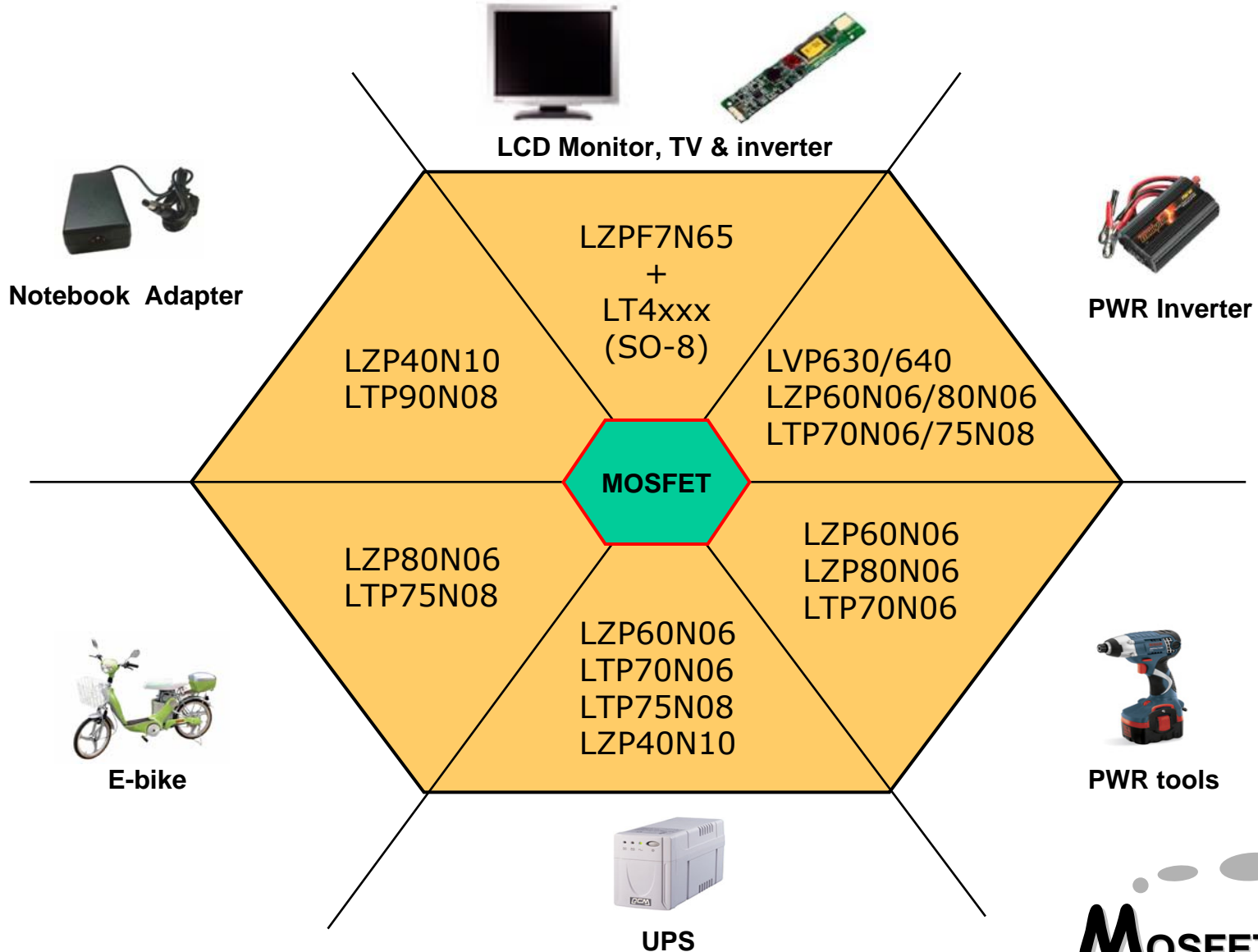


Available Products, 2008

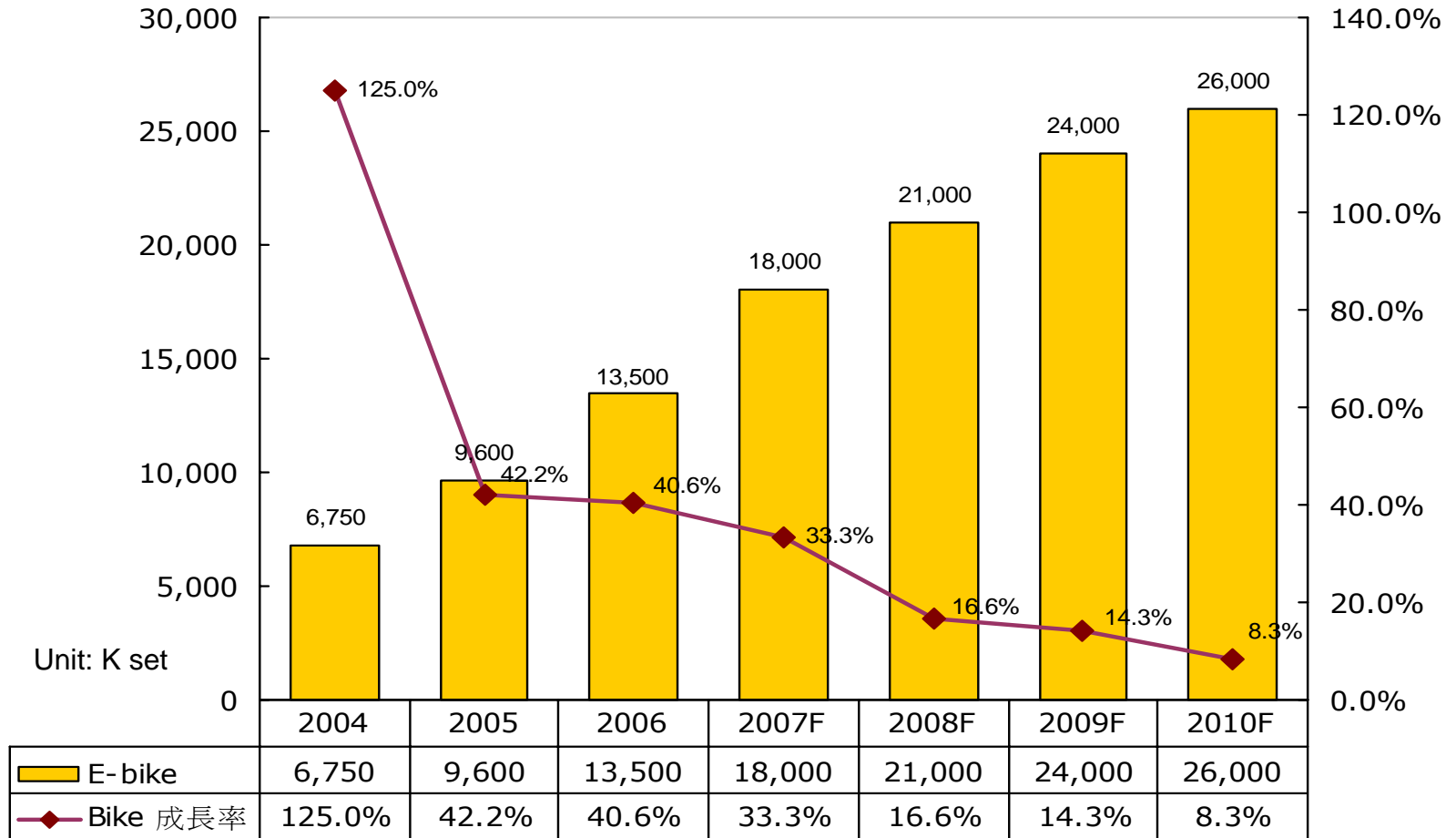
NO	P/N	Vdss	Id(A)	Rds(on)@ 10V	Vth / Polarity	Qg	Package
1	LZP60N06	60	60	16m	2.5-4.5	56	TO-220
2	LTP70N06	60	70	14m	2-4	170	TO-220
3	LZP80N06	60	80	8m	2.5-4.5	120	TO-220
4	LTP75N08	80	75	11m	2-4	160	TO-220
5	LTP90N08	80	90	9m	2-4	160	TO-220
6	LZP40N10	100	40	26m	2.5-4.5	75	TO-220
7	LVP630	200	9	400m	3-5	24	TO-220
8	LVP640	200	18	180m	3-5	48	TO-220
9	LZPF7N65	650	7	1200m	3-5	30	TO-220F
10	LT4542	30	6.9	24m	N+P	11	SOP-8
		-30	-6.1	25m		18	
11	LT4544	30	6.5	35m	N+P	18	SOP-8
		-30	-5.7	45m		19	
12	LT4920	30	6.9	35m	Dual N	15	SOP-8
13	LT4936	30	5.9	25m	Dual N	13	SOP-8
14	LT4942	40	7.4	21m	Dual N	21	SOP-8
15	LT4563D4	40	5.2	25m	Dual N	-	TO252-4
16	LT4565	40	5.2	40m	N+P	8	SOP-8
		-40	-4.5	54m		9	
17	LT4565D4	40	5.2	25m	N+P	-	TO252-4
		-40	-4.9	52m		-	
18	LT20N04L	40	20	12m	Single	36	TO252
19	LT4946D4	60	8	30m	Dual N	29	TO252-4
20	LT4946	60	5.3	41m	Dual N	22	SOP-8
21	LT2N7002	60	0.3	2	Single	0.8	SOT23
22	LT2N7002E	60	0.3	5	Single	2	SOT23

Power MOSFET Product Portfolio Chart



E-Bike solution

E-Bike Market Growth Trend -China-



Market Analysis: China E-bike

■ Government attitude:

- **Against:** 廣東、溫州、海南、福州、常州、廈門、沈陽.
- **For:** 北京、天津、山東、安徽、江蘇、上海、浙江、河北、四川、河南、雲南.
- **Others don't declare their stands.**

