



Potens Semiconductor Corp.

Power Management IC Design

# Outline

- ✓ Potens Award & Certificates
- ✓ Biz Model
- ✓ Product Roadmap
- ✓ Clients

# Potens Award & Certificate

**2012**

ISO 9001 Certificate

**2016**

- 13<sup>th</sup> Golden Torch Award
- Outstanding Top 10 Enterprises

**2017**

- 18<sup>th</sup> Golden Peak Award
- Outstanding Enterprise Award
- Outstanding Manager Award

**2019**

22<sup>th</sup> Rising Star Award



# Business Model

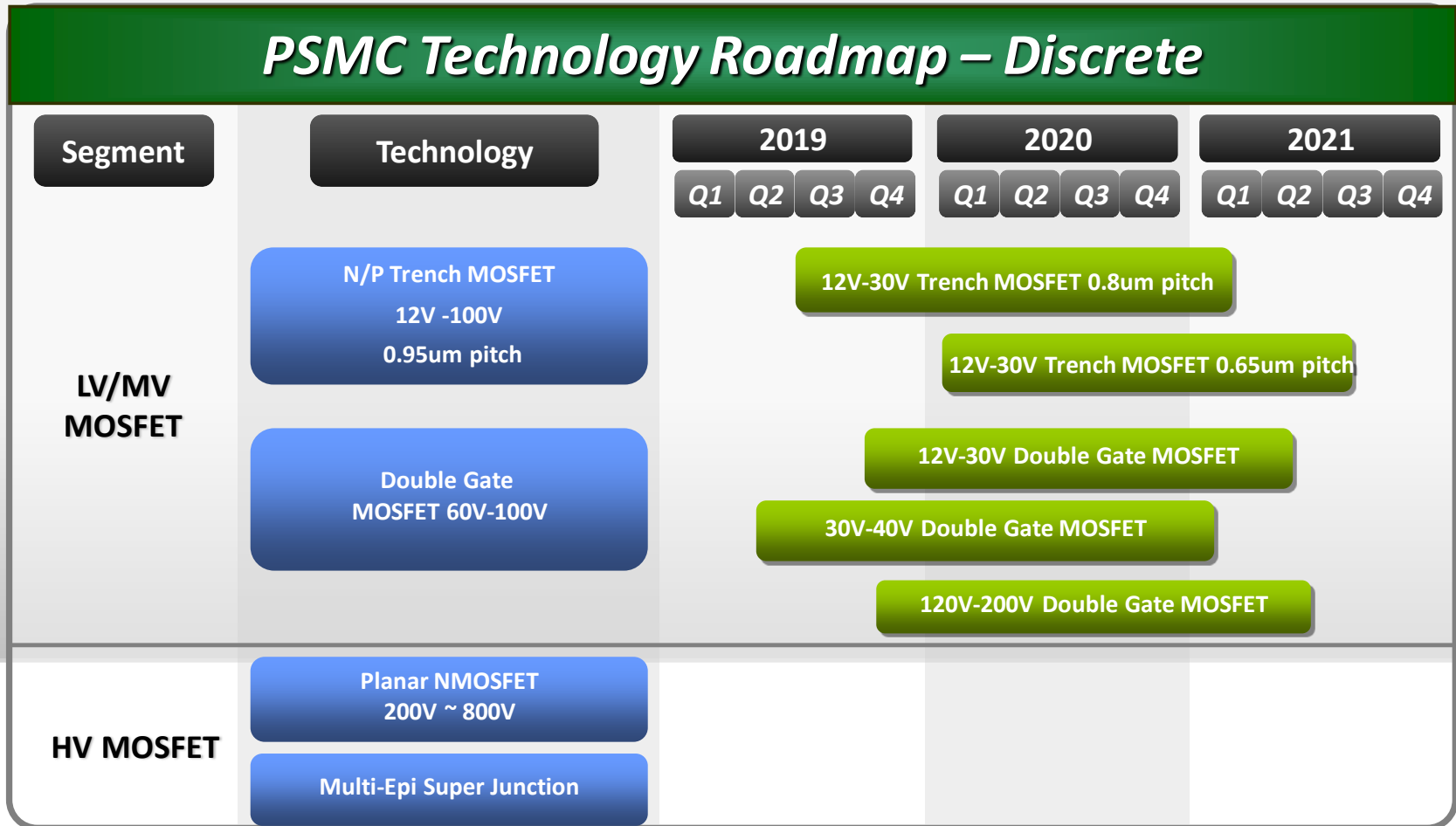
## Alliance Trend



Design	Foundry	Quality	Service
GaN/SiC (SBD/HEMT)	Taiwan	Potens	Potens
Super Junction	Taiwan	Potens	Potens
HV Planar	Taiwan	Potens	Potens
LV/MV Trench / SGT	Taiwan/Europe	Potens	Potens
IGBT	Taiwan/China	Potens	Potens

# Foundry Partner

PSMC (Former Maxchip) in Taiwan



Available

Developing

Planning

(Left edge of box represents process qual completion)



# Product Application



UPS/PV/Motor

TV/Monitor

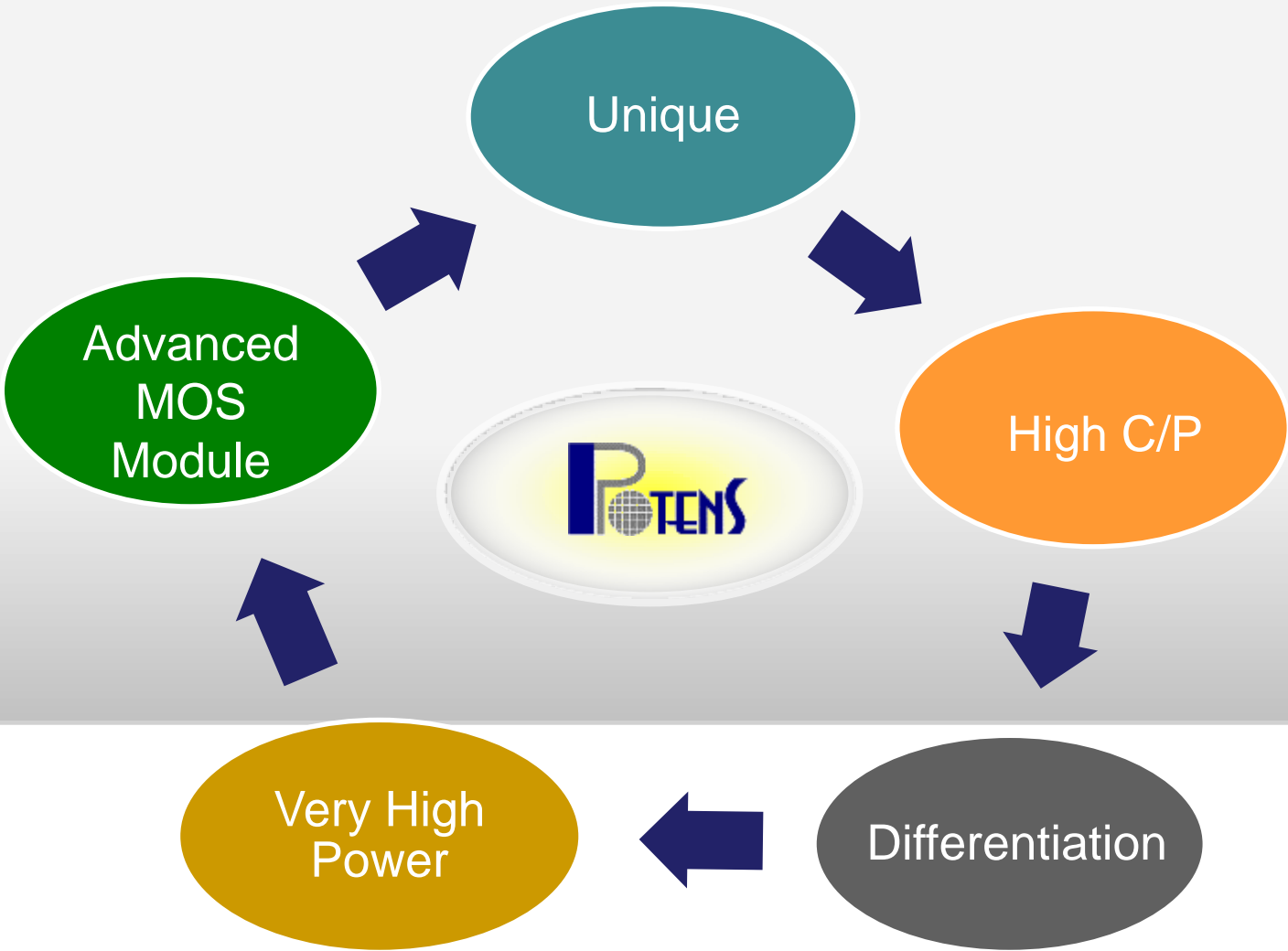
SMPS/Telecom

Battery Pack

PC



# Potens Product Advantage



# Potens Competitive Projects

- ★ Case 1 - 30V 6 in 1 MOS @ DFN6X6 (Brushless DC Motor)
- ★ Sub-case 1 – 100V 3 in 1 [MOS](#) (4G base station)
- ★ Case 2 - 100V MOS @ PPAK5X6
- ★ Case 3 - 100V MOS @ Large Package
- ★ Case 4 - 120V MOS for PD & Quick Charger ([Google](#))
- ★ Case 5 – 150V MOS for communication & 48V以上BMS
- ★ Case 6 – 30V PMOS @ DFN3X3 (Communication)
- ★ Case 7 – 60V NMOS @ TO247 (Air condition for Auto)

# Cross Reference with Major Competitors

Vendor	P/N	Package Type	BVDSS (V)	VGS (V)	Vth (V)	RDSON(Typ.)		Qgd nC	Ciss	Coss	Crss	Rg (W)	End Price	Potens P/N
						10V	4.5V							
AOS	AON6590	PRPAK56	40	20	1.3/1.8/2.3	0.78/0.99	1.15/1.5	7	8320	1438	85	1.15/1.8	---	---
AOS	AON7240	PRPAK33	40	20	1.4/1.9/2.4	4.2/5.1	5.6/7	6	1830	521	43	0.8/1.2	---	PDC4904Z
AOS	AO4260	SOP8	60	20	1.3/1.8/2.4	4.3/5.2	5/6.3	8.5	4940	445	32	0.9/1.4	---	PDS6978-5
AOS	AO4262E	SOP8	60	20	1.2/1.65/2.2	5.2/6.5	6.6/8.5	6.5	1652	520	52	1.3	0.14	PDS6976
AOS	AO4264	SOP8	60	20	1.4/1.9/2.5	9.2/11	10.8/13.5	2.5	2007	177	12.5	1.2	0.07	PDS6904
AOS	AO4266	SOP8	60	20	1.5/2/2.5	12/15	15/19	2.6	1340	123	10	1.5	---	PDS6964
UBIQ	QM6016S	SOP8	60	20	1.2/-/2.5	10/12	12/15	9.4	3240	210	146	1.5/3	0.09	PDS6904
AOS	AON6260	PRPAK56	60	20	1.5/2/2.5	1.95/2.4	2.8/3.5	12	5578	1390	75	0.75	---	PDC6974BX-5
AOS	AON6244	PRPAK56	60	20	1.5/2/2.5	3.8/4.7	4.8/6.2	3	3838	415	14.5	1	0.18	PDC6978X-5
AOS	AON6262E	PRPAK56	60	20	1.2/1.65/2.2	3.5/4.2	5.4/6.8	6.5	1652	520	52	1.3	0.13	PDC6976X-5
AOS	AON6268	PRPAK56	60	20	1.3/1.8/2.3	3.8/4.7	4.9/6.3	8.5	2520	670	65	1.2	0.18	PDC6978X-5
AOS	AON7262E	PRPAK33	60	20	1.2/1.65/2.2	4.8/6.2	6.2/8.5	6.5	1652	520	52	1.3	0.13	---
AOS	AON7246	PRPAK33	60	20	1.5/2/2.5	12/15	15/19	2.6	1340	123	10	1.5	---	PDC6904Z-5
AOS	AO4296	SOP8	100	20	1.3/1.75/2.3	6.8/8.3	8/10.6	4.5	3130	245	12.5	1.4	0.15	PDS0978
AOS	AO4294	SOP8	100	20	1.4/1.9/2.4	10/12	12.5/15.5	4	2420	170	11	0.55	0.17	PDS0976
AOS	AO4292	SOP8	100	20	1.6/2.15/2.7	18/23	24/33	2.5	1190	95	7	1.1	0.18	PDS0960
UBIQ	QM0032S	SOP8	100	20	1.2/-/3	18/22	24/28	8.8	1848	276	98	1.9	0.11	PDS0960
Vanguard	VS1H16AS	SOP8	100	20	1/1.6/3	21/24	22/28	15	3880	188	118	---	0.1	PDS0960
AOS	AON6292	PRPAK56	100	20	2.2/2.8/3.4	4.8/6	6/8.5	7	3830	327	16.5	0.65	---	PDC0974X
AOS	AON6224	PRPAK56	100	20	1.4/1.9/2.4	10/12	12.5/15.5	4	2420	170	11	0.55	---	PDC0976X
AOS	AO6298	PRPAK56	100	20	2.4/2.85/3.4	13.7/16.5	16.6/21	3	1307	127	8	1.25	0.11	PDC0960X

