

**NEW**

# 强茂新产品推荐

PANJIT New Product Recommendation

2021Y Q3

CN1

Technology Application Department

## 推荐系列

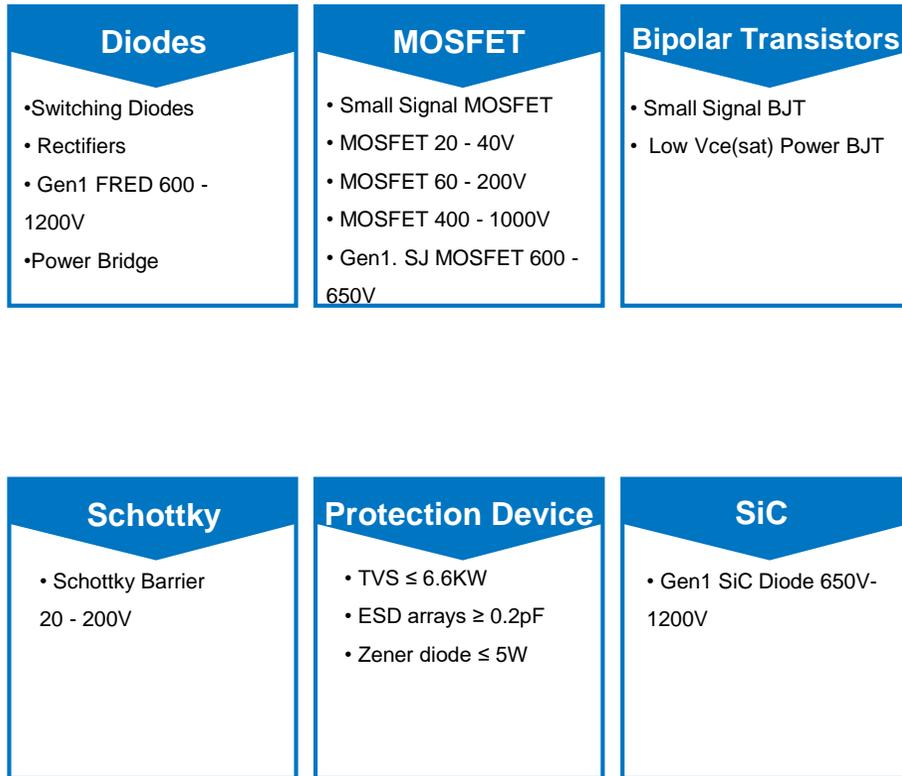
- HV MOSFET (Super Junction & Planar)
- MV MOSFET(Shielded-Gate Trench)
- D-Series LV MOSFET
- SiC Schottky Diode
- FRED Diode
- H-Type Schottky Diode
- Bridge Rectifier **NEW**
- 600V Input Rectifier
- MER-Series Rectifiers **NEW**
- 900mΩ Cool MOSFET

## 介绍方面：

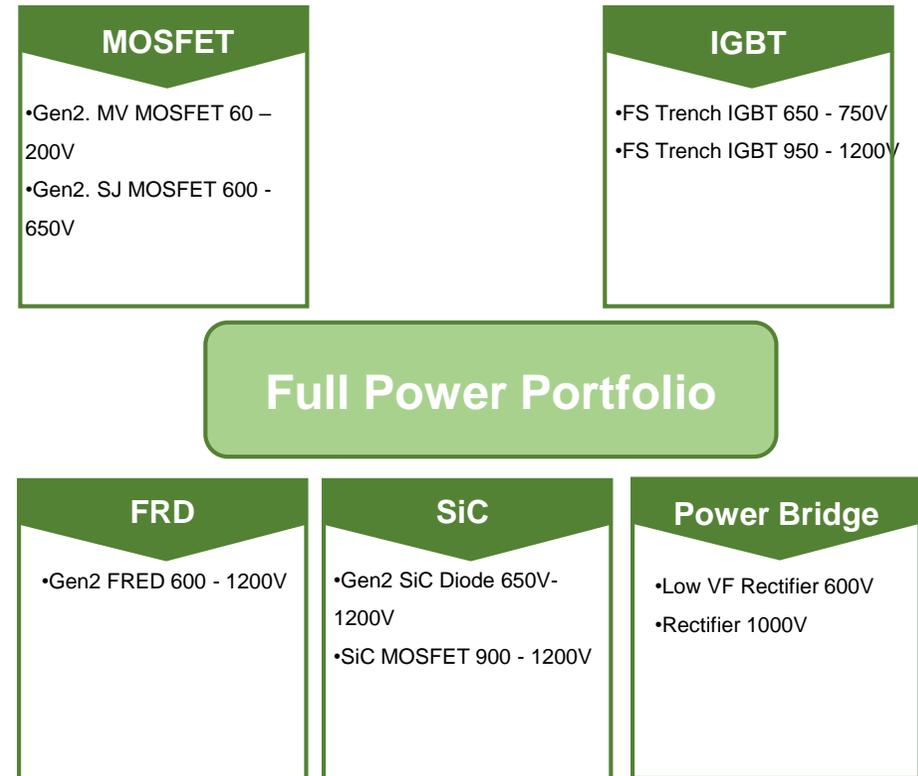
- ✓ Product Road Map (产品规划)
- ✓ Product List (产品清单)
- ✓ Benchmark (工艺特点&产品对比)
- ✓ Target market (目标市场)
- ✓ Typical application (典型应用)



## 现有产品线：自有封装及生产技术



## 拓展功率半导体产品线：自有生产技术与设计能力



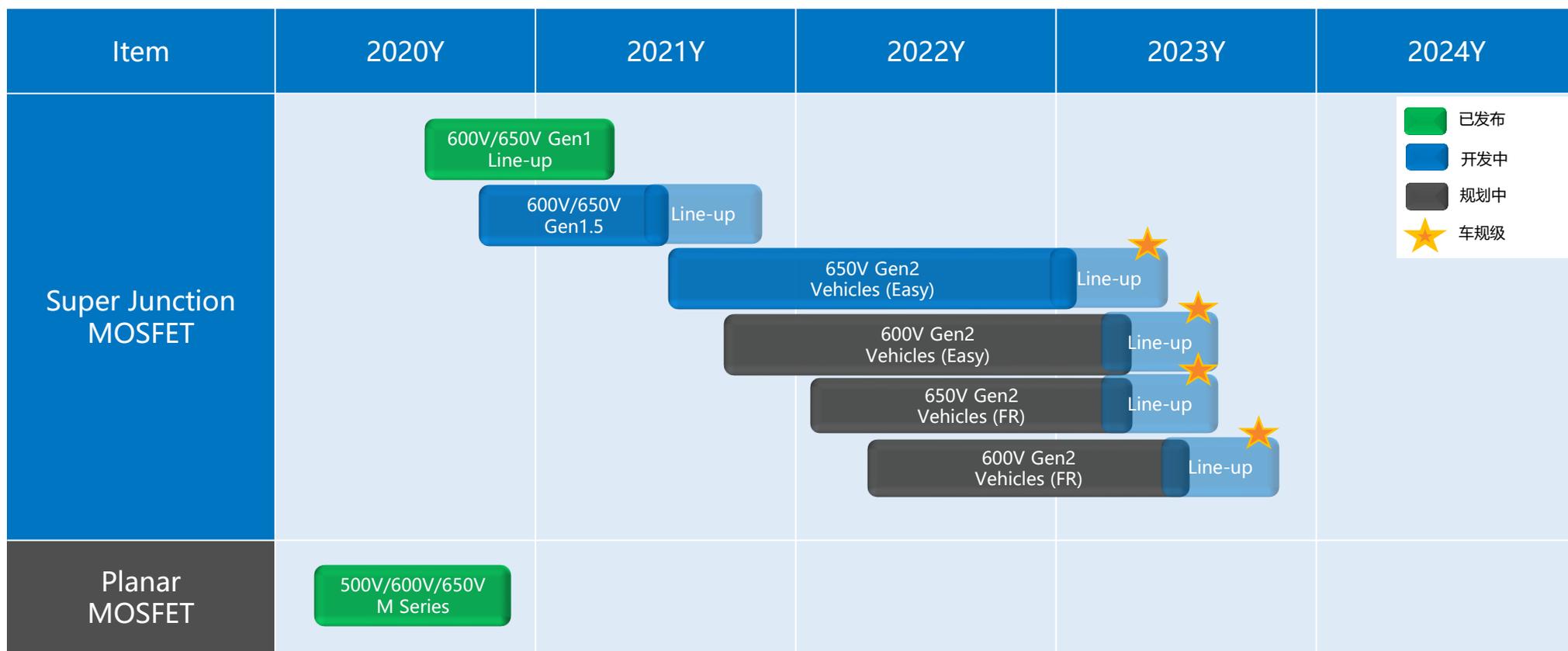
# HV MOSFET

## (Super Junction & Planar)

- ✓ Product Road Map (产品规划)
- ✓ Product List (产品清单)
- ✓ Characteristics & Benchmark (工艺特点&产品对比)
- ✓ Target market (目标市场)
- ✓ Typical application (典型应用)



# Product Road Map (产品规划)



应用特点	Planar MOSFET	Super Junction MOSFET	
	M系列	Easy version	FR version
	High RSP & High FOM	Excellent EMI, Good Efficiency	Smaller Trr & Qrr
	标准RDSON & Qg	Hard/Soft Switching	Soft Switching
	EMI 优	Small Eoss and Qoss	Small Qoss , and Qg
	UIS 强	Good diode di/dt ruggedness	High diode di/dt ruggedness

# Product List (产品清单) GEN1

Product Family	Product ID	VDS(V)	Rds(max) @10V (m ohm)	封装	样品	规格书	ERP料号	交期 (Wafer Time + PKG Time)
600V SJ GEN1 MOS	★ PJMF190N60E1	600	190	ITO-220F	V	V	V	14周+6周
	★ PJMF280N60E1	600	280	ITO-220F	V	V	V	14周+6周
	PJMF360N60E1	600	360	ITO-220F	V	V	V	14周+6周
	★ PJMF580N60E1	600	580	ITO-220F	V	V	V	14周+6周
	PJMF900N60E1	600	900	ITO-220F	V	V	V	14周+6周
	PJMD360N60E1	600	360	TO-252AA	V	V	Aug.2021	14周+6周
	★ PJMD580N60E1	600	580	TO-252AA	V	V	Aug.2021	14周+6周
	PJMD900N60E1	600	900	TO-252AA	V	V	Aug.2021	14周+6周
650V SJ GEN1 MOS	PJMF280N65E1	650	280	ITO-220F	V	V	V	14周+6周
	PJMF380N65E1	650	380	ITO-220F	V	V	V	14周+6周
	★ PJMF600N65E1	650	600	ITO-220F	V	V	V	14周+6周
	PJMF900N65E1	650	900	ITO-220F	V	V	V	14周+6周
	PJMD380N65E1	650	380	TO-252AA	V	V	Aug.2021	14周+6周
	★ PJMD600N65E1	650	600	TO-252AA	V	V	Aug.2021	14周+6周
	PJMD900N65E1	650	900	TO-252AA	V	V	Aug.2021	14周+6周
HV Planar MOS	PJD2N60M	600	4800	TO-252AA	V	V	V	16周+6周
	PJD4N60M	600	2600	TO-252AA	V	V	V	16周+6周
	PJD4N65M	650	2800	TO-252AA	V	V	V	16周+6周
	PJF2N65M	650	5700	ITO-220F	V	V	V	16周+6周
	★ PJF4N65M	650	2800	ITO-220F	V	V	V	16周+6周
	★ PJF8N65M	650	1200	ITO-220F	V	V	V	16周+6周
	★ PJF10N65M	650	850	ITO-220F	V	V	V	16周+6周
	★ PJF12N65M	650	750	ITO-220F	V	V	V	16周+6周
	★ PJF13N50M	500	500	ITO-220F	V	V	V	16周+6周



★ Key promotion items

# Product List (产品清单) GEN1.5

Product Family	Product ID	VDS(V)	Rds(max) @10V (m ohm)	封装	样品	规格书	ERP料号	交期 (Wafer Time + PKG Time)
600V SJ GEN1.5 MOS	★ PJMF120N60EC	600	120	ITO-220AB-F	Aug.2021	Sep.2021	Sep.2021	10周+6周
	★ PJMF360N60EC	600	360	ITO-220AB-F	Aug.2021	Sep.2021	Sep.2021	14周+6周
	PJMF900N60EC	600	900	ITO-220AB-F	Aug.2021	Sep.2021	Sep.2021	14周+6周
	PJMP120N60EC	600	120	TO-220AB-L	Aug.2021	Sep.2021	Sep.2021	14周+6周
	PJMP360N60EC	600	360	TO-220AB-L	Aug.2021	Sep.2021	Sep.2021	14周+6周
	PJMP900N60EC	600	900	TO-220AB-L	Aug.2021	Sep.2021	Sep.2021	14周+6周
	PJMD360N60EC	600	360	TO-252AA	Aug.2021	Sep.2021	Sep.2021	14周+6周
	PJMD900N60EC	600	900	TO-252AA	Aug.2021	Sep.2021	Sep.2021	14周+6周
650V SJ GEN1.5 MOS	★ PJMF130N65EC	650	130	ITO-220AB-F	Aug.2021	Sep.2021	Sep.2021	14周+6周
	★ PJMF390N65EC	650	390	ITO-220AB-F	Aug.2021	Sep.2021	Sep.2021	14周+6周
	PJMF990N65EC	650	990	ITO-220AB-F	Aug.2021	Sep.2021	Sep.2021	14周+6周
	PJMP130N65EC	650	130	TO-220AB-L	Aug.2021	Sep.2021	Sep.2021	14周+6周
	PJMP390N65EC	650	390	TO-220AB-L	Aug.2021	Sep.2021	Sep.2021	14周+6周
	PJMP990N65EC	650	990	TO-220AB-L	Aug.2021	Sep.2021	Sep.2021	14周+6周
	PJMD390N65E1	650	390	TO-252AA	Aug.2021	Sep.2021	Sep.2021	14周+6周
	PJMD990N65E1	650	990	TO-252AA	Aug.2021	Sep.2021	Sep.2021	16周+6周

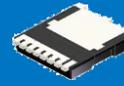
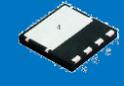
□ Gen1.5 相比Gen1栅极电荷Qg 降低14%

□ Gen1.5 相比Gen1 UIS能力提升1倍

□ Gen1.5 相比Gen1开通损耗降低9%

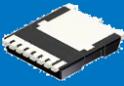
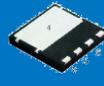
★ Key promotion items

# Product List (产品清单) GEN2

SJ GEN2_Easy FET				Package						
				TO247	ITO220	TO220	TO-LL	DFN8x8	D2PAK	DPAK
VDS (V)	VGS (V)	Vth (V)	Rds(max) @10V (m ohm)							
650	30	3 ~ 4	24	PJMH024N65E2						
650	30	3 ~ 4	37	PJMH037N65E2			PJMN036N65E2			
650	30	3 ~ 4	45	PJMH045N65E2			PJMN045N65E2		PJMB045N65E2	
650	30	3 ~ 4	60	PJMH060N65E2	PJMF060N65E2	PJMP060N65E2	PJMN060N65E2	PJMQ065N65E2	PJMB060N65E2	
650	30	3 ~ 4	80	PJMH080N65E2	PJMF080N65E2	PJMP080N65E2	PJMN080N65E2	PJMQ085N65E2	PJMB080N65E2	
650	30	3 ~ 4	99	PJMH099N65E2	PJMF099N65E2	PJMP099N65E2	PJMN099N65E2	PJMQ105N65E2	PJMB099N65E2	
650	30	3 ~ 4	120	PJMH120N65E2	PJMF120N65E2	PJMP120N65E2		PJMQ125N65E2	PJMB120N65E2	
650	30	3 ~ 4	180	PJMH180N65E2	PJMF180N65E2	PJMP180N65E2		PJMQ185N65E2	PJMB180N65E2	PJMD180N65E2
650	30	3 ~ 4	280		PJMF280N65E2	PJMP280N65E2		PJMQ285N65E2	PJMB280N65E2	PJMD280N65E2
650	30	3 ~ 4	360		PJMF360N65E2	PJMP360N65E2		PJMQ365N65E2	PJMB360N65E2	PJMD360N65E2
650	30	3 ~ 4	600		PJMF600N65E2	PJMP600N65E2				PJMD600N65E2
650	30	3 ~ 4	750							PJMD750N65E2
650	30	3 ~ 4	990							PJMD990N65E2

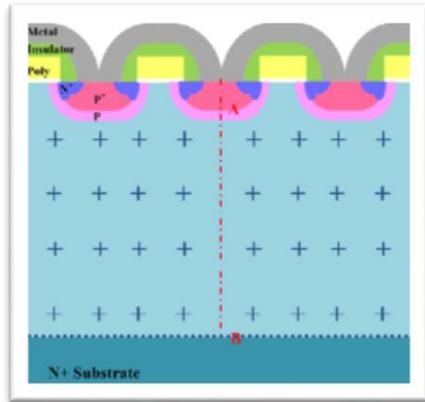
Note: Blue Mark is first product by Easy platform, MP: 2022-Q4

# Product List (产品清单) Gen2

SJ GEN2_FR FET				Package						
				TO247	ITO220	TO220	TO-LL	DFN8x8	D2PAK	DPAK
VDS (V)	VGS (V)	Vth (V)	Rds(max) @10V (m ohm)							
650	30	3 ~ 4	26	PJMH026N65FR2						
650	30	3 ~ 4	41	PJMH041N65FR2			PJMN041N65FR2			
650	30	3 ~ 4	50	PJMH050N65FR2			PJMN050N65FR2		PJMB050N65FR2	
650	30	3 ~ 4	66	PJMH066N65FR2	PJMF066N65FR2	PJMP068N65FR2	PJMN068N65FR2	PJMQ068N65FR2	PJMB068N65FR2	
650	30	3 ~ 4	88	PJMH088N65FR2	PJMF088N65FR2	PJMP088N65FR2	PJMN088N65FR2	PJMQ088N65FR2	PJMB088N65FR2	
650	30	3 ~ 4	109	PJMH109N65FR2	PJMF109N65FR2	PJMP109N65FR2	PJMN109N65FR2	PJMQ109N65FR2	PJMB109N65FR2	
650	30	3 ~ 4	132	PJMH132N65FR2	PJMF132N65FR2	PJMP132N65FR2		PJMQ132N65FR2	PJMB132N65FR2	
650	30	3 ~ 4	198	PJMH198N65FR2	PJMF198N65FR2	PJMP198N65FR2		PJMQ198N65FR2	PJMB198N65FR2	PJMD198N65FR2
650	30	3 ~ 4	308		PJMF308N65FR2	PJMP308N65FR2		PJMQ308N65FR2	PJMB308N65FR2	PJMD308N65FR2
650	30	3 ~ 4	396		PJMF396N65FR2	PJMP396N65FR2		PJMQ396N65FR2	PJMB396N65FR2	PJMD396N65FR2

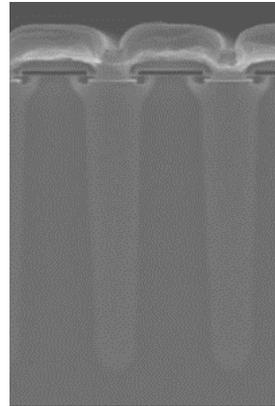
Note: Blue Mark is first product by FR platform, MP: 2023-Q1

## Planar (平面) MOSFET



- 结构工艺简单，晶胞一致性较好，跨导特性较好---成品率高
- 降低Rdson需增加晶片面积，成本与寄生电容增加，RSP相比SJ MOS要高
- 开关损耗 (Qg) 和导通损耗 (Rdson)相比SJ较高
- UIS强，具有较强的抗冲击能力

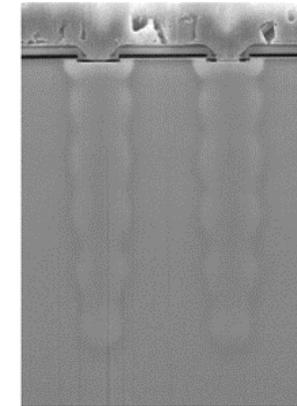
## Deep Trench (深沟槽) Super Junction



- 在Si衬底生长器件所需N型外延，开窗通过Si刻蚀深沟槽，然后填充P型外延层，最后研磨多余P型外延，形成P柱
- 制程步骤少，制造成本相比低
- 制程工艺复杂，不容易控制
- 深沟外延回填有均匀性问题，P型外延容易产生空洞及瑕疵、深沟槽角度难以把控



## Multi Epi (多层外延) Super Junction



- 工艺Si衬底层积N型外延，利用光刻开窗离子注入boron使开窗位置反型P型，如此反复多次生长出器件所需P柱。
- 成熟工艺与制程，工艺控制稳定；参数控制稳定，工艺填充均匀，EMI相比Deep Trench要优
- 较多制程步骤，成本较高
- 相比Deep Trench SJ更优的稳定性

★Panjit selecting process

# Benchmark (产品对比)

## SJ MOSFET 600V/190mohm

Manufacture		PANJIT	Competitor I P6	Competitor S M2
P/N		PJMF190N60E1		
Rds(on)	@ Ids = 10A @ Vgs = 10V	158 mohm	165 mohm	165 mohm
Threshold voltage	Vth @ 1mA	3.3V	4.0V	4.2V
Capacitance	Ciss @ 250kHz, 1V	2120 pF	2210 pF	1530 pF
	Coss @ 250kHz, 1V	4990 pF	6310 pF	5280 pF
	Crss @ 250kHz, 1V	750 pF	580 pF	510 pF
Driving loss	Qg (Qgd, Qgs)	39nC (9nC, 13nC)	40nC (11nC, 14nC)	24nC (8nC, 7nC)
Internal Rg	@ 1Mhz	11.0 ohm	6.7 ohm	12.2 ohm
Switching loss	Eon, Eoff @ 400V, 10A, 4.7ohm	49uJ, 125uJ	33uJ, 121uJ	41uJ, 138uJ
	Eoss @ 400V	6.4uJ	6.0uJ	6.4uJ
Ruggedness	UIS @ 10uH	0.6mJ	3.0mJ	1.9mJ
Body diode	Vsd @ 10A	0.85V	0.87V	0.90V
	Qrr @ 10A, 300A/us	5.6 uC	5.8 uC	3.7 uC
	Max. di/dt ruggedness	1000 A/us passed	500A/us	1000 A/us passed

