

低功率、双通道 SIM 卡模拟开关

FSA2567

描述

FSA2567 是一款双向，低功率，双通道双刀双掷 (4PDT) 模拟开关，主要用于双通道 1 位 SIM 卡多路复用。它专为切换 WLAN-SIM 数据和控制信号进行了优化，将一个通道专门用作电源开关。

FSA2567 符合 SIM 卡要求，具有 10 pF 的低导通电容 (C_{ON}) 以确保高速数据传输。 V_{SIM} 开关路径具有低 R_{ON} 特性，以确保双通道 SIM 卡电源路径的最低压降。

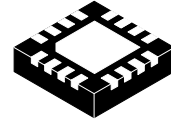
FSA2567 包含特殊的电路，当应用于 SEL 引脚的控制电压低于电源电压 (V_{CC}) 时，可最大限度地降低电流消耗。此特性对超便携式应用 (例如手机) 尤为重要，可便于与基带处理器的通用 I/O 进行直接的接口连接。其他应用包括便携手机，PDA，数码相机，打印机和笔记本电脑中共享的开关和连接器。

特性

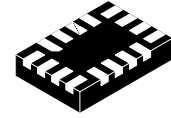
- 数据路径的低导通电容：10 pF 典型值
- 数据路径的低导通电阻：6 Ω 典型值
- 电源路径的低导通电阻：0.4 Ω 典型值
- 较宽的 V_{CC} 工作电压范围：1.65 V 至 4.3 V
- 低功耗：1 μ A 最大值
 - ◆ 15 μ A 在扩展的电压范围内提供最大的 I_{CCT} ($V_{IN} = 1.8$ V, $V_{CC} = 4.3$ V)
- 宽 -3 db 带宽：>160 MHz
- 封装：
 - ◆ 无铅 16 引脚 MLP & 16 引脚 UMLP
- 额定值 8 kV ESD; >12 kV 电源/接地 ESD 额定值

应用

- 手机，PDA，数码相机和笔记本
- 液晶显示器，电视和机顶盒

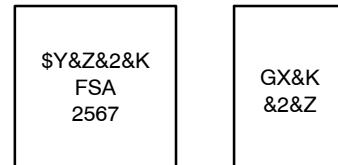


WQFN16 3x3, 0.5P
CASE 510BS



UQFN16 1.8x2.6, 0.4P
CASE 523BF

MARKING DIAGRAM



GX, FSA2567 = Device Code
\$Y = onsemi Logo
&Z = Assembly Plant Code
&2 = 2-Digit Date Code
&K = 2-Digits Lot Run Traceability Code

ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

FSA2567

订购信息

器件编号	顶标	工作温度范围	封装	Shipping [†]
FSA2567MPX	FSA2567	-40 至 +85°C	16 引脚，模塑无铅封装 (MLP)，四通道，JEDEC MO-220, 3 mm	3000 / Tape & Reel
FSA2567UMX	GX		16 引脚，四通道，超薄膜塑无铅封装 (UMLP)，1.8 x 2.6 mm	5000 / Tape & Reel

[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

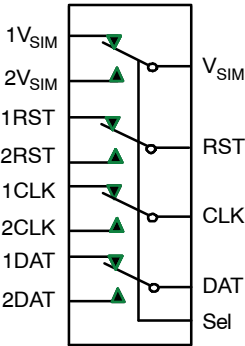


图 1. 模拟符号

引脚分配

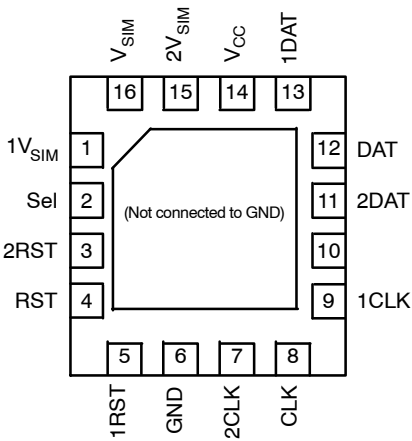


图 2. 焊盘分配 MLP16 (顶视图)

