



Test Report: HVGC-65-700

65W Single Output LED 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

■ ESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	RIPPLE & NOISE	V1 : 0.5 Vp-p (Max)	I/P : 347VAC O/P : FULL LOAD Ta : 25°C	V1 : 107 mVp-p (Max)
2	CURRENT ACCURACY	± 5%	I/P : 347VAC O/P : LED MODE : 9V~ 93V Ta : 25°C	-0.12 %~ 0.12 %
3	OUTPUT VOLTAGE RANGE	9V ~ 93V	I/P : 347 VAC O/P : FULL LOAD Ta : 25°C	O/P=9V : 0.701A O/P=92V : 0.701 A
4	OUTPUT CURRENT ADJUST RANGE	CH1 : 420mA~ 700mA	I/P : 480 VAC I/P : 347 VAC O/P : LED : 92V Ta : 25°C	0.3018 A~ 0.7877 A/ 480 VAC 0.3033 A~ 0.7881 A/ 347 VAC
5	SET UP TIME	480 VAC : 400 ms (Max) 347VAC : 400 ms(Max) 230VAC : 500 ms(Max)	I/P : 480 VAC I/P : 347 VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	480 VAC/ 278 ms 347VAC/ 290 ms 230VAC/ 310 ms
6	RISE TIME	480 VAC : 80 ms (Max) 347VAC : 80 ms (Max) 230VAC : 80 ms (Max)	I/P : 440 VAC I/P : 347 VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	480 VAC/ 6 ms 347VAC/ 6.4 ms 230VAC/ 6.4 ms
7	HOLD UP TIME	480 VAC : 30 ms (TYP) 347VAC : 16 ms (TYP)	I/P : 480 VAC I/P : 347 VAC O/P : FULL LOAD Ta : 25°C	480 VAC/ 36.8 ms 347VAC/ 16.9 ms
8	OVER/UNDERSHOOT TEST	< ±5%	I/P : 347 VAC O/P : FULL LOAD Ta : 25°C	TEST : <5 %

12	DIMMER TEST (B Type only) SPEC: ※Built-in 3 in 1 dimming function, IP67 rated. Output constant current level can be adjusted through output cable by connecting a resistance or 0 ~ 10Vdc or 10V PWM signal between DIM+ and DIM-. ※Please DO NOT connect "DIM-" to "-V". ※Reference resistance value for output current adjustment (Typical)													
	Resistance value	Short	10K	20K	30K	40K	50K	60K	70K	80K	90K	100K	OPEN	
	Output current	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	95%~108%	
	*1 ~ 10V dimming function for output current adjustment (Typical)													
	Dimming value	Short	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN	
	Output current	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	95%~108%	
	*10V PWM signal for output current adjustment (Typical) : Frequency range :100Hz ~ 3KHz													
	Duty value	Short	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN	
	Output current	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	95%~108%	
	TEST RESULT: I/P : 230 VAC ;Ta : 25°C													
	1	Resistance value	SHORT	10K	20K	30K	40K	50K	60K	70K	80K	90K	100K	OPEN
		Output current	0.001A	0.078A	0.147A	0.216A	0.285A	0.354A	0.422A	0.492A	0.559A	0.628A	0.693A	0.730A
%		0.14%	11.14%	21.00%	30.86%	40.71%	50.57%	60.29%	70.29%	79.86%	89.71%	99.00%	104.29%	
2	Dimming value	SHORT	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN	
	Output current	0.001A	0.082A	0.154A	0.225A	0.288A	0.362A	0.427A	0.500A	0.570A	0.636A	0.700A	0.730A	
	%	0.14%	11.71%	22.00%	32.14%	41.14%	51.71%	61.00%	71.43%	81.43%	90.86%	100.04%	104.29%	
3	Duty value	SHORT	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN	
	Output current	0.001A	0.078A	0.146A	0.215A	0.284A	0.354A	0.423A	0.492A	0.561A	0.631A	0.700A	0.730A	
	%	0.14%	11.17%	20.86%	30.71%	40.57%	50.57%	60.43%	70.29%	80.14%	90.14%	100.06%	104.29%	

