产品规格书

描述(Description)：　12V2A G5138P

客　户(Customer):

版　本(Version):　V1.0

发行日期(Iss Date):　2019-2-28

拟制 PREPARED BY	检查 CHECKED BY	批准 APPROVED BY
TOM		

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日 期 Date	变更内容 Modify Item	变更依据 Modify Reason	版本 Rev

Section 目录

Global Semiconductor Limited

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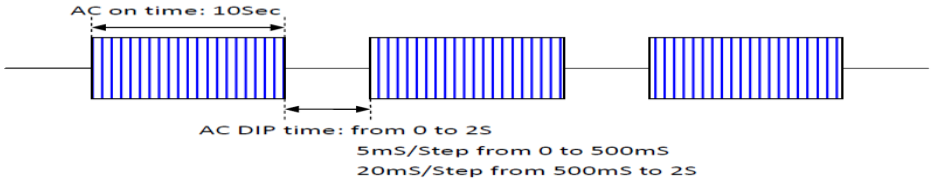
1. Power Supply Overview 电性能指标：

1.1 Table 1 Input Electrical Characteristics Overview (输入特性）

Input voltage range 输入电压范围	90Vac-264Vac
Normal voltage range 标准输入	100Vac-240Vac
Frequency range 频率范围	50Hz/60Hz
Max input AC current 满载输入电流	2A max at full load condition
Inrush current (cold start) 浪涌电流(冷机）	80Atyp peak, 120Vac; 100Atyp peak, 220Vac
Efficiency (full load) 效率	86.8%min at 112Vac/230Vac;
Harmonic current 谐波电流	Meet GB17625.1-1998/IEC61000-3-2 class D
No Load Power Loss 待机功耗	≦0.075W 230Vac input
AC Brown-out AC欠压关机	Not required
AC Brown-in AC开机电压	Not required
AC DIP Test AC跌落测试	Not required

Note: 1) At AC Brown-out and Brown-on test,when the input voltage from 0Vac 120Vac for 3min,and from 120Vac to 0Vac for 3min,the PSU function shall be nomal and no components damaged. AC欠压关机、开机测试时，电压从0V上升到120V，从120Vac降到0Vac，过程的时间均为3分钟。

2) Power moduel shall not shutdown and latch off at AC cycling DIP test (from 10ms to 10sec) during specied load.Power modules must auto-restart when AC input voltage has applied again.电源输出带额定负载情况下，当AC输入电压跌落保持时间在10ms到10sec时，电源不得出现关机或锁死现象。当输入电压恢复正常后，电源应进入正常工作状态。



1.2 Output Eletrical Characteristics Overview (输出特性）

1.2.1 Table 2 Output Voltage, Current & Regulation. (输出调整率）

Output Voltage 输出电压	Regulation 调整率	Min current 最小电流	Rated current 额定电流	Peak current 峰值电流	Peak Power 峰值功率
+12V	±5%	0A	2A	2.1A	

1.2.2 Turn on delay time. (开机延时）

Upon aplacation of the AC signal the PSU shall begain functioning normally umder all operation specifications within 3second. AC上电后，电源必须在3秒内达到正常工作状。

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1.2.3 Table 3 DC Output Ripple & Noise.(输出波纹和噪声）

Output Voltage 输出电压	Ripple & Noise(PK to PK)纹波与噪声	Test Condition测试条件
+12V	120mVp-p	Normal Input, 0%,50%,100% Rated Load

Note: 1) Measurements shall be made with an oscilloscopewith 20Mhz bandwidth 示波器设置在20MHz带宽。

2) Output shall be bypassed at the connector with a 0.1uF ceramic capacitor and a 4.7uF electrolytic simulate system loading . 输出并联一个0.1uF的陶瓷电容和一个4.7uF的电解电容。

1.2.4 Table 4 Output Transient Response. （输出动态响应）

Output Voltage 输出电压	Voltage Tolerance Limit 动态调整率	Slew Rate 动态速率	Load Change 负载变化
+12V	±30%	50mA/uS	Min. to 10% load and 90% to Max load

Note:Transient response measurements shall be made with a load changing repetition rate of 100Hz and 500Hz.

