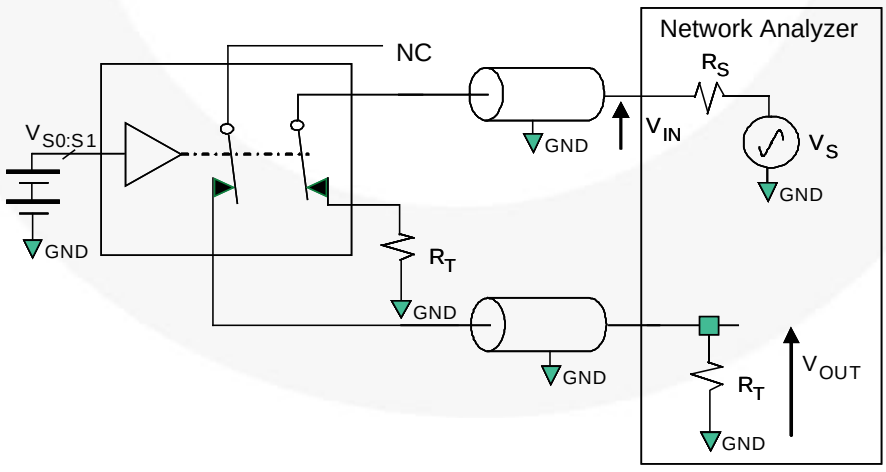
图15. 带宽



R_S and R_T are functions of the application environment (see AC Tables for specific values

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

图16. 通道断开隔离



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

图17. 非相邻通道间的串扰

测试图(续)

