



系统方案指南 - 预览

开关电源 (SMPS)



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方案概述 框图 - 桥式 PFC + 反激式和图腾柱 PFC + LLC 易于使用的 SMPS 矩阵 拓扑 电源参考设计 EliteSiC MOSFET T10 LV-MV MOSFET 和 iGaN 器件 SiC 栅极驱动器 PFC 控制器 副边 LLC 和 SR 控制器	08 09 10 12 13 14 15 16 17
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System Solution Guide
Offline SMPS



立即注册即可解锁所有系统方案指南



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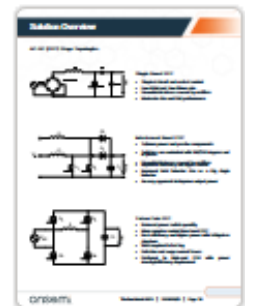
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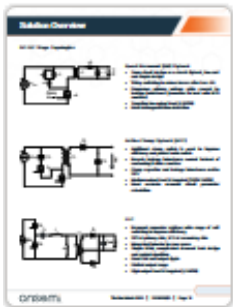
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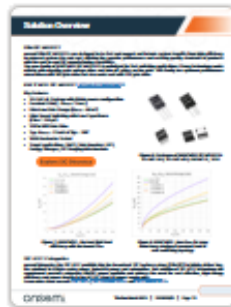
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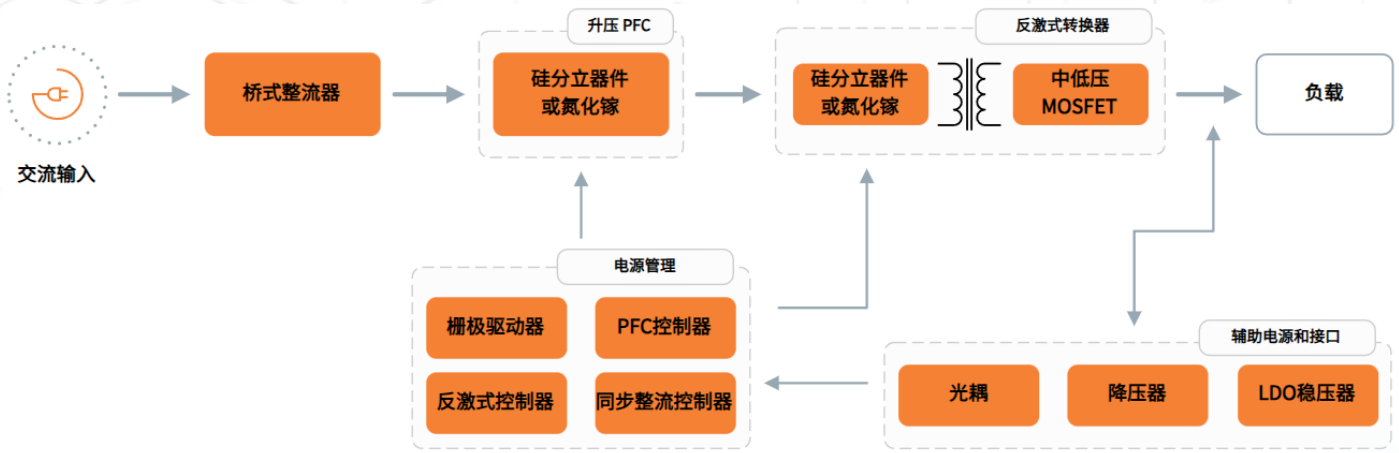


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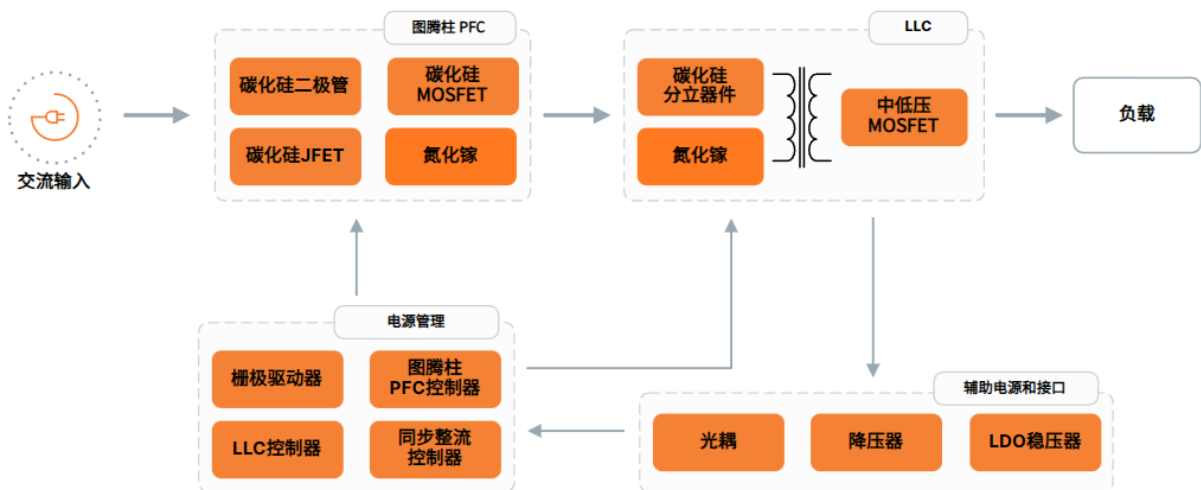
框图 - SMPS