输出以100&500Hz的频率跳变负载来测试。

1.2.5 Table 6 DC Output Hold-Up Time. （输出保持时间）

Output Voltage 输出电压	120Vac input	220Vac input
	≥5 mS	≥10 mS

Note: DC output at full load. 所有输出带满载

1.2.6 Table 7 DC Output Overshoot At Turn On & Turn Off.（输出超调）

OutputVoltage 输出电压	Output Over shoot voltage(V)超调电压	
	Turn on开机	Turn off关机
+12V	±10%	10%

Note: DC output current at Min and Rated load. 测试时负载为最小和额定负载两种状况。

1.2.7 Table 8 DC output voltage rise time（输出上升时间）

OutputVoltage 输出电压	120Vac input	220Vac input
+12V	≤100 mS	≤100 mS

Note: The output voltages shall rise from10% to 90% of their output voltage.输出从10%上升到90%的时间

1.2.8 Table 9 Capacitive load.（容性负载能力）

The PSU should be able to power up and operate normally with the following capacitances simultaneously present on the DC outputs. 当电源输出端并联以下容量的容性负载时，电源应能正常开启并正常工作。

OutputVoltage 输出电压	+12V				
Capacitive load 容性负载					

1.3 Protection:(保护功能）

1.3.1 Table11 DC Over Voltage Protection. (输出过压保护）

The power supply have the over voltage protection. When the main feedback control circuit fault occur .

The power supply shall be over voltage protection to protect the whole system.

该开关电源具有过压保护功能，当主反馈回路出现故障时，电源过压保护，从而保护整个系统安全。

Output Voltage	Over Voltage	Comments
+12V	≤15V	Hiccup尝试重复启动

1.3.2 Table 12 DC Output Over current Protection. (输出过流保护）

Output Voltage	Over Current	Comments
+12V	≥2.4A	Hiccup尝试重复启动

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1.3.3 Table 13 DC Output Short Circuit Protection. (输出短路保护）

Output Voltage	Comments
+12V	Hiccup尝试重复启动

Note: The Short Circuit protection should be test at other of dc output at min load

短路保护测试是在其它最小负载时测试.

2. Safety(ClassII) (安规标准，II类设备）

2.1 Standard（标准）

The PSU must meet with the following standard :

电源必须满足以下标准：

IEC60065，60950-1 and UL60950，60950-1 and GB8898-2011

2.2 Isolation resistance(绝缘阻抗）

Input To Output: 50MΩ Min at DC500V,in room temperature.在室温环境下，DC500电压测试时不得小于50MΩ。

2.3 Hi-Pot test(耐压测试）

Lab test: 3KVac(or 4242Vdc)/10mA, 1 minute between primary and secomdary circuit.

3KVac(or 4242Vdc)/10mA, 1 minute between primary and FG.

室验室测试：初级与次级3KVac(or 4242Vdc)/10mA，1分钟。

初级与保护地3KVac(or 4242Vdc)/10mA，1分钟。

Product line: 3.6KVac(or 5100Vdc)/5mA, 2 second between primary and secomdary circuit.

3.6KVac(or 5100Vdc)/5mA, 2 second between primary and FG.

