Jameco Part Number 1954033

MEAN WELL

500W Single Output DC-DC Converter

SD-500 series

Features :

- DC input active surge current limiting
- Wide 4:1~2:1 DC input range (24V: 19~72VDC, 96V:72~144VDC)
- Protections: Short circuit / Overload / Over voltage / Over temperature / Input polarity(by fuse)
- 2000VAC I/O Isolation
- Forced air cooling by built-in DC fan with fan speed control function
- Output OK Signal
- Built-in remote ON-OFF control
- Built-in remote sense function
- 3 years warranty

CB CE

SPECIFICATION

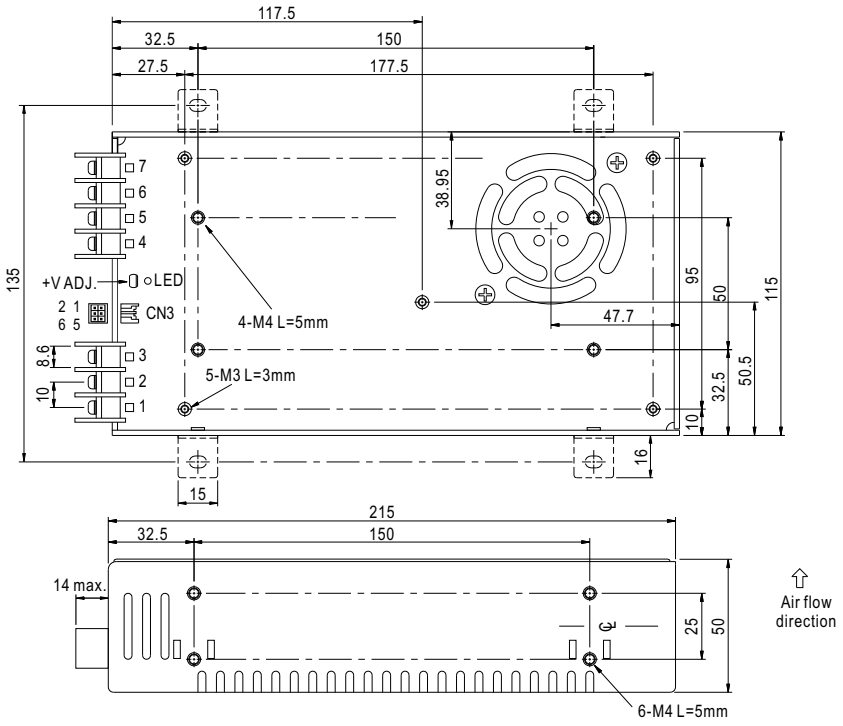
MODEL		SD-500L-12	SD-500L-24	SD-500L-48	SD-500H-12	SD-500H-24	SD-500H-48
OUTPUT	DC VOLTAGE	12V	24V	48V	12V	24V	48V
	RATED CURRENT	40A	21A	10.5A	40A	21A	10.5A
	CURRENT RANGE	0 ~ 40A	0 ~ 21A	0 ~ 10.5A	0 ~ 40A	0 ~ 21A	0 ~ 10.5A
	RATED POWER	480W	504W	504W	480W	504W	504W
	RIPPLE & NOISE (max.) Note.2	150mVp-p	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 Note.3	±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 Note.5	19 ~ 72VDC			72 ~ 144VDC		
	EFFICIENCY (Typ.)	86%	88%	89%	87%	89%	90%
	DC CURRENT (Typ.)	24.2A/19VDC 24.8A/24VDC 12A/48VDC			8A/72VDC 6A/96VDC		
	CURRENT (AT NO LOAD)	Max. 0.2A/48VDC			Max. 0.1A/96VDC		
	INRUSH CURRENT (Typ.)	60A/48VDC			60A/96VDC		
PROTECTION	OVERLOAD	105 ~ 125% rated output power					
		Protection type : Constant current limiting, shut down o/p voltage after about 5 sec., 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	80℃±5℃ (TSW1) detect on heatsink of power transistor					
		80℃±5℃(L-48V,H-24V,H-48V), 85℃±5℃(L-24V), 90℃±5℃(L-12V), 95℃±5℃(H-12V) (TSW2 : detect on heatsink of o/p diode)					
		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, max. 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 (Note 4)	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) Class B					
	EMS IMMUNITY	Compliance to EN61000-4-2,3,4,6,8; ENV50204, light industry level, criteria A					
OTHERS	MTBF	196.3K hrs min. MIL-HDBK-217F (25℃)					
	DIMENSION	215*115*50mm (L*W*H)					
	PACKING	1.15Kg; 12pcs/14.8Kg/0.92CUFT					

