規 格 書

Electrical Specification

Model No：	PA-1650-64
Product No：	PA-1650-64LG-LF
Description：	19V/2.53A 48W Output
Revision：	B
Issued Date：	Jan. 14 , 2013

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RoHS
Safety

Approve By	Check By	Prepared By
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Change List			
DCN No	REV	Revision Description	Date
	X01	Initial	2011-09-15
	X02	1.Add RoHS & Safety logo on cover page 2. Modified 2.2 Input Current from1.8A to 1.4A 3. Define 2.3 inrush current with Cold and hot test. 4.Modified 2.8 Output Features: a. The output voltage from 18~20Vdc change to 18.05~19.95Vdc b. START UP TIME from 3S to 2S. 5.Modified 2.12 Transient Response: Change the dV max (V) from +1.0/-1.0V to +0.95/-0.95 6. Modified the 3.1 Temperature a. operation from 0 to 35℃ change to -10 to 40℃. b. operation from -30 to 60℃ change to -10 to 40℃. 7. Modified the 3.2 Humidity a. operation from 8 to 80% change to 30 to 85%. b. operation from 8 to 80% change to 20 to 90% 8.Define 8.3 DC output cable the dimension.	2011-10-26
	X03	1. Modified 2.9.1 OCP from 5.2A(Max) to 5.0A(Max)	2011-10-31
	X04	1. Modified 2.1 Input Voltage Frequency from 265V to 264V(Max) 2. Modified 2.2 Input current: The voltage from 90V/50Hz to 100V 50Hz 3. Modified 2.5 Power saving: From 10mA Load ≦0.5W to ≦0.4W. 4. Modified 3.2 Humidity to a. Operation : 0 to 80% b. Storage : 0 to 80%	2011-11-09

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Change List			
DCN No	REV	Revision Description	Date
	X05	1. Modified 2.2 Input current: The frequency condition from 50Hz change to 60Hz. 2. Modified 2.5 Power saving: The Voltage condition from 115V&230V change to 230Vac , 50Hz. 3. Modified 2.9.1 OCP: Add the input voltage 115V,60Hz 4. Modified 4.2.1 Hi-Pot test(Product line) : DC 4242V or AC 3000V, 10mA 3Sec. between Primary to Secondary all. 5. Modified 4.2.2 Hi-Pot test(Safety SPEC) : DC 4242V or AC 3000V, 10mA 60Sec. between Primary to Secondary all. 6. Modified 4.3.1 Insulation(Product line) : DC 500V, 1Sec. between Primary to Secondary circuit，IR shall ≧20MΩ. 7. Modified 4.3.2 Insulation(Safety SPEC) : DC 500V, 60Sec. between Primary to Secondary circuit，IR shall ≧20MΩ.	2011-11-15
	A	Release the SPEC to factory	2011-11-16
	B	Add one sentence in the green book. Modify the 3.3 Altitude to 5,000m	2013-01-14

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Contents

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1. Description

This product is an AC to DC power transfer device with lead free(RoHs), it can provide for a 48W single DC output with constant voltage source.

- In case of spec standard of LGE, this product can meet to 48W (19V/2.53A) ; safety only can meet to 65W (19V/3.42A).

2. Electrical Feature

2.1 Input Voltage Frequency

	Min	Normal	Max	unit
Ac Input voltage	90	100-127 / 200-240	264	V
Frequency	47	60 / 50	63	Hz

2.2 Input Current

1.4A max. at 100Vac , 60Hz input & output full-loading.

2.3 Inrush Current

Cold Test: 80A max. at cold start and 25℃, DC output full-loading and 230Vac input.
Hot Test: Inrush peak current and Joule integral will be measured at different line voltage at high ambient temperature. Peak current is within specified limit and Joule integral well below fuse and bridge spec.

2.4 Hold-Up time

5m sec min. at dc output full-loading and 115Vac input.

