参考資料

COSEL

TEST DATA OF ZUW104815

(48.0V INPUT)

Regulated DC Power Supply

Date : Sep 21. 1996

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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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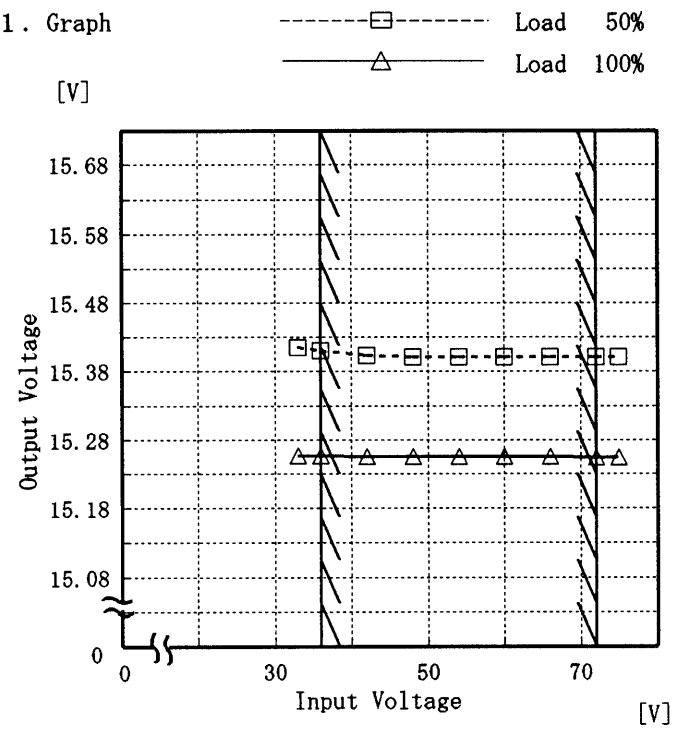
Model	ZUW104815
Item	Line Regulation 静的入力変動

Temperature 25℃
Testing Circuitry Figure A

Object +15V0.350A

1. Graph

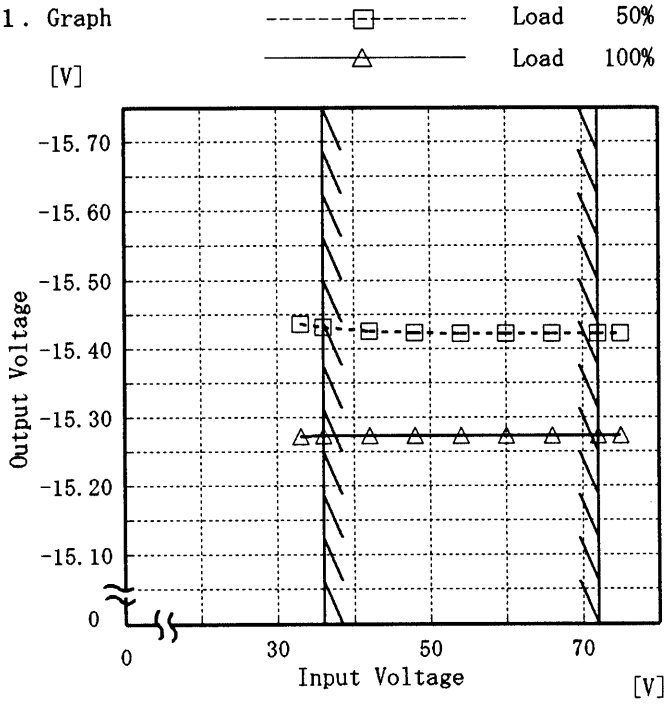


2. Values

Input Voltage [V]	Load 50% Output Volt. [V]	Load 100% Output Volt. [V]
33.0	15.415	15.257
36.0	15.410	15.256
42.0	15.404	15.256
48.0	15.402	15.256
54.0	15.401	15.256
60.0	15.401	15.255
66.0	15.401	15.255
72.0	15.401	15.255
75.0	15.401	15.255
—	—	—
—	—	—
—	—	—

Object −15V0.350A

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	-15.436	-15.273
36.0	-15.431	-15.273
42.0	-15.425	-15.273
48.0	-15.422	-15.273
54.0	-15.422	-15.273
60.0	-15.422	-15.273
66.0	-15.422	-15.273
72.0	-15.422	-15.274
75.0	-15.422	-15.273
—	—	—
—	—	—
—	—	—

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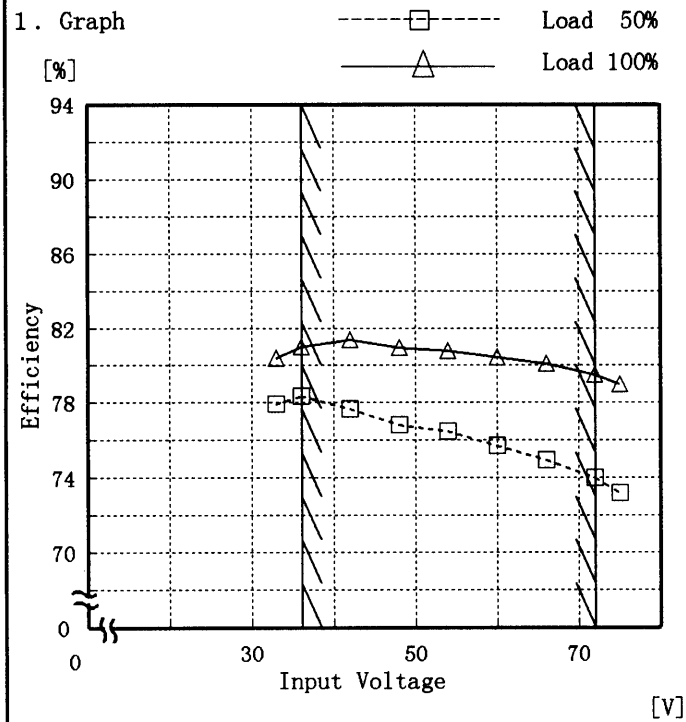
Model	ZUW104815
Item	Efficiency 効率
Object	———————