# Ultra Small Package for Portable and 3C Applications

P/N	Package	Size (mm)	Type	BVDSS (V)	VGS (V)	Vth (V)	RDS(on) (mΩ)			Shipment Record
							@ 4.5V	@ 2.5V	@ 1.8V	
PDEU2320Z	SOT323	2.0 x 2.0	N	20	±8V	0.3/0.6/1	200/300	235/400	295/550	33,750
PDEU2319Z	SOT323	2.0 x 2.0	P	-20	±8V	0.3/0.6/1	440/600	610/850	810/1200	---
PDEU2320Y	SOT523	1.6 x 1.6	N	20	±8V	0.3/0.6/1	200/300	235/400	295/550	336,300
PDEU2319Y	SOT523	1.6 x 1.6	P	-20	±8V	0.3/0.6/1	440/600	610/850	810/1200	13,491,300
PDEU2320X	SOT723	1.2 x 1.2	N	20	±8V	0.3/0.6/1	200/300	235/400	295/550	11,549,400
PDEU2319X	SOT723	1.2 x 1.2	P	-20	±8V	0.3/0.6/1	440/600	610/850	810/1200	62,996,500
PDEU2320W	SOT883	1.0 x 0.6	N	20	±8V	0.3/0.6/1	200/300	235/400	295/550	---
PDEU2319W	SOT883	1.0 x 0.6	P	-20	±8V	0.3/0.6/1	440/600	610/850	810/1200	---
PDEV2220Z	SOT363	2.0 x 2.0	N+N	20	±8V	0.3/0.6/1	200/300	235/400	295/550	661,650
PDEV2219Z	SOT363	2.0 x 2.0	P+P	-20	±8V	0.3/0.6/1	440/600	610/850	810/1200	15,000
PDEV2120Z	SOT363	2.0 x 2.0	N+P	20	±8V	0.3/0.6/1	200/300	235/400	295/550	352,100
				-20	±8V	0.3/0.6/1	440/600	610/850	810/1200	---
PDEV2220Y	SOT563	1.6 x 1.6	N+N	20	±8V	0.3/0.6/1	200/300	235/400	295/550	2,246,000
PDEV2219Y	SOT563	1.6 x 1.6	P+P	-20	±8V	0.3/0.6/1	440/600	610/850	810/1200	21,000
PDEV2120Y	SOT563	1.6 x 1.6	N+P	20	±8V	0.3/0.6/1	200/300	235/400	295/550	77,500
				-20	±8V	0.3/0.6/1	440/600	610/850	810/1200	---



SOT323  
Single



SOT363  
Dual



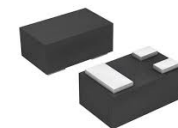
SOT523  
Single



SOT563  
Dual

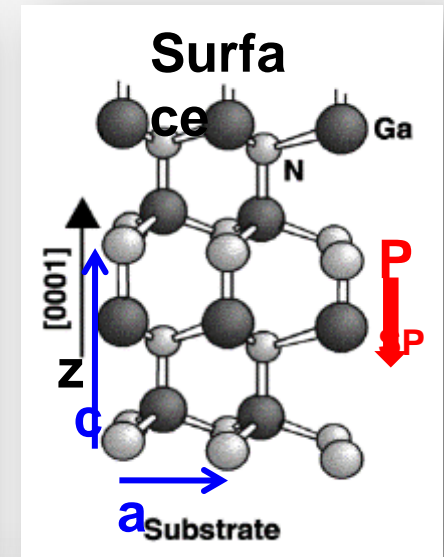
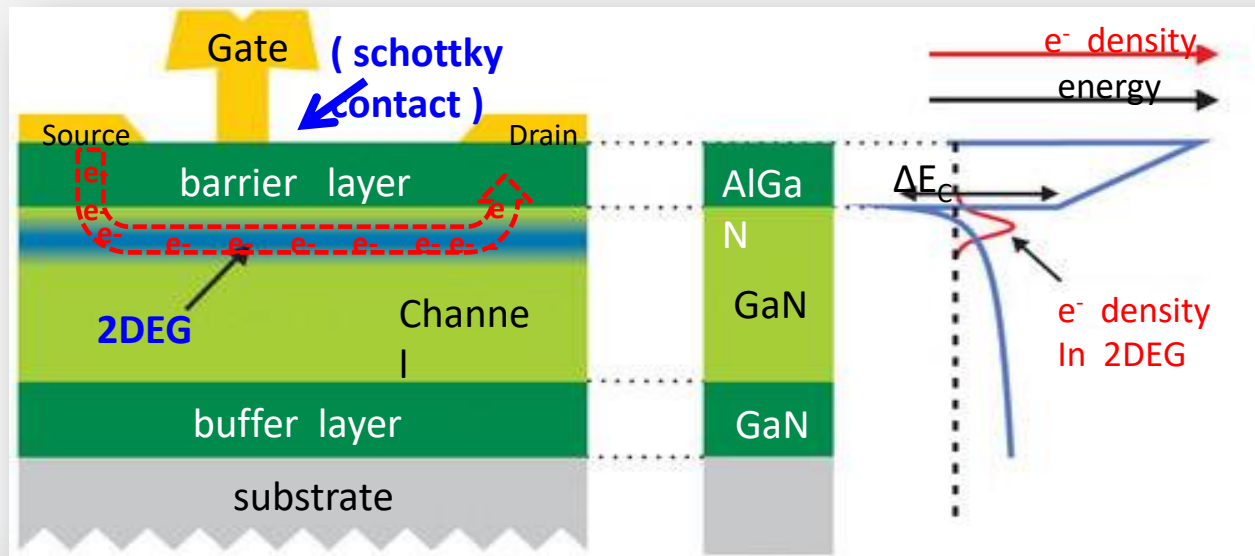


SOT723  
Single



SOT883  
Single

# High Voltage GaN SBD & HEMT



## SBD Technology

$V_{RRM}$	$I_F$	$V_F @ 125^\circ\text{C}$	Application
600~1800V	2~10A	<1.8V @ Full $I_F$	PFC Boost Diode

## HEMT Technology

BVDSS	$V_{th}$	VGS	RDSON	Characteristics
600~1200V	~1.5V	$\pm 20V$	75~280mΩ	1. GaN on Silicon 2. Cascode Enhance mode 3. Enhance mode

# Client Representatives

FOXCONN®

htc  
quietly brilliant

FATON



SUNWODA  
欣旺达

HUAWEI

amazon

RFT

辰阳电子  
CHENYANG ELECTRON

power  
integrations™

LG

Qisda

ASRock

Saiscomp  
赛尔康

iWatt

DELL™

MI

SAMSUNG

京东方  
BOE

XLK

COMPAL

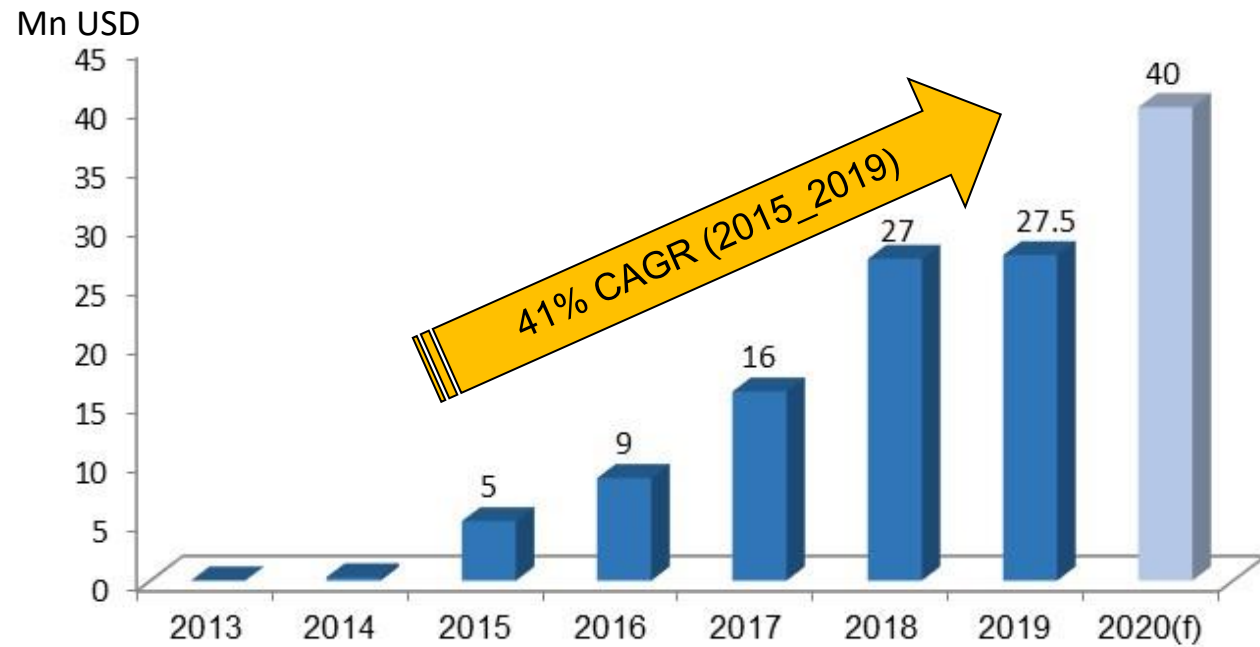
SONY

ZTE

DONG YANG E&P  
energy & power solution

※ Indicating direct sale and also indirect sale through distributors/agents

# Sales Trend



UPS/PV/Motor



TV/Monitor



SMPS



Battery Pak



PC





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Zhubei City, Hsinchu County 302, Taiwan

[www.potens-semi.com](http://www.potens-semi.com)

