1. Wide operating temperature range：-40℃ to +105℃
2. Up to 83% efficiency
3. No load current as low as 5MA
4. Isolation voltage 3.5KVAC/6KVDC
5. Sustainable short-circuit protection

1. 工作温度范围广：-40℃至+105℃
2. 效率高达83%
3. 空载电流低至5MA
4. 隔离电压3.5KVAC/6KVDC
5. 可持续短路保护

IGBT/SiC MOSFET driver specific DC/DC module power supply, constant voltage input, isolated, non regulated, positive and negative dual output, SIP packaging.

IGBT/ SiC MOSFET 驱动器专用 DC/DC 模块电源，定压输入，隔离型，非稳压，正负双路输出，SIP封装。

Model Numbering/命名规则

QAxxxx(C)-(R3)

- Series/系列
- Product code/产品代码
- SiC MOSFET driver/驱动器
- Product Generation/产品代别

Selection Guide/选型表

产品型号 Product model	输入电压 Input Voltage Standard value(range)	输入电流 Input current (mA, Typ.) Full load/No load	输出电压 Output Voltage	输出电流 Output Current (mA)（Max./Min.）	效率 Efficiency % (Min./Typ.)	最大容性负载 Maximum capacitive load (μF)
QA051C	5VDC (4.5-5.5)	456/53	+20/-5.0	+80/-40	75/79	100
QA053C-1505R3		343/20	+15/-5.0	+80/-40	76/83	1000
QA053-1509R3		382/62	+15/-8.7	+80/-40	75/82	1000
QA053C-1803R3		415/20	+18/-3.0	+80/-40	76/83	680
QA053C-2004R3		407/18	+20/-4.0	+80/-40	76/83	470

产品型号 Product model	输入电压 Input Voltage Standard value(range)	输入电流 Input current (mA, Typ.) Full load/No load	输出电压 Output Voltage	输出电流 Output Current (mA)（Max./Min.）	效率 Efficiency % (Min./Typ.)	最大容性负载 Maximum capacitive load (μF)
QA123C-1502R3	12VDC (10.8-13.2)	167/8	+15/-2.5	+100/-100	75/88	2200
QA121C2		210/15	+15/-3.5	+111/-111	75/81	220
QA123C-1504R3		215/8	+15/-4.0	+120/-120	75/88	2200
QA121		280/40	+15/-8.0	+120/-120	75/81	1000
QA04		223/20	+15/-8.0	+100/-80	75/80	220
QA02		162/20	+15/-8.7	+80/-40	75/80	220
QA123-1509R3		242/8	+15/-9.0	+100/-100	75/88	2200
QA123C-1803R3		200/8	+18/-3.0	+100/-100	75/88	2200
QA1201C-20		240/20	+20/-4.0	+100/-100	75/80	220
QA121C-20		260/20	+20/-5.0	+100/-100	75/80	220
QA123C-2005R3		213/14	+20/-5.0	+90/-90	75/88	1000
QA01-09	15VDC (13.5-16.5)	84/20	+9.0/--	+111/--	76/81	220
QA01-A09		84/20	+9.0/-9.0	+55/-55	76/81	220
QA15115R2		193/17	+15/-2.5	+100/-100	75/80	220
QA151C3		151/15	+15/-4.0	+100/-100	75/82	220
QA153C-1504R3		171/8	+15/-4.0	+120/-120	75/88	2200
QA151M		162/15	+15/-5.0	+100/-100	75/81	220
QA151		230/35	+15/-8.0	+120/-120	76/81	1000
QA01		130/20	+15/-8.7	+80/-40	76/81	220
QA153-1509R3		195/8	+15/-9.0	+100/-100	75/88	2200
QA01-17		143/20	+17/-8.7	+80/-40	76/81	220
QA01C-18		177/16	+18/-3.0	+100/-100	75/80	220
QA153C-1803R3		167/14	+18/-3.0	+100/-100	75/88	1000
QA01C		193/16	+20/-4.0	+100/-100	75/80	220
QA151C		150/20	+20/-5.0	+80/-40	73/76	220
QA153C-2005R3		167/8	+20/-5.0	+90/-90	75/88	2200
QA243C-1504R3	24VDC (21.6-26.4)	131/10	+15/-4.0	+120/-120	75/88	2200
QA241		144/30	+15/-8.0	+120/-120	76/81	1000
QA03		81/20	+15/-8.7	+80/-40	75/80	220
QA243-1509R3		135/8	+15/-9.0	+100/-100	75/83	2200
QA243C-1803R3		112/14	+18/-3.0	+100/-100	75/88	1000
QA2401C-20		125/13	+20/-4.0	+100/-100	75/80	220
QA243C-2005R3		129/11	+20/-5.0	+90/-90	75/82	2200

