



Test Report: CLG-150-48

150W Single Output Switching Power Supply

■ DESIGN VERIFY TEST

Output Function Test
Input Function Test
Protection Function Test
Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test
E.M.C. Test

■ RELIABILITY TEST

ENVIRONMENT TEST

■ DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1 : 200 mVp-p (Max)	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 20.9 mVp-p (Max)	PASS
2	VOLTAGE ADJUST RANGE	CH1: 40 V ~ 56 V	I/P : 230VAC I/P : 115VAC O/P : CV MODE Ta : 25°C	37.246 V ~ 58.51 V /230VAC 37.269 V ~ 58.50 V /115VAC	PASS
3	CURRENT ADJUST RANGE	CH1: 1.6 A ~ 3.2 A	I/P : 230VAC I/P : 115VAC O/P : CV MODE Ta : 25°C	1.1638 A ~ 3.6423 A /230VAC 1.1661 A ~ 3.6397 A /115VAC	PASS
4	CONSTANT CURRENT REGION	V1 = 36 V ~ 48 V	I/P : 230VAC I/P : 115VAC O/P : CV MODE Ta : 25°C	O/P= 36V : 3.199 A 230V O/P= 47V : 3.207 A 230V O/P= 36V : 3.198 A 115V O/P= 47V : 3.204 A 115V	PASS
5	OUTPUT VOLTAGE TOLERANCE	V1 : -1.0 % ~ 1.0 % (Max)	I/P : 100 VAC / 295 VAC O/P : FULL/ MIN LOAD Ta : 25°C	V1 : -0.13 %~ 0.52 %	PASS
6	LINE REGULATION	V1 : -0.5 % ~ 0.5 % (Max)	I/P : 100 VAC ~ 295 VAC O/P : FULL LOAD Ta : 25°C	V1 : -0.004 %~ 0 %	PASS
7	LOAD REGULATION	V1 : -0.5 % ~ 0.5 % (Max)	I/P : 230 VAC O/P : FULL ~MIN LOAD Ta : 25°C	V1 : -0.13 %~ 0 %	PASS
8	SET UP TIME	230VAC : 500 ms (Max) 115VAC : 3000 ms(Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 360.979 ms 115VAC/ 1522.313 ms	PASS
9	RISE TIME	230VAC : 80 ms (Max) 115VAC : 80 ms (Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 17.252 ms 115VAC/ 17.209 ms	PASS
10	HOLD UP TIME	230VAC : 50 ms (TYP) 115VAC : 16 ms (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 85.166 ms 115VAC/ 86.054 ms	PASS
11	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : < ±1.255 %	PASS
12	DYNAMIC LOAD	V1 : 4800 mVp-p	I/P : 230 VAC (1).O/P : FULL /Min LOAD 90%DUTY/ 1KHZ (2).O/P : FULL /Min LOAD 50%DUTY/ 120HZ Ta : 25°C	(1) 702 mVp-p (2) 832 mVp-p	PASS

13	RESISTANCE	Short -Open 50%-100%LOAD	I/P:230V						PASS
			RESISTANCE	Short	82Ω	620Ω	4.7KΩ	OPEN	
			O/P LOAD	Slightly < 50%	50%	75%	100.0%	Slightly > 100%	
			TEST RESULT: I/P : 230VAC ; Ta : 25°C						
			RESISTANCE	Short	82Ω	620Ω	4.7KΩ	OPEN	
			O/P LOAD	39.06%	48.75%	76.87%	100.1%	105.94%	

