



Test Report: SD-100A-24

100W Single Output DC-DC Converter

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Control Function Test

Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test

E.M.C. Test

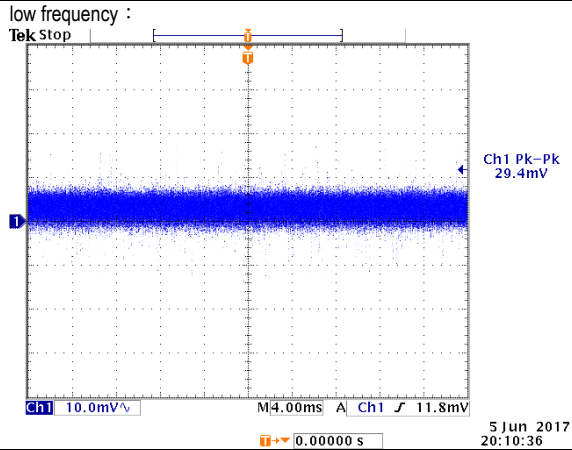
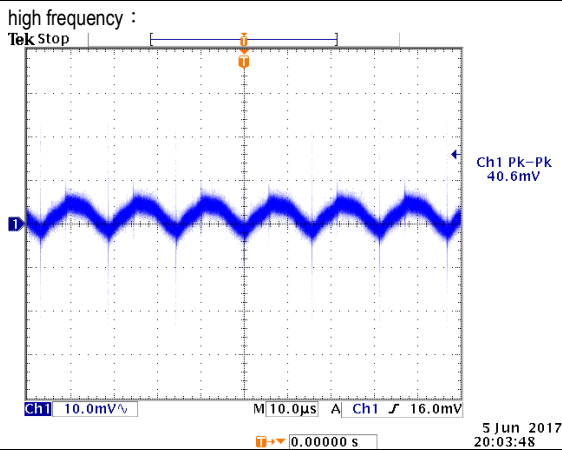
■ RELIABILITY TEST

ENVIRONMENT TEST

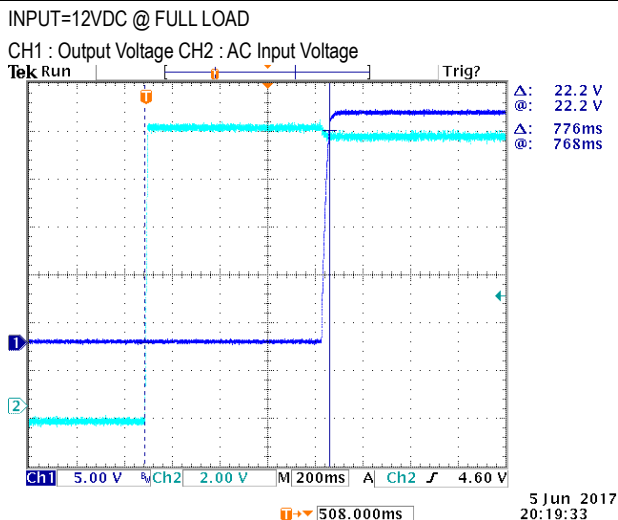
DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE TOLERANCE (Max)	V1: 1%~-1%	I/P: 9.5VDC / 18 VDC O/P: FULL / MIN. LOAD Ta: 25°C	V1: 0.02%~-0.01%
2	LINE REGULATION (Max)	V1: 0.2%~-0.2%	I/P: 10VDC / 18 VDC O/P: FULL LOAD Ta: 25°C	V1: 0.01%~-0.01%
3	LOAD REGULATION (Max)	V1: 0.2%~-0.2%	I/P: 12VDC O/P: FULL ~MIN LOAD Ta: 25°C	V1: 0.02%~-0.01%
4	OVER/UNDERSHOOT TEST	< ±5%	I/P: 12 VDC O/P: FULL LOAD Ta: 25°C	TEST: 2.101%
5	RIPPLE & NOISE (Max)	V1: 150mVp-p	I/P: 12 VDC O/P: FULL LOAD Ta: 25°C	V1: 40.6mVp-p



