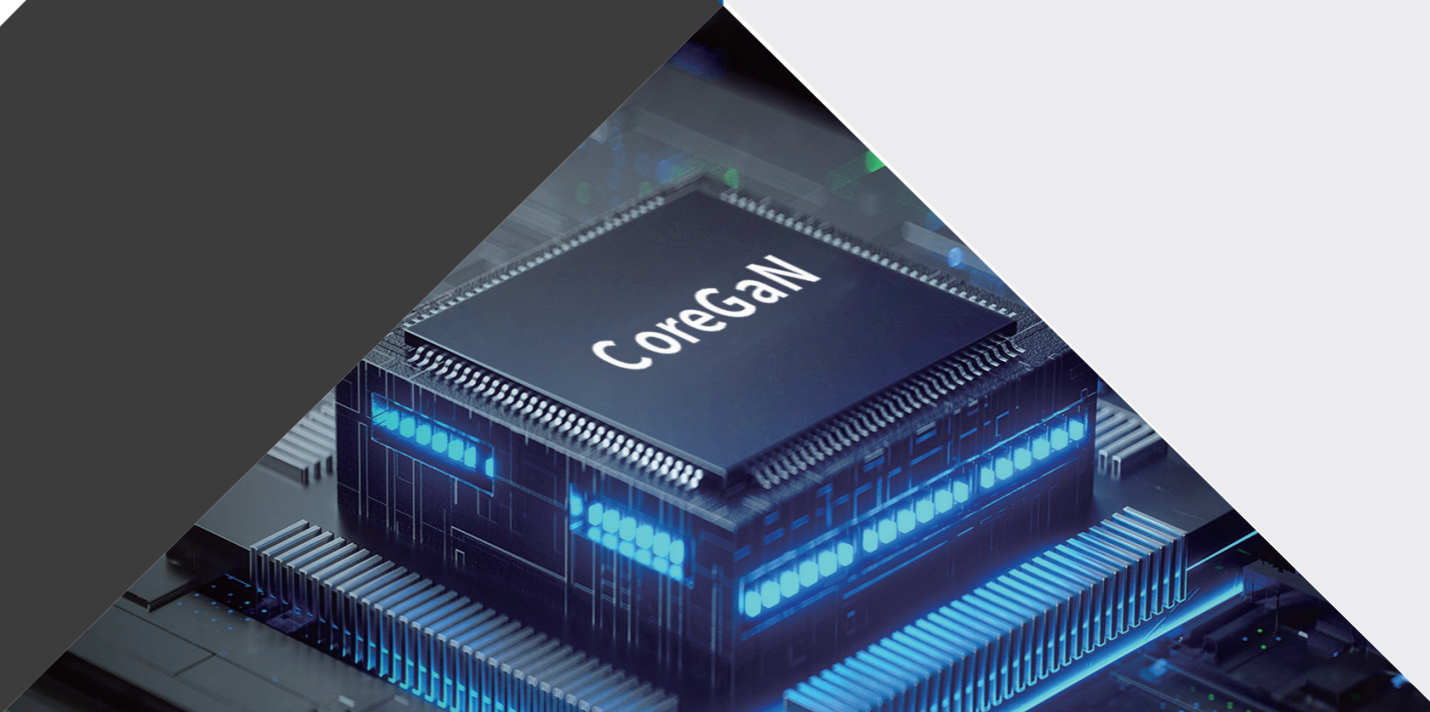




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中国·苏州



关于能华

Power The World Greener

能华半导体于2010年成立，是国内领先的专注于第三代半导体GaN的高新技术企业，核心团队汇聚了从外延到器件设计、制造工艺，封装和测试到应用模块等各个环节的科技创新型资深专家，是全球为数不多同时掌握增强型GaN技术、耗尽型GaN技术以及耗尽型GaN直驱方案的半导体公司，自成立至今已获得专利100多项。总部位于江苏苏州，在加州硅谷、深圳均设有研发基地和市场销售中心。

能华半导体采用IDM全产业链模式，致力于硅基GaN (GaN-on-Si),蓝宝石基GaN (GaN-on-Sapphire), 碳化硅基GaN (GaN-on-SiC) 晶圆与器件的研发、设计、制造与销售。能华的6英寸/8英寸GaN晶圆和功率器件涵盖650V-1200V，目前产能为6000片/月。

目前，公司已实现了GaN器件全功率范围的量产，主要应用市场包括消费电子、电动工具、数据中心、照明电源、便携储能、微型逆变器、电动汽车、智能电网等领域。

能华半导体，以塑造一个更绿色的世界为愿景，将持续用GaN为客户提供更高效更可靠的半导体产品。

About CorEnergy

Founded in 2010, Corenergy Semiconductor is a leading high-tech enterprise in China that focuses on wide band-gap semiconductor GaN. Its core technical team brings together creative and innovative senior experts in various fields covering from epitaxy growth, device design, manufacturing process, packaging and testing to application modules. It is one of the few semiconductor companies in the world that simultaneously masters E-mode GaN technology, D mode GaN technology, and direct drive GaN technology. Since its establishment, it has obtained more than 100 patents. Headquartered in Suzhou, Jiangsu, it has R&D centers and marketing & sales centers in Silicon Valley, California and Shenzhen.

