



Test Report: DRDN40-48

40A DIN Rail 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

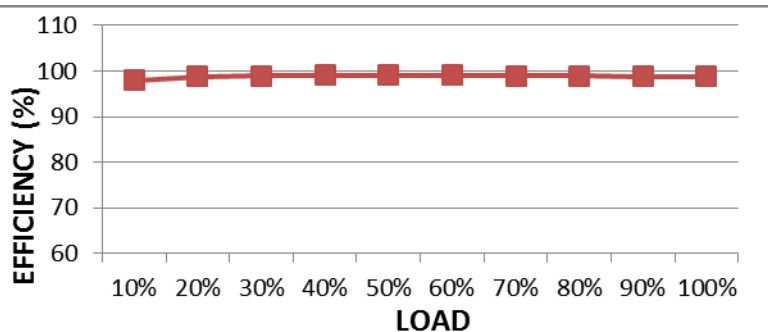
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	RATED CURRENT	0~40A CONTINUOUS	I/P : 48VDC O/P : FULL LOAD Ta : 25°C	OK
2	PEAK CURRENT	60A 5Sec NO DAMAGE	I/P: 48VDC O/P : 60A Ta:25°C	OK
3	CAPACITANCE	320uF	I/P : 48VDC O/P : 320uF Ta : 25°C	OK
4	STANDBY POWER LOSSES (Typ.)	1.5W	I/P : 48VDC O/P : NO LOAD Ta : 25°C	0.89W

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	36VDC~60VDC	I/P: TESTING O/P: FULL LOAD Ta: 25°C	34.14VDC~62.08VDC
2	RATED CURRENT	0~20Ax2 input, 0~40Ax1 input Continuous	I/P : 48VDC O/P: 0~20Ax2 input, 0~40Ax1 Ta: 25°C	OK
3	VOLTAGE DROP (Vin-Vout) (max.)	0.3V	I/P : 48VDC O/P : FULL LOAD Ta : 25°C	0.24V
4	PEAK CURRENT	0~30Ax2 input, 0~60Ax1 5Sec NO DAMAGE	I/P: 48VDC O/P : 60A Ta: 25°C	OK
5	INPUT REVERSE CURRENT (max.)	1mA	I/P : 48VDC O/P : FULL LOAD Ta : 25°C	2.87uA
6	INPUT REVERSE VOLTAGE (max.)	65Vdc NO DAMAGE	I/P : 65VDC O/P : FULL LOAD Ta : 25°C	OK
7	EFFICIENCY(Typ.)	98%	I/P: 48VDC O/P: FULL LOAD Ta: 25°C	99.66%

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:48VDC O/P:TESTING Ta:25°C	NO DAMAGE
2	SHORT PROTECTION	<60A No damage 5 sec (max)	I/P: 60VDC 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:48VDC O/P:FULL LOAD Ta:25°C	TEST : OK
2	REDUNDANCY	For 1+1 redundancy,and support N+1 redundancy	I/P:48VDC O/P:FULL LOAD Ta:25°C	TEST :OK
3	BOTH INPUTS VOLTAGE ALARM	<34.2V OR> 63V (±5%)	I/P:48VDC O/P:FULL LOAD Ta:25°C	TEST :OK
4	LED STATUS DISPLAY	GREEN LED OK	I/P:48VDC 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:60VDC DC ON/OFF O/P:FULL LOAD Ta:25°C	Q1 VGS:12.4V Q3 VGS:12.2V

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:7.68mA I/P/FG-RELAY:0.275mA FG-RELAY:0.264mA 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	4 mΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CONDUCTION	☑EN55032 CLASS B	I/P : 48VDC O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab

2	RADIATION	☒ EN55032 CLASS B	I/P : 48VDC O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab
3	E.S.D	EN61000-4-2 ☒ Din rail Model : AIR: 15KV / Contact: 8KV	I/P : 48VDC O/P : FULL LOAD Ta : 25°C	☒ CRITERIA A ☐ CRITERIA B
4	E.F.T	EN61000-4-4 ☒ INDUSTRY INPUT : 2KV	I/P : 48VDC O/P : FULL LOAD Ta : 25°C	☒ CRITERIA A ☐ CRITERIA B
5	SURGE	IEC61000-4-5 ☒ LIGHT INDUSTRY L-N : 1KV L,N-PE : 2KV	I/P : 48VDC O/P : FULL LOAD Ta : 25°C	☒ CRITERIA A ☐ CRITERIA B
6	Test by certified Lab & Test Report Prepare Any contradictions of the test results, please refer to the latest EMC test report			