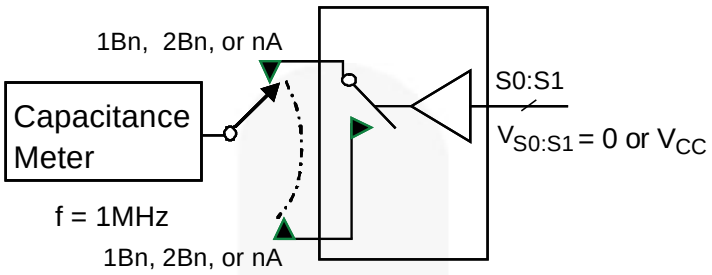


图18.通道断开（Off）电容

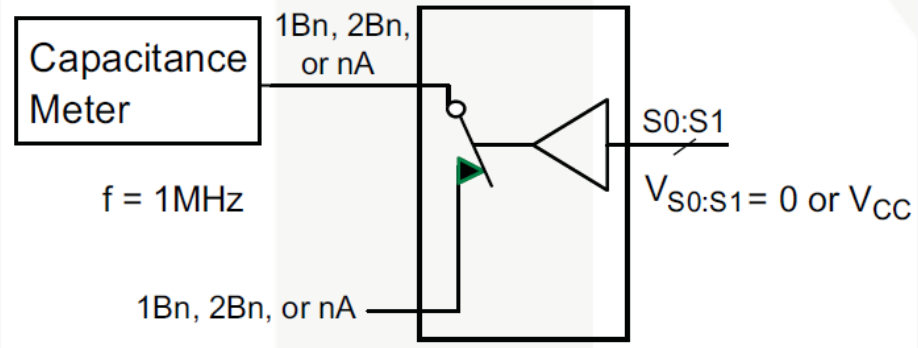


图19. 通道导通（On）电容

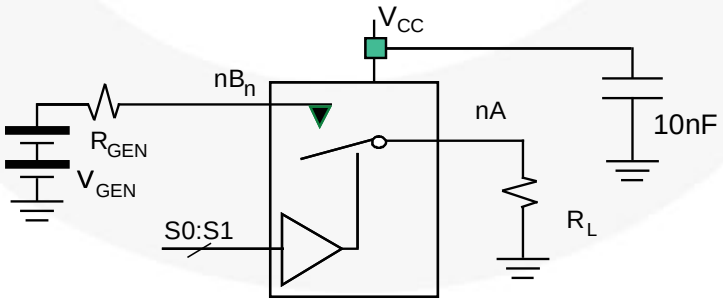
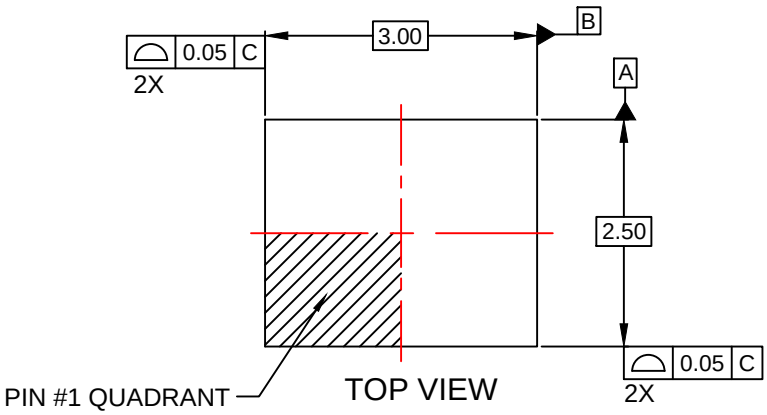
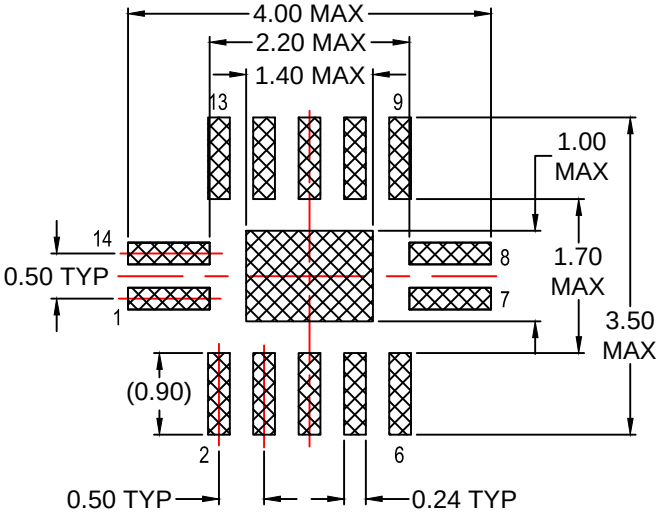
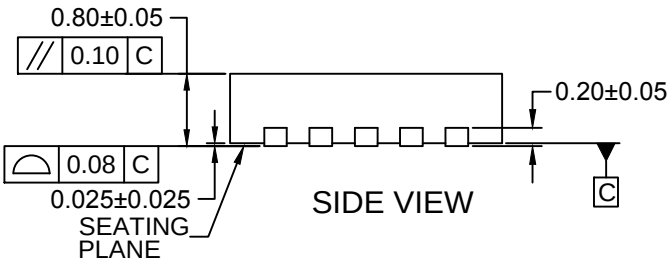


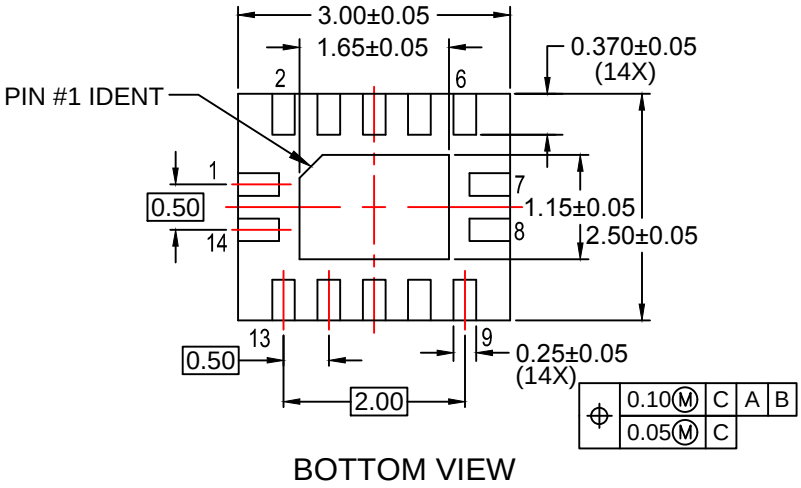
图20. 总谐波失真





RECOMMENDED LAND PATTERN





NOTES:

A. CONFORMS TO JEDEC REGISTRATION MO-241, VARIATION AA

B. DIMENSIONS ARE IN MILLIMETERS.

C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 2009.

D. LAND PATTERN RECOMMENDATION IS EXISTING INDUSTRY LAND PATTERN.

E. DRAWING FILENAME: MKT-MLP14Arev2.

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