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FAIRCHILD SEMICONDUCTOR®

2013年7月

FSA8009
带MIC/视频开关的自动插孔发送/结束检测

特性

检测	附件插孔 3/4极音频插孔 按下发送/结束键
开关类型	麦克风和视频
V_{DD}	2.5 至 4.3 V
THD (MIC)	0.01%（典型值）
ESD (空气间隙)	16 kV
工作温度	-40°C至85°C
封装	10-Lead UMLP 1.4x1.8x0.5 mm，0.4 mm 间距
顶标	KP
订购信息	FSA8009UMX

应用

- 3.5 mm 和 2.5 mm 音频插孔
- 移动电话，智能电话
- MP3 和 PMP

说明

FSA8009是一款音频插孔麦克风/视频开关，用于具有发送/结束(S/E)检测的3或4极附件。除了检测外，FSA8029还包含集成式麦克风/视频开关，允许处理器配置音频插孔。该架构的设计旨在允许常见的第三方耳机用于从手机、个人媒体播放器和便携式外围设备听音乐。

- 确定何时按下发送/结束键
- 整合了用于4极的 MIC/视频 开关
- 降低了麦克风偏压造成的杂音

相关资源

- *有关样品、疑问，请联系：Analog.Switch@fairchildsemi.com.*
- *FSA8009 演示板*

典型应用

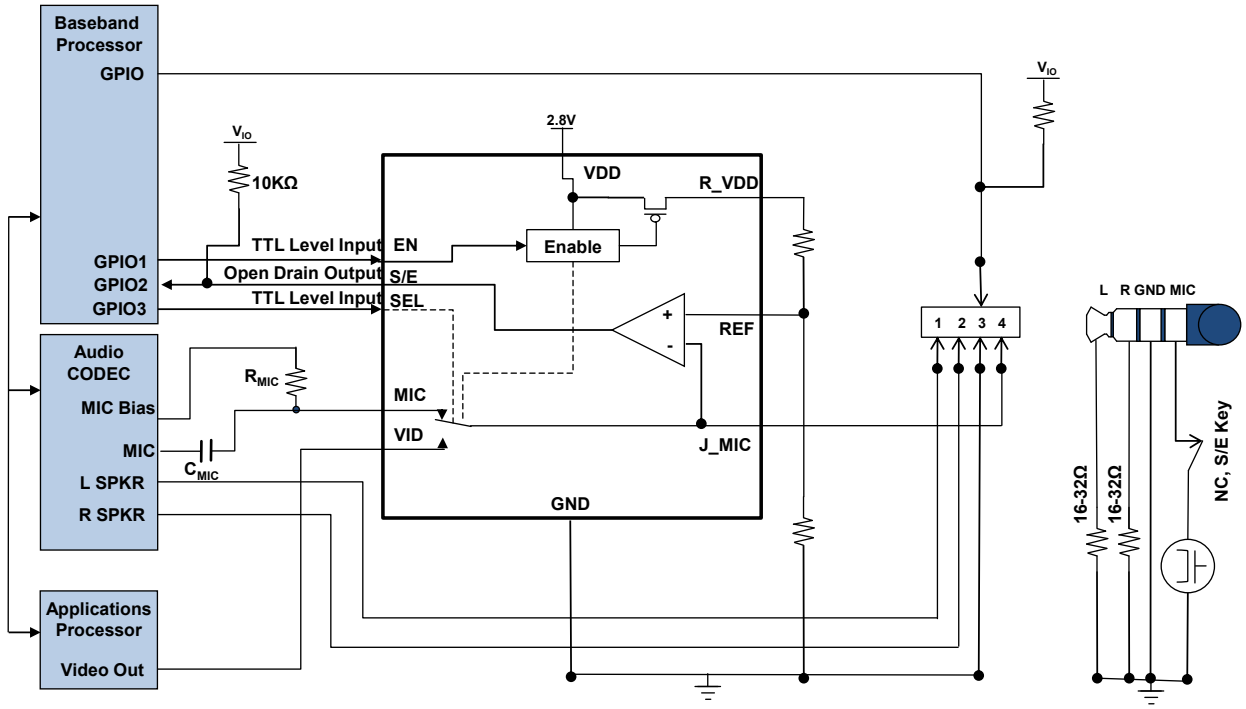

图 1. 移动电话示例

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引脚描述

名称	引脚号	类型	说明		
R_VDD	1	输出	备选的上拉电压，带有分压电阻，设置 REF 引脚上的参考电压		
