MORNSUN®

Fixed Input and Non-isolated Product Line

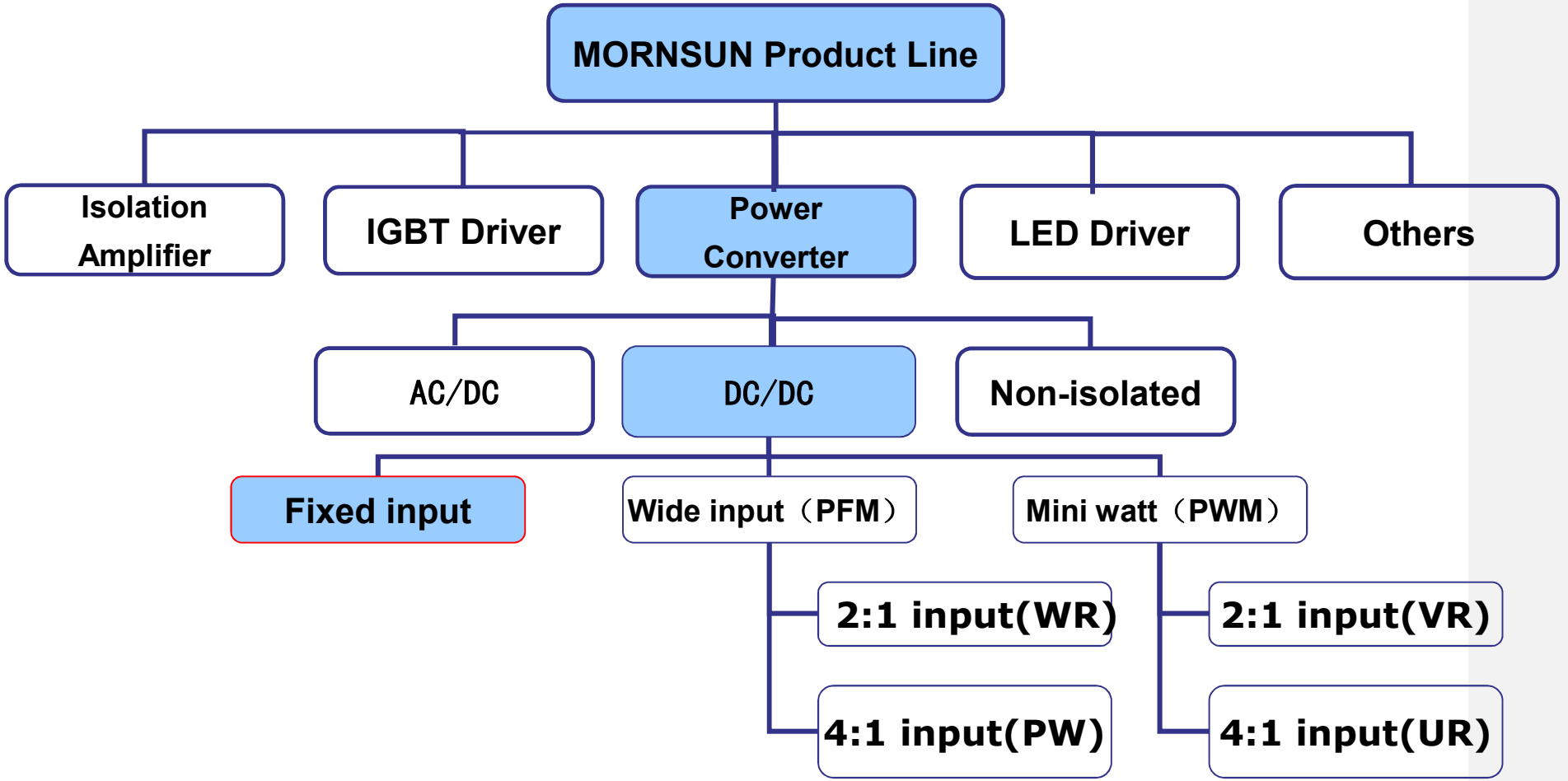
What is the application for B0505LS-1WR2 and K7805-500R3?

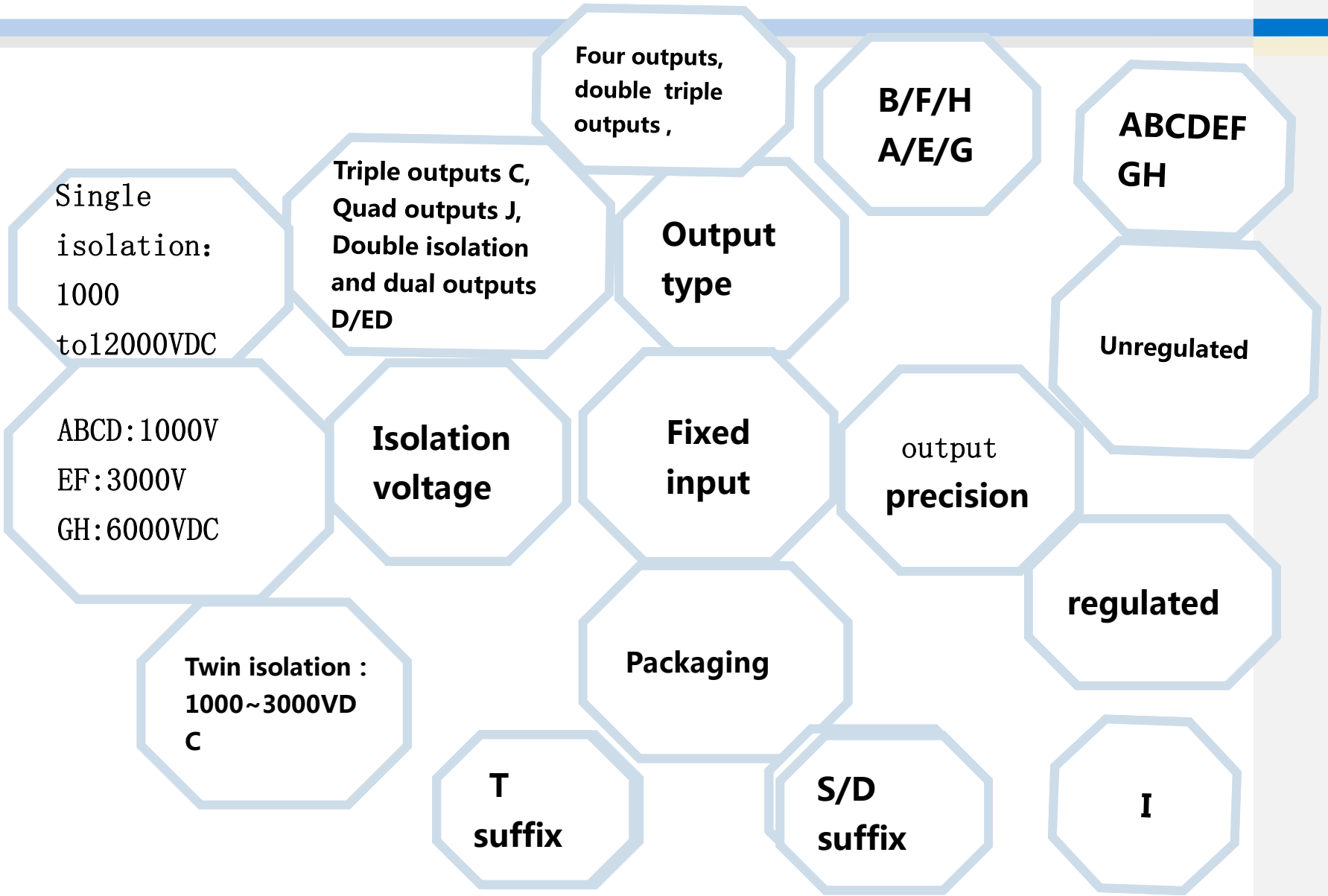
1 Fixed input product basic knowledge

2 Non-isolated Product basic knowledge

3 Product selling point analysis

4 Application case and error analysis


MORNSUN Product Line
Isolation Amplifier
IGBT Driver
Power Converter
LED Driver
Others
AC/DC
DC/DC
Non-isolated
Fixed input
Wide input（PFM）
Mini watt（PWM）
2:1 input(WR)
4:1 input(PW)
2:1 input(VR)
4:1 input(UR)