产线测试：初级与次级间3.6KVac(or 5100Vdc)/5mA, 2秒。

初级与保护地间3.6KVac(or 5100Vdc)/5mA, 2秒。

2.4 Leakage current(泄漏电流）

0.25mA MAX a t 230Vac/50Hz. 输入230Vac/50Hz时最大0.25mA。

2.5 Lignting surge(雷击浪涌）

⑴. common mode(Line to secondary GND and Neutral to secondary GND)

（L与次级地之间，N与次级地之间）

⑵. ±1KV/differential mode(Line to Neutral). 差模±1KV（L与N之间）

Note: After the test, no loss function. 测试后产品无功能失效。

Reference standard 参照标准 ：GB17626.5-1998/IEC61000-4-5

3. EMC (电磁兼容性）

3.1 EMI（电磁干扰）

The PSU shall compliance with the following conduction emission and radiate emission standard:

电源电磁干扰满足下列标准：

EN55022 CLASS B for Europe. 欧州标准 EN55022 CLASS B

GB9254 CLASS B for China CCC. 中国标准 GB9254 CLASS B

FCC PART15 CLASS B for America. 美国标准 FCC PART15 CLASS B

3.2 EMS（电磁抗干扰）

The PSU shall compliance with the following standard电源电磁抗干扰满足下标准：

3.2.1 ESD (静电抗扰度)

IEC61000-4-2 ESD level 4, criterion B. 测试标准IEC61000-4-2 ESD level 4, criterion B

Air discharge test(with system) 空气放电（带整机）： ±2KV， ±4KV， ±8KV ，±12KV , ±15KV

Contact discharge test(with system) 接触放电（带整机）： ±2KV， ±4KV, ±8KV

3.2.2 EFT (快速脉冲群)

IEC61000-4-4 EFT level 2, criterion B(with system) 1KV/5KHz on AC power port for 1 minute.

测试标准IEC61000-4-4 EFT level 2, criterion B（带整机）：电源输入端口1KV/5KHz信号1分钟。

4. Environmental Requirement （工作环境）

4.1 Temperature （环境温度）

Operating temperature工作温度： 0℃ to +40℃

Note: Only for the temperate climate conditions. 仅适用于温带气候条件下使用。

4.2 Humidity （环境湿度）

Operating humidity工作环境湿度：From10% to 90% relative humidity (without dewdrop无结露条件下).

4.3 Altitude (海拔高度）

Operating altitude工作海拔高度： 2Km MAX.

Store altitude贮存海拔高度：6Km MAX.

