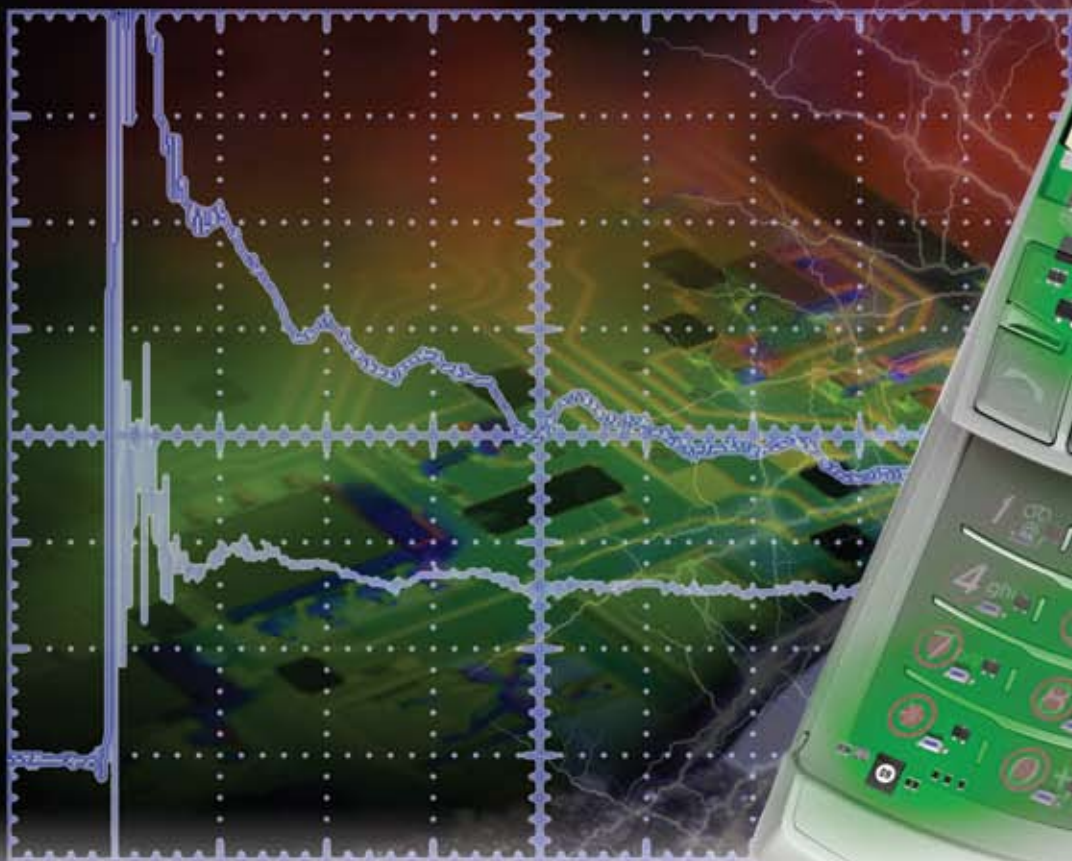


# 分立ESD保护解决方案



安森美半导体提供的分立ESD保护解决方案具有业界最佳的钳位性能，  
以最小的封装提供卓越的保护功能。



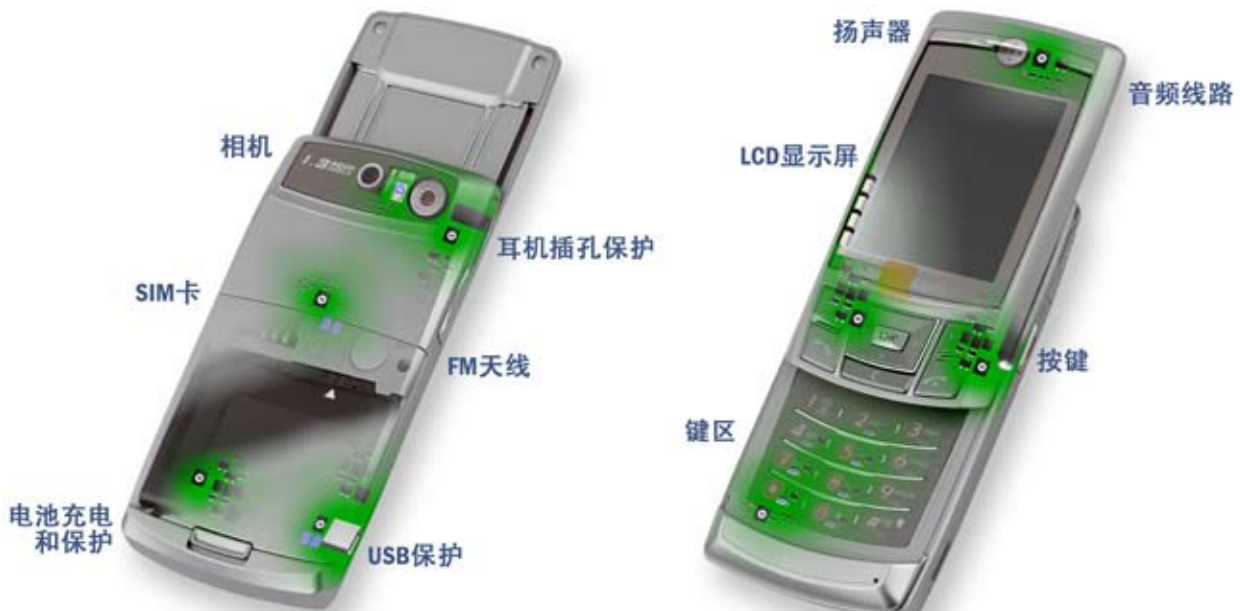
## 为什么需要保护

手机等便携电子设备在其整个生命周期中不断地面对静电放电(ESD)的问题, 它们所含有大量接口连接为ESD进入电路板提供了通道。电路板上的IC可能不具备足够电平的ESD保护电路来防止受到真实世界中ESD的损坏。