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	90VAC~295 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C I/P : LOW-LINE -3V=87 V HIGH-LINE=295 V O/P : FULL/MIN LOAD ON : 30 Sec . OFF : 30 Sec 10MIN (AC POWER ON/OFF NO DAMAGE)	85 V ~ 295V TEST : OK	PASS
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P : 90 VAC ~ 295 VAC O/P : FULL -MIN LOAD Ta : 25°C	TEST : OK	PASS
3	POWER FACTOR	0.95 / 230 VAC(TYP) 0.98 / 115 VAC(TYP) 0.93 / 277 VAC(TYP)	I/P : 230 VAC I/P : 115 VAC I/P : 277 VAC O/P : FULL LOAD Ta : 25°C	PF= 0.980 / 100% PF= 0.997 / 100% PF= 0.947 / 100%	PASS
4	EFFICIENCY	91% (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	91.21 %	PASS
5	INPUT CURRENT	230V/ 1.00 A (TYP) 115V/ 2.00 A (TYP) 277V/ 0.68 A (TYP)	I/P : 230 VAC I/P : 115 VAC I/P : 277 VAC O/P : FULL LOAD Ta : 25°C	I = 0.728 A/ 230 VAC I = 1.474 A/ 115 VAC I = 0.623 A/ 277 VAC	PASS
6	INRUSH CURRENT	230V/ 65 A (TYP) (width=595us measured at 50% Ipeak) COLD START	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I = 61.125 A/ 230 VAC T50= 590 us	PASS
7	LEAKAGE CURRENT	< 1 mA / 240 VAC	I/P : 295 VAC O/P : Min LOAD Ta : 25°C	L-CASE : 0.514 mA N-CASE : 0.508 mA	PASS
8	TOTAL HARMONIC DISTORTION	Total harmonic distortion will be lower than 20% when output loading is 75% or higher at 230V/115 V/277 VAC	I/P : 230VAC I/P : 115VAC I/P : 277VAC O/P : 75% LOAD Ta : 25°C	THD : 6.16 % THD : 4.29 % THD : 10.64 %	PASS

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	95 % ~ 108 %	I/P : 295 VAC I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25°C	100.84%/ 295 VAC 100.37%/ 230 VAC 100.84%/ 115 VAC Constant current limiting, recovers automatically after fault condition is removed.	PASS
2	OVER VOLTAGE PROTECTION	CH1 : 59 V ~ 70 V	I/P : 295 VAC I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	62.31V/ 295 VAC 62.12V/ 230 VAC 62.35V/ 115 VAC Shunt down and latch off o/p voltage ,Re- power on to recover	PASS
3	OVER TEMPERATURE PROTECTION	SPEC : O.T.P. NO DAMAGE	I/P : 230 VAC O/P : FULL LOAD	O.T.P. Active Shut down o/p voltage, Re- power on to recover	PASS
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 295 VAC O/P : FULL LOAD Ta : 25°C	NO DAMAGE Hiccup mode, recovers automatically after fault condition is removed.	PASS

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated : SPA11N65C3: 650 V 11 A	I/P : High-Line +3V = 298 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 600 V (2) 526 V (3) 592 V	PASS
2	Diode Peak Voltage	Q100 Rated : SF20LC30 : 300 V 20 A	I/P : High-Line +3V = 298 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25°C	(1) 255 V (2) 207 V (3) 256 V	PASS
3	Input Capacitor Voltage	C5 Rated: NCC : 150uF / 450 V 105 °C / CLA Series	I/P : High-Line +3V = 298 V O/P : (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C	(1) 478 V (2) 448 V (3) 464 V	PASS
4	Control IC Voltage Test	U2 Rated: NCP1380BDR2G: 28V	I/P : High-Line +3V = 298 V O/P : (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C	(1) 17.2 V (2) 14.3 V (3) 15.8 V	PASS
5	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q2 Rated FMV20N60S1HF: 600 V/ 20 A	I/P : High-Line +3V = 298 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 508 V (2) 446 V (3) 452 V	PASS

■ SAFETY & E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P : 3.75 KVAC/min I/P-FG : 2.0 KVAC/min O/P-FG : 0.5 KVAC/min	I/P-O/P : 4.2 KVAC/min I/P-FG : 2.4 KVAC/min O/P-FG : 0.6 KVAC/min Ta : 25°C	I/P-O/P : 3.872 mA I/P-FG : 3.631 mA O/P-FG : 1.243 mA NO DAMAGE	PASS
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°C /70%RH	I/P-O/P : >9999 MΩ I/P-FG : >9999 MΩ O/P-FG : >9999 MΩ NO DAMAGE	PASS
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta : 25°C / 70%RH	20 mΩ	PASS

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS C	I/P:220VAC/230VAC/240VAC50HZ O/P:100%,75%LOAD Ta:25°C	PASS	PASS
2	CONDUCTION	EN55015	I/P: 230 VAC (50HZ)/115V[60HZ] O/P:FULL/65% LOAD Ta:25°C	PASS Test by certified Lab	PASS
3	RADIATION	EN55015	I/P: 230 VAC (50HZ)/115V[60HZ] O/P: FULL/65% LOAD Ta:25°C	PASS Test by certified Lab	PASS
4	E.S.D	EN61000-4-2 LIGHT INDUSTRY AIR:8KV / Contact:4KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	PASS
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT: 1KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	PASS
6	SURGE	IEC61000-4-5 INDUSTRY L-N :2KV L,N-PE:4KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	PASS
7	Test by certified Lab & Test Report Prepare				

