



# Test Report: ELG-75-12

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75W Single Output Switching 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

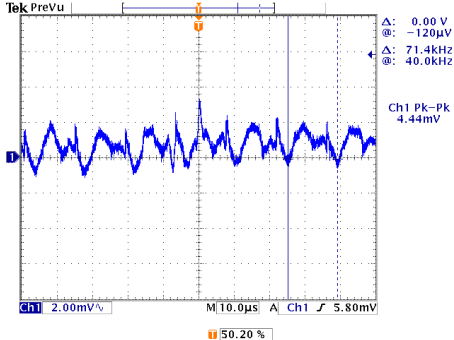
Environment Test

DESIGN VERIFY TEST

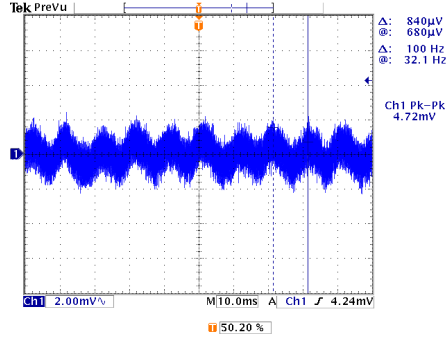
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CONSTANT CURRENT REGION	6V~12V	I/P: 230VAC O/P: LED MODE Ta: 25°C	5.0 V~ 11.8 V
2	OUTPUT VOLTAGE ADJUST RANGE	10.8V~13.2V	I/P: 230VAC O/P: NO LOAD Ta: 25°C	9.82 V~ 13.69 V
3	OUTPUT CURRENT ADJUST RANGE	2.5A~5A	I/P: 230VAC O/P: SETTING Ta: 25°C	1.89 A~ 5.62 A
4	OUTPUT VOLTAGE TOLERANCE	-3%~+3%	I/P: 180VAC / 295VAC O/P: FULL/ NO LOAD Ta: 25°C	-1.16%~ 0.83%
5	LINE REGULATION	-0.5%~+0.5%	I/P: 200VAC ~ 295VAC O/P: FULL LOAD Ta: 25°C	0%~ 0%
6	LOAD REGULATION	-2%~+2%	I/P: 230VAC O/P: FULL ~NO LOAD Ta: 25°C	-0.92%~ 0.83%
7	OVER/UNDERSHOOT TEST	$\pm 5\%$	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	$\pm 1.231\%$
8	RIPPLE & NOISE (Max)	150mVp-p	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	4.72 mVp-p

high frequency :



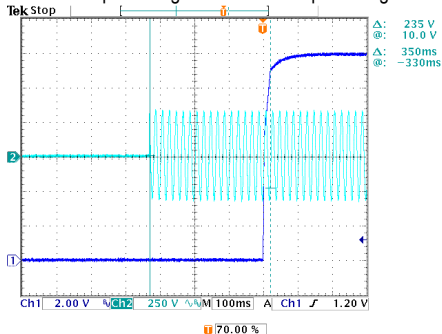
low frequency :