2.5 Power saving

Input power at 230Vac , 50Hz	≦ 0.1W	≦ 0.4W
Output load	0A	10mA

2.6 Efficiency

The power supply shall have >=86.5% efficient at Vin= 115Vac、230 Vac, measured load condition as below table.

Measured point	Output Current(A)	Efficiency
1	0.633	(Measured point 1+2+3+4Efficiency)/ 4 ≧ 86.5%
2	1.265	
3	1.895	
4	2.530	

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2.7 Total Harmonic Distortion

AC input voltage 5% waveform distortion rate ， PSU shall be able to operate continuously.

2.8 Output Features

PARAMETER	Unit	DC OUTPUT			Note
		MIN	TYP	MAX	
OUTPUT VOLTAGE	V	*18.05*	*19.00*	*19.95*	*Overshoot shall less than 10%*
OUTPUT CURRENT	A	*0.0*	--	*2.53*	
RIPPLE / NOISE	mV	*300 max.*			*with a 10uF/EC. and 0.1uF/Ceramic. Capacitors and Measured Band Width 20MHz.*
START UP TIME	S	*2 max.*			Measured from AC turn on point to 90% of the output voltage at Normal voltage
RISE TIME	ms	*50 max*			Measured form output on 10%~90%
FALL TIME	ms	*100 max*			Measured form output off 10%~90%

2.9 Protection

2.9.1. OCP：When PSU occur over current at 115Vac/60HZ , The PSU will be auto-restart . See below Table limit.

DC OUTPUT	Over Current Limit
19V	5.0A(Max)

2.9.2. SCP：When PSU occur output short , PSU will be auto-restart.

2.9.3. OVP : When PSU occur over voltage , PSU will be latch-off .see below Table limit.

DC OUTPUT	Over Voltage Limit
	MAX
19V	25V (Peak over 25V could be accepted if under 250mS with a max of 28V)

2.9.4. OTP： When PSU occur over temperature, PSU will be latch-off.

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2.10 Temperature Coefficient

Less than 0.2%/C

2.11 Warm-up Drift

Any change in output voltage due to warm-up drift.

2.12 Transient Response

DC output	I1 (A)	I2 (A)	dV max (V)	I1 time	I2 time	dI/dT
19V	0.0	1.27	+0.95 / - 0.95	5msec	5msec	0.5A/usec
19V	1.27	1.89	+0.95 / - 0.95	5msec	5msec	0.5A/usec
19V	1.89	2.53	+0.95 / - 0.95	5msec	5msec	0.5A/usec
19V	0.0	2.53	+0.95 / - 0.95	5msec	5msec	0.5A/usec

3.Environment

3.1 Temperature

a. Operation : -10 to 40℃*

b. Storage : -10 to 40℃

* *In case of no load condition (0A), the allowable maximum operation temperature is 60 ℃*

3.2 Humidity

a. Operation : 0 to 80%

b. Storage : 0 to 80%

3.3 Altitude

From sea level to 5,000m.

3.4 Lead free requirements

The power supply will be fully RoHS compliant.

4. Basic Safety Test

Safety

4.1 Leakage current shall be less than 0.15 mA at 254Vac / 60Hz

4.2.1 Hi-Pot test(Product line) : DC 4242V or AC 3000V, 10mA 3Sec. between Primary to Secondary all.

4.2.2 Hi-Pot test(Safety SPEC) : DC 4242V or AC 3000V, 10mA 60Sec. between Primary to Secondary all.

4.3.1 Insulation(Product line) : DC 500V, 1Sec. between Primary to Secondary circuit，IR shall ≧20MΩ.

4.3.2 Insulation(Safety SPEC) : DC 500V, 60Sec. between Primary to Secondary circuit，IR shall ≧20MΩ.

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5. Electro-Magnetic Compatibility

5.1 EN61000-3-3 Voltage Fluctuation and Flicker.

The adapter shall meet EN610003-3.