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																																																												
1	TEMPERATURE RISE TEST	MODEL : DRDN40-48 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 48VDC O/P : FULL LOAD Ta= 28.4 °C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 48VDC O/P : FULL LOAD Ta= 63.6 °C <table><thead><tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta= 28.4 °C</th><th>HIGH AMBIENT Ta= 63.6 °C</th></tr></thead><tbody><tr><td>1</td><td>ZNR1</td><td>64.1°C</td><td>102.1°C</td></tr><tr><td>2</td><td>Q1</td><td>67.9°C</td><td>106.6°C</td></tr><tr><td>3</td><td>Q2</td><td>68.5°C</td><td>107.8°C</td></tr><tr><td>4</td><td>C17</td><td>71.4°C</td><td>109.9°C</td></tr><tr><td>5</td><td>C15</td><td>49.3°C</td><td>86.3°C</td></tr><tr><td>6</td><td>C16</td><td>47.2°C</td><td>83.5°C</td></tr><tr><td>7</td><td>RY1</td><td>55.0°C</td><td>93.5°C</td></tr><tr><td>8</td><td>RY2</td><td>55.0°C</td><td>92.8°C</td></tr><tr><td>9</td><td>PCB</td><td>77.8°C</td><td>117.6°C</td></tr><tr><td>10</td><td>U4</td><td>55.0°C</td><td>91.5°C</td></tr><tr><td>11</td><td>U1</td><td>54.0°C</td><td>90.8°C</td></tr><tr><td>12</td><td>U2</td><td>53.8°C</td><td>90.4°C</td></tr><tr><td>13</td><td>C4</td><td>67.8°C</td><td>104.6°C</td></tr><tr><td>14</td><td>Q3</td><td>77.3°C</td><td>118.3°C</td></tr><tr><td>15</td><td>Q4</td><td>70.7°C</td><td>110.5°C</td></tr><tr><td>16</td><td>D3</td><td>56.1°C</td><td>92.0°C</td></tr><tr><td>17</td><td>R54</td><td>60.1°C</td><td>95.6°C</td></tr><tr><td>18</td><td>R56</td><td>63.0°C</td><td>98.9°C</td></tr><tr><td>19</td><td>Q13</td><td>63.1°C</td><td>97.5°C</td></tr><tr><td>20</td><td>Q14</td><td>71.1°C</td><td>107.4°C</td></tr><tr><td>21</td><td>R48</td><td>63.5°C</td><td>99.4°C</td></tr><tr><td>22</td><td>Q21</td><td>45.4°C</td><td>82.3°C</td></tr></tbody></table>			NO	Position	ROOM AMBIENT Ta= 28.4 °C	HIGH AMBIENT Ta= 63.6 °C	1	ZNR1	64.1°C	102.1°C	2	Q1	67.9°C	106.6°C	3	Q2	68.5°C	107.8°C	4	C17	71.4°C	109.9°C	5	C15	49.3°C	86.3°C	6	C16	47.2°C	83.5°C	7	RY1	55.0°C	93.5°C	8	RY2	55.0°C	92.8°C	9	PCB	77.8°C	117.6°C	10	U4	55.0°C	91.5°C	11	U1	54.0°C	90.8°C	12	U2	53.8°C	90.4°C	13	C4	67.8°C	104.6°C	14	Q3	77.3°C	118.3°C	15	Q4	70.7°C	110.5°C	16	D3	56.1°C	92.0°C	17	R54	60.1°C	95.6°C	18	R56	63.0°C	98.9°C	19	Q13	63.1°C	97.5°C	20	Q14	71.1°C	107.4°C	21	R48	63.5°C	99.4°C	22	Q21	45.4°C	82.3°C
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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	± 0.016%/°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:48VDC/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle:48VDC/ 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 C15 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) 420906 HRS (2) 32839 HRS (3) 53719 HRS (4) 81989 HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 557.52K hrs min. Telcordia SR-332 (Bellcore) ; 277.24K 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

2018.4.30 GP-A50-F010