参考資料

COSEL

TEST DATA OF ZUW104812

(48.0V INPUT)

Regulated DC Power Supply

Date : Sep 21. 1996

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Design Manager

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Design Engineer

コーセル株式会社

COSEL CO.,LTD.

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(Final Page 20)

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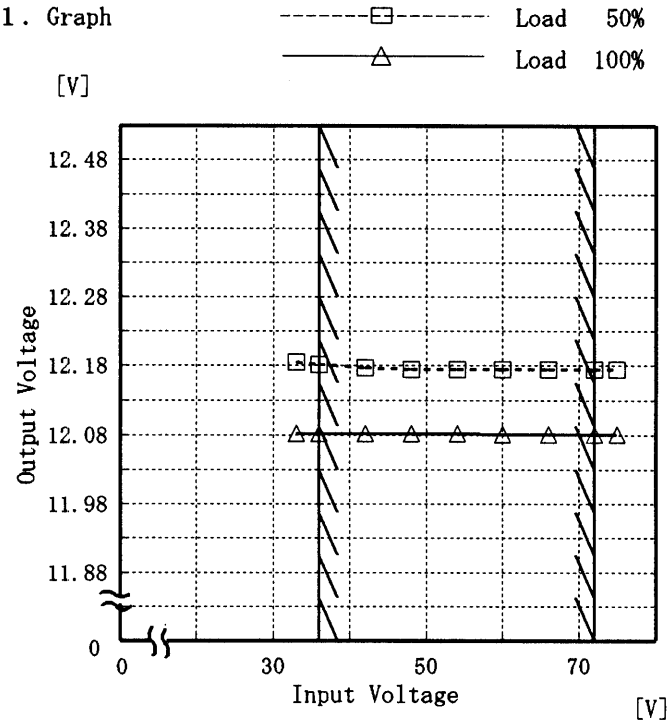
Model	ZUW104812
Item	Line Regulation 静的入力変動

Temperature 25℃
Testing Circuitry Figure A

Object ＋12V0.45A

1. Graph

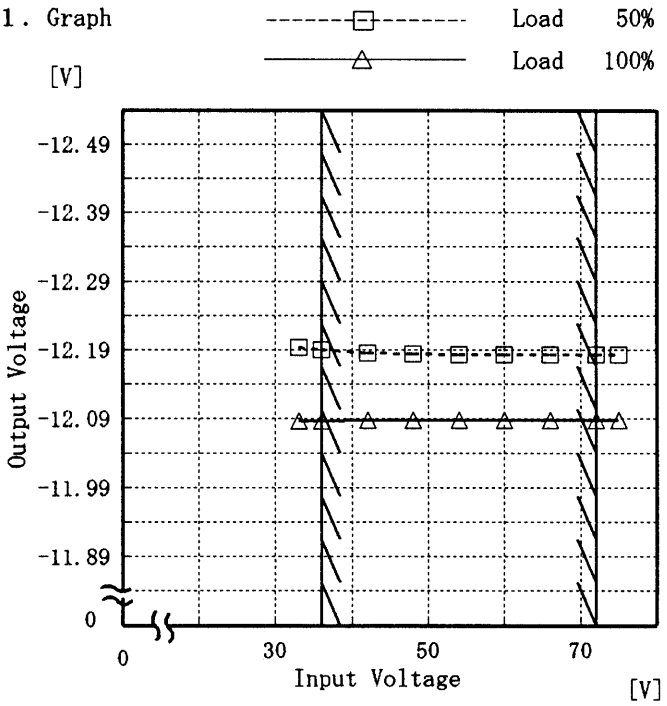


2. Values

Input Voltage [V]	Load 50% Output Volt. [V]	Load 100% Output Volt. [V]
33.0	12.186	12.082
36.0	12.182	12.082
42.0	12.177	12.082
48.0	12.175	12.082
54.0	12.175	12.082
60.0	12.175	12.081
66.0	12.175	12.081
72.0	12.175	12.081
75.0	12.175	12.080
—	—	—
—	—	—
—	—	—

Object －12V0.45A

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	-12.193	-12.086
36.0	-12.189	-12.087
42.0	-12.185	-12.087
48.0	-12.183	-12.087
54.0	-12.183	-12.087
60.0	-12.183	-12.087
66.0	-12.183	-12.088
72.0	-12.183	-12.088
75.0	-12.183	-12.088
—	—	—
—	—	—
—	—	—

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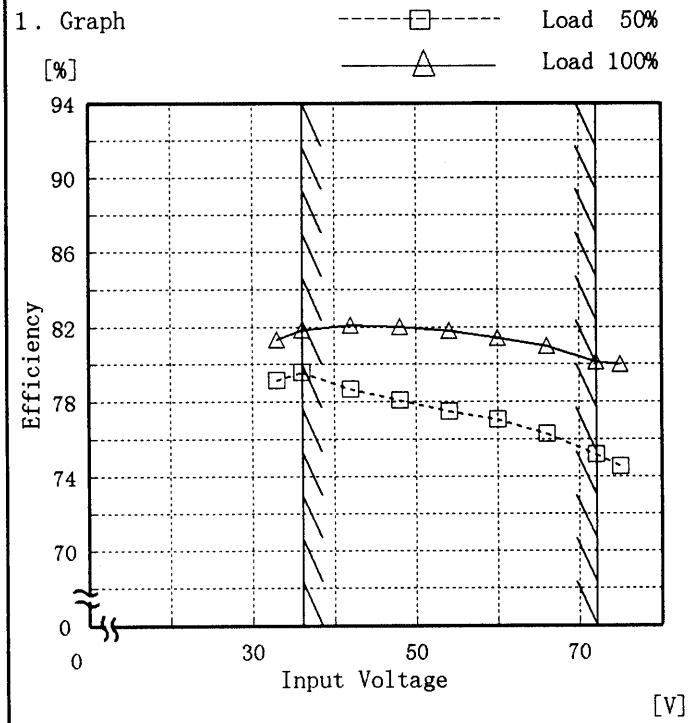
Model	ZUW104812
Item	Efficiency 効率
Object	――――――――――

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	79.2	81.3
36.0	79.6	81.9
42.0	78.7	82.1
48.0	78.1	82.0
54.0	77.5	81.8
60.0	77.1	81.4
66.0	76.3	81.0
72.0	75.2	80.1
75.0	74.6	80.0
—	—	—
—	—	—
—	—	—

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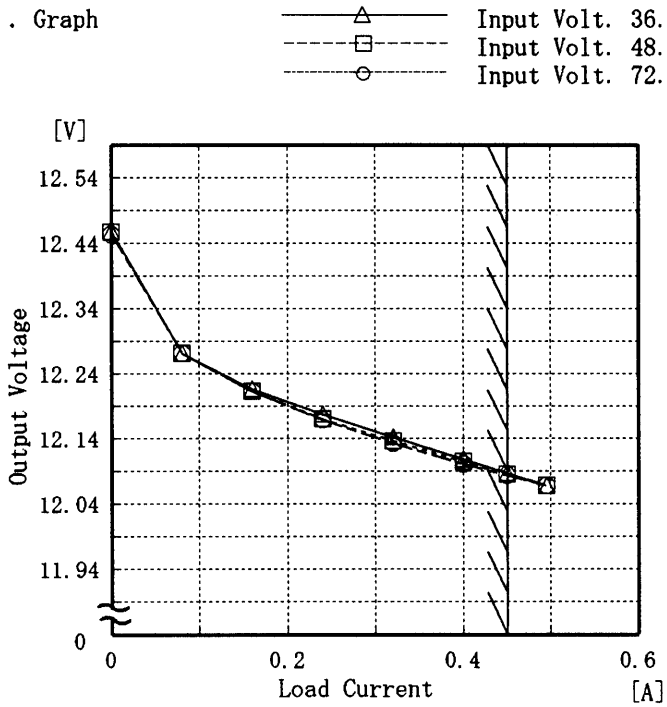
COSEL

