

SPECIFICATION FOR APPROVAL**客户承认书**

客户编码 Customer ID: 190175

景荣料号 KRECO P/N No. :KRE-GaN33WEUAC

日期 Date:2023-5-26

设计流水/订单号 Design/PO No. :230315-190175-860875



景荣企业有限公司
中山市景荣电子有限公司

KINGRONG ENTERPRISE LTD. (Since 2008)

ZHONGSHAN KINGRONG ELECTRONICS CO., LTD.

产 品 规 格 书**SPECIFICATION FOR APPROVAL****DESCRIPTION /产品名称** : 33W GaN Fast Charger**CUSTOMER ID /客户代码** : 190175**CP.N. /客户料号** :

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KRECO LTD
intelligent power solutions

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1 / 14

TABLE OF CONTENTS/目录

1. Product Introduction /产品介绍	3
1.2.1 Output ports/输出端口 1: USB-A	3
1.2.2 Output ports/输出端口 2: USB-C	3
2. Input Characteristics /输入特性	3
2.2 Stand-by Power (no-load) Consumption < : 0.075W max. /空载待机功耗小于数。	3
2.3 Input AC Current Limit under min AC input & full load: 0.8A max.	3
2.4 Average Efficiency /平均效率%	3
3. Output Characteristics /输出特性	3
3.1 Output Specification 输出特性	3
3.1.1 DC Voltage Regulation 输出电压调整率范围	4
3.1.2 DC Output Current 输出电流	4
3.1.3 Output Ripple and Noise 输出纹波与噪音	5
3.1.4 Output Dynamic Load Response 输出动态负载响应	5
3.1.5 Overshoot at turn-on/ turn-off 电压过冲	6
3.2 Protection Function 保护功能	6
3.2.1 Over Voltage Protection 过压保护	6
3.3 Timing 时序特性	7
4. Environment Requirement 环境要求	7
5. Reliability 可靠性	8
6. Safety Requirement 安规要求	8
7. EMC Requirement 电磁兼容要求	9
8. Label Diagram /铭牌图	10
9. Outline Photograph /相片+机械图纸	11
10. Package Information /包装示意图	12
11. Operation Caution 操作注意事项	13
12. Statement 声明	13
13. Customer Confirmation 客户确认	13

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1. Product Introduction /产品介绍

1.1 Power Supply Overview/电源概况

This product is a Total Power: **33W GaN Fast Charger**. The product has short-circuit protection, over-current protection and other protections, meeting ROHS requirement. 本产品为总功率(见以上英文)W 的快充充电器。产品具有短路保护、过电流保护等保护功能，满足 RoHS 要求。

1.2 Features/特性

1.2.1 Output ports/输出端口 1: USB-A

support several charging standards including/支持多种充电标准，包括：

QC3.0/QC2.0(Quick Charge), FCP(Hisilicon® Fast Charge Protocol), AFC(Samsung® Adaptive Fast Charge).Hua wei-SCP,Apple 2.4A/BC1.2

1.2.2 Output ports/输出端口 2: USB-C

support several charging standards including/支持多种充电标准，包括：

USB Type C PD2.0/PD3.0,QC3.0/QC2.0 (Quick Charge), Apple 2.4A, Huawei wei-SCP,BC1.2/PPS/MTK-PE+2.0.FCP(Hisilicon® Fast Charge Protocol),AFC(Samsung® Adaptive Fast Charge).

2. Input Characteristics /输入特性

2.1 Input Voltage & Frequency/输入电压&频率

The range of input voltage, single phase. /输入电压范围：单相输入。

Items/项目	Minimum /最小	Nominal /额定值	Maximum /最大
Input voltage /输入电压	90Vac	100Vac~240Vac	264Vac
Input frequency /输入频率	47Hz	50/60Hz	63Hz

2.2 Stand-by Power (no-load) Consumption < : **0.075W** max. /空载待机功耗小于数。

2.3 Input AC Current Limit under min AC input & full load: **0.8A** max.

最小交流输入和满载的情况下，输入电流限制。

2.4 Average Efficiency /平均效率%

Every single unit achieves at least **81.84 %** efficiency at 25%. 50%. 75%. 100% of load conditions (After warm up 30 minutes) . /热机 30 分钟后，每一个产品至少达到的效率，在 25%，50%，75%，100%负载状态。