EN	2	输入	器件启用，低功率模式	0	器件无效(1)
				1	器件有效(1)
SEL	3	输入	MIC / VID 开关选择引脚	0	VID = J_MIC(1)
				1	MIC = J_MIC(1)
S/E	4	输出	指示发送/结束键按下的状态，开漏输出需要上拉电阻	0	按(1)
				1	无键按下(1)
VID	6	开关	视频开关路径；连接在视频源和音频插孔麦克风引脚之间		
VDD	5	功率	电源电压		
MIC	7	开关	麦克风开关路径，进入 CODEC 麦克风放大器输入		
J_MIC	8	开关	麦克风开关路径，连接至麦克风和 SEND/END 键和视频插孔		
REF	10	输入	通过分压电阻 R_VDD 或外部的参考电压，参考电压可用来检测发送/结束键的按下状态		
GND	9	接地	音频插孔和 PCB 接地		

注意：

1. 0 = V_{OL} 或 V_{IL}；1 = V_{OH} 或 V_{IH}。

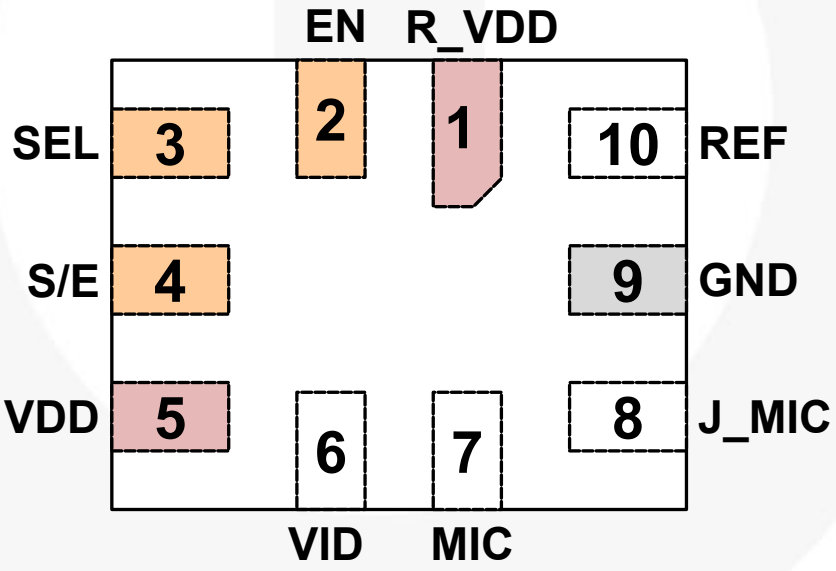

图 2. UMLP引脚配置（透视图）

表 1. 复位和有效状态下的器件配置

EN	SEL	MIC	VID	R_VDD	S/E
0	X	3态	3态	GND	高
1	1	J_MIC	打开	VDD	有效
1	0	打开	J_MIC	GND	低

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绝对最大额定值

应力超过绝对最大额定值，可能会损坏设备。在超出推荐的工作条件的情况下，该器件可能无法正常运行或操作，且不建议让器件在这些条件下长期工作。此外，过度暴露在高于推荐的工作条件下，会影响器件的可靠性。绝对最大额定值仅是额定应力值。