Four outputs, double triple outputs ,
B/F/H
A/E/G
ABCDEF
GH
Single isolation: 1000 to12000VDC
Triple outputs C, Quad outputs J, Double isolation and dual outputs D/ED
Output type
Unregulated
ABCD:1000V
EF:3000V
GH:6000VDC
Isolation voltage
Fixed input
output precision
regulated
Twin isolation : 1000~3000VDC
Packaging
T suffix
S/D suffix
I

Package type

SIP (Single Inline Plastic case)

B0505LS-1WR2

DIP (Potting type)

SMD (Surface mounting)

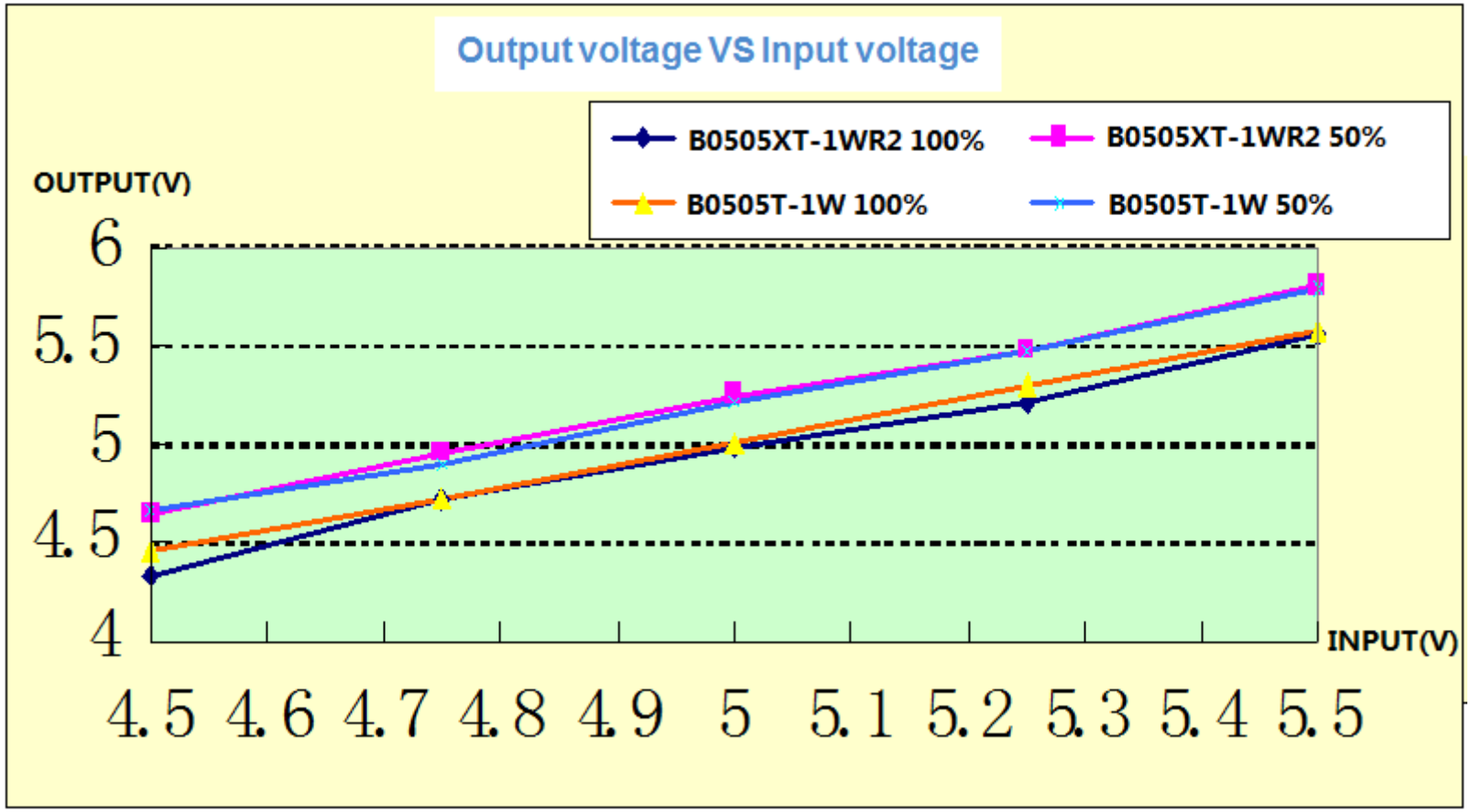
E0505D-2WR2

IF1205XT-1WR2

Classification in detail of fixed input product

Product line	Input range	Isolation voltage	Single Output	Dual Output	Double Isolation	Quad Output
Fixed input & regulated	±5%Vin	1000VDC	IB series	IA series	ID series	None
		3000VDC	IF series	IE series	None	None
		6000VDC	IH series	None	None	None
Fixed input & unregulated	±10%Vin	1500VDC	B_S series	A_S series	D_S series	J_N series
		3000VDC	F_S series	E_S series	ED_S series	None
		6000VDC	H_S series	G_S series	None	None
		12000VDC	BY_D series	AY_D series	None	None

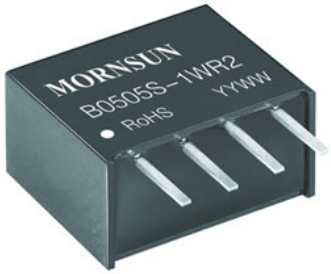
Output specifications



MORNSUN R2 new generation fixed input product

- Innovation and breakthroughs
- Cope with the impact of worldwide competitors
- Industry development, and higher demand on performance
- Strengthen our company market share and leading position

