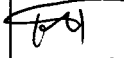




VS10C

RELIABILITY DATA

| DWG No. : CA709-57-01B | | |
|---|--|--|
| APPD | CHK | DWG |
|  20-Nov-07 |  20/Nov/07 |  20-Nov-07 |

I N D E X

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The above data is typical value. As all units have nearly the same characteristics, the data to be considered as ability value.

1. CALCULATED VALUES OF MTBF

MODEL : VS10C-5

(1) Calculating method

Calculated based on part count reliability projection of JEITA (RCR-9102).

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

<Formula> :

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

λ_{equip} : Total Equipment Failure Rate (Failure/10⁶ Hours)

λ_G : Generic Failure Rate for The ith Generic Part (Failure/10⁶ Hours)

N_i : Quantity of ith Generic Part

n : Number of Different Generic Part Categories

π_Q : Generic Quality Factor for The ith Generic Part ($\pi_Q = 1$)

(2) MTBF Values

GF : (Ground , Fixed)

MTBF ≐ 1,036,398 (Hours)

2. COMPONENT DERATING

MODEL: VS10C-5

(1) Calculating Method

(a) Measuring conditions

Input : 100VAC , Ambient temperature : 50°C
 Output : 5V 2A(100%) , Mounting method : Standard Mounting

(b) Semiconductors

Compared with maximum junction temperature and actual one which is calculated based on case temperature, power dissipation and thermal impedance.

(c) IC, Resistors, Capacitors, etc.

Ambient temperature, operating condition, power dissipation and so on are within derating criteria.

(d) Calculating method of thermal impedance

$$\theta_{j-c} = \frac{T_{j(max)} - T_c}{P_{c(max)}} \quad \theta_{j-a} = \frac{T_{j(max)} - T_a}{P_{c(max)}} \quad \theta_{j-l} = \frac{T_{j(max)} - T_l}{P_{c(max)}}$$

T_c : Case Temperature at Start Point of Derating ; 25°C in General

T_a : Ambient Temperature at Start Point of Derating ; 25°C in General

T_l : Lead Temperature at Start Point of Derating ; 25°C in General

$P_{c(max)}$: Maximum Collector(Channel) Dissipation
 ($P_{ch(max)}$)

$T_{j(max)}$: Maximum Junction(Channel) Temperature
 ($T_{ch(max)}$)

θ_{j-c} : Thermal Impedance between Junction(Channel) and Case
 (θ_{ch-c})

θ_{j-a} : Thermal Impedance between Junction and Air

θ_{j-l} : Thermal Impedance between Junction and lead

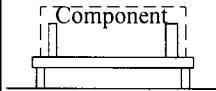
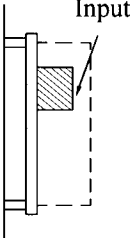
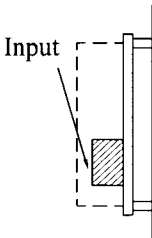
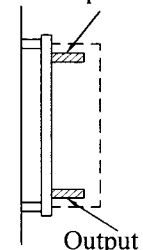
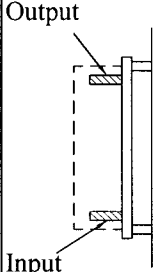
(2) Component Derating List