NOTE

1. All parameters NOT specially mentioned are measured at 48, 96VDC input, rated load and 25℃ of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor.
3. Tolerance : includes set up tolerance, line regulation and load regulation.
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.
5. Derating may be needed under low input voltages. Please check the derating curve for more details.

■ Mechanical Specification

Case No. 912A Unit:mm



DC Input Terminal Pin No. Assignment

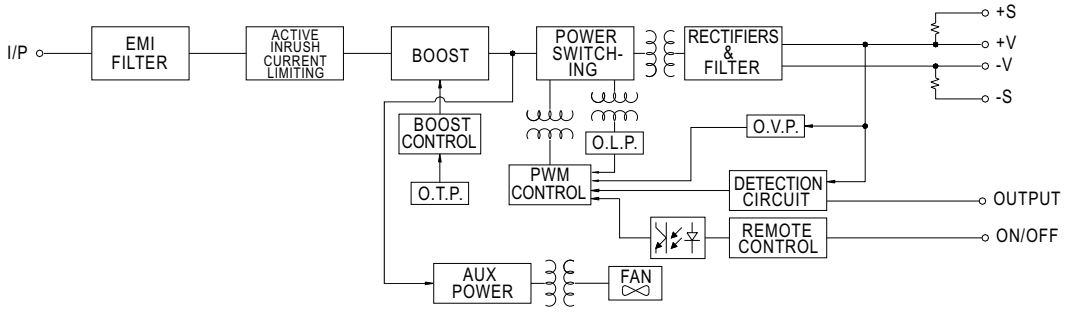
Pin No.	Assignment	Pin No.	Assignment
1	DC INPUT V+	4,5	-V
2	DC INPUT V-	6,7	+V
3	FG ⏚		

Control Pin No. Assignment (CN3) : JST B6B-PHDSS or equivalent

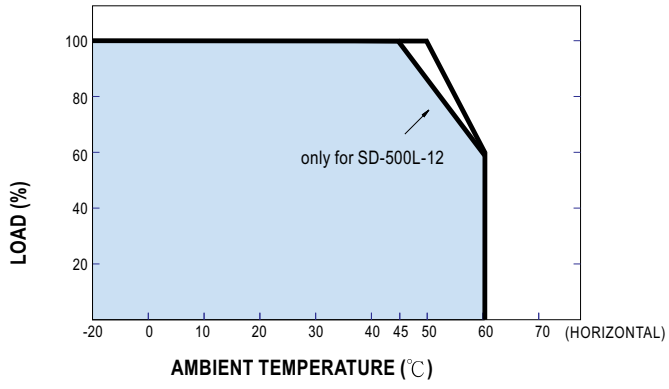
Pin No.	Assignment	Pin No.	Assignment	Mating Housing	Terminal
1	+S	4	GND	JST PHDR-06VS or equivalent	JST SPHD-002T-P0.5 or equivalent
2	-S	5	RC		
3	OUTPUT OK	6	RCG		

■ Block Diagram

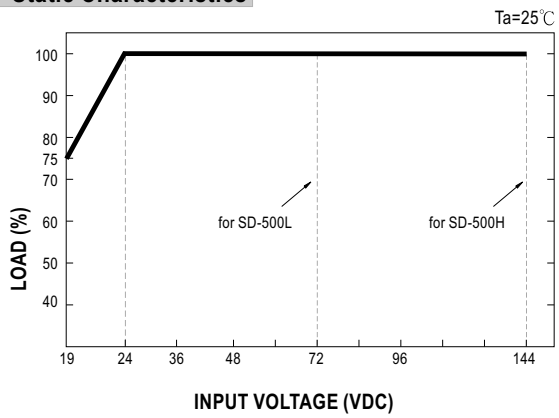
BOOST fosc : 65KHz
PWM fosc : 110KHz



■ Derating Curve



■ Static Characteristics



■ Function Description of CN3

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, reference 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	RC	Remote ON/OFF
6	RCG	Remote ON/OFF ground

