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1. Scope

The PWR0451704005 comprises a 45 watts dual -Outputs, full range switching power supply and a DC to AC inverter that for a 17", 19" XGA color TFT-LCD module.

2. Feature

All products including samples delivered will meet all the requirements as outlined in the document. The basic requirements of the design features are listed below:

- Dual Output Voltages: +12V , +5V
- Build in DC-AC inverter.
- Short circuit protection / power limiting.
- Simple construction - easy assembly and service /repair.
- High reliability.
- High efficiency - to reduce temperature rise, the efficiency is greater than 75%.
- Green Mode function for LCD panel .The power supply has the green mode function. That is if the system power No Load. The power consumption wills less than 0.5 Watts.
At 60 Hz 110V

3. Mechanical Requirements

3.1 Power Supply Connectors

CN1 : LM302-010-TF-2 (UNICORN) Pin assignment of Connector on power output

| Pin number | Output Name |
|------------|-------------|
| 1 | +5V |
| 2 | +5V |
| 3 | GND |
| 4 | GND |
| 5 | ON / Off |
| 6 | BRTADJ |
| 7 | GND |
| 8 | GND |
| 9 | +12V |
| 10 | +12V |

4. Electrical Requirements

4.1 Input AC

4.1.1 Input Voltage

| Minimum | Nominal | Maximum | |
|---------|---------|---------|-----|
| 90 | 110/230 | 264 | VAC |

4.1.2 Input Frequency

| Minimum | Nominal | Maximum | |
|---------|---------|---------|----|
| 47 | 50/60 | 63 | Hz |

4.1.3 Input Current

| Input Current | |
|---------------|------------|
| 90 Vac | 1.25 A Max |
| 264 Vac | 0.40A Max |

4.1.4 Inrush Current

60A Max. at Cold-start and 25°C, DC output Max load and 115Vac input.

4.2 Output voltages and loads

They are measured at the load end of connected cables.

Table.1 SMPS load limits

| Signal Name | Voltage (Volts) | | | Current (mA) | | |
|--------------------|-----------------|------|------|--------------|------------|--------|
| | Min | Typ | Max | I max. | I stand-by | I min. |
| +12V | 10.8 | 12.0 | 13.2 | 700 | ---- | ---- |
| +12V(for inverter) | 10.8 | 12.0 | 13.2 | 2000 | 0 | 0 |
| +5V | 4.75 | 5.0 | 5.25 | 2500 | 40 | 40 |

Note :1 The output voltage shall remain within the following the output regulation under I_{max} , I_{min}. And I stand-by at any AC input condition.

4.3 Ripple and Noise

4.3.1 Ripple and Noise required specification

Table.2 lists the Ripple and Noise limitations of switching power supply unit only under all operating conditions including the input line voltage range and over all the full load range.

Table.2 Ripple and Noise Limitations

| Signal Name | Ripple & Noise (Vpp) |
|-------------|----------------------|
| +12V | 250 |
| +5V | 250 |

Note:

1. The measuring is done by 20MHz bandwidth limited oscilloscope and terminated each output with a 47uF capacitor in parallel with a 0.1uF capacitor.
2. While test ripple noise of the output the probe shall avoid any coupling from other circuit or equipment or the test result will not show power supply's actual ripple/noise.

4.4 Protection

The switching power supply will be auto recovery while the fault is removed.

4.4.1 Short circuit protection

Each DC output shall have short circuit protection. A short condition on any of DC outputs shall cause no damage to the power supply. The unit shall recover and function automatically as soon as the short condition is removed.

4.4.2 Fuse protection

The Fuse inside the power supply shall open when the AC input current is over the rated current of fuse. This Fuse protection will cause switching power supply to fail.

4.5 Efficiency

75% min. It will be measured at the maximum load and nominal line (110V/230V).

4.6 Hold-up time

The power supply shall maintain voltage regulation within the specified limits in table 1 for at least 10 milliseconds (one cycle drop) after losing of input voltage under the following conditions:

Input voltage: 110Vac

Loading: max output load

That's mean the power supply shall cover the AC one cycle without any impairment to the power supply output's regulations.

4.7 Green Mode function

The power supply shall have the green mode function. When there is no output. The input power consumption shall less than 0.5Watts under AC230V 50Hz input.

5. Environmental Requirements

5.1 Operating Temperature

| | |
|-----------------|-------------|
| Power Operating | 0 ~ +50°C |
| Storage | -20 ~ +70°C |

Note : Thermal test must be done at nom. AC and at I max. load.

5.2 Humidity (Non-condensing)

Operating 0% to 90% RH

5.3 Hi-pot test

100% Hi-pot tested

Primary to second: 1.8KVAC 3 second

6. General Specification

This dc-ac inverter designs for 17", 19" 4 CCFL(Cold Cathode Fluorescent Lamp) LCD panels

Note:

1. Single lamp current is measured with current meter for high frequency as show below.
2. Lamp frequency shall be detached from the horizontal synchronous frequency and its harmonics as far as possible in order to avoid interference.
3. The waveform of the inverter output voltage shall be area symmetric and the designs of our inverters have specification for the modularized lamps.
4. To avoid over-shoot and inrush current problems, the designs of our inverter have soft-starup.