## HV Planar MOSFET 650V/10A

Manufacture		PANJIT	Competitor SVF10N65F	Competitor CS10N65FA9R
P/N		PJF10N65M		
Drain-Source On-State Resistance	Rds(on) @ Ids = 5A, Vgs = 10V	0.85 mohm	1.0 ohm	1.0 ohm
Threshold voltage	Vth@VDS = VGS, ID = 250uA	4.0 V	4.0 V	4.0 V
Capacitance	Ciss @ 1MHz, VDS=50V, VGS=0V	1790 pF	1100 pF	1642 pF
	Coss @ 1MHz, VDS=50V, VGS=0V	100 pF	130 pF	128 pF
	Crss @ 1MHz, VDS=50V, VGS=0V	31 pF	12.5 pF	7 pF
Driving loss	Qg (Qgd, Qgs)	37nC (8nC, 11nC)	28.5nC (6.23nC, 13.2nC)	32nC (8nC, 12nC)
Turn-On/off Time	td(on)@ID=5A, VGS=10V	23 ns	21 ns	27 ns
	tr@ID=5A, VGS=10V	27 ns	41 ns	22 ns
	td(off)@ID=5A, VGS=10V	62 ns	82 ns	53 ns
	tf@ID=5A, VGS=10V	26 ns	42 ns	24 ns
Body diode	Vsd @ IS=10A, VGS=0V	1.4V	1.3V	1.5V
	Qrr @ VGS=0V, IS=5A dIS/dt=100A/us	2.6 uC	4.32 uC	3.22 uC

- 动态参数:
- Rds(on)—导通阻抗
- Vth—阈值电压
- Ciss/Coss/Crss—寄生结电容
- Eon, Eoff—开&关功耗
- Eoss—导通功耗
- Qg—充电电荷
- UIS—雪崩能量
- Vsd—体二极管导通压降
- Qrr—体二极管恢复总电荷
- di/dt—电流上升率
- PD—耗散功率
- Td (on) —开启延迟时间
- Tr—开启上升时间
- td(off)—关闭延迟时间
- Tf—关闭下降时间

快充



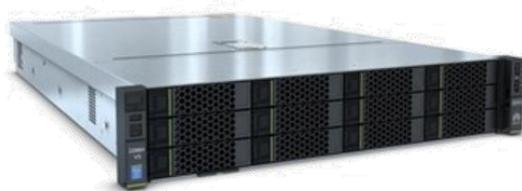
PC Power



工业电源



伺服器Power



AC to DC  
开关电源

适配器

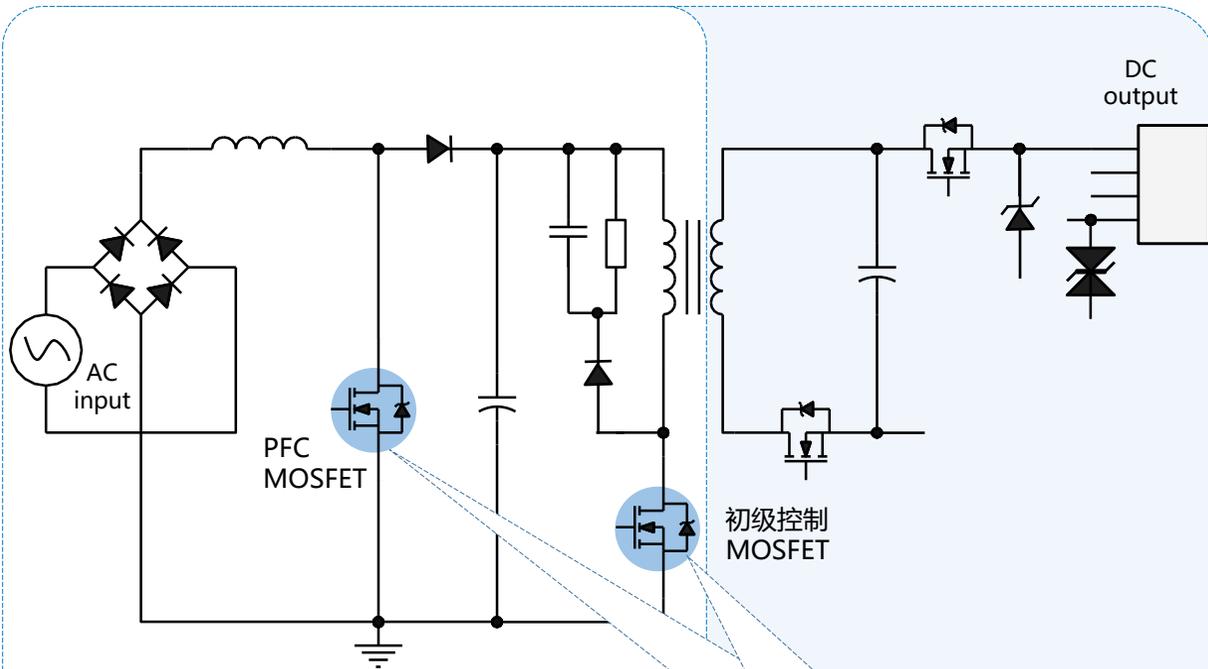


TV Power



# Typical application (典型应用)

## 应用电路



Primary rectification control

 适配器应用电路

### 特点:

- 低Rdson导通阻抗, 高效率
- 硬开关切换
- 优异的EMI表现

## 应用推荐

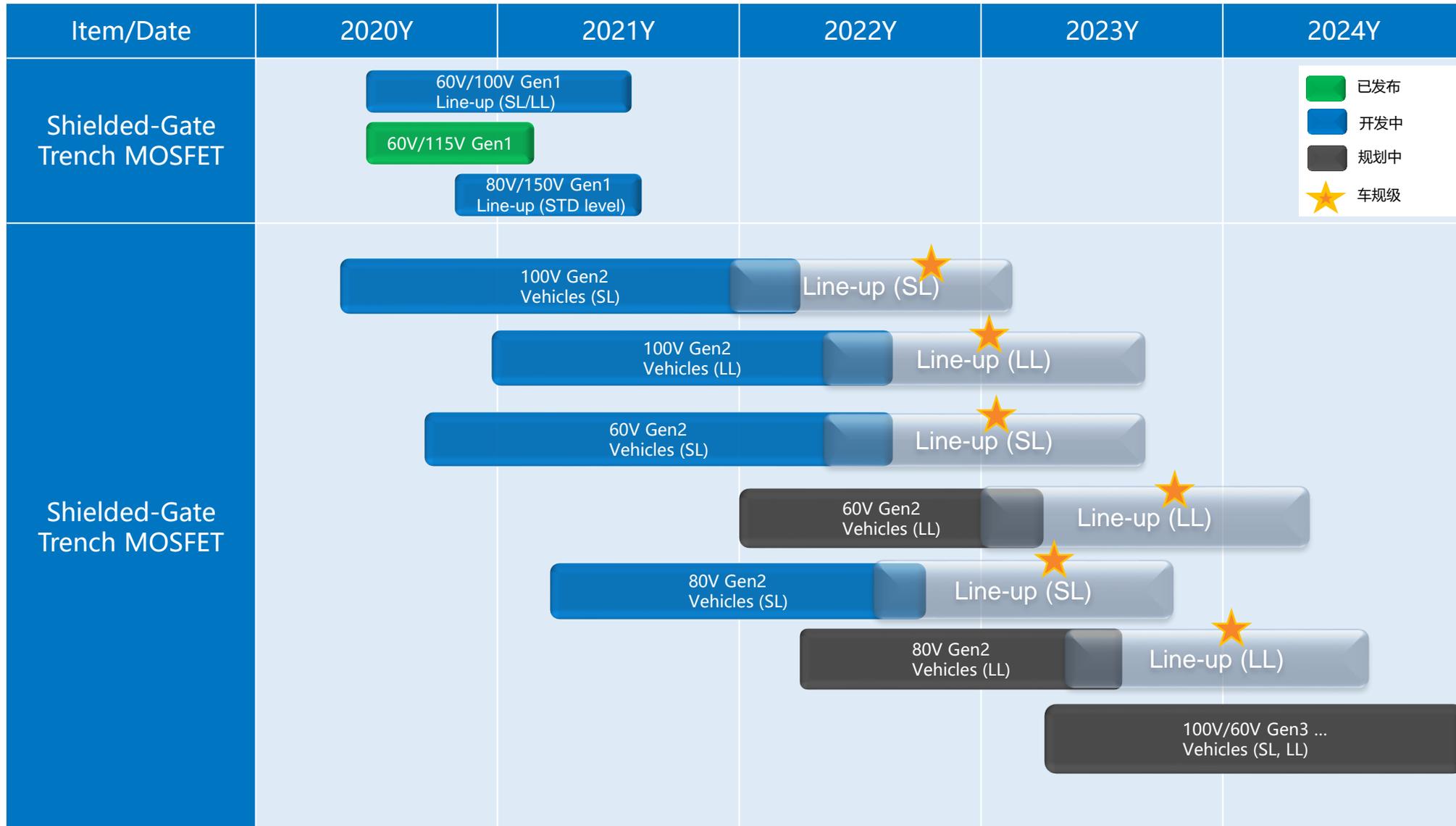
电源功率	系列	推荐型号	VDS (V)	Rdson @10V (mΩ)	封装
12W-150W	Planar	PJD4N65M	650	2800	TO-252
	Planar	PJF4N65M	650	2800	ITO-220F
	Planar	PJF8N65M	650	1200	ITO-220
	Planar	PJF10N65M	650	850	ITO-220F
	Planar	PJF12N65M	650	750	ITO-220F
	SJ	PJMF600N65E1 PJMD600N65E1	650	600	ITO-220F TO-252
	SJ	PJMF900N65E1 PJMD600N65E1	650	900	ITO-220F TO-252
	SJ	PJMF280N65E1	650	280	ITO-220F
	SJ	PJMF380N65E1	650	380	ITO-220F

# MV MOSFET (Shielded-Gate Trench)

- ✓ Product Road Map (产品规划)
- ✓ Product List (产品清单)
- ✓ Characteristics & Benchmark (工艺特点&产品对比)
- ✓ Target market (目标市场)
- ✓ Typical application (典型应用)



# Product Road Map (产品规划)



备注: LL: Logic Level( $V_{th} < 2.5V$ ); SL: Stand Level( $2V < V_{th} < 4V$ )

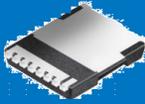
# Product List (产品清单)

Product Family	Product ID	VDS(V)	VTH(V)	RDS(max) @10V (m ohm)	封装	样品	规格书	ERP料号	交期 (Wafer Time + PKG Time)
SGT Gen.1 LL	★ PSMQC060N06LS1	60	1~2.5	6	DFN5*6	V	V	V	14周+12周
	★ PSMQC120N06LS1	60	1~2.5	12	DFN5*6	V	V	V	14周+12周
	PSMQC072N10LS1	100	1~2.5	7.2	DFN5*6	Aug.2021	Sep.2021	Nov.2021	48周+12周
	PSMQC092N10LS1	100	1~2.5	9.2	DFN5*6	Aug.2021	Sep.2021	Nov.2021	48周+12周
	★ PSMQC076N12LS1	115	1~2.5	7.6	DFN5*6	V	V	V	48周+12周
SGT Gen.1 SL	PSMQC033N06NS1	60	2~4	3.3	DFN5*6	V	Aug.2021	Aug.2021	48周+12周
	PSMQC073N06NS1	60	2~4	7.3	DFN5*6	V	Aug.2021	Aug.2021	48周+12周
	PSMP021N08NS1	80	2~4	2.1	TO-220	Oct. 2021	Dec.2021	Dec.2021	20周+6周
	PSMP032N08NS1	80	2~4	3.2	TO-220	Oct. 2021	Dec.2021	Dec.2021	20周+6周
	PSMP055N08NS1	80	2~4	5.5	TO-220	Oct. 2021	Dec.2021	Dec.2021	20周+6周
	PSMP075N15NS1	150	2~4	7.5	TO-220	Oct. 2021	Dec.2021	Dec.2021	20周+6周
	PSMD460N15NS1	150	2~4	46	TO-252	V	Aug.2021	Aug.2021	20周+6周
	PSMB021N08NS1	80	2~4	2.1	TO-263	Oct. 2021	Dec.2021	Dec.2021	20周+6周
	PSMB032N08NS1	80	2~4	3.2	TO-263	Oct. 2021	Dec.2021	Dec.2021	20周+6周
	PSMB055N08NS1	80	2~4	5.5	TO-263	Oct. 2021	Dec.2021	Dec.2021	20周+6周
	PSMB075N15NS1	150	2~4	7.5	TO-263	Oct. 2021	Dec.2021	Dec.2021	20周+6周



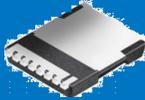
★ Key promotion items

# Product List (产品清单) Gen2

Product Family	Vth(V)	Voltage (V)	Rdson typ. @ 10Vgs (mohm)	TO-LL (option)	D2PAK	DFN5x6	DFN3x3	TO-220L
								
SGT Gen.2 SL	2~4	60	0.63	PSMN008N06NS2 (60V/ 0.75mohm)				
	2~4	60	1	PSMN012N06NS2 (60V/ 1.2mohm)				
	2~4	60	1.2	PSMN014N06NS2 (60V/ 1.4mohm)		PSMQC014N06NS2 (60V/ 1.4mohm)		
	2~4	60	1.4			PSMQC016N06NS2 (60V/ 1.6mohm)		
	2~4	60	1.7		PSMB020N06NS2 (60V/ 2mohm)	PSMQC020N06NS2 (60V/ 2mohm)		PSMP021N06NS2 (60V/ 2.1mohm)
	2~4	60	2.35		PSMB028N06NS2 (60V/ 2.8mohm)	PSMQC028N06NS2 (60V/2.8mohm)		PSMP029N06NS2 (60V/ 2.9mohm)
	2~4	60	3.3		PSMB040N06NS2 (60V/ 4mohm)	PSMQC039N06NS2 (60V/ 3.9mohm)	PSMQB042N06NS2 (60V/ 4.2mohm)	PSMP041N06NS2 (60V/ 4.1mohm)
	2~4	60	5.6			PSMQC067N06NS2 (60V/ 6.7mohm)	PSMQB068N06NS2 (60V/ 6.8mohm)	
	2~4	60	8			PSMQC096N06NS2 (60V/ 9.6mohm)	PSMQB100N06NS2 (60V/ 10mohm)	

Note: Blue Mark is first product by platform, MP: 2022-Q2

# Product List (产品清单) Gen2

Product Family	Vth(V)	Voltage (V)	Rdson typ. @ 10Vgs (mohm)	TO-LL	D2PAK	DFN5x6	DFN3x3
							
SGT Gen.2 SL	2~4	80	1	PSMN012N08NS2 (80V/ 1.2mohm)			
	2~4	80	1.6	PSMN019N08NS2 (80V/ 1.9mohm)	PSMB019N08NS2 (80V/ 1.9mohm)		
	2~4	80	2.2	PSMN026N08NS2 (80V/ 2.6mohm)	PSMB025N08NS2 (80V/ 2.5mohm)	<b>PSMQC027N08NS2 (80V/ 2.7mohm)</b>	
	2~4	80	2.6		PSMB031N08NS2 (80V/ 3.1mohm)		
	2~4	80	3.2			PSMQC037N08NS2 (80V/ 3.7mohm)	
	2~4	80	3.4		PSMB040N08NS2 (80V/ 4mohm)	PSMQC040N08NS2 (80V/ 4mohm)	
	2~4	80	4.4		PSMB050N08NS2 (80V/ 5mohm)	PSMQC052N08NS2 (80V/ 5.2mohm)	
	2~4	80	5.2			PSMQC061N08NS2 (80V/ 6.1mohm)	
	2~4	80	6.2			PSMQC072N08NS2 (80V/ 7.2mohm)	PSMQB075N08NS2 (80V/ 7.5mohm)
	2~4	80	7.6				PSMQB084N08NS2 (80V/ 8.4mohm)
2~4	80	9.6				PSMQB110N08NS2 (80V/ 11mohm)	

Note: Blue Mark is first product by platform, MP: 2022-Q3

# Product List (产品清单) Gen2

Product Family	Vth(V)	Voltage (V)	Rdson typ. @ 10Vgs (mohm)	DFN5x6	DFN3x3	DPAK
						
SGT Gen.2 LL	1~2.5	100	2.8	PSMQC034N10LS2 (100V/ 3.4mohm)		
	1~2.5	100	3.2	<b>PSMQC038N10LS2 (100V/ 3.8mohm)</b>		
	1~2.5	100	6.5	PSMQC078N10LS2 (100V/ 7.8mohm)		PSMD080N10LS2 (100V/ 8mohm)
	1~2.5	100	7.5	PSMQC090N10LS2 (100V/ 9mohm)	PSMQB093N10LS2 (100V/ 9.3mohm)	PSMD093N10LS2 (100V/ 9.3mohm)
	1~2.5	100	9	PSMQC108N10LS2 (100V/ 10.8mohm)	PSMQB110N10LS2 (100V/ 11mohm)	
	1~2.5	100	10.5	PSMQC126N10LS2 (100V/ 12.6mohm)	PSMQB130N10LS2 (100V/ 13mohm)	
	1~2.5	100	12	PSMQC144N10LS2 (100V/ 14.4mohm)	PSMQB144N10LS2 (100V/ 14.4mohm)	
	1~2.5	100	20	PSMQC240N10LS2 (100V/ 24mohm)	PSMQB240N10LS2 (100V/24mohm)	

Note: **Blue Mark** is first product by platform, MP: **2022-Q2**

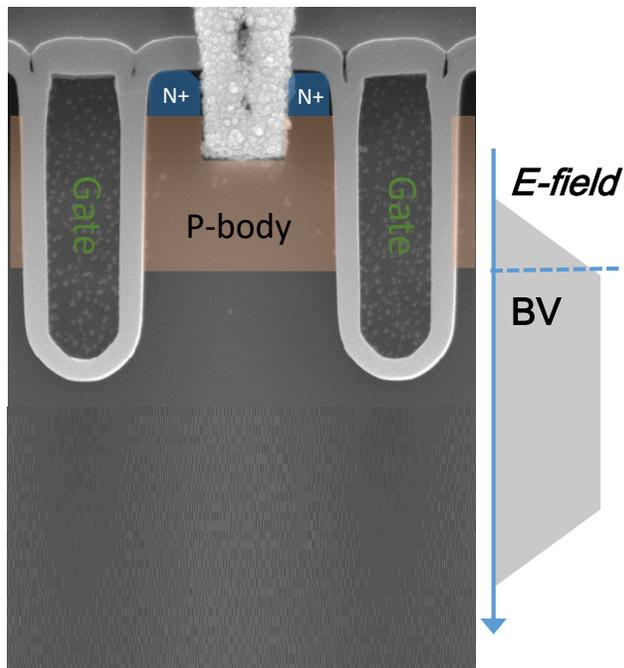
# Product List (产品清单) Gen2

Product Family	Vth(V)	Voltage (V)	Rdson typ. @ 10Vgs (mohm)	TO-LL	D2PAK	DFN5x6	DFN3x3	TO-220L
								
SGT Gen.2 SL	2~4	100	1.25	PSMN015N10NS2 (100V/ 1.5mohm)				
	2~4	100	1.6	PSMN020N10NS2 (100V/ 2mohm)				
	2~4	100	2.2	PSMN026N10NS2 (100V/2.6mohm)				
	2~4	100	2.9			PSMQC036N10NS2 (100V/ 3.6mohm)		
	2~4	100	3.3		PSMB041N10NS2 (100V/ 4.1mohm)	<b>PSMQC040N10NS2 (100V/ 4mohm)</b>		PSMP042N10NS2 (100V/ 4.2mohm)
	2~4	100	4.3		PSMB050N10NS2 (100V/5mohm)	PSMQC050N10NS2 (100V/ 5mohm)		PSMP051N10NS2 (100V/ 5.1mohm)
	2~4	100	6			PSMQC072N10NS2 (100V/ 7.2mohm)		
	2~4	100	7			PSMQC082N10NS2 (100V/8.2mohm)		
	2~4	100	8.2			PSMQC096N10NS2 (100V/ 9.6mohm)	PSMQB096N10NS2 (100V/ 9.6mohm)	
	2~4	100	10			PSMQC120N10NS2 (100V/ 12mohm)	PSMQB120N10NS2 (100V/ 12mohm)	
	2~4	100	14			PSMQC164N10NS2 (100V/ 16.4mohm)	PSMQB164N10NS2 (100V/ 16.4mohm)	
	2~4	100	20			PSMQC230N10NS2 (100V/ 23mohm)	PSMQB230N10NS2 (100V/ 23mohm)	
	2~4	100	38			PSMQC440N10NS2 (100V/ 44mohm)	PSMQB440N10NS2 (100V/ 44mohm)	