As a leading IDM company in the industry, Corenergy Semiconductor is committed to the research and development, design, manufacturing, and sales of GaN on Si, GaN on Sapphire, and GaN on SiC wafers and devices. Its 6-inch/8-inch GaN wafers and power devices supports from 650V to 1200V BV, with a current production capacity of 6000 wafers per month.

At present, Corenergy Semiconductor has achieved mass production of GaN devices in the full power range, mainly applied in consumer electronics, electric tools, data centers, lighting power supplies, portable energy storage, micro-inverters, electric vehicles, smart grids and other fields.

Corenergy Semiconductor, with its vision of "power the world greener", will continue to provide customers with more efficient and reliable semiconductor products using GaN.

企业价值观/Corporate Values

以客户利益为核心，务实创新，品质卓越，安全高效，诚信敬业

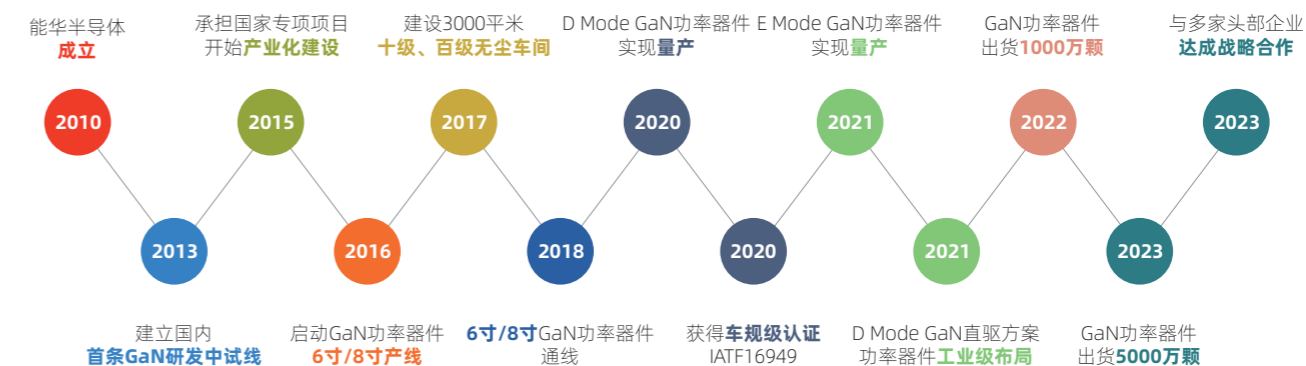
Customer Interests at the Core, Pragmatic Innovation, Excellent Quality, Safety and Efficiency, Integrity and Dedication.

企业文化/Corporate Culture

客户第一，成就客户，共赢发展；
积极向上，追求成长，迎接变化，务实创新！

Customer First, Achieving Customer Success, and Win-Win Development;

Positive and Proactive, Pursuing Growth, Embracing Change, Pragmatic Innovation.





质量为先、品质承诺
Quality First, Commitment on Quality

公司拥有完善的质量管理体系，高效的数字化运营管理流程。
Comprehensive Quality Control and Efficient Manufacturing Management Systems installed and running across the Fab



按照客户及相关质量体系的要求，严格把关每一件产品，真正把放心的产品交到客户手中。

Follow strict manufacturing procedures and production quality control to meet and exceed customers' expectations and product specifications



氮化镓外延片
GaN Epitaxy

RF HEMT on SiC



Cap layer
AlGaN/(In)AlN barrier
GaN channel
Fe doped GaN buffer
AlN Buffer
SiC

Substrate thickness: 350, 500 μm
Wafer size: 2", 3", 4", 6"

Main technical parameters

Specification	Nominal Value
4H-SiC(Si) substrate size	2", 3", 4", 6"
GaN buffer layer (μm)	0.5~1.8
AlGaN/(In)AlN barrier layer (nm)	15~30 for AlGaN/4~10 for InAlN
Al%/In%	Al% 15~30/In% 17 for InAlN
SiN passivation layer (nm)	0~30
Rs (ohm/sq)	200~450
Carrier density (cm ⁻²)	6E12~2E13
Hall mobility (cm ² V ⁻¹ s ⁻¹)	1300~2200
Bow (μm)	<±30
Edge exclusion (mm)	<2
Lateral BV (V) for 2μm GaN:Fe, L _{gd} =4μm	>200 @1uA/mm

氮化镓外延片
GaN Epitaxy

D-Mode HEMT on Sapphire



Cap layer
AlGaN/(In)AlN barrier
GaN channel
C doped GaN buffer
AlN Buffer
Sapphire

E-mode HEMT on Sapphire



pGaN cap
AlGaN/(In)AlN barrier
GaN channel
C doped GaN buffer
AlN Buffer
Sapphire

