参考資料

COSEL

TEST DATA OF ZUW64812

(48.0V INPUT)

Regulated DC Power Supply

Date : Sep. 21. 1996

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Design Manager

Prepared by : H. Ise
Design Engineer

コーセル株式会社

COSEL CO., LTD.

参考資料

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(Final Page 20)

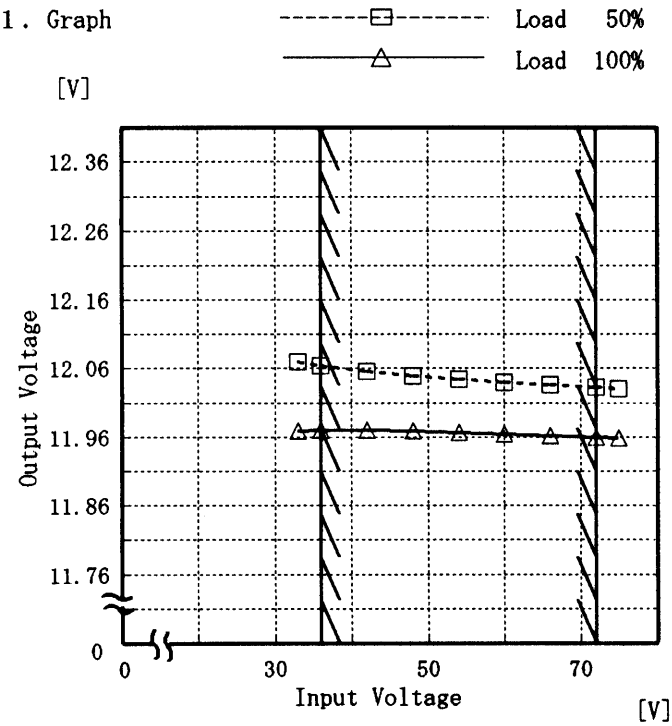
COSEL

Model	ZUW64812
Item	Line Regulation 静的入力変動

Temperature 25℃
Testing Circuitry Figure A

Object +12V0.25A

1. Graph

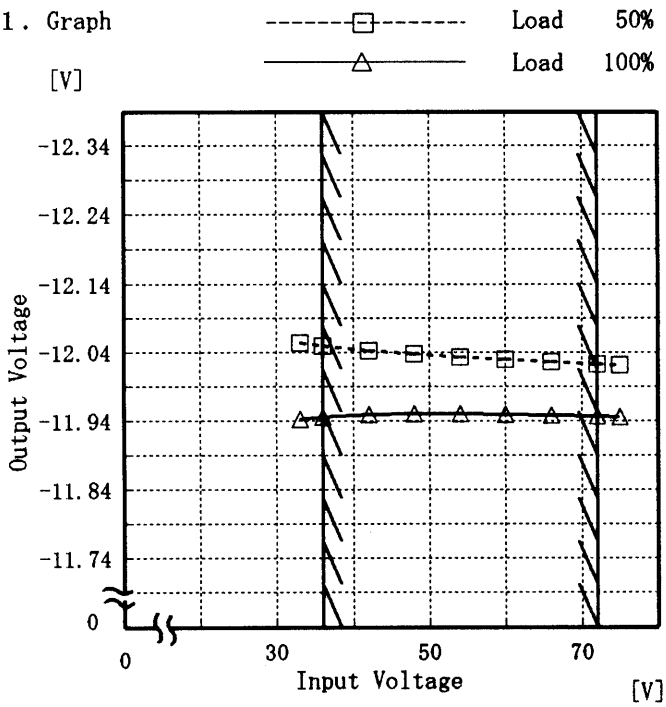


2. Values

Input Voltage [V]	Load 50% Output Volt. [V]	Load 100% Output Volt. [V]
33.0	12.070	11.969
36.0	12.064	11.970
42.0	12.055	11.970
48.0	12.049	11.969
54.0	12.044	11.967
60.0	12.040	11.965
66.0	12.036	11.962
72.0	12.033	11.960
75.0	12.031	11.959
—	—	—
—	—	—
—	—	—

Object −12V0.25A

1. Graph



Note: Slanted line shows the range of the rated input voltage.
(注)斜線は定格入力電圧範囲を示す。

2. Values

Input Voltage [V]	Load 50% Output Volt. [V]	Load 100% Output Volt. [V]
33.0	-12.053	-11.942
36.0	-12.049	-11.946
42.0	-12.042	-11.949
48.0	-12.037	-11.951
54.0	-12.033	-11.950
60.0	-12.029	-11.950
66.0	-12.026	-11.948
72.0	-12.023	-11.946
75.0	-12.021	-11.945
—	—	—
—	—	—
—	—	—

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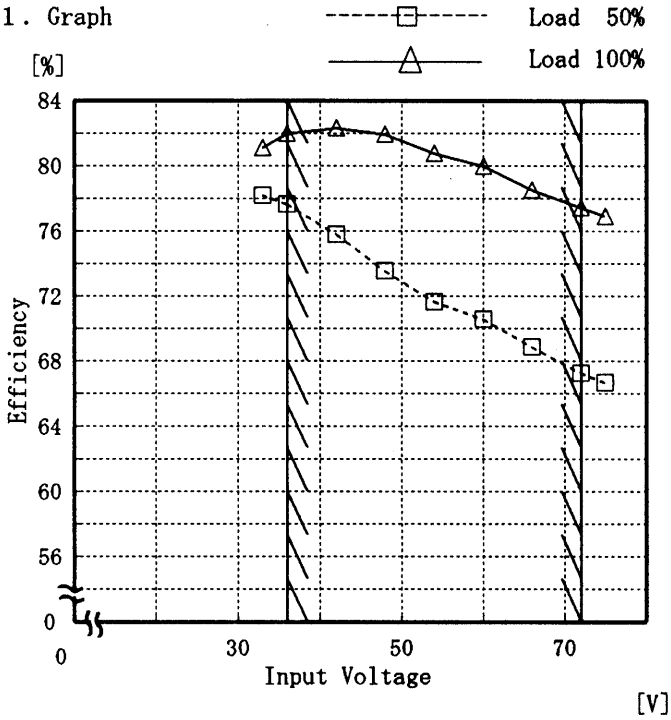
COSEL

Model	ZUW64812
Item	Efficiency 効率
Object	――――――――――――

Temperature 25℃
Testing Circuitry Figure A

1. Graph



Note: Slanted line shows the range of the rated input voltage.

(注)斜線は定格入力電圧範囲を示す。

2. Values

Input Voltage [V]	Load 50% Efficiency [%]	Load 100% Efficiency [%]
33.0	78.2	81.1
36.0	77.7	82.0
42.0	75.8	82.3
48.0	73.6	81.9
54.0	71.6	80.8
60.0	70.6	80.0
66.0	68.9	78.5
72.0	67.3	77.4
75.0	66.7	76.9
—	—	—
—	—	—
—	—	—

