TDK·Lambda

RSAL-2002A

RELIABILITY DATA

DWG. No.SC575-RSAL-2A-001			
QA	R&D		
APPROVED BY	APPROVED BY	CHECKED BY	DRAWN BY
K. Yamamoto 10.Jan.2008	T. Kuroshima 10.Jan.2008	T. Arasawa 10.Jan.2008	Y. Ishida 10.Jan.2008

TDK

I N D E X

	Page
1. Calculated Values of MTBF	Page-3
2. Vibration Test	Page-4
3. Heat Cycle Test	Page-5
4. Humidity Test	Page-6
5. High Temperature Resistance Test	Page-7
6. Low Temperature Storage Test	Page-8

The following data are typical values. As all units have nearly the same characteristics, the data to be considered as ability values.

1. Calculated values of MTBF

MODEL : RSAL-2002A

(1) Calculating Method

Calculated based on parts stress reliability projection of MIL-HDBK-217F NOTICE2.

Individual failure rates λ_G is given to each part and MTBF is calculated by the count of each part.

$$MTBF = \frac{1}{\lambda_{equip}} = \frac{1}{\sum_{i=1}^{n} N_i(\lambda_G \pi_Q)_i} \times 10^6 \text{ (hours)}$$

λ equip	: Total equipment failure rate (Failure / 10^6 Hours)
λ_G	: Generic failure rate for the *i*th generic part (Failure/ 10^6 Hours)
Ni	: Quantity of *i*th generic part
N	: Number of different generic part categories
π_Q	: Generic quality factor for the *i*th generic part (π_Q = 1)

(2) MTBF Values

GF : Ground, Fixed

MTBF = 9,978,048 (Hours)

2. Vibration Test

MODEL : RSAL-2002A (Representation Product : RSEL-2006W)

(1) Vibration Test Class

Frequency Variable Endurance Test

(2) Equipment Used

Controller VS-1000-6, Vibrator 905-FN (IMV CORP.)

(3) The Number of D.U.T. (Device Under Test)

5 units

(4) Test Condition

· Frequency : 10~55Hz

· Amplitude : 1.5mm, Sweep for 1 min.

· Dimension and times : X, Y and Z directions for 2 hours each.

(5) Test Method

Fix the D.U.T. on the fitting-stage

(6) Test Results

PASS

Typical Sample Data

Check item	Spec.		Before Test	After Test
Attenuation (dB)	Differential Mode : 25dBmin.	1 MHz	47.70	47.24
		30 MHz	60.94	59.16
	Common Mode : 25dBmin.	1 MHz	37.62	37.84
		10 MHz	55.26	55.38
Leakage Current (mA)	1mA max.(250V, 60Hz)	Line1	0.30	0.29
		Line2	0.30	0.29
DC Resistance (mΩ)	80m Ω max.		24.96	25.50
Test Voltage	L-L : 1768Vdc 60s. L-E : 2500Vac 60s.		OK	OK
Isolation Resistance (MΩ)	100M Ω min. (500Vdc 60s)		3.9×10^6	4.5×10^6

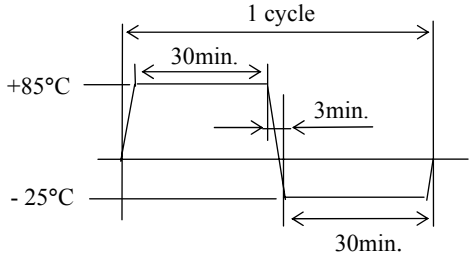
3. Heat Cycle Test

MODEL : RSAL-2002A (Representation Product : RSEL-2006W)

(1) Equipment Used
TEMPERATURE CHAMBER TSA-71H-W (ESPEC CORP.)

(2) The Number of D.U.T. (Device Under Test)
5 units

(3) Test Conditions
· Ambient Temperature : -25~+85°C
· Test Cycles : 100cycles



(4) Test Method
Before the test check if there is no abnormal characteristics and put the D.U.T. in the testing chamber. Then test it in the above cycles, After the test is completed leave it for 1 hour at room temperature and check it if there is no abnormal each characteristics.