Model	ZUW104812
Item	Load Regulation 静的負荷変動

Temperature 25℃
Testing Circuitry Figure A

Object +12V0.45A

1. Graph

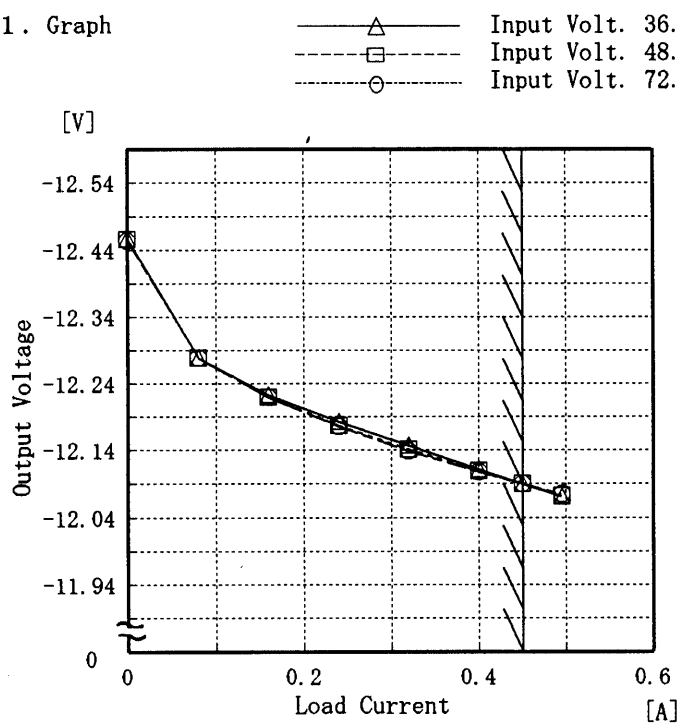


2. Values

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	12.458	12.457	12.453
0.080	12.272	12.271	12.271
0.160	12.216	12.213	12.213
0.240	12.178	12.170	12.169
0.320	12.142	12.136	12.132
0.400	12.108	12.104	12.101
0.450	12.087	12.085	12.084
0.495	12.068	12.068	12.068
—	—	—	—
—	—	—	—

Object −12V0.45A

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	-12.459	-12.457	-12.454
0.080	-12.280	-12.280	-12.280
0.160	-12.224	-12.220	-12.220
0.240	-12.184	-12.177	-12.176
0.320	-12.147	-12.142	-12.139
0.400	-12.112	-12.110	-12.108
0.450	-12.091	-12.090	-12.090
0.495	-12.071	-12.073	-12.075
—	—	—	—
—	—	—	—

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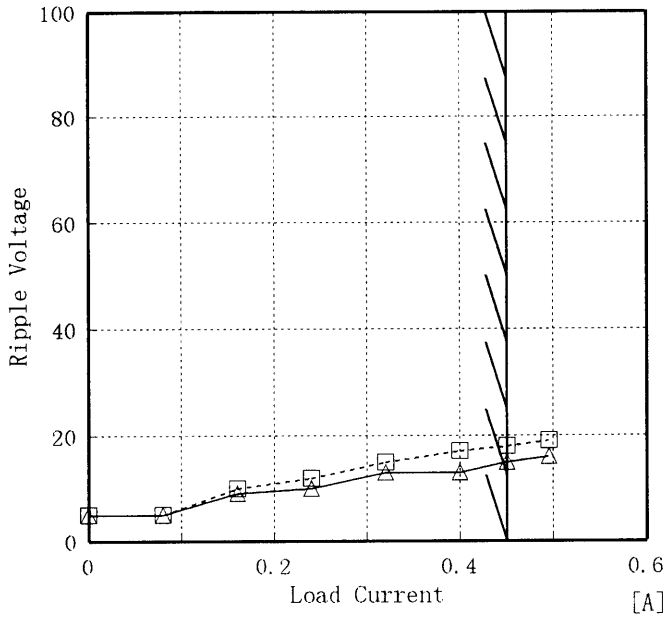
Model	ZUW104812
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	+12V0.45A

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

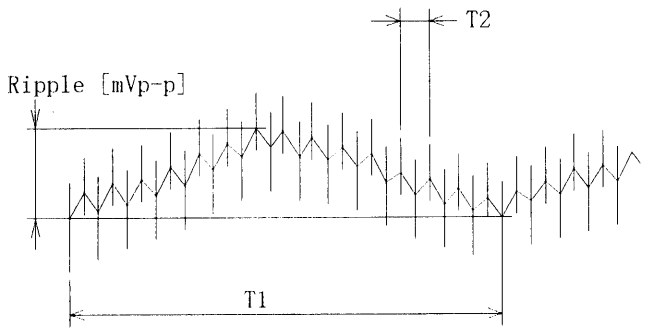


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

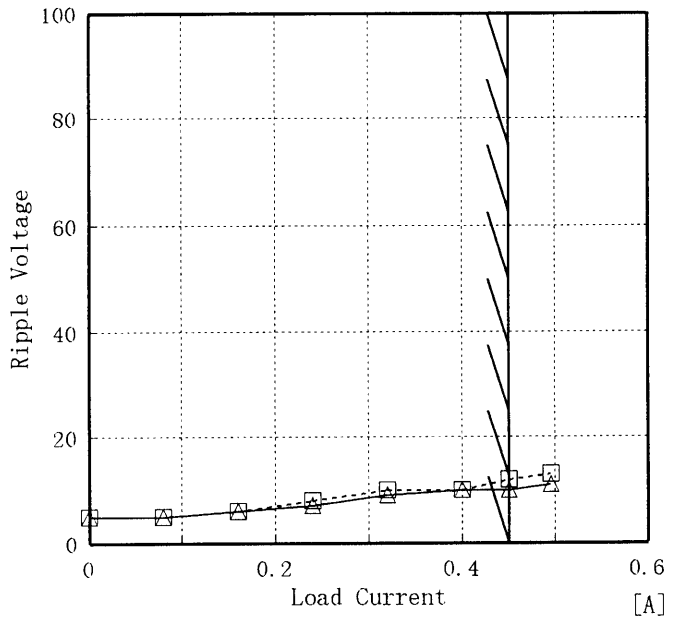
Load Current [A]	Input Volt. 36.0 [V] Ripple Output Volt. [mV]	Input Volt. 72.0 [V] Ripple Output Volt. [mV]
0.00	5	5
0.08	5	5
0.16	10	9
0.24	12	10
0.32	15	13
0.40	17	13
0.45	18	15
0.50	19	16
—	—	—
—	—	—
—	—	—

