



Test Report: CSP-3000-400

3000W Power Supply with Single Output

■ 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

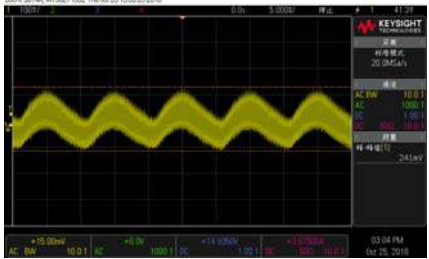


3000W Power Supply with Single Output

CSP-3000 series

DESIGN VERIFY TEST

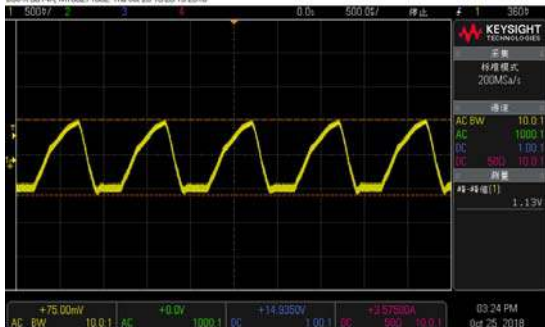
OUTPUT FUNCTION TEST

N O	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CONSTANT CURRENT REGION	200V~400	I/P: 230 VAC O/P: TESTING Ta: 25°C	170 V~402 V
2	OUTPUT VOLTAGE TOLERANCE	-1%~+1%	I/P: 180VAC ~ 264VAC O/P: FULL/ NO LOAD Ta: 25°C	-0.021%~ 0.009%
3	LINE REGULATION	-0.5%~+0.5%	I/P: 180VAC ~ 264VAC O/P: FULL/ NO LOAD Ta: 25°C	-0.019% ~ 0.018%
4	LOAD REGULATION	-0.5%~+0.5%	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	-0.018%~ 0.009%
5	VOLTAGE OVER/UNDERSHOOT TEST	$\pm 5\%$	I/P: 230VAC O/P: FULL LOAD/NO LOAD Ta: 25°C	1.71%
6	RIPPLE & NOISE	1200mVp-p	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	241 mVp-p
high frequency :  low frequency : 				
7	SET UP TIME(Max)	1000ms/230VAC	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	700 ms/230 VAC
INPUT=230VAC/50HZ @ FULL LOAD CH1: Output Voltage CH2: AC Input Voltage 				

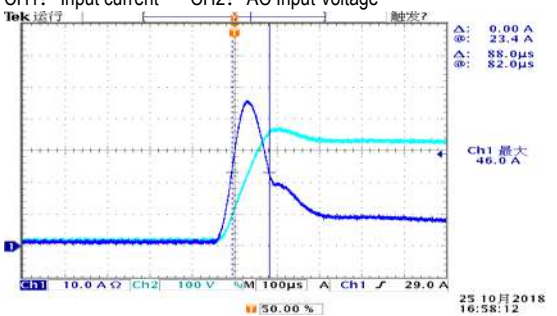
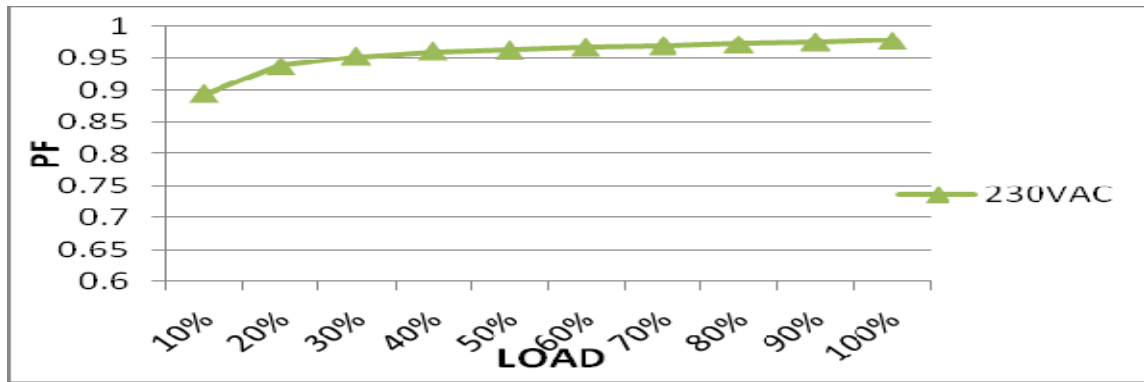