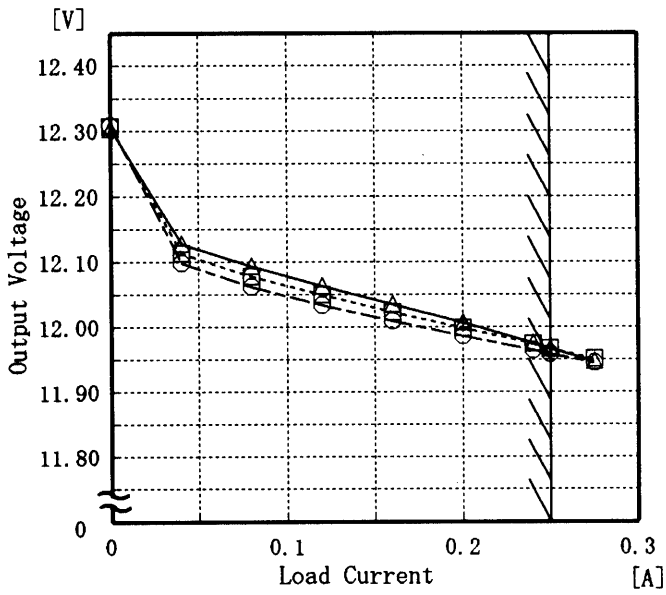
COSEL

Model	ZUW64812
Item	Load Regulation 静的負荷変動

Temperature 25℃
Testing Circuitry Figure A

Object +12V0.25A

1. Graph

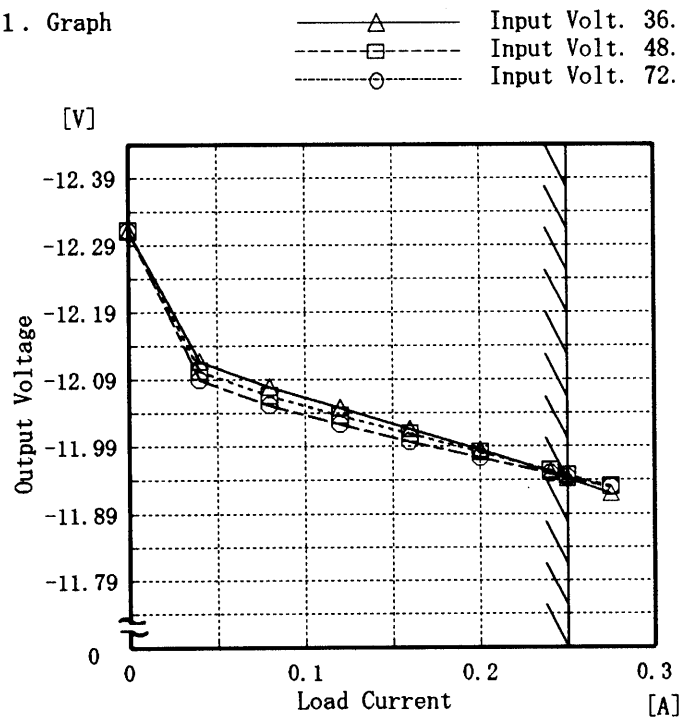


2. Values

Load Current [A]	Input Volt. 36.0[V] Output Volt. [V]	Input Volt. 48.0[V] Output Volt. [V]	Input Volt. 72.0[V] Output Volt. [V]
0.000	12.303	12.307	12.308
0.040	12.128	12.113	12.099
0.080	12.094	12.078	12.062
0.120	12.064	12.049	12.034
0.160	12.036	12.023	12.009
0.200	12.007	11.999	11.987
0.240	11.976	11.974	11.964
0.250	11.968	11.967	11.958
0.275	11.947	11.951	11.945
—	—	—	—

Object −12V0.25A

1. Graph



Note: Slanted line shows the range of the rated load current.
(注)斜線は定格負荷電流範囲を示す。

2. Values

Load Current [A]	Input Volt. 36.0[V] Output Volt. [V]	Input Volt. 48.0[V] Output Volt. [V]	Input Volt. 72.0[V] Output Volt. [V]
0.000	-12.312	-12.313	-12.312
0.040	-12.118	-12.104	-12.091
0.080	-12.080	-12.067	-12.053
0.120	-12.048	-12.037	-12.023
0.160	-12.017	-12.010	-11.998
0.200	-11.986	-11.983	-11.974
0.240	-11.952	-11.956	-11.951
0.250	-11.943	-11.948	-11.945
0.275	-11.921	-11.931	-11.930
—	—	—	—

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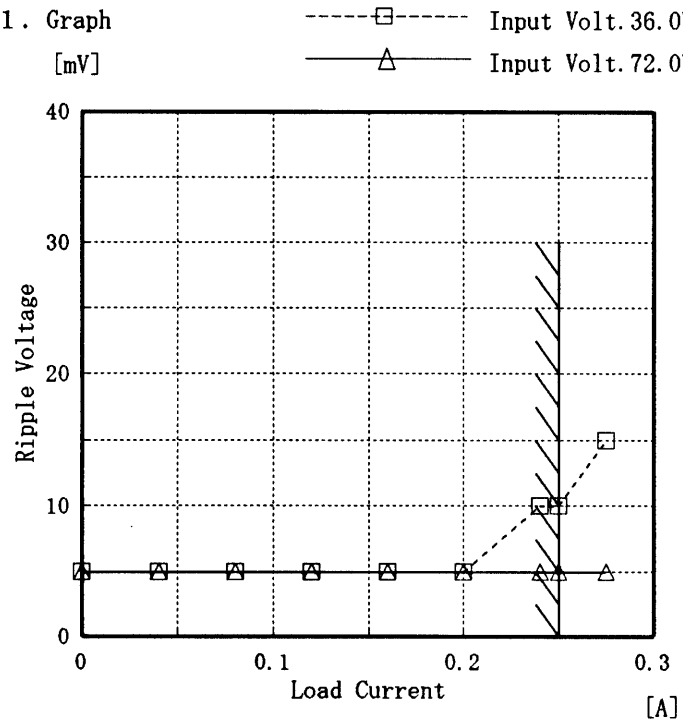
COSEL

Model	ZUW64812
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	+12V 0.25A

Temperature 25℃
Testing Circuitry Figure A

1. Graph



Ripple Voltage is shown as p-p in the figure below.

Note: Slanted line shows the range of the rated load current.

リップル電圧は、下図ｐ－ｐ値で示される。
(注)斜線は定格負荷電流範囲を示す。

T1: Due to AC Input Line
入力商用周期
T2: Due to Switching
ｽｲｯﾁﾝｸﾞ周期

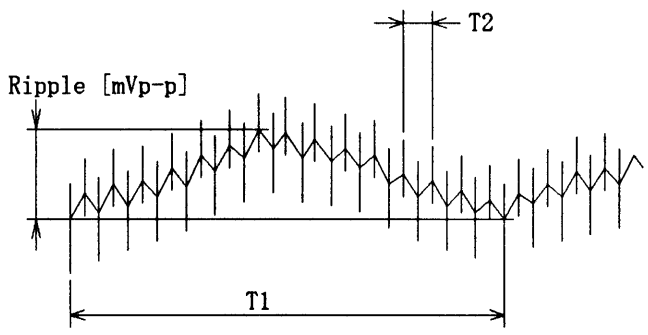


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

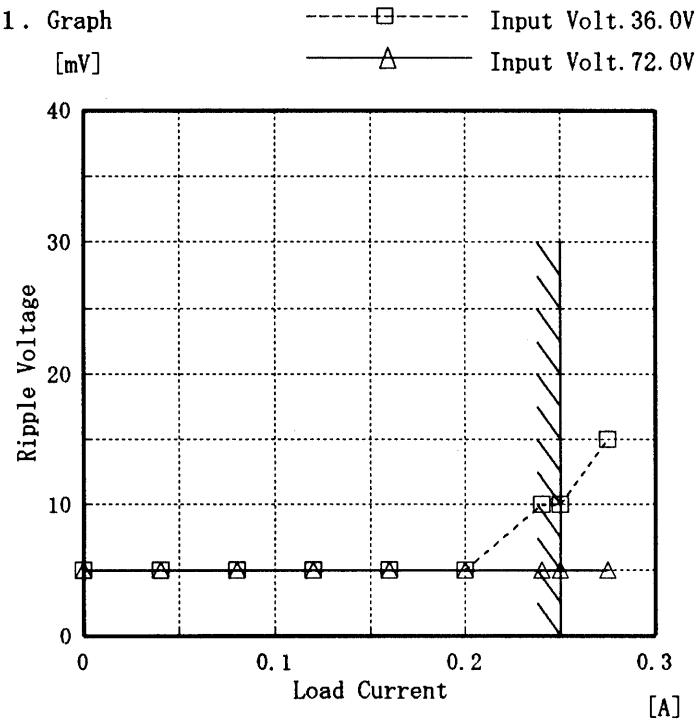
Load Current [A]	Input Volt. 36.0 [V] Ripple Output Volt. [mV]	Input Volt. 72.0 [V] Ripple Output Volt. [mV]
0.000	5	5
0.040	5	5
0.080	5	5
0.120	5	5
0.160	5	5
0.200	5	5
0.240	10	5
0.250	10	5
0.275	15	5
—	—	—
—	—	—

COSEL

Model	ZUW64812
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	−12V 0.25A

Temperature 25℃
Testing Circuitry Figure A

1. Graph



Ripple Voltage is shown as p-p in the figure below.

Note: Slanted line shows the range of the rated load current.