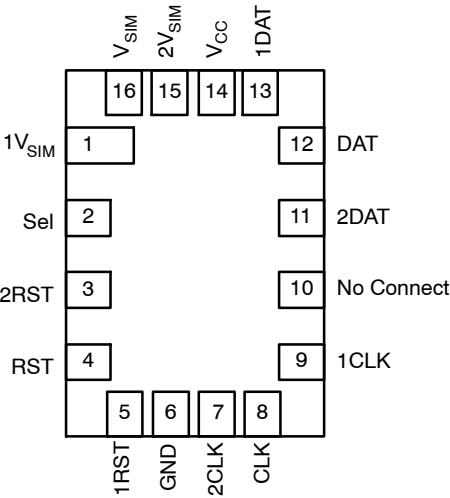


图 3. 焊盘分配 UMLP16 (顶视图)

引脚定义

引脚	描述
nDAT, nRST, nCLK	多路复用数据源输入
nV _{SIM}	多路复用 SIM 电源输入
V _{SIM} , DAT, RST, CLK	通用 SIM 端口
Sel	开关选择

真值表

Sel	功能
逻辑低电平	1DAT = DAT, 1RST = RST, 1CLK = CLK, 1V _{SIM} = V _{SIM}
逻辑高电平	2DAT = DAT, 2RST = RST, 2CLK = CLK, 2V _{SIM} = V _{SIM}

绝对最大额定值

符号	参数	最小值	最大值	单位
V _{CC}	电源电压	-0.5	+5.5	V
V _{CNTRL}	直流输入电压 (Sel) (注 1)	-0.5	V _{CC}	V
V _{SW}	直流开关 I/O 电压 (注 1)	-0.5	V _{CC} + 0.3	V
I _{IK}	直流输入二极管电流	-50	-	mA
I _{SIM}	直流输出电流 - V _{SIM}	-	350	mA
I _{OUT}	直流输出电流 - DAT, CLK, RST	-	35	mA
T _{STG}	存储温度	-65	+150	°C
ESD	人体模型, JEDEC: JESD22-A114	全部引脚	3	kV
		I/O 至 GND	12	
	元件充电模型, JEDEC: JESD22-C101	-	2	

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

(参考译文)

如果电压超过最大额定值表中列出的值范围, 器件可能会损坏。如果超过任何这些限值, 将无法保证器件功能, 可能会导致器件损坏, 影响可靠性。

1. 当测量输入与输出二极管电流额定值时, 该输入与输出可能超出负额定值。

推荐工作条件

符号	参数	最小值	最大值	单位
V _{CC}	电源电压	1.65	4.30	V
V _{CNTRL}	控制输入电压 (Sel) (注 2)	0	V _{CC}	V
V _{SW}	开关 I/O 电压	-0.5	V _{CC}	V
I _{SIM}	直流输出电流 - V _{SIM}	-	150	mA
I _{OUT}	直流输出电流 - DAT, CLK, RST	-	25	mA
TA	工作温度	-40	+85	°C

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

(参考译文)

高于推荐工作范围表格中所列电压时, 不保证能够正常运行。长时间在推荐工作范围表格中规定范围以外的电压下运行, 可能会影响器件的可靠性。

2. 控制输入必须保持高电平或低电平, 不允许浮动。

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直流电气特性 (所有典型值都在 25°C, 3.3 V V_{CC} 下测得, 若无其他说明。)

符号	参数	工作条件	V_{CC} (V)	$T_A = -40^{\circ}\text{C}$ 至 85°C			单位
				最小值	典型值	最大值	
V_{IK}	箝位二极管电压	$I_{IN} = -18\text{ mA}$	2.7	–	–	–1.2	V
V_{IH}	输入电压高电平		1.65 至 2.3	1.1	–	–	V
			2.7 至 3.6	1.3	–	–	
			4.3	1.7	–	–	
V_{IL}	输入电压低电平		1.65 至 2.3	–	–	0.4	V
			2.7 至 3.6	–	–	0.5	
			4.3	–	–	0.7	
I_{IN}	控制脚输入漏电流	$V_{SW} = 0$ to V_{CC}	4.3	–1	–	1	μA
$I_{nc(off)}$, $I_{no(off)}$	关断漏电流	nRST, nDAT, nCLK, $nV_{SIM} = 0.3\text{ V}$ 或 3.6 V 图 10	4.3	–60	–	60	nA
R_{OND}	数据路径导通电阻 (注 3)	$V_{SW} = 0$, 1.8 V , $I_{ON} = -20\text{ mA}$ 图 9	1.8	–	7.0	12.0	Ω
		$V_{SW} = 0$, 2.3 V , $I_{ON} = -20\text{ mA}$ 图 9	2.7	–	6.0	10.0	
R_{ONV}	V_{SIM} 开关导通电阻 (注 3)	$V_{SW} = 0$, 1.8 V , $I_{ON} = -100\text{ mA}$ 图 9	1.8	–	0.5	0.7	Ω
		$V_{SW} = 0$, 2.3 V , $I_{ON} = -100\text{ mA}$ 图 9	2.7	–	0.4	0.6	
ΔR_{OND}	数据路径德尔塔导通电阻 (注 4)	$V_{SW} = 0\text{ V}$, $I_{ON} = -20\text{ mA}$	2.7	–	0.2	–	Ω
I_{CC}	静态电源电流	$V_{CNTRL} = 0$ 或 V_{CC} , $I_{OUT} = 0$	4.3	–	–	1.0	μA
I_{CCT}	每个控制电压和 V_{CC} 的 I_{CC} 电流增量	$V_{CNTRL} = 2.6\text{ V}$, $V_{CC} = 4.3\text{ V}$	4.3	–	5.0	10.0	μA
		$V_{CNTRL} = 1.8\text{ V}$, $V_{CC} = 4.3\text{ V}$	4.3	–	7.0	15.0	μA