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	77.9	80.4
36.0	78.4	81.0
42.0	77.7	81.4
48.0	76.8	80.9
54.0	76.5	80.8
60.0	75.7	80.4
66.0	75.0	80.1
72.0	74.0	79.5
75.0	73.2	79.0
—	—	—
—	—	—
—	—	—

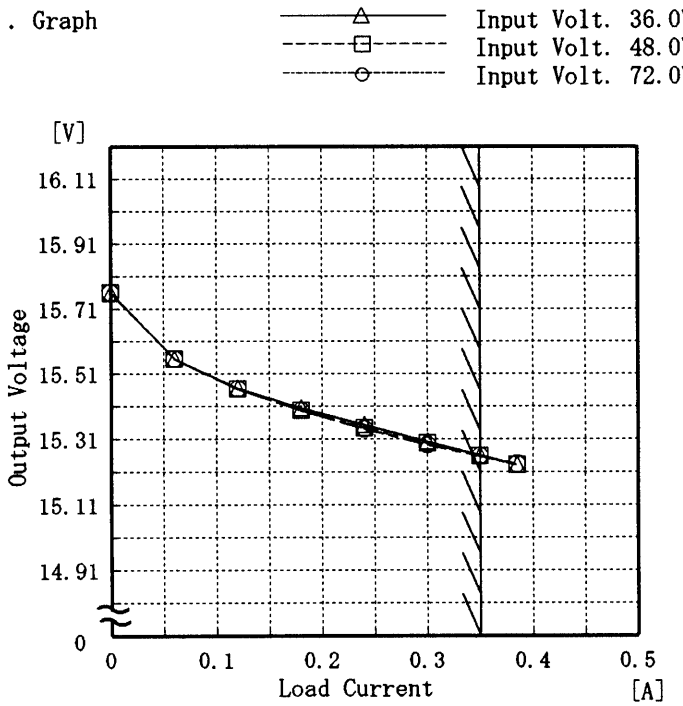
COSEL

Model	ZUW104815
Item	Load Regulation 静的負荷変動

Temperature 25℃
Testing Circuitry Figure A

Object ＋15V0.350A

1. Graph

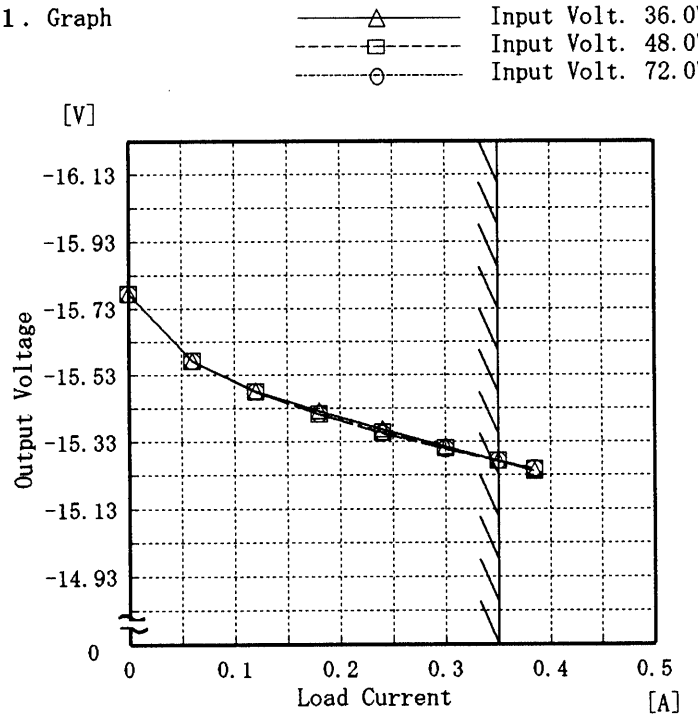


2. Values

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	15.759	15.760	15.761
0.060	15.556	15.557	15.558
0.120	15.466	15.464	15.464
0.180	15.406	15.397	15.397
0.240	15.354	15.344	15.341
0.300	15.302	15.297	15.293
0.350	15.261	15.259	15.258
0.385	15.231	15.233	15.234
—	—	—	—
—	—	—	—

Object －15V0.350A

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	-15.776	-15.776	-15.776
0.060	-15.574	-15.574	-15.575
0.120	-15.484	-15.481	-15.482
0.180	-15.423	-15.414	-15.414
0.240	-15.369	-15.361	-15.358
0.300	-15.317	-15.313	-15.310
0.350	-15.274	-15.274	-15.274
0.385	-15.244	-15.247	-15.249
—	—	—	—
—	—	—	—

