



### 1000W Single Output DC-DC Converter

## SD-1000 series



#### ■ Features :

- 1U low profile 41mm
- High power density 10.7w/inch<sup>3</sup>
- 2000VAC I/O Isolation
- Protections: Short circuit / Overload / Over voltage / Over temperature
- Output OK signal
- Built-in remote ON-OFF control
- Built-in remote sense function
- Forced air cooling by built-in DC fan with fan speed control
- 12V, 0.25A auxiliary output
- 3 years warranty

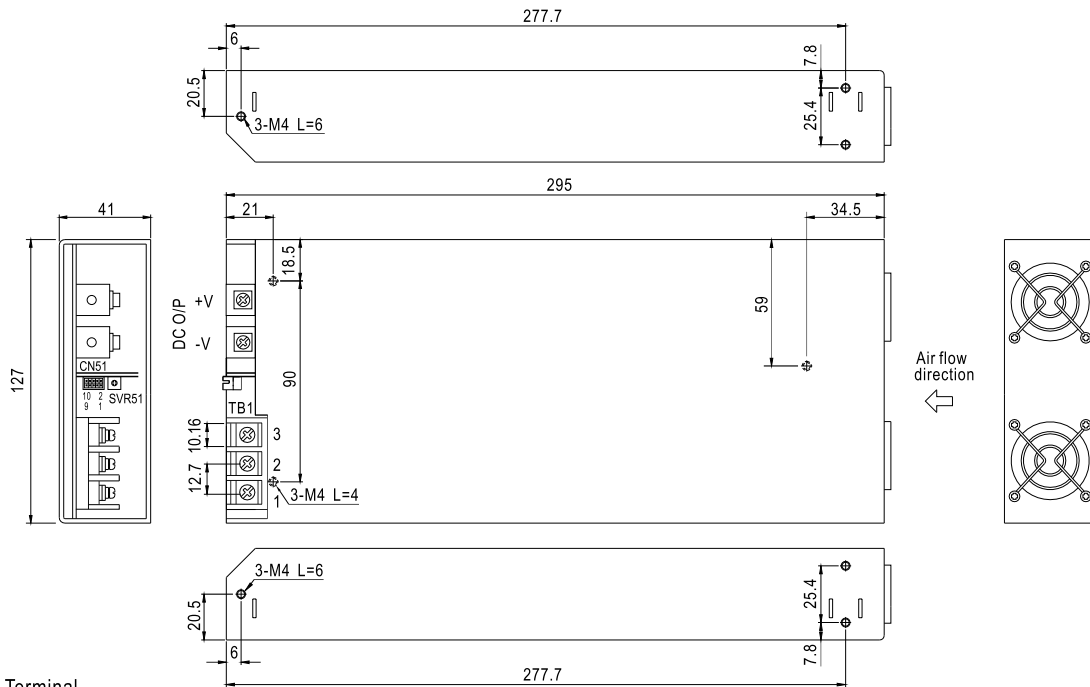
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#### SPECIFICATION

