



Test Report: HSN-300-5B

300W 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

■ RELIABILITY TEST

ENVIRONMENT TEST

■ DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1 : 150 mVp-p (Max)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	V1 : 95 mVp-p (Max)	PASS
2	OUTPUT VOLTAGE ADJUST RANGE	V1 : 4.5 V ~ 5.5 V	I/P : 230 VAC O/P : NO LOAD Ta : 25°C	V1 : 4.35V~ 5.61V / 230 VAC	PASS
3	OUTPUT VOLTAGE TOLERANCE	V1 : -3%~ 3% (Max)	I/P : 180 VAC / 264 VAC O/P : FULL/ NO LOAD Ta : 25°C	V1 : -0.06 %~ 0.47 %	PASS
4	LINE REGULATION	V1 : -0.5%~ 0.5% (Max)	I/P : 180 VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : -0.003 %~ 0.003 %	PASS
5	LOAD REGULATION	V1 : -2%~ 2% (Max)	I/P : 230 VAC O/P : FULL~NO LOAD Ta : 25°C	V1 : -0.06 %~ 0.07 %	PASS
6	SET UP TIME	230VAC : 2500 ms (Max)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 948 ms	PASS
7	RISE TIME	230VAC : 100 ms (Max)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 5.7 ms	PASS
8	HOLD UP TIME	230VAC : 10 ms (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 26.9 ms	PASS
9	OVER/UNDERSHOOT TEST	< ±10%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : < ±10 %	PASS
10	DYNAMIC LOAD	V1 : 1000 mVp-p	I/P : 230 VAC (1).O/P : FULL /NO LOAD 90%DUTY/ 1KHZ (2).O/P : FULL /NO LOAD 50%DUTY/ 120HZ Ta : 25°C	(1) 488 mVp-p (2) 708 mVp-p	PASS

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	180 VAC~264 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C	177 V~264 V	PASS
			I/P : (1)LOW-LINE-3V=177 V HIGH-LINE+15%=300 V O/P : FULL/MIN LOAD ON : 30 Sec OFF : 30 Sec 10MIN (2)230Vac ON : 0.5 Sec OFF : 0.5 Sec 20MIN (3)230Vac ON : 3Sec OFF : 3Sec 12HOURS (POWER ON/OFF NO DAMAGE)	TEST : OK	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P : 180 VAC ~ 264 VAC O/P : FULL ~NO LOAD Ta : 25°C	TEST : OK	PASS
3	EFFICIENCY	86% (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	86.24%	PASS
4	INPUT CURRENT	230V/ 3 A (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I = 2.756 A/ 230 VAC	PASS
5	INRUSH CURRENT	230V/ 90 A (TYP) COLD START	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I = 86.72 A	PASS
6	LEAKAGE CURRENT	< 1 mA	I/P : 264 VAC O/P : NO LOAD Ta : 25°C	L-CASE : 0.665 mA N-CASE : 0.670 mA	PASS

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 % ~ 140 %	I/P : 200 VAC I/P : 230 VAC I/P : 264 VAC O/P : TESTING Ta : 25°C	121.0 %/ 200 VAC 121.5 %/ 230 VAC 122.2 %/ 264 VAC Hiccup mode,recovers automatically after fault condition is removed	PASS
2	OVER VOLTAGE PROTECTION	CH1 : 5.7 V ~ 7.0 V	I/P : 180 VAC I/P : 230 VAC I/P : 264 VAC O/P : NO LOAD Ta : 25°C	6.05 V/ 180 VAC 5.99 V/ 230 VAC 6.01 V/ 264 VAC Hiccup mode,recovers automatically after fault condition is removed	PASS
3	OVER TEMPERATURE PROTECTION	SPEC : O.T.P. NO DAMAGE	I/P : 230 VAC O/P : FULL LOAD	O.T.P. Active Shut down o/p voltage , recovers automatically after temperature goes down	PASS
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 264 VAC O/P : FULL LOAD Ta : 25°C	NO DAMAGE Hiccup mode,recovers automatically after fault condition is removed.	PASS