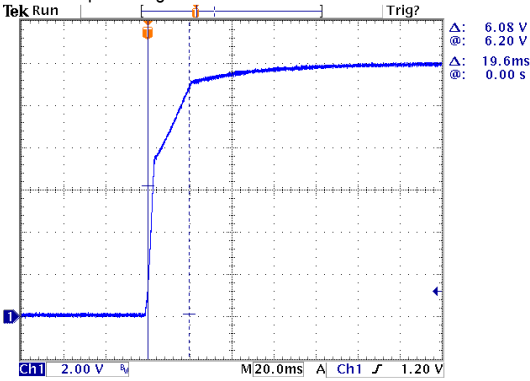
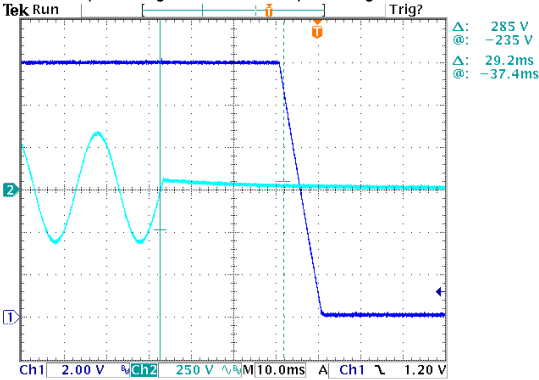
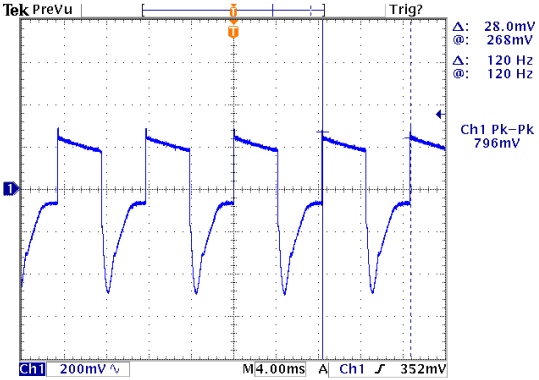
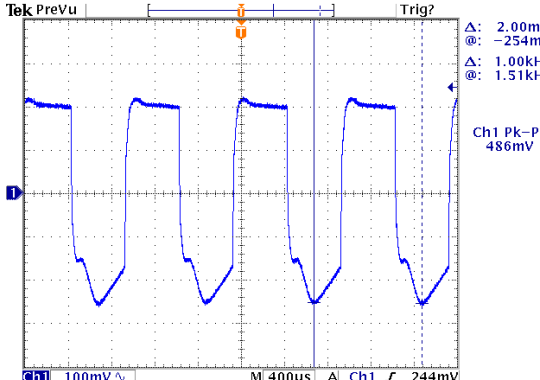


9	SET UP TIME(Max)	230VAC/ 500ms	I/P: 230 VAC O/P: 95% LOAD Ta: 25°C	230VAC/ 350 ms
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INPUT=230VAC/50HZ @ 95% LOAD

CH1: Output Voltage CH2: AC Input Voltage



10	RISE TIME (Max)	230VAC/ 100ms	I/P: 230 VAC O/P: 95% LOAD Ta: 25°C	230VAC/ 19.6 ms
<p>INPUT=230VAC/50HZ @ 95% LOAD CH1: Output Voltage</p>  <p>Δ: 6.08 V @: 6.20 V Δ: 19.6ms @: 0.00 s</p> <p>Ch1 2.00 V M20.0ms A Ch1 1.20 V</p>				
11	HOLD UP TIME(Typ)	230VAC/ 10ms	I/P: 230 VAC O/P: 95% LOAD Ta: 25°C	230VAC/ 29.2 ms
<p>INPUT=230VAC/50HZ @ 95% LOAD CH1: Output Voltage CH2: AC Input Voltage</p>  <p>Δ: 285 V @: -235 V Δ: 29.2ms @: -37.4ms</p> <p>Ch1 2.00 V Ch2 250 V M10.0ms A Ch1 1.20 V</p>				
12	DYNAMIC LOAD	1200 mVp-p	I/P: 230VAC O/P: (1) FULL /50% LOAD 50%DUTY / 120HZ (2) FULL /50% LOAD 50%DUTY / 1KHZ Ta: 25°C	(1) 796mVp-p (2) 486mVp-p
<p>FULL /50% LOAD 50%DUTY / 120HZ</p>  <p>Δ: 28.0mV @: 268mV Δ: 120 Hz @: 120 Hz Ch1 PK-Pk 796mV</p> <p>Ch1 200mV M4.00ms A Ch1 352mV</p> <p>FULL /50% LOAD 50%DUTY / 1KHZ</p>  <p>Δ: 2.00mV @: -254mV Δ: 1.00kHz @: 1.51kHz Ch1 PK-Pk 486mV</p> <p>Ch1 100mV M400µs A Ch1 244mV</p>				

