TEST REPORT: EPS-45S-48

45W 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

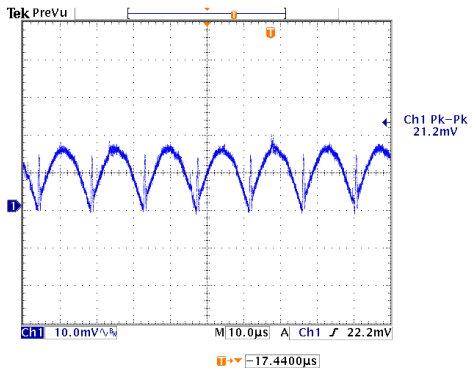
- ENVIRONMENT TEST

DESIGN VERIFY TEST

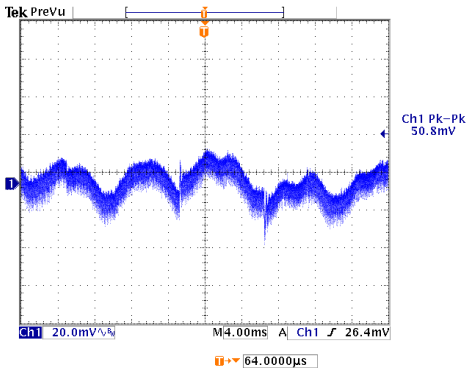
OUTPUT FUNCTION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 45.60V ~ 52.80V	I/P : 230VAC O/P: MIN LOAD TA : 25℃	CH1: 43.97V ~ 53.94V
2	OUTPUT VOLTAGE TOLERANCE (Max)	V1 : 1.0% ~ -1.0%	I/P : 115VAC / 264VAC O/P: FULL / MINLOAD TA= 25℃	V1: 0.14% ~ -0.28%
3	LINE REGULATION (MAX.)	V1 : 0.5% ~ -0.5%	I/P : 115VAC / 264VAC O/P: FULL LOAD TA : 25℃	V1: 0.06% ~ -0.02%
4	LOAD REGULATION (MAX.)	V1 : 1.0% ~ -1.0%	I/P : 230VAC O/P: MIN LOAD ~ FULL LOAD TA : 25℃	V1: 0.14% ~ -0.28%
5	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230VAC O/P: FULL LOAD TA : 25℃	TEST< 3.361 %
6	RIPPLE & NOISE(Max)	V1 : 300 mVp-p	I/P : 230VAC O/P: FULL LOAD TA : 25℃	V1 : 50.8 mVp-p

high frequency :



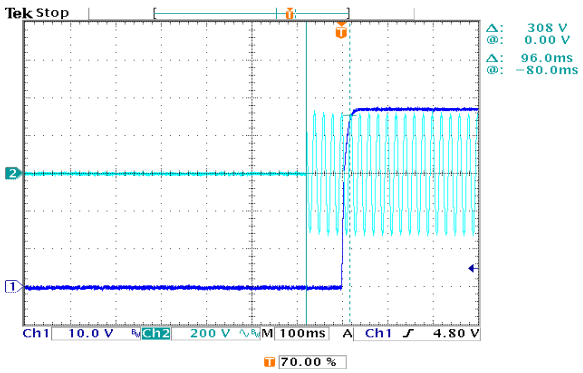
low frequency :



7	SET UP TIME (MAX.)	230VAC : 500ms 115VAC : 500ms	I/P : 230VAC I/P : 115VAC	230VAC 96ms 115VAC 70ms	

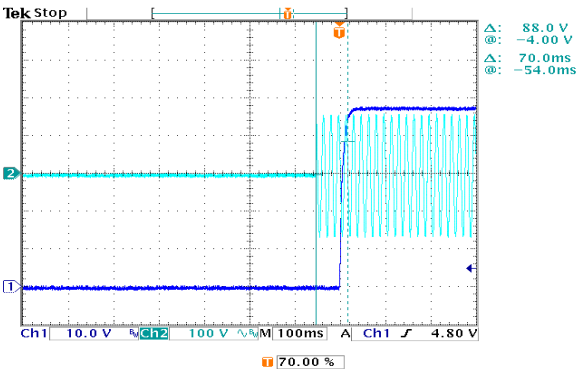
INPUT=230VAC/50HZ @ FULL LOAD

CH1 : Output Voltage CH2 : AC Input Voltage



INPUT=115VAC/60HZ @ FULL LOAD

CH1 : Output Voltage CH2 : AC Input Voltage



	RISE TIME (MAX.)	230VAC : 30ms 115VAC : 30ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25℃	230VAC : 13.6ms 115VAC : 15.4ms	