■ 中國大陸國家電動自行車通用技術條件(GB17761—1999)、該法規於2004年5月實施

車種	分類	定義	參數規定	合法性
電動自行車	非機動車	以蓄電池作為輔助能源，具有兩個車輪，能實現人力騎行、電動或電助動功能的特種自行車	最大時速 ≤ 20km 整車重量 ≤ 40kg 馬達輸出功率 ≤ 240W 車胎寬度 ≤ 54mm 蓄電池電壓 ≤ 48V 30分鐘的腳踏行駛距離 ≥ 7km	可合法上路
電動車	機動車	以電動力驅動的兩輪車	不符合上述技術參數者	禁止上路

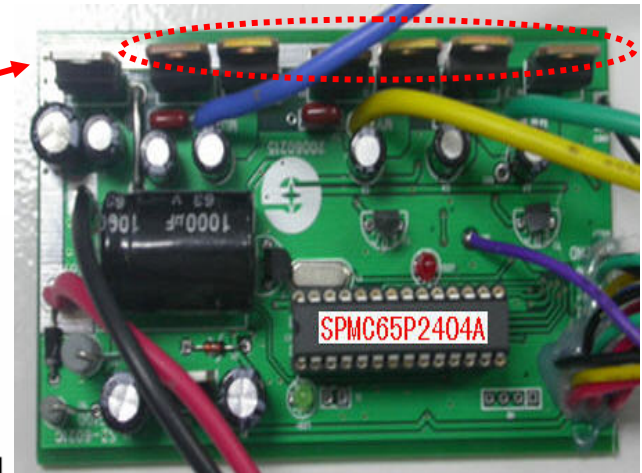
■ Quality:

- 根據大陸檢測中心抽測，輕摩產品不合格率達45%以上，75%會發生車架斷裂的情形。
- 2005年中國自行車協會通過21個電動自行車品牌準備使用(信譽標誌)的廠牌，尚未達到1000多家生產廠商的2%，其中最大的市佔率還不到5%.

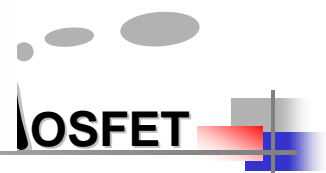
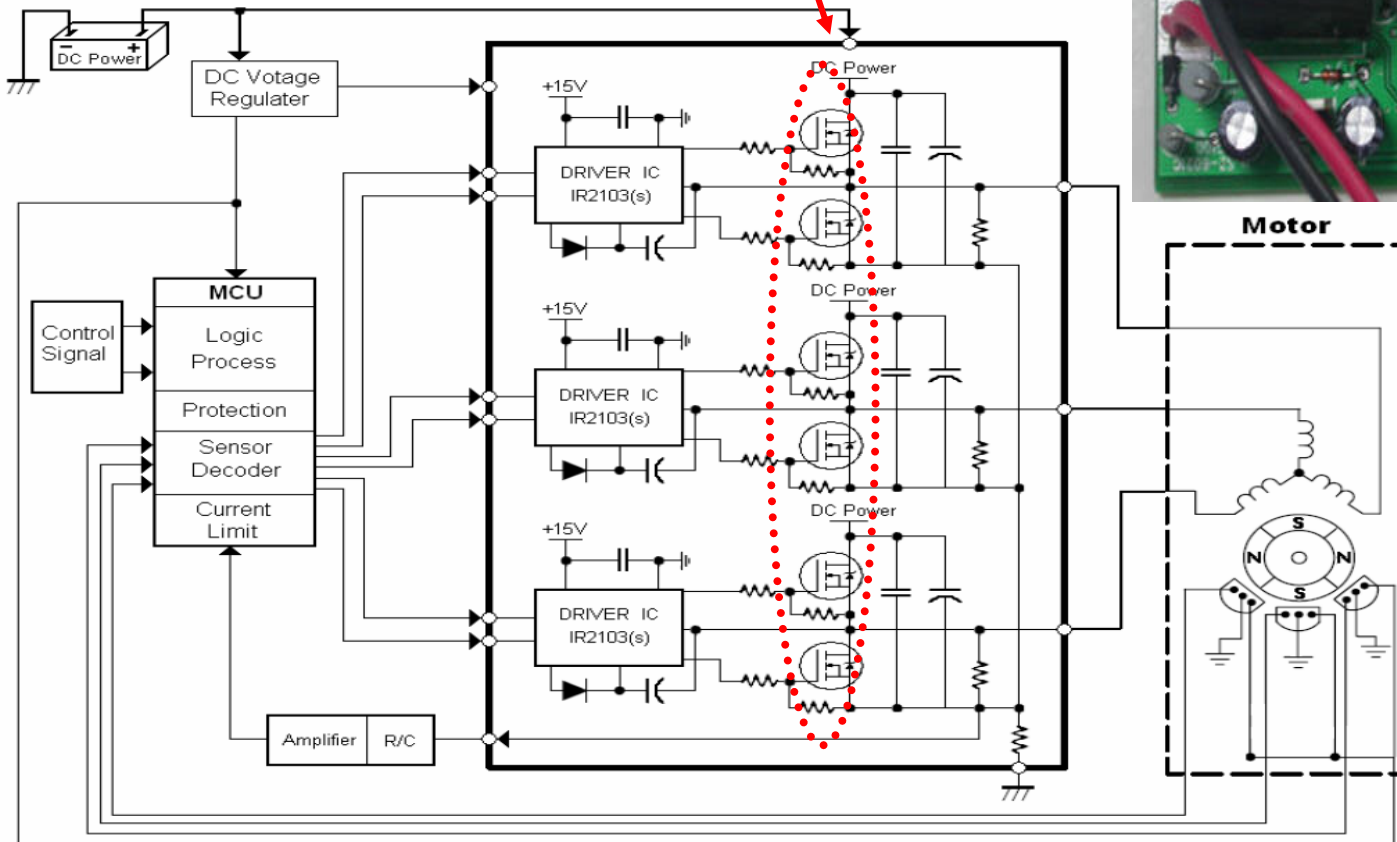
■ 競爭:市場前景無限，同時競爭無比慘烈。如由于價格大戰，2002年每輛電動車市場平均毛利超過500元，但到2005年已經降到200元了。

