

NNS30

RELIABILITY DATA

DWG. No. IA501-79-01			
Q.A.NLJ	Q.A.NLI	ENG.	APP.
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NEMIC-LAMBDA

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

NEMIC-LAMBDA

M. T. B. F.

1. Method of calculation:

This calculation is by 'components count method' laid down by the DC Stabilized Power Supplies (Switching mode) committee of EIAJ.

The MTBF is determined by means of a fixed component failure rate λ_G given to each component and the number of component count of each type of component. λ_G is determined based on MIL-HDBK-217D.

Please refer to EIAJ handbook no. RCF-9021 for formula:

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

λ_{equip} = Total equipment failure rate (failures / 10^6 hrs)

λ_G = Failure rate of the i^{th} component

N_i = Number of i^{th} component

n = Number of categories of component

2. MTBF Value:

Conditions: Nominal line, rated load

Ambient Temperature 25 C °

MTBF = 118,300 hrs

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2. COMPONENT DERATING

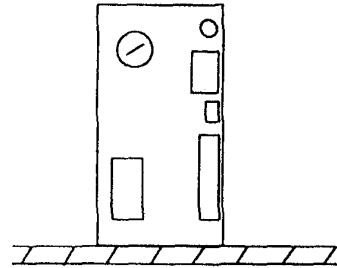
MODEL : NNS30 - 5

(1) calculation method:

conditions:

Input: 100VAC Output 5V 6A (100%)

Ambient temperature : 50° C



Mounting Method : Standard

(b) Semiconductor

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

(c) IC, Resistors, Capacitors, etc.

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

(d) Calculating criteria:

$$\Theta_{j-c} = \frac{T_j(\max) - T_c}{P_c(\max)} \quad \Theta_{j-a} = \frac{T_j(\max) - T_a}{P_c(\max)}$$

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

$P_c(\max)$: Maximum Power Dissipation

$T_j(\max)$: Maximum Junction Temperature

Θ_{j-c} : Thermal Impedance between Junction and Case

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

NNS30**(2) Component Derating List**

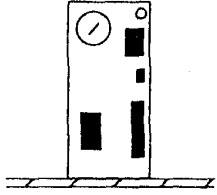
Location No.	Parts Name	MAX Rating	Actual Rating	Derating Factor	Note
Q1A,B,C,D	MOSFET	$T_{j_{max}} = 150^{\circ}\text{C}$	$T_j = 99^{\circ}\text{C}$	66%	
Q4	SCR	$T_{j_{max}} = 125^{\circ}\text{C}$	$T_j = 99.1^{\circ}\text{C}$	79.2%	
CR1	S.B.D.	$T_{j_{max}} = 150^{\circ}\text{C}$	$T_j = 93.2^{\circ}\text{C}$	62.1%	
CR4	DIODE	$T_{j_{max}} = 150^{\circ}\text{C}$	$T_j = 82.7^{\circ}\text{C}$	55.1%	
CR5	LED	$I_{f_{max}} = 35\text{mA}$	$I_f = 10\text{mA}$	28.5%	
CR6	ZENER	$T_{j_{max}} = 150^{\circ}\text{C}$	$T_j = 84^{\circ}\text{C}$	56%	
CR8	DIODE	$T_{j_{max}} = 150^{\circ}\text{C}$	$T_j = 83.2^{\circ}\text{C}$	55.4%	
IC1	OP - AMP	$T_{j_{max}} = 150^{\circ}\text{C}$	$T_j = 85.6^{\circ}\text{C}$	57%	
IC2	REF. DIODE	$T_{j_{max}} = 150^{\circ}\text{C}$	$T_j = 84.6^{\circ}\text{C}$	56.4%	

3. ΔT TEMPERATURE RISE

MODEL: NNS30 - 5

Location No.	Parts Name	$\Delta T C$ TEMP. RISE
Q1A,B,C,D	MOSFET	40.1
Q4	SCR	47.5
CR1	S. B. D.	54.8
C2A,B	ELEC. CAP.	22.1
C4	ELEC. CAP	30.6
T1	TRANSFORMER	62.3