リップル電圧は、下図ｐ－ｐ値で示される。

(注)斜線は定格負荷電流範囲を示す。

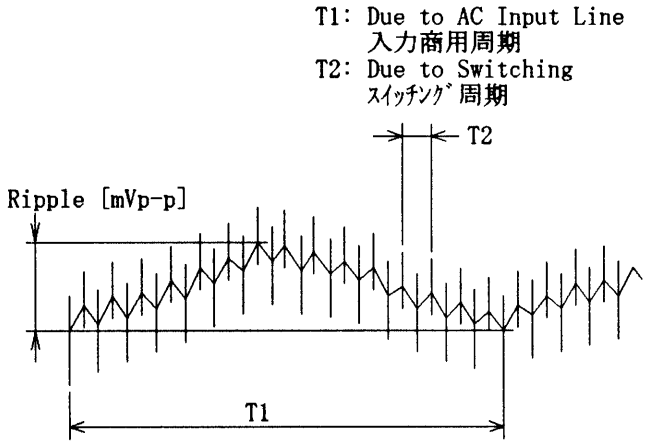


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

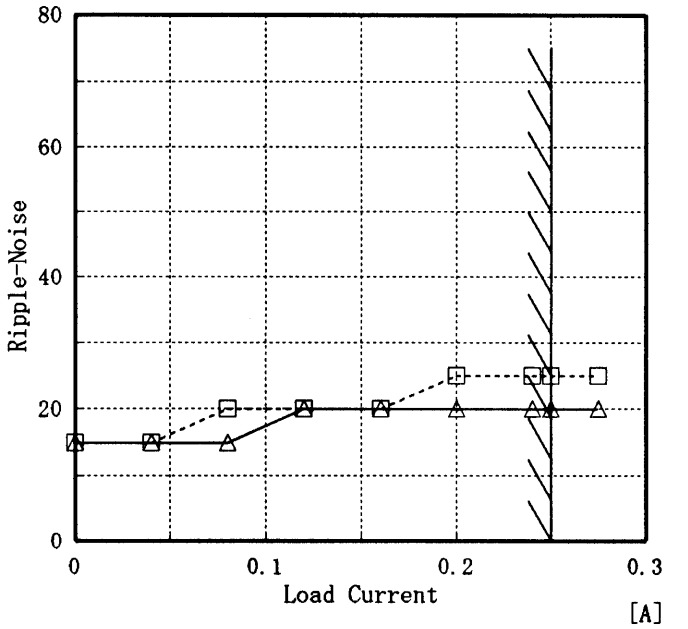
Load Current [A]	Input Volt. 36.0 [V] Ripple Output Volt. [mV]	Input Volt. 72.0 [V] Ripple Output Volt. [mV]
0.000	5	5
0.040	5	5
0.080	5	5
0.120	5	5
0.160	5	5
0.200	5	5
0.240	10	5
0.250	10	5
0.275	15	5
—	—	—
—	—	—

COSEL

Model	ZUW64812
Item	Ripple-Noise リップルノイズ
Object	+12V0.25A

Temperature 25℃
Testing Circuitry Figure A

1. Graph



Ripple-Noise is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated load current.

リップルノイズは、下図ｐ－ｐ値で示される。
(注)斜線は定格負荷電流範囲を示す。

T1: Due to AC Input Line
入力商用周期
T2: Due to Switching
ｽｲｯﾁﾝｸﾞ周期

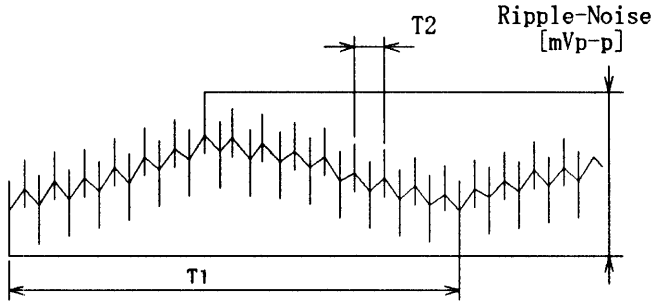


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

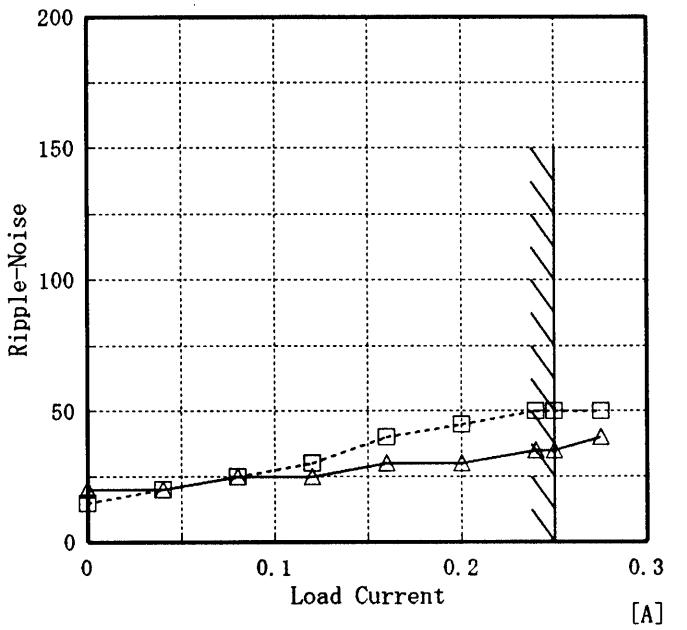
Load current [A]	Input Volt. 36.0 [V] Ripple-Noise [mV]	Input Volt. 72.0 [V] Ripple-Noise [mV]
0.000	15	15
0.040	15	15
0.080	20	15
0.120	20	20
0.160	20	20
0.200	25	20
0.240	25	20
0.250	25	20
0.275	25	20
—	—	—
—	—	—

COSEL

Model	ZUW64812
Item	Ripple-Noise リップルノイズ
Object	−12V0.25A

Temperature 25℃
Testing Circuitry Figure A

1. Graph



Ripple-Noise is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated load current.

リップルノイズは、下図ｐ－ｐ値で示される。
(注)斜線は定格負荷電流範囲を示す。

T1: Due to AC Input Line
入力商用周期
T2: Due to Switching
ｽｲｯﾁﾝｸﾞ周期

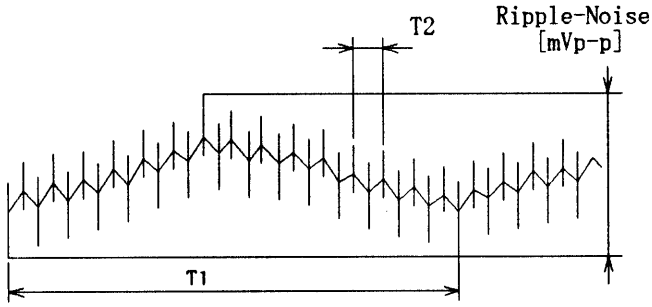


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

Load current [A]	Input Volt. 36.0 [V] Ripple-Noise [mV]	Input Volt. 72.0 [V] Ripple-Noise [mV]
0.000	15	20
0.040	20	20
0.080	25	25
0.120	30	25
0.160	40	30
0.200	45	30
0.240	50	35
0.250	50	35
0.275	50	40
—	—	—
—	—	—

