Test Report: DDR-30G-15

30W DIN Rail Type 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

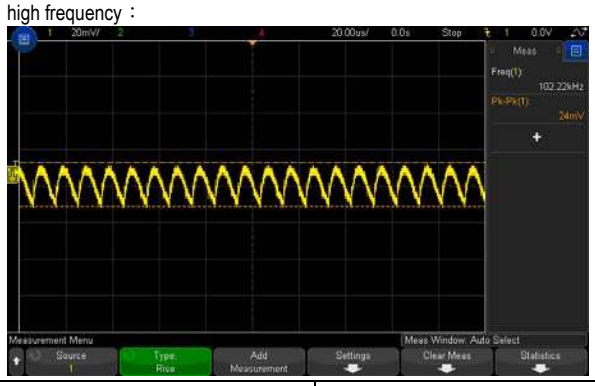
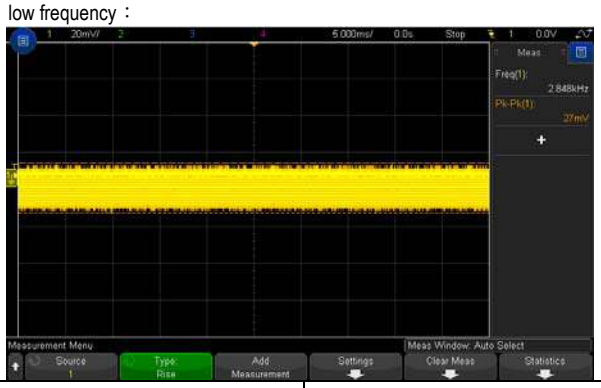
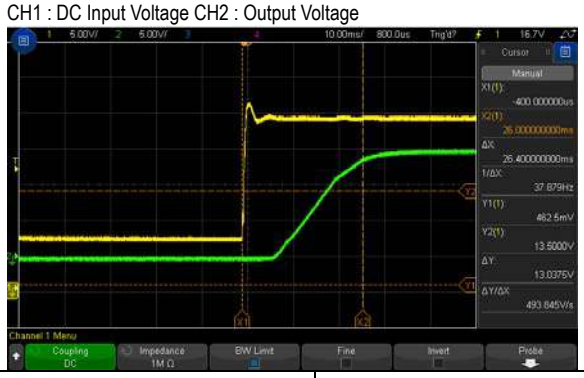
Safety Test
E.M.C. Test

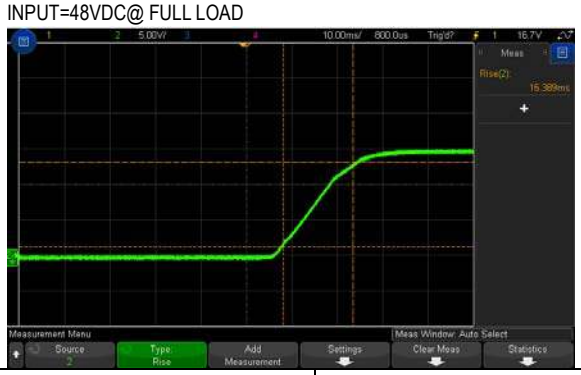
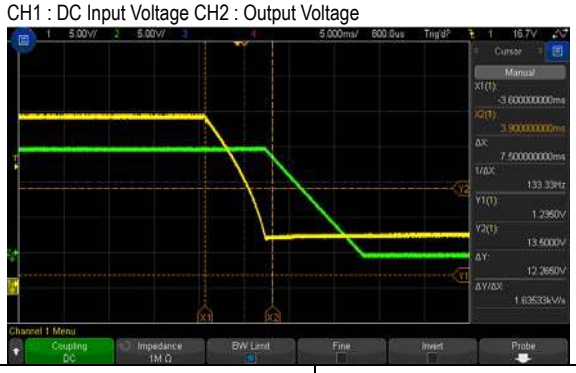
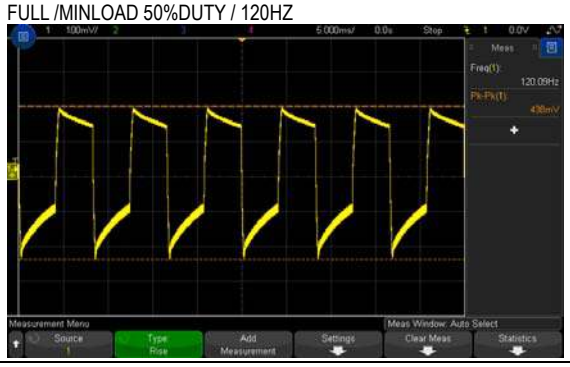
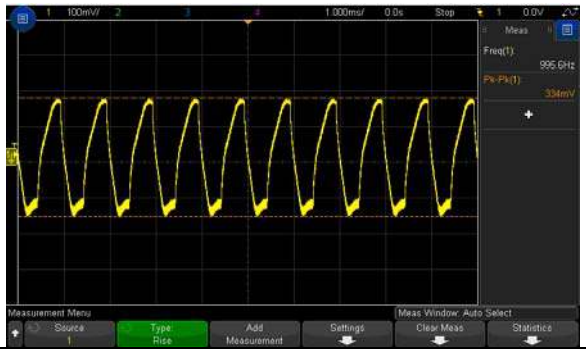
■ RELIABILITY TEST