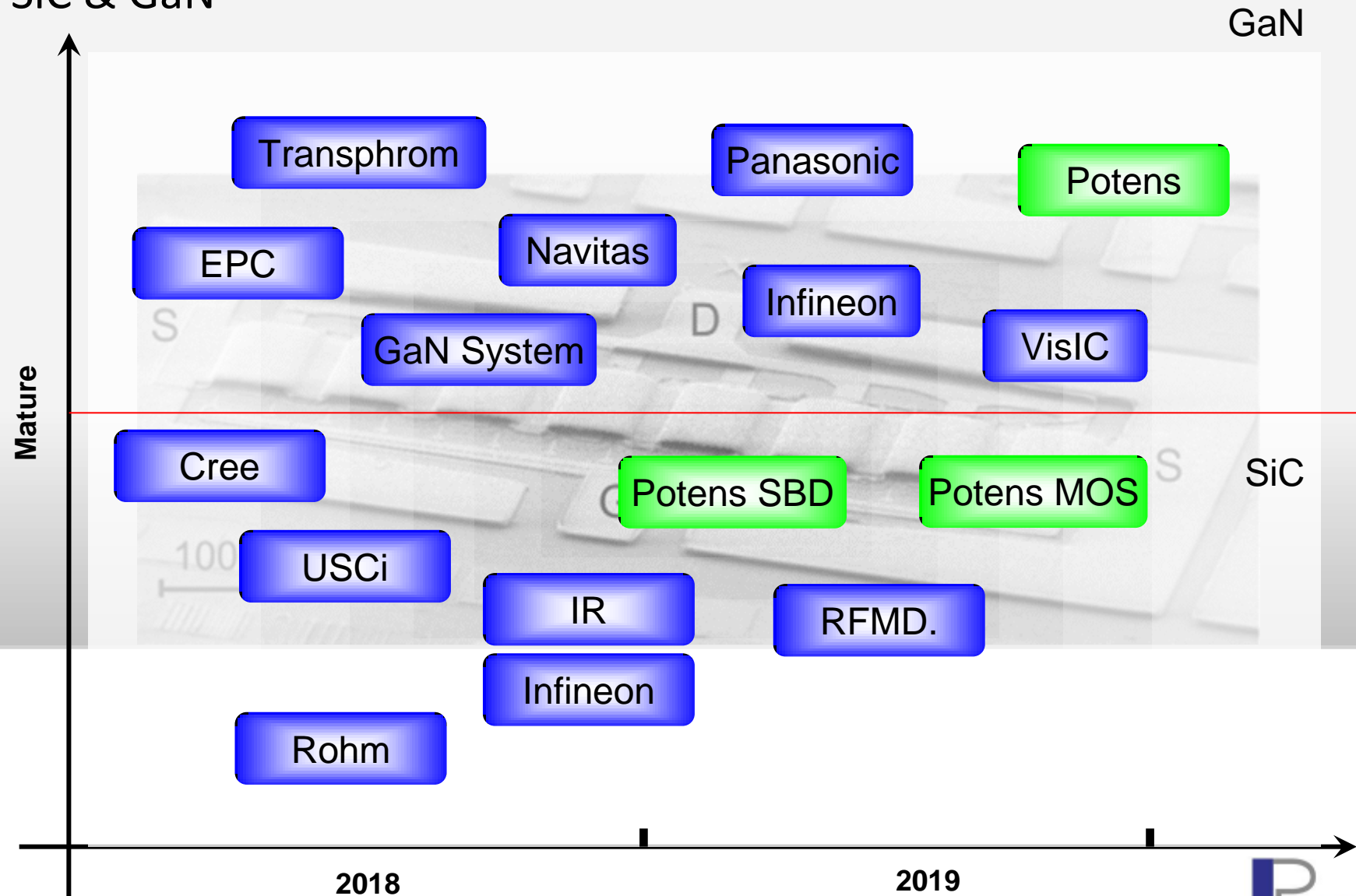


# APPENDIX

# Advantage 1 : Unique Product



SiC & GaN



GaN

SiC

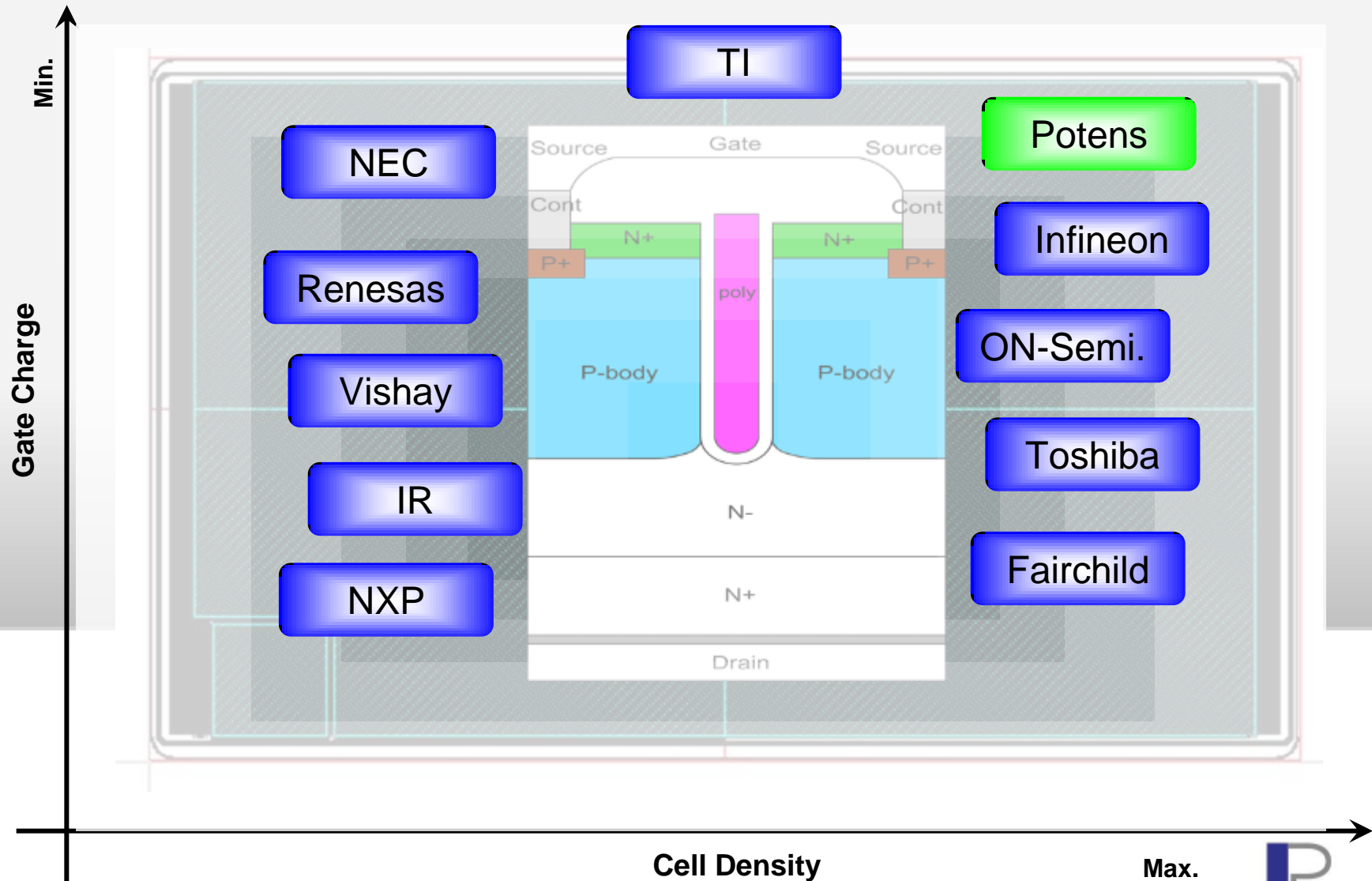
2018

2019

# Advantage 2 : High C/P Product



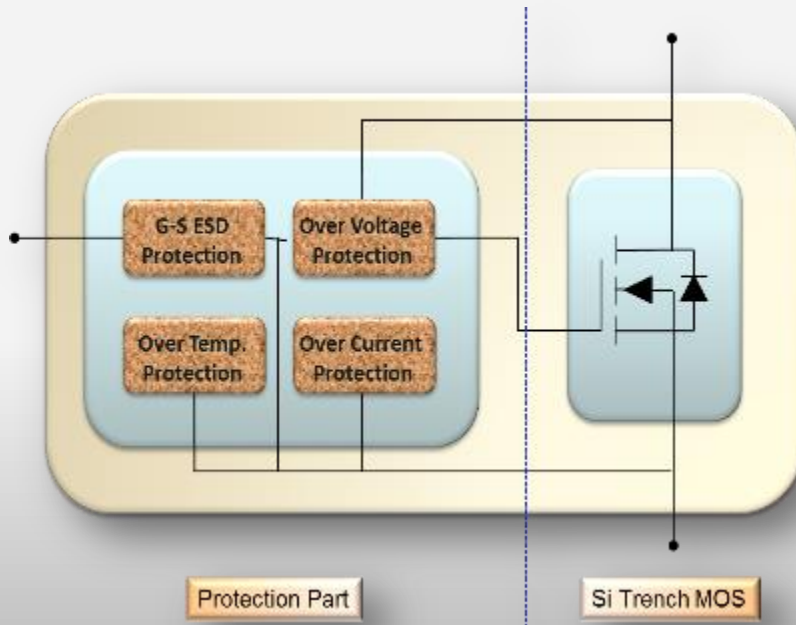
Base on normal Trench process



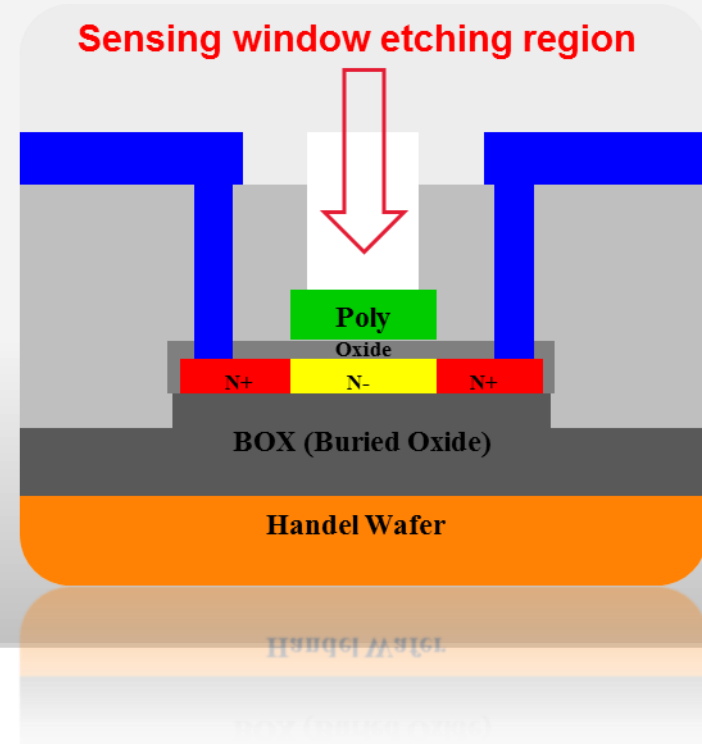
# Advantage3 : Differentiation Product



Base on normal Trench process



Full protect MOS



Biochip

## Advantage 4 : Very High Power Product



SOT227



IAP Half Bridge

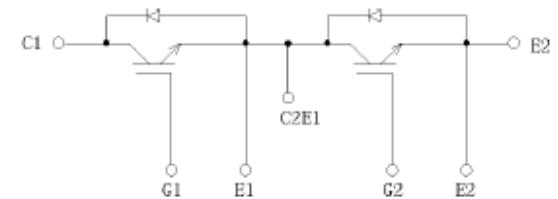
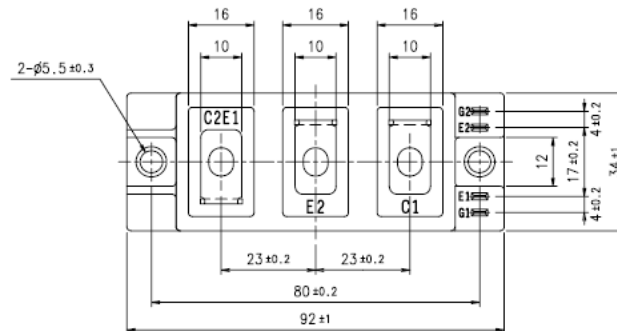
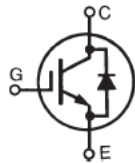
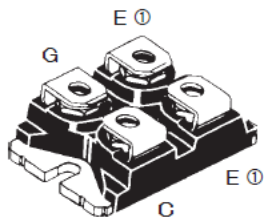


TO244AB

1. Potens support MOS , IGBT , Thyristor , FRED , SiC , GaN
2. Voltage Range : 60V , 100V , 200V , 600V , 1200V , 1700V and above
3. Application: Industrial , BMS , Automotive , Military