在所有易受影响的位置增加ESD保护元件可以确保便携设备符合IEC61000-4-2等强制性ESD免疫标准, 并帮助预防成品在实际应用中可能出现的昂贵维修费。

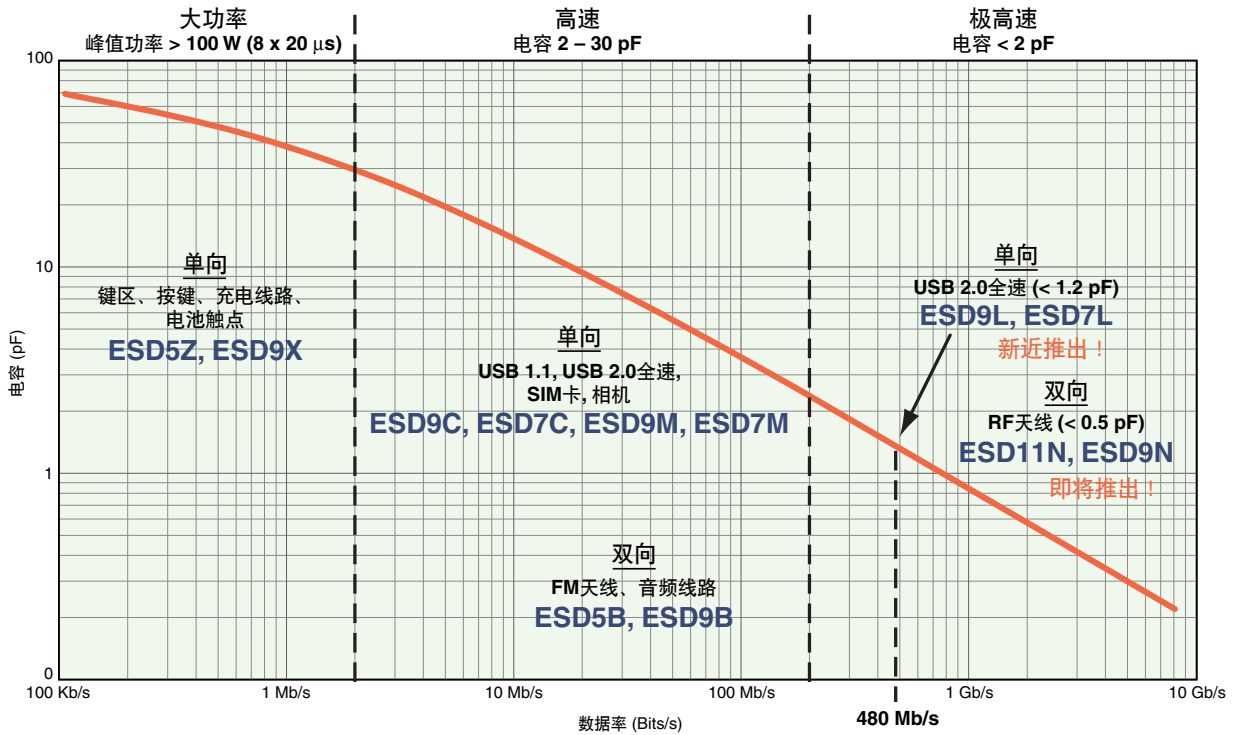
便携电子产品设计人员的挑战是寻找既提供低ESD钳位电压、封装又小到能够适合当今日益缩小的便携电子应用的片外ESD保护解决方案。安森美半导体帮助设计人员应对这个挑战, 提供为便携应用中易受ESD损坏的每个接口的业界最低钳位电压的完备ESD保护器件系列。