COSEL

Model	ZUW104812
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	−12V0.45A

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

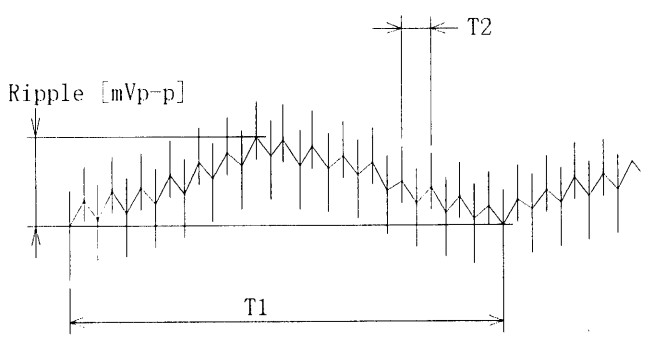


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

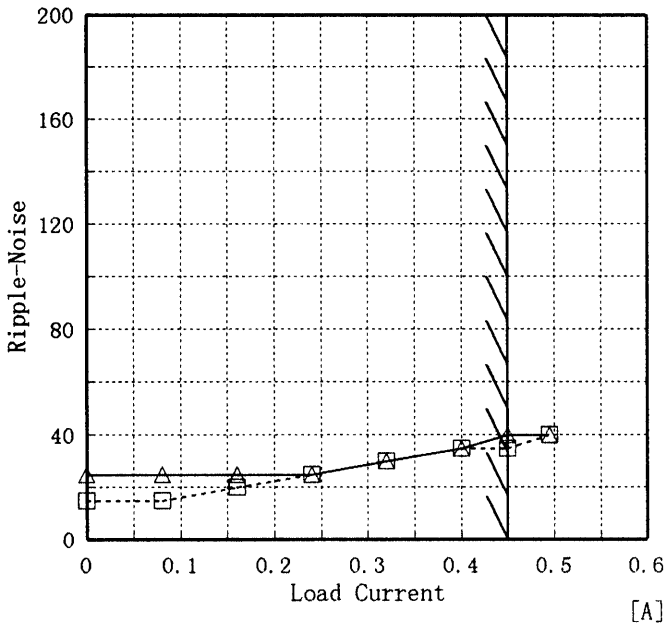
Load Current [A]	Input Volt. 36.0 [V] Ripple Output Volt. [mV]	Input Volt. 72.0 [V] Ripple Output Volt. [mV]
0.00	5	5
0.08	5	5
0.16	6	6
0.24	8	7
0.32	10	9
0.40	10	10
0.45	12	10
0.50	13	11
—	—	—
—	—	—
—	—	—

COSEL

Model	ZUW104812
Item	Ripple-Noise リップルノイズ
Object	+12V0.450A

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

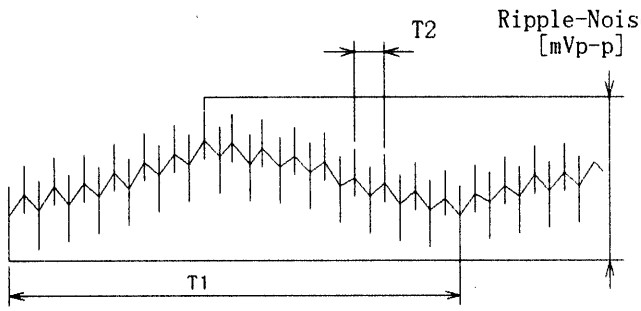


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

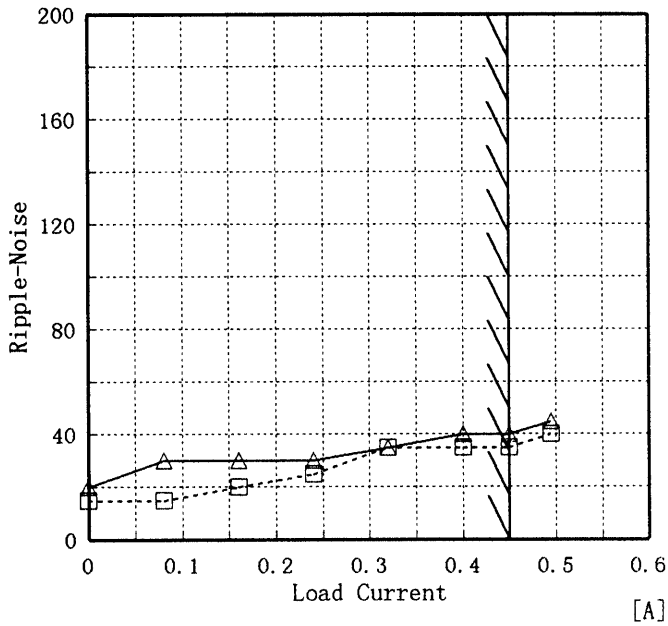
Load current [A]	Input Volt. 36.0 [V] Ripple-Noise [mV]	Input Volt. 72.0 [V] Ripple-Noise [mV]
0.00	15	25
0.08	15	25
0.16	20	25
0.24	25	25
0.32	30	30
0.40	35	35
0.45	35	40
0.50	40	40
—	—	—
—	—	—
—	—	—

COSEL

Model	ZUW104812
Item	Ripple-Noise リップルノイズ
Object	-12V0.450A

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

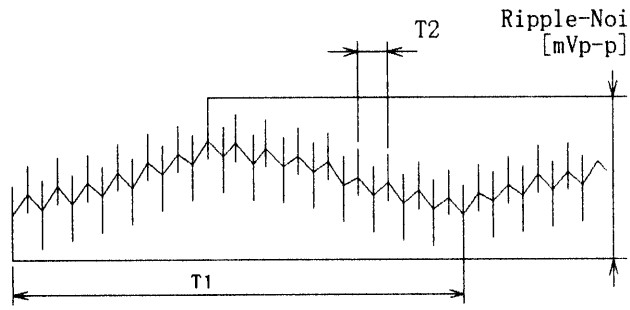


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

Load current [A]	Input Volt. 36.0 [V] Ripple-Noise [mV]	Input Volt. 72.0 [V] Ripple-Noise [mV]
0.00	15	20
0.08	15	30
0.16	20	30
0.24	25	30
0.32	35	35
0.40	35	40
0.45	35	40
0.50	40	45
—	—	—
—	—	—
—	—	—

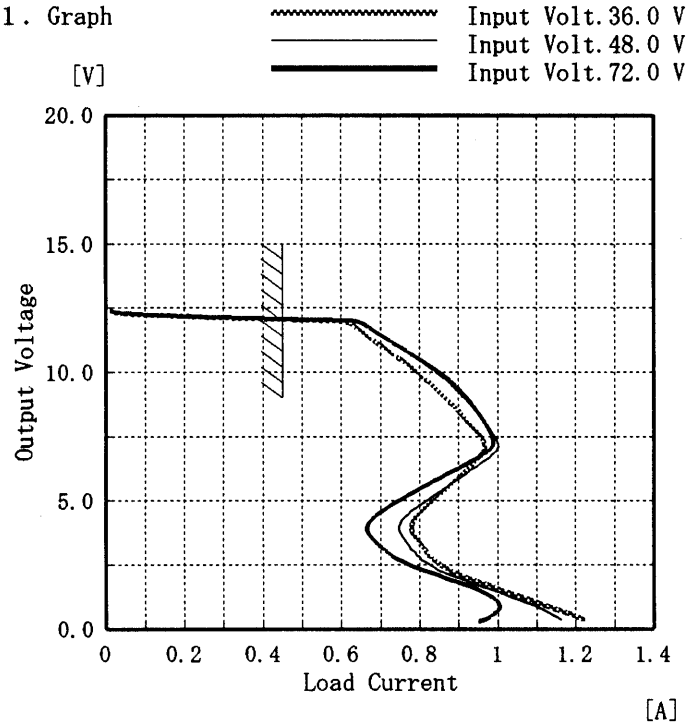
COSEL

Model	ZUW104812
Item	Overcurrent Protection 過電流保護

Temperature 25℃
Testing Circuitry Figure A

Object ＋12V0.45A

1. Graph

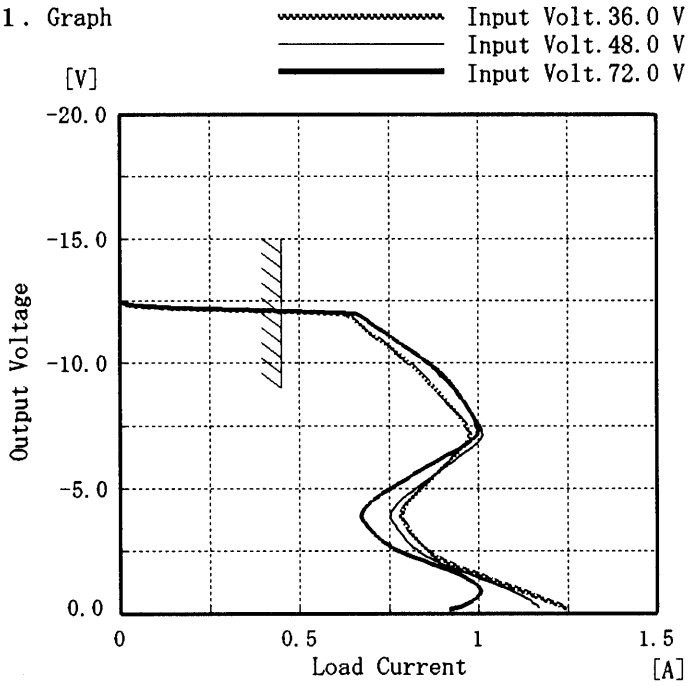


2. Values

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	0.581	0.617	0.625
11.40	0.671	0.712	0.709
10.80	0.723	0.758	0.759
9.60	0.823	0.874	0.885
8.40	0.901	0.945	0.949
7.20	0.963	0.999	0.989
6.00	0.906	0.912	0.876
4.80	0.820	0.797	0.732
3.60	0.786	0.754	0.675
2.40	0.861	0.834	0.788
1.20	1.063	1.040	0.978
0.00	1.225	1.165	0.950