5 MTBF （平均无故障时间）

TBD

6. Dimension(物理尺寸）

TBD

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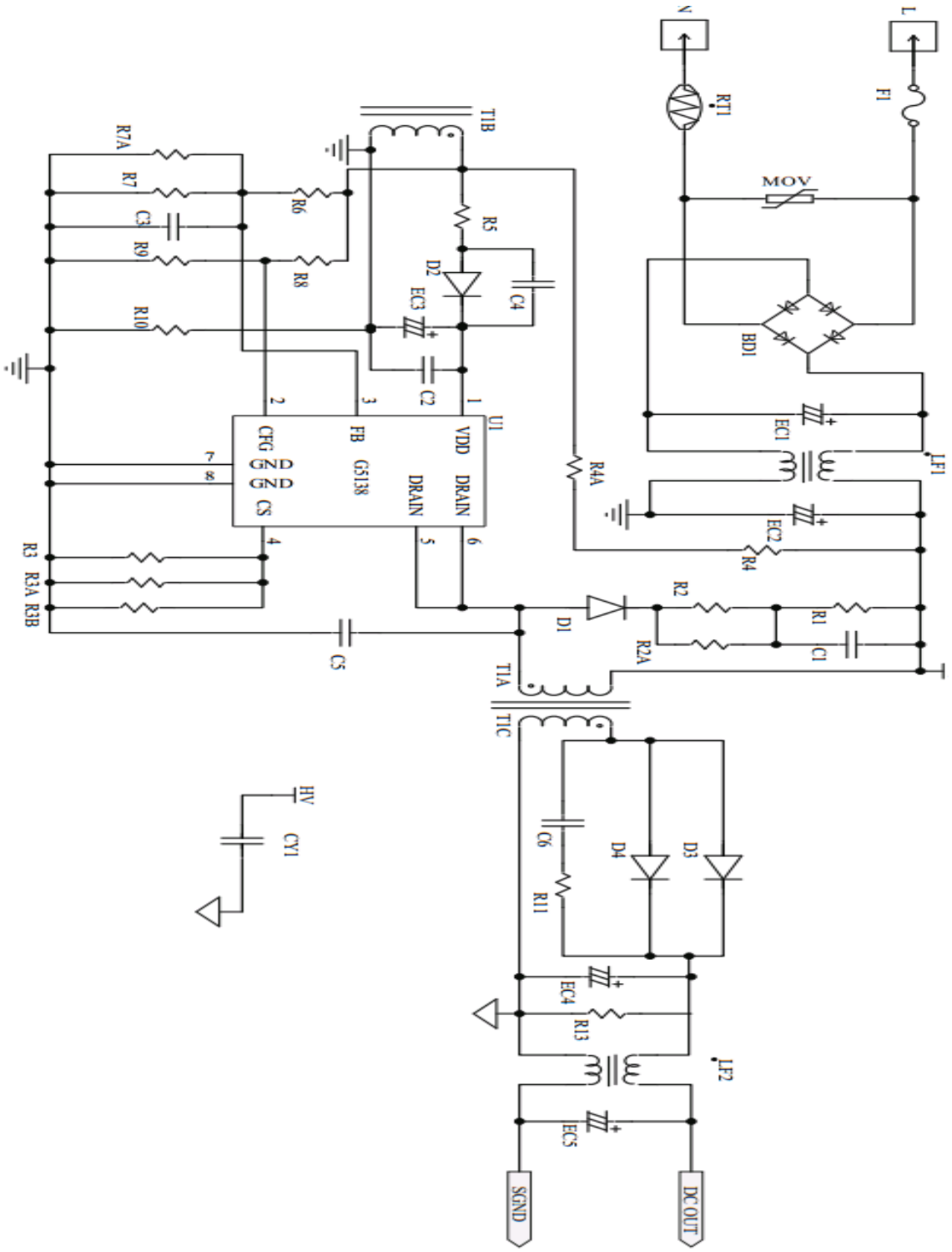
7. Schematic (原理图）



