



# Test Report: ELG-100U-48

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100W Constant Voltage+Constant Current 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

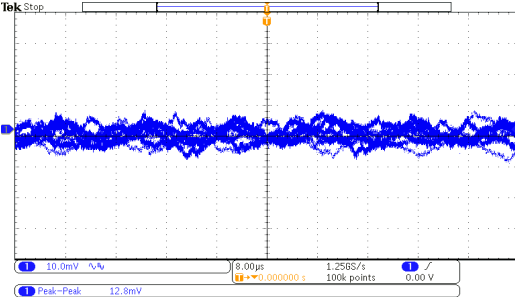
Environment Test

## DESIGN VERIFY TEST

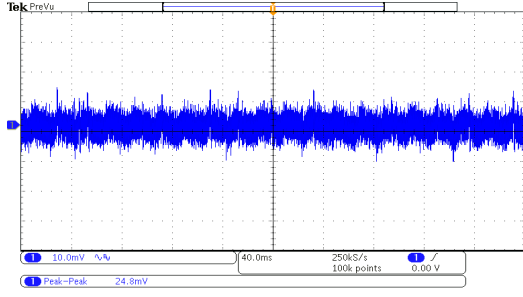
### OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CONSTANT CURRENT REGION	24V~48V	I/P: 230VAC O/P: LED MODE Ta: 25°C	9.6V~48V
2	OUTPUT VOLTAGE ADJUST RANGE (For A-Type only)	43.2V~52.8V	I/P: 230VAC O/P: NO LOAD Ta: 25°C	41.91V~55.01V
3	OUTPUT CURRENT ADJUST RANGE (For A-Type only)	1.0A~2.0A (For A-Type only)	I/P: 230VAC O/P: SETTING Ta: 25°C	0.598A~2.173A
4	OUTPUT VOLTAGE TOLERANCE	-2.0%~+2.0%	I/P: 100VAC / 305VAC O/P: FULL/ NO LOAD Ta: 25°C	-0.25%~0.416%
5	LINE REGULATION	-0.5%~+0.5%	I/P: 100VAC ~ 305VAC O/P: FULL LOAD Ta: 25°C	-0.25%~0.04%
6	LOAD REGULATION	-0.5%~+0.5%	I/P: 230VAC O/P: FULL ~NO LOAD Ta: 25°C	-0.1%~0.16%
7	OVER/UNDERSHOOT TEST	$\pm 5\%$	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	$\pm 0.5\%$
8	RIPPLE & NOISE (Max)	250mVp-p	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	24.8mVp-p

high frequency :



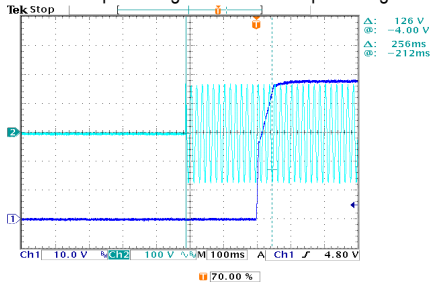
low frequency :



9	SET UP TIME(Max)	120VAC/ 1000ms 230VAC/ 500ms	I/P: 120 VAC I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	120VAC/ 256ms 230VAC/ 312ms
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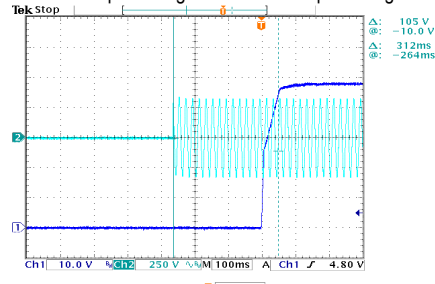
INPUT=120VAC/50HZ @ FULL LOAD