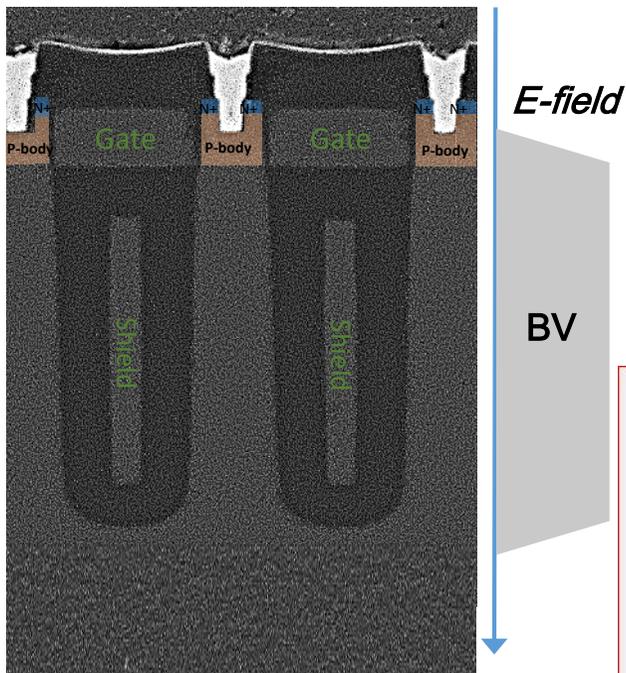
Note: Blue Mark is first product by platform, MP: 2022-Q1

# Technological Characteristics (工艺特点)

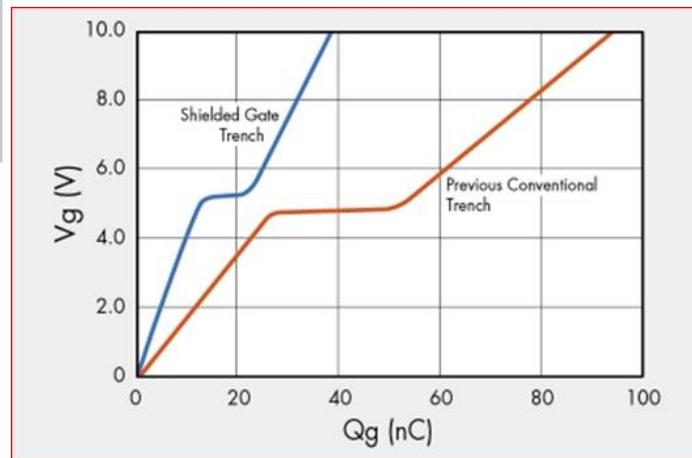
传统沟槽  
Traditional Trench



屏蔽栅极沟槽  
Shielded-Gate  
Trench

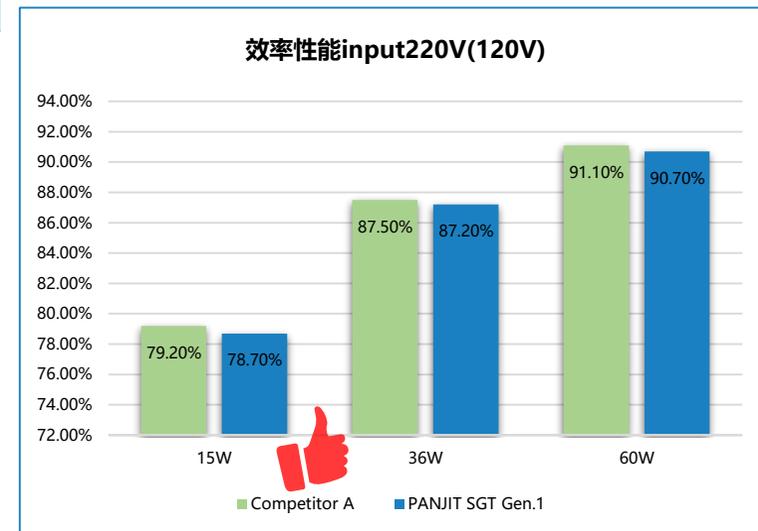
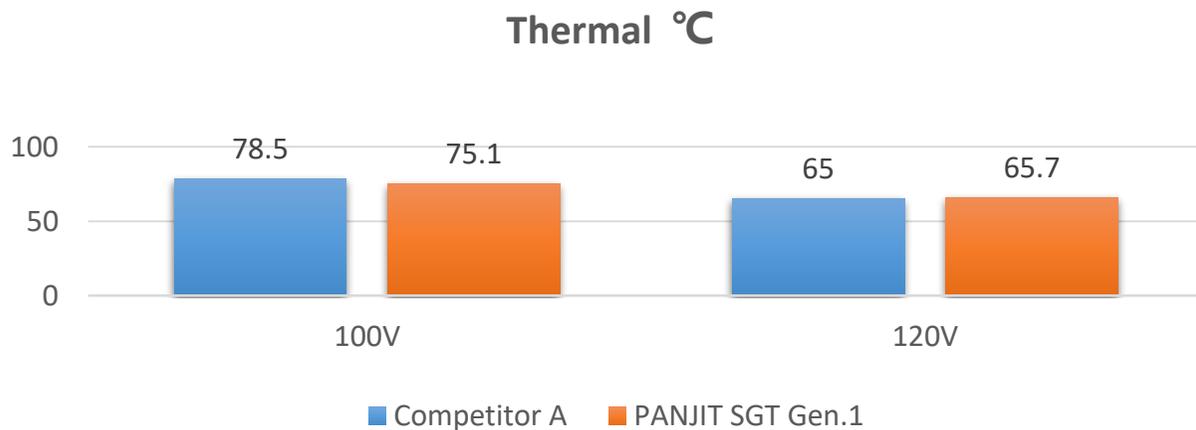
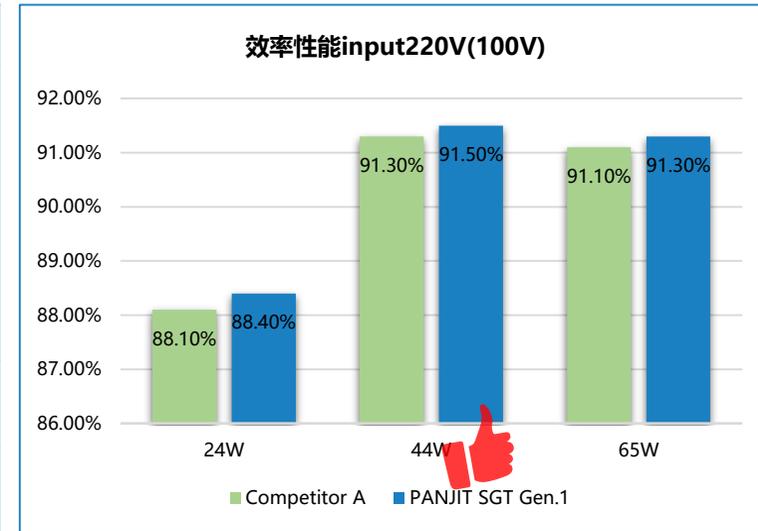


- ✓ 显著降低RSP (特征导通电阻)
- ✓ 改善MOS品质因子FOM (FOM越小越好) 增加材料功率密度
- ✓ 降低极间电容, 优化MOS开关特性 (更低的CGD&Qg)



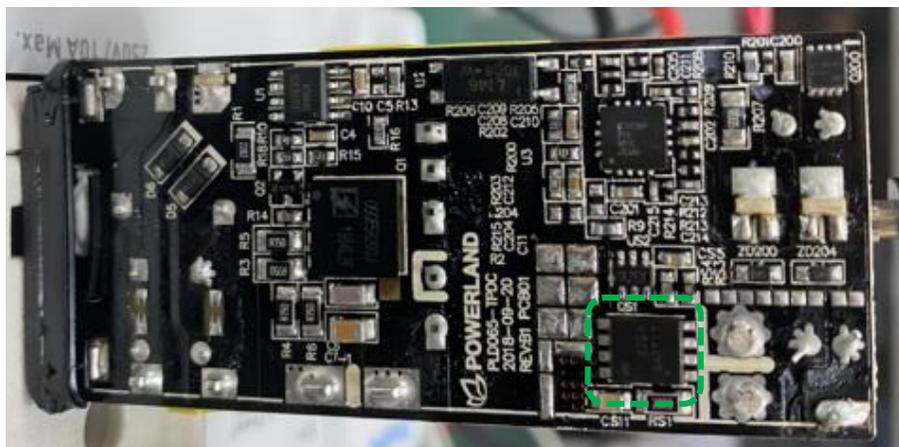
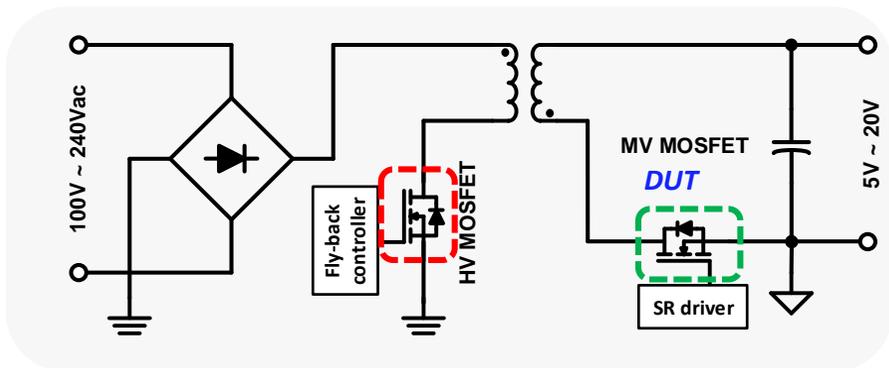
# Benchmark (产品对比)

SGT MV MOS 100V&120V						
Manufacture		Competitor A	PANJIT	Competitor A	PANJIT	unit
P/N		AON6220	PSMQC060 N10LS1	AON62922	PSMQC076 N12LS1	-
封装		DFN5*6	DFN5*6	DFN5*6	DFN5*6	-
VDS(V)	ID=250uA	111.8	109.6	128.7	123.0	V
RDson	VGS=10V, ID=20A	6.0	5.6	7.0	8.2	mΩ
	VGS=4.5V, ID=20A	6.9	7.7	8.2 (@ID=10A)	10.7 (@ID=10A)	mΩ
VTH	ID=250uA	1.9	2.0	1.9	1.8	V



# Benchmark (产品对比)

## Lenovo ThinkPlus 65W USB PD Charger



Parameters	Specification
Input Voltage	115VAC / 60Hz 230VAC / 50Hz
Output Voltage	20VDC
Max. Power	65W
Switching Frequency	50 ~ 70kHz
Ambient Temperature	25 deg.c

Test Condition	4 Points Avr. Effi.	10% load Effi.	No-load loss	
Criteria (CoC Tier 2)	> 89.0 %	> 79.0 %	< 0.150 W	
115Vac 60Hz	PANJIT PSMQC076N12LS1	>92.4 %	> 89%	0.031 W
	I-Company	>92.4 %	> 89%	0.032 W
	A-Company	>92.4 %	> 89%	0.035 W
230Vac 50Hz	PANJIT PSMQC076N12LS1	> 92%	>85.7 %	< 0.06 W
	I-Company	> 92%	>85.7 %	0.06W
	A-Company	> 92%	>85.7 %	<0.06 W

## 绿能源

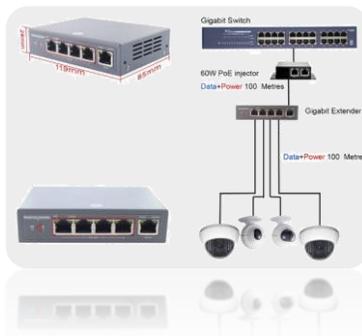


## PD Power



控制开关  
电源&马达

## 电信服务器



## 无人机

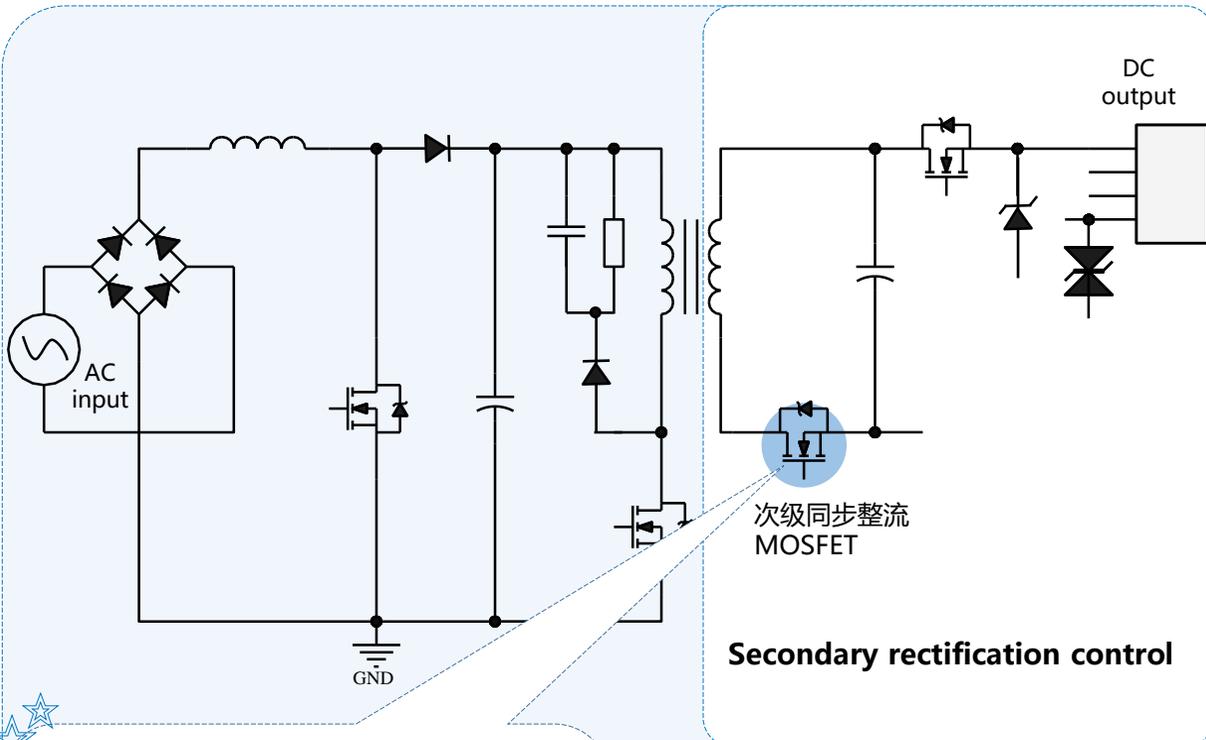


## 电动工具



# Typical application (典型应用)

## 应用电路



### 特点:

- 低Rds(on), 导通损耗低
- 低Qg, 开关性能优, 开关损耗减少



## PD应用电路

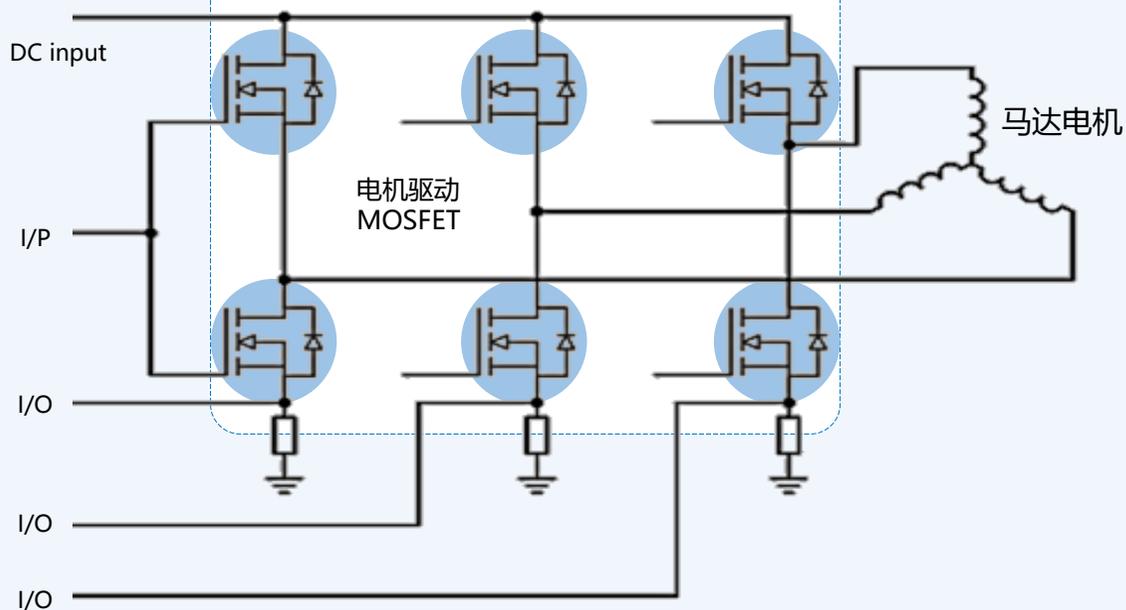
## 应用推荐

系列	推荐型号	VDS (V)	VTH (V)	Rdson @10V (mΩ)	封装
SGT MV LL	PSMQC060N06LS1	60	1~2.5	6	DFN5*6
SGT MV LL	PSMQC120N06LS1	60	1~2.5	12	DFN5*6
SGT MV LL	PSMQC072N10LS1	100	1~2.5	7.2	DFN5*6
SGT MV LL	PSMQC092N10LS1	100	1~2.5	9.2	DFN5*6
SGT MV LL	PSMQC076N12LS1	115	1~2.5	7.6	DFN5*6

# Typical application (典型应用)

## 应用电路

Three-phase motor drive



**特点:**

- 低Qg, 卓越开关性能
- 低Rdson, 导通损耗减少
- 高Vth, 防误导通
- 高UIS能力

**电机驱动应用电路**

## 应用推荐

系列	推荐型号	VDS (V)	VTH (V)	Rdson @10V (mΩ)	封装
SGT MV SL	PSMQC033N06NS1	60	2~4	3.3	DFN5*6
SGT MV SL	PSMQC073N06NS1	60	2~4	7.3	DFN5*6
SGT MV SL	PSMP021N08NS1	80	2~4	2.1	TO-220
SGT MV SL	PSMP032N08NS1	80	2~4	3.2	TO-220
SGT MV SL	PSMP055N08NS1	80	2~4	5.5	TO-220
SGT MV SL	PSMP075N15NS1	150	2~4	7.5	TO-220

# SiC Schottky Diode

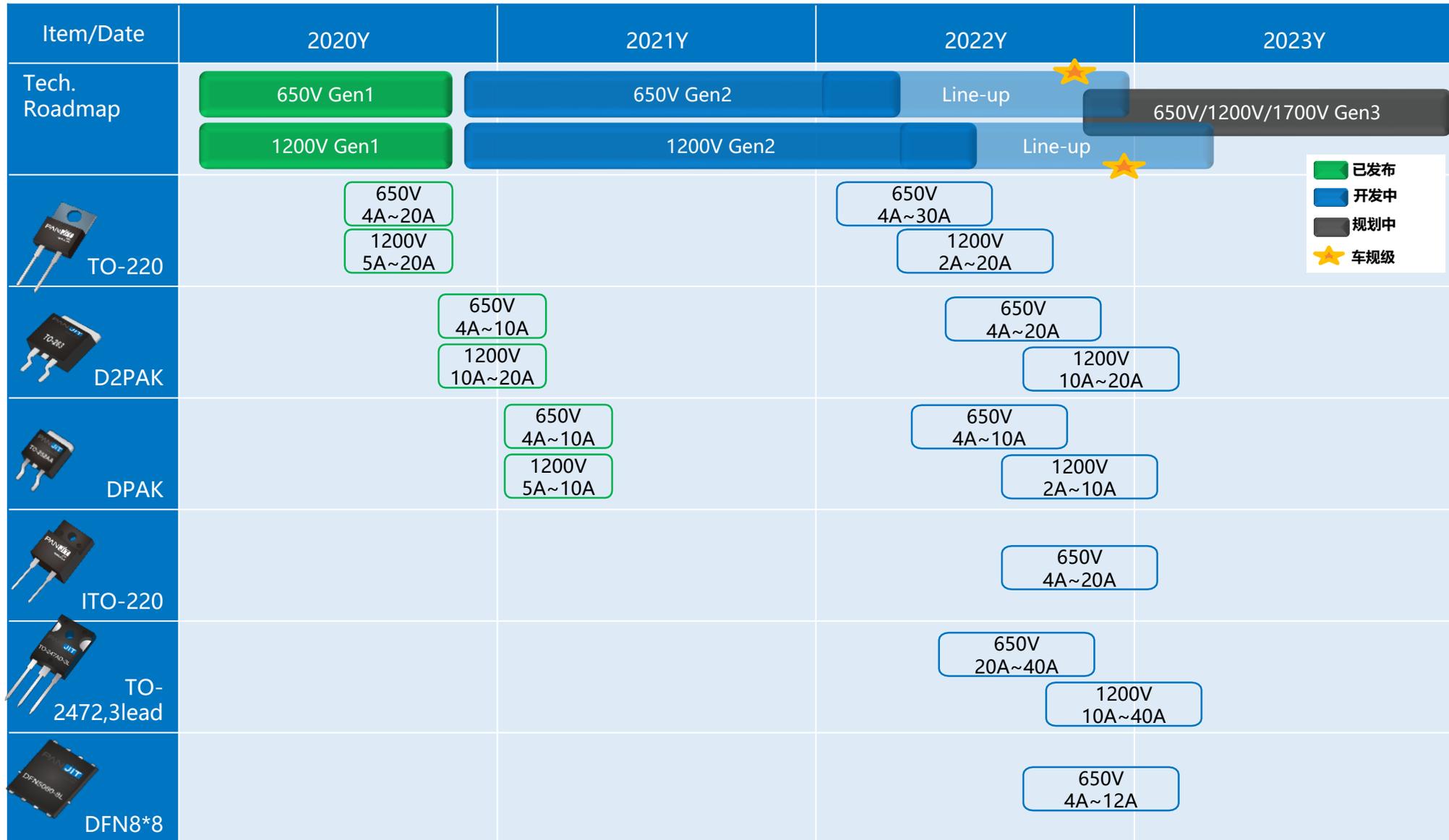
- ✓ Product Road Map (产品规划)
- ✓ Product List (产品清单)
- ✓ Characteristics & Benchmark (工艺特点&产品对比)
- ✓ Target market (目标市场)
- ✓ Typical application (典型应用)