| Location No. | $V_{in} = 100VAC$ | Load = 100% | $T_a = 50^{\circ}C$ |
|--|--|---|--|
| A1 UPC1944J NEC | $T_{jmax} = 125^{\circ}C,$ $P_d = 0.01 W,$ $T_j = T_a + ((\theta_j - a) \times P_d) = 84.2^{\circ}C$ D.F. = 67.4 % | $\theta_{j-a} = 178.6^{\circ}C/W,$ $\Delta T_a = 32.4^{\circ}C,$ | $P_j(max) = 0.56 W$ $T_a = 82.4^{\circ}C$ |
| D1 S1WB(A)60B -4101 SHINDENGEN | $T_{jmax} = 150^{\circ}C,$ $P_d = 0.235 W,$ $T_j = T_l + ((\theta_j - l) \times P_d) = 83.5^{\circ}C$ D.F. = 55.7 % | $\theta_{j-l} = 10^{\circ}C/W,$ $\Delta T_l = 31.1^{\circ}C,$ | $P_j(max) = - W$ $T_l = 81.1^{\circ}C$ |
| D2 ERC81-004 FUJI | $T_{jmax} = 150^{\circ}C,$ $P_d = 1.1 W,$ $T_j = T_l + ((\theta_j - l) \times P_d) = 131.3^{\circ}C$ D.F. = 87.5 % | $\theta_{j-l} = 8^{\circ}C/W,$ $\Delta T_l = 72.5^{\circ}C,$ | $P_j(max) = - W$ $T_l = 122.5^{\circ}C$ |
| D3 1SS178 TOSHIBA | $T_{jmax} = 175^{\circ}C,$ $P_d = 0.01 W,$ $T_j = T_a + ((\theta_j - a) \times P_d) = 104.4^{\circ}C$ D.F. = 59.7 % | $\theta_{j-a} = 500^{\circ}C/W,$ $\Delta T_a = 49.4^{\circ}C,$ | $P_j(max) = 0.3 W$ $T_a = 99.4^{\circ}C$ |
| D4 1SS178 TOSHIBA | $T_{jmax} = 175^{\circ}C,$ $P_d = 0.005 W,$ $T_j = T_a + ((\theta_j - a) \times P_d) = 88.5^{\circ}C$ D.F. = 50.6 % | $\theta_{j-a} = 500^{\circ}C/W,$ $\Delta T_a = 36^{\circ}C,$ | $P_j(max) = 0.3 W$ $T_a = 86^{\circ}C$ |
| D5 1SS178 TOSHIBA | $T_{jmax} = 175^{\circ}C,$ $P_d = 0.03 W,$ $T_j = T_a + ((\theta_j - a) \times P_d) = 106^{\circ}C$ D.F. = 60.6 % | $\theta_{j-a} = 500^{\circ}C/W,$ $\Delta T_a = 41^{\circ}C,$ | $P_j(max) = 0.3 W$ $T_a = 91^{\circ}C$ |
| Q1 2SC4953 MATSUSHITA | $T_{jmax} = 150^{\circ}C,$ $P_d = 0.46 W,$ $T_j = T_c + ((\theta_j - c) \times P_d) = 100.8^{\circ}C$ D.F. = 67.2 % | $\theta_{j-c} = 4.17^{\circ}C/W,$ $\Delta T_c = 48.9^{\circ}C,$ | $P_c(max) = - W$ $T_c = 98.9^{\circ}C$ |
| Q2 2SD467C HITACHI | $T_{jmax} = 150^{\circ}C,$ $P_d = 0.014 W,$ $T_j = T_a + ((\theta_j - a) \times P_d) = 88^{\circ}C$ D.F. = 58.7 % | $\theta_{j-a} = 250^{\circ}C/W,$ $\Delta T_a = 34.5^{\circ}C,$ | $P_c(max) = 0.5 W$ $T_a = 84.5^{\circ}C$ |
| PC1 PS2561-1-V-L (LED) NEC | $T_{jmax} = 125^{\circ}C,$ $I_f = 2.7 mA,$ $I_f(max) = 50 mA$ (at $T_a = 77.7^{\circ}C$) D.F. = 5.4 % | $\Delta P_j / ^{\circ}C = -1.5mW / ^{\circ}C,$ $\Delta T_a = 27.7^{\circ}C,$ | $P_j(max) = 0.15 W$ $T_a = 77.7^{\circ}C$ |
| PC1 PS2561-1-V-L (Transistor) NEC | $T_{jmax} = 125^{\circ}C,$ $P_d = 0.009 W,$ $T_j = T_a + ((\theta_j - a) \times P_d) = 83.7^{\circ}C$ D.F. = 70 % | $\theta_{j-a} = 667^{\circ}C/W,$ $\Delta T_a = 27.7^{\circ}C,$ | $P_c(max) = 0.15 W$ $T_a = 77.7^{\circ}C$ |
| ZD3 HZS9.1NB2 HITACHI | $T_{jmax} = 200^{\circ}C,$ $P_d = 0 W,$ $T_j = T_a + ((\theta_j - a) \times P_d) = 82.6^{\circ}C$ D.F. = 41.3 % | $\theta_{j-a} = 437.5^{\circ}C/W,$ $\Delta T_a = 32.6^{\circ}C,$ | $P_j(max) = 0.4 W$ $T_a = 82.6^{\circ}C$ |
| ZD4 HZ6.2CP HITACHI | $T_{jmax} = 175^{\circ}C,$ $P_d = 0 W,$ $T_j = T_a + ((\theta_j - a) \times P_d) = 83.2^{\circ}C$ D.F. = 47.5 % | $\theta_{j-a} = 187.5^{\circ}C/W,$ $\Delta T_a = 33.2^{\circ}C,$ | $P_j(max) = 0.8 W$ $T_a = 83.2^{\circ}C$ |

3. MAIN COMPONENTS TEMPERATURE RISE ΔT LIST

MODEL : VS10C-5

Measuring Conditions

| Mounting Method (Standard Mounting Method:(A)) | (A) | (B) | (C) | (D) | (E) |
|---|--|--|---|--|--|
| | Horizontal mounting  | Vertical mounting  | Vertical mounting  | Vertical mounting  | Vertical mounting  |
| Input Voltage (VAC) | 100 | 100 | 100 | 100 | 100 |
| Output Voltage (VDC) | 5 | 5 | 5 | 5 | 5 |
| Output Current (A) | 2 | 2 | 2 | 2 | 2 |

*Condition $T_a = 50^\circ\text{C}$, Convection cooling .

