



# TEST REPORT: EPS-65S-5

## 65W 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

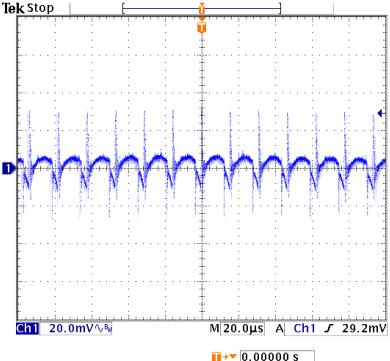
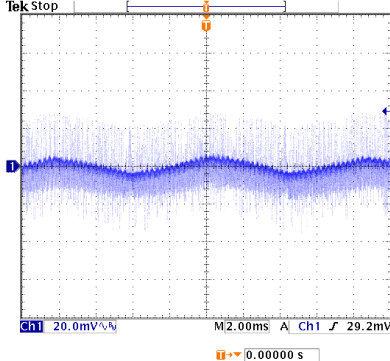
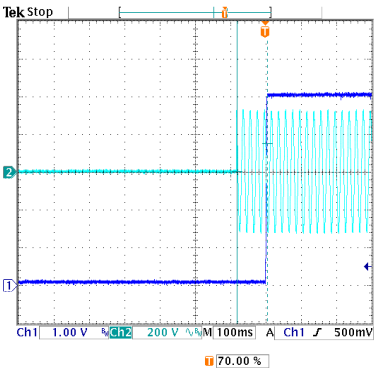
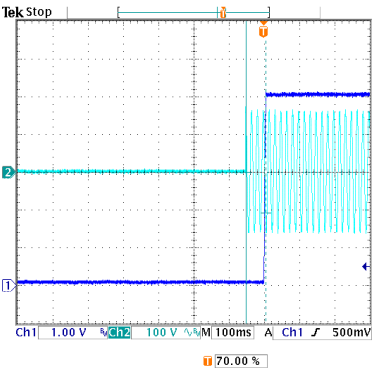
E.M.C. Test