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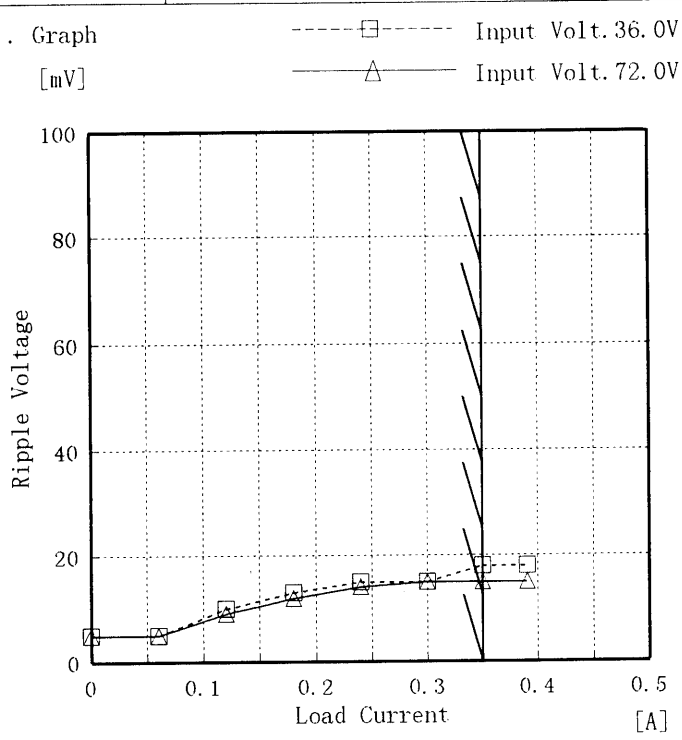
Model	ZUW104815
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	+15V0.35A

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

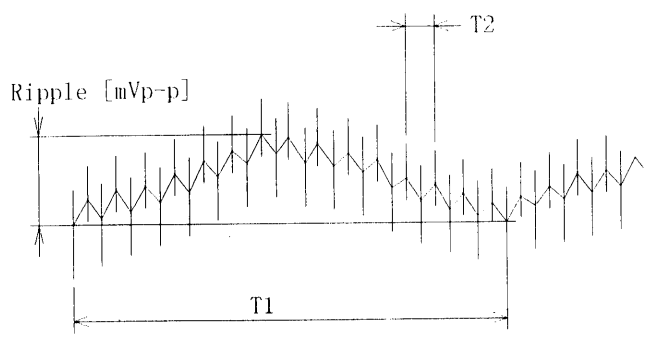


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

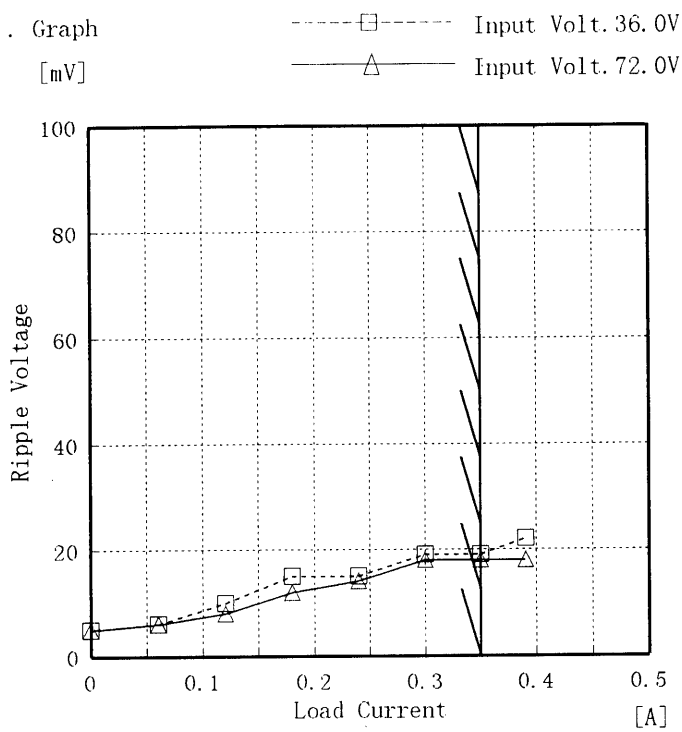
Load Current [A]	Input Volt. 36.0 [V] Ripple Output Volt. [mV]	Input Volt. 72.0 [V] Ripple Output Volt. [mV]
0.00	5	5
0.06	5	5
0.12	10	9
0.18	13	12
0.24	15	14
0.30	15	15
0.35	18	15
0.39	18	15
—	—	—
—	—	—
—	—	—

COSEL

Model	ZUW104815
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	−15V0.35A

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

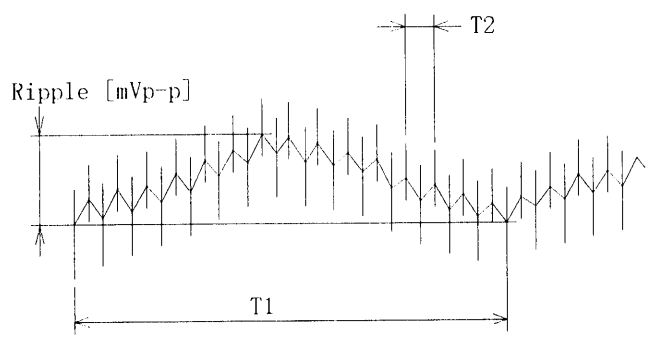


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

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
0.06	6	6
0.12	10	8
0.18	15	12
0.24	15	14
0.30	19	18
0.35	19	18
0.39	22	18
—	—	—
—	—	—
—	—	—