| SPECIFICATION                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                      |              |             |             |              |             |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------|-------------|--------------|-------------|
| MODEL                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | SD-1000L-12                                                                                                                                                                                          | SD-1000L-24  | SD-1000L-48 | SD-1000H-12 | SD-1000H-24  | SD-1000H-48 |
| OUTPUT                                  | DC VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 12V                                                                                                                                                                                                  | 24V          | 48V         | 12V         | 24V          | 48V         |
|                                         | RATED CURRENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 60A                                                                                                                                                                                                  | 40A          | 21A         | 60A         | 40A          | 21A         |
|                                         | CURRENT RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0 ~ 60A                                                                                                                                                                                              | 0 ~ 40A      | 0 ~ 21A     | 0 ~ 60A     | 0 ~ 40A      | 0 ~ 21A     |
|                                         | RATED POWER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 720W                                                                                                                                                                                                 | 960W         | 1008W       | 720W        | 960W         | 1008W       |
|                                         | RIPPLE & NOISE (max.) <small>Note.2</small>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 150mVp-p                                                                                                                                                                                             | 150mVp-p     | 150mVp-p    | 150mVp-p    | 150mVp-p     | 150mVp-p    |
|                                         | VOLTAGE ADJ. RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 11 ~ 15V                                                                                                                                                                                             | 23 ~ 30V     | 46 ~ 60V    | 11 ~ 15V    | 23 ~ 30V     | 46 ~ 60V    |
|                                         | VOLTAGE TOLERANCE <small>Note.3</small>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ±1.0%                                                                                                                                                                                                | ±1.0%        | ±1.0%       | ±1.0%       | ±1.0%        | ±1.0%       |
|                                         | LINE REGULATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ±0.5%                                                                                                                                                                                                | ±0.5%        | ±0.5%       | ±0.5%       | ±0.5%        | ±0.5%       |
|                                         | LOAD REGULATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ±0.5%                                                                                                                                                                                                | ±0.5%        | ±0.5%       | ±0.5%       | ±0.5%        | ±0.5%       |
|                                         | SETUP, RISE TIME                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 500ms, 50ms at full load                                                                                                                                                                             |              |             |             |              |             |
| INPUT                                   | VOLTAGE RANGE <small>Note.5</small>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 19 ~ 72VDC                                                                                                                                                                                           |              |             | 72 ~ 144VDC |              |             |
|                                         | EFFICIENCY (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 84%                                                                                                                                                                                                  | 88%          | 90%         | 85%         | 89%          | 92%         |
|                                         | DC CURRENT (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 23.5A/48VDC                                                                                                                                                                                          |              |             | 11.6A/96VDC |              |             |
|                                         | INRUSH CURRENT (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -----                                                                                                                                                                                                |              |             | 100A/96VDC  |              |             |
| PROTECTION                              | OVERLOAD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 105 ~ 125% rated output power<br>Protection type : Constant current limiting, unit will shut down o/p voltage after about 5sec. Re-power on to recover                                               |              |             |             |              |             |
|                                         | OVER VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 16 ~ 19V                                                                                                                                                                                             | 30.8 ~ 35.2V | 62 ~ 68V    | 16 ~ 19V    | 30.8 ~ 35.2V | 62 ~ 68V    |
|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Protection type : Shut down o/p voltage, re-power on to recover                                                                                                                                      |              |             |             |              |             |
|                                         | OVER TEMPERATURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 85℃ ±5℃ (TSW2) detect on heatsink of O/P diode; 75℃ ±5℃ (TSW1) detect on heatsink of power transistor<br>Protection type : Shut down o/p voltage, recovers automatically after temperature goes down |              |             |             |              |             |
| FUNCTION                                | REMOTE ON/OFF CONTROL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Please refer to function manual                                                                                                                                                                      |              |             |             |              |             |
|                                         | OUTPUT OK SIGNAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Open collector signal low when PSU turns on, maximum, sink current :10mA                                                                                                                             |              |             |             |              |             |
| ENVIRONMENT                             | WORKING TEMP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -20 ~ +60℃ (Refer to output load derating curve)                                                                                                                                                     |              |             |             |              |             |
|                                         | WORKING HUMIDITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 20 ~ 90% RH non-condensing                                                                                                                                                                           |              |             |             |              |             |
|                                         | STORAGE TEMP., HUMIDITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -40 ~ +85℃, 10 ~ 95% RH                                                                                                                                                                              |              |             |             |              |             |
|                                         | TEMP. COEFFICIENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ±0.02%/℃ (0 ~ 50℃)                                                                                                                                                                                   |              |             |             |              |             |
|                                         | VIBRATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes                                                                                                                                         |              |             |             |              |             |
| SAFETY & EMC<br><small>(Note 4)</small> | SAFETY STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | IEC60950-1 CB approved by TUV                                                                                                                                                                        |              |             |             |              |             |
|                                         | WITHSTAND VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | I/P-O/P:2KVAC I/P-FG:1.5KVAC O/P-FG:0.5KVAC                                                                                                                                                          |              |             |             |              |             |
|                                         | ISOLATION RESISTANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | I/P-O/P, I/P-FG, O/P-FG:100M Ohms/500VDC 25℃ 70%RH                                                                                                                                                   |              |             |             |              |             |
|                                         | EMI CONDUCTION & RADIATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Compliance to EN55022 (CISPR22)                                                                                                                                                                      |              |             |             |              |             |
|                                         | EMS IMMUNITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Compliance to EN61000-4-2,3,4,6,8; ENV50204, light industry level, criteria A                                                                                                                        |              |             |             |              |             |
| OTHERS                                  | MTBF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 32K hrs min. MIL-HDBK-217F (25℃)                                                                                                                                                                     |              |             |             |              |             |
|                                         | DIMENSION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 295*127*41mm (L*W*H)                                                                                                                                                                                 |              |             |             |              |             |
|                                         | PACKING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1.94Kg; 6pcs/12.6Kg/0.99CUFT                                                                                                                                                                         |              |             |             |              |             |
| NOTE                                    | 1. All parameters NOT specially mentioned are measured at 48, 96VDC input, rated load and 25℃ of ambient temperature.<br>2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor.<br>3. Tolerance : includes set up tolerance, line regulation and load regulation.<br>4. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives.<br>5. Derating may be needed under low input voltages. Please check the derating curve for more details. |                                                                                                                                                                                                      |              |             |             |              |             |

### Mechanical Specification

Case No. 952B Unit:mm



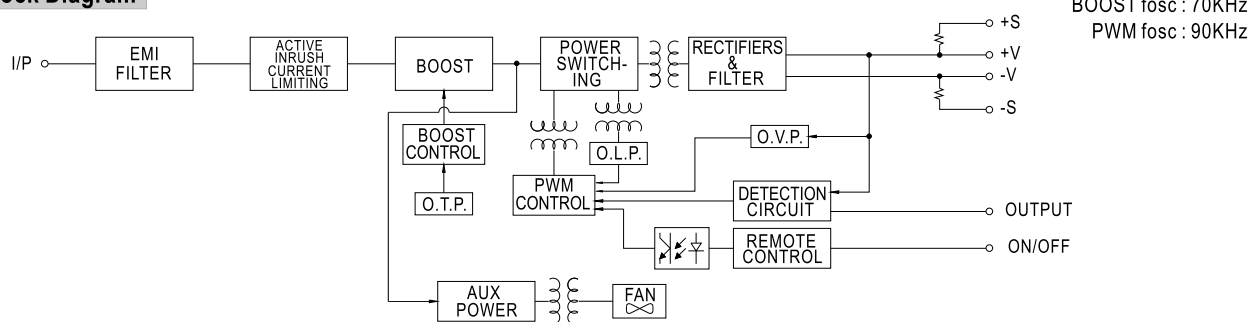
DC Input Terminal  
Pin No. Assignment

| Pin No. | Assignment  |
|---------|-------------|
| 1       | DC INPUT V+ |
| 2       | DC INPUT V- |
| 3       | FG $\perp$  |

