



TEST REPORT: EPS-65S-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

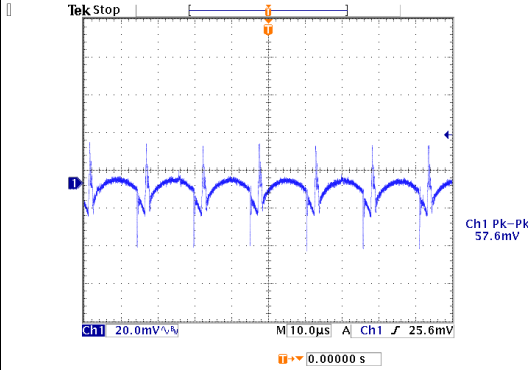
Safety Test

E.M.C. Test

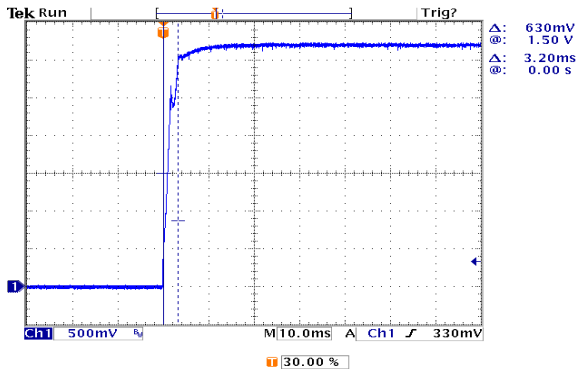
■ RELIABILITY TEST

ENVIRONMENT TEST

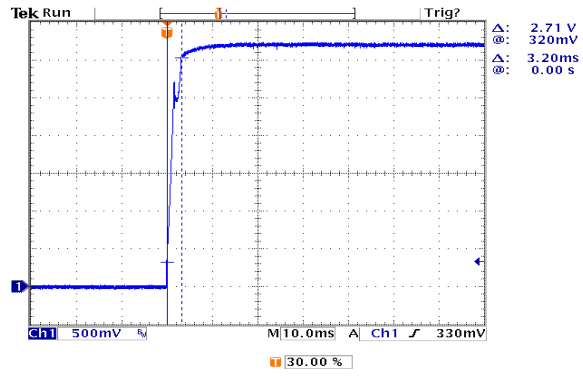
DESIGN VERIFY TEST OUTPUT FUNCTION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 2.90V ~ 3.60V	I/P : 230VAC O/P: MIN LOAD TA : 25°C	CH1: 2.79V ~ 3.73V
2	OUTPUT VOLTAGE TOLERANCE (Max)	V1 : 2.0% ~ -2.0%	I/P : 115VAC / 264VAC O/P: FULL / MINLOAD TA= 25°C	V1: 0.75% ~ -0.36%
3	LINE REGULATION (MAX.)	V1 : 0.5% ~ -0.5%	I/P : 115VAC / 264VAC O/P: FULL LOAD TA : 25°C	V1: 0.00% ~ -0.18%
4	LOAD REGULATION (MAX.)	V1 : 2.0% ~ -2.0%	I/P : 230VAC O/P: MIN LOAD ~ FULL LOAD TA : 25°C	V1: 0.75% ~ -0.36%
5	OVER/UNDERSHOOT TEST	< ±15%	I/P : 230VAC O/P: FULL LOAD TA : 25°C	TEST< 2.410 %
6	RIPPLE & NOISE(Max)	V1 : 80 mVp-p	I/P : 230VAC O/P: FULL LOAD TA : 25°C	V1 : 58.4 mVp-p
		high frequency :  Ch1 Pk-Pk 57.6mV		
7	SET UP TIME (MAX.)	230VAC : 500ms 115VAC : 500ms	I/P : 230VAC I/P : 115VAC	230VAC 22ms 115VAC 24ms
		INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage		
8	RISE TIME (MAX.)	230VAC : 30ms 115VAC : 30ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25°C	230VAC : 3.2ms 115VAC : 3.2ms
		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage		

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



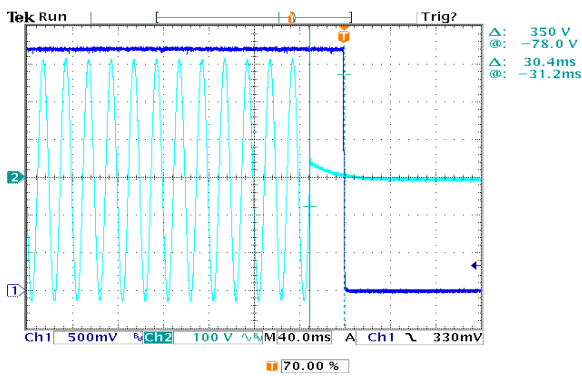
INPUT=115VAC/60HZ @ FULL LOAD
CH1 : Output Voltage