A/B/E/F-S-2WR2



B-S-1WR2

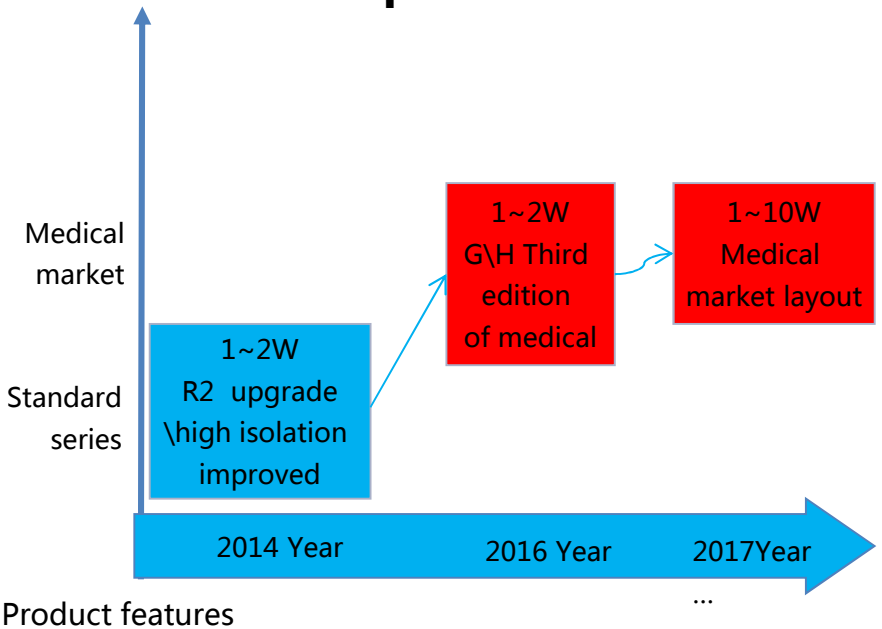
A-S-1WR2, B-LS-1WR2

B-D-1WR2

E/F-S-1WR2

Fixed input new product introduction ---Medical product line

	1W	2W
Single	H0503S-1WR2	
	H0505S-1WR2	H0505S-2WR2
	H0512S-1WR2	H0512S-2WR2
	H0515S-1WR2	H0515S-2WR2
	H1205S-1WR2	H1205S-2WR2
	H1212S-1WR2	H1212S-2WR2
	H1215S-1WR2	H1215S-2WR2
	H2405S-1WR2	H2405S-2WR2
	H2412S-1WR2	H2412S-2WR2
	H2415S-1WR2	H2415S-2WR2
Dual	G0505S-1WR2	G0505S-2WR2
	G0509S-1WR2	G0509S-2WR2
	G0512S-1WR2	G0512S-2WR2
	G0515S-1WR2	G0515S-2WR2
	G1205S-1WR2	G1205S-2WR2
	G1209S-1WR2	G1209S-2WR2
	G1212S-1WR2	G1212S-2WR2
	G1215S-1WR2	G1215S-2WR2
	G2405S-1WR2	G2405S-2WR2
	G2409S-1WR2	G2409S-2WR2
	G2412S-1WR2	G2412S-2WR2
	G2415S-1WR2	G2415S-2WR2



Product features

- Meets third edition of medical standards EN60601，ANSI/AAMI ES60601-1 Certification（pending）（1xMOPP/2xMOOP）
- Isolation voltage: 4200VAC or 6000VDC
- Leakage current less than 2μA for patient protection
- Meet reinforced insulation requirements
- Operating temperature: -40℃~+85℃
- Efficiency up to 84%
- Internal SMD construction design
- Industry standard pin-out

1 Fixed input product basic knowledge

2 **Non-isolated Product basic knowledge**

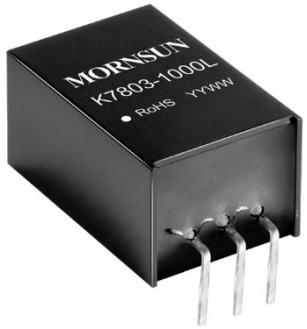
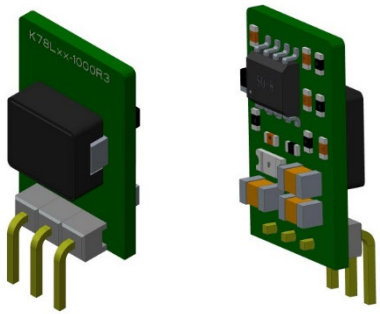
3 Product selling point analysis

4 Application case and error analysis

Classification of K78 series

Output current	R1	R2	R3
500mA	K78XX-500	K78XX-500R2	K78XX-500R3
	K78LXX-500	K78LXX-500R2	K78LXX-500R3
	K78UXX-500 (L)		
	K78XXT-500		
	K7812KT-500		
1000mA	K78XX-1000 (L)		K78XX-1000R3 (L)
	K78LXX-1000	K78LXX-1000R2	K78LXX-1000R3
	K78XXM-1000		
	K78XXT-1000		
1500mA	K78XX-1500 (L)		
	K78XX-2000 (L)		
	K7805YMD-2000		

Available in different package

		
11.6*7.5*10.2mm	11.5*9*17.5mm	
		
15.24*10.05*7.25mm	17.50*11.50*5.40mm	11.50*10.00*5.40mm

Non-isolated new product introduction ---R3 series

Part NO.	Output current（mA)	Output voltage range（VCD）	Output voltage（VCD)	Efficiency（%）	Package	Certification
K78Lxx-500R3	500mA	4.75-36	3.3,5,12,15, -5,-12,-15	93%	Plate open SIP	UL/CE
K78Lxx-1000R3	1000mA	6.5-32	3.3,5,12,15, -5,-12,-15	94%	Plate open SIP	UL/CE
K78xx-500R3	500mA	4.75-36	3.3,5,9,12,15, -5,-12,-15	93%	Potting SIP	UL/CE
K78xx-1000R3(L)	1000mA	6.5-32	3.3,5,9,12,15, -5,-12,-15	94%	Potting SIP	UL/CE

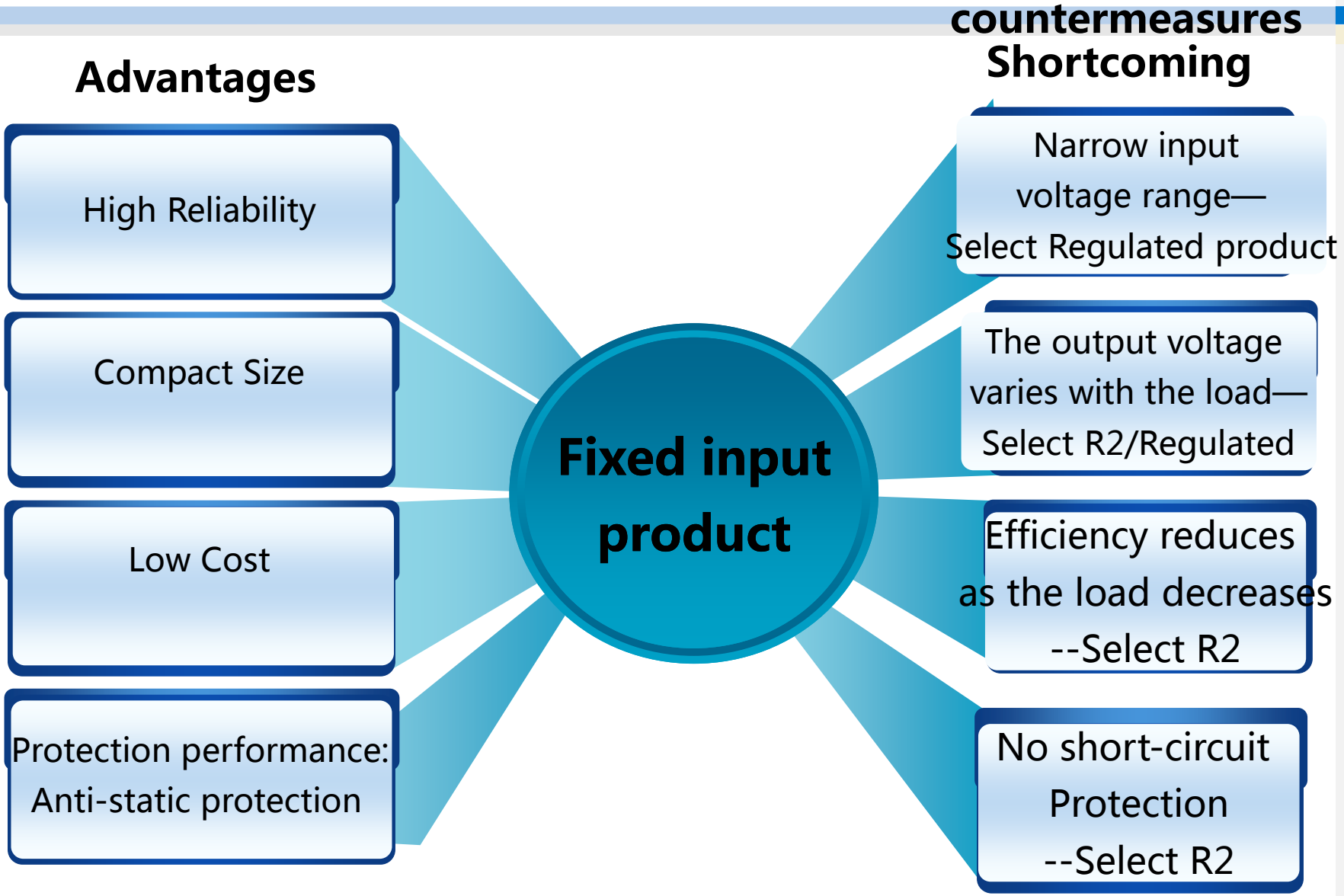
- Efficiency up to 94%
- Support the negative output
- Compact Pin compatible with LM78xx series
- Meet UL60950, EN60950 approval
- No-load input current is low to 0.2mA
- Cost effectlive and fast delivery time