7. Electrical Requirements

This section defines the electrical requirements for the inverter.

7.1.1 Input Characteristics

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNIT | REMARK |
|---------------|--------------|------|------|------|------|---|
| INPUT VOLTAGE | V_{in} | 10.8 | 12.0 | 13.2 | V | $V_{in} = 12\text{ V}$ |
| INPUT CURRENT | I_{in} | 1.05 | 1.26 | 1.47 | A | $V_{on/off}=5\text{V}$ $V_{in} = 12\text{ V}$ $V_{brt}=0\text{V}$ $RL=62\text{K}\Omega$ |
| INPUT CURRENT | I_{in} | 0.31 | 0.43 | 0.58 | A | $V_{on/off}=5\text{V}$ $V_{in} = 12\text{ V}$ $V_{brt}=5\text{V}$ $RL=62\text{K}\Omega$ |
| INPUT POWER | P_{in} | ---- | 15 | ---- | W | $V_{on/off}=5\text{V}$ $V_{in} = 12\text{ V}$ $V_{brt}=0\text{V}$ $RL= 62\text{K}\Omega$ |
| INPUT VOLTAGE | $V_{on/off}$ | --- | 0 | 0.8 | V | OFF State |
| | | 2.5 | 5.0 | 5.5 | | ON State |
| EFFICIENCY | η | 75 | --- | --- | % | $V_{on/off}=5\text{V}$ $V_{in} = 12\text{ V}$ $V_{brt}=0\text{V}, RL=62\text{K}\Omega$ |

7.1.2 Output Characteristics

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNIT | REMARK | |
|---------------------|--------|-------|-----|------|------|---|------------------------|
| LAMP CURRENT | I_L | 6.9 | 7.5 | 8.1 | mA | $V_{on/off}=5\text{V}$ $V_{in} = 12\text{ V}$ $V_{brt}=0\text{V}$ $RL= 62\text{K}\Omega$ | |
| LAMP CURRENT | I_L | 3.7 | 4.3 | 4.9 | mA | $V_{on/off}=5\text{V}$ $V_{in} = 12\text{ V}$ $V_{brt}=5\text{V}$ $RL=62\text{K}\Omega$ | |
| FREQUENCY | f_L | 43 | 48 | 53 | KHz | $V_{on/off}=5\text{V}$ $V_{in} = 12\text{ V}$ $V_{brt}=0\text{V}$ $RL= 62\text{K}\Omega$ | |
| OUTPUT OPEN VOLTAGE | V_s | 1600 | --- | ---- | Vrms | $V_{on/off}=5\text{V}$ | |
| OUTPUT OPEN | V_L | LATCH | | | | | $V_{on/off}=5\text{V}$ |

7.2.1 Input Characteristics

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNIT | REMARK |
|---------------|---------------------|------|------|------|------|---|
| INPUT VOLTAGE | V _{in} | 10.8 | 12.0 | 13.2 | V | V _{in} = 12 V |
| INPUT CURRENT | I _{in} | 1.74 | 1.89 | 2.04 | A | Von/off=5V V _{in} = 12 V Vbrt=0V Panel No. : M190EN04 V.1 (AU) |
| INPUT CURRENT | I _{in} | 1.05 | 1.19 | 1.33 | A | Von/off=5V V _{in} = 12 V Vbrt=5V Panel No. : M190EN04 V.1 (AU) |
| INPUT POWER | P _{in} | ---- | 23 | ---- | W | Von/off=5V V _{in} = 12 V Vbrt=0V Panel No. : M190EN04 V.1 (AU) |
| INPUT VOLTAGE | V _{on/off} | --- | 0 | 0.8 | V | OFF State |
| | | 2.5 | 5.0 | 5.5 | | ON State |
| EFFICIENCY | η | 75 | --- | --- | % | Von/off=5V V _{in} = 12 V Vbrt=0V Panel No. : M190EN04 V.1 (AU) |

7.2.2 Output Characteristics

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNIT | REMARK |
|---------------------|----------------|-------|-----|------|------------------|---|
| LAMP CURRENT | I _L | 6.9 | 7.5 | 8.1 | mA | Von/off=5V V _{in} = 12 V Vbrt=0V Panel No. : M190EN04 V.1 (AU) |
| LAMP CURRENT | I _L | 3.2 | 3.8 | 4.4 | mA | Von/off=5V V _{in} = 12 V Vbrt=5V Panel No. : M190EN04 V.1 (AU) |
| FREQUENCY | FL | 43 | 48 | 53 | KHz | Von/off=5V V _{in} = 12 V Vbrt=0V Panel No. : M190EN04 V.1 (AU) |
| OUTPUT OPEN VOLTAGE | V _s | 1600 | --- | ---- | V _{rms} | Von/off=5V |
| OUTPUT OPEN | V _L | LATCH | | | | Von/off=5V |

8. Pin Assignments

The following will specify the input and output connector to be provided by the inverter.

