参考資料

COSEL

TEST DATA OF ZUW34815

(48.0V INPUT)

Regulated DC Power Supply

Date : Nov. 5. 1996

Approved by : T. Sugimori
Design Manager

Prepared by : Y. Nagai
Design Engineer

コーセル株式会社

COSEL CO., LTD.

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(Final Page 20)

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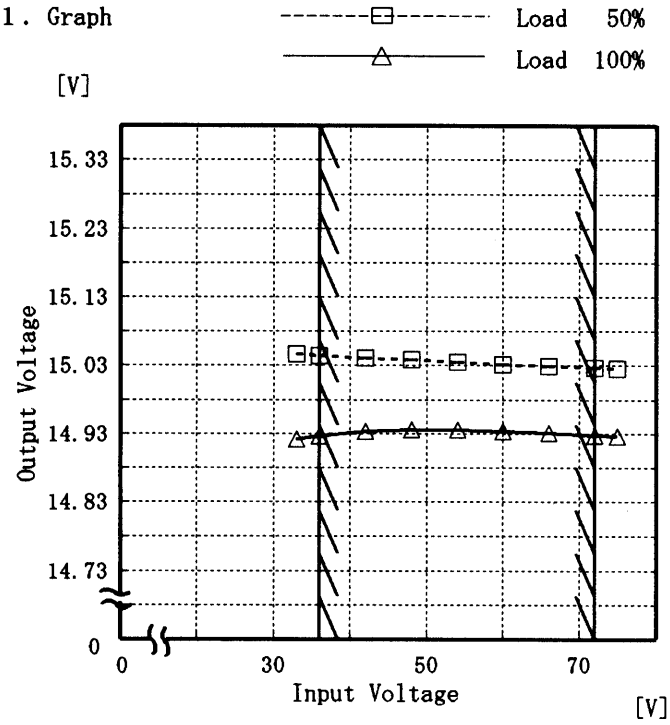
Model	ZUW34815
Item	Line Regulation 静的入力変動

Temperature 25℃
Testing Circuitry Figure A

Object +15V0.1A

1. Graph

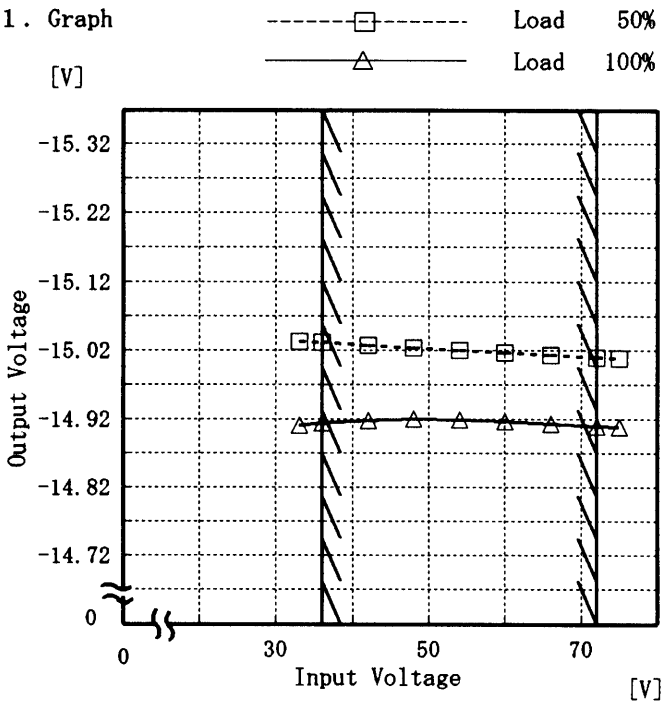


2. Values

Input Voltage [V]	Load 50% Output Volt. [V]	Load 100% Output Volt. [V]
33.0	15.047	14.922
36.0	15.045	14.926
42.0	15.041	14.933
48.0	15.038	14.935
54.0	15.035	14.935
60.0	15.032	14.934
66.0	15.029	14.931
72.0	15.027	14.928
75.0	15.026	14.927
—	—	—
—	—	—
—	—	—

Object −15V0.1A

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	-15.033	-14.911
36.0	-15.031	-14.914
42.0	-15.027	-14.918
48.0	-15.023	-14.920
54.0	-15.019	-14.919
60.0	-15.016	-14.917
66.0	-15.012	-14.913
72.0	-15.010	-14.910
75.0	-15.009	-14.909
—	—	—
—	—	—
—	—	—

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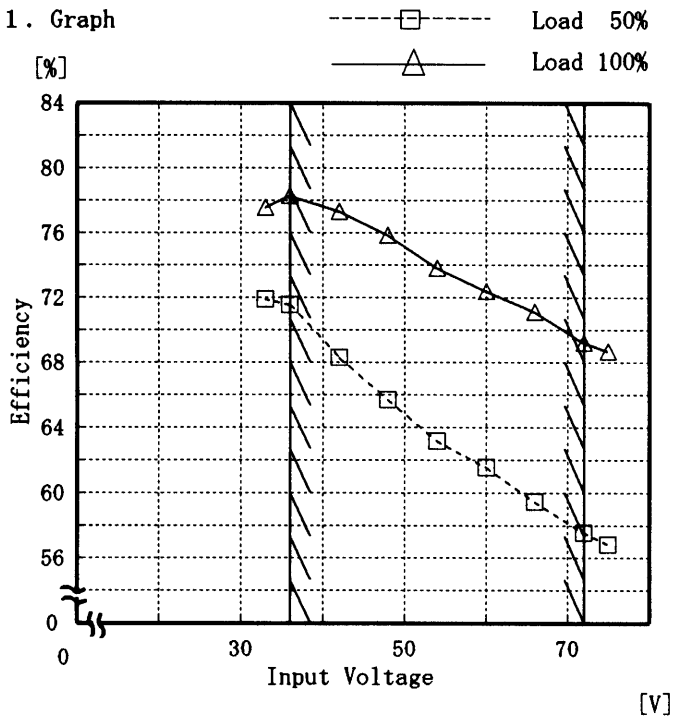
Model	ZUW34815
Item	Efficiency 効率
Object	――――――――――――

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	71.9	77.6
36.0	71.5	78.3
42.0	68.3	77.3
48.0	65.7	75.9
54.0	63.2	73.8
60.0	61.6	72.4
66.0	59.5	71.1
72.0	57.6	69.2
75.0	56.8	68.7
—	—	—
—	—	—
—	—	—

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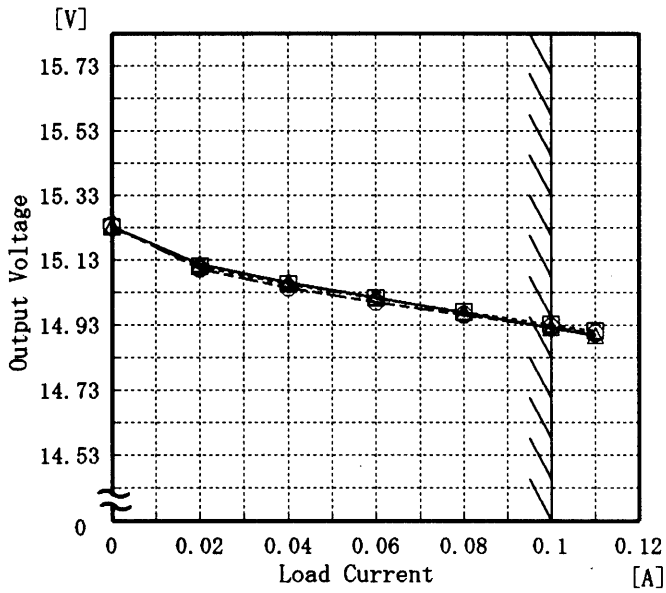
Model	ZUW34815
Item	Load Regulation 静的負荷変動