1 Fixed input product basic knowledge

2 Non-isolated Product basic knowledge

3 **Product selling point**

4 Application case and error analysis


Advantages
High Reliability
Compact Size
Low Cost
Protection performance:
Anti-static protection
Fixed input product
countermeasures
Shortcoming
Narrow input voltage range—Select Regulated product
The output voltage varies with the load—Select R2/Regulated
Efficiency reduces as the load decreases --Select R2
No short-circuit Protection --Select R2

Performance Comparison

Product Specifications	B0505LS-1WR2		B0505LS-1W
Product Generation	R2		R1
Ripple & Noise*(mV)	≤60&75		≤100&100
Full-load efficiency Typ.(%)	80		70
No-load power consumption(W)	0.10		0.15
Capacitive load Max.(uF)	220		10
Continuous short-circuit protection	YES		NO
Operating Temperature	-40℃-105℃		-40℃-85℃
EMC Conduction(with Peripheral circuits)	CLASS B		CLASS A
ESD	8KV		4KV

Efficiency Comparison

Diagram of Efficiency VS Output load
（Nominal input voltage）

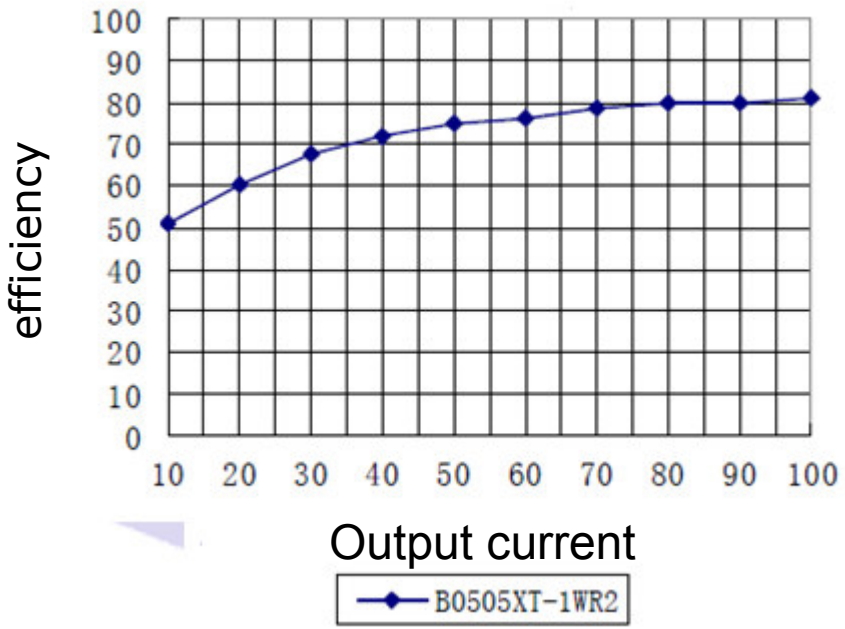
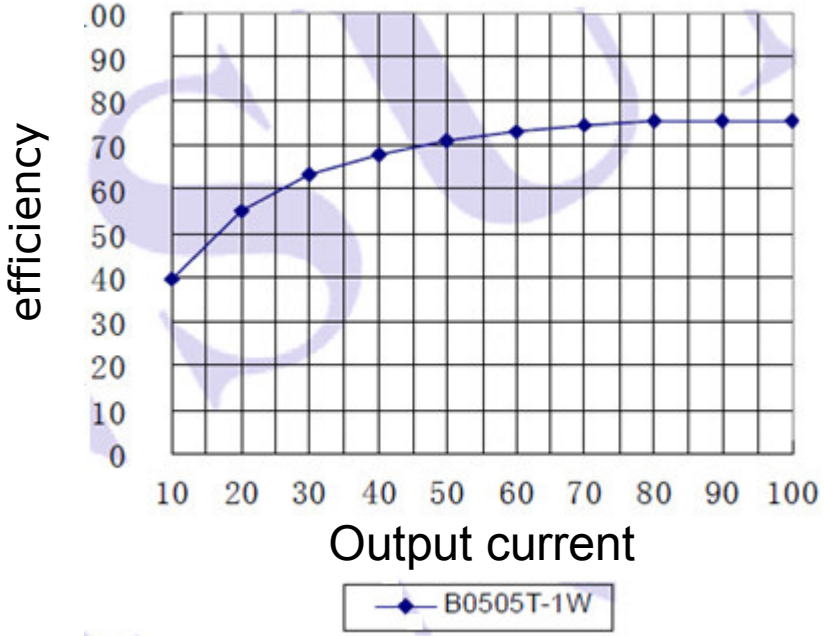
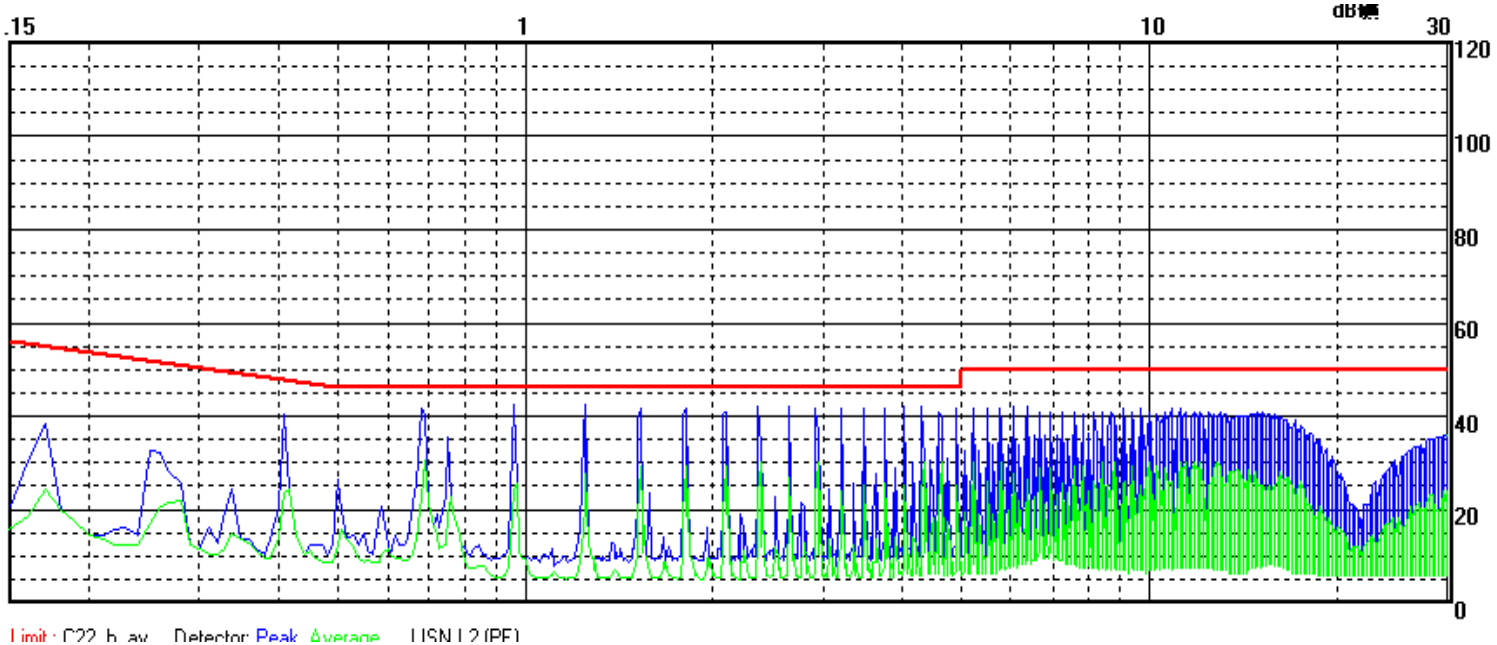
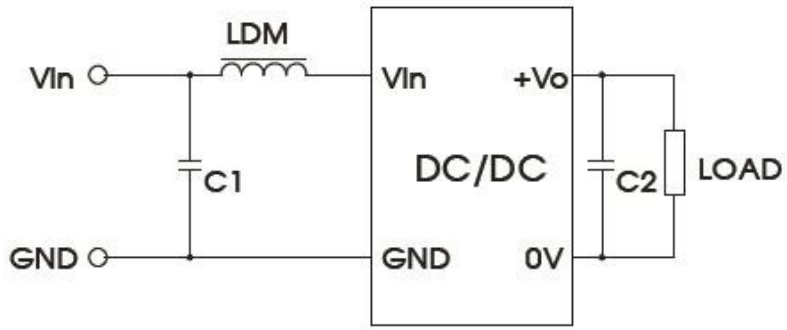