Application Block Diagram – E-bike

MOSFET



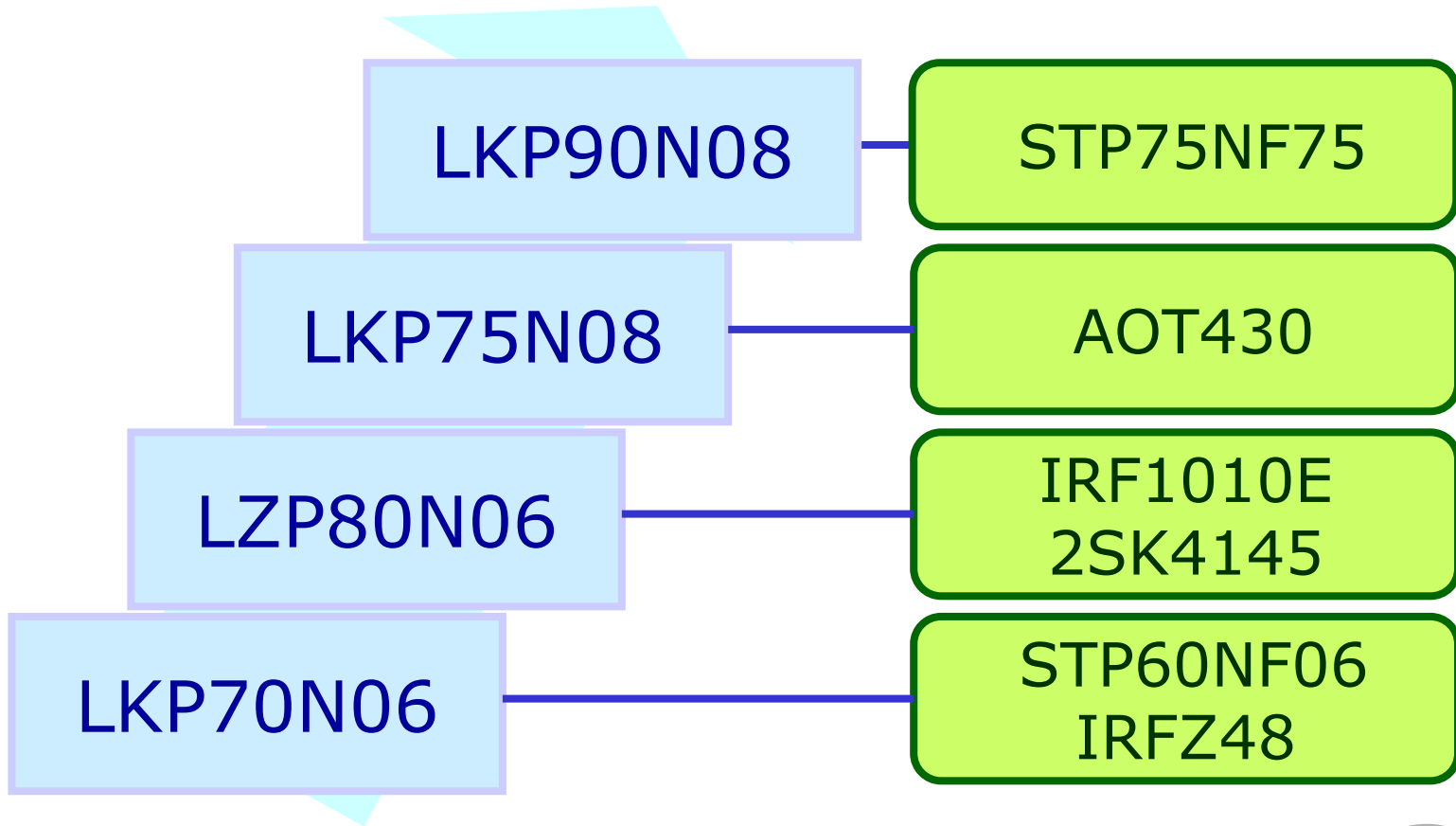
Functional Block Diagram



2008 available Products, E-Bike

NO	P/N	Vdss	Id(A)	Vth	Rds(on)@10V	Qg	Package
1	LZP60N06	60	60	2.5-4.5	16m	56	TO-220
2	LTP70N06	60	70	2-4	14m	170	TO-220
3	LZP80N06	60	80	2.5-4.5	8m	120	TO-220
4	LTP75N08	80	75	2-4	11m	160	TO-220
5	LTP90N08	80	90	2-4	9m	160	TO-220