Temperature 25℃
Testing Circuitry Figure A

Object +15V0.1A

1. Graph

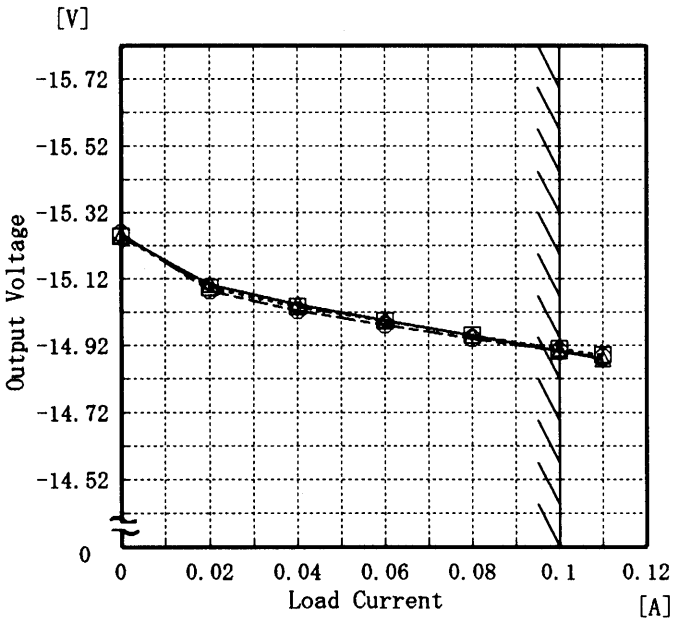


2. Values

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	15.235	15.233	15.236
0.020	15.118	15.111	15.102
0.040	15.062	15.056	15.046
0.060	15.015	15.012	15.002
0.080	14.969	14.971	14.962
0.100	14.922	14.931	14.924
0.110	14.898	14.912	14.906
—	—	—	—
—	—	—	—
—	—	—	—

Object −15V0.1A

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	-15.251	-15.250	-15.258
0.020	-15.103	-15.095	-15.086
0.040	-15.046	-15.038	-15.027
0.060	-14.998	-14.994	-14.982
0.080	-14.951	-14.952	-14.942
0.100	-14.905	-14.912	-14.904
0.110	-14.881	-14.892	-14.885
—	—	—	—
—	—	—	—
—	—	—	—

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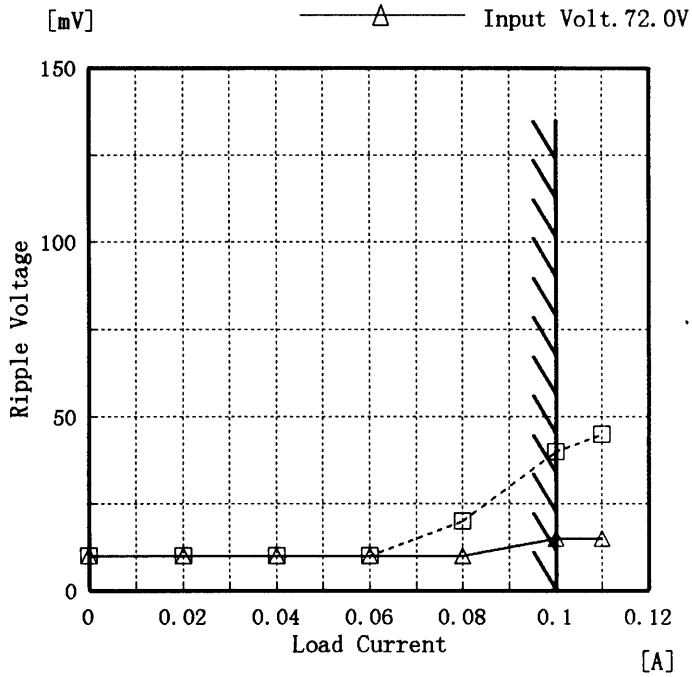
Model	ZUW34815
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	+15V0.1A

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。

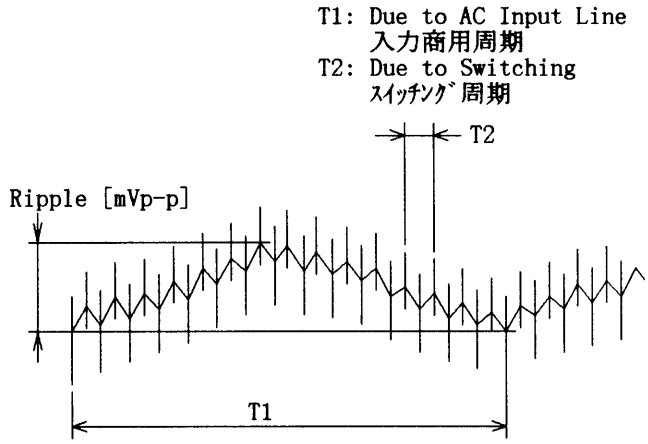


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

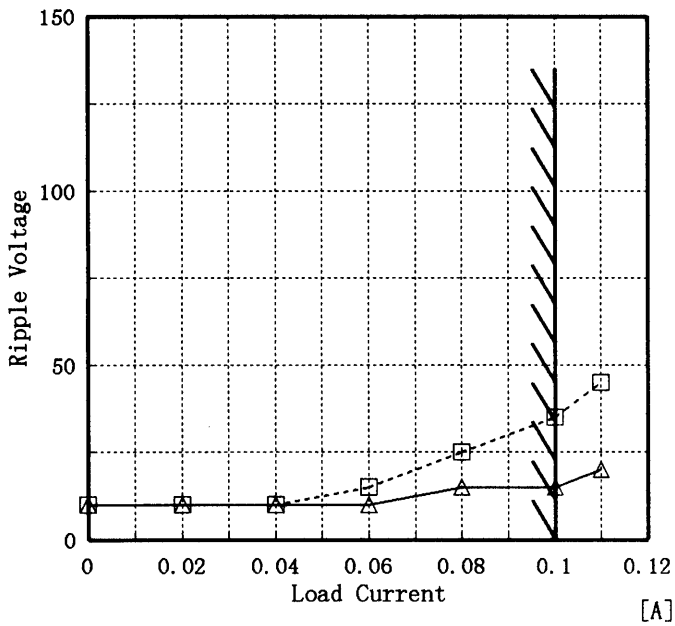
Load Current [A]	Input Volt. 36.0 [V] Ripple Output Volt. [mV]	Input Volt. 72.0 [V] Ripple Output Volt. [mV]
0.00	10	10
0.02	10	10
0.04	10	10
0.06	10	10
0.08	20	10
0.10	40	15
0.11	45	15
—	—	—
—	—	—
—	—	—
—	—	—

COSEL

Model	ZUW34815
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	−15V0.1A

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

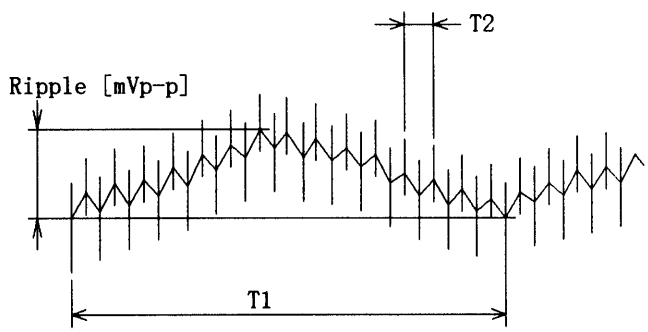


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

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	10	10
0.02	10	10
0.04	10	10
0.06	15	10
0.08	25	15
0.10	35	15
0.11	45	20
—	—	—
—	—	—
—	—	—
—	—	—