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8	RISE TIME (Max)	230VAC/ 80ms	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	54ms /230VAC FULL LOAD
INPUT=230VAC/50HZ @ FULL LOAD CH1: Output Voltage 				
9	HOLD UP TIME(Typ)	230VAC/ 10ms	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	230VAC/ 14ms
INPUT=230VAC/50HZ @ FULL LOAD CH1: Output Voltage CH2: AC Input Voltage 				
10	DYNAMIC LOAD	V1: 40000mVp-p(Max)	I/P: 230VAC O/P: (1) FULL / Min LOAD 90%DUTY / 1KHZ (2) 50% LOAD/Min LOAD 50%DUTY / 1KHZ Ta: 25°C	TEST: (1) 680 mVp-p (2) 1130mVp-p
1、FULL/Min LOAD 90%DUTY / 1KHZ  2、50% LOAD/Min LOAD 50%DUTY / 1KHZ 				

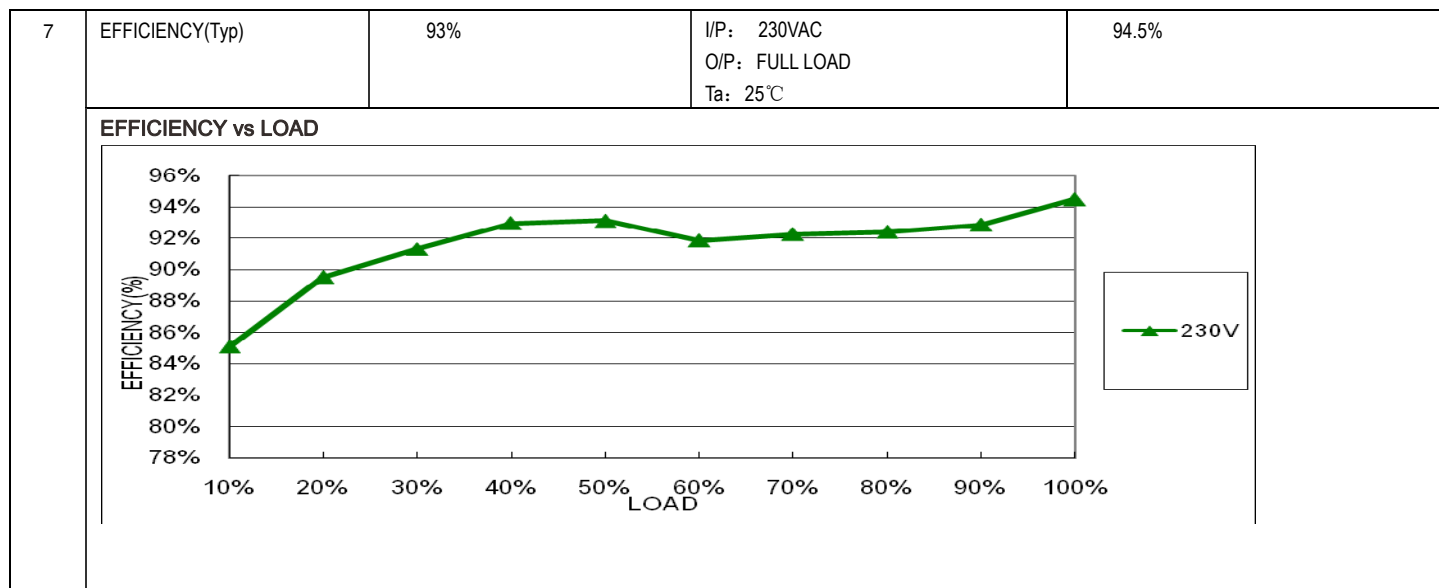
INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	180VAC~264 VAC	I/P: TESTING O/P: FULL LOAD (PLEASE CHECK DERATING CURVE) Ta: 25°C	177V~300V
			I/P: LOW-LINE-3V=177 V HIGH-LINE+15%=300 V O/P: FULL/MIN LOAD ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST: OK
2	INPUT FREQUENCY RANGE	50 HZ NO DAMAGE	I/P: 180 VAC ~264 VAC O/P: FULL~NO LOAD Ta: 25°C	TEST: OK
3	AC CURRENT	230 VAC/ 16 A	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	I = 14.10A/ 230VAC
4	LEAKAGE CURRENT	< 0.3mA / 240VAC	I/P: 240VAC O/P: NO LOAD Ta: 25°C	L-FG: 0.223mA N-FG: 0.227mA
5	INRUSH CURRENT(Typ)	230 V/ 60A COLD START at 230V	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	I=46.0A/ 230VAC T50=88us
INPUT=230VAC/50HZ @ FULL LOAD CH1: Input current CH2: AC Input Voltage 				
6	POWER FACTOR	0.95/ 230VAC@ FULL LOAD	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	PF=0.979 @ FULL LOAD /230VAC
PF vs LOAD 				