3. 在通过开关的指定电流下, 由 nDAT, nRST, nCLK 和相对通用端口引脚之间的电压降测得。导通电阻决定于相对端口上的较低电压。
4. 由产品特性保证。

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交流电气特性 (所有典型值都在 $V_{CC} = 3.3\text{ V}$, 25°C 时测得, 若无其他说明。)

符号	参数	工作条件	V_{CC} (V)	$T_A = -40^\circ\text{C}$ 至 85°C			单位
				最小值	典型值	最大值	
t_{OND}	导通时间 Sel 至输出 (DAT, CLK, RST)	$R_L = 50\ \Omega$, $C_L = 35\text{ pF}$ $V_{\text{SW}} = 1.5\text{ V}$ 图 11, 图 12	1.8 (注 5)	–	65	95	ns
			2.7 至 3.6	–	42	60	ns
t_{OFFD}	关断时间 Sel 至输出 (DAT, CLK, RST)	$R_L = 50\ \Omega$, $C_L = 35\text{ pF}$ $V_{\text{SW}} = 1.5\text{ V}$ 图 11, 图 12	1.8 (注 5)	–	30	50	ns
			2.7 至 3.6	–	20	40	ns
t_{ONV}	导通时间 Sel 至输出 (V_{SIM})	$R_L = 50\ \Omega$, $C_L = 35\text{ pF}$ $V_{\text{SW}} = 1.5\text{ V}$ 图 11, 图 12	1.8 (注 5)	–	55	80	ns
			2.7 至 3.6	–	35	55	ns
t_{OFFV}	关断时间 Sel 至输出 (V_{SIM})	$R_L = 50\ \Omega$, $C_L = 35\text{ pF}$ $V_{\text{SW}} = 1.5\text{ V}$ 图 11, 图 12	1.8 (注 5)	–	35	50	
			2.7 至 3.6	–	22	40	ns
t_{PD}	传输延迟 (注 5) (DAT, CLK, RST)	$C_L = 35\text{ pF}$, $R_L = 50\ \Omega$ 图 11, 图 13	3.3	–	0.25	–	ns
t_{BBMD}	先开后合 (注 5) (DAT, CLK, RST)	$R_L = 50\ \Omega$, $C_L = 35\text{ pF}$ $V_{\text{SW1}} = V_{\text{SW2}} = 1.5\text{ V}$ 图 15	2.7 至 3.6	3	18	–	ns
t_{BBMV}	先开后合 (注 5) (V_{SIM})	$R_L = 50\ \Omega$, $C_L = 35\text{ pF}$ $V_{\text{SW1}} = V_{\text{SW2}} = 1.5\text{ V}$ 图 15	2.7 至 3.6	3	12	–	ns
Q	电荷注入 (DAT, CLK, RST)	$C_L = 50\text{ pF}$, $R_{\text{GEN}} = 0\ \Omega$, $V_{\text{GEN}} = 0\text{ V}$	2.7 至 3.6	–	10	–	pC
O_{IRR}	关断隔离 (DAT, CLK, RST)	$R_L = 50\ \Omega$, $f = 10\text{ MHz}$ 图 17	2.7 至 3.6	–	–60	–	dB
Xtalk	非相邻通道串扰 (DAT, CLK, RST)	$R_L = 50\ \Omega$, $f = 10\text{ MHz}$ 图 18	2.7 至 3.6	–	–60	–	dB
BW	–3 db 带宽 (DAT, CLK, RST)	$R_L = 50\ \Omega$, $C_L = 5\text{ pF}$ 图 16	2.7 至 3.6	–	475	–	MHz