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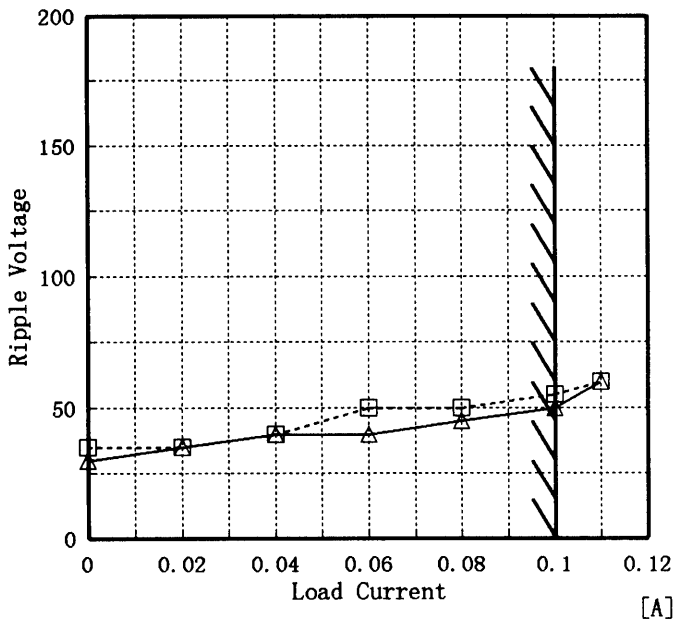
Model	ZUW34815
Item	Ripple-Noise リップルノイズ
Object	+15V0.1A

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。

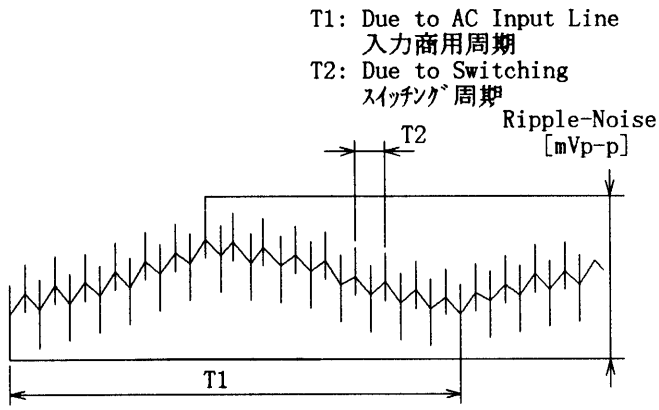


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

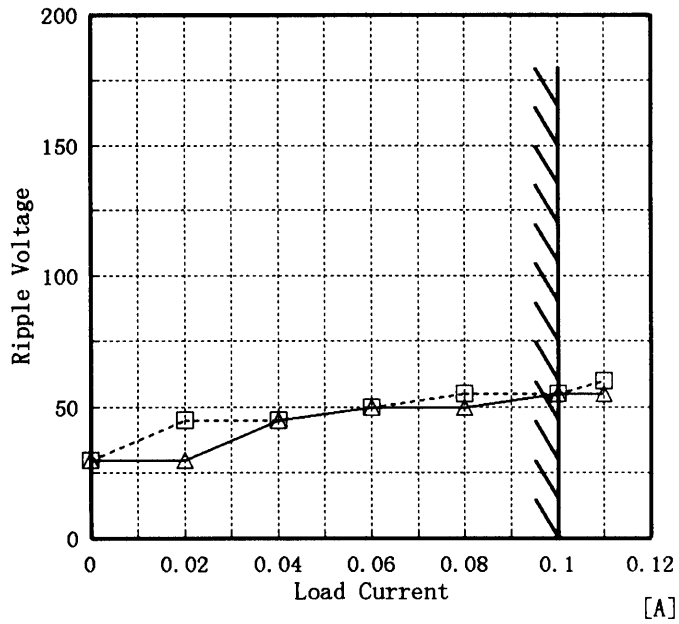
Load Current [A]	Input Volt. 36.0 [V] Ripple Output Volt. [mV]	Input Volt. 72.0 [V] Ripple Output Volt. [mV]
0.00	35	30
0.02	35	35
0.04	40	40
0.06	50	40
0.08	50	45
0.10	55	50
0.11	60	60
—	—	—
—	—	—
—	—	—
—	—	—

COSEL

Model	ZUW34815
Item	Ripple-Noise リップルノイズ
Object	−15V0.1A

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。

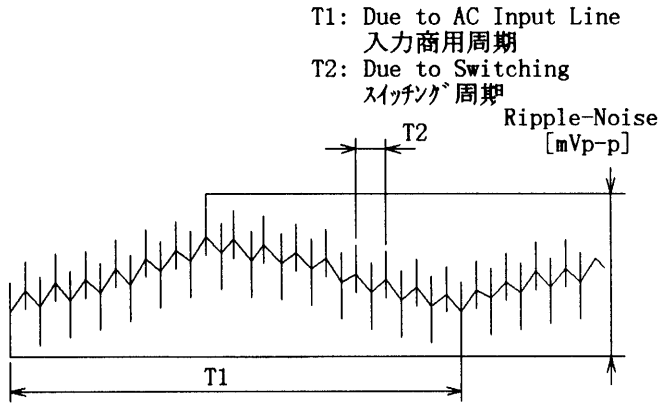


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

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	30	30
0.02	45	30
0.04	45	45
0.06	50	50
0.08	55	50
0.10	55	55
0.11	60	55
—	—	—
—	—	—
—	—	—
—	—	—

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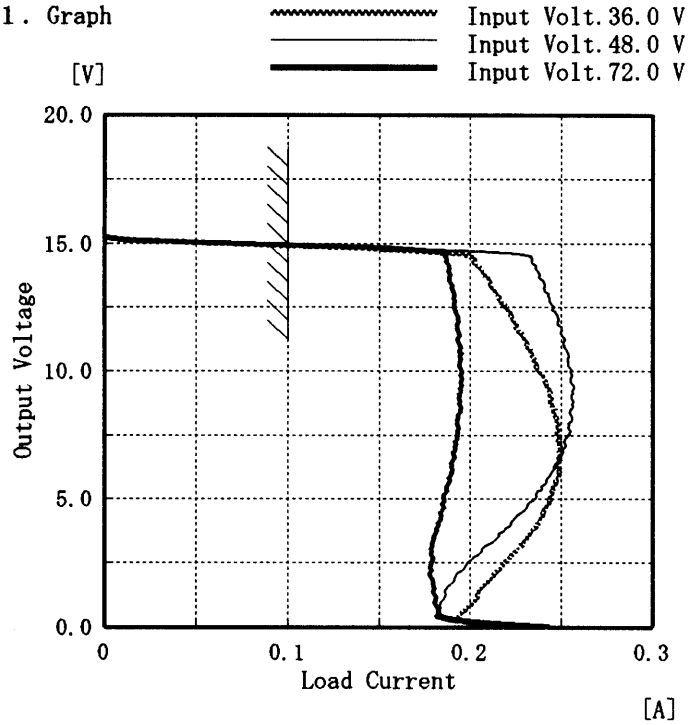
Model	ZUW34815
Item	Overcurrent Protection 過電流保護