■ Function Manual

1.Remote ON/OFF

(1)Remote ON/OFF control becomes available by applying voltage in CN3

(2)Table 1.1 shows the specification of Remote ON/OFF function

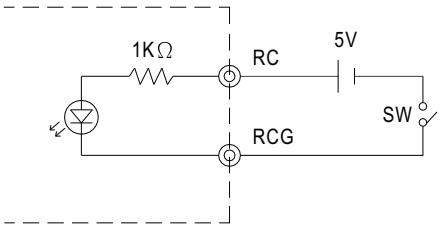
(3)Fig.1.2 shows the example to connect Remote ON/OFF control function

Table 1.1 Specification of Remote ON/OFF

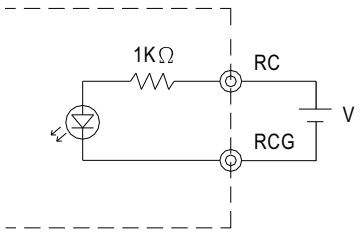
Connection Method	Fig. 1.2(A)	Fig. 1.2(B)
Output on	SW Open	V=0~0.8Vdc
Output off	SW Close	V=4~10Vdc

Fig.1.2 Examples of connecting remote ON/OFF

(A)Using external voltage source



(B)Using external voltage source



2.Output OK signal

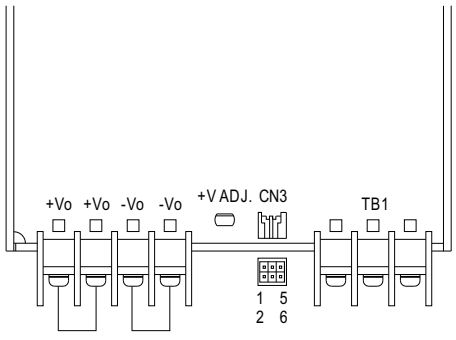
"Output OK" is an open collector signal.
It indicates the output status of the PSU. It can operate in two ways : One is sinking current from external signal ; the other is sending out a voltage signal.

2-1 Sink current :

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

2-2 Voltage signal :

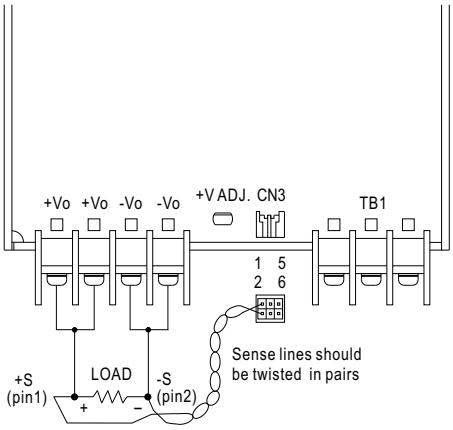
Between O/P OK(pin3) and GND(pin4)	Output Status
0 ~ 0.5V	ON
12 ~ 13V	OFF