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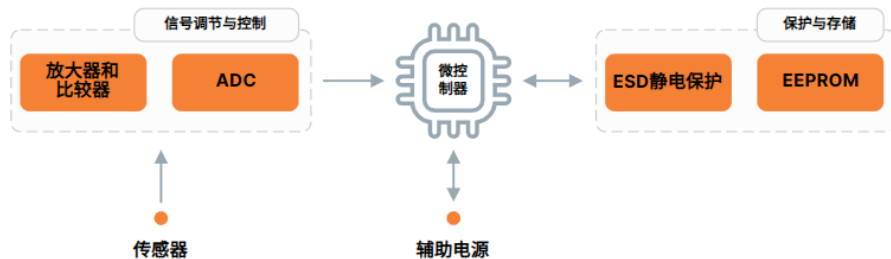
框图 - SMPS (桥式 PFC + 反激式转换器)



框图 - SMPS (图腾柱 PFC + LLC 谐振转换器)



* 可选



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易于使用的 SMPS 矩阵

安森美 (onsemi) SMPS 矩阵 (表 2) 提供了一系列全面的电源管理方案, 可根据各类应用场景进行定制, 覆盖的功率范围从 5W 到 3kW 以上。例如, 其中包含专为以下应用配置设计的控制器、栅极驱动器及开关器件: 功率因数校正 (PFC)、有源钳位反激 (ACF)、准谐振反激 (QR) 及同步整流控制器 (SRC)。这些方案经过优化, 能实现可靠且高效的电能转换, 可满足从低功率 USB-C PD 设计, 到高功率工业与通信应用的各类需求。通过采用碳化硅 (SiC) 和增强型氮化镓 (iGaN) 等先进技术, 安森美确保 SMPS 矩阵方案能为各类电源管理需求提供出色的性能与能效。

表 2: 安森美 “易于使用” 的 SMPS 矩阵

功率范围 (W)	功率密度等级	整流器	初级侧										次级侧		USB-C/PD				
			PFC			ACF			QR 反激式		LLC		控制器	SR 开关					
			控制器	功率开关	慢/快桥臂栅极驱动	控制器	HV (Q2) 栅极驱动	功率开关	控制器	功率开关	控制器	HS/LS 开关/栅极驱动							
1kW 至 3kW 以上 (24-48V)	超高	w/o	NCP1681 (CCM)	SiC iGaN	NCP51530 NCP51561	NA			NCP13994		NCP13994		NCP4318	NA					
	高	DFB25100 DFB2580	FAN9672 FAN9673 (CCM)	HV MOSFET	NA			NCP4390		SiC /iGaN NCP51561		NA							
350W 至 1kW (12V-24V)	超高	w/o	NCP1681	SiC iGaN	NCP51530 NCP51561	NA			NCP13994		NCP13994		NCP4318			LV-MV MOSFET			
	高	DFB20100 DFB2080	NCP1618 (MM)	HV MOSFET	NA			NCP13994		HV MOSFET		NCP4318							
200W 至 350W (12V-24V)	超高	w/o	NCP1680 (TP CrM)	SiC iGaN	NCP51530 NCP51561	NA			NCP13994		NCP13994		NCP4318					LV-MV MOSFET	
	薄型	DFB20100 DFB2080	NCP1632 (CrM)	SiC / iGaN NCD 57000	NA			NCP13994		SiC /iGaN NCP51561		NCP4318							
	高	GBU8M GBU8K	NCP1616 (CrM)	HV MOSFET	NA			NCP13994		HV MOSFET		NCP4318							
70W 至 200W (12V-24V)	超高	GBU8M GBU8K	NCP1623	SiC / iGaN NCD 57000	NA	NCP1568	NCP51561	SiC iGaN	NA			NCP4307	EUSB15101						
	高	GBU6M GBU6K	NCP1623	HV MOSFET	NA			NCP1343	HV MOSFET	NA		NCP4307							
65W (3.3V-21V)	高	GBU4M GBU4K	NA			NA			NCP1345	HV MOSFET	NA		NCP4306						
25W 至 50W	高	开关器件: NCP11184 / NCP11185 / NCP11187																	
5W 至 25W	高	DF10S DF08S	开关器件: NCP1072 / NCP1075 / NCP1076 / NCP1077																