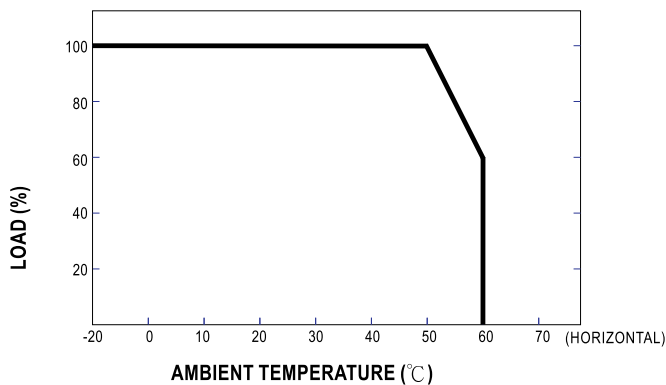
Control pin number assignment (CN51) : JST B10B-PHDSS or equivalent

| Pin No. | Assignment | Pin No. | Assignment | Pin No. | Assignment | Mating Housing                 | Terminal                            |
|---------|------------|---------|------------|---------|------------|--------------------------------|-------------------------------------|
| 1       | +S         | 5       | AUX        | 9       | RCG        | JST PHDR-10VS<br>or equivalent | JST SPHD-002T-P0.5<br>or equivalent |
| 2       | -S         | 6       | AUXG       | 10      | NC         |                                |                                     |
| 3       | OUTPUT OK  | 7       | RC1        |         |            |                                |                                     |
| 4       | GND        | 8       | RC2        |         |            |                                |                                     |

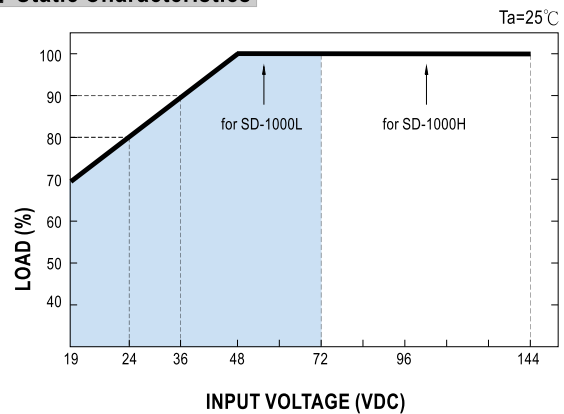
### Block Diagram



### Derating Curve



### Static Characteristics



## Function Description of CN51

| Pin No. | Function | Description                                                                                                                                                                                                           |
|---------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | +S       | Positive sensing. The +S signal should be connected to the positive terminal of the load. The +S and -S leads should be twisted in pair to minimize noise pick-up effect. The maximum line drop compensation is 0.5V. |
| 2       | -S       | Negative sensing. The -S signal should be connected to the negative terminal of the load. The -S and +S leads should be twisted in pair to minimize noise pick-up effect. The maximum line drop compensation is 0.5V. |
| 3       | O/P OK   | Open collector signal, referenced to pin4(GND). Low when PSU turns on. The maximum sink current is 10mA and the maximum external voltage is 13V.                                                                      |
| 4       | GND      | These pins connect to the negative terminal (-V).                                                                                                                                                                     |
| 5       | AUX      | Auxiliary voltage output, 10.8~13.2V referenced to pin6(AUXG).The maximum load current is 0.25A.                                                                                                                      |
| 6       | AUXG     | Auxiliary voltage output ground. The signal return is isolated from the output terminals(+V & -V).                                                                                                                    |
| 7       | RC1      | Remote ON/OFF                                                                                                                                                                                                         |
| 8       | RC2      | Remote ON/OFF                                                                                                                                                                                                         |
| 9       | RCG      | Remote ON/OFF ground                                                                                                                                                                                                  |
| 10      | NC       | No connection                                                                                                                                                                                                         |

## Function Manual

### 1.Remote ON/OFF

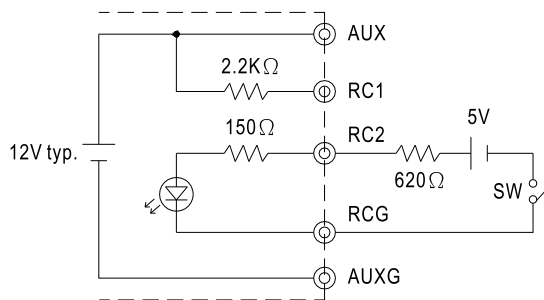
- (1)Remote ON/OFF control becomes available by applying voltage in CN51
- (2)Table 1.1 shows the specification of Remote ON/OFF function
- (3)Fig.1.2 shows the example to connect Remote ON/OFF control function

Table 1.1 Specification of Remote ON/OFF

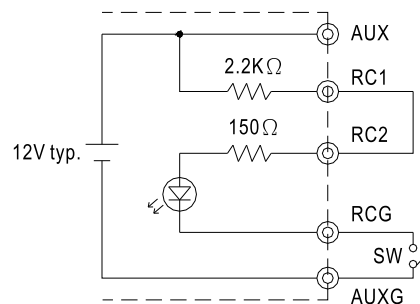
| Connection Method | Fig. 1.2(A) | Fig. 1.2(B) | Fig. 1.2(C) |
|-------------------|-------------|-------------|-------------|
| SW Logic          | Output on   | SW Open     | SW Close    |
|                   | Output off  | SW Close    | SW Open     |

Fig.1.2 Examples of connecting remote ON/OFF

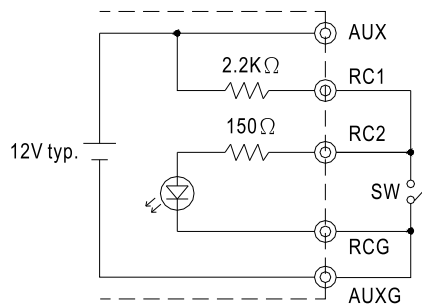
(A)Using external voltage source



(B)Using internal 12V auxiliary output



(C)Using internal 12V auxiliary output



## 2. Output OK signal

"Output OK" is an open collector signal.

It indicates the output status of the PSU. It can operate in two ways : One is sinking current from external signal ; the other is sending out a voltage signal.

### 2-1 Sink current :

The maximum sink current is 10mA and the maximum external voltage is 13V.