Object −12V0.45A

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	0.581	0.617	0.625
11.40	0.671	0.712	0.709
10.80	0.723	0.758	0.759
9.60	0.823	0.874	0.885
8.40	0.901	0.945	0.949
7.20	0.963	0.999	0.989
6.00	0.906	0.912	0.876
4.80	0.820	0.797	0.732
3.60	0.786	0.754	0.675
2.40	0.861	0.834	0.788
1.20	1.063	1.040	0.978
0.00	1.225	1.165	0.950

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Model	ZUW104812		
Item	Dynamic Load Responce 動的負荷変動	Temperature Testing Circuitry	25℃ Figure A
Object	+12V0.450A		

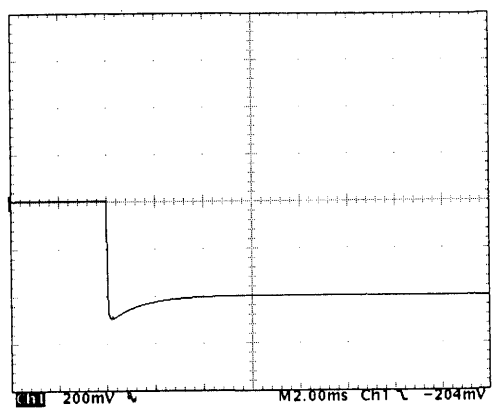
Input Volt. 48 V

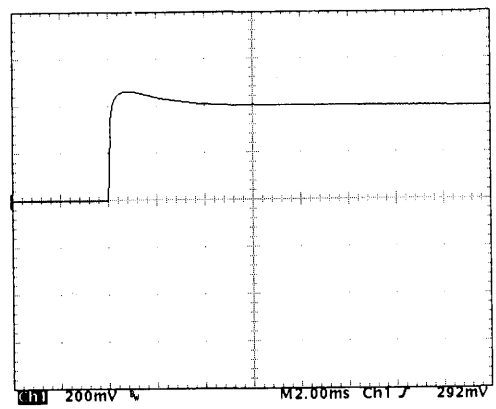
Cycle 100 mS

Load Current

Min. Load ←→
Load 100 %

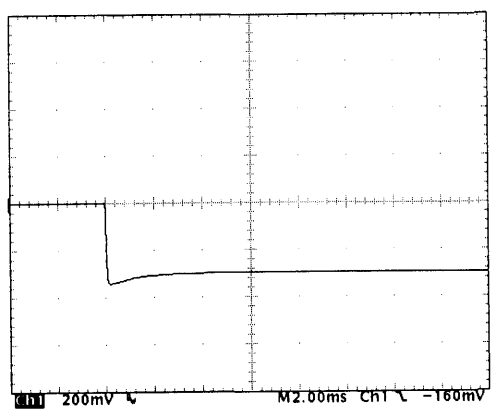
200 mV/div

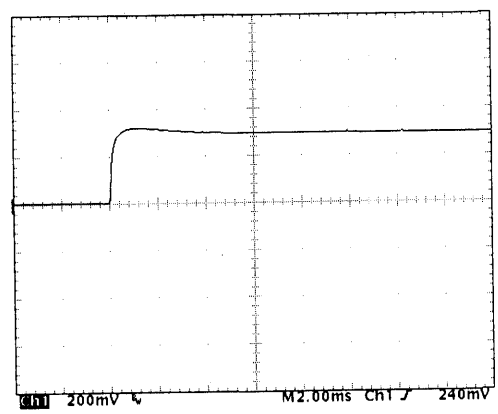




Min. Load ←→
Load 50 %

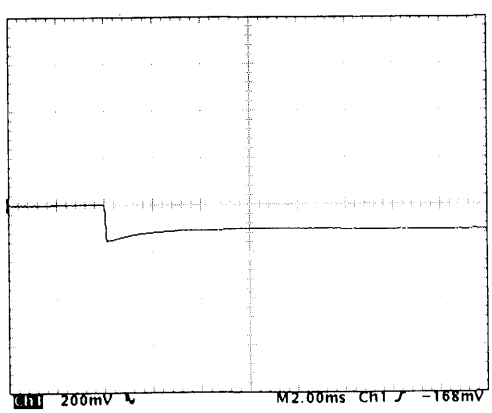
200 mV/div

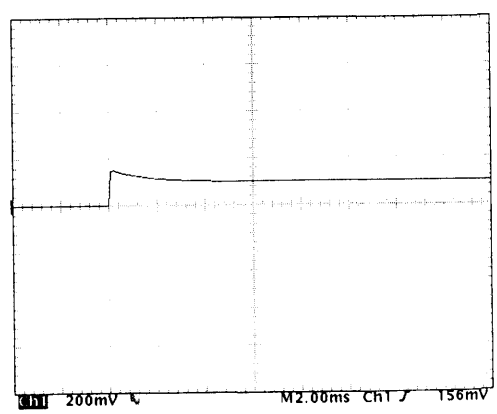




Load 50%←→
Load 100 %

200 mV/div





2 mS/div

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Model	ZUW104812	Temperature	25℃
Item	Dynamic Load Responce 動的負荷変動	Testing Circuitry	Figure A
Object	-12V0.450A		