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q2 Rated 600 V 20A	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) 458 V (2) 432 V (3) 418 V	PASS
2	Diode Peak Voltage	Q100 Rated 40 V 120 A Q102 Rated 40 V 208 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) 25.2 V (2) 24.8 V (3) 24.6 V (1) 27.6 V (2) 26.7 V (3) 26.5 V	PASS
3	Input Capacitor Voltage	C5 Rated 470uF / 200 V	I/P : High-Line +3V = 267 V O/P : (1) FULL LOAD Turn on /Off (2) NO load Turn on /Off (3) FULL LOAD /Min load Change Ta : 25°C	(1) 190 V (2) 175 V (3) 180 V	PASS
4	Control IC Voltage Test	U1 Rated 30V	I/P : High-Line +3V = 267 V O/P : (1) FULL LOAD Turn on /Off (2) NO load Turn on /Off (3) FULL LOAD /Min load Change Ta : 25°C	(1) 20.5 V (2) 20.1 V (3) 20.4 V	PASS

SAFETY 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 : 2.908 mA I/P-FG : 2.809 mA O/P-FG : 2.023 mA NO DAMAGE	PASS
2	ISOLATION RESISTANCE	I/P-O/P : 500VDC>100MΩ I/P-FG : 500VDC>100MΩ O/P-FG : 500VDC>100MΩ	I/P-O/P : 500 VDC I/P-FG : 500 VDC O/P-FG : 500 VDC Ta : 25°C/70% RH	I/P-O/P : >9999MΩ I/P-FG : >9999MΩ O/P-FG : >9999MΩ NO DAMAGE	PASS
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta : 25°C	11 mΩ	PASS