ENVIRONMENT TEST

■ DESIGN VERIFY TEST

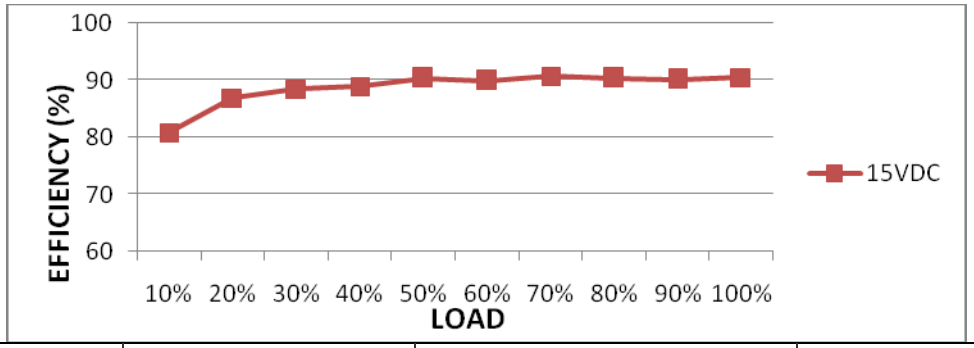
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1:13.5 V~16.5 V	I/P： 24 VDC O/P：MIN LOAD Ta：25℃	13.17V~16.86V
2	OUTPUT VOLTAGE TOLERANCE (Max)	V1: -2%~ 2%	I/P:9 VDC / 36VDC O/P:FULL/ MIN. LOAD Ta:25℃	V1: -0.28 %~ 0.28 %
3	LINE REGULATION (Max)	V1:-0.5%~ 0.5%	I/P: 9VDC /36VDC O/P:FULL LOAD Ta:25℃	V1: -0.01%~ 0.01 %
4	LOAD REGULATION (Max)	V1: -0.5%~ 0.5%	I/P: 24VDC O/P:FULL ~MIN LOAD Ta:25℃	V1: -0.28 %~ 0.28 %
5	OVER/UNDERSHOOT TEST	< ±5%	I/P:24VDC O/P:FULL LOAD Ta:25℃	TEST: 2%
6	RIPPLE & NOISE (Max)	V1: 75 mVp-p	I/P: 24VDC O/P:FULL LOAD Ta:25℃	27mVp-p
	high frequency： 		low frequency： 	
7	SET UP TIME (Max)	24VDC/120 ms	I/P:24 VDC O/P:FULL LOAD Ta:25℃	24VDC/ 26.4 ms
	INPUT=24VDC @ FULL LOAD CH1 : DC Input Voltage CH2 : Output Voltage 			
8	RISE TIME (Max)	24VDC/ 85 ms	I/P: 24 VDC O/P:FULL LOAD Ta:25℃	24VDC/ 15.38ms