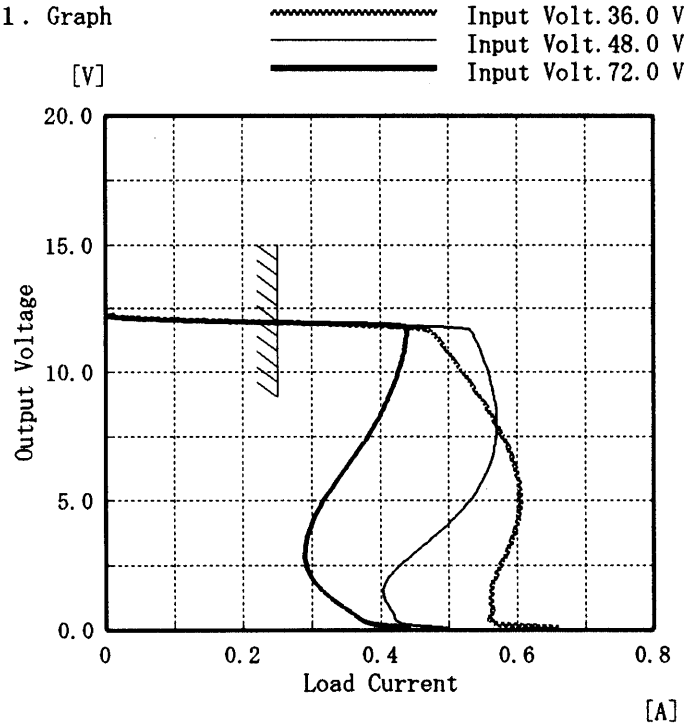
COSEL

Model	ZUW64812
Item	Overcurrent Protection 過電流保護

Temperature 25℃
Testing Circuitry Figure A

Object +12V0.25A

1. Graph

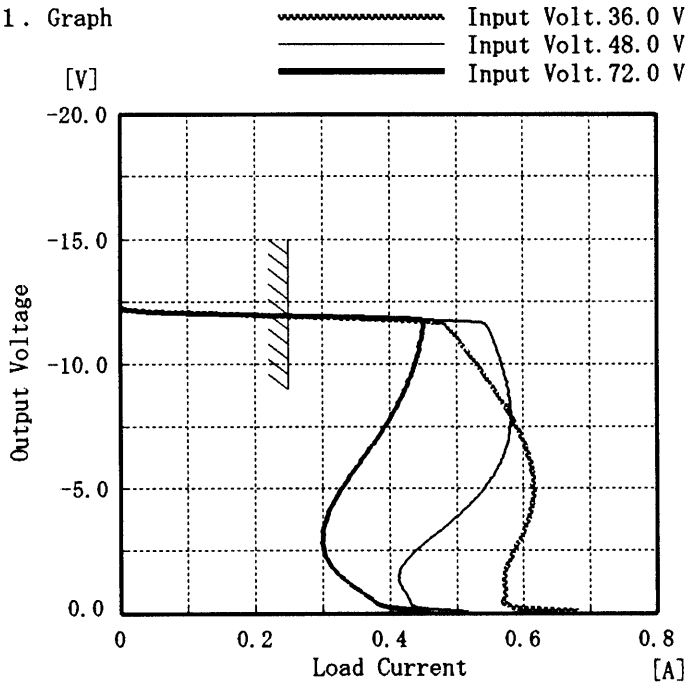


2. Values

Output Voltage [V]	Input Volt. 36.0[V] Load Current [A]	Input Volt. 48.0[V] Load Current [A]	Input Volt. 72.0[V] Load Current [A]
12.00	0.194	0.183	0.161
11.40	0.480	0.537	0.438
10.80	0.497	0.545	0.435
9.60	0.531	0.561	0.421
8.40	0.558	0.569	0.402
7.20	0.584	0.569	0.376
6.00	0.600	0.553	0.343
4.80	0.605	0.526	0.314
3.60	0.594	0.477	0.293
2.40	0.574	0.427	0.292
1.20	0.561	0.405	0.327
0.00	0.661	0.498	0.444

Object −12V0.25A

1. Graph



Note: Slanted line shows the range of the rated load current.

(注)斜線は定格負荷電流範囲を示す。

2. Values

Output Voltage [V]	Input Volt. 36.0[V] Load Current [A]	Input Volt. 48.0[V] Load Current [A]	Input Volt. 72.0[V] Load Current [A]
-12.00	0.165	0.090	0.072
-11.40	0.491	0.548	0.450
-10.80	0.508	0.558	0.445
-9.60	0.541	0.571	0.433
-8.40	0.571	0.579	0.412
-7.20	0.594	0.579	0.387
-6.00	0.611	0.564	0.354
-4.80	0.615	0.535	0.325
-3.60	0.604	0.487	0.303
-2.40	0.584	0.434	0.302
-1.20	0.571	0.415	0.340
0.00	0.683	0.517	0.460

COSEL

Model	ZUW64812		
Item	Dynamic Load Responce 動的負荷変動	Temperature Testing Circuitry	25℃ Figure A
Object	+12V0.25A		

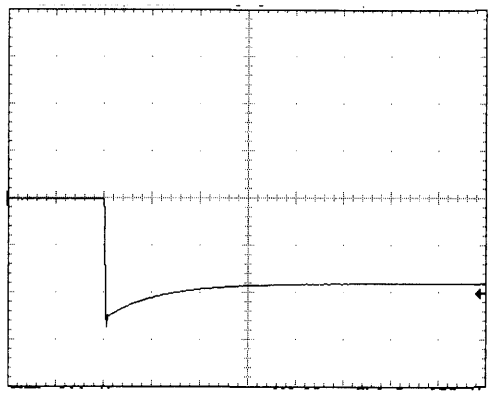
Input Volt. 48.0 V

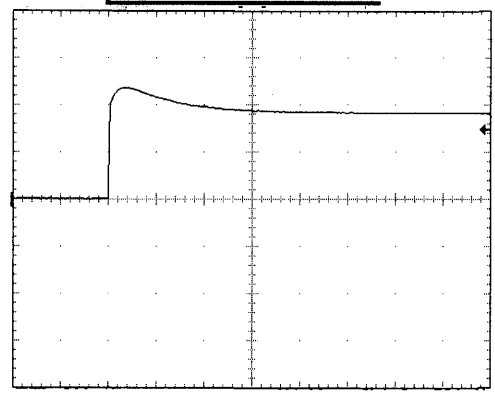
Cycle 100 mS

Load Current

Min. Load ←→
Load 100 %

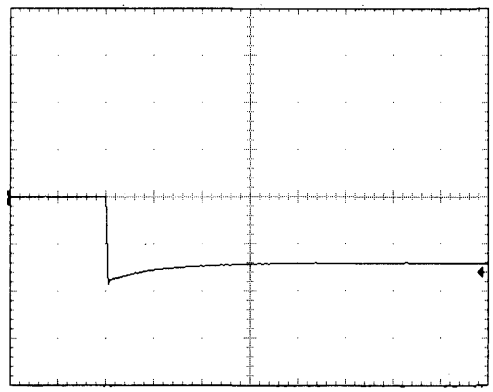
200 mV/div

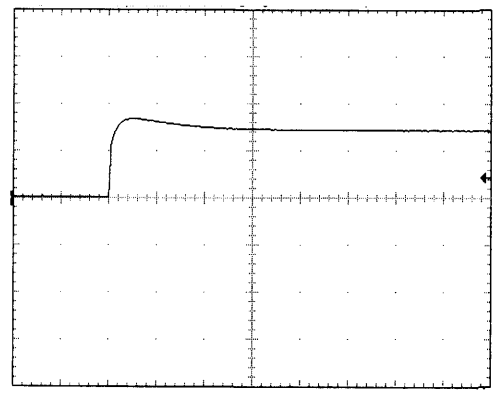




Min. Load ←→
Load 50 %

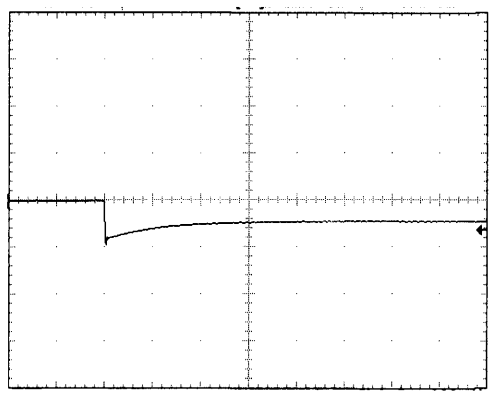
200 mV/div

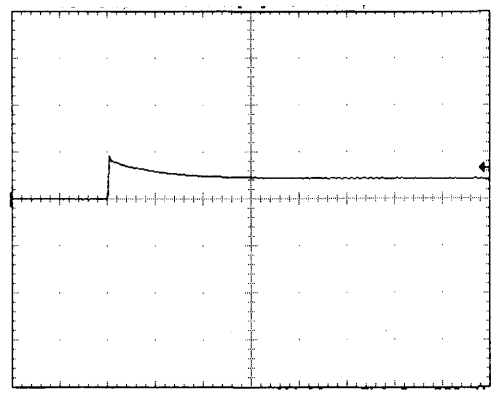




Load 50%←→
Load 100 %

200 mV/div





1 mS/div

COSEL

Model	ZUW64812		
Item	Dynamic Load Responce 動的負荷変動	Temperature Testing Circuitry	25℃ Figure A
Object	−12V0.25A		