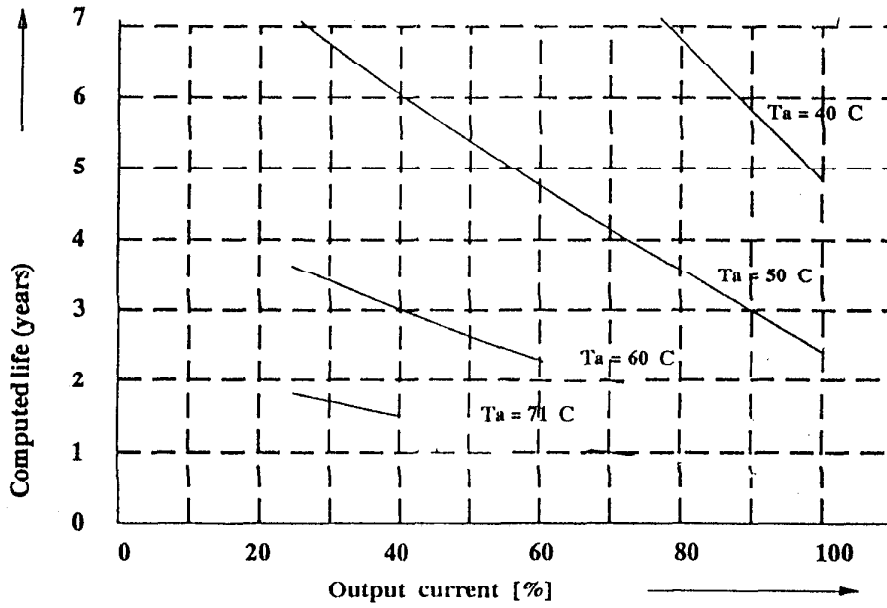
Conditions:

Mounting Method	 (STANDARD)
Input Voltage	100VAC
Output Volt.	5V
Output Curr.	6A (100%)

ELEC. CAPACITOR COMPUTED LIFE

MODEL: NNS30 - 5

Computation Life curve



Formula: $L = L_0 \times 2^{\frac{105 - T_c}{10}}$ (year)

L: Elec. capacitor computed life
(24 hours per day, 365 days operation)

L₀: Guarantee life for Elec. Cap.

T_c: Case temperature of Elec. Cap.

CONDITIONS: Mounting method: Standard mounting

Input Voltage: 100VAC

Output Voltage: 5V

Cooling: convection cooling

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5. ABNORMAL TEST

MODEL - NNS30 - 5

(1) Conditions

Input: 115VAC Output: 5V 6A Ta: 25c Selector: 100VAC

(2) Test Results

No.	Test Point		Test Mode		Test Result												Note
	Location No.	Test Point	Short	Open	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	
					Fire	Smoke	Burst	Smell	Red Hot	Damaged	Fuse Blown	O V P	O C P	No Output	No Change	Others	
1	C2A		●								●			●			
2				●												●	
3	C2B		●								●			●			
4				●												●	
5	C4		●										●	●			
6				●												●	OUTPUT OSCILLATIONS
7	CR1	⊖		●										●			
8		⊕		●										●			
9		⊕-⊖	●									●		●			
10		⊖-⊖	●									●		●			
11	CR4		●									●		●			
12				●											●		
13	CR6		●									●		●			
14				●											●		
15	CR8		●									●		●			
16				●											●		
17	Q1 (A,B,C)	D		●											●		
18		S		●											●		
19		G		●								●		●			
20		D-S	●									●		●			
21		G-S	●											●			
22		D-G	●								●		●				