NA: 不适用



图 3: 各功率等级对应的应用

电源参考设计

安森美提供品类丰富的开关电源 (SMPS) 方案，可满足从 65W 到 3kW 以上的各类功率需求。产品系列涵盖控制器、栅极驱动器、MOSFET 和先进的宽带隙 (WBG) 材料器件 (SiC、GaN 等)，旨在为多种应用场景提供高效率、高可靠性与高性能，包括 USB-C PD、工业电源及云服务器电源。

3kW EliteSiC 图腾柱 PFC + LLC PSU

- 高功率密度拓扑 - 图腾柱 PFC+LLC
- $V_{in} = 85V-264V$, $V_{out} = 54V$, $I_{out} = 55.5A$
- PFC 效率: 100% 负载时 > 98%
- 系统峰值效率: 115VAC 时 > 94%; 230VAC 时 > 96%
- PCBA 尺寸: 280mm x 110mm x 38mm
- 精选产品: 多模式 TP PFC [NCP1681](#)、带 SR 控制器的 LLC [NCP4390](#)、隔离式半桥栅极驱动器 [NCP51561](#)、650V SiC MOSFET [NTHL045N065SC1](#)
- 应用: 工业 PSU

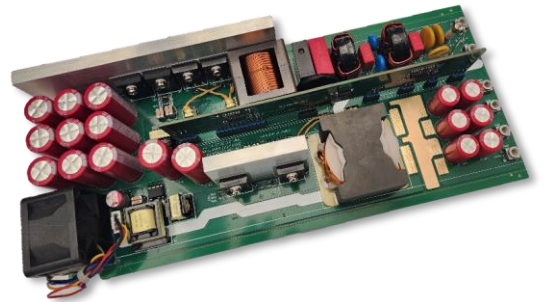
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图 4: 3 kW 图腾柱 PFC + LLC PSU 评估板

1 kW 通用输入 48V 输出电源

- 高效图腾柱 CCM PFC + HF LLC
- $V_{in} = 90-265VAC$, $V_{out} = 48V$, $I_{out} = 21A$
- 满载效率: 在 110VAC 和 230VAC 输入下, 分别为 92.5% 和 95.4%
- PCBA 尺寸: 328mm x 93mm x 50mm
- 功率密度: 10.74W/in³
- 精选产品: TP PFC [NCP1681](#)、LLC [NCP13994](#)、iGaN [NCP58921](#)、[NCP58920](#) 和 SR 控制器 [NCP4306](#)
- 应用: 计算电源、工业 PSU

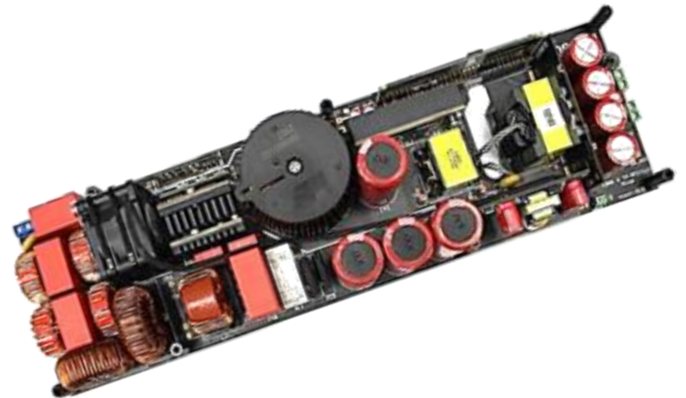
[查找参考设计](#)

图 5: 1 kW 48V 输出电源评估板

如需了解更多电源参考设计及评估板，请参阅《系统方案指南》- “USB-C 电池充电器”，详情可访问下方链接。

更多信息，请参阅系统方案指南：

USB-C 电池充电器

USB-C 电池充电器凭借高功率传输能力与高效率，已成为各类便携式设备快速、高效充电的通用标准。其中采用的宽带隙半导体（材料）可进一步提升能效、降低能量损耗，并有助于减小设备体积。

[在网上查找系统方案指南](#)




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