英飞凌之低电压功率晶体管技术

- 低电压功率晶体管结构
- 晶粒技术发展
- 封装技术发展
- 双层冷却封装之功率晶体管 – CanPAK
- 英飞凌之低电压功率晶体管
- 总结

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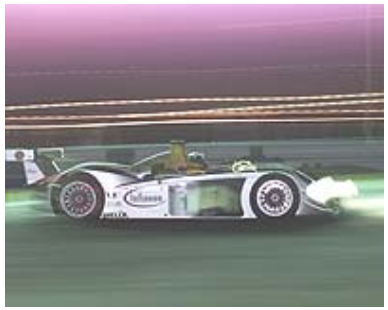
电源产品设计需求

- 高功率密度
- 高转换效率
- 较佳的效能/成本比

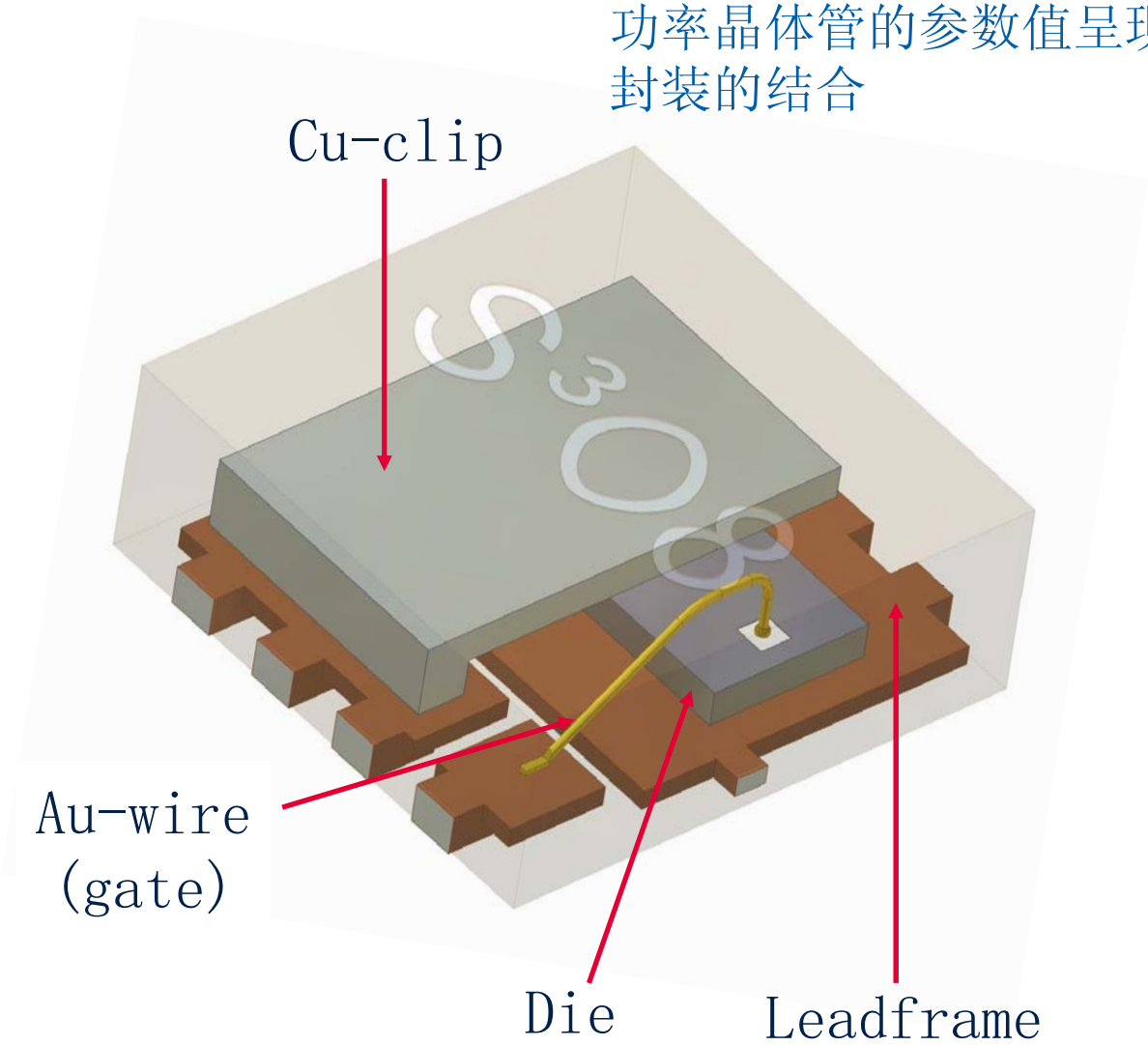


晶粒技术

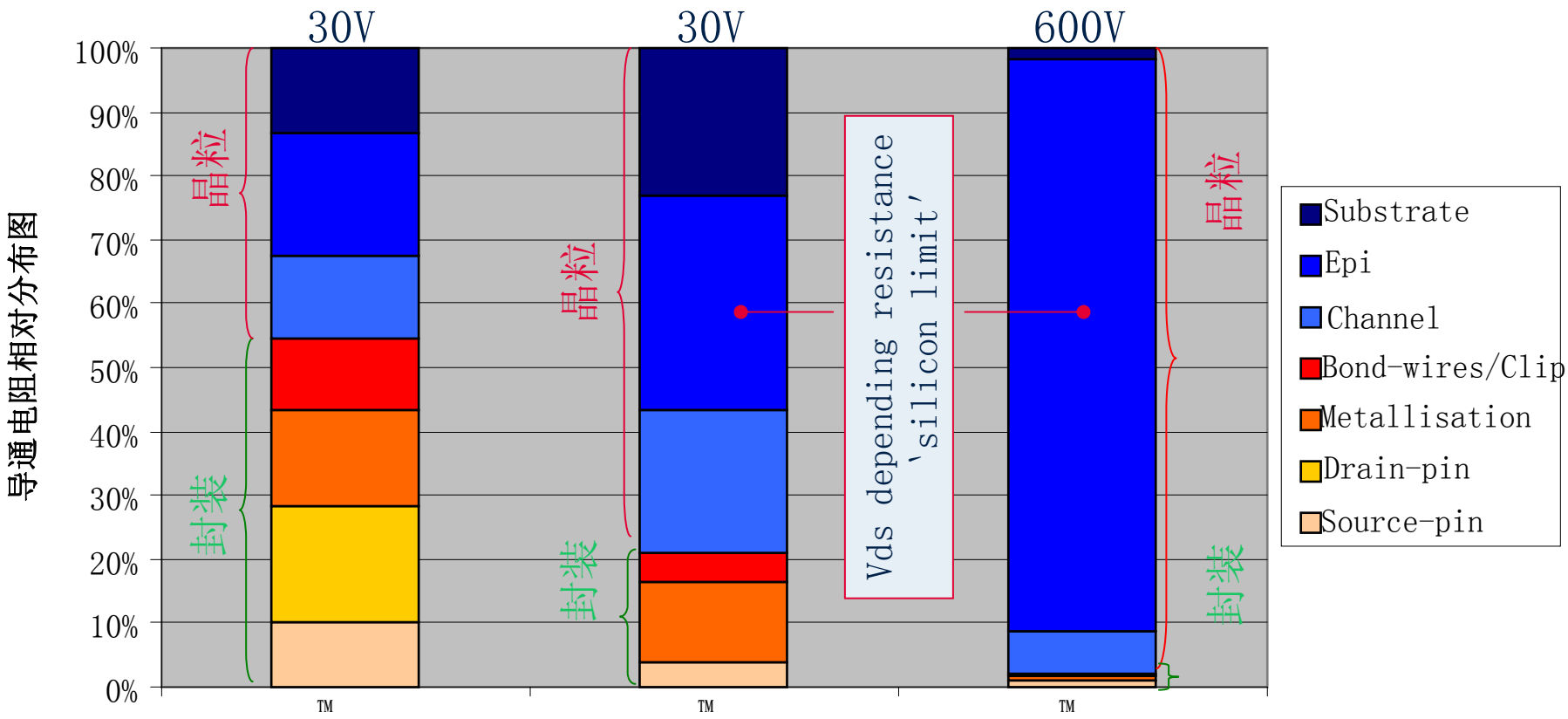
封装技术

功率晶体管结构　SuperS08

功率晶体管的参数值呈现来自晶粒及封装的结合



晶体管导通电阻分布图



- 在低电压功率晶体管中，封装电阻在整体导通电阻中所占比例较大
- 在高电压功率晶体管中，晶粒导通电阻在整体导通电阻中所占比例较大
- 其中晶粒导通电阻中之Epi层电阻正比于 Vds2.5 (silicon limit)