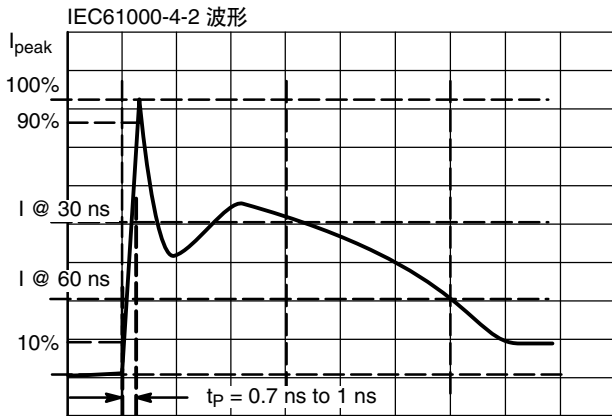
## 为什么需要保护



## 便携应用的电压保护器件



## 关键性能测试 - ESD钳位电压



IEC 61000-4-2 规范

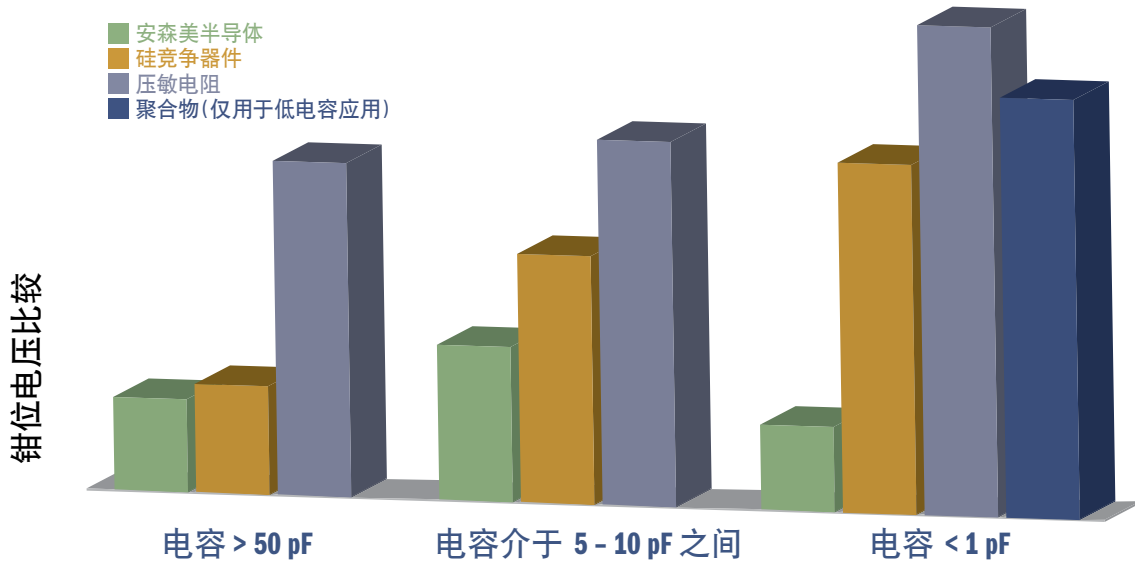
等级	测试电压 (kV)	第一个峰值电流 (A)	30 ns 时的电流 (A)	60 ns 时的电流 (A)
1	2	7.5	4	2
2	4	15	8	4
3	6	22.5	12	6
4	8	30	16	8