5. 由产品特性保证。

电容值

符号	参数	工作条件	$T_A = -40^\circ\text{C}$ 至 85°C			单位
			最小值	典型值	最大值	
C_{IN}	控制引脚输入电容	$V_{CC} = 0\text{ V}$	–	1.5	–	pF
C_{OND}	RST, CLK, DAT 导通电容 (注 6)	$V_{CC} = 3.3\text{ V}$, $f = 1\text{ MHz}$, 图 20	–	10	12	
C_{ONV}	V_{SIM} 导通电容 (注 6)	$V_{CC} = 3.3\text{ V}$, $f = 1\text{ MHz}$, 图 20	–	110	150	
C_{OFFD}	RST, CLK, DAT 关断电容	$V_{CC} = 3.3\text{ V}$, 图 19	–	3	–	
C_{OFFV}	V_{SIM} 关断电容	$V_{CC} = 3.3\text{ V}$, 图 19	–	40	–	

6. 由产品特性保证。

典型性能特征

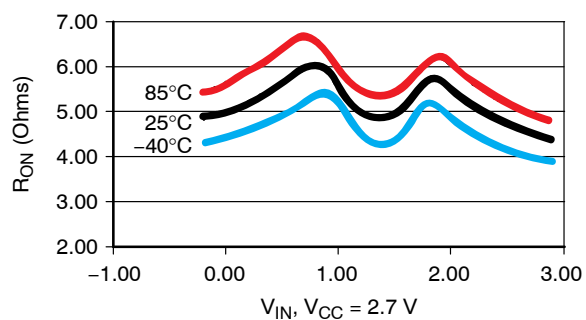
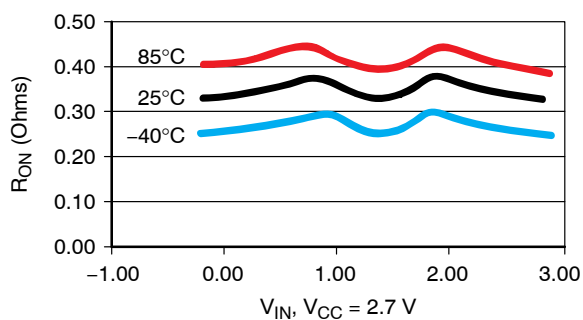
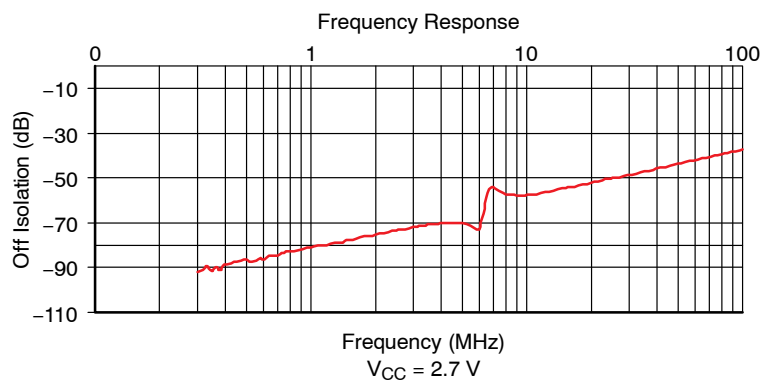
图 4. R_{ON} 数据路径图 5. R_{ON} V_{SIM} 