低电压功率晶体管结构

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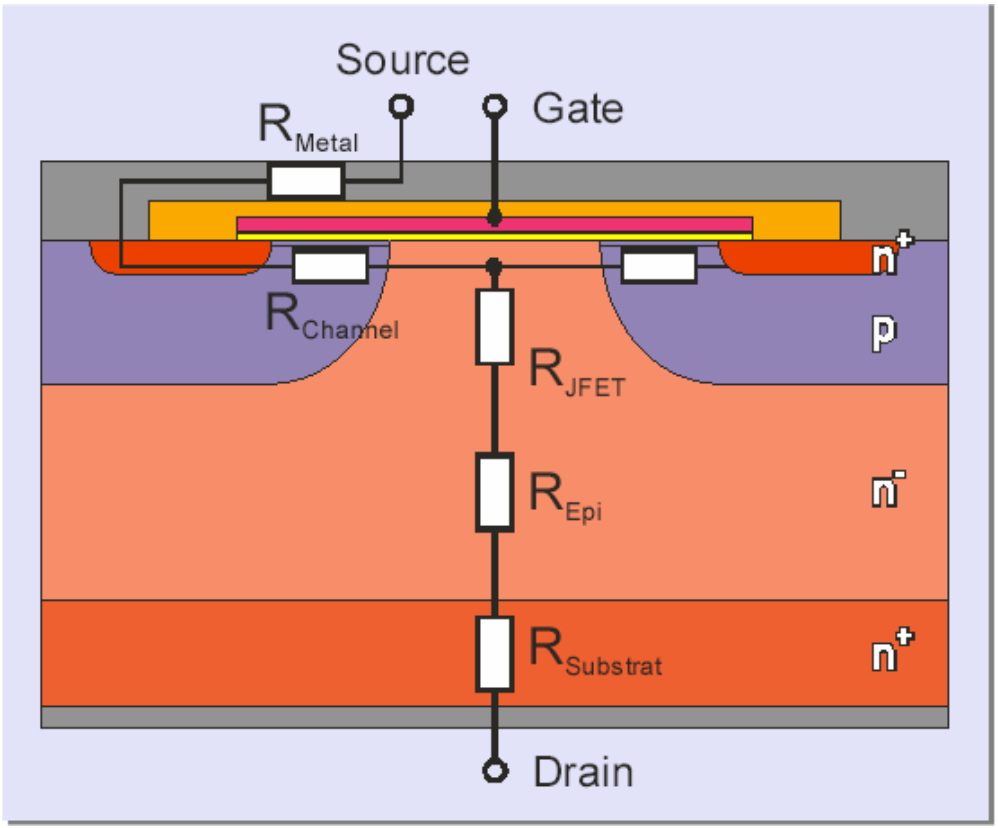
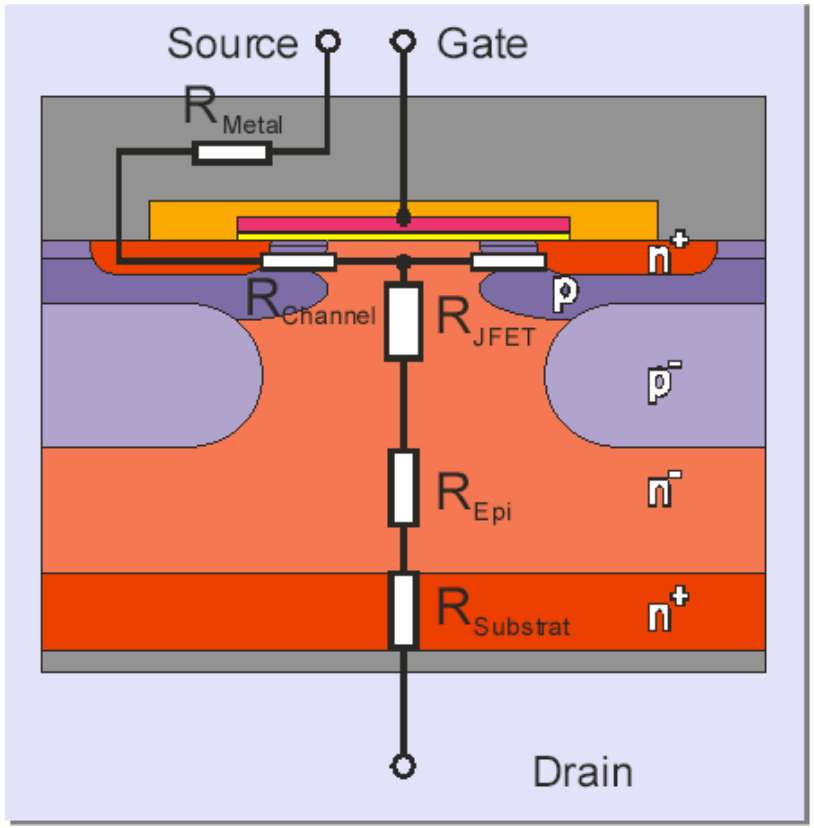
低电压功率晶体管发展演进

标准平面(Planar)扩散型功率晶体管



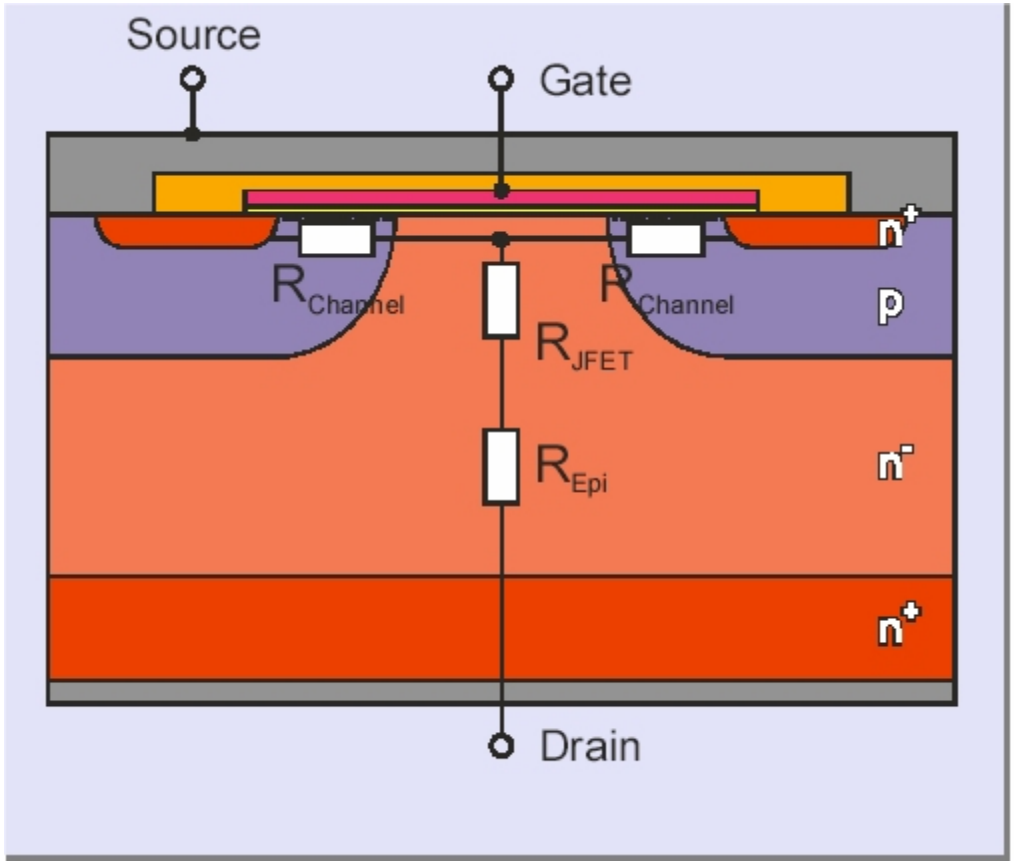
改良平面扩散型功率晶体管



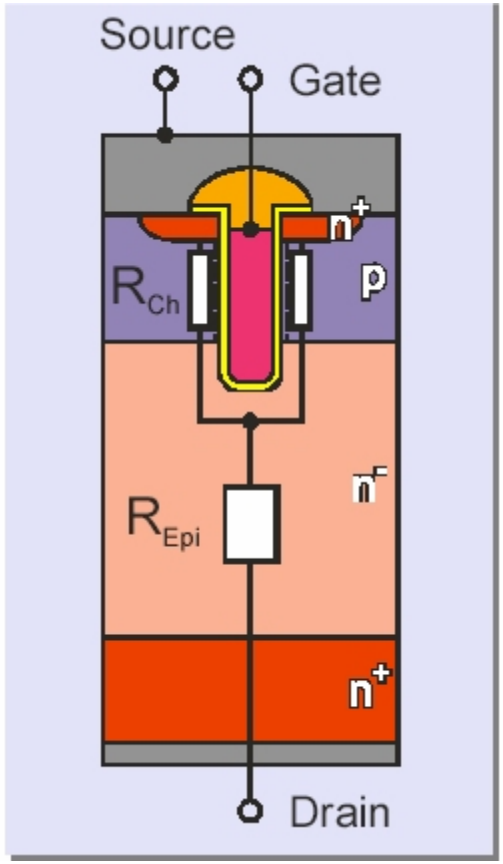
改善
- $R_{Channel}$
- R_{JFET}
- R_{Epi}

低电压功率晶体管发展演进 – II

平面扩散型

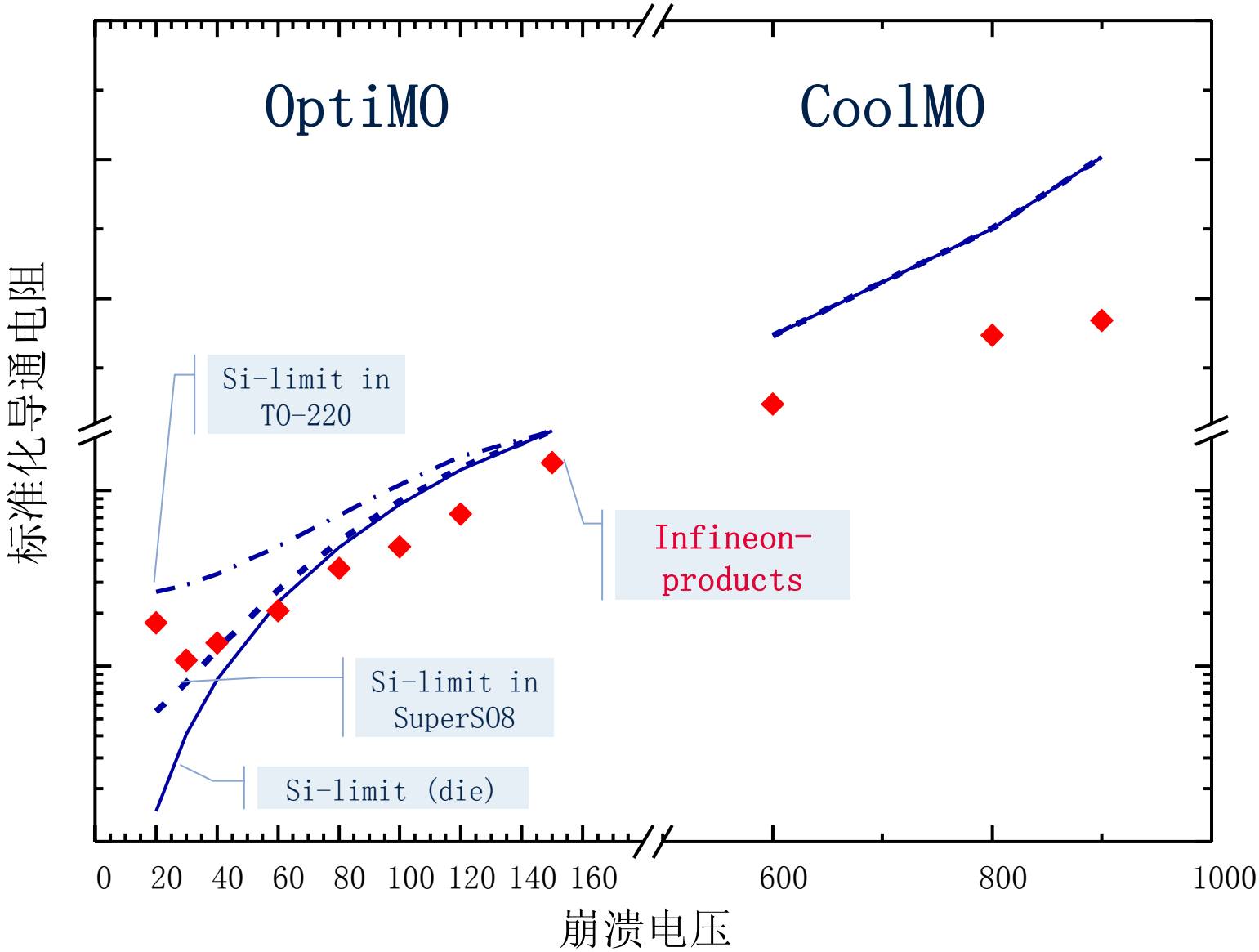


标准沟槽式(Trench)



