



Test Report: HVGC-65-350

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 : 1 Vp-p (Max)	I/P : 347VAC O/P : FULL LOAD Ta : 25°C	V1 : 82 mVp-p (Max)
2	CURRENT ACCURACY	± 5%	I/P : 347VAC O/P : LED MODE : 18V~186V Ta : 25°C	-0.28 %~ 0 %
3	OUTPUT VOLTAGE RANGE	18V ~ 186V	I/P : 347 VAC O/P : FULL LOAD Ta : 25°C	O/P=18V : 0.352A O/P=185V : 0.352A
4	OUTPUT CURRENT ADJUST RANGE	CH1 : 210mA~ 350m A	I/P : 480 VAC I/P : 347 VAC O/P : LED : 185V Ta : 25°C	0.1491 A~ 0.3906 A/ 480 VAC 0.1496 A~ 0.3910 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/ 20 ms 347VAC/ 20.8 ms 230VAC/ 20.8 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/ 35.2 ms 347VAC/ 21.6 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 resistance or

cable by connecting a

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℃

1	Resistance value	SHORT	10K	20K	30K	40K	50K	60K	70K	80K	90K	100K	OPEN
	Output current	0.001A	0.036A	0.070A	0.104A	0.139A	0.174A	0.209A	0.244A	0.279A	0.315A	0.348A	0.366A
	%	0.26%	10.17%	19.91%	29.63%	39.69%	49.66%	59.60%	69.83%	79.71%	89.94%	99.51%	104.54%
2	Dimming value	SHORT	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN
	Output current	0.001A	0.036A	0.071A	0.111A	0.140A	0.175A	0.210A	0.245A	0.280A	0.315A	0.350A	0.366A
	%	0.26%	10.37%	20.23%	31.71%	40.00%	50.00%	60.00%	69.94%	80.00%	90.06%	100.09%	104.54%
3	Duty value	SHORT	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
	Output current	0.001A	0.036A	0.071A	0.106A	0.141A	0.176A	0.211A	0.246A	0.282A	0.318A	0.354A	0.366A
	%	0.29%	10.40%	20.29%	30.40%	40.20%	50.29%	60.29%	70.29%	80.57%	90.86%	101.14%	104.54%

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	156V~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) 0.97 / 277VAC(TYP) 0.95 /347 VAC(TYP) 0.93 / 480VAC(TYP)	I/P : 230VAC I/P : 277VAC I/P : 347VAC I/P : 480VAC O/P : FULL LOAD Ta : 25°C	PF= 0.995 / 230 VAC PF= 0.991 / 277 VAC PF= 0.982 / 347VAC PF= 0.967 / 480VAC
4	EFFICIENCY	90 % (TYP)	I/P : 347 VAC O/P : FULL LOAD Ta : 25°C	91.75 %
5	INPUT CURRENT	347V/ 0.22 A (TYP) 480V/ 0.18 A (TYP)	I/P : 347 VAC I/P : 480 VAC O/P : FULL LOAD Ta : 25°C	I = 0.207 A/ 347 VAC I = 0.154 A/ 480 VAC
6	INRUSH CURRENT	480V/ 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 : 0.18 mA N-FG : 0.19 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 : 8.39 % THD : 10.35 % THD : 16.83 %
		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 : 16.47 %

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER VOLTAGE PROTECTION	CH1 : 195 V ~ 210 V	I/P : 480 VAC I/P : 347 VAC O/P : MIN LOAD Ta : 25°C	200.79 V/ 480VAC 201.61 V/ 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) 860 V (2) 324 V (3) 692 V
2	Diode Peak Voltage	D101 Rated : 3A/600V	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) 560 V (2) 370 V (3) 520 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) 422 V (2) 420 V (3) 428 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 V (2) 19 V (3) 19 V (4) 16.2 (5) 16.4 (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) 892 V (2) 816 V (3) 816 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 : 3.18 mA I/P-FG : 2.942 mA O/P-FG : 1.735 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 : 2.85 GΩ I/P-FG : 1.25 GΩ O/P-FG : 2.14 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:230/347VAC/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℃ 2. HIGH AMBIENT BURN-IN : 1.5 HRS I/P : 347VAC O/P : FULL LOAD Ta= 58.9℃ <table><tr><td>NO</td><td>Position</td><td>ROOM AMBIENT Ta= 34.2 ℃</td><td>HIGH AMBIENT Ta= 58.9 ℃</td></tr><tr><td>1</td><td>BD1</td><td>51.5℃</td><td>75.7℃</td></tr><tr><td>2</td><td>Q1</td><td>57.6℃</td><td>80.9℃</td></tr><tr><td>3</td><td>Q3</td><td>58.8℃</td><td>81.8℃</td></tr><tr><td>4</td><td>T1</td><td>61.5℃</td><td>84.2℃</td></tr><tr><td>5</td><td>C5</td><td>49.9℃</td><td>78.4℃</td></tr><tr><td>6</td><td>RTH2</td><td>53.5℃</td><td>76.9℃</td></tr><tr><td>7</td><td>C102</td><td>56.8℃</td><td>80.1℃</td></tr><tr><td>8</td><td>U2</td><td>54.1℃</td><td>77.6℃</td></tr><tr><td>9</td><td>D101</td><td>59.5℃</td><td>82.7℃</td></tr></table>			NO	Position	ROOM AMBIENT Ta= 34.2 ℃	HIGH AMBIENT Ta= 58.9 ℃	1	BD1	51.5℃	75.7℃	2	Q1	57.6℃	80.9℃	3	Q3	58.8℃	81.8℃	4	T1	61.5℃	84.2℃	5	C5	49.9℃	78.4℃	6	RTH2	53.5℃	76.9℃	7	C102	56.8℃	80.1℃	8	U2	54.1℃	77.6℃	9	D101	59.5℃	82.7℃
NO	Position	ROOM AMBIENT Ta= 34.2 ℃	HIGH AMBIENT Ta= 58.9 ℃																																									
1	BD1	51.5℃	75.7℃																																									
2	Q1	57.6℃	80.9℃																																									
3	Q3	58.8℃	81.8℃																																									
4	T1	61.5℃	84.2℃																																									
5	C5	49.9℃	78.4℃																																									
6	RTH2	53.5℃	76.9℃																																									
7	C102	56.8℃	80.1℃																																									
8	U2	54.1℃	77.6℃																																									
9	D101	59.5℃	82.7℃																																									
2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 528VAC/180VAC O/P : 100 % LOAD Ta= -40 ℃	TEST : OK																																								
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 60℃ NO DAMAGE	I/P : 531 VAC O/P : FULL LOAD Ta= 60 ℃ HUMIDITY= 95 %R.H	TEST : OK																																								
4	TEMPERATURE COEFFICIENT	±0.03%(0~50℃)	I/P : 347 VAC O/P : FULL LOAD	± 0 %(0~50℃)																																								
5	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45℃~ +90℃ 2. Temperature change rate : 25℃ / 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℃~ +65℃ 2. Temperature change rate : 25℃ / 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℃		TEST : OK																																								

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