图 6. 关断隔离

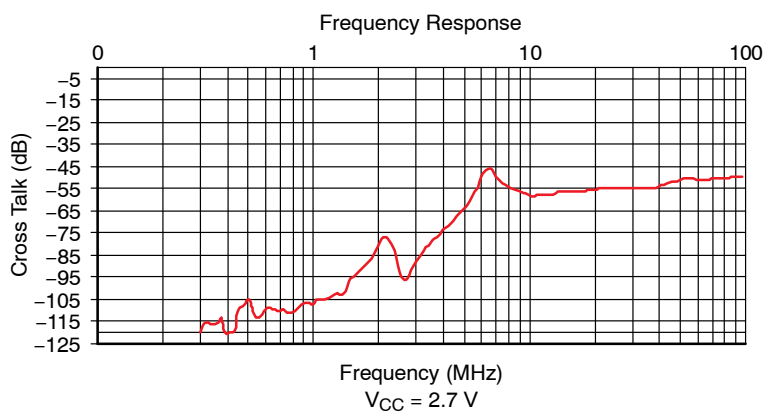


图 7. 串扰

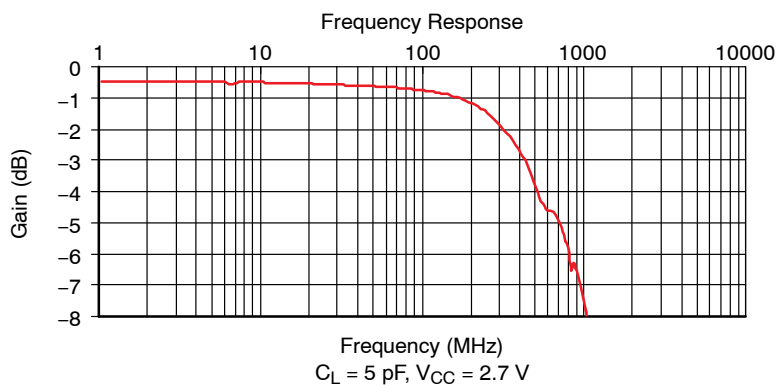


图 8. 带宽

测试框图

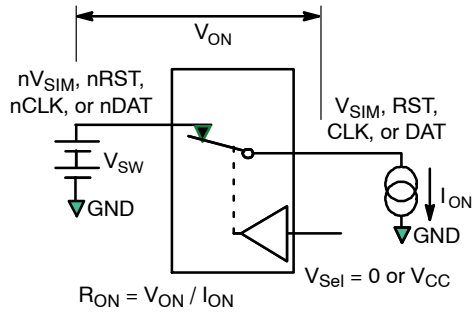


图 9. 导通电阻

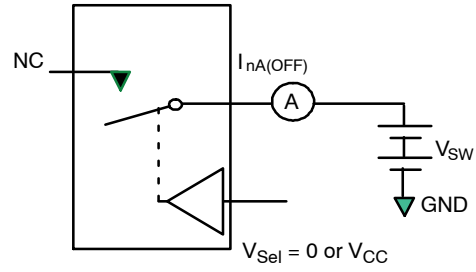
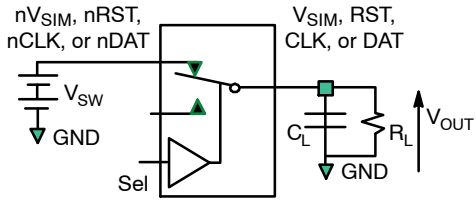


图 10. 关断漏电流



R_L and C_L are functions of the application environment (see tables for specific values). C_L includes test fixture and stray capacitance.