| Output Derating (%) $T_a = 50^\circ\text{C}$ | | ΔT Temperature rise ($^\circ\text{C}$) | | | | |
|--|--------------|--|------------|------------|------------|------------|
| | | 100% | 100% | 100% | 100% | 100% |
| Location No. | Parts Name | Mounting A | Mounting B | Mounting C | Mounting D | Mounting E |
| Q1 | TRANSISTOR | 48.9 | 44.1 | 45.5 | 50.2 | 50.1 |
| D1 | BRIDGE DIODE | 31.1 | 25.9 | 30.7 | 40.4 | 27.6 |
| D2 | OUTPUT DIODE | 72.5 | 63.4 | 62.1 | 61.6 | 68.4 |
| T1 | X'MER. | 43.0 | 36.1 | 44.5 | 39.9 | 44.5 |
| C3 | E. CAP. | 16.7 | 13.8 | 22.9 | 25.6 | 16.9 |
| C7 | E. CAP. | 34.4 | 30.1 | 34.8 | 30.9 | 36.9 |
| C12 | E. CAP. | 27.7 | 22.5 | 29 | 22.6 | 32.6 |
| C14 | E. CAP. | 29.4 | 32.7 | 22.4 | 29.1 | 30.7 |

4. ELECTROLYTIC CAPACITOR LIFETIME VERSUS LOAD

MODEL : VS10C - 5

Mounting A

Input : 100VAC

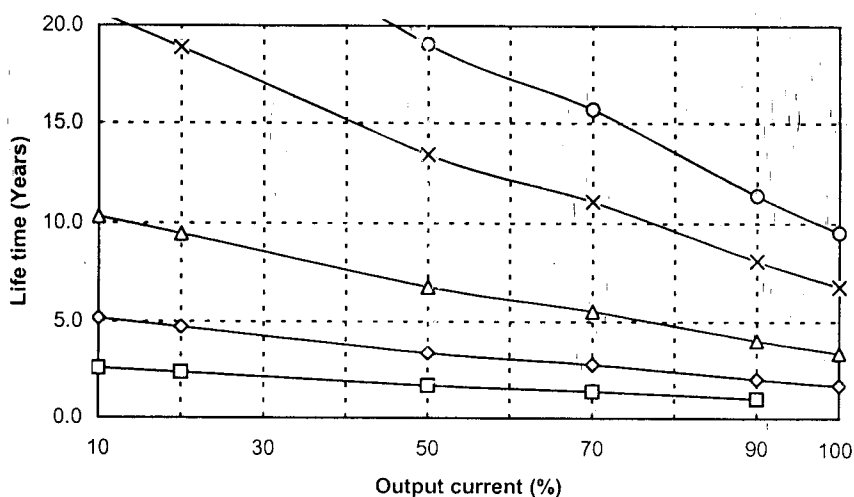
| LOAD % | Life time (years) Ta (°C) | | | | |
|--------|------------------------------|------|------|------|------|
| | 25.0 | 30.0 | 40.0 | 50.0 | 60.0 |
| 10 | 29.2 | 20.7 | 10.3 | 5.2 | 2.6 |
| 20 | 26.7 | 18.9 | 9.4 | 4.7 | 2.4 |
| 50 | 19.0 | 13.5 | 6.7 | 3.4 | 1.7 |
| 70 | 15.7 | 11.1 | 5.5 | 2.8 | 1.4 |
| 90 | 11.4 | 8.1 | 4.0 | 2.0 | 1.0 |
| 100 | 9.5 | 6.7 | 3.4 | 1.7 | — |

$$L = L_o \cdot 2^{(105 - T_c) / 10} \quad (\text{Yrs})$$

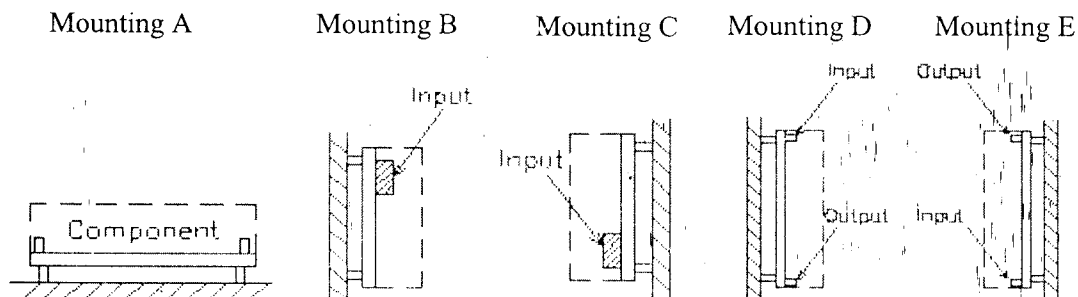
L : Elec. Capacitor computed life (24 Hrs / day , 365 days / year)