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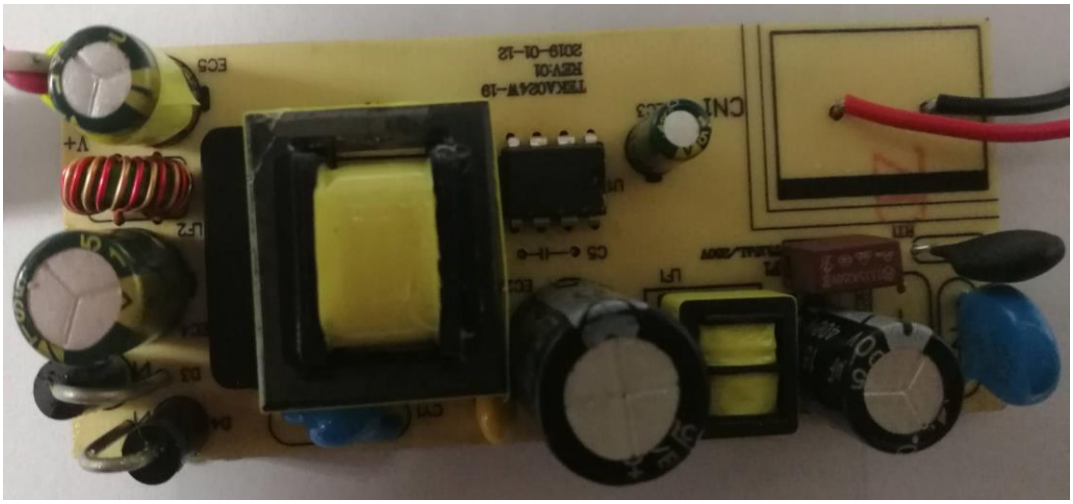
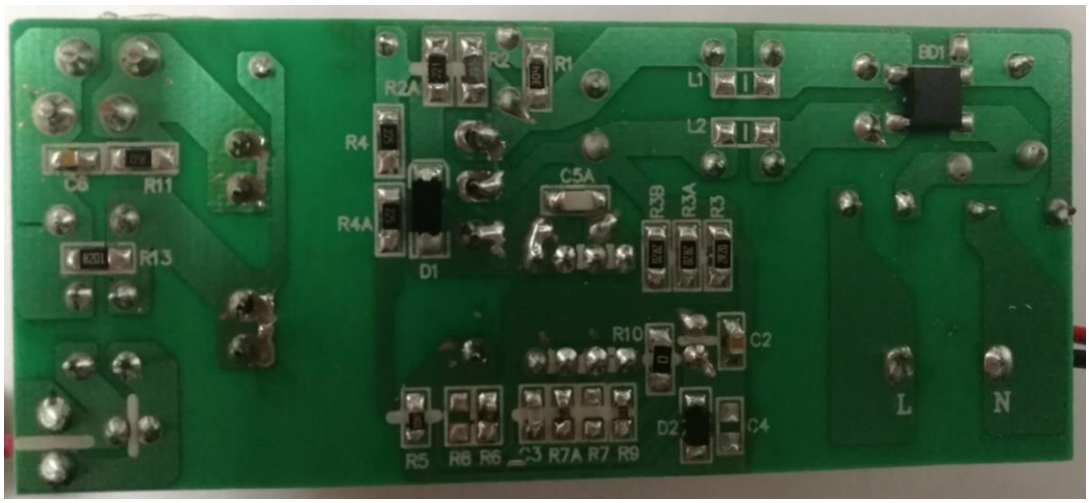
8. Product photos （产品照片）





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9.Bill of material （物料清单）

NO.	Location	Parts	Q'TY	MAKER
		SMD		
1	BD1	Rectifier Bridge, HRB210 2A 1000V	1	
2	R1	SMD-RES, 300K 5% 1206	1	
3	R2 R2A	SMD-RES, 220Ω 5% 1206	2	
4	R3 R3A R3B	SMD-RES, 2.2Ω 1% 1206	3	
5	R4 R4A	SMD-RES, 2.2MΩ 5% 1206	2	
6	R5	SMD-RES, 2.0Ω 5% 0805	1	
7	R6	SMD-RES, 18.2KΩ 1% 0805	1	
8	R7	SMD-RES, 2.7K 1% 0805	1	
9	R9	SMD-RES, 9.1K 1% 0805	1	
10	R10	SMD-RES, 0Ω 5% 1206	1	
11	R11	SMD-RES, 36Ω 5% 1206	1	
12	R13	SMD-RES, 8.2KΩ 5% 1206	1	
13	C2	SMD-CAP, 100nF/50V 0805 X7R	1	
14	C3	SMD-CAP, 33pF/50V 0805 X7R	1	
15	C5A	SMD-CAP, 39pF/500V 1206 X7R	1	
16	C6	SMD-CAP, 470pF/100V 1206 X7R	1	
17	D1	SMD-DIDOE, M7 1A1000V SMA	1	
18	D2	SMD-DIDOE, FR107 1A1000V SOT-123	1	
		DIP		
19	F1	Fusible Resistor, 方形保险丝3.15A/250Vac	1	
20	RT1	5D-9M	1	
21	MOV1	10D561	1	
22	EC1	E-CAP, 15uF/400V 10*16MM LOW ESR	1	
23	EC2	E-CAP, 22uF/400V 13*20MM LOW ESR	1	
24	EC3	E-CAP, 4.7uF/50V 5*11MM LOW ESR	1	
25	EC4	E-CAP,1500uF/16V 10*16MM LOW ESR	1	
26	EC5	E-CAP,1000uF/16V 8*16MM LOW ESR	1	
27	C1	瓷片电容，470pF，1KV	1	
28	D3 D4	SB5100 5A 100V TO-201AD	2	
29	LF1	EE10-35mH	1	
30	LF2	绿环9*5*3 L=240uH 线径0.5mm 8T	1	
31	T1	EE22 Lp:850uH	1	
32	U1	PWM, DIP-8 , G5138P	1	
33	CY1	Y-CAP, 470pF/250V	1	
34	PCB	TEKA024W-19 REV:01 2019-02-28	1	