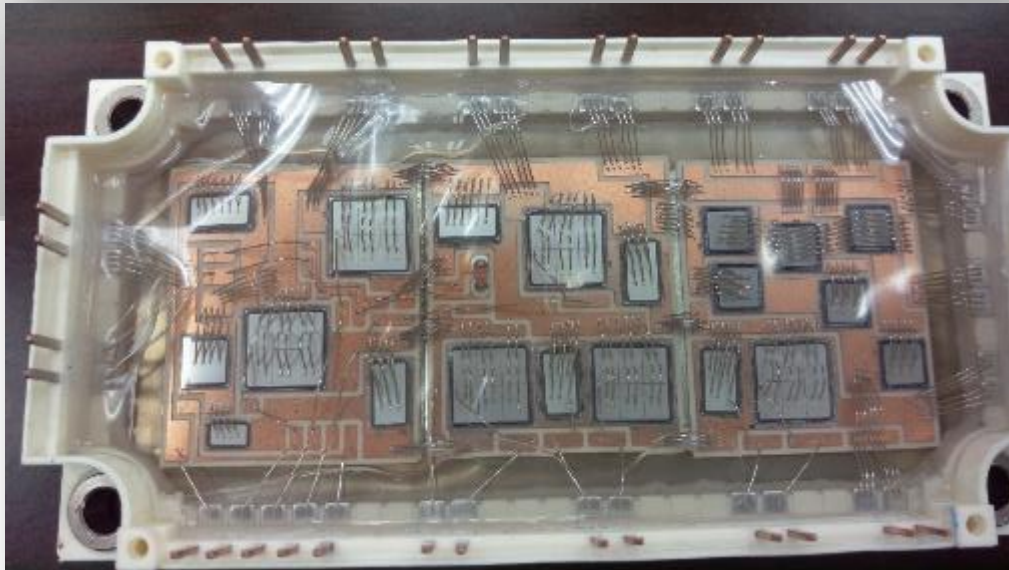
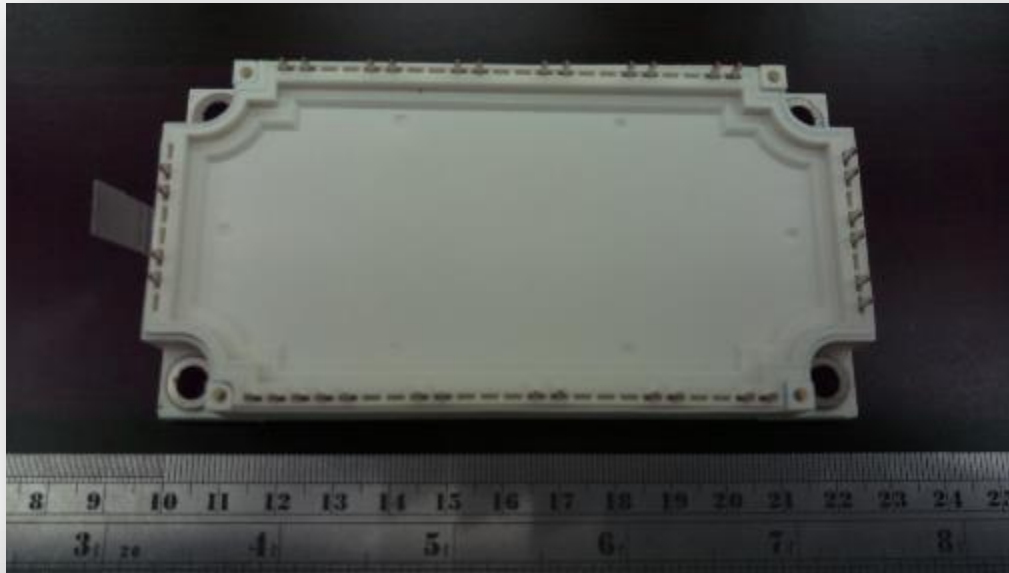
# Advantage 4 : Very High Power Product

P/N	Package	VCE (V)	IC (100°C) (A)	FRED
PBY100F65Z	SOT227	650V	100	YES
PBY75F125Z	SOT227	1250V	75	YES
PBY100F125Z	SOT227	1250V	100	YES
<b>PBY150F125Z</b>	<b>SOT227</b>	<b>1250V</b>	<b>150</b>	<b>No</b>
PBY100F65W2	IAP Half Bridge	650V	100	YES
PBY75F125W2	IAP Half Bridge	1250V	75	YES
PBY100F125W2	IAP Half Bridge	1250V	100	YES
PBY150F125W2	IAP Half Bridge	1250V	150	YES

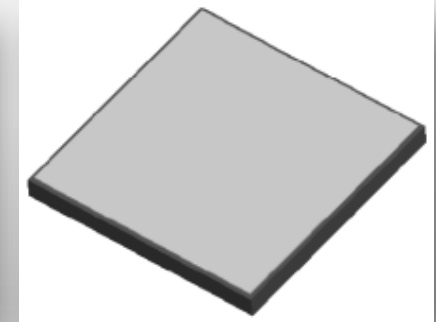
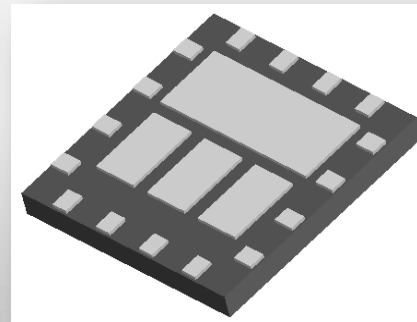
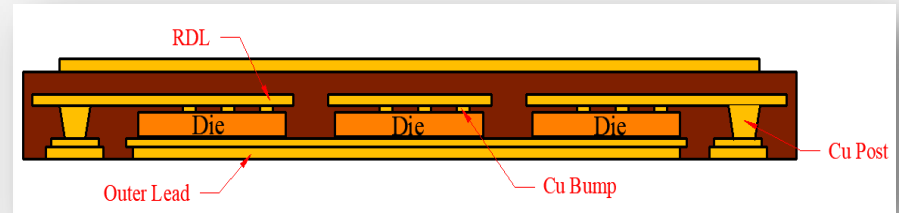
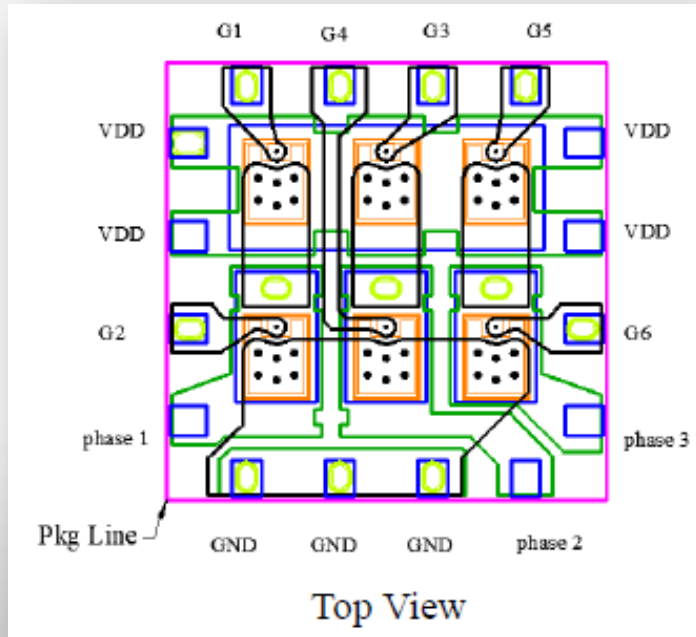


G = Gate, C = Collector, E = Emitter  
 ① either emitter terminal can be used as Main or Kelvin Emitter

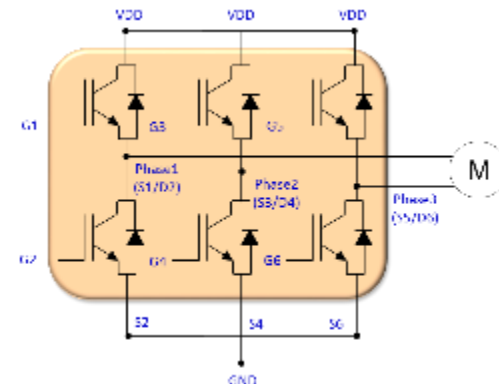
# Advantage 4 : Very High Power Product



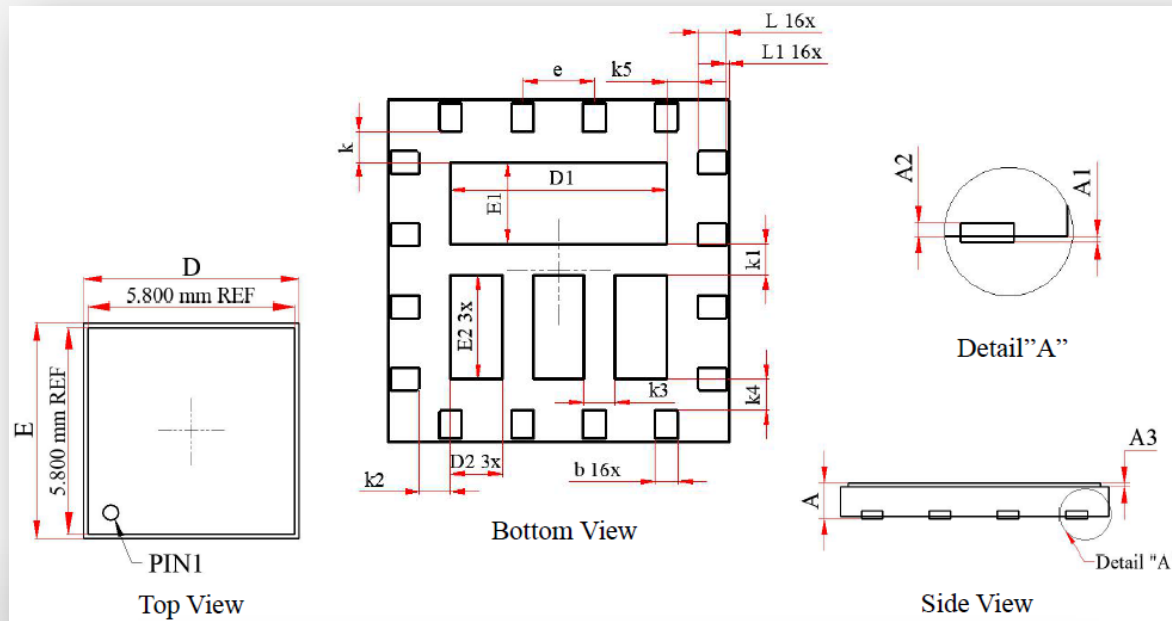
# Advanced MOS Module (6 in 1 @ DFN6X6)



1. For three phase motor drive application
2. Potens support any voltage
3. Potens support any package size
4. Space saving with excellent performance



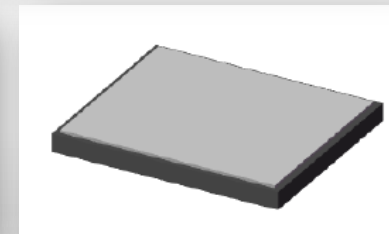
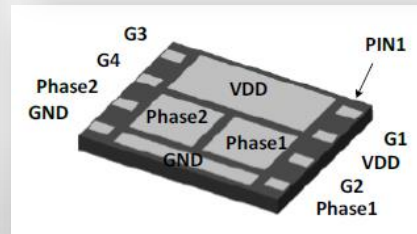
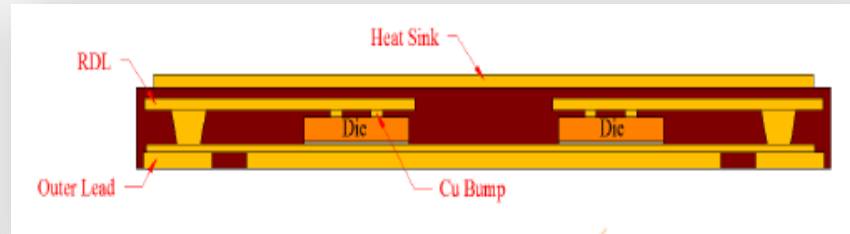
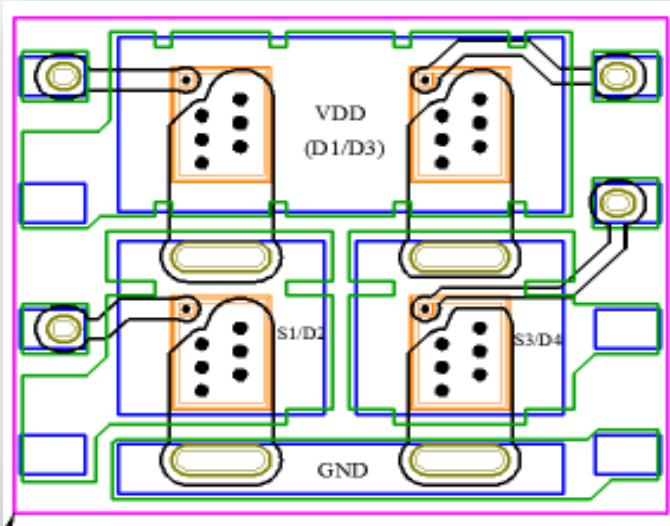
# Advantage 5 : Advanced MOS Module (6 in 1)