L_o : Guarantee life for Elec. Capacitor

T_c(ΔT+T_a) : Case temperature of Elec. Capacitor



Ta=25°C —○— Ta=30°C —×— Ta=40°C —△— Ta=50°C —◇— Ta=60°C —□—



4. ELECTROLYTIC CAPACITOR LIFETIME VERSUS LOAD

MODEL : VS10C - 5

Mounting B

Input : 100VAC

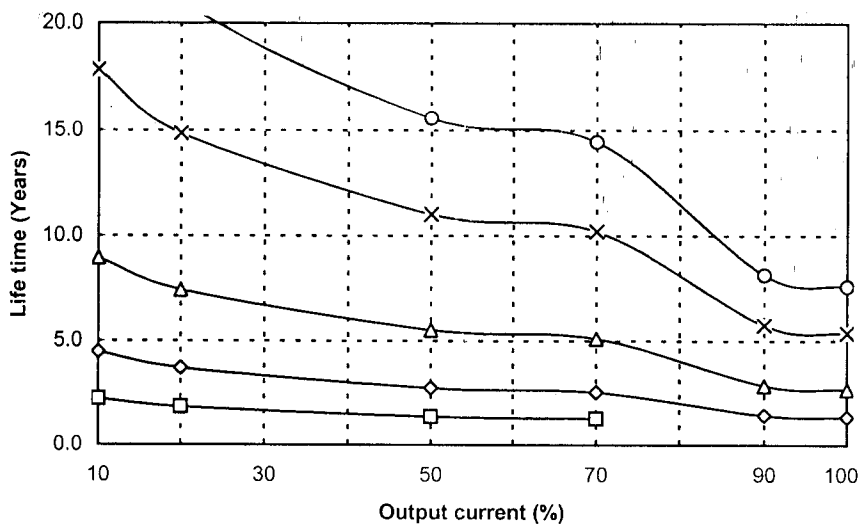
| LOAD % | Life time (years) | | | | |
|--------|-------------------|------|------|------|------|
| | Ta (°C) | | | | |
| | 25.0 | 30.0 | 40.0 | 50.0 | 60.0 |
| 10 | 25.3 | 17.9 | 8.9 | 4.5 | 2.2 |
| 20 | 21.0 | 14.8 | 7.4 | 3.7 | 1.9 |
| 50 | 15.6 | 11.0 | 5.5 | 2.8 | 1.4 |
| 70 | 14.4 | 10.2 | 5.1 | 2.6 | 1.3 |
| 90 | 8.1 | 5.7 | 2.9 | 1.4 | — |
| 100 | 7.6 | 5.4 | 2.7 | 1.3 | — |

$$L = L_o \cdot 2^{(105 - T_c) / 10} \quad (\text{Yrs})$$

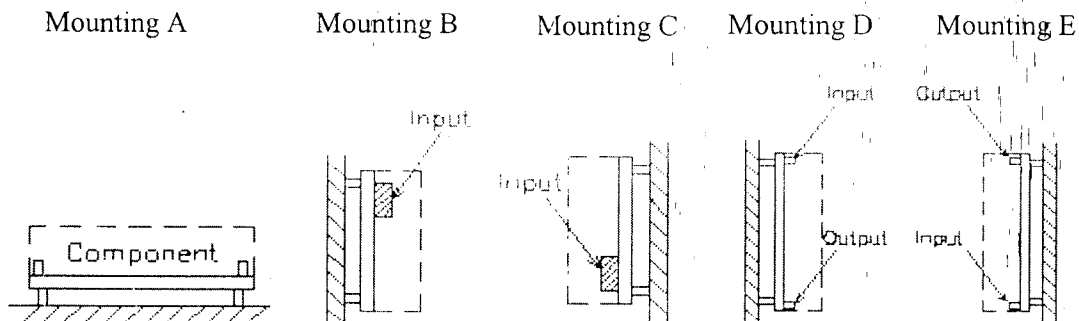
L : Elec. Capacitor computed life (24 Hrs / day , 365 days / year)

