



Test Report: SD-100A-12

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

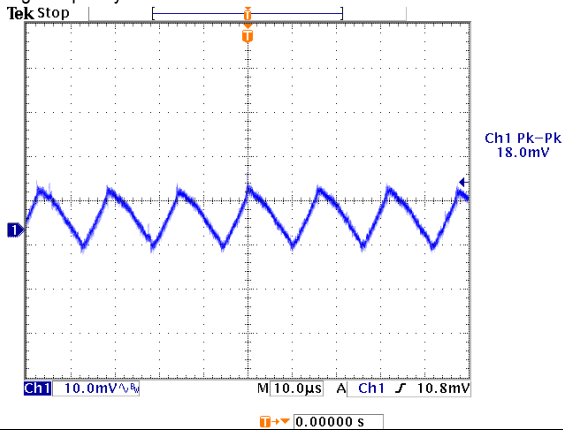
- ENVIRONMENT TEST

DESIGN VERIFY TEST

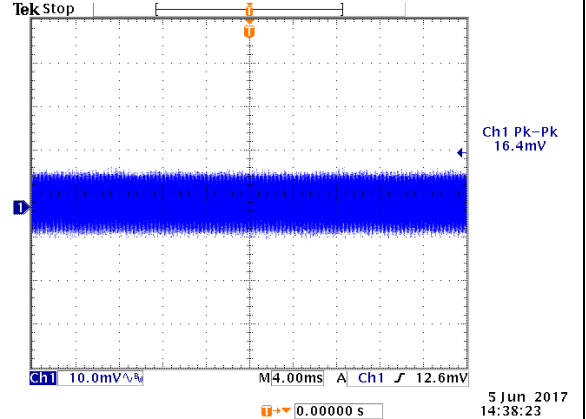
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE TOLERANCE (Max)	V1: 1%~ -1%	I/P: 10VDC / 18VDC O/P:FULL/ MIN. LOAD Ta:25°C	V1: 0.04%~ -0.03 %
2	LINE REGULATION (Max)	V1: 0.3%~0.3 %	I/P: 10VDC /18 VDC O/P:FULL LOAD Ta:25°C	V1: 0 %~ -0 %
3	LOAD REGULATION (Max)	V1: 0.3%~0.3%	I/P: 12VDC O/P:FULL ~MIN LOAD Ta:25°C	V1: 0.04 %~ -0.03 %
4	OVER/UNDERSHOOT TEST	< ±5%	I/P: 12 VDC O/P:FULL LOAD Ta:25°C	TEST: 1.35%
5	RIPPLE & NOISE (Max)	V1: 120 mVp-p	I/P: 12 VDC O/P:FULL LOAD Ta:25°C	V1: 18mVp-p

high frequency :



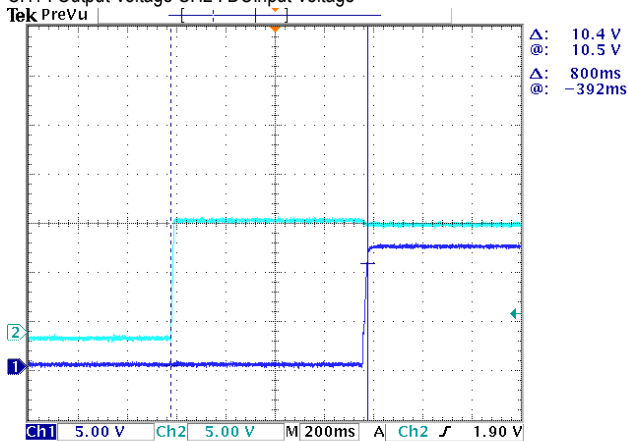
low frequency :