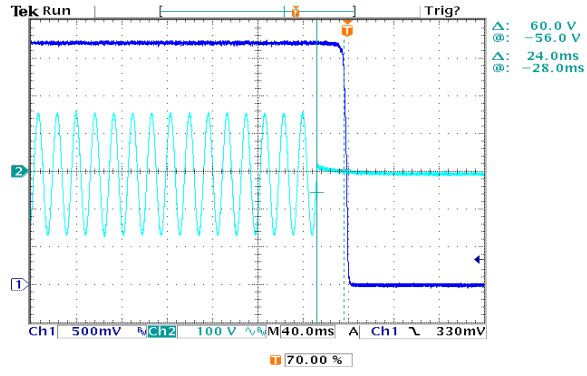
HOLD UP TIME (TYP.)

230VAC	: 30ms	I/P : 230VAC	230VAC	: 30.4ms
115VAC	: 12ms	I/P : 115VAC	115VAC	: 24.0ms
		O/P: FULL LOAD		
		TA : 25°C		

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



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

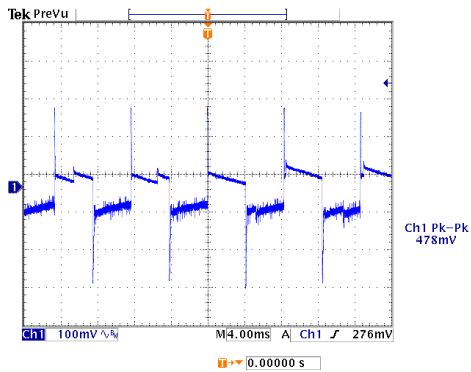
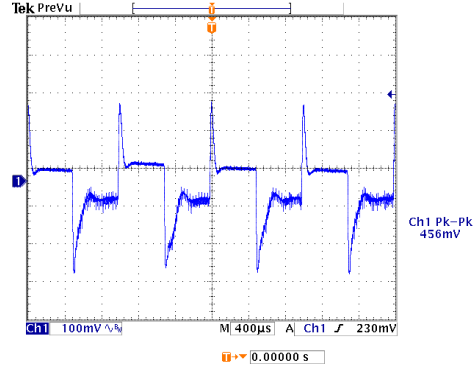


DYNAMIC LOAD

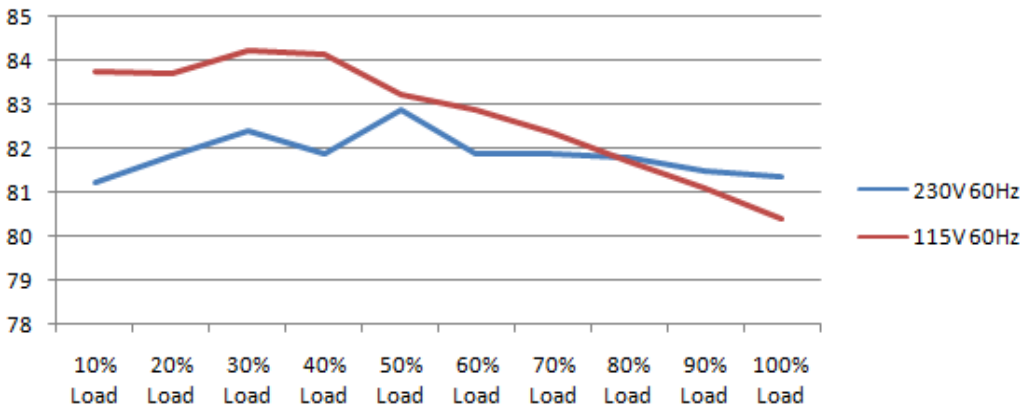
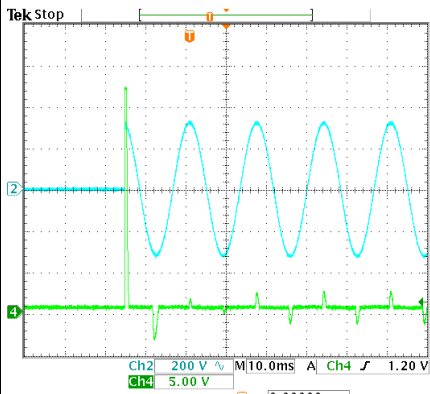
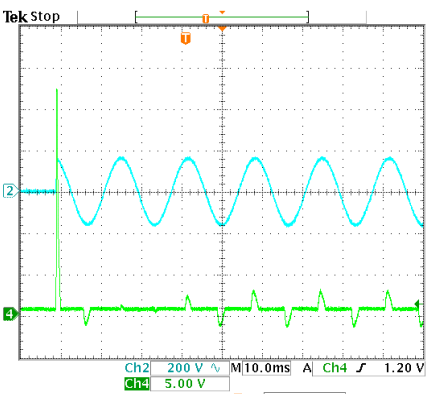
V1 : 990 mVp-p	I/P : 230VAC	(1).	(2).	unit:mVp-p
	O/P:	478.0mv	456.0mv	
	(1)Full/Min load 50%duty/120HZ			
	(2)Full/Min load 50%duty/1KHZ			
	TA : 25°C			