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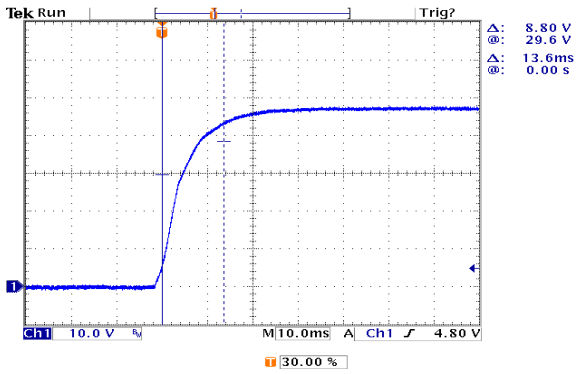
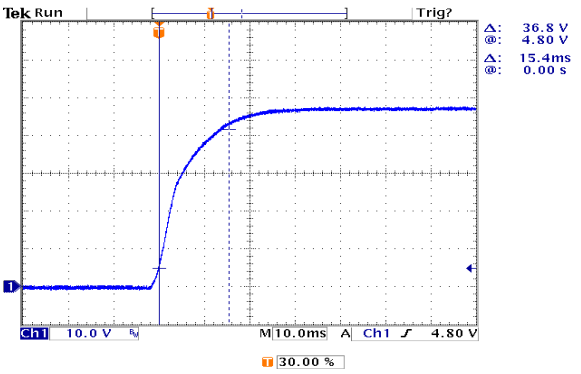
INPUT=230VAC/50HZ @ FULL LOAD
CH1 : Output Voltage



INPUT=115VAC/60HZ @ FULL LOAD
CH1 : Output Voltage



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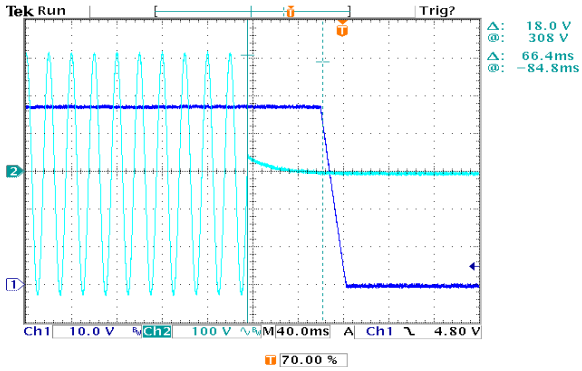
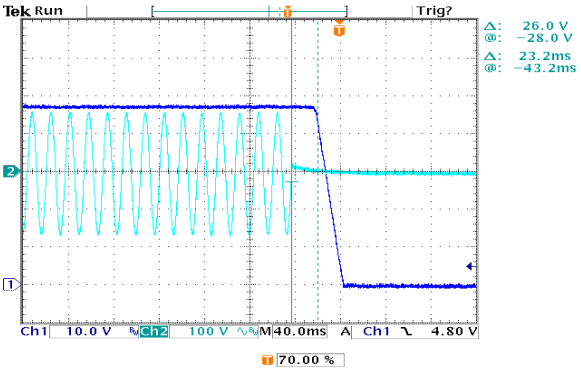
HOLD UP TIME (TYP.)	230VAC : 30ms 115VAC : 12ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25℃	230VAC : 66.4ms 115VAC : 23.2ms

INPUT=230VAC/50HZ @ FULL LOAD
CH1 : Output Voltage CH2 : AC Input Voltage



INPUT=115VAC/60HZ @ FULL LOAD
CH1 : Output Voltage CH2 : AC Input Voltage



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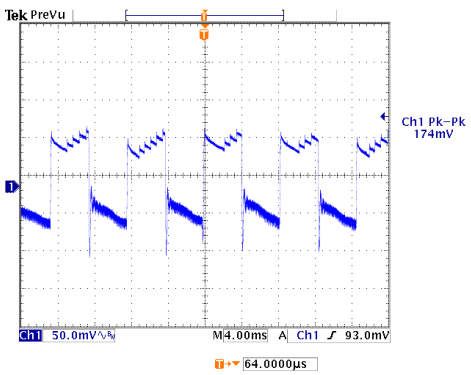
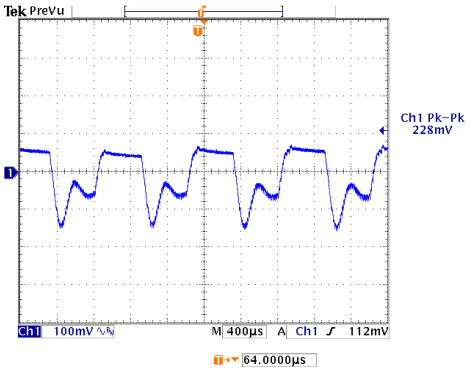
DYNAMIC LOAD	V1 : 4800 mVp-p	I/P : 230VAC O/P: (1)Full/Min load 50%duty/120HZ (2)Full/Min load 50%duty/1KHZ TA : 25℃		(1). (2). unit:mVp-p V1: 174.0mv 228.0mv	