消除 RJFE
改进

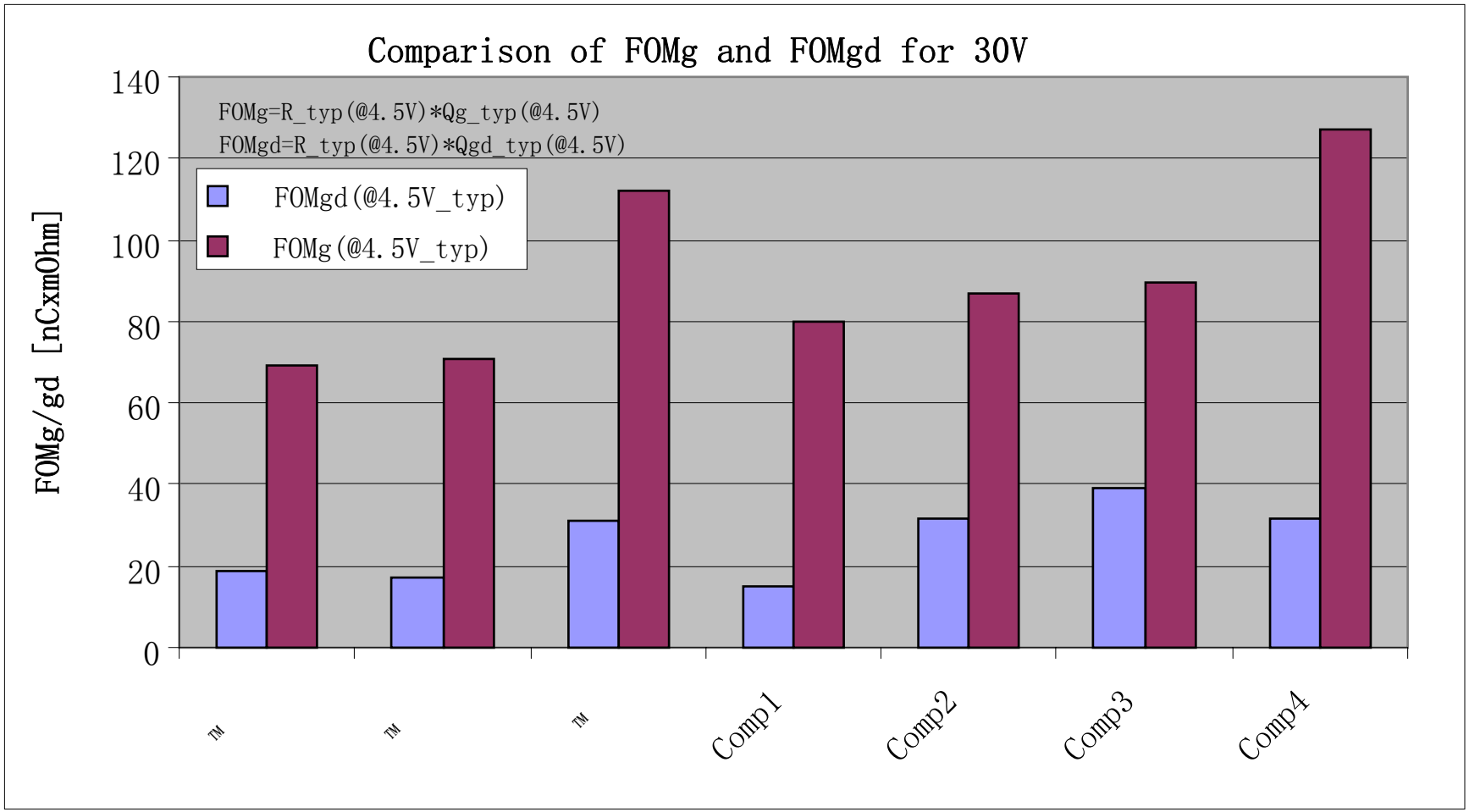
硅限制(Si-limit)及英飞凌之功率晶体管



30V功率晶体管之优质化系数比较图

优质化系数 Figure-Of-Merit (FOMg)=Qg×RDSon

(FOMgd)=Qgd×RDSon



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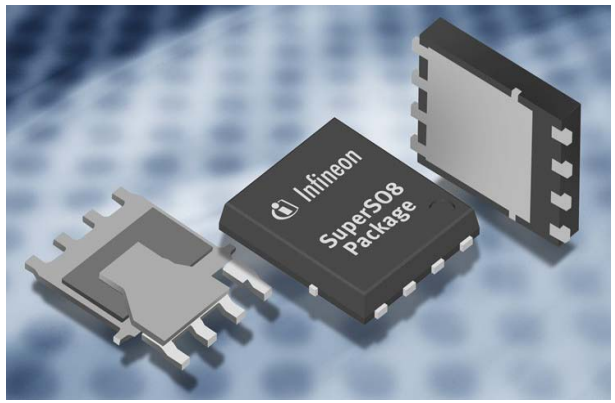
无引线功率晶体管封装

Leadless

SuperSO8

Shrink Super SO8

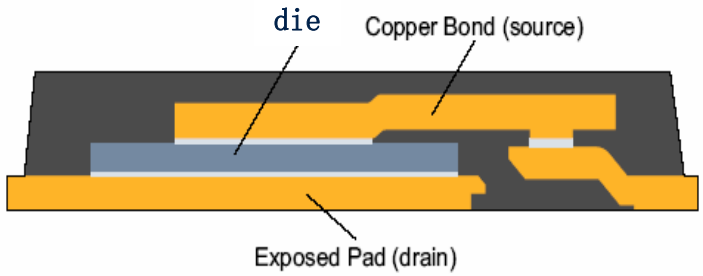
CanPAK



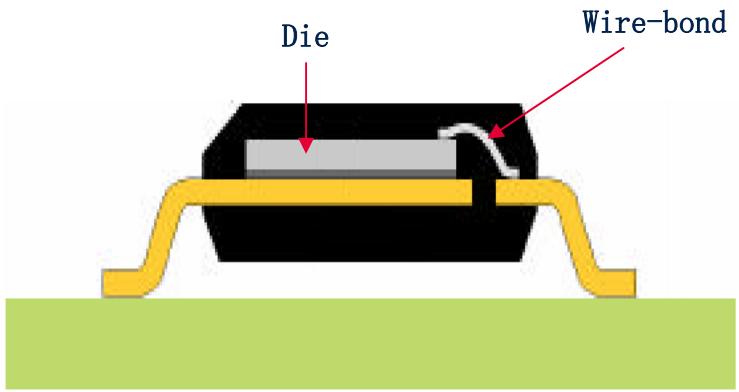
*DirectFET(R) is a trademark of international rectifier corporation; DirectFET(R) technology is licensed from international rectifier corporation

