



# TEST REPORT: EPS-45S-7.5

## 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

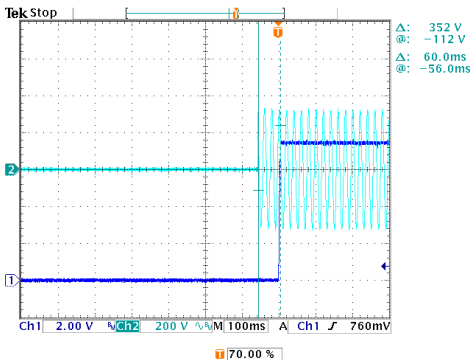
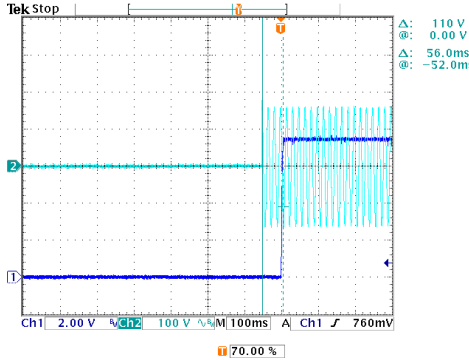
E.M.C. Test

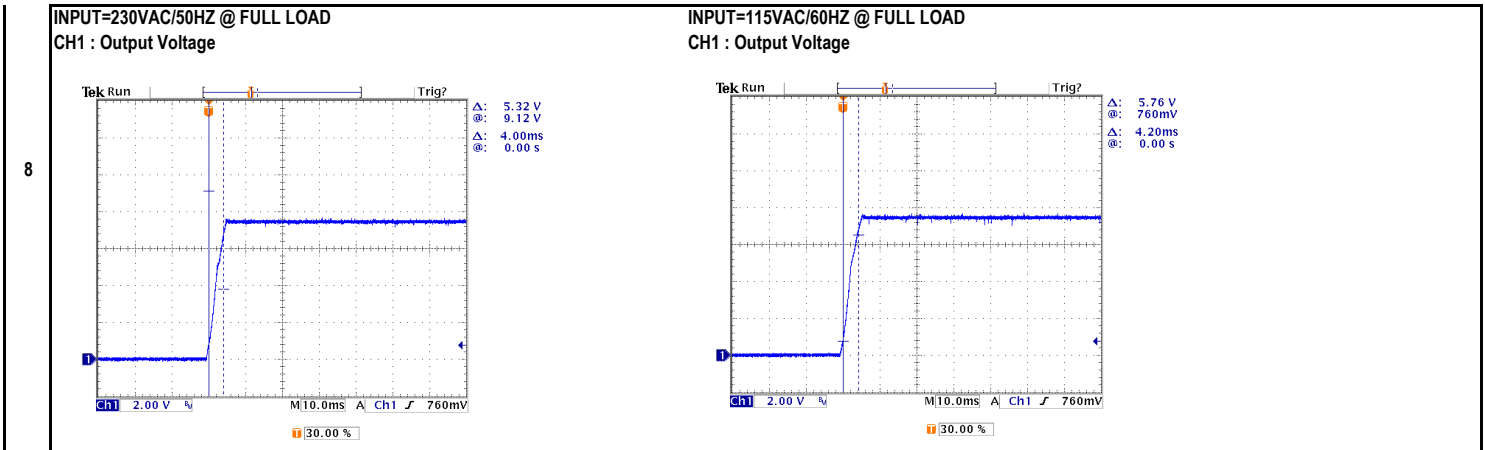
### ■ RELIABILITY TEST

ENVIRONMENT TEST



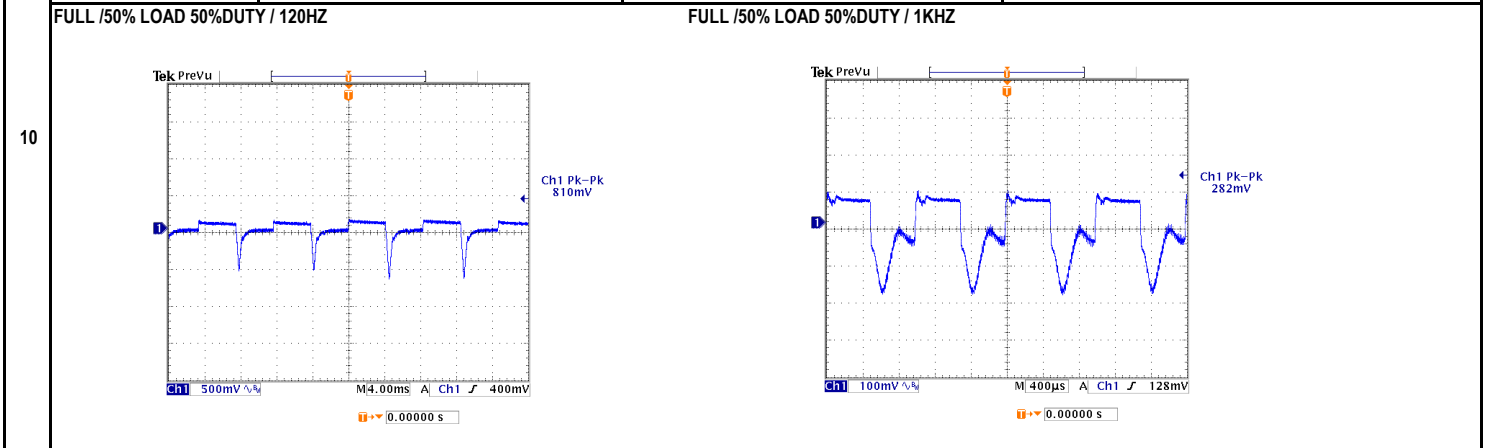
DESIGN VERIFY TEST  
OUTPUT FUNCTION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 7.12V ~ 8.30V	I/P : 230VAC O/P: MIN LOAD TA : 25°C	CH1: 6.79V ~ 8.55V
2	OUTPUT VOLTAGE TOLERANCE (Max)	V1 : 2.0% ~ -2.0%	I/P : 115VAC / 264VAC O/P: FULL / MINLOAD TA= 25°C	V1: 0.16% ~ -0.24%
3	LINE REGULATION (MAX.)	V1 : 0.5% ~ -0.5%	I/P : 115VAC / 264VAC O/P: FULL LOAD TA : 25°C	V1: 0.00% ~ -0.08%
4	LOAD REGULATION (MAX.)	V1 : 2.0% ~ -2.0%	I/P : 230VAC O/P: MIN LOAD ~ FULL LOAD TA : 25°C	V1: 0.16% ~ -0.24%