符号	参数		最小值	最大值	单位
V_{DD}	来自电池的电源电压		-0.5	5.5	V
V_{SW}	开关I/O电压		-0.5	V_{DD}+0.5	V
I_{IK}	输入箝位二极管电流(2)		-50		mA
I_{SW}	开关输入/输出（连续）电流(2)			50	mA
T_{STG}	存储温度范围		-65	+150	°C
T_J	最大结温			+150	°C
T_L	引脚温度（焊接 ，10 秒）			+260	°C
ESD	IEC 61000-4-2 系统	空气式	16		kV
		接触式	10		
	人体模型，JEDEC JESD22-A114	全部其他引脚	6		
		J_DET, J_MIC, V_{DD}, V_{IO}, GND	8		
	充电器件模型, JEDEC JESD22-C101	全部引脚	2		

注意：

2. 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

推荐的操作条件表定义了器件的真实工作条件。指定推荐的工作条件，以确保设备的最佳性能达到数据表中的规格。飞兆半导体建议不要超过推荐工作条件，也不能按照绝对最大额定值进行设计。

符号	参数	最小值	最大值	单位
V_{DD}	电池电源电压	2.5	4.3	V
T_A	工作温度	-40	+85	°C

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直流电气特性

若无其他说明，所有典型值都在T_A=25° C下测得。

MIC 开关

符号	参数	V_{DD} (V)	工作条件	T_A = -40 to +85° C			单位
				最小值	典型值	最大值	
R_{ON}	MIC 开关导通电阻	2.8	I_{OUT} = 24 mA, V_{IN} = 2.2 V		2.0	4.0	Ω
		3.0			1.5	3.5	
		3.3			1.2	3.0	
		3.8			1.0	2.5	
$R_{FLAT(ON)}$	导通阻抗平面度	2.8	I_{OUT} = 24 mA, V_{IN} = 1 V to V_{DD}		0.7	1.5	Ω
		3.0			0.6	1.4	
		3.3			0.5	1.3	
		3.8			0.5	1.2	
V_{IN}	开关输入电压范围	2.5 至 4.3		0		V_{DD}	V
C_{ON}	MIC 和 J_MIC 开关导通电容	2.8	f = 1 MHz		15		pF
C_{OFF}	MIC 和 J_MIC 开关关断电容	2.8	f = 1 MHz		8		pF

视频开关特性

符号	参数	V_{DD} (V)	工作条件	T_A = -40 to +85° C			单位
				最小值	典型值	最大值	
R_{ON}	MIC 开关导通电阻	2.8	I_{OUT} = 24 mA, V_{IN} = 0.5 V		1.0	1.5	Ω
		3.0			0.9	1.4	
		3.3			0.8	1.3	
		3.8			0.7	1.2	
$R_{FLAT(ON)}$	导通阻抗平面度	2.8	I_{OUT} = 24 mA, V_{IN} = 0 V to 1.2 V		0.4	0.60	Ω
		3.0			0.3	0.55	
		3.3			0.2	0.50	
		3.8			0.15	0.45	
V_{IN}	开关输入电压范围	2.5 至 4.3		0		1.5	V
C_{ON}	VID 开关导通电容	2.8	f = 1 MHz		40		pF
C_{OFF}	VID 开关关断电容	2.8	f = 1 MHz		10		pF

并联I/O

符号	参数	T_A = -40 to +85° C			单位
		最小值	典型值	最大值	
V_{IH}	输入高电压（EN, SEL）	0.44 x V_{DD}		V_{DD}	V
V_{IL}	输入低电压（EN, SEL）	GND		0.15 x V_{DD}	V
$PUR_{S/E}$	S/E 的上拉电阻	2		110	KΩ
V_{OL}	输出低电压（S/E）（V_{PUR} = 上拉电阻的电压）			0.2 x V_{PUR}	V

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直流电气特性（续）

若无其他说明，所有典型值都在T_A=25° C下测得。

比较器 NC开关

符号	参数	V_{DD} (V)	工作条件	T_A = -40 至 +85° C			单位
				最小值	典型值	最大值	
V_{REF}	REF 引脚上的输入电压			1		V_{DD} - 0.075	V
COM_{HYS}	比较器 "-" 端滞环				50		mV