(5) Test Results
PASS

Typical Sample Data

Check item	Spec.		Before Test	After Test
Attenuation (dB)	Differential Mode : 25dBmin.	1 MHz	47.64	47.86
		30 MHz	58.32	59.54
	Common Mode : 25dBmin.	1 MHz	37.94	39.00
		10 MHz	54.52	56.02
Leakage Current (mA)	1mA max. (250V, 60Hz)	Line1	0.30	0.33
		Line2	0.29	0.34
DC Resistance (mΩ)	80m Ω max.		25.54	25.18
Test Voltage	L-L : 1768Vdc 60s. L-E : 2500Vac 60s.		OK	OK
Isolation Resistance (MΩ)	100M Ω min. (500Vdc 60s)		4.9×10^6	4.2×10^6

4. Humidity Test

MODEL : RSAL-2002A (Representation Product : RSEL-2006W)

(1) Equipment Used

TEMP. & HUMID. CHAMBER PR-4KT (ESPEC CORP.)

(2) The Number of D.U.T. (Device Under Test)

5 units

(3) Test Conditions

· Ambient Temperature : +40°C
· Test Time : 500 hours
· Ambient Humidity : 90~95% RH No Dewdrop

(4) Test Method

Before the test check if there is no abnormal characteristics and put the D.U.T. in the testing chamber. Then test it in the above conditions. After the test is completed leave it for 1 hour at room temperature and check it if there is no abnormal each characteristics.

(5) Test Results

PASS

Typical Sample Data

Check item	Spec.		Before Test	After Test
Attenuation (dB)	Differential Mode : 25dBmin.	1 MHz	47.84	45.98
		30 MHz	55.40	55.92
	Common Mode : 25dBmin.	1 MHz	37.24	37.92
		10 MHz	53.44	54.30
Leakage Current (mA)	1mA max. (250V, 60Hz)	Line1	0.29	0.29
		Line2	0.30	0.28
DC Resistance (mΩ)	80m Ω max.		25.32	25.60
Test Voltage	L-L : 1768Vdc 60s. L-E : 2500Vac 60s.		OK	OK
Isolation Resistance (MΩ)	100M Ω min. (500Vdc 60s)		4.3×10^6	4.9×10^6

5. High Temperature Resistance Test

MODEL : RSAL-2002A (Representation Product : RSEL-2006W)

(1) Equipment Used
TEMPERATURE CHAMBER PHH-300 (ESPEC CORP.)

(2) The Number of D.U.T. (Device Under Test)
5 units

(3) Test Conditions
· Ambient Temperature : +55°C
· Test Time : 500 hours
· Operating : DC 6A

(4) Test Method
Before the test check if there is no abnormal characteristics and put the D.U.T. in the testing chamber. Then test it in the above conditions. After the test is completed leave it for 1 hour at room temperature and check it if there is no abnormal each characteristics.

(5) Test Results
PASS

Typical Sample Data

Check item	Spec.		Before Test	After Test
Attenuation (dB)	Differential Mode : 25dBmin.	1 MHz	47.32	47.38
		30 MHz	55.64	57.74
	Common Mode : 25dBmin.	1 MHz	37.52	38.78
		10 MHz	54.78	56.06
Leakage Current (mA)	1mA max. (250V, 60Hz)	Line1	0.30	0.30
		Line2	0.31	0.31
DC Resistance (mΩ)	80m Ω max.		25.10	25.44
Test Voltage	L-L : 1768Vdc 60s. L-E : 2500Vac 60s.		OK	OK
Isolation Resistance (MΩ)	100M Ω min. (500Vdc 60s)		4.4×10^6	5.1×10^6

6. Low Temperature Storage Test

MODEL : RSAL-2002A (Representation Product : RSEL-2006W)

(1) Equipment Used

TEMPERATURE CHAMBER PG-2FT (ESPEC CORP.)

(2) The Number of D.U.T. (Device Under Test)

5 units

(3) Test Conditions

· Ambient Temperature : -25°C

· Test Time : 500 hours

(4) Test Method

Before the test check if there is no abnormal characteristics and put the D.U.T. in the testing chamber. Then test it in the above conditions. After the test is completed leave it for 1 hour at room temperature and check it if there is no abnormal each characteristics.

(5) Test Results

PASS

Typical Sample Data

Check item	Spec.		Before Test	After Test
Attenuation (dB)	Differential Mode : 25dBmin.	1 MHz	47.66	47.34
		30 MHz	61.54	56.74
	Common Mode : 25dBmin.	1 MHz	37.72	37.88
		10 MHz	55.74	55.72
Leakage Current (mA)	1mA max. (250V, 60Hz)	Line1	0.30	0.30
		Line2	0.31	0.30
DC Resistance (mΩ)	80m Ω max.		25.32	25.50
Test Voltage	L-L : 1768Vdc 60s. L-E : 2500Vac 60s		OK	OK
Isolation Resistance (MΩ)	100M Ω min. (500Vdc 60s)		5.2×10^6	4.9×10^6