5	OVER/UNDERSHOOT TEST	< ±10%	I/P : 230VAC O/P: FULL LOAD TA : 25°C	TEST< 5.333 %
6	RIPPLE & NOISE(Max)	V1 : 80 mVp-p	I/P : 230VAC O/P: FULL LOAD TA : 25°C	V1 : 32.6 mVp-p
7	SET UP TIME (MAX.)	230VAC : 500ms	I/P : 230VAC	230VAC : 60ms
		115VAC : 500ms	I/P : 115VAC	115VAC : 56ms
INPUT=230VAC/50HZ @ FULL LOAD		INPUT=115VAC/60HZ @ FULL LOAD		
CH1 : Output Voltage CH2 : AC Input Voltage		CH1 : Output Voltage CH2 : AC Input Voltage		
				
RISE TIME (MAX.)	230VAC : 30ms	I/P : 230VAC	230VAC : 4.0ms	
	115VAC : 30ms	I/P : 115VAC O/P: FULL LOAD TA : 25°C	115VAC : 4.2ms	



9	<b>INPUT=230VAC/50HZ @ FULL LOAD</b> CH1 : Output Voltage CH2 : AC Input Voltage	<b>INPUT=115VAC/60HZ @ FULL LOAD</b> CH1 : Output Voltage CH2 : AC Input Voltage