	INPUT=48VDC@ FULL LOAD 			
9	HOLD UP TIME (TYP)	24VDC/7ms	I/P: 24VDC O/P:F ULL LOAD Ta:25℃	24VDC/7.5 ms
	INPUT=24VDC @ FULL LOAD CH1 : DC Input Voltage CH2 : Output Voltage 			
10	DYNAMIC LOAD	V1: 1500mVp-p	I/P: 24VDC O/P: (1)FULL /min LOAD 50%DUTY / 120HZ (2)FULL /min LOAD 50%DUTY / 1KHZ Ta:25℃	 438mVp-p 334mVp-p
	FULL /MINLOAD 50%DUTY / 120HZ 		FULL MIN LOAD 50%DUTY / 1KHZ 	

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	9VDC~ 36VDC	I/P:TESTING O/P:FULL LOAD Ta:25℃	8.23V~ 36V

			I/P: LOW-LINE-0.2=8.8V HIGH-LINE+3V=39V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec . OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST: OK
2	INPUT CURRENT(TYP)	24VDC/1.5A	I/P: 24VDC O/P:FULL LOAD Ta:25℃	I =1.37A/24VDC
3	EFFICIENCY(TYP)	87%	I/P: 24VDC O/P:FULL LOAD Ta:25℃	90.51 %
	EFFICIENCY vs LOAD 			
4	INRUSH CURRENT(TYP)	24VDC/ 15 A COLD START	I/P: 24VDC O/P:FULL LOAD Ta:25℃	8.6A/ 24VDC
	INPUT=24VDC @ FULL LOAD 			

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	110%~150%RATED OUTPUT POWER	I/P: 36VDC I/P: 24 VDC I/P: 9 VDC O/P:TESTING Ta:25℃	129.2%/ 36VDC 129.2%/ 24VDC 130.5%/9VDC PROTECTION TYPE： Constant current limiting, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	CH: 17.25V~ 20.25 V	I/P: 36VDC I/P: 24 VDC I/P: 9 VDC O/P:MIN LOAD Ta:25℃	18.9V/36VDC 18.9V/ 24VDC 18.9V/ 9VDC PROTECTION TYPE： Shut down O/P voltage,re-power on to recover

3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 36VDC O/P: FULL LOAD Ta:25℃	NO DAMAGE PROTECTION TYPE： Constant current limiting, recovers automatically after fault condition is removed
4	INPUT REVERSE	POWER OK	I/P:36VDC O/P: NO LOAD Ta:25℃	NO DAMAGE

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q 3 Rated ： 80 A/100 V	I/P:High-Line +3V =39V DC ON/OFF VDS: O/P: (1)Full Load (2)Output Short (3)full load continue Ta:25℃	VDS: (1) 69.9V (2) 74.7V (3) 65.8V
2	Diode Peak Voltage	Q100 Rated ： 100V	I/P:High-Line +3V =39 V DC ON/OFF O/P: (1)Full Load (2)Output Short (3) FULL LOAD continue Ta:25℃	VDS: (1)77.9V (2)77.9V (3)77.1V
3	Input Capacitor Voltage	C5 Rated: ： 820 μ / 50V	I/P:High-Line +3V =39 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℃	C5: (1)41.5V (2)41.7V (3)41.5V (4)41.5V
4	Control IC Voltage Test	PWM IC U1 Rated -0.3V~30V	I/P:High-Line +3V =39 V DC ON/OFF O/P(1)FULL LOAD (2) Output Short (3)O.L.P (4)O.V.P. Ta:25℃	U1: (1) 14.1V (2) 13.7V (3) 13.7V (4) 16.7V
5	Clamp Diode Peak Voltage	D4 Rated： 400V	I/P：High-Line +3V =39 V DC ON/OFF O/P： (1) Dynamic Load 90%Duty/1KHz (2)Full load continue Ta：25℃	D4: (1)40.8V (2)40.0V

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	EN 60950-1 I/P-O/P:4KVDC/min	I/P-O/P: 4.4KVDC/min Ta:25℃	I/P-O/P: 0 μA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ	I/P-O/P: 500 VDC Ta:25℃	I/P-O/P: 9999MΩ NO DAMAGE