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																																																				
1	TEMPERATURE RISE TEST	MODEL : CLG-150-48A 1. ROOM AMBIENT BURN-IN : 1.0 HRS I/P : 230VAC O/P : LEDmode=47V Ta=32.0 °C 2. HIGH AMBIENT BURN-IN : 2.0 HRS I/P : 230VAC O/P : LEDmode=47V Ta=55.0 °C	<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 30.5 °C</th> <th>HIGH AMBIENT Ta= 55.0 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>U1</td><td>65.1°C</td><td>88.2°C</td></tr> <tr><td>2</td><td>C42</td><td>61.8°C</td><td>85.4°C</td></tr> <tr><td>3</td><td>L2</td><td>62.1°C</td><td>85.8°C</td></tr> <tr><td>4</td><td>C5</td><td>65.7°C</td><td>89.1°C</td></tr> <tr><td>5</td><td>U2</td><td>63.8°C</td><td>86.8°C</td></tr> <tr><td>6</td><td>C52</td><td>63.8°C</td><td>87.3°C</td></tr> <tr><td>7</td><td>D2</td><td>75.7°C</td><td>100.3°C</td></tr> <tr><td>8</td><td>Q1</td><td>70.5°C</td><td>104.3°C</td></tr> <tr><td>9</td><td>Q2</td><td>65.2°C</td><td>88.9°C</td></tr> <tr><td>10</td><td>T1</td><td>76.3°C</td><td>100.3°C</td></tr> <tr><td>11</td><td>J100</td><td>62.3°C</td><td>86.5°C</td></tr> <tr><td>12</td><td>Q100</td><td>67.8°C</td><td>92.3°C</td></tr> <tr><td>13</td><td>Q101</td><td>69.6°C</td><td>93.4°C</td></tr> <tr><td>14</td><td>C107</td><td>67.8°C</td><td>91.7°C</td></tr> <tr><td>15</td><td>RTH2</td><td>60.5°C</td><td>84.1°C</td></tr> <tr><td>16</td><td>C108</td><td>61.7°C</td><td>85.8°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 30.5 °C	HIGH AMBIENT Ta= 55.0 °C	1	U1	65.1°C	88.2°C	2	C42	61.8°C	85.4°C	3	L2	62.1°C	85.8°C	4	C5	65.7°C	89.1°C	5	U2	63.8°C	86.8°C	6	C52	63.8°C	87.3°C	7	D2	75.7°C	100.3°C	8	Q1	70.5°C	104.3°C	9	Q2	65.2°C	88.9°C	10	T1	76.3°C	100.3°C	11	J100	62.3°C	86.5°C	12	Q100	67.8°C	92.3°C	13	Q101	69.6°C	93.4°C	14	C107	67.8°C	91.7°C	15	RTH2	60.5°C	84.1°C	16	C108	61.7°C	85.8°C		P
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2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 295VAC/100VAC O/P : 95% LOAD Ta= -35°C/-15°C	TEST : OK	P																																																																				
3	TEMPERATURE COEFFICIENT	± 0.03 % (0-50°C)	I/P : 230 VAC O/P : 95% LOAD	± 0.008 % (0-50°C)	P																																																																				
4	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45°C ~ +90°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 5 CYCLE 5. Input/Output condition : STATIC		OK	P																																																																				
5	THERMAL SHOCK TEST	1. Thermal shock Temperature : -35°C ~ +60°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 10 CYCLE 5. Input/Output condition : 230VAC/95% Load AC ON/OFF TEST turn on 58sec ; turn off 2sec		OK	P																																																																				
6	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10-500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 6G (5) Test Time : 90min in each axis (X.Y.Z) (6) Ta : 25°C		TEST : OK	P																																																																				



150W Single Output Switching Power Supply

CLG-150 series

7	CAPACITOR LIFE CYCLE	CLG-150-48A:SUPPOSE C108 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta=25 °C LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta=55 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta=55 °C LIFE TIME	(1) 152138.7 HRS (2) 19527.5 HRS (3) 33320.7 HRS	P
8	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 303.7KHRS		P
9	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 30,000 hours @ Tcase 75 °C ; 50,000 hours @ Tcase 65 °C		P

TEST RESULT	TESTER	APPROVAL
PASS	ZHUOKB/ZOULF	LIUWY

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