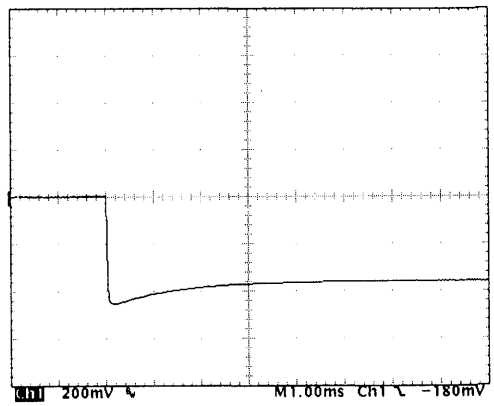
Input Volt. 48 V

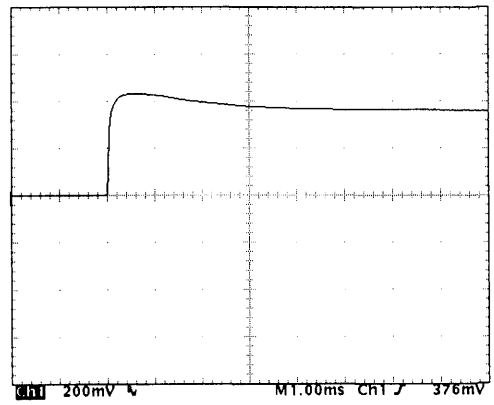
Cycle 100 mS

Load Current

Min. Load ←→
Load 100 %

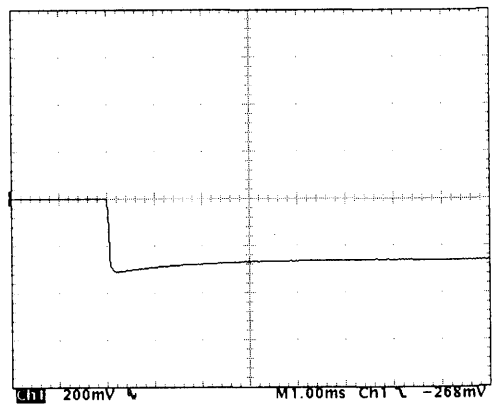
200 mV/div

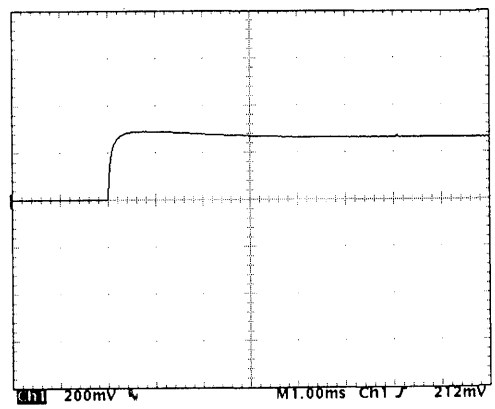




Min. Load ←→
Load 50 %

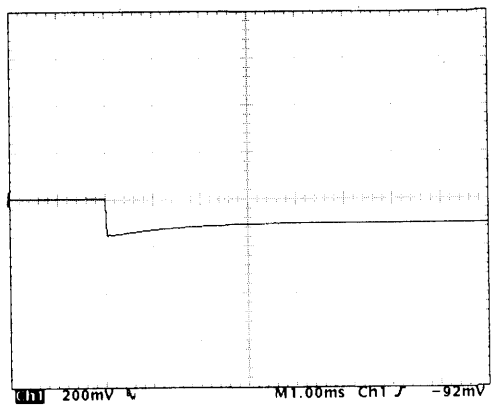
200 mV/div

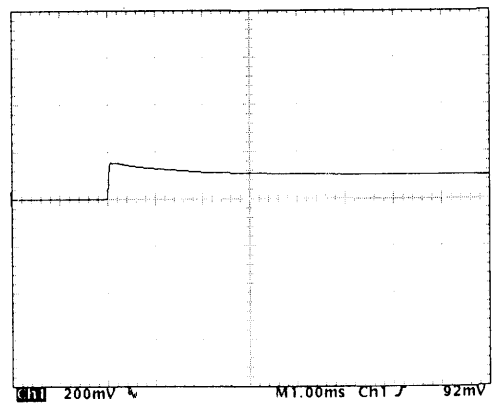




Load 50%←→
Load 100 %

200 mV/div





1 mS/div

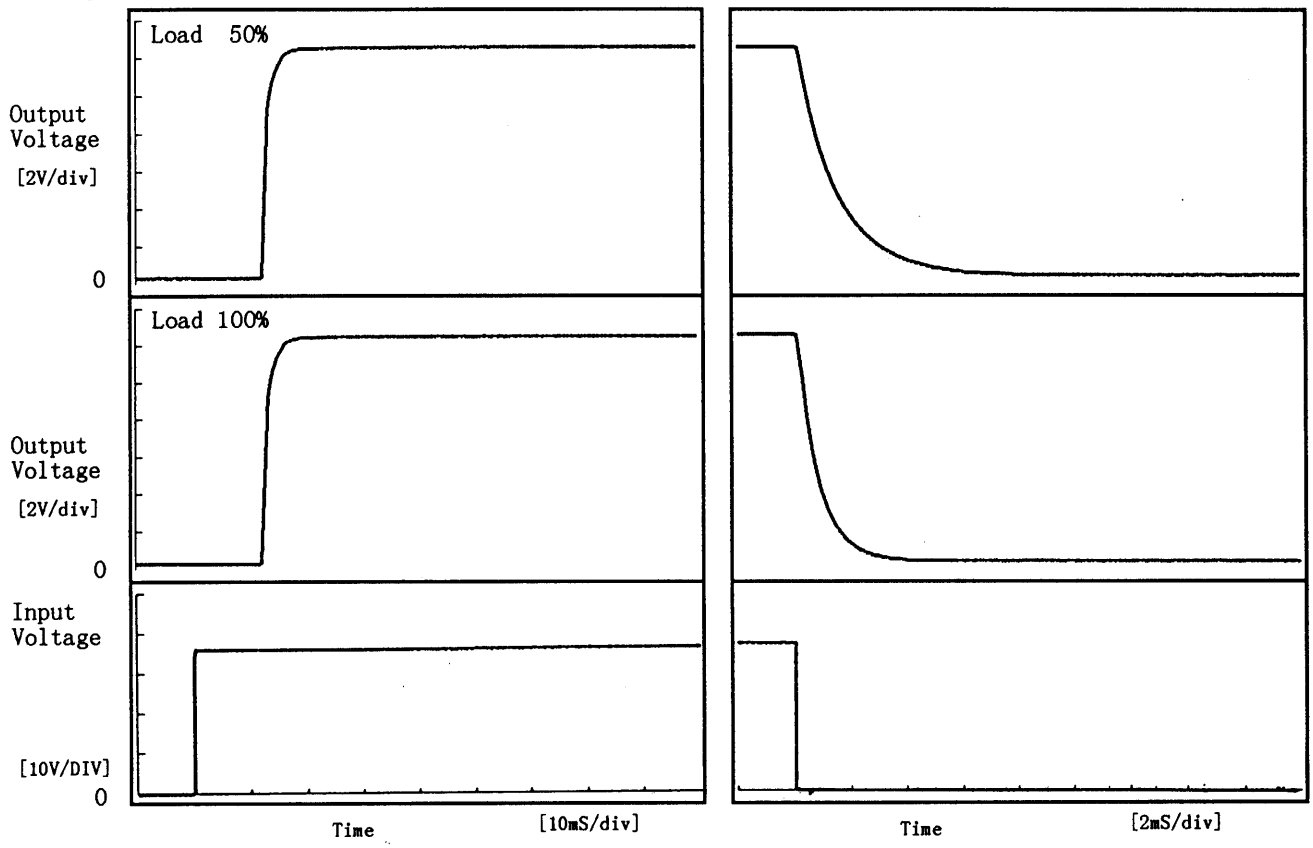
BC－2081

COSEL

Model	ZUW104812		
Item	Rise and Fall Time 立上り、立下り時間	Temperature Testing Circuitry	25℃ Figure A
Object	-12V0.45A		

1. Graph

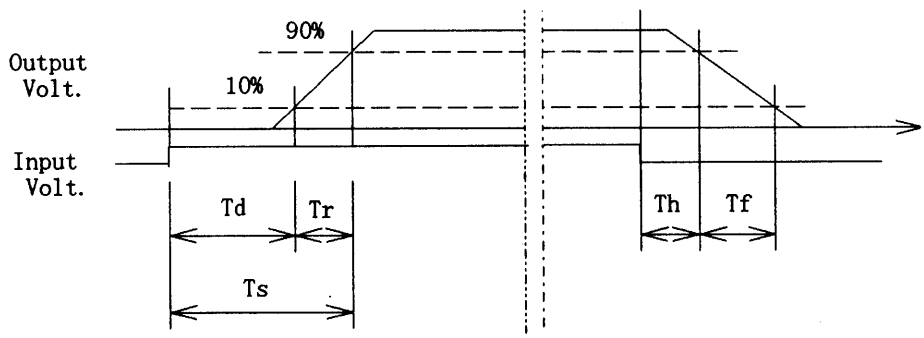
Input Volt. 36.0 V



2. Values

[mS]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	12.30	2.10	14.40	0.29	3.30
100 %	12.25	2.30	14.55	0.19	1.69