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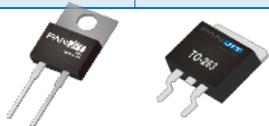
[www.panjit.com.cn](http://www.panjit.com.cn)

# Product Road Map (产品规划)



# Product List (产品清单)

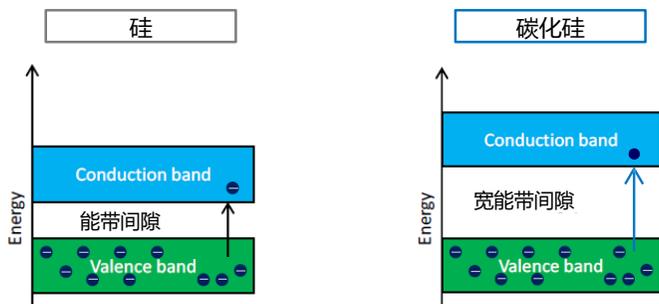
Product Family	Product ID	VRRM (V)	IF(A)	VF(V)	CJ(pf)	封装	样品	规格书	ERP料号	交期 (Wafer Time + PKG Time)
SiC Diode 650V	PCDP0465G1	650	4	1.5	6.4	TO-220AC	V	V	V	10周+4周
	PCDP0665G1	650	6	1.5	11.3	TO-220AC	V	V	V	10周+4周
	PCDP0865G1	650	8	1.5	15.7	TO-220AC	V	V	V	10周+4周
	PCDP1065G1	650	10	1.5	20	TO-220AC	V	V	V	10周+4周
	PCDP1265G1	650	12	1.5	25	TO-220AC	V	V	V	10周+4周
	PCDP1665G1	650	16	1.5	34.9	TO-220AC	V	V	V	10周+4周
	PCDP2065G1	650	20	1.5	43.5	TO-220AC	V	V	V	10周+4周
	PCDB0465G1	650	4	1.5	6.4	TO-263	V	V	V	10周+4周
	PCDB0665G1	650	6	1.5	11.3	TO-263	V	V	V	10周+4周
	PCDB0865G1	650	8	1.5	15.7	TO-263	V	V	V	10周+4周
	PCDB1065G1	650	10	1.5	20	TO-263	V	V	V	10周+4周
	PCDD0465G1	650	4	1.5	6.4	TO-252AA	V	V	Sep.2021	10周+4周
	PCDD0665G1	650	6	1.5	11.3	TO-252AA	V	V	Sep.2021	10周+4周
	PCDD0865G1	650	8	1.5	15.7	TO-252AA	V	V	Sep.2021	10周+4周
	PCDD1065G1	650	10	1.5	20	TO-252AA	V	V	Sep.2021	10周+4周
SiC Diode 1200V	PCDP05120G1	1200	5	1.5	17	TO-220AC	V	V	V	10周+4周
	PCDP08120G1	1200	8	1.5	32	TO-220AC	V	V	V	10周+4周
	PCDP10120G1	1200	10	1.5	42	TO-220AC	V	V	V	10周+4周
	PCDP15120G1	1200	15	1.5	67	TO-220AC	V	V	V	10周+4周
	PCDP20120G1	1200	20	1.5	87	TO-220AC	V	V	V	10周+4周
	PCDB10120G1	1200	10	1.5	42	TO-263	V	V	V	10周+4周
	PCDB20120G1	1200	20	1.5	87	TO-263	V	V	V	10周+4周
	PCDD05120G1	1200	5	1.5	17	TO-263	V	V	V	10周+4周
	PCDD08120G1	1200	8	1.5	32	TO-252AA	V	V	Sep.2021	10周+4周
	PCDD10120G1	1200	10	1.5	42	TO-252AA	V	V	Sep.2021	10周+4周



## 3倍的能带间隙

碳化硅中电子需要更多的能量从禁带激发到导带

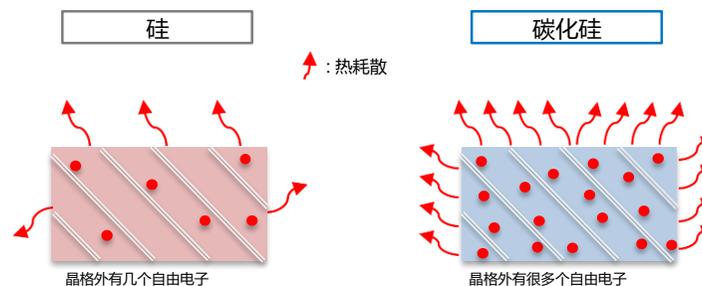
- 在宽温度范围内具有更稳定&低漏电流



## 3倍的导热系数

碳化硅具有更高的导热性能，激发电子更快

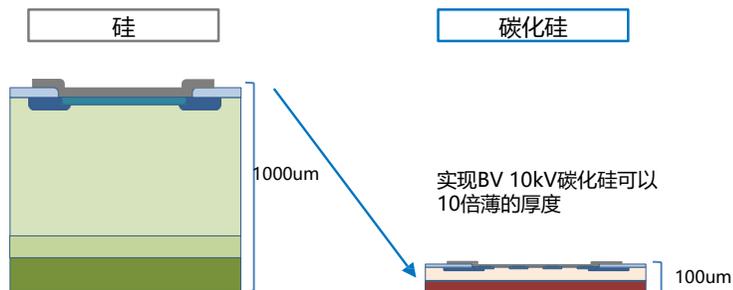
- 较低的工作温度和较小的热应力



## 10倍的介电击穿场强

碳化硅晶圆厚度可以显著降低

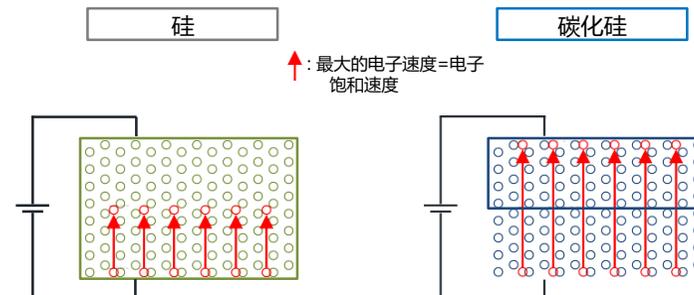
- 减小电阻，可以降低导通损耗



## 2倍的电子饱和速度

碳化硅具有更高的电子饱和速度

- 可以实现更高的开关速度



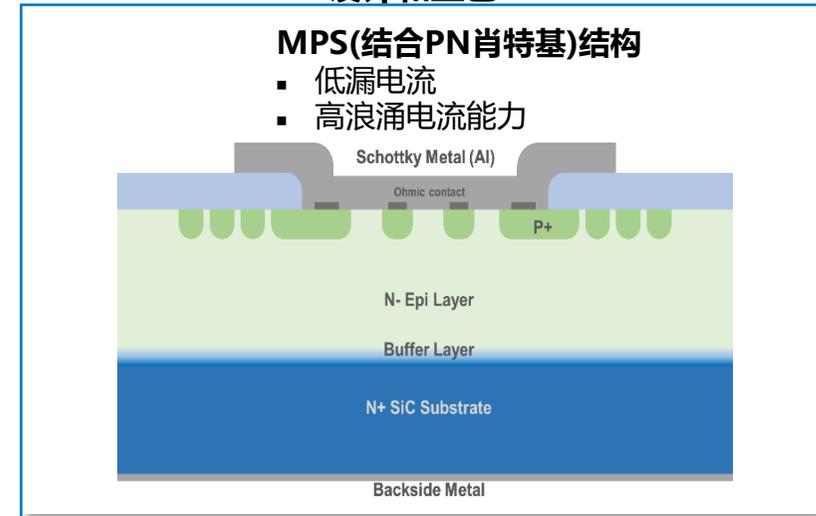
## ■ 工艺特点

- ✓ 高质量的肖特基结
  - 低正向导通压降和低漏电流
- ✓ 优化 MPS 单元设计
  - 高耐压能力, 同时低正向压降
  - 高抗浪涌电流能力
- ✓ 外延层和缓冲层结构设计
  - 高可靠的耐压能力
  - 优异鲁棒性
- ✓ 晶圆减薄工艺 (第二代计划)
  - 实现低热阻, 低导通正向压降

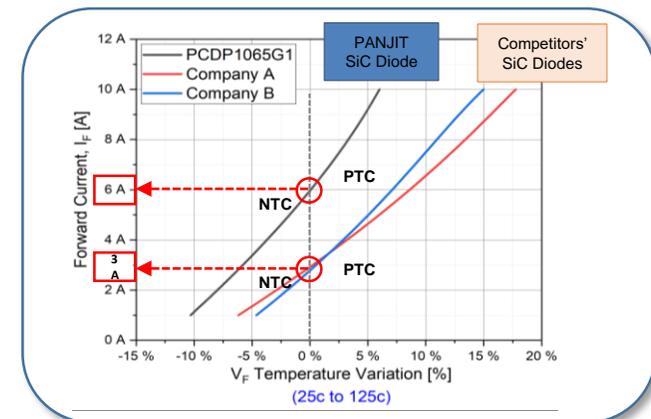
## ■ 产品优势

- 低正向导通压降
- 低反向漏电流
- 高浪涌电流能力
- 结温  $T_j 175^{\circ}\text{C}$

## 高性能SiC二极管的设计和工艺



## 温度系数



\* PTC : Positive Temperature Coefficient  
\* NTC : Negative Temperature Coefficient

# Benchmark (产品对比)

SiC Diode 600V, 650V / 10A

Manufacture		PANJIT	Company R	Company C	Company I	Unit
P/N		650V / 10A	650V / 10A	600V / 10A	600V / 10A	-
VF	IF = 5A, 25°C	1.22	1.22	1.23	1.42	V
	IF = 5A, 125°C	 1.22	1.57	1.32	1.50	V
	IF = 10A, 25°C	1.51	1.45	1.53	1.80	V
	IF = 10A, 125°C	1.60	 1.57	1.79	2.04	V
QC	10A, 400V, 500A/us	51	49	50	46	nC
E <sub>ON</sub> (with 650V IGBT)	5A / 10A @ 400V, 25°C	126 / 264	126 / 267	126 u / 266	129 / 253	uJ
	5A / 10A @ 400V, 125°C	129 / 271	132 / 276	134 / 263	126 / 272	uJ
IFSM	10us, 25°C	600	300	1400	700	A
	10ms, 25°C	50	40	 90	70	A
IFRM	Square, 10ms, D=0.01, 1000cyc	40	35	60	50	A
EAS	L=10uH	60	6	 67	61	mJ

■ 动态参数:

- VF—正向导通电压
- IFSM—最大正向峰值浪涌电流
- Eon—开通功耗
- IFRM—正向重复峰值电流
- EAS—单脉冲雪崩能量



# Target market (目标市场)

## Consumer & Power Supply



Power Supply



Quick Charger



Consumer Electronics



Telecom / Server Power

## Automotive



OBC



DC/DC Converter



HV ISG



Traction Inverter



EV Charging Pile

Gen.1 Target

Gen.2 Target

Gen.3 Target

## Industrial



PV Inverter



UPS



ESS



Industrial Motor

## Industrial (>1700V)



Rail Transportation



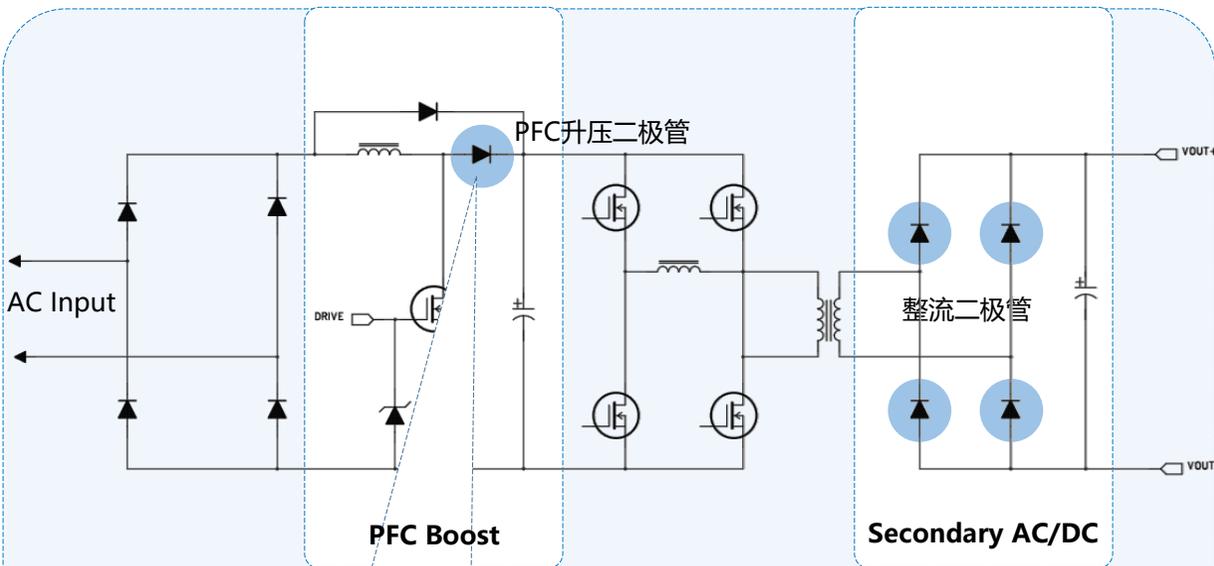
Power Grid



Wind Power

# Typical application (典型应用)

## 应用电路



### 特点:

- 高功率密度
- 优异开关特性, LOW TRR/QRR
- 高效率, 低VF值, 低导通损耗

**工业电源应用电路**

## 应用推荐

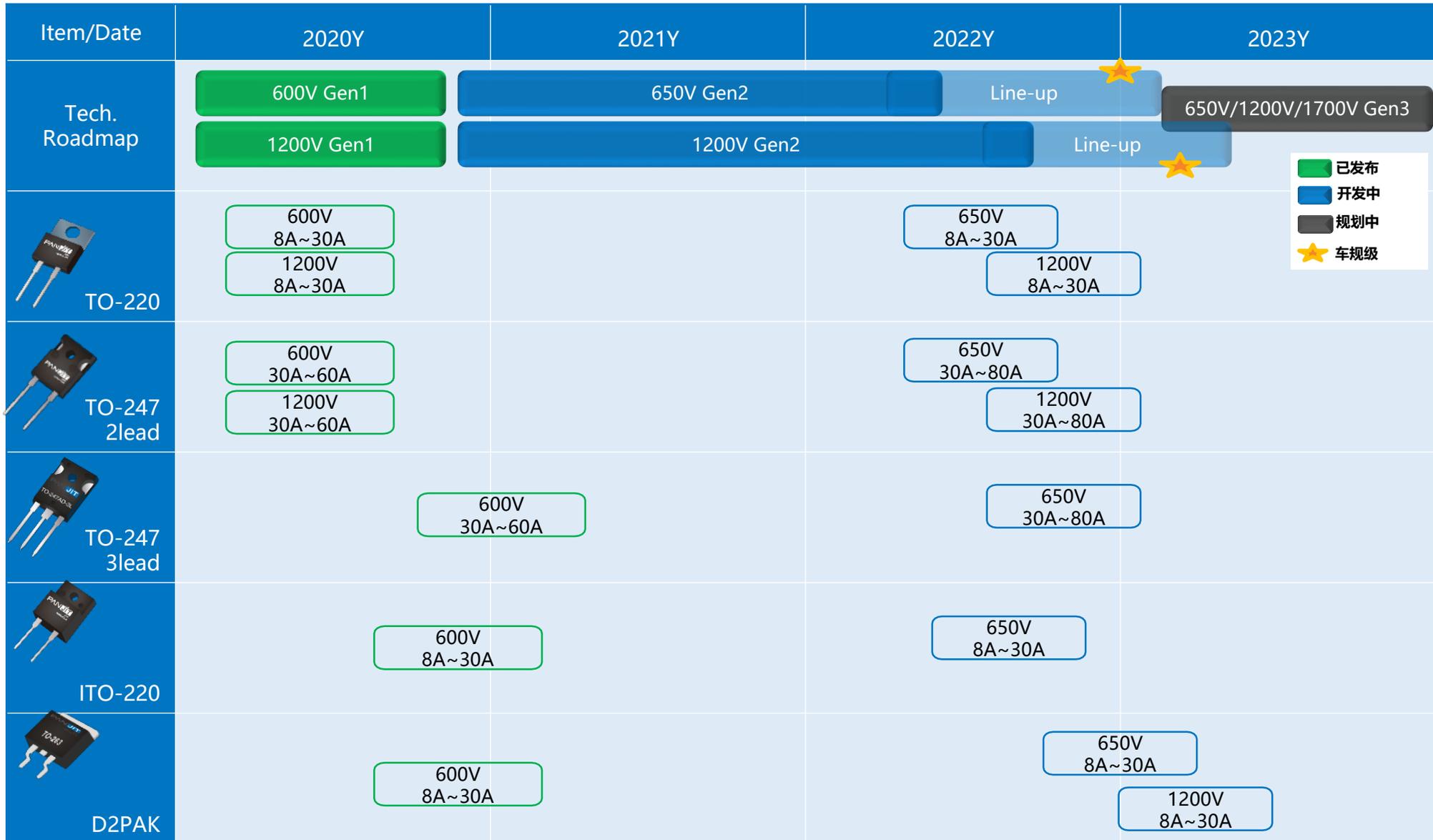
系列	推荐型号	VRRM (V)	IF(A)	封装
SiC Diode650V	PCD(X)0465G1	650	4	TO-220AC D2PAK TO-252
	PCD(X)0665G1	650	6	TO-220AC D2PAK TO-252
	PCD(X)0865G1	650	8	TO-220AC D2PAK TO-252
	PCD(X)1065G1	650	10	TO-220AC D2PAK TO-252
	PCDP1265G1	650	12	TO-220AC
	PCDP1665G1	650	16	TO-220AC
	PCDP2065G1	650	20	TO-220AC
	PCDP0465G1	650	4	TO-220AC
SiC Diode1200V	PCDP05120G1	1200	5	TO-220AC D2PAK
	PCDP08120G1	1200	8	TO-220AC D2PAK
	PCDP10120G1	1200	10	TO-220AC D2PAK
	PCDP15120G1	1200	15	TO-220AC D2PAK
	PCDP20120G1	1200	20	TO-220AC D2PAK

# FRED Diode

- ✓ Product Road Map (产品规划)
- ✓ Product List (产品清单)
- ✓ Characteristics & Benchmark (工艺特点&产品对比)
- ✓ Target market (目标市场)
- ✓ Typical application (典型应用)



# Product Road Map (产品规划)



# Product List (产品清单)

Product Family	Product ID	VRRM (V)	IF(A)	VF(V)	Trr(ns)	封装	样品	规格书	ERP料号	交期 (Wafer Time + PKG Time)
600V FREDSpeedy (Low Trr)	PSDP0860S1	600	8	1.8	35	TO-220AC	V	V	V	20周+4周
	PSDP1560S1	600	15	1.8	42	TO-220AC	V	V	V	20周+4周
	PSDP3060S1	600	30	1.8	45	TO-220AC	V	V	V	20周+4周
	PSDH3060S1	600	30	1.8	45	TO-247AD-2LD	V	V	V	20周+4周
	PSDH6060S1	600	60	1.65	55	TO-247AD-2LD	V	V	V	20周+4周
	PSDH3060CCS1	600	30	1.8	42	TO-247AD-3LD	V	V	V	20周+4周
	PSDH6060CCS	600	60	1.8	45	TO-247AD-3LD	V	V	V	20周+4周
	PSDF0860S1	600	8	1.8	35	ITO-220AC	V	V	V	20周+4周
	PSDF1560S1	600	15	1.8	42	ITO-220AC	V	V	V	20周+4周
	PSDF3060S1	600	30	1.8	45	ITO-220AC	V	V	V	20周+4周
	PSDB0860S1	600	8	1.8	35	D2PAK	V	V	V	20周+4周
	PSDB1560S1	600	15	1.8	42	D2PAK	V	V	V	20周+4周
	PSDB3060S1	600	30	1.8	45	D2PAK	V	V	V	20周+4周
600V FREDOptima (Low Vf)	PSDP0860L1	600	8	1.3	60	TO-220AC	V	V	V	20周+4周
	PSDP1560L1	600	15	1.3	70	TO-220AC	V	V	V	20周+4周
	PSDP3060L1	600	30	1.3	75	TO-220AC	V	V	V	20周+4周
	PSDH3060L1	600	30	1.3	75	TO-247AD-2LD	V	V	V	20周+4周
	PSDH6060L1	600	60	1.25	135	TO-247AD-2LD	V	V	V	20周+4周
	PSDH3060CCL1	600	30	1.3	70	TO-247AD-3LD	V	V	V	20周+4周
	PSDH6060CCL1	600	60	1.3	75	TO-247AD-3LD	V	V	V	20周+4周
	PSDF0860L1	600	8	1.3	60	ITO-220AC	V	V	V	20周+4周
	PSDF1560L1	600	15	1.3	70	ITO-220AC	V	V	V	20周+4周
	PSDF3060L1	600	30	1.3	75	ITO-220AC	-	V	V	20周+4周
	PSDB0860L1	600	8	1.3	60	D2PAK	-	V	V	20周+4周
	PSDB1560L1	600	15	1.3	70	D2PAK	-	V	V	20周+4周
	PSDB3060L1	600	30	1.3	75	D2PAK	-	V	V	20周+4周