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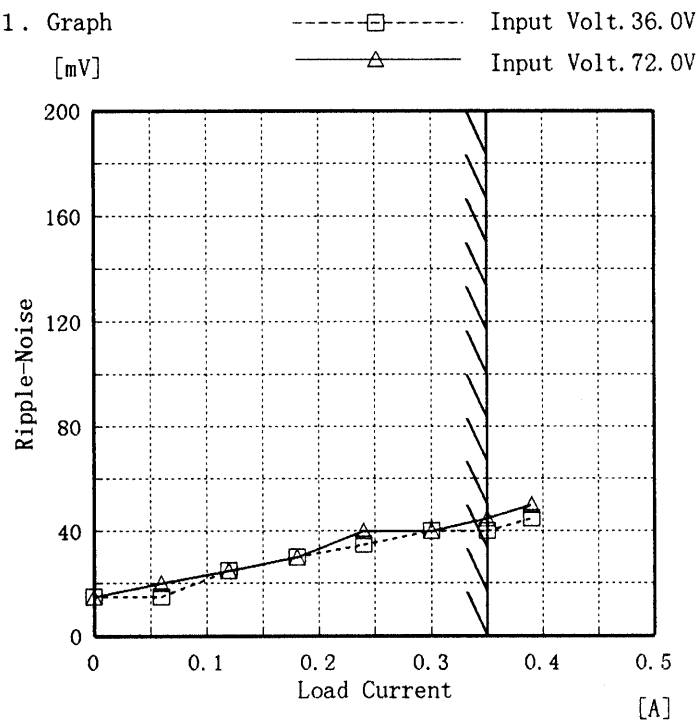
Model	ZUW104815
Item	Ripple-Noise　リップルノイズ
Object	+15V0.350A

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

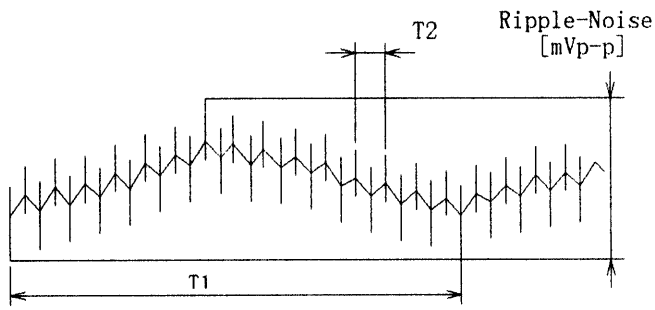


Fig. Complex Ripple Wave Form
図　リップル波形詳細図

2. Values

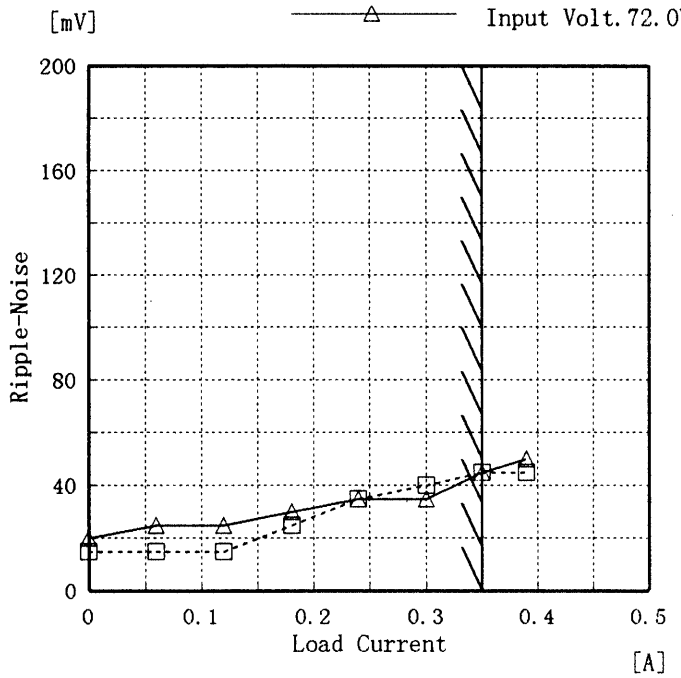
Load current [A]	Input Volt. 36.0 [V] Ripple-Noise [mV]	Input Volt. 72.0 [V] Ripple-Noise [mV]
0.00	15	15
0.06	15	20
0.12	25	25
0.18	30	30
0.24	35	40
0.30	40	40
0.35	40	45
0.39	45	50
—	—	—
—	—	—
—	—	—

COSEL

Model	ZUW104815
Item	Ripple-Noise リップルノイズ
Object	-15V0.350A

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

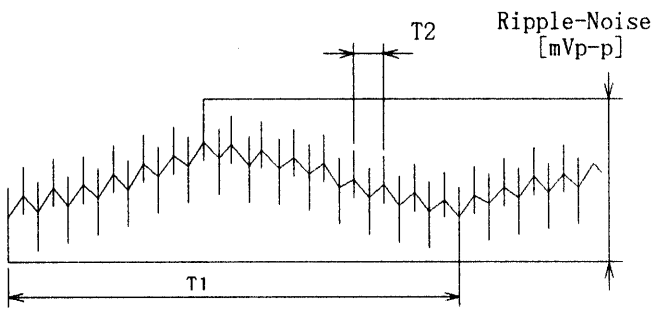


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

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
0.06	15	25
0.12	15	25
0.18	25	30
0.24	35	35
0.30	40	35
0.35	45	45
0.39	45	50
—	—	—
—	—	—
—	—	—