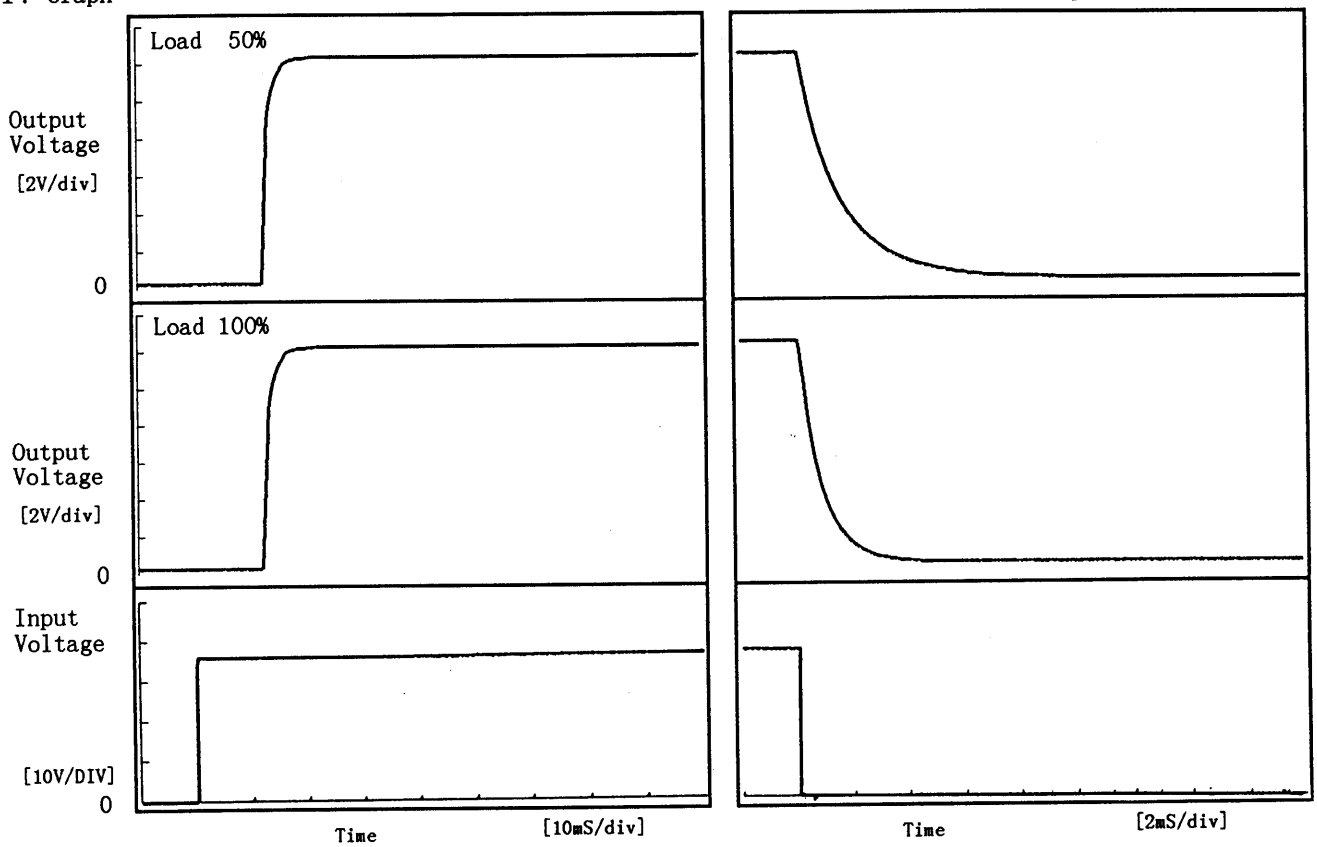


COSEL

Model	ZUW104812	Temperature	25℃
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	+12V0.45A		

1. Graph

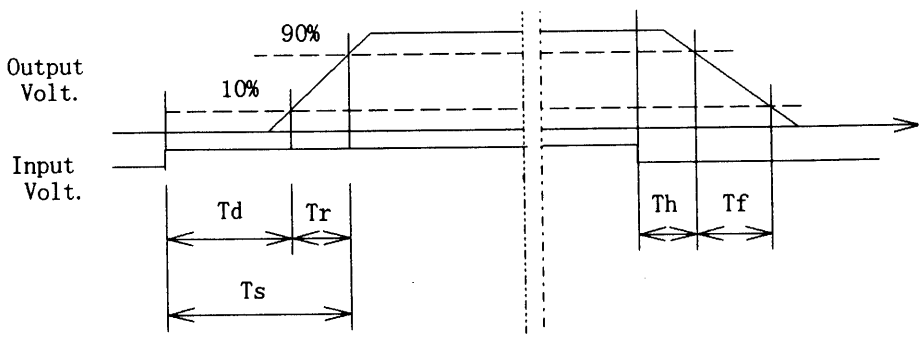
Input Volt. 36.0 V



2. Values

[mS]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	12.30	2.40	14.70	0.27	3.68
100 %	12.30	2.65	14.95	0.17	1.88



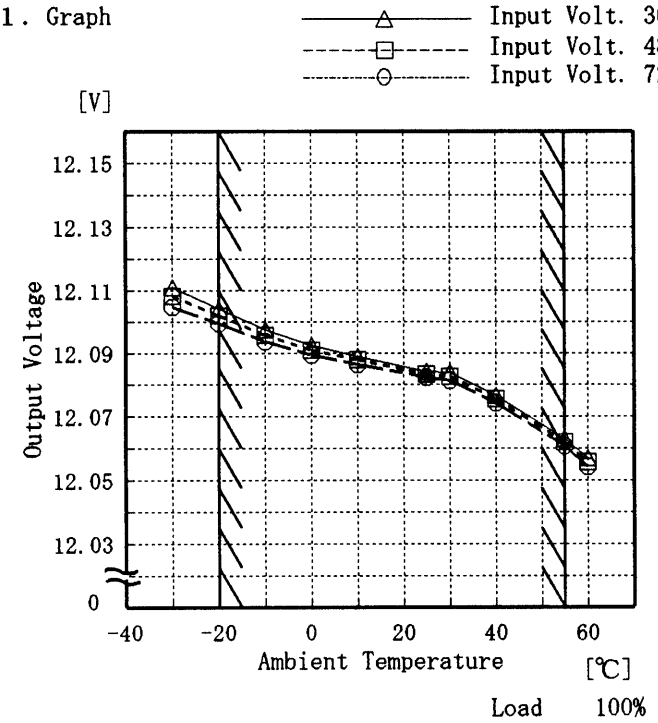
COSEL

Model	ZUW104812
Item	Ambient Temperature Drift 周囲温度変動

Testing Circuitry Figure A

Object ＋12V0.45A

1. Graph

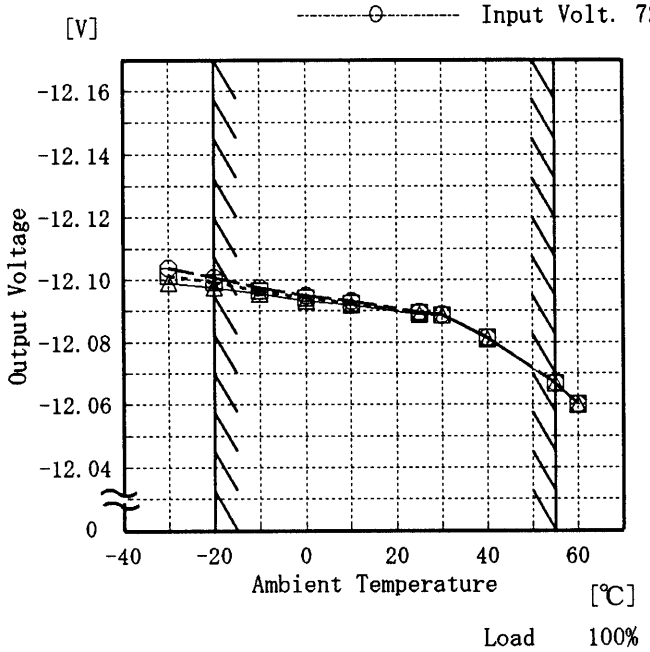


2. Values

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	12.111	12.108	12.105
-20	12.104	12.102	12.099
-10	12.097	12.096	12.094
0	12.092	12.091	12.089
10	12.089	12.088	12.086
25	12.084	12.083	12.082
30	12.084	12.083	12.081
40	12.077	12.076	12.074
55	12.063	12.062	12.061
60	12.057	12.056	12.054
70	12.04615	12.04491	12.0436

