



Test Report: EPS-65-3.3

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 TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1 : 80 mVp-p (Max)	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 35 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 3.1 V ~ 3.6 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	2.82 V~ 3.86 V/ 230 VAC 2.82 V~ 3.86 V/ 115 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1 : -3 %~ +3 % (Max)	I/P : 90 VAC / 264 VAC O/P : FULL/ MIN LOAD Ta : 25°C	V1 : -0.47 %~ 0.03 %	P
4	LINE REGULATION	V1 : -0.5 %~ +0.5 % (Max)	I/P : 100VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : 0 %~ 0.32 %	P
5	LOAD REGULATION	V1 : -2 %~ +2 % (Max)	I/P : 230 VAC O/P : FULL ~MIN LOAD Ta : 25°C	V1 : 0 %~ 0.12 %	P
6	SET UP TIME	230VAC : 1000 ms (Max) 115VAC : 2000 ms(Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 422 ms 115VAC/ 857 ms	P
7	RISE TIME	230VAC : 50 ms (Max) 115VAC : 50 ms (Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 4.2 ms 115VAC/ 4.4 ms	P
8	HOLD UP TIME	230VAC : 50 ms (TYP) 115VAC : 12 ms (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 104.2 ms 115VAC/ 19.8 ms	P
9	OVER/UNDERSHOOT TEST	< +10%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : 1.03 %	P
10	DYNAMIC LOAD	V1 : 660 mVp-p	I/P : 230 VAC (1).O/P : FULL /Min LOAD 90%DUTY/ 1KHZ (2).O/P : FULL /Min LOAD 90%DUTY/ 3KHZ (3).O/P : FULL /Min LOAD 90%DUTY/ 5KHZ (4).O/P : FULL /Min LOAD 50%DUTY/ 120HZ Ta : 25°C	(1) 595 mVp-p (2) 586 mVp-p (3) 536 mVp-p (4) 556 mVp-p	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
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1	INPUT VOLTAGE RANGE	90VAC~264 VAC 127VDC ~ 370VDC	(1) I/P:TESTING O/P:FULL LOAD (2) I/P:DC TESTING(L:+ N:-) O/P: FULL / 50% LOAD (3) I/P:DC TESTING(L:- N:+) O/P: FULL / 50% LOAD Ta : 25°C	(1) 63V~264V (2) 115.8Vdc~370Vdc/FULL LOAD 115.8Vdc~370Vdc/50% LOAD (3) 115.8Vdc~370Vdc/FULL LOAD 115.8Vdc~370Vdc/50% LOAD	P
			I/P : LOW-LINE-3V= 87 V HIGH-LINE+15%=300 V O/P : FULL/MIN LOAD ON : 30 Sec . OFF : 30 Sec 10MIN (AC POWER ON/OFF NO DAMAGE)	TEST : OK	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P : 90 VAC ~ 264 VAC O/P : FULL~MIN LOAD Ta : 25°C	TEST : OK	P
3	EFFICIENCY	80 % (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	80.3 %	P
4	INPUT CURRENT	230V/ 1 A (TYP) 115V/ 1.8 A (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 0.46 A/ 230 VAC I = 0.75 A/ 115 VAC	P
5	INRUSH CURRENT	230V/ 60 A (TYP) COLD START	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I = 50.2 A/ 230 VAC	P
6	LEAKAGE CURRENT	< 2 mA / 240 VAC	I/P : 264 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.72 mA N-FG : 0.68 mA	P
7	NO LOAD CONSUMPTION	< 0.3 W	I/P : 240VAC O/P : NO LOAD Ta : 25°C	< 0.293 W	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	115 % ~ 160 %	I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25°C	140.1 %/ 230 VAC 131.1 %/ 115 VAC Protection type : Hiccup mode, recovers automatically after fault condition is removed	P
2	OVER VOLTAGE PROTECTION	CH1 : 3.7 V ~ 4.45 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	4.04 V/ 230 VAC 4.12 V/ 115 VAC Protection type : Shut down o/p voltage, re-power on to recover	P
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 264 VAC O/P : FULL LOAD Ta : 25°C	NO DAMAGE Hiccup Mode	P

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q 1 Rated : 650 V 12 A	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 586 V (2) 538 V (3) 544 V	P
2	Diode Peak Voltage	Q101 Rated : 40 V 160 A	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25°C	(1) 19.4 V (2) 16.6 V (3) 17.5 V	P
3	Clamp Diode Peak Voltage	D 1 Rated : 600 V 3 A	I/P : High-Line +3V = 267 V O/P : (1) Dynamic Load 90%Duty/1KHz (2)Full load continue Ta : 25°C	(1) 546 V (2) 544 V	P
4	Input Capacitor Voltage	C5 Rated : 100 u /400V/105°C	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C	(1) 398 V (2) 398 V (3) 394 V	P
5	Control IC Voltage Test	U1 Rated : 28 V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C	(1) 23.1 V (2) 24.2 V (3) 23.5 V	P