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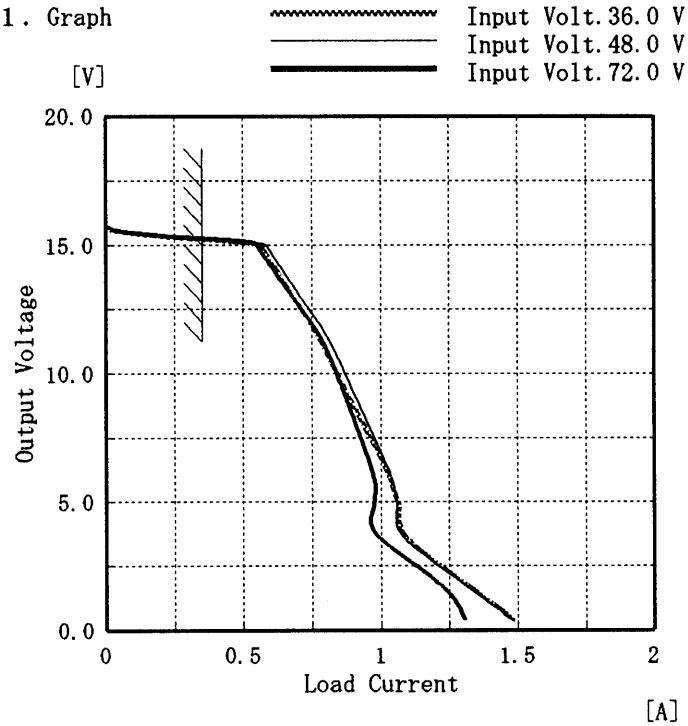
Model	ZUW104815
Item	Overcurrent Protection 過電流保護

Temperature 25℃
Testing Circuitry Figure A

Object ＋15V0.350A

1. Graph

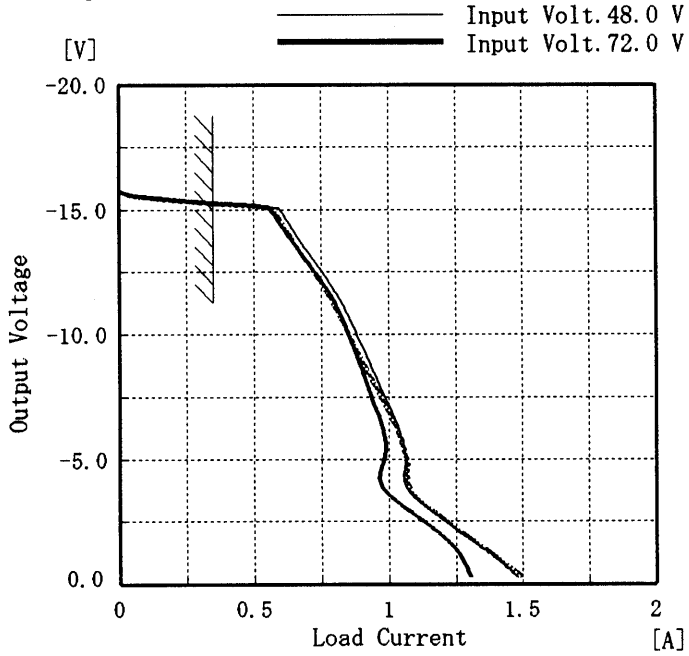


2. Values

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	0.565	0.583	0.549
14.25	0.606	0.629	0.598
13.50	0.646	0.672	0.643
12.00	0.737	0.768	0.744
10.50	0.818	0.845	0.818
9.00	0.886	0.911	0.876
7.50	0.955	0.972	0.924
6.00	1.028	1.035	0.973
4.50	1.064	1.054	0.967
3.00	1.146	1.142	1.061
1.50	1.343	1.339	1.241
0.00	1.488	1.471	1.309

Object －15V0.350A

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	ZUW104815
Item	Dynamic Load Responce 動的負荷変動
Object	+15V0.350A

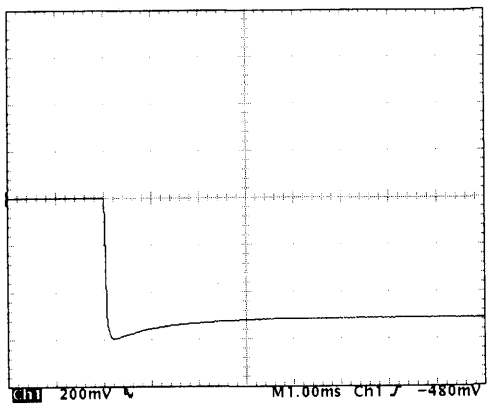
Temperature 25℃
Testing Circuitry Figure A