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	RADIATION	☑EN55032 ☐EN55011 ☐CLASS A ☑CLASS B	I/P:24VDC O/P:FULL LOAD Ta:25℃	☑PASS ☐FAIL Test by certified Lab
2	CONDUCTION	☑EN55032 ☐EN55011 ☐CLASS A ☑CLASS B	I/P: 24 VDC O/P:FULL LOAD Ta:25℃	☑PASS ☐FAIL Test by certified Lab
3	E.S.D	EN61000-4-2 □Din rail Model : AIR：8KV / Contact：6KV	I/P: 24 VDC O/P:FULL LOAD Ta:25℃	☑CRITERIA A ☐CRITERIA B
4	E.F.T	EN61000-4-4 ☐INDUSTRY INPUT: 2KV	I/P: 24VDC O/P:FULL LOAD Ta:25℃	☑CRITERIA A ☐CRITERIA B
5	SURGE	IEC61000-4-5 ☐INDUSTRY line-line :1KV	I/P: 24 VDC O/P:FULL LOAD Ta:25℃	☑CRITERIA A ☐CRITERIA B
6	Test by certified Lab & Test Report Prepare			

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	TEMPERATURE RISE TEST	MODEL：DDR-30G-24 1. ROOM AMBIENT BURN-IN：1 HRS I/P： 24VDC O/P： FULL LOAD Ta= 25.6 ℃ 2. HIGH AMBIENT BURN-IN： 1 HRS I/P： 24VDC O/P： FULL LOAD Ta= 62.5 ℃		

NO	Position	ROOM AMBIENT Ta= 25.6 ℃	HIGH AMBIENT Ta= 62.5 ℃
1	C110	54.3℃	84.9℃
2	LF1	43.2℃	78.4℃
3	T1	61.7℃	92.3℃
4	T2	61.8℃	94.8℃
5	L100	56.4℃	73.7℃
6	Q2	35.7℃	71.4℃
7	Q3	68.8℃	105.0℃
8	Q100	77.1℃	85.0℃
9	D4	60.8℃	91.7℃
10	C15	62.1℃	92.3℃
11	R7	64.7℃	94.8℃
12	U1	49.1℃	82.3℃
13	C5	45.7℃	80.5℃
14	C105	55.2℃	84.9℃
15	C106	51.3℃	81.7℃

2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P：24 VDC O/P：126 % LOAD Ta：25℃	TEST：OK

3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P：12 VDC/ 36 VDC O/P： 100 % LOAD Ta= -45 ℃	TEST：OK
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 60 ℃ NO DAMAGE	I/P： 39 VDC O/P：FULL LOAD Ta= 60 ℃ HUMIDITY= 95 %R.H	TEST：OK
5	TEMPERATURE COEFFICIENT	± 0.03 %(0~60℃)	I/P：24 VDC O/P：FULL LOAD	±0.0034 %(0~60℃)
6	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：10 CYCLE 5. Input/Output condition： STATIC		TEST：OK
7	THERMAL SHOCK TEST	1. Thermal shock Temperature： -45℃~ +65℃ 2. Temperature change rate ：25℃ / MIN 3. Dwell time low and high temperature ： 30 MIN/EACH 4. Total test cycle：16 CYCLE 5. Input/Output condition：24VDC/Full Load DC ON/OFF TEST turn on 3sec；turn off 1sec@15cycle\ 24VDC/Full Load DC ON@1cycle		TEST：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℃ 2 Din Rail		TEST：OK
9	CAPACITOR LIFE CYCLE	SUPPOSE C105 IS THE MOST CRITICAL COMPONENT (1) I/P： 24VDC O/P：FULL LOAD Ta= 25 ℃ LIFE TIME (2) I/P： 24VDC O/P：FULL LOAD Ta= 60 ℃ LIFE TIME (3) I/P： 24VDC O/P：75% LOAD Ta= 60 ℃ LIFE TIME (4) I/P： 24VDC O/P：50% LOAD Ta= 60 ℃ LIFE TIME		(1) 290178 HRS (2) 42247.8 HRS (3) 49804.4 HRS (4) 101279.9 HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 483.3K hrs min. MIL-HDBK-217F (25℃)		
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 60℃		

Displacement	Acceleration
2 （+3/-0） Hz up to 15Hz	±2.5mm	————
15Hz up to 50Hz	————	2.3g
Sweep rate	Max 1 Octave/minute	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	LIUTT		WANGDZ

12.10.30 A50-F031