### 2-2 Voltage signal :

| Between O/P OK(pin3) and GND(pin4) | Output Status |
|------------------------------------|---------------|
| 0 ~ 0.5V                           | ON            |
| 12 ~ 13V                           | OFF           |

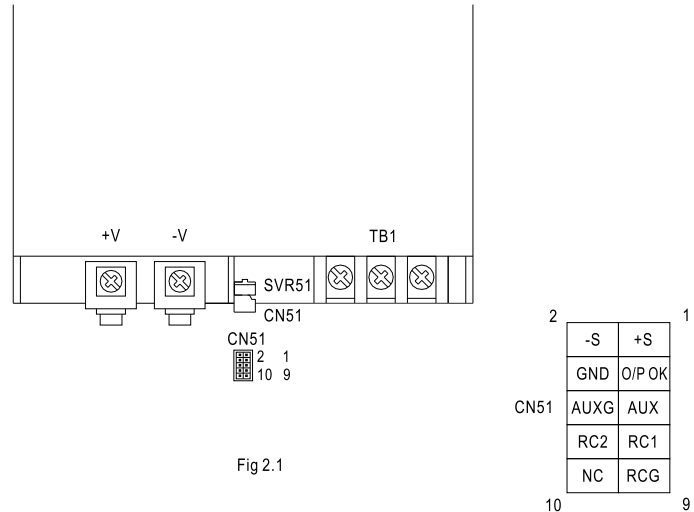


Fig 2.1

## 3. Remote Sense

The remote sensing compensates voltage drop on the load wiring up to 0.5V.

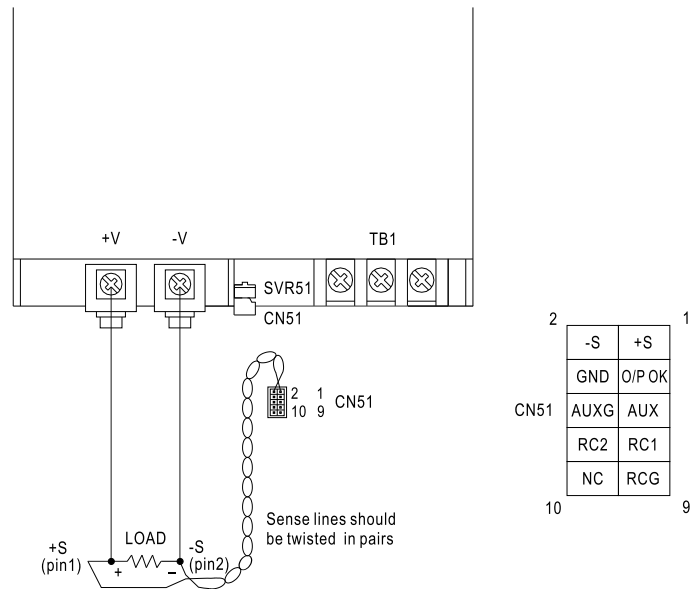


Fig 3.1



MODEL : SD-1000L-24

## OUTPUT FUNCTION TEST

| NO | TEST ITEM                      | SPECIFICATION           | TEST CONDITION                                               | RESULT               | VERDICT |
|----|--------------------------------|-------------------------|--------------------------------------------------------------|----------------------|---------|
| 1  | RIPPLE & NOISE                 | V1: 150 mVp-p (Max )    | I/P: 48 VDC<br>O/P:FULL LOAD<br>Ta:25°C                      | V1: 42 mVp-p (Max )  | P       |
| 2  | OUTPUT VOLTAGE<br>ADJUST RANGE | CH1:23 V ~ 30 V         | I/P: 48 VDC<br>O/P:MIN LOAD<br>Ta:25°C                       | 22.34 V ~ 30.78 V    | P       |
| 3  | OUTPUT VOLTAGE<br>TOLERANCE    | V1: 1%~ -1 % (Max)      | I/P: 48 VDC / 72VDC<br>O/P:FULL/ MIN LOAD<br>Ta:25°C         | V1: 0.03 %~- -0.03 % | P       |
| 4  | LINE REGULATION                | V1: 0.5 %~ -0.5 % (Max) | I/P: 48VDC ~ 72VDC<br>O/P:FULL LOAD<br>Ta:25°C               | V1: 0.03 %~- -0.03 % | P       |
| 5  | LOAD REGULATION                | V1: 0.5 %~ -0.5 % (Max) | I/P: 48 VDC<br>O/P:FULL ~MIN LOAD<br>Ta:25°C                 | V1: 0.03 %~- -0.03 % | P       |
| 6  | SET UP TIME                    | 500 ms (Max)            | I/P: 48 VDC<br>O/P:FULL LOAD<br>Ta:25°C                      | 97 ms                | P       |
| 7  | RISE TIME                      | 50 ms (Max)             | I/P: 48 VDC<br>O/P:FULL LOAD<br>Ta:25°C                      | 28 ms                | P       |
| 8  | OVER/UNDERSHOOT TEST           | < ±5%                   | I/P: 48 VDC<br>O/P:FULL LOAD<br>Ta:25°C                      | TEST: < 5 %          | P       |
| 9  | DYNAMIC LOAD                   | V1: 2400 mVp-p          | I/P: 48 VDC<br>O/P:FULL /Min LOAD<br>90%DUTY/1KHZ<br>Ta:25°C | 277 mVp-p            | P       |