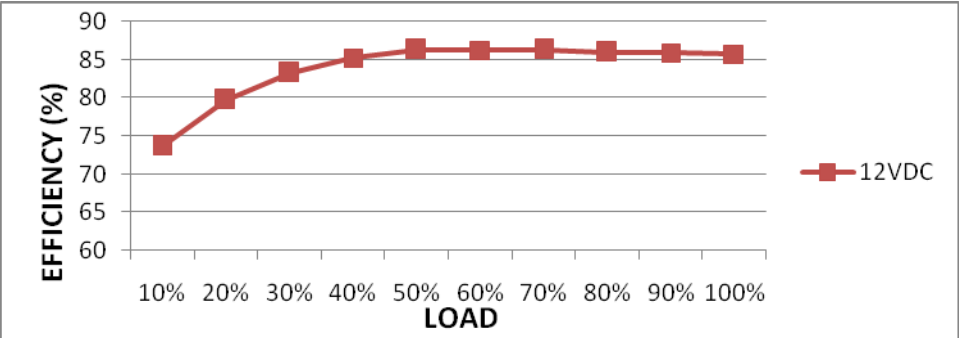
6	SET UP TIME (Max)	12VDC/ 2000 ms	I/P: 12VDC O/P: FULL LOAD Ta: 25°C	776 ms
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7	RISE TIME (Max)	12VDC/ 50ms	I/P: 12 VDC O/P:FULL LOAD Ta:25°C	29.2 ms
<p>INPUT=12VDC FULL LOAD</p> <p>CH1 : Output Voltage</p> <p>Ch1 Rise 29.16ms</p> <p>6 Jun 2017 09:07:15</p>				
8	DYNAMIC LOAD	V1: 2400mVp-p	I/P: 12VDC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C	167mVp-p 209mVp-p
<p>FULL /50% LOAD 50%DUTY / 120HZ</p> <p>Ch1 Pk-Pk 167mV</p> <p>FULL /50% LOAD 50%DUTY / 1KHZ</p> <p>Ch1 Pk-Pk 209mV</p> <p>6 Jun 2017 09:23:22</p> <p>6 Jun 2017 09:26:34</p>				

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	9.5VDC~ 18 VDC	I/P: TESTING O/P:FULL LOAD Ta:25°C I/P: LOW-LINE-0.2=9.3 V HIGH-LINE+3V=21 V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec . OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	8.75V~21V TEST OK
2	INPUT CURRENT(TYP)	12VDC/ 10A	I/P: 12VDC O/P:FULL LOAD Ta:25°C	I=9.86A/12VDC

3	EFFICIENCY(TYP)	84 %	I/P:12 VDC O/P:FULL LOAD Ta:25°C	85.76%																						
<p>EFFICIENCY vs LOAD</p>  <table border="1"> <caption>Efficiency vs Load Data (12VDC)</caption> <thead> <tr> <th>LOAD (%)</th> <th>EFFICIENCY (%)</th> </tr> </thead> <tbody> <tr><td>10%</td><td>74</td></tr> <tr><td>20%</td><td>80</td></tr> <tr><td>30%</td><td>83</td></tr> <tr><td>40%</td><td>85</td></tr> <tr><td>50%</td><td>86</td></tr> <tr><td>60%</td><td>86</td></tr> <tr><td>70%</td><td>86</td></tr> <tr><td>80%</td><td>86</td></tr> <tr><td>90%</td><td>86</td></tr> <tr><td>100%</td><td>86</td></tr> </tbody> </table>					LOAD (%)	EFFICIENCY (%)	10%	74	20%	80	30%	83	40%	85	50%	86	60%	86	70%	86	80%	86	90%	86	100%	86
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PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105%~ 135 %RATED OUTPUT POWER	I/P: 10VDC I/P: 12VDC I/P: 18VDC O/P:TESTING Ta:25°C	117% 115% 112% PROTECTION TYPE : HICCUP MODE
2	OVER VOLTAGE PROTECTION	CH: 31.5 V~37.5 V	I/P: 10VDC I/P: 12VDC I/P: 18VDC O/P:10% LOAD Ta:25°C	34.1V 34.1V 34.1V PROTECTION TYPE : HICCUP MODE
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 21 VDC O/P: FULL LOAD Ta:25°C	NO DAMAGE PROTECTION TYPE : HICCUP MODE

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated : 97 A/ 100 V VGS :± 20V	I/P:High-Line +3V =21V DC ON/OFF VDS: O/P: (1)Full Load (2)Output Short (3) Full load continue	VDS: (1)60.2V (2)61.6V (3)56.8V VGS: (1)13.5V (2)13.6V (3)9.2V
2	Diode Peak Voltage	Q101 Rated : 20 A/ 170 V Q102 Rated : 10 A/ 200 V	I/P:High-Line +3V =21 V DC ON/OFF O/P: (1)Full Load (2)Output Short (3) Full load continue Ta:25°C	Q101: VDS: (1)132V (2)96.4V (3)130V Q102 VDS: (1)178V (2)174V (3)179V
3	Input Capacitor Voltage	C5 Rated: : 3300 μ / 25 V °C / Series	I/P:High-Line +3V =21 V O/P: (1)Full Load input on/off (2) Min load input on /Off (3)Full Load /Min load Change (4)Full load continue Ta:25°C	(1)22.6V (2)21.6V (3)22.5V (4)22.4V