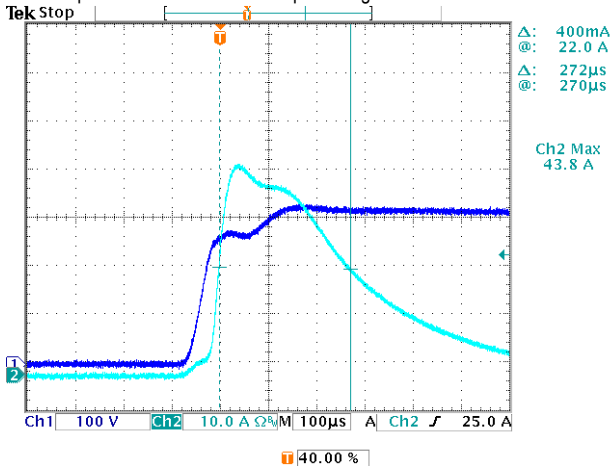
13	DIMMING TEST (For B-Type only)	SPEC:													
		※ Built-in 3 in 1 dimming function, IP67 rated. Output constant current level can be adjusted through output cable by connecting a resistance or 0 ~ 10Vdc or 10V PWM signal between DIM+ and DIM-.													
		※ Please DO NOT connect "DIM-" to "-V".													
		※ Reference resistance value for output current adjustment (Typical)													
		Resistance value	Single driver	Short	10K Ω	20K Ω	30K Ω	40K Ω	50K Ω	60K Ω	70K Ω	80K Ω	90K Ω	100K Ω	OPEN
			Multiple drivers (N=driver quantity for synchronized dimming operation)	Short	10K Ω/N	20K Ω/N	30K Ω/N	40K Ω/N	50K Ω/N	60K Ω/N	70K Ω/N	80K Ω/N	90K Ω/N	100K Ω/N	.....
		Percentage of rated current		0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	95%~108%
		※ 0 ~ 10V dimming function for output current adjustment (Typical)													
		Dimming value		0V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN
		Percentage of rated 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		0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
		Percentage of rated 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	0A	0.459A	0.960A	1.461A	1.963A	2.464A	2.957A	3.468A	3.950A	4.462A	4.972A	5.143A		
	Percentage of rated current	0.00%	9.18%	19.20%	29.22%	39.27%	49.28%	59.14%	69.36%	79.00%	89.23%	99.44%	102.86%		
2	Dimming value	0V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN		
	Output Current	0A	0.491A	1.007A	1.500A	2.021A	2.535A	3.064A	3.580A	4.079A	4.604A	5.115A	5.147A		
	Percentage of rated current	0.00%	9.81%	20.14%	30.00%	40.41%	50.70%	61.28%	71.60%	81.57%	92.08%	102.31%	102.93%		
3	Duty value	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN		
	Output Current	0A	0.523A	1.026A	1.536A	2.038A	2.552A	3.053A	3.564A	4.066A	4.578A	5.035A	5.138A		
	Percentage of rated current	0.00%	10.46%	20.52%	30.71%	40.76%	51.03%	61.06%	71.28%	81.33%	91.55%	100.69%	102.75%		

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	180VAC~295VAC	I/P: TESTING O/P: FULL LOAD Ta: 25°C	177 V~ 295 V
			I/P: (1)LOW-LINE-3V=177 V HIGH-LINE+10V=305 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: 180 VAC ~295 VAC O/P: FULL-NO LOAD Ta: 25°C	TEST: OK
3	AC CURRENT	0.38A/277VAC 0.45A/230VAC	I/P: 277 VAC I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	I = 0.240 A/ 277VAC I = 0.280 A/ 230VAC
4	LEAKAGE CURRENT	< 0.75mA / 277VAC	I/P: 277 VAC O/P: NO LOAD Ta: 25°C	L-FG: 0.354 mA N-FG: 0.380 mA
5	NO LOAD POWER CONSUMPTION	< 0.5W	I/P: 230VAC O/P: NO LOAD Ta: 25°C	0.155 W/ 230VAC
6	TOTAL HARMONIC DISTORTION	Total harmonic distortion will be lower than 20% when output loading is 50% or higher at 230VAC	I/P: 230VAC O/P: 50% LOAD	THD: 13.65 %
		Total harmonic distortion will be lower than 20% when output loading is 75% or higher at 277VAC	I/P: 277VAC O/P: 75% LOAD	THD: 14.69 %
7	INRUSH CURRENT(Typ)	230V/ 50A τwidth =350us measured at 50% Ipeak COLD START	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	I = 43.8 A/ 230VAC Twidth =272 us