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PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER VOLTAGE PROTECTION	420V~500V	I/P: 230VAC O/P: TESTING	433.8V/ 230VAC Shut down o/p voltage, re-power on to recovery
2	OVER LOAD PROTECTION	105%~120%(Typ)	I/P: 180VAC I/P: 230VAC I/P: 264VAC O/P: TESTING Ta: 25°C	115.87%/ 180VAC 116.27%/ 230VAC 116.0%/ 264VAC continuous constant current limiting
3	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 180VAC I/P: 264VAC O/P: FULL LOAD	O.T.P. Active Shut down o/p voltage, recovers automatically after temperature goes down or re-power on to recovery
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 180VAC I/P: 264VAC O/P: FULL LOAD Ta: 25°C	NO DAMAGE Shut down and latch off o/p voltage, re-power on to recovery

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT
1	AUXILIARY POWER(AUX)	12V@0.4A	I/P: 230 VAC O/P:FULLLOAD Ta:25°C	PASS

2	REMOTE CONTROL	ON-OFF	I/P:230VAC Rc+/Rc- O/P:FULL LOA /NO LOAD <table><tr><td colspan="2">Connection method</td><td>Example2.2 (A)</td><td>Example2.2 (B)</td><td>Example2.2(C)</td></tr><tr><td rowspan="2">SW Logic</td><td>Output ON</td><td>SW OPEN</td><td>SW OPEN</td><td>SW CLOSE</td></tr><tr><td>Output OFF</td><td>SW CLOSE</td><td>SW CLOSE</td><td>SW OPEN</td></tr></table> 1、Example 2.2(A): 2、Example 2.2(B) : 3、Example 2.2(C): 	Connection method		Example2.2 (A)	Example2.2 (B)	Example2.2(C)	SW Logic	Output ON	SW OPEN	SW OPEN	SW CLOSE	Output OFF	SW CLOSE	SW CLOSE	SW OPEN	PASS
	Connection method		Example2.2 (A)	Example2.2 (B)	Example2.2(C)													
SW Logic	Output ON	SW OPEN	SW OPEN	SW CLOSE														
	Output OFF	SW CLOSE	SW CLOSE	SW OPEN														
3	CURRENT SHARING	PSU1-PSU2 -P SU3 < 10%	I/P: 230 VAC O/P: FULL/50% LOAD Ta: 25℃	PASS														
4	ALARM SIGNAL OUTPUT	I/P:230VAC O/P:FULL LOAD Ta:25℃ ※: Alarm signal is sent out through "P OK" & "P OK GND" and P OK2 & P OK GND2 pins on CN1. Please acknowledge an external voltage source is required for this function <table><tr><th>Function</th><th>Description</th><th>Output of alarm(P OK, Relay Contact)</th><th>Output of alarm(P OK2, TTL Signal)</th></tr><tr><td rowspan="2">P OK</td><td>The signal is "Low" when the power supply is above 80% of the rated output voltage, or, say, Power OK</td><td>Low (0.5V max at 500mA)</td><td>Low (0.5V max at 10mA)</td></tr><tr><td>The signal turns to be "High" when the power supply is under 80% of the rated output voltage, or, say, Power Fail</td><td>High or open (External applied voltage, 500mA max.)</td><td>High or open (External applied voltage, 10mA max.)</td></tr></table> Table 3.1 Explanation of alarm Fig. 3.2 Internal circuit of P OK (Relay, total is 10W) Fig. 3.3 Internal circuit of P OK2 (Open collector method) 1、ALARM SIGNAL OUTPUT High (*~*V) : When the $V_{out} \leq 80\% \pm 5\%$. Low (*~*V) : When $V_{out} \geq 80\% \pm 5\%$. I/P: 230 VAC O/P:FULL LOAD/NO LOAD Ta:25℃			Function	Description	Output of alarm(P OK, Relay Contact)	Output of alarm(P OK2, TTL Signal)	P OK	The signal is "Low" when the power supply is above 80% of the rated output voltage, or, say, Power OK	Low (0.5V max at 500mA)	Low (0.5V max at 10mA)	The signal turns to be "High" when the power supply is under 80% of the rated output voltage, or, say, Power Fail	High or open (External applied voltage, 500mA max.)	High or open (External applied voltage, 10mA max.)			
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1、FULL LOAD P OK