电流

符号	参数	V_{DD} (V)	工作条件	T_A = -40 至 +85° C			单位
				最小值	典型值	最大值	
I_{OFF}	关断漏电流	4.3	J_MIC = 1 V, 4.3 V MIC 或 VID = 4.3 V, 1 V	-15		15	nA
I_{IN}	输入漏电流	0 至 4.3	输入 0 至 4.3 V			1	µA
I_{CC-EN}	低耗模式	2.5 至 4.3	EN = 低电平		10		nA
I_{CC-VID}	视频模式期间的电流	2.5 至 4.3	启用电流（EN = 高电平，SEL = 低电平）		10		nA
I_{CC-MIC}	麦克风模式期间的电流	2.5 至 4.3	启用电流（EN = 低电平，SEL = 高电平）		20		µA

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交流电气特性

若无其他说明，所有典型值都在 V_{CC}=3.3 V，T_A = 25° C 下测得。

MIC 开关

符号	参数	V_{DD} (V)	工作条件	T_A = -40 至 +85° C			单位
				最小值	典型值	最大值	
THD	总谐波失真度	2.8	R_T = 600 Ω，V_{SW} = 0.5 V_{PP}，f = 20 Hz 至 20 kHz，V_{IN} = 2.2 V		.003		%
O_{IRR}	关断隔离	2.8	f = 20 kHz，R_S=32 Ω，C_L=0 pF，R_T=32 Ω		-100		dB
X_{TALK}	MIC 至 VID 的串扰	2.8	f = 100 MHz，R_L=100 Ω		-67		dB

视频开关特性

符号	参数	V_{DD} (V)	工作条件	T_A = -40 至 +85° C			单位
				最小值	典型值	最大值	
D_G	差分增益	2.8	R_L = 150 Ω，f = 3.58 MHz		.09		%
D_P	差分相位	2.8	R_L = 150 Ω，f = 3.58 MHz		.13		°
O_{IRR}	关断隔离	2.8	f=10 MHz，R_L=150 Ω，		-45		dB
X_{TALK}	VID 至 MIC 的串扰	2.8	f=10 MHz，R_{IN} = 10 Ω，C_L=0 pF，R_L=150 Ω		-65		dB

并联I/O

符号	参数	V_{DD} (V)	工作条件	T_A = -40 至 +85° C			单位
				最小值	典型值	最大值	
t_{BBM}	"先开后合"时间	2.5 至 4.3			120		Ns
t_{EN}	启用和禁用时间	2.5 至 4.3	EN 低→高或 EN 高→低		15		μs
$t_{SEL-COM-ON}$	选择比较器导通	2.5 至 4.3	SEL 低→高至比较器导通		10		μs
$t_{SEL-COM-OFF}$	选择比较器关断	2.5 至 4.3	SEL 高→低至比较器关断		20		ns
t_{ON}	开关导通时间	2.5 至 4.3			40		ns
t_{OFF}	开关关断时间	2.5 至 4.3			15		ns
$t_{J_MIC-S/E}$	比较器触发至 S/E 输出的传输延迟	2.5 至 4.3	J_MIC > REF，低→高 J_MIC < REF，高→低		10		μs

功率

符号	参数	V_{DD} (V)	工作条件	T_A = -40 至 +85° C			单位
				最小值	典型值	最大值	
PSRR	电源抑制比	2.8	电源噪声 300 mV_{PP}，测得 10/90%，f=217 Hz		-100		dB