1	CN3	5
+S	O/P OK	RC
-S	GND	RCG
2		6

3.Remote Sense

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



1	CN3	5
+S	O/P OK	RC
-S	GND	RCG
2		6

MODEL：SD-500L-12

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1:150 mVp-p (Max)	I/P: 48 VDC O/P:FULL LOAD Ta:25℃	V1: 40 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1: 11V~ 15V	I/P: 48VDC O/P:MIN LOAD Ta:25℃	10.09 V~15.25 V	P
3	OUTPUT VOLTAGE TOLERANCE	V1: 1%~ -1%	I/P: 24 VDC / 72 VDC O/P:FULL/ MIN LOAD Ta:25℃	V1: 0.2 %~ -0.2 %	P
4	LINE REGULATION	V1: 0.5 %~ -0.5 %	I/P: 24VDC ~72VDC O/P:FULL LOAD Ta:25℃	V1: 0.05 %~ -0.05 %	P
5	LOAD REGULATION	V1: 0.5 %~ -0.5 %	I/P: 48VDC O/P:FULL ~MIN LOAD Ta:25℃	V1: 0.1 %~ -0.1 %	P
6	SET UP TIME	500 ms	I/P: 48VDC O/P:FULL LOAD Ta:25℃	127 ms	P
7	RISE TIME	50ms	I/P: 48VDC O/P:FULL LOAD Ta:25℃	13 ms	P
8	OVER/UNDERSHOOT TEST	< ±5%	I/P: 48 VDC O/P:FULL LOAD Ta:25℃	TEST: < 5 %	P
9	DYNAMIC LOAD	V1: 1200mVp-p	I/P: 48 VDC O/P:FULL /Min LOAD 90%DUTY/1KHZ Ta:25℃	510 mVp-p	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	24VDC~72VDC	I/P:TESTING O/P:FULL LOAD Ta:25℃	19.8 V~ 72 V	P
			I/P: LOW-LINE-0.2V= 23.8 V HIGH-LINE+5%= 75.6 V O/P:FULL/MIN LOAD ON: 30 Sec . OFF: 30 Sec 10MIN (AC POWER ON/OFF NO DAMAGE)	TEST: OK	
2	EFFICIENCY	85 % (TYP)	I/P: 48 VDC O/P:FULL LOAD Ta:25℃	85.08 %	P
3	INPUT CURRENT	12 A(TYP)	I/P: 48 VDC O/P:FULL LOAD Ta:25℃	I = 11.6 A	P
4	INRUSH CURRENT	60A (TYP) COLD START	I/P: 48 VDC O/P:FULL LOAD Ta:25℃	I = 32 A	P
5	CURRENT (at no load)	0.2A (MAX)	I/P: 48 VDC O/P:NO LOAD Ta:25℃	I = 0.15 A	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 %~ 125 %	I/P: 48 VDC O/P:TESTING Ta:25℃	115 % Constant Current Limiting , Shut down O/P voltage ,after about 5 sec Re-power ON to recover	P
2	OVER VOLTAGE PROTECTION	CH1: 16 V~ 19V	I/P: 48 VDC O/P:MIN LOAD Ta:25℃	16.9 V Shut down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	SPEC: TSW2 > 90℃ ±5℃ O.T.P TSW1 > 80℃ ±5℃ O.T.P NO DAMAGE	I/P: 48 VDC O/P:FULL LOAD	O.T.P. Active Shut down o/p voltage，recovers automatically after temperature goes down	P
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 72 VDC O/P: FULL LOAD Ta:25℃	NO DAMAGE Constant Current Limiting , Shut down O/P voltage ,after about 5 sec Re-power ON to recover	P

CONTROL FUNCTION TEST

<table>
<tr><th>NO</th><th>TEST ITEM</th><th>SPECIFICATION</th><th>TEST CONDITION</th><th>RESULT</th><th>VERDICT</th></tr>
<tr><td>1</td><td>FAN SPEED CONTROL</td><td>NO LOAD= 8.5V ± 1V
FULL LOAD= 12.6V ± 0.5V</td><td>I/P: 48VDC
O/P:FULL LOAD
Ta:25℃</td><td>NO LOAD= 8.59 V
FULL LOAD= 12.5 V</td><td>P</td></tr>
<tr><td>2</td><td>REMOTE CONTROL</td><td>Remote on/off control becomes available by applying voltage in CN3 (RC/RCG)
<table><tr><td>Connection method</td><td>Fig 1.2(A)</td><td>Fig 1.2(B)</td></tr><tr><td>Output on</td><td>SW Open</td><td>V=0~0.8VDC</td></tr><tr><td>Output off</td><td>SW Close</td><td>V=4VDC~10VDC</td></tr></table>Fig 1.2(A)/ Fig 1.2(B) see SPEC function manual</td><td>I/P: 48VDC
O/P:FULL LOAD
Ta:25℃</td><td>a. OK
b. 0 V~ 2.6 V POWER ON
2.7 V~ 10 V POWER OFF</td><td>P</td></tr>
<tr><td>3</td><td>REMOTE SENSE</td><td>S+ / S-
>0.3V</td><td>I/P: 48 VDC
O/P:FULL LOAD
Ta:25℃</td><td>>0.3 V</td><td>P</td></tr>
<tr><td>4</td><td>OUTPUT OK SIGNAL</td><td>OPEN COLLECTOR SIGNAL LOW WHEN PSU TURN ON,MAX.SINK CURRENT 10mA,external voltage is 13V
0~0.5V OUTPUT STATUS ON
12~13V OUTPUT STATUS OFF</td><td>I/P: 48 VDC
O/P:FULL LOAD
Ta:25℃</td><td>SINK CURRENT: 10 mA
0.05V: OUTPUT STATUS ON
12.68V: OUTPUT STATUS OFF</td><td>P</td></tr>
</table>