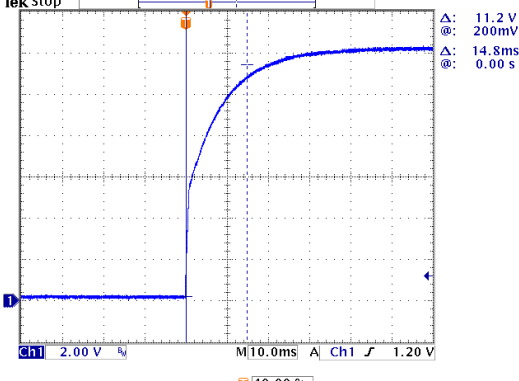
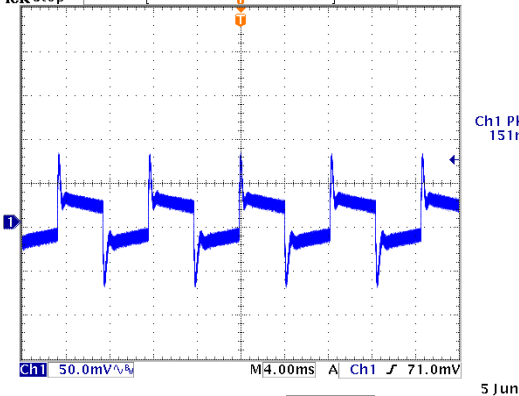
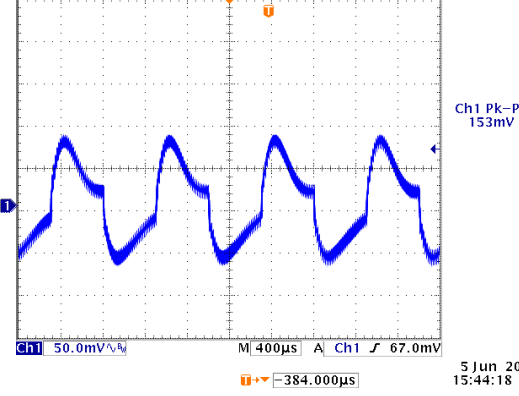


6	SET UP TIME (Max)	12VDC/ 2000 ms	I/P:12 VDC O/P:FULL LOAD Ta:25°C	800 ms
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INPUT=12VDC @ FULL LOAD

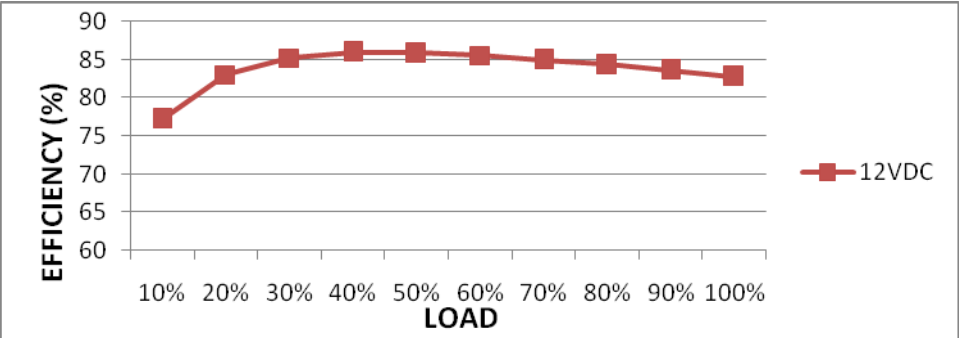
CH1 : Output Voltage CH2 : DCInput Voltage



7	RISE TIME (Max)	12VDC/ 50 ms	I/P: 12VDC O/P:FULL LOAD Ta:25°C	12VDC/ 19.6 ms
<p>INPUT=12VDC @ FULL LOAD CH1 : Output Voltage</p>  <p>Δ: 11.2 V @: 200mV Δ: 14.8ms @: 0.00 s</p> <p>Ch1 2.00 V 10.0ms A Ch1 1.20 V</p>				
8	DYNAMIC LOAD	V1: 1200mVp-p	I/P: 12VDC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C	(1) 151mVp-p (2) 153mVp-p
<p>FULL /50% LOAD 50%DUTY / 120HZ</p>  <p>Ch1 50.0mV/V 4.00ms A Ch1 71.0mV</p> <p>Ch1 Pk-Pk 151mV</p> <p>5 Jun 2017 15:33:32</p>		<p>FULL /50% LOAD 50%DUTY / 1KHZ</p>  <p>Ch1 50.0mV/V 400µs A Ch1 67.0mV</p> <p>Ch1 Pk-Pk 153mV</p> <p>5 Jun 2017 15:44:18</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= 9.2 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)	9.037V~ >21 V TEST__OK__
2	INPUT CURRENT(TYP)	12VDC/ 10.4 A	I/P: 12VDC O/P:FULL LOAD Ta:25°C	I=10.318A/12VDC