封装技术概述

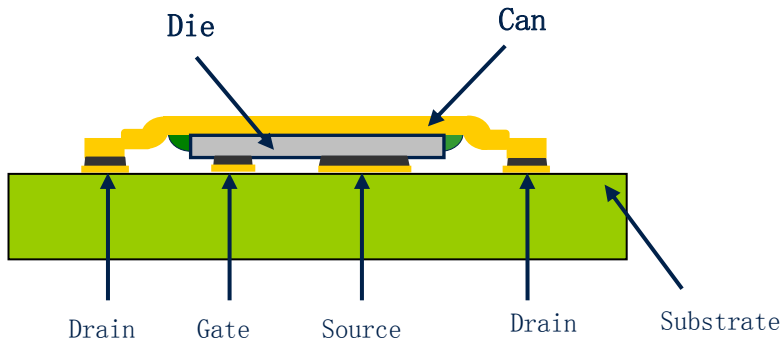
SuperS08



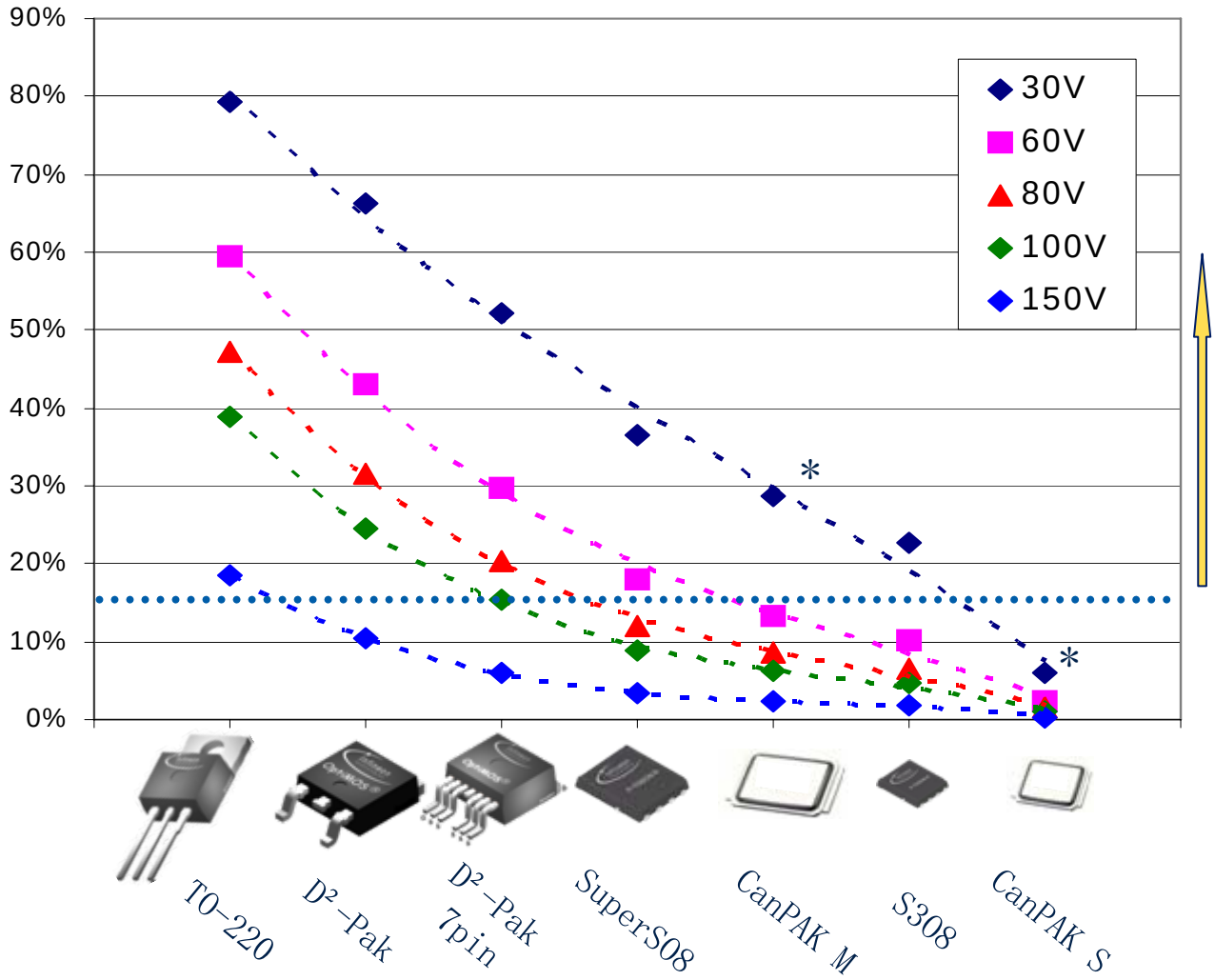
S08



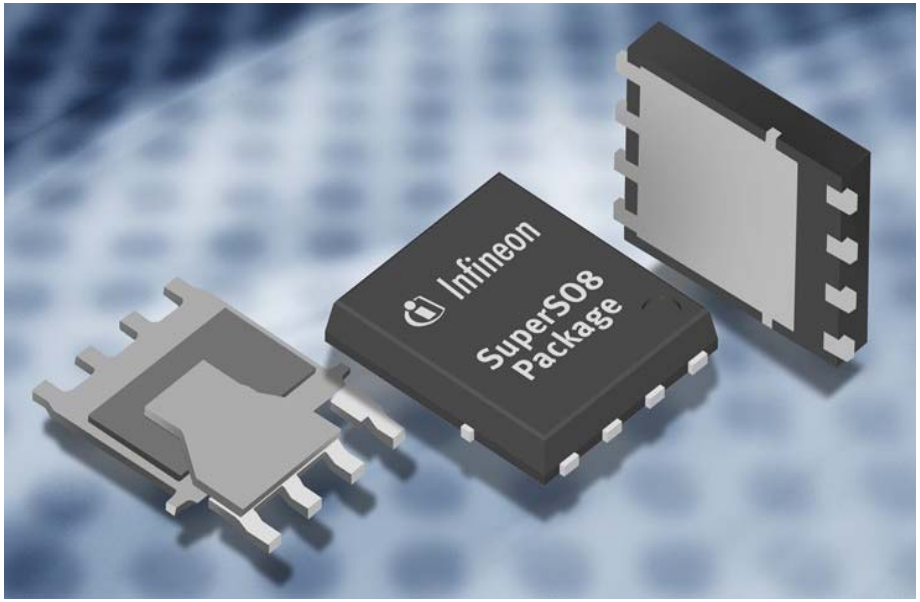
CanPAK



封装寄生电阻对总导通电阻之贡献度



SuperS08封装的特色



特色	
VDS	250V
ID max	100 A
Rpackage	0.2 mW
Rthjc	1 K/W
Tjmax	150° C

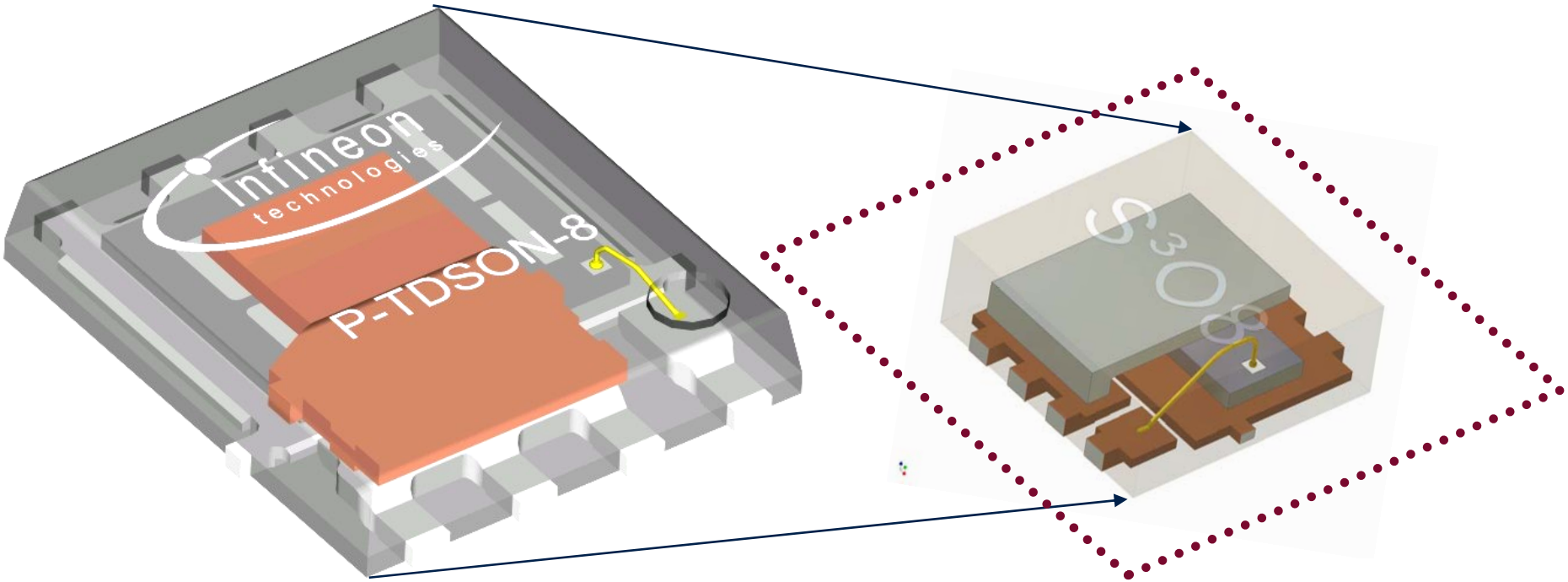
最佳化的封装设计，达到高功率密度系统设计要求

小型化封装	小型化电源产品设计
低封装电阻	降低导通损耗
低封装电感	降低切换损失

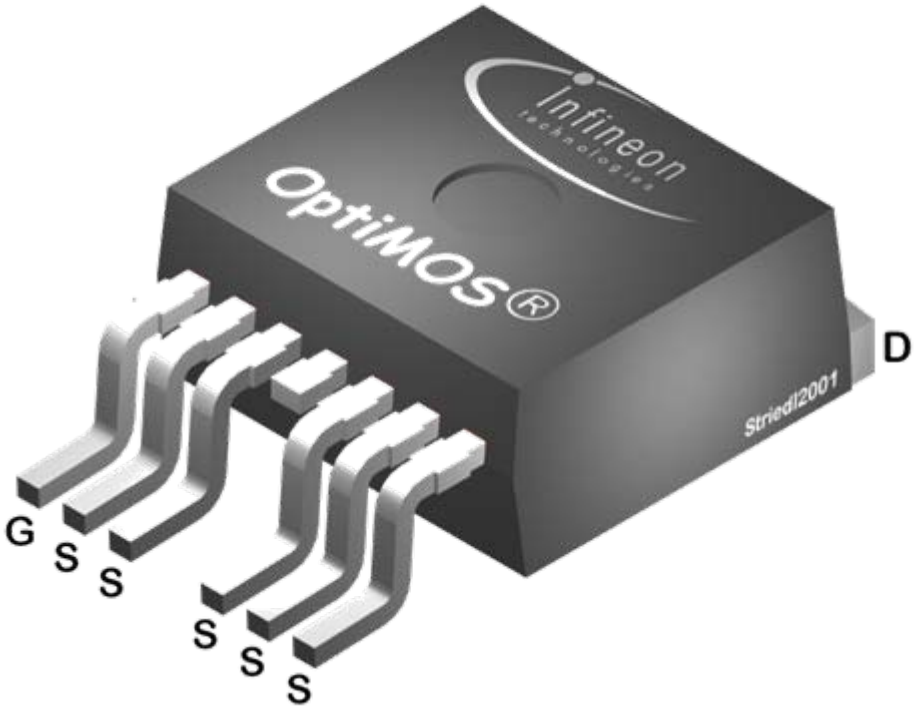
S308封装

为最高功率密度之封装

SuperS08 → S308(11mm²)