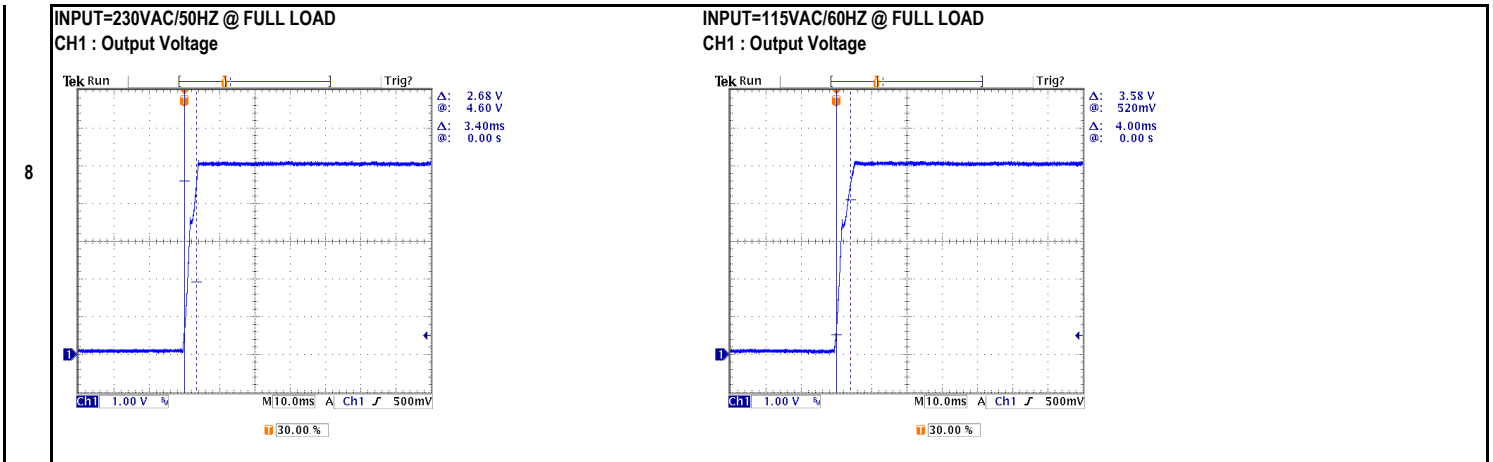
### ■ RELIABILITY TEST

ENVIRONMENT TEST

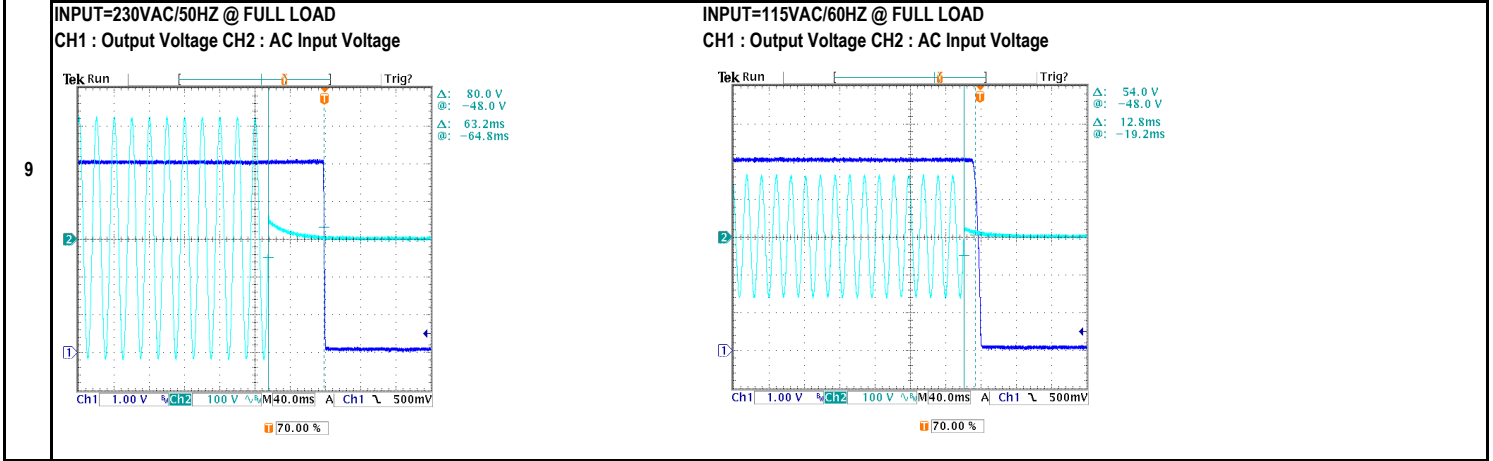


DESIGN VERIFY TEST  
OUTPUT FUNCTION

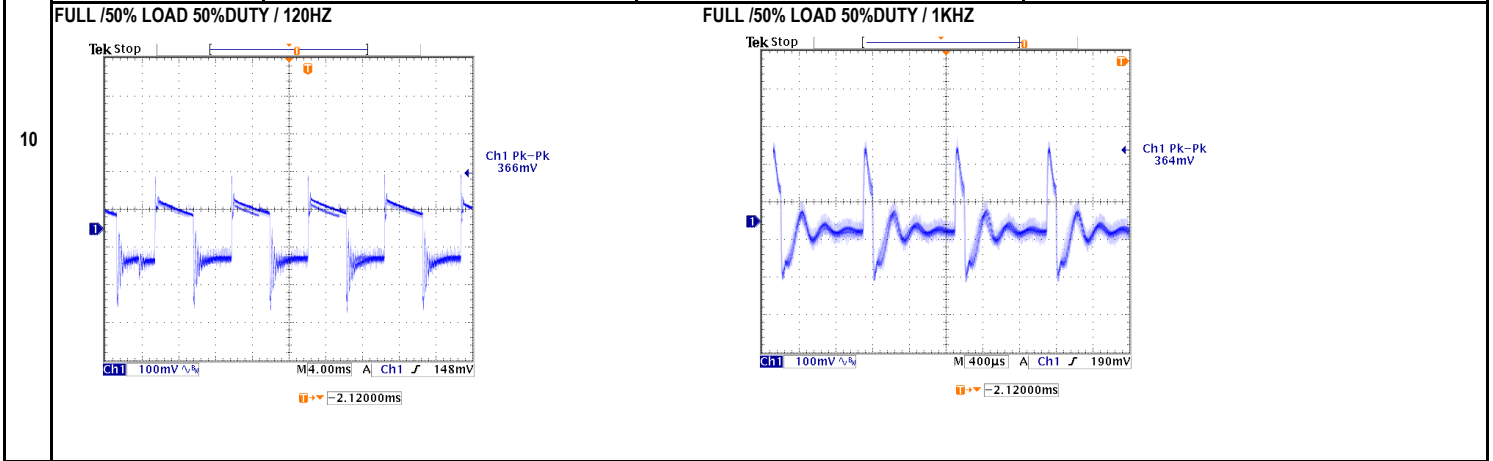
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 4.70V ~ 5.50V	I/P : 230VAC O/P: MIN LOAD TA : 25°C	CH1: 4.46V ~ 5.65V
2	OUTPUT VOLTAGE TOLERANCE (Max)	V1 : 2.0% ~ -2.0%	I/P : 115VAC / 264VAC O/P: FULL / MINLOAD TA= 25°C	V1: 1.49% ~ -1.12%
3	LINE REGULATION (MAX.)	V1 : 0.5% ~ -0.5%	I/P : 115VAC / 264VAC O/P: FULL LOAD TA : 25°C	V1: 0.00% ~ 0.00%
4	LOAD REGULATION (MAX.)	V1 : 2.0% ~ -2.0%	I/P : 230VAC O/P: MIN LOAD ~ FULL LOAD TA : 25°C	V1: 1.49% ~ -1.12%
5	OVER/UNDERSHOOT TEST	< ±10%	I/P : 230VAC O/P: FULL LOAD TA : 25°C	TEST< 1.619 %
	RIPPLE & NOISE(Max)	V1 : 80 mVp-p	I/P : 230VAC O/P: FULL LOAD TA : 25°C	V1 : 62.8 mVp-p
6	<p>high frequency : </p> <p>low frequency : </p>			
7	SET UP TIME (MAX.)	230VAC : 500ms 115VAC : 500ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25°C	230VAC : 86ms 115VAC : 56ms
	<p>INPUT=230VAC/50HZ @ FULL LOAD      INPUT=115VAC/60HZ @ FULL LOAD</p> <p>CH1 : Output Voltage CH2 : AC Input Voltage      CH1 : Output Voltage CH2 : AC Input Voltage</p> <p></p> <p></p>			
	RISE TIME (MAX.)	230VAC : 30ms 115VAC : 30ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25°C	230VAC : 3.4ms 115VAC : 4.0ms



HOLD UP TIME (TYP.)	230VAC : 30ms	I/P : 230VAC	230VAC : 63.2ms
	115VAC : 12ms	I/P : 115VAC	115VAC : 12.8ms
		O/P: FULL LOAD	
		TA : 25°C	