CH1: Output Voltage CH2: AC Input Voltage



INPUT=230VAC/50HZ @ FULL LOAD

CH1: Output Voltage CH2: AC Input Voltage

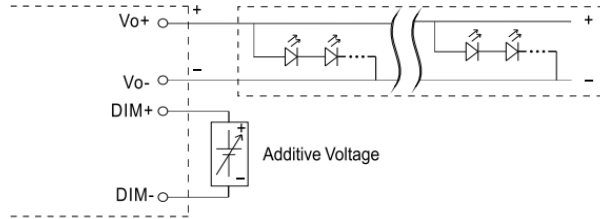


<p>10 RISE TIME (Max)</p>	<p>120VAC/ 80ms 230VAC/ 100ms</p>	<p>I/P: 120 VAC I/P: 230 VAC O/P: FULL LOAD Ta: 25°C</p>	<p>120VAC/ 43.6 ms 230VAC/ 45.6 ms</p>
<p>INPUT=120VAC/50HZ @ FULL LOAD CH1: Output Voltage</p>		<p>INPUT=230VAC/50HZ @ FULL LOAD CH1: Output Voltage</p>	
<p>11 HOLD UP TIME(Typ )</p>	<p>120VAC/ 15ms 230VAC/ 10ms</p>	<p>I/P: 120 VAC I/P: 230 VAC O/P: FULL LOAD Ta: 25°C</p>	<p>120VAC/ 20.8 ms 230VAC/ 31.6 ms</p>
<p>INPUT=120VAC/50HZ @ FULL LOAD CH1: Output Voltage CH2: AC Input Voltage</p>		<p>INPUT=230VAC/50HZ @ FULL LOAD CH1: Output Voltage CH2: AC Input Voltage</p>	
<p>12 DYNAMIC LOAD</p>	<p>V1: 2400 mVp-p</p>	<p>I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta: 25°C</p>	<p>(1) 284mVp-p (2) 248mVp-p</p>
<p>FULL /50% LOAD 50%DUTY / 120HZ</p>		<p>FULL /50% LOAD 50%DUTY / 1KHZ</p>	

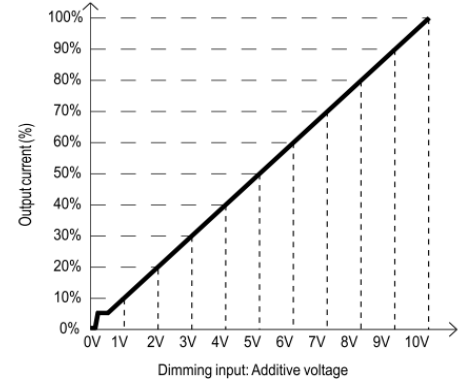
13 DIMMING TEST  
(For B-Type only)

•Output constant current level can be adjusted by applying one of the three methodologies between DIM+ and DIM-:  
 0 ~ 10Vdc, or 10V PWM signal or resistance.  
 •Direct connecting to LEDs is suggested. It is not suitable to be used with additional drivers.  
 •Dimming source current from power supply: 100uA (typ.)

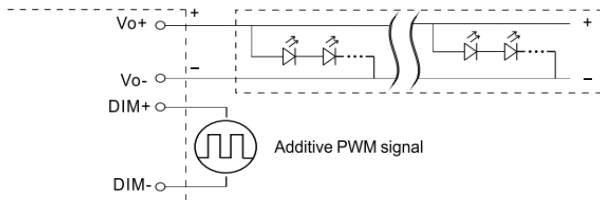
⊙ Applying additive 0 ~ 10VDC



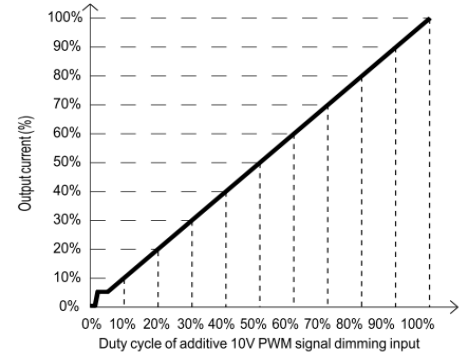
"DO NOT connect "DIM- to Vo-"



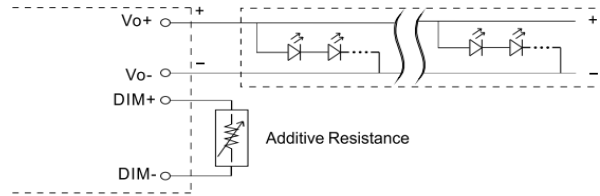
⊙ Applying additive 10V PWM signal (frequency range 100Hz ~ 3KHz):



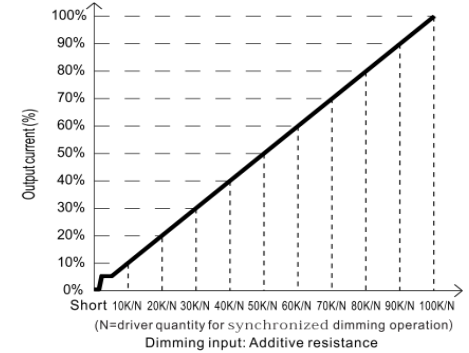
"DO NOT connect "DIM- to Vo-"



⊙ Applying additive resistance:



"DO NOT connect "DIM- to Vo-"



Note : 1. Min. dimming level is about 8% and the output current is not defined when 0% < Iout < 8%.  
 2. The output current could drop down to 0% when dimming input is about 0kΩ or 0Vdc, or 10V PWM signal with 0% duty cycle.