Diagram of Efficiency VS Output load
（Nominal input voltage）



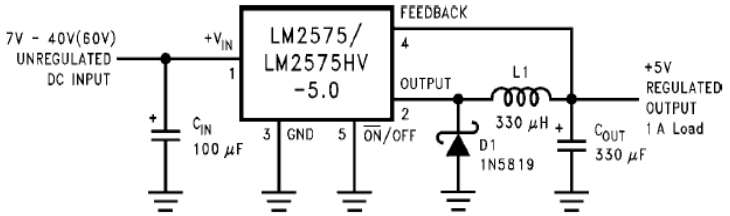
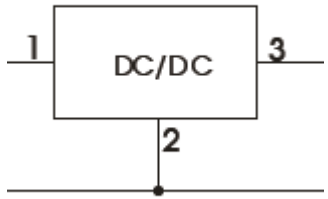
EMI performance



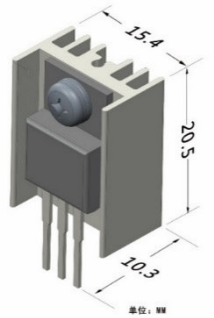
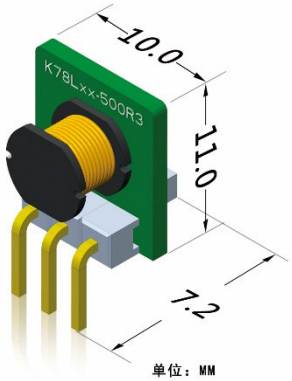


CISPR22/EN55022	CLASS B
CISPR22/EN55022	CLASS B

Advantage of K78xx-500R3 Scenario 1

Comparison of different solutions		
Solutions	**Features**	**Diagram**
1117/2576 Discrete ICs	1.Same performance and material cost same as K78xx-500R3(cost) **2.Cost of Design, purchase, maintenance should be considered(purchase of raw materials)**	
K78xx-500R3	**1.All-in one solution helps to save cost of Design, purchase, maintenance…(without external components)** 2.Reliability design analysis ensure product performance and stability(Reliability guarantee) 3. Automated production means better quality **4. All-in one solution easy to** use and save space(without heat sink)	

Advantage of K78xx-500R3 **Scenario** 2

Comparison of different solutions		
Solution	**Features**	**Dimensions**
LM78XX/LM79XX liner regulator	**1.Low cost** **2. Power dissipation (Great loss)** **3.Heat radiation(step-down 12V to 5V, output current >200mA)(HOT!)**	
K78xx-500R3	1.Efficiency up to 94%, low power dissipation 2.No heat sink required, save space /cost 3.Best choice for the industries which sensitive with temperature, eg. coal mine, monitor of power equipment, precision instrumentation.(especially for application that is sensitive to temperature change)	

Advantage of K78xx-500R3 Scenario 3

Comparison of different solutions		
Solutions	**Feature**	**K78xx-500R3 Advantage**
Products from Recom/Traco	1.Same performance with higher price 2. Lead time of 4-12 weeks	**1.Same performance with a more reasonable prices** 2.Lead time of 2-4 weeks
Products from smaller company	1.Lower price with **compromise of performance and quality(reliable or not?)**	1.Reliability design analysis ensure product performance and stability 2. Fully Automated production mean better quality

Performance comparison

Manufacturers	MORNSUN	RECOM	TRACO
Product	K78xx-500R3	R-78	TSR 0.5
Part No.	K7805-500R3	R-785.0-0.5	TSR 0.5-2450
Input voltage range	6.5 – 36 VDC	6.5 – 32 VDC	6.5 – 32 VDC
Efficiency typ.	94%@ Vin. Min	94 % @ Vin min.	94 % @ Vin min.
No load input current (Quiescent Current)	0.2mA typ.	5mA typ.	5mA typ.
Output Voltage Accuracy	±2% typ.	±2% typ.	±3 %typ.
Negative output available	Yes	No	No

Cross Reference

RECOM	Traco	Minmax	YDS	XP Power	Top power
R-78xx-0.5	TSR 0.5	M78A	08/01D-XX-500	T/SR05Sxx	TP78XX-0.5

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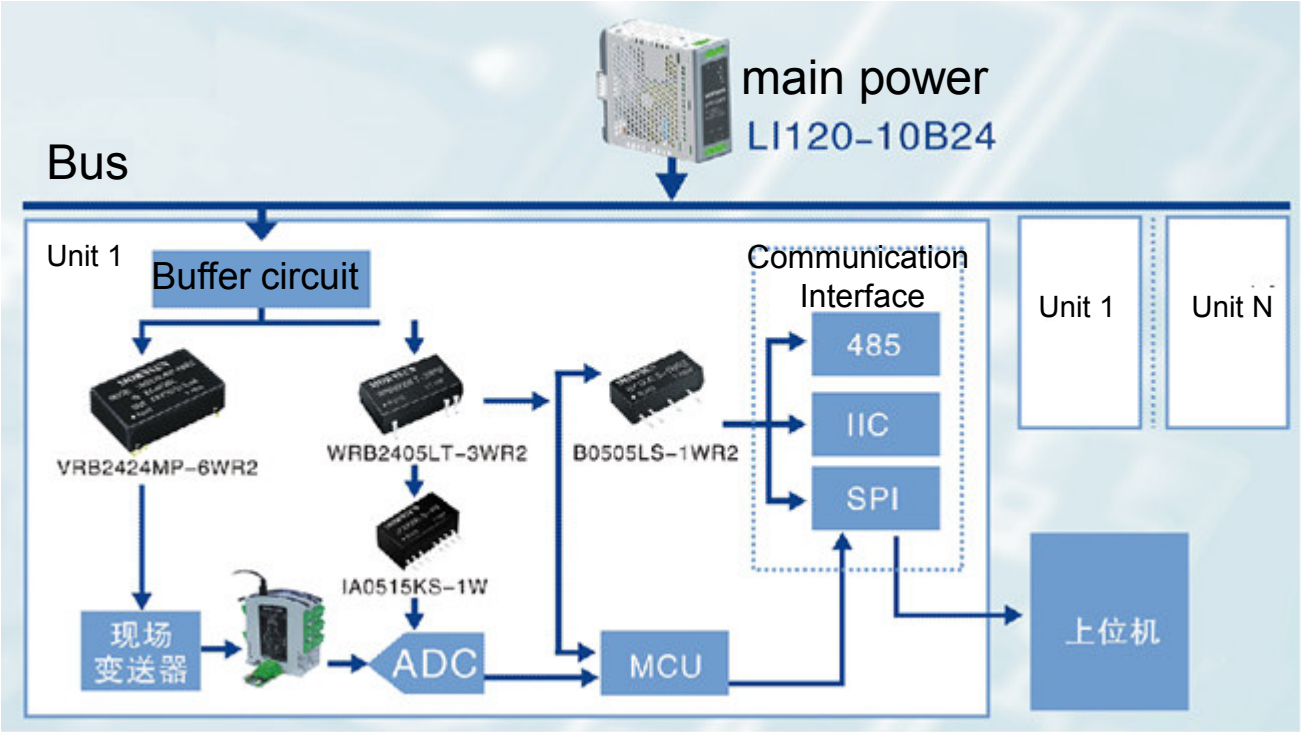
-- DCS Application case