ENVIRONMENT TEST

<table>
<tr><th>NO</th><th>TEST ITEM</th><th>SPECIFICATION</th><th>TEST CONDITION</th><th>RESULT</th><th>VERDICT</th></tr>
<tr><td>1</td><td>TEMPERATURE RISE TEST</td><td colspan="3">MODEL： SD-500L-48
1. ROOM AMBIENT BURN-IN： 1.5 HRS
I/P:48 VDC O/P: FULL LOAD Ta= 30.7 ℃
2. HIGH AMBIENT BURN-IN： 13 HRS
I/P: 48 VDC O/P: FULL LOAD Ta= 54.7 ℃

<table>
<tr><th>NO</th><th>Position</th><th>P/N</th><th>ROOM AMBIENT Ta= 30.7 ℃</th><th>HIGH AMBIENT Ta= 54.7 ℃</th></tr>
<tr><td>1</td><td>LF1</td><td>TR784</td><td>35.3℃</td><td>61.3℃</td></tr>
<tr><td>2</td><td>RY1</td><td>RELAY</td><td>36.5℃</td><td>62.3℃</td></tr>
<tr><td>3</td><td>L2</td><td>TF1725</td><td>40.7℃</td><td>66.7℃</td></tr>
<tr><td>4</td><td>D5</td><td>MBR20H100CT 20A/100V</td><td>39.7℃</td><td>65.1℃</td></tr>
<tr><td>5</td><td>U1</td><td>UCC28019D</td><td>41.7℃</td><td>68.5℃</td></tr>
<tr><td>6</td><td>C5</td><td>1000u/100V 105℃ MXR</td><td>41.4℃</td><td>67.3℃</td></tr>
<tr><td>7</td><td>Q2</td><td>STP80NF12 80A/120V</td><td>43.4℃</td><td>69.1℃</td></tr>
<tr><td>8</td><td>ZD10</td><td>P6KE100A</td><td>48.7℃</td><td>73.7℃</td></tr>
<tr><td>9</td><td>D300</td><td>SBD S100 1A/100V</td><td>55.3℃</td><td>79.7℃</td></tr>
<tr><td>10</td><td>C75</td><td>220u/25V KY 105℃ 7Kh</td><td>39.8℃</td><td>65.2℃</td></tr>
<tr><td>11</td><td>U9</td><td>TNY280PN</td><td>47.4℃</td><td>73.4℃</td></tr>
<tr><td>12</td><td>C110</td><td>470u/63V L10Kh YXF</td><td>37.2℃</td><td>60.6℃</td></tr>
<tr><td>13</td><td>Q201</td><td>IRFP264 38A/250V</td><td>50.2℃</td><td>77.2℃</td></tr>
<tr><td>14</td><td>T1</td><td>TF1718</td><td>64.3℃</td><td>92.8℃</td></tr>
<tr><td>15</td><td>D100</td><td>S20LC30 20A/300V</td><td>57.1℃</td><td>80.4℃</td></tr>
<tr><td>16</td><td>L100</td><td>TF1724</td><td>51.4℃</td><td>76.4℃</td></tr>
</table></td><td>P</td></tr>
<tr><td>2</td><td>OVER LOAD BURN-IN TEST</td><td>NO DAMAGE
1 HOUR (MIN)</td><td>I/P: 48 VDC
O/P: 113 % LOAD
Ta:25℃</td><td>TEST： OK</td><td>P</td></tr>
<tr><td>3</td><td>LOW TEMPERATURE
TURN ON TEST</td><td>TURN ON AFTER 2 HOUR</td><td>I/P: 48 VDC
O/P: 100 % LOAD
Ta= -25 ℃</td><td>TEST： OK</td><td>P</td></tr>
<tr><td>4</td><td>HIGH HUMIDITY
HIGH TEMPERATURE
HIGH VOLTAGE
TURN ON TEST</td><td>AFTER 12 HOURS
IN CHAMBER ON
CONTROL 50 ℃
NO DAMAGE</td><td>I/P: 72 VDC
O/P:FULL LOAD
Ta= 50 ℃
HUMIDITY= 95 %R.H</td><td>TEST： OK</td><td>P</td></tr>
<tr><td>5</td><td>TEMPERATURE
COEFFICIENT</td><td>± 0.02 %(0~50℃)</td><td>I/P: 48 VDC
O/P:FULL LOAD</td><td>± 0.01 %(0~50℃)</td><td>P</td></tr>
<tr><td>6</td><td>VIBRATION TEST</td><td colspan="2">1 Carton & 1 Set
(1) Waveform: Sine Wave
(2) Frequency:10~500Hz
(3) Sweep Time:10min/sweep cycle
(4) Acceleration:2G
(5) Test Time:1 hour in each axis (X.Y.Z)
(6) Ta:25℃</td><td>TEST： OK</td><td>P</td></tr>
</table>