Vout	ALARM SIGNAL OUTPUT
High $V_{out} \leq 80\% \pm 5\%$	294V/ 73.5%
Low $V_{out} \geq 80\% \pm 5\%$	396.25V/99.06%

2、FULL LOAD P OK2

Vout	ALARM SIGNAL OUTPUT
High $V_{out} \leq 80\% \pm 5\%$	296V/ 74%
Low $V_{out} \geq 80\% \pm 5\%$	393.75V/98.44%

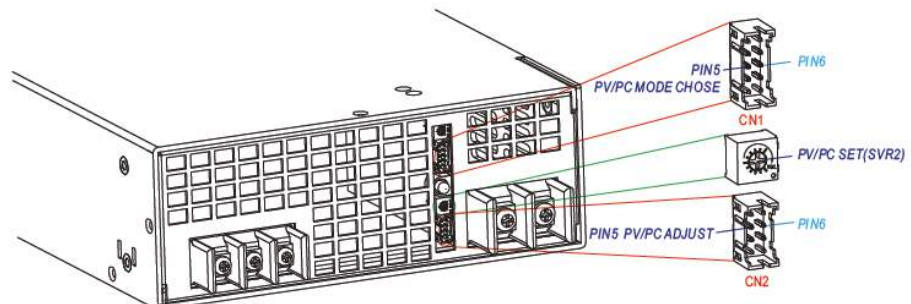
OUTPUT VOLTAGE/CURRENT PROGRAMMABLE

1. Output Voltage/Current Programming

※ Mode Setting

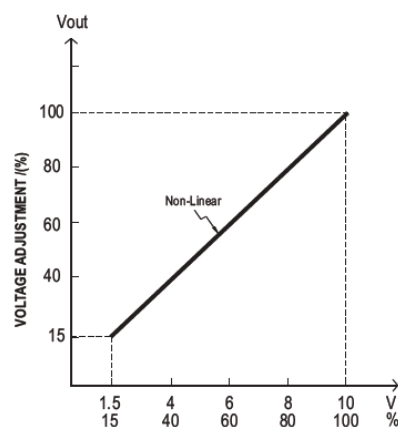
CN1:	CONDITION	MODE	FUNCTION
PINS/PIN6	SHORT	PV MODE	Output Voltage Programming
	OPEN	PC MODE	Output Current Programming

※ The factory default settings: PV mode output max voltage pin5/pin6 short by jumper cap.
When pull out the jumper cap, the default settings: PC mode output max constant current.

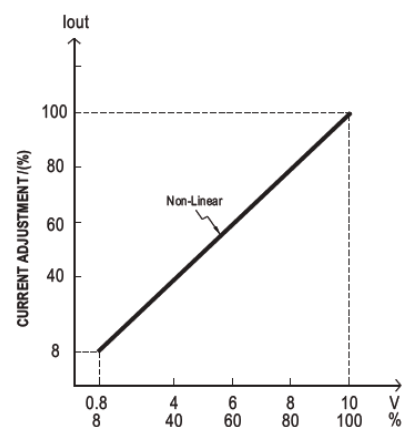


※ PV/PC Set adjustment

- ◎ Adjust the resistance(SVR2) can set output voltage or constant current point, the adjusting range is 20%-100% of max voltage or max constant current point.
- ◎ In the CN2, pin5/pin6 access external 10V voltage signal or 500-1KHz PWM signal can adjust the output voltage or constant current point.