Input Volt. 48.0 V

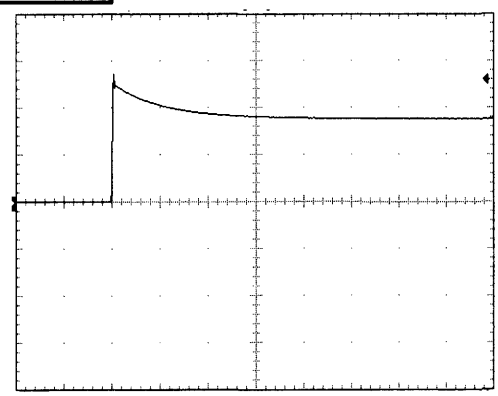
Cycle 100 mS

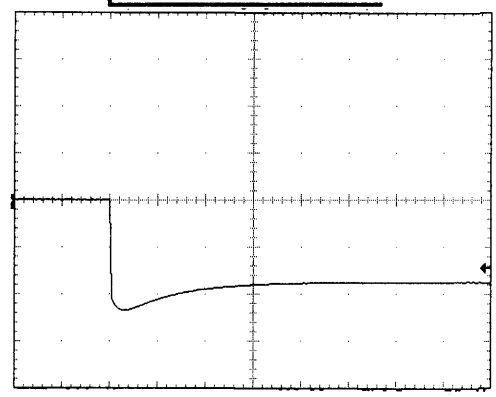
Load Current

Min. Load ←→

Load 100 %

200 mV/div

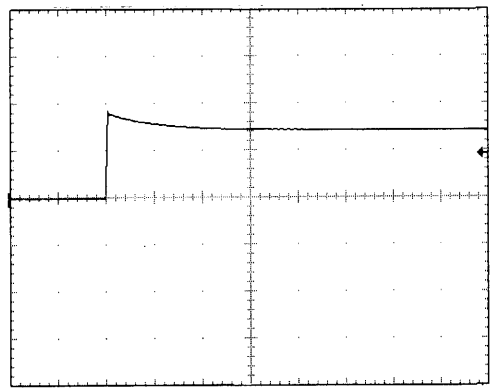


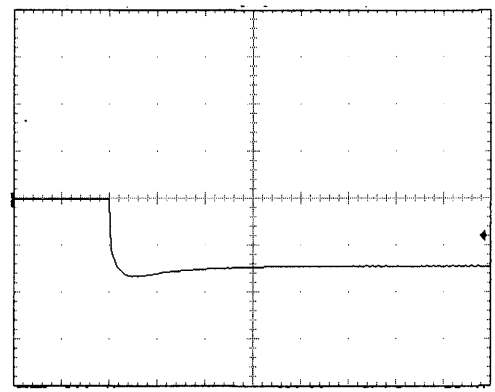


Min. Load ←→

Load 50 %

200 mV/div

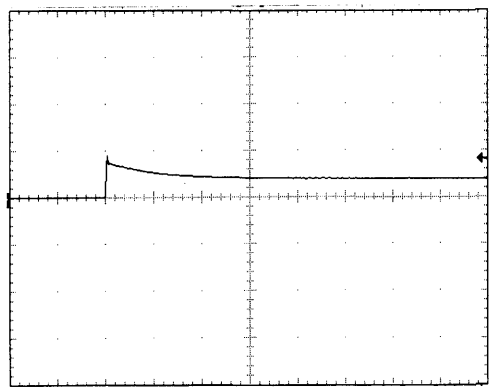


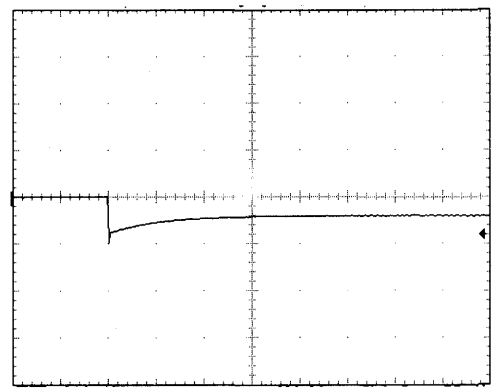


Load 50%←→

Load 100 %

200 mV/div





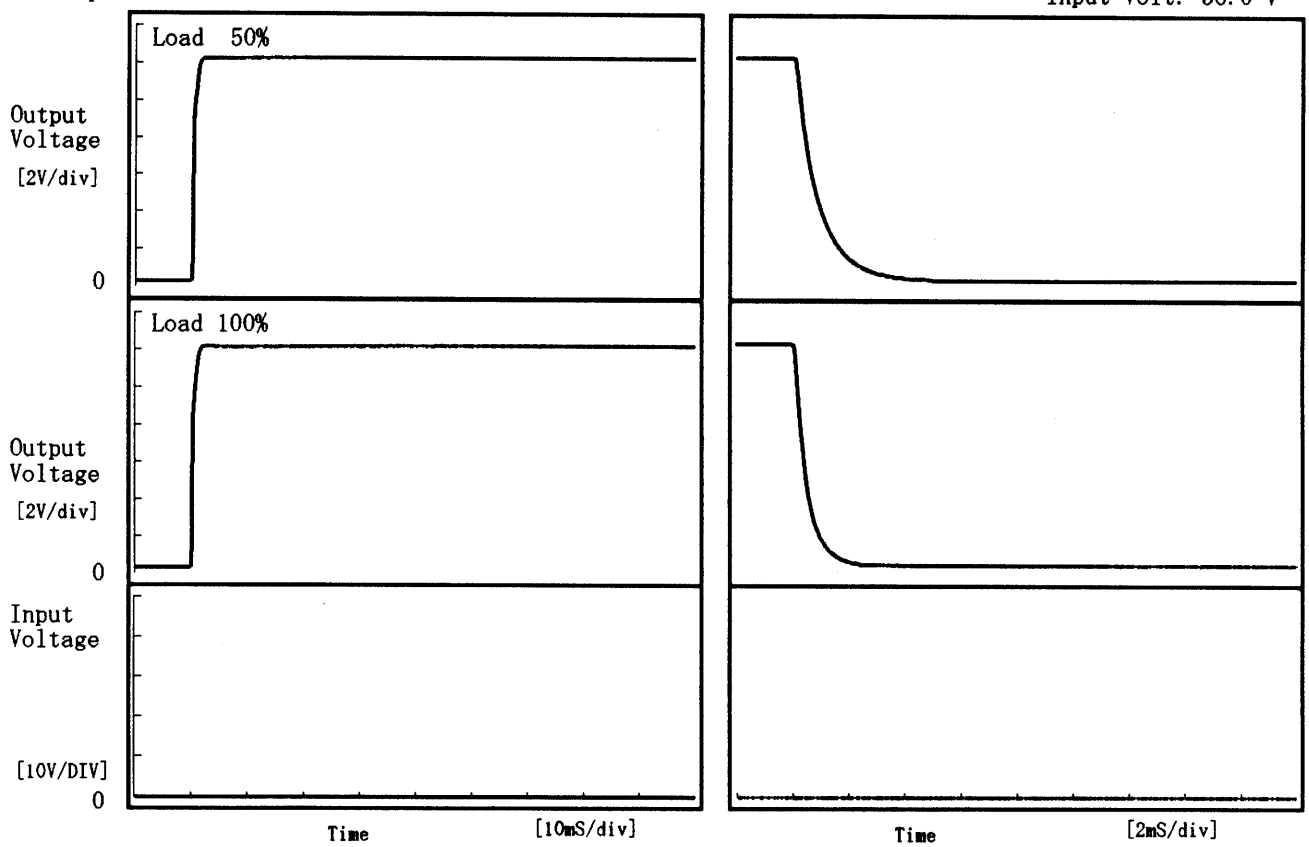
1 mS/div

COSEL

Model	ZUW64812		
Item	Rise and Fall Time 立上り、立下り時間	Temperature	25℃
		Testing Circuitry	Figure A
Object	+12V0.25A		

1. Graph

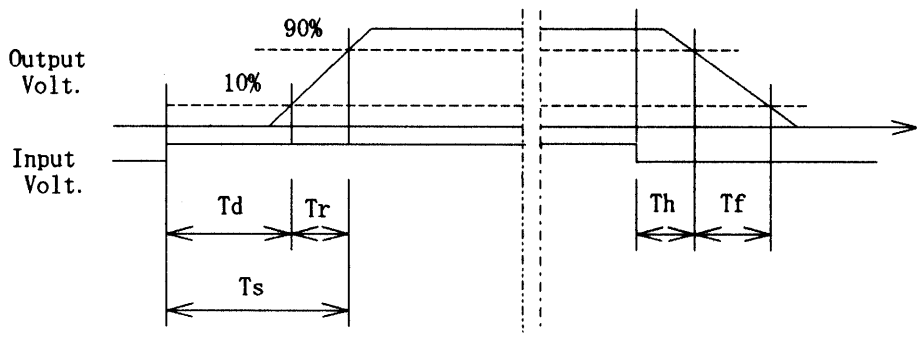
Input Volt. 36.0 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	0.05	0.95	1.00	0.20	1.95
100 %	0.05	1.05	1.10	0.14	1.10