Temperature 25℃
Testing Circuitry Figure A

Object ＋15V0.1A

1. Graph

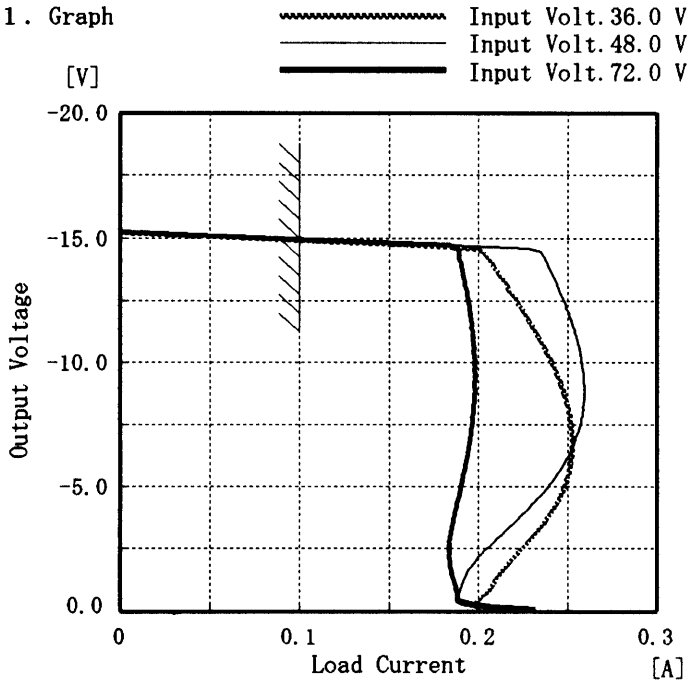


2. Values

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]
15.00	0.049	0.046	0.043
14.25	0.202	0.234	0.186
13.50	0.210	0.240	0.188
12.00	0.223	0.248	0.193
10.50	0.233	0.254	0.194
9.00	0.242	0.255	0.194
7.50	0.247	0.254	0.193
6.00	0.248	0.244	0.190
4.50	0.240	0.230	0.185
3.00	0.226	0.206	0.178
1.50	0.206	0.187	0.180
0.00	0.243	0.234	0.244

Object －15V0.1A

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]
-15.00	0.122	0.131	0.129
-14.25	0.205	0.237	0.189
-13.50	0.212	0.242	0.192
-12.00	0.226	0.250	0.195
-10.50	0.237	0.256	0.197
-9.00	0.246	0.259	0.198
-7.50	0.251	0.257	0.197
-6.00	0.252	0.248	0.193
-4.50	0.246	0.234	0.189
-3.00	0.232	0.213	0.184
-1.50	0.213	0.194	0.185
0.00	0.230	0.221	0.232

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Model	ZUW34815		
Item	Dynamic Load Responce 動的負荷変動	Temperature Testing Circuitry	25℃ Figure A
Object	+15V0.1A		

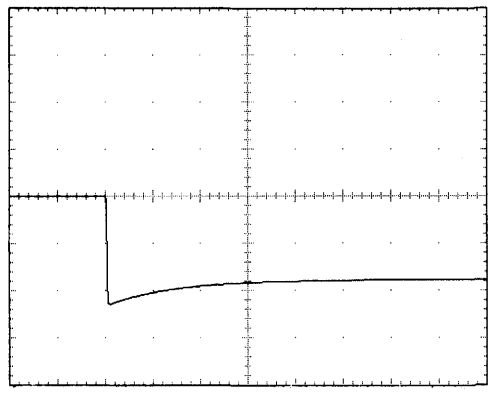
Input Volt. 48.0 V

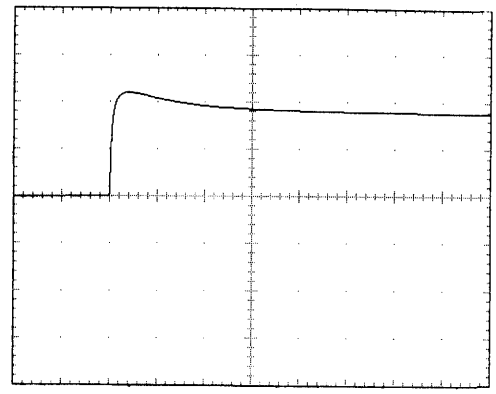
Cycle 100 mS

Load Current

Min. Load ←→
Load 100 %

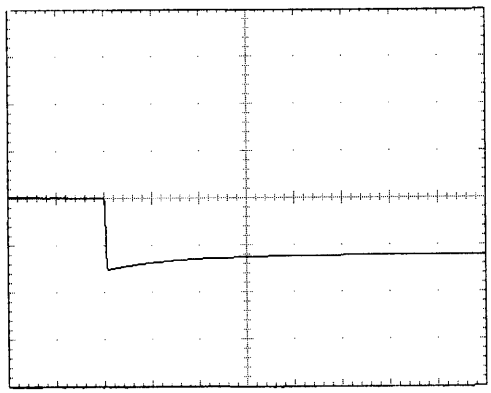
200 mV/div

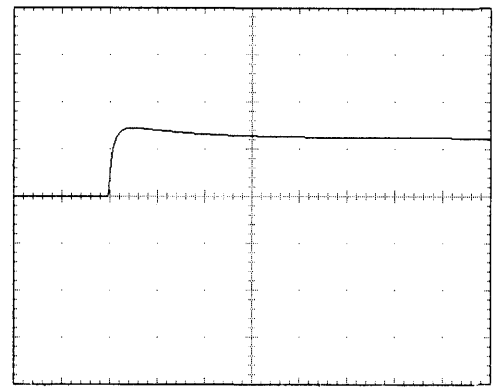




Min. Load ←→
Load 50 %

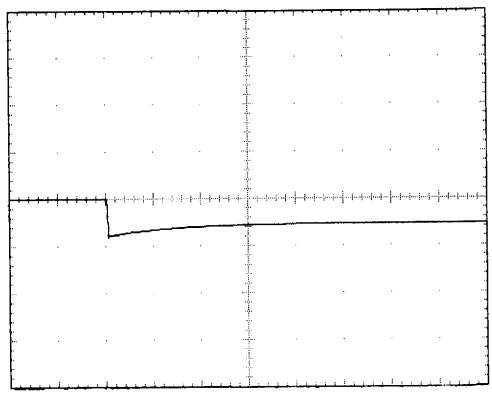
200 mV/div

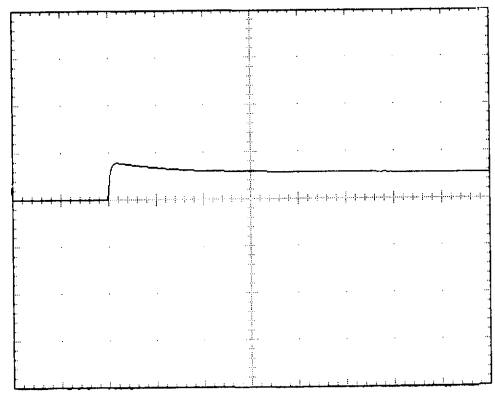




Load 50%←→
Load 100 %

200 mV/div





1 mS/div

COSEL

Model	ZUW34815		
Item	Dynamic Load Responce 動的負荷変動	Temperature Testing Circuitry	25℃ Figure A
Object	−15V0.1A		