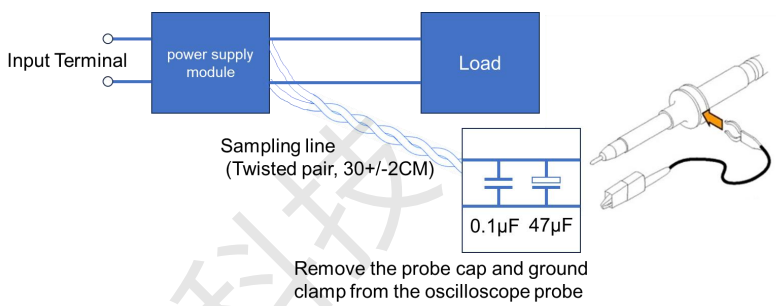
Input Characteristics/输入特性

Parameter/参数	Conditions/测试条件		Min.	Typ.	Max.	Units
Input current (No-load) 输入电流（空载）			- -	5	20	mA
Reflected ripple current 反射纹波电流			3	15	20	mA
Input impulse voltage 输入冲击电压	1sec. max. 最大1秒	3.3VDC/5VDC Input	-0.7	- -	9	VDC
		9VDC Input	-0.7	- -	12	VDC
		12VDC Input	-0.7	- -	18	VDC
		15VDC Input	-0.7	- -	21	VDC
		24VDC Input	-0.7	- -	30	VDC
Input filter 输入滤波类型	Capacitive filtering 电容滤波					
Remarks/备注: **This product does not support hot plug /此产品不支持热插拔**						

Output Characteristic/输出特性

Parameter/参数	Conditions/测试条件		Min.	Typ.	Max.	Units
Output voltage accuracy 输出电压精度			See Figure 3 (envelope curve) 见图3（包络曲线图）			
Linear regulation rate 线性调节率	Input voltage variation+/- 1% 输入电压变化+/-1%	3.3VDC Output	- -	- -	+/-1.5	%
		Other outputs	- -	- -	+/-1.2	%
Load regulation rate 负载调节率	10% to 100% load 10%-100% 负载	+Vo	- -	8	12	%
		-Vo	- -	10	20	%
Ripple & Noise 波纹和噪声	20MHz bandwidth 20MHz带宽		- -	50	120	mVp-p
Temperature drift coefficient 温度漂移系数	100% load 满载		- -	+/-0.03	- -	%/℃
Short circuit protection 短路保护	Sustainable, Self-healing 可持续、自恢复					

Note: The testing method for ripple and noise is the twisted pair testing method.
注：纹波和噪声的测试方法采用双绞线测试方法。



General Characteristics/通用特性

Parameter/参数	Conditions/测试条件		Min.	Typ.	Max.	Units
Isolation voltage 隔离电压	Input-output, Test time 1 minute, Leakage current less than 1 mA 输入-输出，测试时间1分钟，漏电流小于1 mA	IGBT driver	3000	--	--	VAC
		SiC MOSFET driver	3500	--	--	VAC
			6000	--	--	VDC
Insulation resistance 绝缘电阻	Input-output, Insulation voltage 500VDC 输入-输出，绝缘电压500VDC		1000	--	--	MΩ
Isolation capacitance 隔离电容	Input-output, 100KHz/0.1V 输入-输出，100KHz/0.1V		--	3	30	pF
Working temperature 工作温度	Temperature ≥ 85 ℃ for derating (See Figure 4) 温度≥85℃时，降额使用（见图4）		-40	--	+105	℃
Storage temperature 储存温度			-55	--	+125	℃
Storage humidity 储存湿度	Non condensing 无凝结		--	--	95	%RH