## INPUT FUNCTION TEST

| NO | TEST ITEM           | SPECIFICATION     | TEST CONDITION                                                                                                                                                                                                                  | RESULT      | VERDICT |
|----|---------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------|
| 1  | INPUT VOLTAGE RANGE | 19VDC~ 72 VDC     | I/P:TESTING<br>O/P:LOW LINE /70% LOAD<br>HIGH LINE /FULL LOAD<br>Ta:25°C                                                                                                                                                        | 18 V ~ 72 V | P       |
|    |                     |                   | I/P:<br>LOW-LINE-0.2V= 18.8V<br>O/P:70%/MIN LOAD<br>ON: 30 Sec . OFF: 30 Sec 10MIN<br>( POWER ON/OFF NO DAMAGE )<br><br>HIGH-LINE+5%= 75 V<br>O/P:FULL/MIN LOAD<br>ON: 30 Sec . OFF: 30 Sec 10MIN<br>( POWER ON/OFF NO DAMAGE ) | TEST: OK    |         |
| 2  | EFFICIENCY          | 88 % (TYP)        | I/P: 48 VDC<br>O/P:FULL LOAD<br>Ta:25°C                                                                                                                                                                                         | 89.1%       | P       |
| 3  | INPUT CURRENT       | 23.5 A/ 48 V(TYP) | I/P: 48 VDC<br>O/P:FULL LOAD<br>Ta:25°C                                                                                                                                                                                         | I = 22.64 A | P       |

## PROTECTION FUNCTION TEST

| NO | TEST ITEM                   | SPECIFICATION                                                            | TEST CONDITION                           | RESULT                                                                                                       | VERDICT |
|----|-----------------------------|--------------------------------------------------------------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------|---------|
| 1  | OVER LOAD PROTECTION        | 105 %~ 125 %                                                             | I/P: 48VDC<br>O/P:TESTING<br>Ta:25°C     | 117 %<br>Constant Current Limiting, unit will shut down o/p voltage above 5sec<br>Re-power on to recover     | P       |
| 2  | OVER VOLTAGE PROTECTION     | CH1: 30.8V~ 35.2V                                                        | I/P: 48VDC<br>O/P:MIN LOAD<br>Ta:25°C    | 33 V<br>Shunt down Re- power ON                                                                              | P       |
| 3  | OVER TEMPERATURE PROTECTION | SPEC:<br>75°C ± 5°C OT.P. (TSW1)<br>85°C ± 5°C OT.P. (TSW2)<br>NO DAMAGE | I/P: 48 VDC<br>O/P:FULL LOAD             | O.T.P. Active<br>Shut down o/p volotage , recovers automatically after temperature goes down                 | P       |
| 4  | SHORT PROTECTION            | SHORT EVERY OUTPUT<br>1 HOUR NO DAMAGE                                   | I/P: 72 VDC<br>O/P: FULL LOAD<br>Ta:25°C | NO DAMAGE<br>Constant Current Limiting, unit will shut down o/p voltage above 5sec<br>Re-power on to recover | P       |

## CONTROL FUNCTION TEST

| NO | TEST ITEM         | SPECIFICATION                                                                                                                                                                                          | TEST CONDITION                          | RESULT                                                                    | VERDICT |
|----|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|---------------------------------------------------------------------------|---------|
| 1  | FAN SPEED CONTROL | 0%LOAD=6V~8.5V<br>100%LOAD=11.8V~12.8V                                                                                                                                                                 | I/P: 48 VDC<br>O/P:FULL LOAD<br>Ta:25°C | Fan Voltage= 7.25 V/ NO LOAD<br>Fan Voltage=12.36 V/ 100%LOAD             | P       |
| 2  | REMOTE CONTROL    | Rc+ / Rc-<br>POWER ON:OPEN BETWEEN ON/OFF<br>POWEROFF:SHORT BETWEEN ON/OFF<br>(A) Using External Voltage Source<br>(B) Using Internal 12V Auxiliary Output<br>(C) Using Internal 12V Auxiliary Output. | I/P: 48 VDC<br>O/P:FULL LOAD<br>Ta:25°C | (A)OK<br>(B)OK<br>(C)OK                                                   | P       |
| 3  | REMOTE SENSE      | >0.3V                                                                                                                                                                                                  | I/P: 48 VDC<br>O/P:FULL LOAD<br>Ta:25°C | > 0.3 V                                                                   | P       |
| 4  | OUTPUT OK SIGNAL  | OPEN COLLECTOR SIGNAL LOW WHEN<br>PSU TURN ON,MAX.SINK CURRENT<br>10mA,external voltage is 13V<br>0~0.5V OUTPUT STATUS ON<br>12~13V OUTPUT STATUS OFF                                                  | I/P: 48 VDC<br>O/P:FULL LOAD<br>Ta:25°C | SINK CURRENT:10 mA<br>OUTPUT STATUS ON= 0 V<br>OUTPUT STATUS OFF= 12.57 V | P       |
| 5  | FAN LOCK          | SHUTDOWN RE-POWER ON                                                                                                                                                                                   | I/P: 48 VDC<br>O/P:FULL LOAD<br>Ta:25°C | SHUTDOWN RE-POWER ON                                                      | P       |
| 6  | AUX POWER         | 0~0.25A(10.8V~13.2V)                                                                                                                                                                                   | I/P: 48 VDC<br>Ta:25°C                  | 12.91V/ 0 A<br>12.75V/ 0.25 A                                             | P       |
| 7  | DC I/P UVP        | 17V~18.7V                                                                                                                                                                                              | O/P:70% LOAD<br>Ta:25°C                 | 18 VDC                                                                    | P       |