3. Output Characteristics /输出特性

3.1 Output Specification 输出特性

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5/26/2023 3:44 PM

3 / 14

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3.1.1 DC Voltage Regulation 输出电压调整率范围

The DC output voltages will remain within the regulation ranges shown in Table 3 when measured at the load end of the output connectors. 当测量输出连接器的负载端时，直流输出电压将保持在表3所示的调节范围内。

The voltage regulation limits do not include the transient DC load changes, which are covered in Section. 电压调节极限不包括第 3.1.4 节中所述的瞬态直流负载变化。

Table 3-1 :USB A DC Output voltage regulation limits 表格3-1: 直流输出稳压限制

参数 Parameter	输出电流 Output Current	输出电压范围 Output Voltage Range	线性调整 Line Regulation	测试模式 Test Mode
V:5V	0-3.0A	4.7-5.3V	4.7-5.3V	CC
V:9V	0-2.0A	8.55-9.45V	8.55-9.45V	CC
V:12V	0-1.5A	11.4-12.6V	11.4-12.6V	CC

Table 3-2 :USB C DC Output voltage regulation limits 表格3-2: 直流输出稳压限制

参数 Parameter	输出电流 Output Current	输出电压范围 Output Voltage Range	线性调整 Line Regulation	测试模式 Test Mode
V:5V	0-3.0A	4.7-5.3V	4.7-5.3V	CC
V:9V	0-3.0A	8.55-9.45V	8.55-9.45V	CC
V:12V	0-2.5A	11.4-12.6V	11.4-12.6V	CC
V:15V	0-2.0A	14.25-15.75V	14.25-15.75V	CC
V:20V	0-1.5A	19-21V	19-21V	CC
PPS:3.3V-11V	0-3A		-	CC

3.1.2 DC Output Current 输出电流

Table 4: (2)DC output current limits 表格4:直流输出电流限制

参数 Parameter	最小电流 Min Current	标称电流 Rate Current	峰值电流 PK Current	单位Unit	测试模式 Test Mode
V:5V		3.0		A	CC
V:9V		2.0		A	CC



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V:12V		1.5		A	CC
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Table 4: (1)DC output current limits 表格4:直流输出电流限制

参数 Parameter	最小电流 Min Current	标称电流 Rate Current	峰值电流 PK Current	单位Unit	测试模式 Test Mode
V:5V		3.0		A	CC
V:9V		3.0		A	CC
V:12V		3.0		A	CC
V:15V		2.0		A	CC
V:20V		1.5		A	CC
PPS:3.3-21V		3.0		A	CC

3.1.3 Output Ripple and Noise 输出纹波与噪音

The following table 5 is output ripple and noise requirements, it will be met throughout the load ranges specified in Section 3.1.2 and rated input voltage conditions as specified Section 2.1, Measurements will be made with an oscilloscope set to 20MHz bandwidth limit. The outputs will be bypassed with one 0.1uF multilayer and one 47uF electrolytic capacitors . 下面表格 5 是纹波与噪声要求，以 3.1.2 节中定义负载范围和 2.1 节定义的额定输入电压为测试条件，纹波与噪声均应符合要求，测试时示波器设置为 20MHz 带宽，输出端并接一 0.1uF 瓷片电容和一 47uF 铝电解电容（输入电压为 110-240Vac）。

Table 5: Output ripples and noise limits 表格5:输出纹波与噪声限值

参数/Parameter	最大值/Max.
5.0V/9V/12V/15V/20V	200mVp-p

3.1.4 Output Dynamic Load Response 输出动态负载响应

The output voltages will remain within specified regulation limit of the nominal set voltage for changes in load as specified below under the following load steps defined below table 6. At a slew rate of 0.1Amps/uS between 50Hz to 10 KHz.

根据表6中定义的下列负载步骤，输出电压将保持在额定设置电压的规定限制内，以适应负载的变化。在50Hz到10khz之间以0.1安培/uS的转换速率工作。

Table 6: Output dynamic load response limits 表格6: 输出动态负载响应

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动态负载/ Dynamic Load	电压调整率/ DC Voltage Regulation
50%~100%~50%	±10%

3.1.5 Overshoot at turn-on/ turn-off 电压过冲

Any overshoot at turn on or turn off shall be less than rate% of rated output voltage.