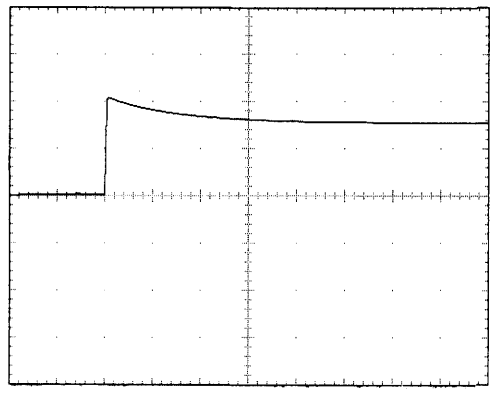
Input Volt. 48.0 V

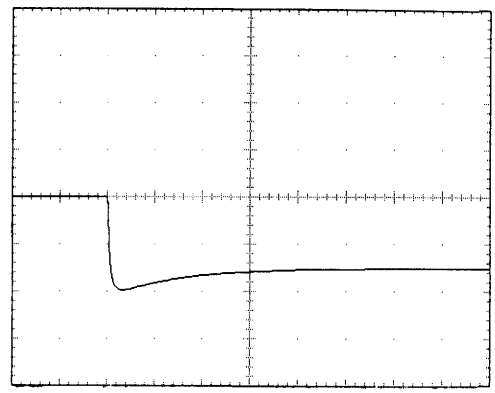
Cycle 100 mS

Load Current

Min. Load ⟷
Load 100 %

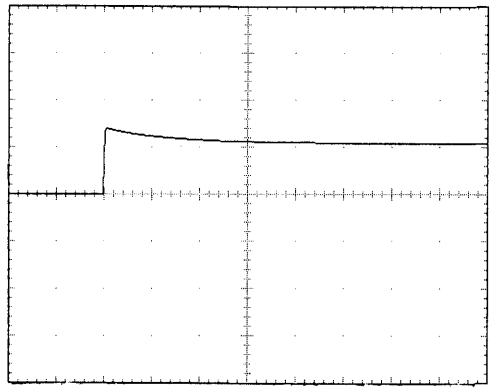
200 mV/div

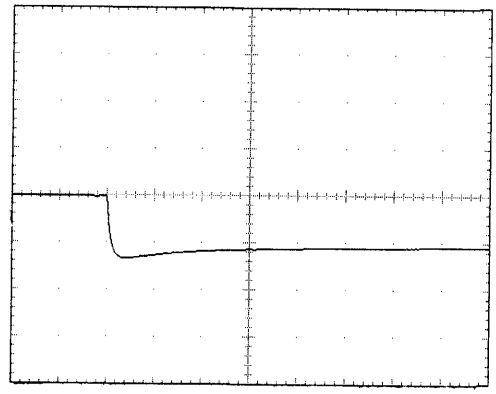




Min. Load ⟷
Load 50 %

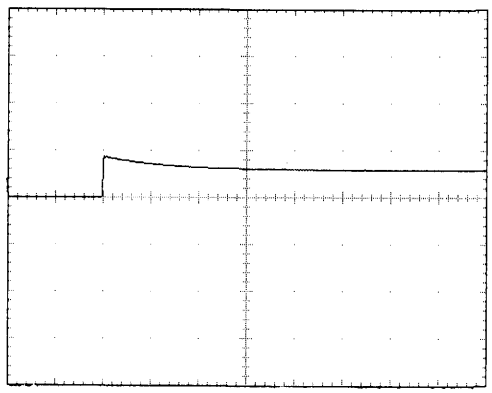
200 mV/div

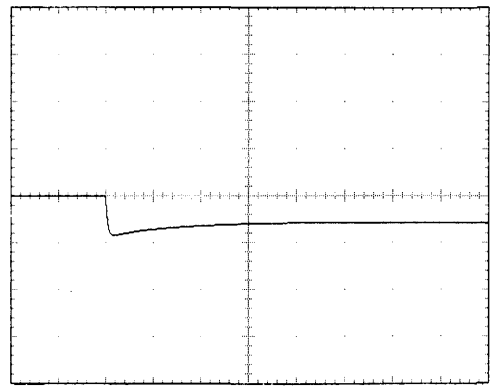




Load 50%⟷
Load 100 %

200 mV/div





1 mS/div

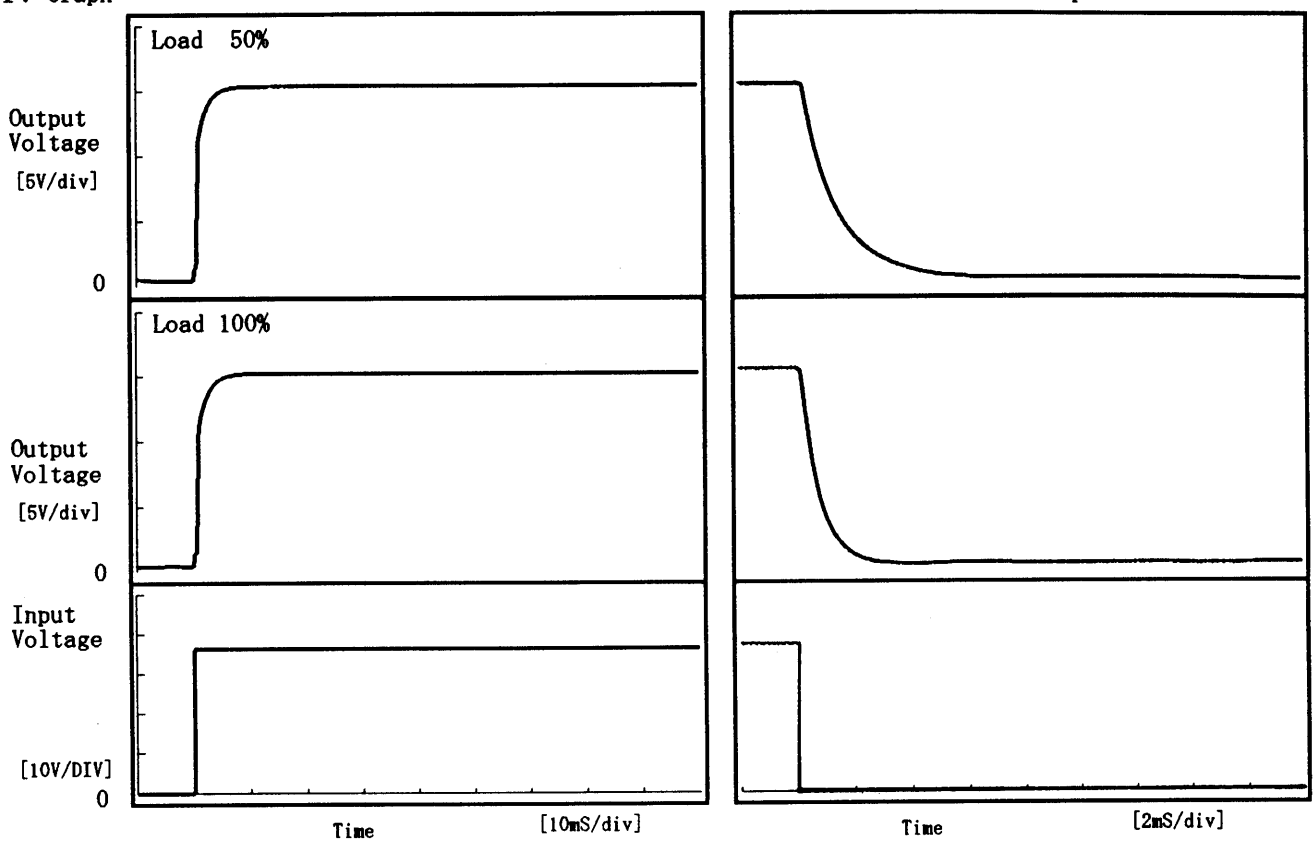
BC−2042

COSEL

Model	ZUW34815	Temperature	25℃
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	+15V0.1A		

1. Graph

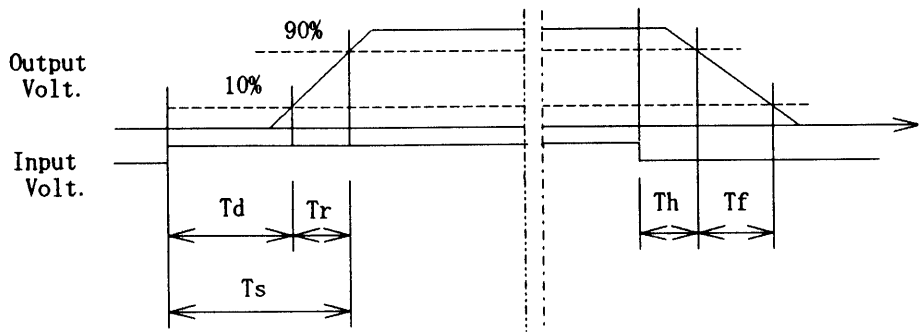
Input Volt. 36.0 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	0.50	2.05	2.55	0.36	3.05
100 %	0.55	2.20	2.75	0.23	1.49