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	180VAC~528VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C	169 V~528V
			I/P : LOW-LINE-3V=177V HIGH-LINE+10V=538 V O/P : FULL/MIN LOAD ON : 30 Sec. OFF : 30 Sec 10MIN (AC POWER ON/OFF NO DAMAGE)	TEST : OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P : 180VAC ~ 528 VAC O/P : FULL~MIN LOAD Ta : 25°C	TEST : OK
3	POWER FACTOR	0.98 / 230 VAC(TYP)	I/P : 230VAC	PF= 0.992 / 230 VAC
		0.97 / 277VAC(TYP)	I/P : 277VAC	PF= 0.990 / 277 VAC
		0.95 /347 VAC(TYP)	I/P : 347VAC	PF= 0.977 / 347VAC
		0.93 / 480VAC(TYP)	I/P : 480VAC O/P : FULL LOAD Ta : 25°C	PF= 0.966 / 480VAC
4	EFFICIENCY	90.5 % (TYP)	I/P : 347 VAC O/P : FULL LOAD Ta : 25°C	91.2 %
5	INPUT CURRENT	347V/ 0.22 A (TYP)	I/P : 347 VAC	I = 0.209 A/ 347 VAC
		480V/ 0.18 A (TYP)	I/P : 480 VAC O/P : FULL LOAD Ta : 25°C	I = 0.155 A/ 480 VAC
6	INRUSH CURRENT	230V/ 25 A (TYP) (twidth=420us measured at 50% Ipeak) COLD START	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	I = 20 A/ 230VAC T50= 406 us
7	LEAKAGE CURRENT	< 0.75 mA / 480 VAC	I/P : 480 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.29 mA N-FG : 0.26 mA
8	TOTAL HARMONIC DISTORTION	Total harmonic distortion will be lower than 20% when output loading is 60% or higher at 230VAC / 277VAC / 347VAC	I/P : 230VAC I/P : 277VAC I/P : 347VAC O/P : 60% LOAD Ta : 25°C	THD : 7.34 % THD : 9.31 % THD : 16.45 %
		Total harmonic distortion will be lower than 20% when output loading is 75% or higher at 480VAC	I/P : 480VAC O/P : 75% LOAD Ta : 25°C	THD : 16.1 %

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER VOLTAGE PROTECTION	CH1 : 98 V ~ 107 V	I/P : 480 VAC I/P : 347 VAC O/P : MIN LOAD Ta : 25°C	102.18V/ 480VAC 100.87V/ 347 VAC Shut down o/p voltage with auto-recovery or re-power on to recovery
2	OVER TEMPERATURE PROTECTION	SPEC : NO DAMAGE	I/P : 347 VAC O/P : FULL LOAD	O.T.P. Active Shut down o/p voltage, recovers automatically after temperature goes down
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 528 VAC O/P : FULL LOAD Ta : 25°C	NO DAMAGE Constant current limiting, recovers automatically after fault condition is removed

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q3 Rated : 9A/950V	I/P : High-Line +3V = 531 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 650 V (2) 292 V (3) 568 V
2	Diode Peak Voltage	D101 Rated : 10A/400V	I/P : High-Line +3V = 531 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25°C	(1) 308 V (2) 254 V (3) 296 V
3	Input Capacitor Voltage	C5 Rated : 22u/450V	I/P : High-Line +3V = 531 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) 450 V (2) 440 V (3) 406 V
4	Control IC Voltage Test	U1 Rated : 10.3V~22.5V U2 Rated : 11V~28V	I/P : High-Line +3V = 531 V O/P : (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Ta : 25°C	(1) 19.1 V (2) 19.2 V (3) 19.2 V (4) 16.6 (5) 16.3 (6) 16.4
5	Power Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated : 9A/950V	I/P : High-Line +3V = 531 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 908 V (2) 852 V (3) 852 V