L_o : Guarantee life for Elec. Capacitor

T_c(ΔT+T_a) : Case temperature of Elec. Capacitor



Ta=25°C —○— Ta=30°C —×— Ta=40°C —△— Ta=50°C —◇— Ta=60°C —□—



4. ELECTROLYTIC CAPACITOR LIFETIME VERSUS LOAD

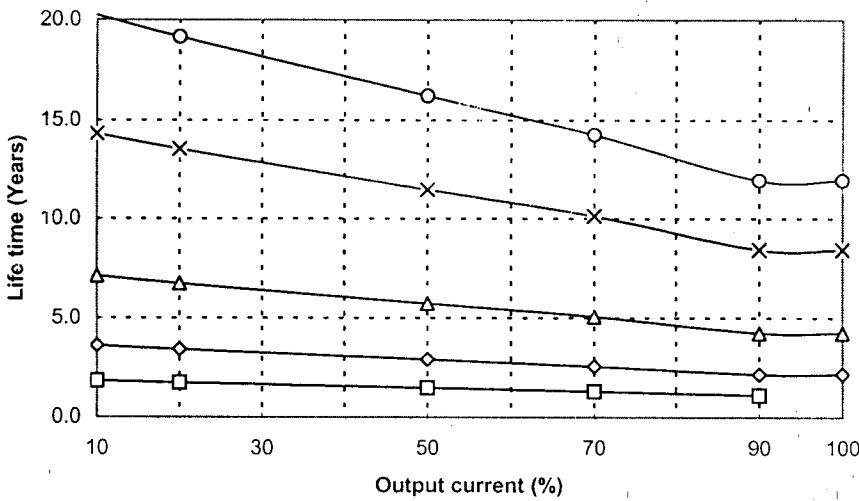
MODEL : VS10C - 5

Mounting C
Input : 100VAC

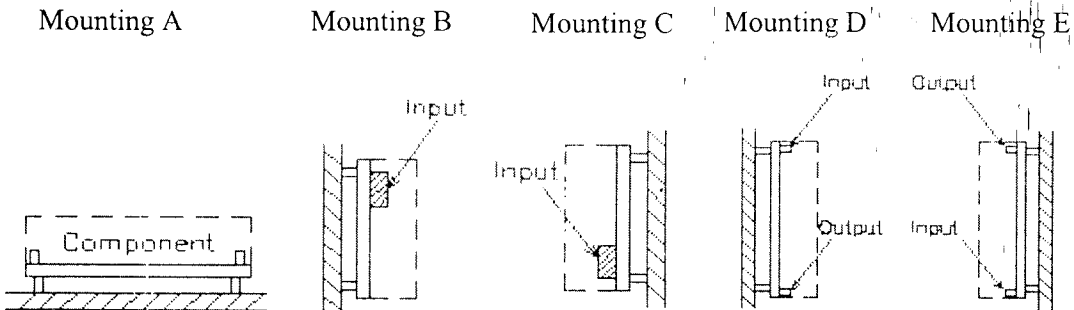
| LOAD % | Life time (years) | | | | |
|--------|-------------------|------|-----|-----|-----|
| | Ta (°C) | | | | |
| 10 | 20.2 | 14.3 | 7.2 | 3.6 | 1.8 |
| 20 | 19.2 | 13.5 | 6.8 | 3.4 | 1.7 |
| 50 | 16.2 | 11.5 | 5.7 | 2.9 | 1.4 |
| 70 | 14.3 | 10.1 | 5.1 | 2.5 | 1.3 |
| 90 | 12.0 | 8.5 | 4.2 | 2.1 | 1.1 |
| 100 | 12.0 | 8.5 | 4.2 | 2.1 | 1.1 |

$$L = L_o \cdot 2^{(105 - T_c) / 10} \quad (\text{Yrs})$$

- L : Elec. Capacitor computed life (24 Hrs / day , 365 days / year)
- L_o : Guarantee life for Elec. Capacitor.
- T_c(ΔT+T_a) : Case temperature of Elec. Capacitor



Ta=25°C —○— Ta=30°C —×— Ta=40°C —△— Ta=50°C —◇— Ta=60°C —□—



4. ELECTROLYTIC CAPACITOR LIFETIME VERSUS LOAD

MODEL : VS10C - 5

Mounting D
Input : 100VAC

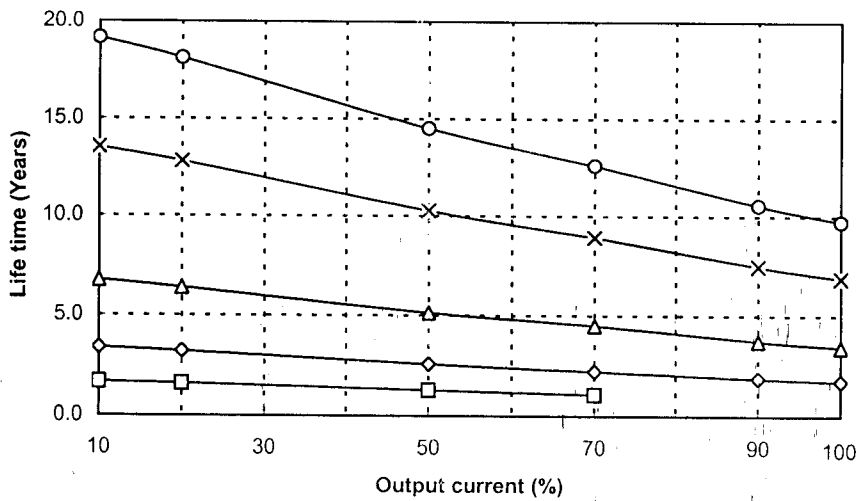
| LOAD % | Life time (years) | | | | |
|--------|-------------------|------|-----|-----|-----|
| | Ta (°C) | | | | |
| 10 | 19.2 | 13.5 | 6.8 | 3.4 | 1.7 |
| 20 | 18.1 | 12.8 | 6.4 | 3.2 | 1.6 |
| 50 | 14.5 | 10.3 | 5.1 | 2.6 | 1.3 |
| 70 | 12.6 | 8.9 | 4.5 | 2.2 | 1.1 |
| 90 | 10.6 | 7.5 | 3.7 | 1.9 | — |
| 100 | 9.7 | 6.9 | 3.4 | 1.7 | — |