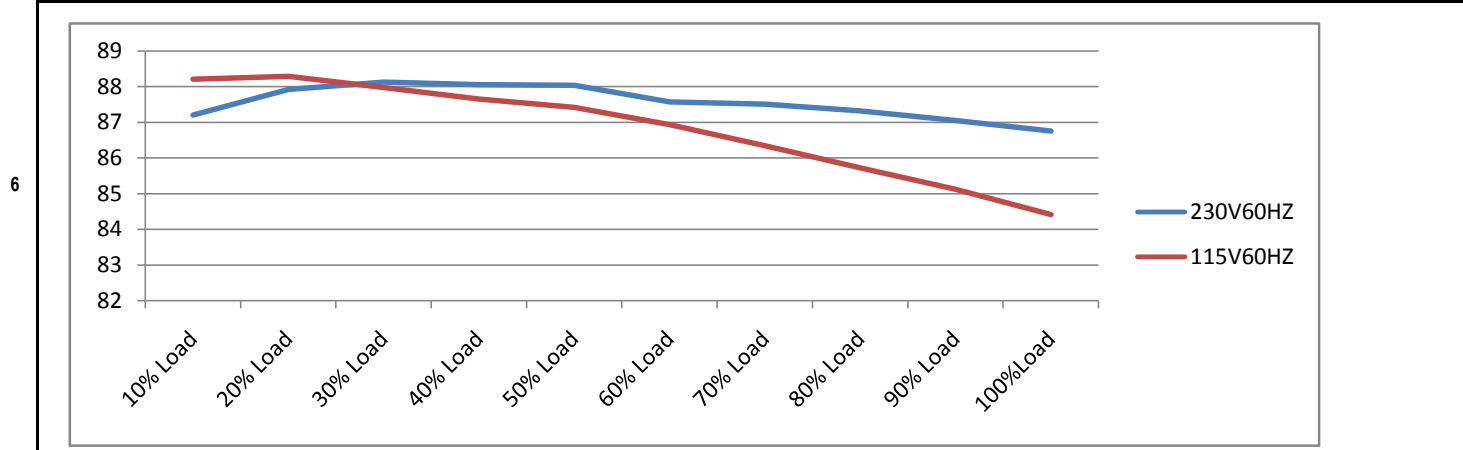
DYNAMIC LOAD	V1 : 1000 mVp-p	I/P : 230VAC	(1). (2). unit:mVp-p
		O/P:	V1: 366mv 364mv
		(1)Full/Min load 50%duty/120HZ	
		(2)Full/Min load 50%duty/1KHZ	
		TA : 25°C	



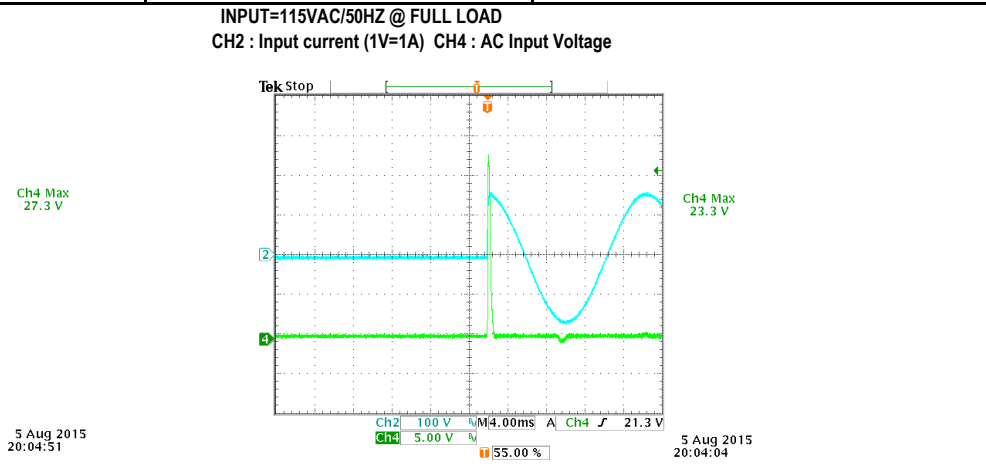
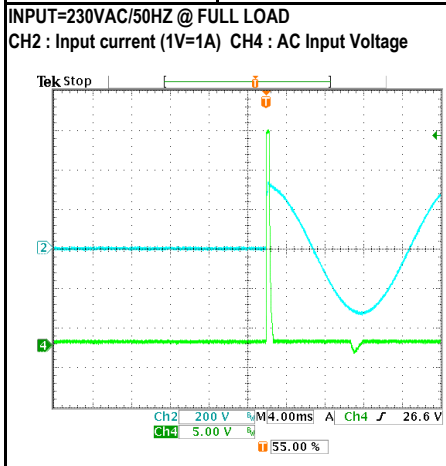


INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	80VAC ~ 264VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C	72.4VAC ~ 300VAC
			I/P : LOW-LINE = 112VAC HIGH-LINE = 300VAC O/P : FULL/MIN LOAD ON:30 Sec ; OFF:30 Sec 10MIN ( POWER ON/OFF NO DAMAGE )	TEST : OK
2	INPUT FREQUENCY RANGE	47HZ ~ 63HZ NO DAMAGE	I/P : 115VAC ~ 264VAC O/P : FULL-MIN LOAD Ta : 25°C	TEST : OK
3	INPUT CURRENT (TYP.)	1 / 230VAC 1.5 / 115VAC	I/P : 230VAC I/P : 115VAC O/P : FULL LOAD TA : 25°C	I= 0.5 / 230VAC I= 0.81 / 115VAC
4	LEAKAGE CURRENT	< 0.25mA	I/P : 264VAC O/P : MIN LOAD TA : 25°C	L-FG: 0.086 mA N-FG: 0.086 mA
5	NO LOAD POWER CONSUMPTION	< 0.10W	I/P : 230VAC O/P : MIN LOAD TA : 25°C	< 0.011 W
EFFICIENCY (TYP.)		84.0%	I/P : 230VAC O/P : FULL LOAD TA : 25°C	86.88 %



7	INRUSH CURRENT (TYP.)	50A / 230VAC 30A / 115VAC twidth= 555 us measured at 50% Ipeak COLD START	I/P : 230VAC I/P : 115VAC O/P : FULL LOAD TA : 25°C	I= 27.3A / 230VAC I= 23.3A / 115VAC
		<p>INPUT=230VAC/50HZ @ FULL LOAD</p> <p>CH2 : Input current (1V=1A) CH4 : AC Input Voltage</p>		<p>INPUT=115VAC/50HZ @ FULL LOAD</p> <p>CH2 : Input current (1V=1A) CH4 : AC Input Voltage</p>





**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	115% ~ 150%	I/P: 264VAC I/P: 230VAC I/P: 115VAC O/P: TESTING TA : 25°C	133% 264VAC 136% 230VAC 122% 115VAC Hiccup Mode
2	OVER VOLTAGE PROTECTION	5.75V ~ 6.75V	I/P: 264VAC I/P: 230VAC I/P: 80VAC O/P: MIN LOAD TA : 25°C	6.05V 264VAC 6.04V 230VAC 6.04V 80VAC Shut down Re- power ON
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 264VAC I/P: 80VAC O/P: FULL LOAD Ta: 25°C	NO DAMAGE Hiccup Mode

**COMPONENT STRESS TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Power Transistor	Q1 Rated : 600V 11.0A	I/P : 267VAC VDS : O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	VIN: 267VAC VDS: (1). 540.00V (2). 546.00V (3). 524.00V
2	O/P Diode	D100 Rated : 45V 30.0A	I/P : 267VAC O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue	(1). 36.80V (2). 33.20V (3). 37.20V
3	Input Capacitor	C5 Rated : 100uf 400V	I/P : 267VAC O/P : (1)Full Load Turn on /Off (2)Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C	(1). 348.00V (2). 352.00V (3). 352.00V
4	Control IC	U1 Rated : 28V (max) -0.3V (min)	I/P : 267VAC 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	U1 (1). 24.60V (2). 17.10V (3). 24.70V (4). 19.50V (5). 15.30V
5	Clamp Diode	D5 Rated : 800V 2.0A	I/P : 267VAC O/P : (1)Full load continue Ta : 25°C	(1). 500.00V