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No.	Test Point		Test Mode		Test Result												Note	
	Loca tion No.	Test Point	Short	Open	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫		
					Fire	Smoke	Burst	Smel	Red Hot	Damaged	Fuse Blown	O V P	O C P	No Output	No Charge	Others		
23	Q2	C		●										●				
24		B		●										●				
25		E		●										●				
26		C-E	●									●			●			
27		C-B	●									●			●			
28		B-E	●												●			
29	Q3	C		●										●				
30		B		●										●				
31		E		●										●				
32		C-E	●									●			●			
33		C-B	●									●			●			
34	B-E	●												●				
35	Q4	A-K	●									●		●				
36		A		●											●			
37		K		●											●			
38	IC2		●											●				
39				●								●		●				
40	T1	PRIM WINDING	●								●			●				
41				●										●				
42		SEC WINDING	●									●			●			
43				●											●			
44		AUX WINDING	●												●			TF1 OPEN
45					●										●			
50																		

6. VIBRATION TEST

MODEL: NNS30 - 12

(1) Vibration test class:

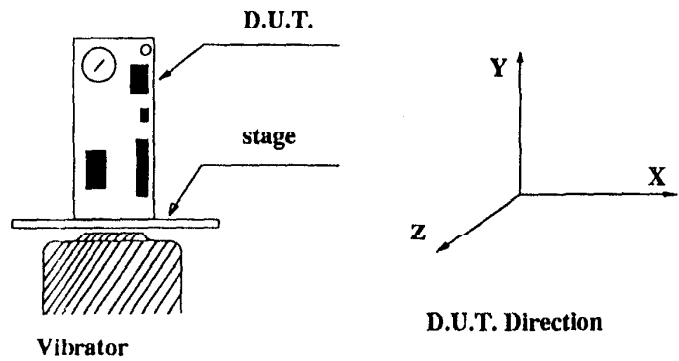
Frequency variable endurance test

(2) Equipment used:

Controller: GENRAD - 2503

Vibrator : ULHOLTZ - DICKIE TA1000

(3) Testing method:



Sweep frequency : 10 - 55Hz

Sweep time: 1min

Acceleration: const. (2G)

Direction: X, Y, Z.

Test time: 1H each

Result:

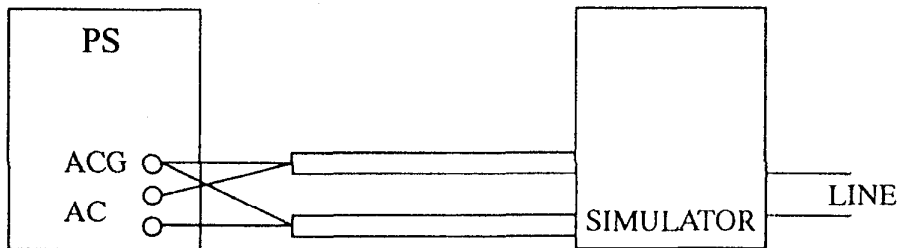
OK NG

Check Item	Vout	Ripple (mVp-p)	D.U.T. stage	Note
Initial Direc.	12.132	2.5	OK	
X	12.133	2.5	OK	
Y	12.133	2.5	OK	
Z	12.133	2.5	OK	

NOISE SIMULATE TEST

MODEL : NNS 30

(1) Test circuit and equipment



Simulator: INS - 4420
(Noise laboratory Co. Ltd.)

(2) Measuring Conditions

Input voltage	: Rated
Output voltage	: Rated
Output current	: 0%, 100%
Ambient temperature	: 25 °C
Pulse width	: 50ns ~ 1000ns
Noise level	: 0 ~ 2KV
Phase shift	: 0 ~ 360 °C
Polarity	: +, -
MODE	: NORMAL, COMMON
TRIG SELECT	: LINE

(3) Acceptable conditions

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

(4) Results

OK

NG

ELECTRO-STATIC DISCHARGE TEST

NNS30

MODEL: NNS30

(1) Equipment used

SET-30E (SANKI, E. IND.)

