



# Test Report: CLG-150-36

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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 : 150 mVp-p (Max)	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 45 mVp-p (Max)	PASS
2	VOLTAGE ADJUST RANGE	CH1: 31 V ~ 41 V	I/P : 230VAC I/P : 115VAC O/P : CV MODE Ta : 25°C	26.641 V ~ 42.534 V /230VAC 26.649 V ~ 42.532 V /115VAC	PASS
3	CURRENT ADJUST RANGE	CH1: 2.1A ~ 4.2 A	I/P : 230VAC I/P : 115VAC O/P : CV MODE Ta : 25°C	0.9174 A ~ 4.7545 A /230VAC 0.9181 A ~ 4.7543 A /115VAC	PASS
4	CONSTANT CURRENT REGION	V1 = 27 V ~ 36 V	I/P : 230VAC I/P : 115VAC O/P : CV MODE Ta : 25°C	O/P= 27V : 4.208 A 230V O/P= 35V : 4.211 A 230V O/P= 27V : 4.207 A 115V O/P= 35V : 4.209 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 : -0.142 %~ 0.125 %	PASS
6	LINE REGULATION	V1 : -0.5 % ~ 0.5 % (Max)	I/P : 100 VAC ~ 295 VAC O/P : FULL LOAD Ta : 25°C	V1 : -0.003 %~ 0.003 %	PASS
7	LOAD REGULATION	V1 : -0.5 % ~ 0.5 % (Max)	I/P : 230 VAC O/P : FULL ~MIN LOAD Ta : 25°C	V1 : -0.142 %~ 0.081 %	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/ 395.512 ms 115VAC/ 1328.483 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/ 11.562 ms 115VAC/ 11.761 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/ 79.760 ms 115VAC/ 80.163 ms	PASS
11	OVER/UNDERSHOOT TEST	< ± 5%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : <±1.972 %	PASS
12	DYNAMIC LOAD	V1 : 3600 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) 940 mVp-p (2) 970 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	37.38%	47.14%	75.71%	100.1%	106.67%	

**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 )	87 V~ 295 V  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= 0.948 / 100%	PASS
4	EFFICIENCY	91% (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	91.01 %	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 = 0.738 A/ 230 VAC I = 1.499 A/ 115 VAC I = 0.639 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 = 60.375 A/ 230 VAC T50= 592 us	PASS
7	LEAKAGE CURRENT	< 1 mA / 240 VAC	I/P : 295 VAC O/P : Min LOAD Ta : 25°C	L-CASE : 0.4940 mA N-CASE : 0.4848 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 : 4.52 % THD : 7.62 % THD : 11.86 %	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	100.12 %/ 295 VAC 100.15 %/ 230 VAC 100.11 %/ 115 VAC Constant current limiting, recovers automatically after fault condition is removed.	PASS
2	OVER VOLTAGE PROTECTION	CH1 : 42 V ~ 50 V	I/P : 295 VAC I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	44.75 V/ 295 VAC 44.74 V/ 230 VAC 44.72 V/ 115 VAC Shunt down and latch off o/p voltage ,Re- power on to recover	PASS
3	OVER TEMPERATURE PROTECTION	SPEC : RTH2 : 100± 10°C 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	
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	Q6 Rated : 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) 614 V (2) 528 V (3) 598 V	PASS
2	Diode Peak Voltage	Q100 Rated : 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) 191 V (2) 163 V (3) 190 V	PASS
3	Input Capacitor Voltage	C5 Rated: 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) 448 V (2) 448 V (3) 448 V	PASS
4	Control IC Voltage Test	U2 Rated: 28 V	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) 17.3 V (2) 17.2 V (3) 17.1 V	PASS
5	P.F.C Transistor ( D to S) or (C to E) Peak Voltage	Q2 Rated 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) 498 V (2) 436 V (3) 448 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 : 3.634 mA I/P-FG : 3.850 mA O/P-FG : 1.191 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	23 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-150-36A 1. ROOM AMBIENT BURN-IN : 1.0 HRS I/P : 230VAC O/P : 95%LOAD Ta=30.5 °C 2. HIGH AMBIENT BURN-IN : 2.0 HRS I/P : 230VAC O/P : 95%LOAD 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>L2</td><td>65.5°C</td><td>89.2°C</td></tr> <tr><td>2</td><td>U1</td><td>66.3°C</td><td>89.8°C</td></tr> <tr><td>3</td><td>C42</td><td>64.3°C</td><td>88.0°C</td></tr> <tr><td>4</td><td>C5</td><td>69.1°C</td><td>92.6°C</td></tr> <tr><td>5</td><td>U2</td><td>68.5°C</td><td>91.5°C</td></tr> <tr><td>6</td><td>C52</td><td>66.5°C</td><td>89.9°C</td></tr> <tr><td>7</td><td>D2</td><td>80.8°C</td><td>105.0°C</td></tr> <tr><td>8</td><td>Q1</td><td>71.9°C</td><td>95.9°C</td></tr> <tr><td>9</td><td>T1</td><td>80.7°C</td><td>104.3°C</td></tr> <tr><td>10</td><td>Q100</td><td>72.0°C</td><td>95.6°C</td></tr> <tr><td>11</td><td>C107</td><td>72.2°C</td><td>95.9°C</td></tr> <tr><td>12</td><td>RTH2</td><td>63.1°C</td><td>86.9°C</td></tr> <tr><td>13</td><td>C108</td><td>64.9°C</td><td>89.2°C</td></tr> <tr><td>14</td><td>Q101</td><td>73.8°C</td><td>97.7°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 30.5 °C	HIGH AMBIENT Ta= 55.0 °C	1	L2	65.5°C	89.2°C	2	U1	66.3°C	89.8°C	3	C42	64.3°C	88.0°C	4	C5	69.1°C	92.6°C	5	U2	68.5°C	91.5°C	6	C52	66.5°C	89.9°C	7	D2	80.8°C	105.0°C	8	Q1	71.9°C	95.9°C	9	T1	80.7°C	104.3°C	10	Q100	72.0°C	95.6°C	11	C107	72.2°C	95.9°C	12	RTH2	63.1°C	86.9°C	13	C108	64.9°C	89.2°C	14	Q101	73.8°C	97.7°C		P
NO	Position	ROOM AMBIENT Ta= 30.5 °C	HIGH AMBIENT Ta= 55.0 °C																																																														
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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	± 0.011 %(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																																																												
7	CAPACITOR LIFE CYCLE	CLG-150-36A:SUPPOSE C107 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) 110688.5 HRS (2) 14633.9 HRS (3) 27711.0 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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