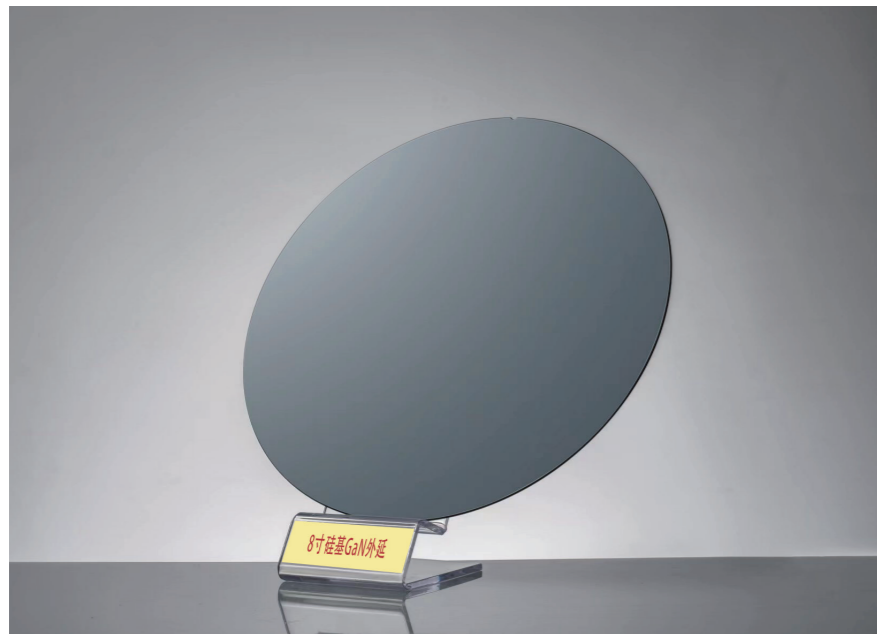
Main technical parameters

Specification	Nominal Value
Substrate size	2", 4", 6"
GaN buffer layer (um)	2~4.5
AlGaN/(In)AlN barrier layer (nm)	15~30 for AlGaN/4~10 for InAlN
Al%/In%	Al% 15~30/In% 17 for InAlN
SiN passivation layer (nm)	0~30
Rs (ohm/sq)	200~450
Carrier density (cm ⁻²)	6E12~2E13
Hall mobility (cm ² V ⁻¹ s ⁻¹)	1300~2200
Edge exclusion (mm)	<2
Lateral BV (V) for 4um GaN:C, L _{gd} =15um	>600V @1uA/mm

Main technical parameters

Specification	Nominal Value
Substrate size	2",4", 6"
GaN buffer layer (um)	2~4.5
AlGaN barrier layer (nm)	10~20 (Al% 15~25)
p-GaN cap layer (nm)	70~100
Sheet Resistance (Ω/sq) (w/o depletion)	< 550
Threshold Voltage (V)	1-3
Residual 2DEG density (Vg = 0 V)	<1e18/cm ³
Edge exclusion (mm)	<2
Lateral BV (V) for 4um GaN:C, L _{gd} =15um	>600V @1uA/mm

D-mode HEMT on Silicon



Cap layer
AlGaN barrier
GaN channel
(Al,Ga)N buffer
AlN
Silicon

E-mode HEMT on Silicon



pGaN cap
AlGaN barrier
GaN channel
(Al,Ga)N buffer
AlN
Silicon

Main technical parameters

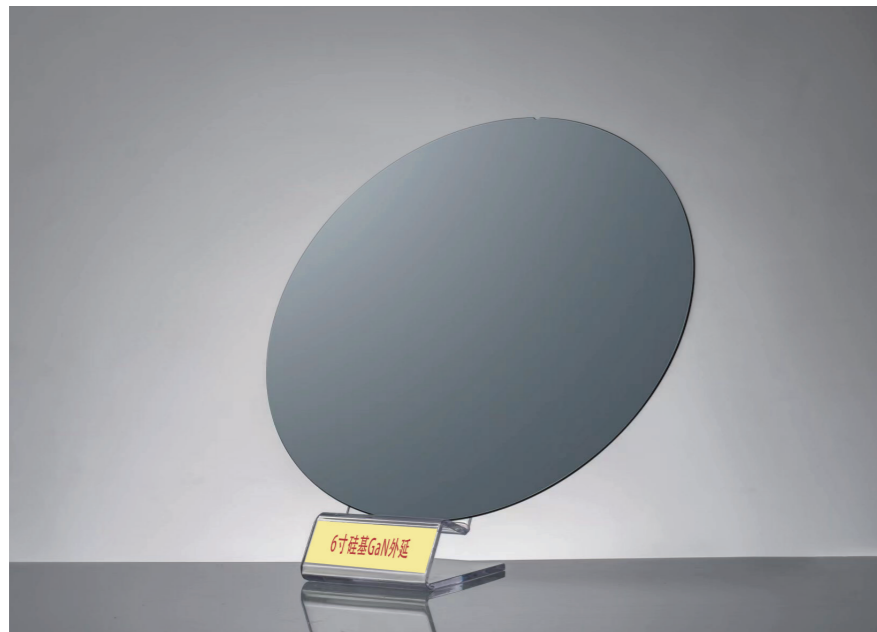
Specification	Nominal Value
CZ Si (p-type) <111> wafer size	2", 4", 6", 8"
Si wafer thickness (μm)	675, 1000
Epi layer total thickness (μm)	2~6
AlGaN barrier layer (nm)	20~25 (Al% 20~30)
Rs (ohm/sq)	<400
Carrier density (cm ⁻²)	>8E12
Hall mobility (cm ² V ⁻¹ s ⁻¹)	>1800
Bow (μm)	<±30
Edge exclusion (mm)	<5
Breakdown voltage (V)	>1000 (@1μA/mm)