**SAFETY & E.M.C. TEST**

**SAFETY TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P : 3.000KVAC /min	I/P-O/P: 3.300KVAC /min Ta : 25°C	I/P-O/P: 1.41mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P : 500VDC>100MΩ	I/P-O/P: 500VDC Ta : 25°C/70%RH	I/P-O/P: 9999MΩ NO DAMAGE

**E.M.C. TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS A	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C	PASS



65W Single Output Switching Power Supply EPS-65S series

2	CONDUCTION	EN55022 CLASS B	I/P : 230VAC /50HZ O/P : FULL LOAD / 50% LOAD Ta : 25°C	Test by certified Lab
3	CONDUCTION	EN55022 CLASS B	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C	Test by certified Lab
4	E.S.D	EN61000-4-2 INDUSTRY AIR: 8KV / Contact: 4KV	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
5	E.F.T	EN61000-4-4 INDUSTRY INPUT: 2KV	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
6	SURGE	IEC61000-4-5 L/N:2KV	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A

RELIABILITY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	TEMPERATURE RISE TEST	MODEL : EPS-65S-5		
		1. ROOM AMBIENT BURN-IN : 1.0hrs IP: 230VAC O/P: 100% LOAD TA= 27.0°C		
		2. HIGH AMBIENT BURN-IN : 1.0hrs IP: 230VAC O/P: 100% LOAD TA= 50.0°C		
			NO. Position ROOM AMBIENT 27.0°C HIGH AMBIENT Ta: 50.0°C	
			1 LF1 54.7°C 71.9°C	
			2 LF2 47.8°C 66.1°C	
			3 BD1 82.9°C 101.5°C	
			4 Q1 86.6°C 105.3°C	
			5 C5 65.2°C 82.9°C	
			6 C40 71.6°C 90.2°C	
			7 T1 81.4°C 95.8°C	
			8 D100 106.1°C 121.6°C	
			9 D101 111.6°C 126.0°C	
			10 C105 91.5°C 98.5°C	
			11 C106 93.0°C 99.5°C	
	12 C107 67.1°C 78.3°C			
	13 L101 83.3°C 84.7°C			
	14 U1 67.8°C 85.4°C			
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P : 230VAC O/P : 120% LOAD Ta : 25°C	TEST : OK
3	LOW TEMPERATURE TURN ON TEST	NO DAMAGE 1 HOUR ( MIN )	I/P : 264VAC / 115VAC O/P : FULL LOAD Ta : -30.0°C	TEST : OK
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50°C NO DAMAGE	I/P : 272VAC O/P : FULL LOAD Ta : 50°C HUMIDITY= 95.0% RH	TEST : OK
5	TEMPERATURE COEFFICIENT	±0.03% /°C(0~50°C)	I/P : 230VAC O/P : FULL LOAD	±0.0000% /°C(0~50°C)
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -40°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
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -35°C ~ +55°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 : 230VAC Full Load AC ON/OFF test turn on 58sec ; turn off 2sec		TEST : OK



65W Single Output Switching Power Supply EPS-65S series

8	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (4) Acceleration : 2G (5) Test Time : 60min in each axis (X.Y.Z) (6) Ta : 25°C	TEST : OK
9	CAPACITOR LIFE CYCLE	:SUPPOSE C105 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25.0°C LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta= 50.0°C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 50.0°C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 50.0°C LIFE TIME	(1). 158118 HRS (2). 8847.6 HRS (3). 39682.8 HRS (4). 125618.4 HRS
10	MTBF	3334.3K hrs min. Telcordia SR-332 (Bellcore) ; 706.6K hrs min. MIL-HDBK-217F (25°C)	
11	DMTBF /Accelerated Life test	Demonstration Mean Time Between Failure (Expected Life): Above 30000HRS @ TA 50°C	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	FRANK	GESG	WANGDZ

2007/3/20 A50-S014