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																																																																				
1	TEMPERATURE RISE TEST	MODEL : HSN-300-5B 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta=36.1℃ 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta=49.1℃			PASS																																																																																				
		<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 36.1℃</th> <th>HIGH AMBIENT Ta= 49.1℃</th> </tr> </thead> <tbody> <tr><td>1</td><td>C5</td><td>72.4℃</td><td>87.8℃</td></tr> <tr><td>2</td><td>Q1</td><td>86.3℃</td><td>106.1℃</td></tr> <tr><td>3</td><td>Q2</td><td>87.1℃</td><td>107.6℃</td></tr> <tr><td>4</td><td>C166</td><td>91.6℃</td><td>103.4℃</td></tr> <tr><td>5</td><td>T1</td><td>94.1℃</td><td>106.2℃</td></tr> <tr><td>6</td><td>Q100</td><td>73.4℃</td><td>83.9℃</td></tr> <tr><td>7</td><td>Q101</td><td>76.4℃</td><td>85.3℃</td></tr> <tr><td>8</td><td>Q102</td><td>79.4℃</td><td>93.8℃</td></tr> <tr><td>9</td><td>Q103</td><td>75.1℃</td><td>89.3℃</td></tr> <tr><td>10</td><td>L100</td><td>99.5℃</td><td>112.0℃</td></tr> <tr><td>11</td><td>C106</td><td>88.0℃</td><td>96.3℃</td></tr> <tr><td>12</td><td>U1</td><td>73.0℃</td><td>86.2℃</td></tr> <tr><td>13</td><td>R106</td><td>81.2℃</td><td>92.1℃</td></tr> <tr><td>14</td><td>C35</td><td>82.0℃</td><td>94.2℃</td></tr> <tr><td>15</td><td>T2</td><td>87.0℃</td><td>99.0℃</td></tr> <tr><td>16</td><td>D5</td><td>95.2℃</td><td>106.1℃</td></tr> <tr><td>17</td><td>U160</td><td>95.4℃</td><td>101.7℃</td></tr> <tr><td>18</td><td>D6</td><td>88.7℃</td><td>102.9℃</td></tr> <tr><td>19</td><td>TSW1</td><td>86.7℃</td><td>95.6℃</td></tr> <tr><td>20</td><td>Tc</td><td>65.3℃</td><td>77.0℃</td></tr> </tbody> </table>	NO	Position		ROOM AMBIENT Ta= 36.1℃	HIGH AMBIENT Ta= 49.1℃	1	C5	72.4℃	87.8℃	2	Q1	86.3℃	106.1℃	3	Q2	87.1℃	107.6℃	4	C166	91.6℃	103.4℃	5	T1	94.1℃	106.2℃	6	Q100	73.4℃	83.9℃	7	Q101	76.4℃	85.3℃	8	Q102	79.4℃	93.8℃	9	Q103	75.1℃	89.3℃	10	L100	99.5℃	112.0℃	11	C106	88.0℃	96.3℃	12	U1	73.0℃	86.2℃	13	R106	81.2℃	92.1℃	14	C35	82.0℃	94.2℃	15	T2	87.0℃	99.0℃	16	D5	95.2℃	106.1℃	17	U160	95.4℃	101.7℃	18	D6	88.7℃	102.9℃	19	TSW1	86.7℃	95.6℃	20	Tc	65.3℃	77.0℃		
NO	Position	ROOM AMBIENT Ta= 36.1℃	HIGH AMBIENT Ta= 49.1℃																																																																																						
1	C5	72.4℃	87.8℃																																																																																						
2	Q1	86.3℃	106.1℃																																																																																						
3	Q2	87.1℃	107.6℃																																																																																						
4	C166	91.6℃	103.4℃																																																																																						
5	T1	94.1℃	106.2℃																																																																																						
6	Q100	73.4℃	83.9℃																																																																																						
7	Q101	76.4℃	85.3℃																																																																																						
8	Q102	79.4℃	93.8℃																																																																																						
9	Q103	75.1℃	89.3℃																																																																																						
10	L100	99.5℃	112.0℃																																																																																						
11	C106	88.0℃	96.3℃																																																																																						
12	U1	73.0℃	86.2℃																																																																																						
13	R106	81.2℃	92.1℃																																																																																						
14	C35	82.0℃	94.2℃																																																																																						
15	T2	87.0℃	99.0℃																																																																																						
16	D5	95.2℃	106.1℃																																																																																						
17	U160	95.4℃	101.7℃																																																																																						
18	D6	88.7℃	102.9℃																																																																																						
19	TSW1	86.7℃	95.6℃																																																																																						
20	Tc	65.3℃	77.0℃																																																																																						
2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/200VAC O/P : FULL LOAD Ta= -25℃	TEST : OK	PASS																																																																																				
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 45 ℃ NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta= 45 ℃ HUMIDITY= 95% R.H	TEST : OK	PASS																																																																																				
4	TEMPERATURE COEFFICIENT	±0.03 %(0~60℃)	I/P : 230 VAC O/P : FULL LOAD	±0.01 %(0~60℃)	PASS																																																																																				
5	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45℃~ +90℃ 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		OK	PASS																																																																																				

6	THERMAL SHOCK TEST	1. Thermal shock Temperature : -25°C~+50°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	PASS
7	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 4G (5) Test Time : 90min in each axis (X.Y.Z) (6) Ta : 25°C	TEST : OK	PASS
8	CAPACITOR LIFE CYCLE	HSN-300-5B: SUPPOSE C106 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=45 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta=45 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta=45 °C LIFE TIME	(1) 46055 HRS (2) 15965 HRS (3) 46384 HRS (4) 96710 HRS	PASS
9	MTBF	Conducted by Parts Stress Analysis Prediction 1758.2K hrs min. Telcordia SR-332 (Bellcore) ; 226.5K hrs min. MIL-HDBK-217F (25°C)		PASS
10	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 20000 hours @ Tcase 70°C		PASS

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	ZHANGZJ/ZHUOKB	SKY	LIUWY