$$L = L_0 \cdot 2^{(105 - T_c) / 10} \quad (\text{Yrs})$$

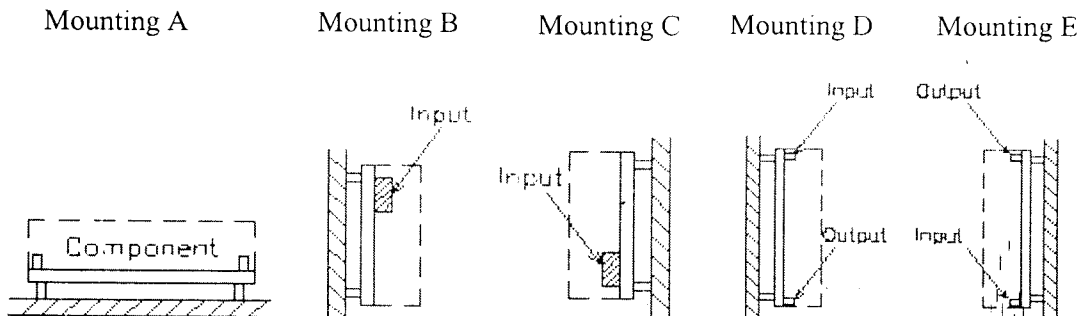
L : Elec. Capacitor computed life (24 Hrs / day , 365 days / year)

L₀ : Guarantee life for Elec. Capacitor

T_c(ΔT+T_a) : Case temperature of Elec. Capacitor



Ta=25°C —○— Ta=30°C —×— Ta=40°C —△— Ta=50°C —◇— Ta=60°C —□—



4. ELECTROLYTIC CAPACITOR LIFETIME VERSUS LOAD

MODEL : VS10C - 5

Mounting E

Input : 100VAC

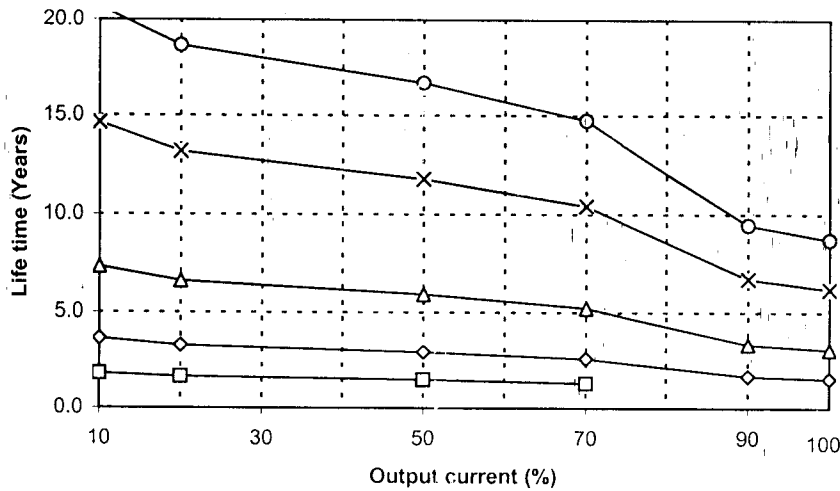
| LOAD % | Life time (years) | | | | |
|--------|-------------------|------|------|------|------|
| | Ta (°C) | | | | |
| | 25.0 | 30.0 | 40.0 | 50.0 | 60.0 |
| 10 | 20.7 | 14.6 | 7.3 | 3.7 | 1.8 |
| 20 | 18.7 | 13.2 | 6.6 | 3.3 | 1.7 |
| 50 | 16.7 | 11.8 | 5.9 | 3.0 | 1.5 |
| 70 | 14.7 | 10.4 | 5.2 | 2.6 | 1.3 |
| 90 | 9.5 | 6.7 | 3.3 | 1.7 | — |
| 100 | 8.7 | 6.2 | 3.1 | 1.5 | — |

$$L = L_o \cdot 2^{(105 - T_c) / 10} \quad (\text{Yrs})$$

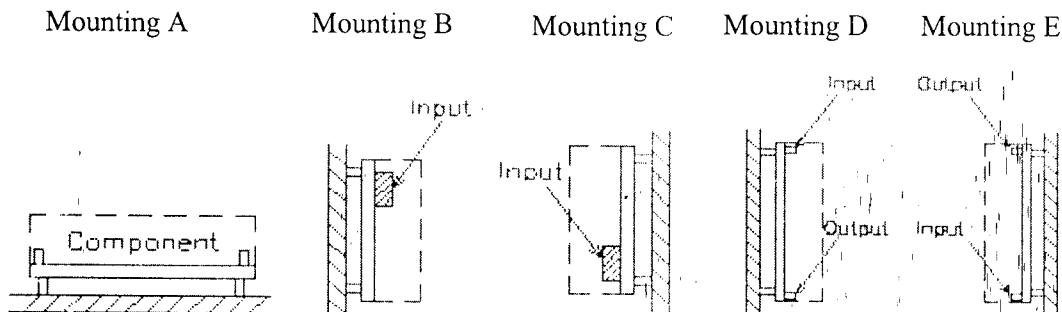
L : Elec. Capacitor computed life (24 Hrs / day , 365 days / year)