SAFETY & E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P : 3 KVAC/min I/P-FG : 2 KVAC/min O/P-FG : 0.5 KVAC/min	I/P-O/P : 3.6 KVAC/min I/P-FG : 2.4 KVAC/min O/P-FG : 0.6 KVAC/min Ta : 25°C	I/P-O/P : 5.72 mA I/P-FG : 4.61 mA O/P-FG : 3.64 mA NO DAMAGE	P
2	ISOLATION RESISTANCE	I/P-O/P : 500VDC>100MΩ	I/P-O/P : 500 VDC	I/P-O/P : 9999 MΩ	P

		I/P-FG : 500VDC>100MΩ O/P-FG : 500VDC>100MΩ	I/P-FG : 500 VDC O/P-FG : 500 VDC Ta : 25°C /70%RH	I/P-FG : 9999 MΩ O/P-FG : 9999 MΩ NO DAMAGE	
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta : 25°C / 70%RH	3 mΩ	P

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	BS EN/EN61000-3-2 CLASS A	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	PASS	P
2	CONDUCTION	BS EN/EN55032 (CISPR32) CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab	P
3	RADIATION	BS EN/EN55032 (CISPR32) CLASS B	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab	P
4	E.S.D	BS EN/EN61000-4-2 INDUSTRY AIR : 8KV / Contact : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
5	E.F.T	BS EN/EN61000-4-4 INDUSTRY INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
6	SURGE	BS EN/EN61000-4-5 INDUSTRY L-N : 2KV L,N-PE : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	TEMPERATURE RISE TEST	MODEL : EPS-65-5 PCB ONLY 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta=33.7 °C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta=39.9°C			P

		NO	Position	PART NUMBER	ROOM AMBIENT	HIGH AMBIENT		
					Ta= 33.7°C	Ta= 39.9°C		
		1	LF1	TR732-R5 T(9×5×3) 1.41m RPT-75C	76.8°C	83.9°C		
		2	BD1	BD 4A/800V GLASS GBU408	75.1°C	81.4°C		
		3	C5	C/E 100u/400V 105°C 18*25 KMG	68.2°C	74.1°C		
		4	D1	RD 3A/600V 1N5406 DO-201 T-52mm	100.0°C	105.8°C		
		5	R42	R/NW 2W 0.22Ω 5%	87.5°C	92.6°C		
		6	Q1	FET STF14NM65N 12A/650V TO220F	98.7°C	104.3°C		
		7	T1	MT TF5085-R2 EER-28 EPS-65-5 B	88.0°C	93.8°C		
		8	U1	PWM NCP1380BDR2G SO-8	98.7°C	103.5°C		
		9	U100	CONTROL TEA1791T SO8	90.2°C	97.8°C		
		10	Q101	FET AP9963GP 160A/40V TO220	91.3°C	100.8°C		
		11	C105	C/E 2200u/10V UL10Kh 10*25 KZM	75.6°C	83.5°C		
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)		I/P : 230 VAC O/P : 126 % LOAD Ta : 25°C	TEST : OK			P
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR		I/P : 264VAC/100VAC O/P : 100 % LOAD Ta= -30 °C	TEST : OK			P
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 40 °C NO DAMAGE		I/P : 272 VAC O/P : FULL LOAD Ta= 40 °C HUMIDITY= 95 %R.H	TEST : OK			P
5	TEMPERATURE COEFFICIENT	± 0.03 %/°C (0~50°C)		I/P : 230 VAC O/P : FULL LOAD	± 0.013 %/°C (0~50°C)			P
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			OK			P
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -30°C~ +70°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			OK			P
8	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 : 60min in each axis (X.Y.Z) (6) Ta : 25°C			TEST : OK			P



65W Single Output Switching Power Supply

EPS-65 series

9	CAPACITOR LIFE CYCLE	EPS-65-5 PCB ONLY SUPPOSE C 105 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=40 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 40 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 40 °C LIFE TIME	(1) 148297 HRS (2) 47247 HRS (3) 60671 HRS (4) 147240 HRS	P
10	MTBF	3077.6K hrs min. Telcordia SR-332 (Bellcore) ; 563.0K hrs min. MIL-HDBK-217F (25°C)		P
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 40°C		P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2011.7.18	RD SAMPLE	PASS	Shenym	Wangdz
Y1201C65E	PRODUCT SAMPLE	PASS	Shenym	Wangdz

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