



Test Report: HVGC-100-350

100W Constant Current Mode LED Driver

■ 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
1	CURRENT TOLERANCE	± 5%	I/P : 347VAC O/P : CV MODE : 29V-284V Ta : 25°C	-0.6%- 0.6%
2	CONSTANT CURRENT REGION	29V-285V	I/P : 347 VAC O/P : CV LOAD Ta : 25°C	O/P=29V : 0.352A O/P=284V : 0.352A
3	OUTPUT CURRENT ADJUST RANGE	CH1 : 210mA~ 350mA	I/P : 480 VAC I/P : 347 VAC O/P : CV MODE : 284V Ta : 25°C	0.176 A- 0.383 A/ 480 VAC 0.176 A- 0.381 A/ 347 VAC
4	CURRENT RIPPLE	5.0% max. @rated current	I/P : 230VAC O/P : LED : 142.5V-284V Ta : 25°C	LED=142.5V 3.1 % LED=284V 2.9 %
5	SET UP TIME	480 VAC : 500 ms (Max) 347VAC : 500 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/ 312 ms 347VAC/ 352 ms 230 VAC/ 360 ms
6	OVER/UNDERSHOOT TEST	< ±5%	I/P : 347 VAC O/P : FULL LOAD Ta : 25°C	TEST : <5 %

7

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	10K	20K	30K	40K	50K	60K	70K	80K	90K	100K
Output current	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

*1 ~ 10V dimming function for output current adjustment (Typical)

Dimming value	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V
Output current	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

*10V PWM signal for output current adjustment (Typical)

Duty value	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Output current	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

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	0.000A	0.034A	0.068A	0.103A	0.139A	0.173A	0.209A	0.241A	0.277A	0.313A	0.348A	0.3632A
	%	0.00%	9.71%	19.43%	29.43%	39.71%	49.43%	59.71%	68.86%	79.14%	89.43%	99.43%	103.77%
2	Dimming value	SHORT	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN
	Output current	0.000A	0.035A	0.070A	0.104A	0.139A	0.175A	0.210A	0.245A	0.281A	0.316A	0.352A	0.3632A
	%	0.00%	10.00%	20.00%	29.71%	39.71%	50.00%	60.00%	70.00%	80.29%	90.29%	100.57%	103.77%
3	Duty value	SHORT	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
	Output current	0.000A	0.036A	0.072A	0.107A	0.142A	0.178A	0.212A	0.247A	0.283A	0.318A	0.353A	0.3632A
	%	0.00%	10.29%	20.57%	30.57%	40.57%	50.86%	60.57%	70.57%	80.86%	90.86%	100.86%	103.77%

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	180VAC~528 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C	159V~528V
			I/P : LOW-LINE-3V=177V HIGH-LINE+3V=531 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= 0.994 / 230 VAC
		0.98 / 277VAC(TYP)	I/P : 277VAC	PF= 0.994 / 277 VAC
		0.97 /347 VAC(TYP)	I/P : 347VAC	PF= 0.981 / 347VAC
		0.93 / 480 VAC(TYP)	I/P : 480VAC O/P : FULL LOAD Ta : 25°C	PF= 0.949 / 480VAC
4	EFFICIENCY	91 % (TYP)	I/P : 347 VAC O/P : FULL LOAD Ta : 25°C	92.12 %
5	INPUT CURRENT	347V/ 0.38 A (TYP)	I/P : 347 VAC	I = 0.32 A/ 347 VAC
		480V/ 0.28 A (TYP)	I/P : 480 VAC O/P : FULL LOAD Ta : 25°C	I = 0.26 A/ 480 VAC
6	INRUSH CURRENT	480V/ 25 A (TYP) (twidth=900μ s measured at 50% I _{peak}) at 480VAC; Per NEMA 410	I/P : 480VAC O/P : FULL LOAD Ta : 25°C	I = 20 A/ 480VAC T50= 353 us
7	LEAKAGE CURRENT	< 0.75 mA / 480 VAC	I/P : 480 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.32 mA N-FG : 0.30 mA
8	TOTAL HARMONIC DISTORTION	Total harmonic distortion will be lower than 20% when output loading is 50% or higher at 230VAC / 277VAC / 347VAC	I/P : 230VAC I/P : 277VAC I/P : 347VAC O/P : 50% LOAD Ta : 25°C	THD : 11.7 THD : 13.6 THD : 16.9
		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 : 15.88

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER VOLTAGE PROTECTION	CH1 : 300 V ~ 320 V	I/P : 480 VAC I/P : 347 VAC O/P : MIN LOAD Ta : 25°C	309.63 V/ 480VAC 308.75 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) 531 V (2) 354 V (3) 530 V
2	Diode Peak Voltage	D100 Rated : 3A/1KV	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) 803 V (3) V
3	Input Capacitor Voltage	C5 Rated : 56u/400V	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) 414 V (2) 410 V (3) 414 V
4	Control IC Voltage Test	U1 Rated : 10.3V~22.5V	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) 17.221 V (2) 17.043 V (3) 17.043 V
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) 864 V (2) 791 V (3) 802 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 : 3.29 mA I/P-FG : 2.159 mA O/P-FG : 3.57 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 : 10.8 GΩ I/P-FG : 10.48 GΩ O/P-FG : 17 GΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta : 25°C / 70%RH	13 mΩ