FULL /50% LOAD 50%DUTY / 120HZ

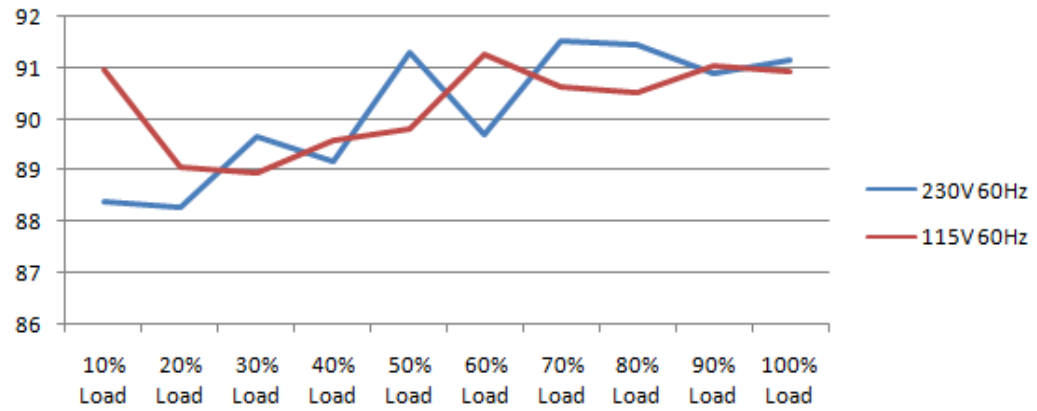


FULL /50% LOAD 50%DUTY / 1KHZ



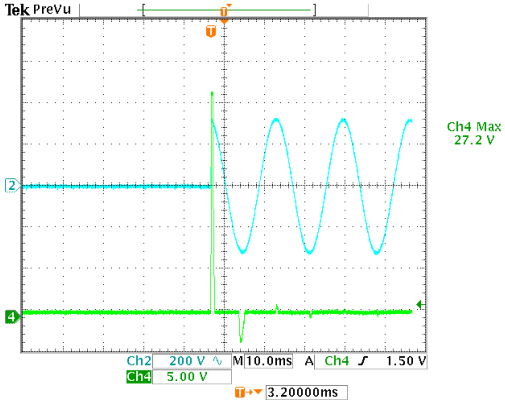
INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	80VAC ~ 264VAC	I/P : TESTING O/P : FULL LOAD Ta : 25℃	64.5VAC ~ 264VAC
			I/P : LOW-LINE = 77VAC 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℃	TEST : OK
3	INPUT CURRENT (TYP.)	1 / 230VAC 1.2 / 115VAC	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25℃	I= 0.418 / 230VAC I= 0.693 / 115VAC
4	LEAKAGE CURRENT	< 0.25mA	I/P : 264VAC O/P: MIN LOAD TA : 25℃	L-FG: 0.083 mA N-FG: 0.084 mA
5	NO LOAD POWER CONSUMPTION	< 0.10W	I/P : 230VAC O/P: MIN LOAD TA : 25℃	< 0.0907 W
6	EFFICIENCY (TYP.)	91.0%	I/P : 230VAC O/P: FULL LOAD TA : 25℃	91.22 %

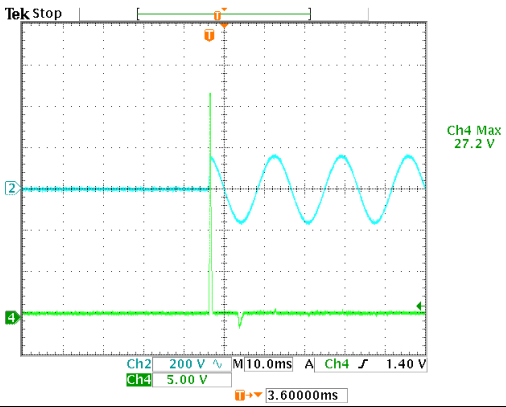


7	INRUSH CURRENT (TYP.)	60A / 230VAC 30A / 115VAC twidth= 0 us measured at 50% Ipeak COLD START	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25℃	I= 27.20A / 230VAC I= 27.20A / 115VAC

INPUT=230VAC/50HZ @ FULL LOAD
CH2 : Input current (1V=1A) CH4 : AC Input Voltage



INPUT=115VAC/50HZ @ FULL LOAD
CH2 : Input current (1V=1A) CH4 : AC Input Voltage



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℃	132.5% 264VAC 138.9% 230VAC 135.6% 115VAC Hiccup Mode
2	OVER VOLTAGE PROTECTION	55.20V ~ 64.80V	I/P: 264VAC I/P: 230VAC I/P: 80VAC O/P: MIN LOAD TA : 25℃	59.20V 264VAC 59.20V 230VAC 59.20V 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℃	NO DAMAGE Hiccup Mode