4	Control IC Voltage Test	PWM IC U1 Rated 30V (1).IC VCC 具有自动重后功能时，需确认空载时 IC VCC 电压波形是否抖动 <u> N </u>	I/P:High-Line +3V =21 V DC ON/OFF O/P(1)FULL LOAD (2) Output Short (3)O.L.P (4)O.V.P. (5)NO LOAD VR 下限.LOW LINE Ta:25°C	(1) 14.6V (2) 9.4V (3) 14.5V (4) 18.8V (5) 12.0V
5	Clamp Diode Peak Voltage	D 6 Rated : 200 V 2A	I/P : High-Line +3V = 21 V DC ON/OFF O/P : (1) Dynamic Load 90%Duty/1KHz (2)Full load continue Ta : 25°C	(1)51.6V (2)50.8V

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	EN 60950-1 I/P-O/P:1.5KVDC/min I/P-FG:2 KVDC/min O/P-FG:0.5KVDC/min	I/P-O/P: 1.8KVDC/min I/P-FG: 2.4 KVDC/min O/P-FG:0.6KVDC/min Ta:25°C	I/P-O/P: 0.527mA I/P-FG: 1.553mA O/P-FG: 1.133 mA NO DAMAGE
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	I/P-O/P: 6655MΩ I/P-FG: 6196MΩ O/P-FG: 1911MΩ NO DAMAGE
3	GROUNDING CONTINUITY	EN 60950-1 FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	10mΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	RADIATION	<input checked="" type="checkbox"/> EN55022 <input type="checkbox"/> EN55011 <input type="checkbox"/> CLASS A <input checked="" type="checkbox"/> CLASS B	I/P: 12VDC O/P:FULL LOAD Ta:25°C	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL Test by certified Lab
2	E.S.D	EN61000-4-2 <input type="checkbox"/> MEDICAL AIR: 15KV / Contact: 8KV <input checked="" type="checkbox"/> LIGHT INDUSTRY AIR: 8KV / Contact: 4KV <input type="checkbox"/> INDUSTRY AIR: 8KV / Contact: 4KV <input type="checkbox"/> Din rail Model : AIR: 15KV / Contact: 8KV	I/P: 12VDC O/P:FULL LOAD Ta:25°C	<input checked="" type="checkbox"/> CRITERIA A <input type="checkbox"/> CRITERIA B
3	E.F.T	EN61000-4-4 <input checked="" type="checkbox"/> LIGHT INDUSTRY INPUT: 0.5KV <input type="checkbox"/> MEDICAL <input type="checkbox"/> INDUSTRY INPUT: 1KV	I/P: 12VDC O/P:FULL LOAD Ta:25°C	<input checked="" type="checkbox"/> CRITERIA A <input type="checkbox"/> CRITERIA B
4	SURGE	IEC61000-4-5 <input type="checkbox"/> MEDICAL <input checked="" type="checkbox"/> LIGHT INDUSTRY L-N :0.5KV L,N-PE:0.5KV	I/P: 12VDC O/P:FULL LOAD Ta:25°C	<input checked="" type="checkbox"/> CRITERIA A <input type="checkbox"/> CRITERIA B

		<input type="checkbox"/> INDUSTRY L-N :1KV L,N-PE:1KV	
5	Test by certified Lab & Test Report Prepare		

RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																																																								
1	TEMPERATURE RISE TEST	MODEL : SD-100A-24 1. ROOM AMBIENT BURN-IN : 1 HRS I/P : 12VDC O/P : FULL LOAD Ta= 25.5 °C 2. HIGH AMBIENT BURN-IN : 1 HRS I/P : 12VDC O/P : FULL LOAD Ta= 41.0 °C																																																																																										
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 12 VDC O/P : >105 % LOAD Ta : 25°C	TEST : OK																																																																																								
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 12 VDC/ 10 VDC O/P : 100 % LOAD Ta= -20 °C	TEST : OK																																																																																								
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 40 °C NO DAMAGE	I/P : 21 VDC O/P : FULL LOAD Ta= 40 °C HUMIDITY= 95 %R.H	TEST : OK																																																																																								
5	TEMPERATURE COEFFICIENT	± 0.03 %(0~50°C)	I/P : 12 VDC O/P : FULL LOAD	± 0.0000 %(0~50°C)																																																																																								

6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45°C~ +90°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
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -5°C~ +45°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 : 12VDC/Full Load DC ON/OFF TEST turn on 58sec ; turn off 2sec	OK
8	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 3G (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 : 12VDC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 12VDC O/P : FULL LOAD Ta= 40 °C LIFE TIME (3) I/P : 12VDC O/P : 75% LOAD Ta= 40°C LIFE TIME (4) I/P : 12VDC O/P : 50% LOAD Ta= 40°C LIFE TIME	(1) 804179HRS (2) 256286HRS (3) 329076HRS (4) 399613HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 399.9K hrs min. MIL-HDBK-217F (25°C)	
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 20,000 hours @ TA 50°C	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	LIUTT		WANGDZ

12.10.30 A50-F031