I/P: 230 VAC  
 O/P: DIMMING TEST  
 Ta: 25°C

	R	0K	10K	20K	30K	40K	50K	60K	70K	80K	90K	100K	OPEN
1	Output Current	0	0.1772	0.3917	0.6067	0.8224	1.0368	1.2530	1.4721	1.6917	1.8755	2.0447	2.0465
	%	0%	8.86%	19.59%	30.34%	41.12%	51.84%	62.65%	73.61%	84.59%	93.78%	102.24%	102.33%
2	V	0V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN
	Output Current	0	0.1786	0.3924	0.5928	0.8093	1.0169	1.2355	1.4490	1.6562	1.8702	2.0434	2.0456
	%	0%	8.93%	19.62%	29.64%	40.47%	50.85%	61.78%	72.45%	82.81%	93.51%	102.17%	102.28%
3	PWM(100Hz)	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
	Output Current	0	0.1699	0.3796	0.5905	0.8012	1.0117	1.2226	1.4348	1.6474	1.8597	2.0472	2.0499
	%	0%	8.50%	18.98%	29.53%	40.06%	50.59%	61.13%	71.74%	82.37%	92.99%	102.36%	102.50%

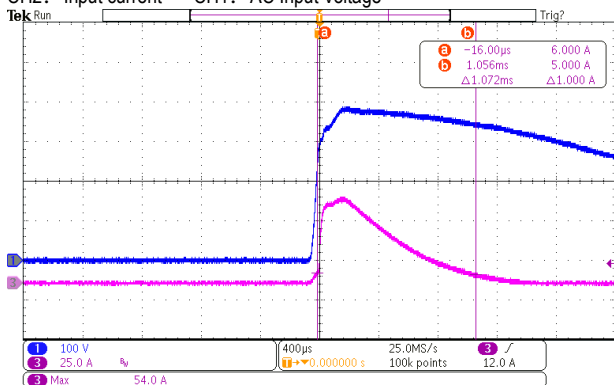
TEST RESULT: OK

## INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	100VAC~305VAC	I/P: TESTING O/P: FULL LOAD Ta: 25°C	97 V~ 305 V
			I/P: (1)LOW-LINE-3V=97 V HIGH-LINE+10V=315 V O/P: FULL/MIN LOAD ON: 30 Sec OFF: 30 Sec 10MIN (2)230VAC ON: 0.5 Sec OFF: 0.5 Sec 20MIN ( POWER ON/OFF NO DAMAGE )	TEST: OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P: 100 VAC ~305 VAC O/P: FULL~NO LOAD Ta: 25°C	TEST: OK
3	AC CURRENT	0.5A/277VAC 0.6A/230VAC 1.1A/120VAC	I/P: 277 VAC I/P: 230 VAC I/P: 120 VAC O/P: FULL LOAD Ta: 25°C	I = 0.37 A/ 277VAC I = 0.44 A/ 230VAC I = 0.85 A/ 120VAC
4	LEAKAGE CURRENT	< 0.75mA / 277VAC	I/P: 277 VAC O/P: NO LOAD Ta: 25°C	L-FG: 0.324 mA N-FG: 0.330 mA
5	NO LOAD/STANDBY POWER CONSUMPTION	< 0.5W	I/P: 230VAC O/P: NO LOAD Ta: 25°C	0.3214 W/ 230VAC
6	INRUSH CURRENT(Typ)	277VAC/ 60A Twidth =1.4ms measured at 10% Ipeak, Twidth =620us measured at 50% Ipeak,  COLD START	I/P: 277 VAC O/P: FULL LOAD Ta: 25°C	I = 54 A/ 277VAC Twidth =1056 us/10% Ipeak Twidth =548 us/50% Ipeak