Main technical parameters

Specification	Nominal Value
CZ Si (p-type) <111> wafer size	2", 4", 6", 8"
Si wafer thickness (μm)	675, 1000
Epi layer total thickness (μm)	2~6
AlGaN barrier layer (nm)	10~20 (Al% 15~25)
p-GaN cap layer (nm)	70~100
Sheet Resistance (Ω/sq) (w/o depletion)	< 550
Threshold Voltage (V)	1-3
Residual 2DEG density (Vg = 0 V)	<1e18/cm ³
Bow (μm)	<±30
Edge exclusion (mm)	<5
Breakdown voltage(V)	>1000 (@1μA/mm)

晶圆 wafer

RF-HEMT on Silicon



Cap layer
AlGaN barrier
GaN channel
GaN:Fe buffer
(Al,Ga)N buffer
AlN
HR Silicon 1 mm (res>5000 ohm cm)

6" GAN WAFER



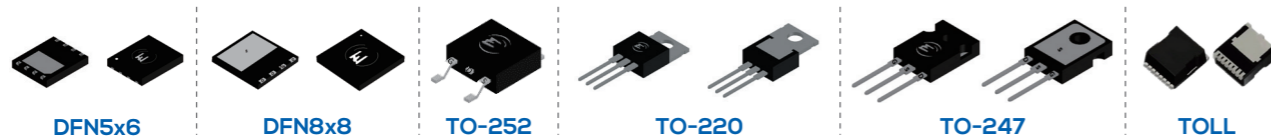
适用于20-100W电源的氮化镓功率器件合封产品

Main technical parameters

Specification	Nominal Value
HR Si (Si) <111> wafer size	6"
Si substrate resistivity (Ω cm)	> 5000
Si wafer thickness (μ m)	1000
Epi layer total thickness (μ m)	1.5-2.0
AlGaN barrier layer (nm)	15~25 (Al% 20~25)
Rs (ohm/sq)	<450
Carrier density (cm^{-2})	>7E12
Hall mobility ($\text{cm}^2\text{V}^{-1}\text{s}^{-1}$)	>1800
Bow (μ m)	< \pm 30
Edge exclusion (mm)	<5
BV (V)	>200 (@1 μ A/mm)

芯片型号	衬底	耐压	导阻	阈值	尺寸	VGS(V)	Remark
CE65E300T30BS	Silicon	650V	300m Ω	2.5V	6	-10~7	MP
CE65E160T30BS	Silicon	650V	160m Ω	2.5V	6	-10~7	MP
CE65D070T30BS	Silicon	650V	70m Ω	-17V	6	-30~20	MP
CE65D100T30BS	Silicon	650V	100m Ω	-17V	6	-30~20	MP
CE65D150T30BS	Silicon	650V	150m Ω	-17V	6	-30~20	MP
CE65D245T30BS	Silicon	650V	245m Ω	-17V	6	-30~20	MP
CE65D550T30BS	Silicon	650V	550m Ω	-17V	6	-30~20	MP
CE65D800T30BS	Silicon	650V	800m Ω	-17V	6	-30~20	MP

消费级&工业级&汽车级应用



产品类型: D mode(Cascade GaN)

芯片型号	导阻	封装	耐压	阈值	Id(A)	Qg(nc)
CE65H070TOCI	70mΩ	TO247-3	650V	4V	29	16
CE12H080TOCI	80mΩ	TO247-3	1200V	4V	25	15
CE65H110TOAI	110mΩ	TO220	650V	4V	21	6.9
CE65H110DNDI	110mΩ	DFN 8×8	650V	4V	18	6.9
CE65H160TOAIF	160mΩ	TO220F	650V	4V	10	7.4
CE65H160DNGI	160mΩ	DFN 8×8	650V	2V	14	7.3
CE65H160DNCI	160mΩ	DFN 5×6	650V	4V	12.4	7.4
CE12H180TOAI	180mΩ	TO220	1200V	4V	14	13
CE65H270TOBI	270mΩ	TO252	650V	4V	9.8	8.7
CE65H270TOEI	270mΩ	TO252	650V	4V	9.8	8.7
CE65H270DNGI	270mΩ	DFN 8×8	650V	2V	10	8.5
CE65H270TOAIF	270mΩ	TO220F	650V	4V	7	8.7
CE65H270DNCI	270mΩ	DFN 5×6	650V	4V	9.3	8.7
CE65H600TOEI	600mΩ	TO252	650V	4V	5	8
CE65H600TOAIF	600mΩ	TO220F	650V	4V	4	8
CE65H600DNCI	600mΩ	DFN 5×6	650V	4V	4.8	8
CE65H900TOEI	900mΩ	TO252	650V	4V	3	4.6
CE65H900DNCI	900mΩ	DFN 5×6	650V	4V	3.5	4.6

产品类型: 单管 E mode

芯片型号	导阻	封装	耐压	阈值	Id(A)	Qg(nc)
CE65E160DNHI	160mΩ	DFN 8×8	650V	2.5V	15	2.4
CE65E160DNYI	160mΩ	DFN 5×6	650V	2.5V	15	2.4
CE65E300DNYI	300mΩ	DFN 5×6	650V	2.5V	8	1.35