# Product List (产品清单)

Product Family	Product ID	VRRM (V)	IF(A)	VF(V)	Trr(ns)	封装	样品	规格书	ERP料号	交期 (Wafer Time + PKG Time)
1000V FREDSpeedy (Low Trr)	PSDH30100S1	1000	30	2.65	95	TO-247AD-2LD	V	V	V	20周+4周
1200V FREDSpeedy (Low Trr)	PSDP08120S1	1200	8	3	45	TO-220AC	V	V	V	20周+4周
	PSDP15120S1	1200	15	3	70	TO-220AC	V	V	V	20周+4周
	PSDP30120S1	1200	30	3	135	TO-220AC	V	V	V	20周+4周
	PSDH30120S1	1200	30	3	135	TO-247AD-2LD	V	V	V	20周+4周
	PSDH60120S1	1200	60	2.7	170	TO-247AD-2LD	V	V	V	20周+4周
1200V FREDOptima (Low Vf)	PSDP08120L1	1200	8	2.1	70	TO-220AC	V	V	V	20周+4周
	PSDP15120L1	1200	15	2.1	105	TO-220AC	V	V	V	20周+4周
	PSDP30120L1	1200	30	2.1	160	TO-220AC	V	V	V	20周+4周
	PSDH30120L1	1200	30	2.1	160	TO-247AD-2LD	V	V	V	20周+4周
	PSDH60120L1	1200	60	2	220	TO-247AD-2LD	V	V	V	20周+4周

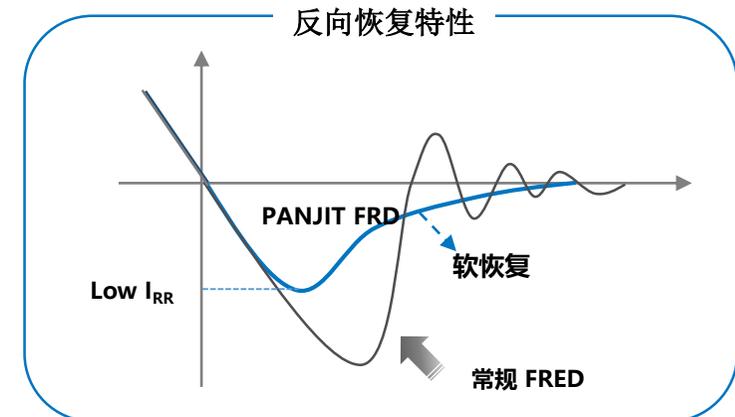
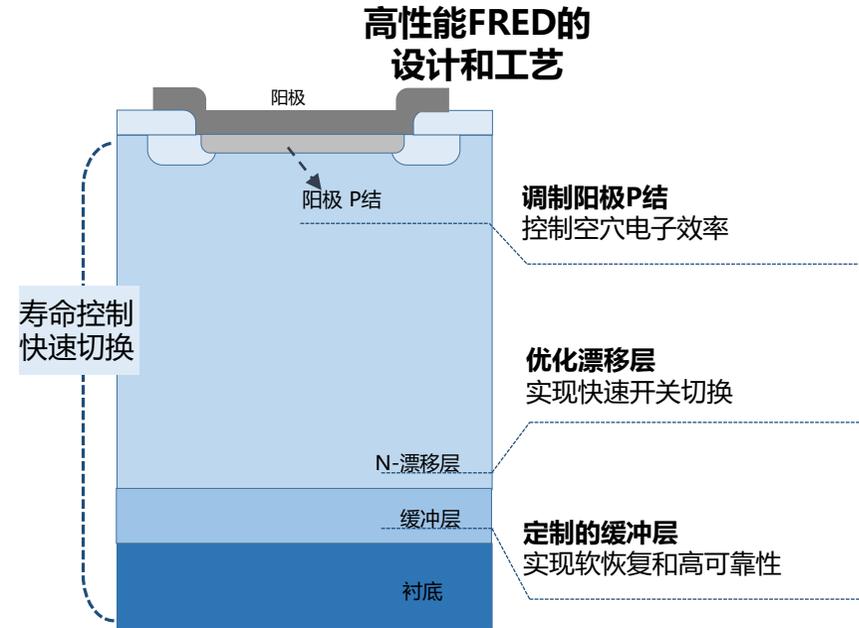


## ■ 工艺特点

- ✓ **可控阳极**
  - 调制空穴注入效率降低VF值
  - 保证优秀的开关特性同时具有低正向导通压降
- ✓ **优化载流子寿命控制技术**
  - 确保快速开关切换应用要求
- ✓ **漂移层和缓冲层设计保证卓越的开关切换**
  - 实现软恢复，更好的EMI表现
  - 优异鲁棒性
- ✓ **可靠的截止能力**

## ■ 产品优势

- Low  $Q_{rr}$  (反向恢复电荷) 和 Low  $T_{rr}$  (反向恢复时间)
- 低反向漏电流  $I_R$
- 软恢复特性，避免振荡和误动作



# Benchmark (产品对比)

## FRED 650V / 8A

Manufacture		PANJIT	Company S	Unit
P/N		PSDP0860S1	Sxxx8x06x	-
150W CCM Boost Converter	Efficiency	94.702% @ 150W / 94.236% @ 113W 93.678% @ 75W / 88.129% @ 15W	94.810% @ 150W / 94.276% @ 113W 93.646% @ 75W / 88.031 @ 15W	-
	Thermal Performance @ 150W	55.8°C @ Diode / 51.9°C @ MOSFET	56.2°C @ Diode / 51.1°C @ MOSFET	-
	VF	IF = 4A, 25°C IF = 4A, 125°C IF = 8A, 25°C IF = 8A, 125°C	1.61 1.21 1.84 1.44	2.06 1.40 2.57 1.81
I <sub>R</sub>	600V, 125°C	2.96	5.06	uA
Q <sub>rr</sub>	di/dt = 1000A/us, 25°C, 8A, 400V	139	92	nC
EON	R <sub>g</sub> =4.7ohm, 25°C, 8A, 400V	163	146	uJ
Oscillation	T <sub>j</sub> = 125c	Less than Sxxx8x06x	Much severe than PSDP0860S1	-
IFSM	10ms, 25°C, Square wave	100	90	A
IFRM	Square, 10ms, D=0.05, 1000cyc	70	70	A
I <sup>2</sup> t	10ms square wave	100	81	A <sup>2</sup> s
UIS	10uH / 300uH	0.19 / 4.10	0.08 / 0.66	mJ

- 动态参数:
  - VF—正向导通电压
  - IR—反向漏电流
  - Qrr—恢复电荷
  - Eon—开通功耗
  - IFSM—最大正向峰值浪涌电流
  - IFRM—正向重复峰值电流
  - I<sup>2</sup>t—瞬间电流耐受量
  - UIS—雪崩能量

# Target market (目标市场)

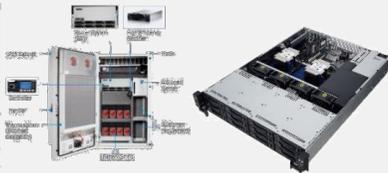
## Consumer & Power Supply



Consumer Electronics



Power Supply



Telecom / Server Power

## Industrial



PV Inverter



UPS



ESS



EV Charging Pile



Industrial Motor

## Automotive



OBC



DC/DC Converter



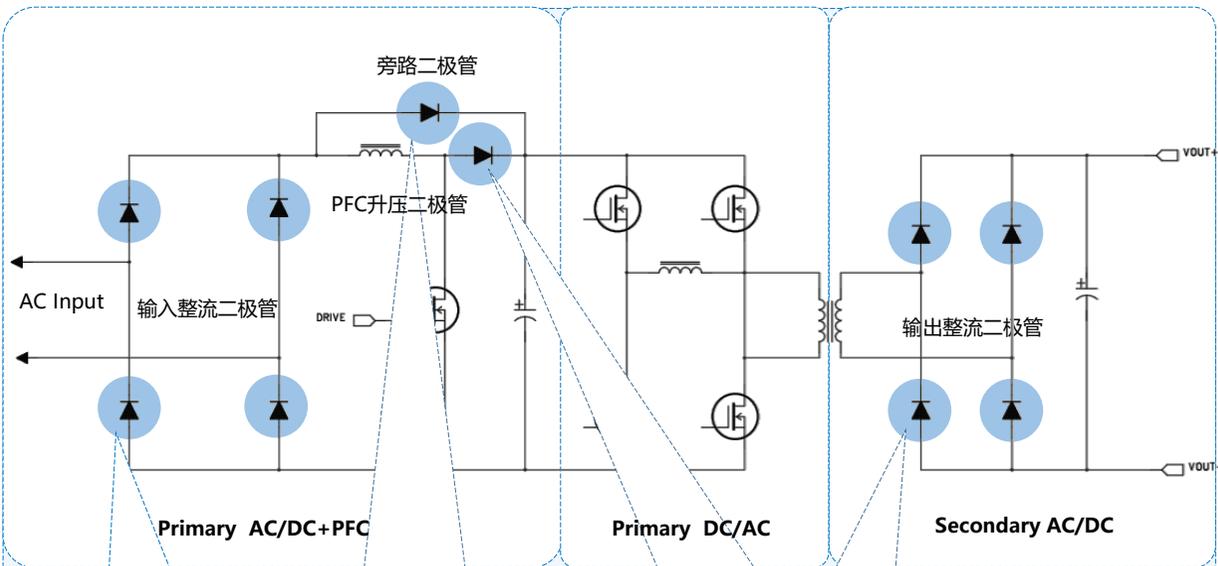
DC/AC Inverter

Gen.1 Target

Gen.2 Target

# Typical application (典型应用)

## 应用电路



电源应用电路

### 特点:

- 输入整流二极管&旁路二极管低VF, 减少导通损耗
- 强的浪涌承受能力

### 特点:

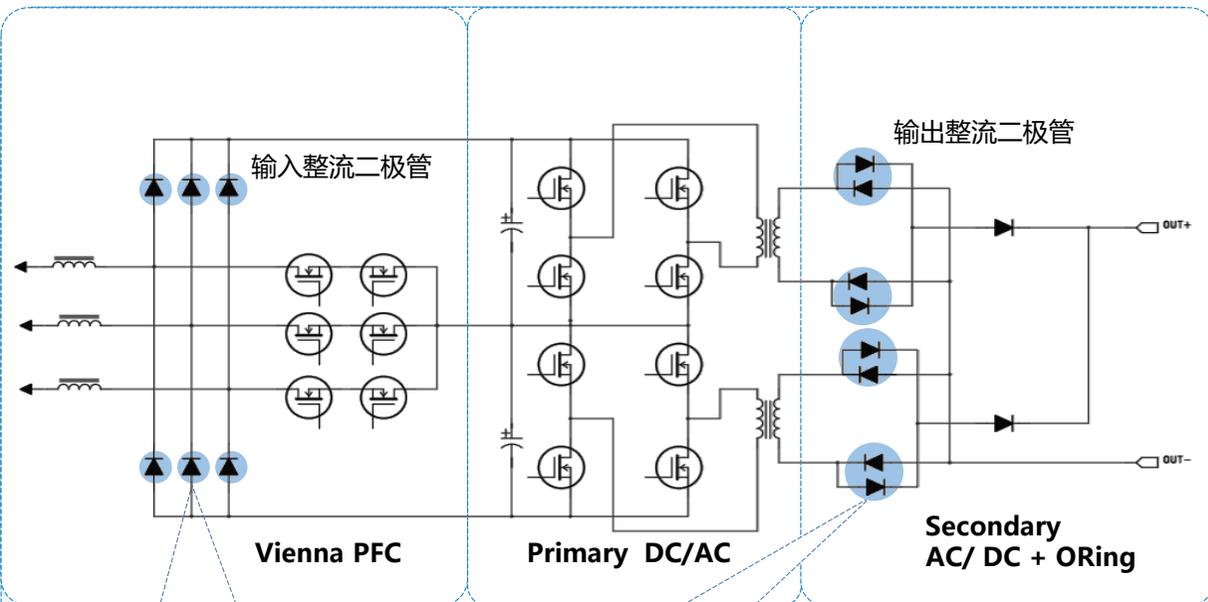
- 输出整流二极管&PFC升压二极管低Low Trr, 减少开关损耗
- 优异开关特性
- 软恢复, 优异EMI表现

## 应用推荐

系列	推荐型号	VRRM (V)	IF(A)	封装
600V/1000V /1200V FRED Speedy (Low Trr)	PSDP0860S1	600	8	TO-220AC
	PSDP1560S1	600	15	TO-220AC
	PSDP3060S1	600	30	TO-220AC
	PSDH3060S1	600	30	TO-247-2L
	PSDH6060S1	600	60	TO-247-2L
	PSDH30100S1	1000	30	TO-247-2L
	PSDP08120S1	1200	8	TO-220AC
	PSDP15120S1	1200	15	TO-220AC
	PSDP30120S1	1200	30	TO-220AC
	PSDH30120S1	1200	30	TO-247-2L
600V /1200V FRED Optima (Low Vf)	PSDH60120S1	1200	60	TO-247-2L
	PSDP0860L1	600	8	TO-220AC
	PSDP1560L1	600	15	TO-220AC
	PSDP3060L1	600	30	TO-220AC
	PSDH3060L1	600	30	TO-247-2L
	PSDH6060L1	600	60	TO-247-2L
	PSDP08120L1	1200	8	TO-220AC
	PSDP15120L1	1200	15	TO-220AC
	PSDP30120L1	1200	30	TO-220AC
	PSDP30120L1	1200	30	TO-247-2L
PSDH60120L1	1200	60	TO-247-2L	

# Typical application (典型应用)

## 应用电路



### 特点:

- 初级&次级整流二极管低QRR/低VF, 低开关损耗和导通损耗
- 优异开关特性, 反向软恢复特性, 优异EMI表现

### 充电桩应用电路

## 应用推荐

系列	推荐型号	VRRM (V)	IF(A)	封装
1000V /1200V FRED Speedy (Low Trr)	PSDH30100S1	1000	30	TO-247-2L
	PSDP30120S1	1200	30	TO-220AC
	PSDH30120S1	1200	30	TO-247-2L
	PSDH60120S1	1200	60	TO-247-2L
600V FRED Speedy (Low Trr)	PSDP3060S1	600	30	TO-220AC
	PSDH3060S1	600	30	TO-247-2L
	PSDH6060S1	600	60	TO-247-2L
	PSDH3060CCS1	600	30	TO-247-3L
	PSDH6060CCS	600	60	TO-247-3L
	PSDF3060S1	600	30	ITO-220AC
	PSDB3060S1	600	30	D2PAK
1000V /1200V FRED Speedy (Low Trr)	PSDH30100S1	1000	30	TO-247-2L
	PSDP30120S1	1200	30	TO-220AC
	PSDH30120S1	1200	30	TO-247-2L
	PSDH60120S1	1200	60	TO-247-2L

# H-Type Schottky Diode

- ✓ Product Road Map (产品规划)
- ✓ Product List (产品清单)
- ✓ Characteristics & Benchmark (工艺特点&产品对比)
- ✓ Target market (目标市场)
- ✓ Typical application (典型应用)



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[www.panjit.com.cn](http://www.panjit.com.cn)

# Product Road Map (产品规划)

Item/Date	2020Y	2021Y	2022Y	
60V 1A-15A	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; background-color: #008000; color: white; padding: 2px;">3A SMAF-C/AU</div> <div style="border: 1px solid black; background-color: #008000; color: white; padding: 2px;">1A SOD-123FL/AU</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <div style="border: 1px solid black; background-color: #008000; color: white; padding: 2px;">5A SMAF-C/AU</div> <div style="border: 1px solid black; background-color: #008000; color: white; padding: 2px;">2A SOD-123FL/AU</div> </div>	<div style="border: 1px solid black; background-color: #008000; color: white; padding: 2px; margin: 10px auto; width: 100px;">5A/10A/15A TO-277C</div>	<div style="text-align: center;">★</div> <div style="border: 1px solid black; background-color: #ADD8E6; padding: 5px; display: inline-block;">Line-up</div>	
120V 1A-15A		<div style="border: 1px solid black; background-color: #000080; color: white; padding: 2px; margin: 5px auto; width: 100px;">1A/3A SMBF</div> <div style="border: 1px solid black; background-color: #000080; color: white; padding: 2px; margin: 5px auto; width: 100px;">1A/3A SMAF-C</div>	<div style="border: 1px solid black; background-color: #000080; color: white; padding: 2px; margin: 5px auto; width: 100px;">5A/10A/15A TO-220AB</div> <div style="border: 1px solid black; background-color: #000080; color: white; padding: 2px; margin: 5px auto; width: 100px;">5A/10A 277C</div>	<div style="text-align: center;">★</div> <div style="border: 1px solid black; background-color: #ADD8E6; padding: 5px; display: inline-block;">Line-up</div>
150V 1A~30A	<div style="border: 1px solid black; background-color: #008000; color: white; padding: 2px; margin: 10px auto; width: 200px;">SMA/SMB/DO-41/TO-220AB/ITO-220AB</div>	<div style="border: 1px solid black; background-color: #000080; color: white; padding: 2px; margin: 10px auto; width: 100px;">5A/10A TO-277C</div>	<div style="text-align: center;">★</div> <div style="border: 1px solid black; background-color: #ADD8E6; padding: 5px; display: inline-block;">Line-up</div>	
200V 1A~15A			<div style="border: 1px solid black; background-color: #000080; color: white; padding: 2px; margin: 5px auto; width: 150px;">1A~3A SMBF</div> <div style="border: 1px solid black; background-color: #000080; color: white; padding: 2px; margin: 5px auto; width: 150px;">1A~3A SMAF-C</div> <div style="border: 1px solid black; background-color: #000080; color: white; padding: 2px; margin: 5px auto; width: 150px;">5A/10A/15A 277C</div>	<div style="text-align: center;">★</div> <div style="border: 1px solid black; background-color: #ADD8E6; padding: 5px; display: inline-block;">Line-up</div>

- 已发布
- 开发中
- 规划中
- 车规级

# Product List (产品清单)

Product Family	Product ID	IF (A)	VF (V)	IR (uA)	封装	样品	规格书	ERP料号	交期 (Wafer Time + PKG Time)
60V 1A-15A	MB1H60AL	1	0.75	3	SOD-123FL	V	V	Sep.2021	12周+4周
	MB2H60AL	2	0.75	3	SOD-123FL	V	V	V	12周+4周
	MB3H60AH	3	0.75	5	SOD-123HE	V	V	Sep.2021	12周+4周
	MBR3H60MB	3	0.7	5	SMB	V	V	V	12周+4周
	MBR3H60AFC	3	0.75	5	SMAF-C	V	V	V	12周+4周
	MBR5H60AFC	5	0.75	5	SMAF-C	V	V	V	12周+4周
	MBR5H60PC	5	0.75	5	TO-277C	-	V	Dec.2021	12周+4周
	MBR10H60PC	10	0.75	5	TO-277C	-	V	Dec.2021	12周+4周
	MBR15H60PC	15	0.75	5	TO-277C	-	V	Dec.2021	12周+4周
120V 2A-20A	MBR2H120AFC	2	0.88	1	SMAF-C	-	Sep.2021	Dec.2021	12周+4周
	MBR6H120AFC	6	0.87	1	SMAF-C	Sep.2021	Sep.2021	Dec.2021	12周+4周
	MBR2H120BF	2	0.87	1	SMBF	Sep.2021	Sep.2021	Dec.2021	12周+4周
	MBR6H120BF	6	0.87	1	SMBF	-	Sep.2021	Dec.2021	12周+4周
	MBR8H120PC	8	0.87	1	TO-277C	-	Sep.2021	Dec.2021	12周+4周
	MBR15H120PC	15	0.87	1	TO-277C	-	Sep.2021	Dec.2021	12周+4周
	MBR20H120PC	20	0.87	3	TO-277C	-	Sep.2021	Dec.2021	12周+4周
	MBR8H120YT	8	0.87	1	TO-220AB	Sep.2021	Sep.2021	Dec.2021	12周+4周
	MBR15H120YT	15	0.87	1	TO-220AB	-	Sep.2021	Dec.2021	12周+4周
	MBR20H120YT	20	0.87	3	TO-220AB	-	Sep.2021	Dec.2021	12周+4周
	MBR8H120FYT	8	0.87	1	ITO-220AB	-	Sep.2021	Dec.2021	12周+4周
	MBR15H120FYT	15	0.87	1	ITO-220AB	-	Sep.2021	Dec.2021	12周+4周
MBR20H120FYT	20	0.87	3	ITO-220AB	Sep.2021	Sep.2021	Dec.2021	12周+4周	

# Product List (产品清单)

Product Family	Product ID	IF (A)	VF (V)	IR (uA)	封装	样品	规格书	ERP料号	交期 (Wafer Time + PKG Time)
150V 1A~30A	BD10H150CS	10	0.85	0.5	TO-252	V	V	V	12周+4周
	MBR10H150CT	10	0.85	0.5	TO-220AB	V	V	V	12周+4周
	MBR10H150DC	10	0.85	0.5	TO-263	V	V	V	12周+4周
	MBR10H150FCT	10	0.85	0.5	ITO-220AB	V	V	V	12周+4周
	MBR1H150	1	0.85	0.5	DO-41	V	V	V	12周+4周
	MBR20H150CT	20	0.85	0.55	TO-220AB	V	V	V	12周+4周
	MBR20H150DC	20	0.85	0.55	TO-263	V	V	V	12周+4周
	MBR20H150FAT	20	0.85	0.55	ITO-220AB	V	V	V	12周+4周
	MBR20H150FCT	20	0.85	0.55	ITO-220AB	V	V	V	12周+4周
	MBR20H150YD	20	0.9	0.8	TO-252AA	V	V	V	12周+4周
	MBR30H150CT	30	0.85	0.8	TO-220AB	V	V	V	12周+4周
	MBR30H150DC	30	0.85	0.8	TO-263	V	V	V	12周+4周
	MBR30H150FCT	30	0.85	0.8	ITO-220AB	V	V	V	12周+4周
	MBR3H150SS	3	0.85	0.5	DO-201AD	V	V	V	12周+4周
	MBR5H150SS	5	0.85	0.5	DO-201AD	V	V	V	12周+4周
	SR5H15	5	0.85	0.5	SMB	V	V	V	12周+4周
	SX1H15	1	0.85	0.5	SMA	V	V	V	12周+4周
SX3H15	3	0.85	0.5	SMA	V	V	V	12周+4周	