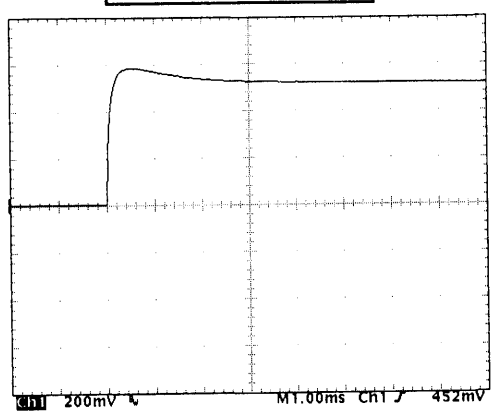
Input Volt. 48 V
Cycle 100 mS

Load Current

Min. Load ⟷
Load 100 %

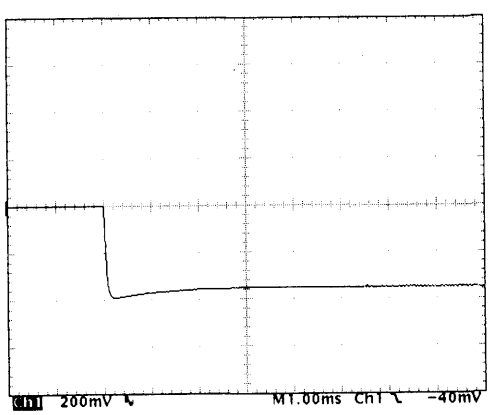
200 mV/div

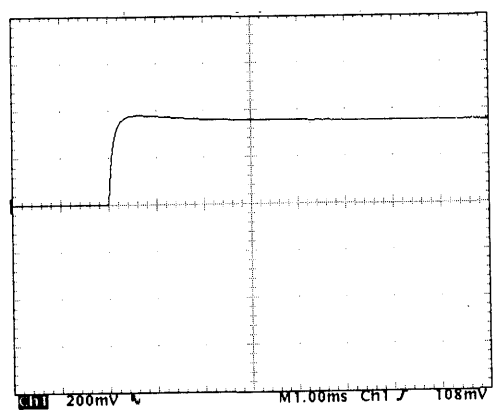




Min. Load ⟷
Load 50 %

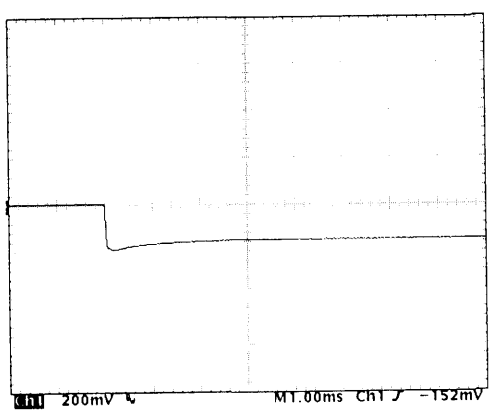
200 mV/div

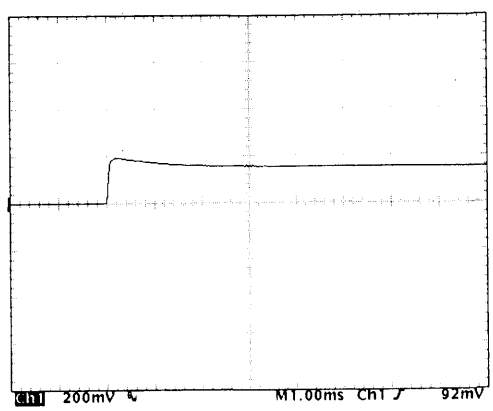




Load 50%⟷
Load 100 %

200 mV/div





1 mS/div

COSEL

Model	ZUW104815
Item	Dynamic Load Responce 動的負荷変動
Object	-15V0.350A

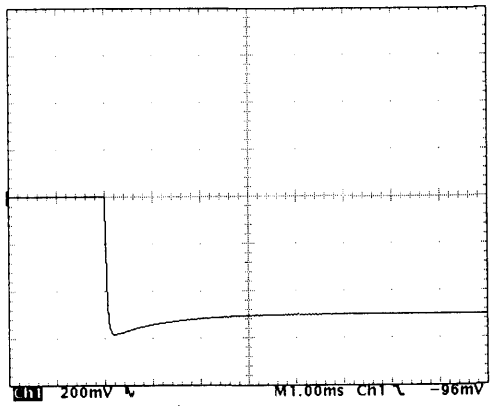
Temperature 25℃
Testing Circuitry Figure A