Product Competitive Strategy



Market popular devices

Brand	P/N	Voltage	Current	RDS(ON)
Vishay(IR)	IRFZ48N	55	64A	14mΩ
	IRF3205	55	110A	8mΩ
	IRF1010E	60	84A	12mΩ
	IRF2807	75	82A	13mΩ
	IRF1607	75	142A	7.5mΩ
	IRF8010	100	80A	15mΩ
STM	STP60NF06	60	60A	16mΩ
	STP75NF75	75	80A	11mΩ
FSC	FQP70N08	80	70A	17mΩ
	FQA90N08	80	90A	16mΩ
NEC	2SK4145	60	82A	10mΩ

E-bike MOSFET Selection

Type	Power	P/N	LT solution
E-bike	<300W	IRFZ48N	LKP70N06
		STP60NF06	LZP60N06
E-motor	500W	STP75NF75	LKP90N08
		IRF2807	LZP80N08-developing
		AO430	LKP75N08
		IRF1010E	LZP80N06
	800W	IRF1607	
		IRF8010	LZP80N10-developing
		FQA90N08	
		STP140NF75	

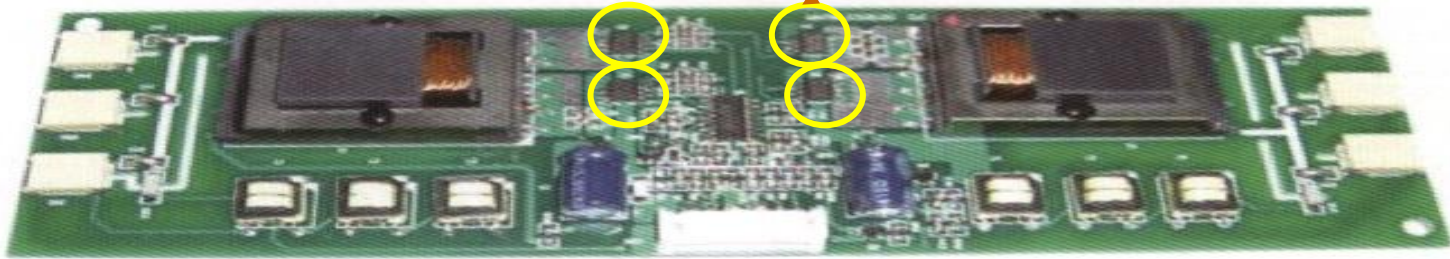
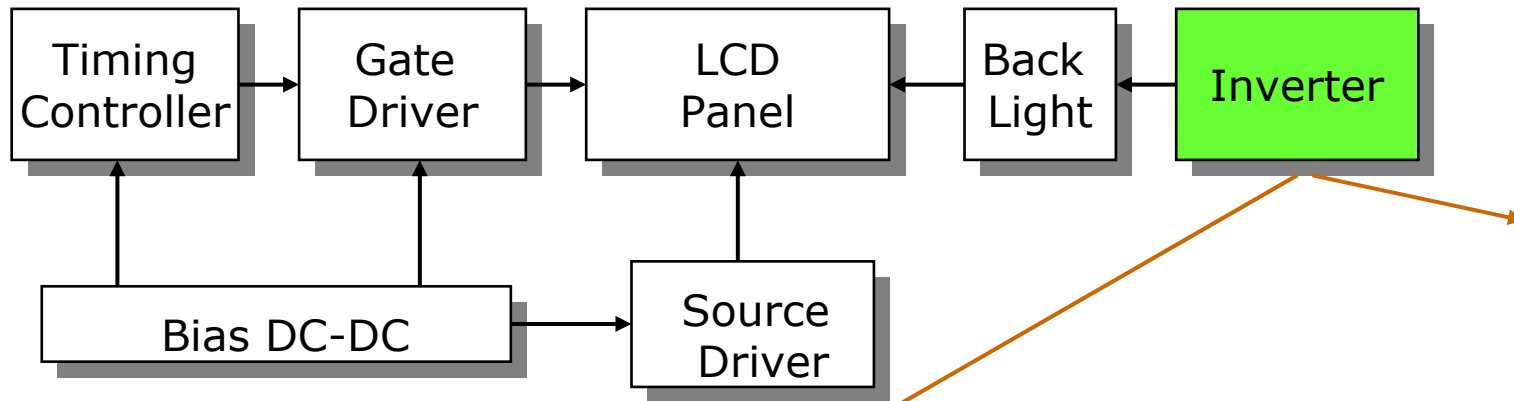
Backlight inverter solution