## ■ 工艺特点

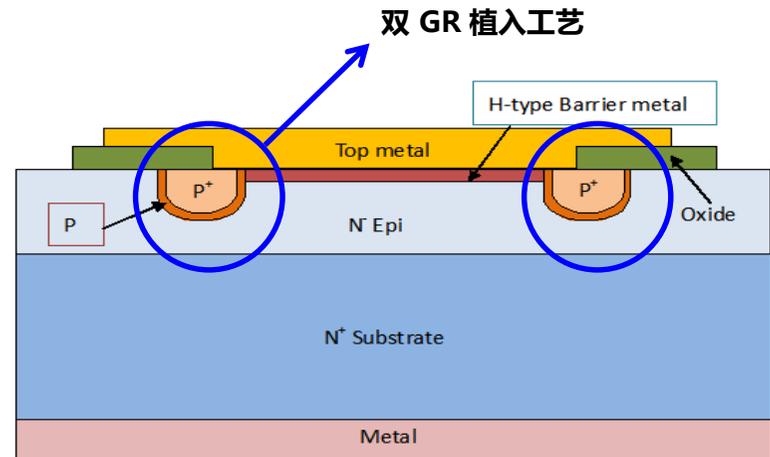
- ✓ 高质量的肖特基势垒金属
  - 超低漏电流、高可靠性
- ✓ 双GR边缘终端设计
  - 更强的截止能力，高可靠性

## ■ 产品优势

- 超低反向漏电流
- 高抗浪涌电流能力
- 优异的鲁棒性
- 结温 达 $T_j 175^{\circ}\text{C}$

## 高性能H-Type Schottky二极管的设计和工艺

- 优化反向漏电流IR  
 $IR(\text{type}) < 1\text{mA}$  at  $T_J = 125^{\circ}\text{C}$ , 高温下反向损耗低
- 功率损耗  
 $P_d = (I_{\text{avg}} * V_f) + (V_R * I_R) * \text{Duty}$   
材料工作在高温下，反向漏电流IR也会较大，可以通过改进高温下IR降低反向功率损耗，提升系统效率和材料的可靠性



# Benchmark (产品对比)

## 3A /60V H-TYPE Schottky VS Traditional Schottky

Manufacture		Schottky	H-Schottky
P/N		SB36AFC-AU	MBR3H60AFC-AU
VRRM		60V	60V
IF		3A	3A
IFSM	8.3ms正弦半波	80A	80A
VF	IF = 3 A, TJ = 25°C Typ	0.6V	0.66V
	IF = 3 A, TJ = 125°C Typ	0.56V	0.56V
IR	VR = 60 V, TJ = 25 °C	100uA	 5uA
	VR = 60 V, TJ = 125 °C	6000uA	 比常规品降低30倍 200uA
CJ	1MHZ,VR=4V	125pF	150pF
Tj		150°C	 175°C

- 动态参数:
  - VRRM—反向峰值电压
  - IF—正向电流
  - IFSM—最大正向峰值浪涌电流
  - VF—正向电压
  - IR—逆向电流
  - CJ—结电容
  - Tj—最大结温度

LED 照明Power



车灯



AC to DC  
开关电源

工业Power

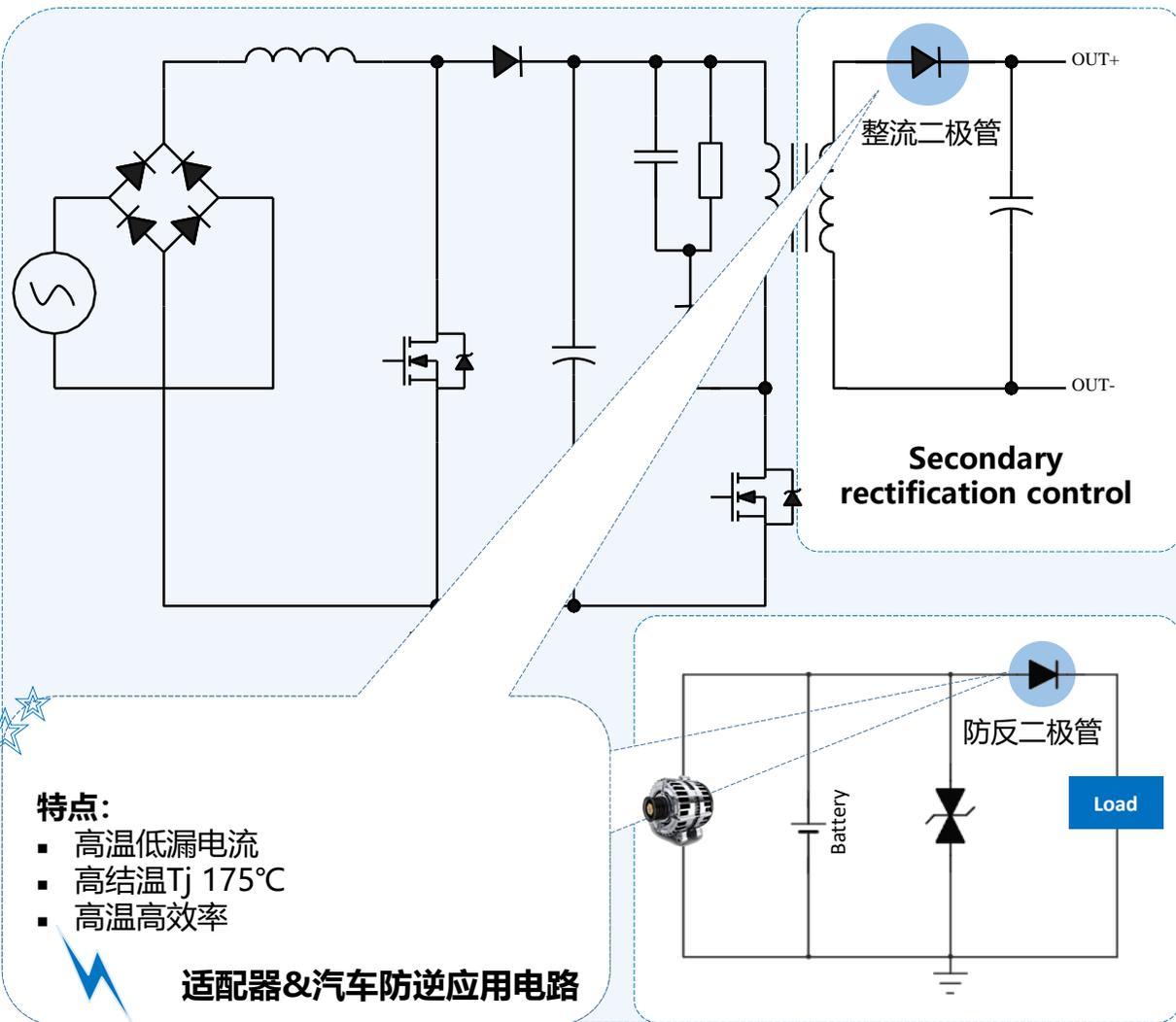


适配器



# Typical application (典型应用)

## 应用电路



## 应用推荐

推荐型号	VRRM (V)	IF (A)	封装
MBR5H60AFC	60	5	SMAF-C
MBR5H60PC	60	5	TO-277C
MBR10H60PC	60	10	TO-277C
MBR15H60PC	60	15	TO-277C
MBR5H60YT	60	5	TO-220AB
MBR10H60YT	60	10	TO-220AB
MBR15H60YT	60	15	TO-220AB
MBR5H60FYT	60	5	ITO-220AB
MBR10H60FYT	60	10	ITO-220AB
MBR15H60FYT	60	15	ITO-220AB
MBR5H120PC	120	5	TO-277C
MBR10H120PC	120	10	TO-277C
MBR15H120PC	120	15	TO-277C
MBR5H120YT	120	5	TO-220AB
MBR10H120YT	120	10	TO-220AB
MBR15H120YT	120	15	TO-220AB
MBR5H120FYT	120	5	ITO-220AB
MBR10H120FYT	120	10	ITO-220AB
MBR15H120FYT	120	15	ITO-220AB

# D-Series LV MOSFET

- ✓ Product Road Map (产品规划)
- ✓ Product List (产品清单)
- ✓ Characteristics & Benchmark (工艺特点&产品对比)
- ✓ Target market (目标市场)
- ✓ Typical application (典型应用)



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# Product Road Map (产品规划)

Item/Date	2018Y	2019Y	2020Y	2021Y	2022Y	
LV MOSFET	<p><b>N-Channel</b> Single &amp; Dual &amp; Complementary 30V: Rds(on) &gt; 1.6mΩ 40V: Rds(on) &gt; 3.8mΩ 60V: Rds(on) &gt; 8mΩ 100V: Rds(on) &gt; 12mΩ</p>		<p>D Series, P-ch -20V advance</p>			<p>D Series, N-ch 20V advance</p>
	<p><b>P-Channel</b> Single &amp; Dual &amp; Complementary 30V: Rds(on) &gt; 3.3mΩ 40V: Rds(on) &gt; 7.6mΩ 60V: Rds(on) &gt; 48mΩ 100V: Rds(on) &gt; 110mΩ</p>		<p>D Series, N-ch 30V advance G2</p>		<p>D Series, P-ch -30V w/ESD</p>	
Package	<p>SOP-8 DFN3333-8L DFN5060-8L TO-252AA</p>	<p>SOP-8 Dual DFN3030B-8L DFN5060B-8L TO-220/ITO-220AB</p>	<p>DFN1006-3L DFN1010B-6L</p>	<p>DFN1010B-6L</p>		

■ 已发布  
■ 开发中  
■ 规划中

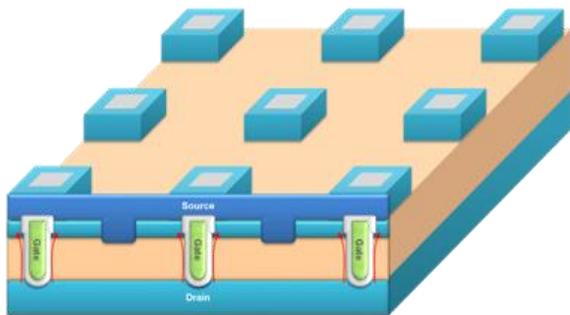
# Product List (产品清单)

Product Family	Product ID	VDS(V)	Rds(typ) @10V (m ohm)	Rds(typ) @4.5V (m ohm)	封装	样品	规格书	ERP料号	交期 (Wafer Time + PKG Time)
D Series P-ch -20V	PJA3459	-20	-	17	SOT-23	-	-	-	SPC统一资源分配
	PJS6419	-20	-	17	SOT-23 6L	-	-	-	SPC统一资源分配
	PJS6423	-20	-	11	SOT-23 6L	-	-	-	SPC统一资源分配
	PJS6425	-20	-	8.5	SOT-23 6L	-	-	-	SPC统一资源分配
	PJQ2421D	-20	-	17	DFN2020B-6L	V	-	-	SPC统一资源分配
	PJQ2423D	-20	-	11	DFN2020B-6L	-	-	-	SPC统一资源分配
	PJQ2425D	-20	-	8.5	DFN2020B-6L	V	-	-	SPC统一资源分配
	PJQ4421DP	-20	-	17	DFN3333-8L	-	-	-	SPC统一资源分配
	PJQ4423DP	-20	-	11	DFN3333-8L	V	V	V	SPC统一资源分配
	PJQ4425DP	-20	-	8.5	DFN3333-8L	V	V	V	SPC统一资源分配
	PJQ4427DP	-20	-	5.8	DFN3333-8L	V	V	V	SPC统一资源分配
D Series N-ch 30V	PJQ4532P	30	3.5 (max)	-	DFN3333-8L	V	V	-	SPC统一资源分配
	PJQ4524P	30	4.4 (max)	-	DFN3333-8L	V	V	-	SPC统一资源分配
	PJQ4526P	30	5.9 (max)	-	DFN3333-8L	V	V	-	SPC统一资源分配
	PJQ4528P	30	6.3 (max)	-	DFN3333-8L	V	-	-	SPC统一资源分配
	PJQ4530P	30	8.3 (max)	-	DFN3333-8L	V	V	-	SPC统一资源分配
	PJQ5532	30	2.5 (max)	-	DFN5060-8L	V	V	-	SPC统一资源分配
	PJQ5524	30	4 (max)	-	DFN5060-8L	V	V	-	SPC统一资源分配
	PJQ5526	30	4.8 (max)	-	DFN5060-8L	V	-	-	SPC统一资源分配
	PJQ5528	30	5.6 (max)	-	DFN5060-8L	V	-	-	SPC统一资源分配
	PJQ5530	30	6.7 (max)	-	DFN5060-8L	V	V	-	SPC统一资源分配

# Product List (产品清单)

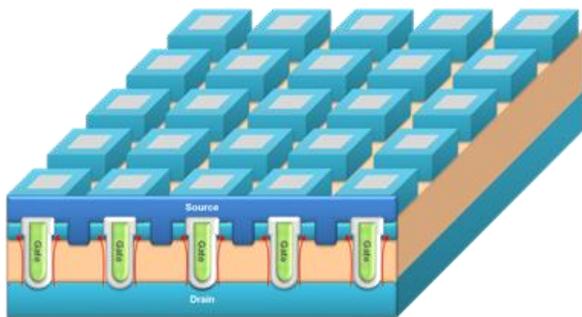
Product Family	Product ID	VDS(V)	Rds(typ) @10V (m ohm)	Rds(typ) @4.5V (m ohm)	封装	样品	规格书	ERP料号	交期 (Wafer Time + PKG Time)
D Series P-ch -30V with ESD	PJA3409E	-30	75	115	SOT-23	V	V	2021/Q3	SPC统一资源分配
	PJA3407E	-30	42	60	SOT-23	V	V	2021/Q3	SPC统一资源分配
	PJS6435E	-30	32	45	SOT-23 6L	-	-	-	SPC统一资源分配
	PJS6433E	-30	24	33	SOT-23 6L	-	-	-	SPC统一资源分配
V Series N-ch 40V STD	PJQ4548VP-AU	40	9.5	-	DFN3333-8L	-	-	-	SPC统一资源分配
	PJQ5548V-AU	40	9.5	-	DFN5060-8L	V	V	2021/Q4	SPC统一资源分配
	PJQ5544V-AU	40	3	-	DFN5060-8L	V	V	2021/Q3	SPC统一资源分配
	PJQ5540V-AU	40	1.7	-	DFN5060-8L	V	V	2021/Q3	SPC统一资源分配

# Technological Characteristics (工艺特点)



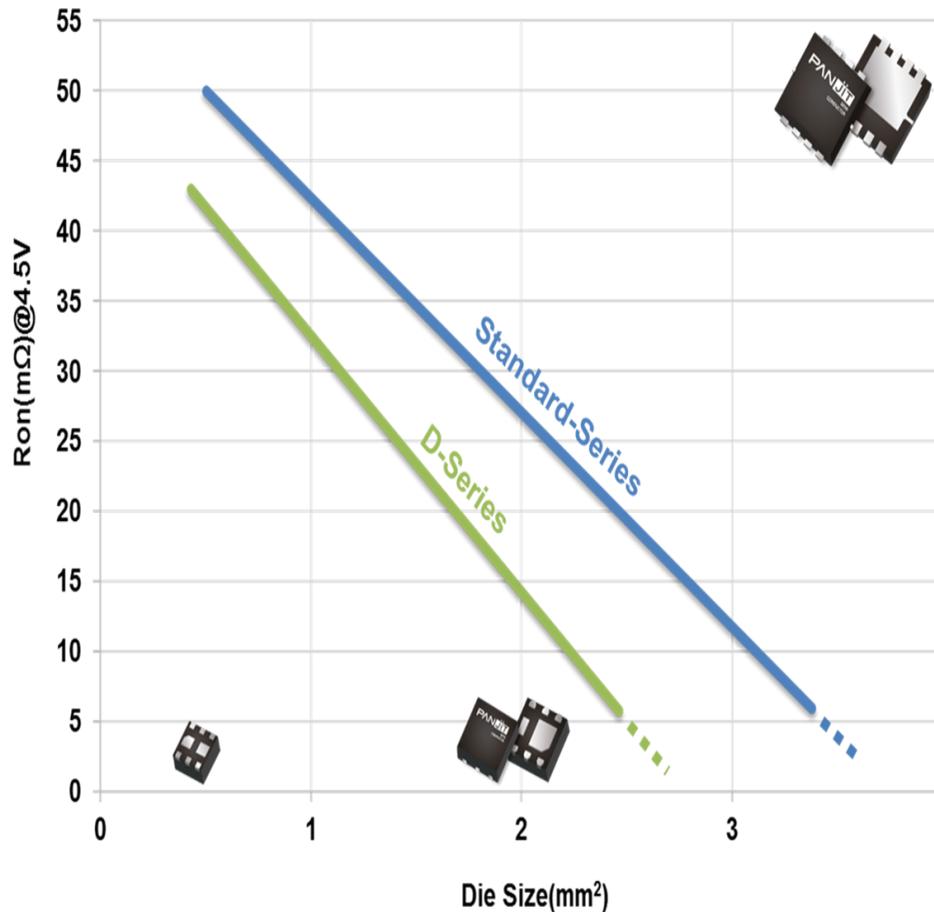
## □ Standard-series

正常晶胞密度，额定电流低，  
Rdson导通阻抗高



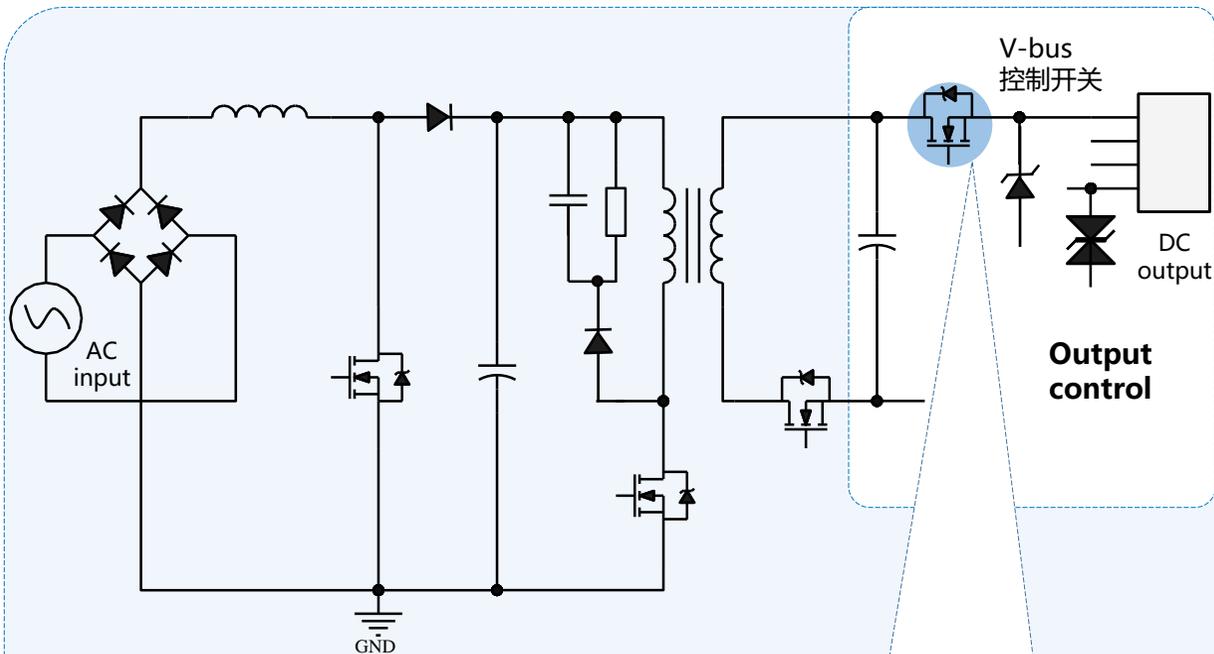
## □ D-Series

高晶胞密度，D系列额定电流  
高，Rdson导通阻抗低



# Typical application (典型应用)

## 应用电路



### 特点:

- 低Rdson导通阻抗, 低损耗
- 小型化高密度设计

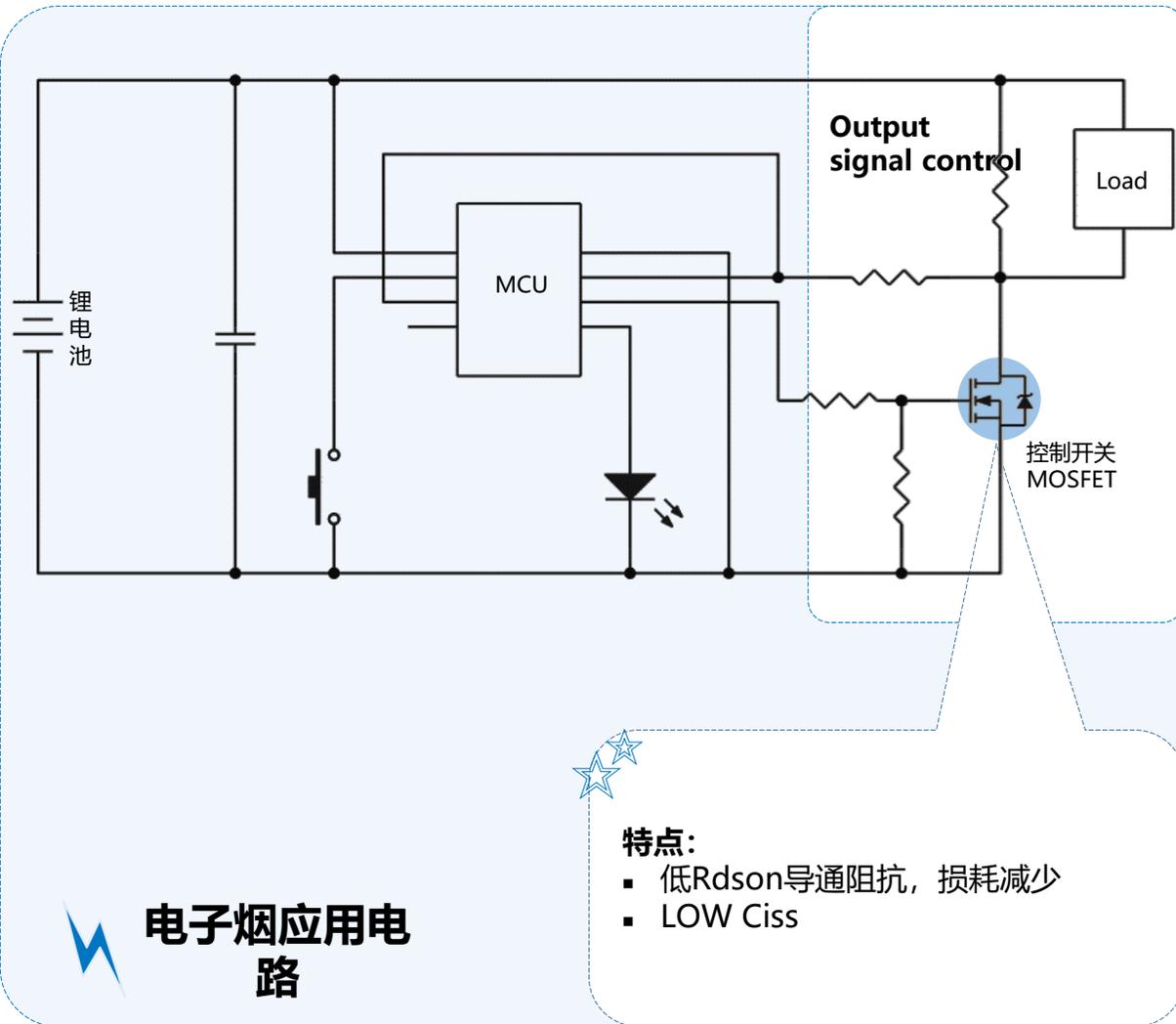
## 适配器应用电路

## 应用推荐

MOSFET TYPE	推荐型号	VDS (V)	Rds(typ) @4.5V (m ohm)	封装
P-Channel	PJQ2421D	-20	17	DFN2020B-6L
	PJQ4423DP	-20	11	DFN3333-8L
	PJQ4425DP	-20	8.5	DFN3333-8L
	PJQ4427DP	-20	5.8	DFN3333-8L
N-channel	PJQ4428DP	20	2.3	DFN3333-8L
	PJQ4426DP	20	4	DFN3333-8L
	PJQ4424DP	20	4.8	DFN3333-8L
	PJQ4532P	30	2.8	DFN3333-8L
	PJQ4524P	30	3.8	DFN3333-8L
	PJQ4526P	30	5.3	DFN3333-8L
	PJQ4528P	30	5.8	DFN3333-8L