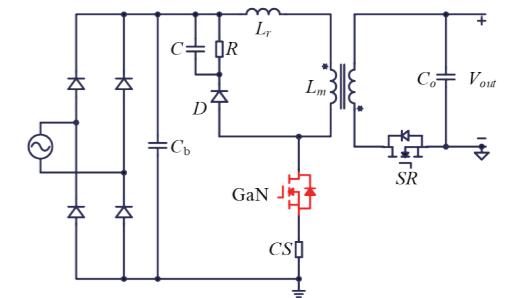
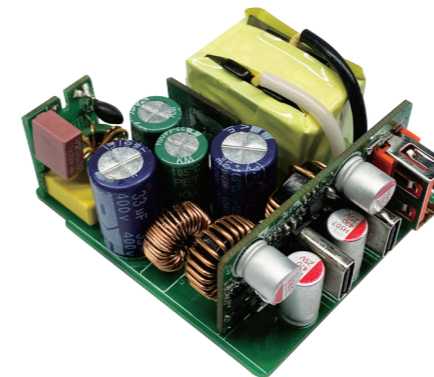
产品类型: 晶圆 wafer

芯片型号	衬底	耐压	导阻	阈值	尺寸	VGS(V)	Remark
CE65E300T30BS	Silicon	650V	300mΩ	2.5V	6	-10~7	MP
CE65E160T30BS	Silicon	650V	160mΩ	2.5V	6	-10~7	MP
CE65D070T30BS	Silicon	650V	70mΩ	-17V	6	-30~20	MP
CE65D100T30BS	Silicon	650V	100mΩ	-17V	6	-30~20	MP
CE65D150T30BS	Silicon	650V	150mΩ	-17V	6	-30~20	MP
CE65D245T30BS	Silicon	650V	245mΩ	-17V	6	-30~20	MP
CE65D550T30BS	Silicon	650V	550mΩ	-17V	6	-30~20	MP
CE65D800T30BS	Silicon	650V	800mΩ	-17V	6	-30~20	MP

PD快充方案

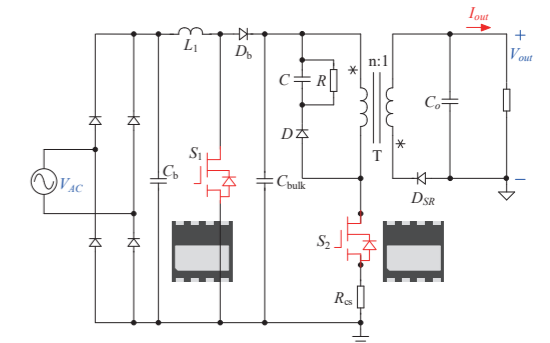
PD Fast Charger Solution

65W2C1A方案



拓扑方案: QR	输入电压: AC90V-264V
CoreGaN: CE65H160DNGI/DFN8*8	输出: PD3.0
尺寸大小: 46mm*53mm*22mm	峰值效率: 93.7%/230V
开关频率: 130kHz(max.)	

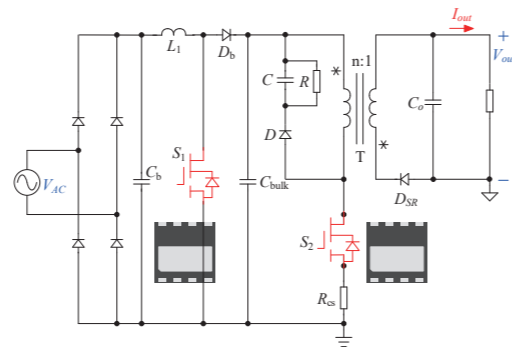
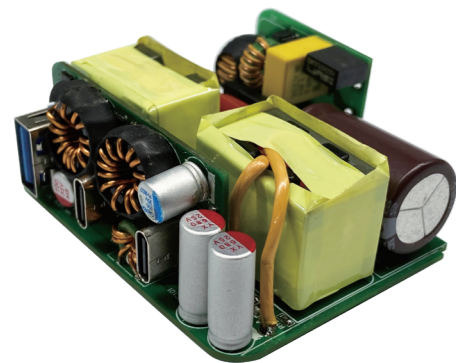
83W快充+无线充



拓扑方案: PFC+QR	输入电压: AC90V-264V
CoreGaN: CE65H160DNGI/DFN8*8	输出: PD3.0, 无线充
尺寸大小: 58mm*57mm*22mm	峰值效率: 93.0%/230V
开关频率: 90kHz	

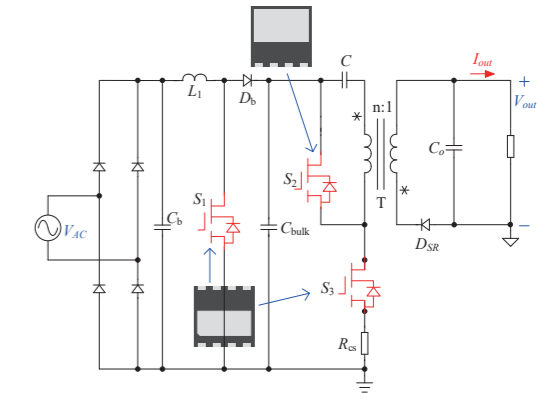
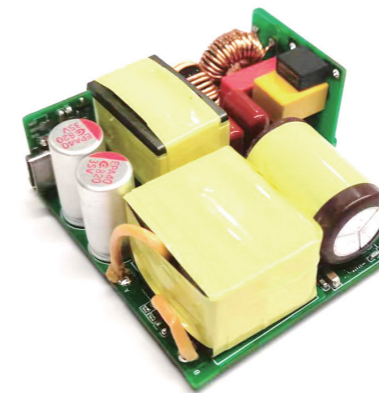
PD快充方案
PD Fast Charger Solution