## ENVIRONMENT TEST

| NO | TEST ITEM                                                         | SPECIFICATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | TEST CONDITION                                               | RESULT                     | VERDICT |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
|----|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|----------------------------|---------|----------|-----|----------------------------|----------------------------|---|----|-----------|-------|-------|---|----|-------------------|-------|-------|---|----|-------------------|-------|-------|---|----|-------------------|-------|-------|---|------|-----------|-------|-------|---|-----|--------|-------|-------|---|----|---------------------|-------|-------|---|---------|---------|-------|-------|---|------|-----------------|-------|-------|----|----|---------|-------|-------|----|----|----------|-------|-------|----|------|----------|-------|-------|----|----|---------------|-------|-------|----|------|-------------------|-------|-------|----|-----|-----------------|-------|-------|----|------|---------|-------|-------|----|------|-----------------|-------|-------|----|------|-----------|-------|-------|----|------|--------------------|-------|-------|----|-----|-------------|-------|-------|----|------|----------|-------|-------|----|------|--------------------|-------|-------|---|
| 1  | TEMPERATURE RISE TEST                                             | <div>MODEL : SD-1000L-24</div> <div>1. ROOM AMBIENT BURN-IN : 1 HRS</div> <div>I/P: 48 VDC O/P: FULL LOAD Ta= 29.6℃</div> <div>2. HIGH AMBIENT BURN-IN : 2HRS</div> <div>I/P: 48 VDC O/P: FULL LOAD Ta= 53.6℃</div> <table><thead><tr><th>NO</th><th>Position</th><th>P/N</th><th>ROOM AMBIENT<br/>Ta= 29.6 ℃</th><th>HIGH AMBIENT<br/>Ta= 53.6 ℃</th></tr></thead><tbody><tr><td>1</td><td>U2</td><td>UCC28220D</td><td>46.6℃</td><td>65.0℃</td></tr><tr><td>2</td><td>D2</td><td>60CPQ150 60A/150V</td><td>44.0℃</td><td>64.6℃</td></tr><tr><td>3</td><td>Q3</td><td>IRFP3710 57A/100V</td><td>53.3℃</td><td>69.3℃</td></tr><tr><td>4</td><td>Q1</td><td>IRFP3710 57A/100V</td><td>50.0℃</td><td>73.8℃</td></tr><tr><td>5</td><td>TSW1</td><td>ST-22 75℃</td><td>42.2℃</td><td>63.1℃</td></tr><tr><td>6</td><td>LF1</td><td>TR-757</td><td>51.3℃</td><td>72.3℃</td></tr><tr><td>7</td><td>C8</td><td>1000U/100V 105℃ MXR</td><td>50.7℃</td><td>71.2℃</td></tr><tr><td>8</td><td>T2 COIL</td><td>TF-1684</td><td>66.2℃</td><td>87.9℃</td></tr><tr><td>9</td><td>D901</td><td>S3L60 2.2A/600V</td><td>56.9℃</td><td>78.1℃</td></tr><tr><td>10</td><td>L2</td><td>TF-1655</td><td>59.5℃</td><td>79.3℃</td></tr><tr><td>11</td><td>U9</td><td>TNY280PN</td><td>58.8℃</td><td>80.7℃</td></tr><tr><td>12</td><td>ZD10</td><td>P6KE100A</td><td>56.5℃</td><td>78.3℃</td></tr><tr><td>13</td><td>U1</td><td>IR1150IS(PbF)</td><td>39.6℃</td><td>60.1℃</td></tr><tr><td>14</td><td>Q903</td><td>IRFP260N 50A/200V</td><td>66.6℃</td><td>91.5℃</td></tr><tr><td>15</td><td>C73</td><td>10U/50V 105℃ KY</td><td>54.9℃</td><td>76.1℃</td></tr><tr><td>16</td><td>L100</td><td>TF-1455</td><td>58.6℃</td><td>80.1℃</td></tr><tr><td>17</td><td>Q161</td><td>TIP42C -5A/100V</td><td>51.0℃</td><td>72.8℃</td></tr><tr><td>18</td><td>TSW2</td><td>ST-22 90℃</td><td>61.1℃</td><td>85.9℃</td></tr><tr><td>19</td><td>D102</td><td>ESAD83-006 30A/60V</td><td>70.4℃</td><td>92.0℃</td></tr><tr><td>20</td><td>PCB</td><td>T2 與 ZD10 間</td><td>59.4℃</td><td>82.2℃</td></tr><tr><td>21</td><td>內 TA</td><td>C303 上方處</td><td>43.8℃</td><td>64.5℃</td></tr><tr><td>22</td><td>C113</td><td>1000U/35V 105℃ YXG</td><td>58.1℃</td><td>78.9℃</td></tr></tbody></table> |                                                              |                            | NO      | Position | P/N | ROOM AMBIENT<br>Ta= 29.6 ℃ | HIGH AMBIENT<br>Ta= 53.6 ℃ | 1 | U2 | UCC28220D | 46.6℃ | 65.0℃ | 2 | D2 | 60CPQ150 60A/150V | 44.0℃ | 64.6℃ | 3 | Q3 | IRFP3710 57A/100V | 53.3℃ | 69.3℃ | 4 | Q1 | IRFP3710 57A/100V | 50.0℃ | 73.8℃ | 5 | TSW1 | ST-22 75℃ | 42.2℃ | 63.1℃ | 6 | LF1 | TR-757 | 51.3℃ | 72.3℃ | 7 | C8 | 1000U/100V 105℃ MXR | 50.7℃ | 71.2℃ | 8 | T2 COIL | TF-1684 | 66.2℃ | 87.9℃ | 9 | D901 | S3L60 2.2A/600V | 56.9℃ | 78.1℃ | 10 | L2 | TF-1655 | 59.5℃ | 79.3℃ | 11 | U9 | TNY280PN | 58.8℃ | 80.7℃ | 12 | ZD10 | P6KE100A | 56.5℃ | 78.3℃ | 13 | U1 | IR1150IS(PbF) | 39.6℃ | 60.1℃ | 14 | Q903 | IRFP260N 50A/200V | 66.6℃ | 91.5℃ | 15 | C73 | 10U/50V 105℃ KY | 54.9℃ | 76.1℃ | 16 | L100 | TF-1455 | 58.6℃ | 80.1℃ | 17 | Q161 | TIP42C -5A/100V | 51.0℃ | 72.8℃ | 18 | TSW2 | ST-22 90℃ | 61.1℃ | 85.9℃ | 19 | D102 | ESAD83-006 30A/60V | 70.4℃ | 92.0℃ | 20 | PCB | T2 與 ZD10 間 | 59.4℃ | 82.2℃ | 21 | 內 TA | C303 上方處 | 43.8℃ | 64.5℃ | 22 | C113 | 1000U/35V 105℃ YXG | 58.1℃ | 78.9℃ | P |
| NO | Position                                                          | P/N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ROOM AMBIENT<br>Ta= 29.6 ℃                                   | HIGH AMBIENT<br>Ta= 53.6 ℃ |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 1  | U2                                                                | UCC28220D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 46.6℃                                                        | 65.0℃                      |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 2  | D2                                                                | 60CPQ150 60A/150V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 44.0℃                                                        | 64.6℃                      |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 3  | Q3                                                                | IRFP3710 57A/100V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 53.3℃                                                        | 69.3℃                      |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 4  | Q1                                                                | IRFP3710 57A/100V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 50.0℃                                                        | 73.8℃                      |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 5  | TSW1                                                              | ST-22 75℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 42.2℃                                                        | 63.1℃                      |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 6  | LF1                                                               | TR-757                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 51.3℃                                                        | 72.3℃                      |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 7  | C8                                                                | 1000U/100V 105℃ MXR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 50.7℃                                                        | 71.2℃                      |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 8  | T2 COIL                                                           | TF-1684                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 66.2℃                                                        | 87.9℃                      |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 9  | D901                                                              | S3L60 2.2A/600V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 56.9℃                                                        | 78.1℃                      |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 10 | L2                                                                | TF-1655                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 59.5℃                                                        | 79.3℃                      |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 11 | U9                                                                | TNY280PN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 58.8℃                                                        | 80.7℃                      |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 12 | ZD10                                                              | P6KE100A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 56.5℃                                                        | 78.3℃                      |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 13 | U1                                                                | IR1150IS(PbF)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 39.6℃                                                        | 60.1℃                      |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 14 | Q903                                                              | IRFP260N 50A/200V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 66.6℃                                                        | 91.5℃                      |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 15 | C73                                                               | 10U/50V 105℃ KY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 54.9℃                                                        | 76.1℃                      |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 16 | L100                                                              | TF-1455                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 58.6℃                                                        | 80.1℃                      |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 17 | Q161                                                              | TIP42C -5A/100V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 51.0℃                                                        | 72.8℃                      |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 18 | TSW2                                                              | ST-22 90℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 61.1℃                                                        | 85.9℃                      |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 19 | D102                                                              | ESAD83-006 30A/60V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 70.4℃                                                        | 92.0℃                      |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 20 | PCB                                                               | T2 與 ZD10 間                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 59.4℃                                                        | 82.2℃                      |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 21 | 內 TA                                                              | C303 上方處                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 43.8℃                                                        | 64.5℃                      |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 22 | C113                                                              | 1000U/35V 105℃ YXG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 58.1℃                                                        | 78.9℃                      |         |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 2  | OVER LOAD BURN-IN TEST                                            | NO DAMAGE<br>1 HOUR ( MIN )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | I/P: 48 VDC<br>O/P: 113 % LOAD<br>Ta:25℃                     | TEST : OK                  | P       |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 3  | LOW TEMPERATURE<br>TURN ON TEST                                   | TURN ON AFTER 2 HOUR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | I/P: 48 VDC<br>O/P: 100% LOAD<br>Ta= -20℃                    | TEST : OK                  | P       |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 4  | HIGH HUMIDITY<br>HIGH TEMPERATURE<br>HIGH VOLTAGE<br>TURN ON TEST | AFTER 12 HOURS<br>IN CHAMBER ON<br>CONTROL 50℃<br>NO DAMAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | I/P: 72 VDC<br>O/P:FULL LOAD<br>Ta= 50℃<br>HUMIDITY= 95 %R.H | TEST : OK                  | P       |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 5  | TEMPERATURE<br>COEFFICIENT                                        | ± 0.02%(0~50℃)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | I/P: 48VDC<br>O/P:FULL LOAD                                  | ± 0.013 %(0~50℃)           | P       |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |
| 6  | VIBRATION TEST                                                    | 1 Carton & 1 Set<br>(1) Waveform: Sine Wave<br>(2) Frequency:10~500Hz<br>(3) Sweep Time:10min/sweep cycle<br>(4) Acceleration:2G<br>(5) Test Time:1 hour in each axis (X.Y.Z)<br>(6) Ta:25℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                              | TEST : OK                  | P       |          |     |                            |                            |   |    |           |       |       |   |    |                   |       |       |   |    |                   |       |       |   |    |                   |       |       |   |      |           |       |       |   |     |        |       |       |   |    |                     |       |       |   |         |         |       |       |   |      |                 |       |       |    |    |         |       |       |    |    |          |       |       |    |      |          |       |       |    |    |               |       |       |    |      |                   |       |       |    |     |                 |       |       |    |      |         |       |       |    |      |                 |       |       |    |      |           |       |       |    |      |                    |       |       |    |     |             |       |       |    |      |          |       |       |    |      |                    |       |       |   |

