TDK·Lambda

# RPA-2003R

# RELIABILITY DATA

| DWG.No.SC-575-RPA-2003R-002 | | | |
|---|---|---|---|
| QA | R & D | | |
| APPROVED BY | APPROVED BY | CHECKED BY | DRAWN BY |
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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 : RPA-2003R

(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 / 106 Hours)
λ G : Generic failure rate for the i th generic part (Failure/ 106 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 = 10,264,833 (Hours)

2. Vibration Test

MODEL: RPA-2003R(Representation Product : RPE-2010R)

(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)
6 units

(4) Test Conditions
Frequency : 10~55Hz
Amplitude : 1.5mm,Sweep for 1 min.
Dimension and times : X,Y and Z Directions for 2 hours each.

(5) The 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 : 25dB min. | 10 MHz | 38.78 | 38.55 |
| | | 30 MHz | 53.11 | 52.66 |
| | Common Mode: 25dB min. | 5 MHz | 36.35 | 36.07 |
| | | 20 MHz | 63.21 | 62.52 |
| Leakage Current (mA) | 0.5mA max. (250V, 60Hz) | Line1 | 0.24 | 0.24 |
| | | Line2 | 0.24 | 0.24 |
| DC Resistance (mΩ) | 30 mΩ max. | | 9.37 | 9.35 |
| Test Voltage | L-L : 1768Vdc 60sec.<br>L-E : 1500Vac 60sec. | | OK | OK |
| Isolation Resistance(MΩ) | 100 MΩ min.(500Vdc 60sec.) | | 6.04×E5 | 5.76×E5 |

3. Heat Cycle Test

MODEL: RPA-2003R (Representation Product : RPE-2010R)

(1)Equipment Used

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

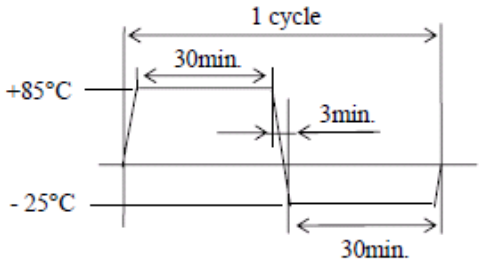
(2)The Number of D.U.T (Device Under Test)

6 units

(3)Test Conditions

Ambient Temperature : -25~+85℃

Test Cycles: 100 cycles




(4)The 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 : 25dB min. | 10 MHz | 38.82 | 38.66 |
| | | 30 MHz | 53.20 | 52.99 |
| | Common Mode: 25dB min. | 5MHz | 36.34 | 35.99 |
| | | 20 MHz | 60.39 | 60.47 |
| Leakage Current (mA) | 0/5mA max. (250V, 60Hz) | Line1 | 0.24 | 0.24 |
| | | Line2 | 0.24 | 0.24 |
| DC Resistance (mΩ) | 30 mΩ max. | | 9.30 | 9.30 |
| Test Voltage | L-L : 1768Vdc 60sec.<br>L-E : 1500Vac 60sec. | | OK | OK |
| Isolation Resistance(MΩ) | 100 MΩmin.(500Vdc 60sec.) | | 5.32×E5 | 5.17×E5 |

4. Humidity Test

MODEL: RPA-2003R (Representation Product : RPE-2010R)

(1)Equipment Used

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

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

6 units

(3)Test Conditions

Ambient Temperature : +40℃

Test Times: 500 hours

Ambient Humidity: 90~95%RH No Dewdrop

(4)The 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 : 25dB min. | 10 MHz | 39.49 | 39.52 |
| | | 30 MHz | 52.90 | 53.08 |
| | Common Mode: 25dB min. | 5Hz | 36.58 | 36.81 |
| | | 20 MHz | 61.90 | 61.53 |
| Leakage Current (mA) | 0.5mA max. (250V, 60Hz) | Line1 | 0.25 | 0.25 |
| | | Line2 | 0.24 | 0.24 |
| DC Resistance (mΩ) | 30mΩ max. | | 9.18 | 9.10 |
| Test Voltage | L-L : 1768Vdc 60sec.<br>L-E : 1500Vac 60sec. | | OK | OK |
| Isolation Resistance(MΩ) | 100 MΩmin.(500Vdc 60sec.) | | 5.66×E5 | 5.75×E5 |

5. High Temperature Resistance Test

MODEL: RPA-2003R (Representation Product : RPE-2010R)

(1)Equipment Used

TEMPERATURE CHAMBER PHH-300 (ESPEC CORP.)

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

6 units

(3)Test Conditions

Ambient Temperature : +55℃

Test Times: 500 hours

Operating: DC 10A

(4)The 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 : 25dB min. | 10 MHz | 39.38 | 39.08 |
| | | 30 MHz | 53.52 | 53.99 |
| | Common Mode: 25dB min. | 5MHz | 36.41 | 36.48 |
| | | 20 MHz | 61.94 | 61.26 |
| Leakage Current (mA) | 0.5mA max. (250V, 60Hz) | Line1 | 0.24 | 0.24 |
| | | Line2 | 0.24 | 0.24 |
| DC Resistance (mΩ) | 30mΩ max. | | 9.35 | 9.20 |
| Test Voltage | L-L : 1768Vdc 60sec.<br>L-E : 1500Vac 60sec. | | OK | OK |
| Isolation Resistance(MΩ) | 100 MΩmin.(500Vdc 60sec.) | | 5.45×E5 | 5.33×E5 |

6. Low Temperature Storage Test

MODEL: RPA-2003R (Representation Product : RPE-2010R)

(1)Equipment Used

TEMPERATURE CHAMBER PG-2FT (ESPEC CORP.)

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

6 units

(3)Test Conditions

Ambient Temperature : －25℃

Test Times: 500 hours

(4)The 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 : 25dB min. | 10 MHz | 39.10 | 38.88 |
| | | 30 MHz | 53.59 | 53.78 |
| | Common Mode: 25dB min. | 5MHz | 36.07 | 36.07 |
| | | 20 MHz | 63.03 | 62.57 |
| Leakage Current (mA) | 0.5mA max. (250V, 60Hz) | Line1 | 0.25 | 0.25 |
| | | Line2 | 0.24 | 0.24 |
| DC Resistance (mΩ) | 30mΩ max. | | 9.35 | 9.28 |
| Test Voltage | L-L：1768Vdc 60sec.<br>L-E：1500Vac 60sec. | | OK | OK |
| Isolation Resistance(MΩ) | 100 MΩmin.(500Vdc 60sec.) | | 6.05×E5 | 5.68×E5 |