开机或关机时，电压过冲不得超过标称值的百分比%

3.2 Protection Function 保护功能

3.2.1 Over Voltage Protection 过压保护

The power supply will provide OVP function. Over voltage: 120% - 180% rated output voltage; protection type - Shut off o/p voltage, re-power on to recover.

本产品提供 OVP 保护，过压百分比%额定输出电压，过压情况解除后，产品将会自动恢复正常。

3.2.2 Short Circuit Protection 短路保护

The input power shall decrease when the output rail short, the power supply shall no damage, and shall be self-recovery when the fault condition is removed.

当输出短路时,电源输入功率降低且不会损伤,当短路情况解除后,产品将会自动恢复正常

3.2.3 Over Current Protection 过流保护

The power supply shall meet the limitation requirement as below table, The output shall hiccup when the over currents applied to the output rail, and shall be self-recovery when the fault condition is removed.

电源过流点符合下表限值要求，当输出过流时，产品打嗝保护，当过流情况解除后，产品将会自动恢复正常。

Table 7: USB C Over Current Protection limits 表格7: 过电流极限

Parameter	Min.	-	Max	Unit
参数Parameter	最小Min.	-	最大Max	单位Unit
V:5V	3	-	4.5	A
V:9V	2	-	3	A
V:12V	1.5	-	2.25	A

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Table 7: USB C Over Current Protection limits 表格7: 过电流极限

Parameter	Min.	-	Max	Unit
参数Parameter	最小Min.	-	最大Max	单位Unit
V:5V	3	-	4.5	A
V:9V	3	-	4.5	A
V:12V	2.5	-	3.75	A
V:15V	2	-	3.0	A
V:20V	1.5	-	2.25	A

3.3 Timing 时序特性

3.3.1 Hold up Time 保持时间

Hold-up time no less than 10mS at 110Vac/60Hz input and no less than 20mS at 240Vac50Hz input with full load.

满载条件下，电源在 110Vac/60Hz 输入时，保持时间不小于 8mS； 240Vac50Hz 输入时，保持时间不小于 20mS。

3.3.2 Start-up Time 启动时间

Start-up time no more than 3 seconds at 110Vac/60Hz input and no more than 2 seconds at 240Vac50Hz with full load.

满负载条件下，电源在 110Vac/60Hz 输入时，启动时间不大于 3 秒； 240Vac50Hz 输入时，启动时间不大于 2 秒。

4. Environment Requirement 环境要求

4.1 温度 Temperature

工作环境温度： 0℃~ 25℃ Operating Ambient: 0℃~ 25℃

储存环境温度： -10℃~ +70℃ Non-operating Ambient: -10℃~ +70℃

4.2 湿度 Humidity

工作时： 20%~80% 相对湿度（非冷凝） Operating: 10%~90% relative humidity (Non-condensing)

储存时： 10%~90% 相对湿度（非冷凝） Non-operating: 10%~90% relative humidity (Non- condensing)

4.3 海拔高度 Altitude

工作时： 2000 米 Operating: 2000 meters

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贮存时: 2000 米 Non-operating: 2000 meters

5. Reliability 可靠性

5.1 MTBF 平均无故障间隔时间

MTBF no less than 20K hours (25 degrees C, Full load and rated voltage input)

25℃环境温度, 满载条件, 额定电压输入条件, 平均无故障间隔时间≥20K小时

5.2 Burn-in and Life test 老化寿命测试

The charger is aged for 2H with 100% rated load, and the temperature rise of the case is ≤40℃. 充电器在 100%额定负载下带载老化 2H , 外壳温升≤40℃ 。

5.3 Drop test 跌落测试

Drop freely from 1.0m height onto the surface which is consisted of 10 mm thick griotte floor, 12 times. After the test, the product performance meet requirements stated in the specification. 产品跌落高度为: 1.0m, 跌落的地面为 10mm 厚的大理石地板, 3 次, 测试后, 产品能充电和无异响要求。。

6. Safety Requirement 安规要求

6.1 Standard 标准

Meet IEC62368-1 standard requirement.符合IEC62368-1标准要求。

6.2 Leakage Current 接触电流

Leakage current shall not exceed 0.5mA at 110-240Vac/50Hz.