L_o : Guarantee life for Elec. Capacitor

T_c(ΔT+T_a) : Case temperature of Elec. Capacitor



Ta=25°C -○- Ta=30°C -X- Ta=40°C -△- Ta=50°C -◇- Ta=60°C -□-



5. ABNORMAL TEST

MODEL: VS10C-5

(1) Test Conditions

Input : 132VAC

Output : 5V / 2A

Ta : 25°C , 70%RH

(2) Test Results

| No. | Test position | | Test Mode | | Test Results | | | | | | | | | | | | Note |
|-----|---------------|------------|-----------------------|------------------|------------------|-----------------------|-----------------------|------------------|------------|----------------------------|---------------|-------------|-------------|-----------------------|--------------|----------------------------|-------------|
| | Location No. | Test Point | S H O R T | O P E N | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| | | | | | F I R E | S M O K E | B U R S T | S M E L | Red Hot | D A M A G E | Fuse Blown | O V P | O C P | No Out - put | No Change | O T H E R S | |
| 1 | Q1 | B-C | Y | | | | | | | | Y | | | Y | | | Q1 SHORTED |
| 2 | | C-E | Y | | | | | | | | Y | | | Y | | | |
| 3 | | B-E | Y | | | | | | | | | | | Y | | | |
| 4 | | B | | Y | | | | | | | | | | Y | | | |
| 5 | | C | | Y | | | | | | | | | | Y | | | |
| 6 | | E | | Y | | | | | | | | | | Y | | | |
| 7 | Q2 | C-E | Y | | | | | | | | | | | Y | | | |
| 8 | | B-C | Y | | | | | | | | | | | Y | | | |
| 9 | | B-E | Y | | | | | | | | Y | | | Y | | | Q1 SHORTED |
| 10 | | E | | Y | | | | | | | Y | | | Y | | | Q1 SHORTED |
| 11 | | C | | Y | | | | | | | Y | | | Y | | | Q1 SHORTED |
| 12 | | B | | Y | | | | | | | Y | | | Y | | | Q1 SHORTED |
| 13 | A1 | K-A | Y | | | | | | | | | | | | | Y | O/P LOW |
| 14 | | K-R | Y | | | | | | | | | | | | | Y | O/P LOW |
| 15 | | R-A | Y | | | | | | | | | Y | | Y | | | ZD4 SHORTED |
| 16 | | K | | Y | | | | | | | | Y | | Y | | | ZD4 SHORTED |
| 17 | | A | | Y | | | | | | | | Y | | Y | | | ZD4 SHORTED |
| 18 | | R | | Y | | | | | | | | Y | | Y | | | ZD4 SHORTED |
| 19 | PC1 | 1-2 | Y | | | | | | | | | Y | | Y | | | ZD4 SHORTED |
| 20 | | 3-4 | Y | | | | | | | | | | | Y | | | |
| 21 | | 1 | | Y | | | | | | | | | Y | Y | | | ZD4 SHORTED |
| 22 | | 2 | | Y | | | | | | | | | Y | Y | | | ZD4 SHORTED |
| 23 | | 3 | | Y | | | | | | | | | Y | Y | | | ZD4 SHORTED |
| 24 | | 4 | | Y | | | | | | | | | Y | Y | | | ZD4 SHORTED |
| 25 | D1 | | Y | | | | | | | | Y | | | Y | | | |
| 26 | | | | Y | | | | | | | | | | Y | | | |
| 27 | D2 | | Y | | | | | | | | | | | Y | | | |
| 28 | | | | Y | | | | | | | | | | Y | | | |
| 29 | D3 | | Y | | | | | | | | | | | | | Y | O/P LOW |
| 30 | | | | Y | | | | | | | | Y | | Y | | | ZD4 SHORTED |