PIN5/PIN6 ACCESS TO EXTERNAL VOLTAGE SIGNALS(DC/PWM)



PIN5/PIN6 ACCESS TO EXTERNAL VOLTAGE SIGNALS(DC/PWM)



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MODEL	120V	250V	400V
PV range	18 ~ 120V(max.)	37.5 ~ 250V(max.)	60 ~ 400V(max.)
PC range	2.4 ~ 30A(max.)	1.4~ 17A(max.)	0.8 ~ 10A(max.)

I/P: 230 VAC

O/P: FULL LOAD

Ta: 25°C

TEST RESULT: OK

1. FULL LOAD

PV MODEL	1.5V	4V	6V	8V	10V
SPEC	15%V±5%	40%V±5%	60%V±5%	80%V±5%	100%V±5%
Vout	14.9%	41.3%	61.48%	81.78%	100.5%

PV MODEL	15%	40%	60%	80%	100%
SPEC	15%V±5%	40%V±5%	60%V±5%	80%V±5%	100%V±5%
Vout	14.9%	40.35%	60.1%	79.9%	100.5 %

2. FULL LOAD

PC MODEL	0.8V	4V	6V	8V	10V
SPEC	8%I±5%	40%I±5%	60%I±5%	80%I±5%	100%I±5%
I _{max}	7.54%	40.06%	59.36%	78.8%	96.19%

PC MODEL	8%	40%	60%	80%	100%
SPEC	8%I±5%	40%I±5%	60%I±5%	80%I±5%	100%I±5%
I _{max}	7.54%	39.11%	57.94%	76.92%	96.19%

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q51 Rated 50A/600V	I/P: High-Line +3V =267V O/P: (1) Full Load Turn on (2) Output Short (3) Dynamic Load Full Load/ Min. Load 75%Duty/120Hz (4) Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (5) Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6) 200% Load (7) NO Load (8) VOLTAGE PROGRAMMABLE (PV) 20%/60%	(1) 562V (2) 513V (3) 497V (4) 538V (5) 554V (6) 550V (7) 497V (8) 20% 493V 60% 534V
2	PFC Transistor	Q1 Rated 52A/600V	I/P: High-Line +3V =267V O/P: (1) Full Load Turn on (2) Output Short (3) Dynamic Load Full Load/ Min. Load 75%Duty/120Hz (4) Dynamic Load Full Load/	(1) 501V (2) 405V (3) 501V (4) 501V (5) 501V (6) 413V



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			Min. Load 90%Duty/1KHz (5) Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6) 200% Load (7) NO Load (8) VOLTAGE PROGRAMMABLE (PV) 20%/60%	(7) 413V (8) 20%437V 60%493V
3	CLAMP Diode	D38 Rated 8A/ 600 V	I/P: High-Line +3V =267V O/P: (1) Full Load Turn on (2) Output Short (3)Dynamic Load Full Load/ Min. Load 75%Duty/120Hz (4)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (5) Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6) 200% Load (7) NO Load (8) VOLTAGE PROGRAMMABLE (PV) 20%/60%	(1) 457V (2) 457V (3) 449V (4)453V (5) 449V (6) 465V (7) 433V (8) 20%433V 60%437V
4	Diode Peak Voltage	D100 Rated 10A/650V	I/P: High-Line +3V =267V O/P: (1) Full Load Turn on (2) Output Short (3)Dynamic Load Full Load/ Min. Load 75%Duty/120Hz (4)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (5) Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6) 200% Load (7) NO Load (8) VOLTAGE PROGRAMMABLE (PV) 20%/60%	(1) 600V (2) 596V (3) 648V (4)624V (5) 600V (6) 628V (7)576V (8) 20%580V 60%592V
5	Input Capacitor Voltage	C5 Rated: 560 μ / 420 V	I/P: High-Line +3V =308 V O/P: (1)Full Load input on/off (2) Min load input on /Off (3)Full Load /Min load Change (4)Full load BURN-IN 1H Ta: 25°C	(1)402V (2)402V (3)402V (4)396V
6	Control IC Voltage Test	U5 Rated 17 V	I/P: High-Line +3V =308V O/P:(1)Full Load Input On/Off (2) Output Short (3)O.L.P (4)O.V.P. (5)NO LOAD VR 下限.LOW LINE (6) CV 下限 (7)VOLTAGE PROGRAMMABLE 20%/60%	(1) 14.0V (2) 13.9V (3) 13.9V (4)13.9V (5) 14.0V (6) 14.0V (7) 20%14.2V 60%14.0V