100W2C1A方案



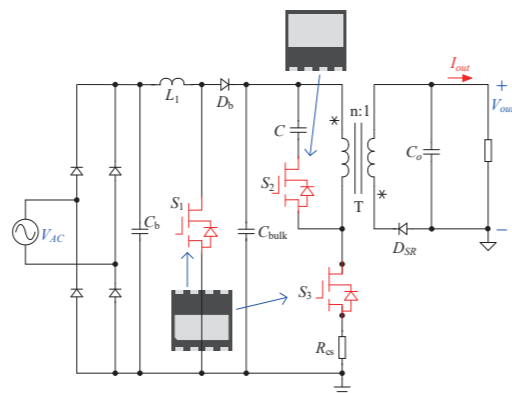
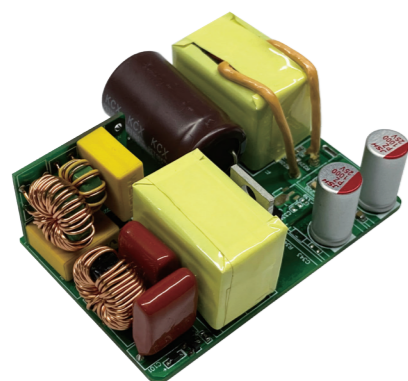
拓扑方案: PFC+QR	输入电压: AC90V-264V
CoreGaN: CE65H160DNGI/DFN8*8	输出: PD3.0
尺寸大小: 60.8mm*56.4mm*24mm	峰值效率: 93.3%/230V
开关频率: 150kHz	

140W1C高功率密度方案



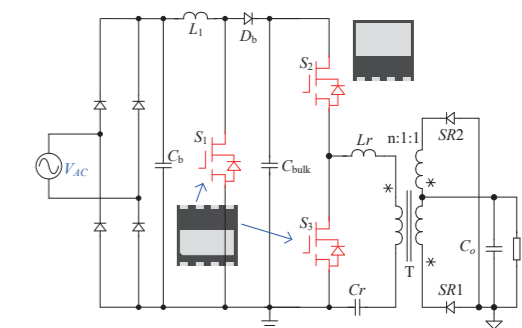
拓扑方案: PFC+AHB	输入电压: AC90-264V
CoreGaN: CE65H110DNDI+CE65H270DNGI /DFN8*8	输出: PD3.1, PPS/140W
尺寸大小: 60mm*60mm*20mm	峰值效率: 95%以上/230V
开关频率: 125kHz	

120W2C方案



拓扑方案: PFC+ACF	输入电压: AC90V-264V
CoreGaN: CE65H160DNGI/DFN8*8	输出: 20Vdc
尺寸大小: 63.5mm*51mm*21mm	峰值效率: 95%/230V
开关频率: 130kHz	

140W2C方案

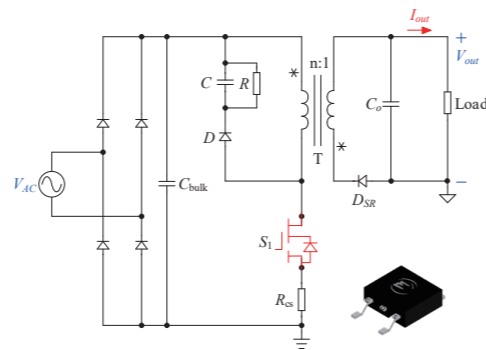


拓扑方案: PFC+LLC	输入电压: AC90V-264V
CoreGaN: CE65H110DNDI+CE65H270DNGI /DFN8*8	输出: PD3.1
尺寸大小: 90mm*56mm*25mm	峰值效率: 95%/230V
开关频率: 150kHz	

适配器方案

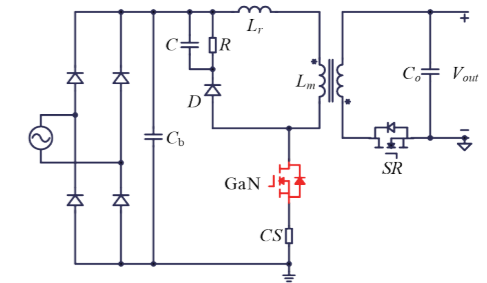
Adapter Solution

36W适配器低成本方案



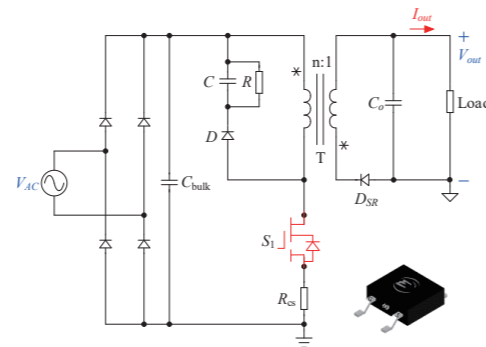
拓扑方案: QR	输入电压: AC90V-264V
CoreGaN: CE65H600TOEI / TO252	输出: 12V/3A
开关频率: 100KHz	峰值效率: 92% /230V
PCBA尺寸: 65mmX39mmX23mm	