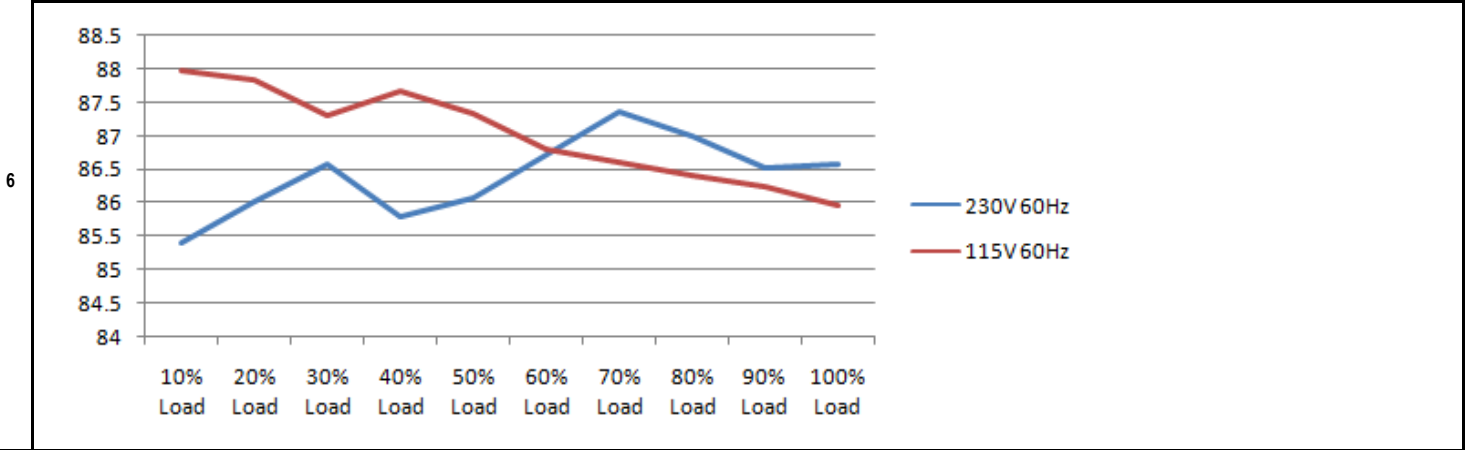
<b>HOLD UP TIME (TYP.)</b>	230VAC : 30ms 115VAC : 12ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25°C	230VAC : 63.2ms 115VAC : 22.4ms
<b>DYNAMIC LOAD</b>	V1 : 1500 mVp-p	I/P : 230VAC O/P: (1) Full/Min load 50%duty/120HZ (2) Full/Min load 50%duty/1KHZ TA : 25°C	V1: (1). 810.0mv (2). 282.0mv unit:mVp-p





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	68.5VAC ~ 264VAC
			I/P : LOW-LINE = 77VAC HIGH-LINE = 267VAC 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 1.2 / 115VAC	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25°C	I= 0.414 / 230VAC I= 0.669 / 115VAC
4	LEAKAGE CURRENT	< 0.25mA	I/P : 264VAC O/P: MIN LOAD TA : 25°C	L-FG: 0.085 mA N-FG: 0.085 mA
5	NO LOAD POWER CONSUMPTION	< 0.10W	I/P : 230VAC O/P: MIN LOAD TA : 25°C	< 0.0478 W
	EFFICIENCY (TYP.)	85.0%	I/P : 230VAC O/P: FULL LOAD TA : 25°C	86.55 %