Parameter/参数	Conditions/测试条件	Min.	Typ.	Max.	Units
Housing temperature rise during operation 工作时外壳温升	Ta=25 ℃, Nominal input, Full output Ta=25℃，标称电压输入，满载	--	15	25	℃
Soldering temperature resistance of pins 引脚耐焊接温度	The distance from the welding spot to the shell is 1.5mm, 10 seconds 焊点到壳体的距离为1.5mm，10秒	--	--	300	℃
	REFLOW:Peak temperature Tc ≤ 245 ℃, maximum time above 217 ℃ for 60 seconds.(B_XT series) 回流焊：峰值温度 Tc≤245℃，217℃以上时间最大为60s.(B_XT系列)	--	--	245	℃
Switching frequency 开关频率	Full load, Nominal input voltage 满载，标称输入电压	--	270	--	kHz
Mean time between failures【MTBF】 平均无故障时间	MIL-HDBK-217F@25℃	3500	--	--	kHours

Physical Characteristics/物理特性

Parameter/参数	Content/内容
Housing material 外壳材料	Black flame retardant and heat-resistant plastic (UL94V-0) 黑色阻燃耐热塑料（UL94V-0）
Overall dimensions 外形尺寸	19.50 x 9.80 x 12.50mm
Weight 重量	4.2g(Typ.)
Cooling mode 冷却方式	Natural air cooling 自然空冷

EMC Characteristics/EMC特性

Parameter 参数	Category 类别	Content 内容
EMI	Conductive disturbance 传导骚扰	CISPR32/EN55032 CLASS B（The recommended circuit is shown in Figure 2） （推荐电路如图2所示）
	Radiation disturbance 辐射骚扰	CISPR32/EN55032 CLASS B（The recommended circuit is shown in Figure 2） （推荐电路如图2所示）
EMS	Electrostatic discharge 静电放电	IEC/EN61000-4-2 Contact ±4KV perf. Criteria B

Circuit Design and Application/电路设计与应用

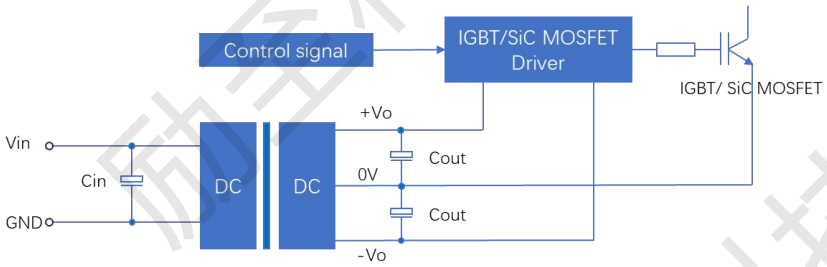


Figure 1: Application circuit

图1：应用电路

Table 1:
Recommended Capacitive Load Values
推荐电容负载值

Vin(VDC)	Cin(μF)	Vo(VDC)	Cout(μF)
Nominal voltage 标称电压	1-10	Nominal voltage 标称电压	2.2-22