接触电流不得超过 0.5mA (110-240Vac/50Hz).

6.3 Insulation Resistance 绝缘阻抗

Primary to Secondary: 50 Meg. Ohms min. 500VDC

初级对次级: ≥50M 欧姆, 500VDC

6.4 Dielectric Strength Testing 绝缘强度

Hi-pot test shall be met the table 8 requirements, an item listing this test as a 100% production test must be performed and be maintained at that level for a minimum of 3 seconds without failure. 绝缘强度满足下表的要求, 100% 在线产品执行此项测试, 并每一项目至少保持 3S 时间, 无任何障碍。

Table 8: Hi-pot test 表格8:高压试验

项目Item	规格要求Specification		备注Remark
输入---输出 Primary to Secondary	3.0KVac	<5mA	无飞狐No arcing 无击穿No broken
Primary to P. G	N/A	N/A	

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7. EMC Requirement 电磁兼容要求

7.1 Radiation Emissions Test 电磁辐射干扰测试

测试标准: EN55032/55035 CISPR 32/35 Performance : B

Test Criteria: EN55032/55035 CISPR 32/35 Performance : B

7.2 Radiation Emissions Test 电磁传导干扰测试

测试标准: EN55032/55035 CISPR 32/35 Performance : B

Test Criteria: EN55032/55035 CISPR 32/35 Performance : B

7.3 EFT Test 电快速脉冲群干扰测试

测试标准: EN 61000-4-4

Test Criteria: EN 61000-4-4

Power Line: $\pm 1\text{KV}$

Performance Criteria: B

7.4 Surge Test 浪涌测试

测试标准: EN 61000-4-5

Test Criteria: EN 61000-4-5

Common mode(line to earth) : $\pm 1\text{KV}$

Differential mode (Line to Line): $\pm 1\text{KV}$

Performance: B

7.5 ESD Test 静电测试

测试标准: EN 61000-4-2

Test Criteria: EN 61000-4-2 Air

Discharger : $\pm 8\text{KV}$

Contact discharger: $\pm 4\text{KV}$

Performance: B



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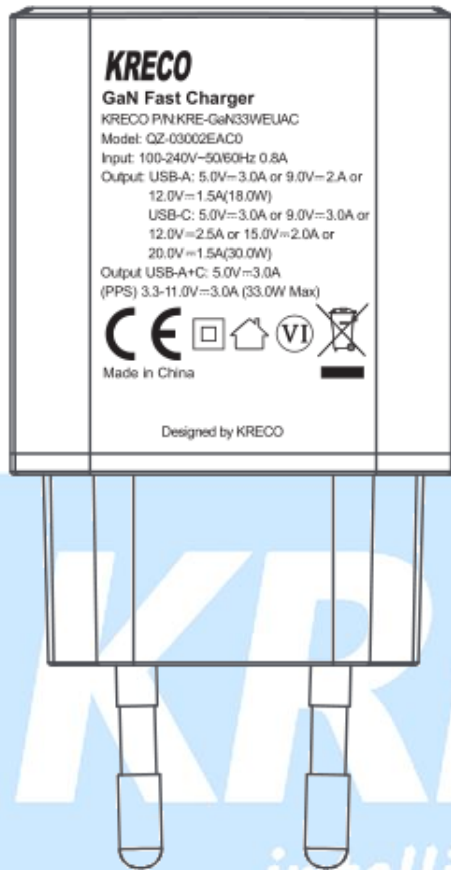
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8. Label Diagram /铭牌图



- ☒ Laser engraving or ☒ PVC sticker +
☒ Serial Number 128 (YYFACTORYID00000001)

