



Test Report: ERDN40-12

40A Enclosed Type Redundancy Module

■ 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

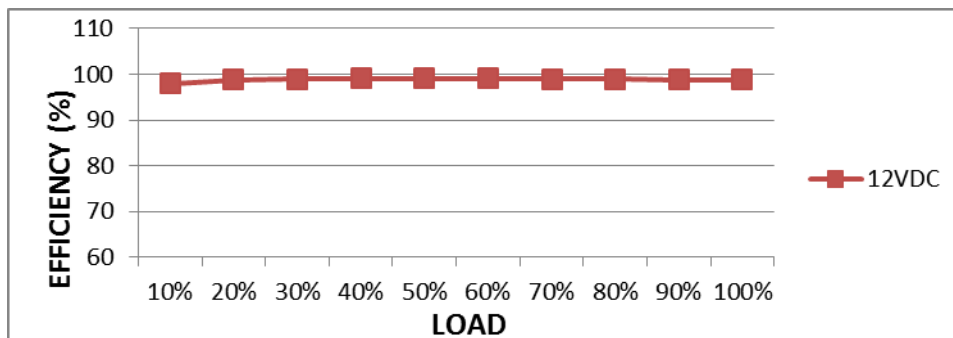
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	RATED CURRENT	0~40A CONTINUOUS	I/P : 12VDC O/P : FULL LOAD Ta : 25°C	OK
2	PEAK CURRENT	60A 5Sec NO DAMAGE	I/P: 12VDC O/P : 60A Ta:25°C	OK
3	CAPACITANCE	320uF	I/P : 12VDC O/P : 320uF Ta : 25°C	OK
4	STANDBY POWER LOSSES (Typ.)	1.5W	I/P : 12VDC O/P : NO LOAD Ta : 25°C	0.21W

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	9VDC~14VDC	I/P:TESTING O/P:FULL LOAD Ta:25°C	8.50VDC~14.50VDC
2	RATED CURRENT	0~20Ax2 input, 0~40Ax1 input Continuous	I/P : 12VDC O/P: 40A Ta:25°C	OK
3	VOLTAGE DROP (Vin-Vout) (max.)	0.2V	I/P : 12VDC O/P : FULL LOAD Ta : 25°C	0.15V
4	PEAK CURRENT	0~30Ax2 input, 0~60Ax1 5Sec NO DAMAGE	I/P: 12VDC O/P : 60A Ta:25°C	OK
5	INPUT REVERSE CURRENT (max.)	1mA	I/P : 40VDC O/P : FULL LOAD Ta : 25°C	2.14uA
6	INPUT REVERSE VOLTAGE (max.)	40Vdc NO DAMAGE	I/P : 40VDC O/P : FULL LOAD Ta : 25°C	OK
7	EFFICIENCY(Typ.)	98%	I/P:12VDC O/P:FULL LOAD Ta:25°C	99.29 %

EFFICIENCY vs LOAD



PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	<60A No damage 5 sec (max)	I/P:12VDC O/P:60A Ta:25°C	NO DAMAGE
2	SHORT PROTECTION	<60A No damage 5 sec (max)	I/P: 14VDC O/P: FULL LOAD Ta:25°C	NO DAMAGE

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	RELAY	30VDC/1A RESISTIVE LOAD	I/P:12VDC O/P:FULL LOAD Ta:25°C	TEST : OK
2	REDUNDANCY	For 1+1 redundancy,and support N+1 redundancy	I/P:12VDC O/P:FULL LOAD Ta:25°C	TEST :OK
3	BOTH INPUTS VOLTANG ALARM	<8.5V OR >14.7V (±5%)	I/P:TESTING O/P:FULL LOAD Ta:25°C	TEST :OK
4	LED STATUS DISPLAY	GREEN LED OK	I/P:12VDC O/P:FULL LOAD Ta:25°C	TEST :OK

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	Transistor Peak Voltage	Q1 VGS Rated : ± 20V Q3 VGS Rated : ± 20V	I/P:14VDC DC ON/OFF O/P:FULL LOAD Ta:25°C	Q1 VGS:12.4V Q3 VGS:11.8V

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P/O/P-FG: 0.5KVAC/min I/P/FG-RELAY :0.5KVAC/min FG-RELAY:0.5KVAC/min	I/P/O/P-FG: 0.6 KVAC/min I/P/FG-RELAY: 0.6 KVAC/min O/P-FG:0.6 KVAC/min Ta:25°C	I/P/O/P-FG:7.69mA I/P/FG-RELAY:0.274mA FG-RELAY:0.262m A NO DAMAGE
2	ISOLATION RESISTANCE	I/P/O/P-FG:500VDC>100MΩ I/P/FG-RELAY: 500VDC>100MΩ FG-RELAY:500VDC>100MΩ	I/P/O/P-FG: 500 VDC I/P/FG-RELAY: 500 VDC FG-RELAY: 500 VDC Ta:25°C	I/P/O/P-FG: 9999MΩ I/P/FG-RELAY: 9999MΩ FG-RELAY:9999MΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	7 mΩ



40A Enclosed Type Redundancy Module

ERDN40 series

2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 48 VDC O/P : 115% LOAD Ta : 25°C	TEST : OK
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 36VDC/60VDC O/P : 100 % LOAD Ta= -45°C	TEST : OK
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 60 °C /95 %R.H NO DAMAGE	I/P : 60 VDC O/P : FULL LOAD Ta= 60 °C HUMIDITY= 95 %R.H	TEST : OK
5	TEMPERATURE COEFFICIENT	± 0.03%/°C (0~60°C)	I/P : 48 VDC O/P : FULL LOAD	± 0.012%/°C (0~60°C)
6	STORAGE TEMPERATURE TEST	-40~85°C	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 : 10 CYCLE 5. Input/Output condition : STATIC	
7	THERMAL SHOCK TEST	-40~60°C	1. Thermal shock Temperature : -45°C~ +65°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 16 CYCLE 5. Input/Output condition : 15cycle:5VDC/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle:5VDC/ FULL LOAD Burn In Test	
8	VIBRATION TEST	10 ~ 500Hz, 5G 10min./1cycle, 60min. each along X, Y, Z axes	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 6G (5) Test Time : 180min in each axis (X.Y.Z) (6) Ta : 25°C	
9	CAPACITOR LIFE CYCLE	SUPPOSE C17 IS THE MOST CRITICAL COMPONENT (1) I/P : 48VDC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 48VDC O/P : FULL LOAD Ta= 60 °C LIFE TIME (3) I/P : 48VDC O/P : 75% LOAD Ta= 60 °C LIFE TIME (4) I/P : 48VDC O/P : 50% LOAD Ta= 60 °C LIFE TIME		(1) 199101HRS (2) 16534HRS (3) 37462 HRS (4) 74924 HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 1687.9K hrs min. Telcordia SR-332 (Bellcore) ; 294.1K hrs min. MIL-HDBK-217F (25°C)		
11	Ongoing Reliability Test	I/P : 48VDC O/P : FULL LOAD TA=50°C Demonstration Mean Time Between Failure : 30000 hours		

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	LIUTT		WANGDZ

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