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Power Transistor	Q1 Rated : 600V 9.0A	I/P : 267VAC VDS : O/P : (1)Full Load Turn on (2) Output Short (3)Fulll load continue Ta : 25℃	VIN: 267VAC VDS: (1). 552.00V (2). 484.00V (3). 564.00V
2	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℃	(1). 360.00V (2). 364.00V (3). 368.00V
3	Control IC	U1 Rated : 28.0V (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℃	U1 (1). 21.20V (2). 11.20V (3). 20.40V (4). 25.80V (5). 20.20V
4	O/P Diode	D100 Rated : 300V 20.0A	I/P : 267VAC O/P : (1)Full Load Turn on (2) Output Short (3)Fulll load continue Ta : 25℃	(1). 176.00V (2). 164.00V (3). 178.00V
5	Clamp Diode	D5 Rated : 800V 2.0A	I/P : 267VAC O/P : (1)Fulll load continue Ta : 25℃	(1). 520.00V

■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℃	I/P-O/P: 1.40mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P : 500VDC>100MΩ	I/P-O/P: 500VDC Ta : 25℃/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℃	PASS

2	CONDUCTION	EN55022 CLASS B	I/P : 230VAC /50HZ O/P : FULL LOAD / 50% LOAD Ta : 25℃	PASS Test by certified Lab
3	RADIATION	EN55022 CLASS B	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25℃	PASS 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℃	CRITERIA A
5	E.F.T	EN61000-4-4 INDUSTRY INPUT： 2KV	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25℃	CRITERIA A
6	SURGE	IEC61000-4-5 INDUSTRY L-N：2KV;L/N-PE：4KV	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25℃	CRITERIA A

■RELIABILITY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	TEMPERATURE RISE TEST	MODEL : EPS-45S-7.5 1. ROOM AMBIENT BURN-IN : 1.0hrs IP: 230VAC O/P: 100% LOAD TA= 31.3℃ 2. HIGH AMBIENT BURN-IN : 1.0hrs IP: 230VAC O/P: 100% LOAD TA= 44.6℃		
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230VAC O/P : 132% LOAD Ta : 25℃	TEST：OK
3	LOW TEMPERATURE TURN ON TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 264VAC / 115VAC O/P : FULL LOAD Ta : -30.0℃	TEST：OK
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50℃ NO DAMAGE	I/P : 272VAC O/P : FULL LOAD Ta : 50℃ HUMIDITY= 95.0% RH	TEST：OK
5	TEMPERATURE COEFFICIENT	±0.03% /℃(0~50℃)	I/P : 230VAC O/P : FULL LOAD	±0.0100% /℃(0~50℃)
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -40℃ ~ +85℃ 2. Temperature change rate ：25℃ / 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℃ ~ +55℃ 2. Temperature change rate ：25℃ / 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
		1 Carton & 1 Set (1) Waveform： Sine Wave		TEST：OK

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
		NO.	Position	ROOM AMBIENT 31.3℃	HIGH AMBIENT Ta： 44.6℃
		1	LF1	47.1℃	61.5℃
		2	LF2	46.4℃	59.4℃
		3	BD1	70.2℃	83.4℃
		4	Q1	76.3℃	89.5℃
		5	C5	56.0℃	69.6℃
		6	C40	65.4℃	79.4℃
		7	T1	68.1℃	79.5℃
		8	D100	90.6℃	103.7℃
		9	C105	70.0℃	82.3℃
		10	C106	63.6℃	75.0℃
		11	C107	51.2℃	62.2℃
		12	L100	53.2℃	64.7℃
		13	U1	59.2℃	73.0℃

8	VIBRATION TEST	(2) Frequency：10~500Hz (4) Acceleration： 2G (5) Test Time：60min in each axis (X.Y.Z) (6) Ta：25℃								
9	CAPACITOR LIFE CYCLE		:SUPPOSE	C105	IS THE MOST CRITICAL COMPONENT					
		(1) I/P：	230VAC	O/P：FULL LOAD	Ta=	25.0℃	LIFE TIME	(1).	104779.8	HRS
		(2) I/P：	230VAC	O/P：FULL LOAD	Ta=	50.0℃	LIFE TIME	(2).	19866.9	HRS
		(3) I/P：	230VAC	O/P：75% LOAD	Ta=	50.0℃	LIFE TIME	(3).	51275.1	HRS
		(4) I/P：	230VAC	O/P：50% LOAD	Ta=	50.0℃	LIFE TIME	(4).	97762.8	HRS
10	MTBF	MIL-HDBK-217F TOTAL FAILURE RATE： 726.2 KHRS								
11	DMTBF /Accelerated Life test	Demonstration Mean Time Between Failure (Expected Life): Above 50000HRS @ TA 50℃								

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	FRANK	GESG	WANGDZ

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