## 测试电路设置



有关ESD钳位的性能鉴定和性能重要性的更多信息请在[www.onsemi.com/circuitprotection](http://www.onsemi.com/circuitprotection) 参阅安森美半导体应用注释AND8307/D和AND8309/D。

## 保护产品钳位电压趋势



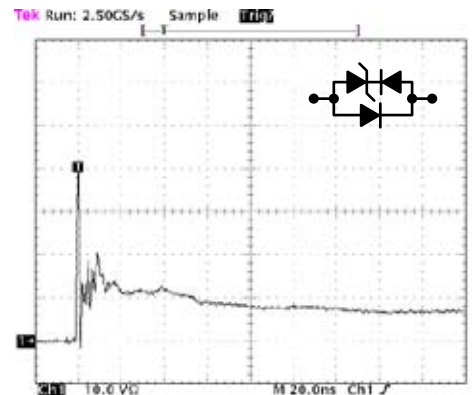
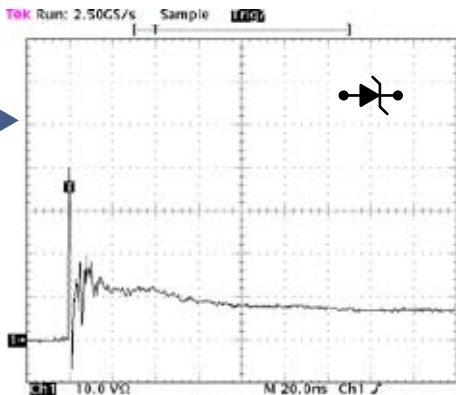
## ESD保护技术的演进

硅瞬态电压抑制器(TVS)二极管的传统片外保护解决方案提供低ESD钳位电压和快响应时间,但它们的高电容限制了其在高速应用中的使用。为了克服传统硅TVS二极管的这些局限,安森美半导体运用突破性的工艺技术,将超低电容pin二极管和大功率TVS二极管集成到单个裸片上,能够用作高性能片外ESD保护解决方案。这新的集成型ESD保护技术平台既保留了传统硅TVS二极管技术的卓越钳位和低泄漏性能,又将电容从65 pF大幅降低至0.5 pF。

技术: 大PN结  
 优势: 出色的钳位电压  
 折衷: 电容较高

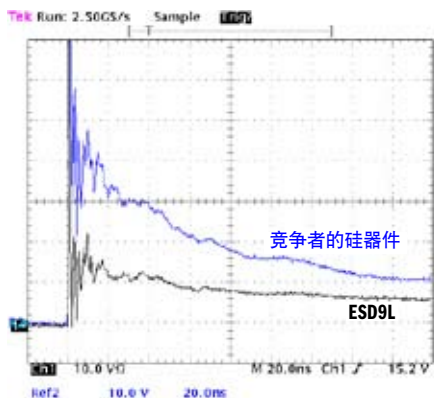
技术: 小PN结  
 优势: 电容较低  
 折衷: 钳位电压略高

技术: 集成ESD(大PN结、低电容导向二极管)  
 优势: 最低的电容,出色的钳位电压性能  
 折衷: 无

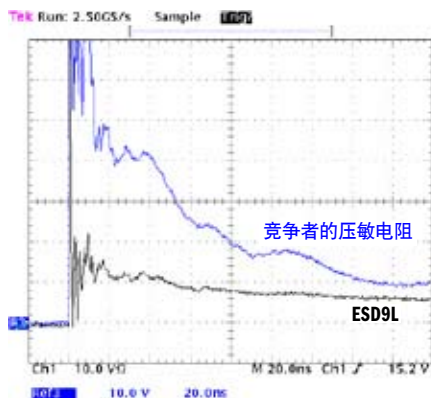


(输入脉冲IEC61000-4-2 8 kV 接触电压放电; SOD-923 封装; Vr = 5V)