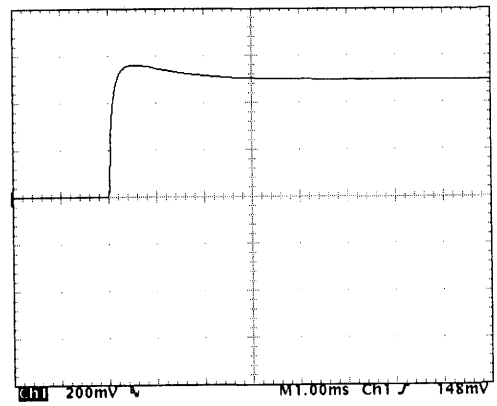
Input Volt. 48 V
Cycle 100 mS

Load Current

Min. Load ⟷
Load 100 %

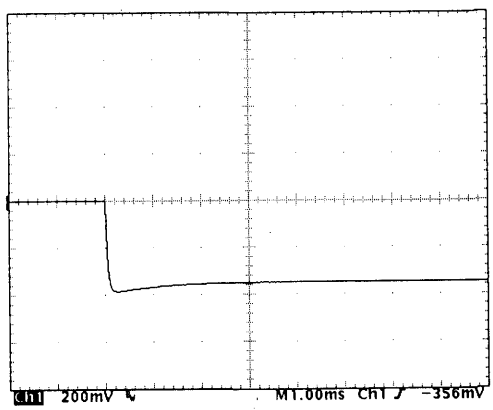
200 mV/div

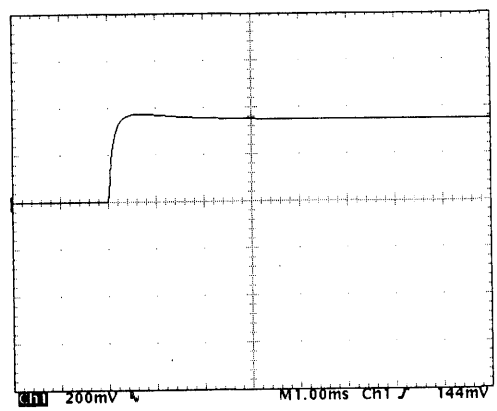




Min. Load ⟷
Load 50 %

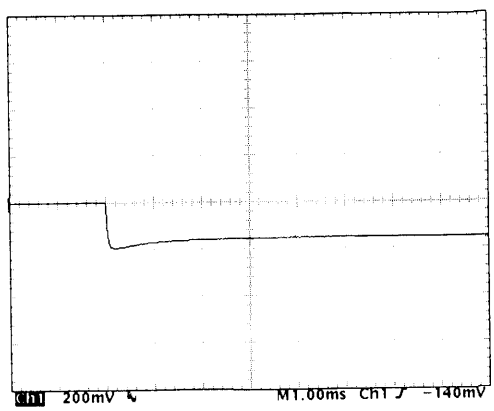
200 mV/div

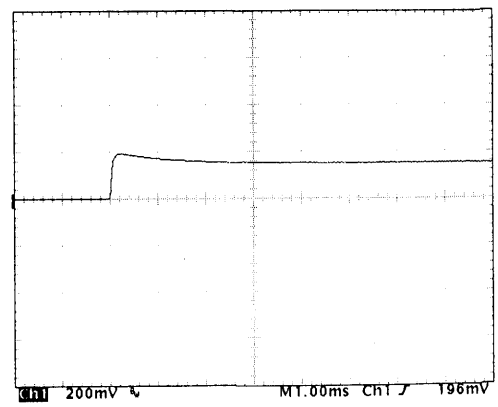




Load 50%⟷
Load 100 %

200 mV/div





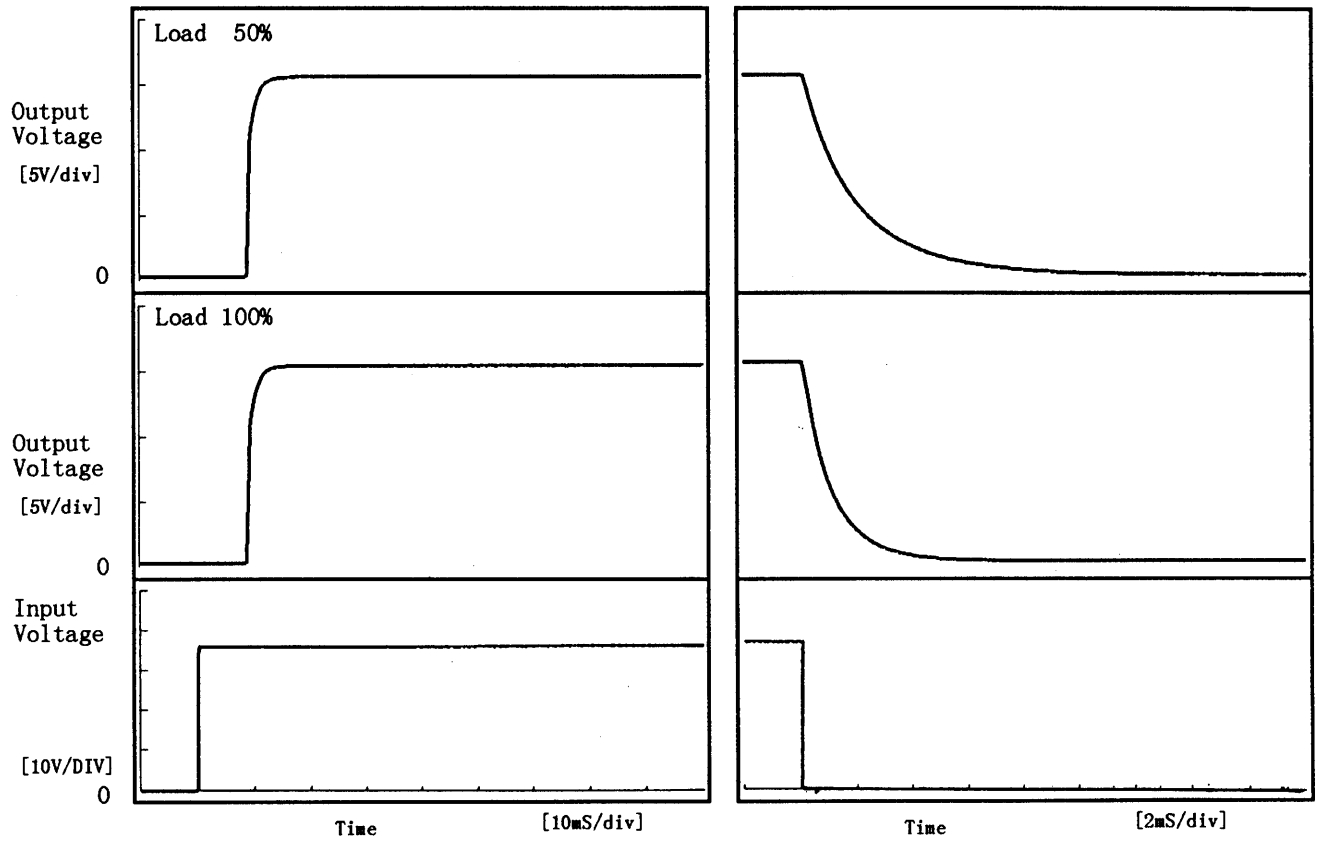
1 mS/div

COSEL

Model	ZUW104815		
Item	Rise and Fall Time 立上り、立下り時間	Temperature	25℃
		Testing Circuitry	Figure A
Object	+15V0.350A		