D2-Pak 7Pin 封装技术



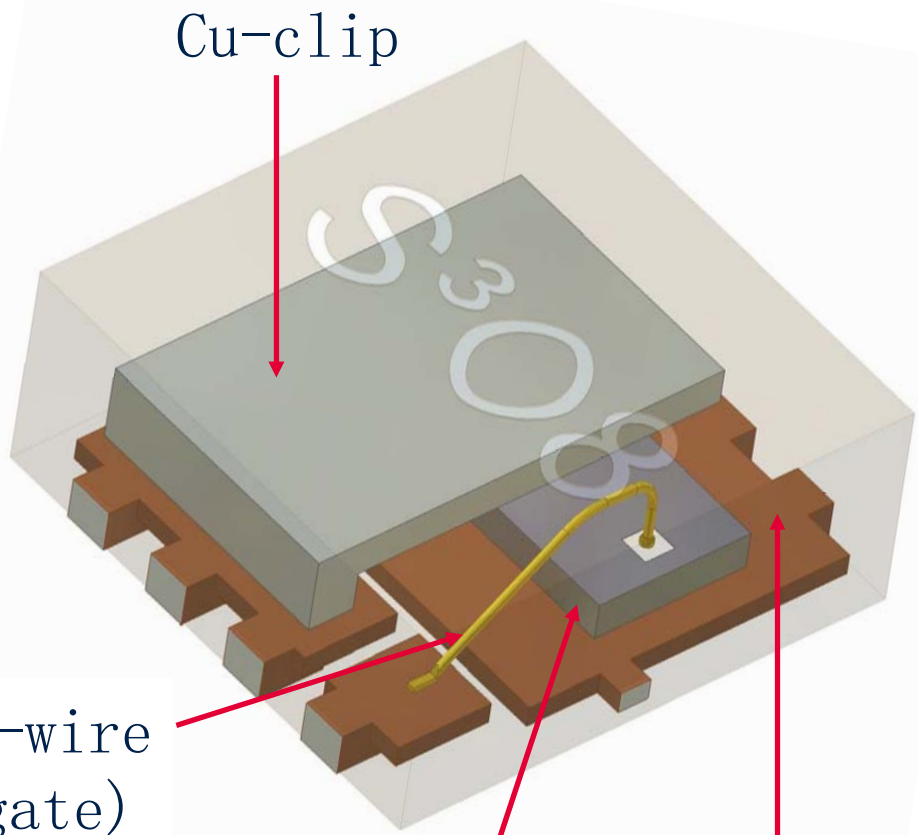
封装大小
标准D2-Pak

封装技术电气特色
达到180A的电流导通能力

可靠度
极低的热阻very low Rth
极大的源极连接，不易在内部造成热点

世界最低导通电阻之功率晶体管!!
IPB009N03L G
0.95mOhmmax; 30V

S308封装技术



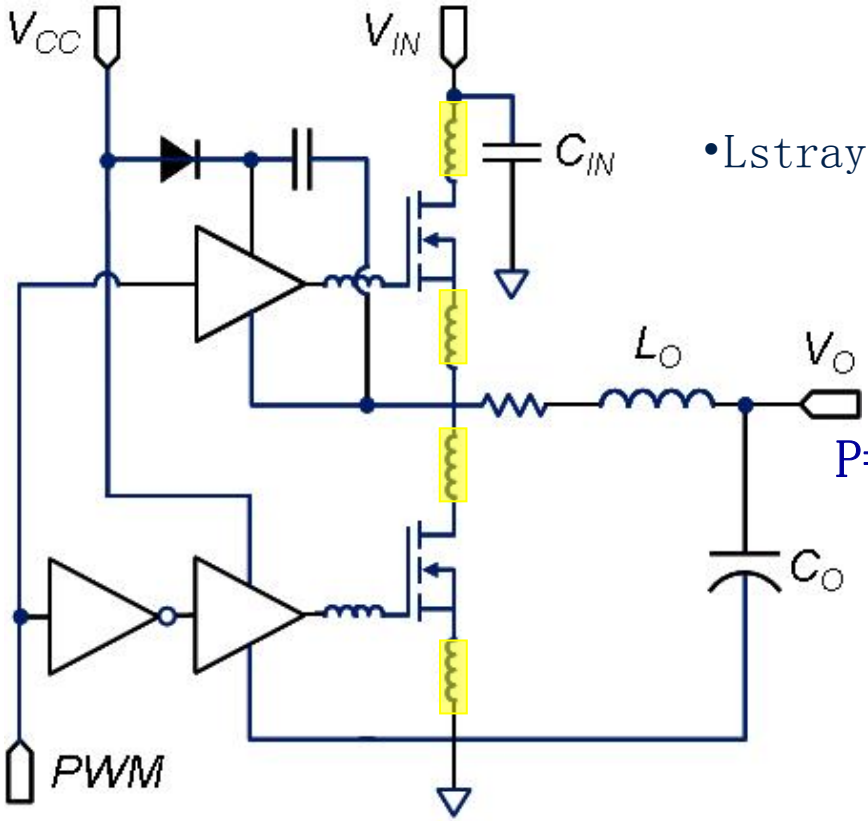
内部采引线夹(clip)接线方式
极低的封装电阻
极低的封装电感
大电流导通能力

裸晶粒下之各式封装参数比较表

	封装电感	封装电阻	上层冷却能力	下层冷却能力	并联使用难易度
SO8 	1.5nH	2.3mΩ	否	否	普通
SSO8 	0.6nH	0.2mΩ	受限制	是	普通
S308 	0.5nH	0.3mΩ	受限制	是	易
CanPAK SQ 	0.3nH	0.2mΩ	是	是	易
CanPAK MX 	0.3nH	0.2mΩ	是	是	易
DPAK 	3.8nH	0.5mΩ	否	是	普通

- 封装寄生电感影响切换速度及寄生电感存贮之能量
- 封装寄生电值影响等效导通电阻

寄生电感的影响



•Lstray：回路之总寄生电感值，来自封装及及线路

寄生电感之存贮能量为

$P = f_{sw} * E_{stray} =$

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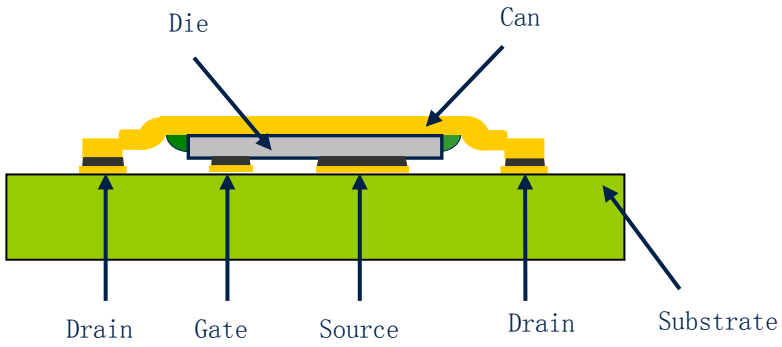
总结

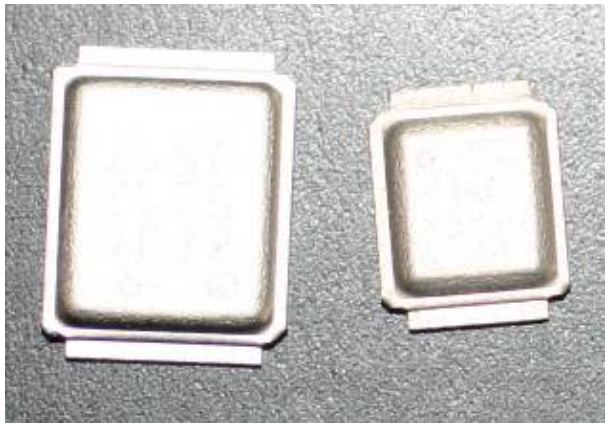
英飞凌之首颗双层散热封装功率晶体管- CanPAK

- 产品特色
- 符合国际规范要求
- 高效能上层冷却能力(低热阻 Rth(J-C))
- 无引线封装
- 极低之封装电感值
- 极低之封装电阻值
- 极佳的优质化系数表现