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10. Test report （测试报告）

MODEL	
SPEC	12V/2A
INPUT	90Vac/60Hz-264Vac/50Hz

DATE	2019/2/28
TESTED BY	
Ta	25℃

10.1 Electrical performance test report （电性能测试报告） 20#线/1.5M

NO.1	Load Rate	Pin (W)	Vout (V)	Iout (mA)	Pout (W)	η (%)	OCP (A)	Average η(%) ≥	Ripple & Noise ≤	Common mode noise ≤
Iput:	0%	0.036	12.140	0.000			2.46	87.99%	82	
115Vac	10%	2.700	12.100	0.200	2.420	89.63%				
	25%	6.800	12.130	0.500	6.065	89.19%				
	50%	13.680	12.150	1.000	12.150	88.82%				
	75%	20.770	12.170	1.500	18.255	87.89%				
	100%	28.350	12.200	2.000	24.400	86.07%				
Iput:	0%	0.068	12.180	0.000	0	0	2.45	87.97%	72	
230Vac	10%	2.810	12.100	0.200	2.42	86.12%				
	25%	7.000	12.120	0.500	6.060	86.57%				
	50%	13.700	12.140	1.000	12.140	88.61%				
	75%	20.610	12.180	1.500	18.270	88.65%				
	100%	27.690	12.190	2.000	24.380	88.05%				

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10.1 Temperature test report（温升测试报告）

	Output:12V/2A

Item	Vin=90Vac		Vin=264Vac	
	T(℃)	Tr(℃)	T(℃)	Tr(℃)
IC (U1 G5138P)	104.40	66.59	96.19	56.49
Transformer coil (EE22)	105.30	67.49	102.40	62.70
Transformer core (EE22)	96.19	58.38	95.00	55.30
IC (D3 5100)	114.19	76.38	114.59	74.89
Ambient Temperatuer	37.81		39.70	

1. 90V Full Load startup: OK ;
2. 264V Full Load Vds1(max) : 57.0V ;
3. 264V Full Load Vds(max) ： 590V;
4. 90V Full Load Noise :100mV ;

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11 EMC test report （EMC测试报告）

EMI TEST REPORT

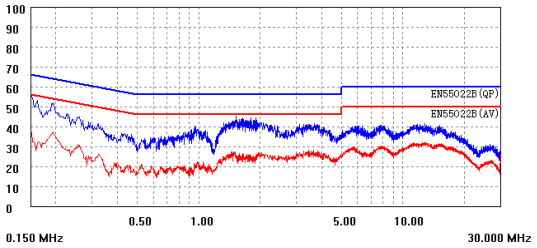
parameter

Organization:	Operator:	EUT:
Place:	Time: 2019/2/28/11:3	Test equipment:KH3932
Detector: PK+AV	Test-time[ms]: 10	SN: 1332399
Limit: EN55022B	Transductor[PK/AV]: PK / AV	JZ: 2,14,1017
Remark:		

freq, step

Start[MHz]	End[MHz]	Step[MHz]
0.150	2.000	0.002
2.000	10.000	0.010
10.000	30.000	0.020