Market Segment Business Status

Unit : K Pcs

Market Segment	TAM (K Pcs)			Remarks
	2007F	2008F	2009F	
NB	84,700	101,800	117,600	工研院 IEK report 2007
LCD Monitor	129,400	135,870	145,380	工研院 IEK report 2007
LCD TV	14,500	24,600	33,000	DIGITIMES 2007/7

DC to DC Block Diagram

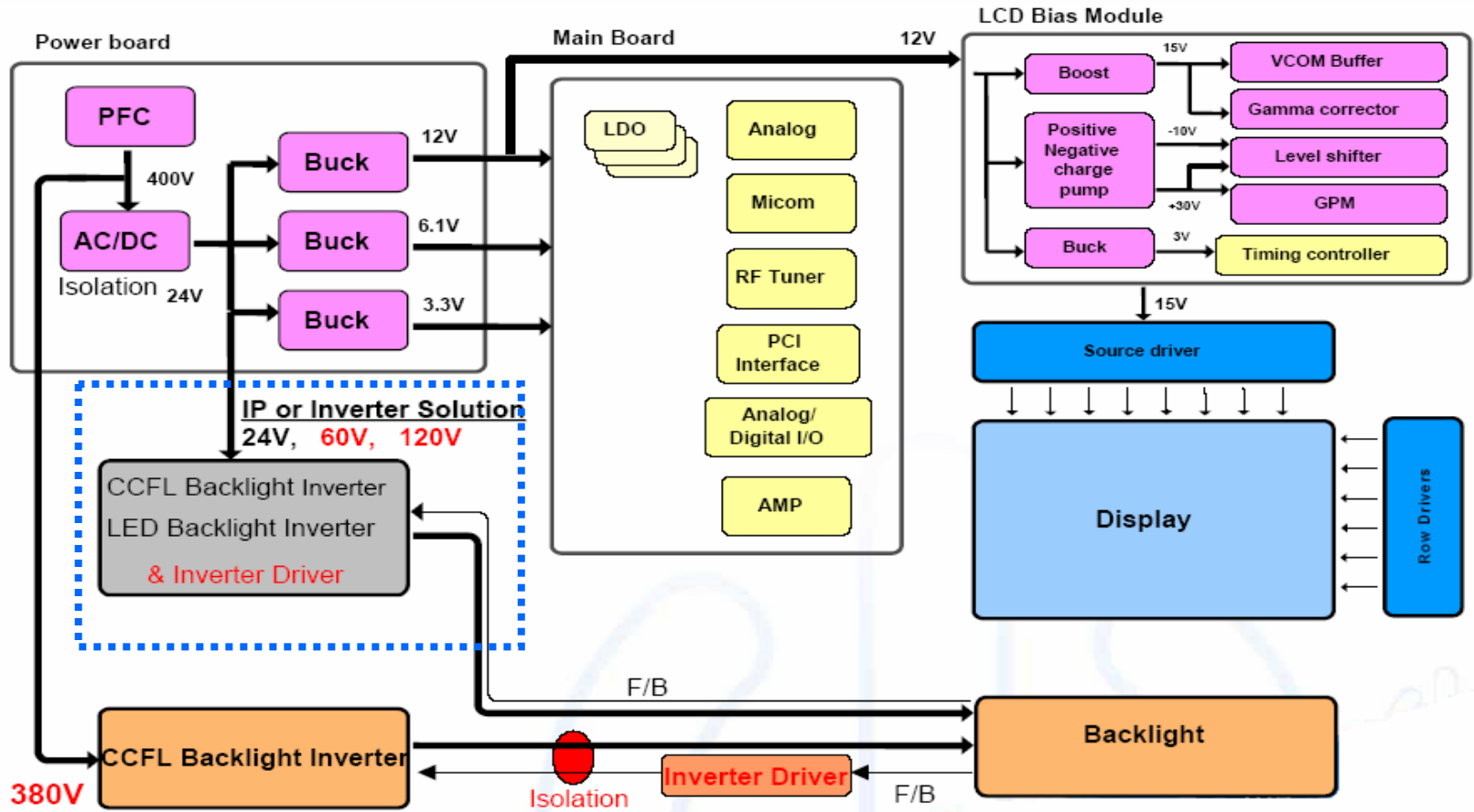


What is LIPS

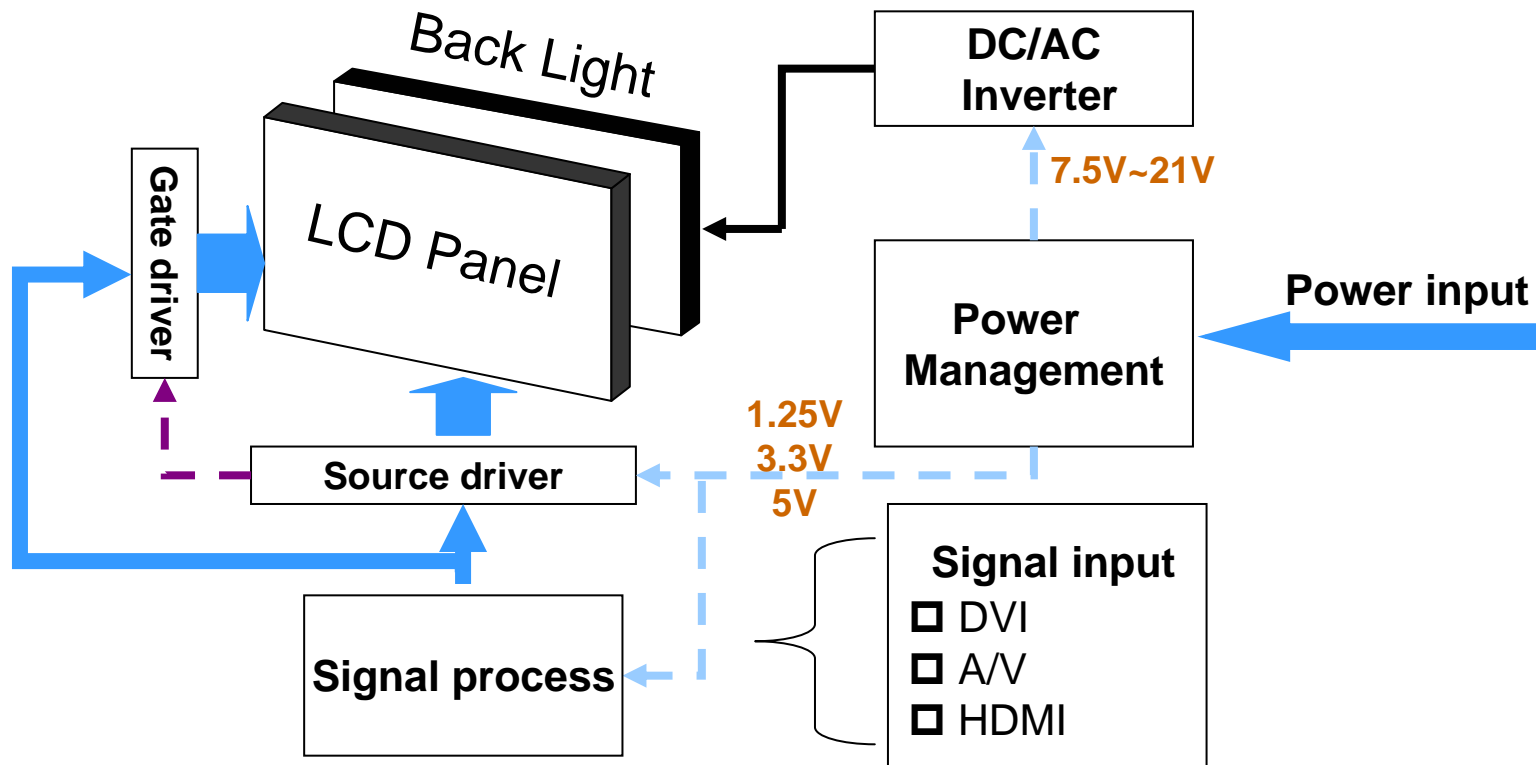
在LCD monitor or TV 常區分其兩大電壓供應區塊：
Main power & inverter.

- 1). 2 IN 1：將上述兩種電源作在同一片板子