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°C	I= 27.30A / 230VAC I= 27.10A / 115VAC
		<p>INPUT=230VAC/50HZ @ FULL LOAD CH2 : Input current (1V=1A) CH4 : AC Input Voltage</p> <p>INPUT=115VAC/50HZ @ FULL LOAD 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	131.1% 264VAC 137.5% 230VAC 132.2% 115VAC Hiccup Mode
2	OVER VOLTAGE PROTECTION	8.62V ~ 11.30V	I/P: 264VAC I/P: 230VAC I/P: 80VAC O/P: MIN LOAD TA: 25°C	10.24V 264VAC 10.22V 230VAC 10.24V 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 9.0A	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). 524.00V (2). 492.00V (3). 516.00V
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°C	(1). 356.00V (2). 368.00V (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°C	U1 (1). 23.00V (2). 11.60V (3). 23.80V (4). 22.00V (5). 18.80V
4	O/P Diode	D100 Rated : 60V 20.0A	I/P : 267VAC O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1). 47.60V (2). 42.00V (3). 47.60V
5	Clamp Diode	D5 Rated : 800V 2.0A	I/P : 267VAC O/P : (1)Full load continue Ta : 25°C	(1). 476.00V

**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: 1.36mA 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



2	CONDUCTION	EN55022 CLASS B	I/P : 230VAC /50HZ O/P : FULL LOAD / 50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	EN55022 CLASS B	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C	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°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 INDUSTRY L-N: 2KV;L/N-PE: 4KV	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-45S-7.5 1. ROOM AMBIENT BURN-IN : 1.0hrs IP: 230VAC                   O/P: 100% LOAD                   TA= 31.3°C 2. HIGH AMBIENT BURN-IN : 1.0hrs IP: 230VAC                   O/P: 100% LOAD                   TA= 44.6°C	<table border="1"> <thead> <tr> <th>NO.</th> <th>Position</th> <th>ROOM AMBIENT 31.3°C</th> <th>HIGH AMBIENT Ta: 44.6°C</th> </tr> </thead> <tbody> <tr><td>1</td><td>LF1</td><td>47.1°C</td><td>61.5°C</td></tr> <tr><td>2</td><td>LF2</td><td>46.4°C</td><td>59.4°C</td></tr> <tr><td>3</td><td>BD1</td><td>70.2°C</td><td>83.4°C</td></tr> <tr><td>4</td><td>Q1</td><td>76.3°C</td><td>89.5°C</td></tr> <tr><td>5</td><td>C5</td><td>56.0°C</td><td>69.6°C</td></tr> <tr><td>6</td><td>C40</td><td>65.4°C</td><td>79.4°C</td></tr> <tr><td>7</td><td>T1</td><td>68.1°C</td><td>79.5°C</td></tr> <tr><td>8</td><td>D100</td><td>90.6°C</td><td>103.7°C</td></tr> <tr><td>9</td><td>C105</td><td>70.0°C</td><td>82.3°C</td></tr> <tr><td>10</td><td>C106</td><td>63.6°C</td><td>75.0°C</td></tr> <tr><td>11</td><td>C107</td><td>51.2°C</td><td>62.2°C</td></tr> <tr><td>12</td><td>L100</td><td>53.2°C</td><td>64.7°C</td></tr> <tr><td>13</td><td>U1</td><td>59.2°C</td><td>73.0°C</td></tr> </tbody> </table>	NO.	Position	ROOM AMBIENT 31.3°C	HIGH AMBIENT Ta: 44.6°C	1	LF1	47.1°C	61.5°C	2	LF2	46.4°C	59.4°C	3	BD1	70.2°C	83.4°C	4	Q1	76.3°C	89.5°C	5	C5	56.0°C	69.6°C	6	C40	65.4°C	79.4°C	7	T1	68.1°C	79.5°C	8	D100	90.6°C	103.7°C	9	C105	70.0°C	82.3°C	10	C106	63.6°C	75.0°C	11	C107	51.2°C	62.2°C	12	L100	53.2°C	64.7°C	13	U1	59.2°C	73.0°C	
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P : 230VAC O/P : 132% 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	±0.0100% /°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																																																								



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). 104779.8 HRS (2). 19866.9 HRS (3). 51275.1 HRS (4). 97762.8 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