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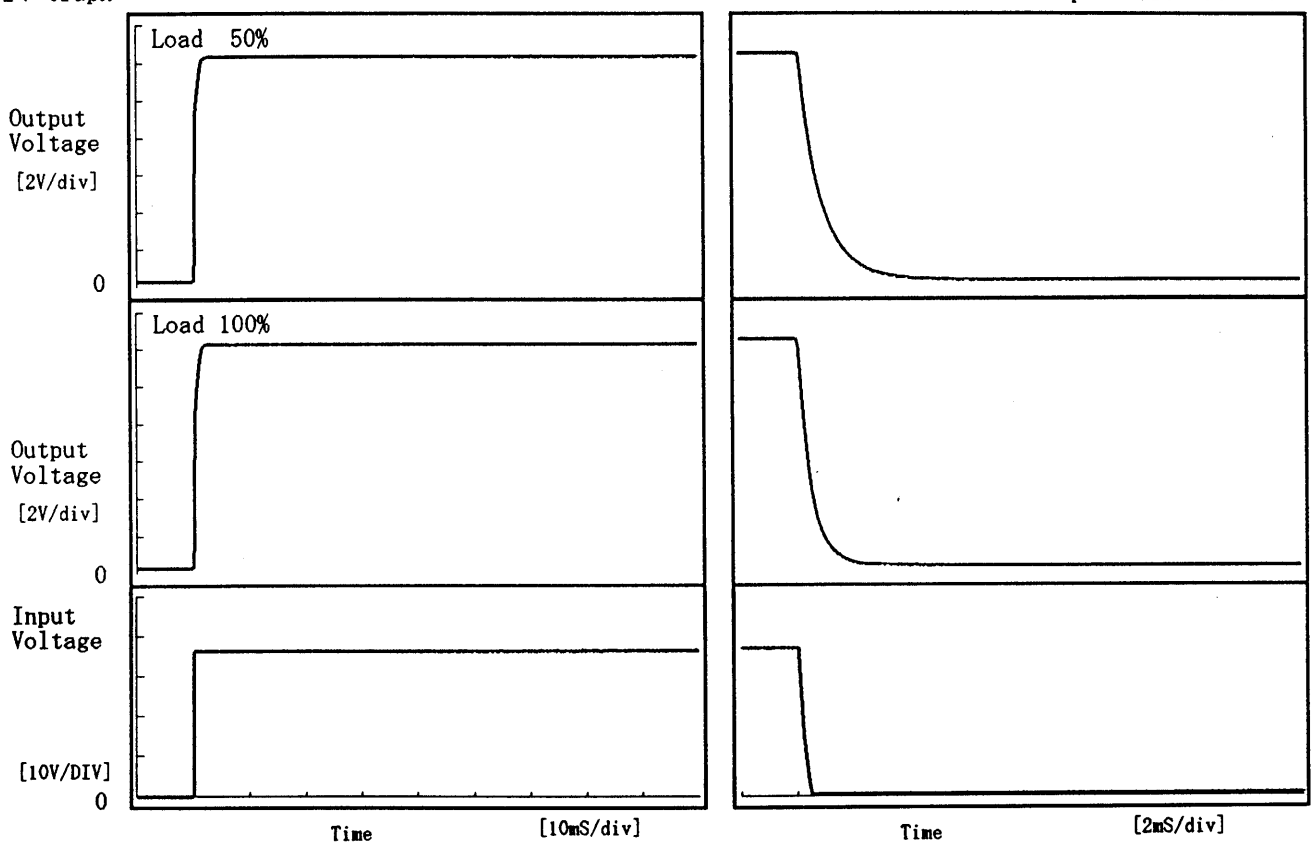
COSEL

Model	ZUW64812		
Item	Rise and Fall Time 立上り、立下り時間	Temperature Testing Circuitry	25℃ Figure A
Object	-12V0.25A		

1. Graph

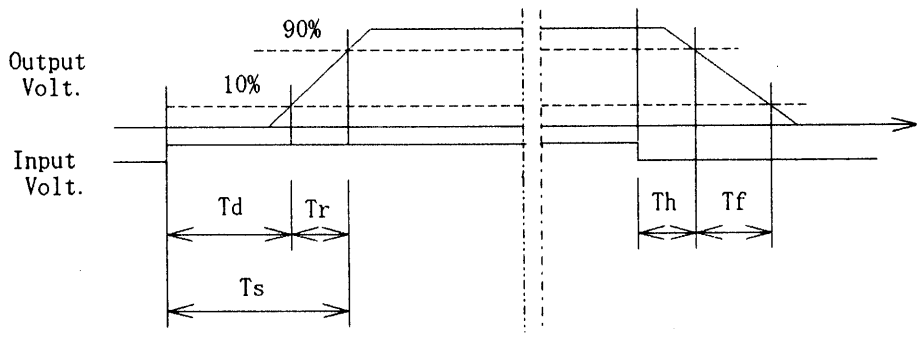
Input Volt. 36.0 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	0.05	0.90	0.95	0.21	1.89
100 %	0.05	1.00	1.05	0.15	1.06



BC−2061

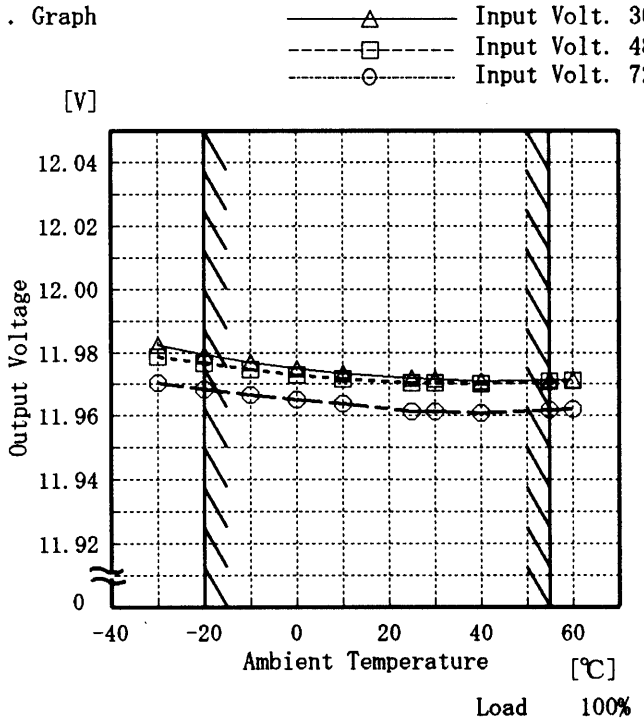
COSEL

Model	ZUW64812
Item	Ambient Temperature Drift 周囲温度変動

Testing Circuitry Figure A

Object +12V0.25A

1. Graph

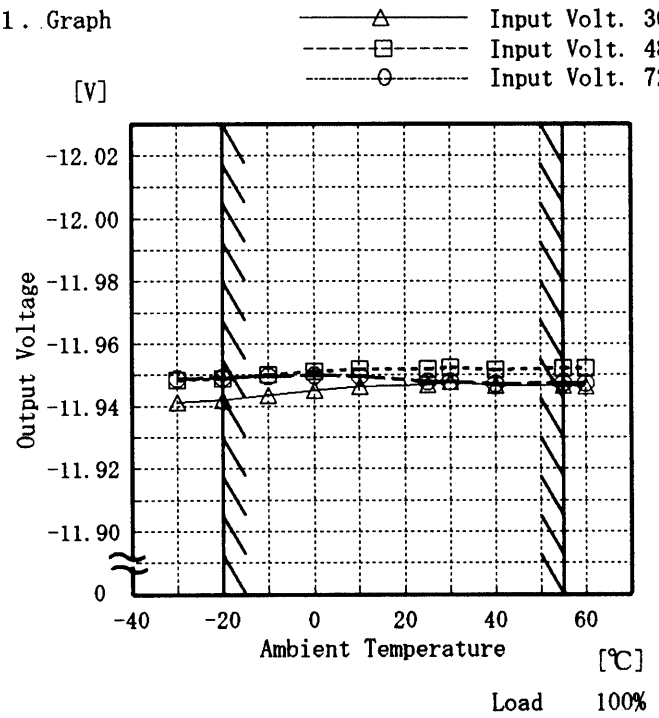


2. Values

Temperature [℃]	Input Volt. 36.0[V] Output Volt. [V]	Input Volt. 48.0[V] Output Volt. [V]	Input Volt. 72.0[V] Output Volt. [V]
-30	11.982	11.979	11.970
-20	11.979	11.977	11.968
-10	11.977	11.975	11.966
0	11.975	11.973	11.965
10	11.973	11.972	11.964
25	11.972	11.970	11.961
30	11.972	11.970	11.961
40	11.971	11.970	11.961
55	11.971	11.971	11.962
60	11.971	11.971	11.962
—	—	—	—

Object −12V0.25A

1. Graph



2. Values

Temperature [℃]	Input Volt. 36.0[V] Output Volt. [V]	Input Volt. 48.0[V] Output Volt. [V]	Input Volt. 72.0[V] Output Volt. [V]
-30	-11.941	-11.948	-11.949
-20	-11.942	-11.949	-11.949
-10	-11.944	-11.950	-11.950
0	-11.945	-11.951	-11.950
10	-11.946	-11.952	-11.950
25	-11.947	-11.952	-11.948
30	-11.948	-11.952	-11.948
40	-11.947	-11.952	-11.947
55	-11.947	-11.952	-11.947
60	-11.946	-11.952	-11.947
—	—	—	—

Note: Slanted line shows the range of the rated ambient temperature.