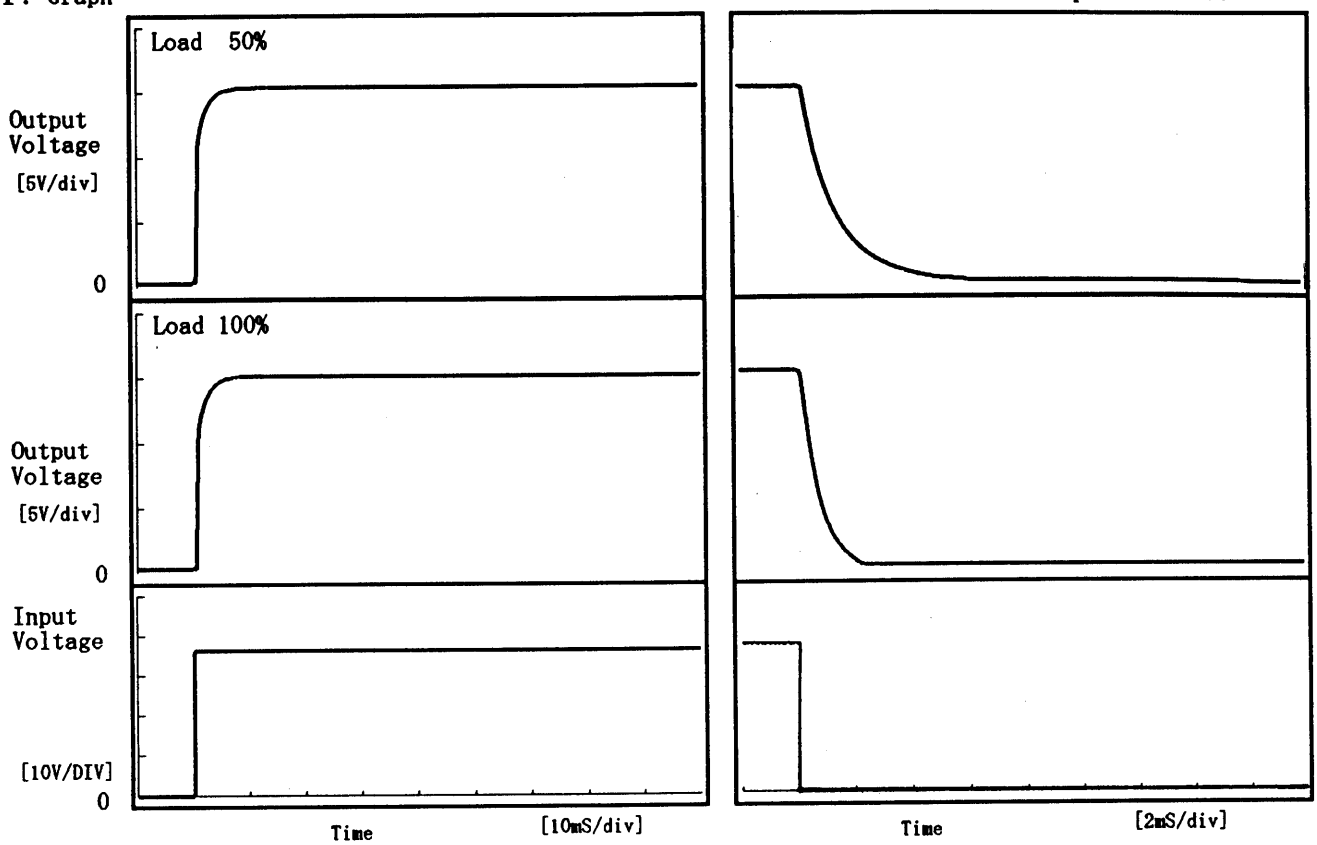
BC−2042

COSEL

Model	ZUW34815		
Item	Rise and Fall Time 立上り、立下り時間	Temperature Testing Circuitry	25℃ Figure A
Object	-15V0.1A		

1. Graph

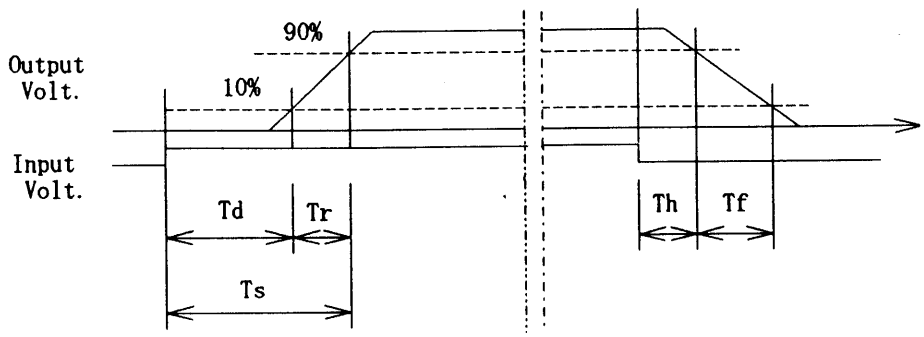
Input Volt. 36.0 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	0.50	2.10	2.60	0.36	2.94
100 %	0.55	2.25	2.80	0.23	1.38



BC−2042

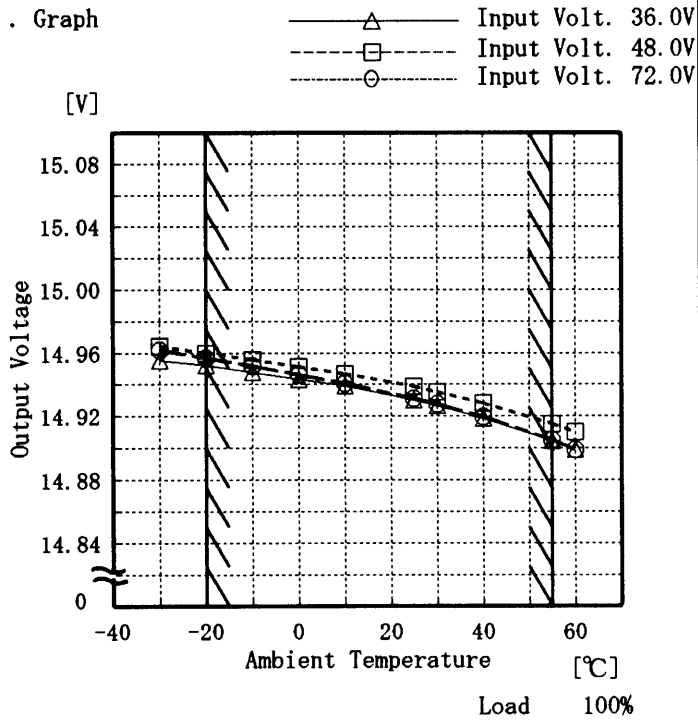
COSEL

Model	ZUW34815
Item	Ambient Temperature Drift 周囲温度変動

Testing Circuitry Figure A

Object +15V0.1A

1. Graph

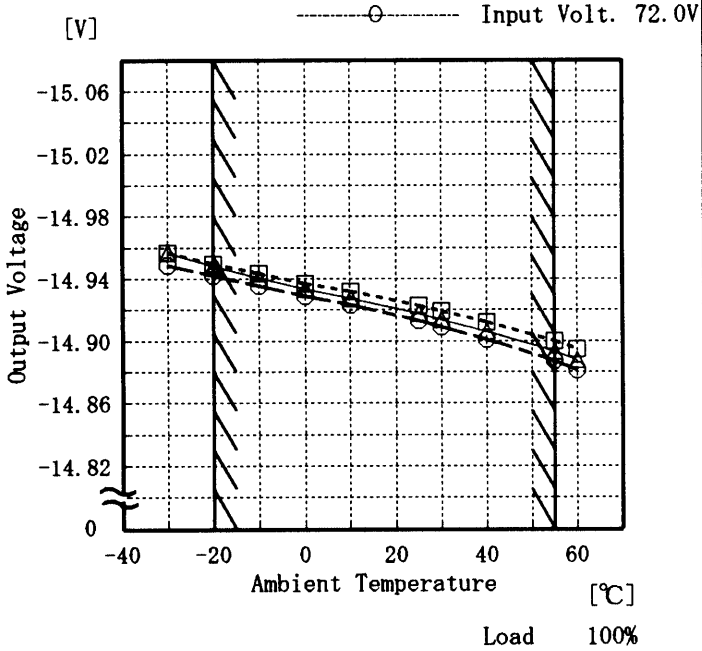


2. Values

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	14.955	14.964	14.962
-20	14.952	14.960	14.957
-10	14.948	14.956	14.951
0	14.943	14.951	14.946
10	14.939	14.947	14.941
25	14.930	14.938	14.931
30	14.927	14.935	14.928
40	14.919	14.928	14.919
55	14.905	14.915	14.905
60	14.899	14.910	14.899
—	—	—	—