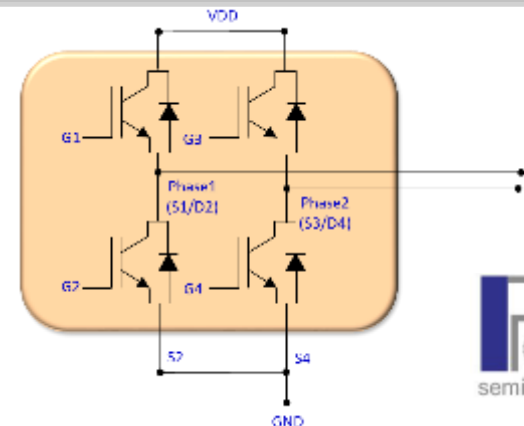
Symbol	Dimensions In Millimeters			Symbol	Dimensions In Millimeters		
	MIN	Normal	MAX		MIN	Normal	MAX
A	0.530	---	0.600	b	0.350	0.400	0.450
A1	---	---	0.005	L	0.450	0.500	0.550
A2	0.030	---	0.100	L1	0.010	0.050	0.090
A3	0.050	---	0.100	k	0.550 REF		
D	5.900	6.000	6.100	k1	0.550 REF		
E	5.900	6.000	6.100	k2	0.550 REF		
D1	3.700	3.800	3.900	k3	0.550 REF		
E1	1.325	1.425	1.525	k4	0.550 REF		
D2	0.800	0.900	1.000	k5	0.550 REF		
E2	1.725	1.825	1.925	e	1.27 BSC		

# Advantage 5 :

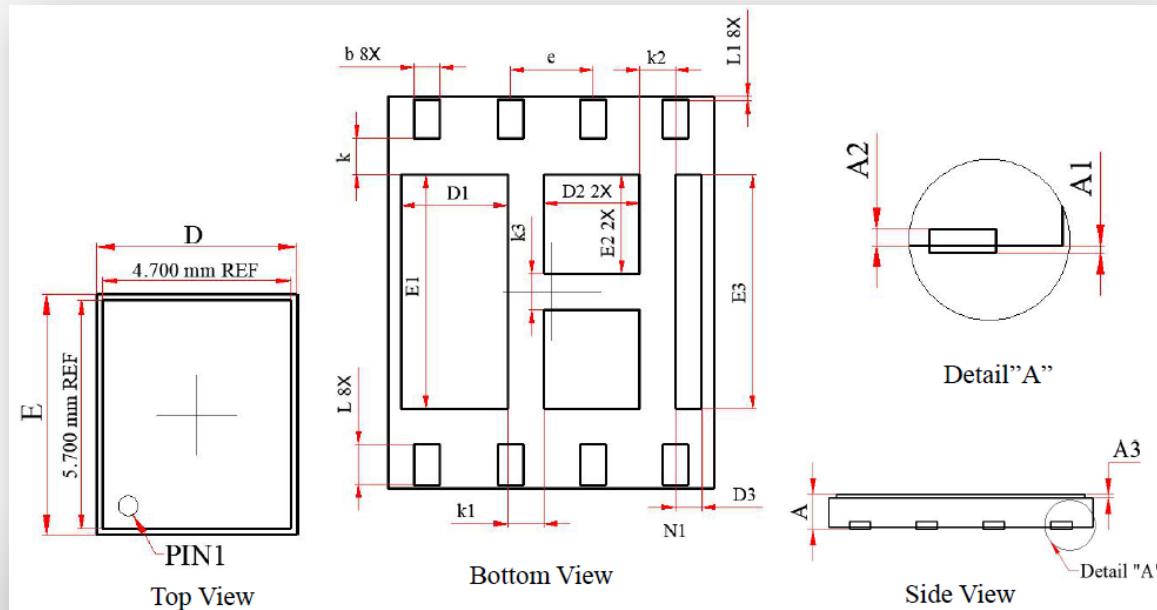
## Advanced MOS Module (4 in 1 @ DFN5X6)



1. For full bridge application
2. Potens support any voltage
3. Potens support any package size
4. Space saving with excellent performance



# Advantage 5 : Advanced MOS Module (4 in 1)

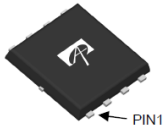
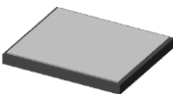
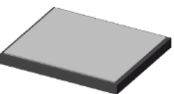
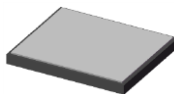


Symbol	Dimensions In Millimeters			Symbol	Dimensions In Millimeters		
	MIN	Normal	MAX		MIN	Normal	MAX
A	0.530	---	0.600	D3	0.300	0.400	0.500
A1	---	---	0.005	E3	3.500	3.600	3.700
A2	0.030	---	0.100	b	0.350	0.400	0.450
A3	0.050	---	0.100	L	0.550	0.600	0.650
D	4.900	5.000	5.100	L1	0.010	0.050	0.090
E	5.900	6.000	6.100	k	0.550 REF		
D1	1.525	1.625	1.725	k1	0.550 REF		
E1	3.500	3.600	3.700	k2	0.550 REF		
D2	1.375	1.475	1.575	k3	0.550 REF		
E2	1.425	1.525	1.625	e	1.27 BSC		

# Competitive Case 1

- 30V 6 in 1 MOS @ DFN6X6 (BLDC motor)



Vendor		AOS	Potens	Potens	Potens
P/N		AON6204	PDB3008HF6H	PDB3010HF6H	PDB3012HF6H
Package					
		DFN5X6	SuperDFN6X6	SuperDFN6X6	SuperDFN6X6
BVDSS	V	30	30	30	30
V <sub>th</sub>	V	1.4/1.9/2.4	1.2/1.6/2.5	1.2/1.6/2.5	1.2/1.6/2.5
RDSON @ 10V <sub>GS</sub>	mΩ	10/12	7/8.5	10/12	13.5/18
RDSON @ 4.5V <sub>GS</sub>	mΩ	14.5/18	10/13	14/18	18.5/24
Q <sub>gd</sub>	nC	1.4	1.3	2.5	2
R <sub>g</sub>	Ω	1.6	2.7	2.8	2.2
C <sub>iss</sub>	pF	510	850	670	370
EAS	mJ	22	45	34	18



AON6204



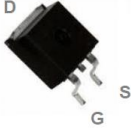
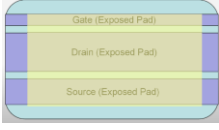
PDB3008HF6H



PDB3012HF6H

# Sub Case 1 – 100V 3 in 1 MOS (4G base station)



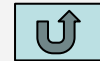
Vendor		Potens	Potens
P/N		PDH0980	3 in 1
Package			
		TO263-3	SuperDFN
BVDSS	V	100	100
Vth	V	1.2/1.8/2.5	1.2/1.8/2.5
RDS(on)	mΩ	3.5/3.9	1.1/1.4
Qgd	nC	28	84
Rg	Ω	1.9	0.65
Ciss	pF	6680	20000
EAS	mJ	378	1000


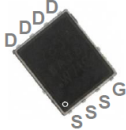
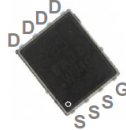

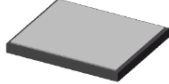
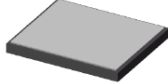


PDH0980

1. 4G base station needs huge quantity for BMS MOS in limited layout space
2. 3 in 1 MOS with the advantage of cost saving compared to 3 single MOS
3. Further evaluating solutions for cost reduction and heating issues

# Competitive Case 2 - 100V MOS @ PPAK5X6



Vendor		Infineon	Potens	Potens	Infineon	Potens	Potens
P/N		BSC050N10NS5	PDC0974X	Potens G2	BSC035N10NS5	PDB0980HX	Potens G2
Process		SGT	SGT G1	SGT G2	SGT	SGT G1	SGT G2
Package							
		SuperSO8	PPAK5X6	PPAK5X6	SuperSO8	SuperDFN5X6	SuperDFN5X6
BVDSS	V	100	100	100	100	100	100
Vth	V	2/3/3.8	1/1.6/2.5	1/1.6/2.5	2.2/3/3.8	2.2/3/4	2.2/3/4
RDSON @ 10V <sub>GS</sub>	mΩ	4.3/5	4.6/5.5	3.9/4.7	2.9/3.5	3.2/3.8	2.7/3.3
RDSON @ 4.5V <sub>GS</sub>	mΩ	---	6.2/7.8	5.5/7	---	4.5/5.5	3.8/5
Qgd	nC	11	20.8	16	14	28	22
Ciss	pF	3300	4570	4000	5000	5100	4500
EAS	mJ	155	320	300	398	605	580



BSC050N10NS5



PDC0974X


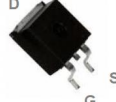



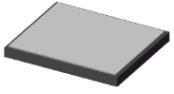


BSC035N10NS5

1. 100 N MOS mainly applied on BMS , PD , SR , QC
2. Potens 's 1<sup>st</sup> generation of SGT MOS PDC0974X / PDC0980X have already met customers' requirement
3. 2<sup>nd</sup> generation to further reduce RDSON

# Competitive Case 3 - 100V MOS @ Large Package



Vendor		Infineon	Potens	Infineon	Potens	Infineon	Potens
P/N		IPB020N10N5	PDH0080	IRF100P218	PDX0080	IPT015N10N5	Potens G2
Process		SGT	SGT G1	SGT	SGT G1	SGT	SGT G2
Package							
		TO263-3	TO263-3	TO247	TO247	HSOF8 (10X11.5)	SuperDFN10X11
BVDSS	V	100	100	100	100	100	100
Vth	V	2.5/3.3/4.1	1/1.5/2.5	2.2/-/3.8	1/1.5/2.5	2.2/3/3.8	1/1.5/2.5
RDSON	mΩ	1.8/2	1.8/2.2	1.1/1.28	1.8/2.2	1.3/1.5	1.4/1.7
Qgd	nC	141	56	65	56	34	45
Rg	Ω	44	1.1	0.6	1.1	1.4	1.1
Ciss	pF	650	13300	24000	13300	12000	11800
EAS	mJ	979	1050	1050	1050	775	1000



IPB020N10N5



PDH0080



IRF100P218





IPT015N10N5

1. Key requirements of min. RDSON and max. IAS for 48V auto BMS
2. Potens 1<sup>st</sup> generation of SGT MOS PDH0080 has met customers' spec
3. Continue to lower our RDSON for 2<sup>nd</sup> Generation of SGT MOS

# Competitive Case 4



## - 120V MOS for PD & Quick Charger (Google)

Vendor		Infineon	Potens
P/N		IPS110N12N3G	PDR50N12
Process		SGT	SGT
Package			
			TO251
BVDSS	V	120	120
V <sub>th</sub>	V	2002/3/4	1.5/2/2.5
RDSON @ 10V <sub>GS</sub>	mΩ	9.2/11	10.5/12.5
RDSON @ 4.5V <sub>GS</sub>	mΩ	---	14.5/18.5
Q <sub>gd</sub>	nC	12	8.4
R <sub>g</sub>	Ω	1.5	1.4
C <sub>iss</sub>	pF	3240	3750
EAS	mJ	120	200



IPS110N12N3G





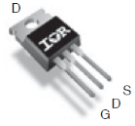


PDR50N12

1. 120V N MOS to strength the voltage de-rating per USA customer's request
2. SGT tech to optimize Q<sub>gd</sub> and Logic Level drive MOS to secure normal operation under 4.5V V<sub>GS</sub>.