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°C 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)	64.4VAC ~ 264VAC 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= 0.397 / 230VAC I= 0.651 / 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	< 0.0472 W
6	EFFICIENCY (TYP.)	80.0%	I/P : 230VAC O/P : FULL LOAD TA : 25°C	81.45 %
				
7	INRUSH CURRENT (TYP.)	50A / 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= 27.20A / 230VAC I= 27.20A / 115VAC
<div> <div> <p>INPUT=230VAC/50HZ @ FULL LOAD</p> <p>CH2 : Input current (1V=1A) CH4 : AC Input Voltage</p>  </div> <div> <p>INPUT=115VAC/50HZ @ FULL LOAD</p> <p>CH2 : Input current (1V=1A) CH4 : AC Input Voltage</p>  </div> </div>				



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	130.4% 264VAC 135.2% 230VAC 129.2% 115VAC Hiccup Mode
2	OVER VOLTAGE PROTECTION	3.80V ~ 4.46V	I/P: 264VAC I/P: 230VAC I/P: 80VAC O/P: MIN LOAD Ta: 25°C	4.06V 264VAC 4.06V 230VAC 4.06V 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). 496.00V (2). 512.00V (3). 508.00V
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). 352.00V (2). 358.00V (3). 356.00V
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). 25.70V (2). 24.70V (3). 26.10V (4). 18.20V (5). 26.60V
4	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 Ta : 25°C	(1). 36.40V (2). 33.80V (3). 36.20V
5	Clamp Diode	D5 Rated : 800V 2.0A	I/P : 267VAC O/P : (1)Full load continue Ta : 25°C	(1). 354.00V

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: 1.42mA 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-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																																																														
		<table><tr><td>NO.</td><td>Position</td><td>ROOM AMBIENT 27.0°C</td><td>HIGH AMBIENT Ta: 50.0°C</td></tr><tr><td>1</td><td>LF1</td><td>54.7°C</td><td>71.9°C</td></tr><tr><td>2</td><td>LF2</td><td>47.8°C</td><td>66.1°C</td></tr><tr><td>3</td><td>BD1</td><td>82.9°C</td><td>101.5°C</td></tr><tr><td>4</td><td>Q1</td><td>86.6°C</td><td>105.3°C</td></tr><tr><td>5</td><td>C5</td><td>65.2°C</td><td>82.9°C</td></tr><tr><td>6</td><td>C40</td><td>71.6°C</td><td>90.2°C</td></tr><tr><td>7</td><td>T1</td><td>81.4°C</td><td>95.8°C</td></tr><tr><td>8</td><td>D100</td><td>106.1°C</td><td>121.6°C</td></tr><tr><td>9</td><td>D101</td><td>111.6°C</td><td>126.0°C</td></tr><tr><td>10</td><td>C105</td><td>91.5°C</td><td>98.5°C</td></tr><tr><td>11</td><td>C106</td><td>93.0°C</td><td>99.5°C</td></tr><tr><td>12</td><td>C107</td><td>67.1°C</td><td>78.3°C</td></tr><tr><td>13</td><td>L101</td><td>83.3°C</td><td>84.7°C</td></tr><tr><td>14</td><td>U1</td><td>67.8°C</td><td>85.4°C</td></tr></table>			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
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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																																																												
		1 Carton & 1 Set		TEST : OK																																																												



8	VIBRATION TEST	(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	
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	MIL-HDBK-217F TOTAL FAILURE RATE : 959.1 KHRS	
11	DMTBF /Accelerated Life test	Demonstration Mean Time Between Failure (Expected Life): Above 50000HRS @ TA 50°C	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	FRANK	GESG	WANGDZ

2007/3/20 A50-S014