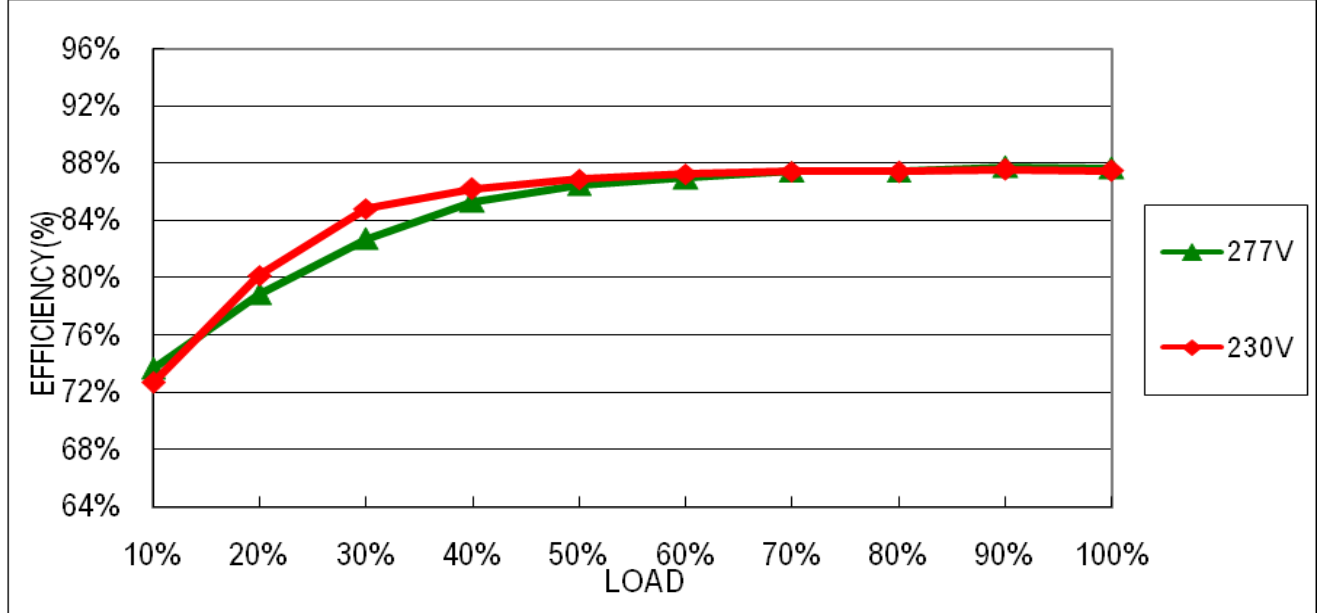
INPUT=230VAC/50HZ @ FULL LOAD

CH2: Input current CH1: AC Input Voltage



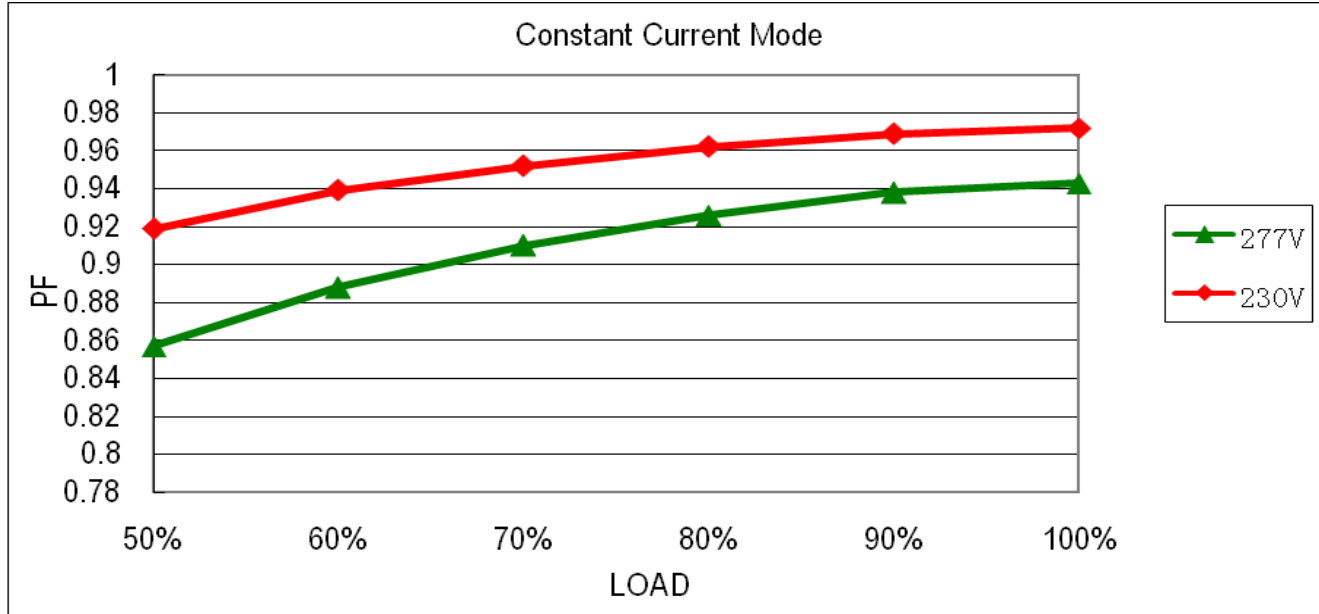
8	EFFICIENCY(Typ)	85%	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	87.49%
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EFFICIENCY vs LOAD