## SAFETY TEST

| NO | TEST ITEM            | SPECIFICATION                                                       | TEST CONDITION                                                                          | RESULT                                                              | VERDICT |
|----|----------------------|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------|---------|
| 1  | WITHSTAND VOLTAGE    | I/P-O/P: 2 KVAC/min<br>I/P-FG: 1.5 KVAC/min<br>O/P-FG: 0.5 KVAC/min | I/P-O/P: 2.4 KVAC/min<br>I/P-FG: 1.8 KVAC/min<br>O/P-FG: 0.6 KVAC/min<br>Ta:25℃ / 70%RH | I/P-O/P: 4.77 mA<br>I/P-FG: 4.54 mA<br>O/P-FG: 4.46 mA<br>NO DAMAGE | P       |
| 2  | ISOLATION RESISTANCE | I/P-O/P:500VDC>100MΩ<br>I/P-FG: 500VDC>100MΩ<br>O/P-FG:500VDC>100MΩ | I/P-O/P: 500 VDC<br>I/P-FG: 500 VDC<br>O/P-FG: 500 VDC<br>Ta:25℃                        | I/P-O/P: 9.45 GΩ<br>I/P-FG: 1.92 GΩ<br>O/P-FG: 30 GΩ<br>NO DAMAGE   | P       |
| 3  | GROUNDING CONTINUITY | FG(PE) TO CHASSIS<br>OR TRACE < 100 mΩ                              | 40 A / 2min<br>Ta:25℃ / 70%RH                                                           | 8 mΩ                                                                | P       |
| 4  | APPROVAL             | TUV: Certificate NO :<br>UL: File NO :                              |                                                                                         |                                                                     | N/A     |