图 11. 交流测试电路负载

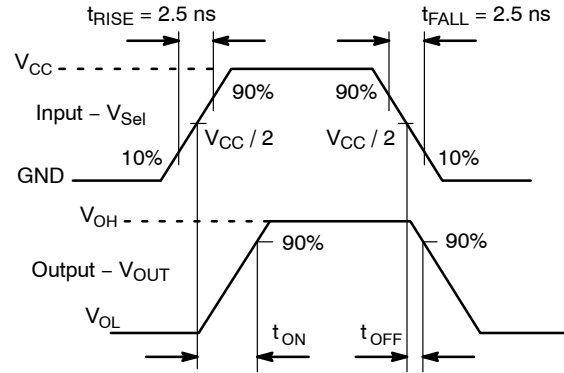


图 12. 开通/关断波形

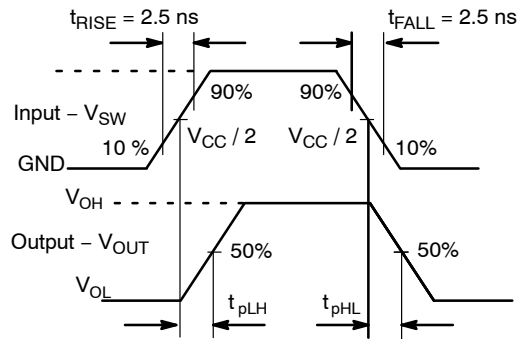


图 13. 传播延迟

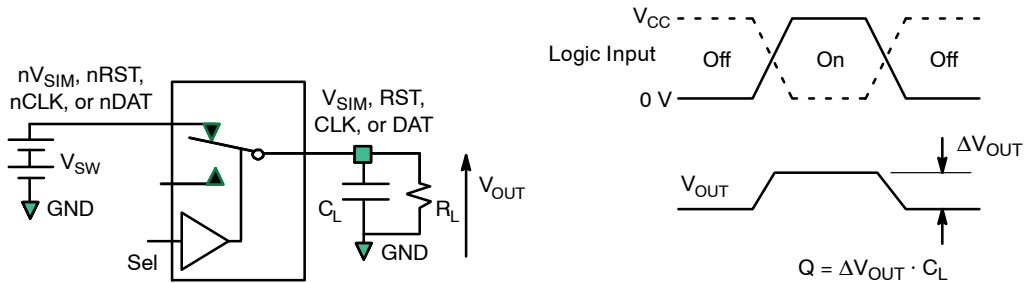


图 14. 电荷注入

测试框图 (续)