Object －12V0.45A

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	-12.099	-12.101	-12.104
-20	-12.098	-12.099	-12.101
-10	-12.095	-12.096	-12.098
0	-12.093	-12.094	-12.095
10	-12.092	-12.092	-12.093
25	-12.089	-12.089	-12.090
30	-12.088	-12.089	-12.089
40	-12.081	-12.081	-12.082
55	-12.067	-12.067	-12.067
60	-12.060	-12.060	-12.060
70	-12.04765	-12.04812	-12.04845

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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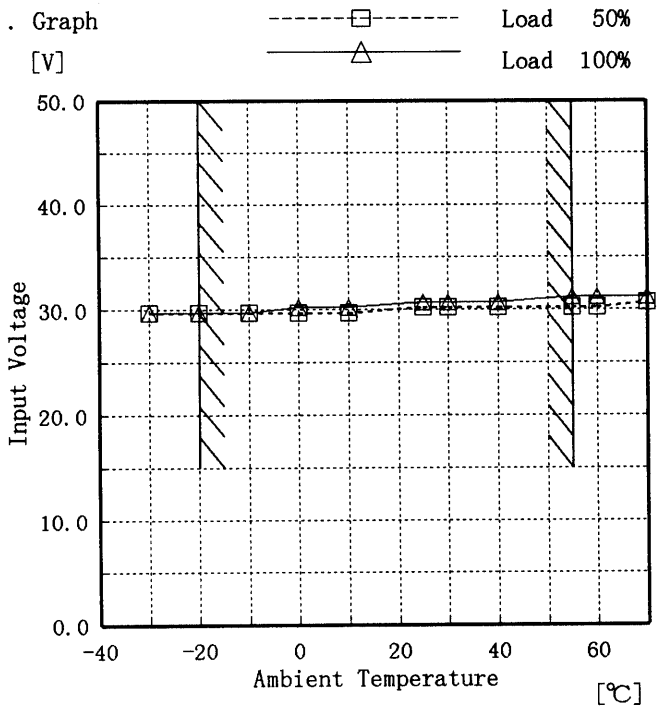
COSEL

Model	ZUW104812
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 +12V0.45A

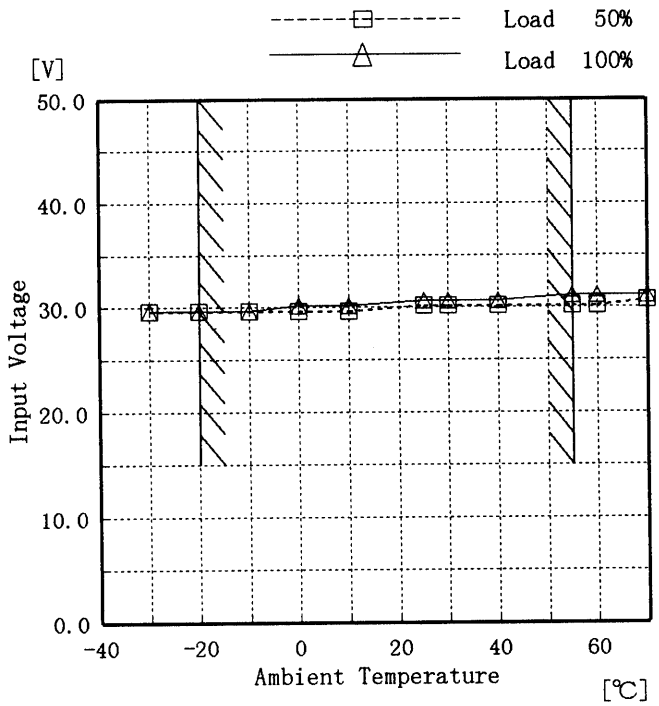
1. Graph



2. Values

Ambient Temp. [℃]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-30	29.7	29.7
-20	29.7	29.7
-10	29.7	29.7
0	29.7	30.2
10	29.7	30.2
25	30.2	30.7
30	30.2	30.7
40	30.2	30.7
55	30.2	31.2
60	30.2	31.2
70	30.7	31.2

Object −12V0.45A



2. Values

Ambient Temp. [℃]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-30	29.7	29.7
-20	29.7	29.7
-10	29.7	29.7
0	29.7	30.2
10	29.7	30.2
25	30.2	30.7
30	30.2	30.7
40	30.2	30.7
55	30.2	31.2
60	30.2	31.2
70	30.7	31.2

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。

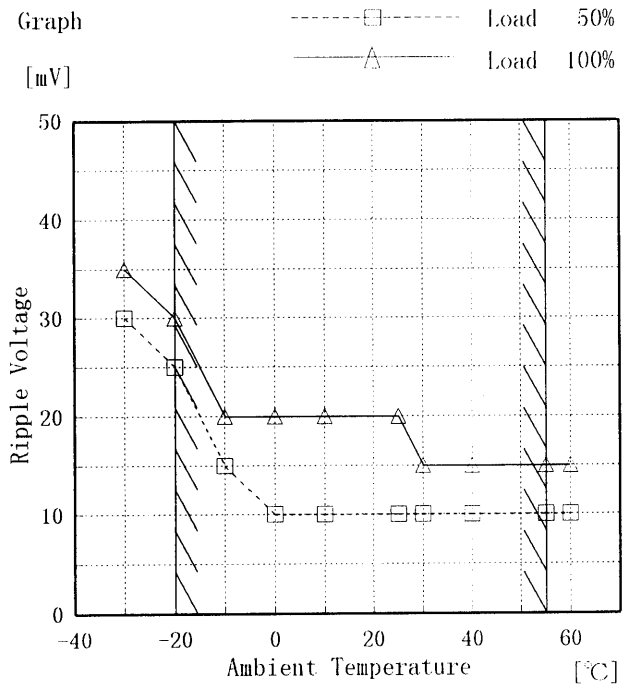
COSEL

Model	ZUW104812
Item	Ripple Voltage (by Ambient Temp.) リップル電圧（周囲温度特性）

Testing Circuitry　Figure A

Object　+12V0.450A

1. Graph



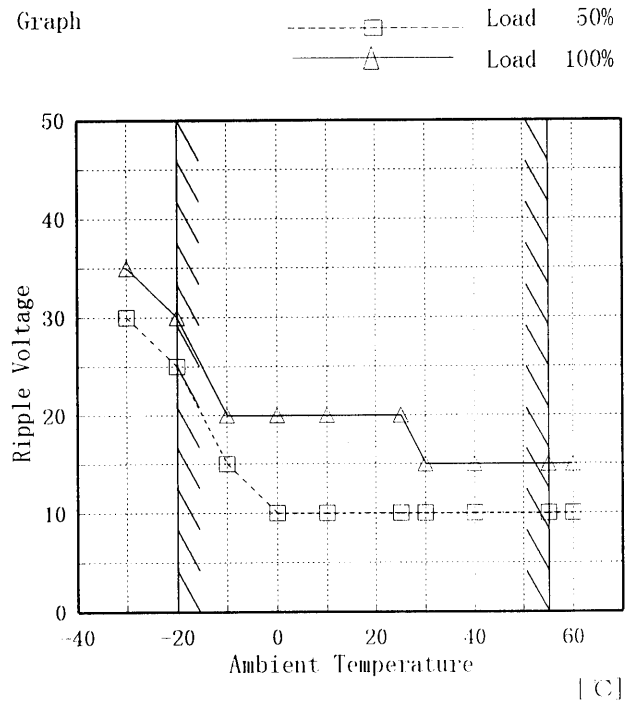
Input Volt.　36.0 V

2. Values

Ambient Temp. [℃]	Load 50% Ripple Output Volt. [mV]	Load 100% Ripple Output Volt. [mV]
-30	30	35
-20	25	30
-10	15	20
0	10	20
10	10	20
25	10	20
30	10	15
40	10	15
55	10	15
60	10	15
—	—	—