# Competitive Case 5

– 150V MOS for Communication and 48V & Above BMS



Vendor		Infineon	Potens	Infineon	Potens	Potens
P/N		BSC520N15NS3G	PDC30N15X	IRFB4115PbF	PDP80N15	PDN02N15S
Process		SGT	Trench	Trench	Trench	Trench
Package						
		SuperSO8	PPAK5X6	TO220	TO220	SOT23-3
BVDSS	V	150	150	150	150	150
Vth	V	2/3/4	2/3/4	2/3/4	2/3/4	2/3/4
RDSON @ 10V <sub>GS</sub>	mΩ	42/52	52/65	9.3/11	10.5/13	380/480
RDSON @ 6V <sub>GS</sub>	mΩ	---	65/90	---	---	---
Qgd	nC	1.5	8	26	49	2.7
Rg	Ω	2.1	1.4	2.3	2	2
Ciss	pF	670	1790	5270	15100	350
EAS	mJ	60	242	830	280	---



BSC520N15N3G



PDC30N15X



IRFB4115PbF



PDP80N15



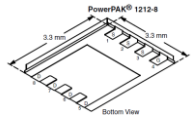

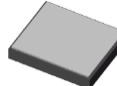
PDN02N15S

1. Trench process to optimize avalanche breakdown energy of EAS

2. SGT process for 150V MOS to be commercialized in 2019

# Competitive Case 6 – 30V PMOS @ DFN3X3 (Communication)



Vendor		Vishay	Potens	Potens
P/N		Si7615ADN	PDC2603AZ	PDC2603HZ
Package				
		PowerPAK 1212-8	PPAK3X3	SuperDFN3X3
BVDSS	V	-20	-20	-20
Vth	V	0.4/--/1.5	0.3/0.6/1	0.3/0.6/1
RDSON @ -10V <sub>GS</sub>	mΩ	3.5/4.4	4.6/5.5	3.8/4.6
RDSON @ -4.5V <sub>GS</sub>	mΩ	4.7/6	5.6/6.7	4.8/6
RDSON @ -2.5V <sub>GS</sub>	mΩ	7.7/9.8	7.7/9.8	7/9
Qgd	nC	14.2	10.2	10.2
Rg	Ω	2.2	---	---
Ciss	pF	5590	4060	4060



Si7615ADN





PDC2603AZ

1. Telecom customers request to achieve smallest RDSON under DFN3X3 small package type
2. Potens designed in those customers in only one month with optimized package and best dynamic parameters
3. Potens's also developing most SuperDFNX3X3 consistently and will surpass Si7615ADN when mass production

# Competitive Case 7

– 60V NMOS @ TO247 (Air Condition for Auto)



Vendor		Vishay	Potens
P/N		V50382	PMX130N06M
Package			
		TO247	TO247
BVDSS	V	60	60
Vth	V	2/--/4	2/2.8/4
RDSON @ 10V <sub>GS</sub>	mΩ	--/9	3.8/6
Qgd	nC	90	53.6
Rg	Ω	---	---
Ciss	pF	7400	6670
EAS	mJ	1000	2000
IAS	A	70	200



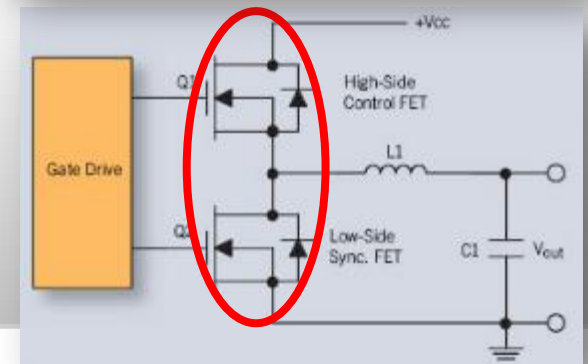
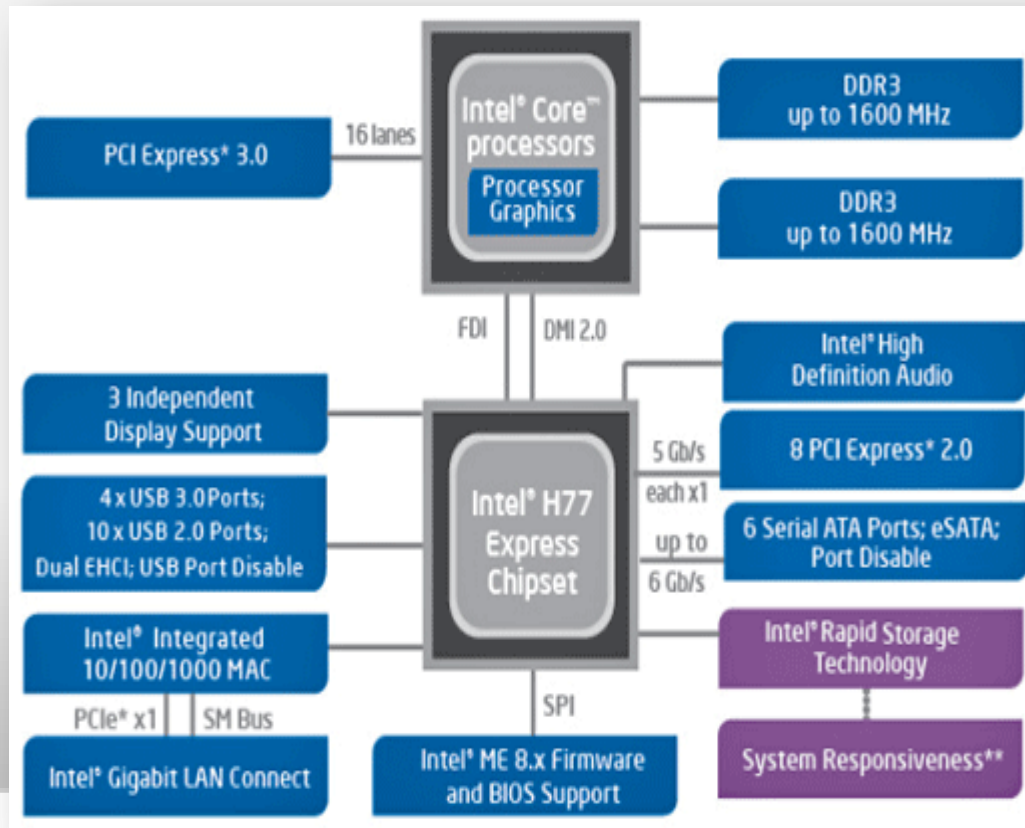
V50382



PMX130N06M

1. Potens with max. capability of IAS under suitable RDSON based on Auto customer's inquiry
2. Planar structure design to achieve Max. IAS and avalanche breakdown energy
3. Plan to mass production in 2019 after much efforts on auto qualification for 2 and half years

# Application Field - Low Voltage Trench MOS for VGA/MB/NB



## Technology

BVDSS	VGS	RDS(on)	Rsp	FOM
20~30V	$\pm 20\sim 25V$	2~30 m $\Omega$	< 10 m $\Omega\cdot\text{mm}^2$	<20 m $\Omega\cdot\text{nC}$

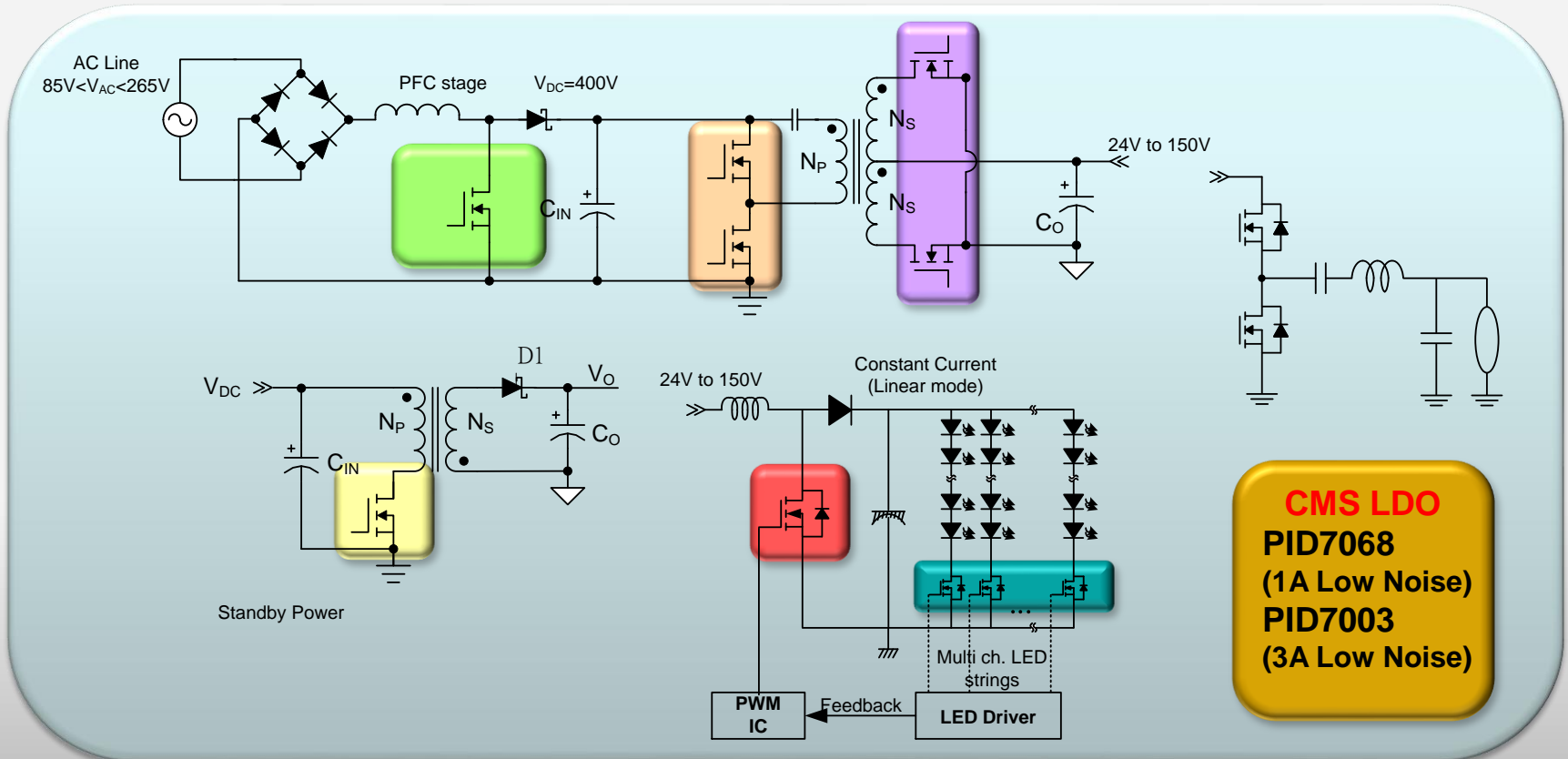
# Application Field - Low Voltage Trench MOS



P/N	Package	BVDSS (V)	VGS (V)	Vth (V)	RDSON (mΩ)		ESD
					10V	4.5V	
PDD3902	TO252	30V	± 20V	1/1.6/2.5	3	4	NO
PDD3904	TO252	30V	± 20V	1/1.6/2.5	4	6	NO
PDED3906	TO252	30V	± 20V	1/1.6/2.5	6	9	YES
PDED3908	TO252	30V	± 20V	1/1.6/2.5	9	14	YES
PDED3910	TO252	30V	± 20V	1/1.6/2.5	12	18	YES
PDED3912	TO252	30V	± 20V	1/1.6/2.5	18	28	NO
PDC3990X	PPAK5X6	30V	± 20V	1/1.6/2.5	1.2	2.2	NO
PDC3902X	PPAK5X6	30V	± 20V	1/1.6/2.5	3	4	NO
PDC3904X	PPAK5X6	30V	± 20V	1/1.6/2.5	4	6	NO
PDEC3906X	PPAK5X6	30V	± 20V	1/1.6/2.5	6	9	YES
PDEC3906Z	PPAK3X3	30V	± 20V	1/1.6/2.5	6	9	YES
PDEC3908Z	PPAK3X3	30V	± 20V	1/1.6/2.5	9	14	YES

- Benefit :
1. Excellent FOM & RSP
  2. ESD Protection inside
  3. Suitable for Vcore application in MB/VGA/NB
  4. 8" 0.18um Trench process for 750M Cell Density