9	POWER FACTOR	0.92/ 277VAC 0.95/ 230VAC	I/P: 277 VAC I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	PF= 0.943 / 277VAC PF= 0.972 / 230VAC
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P.F vs LOAD



**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	95%~108%	I/P: 200VAC I/P: 230VAC I/P: 295VAC O/P: TESTING Ta: 25°C	101.40 %/ 200VAC 101.40 %/ 230VAC 101.40 %/ 295VAC Constant Current Limiting, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	14V~18V	I/P: 180VAC I/P: 230VAC I/P: 295VAC O/P: NO LOAD Ta: 25°C	16.15 V/ 180VAC 16.15 V/ 230VAC 16.15 V/ 295VAC Shut down o/p voltage, re-power on to recovery
3	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 200VAC I/P: 230VAC I/P: 295VAC O/P: FULL LOAD	O.T.P. Active Shut down o/p voltage, re-power on to recovery
4	SHORT CIRCUIT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 200VAC I/P: 295VAC 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 =298V O/P: (1) Full Load Turn on (2) Output Short (3) Full load continue Ta: 25°C	(1) 692 V (2) 548 V (3) 684 V
2	O/P Diode (MOSFET)	D100 Rated 60V/40A	I/P: High-Line +3V =298V O/P: (1) Full Load Turn on (2) Output Short (3) Full load continue Ta: 25°C	(1) 46.8 V (2) 46.6 V (3) 46.2 V
3	Input Capacitor	C5 Rated 47u/ 450V	I/P: High-Line +3V =298 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) 442 V (2) 448 V (3) 448 V
4	Control IC	U1 Rated 28V (MAX.)	I/P: High-Line +3V =298 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) 17.4 V (2) 15.1 V (3) 10.5 V (4) 15.1 V (5) 17.2 V
5	PFC Power Transistor	Q 1 Rated 600V/5.7A	I/P: High-Line +3V =298V O/P: (1) Full Load Turn on (2) Output Short (3) Full load continue Ta: 25°C	(1) 488 V (2) 470 V (3) 474 V
6	Clamp Diode	D10 Rated 800V/2A	I/P: High-Line +3V = 298V O/P: (1) Full Load input on/off (2) Output Short Ta: 25°C	(1) 648 V (2) 504 V

**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: 4.2KVAC/min I/P-FG: 2.4 KVAC/min O/P-FG: 1.8 KVAC/min Ta: 25°C	I/P-O/P: 1.775 mA I/P-FG: 2.352 mA O/P-FG: 1.614 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

**E.M.C TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS C	I/P: 230VAC/50HZ O/P: FULL/50% LOAD Ta: 25°C	PASS
2	CONDUCTION	EN55015	I/P: 230 VAC (50HZ) O/P: FULL LOAD Ta: 25°C	PASS Test by certified Lab
3	RADIATION	EN55015	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: 230VAC/50HZ O/P: FULL LOAD Ta: 25°C	CRITERIA A
6	SURGE	EN61000-4-5 INDUSTRY L-N: 3KV L,N-PE: 6KV	I/P: 230VAC/50HZ O/P: FULL LOAD Ta: 25°C	CRITERIA A
7	Test by certified Lab & Test Report Prepare			