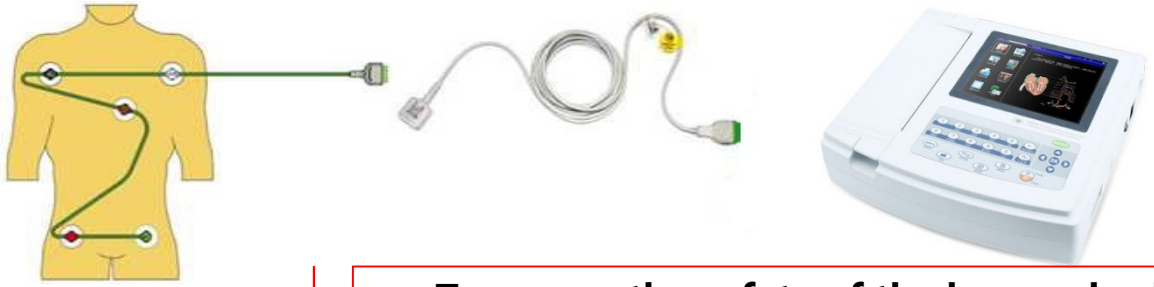
Use of power module in DCS application

1) For the main power supply of the controller;
2) Power supply operational amplifier etc;
3) Isolated Power Supply for I / O peripherals interface;
4) Isolated Power Supply for Communication such as RS485, etc.

DCS system widely used in the following applications:

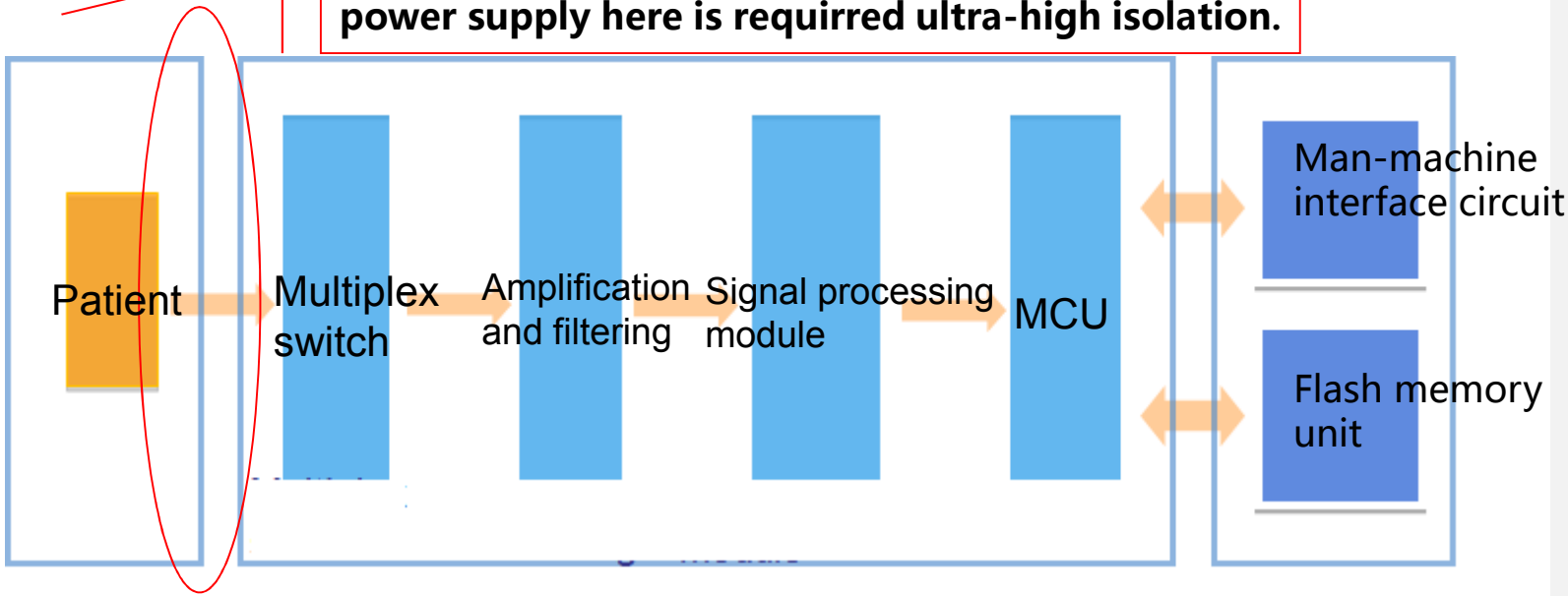
Power plant automatic control system, metallurgical automation , petrochemical industry, Chemical industry, mining, machine tool automation, textile machinery, packaging industry, elevators, crane and urban rail transit, etc.