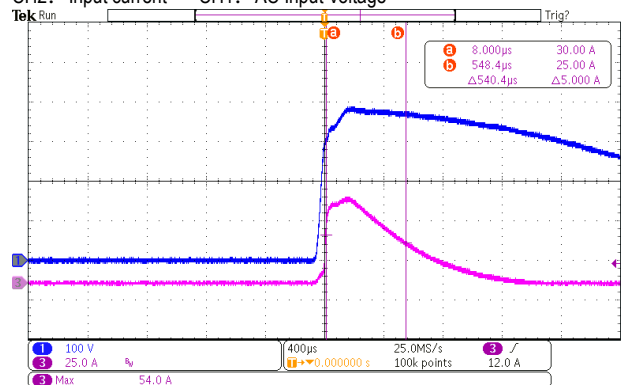
INPUT=277VAC/50HZ @ FULL LOAD

CH2: Input current CH1: AC Input Voltage



INPUT=277VAC/50HZ @ FULL LOAD

CH2: Input current CH1: AC Input Voltage



7	EFFICIENCY(Typ)	90%	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	91.18%																												
<p><b>EFFICIENCY vs LOAD</b></p> <table border="1"> <caption>Efficiency vs Load Data</caption> <thead> <tr> <th>LOAD (%)</th> <th>277V (%)</th> <th>230V (%)</th> <th>120V (%)</th> </tr> </thead> <tbody> <tr><td>50%</td><td>90.0</td><td>89.5</td><td>89.0</td></tr> <tr><td>60%</td><td>90.5</td><td>90.0</td><td>89.5</td></tr> <tr><td>70%</td><td>91.0</td><td>90.5</td><td>89.0</td></tr> <tr><td>80%</td><td>91.5</td><td>91.0</td><td>89.0</td></tr> <tr><td>90%</td><td>91.5</td><td>91.0</td><td>88.5</td></tr> <tr><td>100%</td><td>91.8</td><td>91.5</td><td>88.5</td></tr> </tbody> </table>					LOAD (%)	277V (%)	230V (%)	120V (%)	50%	90.0	89.5	89.0	60%	90.5	90.0	89.5	70%	91.0	90.5	89.0	80%	91.5	91.0	89.0	90%	91.5	91.0	88.5	100%	91.8	91.5	88.5
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8	POWER FACTOR	0.92/ 277VAC 0.95/ 230VAC 0.97/ 120VAC	I/P: 277 VAC I/P: 230 VAC I/P: 120 VAC O/P: FULL LOAD Ta: 25°C	PF= 0.950 / 277VAC PF= 0.980 / 230VAC PF= 0.996 / 120VAC																												
<p><b>P.F vs LOAD</b></p> <table border="1"> <caption>P.F vs Load Data</caption> <thead> <tr> <th>LOAD (%)</th> <th>277V</th> <th>230V</th> <th>120V</th> </tr> </thead> <tbody> <tr><td>50%</td><td>0.86</td><td>0.94</td><td>0.99</td></tr> <tr><td>60%</td><td>0.89</td><td>0.955</td><td>0.995</td></tr> <tr><td>70%</td><td>0.915</td><td>0.965</td><td>0.995</td></tr> <tr><td>80%</td><td>0.93</td><td>0.97</td><td>0.995</td></tr> <tr><td>90%</td><td>0.94</td><td>0.975</td><td>0.995</td></tr> <tr><td>100%</td><td>0.95</td><td>0.98</td><td>0.995</td></tr> </tbody> </table>					LOAD (%)	277V	230V	120V	50%	0.86	0.94	0.99	60%	0.89	0.955	0.995	70%	0.915	0.965	0.995	80%	0.93	0.97	0.995	90%	0.94	0.975	0.995	100%	0.95	0.98	0.995
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9	TOTAL HARMONIC DISTORTION	THD < 20% ( @load ≥ 50%/120VAC, @load ≥ 60%/230VAC, @load ≥ 75%/277VAC )	I/P: 120 VAC/50% LOAD I/P: 230 VAC/60% LOAD I/P: 277 VAC/75% LOAD Ta: 25°C	THD=6.97% @50% load /120VAC THD=14.71% @60% load /230VAC THD=19.78% @75% load /277VAC																												
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**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER CURRENT PROTECTION	95%~108%	I/P: 100VAC I/P: 230VAC I/P: 305VAC O/P: TESTING Ta: 25°C	100 %/ 100VAC 100 %/ 230VAC 100 %/ 305VAC Constant Current Limiting, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	54V~62V	I/P: 100VAC I/P: 230VAC I/P: 305VAC O/P: NO LOAD Ta: 25°C	57.52V/ 308VAC 57.50V/ 230VAC 57.66V/ 120VAC Shut down output voltage, re-power on to recovery
3	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 100VAC I/P: 230VAC I/P: 305VAC O/P: FULL LOAD	O.T.P. Active Shut down output voltage with auto-recovery or re-power on to recover
4	SHORT CIRCUIT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 100VAC I/P: 305VAC O/P: FULL LOAD Ta: 25°C	NO DAMAGE Hiccup mode, recovers automatically after fault condition is removed