8.1 AC Output

The lamp output is provided through the connector- CN201,CN202,CN203,CN204 or type:
UNICORN

LM403-002-TF-2 or equivalent

| Pin No | Symbol | Description |
|--------|--------|--------------|
| 1 | Vout-H | High Voltage |
| 2 | Vout-L | Power Return |

8.2 Fault Condition Test(Open Circuit Protection)

Damage to the inverter must not occur such as fire , smoke , break , and molten metal in equipment.

9. Product Requirements And Test Requirements

9.1 Operating And Storage Temperature And Humidity.

Operating Temperature Range : Operating 0 ~ 50 ° C.

Operating Humidity : 0~90% RH, non-condensing.

Storage Temperature Range : -20 ~ 70 ° C.

Storage Humidity : 0~90%RH, non-condensing.

9.2 Safety Meet

Combine with system to apply

9.3 Leakage Current

The leakage current less than 0.75 mA

9.4 Insulation Resistance

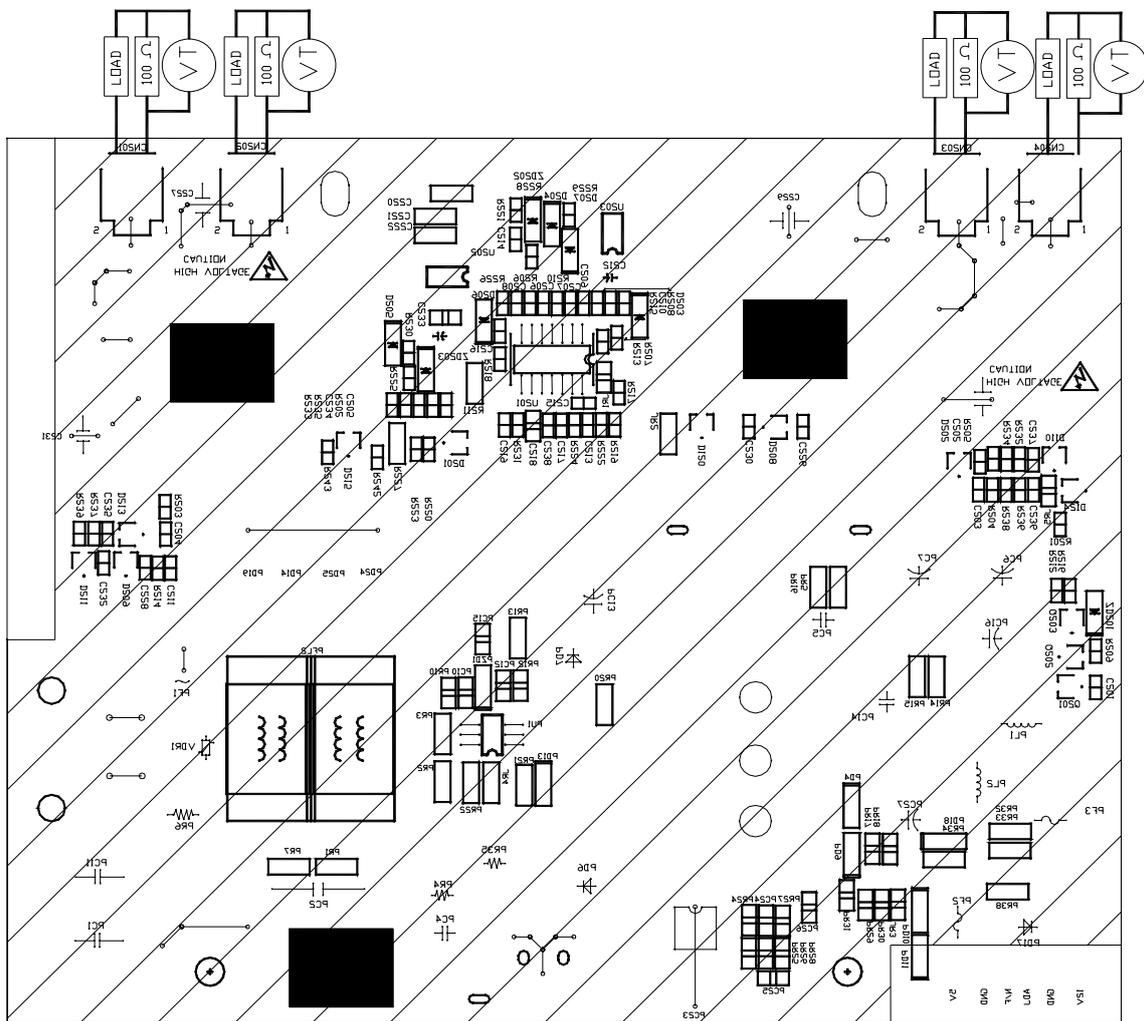
More than 10 Mohm withstanding (cutoff current 10 mA)

CUSTOMER: _____

Specification

| | | | | | |
|------------|---------------|-------|-----------------|----|---|
| Part Name: | Power Supply | Page: | 2 | of | 2 |
| Model No: | PWR0451704005 | Date: | OCT / 18 / 2006 | | |

11. Test Circuit



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