3	EFFICIENCY(TYP)	82 %	I/P: 12VDC O/P:FULL LOAD Ta:25°C	82.7%																						
<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>77</td></tr> <tr><td>20%</td><td>83</td></tr> <tr><td>30%</td><td>85</td></tr> <tr><td>40%</td><td>86</td></tr> <tr><td>50%</td><td>86</td></tr> <tr><td>60%</td><td>85</td></tr> <tr><td>70%</td><td>85</td></tr> <tr><td>80%</td><td>84</td></tr> <tr><td>90%</td><td>83</td></tr> <tr><td>100%</td><td>83</td></tr> </tbody> </table>					LOAD (%)	EFFICIENCY (%)	10%	77	20%	83	30%	85	40%	86	50%	86	60%	85	70%	85	80%	84	90%	83	100%	83
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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: 18 VDC I/P: 12 VDC I/P: 10VDC O/P:TESTING Ta:25°C	113.8%/ 18VDC 116.1%/ 12VDC 118.7%/ 10VDC PROTECTION TYPE : Hiccup mode
2	OVER VOLTAGE PROTECTION	CH: 16.8 V~ 20 V	I/P: 10VDC I/P: 12VDC I/P: 18VDC O/P:10% LOAD Ta:25°C	V/ 19.5VDC V/ 19.0 VDC V/ 19.2VDC PROTECTION TYPE : Hiccup mode
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 18 VDC O/P: FULL LOAD Ta:25°C	NO DAMAGE PROTECTION TYPE : Hiccup mode OK

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q 1 Rated : 97 A/ 100 V VGS :± 20 V	I/P:High-Line +3V =21V DC ON/OFF VDS: O/P: (1)Full Load (2)Output Short (3) Full Load Continue Ta:25°C	VDS: (1)68.4V (2)69.2V (3)64.4V VGS: (1)14.7V (2)10.1V (3)14.2V
2	Diode Peak Voltage	Q101 Rated : 20 A/ 100 V Q102 Rated : 20 A/ 100 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)78.4V (2)51.2V (3)78.8V Q102 VDS: (1)86.8V (2) 87.2V (3)87.6V
3	Input Capacitor Voltage	C5 Rated: : 3300 μ/ 25 V	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)22.0V (2)21.8V (3)22.1V (4)22.1v

4	Control IC Voltage Test	PWM IC U1 Rated 30V (1).IC VCC 具有自动重启功能时，需确认空载时 IC VCC 电压波形是否抖动 <u>NO</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) 16.4V (2) 12.4 V (3) 13.9 V (4) 19.7V (5) 10.5V
5	Clamp Diode Peak Voltage	D6 Rated : 200 V 2 A	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)30.8V (2)30.8V

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	EN 60950-1 I/P-O/P:3KVDC/min I/P-FG:2 KVDC/min O/P-FG:0.5KVDC/min	I/P-O/P: 3.6KVDC/min I/P-FG: 2.4 KVDC/min O/P-FG:0.6KVDC/min Ta:25°C	I/P-O/P: 0.674 mA I/P-FG: 1.701mA O/P-FG: 1.290 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: 6200MΩ I/P-FG: 9999MΩ O/P-FG: 6200MΩ 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: VDC 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: VDC 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: VDC 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: VDC 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-5 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 %(0~55°C)	I/P : 12 VDC O/P : FULL LOAD	± 0.0129 %(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) 288076HRS (2) 87991HRS (3) 171785HRS (4) 301160HRS
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