- 产品优势
- 易于散热
- 提高系统效率
- 功率晶体管的高速切换及高频操作
- 易于并联使用

CanPak概述

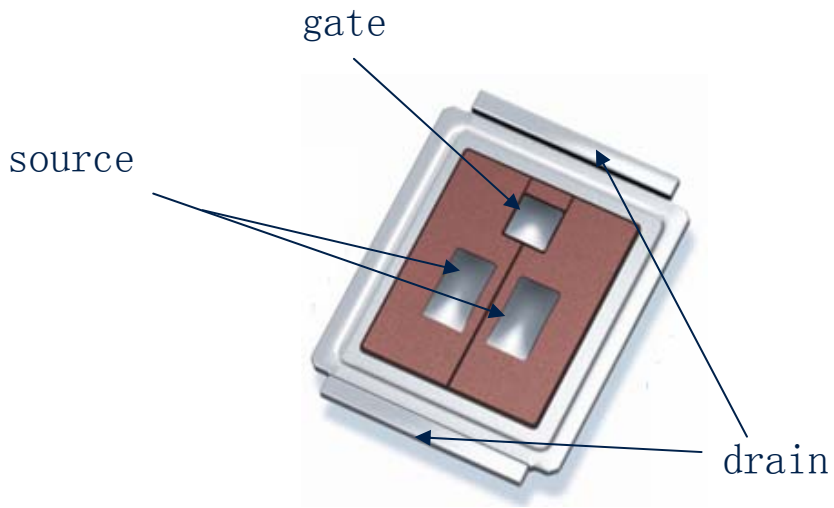




Can M
6.3 x 4.9 mm²

Can S
4.9 x 3.6 mm²

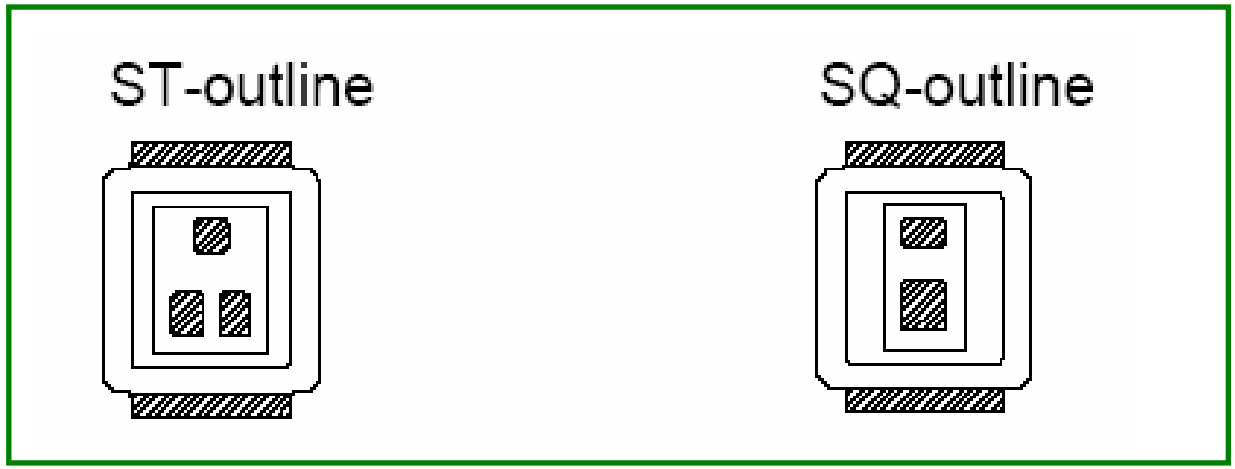
- 高度: 0.7 mm
- 包装面积 M: 31.0 mm2
- 包装面积



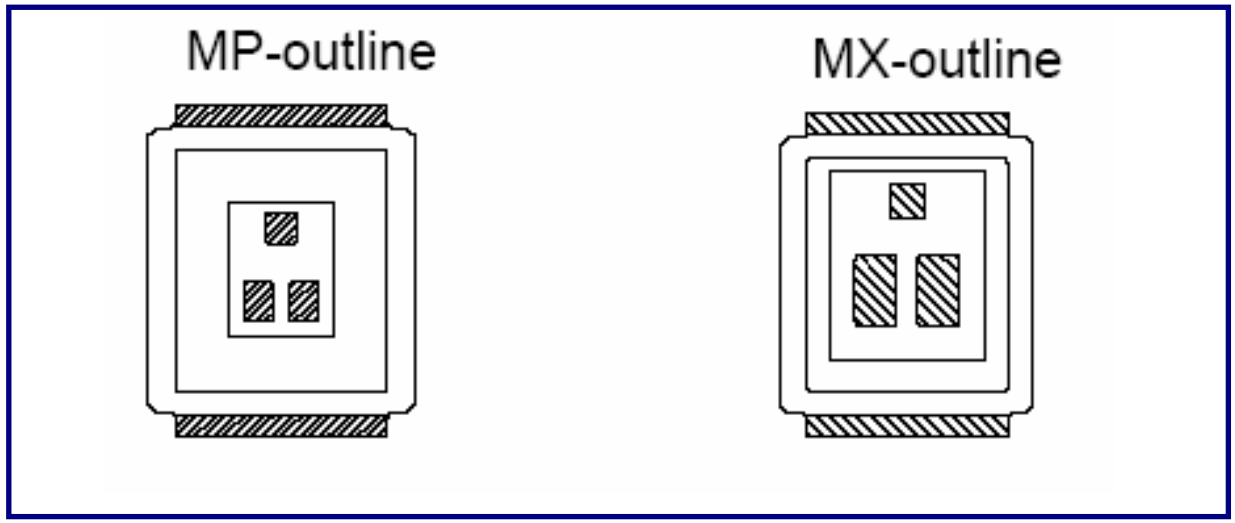
•无引线封装

Small Can S / Medium Can M – Outlines

S series



M series



标记

栅极标

公司名

产品编

制造批

表示无铅的产

生产日期（年周）

热阻比较表 - CanPAK MX vs SS08

SS08

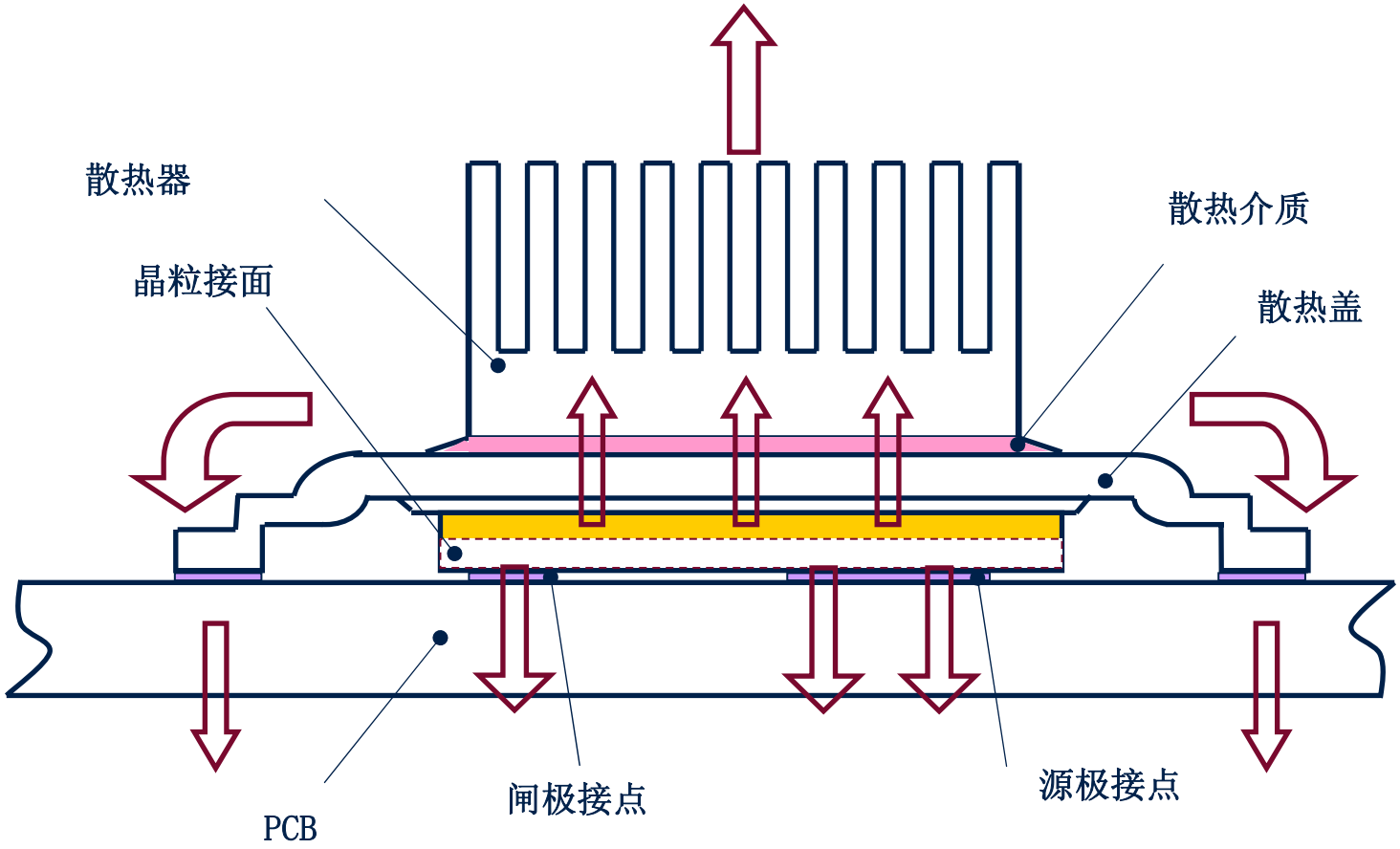
30V SS08 Outline	
Rth(散热介质)[℃/W]	8
Rth(J-C,top)[℃/W]	14
Rth(散热器)[℃/W]	15
总热阻 Rth(top)[℃/W]	37

CanPAK

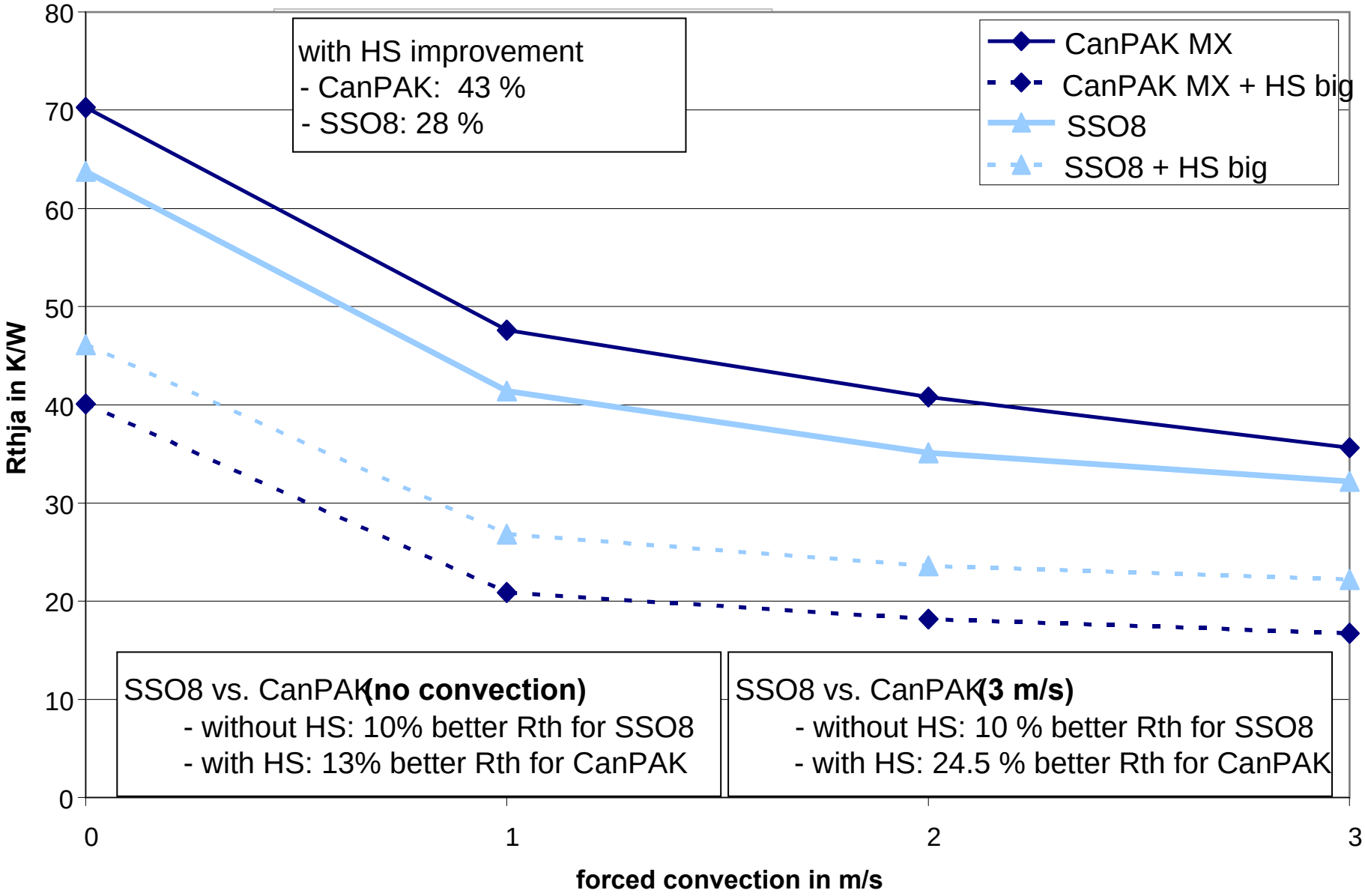
30V CanPAK Outline	
Rth(散热介质)[℃/W]	8
Rth(J-C,top)[℃/W]	2
Rth(散热器)[℃/W]	15
总热阻 Rth(top)[℃/W]	25

CanPAK之总热阻表现约较SS08低50%

热流示意图



热阻量测



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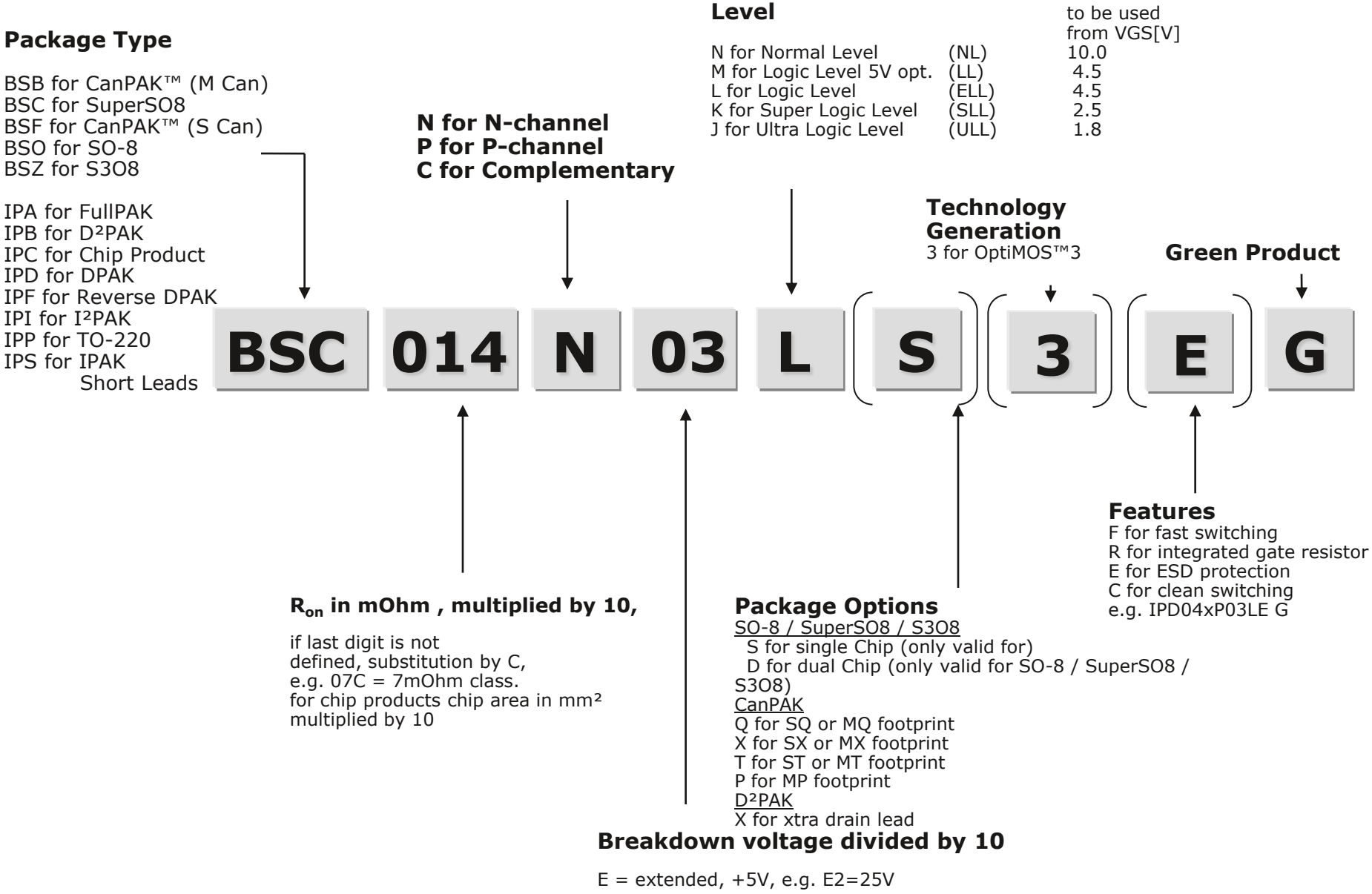
总结