Application solution——Healthcare, such as ECG (electrocardiograph) recorder



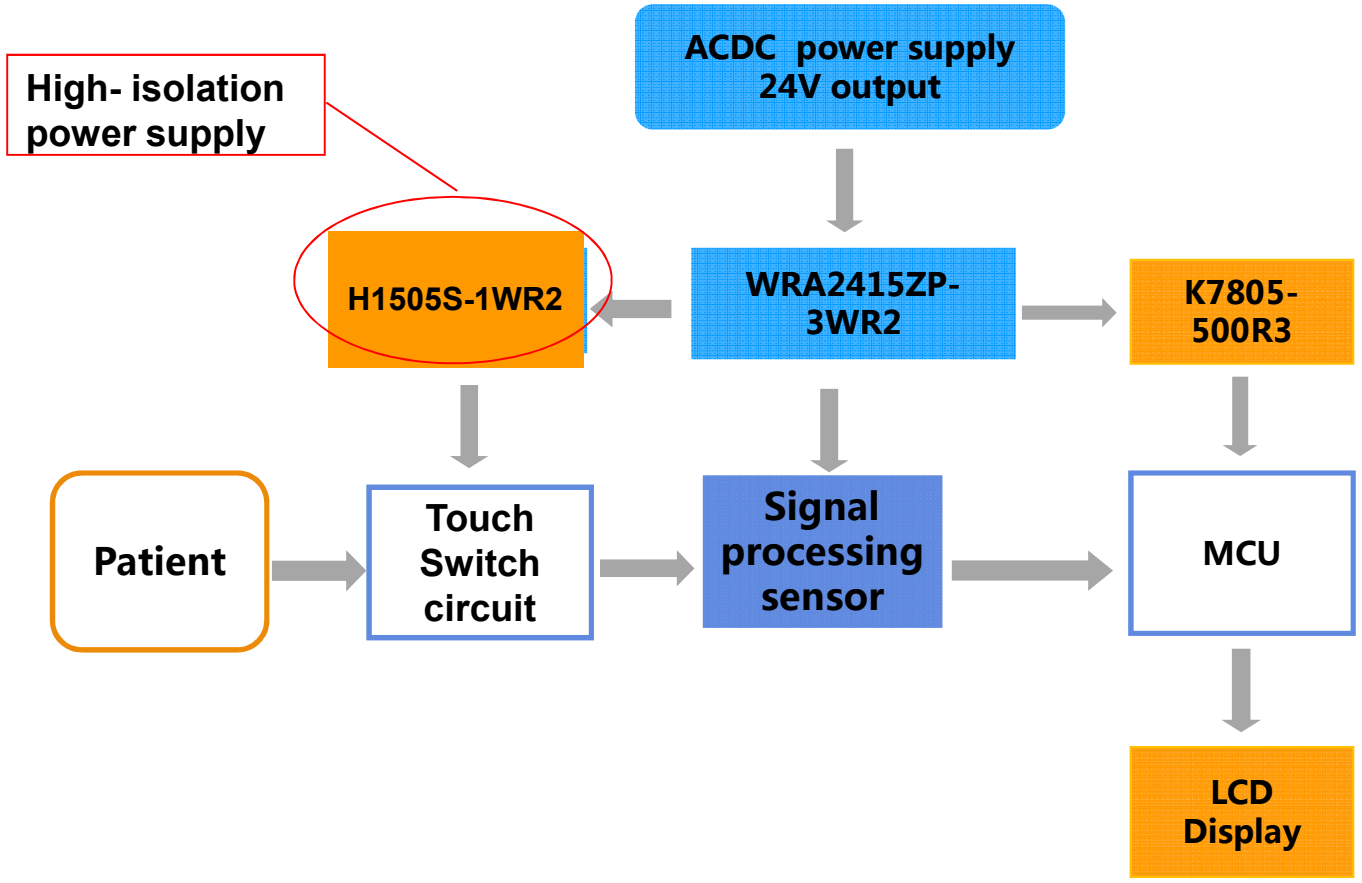
What is ECG

To ensure the safety of the human body, the power supply here is requirred ultra-high isolation.



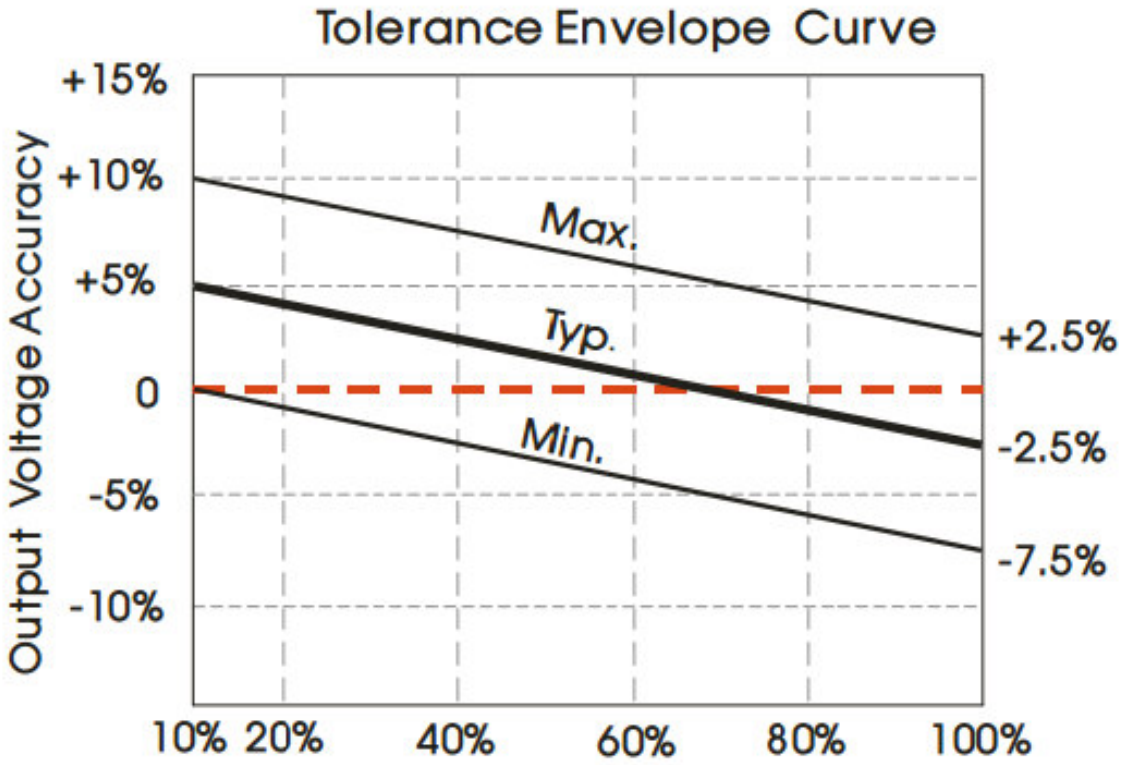
Signal Acquisition **Signal Processing** **Signal storage and display**

--Application solutions

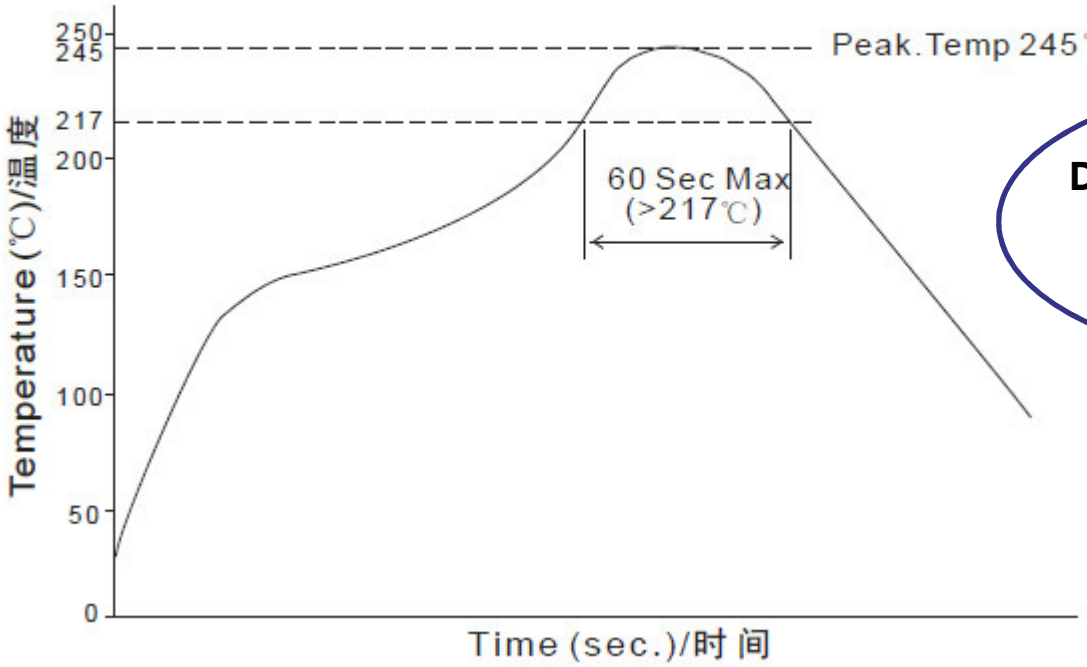


High isolation power supply is used to supply isolation power for CPU / DSP(digital signal processor) modules that in contact with the patient