## E.M.C TEST

| NO | TEST ITEM                                   | SPECIFICATION                                                | TEST CONDITION                         | RESULT                        | VERDICT |
|----|---------------------------------------------|--------------------------------------------------------------|----------------------------------------|-------------------------------|---------|
| 1  | RADIATION                                   | EN55022<br>CLASS B                                           | I/P: 48VDC<br>O/P:FULL LOAD<br>Ta:25℃  | PASS<br>Test by certified Lab | P       |
| 2  | E.S.D                                       | EN61000-4-2<br>LIGHT INDUSTRY<br>AIR:8KV / Contact:4KV       | I/P: 48 VDC<br>O/P:FULL LOAD<br>Ta:25℃ | CRITERIA A                    | P       |
| 3  | E.F.T                                       | EN61000-4-4<br>LIGHT INDUSTRY<br>INPUT: 1KV                  | I/P: 48VDC<br>O/P:FULL LOAD<br>Ta:25℃  | CRITERIA A                    | P       |
| 4  | SURGE                                       | IEC61000-4-5<br>LIGHT INDUSTRY<br>L-N :0.5KV<br>L,N-PE:0.5KV | I/P: 48 VDC<br>O/P:FULL LOAD<br>Ta:25℃ | CRITERIA A                    | P       |
| 5  | Test by certified Lab & Test Report Prepare |                                                              |                                        |                               |         |

## M.T.B.F & LIFE CYCLE CALCULATION

| NO | TEST ITEM                      | SPECIFICATION                                                                                                                                                                  | TEST CONDITION | RESULT | VERDICT |
|----|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------|---------|
| 1  | CAPACITOR<br>LIFE CYCLE        | SD-1000L-24 : SUPPOSE C113 IS THE MOST CRITICAL COMPONENT<br>I/P: 48VDC O/P:FULL LOAD Ta=50 °C LIFE TIME= 251623 HRS<br>I/P: 48VDC O/P:FULL LOAD Ta=50 °C LIFE TIME= 55554 HRS |                |        | P       |
| 2  | MTBF                           | MIL-HDBK-217F NOTICES2 PARTS COUNT<br>TOTAL FAILURE RATE: 32KHRS                                                                                                               |                |        | P       |
| 3  | ORT (Ongoing Reliability test) | SD-1000L-48:I/P : 230VAC O/P : FULL LOAD TA=50℃ Sample=5pcs TEST TIME=2544HRS                                                                                                  |                |        | P       |

## COMPONENT STRESS TEST

| NO | TEST ITEM                                                    | SPECIFICATION                       | TEST CONDITION                                                                                                                          | RESULT                                  | VERDICT |
|----|--------------------------------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|---------|
| 1  | Power Transistor<br>(D to S) or (C to E) <b>Peak Voltage</b> | Q 900 Rated<br>IRFP260N: 200 V 50 A | I/P: High-Line +3V = 75 V<br>O/P: (1) Full Load Turn on<br>(2) Output Short<br>Ta: 25°C                                                 | (1) 201 V<br>(2) 205 V                  | P       |
| 2  | Diode <b>Peak Voltage</b>                                    | D101 Rated<br>S30JC10 30A/100V      | I/P: High-Line +3V = 75 V<br>O/P: (1) Full Load Turn on<br>(2) Output Short<br>Ta: 25°C                                                 | (1) 75 V<br>(2) 40 VV                   | P       |
| 3  | Clamp Diode <b>Peak Voltage</b>                              | D 900 Rated<br>S3L60 2.2A/600V      | I/P: High-Line +3V = 75 V<br>O/P: (1) Dynamic Load<br>90% Duty/1KHz<br>Ta: 25°C                                                         | (1) 178 V                               | P       |
| 4  | Input Capacitor <b>Voltage</b>                               | C5 Rated<br>1000u /100 V /105°C     | I/P: High-Line +3V = 75V<br>O/P: (1) Full Load Turn on /Off<br>(2) Min load Turn on /Off<br>(3) Full Load /Min load Change<br>Ta: 25°C  | (1) 81 V<br>(2) 79 V<br>(3) 81 V        | P       |
| 5  | Control IC <b>Voltage Test</b>                               | U2 Rated<br>UCC28220: 8V~14 V       | I/P: High-Line +3V = 75 V<br>O/P: (1) Full Load Turn on /Off<br>(2) Min load Turn on /Off<br>(3) Full Load /Min load Change<br>Ta: 25°C | (1) 13.6 V<br>(2) 13.51 V<br>(3) 13.6 V | P       |

| DATE       | SAMPLE                     | TEST RESULT | TESTER        | APPROVAL      |
|------------|----------------------------|-------------|---------------|---------------|
| 2007/9/14  | RD SAMPLE                  | PASS        | VINCENT TSENG | MAX LIN       |
| 2007/11/16 | PRODUCT SAMPLE<br>W0710C50 | PASS        | VINCENT TSENG | MAX LIN       |
| 2008/1/10  | PRODUCT SAMPLE<br>W0712C58 | PASS        | SANFORD SU    | VINCENT TSENG |

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