# Application Field - TV/Monitor



## PFC

PDF14N65  
PDF12N50  
PDF09N50  
PDF07N50  
PDF05N50

## Switch

PDF14N65  
PDF12N65  
PDF09N65  
PDF07N65  
PDF04N65  
PMF04N60M

## 2<sup>nd</sup> SR

PDP4902  
PDP6974  
PDP8970  
PDP8974  
PDP0970  
PDP0974

## Standby

PDP04N65  
PDP03N65  
PDP02N65  
PDP01N65

## Boost

PDD0904  
PDD0958A  
PDD0910  
PDD0966  
PDD0954  
PDD0956

## Current Balance

PDL0910  
PDL0956  
PDL0954  
PDL6910  
PDL6912

# Application Field - 2nd SR Trench MOS

P/N	Package	BVDSS (V)	VGS (V)	Vth (V)	RDSON (mΩ)		ESD
					10V	4.5V	
PDP4902	TO220	40V	± 20V	1/1.6/2.5	2.2	3	NO
PDP6974	TO220	60V	± 20V	1/2/3	3.5	6.5	NO
PDP8970	TO220	80V	± 20V	1.2/2.2/3.5	2.6	---	NO
PDP8974	TO220	80V	± 20V	1.2/2/3	4.2	7	NO
PDP0970	TO220	100V	± 20V	1.2/2.2/3.5	4.5	---	NO
PDP0974	TO220	100V	± 20V	1.2/1.8/2.5	6.5	9	NO
PDC4902X	PPAK5X6	40V	± 20V	1/1.6/2.5	2.2	3	NO
PDC6974X	PPAK5X6	60V	± 20V	1/1.6/2.5	3.5	6.5	NO
PDC8974X	PPAK5X6	80V	± 20V	1.2/2/3	4.2	7	NO
PDC0974X	PPAK5X6	100V	± 20V	1/1.6/2.5	6.5	9	NO
PDC0902X	PPAK5X6	100V	± 20V	1/2/3	13	18	NO

# Application Field - LED Boost and Current Balance MOS

P/N	Package	BVDSS (V)	VGS (V)	Vth (V)	RDSON (mΩ)		ESD
					10V	4.5V	
PDD0904	TO252	100V	± 20V	1.2/1.6/2.5	55	60	NO
PDD0958A	TO252	100V	± 20V	2/3/4	85	---	NO
PDD0910	TO252	100V	± 20V	1.2/1.8/2.5	200	210	NO
PDD0966	TO252	100V	± 20V	1/2/3	18	38	NO
PDD0954	TO252	100V	± 20V	1.2/1.8/2.5	310	320	NO
PDD0956	TO252	100V	± 20V	1.2/1.6/2.5	115	120	NO
PDL0910	SOT223	100V	± 20V	1.2/1.8/2.5	185	195	NO
PDL0956	SOT223	100V	± 20V	1/1.6/2.5	120	130	NO
PDL0954	SOT223	100V	± 20V	1.2/1.8/2.5	310	320	NO
PDL6910	SOT223	60V	± 20V	1.2/1.8/2.5	60	70	NO
PDL6912	SOT223	60V	± 20V	1.2/1.8/2.5	75	90	NO

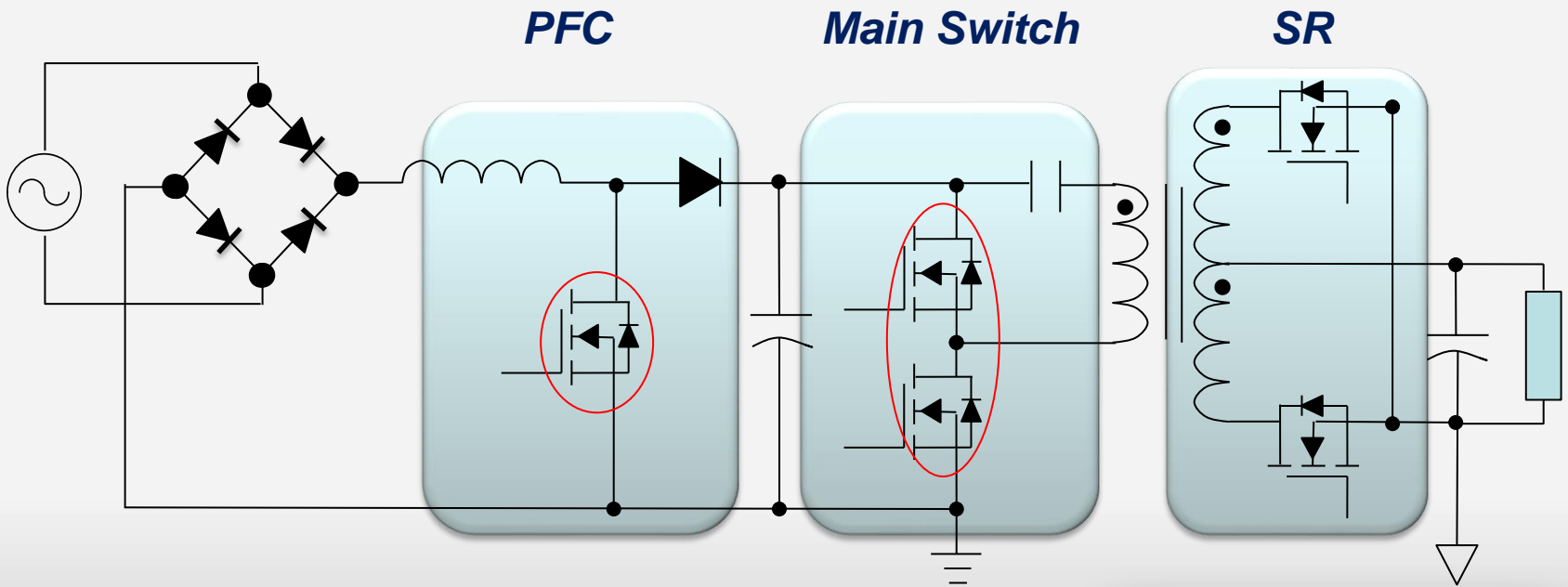
# Application Field- High Voltage Planar MOS Product List



P/N	Package	BVDSS (V)	VGS (V)	Vth (V)	RDSON ( $\Omega$ )
					@10V
PDN001N60	SOT23-3S	600V	$\pm 30V$	2/-/5	200/300
PDD/R01N65	TO252/251	650V	$\pm 30V$	2/-/5	9/12
PDD/R02N65	TO252/251	650V	$\pm 30V$	2/-/5	7.5/9
PMD/R02N65N	TO252/251	650V	$\pm 30V$	2/-/5	4.9/5.6
PDD/R03N65	TO252/251	650V	$\pm 30V$	2/-/5	4/5.22
PDD/R04N65	TO252/251	650V	$\pm 30V$	2/-/5	2.2/2.6
PMD/R04N65M	TO252/251	650V	$\pm 30V$	2/-/5	2.2/2.6
PDD/R07N65	TO252/251	650V	$\pm 30V$	2/-/5	1.2/1.6
PDD/R09N65	TO252/251	650V	$\pm 30V$	2/-/5	1/1.2
PDD/R12N65	TO252/251	650V	$\pm 30V$	2/-/5	0.82/0.95
PMP/F14N60M	TO220/F	600V	$\pm 30V$	2/-/5	0.55/0.67

*Potens also provide full series of 600V MOSFETs*

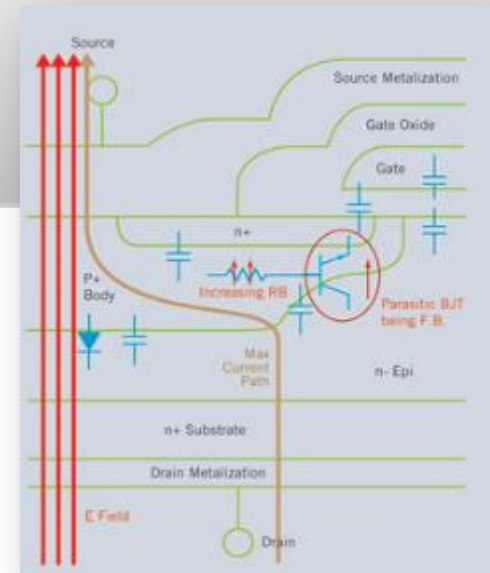
# Application Field - High Voltage Planar MOS for SMPS