Discharge resistance : 250 Ω M

Capacity : 200 pF

(2) Measuring conditions

Input voltage : Rated (100 VAC)

Output voltage : Rated

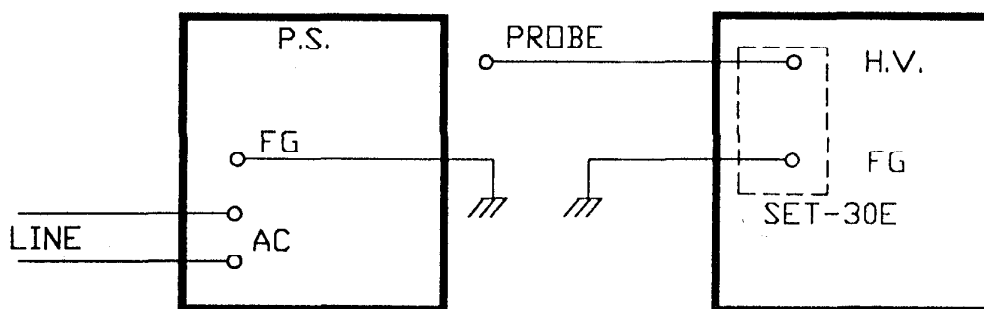
Output current : Rated

Ambient temperature : 25°C

Test voltage : \pm 3KV , \pm 5KV , \pm 10KV , \pm 15KV

(3) Testing method

Check if there is no abnormal output when the testing voltage is applied to operating D. U. T. (Device Under Test) on its case, input terminal, output terminal, FG terminal and ACG terminal which are exposed parts to human body. Testing circle is at +,- for three times each, and the applied voltage to be gradually increased from 3KV to 15KV.



(4) Acceptable conditions

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

(5) Results

OK

NG

NEMIC-LAMBDA

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IMPULSE TEST

NNS 30

MODEL : NNS 30

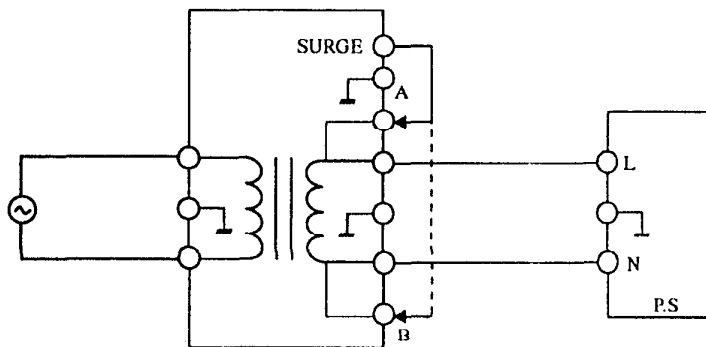
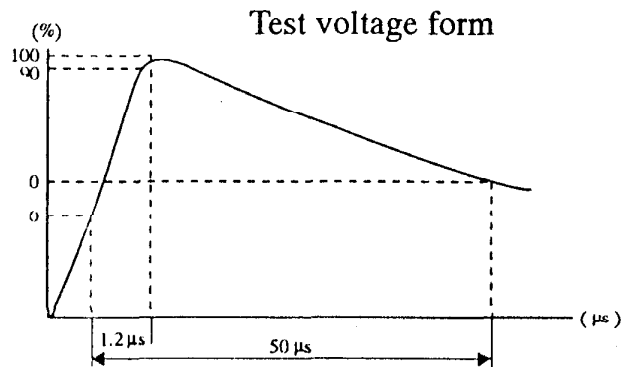
(1) Equipment used

LSS - 710B (Noise laboratory Co. Ltd.)

(2) Measuring Conditions

Input voltage	: Rated	Test voltage	: 5KV
Output voltage	: Rated	Test point	: Between FG - AC
Output current	: Full load	Test time	: 3 times
Ambient temperature	: 25 °C	Polarity	: + , -

(3) Testing method



(4) Acceptable conditions

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

(5) Results

⊙ OK

NG