OptiMOS(TM) Naming System



OptiMOS™ 20V Super Logic Level (SLL)

	SO-8	SuperSO8
		
1.9 mΩ		BSC019N02KS G
2.6 mΩ		BSC026N02KS G
4.6 mΩ		BSC046N02KS G
32 mΩ	BSO330N02K G	

More 20V SLL products in small signal packages available

OptiMOS™ 25V: Performance optimized for Server, Datacom, Telecom Applications

	SuperSO8	S3O8
		
< 1.0 mΩ		
1.0 - 1.5 mΩ	BSC010NE2LS	
1.6 - 2.0 mΩ	BSC018NE2LS	BSZ018NE2LS
2.1 - 2.5 mΩ	BSC024NE2LS	
3.0 - 4.0 mΩ	BSC032NE2LS	BSZ036NE2LS
4.1 - 4.5 mΩ		
4.6 - 5.0 mΩ	BSC050NE2LS	
5.1 - 5.5 mΩ		
5.6 - 6.0 mΩ		BSZ060NE2LS

	CanPAK™ M	CanPAK™ S
		
< 1.0 mΩ		
1.0 - 1.5 mΩ	BSB012NE2LX BSB013NE2LXI	
1.6 - 2.0 mΩ		
2.1 - 2.5 mΩ		
4.1 - 4.5 mΩ		BSF030NE2LQ
4.6 - 5.0 mΩ		
5.1 - 5.5 mΩ		
5.6 - 6.0 mΩ		

OptiMOS™ 30V: Released for Industrial Applications Performance optimized for Notebook, VGA Applications

	SuperSO8	S3O8
1.0 - 1.5 mΩ	BSC011N03LS	
1.6 - 2.0 mΩ	BSC0901NS BSC0901NSI	BSZ019N03LS
2.1 - 2.5 mΩ		BSZ0901NSI
2.6 - 3.0 mΩ	BSC0902NS	BSZ0902NS BSZ0902NSI
3.1 - 3.5 mΩ	BSC0902NSI	
3.6 - 4.0 mΩ	BSC0904NSI	BSZ0904NSI
4.1 - 4.5 mΩ		
5.1 - 5.5 mΩ	BSC0906NS BSC052N03LS	
6.1 - 6.5 mΩ		BSZ065N03LS
7.0 - 8.0 mΩ	BSC0908NS	
> 9.0 mΩ	BSC0909NS	BSZ0905NS BSZ0909NS
20 mΩ		BSZ0920NS

	S3O8 - dual (Power Stage 3x3)
7+9 mΩ	BSZ0907ND
9+19 mΩ	BSZ0908ND

Grey: Upcoming products

BSC 0901 N x

Package Type

consecutively number
without any correlation to product specifications (Start with Nr.0901, 0902, 0903,…)

N= N-Channel
P= P-Channel

further character if needed
D=Dual
E=ESD
I=Integrated Diode
S=Single

OptiMOS™ 30V Logic Level

	TO-220	TO-263 (D²PAK)	TO-263 7Pin (D²PAK 7Pin)	TO-251SL (IPAK SL)	TO-252 (DPAK)	SuperSO8	S3O8
<1.6 mΩ			IPB009N03L G			BSC014N03LS G	
1.6-2 mΩ						BSC016N03LS G	
2-3 mΩ						BSC020N03LS G BSC025N03LS G	
3-4 mΩ	IPP034N03L G	IPB034N03L G		IPS031N03L G	IPD031N03L G	BSC030N03LS G BSC034N03LS G	BSZ035N03LS G
4 mΩ	IPP042N03L G	IPB042N03L G		IPS040N03L G	IPD040N03L G	BSC042N03LS G	
5 - 6 mΩ	IPP055N03L G	IPB055N03L G		IPS050N03L G	IPD050N03L G	BSC050N03LS G BSC057N03LS G	BSZ050N03LS G BSZ058N03LS G
6 - 7 mΩ	IPP065N03L G	IPB065N03L G		IPS060N03L G	IPD060N03L G		
7-8 mΩ	IPP080N03L G	IPB080N03L G		IPS075N03L G	IPD075N03L G		
8-10 mΩ	IPP096N03L G	IPB096N03L G		IPS090N03L G	IPD090N03L G	BSC080N03LS G BSC090N03LS G	BSZ088N03LS G
10-13 mΩ	IPP114N03L G	IPB114N03L G		IPS105N03L G	IPD105N03L G	BSC100N03LS G	BSZ100N03LS G
13-15 mΩ	IPP147N03L G	IPB147N03L G		IPS135N03L G	IPD135N03L G	BSC120N03LS G	BSZ130N03LS G
2 x 7,2 mΩ						BSC072N03LD G	
2 x 15mΩ						BSC150N03LD G	

	CanPAK™ M	CanPAK™ S
1-3mΩ	BSB012N03LX3 G BSB017N03LX3 G	BSF024N03LT3 G
3-6 mΩ		BSF050N03LQ3 G

OptiMOS™ 30V Enhanced Logic Level (M-Series)

	S-O8 	SuperSO8 	S3O8 
1 - 2 mΩ		BSC014N03MS G	
		BSC016N03MS G	
2 - 4 mΩ	BSO033N03MS G	BSC020N03MS G	BSZ035N03MS G
	BSO040N03MS G	BSC025N03MS G	
		BSC030N03MS G	
4 - 6 mΩ	BSO051N03MS G	BSC042N03MS G	BSZ050N03MS G
		BSC050N03MS G	BSZ058N03MS G
		BSC057N03MS G	
6 - 7 mΩ	BSO065N03MS G		
8 - 9 mΩ	BSO083N03MS G	BSC090N03MS G	BSZ088N03MS G
		BSC080N03MS G	
10 - 13 mΩ	BSO110N03MS G	BSC100N03MS G	BSZ100N03MS G
	BSO130N03MS G	BSC120N03MS G	BSZ130N03MS G
22 mΩ	BSO220N03MS G		

2 x 15 mΩ	BSO150N03MD G
2 x 22 mΩ	BSO220N03MD G

OptiMOS™ 40V Logic Level

	TO-220	TO-263 (D²PAK)	TO-263 7Pin (D²PAK 7Pin)	TO-252 (DPAK)	SuperSO8	S3O8	CanPAK™ M
							
1 - 2 mΩ			IPB011N04L G		BSC016N04LS G		BSB014N04LX3 G
		IPB015N04L G			BSC018N04LS G		
2 mΩ							
2 - 3 mΩ		IPB022N04L G			BSC027N04LS G		
3 - 4 mΩ	IPP039N04L G	IPB039N04L G		IPD036N04L G	BSC035N04LS G	BSZ040N04LS G	
5- 6 mΩ					BSC050N04LS G BSC059N04LS G		
7 - 8 mΩ		IPB075N04L G					
9 - 10 mΩ		IPB093N04L G		IPD088N04L G	BSC093N04LS G	BSZ097N04LS G	
10 - 11 mΩ				IPD105N04L G			
13 - 17 mΩ				IPD160N04L G			

OptiMOS™ 40V Normal Level

	TO-220 	TO-263 (D²PAK) 	TO-263 7Pin (D²PAK 7Pin) 	TO-252 (DPAK) 	SuperSO8 	S3O8 	CanPAK™ M 
1 - 2 mΩ	IPP015N04N G	IPB015N04N G	IPB011N04N G		BSC017N04NS G BSC019N04NS G		BSB015N04NX3 G
2 - 3 mΩ	IPP023N04N G	IPB023N04N G	IPB020N04N G		BSC030N04NS G		
3 - 4 mΩ	IPP041N04N G	IPB041N04N G		IPD038N04N G		BSZ042N04NS G	
4 - 7 mΩ	IPP048N04N G IPP065N04N G	IPB052N04N G			BSC054N04NS G		
10 - 11 mΩ						BSZ105N04NS G	
13 - 18 mΩ				IPD170N04N G		BSZ165N04NS G	

OptiMOS™ 60V Logic Level

	TO-220 	TO-262 (I²PAK) 	TO-263 (D²PAK) 	TO-263 7Pin (D²PAK 7Pin) 	TO-252 (DPAK) 	SuperSO8 	S3O8 
1 mΩ			IPB019N06L3 G	IPB016N06L3 G			
2-3 mΩ						BSC028N06LS3 G	
3-4 mΩ	IPP037N06L3 G	IPI037N06L3 G	IPB034N06L3 G		IPD031N06L3 G IPD035N06L3 G		
4-5 mΩ			IPB048N06L G IPB049N06L3 G		IPD048N06L3 G		
5-6 mΩ	IPP052N06L3 G						
6-7 mΩ	IPP065N06L G					BSC067N06LS3 G	BSZ067N06LS3 G
7-8 mΩ	IPP085N06L G				IPD079N06L3 G		
8-10 mΩ	IPP084N06L3 G		IPB081N06L3 G			BSC100N06LS3 G	BSZ100N06LS3 G
10-13 mΩ					IPD127N06L G		
20-30 mΩ	IPP230N06L3 G		IPB230N06L3 G		IPD220N06L3 G		
35 mΩ					IPD350N06L G		
64 mΩ					IPD640N06L G		

OptiMOS™ 60V Normal Level

	TO-220 	TO-262 (I²PAK) 	TO-220 FullPAK 	TO-263 (D²PAK) 	TO-263 7Pin (D²PAK 7Pin) 
1 mΩ					IPB017N06N3 G
2-3 mΩ	IPP024N06N3 G	IPI024N06N3 G		IPB021N06N3 G IPB029N06N3 G	IPB023N06N3 G
3-4 mΩ	IPP032N06N3 G	IPI032N06N3 G	IPA032N06N3 G	IPB037N06N3 G	IPB034N06N3 G
4 mΩ	IPP040N06N3 G	IPI040N06N3 G			
5-7 mΩ	IPP057N06N3 G		IPA057N06N3 G	IPB050N06N G IPB054N06N3 G	
8-10 mΩ	IPP093N06N3 G		IPA093N06N3 G	IPB090N06N3 G	
10-13 mΩ	IPP120N06N G				
20-30 mΩ	IPP260N06N3 G			IPB260N06N3 G	