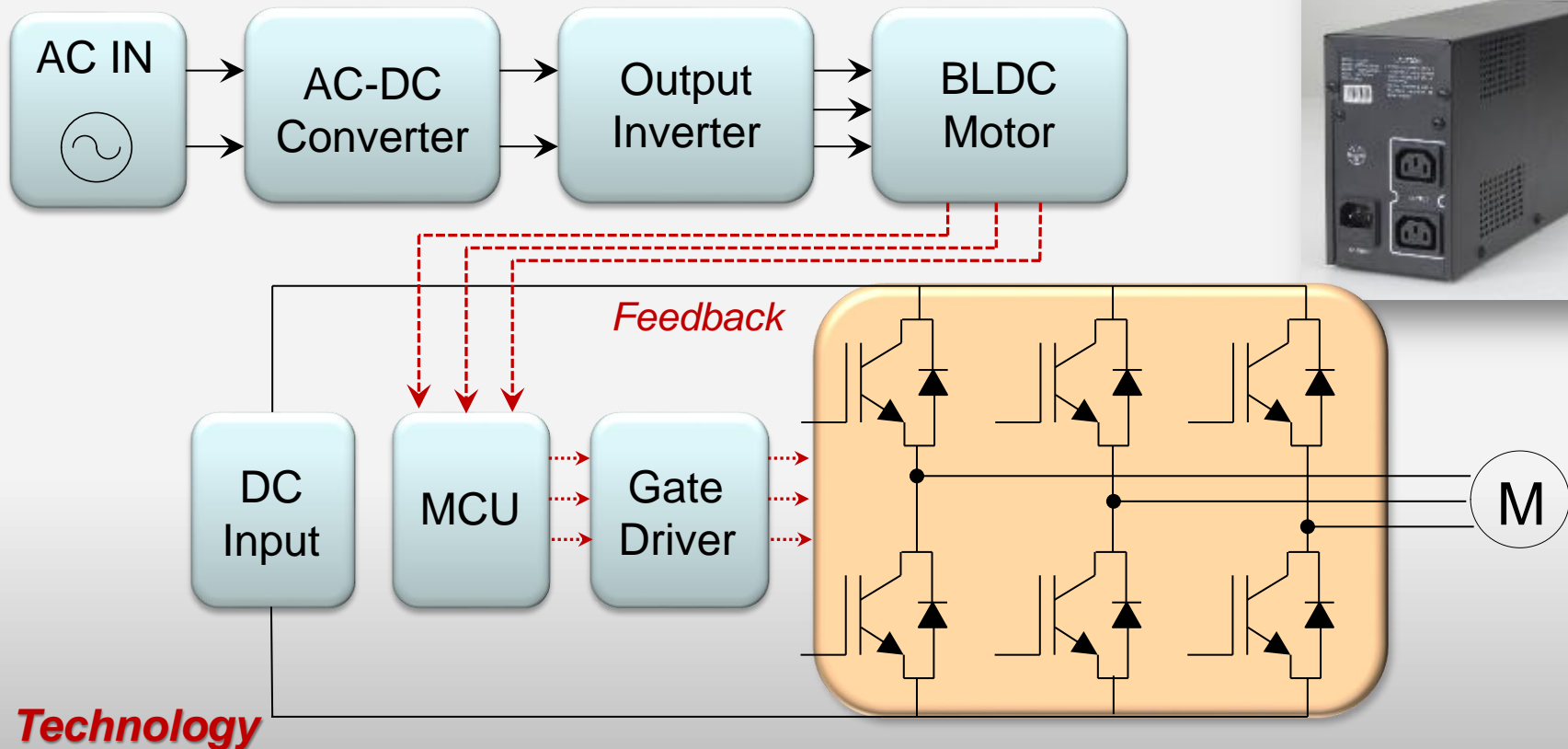
## Technology

BVDSS	VGS	RDS(on)	ID
500~800V	±30V	0.5~12 Ω	1~14A

Package	EAS
TO220/F, TO251, TO252, TO92	100% Tested



# Application Field - High Voltage Super Junction MOS & IGBT



BVDSS	VGS	RDSON	Vth	EAS
500~800V	±30V	165~410 mΩ	2~4V	100% Tested

## Applications

Server Power , SMPS , TV , UPS , PV Inverter , Telecom , Motor Drive

# Application Field

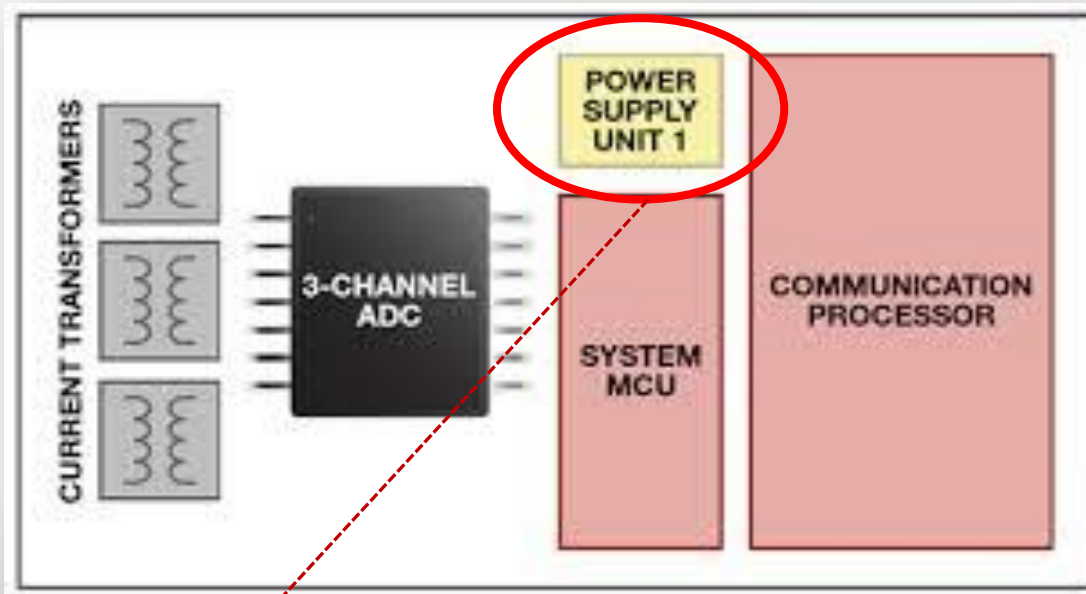
## - High Voltage Super Junction Product List

P/N	Package	BVDSS (V)	VGS (V)	Vth (V)	RDSON (m $\Omega$ )
					@10V
PJD04N60D	TO252	600V	$\pm 30V$	2/-/4	1000/1200
PJF15N60D	TO220F	600V	$\pm 30V$	2/-/5	270/295
PJP15N60D	TO220	600V	$\pm 30V$	2/-/5	270/295
PJD07N65L	TO252	600V	$\pm 30V$	2/-/4	510/570
PJF20N65D	TO220F	650V	$\pm 30V$	2/-/5	160/200
PJP20N65D	TO220	650V	$\pm 30V$	2/-/5	160/200
PJX17N80T	TO3P	800V	$\pm 30V$	2.5/-/4.5	260/350
PJP17N80T	TO220	800V	$\pm 30V$	2.5/-/4.5	260/350

# Application Field



## - High Voltage IGBT & MOS for Smart Meter



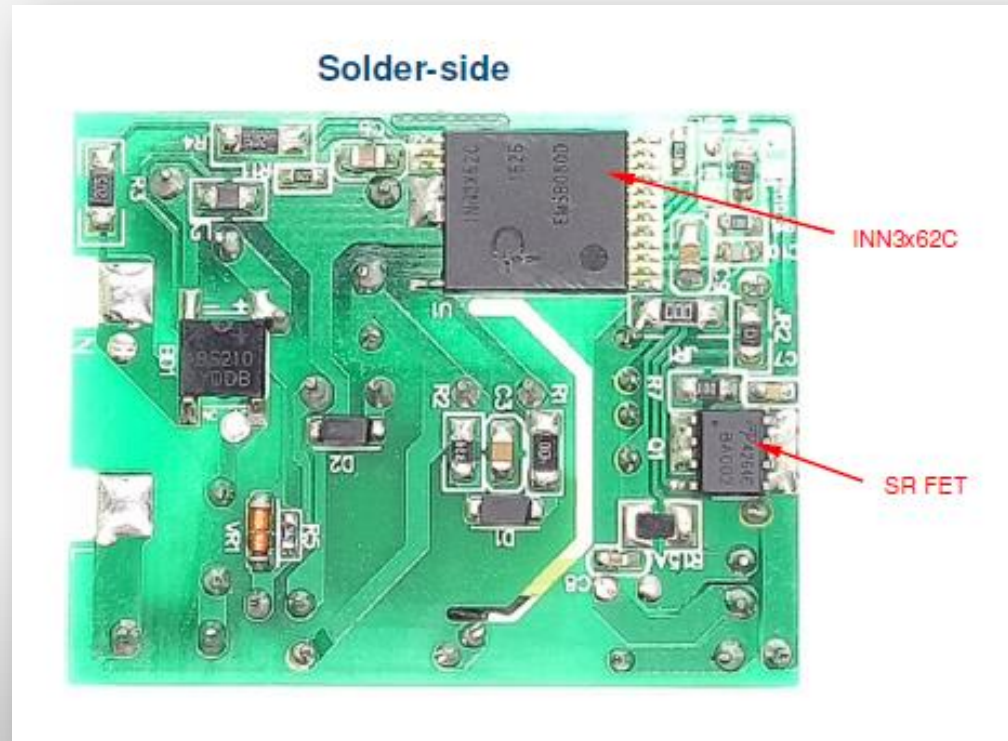
### IGBT

P/N	Package	VCES (V)	VGS (V)	VGE(th) (V)	VCE(sat)
					(V)
PBF02N120N	TO220F	1,200V	± 20V	2/-/4	2.1/2.3

### MOS

P/N	Package	BVDSS (V)	VGS (V)	Vth (V)	RDSON (Ω)
					@10V
PMF04N100T	TO220F	1,000V	± 30V	2/-/4	4.2/5.5

# Application Field - Cellphone Quick Charger



Step 1 : 60V MOS for SOP8 / PPAK5X6 / PPAK3X3

Step 2 : 65V MOS for SOP8 / PPAK5X6 / PPAK3X3

Step 3 : 100V MOS for SOP8 / PPAK5X6 / PPAK3X3

Step 4 : 120V /150V MOS for SOP8 / PPAK5X6 / PPAK3X3

# Step 1 : 60V MOS



Potens P/N	Package	Process	BVDSS (V)	RDSON(mΩ)		Ciss	Coss	Status
				10V	4.5V			
PDC6902X	PPAK5X6	N-Trench	60V	3.8/4.6	4.2/5.5	6805	445	1. Ready
PDC6960X	PPAK5X6	N-Trench	60V	4.6/5.6	5.3/7	4740	325	1. Ready
PDC6904X	PPAK5X6	N-Trench	60V	10/12	12/15	2100	165	1. Ready
PDC6964X	PPAK5X6	N-Trench	60V	13/17	16/20	1515	120	1. Ready
PDC6904Z	PPAK3X3	N-Trench	60V	10/12	12/15	2100	165	1. Ready
PDC6906Z	PPAK3X3	N-Trench	60V	17/21	20/24	1680	115	1. Ready
PDC6964Z	PPAK3X3	N-Trench	60V	13/15	16/19	1515	120	1. Ready
PDS6960	SOP8	N-Trench	60V	4.9/5.8	5.4/7	4740	325	1. Ready
PDS6904	SOP8	N-Trench	60V	10/12	12/15	2100	165	1. Ready
PDS6964	SOP8	N-Trench	60V	13/17	16/20	1515	120	1. Ready
PDS6906	SOP8	N-Trench	60V	17/21	20/24	1680	115	1. Ready

1. The most popular P/N : PDC6904X / PDC6904Z / PDS6904
2. PDC6986X-5 will replace PDC6904X for a cost down version
3. PDC6988X-5 will replace PDC6964X for a cost down version

# Step 2 : 65V MOS



P/N	Package	Process	BVDSS	Vth (V)	RDSON (mΩ)		Ciss (pF)	Coss (pF)	Crss (pF)
					10V	4.5V			
PDC6974X-5	PPAK5X6	SGT	65V	1/1.6/2.5	2.3/2.8	4.2/5.4	4780	1365	51
PDC6978X-5	PPAK5X6	SGT	65V	1/1.6/2.5	2.8/3.5	4.3/6	3590	1130	30
PDC6976X-5	PPAK5X6	SGT	65V	1/1.6/2.5	3.4/4.2	5.4/7.2	2976	950	24
PDC6982X-5	PPAK5X6	SGT	65V	1/1.6/2.5	4.6/5.6	8.2/10.5	1910	520	30
PDC6986X-5	PPAK5X6	SGT	65V	1/1.6/2.5	9.6/11.5	16/20.5	945	275	26
PDC6988X-5	PPAK5X6	SGT	65V	1/1.6/2.5	13.6/16	24.5/30	653	192	27
PDC6982Z-5	PPAK3X3	SGT	65V	1/1.6/2.5	6/7.2	9.6/12.5	1910	520	30
PDC6986Z-5	PPAK3X3	SGT	65V	1/1.6/2.5	9/10.8	16.3/19.5	945	275	26
PDC6988Z-5	PPAK3X3	SGT	65V	1/1.6/2.5	12.6/16	23/30	653	192	27
PDS6976-5	SOP8	SGT	65V	1/1.6/2.5	3.7/4.5	5.7/7.5	2976	950	24
PDS6982-5	SOP8	SGT	65V	1/1.6/2.5	5.5/6.5	8.5/11	1910	520	30
PDS6986-5	SOP8	SGT	65V	1/1.6/2.5	9.4/11.3	15.6/20.5	945	275	26
PDS6988-5	SOP8	SGT	65V	1/1.6/2.5	13/16	23/30	653	192	27

1. All 65V products using the SGT highly technology

# Step 3 : 100V MOS



P/N	Package	Process	BVDSS	Vth (V)	RDSON (mΩ)		Ciss (pF)	Coss (pF)	Crss (pF)
					10V	4.5V			
PDC0974X	PPAK5X6	SGT	100V	1/1.6/2.5	4.6/5.5	6.2/7.8	4570	1180	49
PDC0978X	PPAK5X6	SGT	100V	1/1.6/2.5	6/7.2	8.8/11.2	3250	867	58
PDC0976X	PPAK5X6	SGT	100V	1/1.6/2.5	7.2/9.2	10.8/14	2250	410	25
PDC0982X	PPAK5X6	SGT	100V	1/1.6/2.5	11/13.5	15.9/21	1640	240	4
PDC0986X	PPAK5X6	SGT	100V	1/1.6/2.5	---	---	---	---	---
PDC0988X	PPAK5X6	SGT	100V	1/1.6/2.5	---	---	---	---	---
PDC0982Z	PPAK3X3	SGT	100V	1/1.6/2.5	11.3/13.6	16.7/22	1640	240	4
PDC0986Z	PPAK3X3	SGT	100V	1/1.6/2.5	---	---	---	---	---
PDC0988Z	PPAK3X3	SGT	100V	1/1.6/2.5	---	---	---	---	---
PDS0978	SOP8	SGT	100V	1/1.6/2.5	7.2/8.5	9.8/12.4	2900	450	5
PDS0976	SOP8	SGT	100V	1/1.6/2.5	7.6/9.2	10.8/14	2250	410	25
PDS0982	SOP8	SGT	100V	1/1.6/2.5	12/14.5	16.4/21	1640	240	4
PDS0986	SOP8	SGT	100V	1/1.6/2.5	---	---	---	---	---
PDS0988	SOP8	SGT	100V	1/1.6/2.5	---	---	---	---	---
PDR0976	TO251	SGT	100V	1/1.6/2.5	7.4/9.2	10.6/14	2250	410	25

1. PDC0982Z can support to PPAK3X3 package and will be a cost down solution

## Step 4 : 120V / 150V MOS

Potens P/N	Package	Process	BVDSS (V)	RDSON(mΩ)		Ciss	Coss	Status
				10V	4.5V			
PDC0978X-12	PPAK5X6	Double Gate	120V	--/12	--/16	---	---	1. Creating
PDC0978X-15	PPAK5X6	Double Gate	150V	--/18	--/24	---	---	1. Planning
PDS0978-12	SOP8	Double Gate	120V	--/12	--/16	---	---	1. Creating
PDS0978-15	SOP8	Double Gate	150V	--/18	--/24	---	---	1. Planning

1. PDC0978X-12 under wafer process running
2. PDC0978X-15 just under planning