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P: 2 KVAC/min I/P-FG: 1.5 KVAC/min O/P-FG: 0.5 KVAC/min	I/P-O/P: 2.4 KVAC/min I/P-FG: 1.8 KVAC/min O/P-FG: 0.6 KVAC/min Ta:25℃ / 70%RH	I/P-O/P: 4.23 mA I/P-FG: 3.97 mA O/P-FG: 5.54 mA NO DAMAGE	P
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ I/P-FG: 500VDC>100MΩ O/P-FG:500VDC>100MΩ	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25℃	I/P-O/P: 4.52 GΩ I/P-FG: 1.69 GΩ O/P-FG: 8.22 GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta:25℃ / 70%RH	7 mΩ	P
4	APPROVAL	TUV: Certificate NO : UL: File NO :			N

E.M.C TEST

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

M.T.B.F & LIFE CYCLE CALCULATION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	CAPACITOR LIFE CYCLE	SD-500L-48: SUPPOSE C110 IS THE MOST CRITICAL COMPONENT I/P: 96VDC O/P:FULL LOAD Ta= 25 ℃ LIFE TIME= 1957680 HRS I/P: 96VDC O/P:FULL LOAD Ta= 50 ℃ LIFE TIME= 360720 HRS			P
2	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE: 196.3K HRS			P

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) **Peak Voltage**	Q201 Rated IRFP264 38A/250V	I/P:High-Line +3V = 75 V O/P: (1)Full Load Turn on (2) Output Short Ta:25℃	(1) 200 V (2) 241 V	P
2	Diode Peak **Voltage**	D100 Rated S60SC6M :60 V60 A	I/P:High-Line +3V = 75 V O/P: (1)Full Load Turn on (2)Output Short Ta:25℃	(1) 54.5 V (2) 54.5 V	P
3	**Input Capacitor Voltage**	C5 Rated : 1000 u / 100V 105 ℃	I/P:High-Line +3V = 75 V O/P: (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta:25℃	(1) 83.5 V (2) 82.5 V (3) 83.5 V	P
4	**Control IC Voltage Test**	U2 Rated KA3846 :40 V	I/P:High-Line +3V = 75 V O/P: (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta:25℃	(1) 13.3 V (2) 13.3 V (3) 13.3 V	P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2008/1/21	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2008/3/17	PRODUCT SAMPLE W0802B72	PASS	SANFORD SU	VINCENT TSENG
2008/5/29	PRODUCT SAMPLE W0804B61	PASS	SANFORD SU	VINCENT TSENG

2003/12/12 A50-F023