Other output

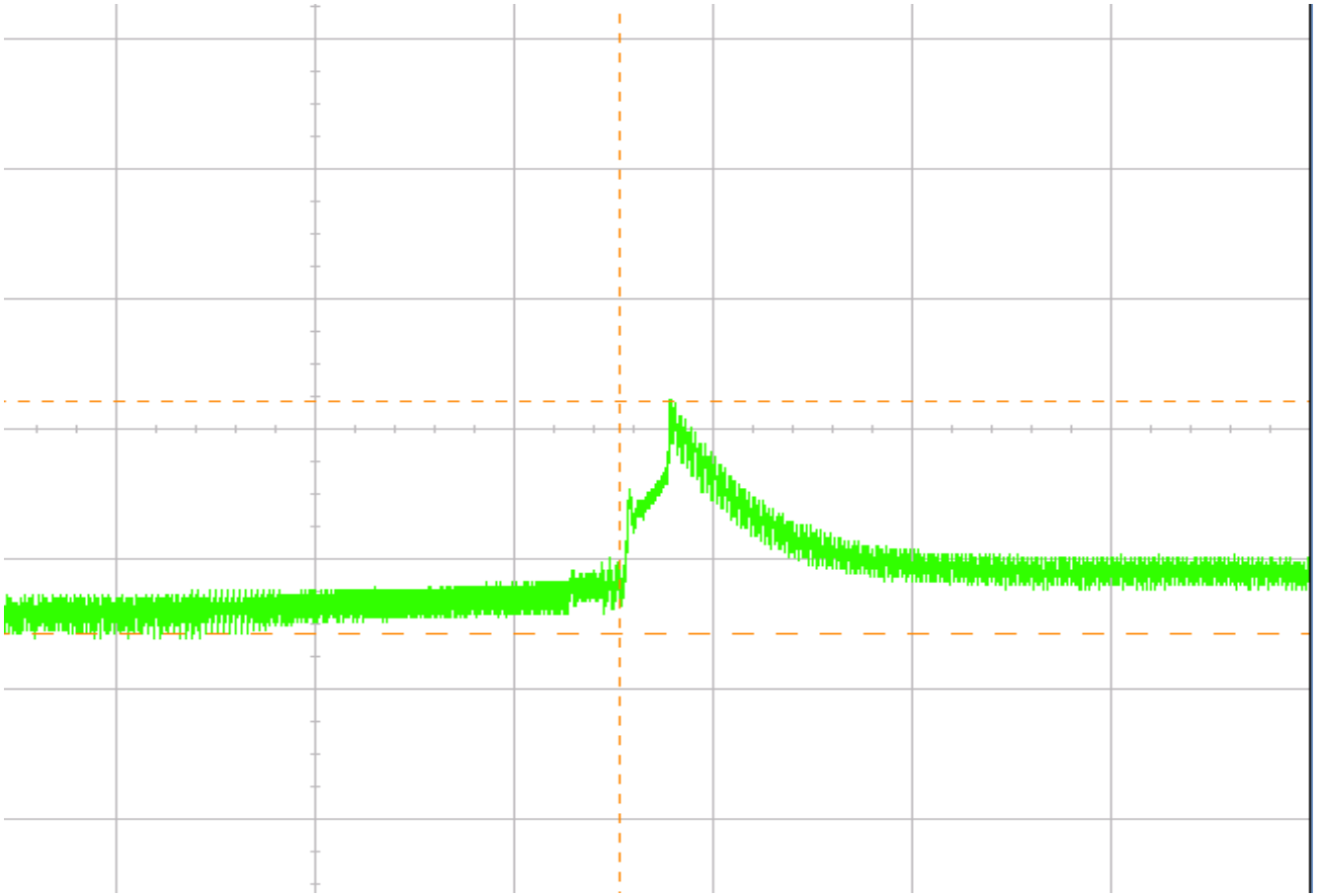


Reflow curve is recommended refer to IPC/JEDEC J-STD-020D standards, and the reflow soldering temperature curve of our product is shown in figure below:

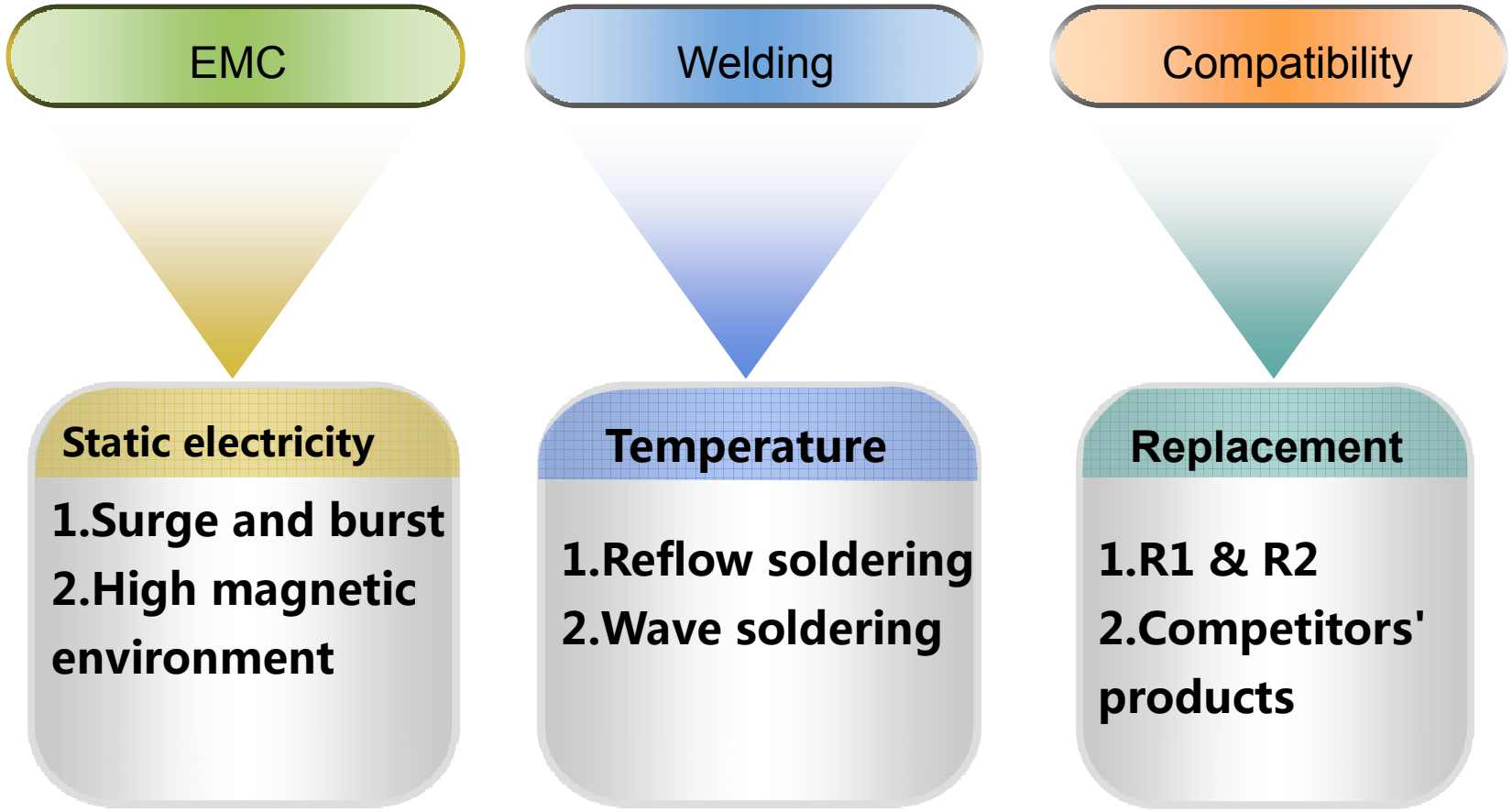


Don’ t use higher reflow soldering temp than recommended

Current to capacitive load during start- up



Other problems



Precautions

- External capacitor is helpful to improve efficiency
- Weak tolerance of electrostatic and surge (use of inductor in series with capacitor at input is beneficial)
- Pay attention to the operating temperature range and power de-rating requirements
- Pay attention to the capacitance polarity when the output is negative.

Thank You!