scan result



120V L-GND 预估

EMI TEST REPORT

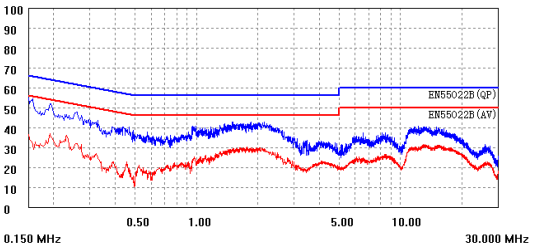
parameter

Organization:	Operator:	EUT:
Place:	Time: 2019/2/28/11:1	Test equipment:KH3932
Detector: PK+AV	Test-time[ms]: 10	SN: 1332399
Limit: EN55022B	Transductor[PK/AV]: PK / AV	JZ: 2,13,1768
Remark:		

freq, step

Start[MHz]	End[MHz]	Step[MHz]
0.150	2.000	0.002
2.000	10.000	0.010
10.000	30.000	0.020

scan result



120V N-GND 预估

EMI TEST REPORT

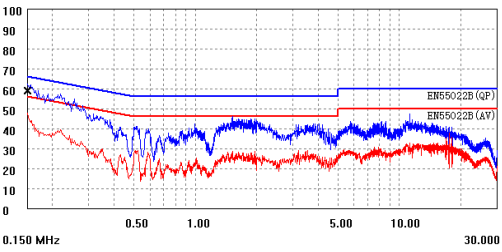
parameter

Organization:	Operator:	EUT:
Place:	Time: 2019/2/28/10:56	Test equipment:KH3932
Detector: PK+AV	Test-time[ms]: 10	SN: 1332399
Limit: EN55022B	Transductor[PK/AV]: PK / AV	JZ: 2,14,1018
Remark:		

freq, step

Start[MHz]	End[MHz]	Step[MHz]
0.150	2.000	0.002
2.000	10.000	0.010
10.000	30.000	0.020

scan result



final test

	freq[MHz]	lev[dBuV]	Lim[dBuV]	Δ[lev-Lim]
[QP]	0.150	58.9	66.0	-7.1

230V L-GND 预估

EMI TEST REPORT

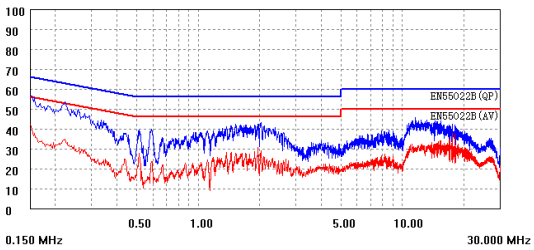
parameter

Organization:	Operator:	EUT:
Place:	Time: 2019/2/28/10:58	Test equipment:KH3932
Detector: PK+AV	Test-time[ms]: 10	SN: 1332399
Limit: EN55022B	Transductor[PK/AV]: PK / AV	JZ: 2,13,1769
Remark:		

freq, step

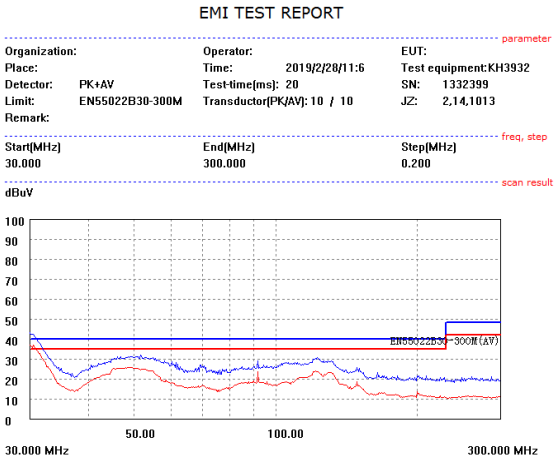
Start[MHz]	End[MHz]	Step[MHz]
0.150	2.000	0.002
2.000	10.000	0.010
10.000	30.000	0.020