**COMPONENT STRESS TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Power Transistor	Q 2 Rated 800V/5.7A	I/P: High-Line +3V =308V O/P: (1) Full Load Turn on (2) Output Short (3) Full load continue Ta: 25°C	(1) 672 V (2) 536 V (3) 668 V
2	O/P Diode (MOSFET)	Q101 Rated 300V/20A	I/P: High-Line +3V =308V O/P: (1) Full Load Turn on (2) Output Short (3) Full load continue Ta: 25°C	(1) 172 V (2) 124 V (3) 168 V
3	Input Capacitor	C5 Rated 100u/ 450V	I/P: High-Line +3V =308 V O/P: (1) Full Load input on/off (2) NO LOAD input on /Off (3) Full Load /NO LOAD Change Ta: 25°C	(1) 444 V (2) 444 V (3) 442 V
4	Control IC	U1 Rated 28V (MAX.)	I/P: High-Line +3V =308 V O/P: ((1) FULL LOAD (2) Output Short (3) O.L.P (4) O.V.P (5) Low Line No Load Vo(min) Ta: 25°C	(1) 17.2 V (2) 15.1 V (3) 15.2 V (4) 17.1 V (5) 17.2 V

5	PFC Power Transistor	Q 1 Rated 600V/10A	I/P: High-Line +3V =308V O/P: (1) Full Load Turn on (2) Output Short (3) Full load continue Ta: 25°C	(1) 494 V (2) 452 V (3) 491 V
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## SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3.75KVAC/min I/P-FG: 2.0KVAC/min O/P-FG: 1.5KVAC/min	I/P-O/P: 4.125 KVAC/min I/P-FG: 2.4 KVAC/min O/P-FG: 1.8 KVAC/min Ta: 25°C	I/P-O/P: 3.232 mA I/P-FG: 2.866 mA O/P-FG: 2.424 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	I/P-O/P: >9999 MΩ I/P-FG: >9999 MΩ O/P-FG: >9999 MΩ
3	GROUNDING CONTINUITY	IEC60950-1 FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	17mΩ

## E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CONDUCTION	FCC PART 15 CLASS B	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS Test by certified Lab
2	RADIATION	FCC PART 15 CLASS B	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS Test by certified Lab
3	E.S.D	EN61000-4-2 LIGHT INDUSTRY AIR: 8KV Contact: 4KV	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS
4	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT: 1KV	I/P: 230VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS
5	SURGE	EN61000-4-5 LIGHT INDUSTRY L-N: 1KV L,N-PE: 2KV	I/P: 230VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS
6	Test by certified Lab & Test Report Prepare			