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10 / 14

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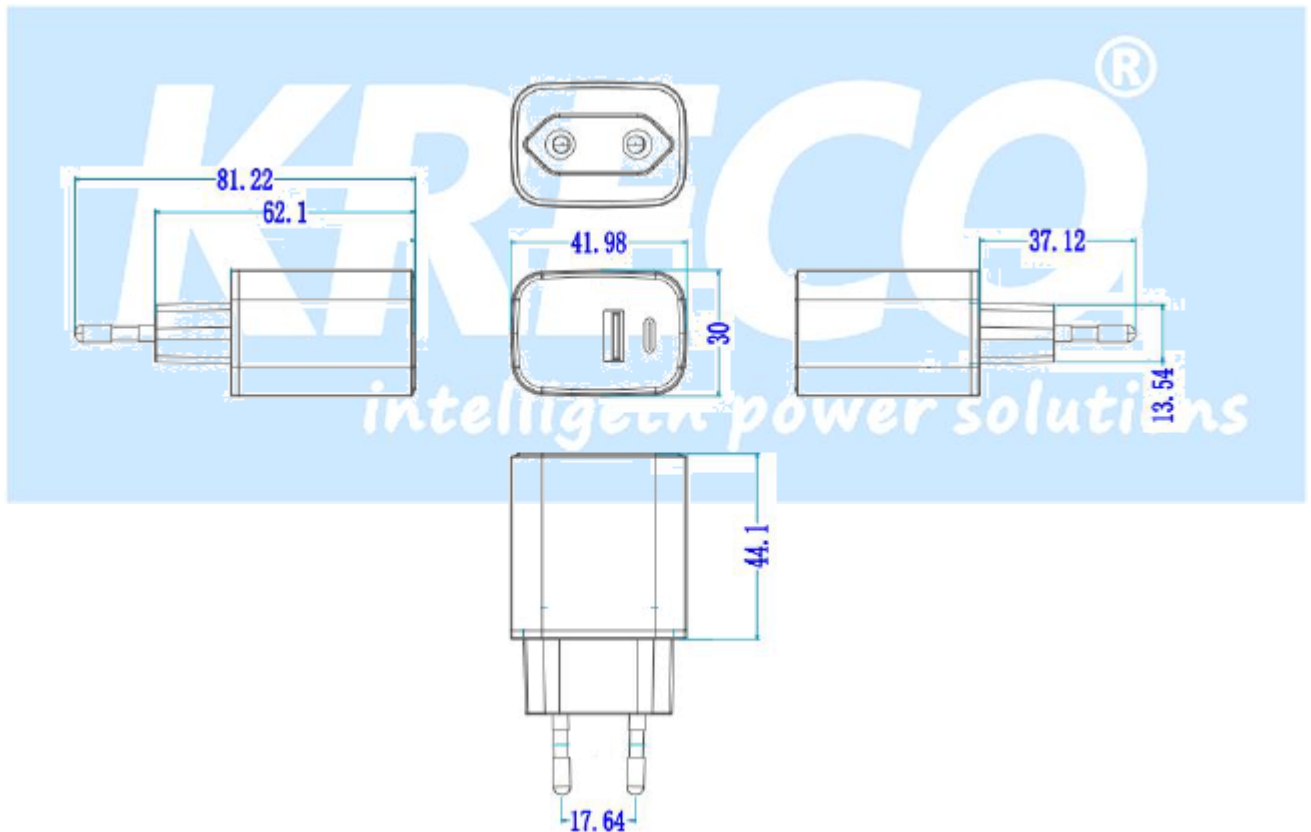
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9. Outline Photograph /相片+机械图纸



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11 / 14

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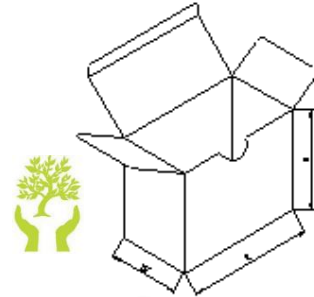
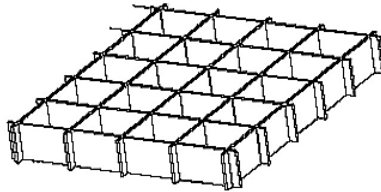
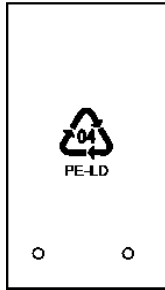
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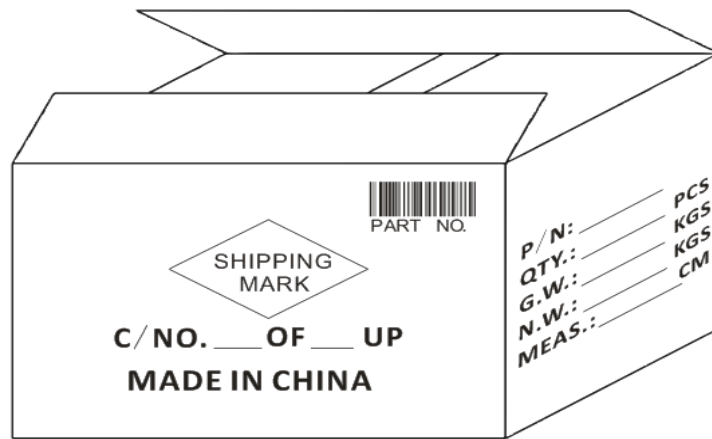
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10. Package Information /包装示意图