(注)斜線は定格周囲温度範囲を示す。

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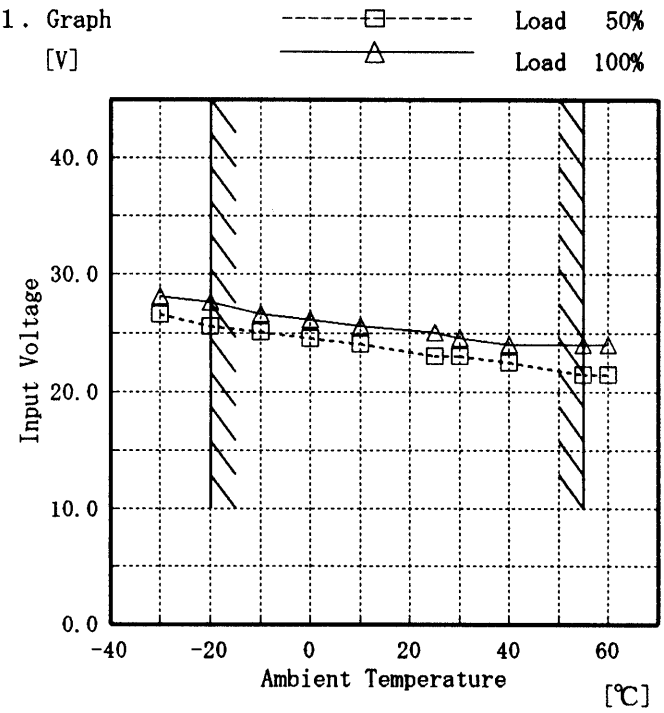
COSEL

Model	ZUW64812
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧

Testing Circuitry Figure A

Object +12V0.25A

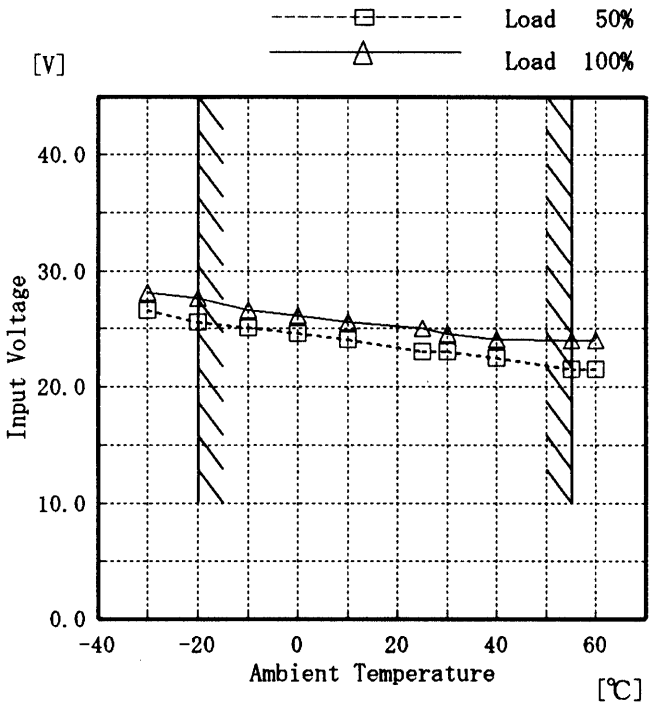
1. Graph



2. Values

Ambient Temp. [℃]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-30	26.6	28.1
-20	25.6	27.6
-10	25.1	26.6
0	24.6	26.1
10	24.1	25.6
25	23.1	25.1
30	23.1	24.6
40	22.5	24.1
55	21.5	24.0
60	21.5	24.0
—	—	—

Object −12V0.25A



2. Values

Ambient Temp. [℃]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-30	26.6	28.1
-20	25.6	27.6
-10	25.1	26.6
0	24.6	26.1
10	24.1	25.6
25	23.1	25.1
30	23.1	24.6
40	22.5	24.1
55	21.5	24.0
60	21.5	24.0
—	—	—

Note: Slanted line shows the range of the rated ambient temperature.

(注)斜線は定格周囲温度範囲を示す。

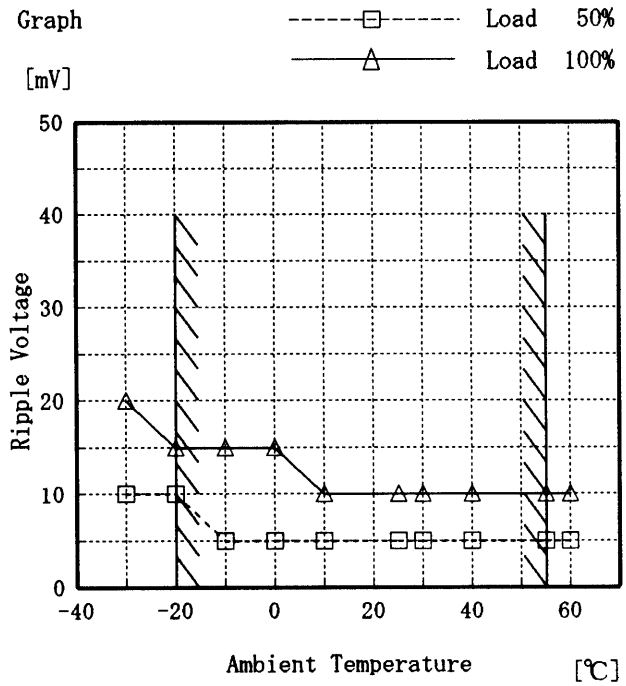
COSEL

Model	ZUW64812
Item	Ripple Voltage (by Ambient Temp.) リップル電圧（周囲温度特性）

Testing Circuitry　Figure A

Object　+12V0.25A

1. Graph



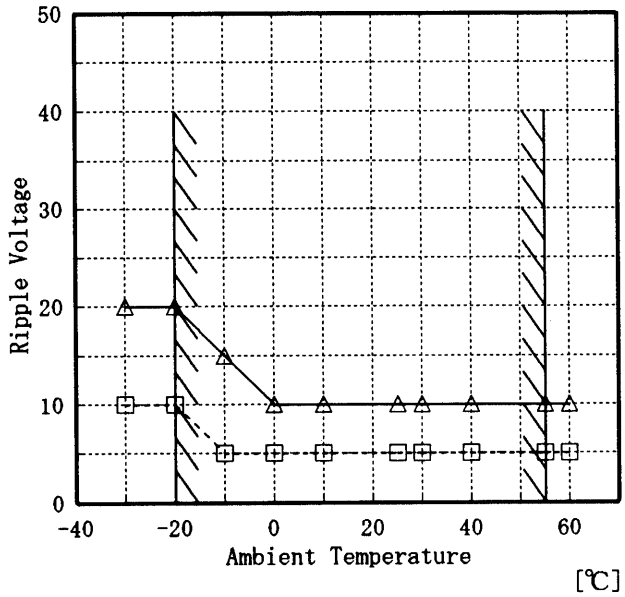
Input Volt.　36.0 V

2. Values

Ambient Temp. [℃]	Load 50% Ripple Output Volt. [mV]	Load 100% Ripple Output Volt. [mV]
-30	10	20
-20	10	15
-10	5	15
0	5	15
10	5	10
25	5	10
30	5	10
40	5	10
55	5	10
60	5	10
—	—	—

Object　−12V0.25A

1. Graph



Input Volt.　36.0 V

Note: Slanted line shows the range of the rated ambient temperature.

