



# Test Report: GSC40E-500

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40W 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

## DESIGN VERIFY TEST

### OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	RIPPLE & NOISE(Max)	V1: 8Vp-p (Max)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	V1: 3.5 Vp-p
2	CURRENT ACCURACY	±8%	I/P: 230 VAC I/P:115VAC O/P:FULL LOAD Ta:25°C	7.17 %
3	SET UP TIME	230VAC/ 500 ms (Max) 115VAC/ 1000ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 120 ms 115 VAC/ 260 ms
4	OVER/UNDERSHOOT TEST	< ±15%	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	TEST: < 15 %
5	NO LOAD OUTPUT VOLTAGE (max.)	100V	I/P: 230 VAC O/P:NO LOAD Ta:25°C	92V

### INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	90VAC~277 VAC	I/P:TESTING O/P:FULL LOAD Ta:25°C	65V~277 V
			I/P: (1)LOW-LINE-3V=87 V HIGH-LINE=300 V O/P:FULL/MIN LOAD ON: 30 Sec . OFF: 30 Sec 10MIN ( POWER ON/OFF NO DAMAGE ) (2) I/P:230Vac ON: 0.5 Sec . OFF: 0.5 Sec 20MIN	(1).TEST: OK (2).TEST : OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P: 90 VAC ~277VAC O/P:FULL~MIN LOAD Ta:25°C	OK
3	POWER FACTOR(TYP)	0.92/230 VAC FULL LOAD 0.98/115 VAC FULL LOAD 0.91/277 VAC FULL LOAD	I/P: 230 VAC/115VAC/277VAC O/P:FULL LOAD Ta:25°C	PF= 0.956 / 230V/100%LOAD PF= 0.989 / 115V/100%LOAD PF= 0.929 / 277V/100%LOAD
4	EFFICIENCY (TYP)	89.5 %	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	91%
5	INPUT CURRENT (TYP)	277VAC/ 0.25A 230 VAC/ 0.35A 115 VAC/ 0.7 A	I/P: 277VAC/230 VAC/115 VAC O/P:FULL LOAD Ta:25°C	I= 0.172A / 277VAC I =0.196A/ 230VAC I = 0.37A/ 115VAC
6	INRUSH CURRENT (TYP)	230 V/ 17A COLD START  (twidh=110us measured at 50% Ipeak) COLD START	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	I = 15.3 A/ 230VAC  T50= 110 us

7	TOTAL HARMONIC DISTORTION	Total harmonic distortion will be lower than 20% when output loading is 75% or higher	I/P : 230VAC I/P : 277VAC I/P : 115VAC O/P : 75% LOAD Ta : 25°C	THD: 16.5 % THD: 16.49 % THD: 13.03 %
8	NO LOAD POWER CONSUMPTION	< 0.15 W	I/P : 240VAC O/P : NO LOAD Ta : 25°C	< 0.1 W

## PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 277VAC O/P: FULL LOAD Ta:25°C	NO DAMAGE Hiccup Mode

## COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated 6A/650V	I/P:High-Line +3V =280V O/P: (1)Full Load input on/off (2)Output Short Ta:25°C	Q1 VDS (1) 592 V (2) 520 V
2	Diode Peak Voltage	D100 Rated 4A/600V	I/P:High-Line +3V = 280 V O/P: (1)Full Load input on/off (2)Output Short (3)NO LOAD Ta:25°C	(1) 354 V (2) 394 V (3) 332 V
3	Control IC Voltage Test	U 1 Rated 9V~30V	I/P:High-Line +3V =280 V O/P:(1) FULL LOAD (2)SHORT (3)NO LOAD (4)NO LOAD(Low LINE) Ta:25°C	(1) 26.3 V (2) 6.7~17.7 V (3) 6.6~28 V (4) 6.6~28 V

## SAFETY & EMC TEST

### SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	IEC60950-1 I/P-O/P: 3.75KVAC/min	I/P-O/P: 4.125 KVAC/min Ta:25°C	I/P-O/P: 1.52 mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ	I/P-O/P: 500 VDC Ta:25°C	I/P-O/P: 30 GΩ NO DAMAGE
3	LEAKAGE CURRENT	IEC60950-1 < 0.5mA / 240VAC	I/P: 240 VAC O/P:Min LOAD Ta:25°C	L-FG: 0.002 mA N-FG: 0.002 mA