(通常是 open frame 方式, 以求有較佳散熱效果)
- 2). Lips：
LCD integrated power supply
LCD inverter power supply
(大部份功率供應給燈管用)

LCD TV application block



LCD MTR application block



How to judge Mosfet voltage rating

$V_{in} = 12\text{ V} \rightarrow 30\text{V MOSFET}$

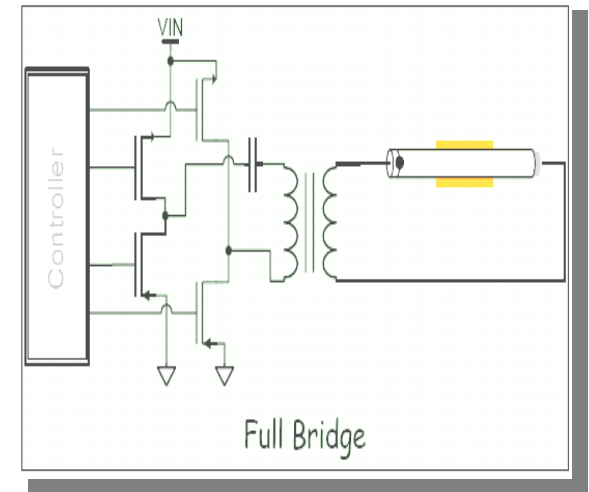
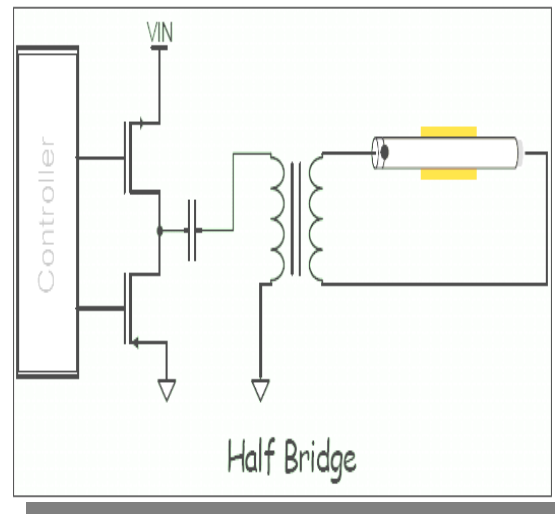
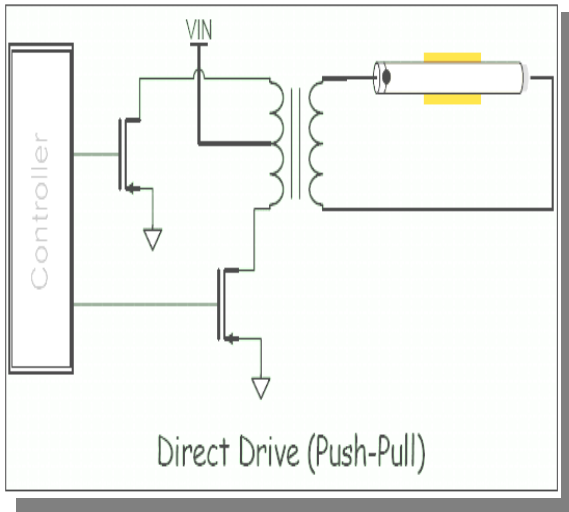
$V_{in} = 24\text{V} \rightarrow 40\sim 60\text{V}$ in full bridge
 $60\sim 100\text{V}$ in push pull