48W适配器 高功率密度方案



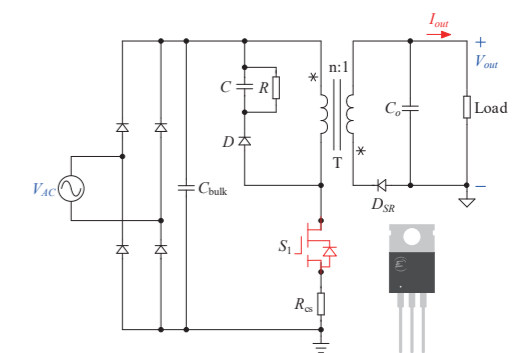
拓扑方案: QR	输入电压: AC90V-264V
CoreGaN: CE65H270TOAIF / TO220	输出: 12V/4A
尺寸大小: 73mm*40mm*25mm	峰值效率: 95%/230V
控制芯片: OB2710	

48W适配器低成本方案



拓扑方案: QR	输入电压: AC90V-264V
CoreGaN: CE65H270TOEI / TO252	输出: DC12V/3.5A
尺寸大小: 65mm*39mm*23mm	峰值效率: 92% /230V
开关频率: 100kHz	

60W适配器低成本方案

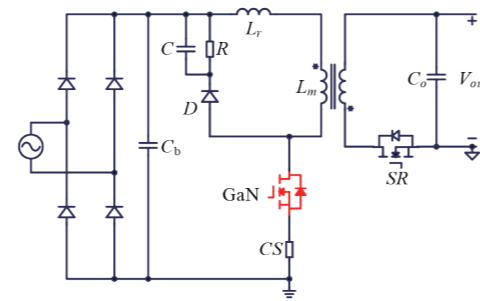
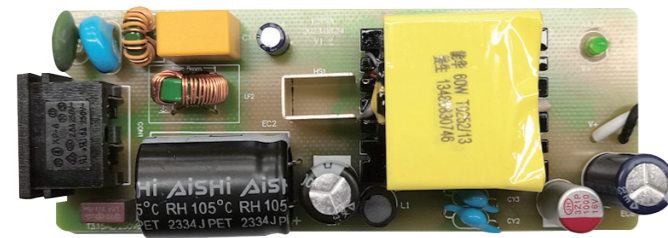


拓扑方案: QR	输入电压: AC90V-264V
CoreGaN: CE65H270TOAIF / TO220	输出: 12V/5A
开关频率: 100KHz MAX	峰值效率: 93% /230V
PCBA尺寸: 79mmX37mmX24mm	

适配器方案

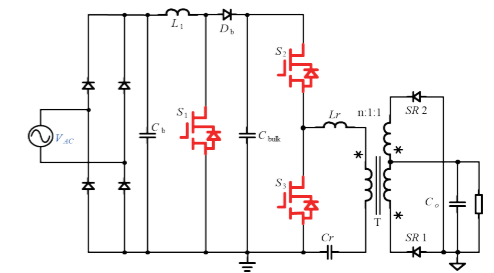
Adapter Solution

60W桌面适配器方案



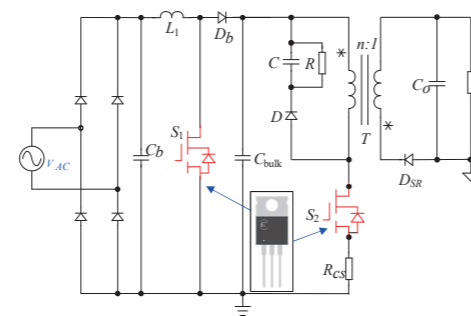
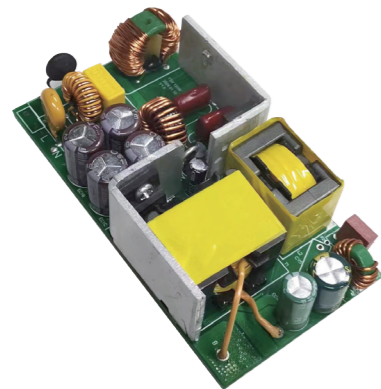
拓扑方案: QR	输入电压: AC90V-264V
CoreGaN: CE65H270TOEI / TO252	输出: 12V/5A
开关频率:	峰值效率: 94% / 230V
PCBA尺寸: 109.5mmX41.9mmX25mm	

140W适配器方案



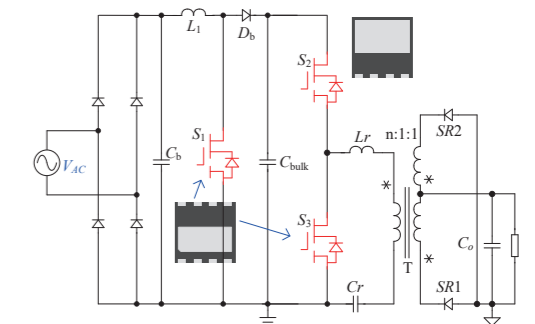
拓扑方案: PFC+LLC	输入电压: AC90V-264V
CoreGaN: CE65H160DNGI+CE65H270DNGI / DFN8*8	输出: DC28V/5A
尺寸大小: 69mm*65mm*23mm	峰值效率: 95.4% / 230V
开关频率: 150kHz	