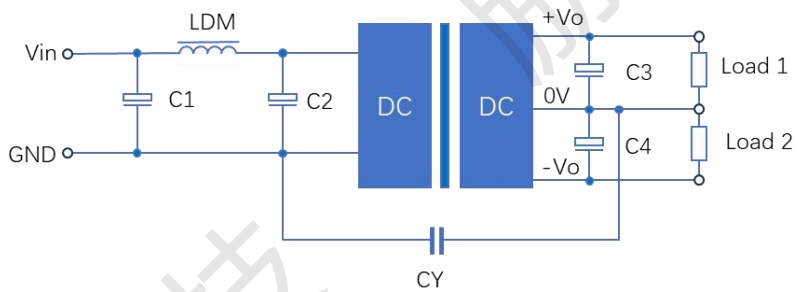


Figure 2: EMC Typical Recommended Circuits

图2:EMC典型推荐电路

Table 2:
Recommended Circuit Parameter Values
推荐电路参数

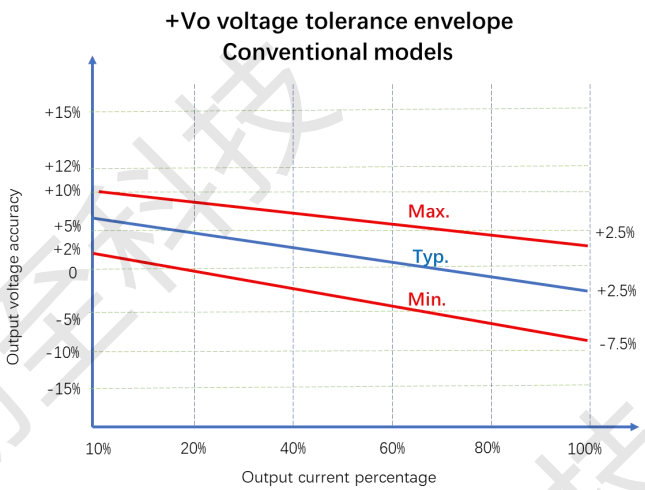
Category 类别	Component 元件	Value 参数
EMI	C1	4.7μF /50V
	C2	4.7μF /50V
	C3,C4	2.2-22μF /50V
	CY	270pF/2kV
	LDM	6.8μH

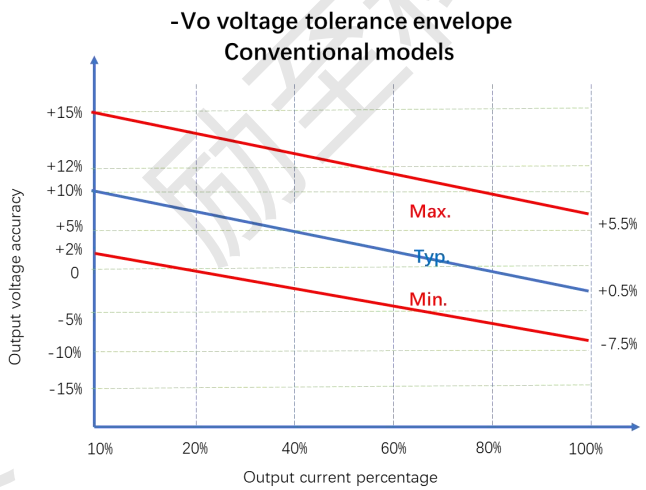
1. Typical application: If further reduction of input and output ripple is required, a capacitor filter network can be connected at the input and output ends. The application circuit is shown in Figure 1. However, suitable filter capacitors should be selected. If the capacitance is too large, it may cause overcurrent or poor startup of the power supply. For each output, while ensuring safe and reliable operation, the recommended capacitance load values are shown in Table 1.
2. EMC requirements: For situations with high EMC requirements, a typical EMC recommended circuit is shown in Figure 2.

3. Input requirements: Ensure that the fluctuation range of the input voltage does not exceed the upper and lower limits of the input voltage specified in this data sheet, and the input power must be greater than the output power specified in this data sheet. For situations with a 24V input voltage, it is recommended to connect a TVS tube between the positive and negative input pins for protection (recommended parameters for TVS tubes: 30V, bidirectional, SOD-123 packaging).
4. Output load requirements: Try to avoid using it without load as much as possible; When the actual power of the load is less than 10% of the rated output power in this data sheet, or when it needs to be used in no-load situations, it is recommended to connect a load resistor externally at the output end. The load resistor can be calculated according to 5-10% of the rated power in this data sheet. The calculation formula for the load resistor value is RL=$Uout^2$/(Pout*10%).
5. Overload protection: Under normal working conditions, the output circuit of this product has no protection function for overload situations. The simplest method is to connect a self recovery fuse in series at the input end, or add a circuit breaker outside the circuit; Or during design and selection, the actual power of the circuit should be around 60-80% of the rated power in this data sheet.