	TO-252 (DPAK) 	SuperSO8 	S3O8 	CanPAK™ M 	CanPAK™ S 
1-3 mΩ				BSB028N06NN3 G	
3-4 mΩ	IPD034N06N3 G IPD038N06N3 G	BSC031N06NS3 G			
4 mΩ					
5-6 mΩ	IPD053N06N3 G				
7-8 mΩ		BSC076N06NS3 G	BSZ076N06NS3 G		BSF077N06NT3 G
8-10 mΩ	IPD088N06N3 G				
10-14 mΩ	IPD144N06N G	BSC110N06NS3 G	BSZ110N06NS3 G		
20-30 mΩ	IPD230N06N G IPD250N06N3 G				
40 mΩ	IPD400N06N G				
80 mΩ	IPD800N06N G				

Grey: Upcoming products, will be released in April 2011

OptiMOS™ 75V Normal Level

	TO-220 	TO-263 (D2PAK) 	TO-262 (I2PAK) 	SuperSO8 
2-4 mΩ	IPP023NE7N3 G IPP034NE7N3 G	IPB031NE7N3 G IPB020NE7N3 G	IPI023NE7N3 G IPI034NE7N3 G	BSC042NE7NS3 G
4-6 mΩ	IPP052NE7N3 G	IPB049NE7N3 G	IPI052NE7N3 G	
6-12 mΩ	IPP062NE7N3 G			

OptiMOS™ 80V

	TO-220	TO-262 (I²PAK)	TO-251 (IPAK)	TO-220 FullPAK	TO-263 (D²PAK)	TO-263 7Pin (D²PAK 7Pin)	TO-252 (DPAK)
2.2 mΩ						IPB019N08N3 G	
2-3 mΩ	IPP028N08N3 G	IPI028N08N3 G		IPA028N08N3 G	IPB025N08N3 G		
3-4 mΩ	IPP037N08N3 G	IPI037N08N3 G		IPA037N08N3 G	IPB035N08N3 G	IPB030N08N3 G	
4-6 mΩ	IPP057N08N3 G	IPI057N08N3 G		IPA057N08N3 G	IPB054N08N3 G		IPD053N08N3 G
6-7 mΩ	IPP070N08N3 G	IPI070N08N3 G			IPB067N08N3 G		
8-11 mΩ	IPP100N08N3 G	IPI100N08N3 G		IPA100N08N3 G	IPB097N08N3 G		IPD096N08N3 G
11-20 mΩ	IPP139N08N3 G	IPI139N08N3 G	IPU135N08N3 G		IPB136N08N3 G		IPD135N08N3 G

	SuperSO8	S3O8	CanPAK™ M
2.2 mΩ			
2-3 mΩ			
3-4 mΩ			
4-6 mΩ	BSC047N08NS3 G BSC057N08NS3 G		BSB044N08NN3 G
6-7 mΩ			
8-11 mΩ			
11-20 mΩ	BSC123N08NS3 G	BSZ123N08NS3 G	
30-40 mΩ	BSC340N08NS3 G	BSZ340N08NS3 G	

Grey: Upcoming products, will be released in April 2011

OptiMOS™ 100V Logic Level

	TO-220 	TO-251SL (IPAK SL) 	SuperSO8 	Replacement for Super SO8
5 mΩ	IPP05CN10L G			
6 mΩ	IPP06CN10L G			
8 - 9mΩ	IPP08CN10L G		BSC082N10LS G²	BSC070N10NS3 G
10 - 11 mΩ			BSC105N10LSF G²	BSC109N10NS3 G
12 - 13 mΩ	IPP12CN10L G	IPS12CN10L G	BSC123N10LS G²	BSC109N10NS3 G
15 - 16 mΩ	IPP16CN10L G		BSC159N10LSF G²	BSC160N10NS3 G
20 - 21 mΩ			BSC205N10LS G²	BSC160N10NS3 G
26 - 27 mΩ			BSC265N10LSF G²	BSC160N10NS3 G

2) Product is „not for new design" and will be discontinued soon

OptiMOS™ 100V Normal Level (6V Gate rating)

	TO-220	TO-220 FullPAK	TO-262 (I^2PAK)	TO-263 (D^2PAK)	TO-263 (D^2PAK 7pin)	TO-252 (DPAK)	TO-251SL (IPAK SL)
2-3 mΩ	IPP030N10N3 G	IPA030N10N3 G	IPI030N10N3 G	IPB027N10N3 G	IPB025N10N3 G		
3-4 mΩ					IPB039N10N3 G		
4-6 mΩ	IPP045N10N3 G	IPA045N10N3 G	IPI045N10N3 G	IPB042N10N3 G			
6-8 mΩ	IPP072N10N3 G		IPI072N10N3 G			IPD068N10N3 G	
8-12 mΩ	IPP086N10N3 G	IPA086N10N3 G	IPI086N10N3 G	IPB083N10N3 G		IPD082N10N3 G	IPS118N10N G*
12-18 mΩ	IPP126N10N3 G	IPA126N10N3 G	IPI126N10N3 G	IPB123N10N3 G		IPD122N10N3 G	
18-20 mΩ	IPP180N10N3 G	IPA180N10N3 G	IPI180N10N3 G			IPD180N10N3 G	
20-26 mΩ	IPP26CN10N G²*		IPI26CN10N G²*	IPB26CN10N G²*		IPD25CN10N G*	
26-35 mΩ			IPI35CN10N G²*	IPB34CN10N G²*		IPD33CN10N G*	
35-50 mΩ	IPP50CN10N G²*		IPI50CN10N G²*	IPB50CN10N G²*			
70-80 mΩ	IPP80CN10N G²*		IPI80CN10N G²*			IPD78CN10N G*	

	SuperSO8	S3O8	CanPAK™ M	CanPAK™ S
3-5 mΩ				
5-7 mΩ	BSC060N10NS3 G		BSB056N10NN3 G	
7 -10 mΩ	BSC070N10NS3 G			
10-11 mΩ	BSC109N10NS3 G			
11-15 mΩ				BSF134N10NJ3 G
16-19 mΩ	BSC160N10NS3 G	BSZ160N10NS3 G		
26-50 mΩ	BSC440N10NS3 G	BSZ440N10NS3 G		
2 x 75 mΩ	BSC750N10ND G			

Grey: Upcoming products, will be released in April(CanPAK)/August(SuperSO8) 2011

* Not 6V rated

2) Product is „not for new design" and will be discontinued soon

OptiMOS™ 120V

	TO-220 	TO-262 (I²PAK) 	TO-263 (D²PAK) 	TO-263 7Pin (D²PAK 7Pin) 	TO-252 (DPAK) 	TO-251 SL (IPAK SL) 
3-4 mΩ			IPB038N12N3 G	IPB036N12N3 G		
4-5 mΩ	IPP041N12N3 G IPP048N12N3 G	IPI041N12N3 G IPI048N12N3 G				
7-8 mΩ						
8-10 mΩ	IPP076N12N3 G	IPI076N12N3 G				
10-13 mΩ	IPP114N12N3 G				IPD110N12N3 G	IPS110N12N3 G
13-20 mΩ	IPP147N12N3 G	IPI147N12N3 G	IPB144N12N3 G			
20-25 mΩ						

	SuperS08 	S3O8 
3-4 mΩ		
4-5 mΩ		
7-8 mΩ	BSC077N12NS3 G	
8-10 mΩ		
10-13 mΩ		
13-20 mΩ	BSC190N12NS3 G	
20-25 mΩ	BSC240N12NS3 G	BSZ240N12NS3 G

OptiMOS™ 150V (8V Gate rating)

	TO-220	TO-220 (Full Pak)	TO-262 (I^2PAK)	TO-263 (D^2PAK)	TO-263 Pin (D^2PAK 7Pin)	TO-252 (DPAK)
6-7 mΩ					IPB065N15N3 G	
7-11 mΩ	IPP075N15N3 G IPP111N15N3 G	IPA075N15N3 G IPA105N15N3 G	IPI075N15N3 G IPI111N15N3 G	IPB072N15N3 G IPB108N15N3 G		
19-30 mΩ	IPP200N15N3 G		IPI200N15N3 G	IPB200N15N3 G		IPD200N15N3 G
50-60 mΩ	IPP530N15N3 G		IPI530N15N3 G	IPB530N15N3 G		IPD530N15N3 G

	SuperSO8	S3O8	CanPAK™ M
6-7 mΩ			
7-15 mΩ			BSB150N15NZ3 G
19-30 mΩ	BSC190N15NS3 G		BSB280N15NZ3 G
30-50 mΩ	BSC360N15NS3 G		
50-60 mΩ	BSC520N15NS3 G	BSZ520N15NS3 G	
80-90 mΩ		BSZ900N15NS3 G	

Grey: Upcoming products, will be released in April 2011

OptiMOS™ 200V

	TO-220 	TO-262 (I^2PAK) 	TO-263 (D^2PAK) 	TO-252 (DPAK) 	SuperS08 	S3O8 
~10mΩ	IPP110N20N3 G IPP110N20NA[3]	IPI110N20N3 G	IPB107N20N3 G IPB107N20NA[3]			
30-40mΩ	IPP320N20N3 G	IPI320N20N3 G	IPB320N20N3 G	IPD320N20N3 G	BSC320N20NS3 G	
90mΩ					BSC900N20NS3 G	BSZ900N20NS3 G
120mΩ					BSC12DN20NS3 G	BSZ12DN20NS3 G
220mΩ					BSC22DN20NS3 G	BSZ22DN20NS3 G

3) part qualified for Automotive

newly released within this update

OptiMOS™ 250V

	TO-220 	TO-262 (I²PAK) 	TO-263 (D²PAK) 	TO-252 (DPAK) 	SuperS08 	S3O8 
~30mΩ	IPP200N25N3 G	IPI200N25N3 G	IPB200N25N3 G			
~80mΩ	IPP600N25N3 G	IPI600N25N3 G	IPB600N25N3 G	IPD600N25N3 G	BSC600N25NS3 G	
~100-300mΩ					BSC16DN25NS3 G	BSZ16DN25NS3 G
~400-500mΩ						BSZ42DN25NS3 G

- 低电压功率晶体管结构
- 晶粒技术发展
- 封装技术发展
- 双层冷却封装之功率晶体管 – CanPAK
- 英飞凌之低电压功率晶体管
- 总结

总结

- 低电压功率晶体管的晶粒技术发展方向在于能够在单位面积之中发展具有更低优质化系数FOM的晶粒
- 低电压功率晶体管的封装技术发展方向在于有效减少封装的热阻($R_{th,J-C}$).

- 英飞凌科技公司所提供之CanPAK产品乃是结合高效能晶粒OptiMOS技术及高效能封装之产品
- 英飞凌科技公司提供的OptiMOS系列低电压功率晶体管产品乃是目前世界上具有最低优质化系数之高效能产品

ENERGY EFFICIENCY
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