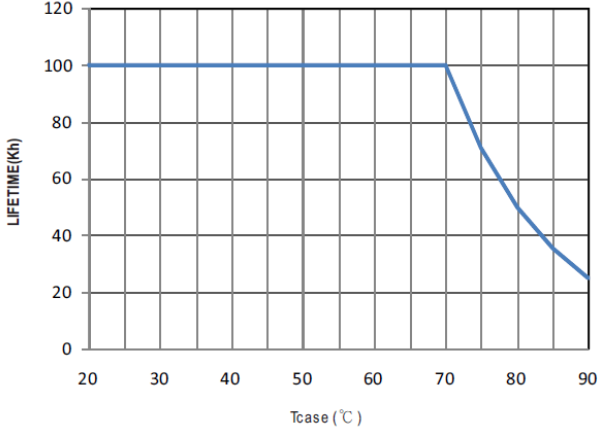
E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS C	I/P:230/380VAC/50HZ O/P:100/50%ELECTRONIC LOAD O/P:100% LED LOAD Ta:25°C	PASS
2	CONDUCTION	EN55015 CLASS B FCC Part 15 Subpart B	I/P: 230/380VAC (50HZ/60HZ) O/P:FULL/50% LOAD Ta:25°C	PASS Test by certified Lab
3	RADIATION	EN55015 CLASS B FCC Part 15 Subpart B	I/P: 230/380 VAC(50HZ/60HZ) O/P:FULL LOAD/50% LOAD Ta:25°C	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 LIGHT INDUSTRY AIR:8KV / Contact:4KV	I/P:230/380VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT : 1KV	I/P: 230/380 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: 230/380 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-100-700 1. ROOM AMBIENT BURN-IN : 2.5 HRS I/P : 347VAC O/P : FULL LOAD Ta=32 °C 2. HIGH AMBIENT BURN-IN : 4 HRS I/P : 347VAC O/P : FULL LOAD Ta= 63 °C	<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 32 °C</th> <th>HIGH AMBIENT Ta= 63 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>LF2</td><td>51.1°C</td><td>75.9°C</td></tr> <tr><td>2</td><td>BD1</td><td>51.8°C</td><td>76.4°C</td></tr> <tr><td>3</td><td>C46</td><td>51.6°C</td><td>76.8°C</td></tr> <tr><td>4</td><td>L1</td><td>52.8°C</td><td>77.6°C</td></tr> <tr><td>5</td><td>D2</td><td>58.3°C</td><td>84.7°C</td></tr> <tr><td>6</td><td>C5</td><td>55.7°C</td><td>80.3°C</td></tr> <tr><td>7</td><td>Q3</td><td>55.0°C</td><td>80.5°C</td></tr> <tr><td>8</td><td>T3</td><td>56.1°C</td><td>81.5°C</td></tr> <tr><td>9</td><td>T1</td><td>62.2°C</td><td>86.4°C</td></tr> <tr><td>10</td><td>C203</td><td>59.2°C</td><td>83.5°C</td></tr> <tr><td>11</td><td>RTH2</td><td>52.4°C</td><td>77.6°C</td></tr> <tr><td>12</td><td>C85</td><td>52.6°C</td><td>77.4°C</td></tr> <tr><td>13</td><td>U2</td><td>52.3°C</td><td>77.0°C</td></tr> <tr><td>14</td><td>C103</td><td>54.0°C</td><td>78.6°C</td></tr> <tr><td>15</td><td>C106</td><td>50.0°C</td><td>75.5°C</td></tr> <tr><td>16</td><td>LF100</td><td>51.3°C</td><td>76.4°C</td></tr> <tr><td>17</td><td>D100</td><td>59.2°C</td><td>83.9°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 32 °C	HIGH AMBIENT Ta= 63 °C	1	LF2	51.1°C	75.9°C	2	BD1	51.8°C	76.4°C	3	C46	51.6°C	76.8°C	4	L1	52.8°C	77.6°C	5	D2	58.3°C	84.7°C	6	C5	55.7°C	80.3°C	7	Q3	55.0°C	80.5°C	8	T3	56.1°C	81.5°C	9	T1	62.2°C	86.4°C	10	C203	59.2°C	83.5°C	11	RTH2	52.4°C	77.6°C	12	C85	52.6°C	77.4°C	13	U2	52.3°C	77.0°C	14	C103	54.0°C	78.6°C	15	C106	50.0°C	75.5°C	16	LF100	51.3°C	76.4°C	17	D100	59.2°C	83.9°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	± 0.02 %(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 : -45°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
8	CAPACITOR LIFE CYCLE	HVGC-100-700:SUPPOSE C103 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) 630750HRS (2) 177384HRS (3) 218494HRS (4) 278581HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 186.1K hrs min. MIL-HDBK-217F (25°C)	
10	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 50,000 hours @ Tcase 80°C 	

RESULT	TESTER	REVIEW	APPROVAL
PASS	DANIEL GAO	SANFORD SU	VINCENT TSENG

12.10.30 A50-F031