SAFETY TEST



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NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3.0KVAC/min I/P-FG: 2 KVAC/min O/P-FG: 0.5KVAC/min	I/P-O/P: 3.6 KVAC/min I/P-FG: 2.4KVAC/min O/P-FG: 0.6 KVAC/min Ta: 25°C	I/P-O/P: 3.84mA I/P-FG: 3.82mA O/P-FG: 2.37mA 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: >9999MΩ I/P-FG: >9999 MΩ O/P-FG: >9999MΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	8mΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2	I/P: 230VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS
2	CONDUCTION	EN55032 CLASS A	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS Test by certified Lab
3	RADIATION	EN55032 CLASS A	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: 2KV	I/P: 230VAC/50HZ O/P: FULL LOAD Ta: 25°C	CRITERIA A
6	SURGE	EN61000-4-5 LIGHT INDUSTRY L-N : 1KV L-PE: 2KV	I/P: 230VAC/50HZ O/P: FULL LOAD Ta: 25°C	CRITERIA A
7	Test by certified Lab & Test Report Prepare. Any contradictions of the test results please refer to the latest EMC test report.			

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
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1	TEMPERATURE RISE TEST	MODEL: CSP-3000-400 1. ROOM AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 36.1℃ 2. HIGH AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta=52.2℃																																																																																																																																																		
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2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 264VAC/180VAC O/P: FULL LOAD Ta= -25℃	TEST: OK																																																																																																																																																
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 ℃ NO DAMAGE	I/P: 272VAC O/P: FULL LOAD Ta=50 ℃ HUMIDITY= 95% R.H	TEST: OK																																																																																																																																																
4	TEMPERATURE COEFFICIENT	±0.05%/℃ (0~50℃)	I/P: 230 VAC O/P: FULL LOAD	±0.002%/℃ (0~50℃)																																																																																																																																																



3000W Power Supply with Single Output

CSP-3000 series

5	STORAGE TEMPERATURE TEST	-40~+85℃	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: 10CYCLE 5. Input/Output condition:	
6	THERMAL SHOCK TEST	-20~+50℃	1. Thermal shock Temperature: -25℃~ +55℃ 2. Temperature change rate : 25℃ / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle: 16CYCLE 5. Input/Output condition: 15cyle:230VAC/ FULL LOAD AC on 3 sec/AC off 1 sec TEST 1cyle:230VAC/ FULL LOAD Burn In Test TEST: OK	
7	VIBRATION TEST	10~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes	1 Carton & 1 Set (1) Waveform: Sine Wave (2) Frequency: 10~500Hz (3) Sweep Time: 10min/sweep cycle (4) Acceleration: 3G (5) Test Time: 180min in each axis (X.Y.Z) (6) Ta: 25℃	
8	CAPACITOR LIFE CYCLE	CSP-3000-250: SUPPOSE C115 IS THE MOST CRITICAL COMPONENT (1) I/P: 230VAC O/P: FULL LOAD Ta= 25 ℃ LIFE TIME (2) I/P: 230VAC O/P: FULL LOAD Ta= 50 ℃ LIFE TIME (3) I/P: 230VAC O/P: 75% LOAD Ta= 50 ℃ LIFE TIME (3) I/P: 230VAC O/P: 50% LOAD Ta= 50 ℃ LIFE TIME	(1) 1150885 HRS (2) 272207 HRS (3) 315285 HRS (4) 340249 HRS	
9	MTBF	Conducted by Parts Stress Analysis Prediction 223.8 K hrs min. Telcordia SR-332 (Bellcore) 75.1K hrs min. MIL-HDBK-217F (25℃)		
10	Ongoing Reliability Test	I/P: 230VAC O/P: FULL LOAD TA=50℃ Demonstration Mean Time Between Failure : 50,000 hours		

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	WUWQ/ZHOUB	WENF	LIUWY