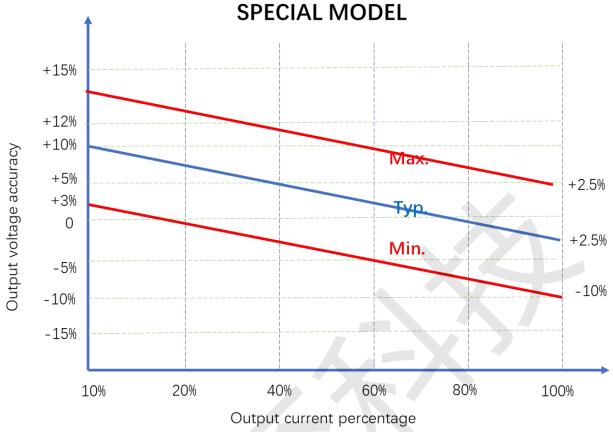
1. 典型应用：如果需要进一步降低输入和输出纹波，可以在输入和输出端连接电容滤波器网络。应用电路如图1所示。但是，应选择合适的滤波电容器。如果电容过大，可能会导致电源启动过流或启动不良。对于每个输出，在确保安全可靠运行的情况下，推荐的电容负载值如表1所示。
2. EMC要求：对于EMC要求较高的场合，典型的EMC推荐电路如图2所示。
3. 输入要求：确保输入电压波动范围不要超出本数据表的输入电压的上限和下限要求，输入功率必须大于本数据表中的输出功率。对于24V输入电压的场合，建议在输入正引脚和输入负引脚之间外接一个TVS管进行保护（TVS管推荐参数：30V,双向，SOD-123封装）。
4. 输出负载要求：应尽量避免空载使用；当负载的实际功率小于本数据表的额定输出功率的10%时，或需要在空载场合使用时，建议在输出端外接负载电阻，负载电阻可按照本数据表额定功率的5-10%计算，负载电阻值计算公式：RL=$Uout^2$/(Pout*10%)。
5. 过载保护：在通常工作条件下，该产品输出电路对于过载情况无保护功能，最简单的方法是在输入端串接一个自恢复保险丝，或在电路中外加一个断路器；或在设计选型时，电路的实际功率在本数据表额定功率的60-80%左右。

Product Characteristic Curve/产品特性曲线

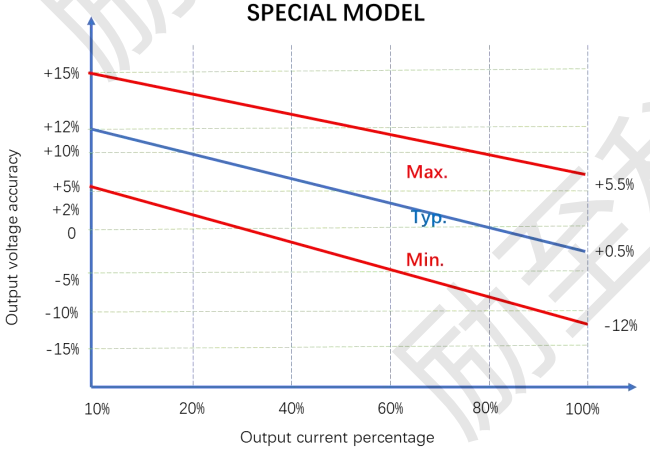




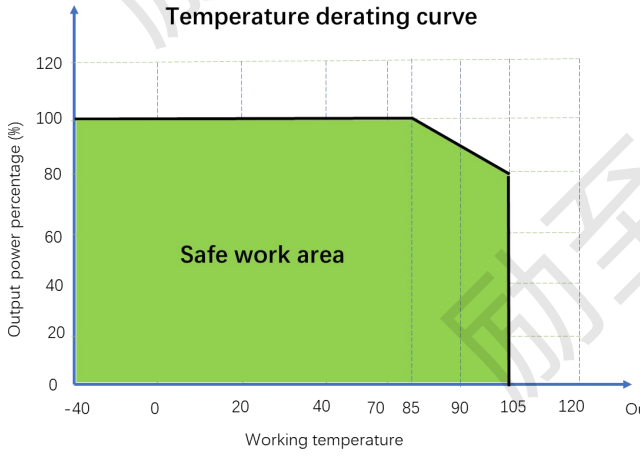
+Vo voltage tolerance envelope
SPECIAL MODEL



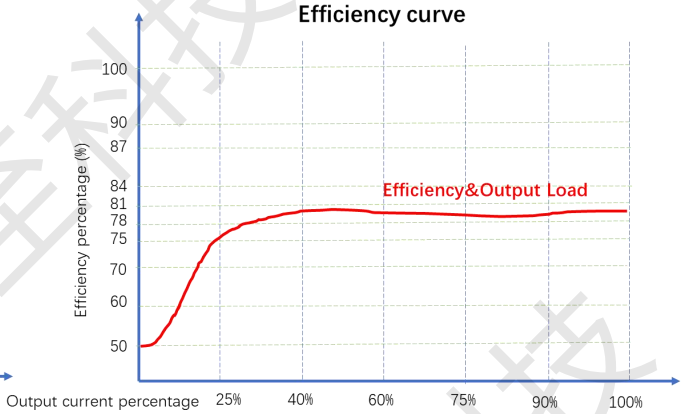
-Vo voltage tolerance envelope
SPECIAL MODEL