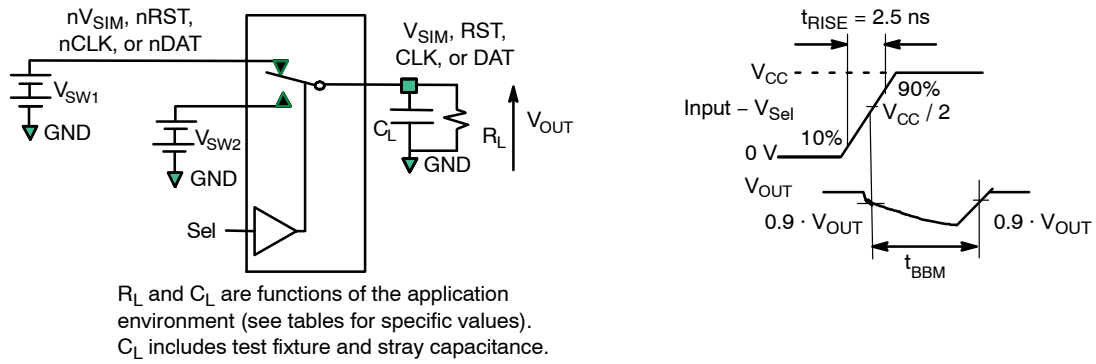


图 15. 先开后合间隔时序

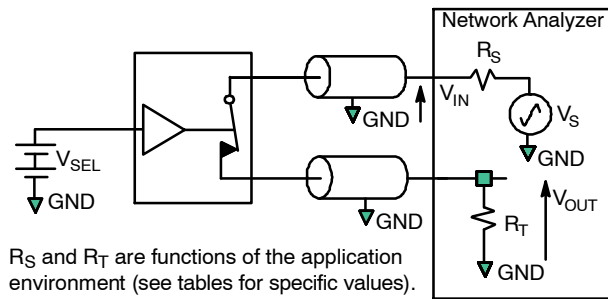


图 16. 带宽

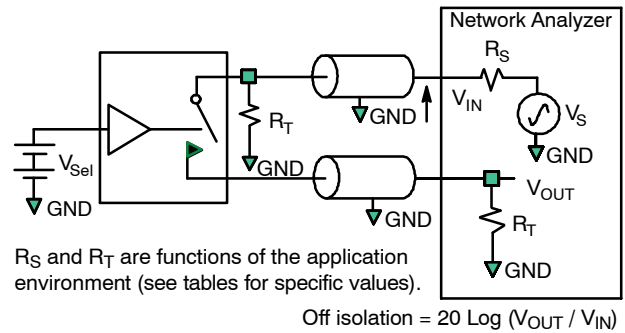


图 17. 通道的关断隔离

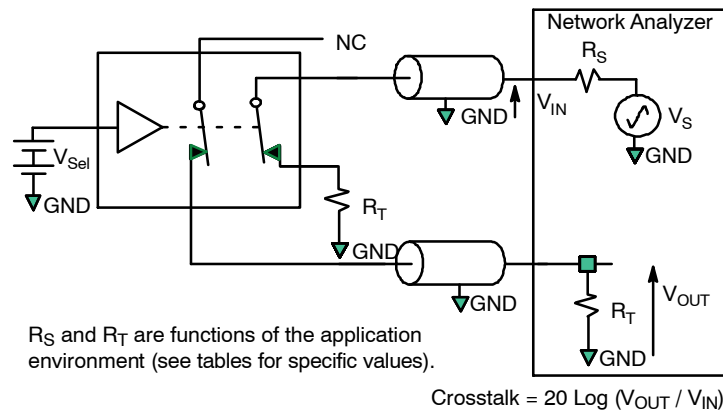


图 18. 非相邻通道间串扰

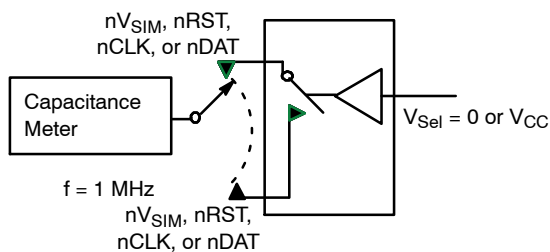


图 19. 通道关断电容

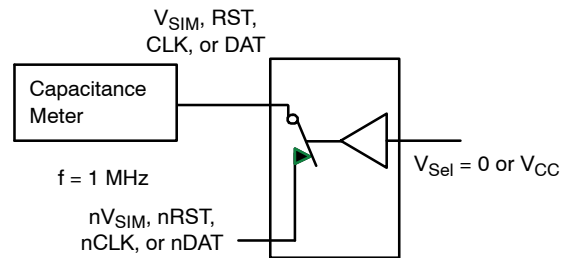
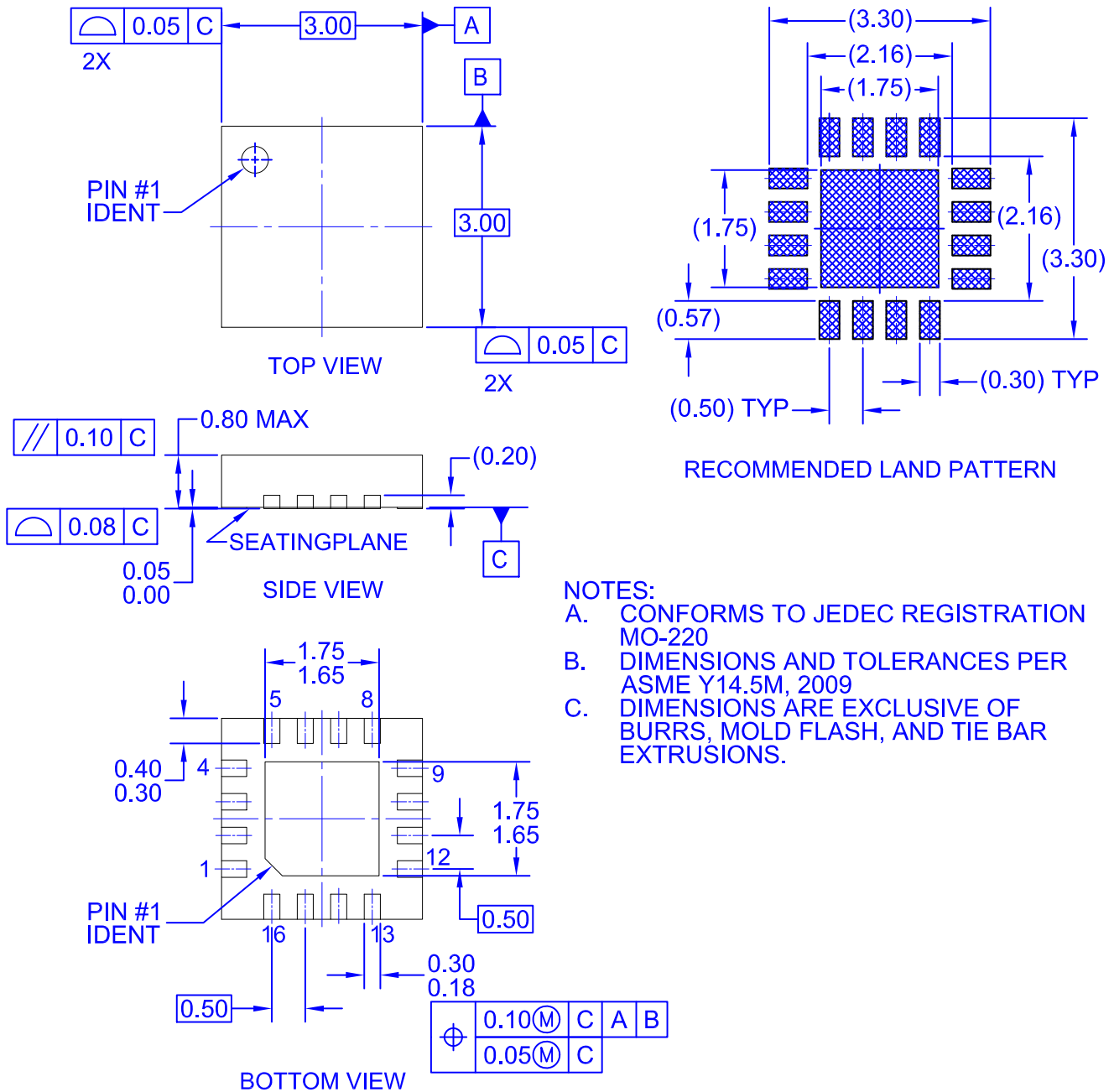