☒: (1) PE Bag + ☒: (2) Blade Cardboard or ☐: (3) Individual box



☒: (4) Outer Carton

No.	Item 名称	Spec 规格	Size (cm)尺寸 长 x 宽 x 高	Qty 数量/箱	G.W (kgs) 公斤/箱	CBM (m3) 立方米
1	PE bag 透明袋	PE	17.5 x 14.5	1		
2	Blade Cardboard 刀卡	A=B				
3	Individual box 白盒	380g/cm3		1	0.12	
4	Outer Carton 外箱	K=K	43 x 36.5 x 27	200	20 max.	0.056
5	Pallet 托盘	Plastic	100 x 110 x 15	x	8	x
*	Marking 唛头	/	KRECO			
*	Part No 条形码	Code 128	As per KRECO P/N Number			
*	Serial No 序列号	Code 128	YYxxxxxx0000001			

The above packing info just for your reference only, the final is **subject to actual production**.

If you need to specify, please ask the salesman in particular.

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11. Operation Caution 操作注意事项

11.1 禁止在室外使用

Prohibited in the outdoor use

11.2 严禁在电源线的损坏的情况下使用充电器，否则会导致触电，起火和充电器损坏。

It is prohibited to use the charger power line damage in the case, otherwise it will result in electric shock, fire damage and chargers.

11.3 避免在高温和强辐射场使用，置于-10~+40℃的通风处保管。

Avoid the use of high temperature and strong radiation place, keep ventilation in - 10 °C ~ + 40 °C.

12. Statement 声明

12.1 本承认书解释权归中山市景荣电子有限公司。

KRECO reserves the right to interpret this acknowledgement.

12.2 本承认书一式两份，客户一份，供应商一份，自双方确认签字之日起生效。

Two sets of specification for mutual approval. It comes into effect after the content is acknowledge.

12.3 如有更新，需由双方协商解决，另行补充。

Any revision change shall be mutually agreed by customer and provider.

13. Customer Confirmation 客户确认

Thank you for your recognition of KRECO product. Your time and every data tested have great significance and contribution. The name you signed will become a permanent witness of KRECO's future development. We KRECO people thank you!

	KRECO LTD <i>intelligent power solutions</i>	Approved by:	Checked by:	Prepared by:
		罗颖澎	李淑仪	陈梓健

SPECIFICATION FOR APPROVAL

客户承认书

客户编码 Customer ID: 190175

景荣料号 KRECO P/N No. :KRE-GaN33WEUAC

日期 Date:2023-5-26

设计流水/订单号 Design/PO No. :230315-190175-860875

客户确认

CUSTOMER CONFIRMATION

Modification is to update a new with new design number 修改生成新版设计号

CUSTOMER AUTHORIZED SIGNATURE/客户承认签核	
Special Notes 特殊要求:	APPROVAL BY: (Signature & seal & Date)
1) 2) 3)	

*Sign it means acknowledge our sample(s) performance and we production to samples. In the event of discrepancies between the sample(s) and specification, the sample(s) shall prevail. /客户确认签字, 盖章即视为确认样品性能, 以样品为准生产.



中山市景荣电子有限公司

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intelligent power solutions



	KRECO LTD intelligent power solutions	Approved by:	Checked by:	Prepared by:
		罗颖澎	李淑仪	陈梓健

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14 / 14