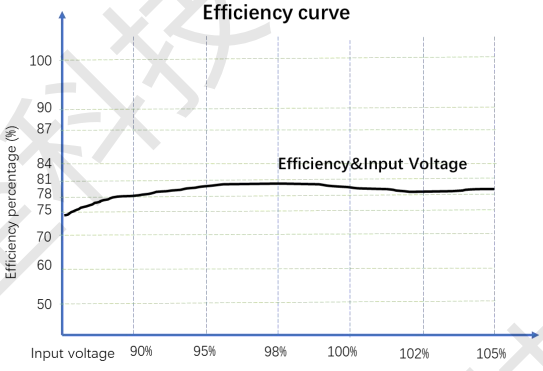
Temperature derating curve



Efficiency curve



Efficiency curve



Overall Dimensions and Pin Functions/外形尺寸和引脚功能

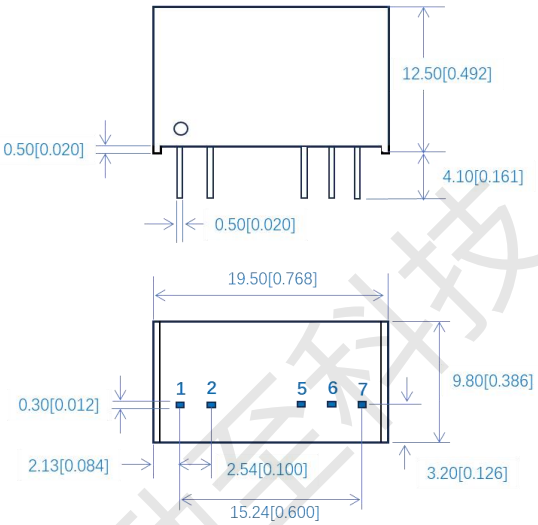


Figure 7: Overall dimensions
图7：外形尺寸

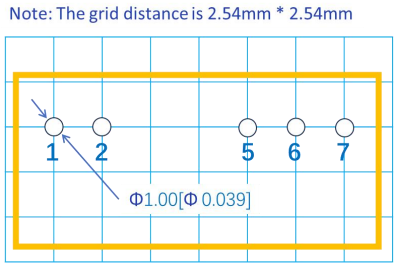


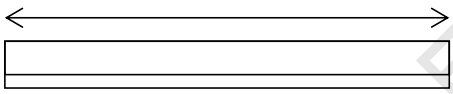
Table 3: Pin Function Table /引脚功能表

Pin	Function
1	Vin
2	GND
5	-Vo
6	0V
7	+Vo

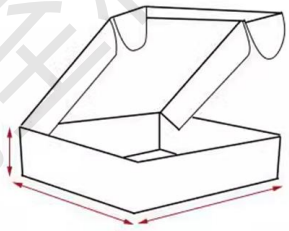
Note:
Dimensions in mm
Terminal diameter tolerance:+/-0.10
Undeclared tolerance:+/-0.50

注：尺寸单位为毫米
端子直径公差：+/-0.10
未注公差：+/-0.50

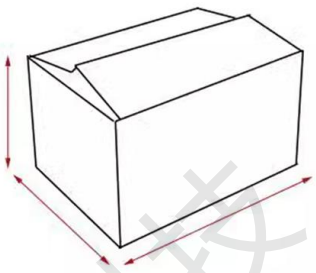
Packaging Method/包装方式



18 Pieces/Tube
18PCS/管



900 Pieces/Inner box
900 PCS/内盒



4500 Pieces/Outer box
4500 PCS/外箱

Notes & Instructions/注释和说明

1. The input voltage shall not exceed the specified range value, otherwise permanent and unrecoverable damage may be caused;
2. Unless otherwise specified, the parameters in this manual are measured at 25 ℃, 40%~75% humidity, input nominal voltage and output pure resistance mode under full load;
3. All index test methods are based on the company's enterprise standards.
4. The copyright and the final interpretation right of the product belong to LZTEC.

1. 输入电压不得超过规定的范围值，否则可能造成永久性和不可恢复的损坏；
2. 除非另有规定，否则本手册中的参数是在25℃、湿度40%~75%、输入标称电压和输出纯电阻模式下满负荷测量的；
3. 所有指标测试方法均基于本公司的企业标准；
4. 该产品的版权和最终解释权归本公司所有。