| No. | Test position | | Test Mode | | Test Results | | | | | | | | | | | | Note |
|-----|---------------|------------|-----------------------|------------------|------------------|-----------------------|-----------------------|-----------------------|------------|----------------------------|---------------|-------------|-------------|-----------------------|--------------|----------------------------|-------------|
| | Location No. | Test Point | S H O R T | O P E N | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| | | | | | F I R E | S M O K E | B U R S T | S M E L L | Red Hot | D A M A G E | Fuse Blown | O V P | O C P | No Out - put | No Change | O T H E R S | |
| 31 | D4 | | Y | | | | | | | | | | | | | Y | O/P LOW |
| 32 | | | | Y | | | | | | | | Y | | Y | | | ZD4 SHORTED |
| 33 | D5 | | Y | | | | | | | | | | | | Y | | |
| 34 | | | | Y | | | | | | | | | | | Y | | |
| 35 | ZD3 | | Y | | | | | | | | | | | | | Y | O/P LOW |
| 36 | | | | Y | | | | | | | | | | | Y | | |
| 37 | ZD4 | | Y | | | | | | | | | | Y | | | | |
| 38 | | | | Y | | | | | | | | | | | Y | | |
| 39 | T1 | 3-4 | Y | | | | | | | | | | Y | | | | |
| 40 | | 4-5 | Y | | | | | | | Y | | | Y | | | | |
| 41 | | 6-7 | Y | | | | | | | | | | | | Y | | |
| 42 | | 7-8 | Y | | | | | | | | | | | | Y | | |
| 43 | | 8-9 | Y | | | | | | | | | | Y | | | | |
| 44 | | 9-10 | Y | | | | | | | | | | | | Y | | |
| 45 | | 1 | | Y | | | | | | | | | Y | | | | |
| 46 | | 3 | | Y | | | | | | | | | Y | | | | |
| 47 | | 4 | | Y | | | | | | | | | Y | | | | |
| 48 | | 5 | | Y | | | | | | | | | Y | | | | |
| 49 | | 6 | | Y | | | | | | | | | | | Y | | |
| 50 | | 7 | | Y | | | | | | | | | | | Y | | |
| 51 | | 8 | | Y | | | | | | | | | | | Y | | |
| 52 | | 9 | | Y | | | | | | | | | | | Y | | |
| 53 | | 10 | | Y | | | | | | | | | | | Y | | |
| 54 | | | | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | |
| 56 | | | | | | | | | | | | | | | | | |
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6. VIBRATION TEST

MODEL : VS10C-5

(1) Vibration test class

Frequency variable endurance test

(2) Equipment used

EMIC CORP Controller : F-400-BM-DCS-7800 Vibrator 905-FN

(3) Test Conditions

Sweep frequency 10 ~ 55Hz

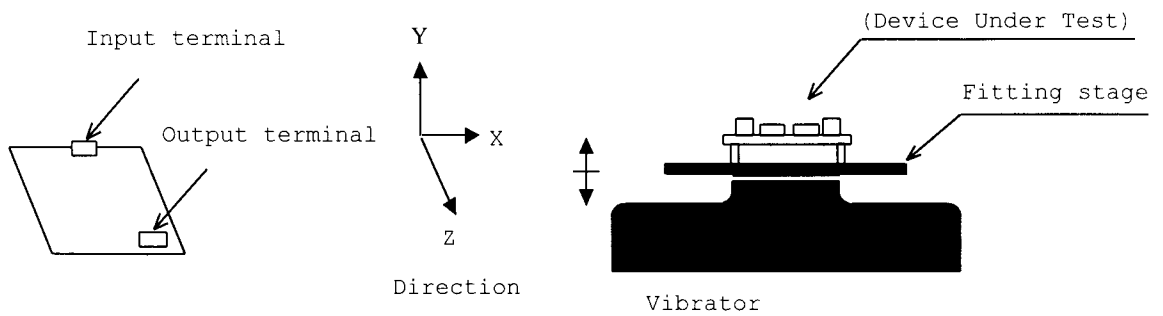
Sweep time 1 minute

Acceleration Constant (2G)

Direction X, Y, Z.

Test time 1 hour each

(4) Test method



(5) Test Results

OK

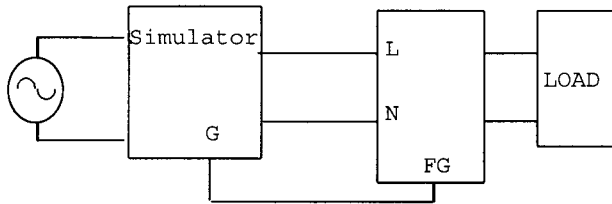
| Check item | Output voltage (V) | Ripple voltage(mVp-p) | Visual Check |
|-------------|--------------------|-----------------------|--------------|
| Before Test | 5.022 | 9 | O.K. |
| After Test | X | 5.026 | O.K. |
| | Y | 5.026 | O.K. |
| | Z | 5.028 | O.K. |

Check conditions: Vin: 100Vac, Iout: 100%

7. NOISE SIMULATE TEST

MODEL : VS10C-5

(1) Test circuit and equipment



Simulator : INS-400L Noise Laboratory Co.,LTD

(2) Test Conditions

- | | | | |
|-----------------------|-----------------|---------------|--------------------|
| * Input voltage | : 100VAC | * Noise level | : 0V~2KV |
| * Output voltage | : Rated | * Phase shift | : 0° ~ 360° |
| * Output current | : 0% , 100% | * Polarity | : + , - |
| * Ambient temperature | : 25°C | * Mode | : Normal Common |
| * Pulse width | : 50ns ~ 1000ns | * Trig select | : Line |

(3) Acceptable conditions

1. Not to be broken
2. Not to be shut down output
3. No other out of orders

(4) Test Result

OK