图 20. 通道导通电容

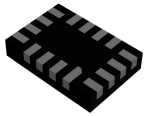
WQFN16 3x3, 0.5P
CASE 510BS
ISSUE O

DATE 31 AUG 2016

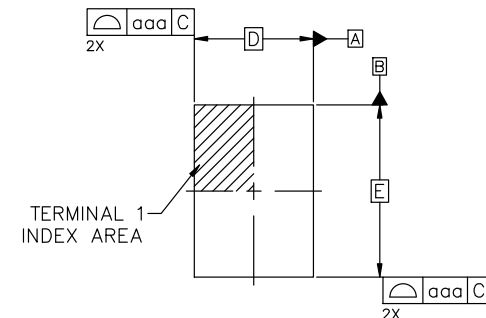


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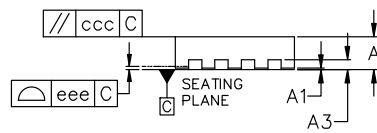
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UQFN16 1.80x2.60x0.50, 0.40P
CASE 523BF
ISSUE A

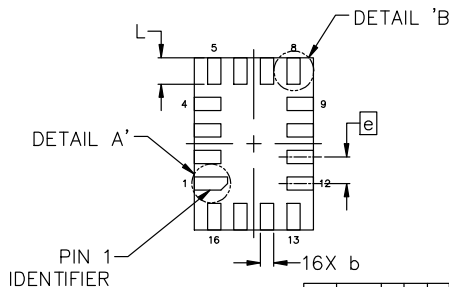
DATE 06 MAY 2024



TOP VIEW



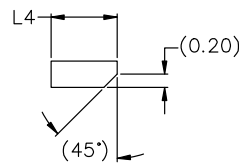
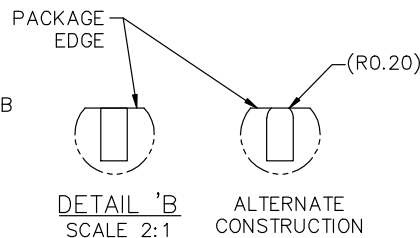
SIDE VIEW



BOTTOM VIEW

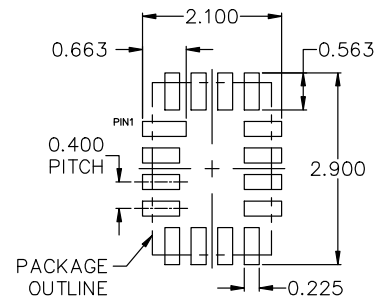
NOTES:

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5M-2018.
2. ALL DIMENSIONS ARE IN MILLIMETERS, DEGREES IN ANGLE.
3. LAND PATTERN RECOMMENDATION IS EXISTING INDUSTRY LAND PATTERN.
4. TERMINAL SHAPE MAY VARY ACCORDING TO PACKAGE SUPPLIER, SEE TERMINAL SHAPE VARIANTS.


DETAIL 'A'
SCALE 2:1

DETAIL 'B'
SCALE 2:1

ALTERNATE
CONSTRUCTION

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.45	0.50	0.55
A1	0.00	---	0.05
A3	0.10	0.15	0.20
b	0.15	0.20	0.25
D	1.80 BSC		
E	2.60 BSC		
e	0.40 BSC		
L	0.35	0.40	0.45
L4	0.45	0.50	0.55
TOLERANCES FOR FEATURE CONTROL FRAME			
aaa	0.05		
bbb	0.10		
ccc	0.10		
ddd	0.05		
eee	0.05		



RECOMMENDED MOUNTING FOOTPRINT*

*FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ONSEMI SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

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