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物理尺寸测试

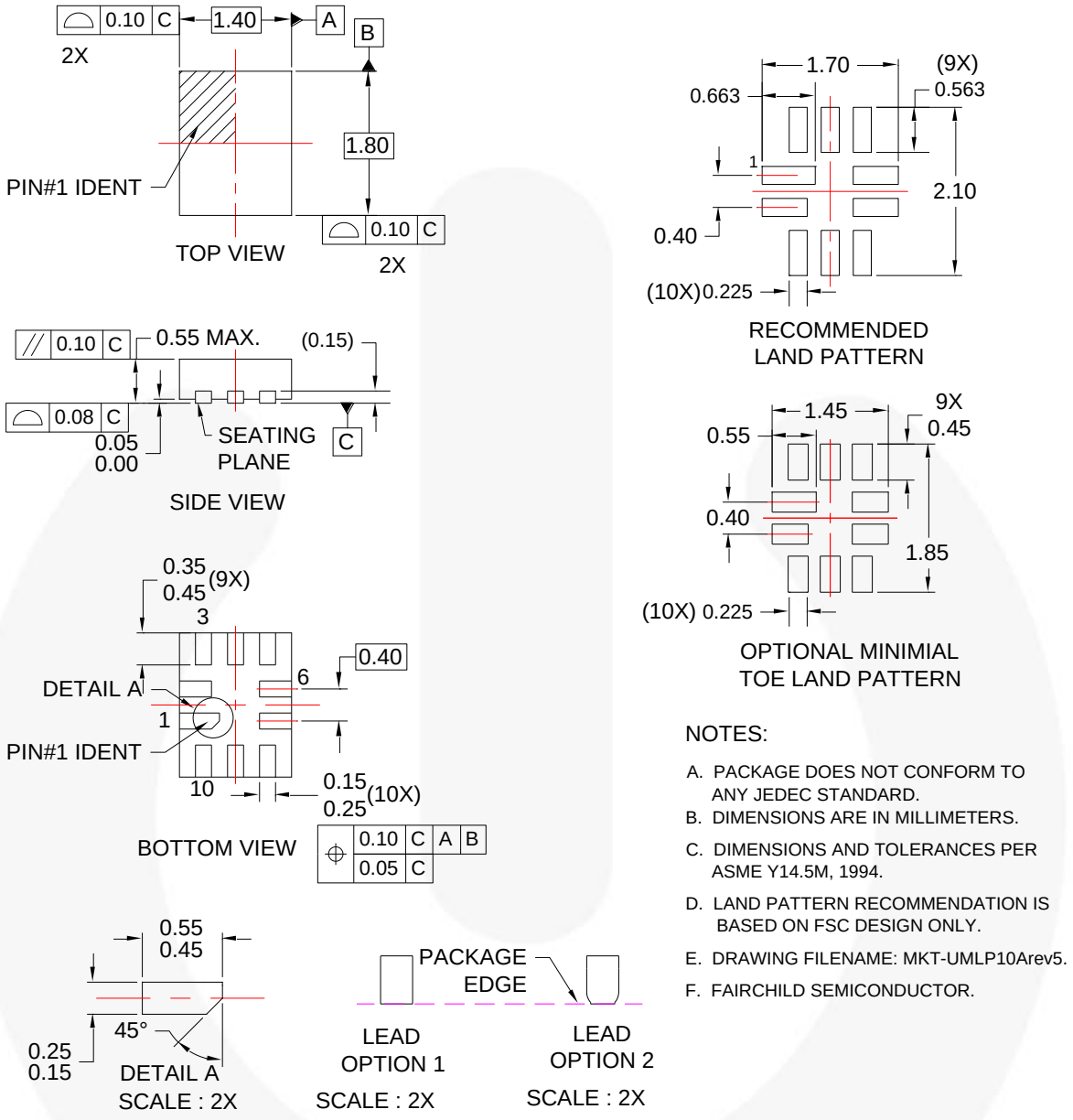

图 3. 10-引脚，UMLP 封装图

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订购信息

器件编号	工作温度范围	顶标	封装
FSA8009UMX	-40 至 +85° C	KP	10 引脚 1.4 x 1.8 x 0.55 mm，0.4 mm 间距，薄模塑无铅封装 (UMLP)

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Rev. I64

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