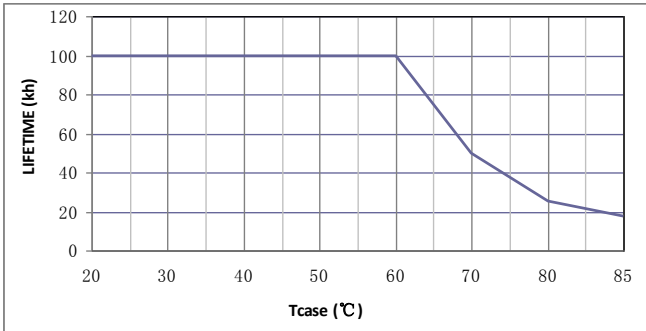


■ **RELIABILITY TEST**

**ENVIRONMENT TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																												
1	TEMPERATURE RISE TEST	MODEL: ELG-75-12 1. ROOM AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Tcase=39.4 °C 2. HIGH AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Tcase=85.3 °C																																																														
		<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>Tcase=39.4 °C</th> <th>Tcase=85.3 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>C11</td><td>42.3°C</td><td>90.7°C</td></tr> <tr><td>2</td><td>L3</td><td>41.0°C</td><td>88.2°C</td></tr> <tr><td>3</td><td>Q1</td><td>43.0°C</td><td>91.6°C</td></tr> <tr><td>4</td><td>C5</td><td>43.1°C</td><td>91.6°C</td></tr> <tr><td>5</td><td>D10</td><td>47.9°C</td><td>101.2°C</td></tr> <tr><td>6</td><td>Q2</td><td>44.9°C</td><td>94.6°C</td></tr> <tr><td>7</td><td>U1</td><td>41.2°C</td><td>88.7°C</td></tr> <tr><td>8</td><td>C45</td><td>42.4°C</td><td>90.4°C</td></tr> <tr><td>9</td><td>T1</td><td>53.1°C</td><td>106.4°C</td></tr> <tr><td>10</td><td>D100</td><td>54.2°C</td><td>105.7°C</td></tr> <tr><td>11</td><td>C105</td><td>51.6°C</td><td>101.8°C</td></tr> <tr><td>12</td><td>C108</td><td>49.6°C</td><td>100.0°C</td></tr> <tr><td>13</td><td>LF100</td><td>51.2°C</td><td>101.9°C</td></tr> <tr><td>14</td><td>RTH2</td><td>41.4°C</td><td>89.1°C</td></tr> </tbody> </table>			NO	Position	Tcase=39.4 °C	Tcase=85.3 °C	1	C11	42.3°C	90.7°C	2	L3	41.0°C	88.2°C	3	Q1	43.0°C	91.6°C	4	C5	43.1°C	91.6°C	5	D10	47.9°C	101.2°C	6	Q2	44.9°C	94.6°C	7	U1	41.2°C	88.7°C	8	C45	42.4°C	90.4°C	9	T1	53.1°C	106.4°C	10	D100	54.2°C	105.7°C	11	C105	51.6°C	101.8°C	12	C108	49.6°C	100.0°C	13	LF100	51.2°C	101.9°C	14	RTH2	41.4°C	89.1°C
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12	C108	49.6°C	100.0°C																																																													
13	LF100	51.2°C	101.9°C																																																													
14	RTH2	41.4°C	89.1°C																																																													
2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 295VAC/200VAC O/P: FULL LOAD Tcase= -45°C	TEST: OK																																																												
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL Tcase= 85°C NO DAMAGE	I/P: 305VAC O/P: FULL LOAD Tcase= 85°C HUMIDITY= 95 %R.H	TEST: OK																																																												
4	TEMPERATURE COEFFICIENT	±0.03 %/°C (0~50°C)	I/P: 230 VAC O/P: FULL LOAD	±0.003 %/°C (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: AC OFF STATIC		TEST: OK																																																												
6	THERMAL SHOCK TEST	1. Thermal shock Temperature: Tcase= -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: 16 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) Ta: 25°C	TEST: OK
8	CAPACITOR LIFE CYCLE	ELG-75-12: SUPPOSE C108 IS THE MOST CRITICAL COMPONENT (1) I/P: 230VAC O/P: FULL LOAD Ta = 25 °C LIFE TIME (2) I/P: 230VAC O/P: FULL LOAD Ta = 60 °C LIFE TIME (3) I/P: 230VAC O/P: 75% LOAD Ta = 60 °C LIFE TIME (4) I/P: 230VAC O/P: 50% LOAD Ta = 60 °C LIFE TIME	(1) 392583 HRS (2) 24161 HRS (3) 33631 HRS (4) 95472 HRS
9	MTBF	MIL-HDBK-217F NOTICE 2 STRESS ANALYSIS TOTAL FAILURE RATE: 331K HRS (25°C)	
10	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): 50000 hours @ Tcase 70°C 	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	ZHANGZJ/ZHUOKB	SKY	LIUWY