## E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS A CLASS C	I/P: 230VAC/50HZ O/P:100%/50% LED LOAD I/P :277VAC 60HZ O/P:100/75% LED LOAD Ta:25°C	PASS
2	CONDUCTION	EN55015 CLASS B	I/P: 230 VAC (50HZ) O/P:FULL/50% LOAD Ta:25°C	PASS Test by certified Lab
3	RADIATION	EN55015 CLASS B	I/P: 230 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 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 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A
6	SURGE	IEC61000-4-5 LIGHT INDUSTRY L-N :1KV	I/P: 230 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 : GSC40E-1400 1. ROOM AMBIENT BURN-IN : 2.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 29 °C 2. HIGH AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 47.8 °C																																						
			<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta=29°C</th> <th>HIGH AMBIENT Ta=47.8°C</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Q1</td> <td>77.4°C</td> <td>92.3°C</td> </tr> <tr> <td>2</td> <td>T1</td> <td>82.0°C</td> <td>96.2°C</td> </tr> <tr> <td>3</td> <td>C101</td> <td>65.2°C</td> <td>80.4°C</td> </tr> <tr> <td>4</td> <td>D100</td> <td>68.0°C</td> <td>83.2°C</td> </tr> <tr> <td>5</td> <td>L2</td> <td>69.3°C</td> <td>84.1°C</td> </tr> <tr> <td>6</td> <td>D3</td> <td>69.1°C</td> <td>84.3°C</td> </tr> <tr> <td>7</td> <td>C40</td> <td>68.1°C</td> <td>83.3°C</td> </tr> <tr> <td>8</td> <td>U1</td> <td>67.3°C</td> <td>81.9°C</td> </tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta=29°C	HIGH AMBIENT Ta=47.8°C	1	Q1	77.4°C	92.3°C	2	T1	82.0°C	96.2°C	3	C101	65.2°C	80.4°C	4	D100	68.0°C	83.2°C	5	L2	69.3°C	84.1°C	6	D3	69.1°C	84.3°C	7	C40	68.1°C	83.3°C	8	U1	67.3°C	81.9°C	
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2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 230VAC/90VAC O/P : 100 % LOAD Ta= -35 °C	TEST : OK																																				
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C NO DAMAGE	I/P : 305 VAC O/P : FULL LOAD Ta= 50 °C HUMIDITY= 95 %R.H	TEST : OK																																				



# 40W Single Output LED Power Supply

# GSC40E series

4	TEMPERATURE COEFFICIENT	$\pm 0.03\%/^{\circ}\text{C}$ (0~50 $^{\circ}\text{C}$ )	I/P : 230 VAC O/P : FULL LOAD	$\pm 0.00153\%/^{\circ}\text{C}$ (0~50 $^{\circ}\text{C}$ )
5	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45 $^{\circ}\text{C}$ ~ +90 $^{\circ}\text{C}$ 2. Temperature change rate : 25 $^{\circ}\text{C}$ / 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 : -35 $^{\circ}\text{C}$ ~ +55 $^{\circ}\text{C}$ 2. Temperature change rate : 25 $^{\circ}\text{C}$ / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 10 CYCLE 5. Input/Output condition : 230VAC/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 : 2G (5) Test Time : 72min in each axis (X.Y.Z) (6) Ta : 25 $^{\circ}\text{C}$		TEST : OK
8	CAPACITOR LIFE CYCLE	SUPPOSE C101 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25 $^{\circ}\text{C}$ LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta= 50 $^{\circ}\text{C}$ LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 50 $^{\circ}\text{C}$ LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 50 $^{\circ}\text{C}$ LIFE TIME		(1) 175883 HRS (2) 36486 HRS (3) 49839 HRS (4) 73908 HRS
9	MTBF	MIL-HDBK-217F TOTAL FAILURE RATE : 358.9 KHRS		
10	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 30,000 hours @ Tcase 75 $^{\circ}\text{C}$ ; 50,000 hours @ Tcase70 $^{\circ}\text{C}$		

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	DANIEL GAO	SANFORD SU	VINCENT ZENG

12.10.30 A50-F031