120W适配器低成本方案



拓扑方案: PFC + QR	输入电压: AC90V-264V
CoreGaN: CE65H160TOAIF + CE65H270TOAIF / TO220	输出: DC 24V/5A
尺寸大小: 96.2mm*50.8mm*24mm	峰值效率: 92.5% / 230V
开关频率: 130kHz	

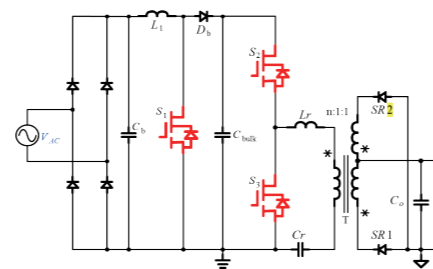
180W适配器方案



拓扑方案: PFC+LLC	输入电压: AC90V-264V
CoreGaN: CE65H110DNDI+CE65H160DNGI / DFN8*8	输出: 12Vdc/180W
尺寸大小: 180mm*65mm*32mm	峰值效率: 95% / 230V
开关频率: 100kHz	

适配器方案
Adapter Solution

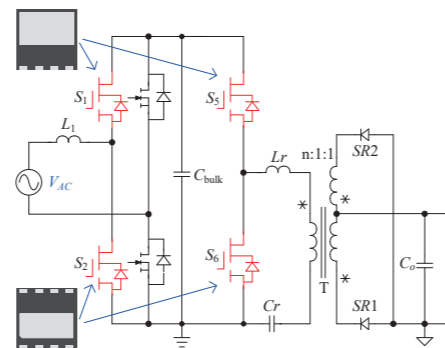
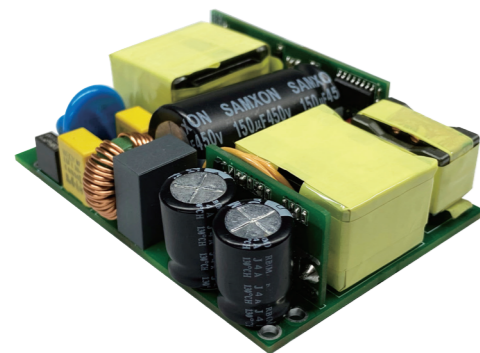
200W 长条型LED适配器方案



拓扑方案: PFC+LLC	输入电压: AC176V-264V
CoreGaN: CE65H160DNGI /DFN8*8+CE65H160DNCI /DFN5*6	输出: 48V/200W
尺寸大小: 300mm*16mm*13mm	峰值效率: 95.6% /230V
开关频率: 200kHz	

电动工具方案
Power Tool Solution

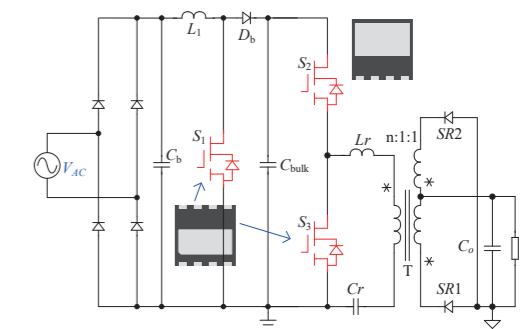
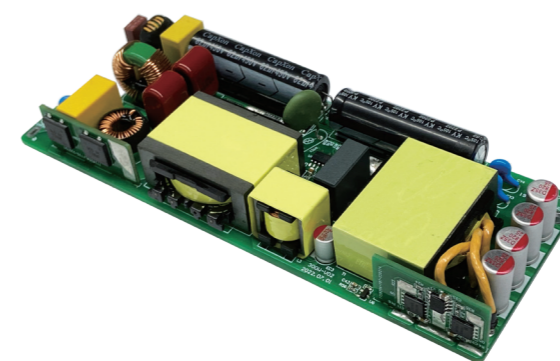
240W电动工具方案



拓扑方案: Totem PFC+LLC	输入电压: AC90V-264V
CoreGaN: CE65H110DNDI+CE65H160DNGI /DFN8*8	输出: 48Vdc
尺寸大小: 78mm*58mm*23mm	峰值效率: 97%/230V
开关频率: 200kHz	

TV方案
TV Solution

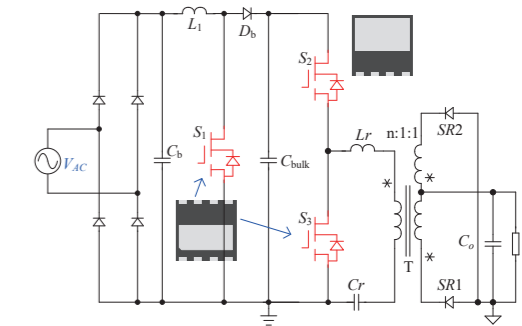
300W激光电视方案



拓扑方案: PFC+LLC	输入电压: AC90V-264V
CoreGaN: CE65H110DNDI /DFN8*8	输出: 19.5V/16A
尺寸大小: 159mm*61mm*20mm	峰值效率: 95%/230V
开关频率: 150kHz	

服务器/PC方案
Server/PC Solution

360W PC适配器方案



拓扑方案: PFC+LLC	输入电压: AC90V-264V
CoreGaN: CE65H110DNDI /DFN8*8	输出: 12Vdc
尺寸大小: 180mm*98mm*32mm	峰值效率: 95%/230V
开关频率: 100kHz	