$V_{in} = 60\text{V} \rightarrow 100\text{V}$

$V_{in} = 120\text{V} \rightarrow 200\sim 250\text{V}$

$V_{in} = 380\text{V} \rightarrow 500\sim 600\text{V}$

Backlight Inverter Power Topology



Power topology base on PWM structure
ex. O2 ->P+N solution
MPS->4N solution

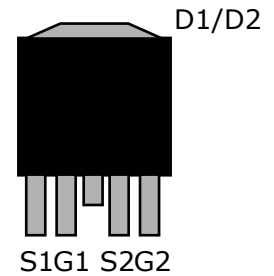
Low voltage family new products

Goods products for backlight inverter

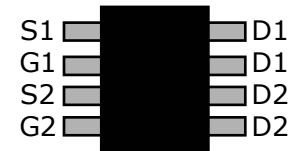
New!!

No	P/N	Vds	Vgs	Id(A)	Rds(on) @10V	Rds(on) @4.5V	Qg	Polarity	Package
1	LT4542	30 -30	±20 ±20	6.9 -6.1	24m 25m	38m 26m	11 18	N+P	SOP-8
2	LT4544	30 -30	±20 ±20	6.5 -5.7	35m 45m	50m 90m	18 19	N+P	SOP-8
3	LT4920	30	±20	6.9	35m	45m	15	Dual	SOP-8
4	LT4936	30	±20	5.9	25m	45m	13	Dual	SOP-8
5	LT4942	40	±20	7.4	21m	28m	21	Dual	SOP-8
6	LT4563D4	40	±25	5.2	25m	52m	-	Dual	TO252-4
7	LT4565	40 -40	±12 ±16	5.2 -4.5	40m 54m	45m 72m	8 9	N+P	SOP-8
8	LT4565D4	40 -40	±25 ±25	5.2 -4.9	25m 52m	52m 55m	- -	N+P	TO252-4
9	LT20N04L	40	±20	20	12m	17m	36	Single	TO252
10	LT4946D4	60	±25	8	30m	40m	29	Dual	TO252-4
11	LT4946	60	±20	5.3	41m	52m	22	Dual	SOP-8
12	LT2N7002	60	±20	0.3	2	4	0.8	Single	SOT23
13	LT2N7002E	60	±20	0.3	5	5.5	2	Single	SOT23

TO-252-4L



SOP-8



Cross reference

NO	P/N	A	V	RDS(on) 10V	RDS(on) 4.5V	AOS	Vishay	Fairchild	APEC	NIKO
1	LT4542	+6.9/-6.1	30	24/25	38/26	AO4606	Si4542DY	FDS8958A	AP4511M	P2103NV
2	LT4544	+6.5/-5.7	30	35/45	50/90	AO4604	Si4544DY		AP4503M	
3	LT4565	+5.2/-4.5	40	40/54	45/72	AO4612	Si4565DY	FDS4895C	AP4532M	
4	LT4920	+6.9/+6.9	30	35	45	AO4812	Si4920DY	FDS6912A	AP4228M	P2103HV
5	LT4936	+5.9/+5.9	30	25	45		Si4936DY	FDS6930A		
6	LT4942	+7.4/+7.4	40	21	28		Si4942DY		AP6692	P2804HV
7	LT4946	+5.3/+5.3	60	41	52	AO4828			AP9971GM	
8	LT20N04L	+20/+20	40	12	17			FDS6635		
12	LT2N7002D	+0.3	60	2	4		2N7002K			
13	LT2N7002E	+0.3	60	5	5.5		2N7002E			