## RELIABILITY TEST

### ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																																																												
1	TEMPERATURE RISE TEST	MODEL: ELG-100U-48 1. ROOM AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta=27.8 °C 2. HIGH AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta=59.4°C																																																																																														
				<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta=27.8 °C</th> <th>HIGH AMBIENT Ta=59.4 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>LF2</td><td>53.6°C</td><td>82.9°C</td></tr> <tr><td>2</td><td>L1</td><td>55.5°C</td><td>84.9°C</td></tr> <tr><td>3</td><td>L2</td><td>55.0°C</td><td>84.1°C</td></tr> <tr><td>4</td><td>ZNR2</td><td>57.7°C</td><td>86.1°C</td></tr> <tr><td>5</td><td>C11</td><td>55.3°C</td><td>84.9°C</td></tr> <tr><td>6</td><td>BD1</td><td>56.8°C</td><td>85.8°C</td></tr> <tr><td>7</td><td>Q1</td><td>55.8°C</td><td>85.6°C</td></tr> <tr><td>8</td><td>Q2</td><td>57.6°C</td><td>87.3°C</td></tr> <tr><td>9</td><td>D6</td><td>57.0°C</td><td>87.0°C</td></tr> <tr><td>10</td><td>D10</td><td>61.9°C</td><td>92.0°C</td></tr> <tr><td>11</td><td>U1</td><td>55.3°C</td><td>84.9°C</td></tr> <tr><td>12</td><td>R7</td><td>62.0°C</td><td>91.6°C</td></tr> <tr><td>13</td><td>C5</td><td>54.4°C</td><td>83.7°C</td></tr> <tr><td>14</td><td>T1</td><td>60.3°C</td><td>89.4°C</td></tr> <tr><td>15</td><td>U100</td><td>52.1°C</td><td>81.6°C</td></tr> <tr><td>16</td><td>Q101</td><td>59.8°C</td><td>89.2°C</td></tr> <tr><td>17</td><td>C205</td><td>56.3°C</td><td>85.8°C</td></tr> <tr><td>18</td><td>C105</td><td>56.9°C</td><td>86.6°C</td></tr> <tr><td>19</td><td>C106</td><td>55.9°C</td><td>85.5°C</td></tr> <tr><td>20</td><td>C108</td><td>54.1°C</td><td>83.8°C</td></tr> <tr><td>21</td><td>RTH3</td><td>54.0°C</td><td>83.3°C</td></tr> <tr><td>22</td><td>TC</td><td>49.3°C</td><td>78.5°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta=27.8 °C	HIGH AMBIENT Ta=59.4 °C	1	LF2	53.6°C	82.9°C	2	L1	55.5°C	84.9°C	3	L2	55.0°C	84.1°C	4	ZNR2	57.7°C	86.1°C	5	C11	55.3°C	84.9°C	6	BD1	56.8°C	85.8°C	7	Q1	55.8°C	85.6°C	8	Q2	57.6°C	87.3°C	9	D6	57.0°C	87.0°C	10	D10	61.9°C	92.0°C	11	U1	55.3°C	84.9°C	12	R7	62.0°C	91.6°C	13	C5	54.4°C	83.7°C	14	T1	60.3°C	89.4°C	15	U100	52.1°C	81.6°C	16	Q101	59.8°C	89.2°C	17	C205	56.3°C	85.8°C	18	C105	56.9°C	86.6°C	19	C106	55.9°C	85.5°C	20	C108	54.1°C	83.8°C	21	RTH3	54.0°C	83.3°C	22	TC	49.3°C	78.5°C
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2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 305VAC/120VAC/100VAC O/P: FULL LOAD/70% LOAD Ta= -45°C / -30°C	TEST: OK																																																																																												
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 55°C NO DAMAGE	I/P: 305VAC O/P: FULL LOAD Ta=55°C HUMIDITY= 95 %R.H	TEST: OK																																																																																												
4	TEMPERATURE COEFFICIENT	±0.03 %/°C (0~60°C)	I/P: 230 VAC O/P: FULL LOAD	±0.002 %/°C (0~60°C)																																																																																												
5	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature: -45°C~ +85°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		TEST: OK																																																																																												



6	THERMAL SHOCK TEST	1. Thermal shock Temperature: $T_{case} = -45^{\circ}\text{C} \sim +90^{\circ}\text{C}$ 2. Temperature change rate : $25^{\circ}\text{C} / \text{MIN}$ 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 AC on 3 sec/AC off 1 sec TEST	TEST: 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) $T_a$ : $25^{\circ}\text{C}$	TEST: OK
8	CAPACITOR LIFE CYCLE	ELG-100U-48: SUPPOSE C106 IS THE MOST CRITICAL COMPONENT (1) I/P: 230VAC O/P: FULL LOAD $T_c = 75^{\circ}\text{C}$ LIFE TIME (2) I/P: 230VAC O/P: 75% LOAD $T_c = 75^{\circ}\text{C}$ LIFE TIME (3) I/P: 230VAC O/P: 50% LOAD $T_c = 75^{\circ}\text{C}$ LIFE TIME	(1) 67551 HRS (2) 73517 HRS (3) 73287 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 2877.8K hrs min. Telcordia SR-332 (Bellcore) ; 287.5K hrs min. MIL-HDBK-217F ( $25^{\circ}\text{C}$ )	
10	Ongoing Reliability Test	I/P: 230VAC O/P: FULL LOAD $T_A = 50^{\circ}\text{C}$ Demonstration Mean Time Between Failure : 50,000 hours	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	WUWQ/ZHOUB	WENF	LIUWY