# Typical application (典型应用)

## 应用电路



## 应用推荐

推荐型号	VDS (V)	Rds(max) @4.5V (m ohm)	封装
PJQ4532P	30	2.8	DFN3333-8L
PJQ4524P	30	3.8	DFN3333-8L
PJQ4526P	30	5.3	DFN3333-8L
PJQ4528P	30	5.8	DFN3333-8L
PJQ4530P	30	5.7	DFN3333-8L
PJQ5532	30	2.2	DFN5060-8L
PJQ5524	30	3.6	DFN5060-8L
PJQ5526	30	4.2	DFN5060-8L
PJQ5528	30	5.3	DFN5060-8L
PJQ5530	30	6.3	DFN5060-8L

# Bridge Rectifier

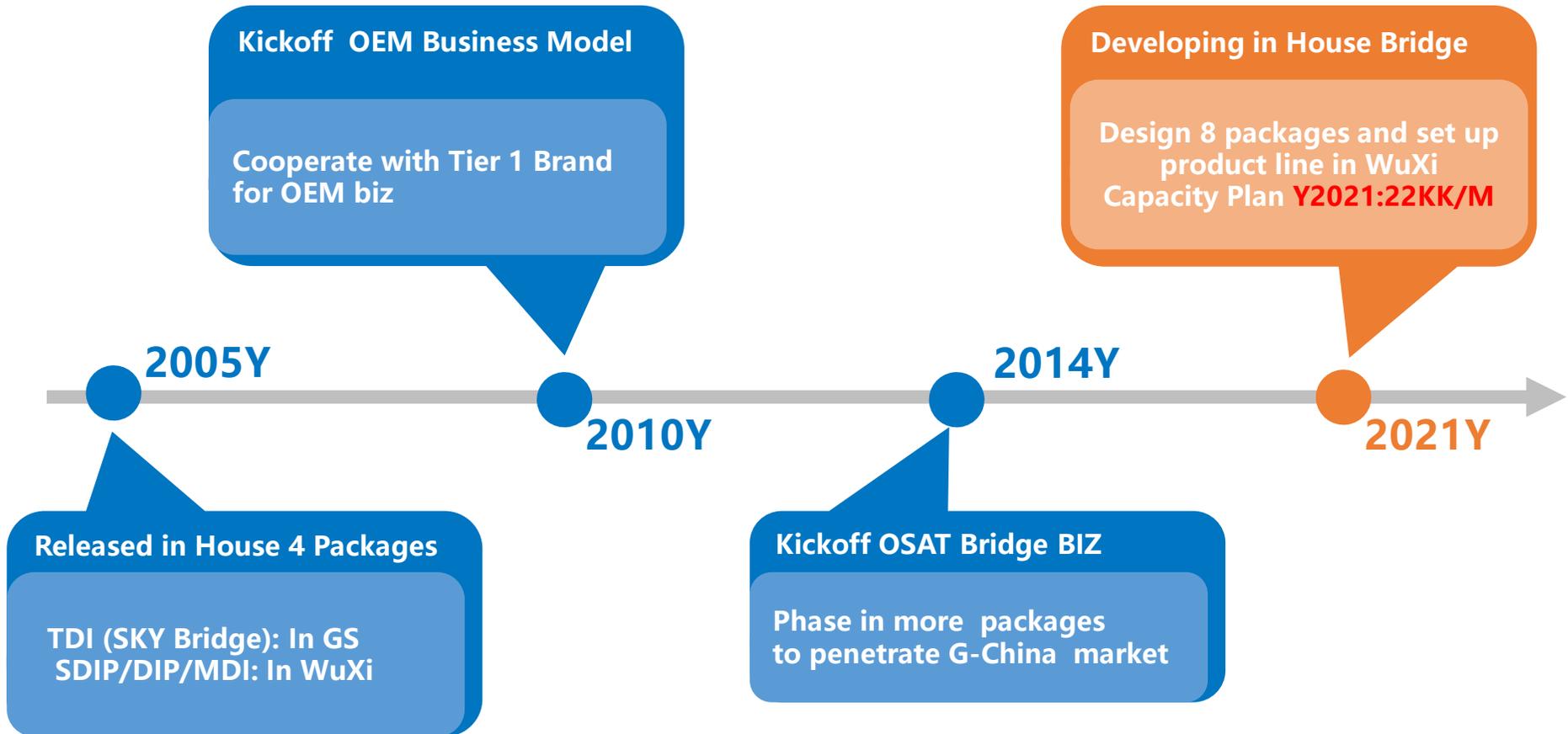
- ✓ Product Road Map (产品规划)
- ✓ Product List (产品清单)
- ✓ Characteristics & Benchmark (工艺特点&产品对比)
- ✓ Target market (目标市场)
- ✓ Typical application (典型应用)



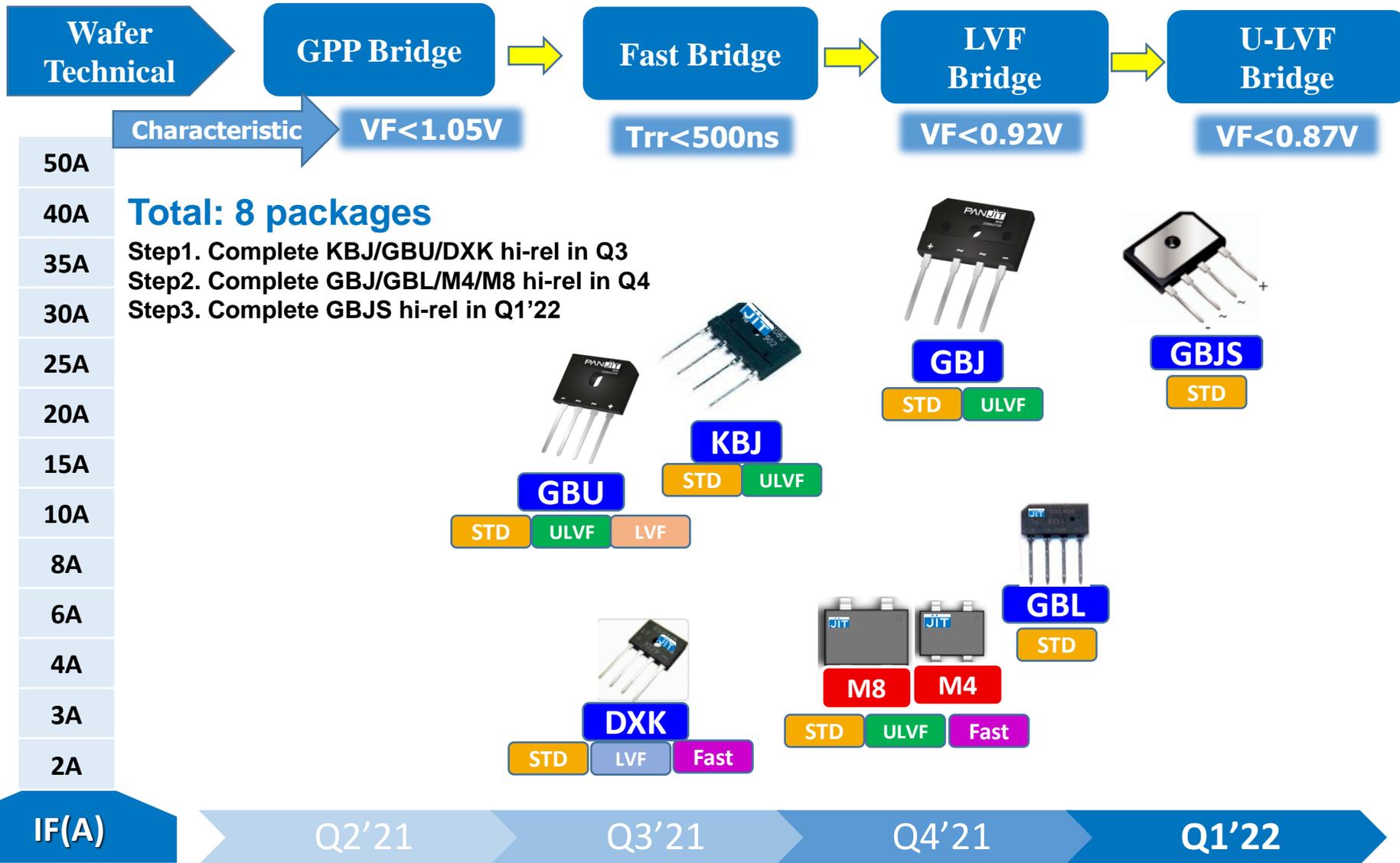
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# Development History (桥堆发展历程)



# Product Road Map (产品规划) -In-house



# Product List (产品清单)

Product Family	Product ID	IF (A)	VB (V)	IFSM(A)	封装	样品	规格书	ERP料号	交期 (Wafer Time + PKG Time)
Outsourcing new Power Bridge	KBP2M	2	1000	55	KBP	V	V	V	8周+4周
	KBP2MI	2	1000	75	KBP	V	V	V	8周+4周
	KBP4M	4	1000	75	KBP	V	V	V	8周+4周
	KBP4MI	4	1000	130	KBP	V	V	V	8周+4周
	GBU4MP	4	1000	135	GBU-1	V	V	V	8周+4周
	GBU6MP	6	1000	175	GBU-1	V	V	V	8周+4周
	GBU8MP	8	1000	180	GBU-1	V	V	V	8周+4周
	GBU10MP	10	1000	200	GBU-1	V	V	Oct.2021	8周+4周
	GBU15M	15	1000	220	GBU-1	V	V	Oct.2021	8周+4周
	GBJ15M	15	1000	200	GBJ-1	V	V	V	8周+4周
	GBJ20M	20	1000	240	GBJ-1	V	V	V	8周+4周
	GBJ25MI	25	1000	260	GBJ-1	V	V	V	8周+4周
	GBJ35M	35	1000	350	GBJ-1	V	V	Oct.2021	8周+4周
	ABS1M	1	1000	35	ABS	V	V	Oct.2021	8周+4周
	ABS2M	2	1000	50	ABS	V	V	Oct.2021	8周+4周
	ABS2MS	2	1000	70	ABS	V	V	V	8周+4周
	RABS2M	2	1000	50	ABS	V	V	Oct.2021	8周+4周
	MSB2M	2	1000	70	MSBL	V	V	Oct.2021	8周+4周
	MSB3M	3	1000	80	MSBL	V	V	Oct.2021	8周+4周
	MSB4M	4	1000	95	MSBL	V	V	Oct.2021	8周+4周
RMSB3M	3	1000	80	MSBL	V	V	Oct.2021	8周+4周	
RMSB4M	4	1000	90	MSBL	V	V	Oct.2021	8周+4周	

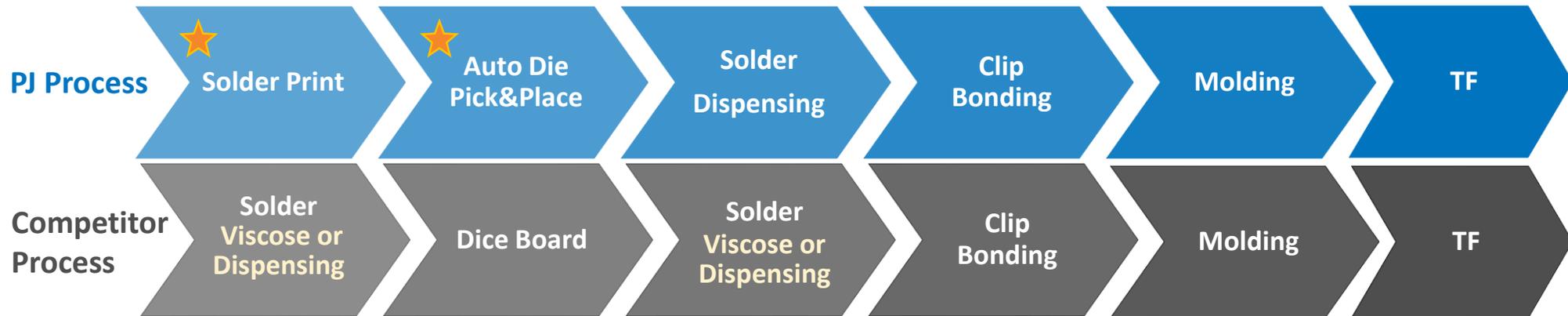
# Product List (产品清单)

Product Family	Product ID	IF (A)	VB (V)	封装	样品	规格书	ERP料号	交期 (Wafer Time + PKG Time)
Power Bridge In-house	DXK210	2	1000	DXK	Oct.2021	Oct.2021	Nov.2021	-
	DXK310	3	1000	DXK	Oct.2021	Oct.2021	Nov.2021	-
	DXK410	4	1000	DXK	Oct.2021	Oct.2021	Nov.2021	-
	DXK610	6	1000	DXK	Oct.2021	Oct.2021	Nov.2021	-
	DXK810	8	1000	DXK	Oct.2021	Oct.2021	Nov.2021	-
	KBJ410	4	1000	KBJ	Oct.2021	Oct.2021	Nov.2021	-
	KBJ610	6	1000	KBJ	Oct.2021	Oct.2021	Nov.2021	-
	KBJ1010	10	1000	KBJ	Oct.2021	Oct.2021	Nov.2021	-
	KBJ1510	15	1000	KBJ	Oct.2021	Oct.2021	Nov.2021	-
	KBJ2010	20	1000	KBJ	Oct.2021	Oct.2021	Nov.2021	-
	KB2510	25	1000	KBJ	Oct.2021	Oct.2021	Nov.2021	-
	KBJ3510	35	1000	KBJ	Oct.2021	Oct.2021	Nov.2021	-
	KBJ1506ULV	15	600	KBJ	Oct.2021	Oct.2021	Nov.2021	-
	KBJ2506ULV	25	600	KBJ	Oct.2021	Oct.2021	Nov.2021	-
	GBU410	4	1000	GBU	Oct.2021	Oct.2021	Nov.2021	-
	GBU610	6	1000	GBU	Oct.2021	Oct.2021	Nov.2021	-
	GBU810	8	1000	GBU	Oct.2021	Oct.2021	Nov.2021	-
	GBU1010	10	1000	GBU	Oct.2021	Oct.2021	Nov.2021	-
	GBU1510	15	1000	GBU	Oct.2021	Oct.2021	Nov.2021	-
	GBU2510	25	1000	GBU	Oct.2021	Oct.2021	Nov.2021	-
	GBU3510	35	1000	GBU	Oct.2021	Oct.2021	Nov.2021	-
	GBU1008LV	10	800	GBU	Oct.2021	Oct.2021	Nov.2021	-
	GBU1506ULV	15	600	GBU	Oct.2021	Oct.2021	Nov.2021	-
GBU2506ULV	25	600	GBU	Oct.2021	Oct.2021	Nov.2021	-	

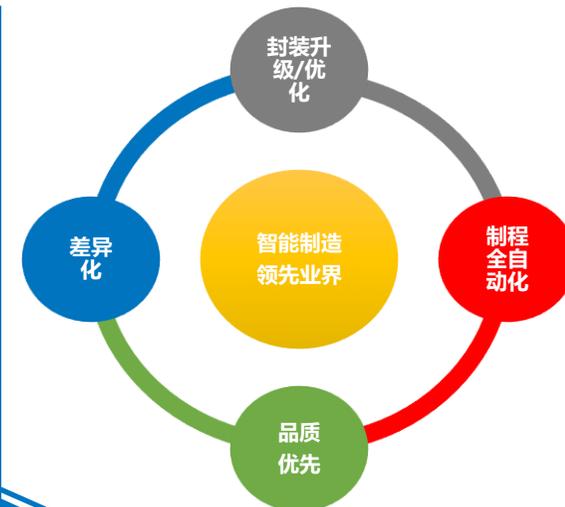
# Product List (产品清单)

Product Family	Product ID	IF (A)	VB (V)	封装	样品	规格书	ERP料号	交期 (Wafer Time + PKG Time)
Power Bridge In-house	PMS210	2	1000	M4	Q4.2021	Q4.2021	Q4.2021	-
	PMS310	3	1000	M4	Q4.2021	Q4.2021	Q4.2021	-
	PMS410	4	1000	M4	Q4.2021	Q4.2021	Q4.2021	-
	RPMS210	2	1000	M4	Q4.2021	Q4.2021	Q4.2021	-
	RPMS310	3	1000	M4	Q4.2021	Q4.2021	Q4.2021	-
	RPMS410	4	1000	M4	Q4.2021	Q4.2021	Q4.2021	-
	PM510	5	1000	M8	Q4.2021	Q4.2021	Q4.2021	-
	PM610	6	1000	M8	Q4.2021	Q4.2021	Q4.2021	-
	PM810	8	1000	M8	Q4.2021	Q4.2021	Q4.2021	-
	PM1010	10	1000	M8	Q4.2021	Q4.2021	Q4.2021	-
	PM806ULV	8	600	M8	Q4.2021	Q4.2021	Q4.2021	-
	RPM510	5	1000	M8	Q4.2021	Q4.2021	Q4.2021	-
	RPM610	6	600	M8	Q4.2021	Q4.2021	Q4.2021	-
	GBJ1010	10	600	GBJ	Q4.2021	Q4.2021	Q4.2021	-
	GBJ1510	15	1000	GBJ	Q4.2021	Q4.2021	Q4.2021	-
	GBJ2010	20	1000	GBJ	Q4.2021	Q4.2021	Q4.2021	-
	GBJ2510	25	1000	GBJ	Q4.2021	Q4.2021	Q4.2021	-
	GBJ3510	35	1000	GBJ	Q4.2021	Q4.2021	Q4.2021	-
	GBJ5010	50	1000	GBJ	Q4.2021	Q4.2021	Q4.2021	-
	GBJ1506ULV	15	1000	GBJ	Q4.2021	Q4.2021	Q4.2021	-
	GBJ2506ULV	25	1000	GBJ	Q4.2021	Q4.2021	Q4.2021	-
	GBJ3506ULV	35	800	GBJ	Q4.2021	Q4.2021	Q4.2021	-
	GBL410	4	1000	GBL	Q1.2022	Q1.2022	Q1.2022	-
	GBL610	6	600	GBL	Q1.2022	Q1.2022	Q1.2022	-
GBL810	8	1000	GBL	Q1.2022	Q1.2022	Q1.2022	-	
GBJS3010	30	1000	GBJS	Q1.2022	Q1.2022	Q1.2022	-	
GBJS4010	40	1000	GBJS	Q1.2022	Q1.2022	Q1.2022	-	

# Technological Characteristics (工艺特点)



站别	特色	优点
Solder Print	传统点胶改为网印刷胶	保证胶量平整度和稳定度, 有效降低焊接空洞率 (Void), 减小晶粒偏位
	取消LDF上钉头, 改双折弯CLIP	增加焊接稳定性, 减少焊接开路, 提升良率
Auto Die Pick&Place	全自动Die(Pick & Place) 取代传统摇Die	提高固晶的精准度, 有效降低Die Shift 及摇Die 碰撞所产生的 Micro Crack;更能有效提升整个制程的封装良率
Molding	引脚根部免去残胶, 打胶机下料	杜绝引脚根部残胶, 改善本体注胶口残胶, 提升外观良率
TF	切脚模清模防呆系统	减少引线压伤, 提升良率