Object　−12V0.450A

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	20	30
-20	15	25
-10	10	20
0	10	15
10	10	10
25	5	10
30	5	10
40	5	10
55	5	10
60	5	10
—	—	—

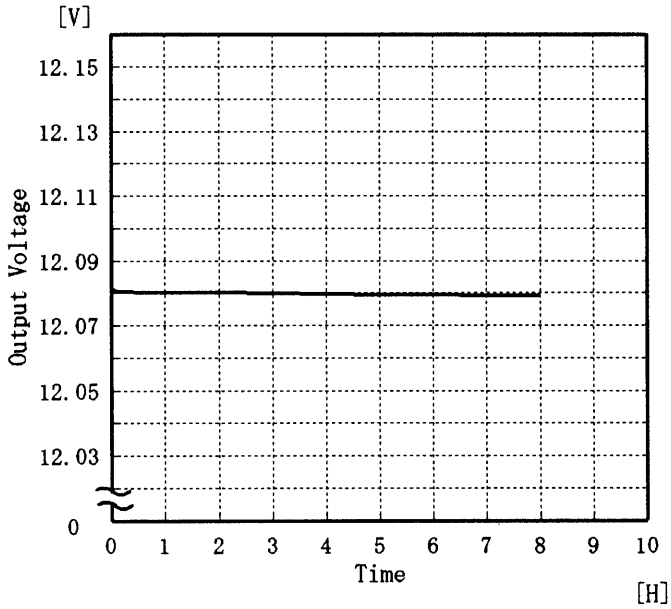
COSEL

Model	ZUW104812
Item	Time Lapse Drift 経時ドリフト

Temperature 25 ℃
Testing Circuitry Figure A

Object ＋12V0.45A

1. Graph



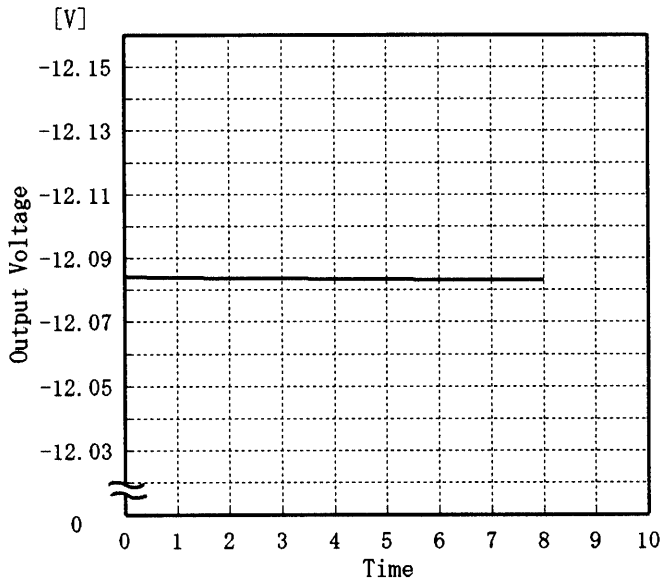
Input Volt. 48.0V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	12.081
0.5	12.080
1.0	12.080
2.0	12.080
3.0	12.080
4.0	12.080
5.0	12.080
6.0	12.080
7.0	12.080
8.0	12.079

Object －12V0.45A

1. Graph



Input Volt. 48.0V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	-12.085
0.5	-12.084
1.0	-12.084
2.0	-12.084
3.0	-12.084
4.0	-12.084
5.0	-12.084
6.0	-12.083
7.0	-12.083
8.0	-12.083

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COSEL

Model	ZUW104812
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) : 0.00～0.45 A

(AVR 2) : 0.00～0.45 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) 0.00～0.45 A

(AVR 2) 0.00～0.45 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 ＋12V0.45A

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ration) [%]
Maximum Voltage	-20	36.0	0.45	12.101	±212	±1.8
Minimum Voltage	55	36.0	0.00	11.678		

Object −12V0.45A

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ration) [%]
Maximum Voltage	-20	72.0	0.45	-12.100	±209	±1.8
Minimum Voltage	55	36.0	0.00	-11.683		

COSEL

Model	ZUW104812
Item	Condensation 結露特性
Object	+12V0.450A

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 25℃ 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２５℃、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	12.168	10	35
	2	12.170	10	35
	3	12.173	10	35
Load 100 %	1	12.086	20	50
	2	12.090	20	50
	3	12.096	20	50

Input Volt. 48.0 V

COSEL

Model	ZUW104812
Item	Condensation 結露特性
Object	−12V0.450A

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 25℃ 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２５℃、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	12.169	15	50
	2	12.174	15	50
	3	12.176	15	50
Load 100 %	1	12.086	20	55
	2	12.094	20	55
	3	12.089	20	55

Input Volt. 48.0 V

COSEL

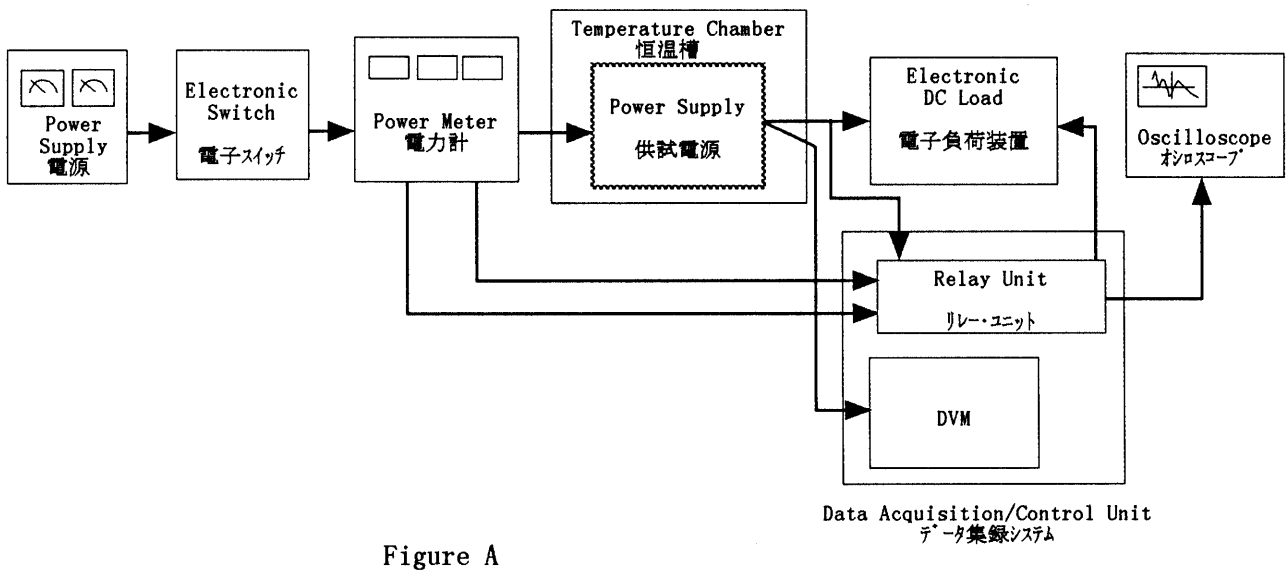

Figure A