SAFETY & E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P : 3.75 KVAC/min I/P-FG : 2 KVAC/min O/P-FG : 1.5 KVAC/min	I/P-O/P : 4 KVAC/min I/P-FG : 2.4 KVAC/min O/P-FG : 1.8 KVAC/min Ta : 25°C	I/P-O/P : 3.13 mA I/P-FG : 2.909 mA O/P-FG : 1.709 mA NO DAMAGE
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 : 11.4 GΩ I/P-FG : 2.71 GΩ O/P-FG : 14.5 GΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta : 25°C / 70%RH	23 mΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS A CLASS C	I/P:230VAC/60HZ O/P:100/75/50/25%ELECTRONIC LOAD O/P:100% LED LOAD Ta:25°C	PASS
2	CONDUCTION	EN55015 CLASS B	I/P: 230/347VAC (50HZ) O/P:FULL/50% LOAD Ta:25°C	PASS Test by certified Lab
3	RADIATION	EN55015 CLASS B	I/P: 230/347 VAC (50HZ) O/P:FULL LOAD Ta:25°C	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 LIGHT INDUSTRY AIR:8KV / Contact:4KV	I/P:230/347 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT : 1KV	I/P: 230/347 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A
6	SURGE	IEC61000-4-5 INDUSTRY L-N :2KV L,N-PE:4KV	I/P: 230/347 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A

RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																								
1	TEMPERATURE RISE TEST	MODEL : HVGC-65-700 1. ROOM AMBIENT BURN-IN : 1.5 HRS I/P : 347VAC O/P : FULL LOAD Ta= 34.2°C 2. HIGH AMBIENT BURN-IN : 1.5 HRS I/P : 347VAC O/P : FULL LOAD Ta= 58.9°C	<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 34.2 °C</th> <th>HIGH AMBIENT Ta= 58.9 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>BD1</td><td>51.5°C</td><td>75.7°C</td></tr> <tr><td>2</td><td>Q1</td><td>57.6°C</td><td>80.9°C</td></tr> <tr><td>3</td><td>Q3</td><td>58.8°C</td><td>81.8°C</td></tr> <tr><td>4</td><td>T1</td><td>61.5°C</td><td>84.2°C</td></tr> <tr><td>5</td><td>C5</td><td>49.9°C</td><td>78.4°C</td></tr> <tr><td>6</td><td>RTH2</td><td>53.5°C</td><td>76.9°C</td></tr> <tr><td>7</td><td>C102</td><td>56.8°C</td><td>80.1°C</td></tr> <tr><td>8</td><td>U2</td><td>54.1°C</td><td>77.6°C</td></tr> <tr><td>9</td><td>D101</td><td>59.5°C</td><td>82.7°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 34.2 °C	HIGH AMBIENT Ta= 58.9 °C	1	BD1	51.5°C	75.7°C	2	Q1	57.6°C	80.9°C	3	Q3	58.8°C	81.8°C	4	T1	61.5°C	84.2°C	5	C5	49.9°C	78.4°C	6	RTH2	53.5°C	76.9°C	7	C102	56.8°C	80.1°C	8	U2	54.1°C	77.6°C	9	D101	59.5°C	82.7°C	
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2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 528VAC/180VAC O/P : 100 % LOAD Ta= -40 °C	TEST : OK																																								
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 60°C NO DAMAGE	I/P : 531 VAC O/P : FULL LOAD Ta= 60 °C HUMIDITY= 95 %R.H	TEST : OK																																								
4	TEMPERATURE COEFFICIENT	±0.03%(0~50°C)	I/P : 347 VAC O/P : FULL LOAD	± 0%(0~50°C)																																								
5	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																																								
6	THERMAL SHOCK TEST	1. Thermal shock Temperature : -40°C~ +65°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 : 347VAC/Full Load AC ON/OFF TEST turn on 58sec ; turn off 2sec		OK																																								
7	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 5G (5) Test Time : 72min in each axis (X.Y.Z) (6) Ta : 25°C		TEST : OK																																								



65W Single Output LED Power Supply

HVGC-65 series

8	CAPACITOR LIFE CYCLE	HVGC-65-700 :SUPPOSE C102 IS THE MOST CRITICAL COMPONENT (1) I/P : 347VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 347VAC O/P : FULL LOAD Ta= 60 °C LIFE TIME (3) I/P : 347VAC O/P : 75% LOAD Ta= 60 °C LIFE TIME (4) I/P : 347VAC O/P : 50% LOAD Ta= 60 °C LIFE TIME	(1) 525948 HRS (2) 51266 HRS (3) 61303 HRS (4) 73996 HRS
9	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 202.7 KHRS	
10	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 50,000 hours @ Tcase 70 °C	

SAMPLE	TESTER	REVIEW	APPROVAL
PRODUCT SAMPLE	DANIEL GAO	SANFORD SU	VINCENT TSENG

12.10.30 A50-F031