5.2 EN61000-4-2 ESD.

Test Item	Test Specification		Test conditions
ESD	Contact	±8 KV	No function loss
	Air	±15 KV	

5.3 EN61000-4-3 RS immunity test.

Test Item	Test Specification	Test conditions
RS	F.R.： 80MHz-1.0GHz, Field Strength： 3V/m (Modulated 80% AM)	No function loss

5.4 EN61000-4-4 EFT / BURST immunity test.

Test specification	Performance level	Test conditions
Tr=5nS, Th=50ns, 5KHz repetition rate	± 1KV (peak)	No function loss
	± 2KV (peak)	No component failure

5.5 EN61000-4-5 Surge immunity test.

Test specification	Mode	Performance level	Test conditions
Tr=1.2uS, Th=50us	Line to Line (L-N)	± 1KV into 2 ohms	No function loss
	Line to Earth (L-Gnd)	± 2KV into 12 ohms	No component failure
	Line to Earth (N-Gnd)		
	Line to Line (L-N)		

5.6 EN61000-4-6 CS test.

Test specification	Test Specification	Test conditions
50Hz	Field Strength： 1A/m	No function loss

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5.7 EN61000-4-8 Power frequency magnetic field immunity test.

Test specification	Test Specification	Test conditions
0.15MHz ~ 80MHz	Test voltage：3V rms (Modulated ,1KHz,80%,AM)	No function loss

5.8 EN61000-4-11 Voltage Dips and short interruptions.

Test Level	Conditions	
>95% Voltage reduction	1/4 cycle@50Hz*	Performance Criteria A
30% Voltage reduction	25 cycles@50Hz	Performance Criteria B
>95% Voltage reduction	250 cycles@50Hz	Performance Criteria C

¼ cycle to meet the 5mS hold up time

6 Electro-Magnetic Interference

6.1 FCC Requirements

The power supply shall comply with the United States Communication Commission (FCC) Rules and Regulations , Part 15, Subpart J, Computing Devices Class B limits.

6.2 VDE Requirements

Power supply shall conform to the Class B requirements of CISPR 22.

6.3 VCCI Requirements

Power supply shall conform to the Class II requirements of VCCI.

6.4 BSMI、C-Tick、CCC、Korea EMC unit Certification.

The 3 pin adapter shall get unit certification of BSMI、C-Tick、CCC、Korea and mark on label for 3 pin input model.

7. Reliability

7.1 Failure Rate

The failure rate shall be defined at 25℃，input voltage 110v and 220v，and full loading，The failure rate shall be less than 0.2% per 1000 hours.

7.2 E-cap Life

a. Average life expectancy of 14600 hours.
b. Environment ambient： 25℃.
c. Input voltage：90Vac and 264Vac.
d. Output load：80% load.

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7.3 M.T.B.F.

20,000 Power On Hours at 35℃，at input voltage 230Vac.
Use MIL-HDBK 217 calculate method.

7.4 Temperature Rise.

Less than 40degC delta T with input voltage from 100Vac to 264VAc.DC output at full load and environment temperature 35degC.
Less than 45degC delta T with 90Vac ; DC output full load and environment temperature 35degC

7.5 Burn-in

100% Burn-In with 80~100% full-loading & 35℃ ±5 ℃ Environment temperature.
Power supply will burn in for 12 hours.

7.6 Vibration Test

a、Non operation vibration with shipping container shall be 2G'S peak, 7-50Hz, 4G'S peak 50-500Hz, after test no abnormally to be found.

b、Operation vibration shall be 0.5G'S peak, 10-60Hz, 3 Axes, after test no abnormally to be noted.

7.7 AC cycles

The adapter shall be designed to withstand a minimum of 4200 cycles of any nominal input voltage without failure rate degradation.

8. Mechanical

8.1 Physical Size

107mm(L) * 48.7mm (W) * 30.5mm (H).

8.2 Weight

250g.

8.3 DC output cable: Length 1500mm and wires 18AWG.

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