scan result

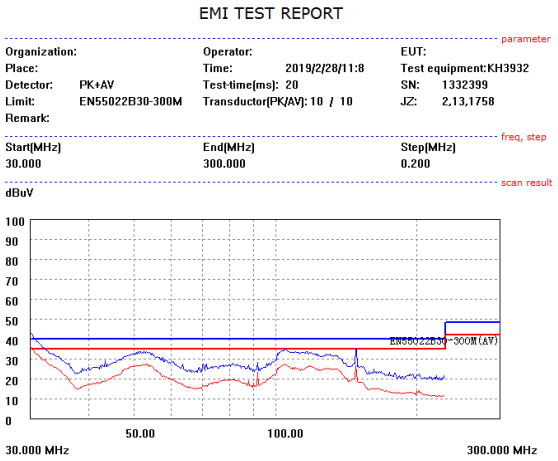


230V N-GND 预估

11.1 EMC test report （EMC测试报告）



120V-辐射预估



230V-辐射预估

Global Semiconductor Limited
环 球 半 导 体 有 限 公 司

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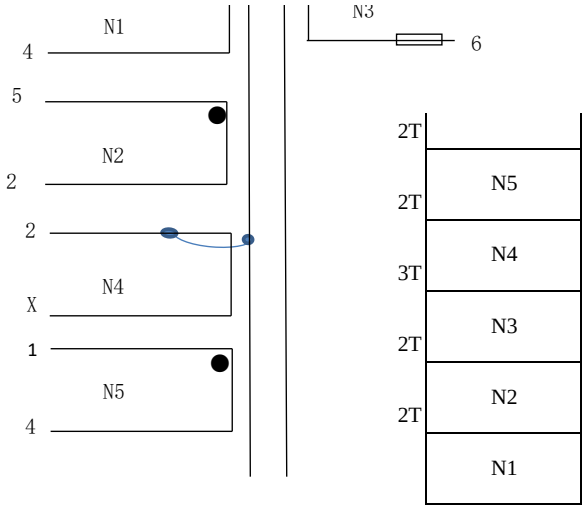
TEL：86 0755-82662217 82662215 FAX：86 0755-82668680

12. Transformer specifications （变压器规格书）

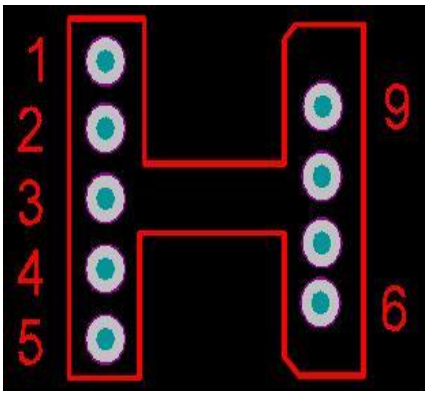
Note:
1.Dot(●)denote electrical start.(●定义为同名端)



序号	绕线参数(mm)	圈数	胶带层数	起始脚	结束脚	挡墙胶带宽度	套管		备注
							起始脚	结束脚	
N1	2UEW Φ0.3*1	48T	2	3	4				密绕两层
N2	2UEW Φ0.18*2	7T	2	5	2				疏绕一层
N3	TEX Φ0.75*1	7T	3	9	6				密绕一层
N4	2UEW Φ0.18*3	5T	2	2	X				疏绕一层
N5	2UEW Φ0.3*1	20T	2	1	4				反骨架密绕一层

NOTE:

1.Bobbin:EE22 槽宽8.5MM
2.Core:EE22(TDK PC95 or equivalent，Ae：50mm2)
3.L1-3: 850uH @10KHz,0.25V
4.Part NO.:
5.Pin2用Φ0.18*2线连接到磁芯上，并接触良好。
6.N3用的三层绝缘线需加套管；从底部起绕。
7.初级Pin1-5脚朝外顺时针绕线
8.Pin-4剪掉一半
9.铁芯研磨放顶部
10.产品需真空含浸



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