Object −15V0.1A

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	-14.957	-14.957	-14.949
-20	-14.948	-14.950	-14.942
-10	-14.941	-14.943	-14.935
0	-14.933	-14.937	-14.929
10	-14.928	-14.932	-14.923
25	-14.918	-14.923	-14.913
30	-14.914	-14.919	-14.909
40	-14.906	-14.912	-14.901
55	-14.893	-14.900	-14.887
60	-14.888	-14.895	-14.881
—	—	—	—

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。

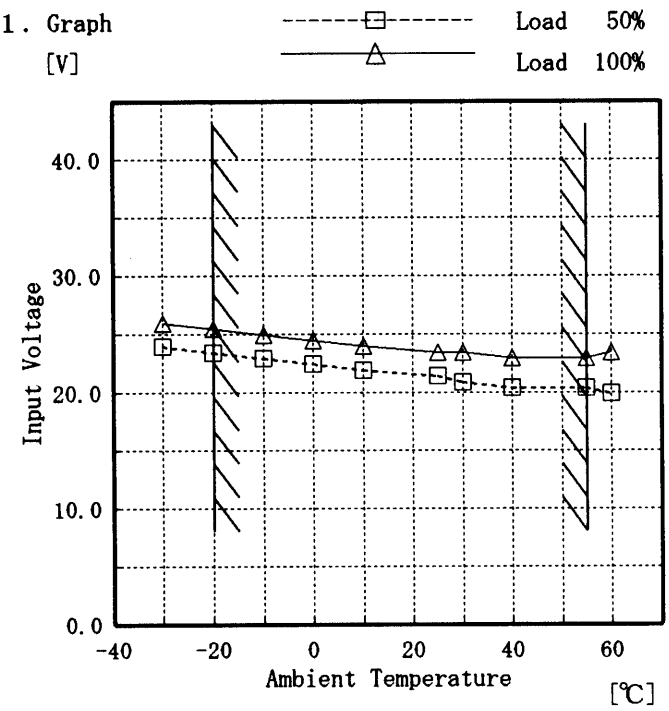
COSEL

Model	ZUW34815
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 +15V0.1A

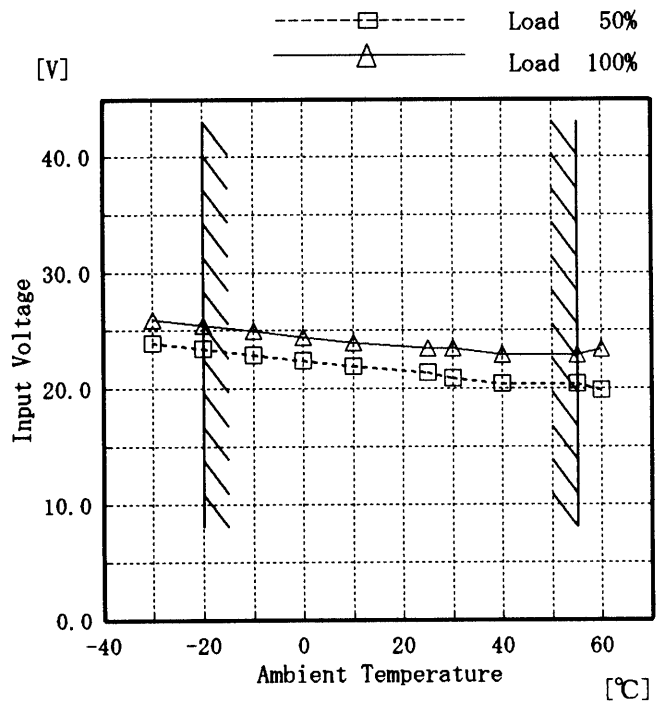
1. Graph



2. Values

Ambient Temp. [℃]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-30	23.9	25.9
-20	23.4	25.4
-10	22.9	24.9
0	22.4	24.4
10	21.9	23.9
25	21.4	23.4
30	20.9	23.4
40	20.4	22.9
55	20.4	22.9
60	19.9	23.4
—	—	—

Object −15V0.1A



2. Values

Ambient Temp. [℃]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-30	23.9	25.9
-20	23.4	25.4
-10	22.9	24.9
0	22.4	24.4
10	21.9	23.9
25	21.4	23.4
30	20.9	23.4
40	20.4	22.9
55	20.4	22.9
60	19.9	23.4
—	—	—

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。

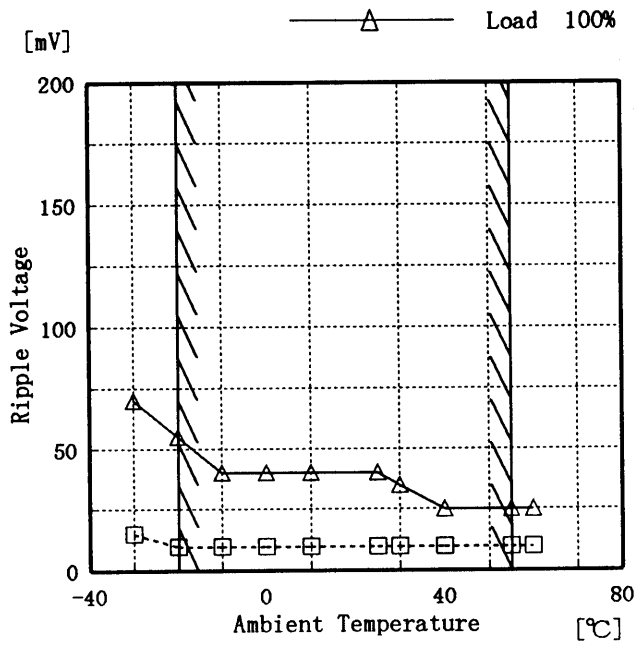
COSEL

Model	ZUW34815
Item	Ripple Voltage (by Ambient Temp.) リップル電圧（周囲温度特性）

Testing Circuitry　Figure A

Object　+15V0.1A

1. Graph



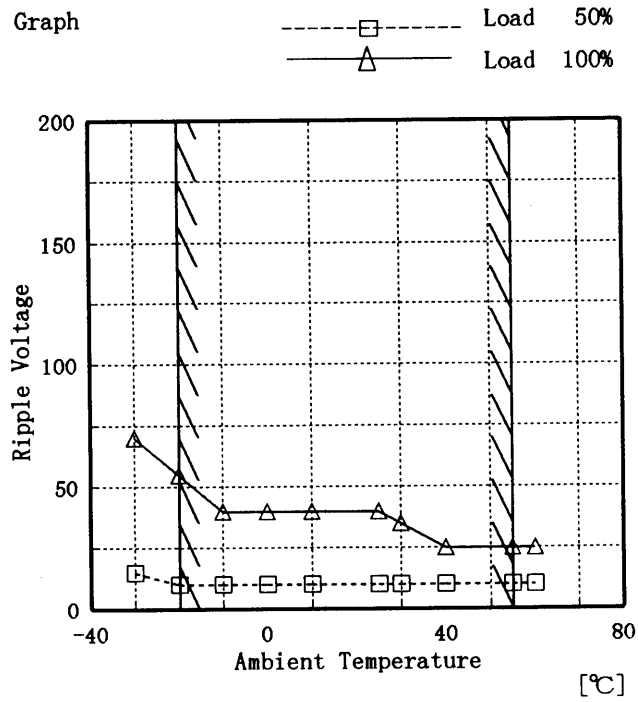
Input Volt.　36.0 V

2. Values

Ambient Temp. [℃]	Load 50% Ripple Output Volt. [mV]	Load 100% Ripple Output Volt. [mV]
-30	15	70
-20	10	55
-10	10	40
0	10	40
10	10	40
25	10	40
30	10	35
40	10	25
55	10	25
60	10	25
—	—	—