# Benchmark (产品对比)

Characteristic	Test Condition	PJ GBU1506ULV	Competitor GBU15JL	Unit
Die size		110 * 110	115 * 115	mil
$V_{RRM}$	$I_R = 10 \text{ uA}, T_j = 25^\circ\text{C}$	 782	727	V
$V_F$	$I_F = 7.5 \text{ A}, T_j = 25^\circ\text{C}$	870	867	mV
	$I_F = 7.5 \text{ A}, T_j = 125^\circ\text{C}$	758	734	
$V_F$	$I_F = 15 \text{ A}, T_j = 25^\circ\text{C}$	950	949	mV
	$I_F = 15 \text{ A}, T_j = 125^\circ\text{C}$	862	836	
$I_R$	$V_R = 600 \text{ V}, T_j = 25^\circ\text{C}$	 0.003	0.1	uA
	$V_R = 600 \text{ V}, T_j = 125^\circ\text{C}$	4.05	14.42	
F/S	8.3ms single half sine wave	300	320	A
Lightning	Polarity : neg, Wave form : 8/20us , damping:2 ohm	 1000	800	V

- 动态参数:
- VRRM—反向峰值电压
- $I_F$ —正向电流
- IFSM—最大正向峰值浪涌电流
- $V_F$ —正向电压
- $I_R$ —逆向电流

1. Due to PJ die size is smaller than (A), so  $V_F$ / $I_{FSM}$  are badly
2. PJ planar process contribute better Hi- $I_R$  and Electrical distribution

# Target market (目标市场)



H&A



UPS



OBC



Server Power

**AC to DC**

消费电子    工业电子  
电源供应    汽车电子



PV Inverter



Power Supply



Quick Charger



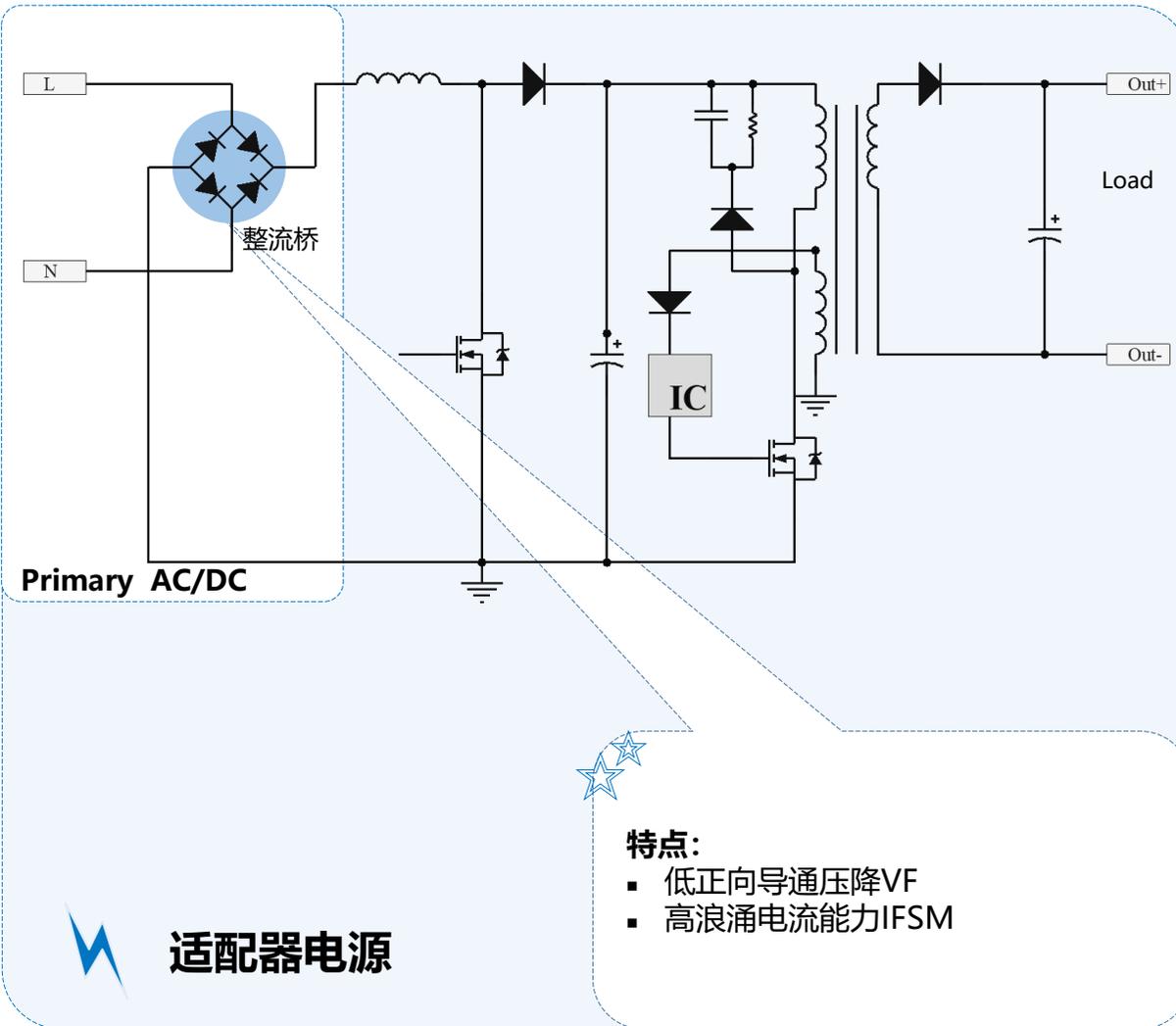
EV Charging Pile



Adapter Power Supply

# Typical application (典型应用)

## 应用电路



## 应用推荐

推荐型号	IF(A)	VB(V)	IFSM	封装
GBU4MP	4	1000	135	GBU-1
GBU6MP	6	1000	175	GBU-1
GBU8MP	8	1000	180	GBU-1
GBU10MP	10	1000	200	GBU-1
GBU15M	15	1000	220	GBU-1
GBJ15M	15	1000	200	GBJ-1
GBJ20M	20	1000	240	GBJ-1
GBJ25MI	25	1000	260	GBJ-1
GBJ35M	35	1000	350	GBJ-1

# Other Product Recommendation

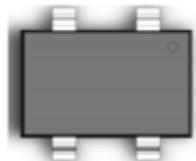
- ✓ SMD Power Bridge
- ✓ 600V Input Rectifier
- ✓ Super Fast Recovery Rectifiers
- ✓ Cool MOSFET



# SMD Power Bridge

## 产品特点

- 电压规格 VRRM-1000V,
- 电流能力IF (A) -4A,5A,6A,8A
- SMD 海鸥脚封装, 改善焊锡性
- FAST 和 LOW VF

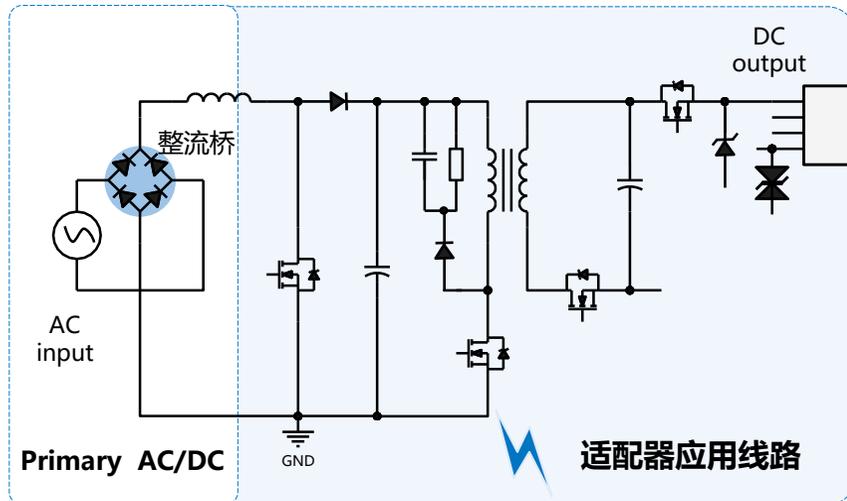


## 目标市场

- 快充 (<65W)
- USB PD&笔电适配器(<120W)
- TV Power Board(<120W)



## 典型应用



## 产品清单

Product Family	Product ID	VRRM(V)	IF(A)	VF(V)	封装	样品	规格书	ERP料号	交期 (Wafer Time + PKG Time)
Power Bridge	DB10W-40	1000	4	1.1	DBSW	V	V	V	8-10周
	DB10W-60	1000	6	1.1	DBSW	V	V	V	8-10周
	DB10W-80	1000	8	1.1	DBSW	V	V	V	8-10周
	DR10W-40	1000	4	1.3	DBSW	V	V	V	8-10周
	DR10W-50	1000	5	1.3	DBSW	V	V	V	8-10周
	DR10W-60	1000	6	1.3	DBSW	V	V	V	8-10周
	DR10W-80	1000	8	1.3	DBSW	V	V	V	8-10周

# 600V Input Rectifier

## ■ Features

- 低正向导通压降
- 小型化封装
- 175°C最大结温度

## ■ Application

- 60 / 65 / 100 / 120W quick charger
- 150W adaptor

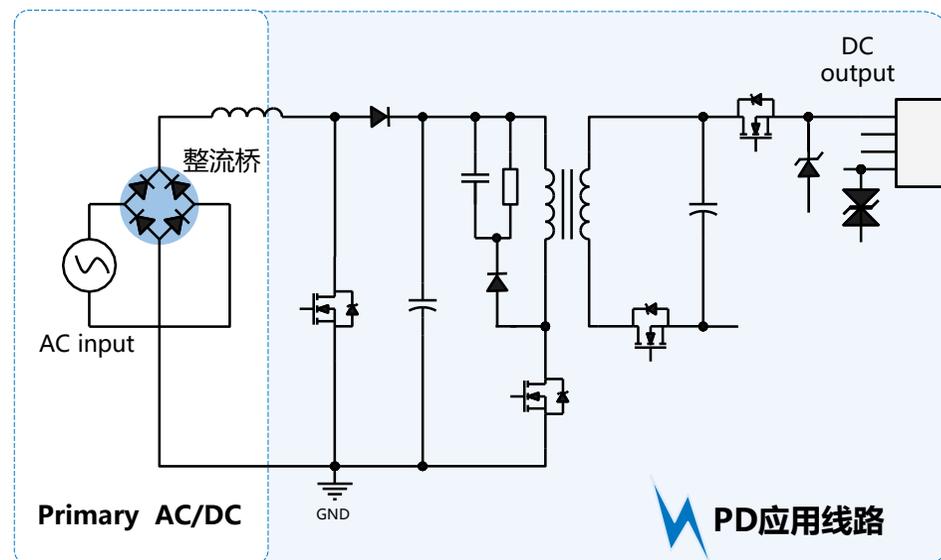
## ■ Benefit

- 解决模块空间设计问题；适用于小、薄、轻的设计。

## ■ 产品清单

App.	Voltage	IF	IR	V <sub>F</sub> , T <sub>j</sub> =25°C	V <sub>F</sub> , T <sub>j</sub> =125°C	TRR	SOD-123FL	SMAF-C	SMBF	TO-277C	样品	规格书
[W]	[V]	[A]	[μA]	[V]	[V]	[nS]						
45	600	1.5	1	0.96@1.5A	0.85@1.5A	400	GSR1HJAL					
65	600	1.5	1	0.92@1.5A	0.81@1.5A	400		GSR1HJAF C				
65	600	2	1	0.92@2A	0.81@2A	400		GSR2JAF C			V	V
100	600	4	1	0.92@4A	0.81@4A	400			GSR4JBF	GSR4JPC	V	V
120	600	6	1	0.92@6A	0.81@6A	400				GSR6JPC	V	Jun.21
150	600	8	1	0.92@8A	0.81@8A	400				GSR8JPC	V	Jun.21

## ■ 典型应用



# Super Fast Recovery Rectifiers

## ■ Features

- 小型化封装
- 软恢复
- 低噪声EMI
- 反向恢复时间 $T_{rr} < 25\text{nS}$
- $175^{\circ}\text{C}$ 最大结温度

## ■ Application

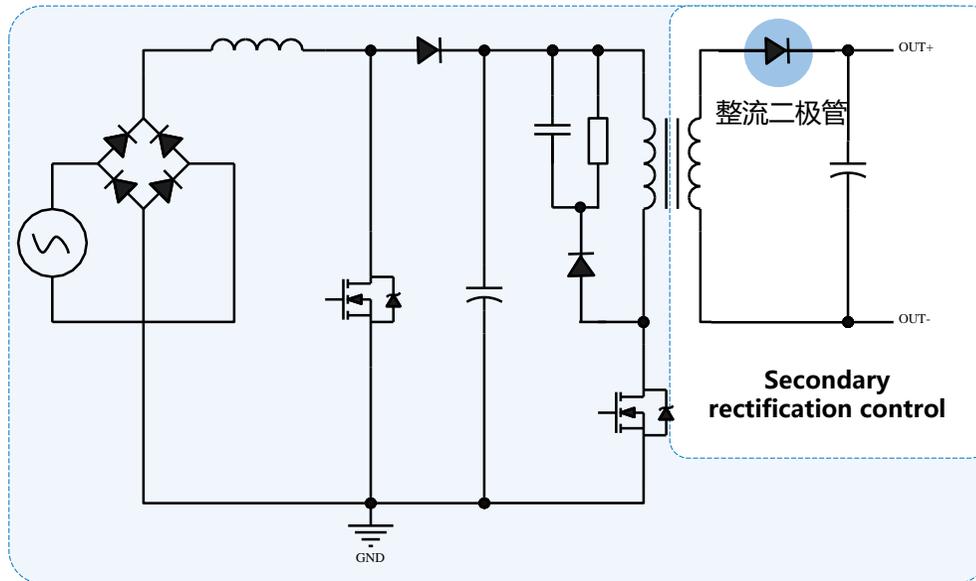
- Adaptor
- Consumer electronics

## ■ Benefit

- 解决模块空间设计问题；适用于小、薄、轻的设计。

## ■ 产品清单

## ■ 典型应用



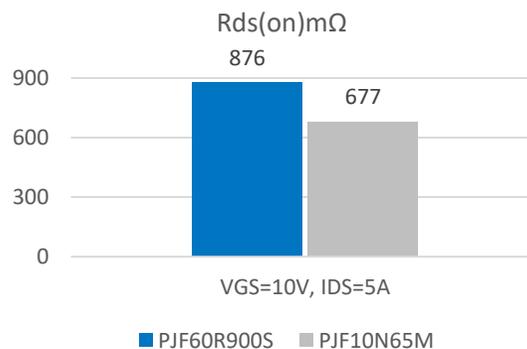
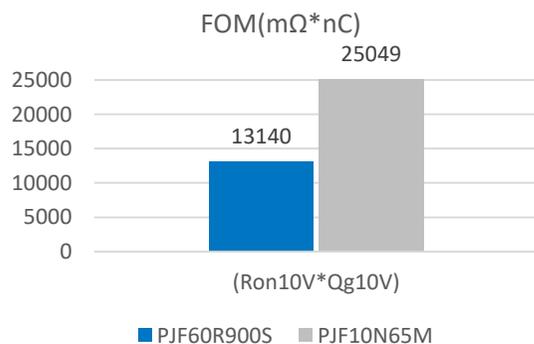
Product Family	Product ID	VRRM(V)	IF(A)	VF(V)	Trr(nS)	封装	样品	规格书	ERP料号	交期 (Wafer Time + PKG Time)
Fast	MSR2DAFC	200	2	0.95	20	SMAF-C	V	V	V	10周+4周
	MSR2DAL	200	2	0.95	20	SOD-123FL	V	V	V	10周+4周
	MSR1DAL	200	1	0.95	20	SOD-123FL	V	V	V	10周+4周



# 900mΩ Cool MOSFET

## ■ 单体静态参数比较

Category	Product/Technology	Test Condition	PJF60R900S	PJF10N65M	Unit
Product Information	Package		ITO-220AB-F	ITO-220AB-F	-
Electrical Parameter	BVDSS (Typ.)	VGS=0, IDS=250uA	674	699	V
	Vth (Typ.)	VDS=VGS, IDS=250uA	3.4	3.1	V
	Rg (Typ.)	f=1.0MHZ	5.5	1.1	Ω
	Rds(on)(Typ.)	VGS=10V, IDS=5A	876	677	mΩ
	Ciss (Typ.)	VDS=50V, VGS=0V, f=1.0MHZ	360	1790	pF
	Coss (Typ.)		25	100	pF
	Qoss (Typ.)		1	31	pF
	Qg (Typ.)	VDS=480V, ID=2.5A, VGS=10V	15	37	nC
	FOM (Ron10V*Qg10V)	-	13,140	25,049	mΩ*nC



Data:



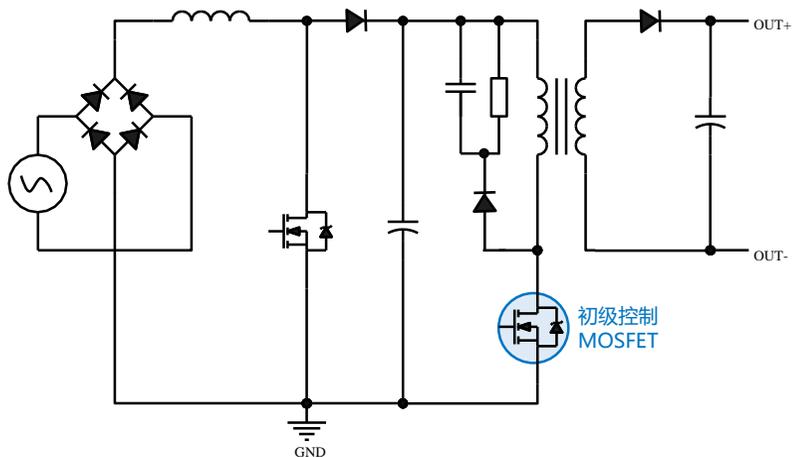
PJF10N65M



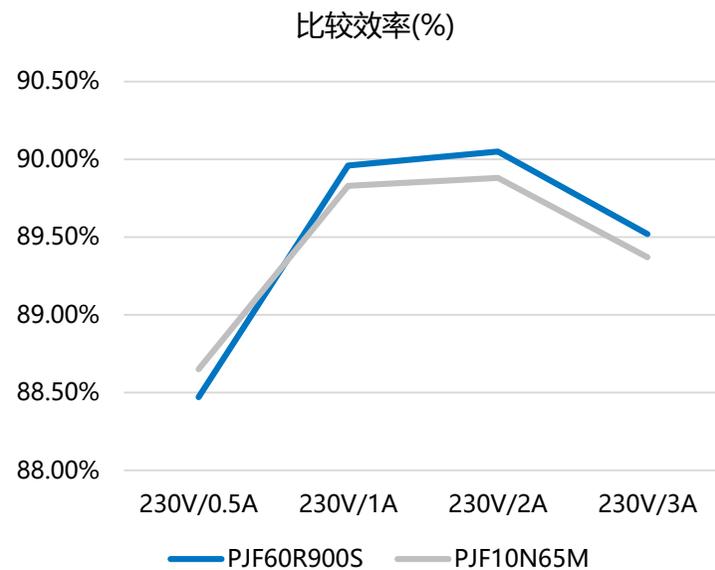
PJF60R900S

# 900mΩ Cool MOSFET

## ■ 电源36W上机效率比较



Model	Item	输入电压(V)	输入功率(W)	输出电压(V)	输出电流(A)	效率%
PJF60R900S		110	6.75	12.12	0.5	89.78%
		230	6.85	12.12	0.5	88.47%
		110	13.44	12.10	1	90.03%
		230	13.45	12.10	1	89.96%
		110	27.46	12.08	2	87.98%
		230	26.83	12.08	2	90.05%
		110	41.41	12.04	3	87.23%
		230	40.38	12.05	3	89.52%
PJF10N65M		110	6.74	12.11	0.5	89.84%
		230	6.83	12.11	0.5	88.65%
		110	13.43	12.10	1	90.10%
		230	13.47	12.10	1	89.83%
		110	27.52	12.08	2	87.79%
		230	26.88	12.08	2	89.88%
		110	41.48	12.04	3	87.08%
		230	40.45	12.05	3	89.37%



## ■ 可匹配竞业规格List

品牌	型号	封装	PANJIT对应型号
新洁能	NCE60R900F	TO-220F	PJF60R900S
东微-Oriental	OSG60R900FF	TO220F	PJF60R900S
SemiHow	HCS60R900ST	TO-220FT	PJF60R900S
吉林华微-JSMC	JS60R900FU	TO-220MF-K2	PJF60R900S
英飞凌	IPA60R950C6	TO220 FullPAK	PJF60R900S
紫光微	TPA60R840C	TO-220F	PJF60R900S
AOS	AOTF4S60	TO-220F	PJF60R900S
ST	STF7NM60N	TO-220FP	PJF60R900S
东芝	TK1K0A60F	TO-220SIS	PJF60R900S
士兰微	SVS5N60F	TO-220F-3L	PJF60R900S

## □ 5年产品开发与投资计划:



- 8" 芯片: 10,000 片/月 (Q3 MP)
- 小讯号封装产能增至2,500KK/月
- 自制Power Bridge封装
- 推出新封装 WLCSP/DFN/桥堆



- 投资AU前瞻技术封装
- IGBT Gen.1 量产
- MV SGT Gen.2 量产
- FRED Gen.2 量产
- SiC Diode Gen.2 量产



- SiC MOSFET Gen.1 量产
- SJ MOSFET Gen.2 量产



- 发布下一代技术
- 新技术与产能投资



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