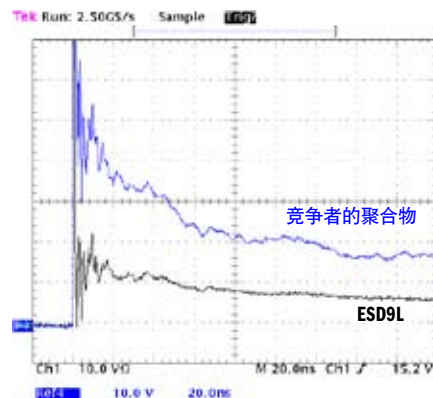
## 技术比较



ESD9L vs 硅器件



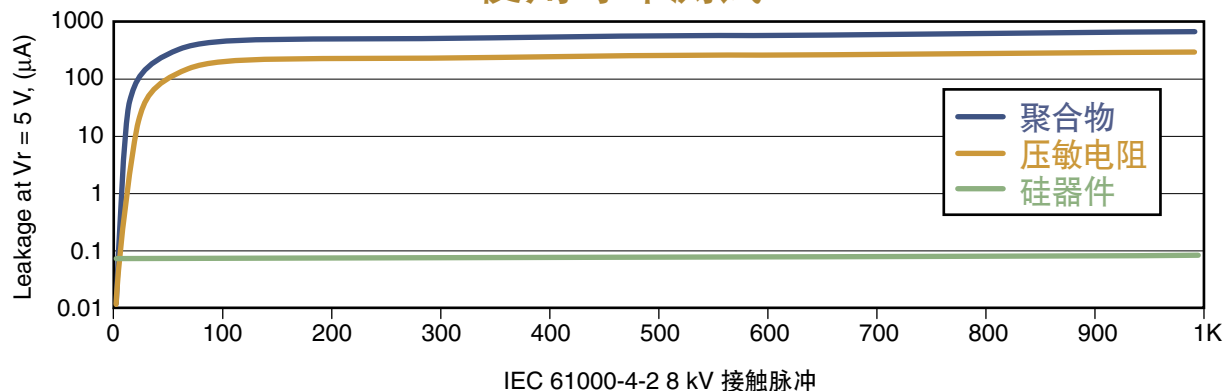
ESD9L vs 压敏电阻



ESD9L vs 聚合物

(输入脉冲IEC61000-4-2 8 kV 接触电压放电; SOD-923 封装; Vr = 5 V; 电容 < 1 pf)

## 使用寿命测试



IEC 61000-4-2 8 kV 接触脉冲

子系统	技术	关键器件*	线路	封装	工作电压 (V)	额定浪涌功率 8x20 µs (W)	IEC61000-4-2额定ESD 接触放电电压 (kV)	电容 (pF)
大功率 键区、按键、 充电线路、 电池触点	单向 TVS 	ESD5Z3.3ST5G	1	SOD-523	3.3	158	± 30	105
		ESD5Z5.0ST5G	1	SOD-523	5	174	± 30	80
		ESD5Z12ST5G	1	SOD-523	12	240	± 30	55
		ESD9X3.3ST5G	1	SOD-923	3.3	102	± 30	80
		ESD9X5.0ST5G	1	SOD-923	5	107	± 30	65
		ESD9X12ST5G	1	SOD-923	12	140	± 30	30
高速 USB 1.1底部连接器、 SIM卡、FM天线、 音频线路	单向 ESD 	ESD9C3.3ST5G	1	SOD-923	3.3	N/A	± 8	12.8
		ESD9C5.0ST5G	1	SOD-923	5	N/A	± 8	6
		ESD9M5.0ST5G	1	SOD-923	5	N/A	±10	2.5
		ESD7C3.3DT5G	2	SOT-723	3.3	N/A	± 8	12
	双向 ESD 	ESD7C5.0DT5G	2	SOT-723	5	N/A	± 8	6
		ESD5B5.0ST5G	1	SOD-523	5	N/A	± 15	30
ESD9B5.0ST5G	1	SOD-923	5	N/A	± 8	15		
	极高速 USB 2.0	集成 ESD 	ESD9L5.0ST5G	1	SOD-923	5	N/A	± 10

\* 可提供其它电压等级的器件。参见数据表或联系安森美半导体销售人员获取更多信息。

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