Object　−15V0.1A

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	15	80
-20	15	65
-10	15	50
0	10	40
10	10	30
25	10	30
30	10	30
40	10	25
55	10	25
60	10	25
—	—	—

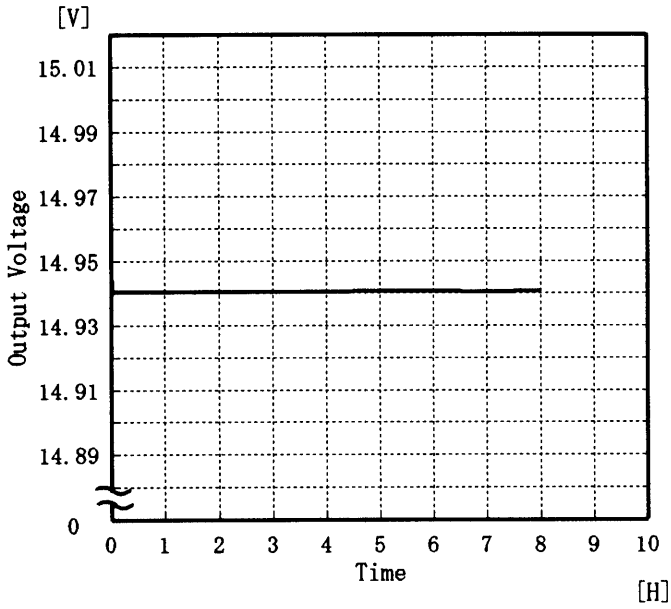
COSEL

Model	ZUW34815
Item	Time Lapse Drift 経時ドリフト

Temperature 25 ℃
Testing Circuitry Figure A

Object ＋15V0.1A

1. Graph



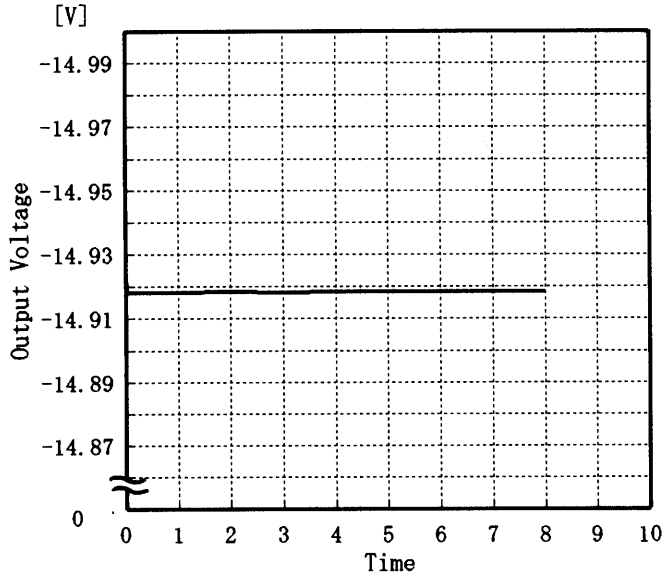
Input Volt. 48.0V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	14.948
0.5	14.941
1.0	14.941
2.0	14.941
3.0	14.941
4.0	14.941
5.0	14.941
6.0	14.941
7.0	14.941
8.0	14.941

Object －15V0.1A

1. Graph



Input Volt. 48.0V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	-14.924
0.5	-14.918
1.0	-14.918
2.0	-14.918
3.0	-14.918
4.0	-14.919
5.0	-14.918
6.0	-14.919
7.0	-14.918
8.0	-14.919

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COSEL

Model	ZUW34815
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) : 0.0～0.1 A

(AVR 2) : 0.0～0.1 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) 0.0～0.1 A

(AVR 2) 0.0～0.1 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 +15V0.1A

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ration) [%]
Maximum Voltage	-20	48.0	0.1	14.958	±171	±1.2
Minimum Voltage	25	36.0	0.0	14.617		

Object −15V0.1A

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ration) [%]
Maximum Voltage	-20	48.0	0.1	-14.949	±163	±1.1
Minimum Voltage	55	36.0	0.0	-14.623		

COSEL

Model	ZUW34815
Item	Condensation 結露特性
Object	+15V0.1A

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	15.056	10	20
	2	15.051	10	20
	3	15.052	10	20
Load 100 %	1	14.956	15	25
	2	14.950	15	25
	3	14.949	15	25

Input Volt. 48.0 V

COSEL

Model	ZUW34815
Item	Condensation 結露特性
Object	−15V0.1A

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	-15.022	10	25
	2	-15.032	10	25
	3	-15.029	10	25
Load 100 %	1	-14.926	15	30
	2	-14.933	15	30
	3	-14.934	15	30

Input Volt. 48.0 V

COSEL

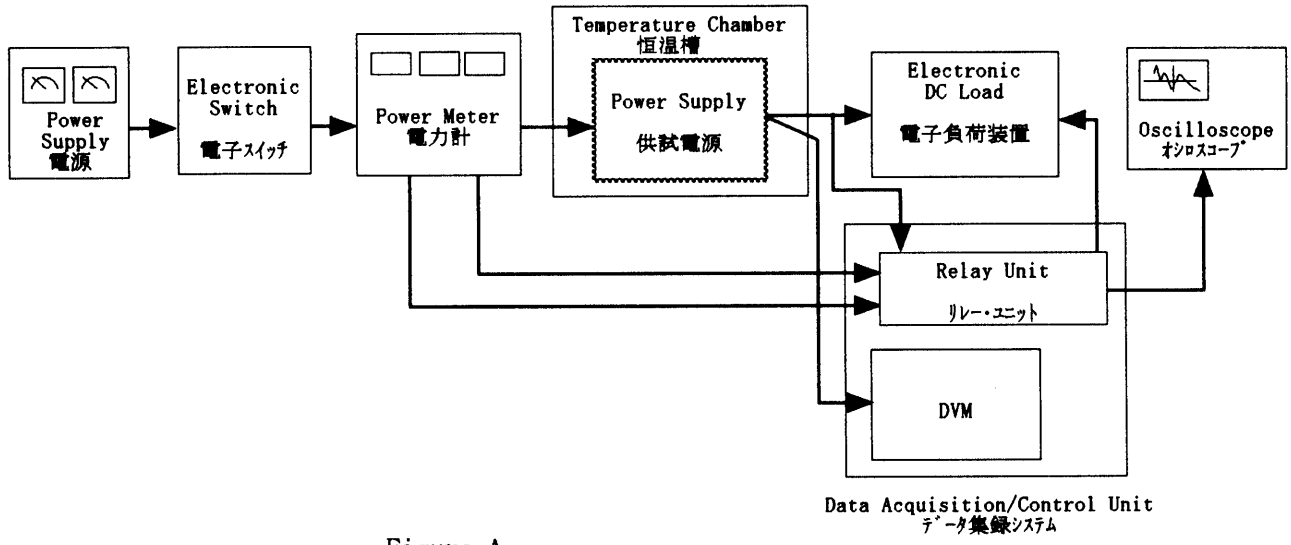

Figure A