(注)斜線は定格周囲温度範囲を示す。

2. Values

Ambient Temp. [℃]	Load 50% Ripple Output Volt. [mV]	Load 100% Ripple Output Volt. [mV]
-30	10	20
-20	10	20
-10	5	15
0	5	10
10	5	10
25	5	10
30	5	10
40	5	10
55	5	10
60	5	10
—	—	—

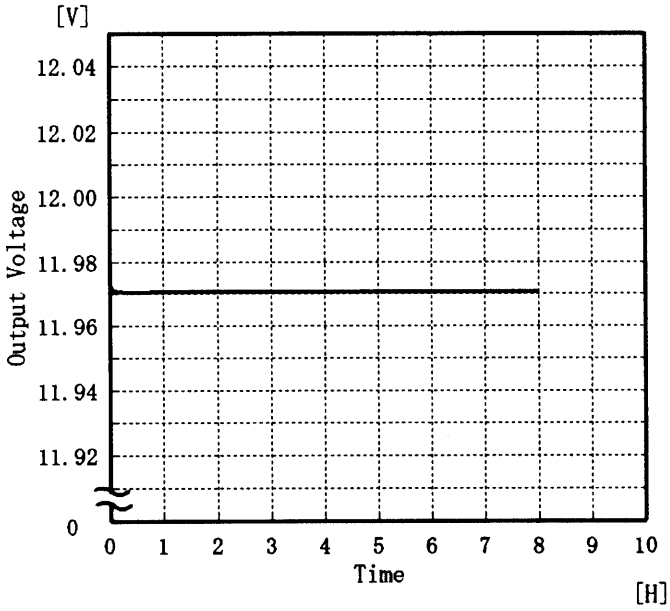
COSEL

Model	ZUW64812
Item	Time Lapse Drift 経時ドリフト

Temperature 25 ℃
Testing Circuitry Figure A

Object ＋12V0.25A

1. Graph



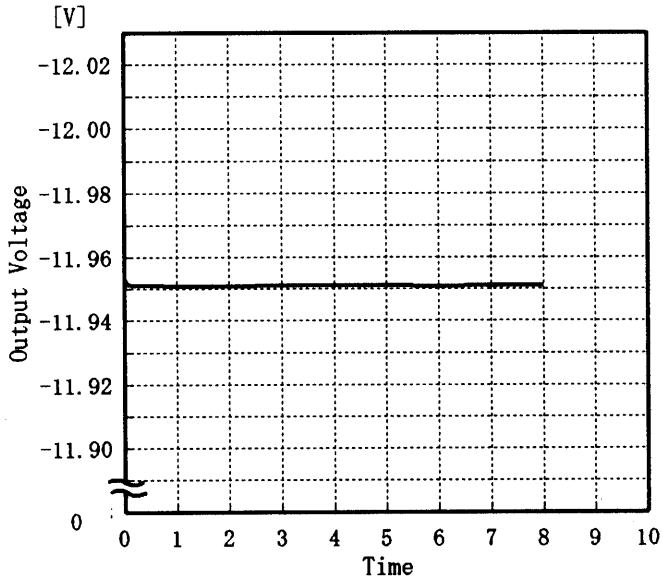
Input Volt. 48.0V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	11.972
0.5	11.971
1.0	11.971
2.0	11.971
3.0	11.971
4.0	11.971
5.0	11.971
6.0	11.971
7.0	11.971
8.0	11.971

Object －12V0.25A

1. Graph



Input Volt. 48.0V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	-11.953
0.5	-11.951
1.0	-11.951
2.0	-11.951
3.0	-11.951
4.0	-11.951
5.0	-11.951
6.0	-11.951
7.0	-11.951
8.0	-11.951

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COSEL

Model	ZUW64812	
Item	Output Voltage Accuracy 定電圧精度	Testing Circuitry Figure A

Output Voltage Accuracy

This is defined as the value of the output voltage, regulation load, ambient temperature and input voltage varied at random in the range as specified below.

Temperature : -20～55 ℃

Input Voltage : 36.0～72.0 V

Load Current (AVR 1) : 0.00～0.25 A

(AVR 2) : 0.00～0.25 A

* Output Voltage Accuracy = ±(Maximum of Output Voltage − Minimum of Output Voltage)／2

$$* \text{ Output Voltage Accuracy (Ration)} = \frac{\text{Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$$

定電圧精度

周囲温度、入力電圧、負荷を下記仕様内で、任意に変動させたときの出力電圧の変動をいう。

周囲温度 -20～55 ℃

入力電圧 36.0～72.0 V

負荷電流 (AVR 1) 0.00～0.25 A

(AVR 2) 0.00～0.25 A

* 定電圧精度(変動値) = ±(出力電圧の最高値－出力電圧の最低値)／2

$$* \text{ 定電圧精度(変動率)} = \frac{\text{変動値}}{\text{定格出力電圧}} \times 100$$

Object ＋12V0.25A

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ration) [%]
Maximum Voltage	-20	36.0	0.25	11.976	±179	±1.5
Minimum Voltage	55	72.0	0.00	11.618		

Object －12V0.25A

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ration) [%]
Maximum Voltage	55	48.0	0.25	-11.951	±166	±1.4
Minimum Voltage	55	72.0	0.00	-11.619		

COSEL

Model	ZUW64812
Item	Condensation 結露特性
Object	+12V 0.25A

Testing Circuitry Figure A

1. Condensation test

Testing procedure is as follows.

① Keeping and cooling the unit in a tank at -10℃ for an hour with the input off.

② Taking it out of the tank and dewing itself in a room where the temperature is 26℃ and the humidity is 40%RH.

③ Testing electrical characteristics of the unit to confirm there be no fault.

④ Repeating ①,② and ③ three times.

1．結露特性試験

入力を切った状態で、恒温槽で－１０℃に冷却しておき、約１時間後に恒温槽から取り出し、室温２６℃、湿度４０%RHの状態におき結露させ、その電気的特性の測定を３度行い、異常のないことを確認する。

2. Values

	Times	Output Voltage [V]	Ripple Voltage [mV]	Ripple Noise [mV]
Load 50 %	1	12.098	5	30
	2	12.095	5	30
	3	12.098	5	30
Load 100 %	1	12.005	10	35
	2	12.003	10	35
	3	12.008	10	35

Input Volt. 48.0 V

COSEL

Model	ZUW64812
Item	Condensation 結露特性
Object	−12V 0.25A

Testing Circuitry Figure A

1. Condensation test

Testing procedure is as follows.

① Keeping and cooling the unit in a tank at -10℃ for an hour with the input off.

② Taking it out of the tank and dewing itself in a room where the temperature is 26℃ and the humidity is 40%RH.

③ Testing electrical characteristics of the unit to confirm there be no fault.

④ Repeating ①,② and ③ three times.

1．結露特性試験

入力を切った状態で、恒温槽で－１０℃に冷却しておき、約１時間後に恒温槽から取り出し、室温２６℃、湿度４０%RHの状態におき結露させ、その電気的特性の測定を３度行い、異常のないことを確認する。

2. Values

	Times	Output Voltage [V]	Ripple Voltage [mV]	Ripple Noise [mV]
Load 50 %	1	-12.097	5	30
	2	-12.104	5	30
	3	-12.101	5	30
Load 100 %	1	-12.005	10	35
	2	-12.007	10	35
	3	-12.001	10	35

Input Volt. 48.0 V

COSEL

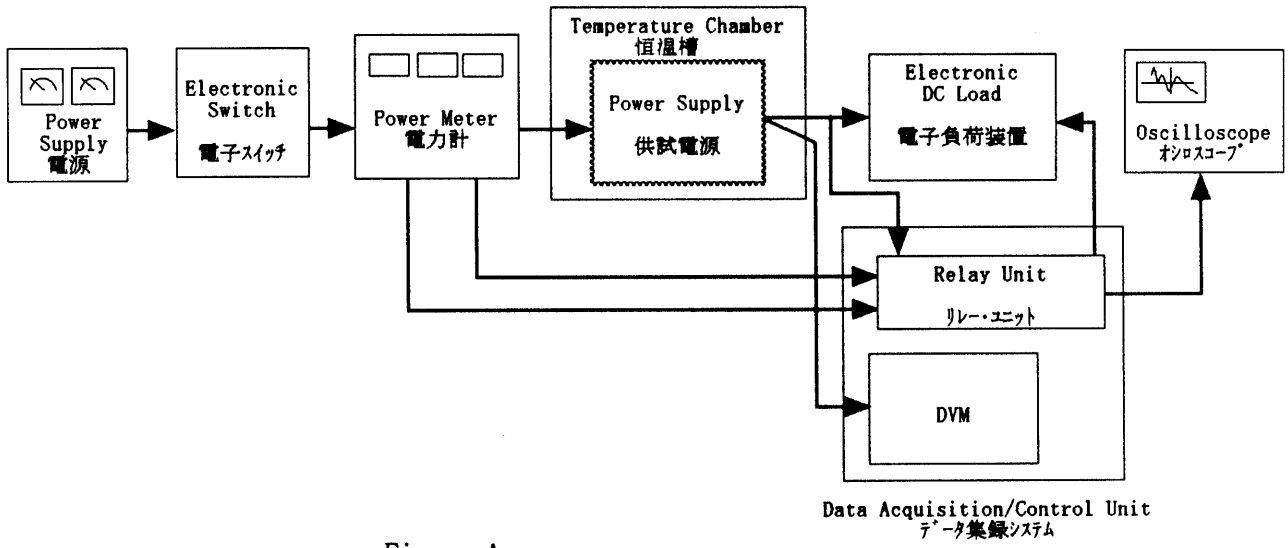

Figure A