1. Graph

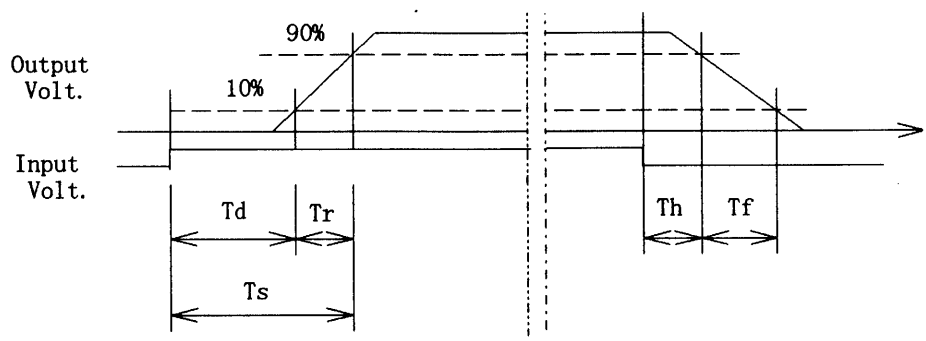
Input Volt. 36.0 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	8.90	1.75	10.65	0.35	4.87
100 %	8.90	1.90	10.80	0.22	2.48

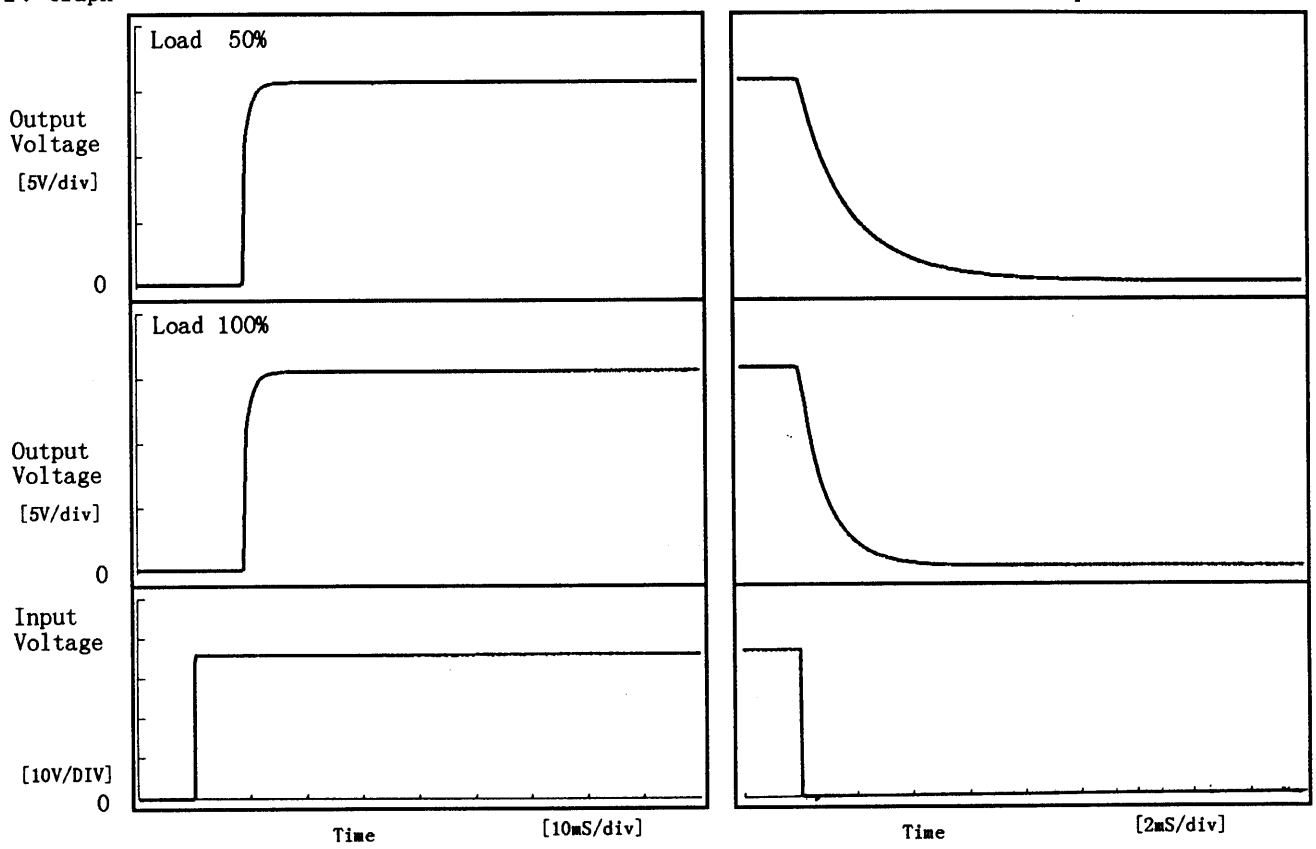


COSEL

Model	ZUW104815		
Item	Rise and Fall Time 立上り、立下り時間	Temperature	25℃
		Testing Circuitry	Figure A
Object	-15V0.350A		

1. Graph

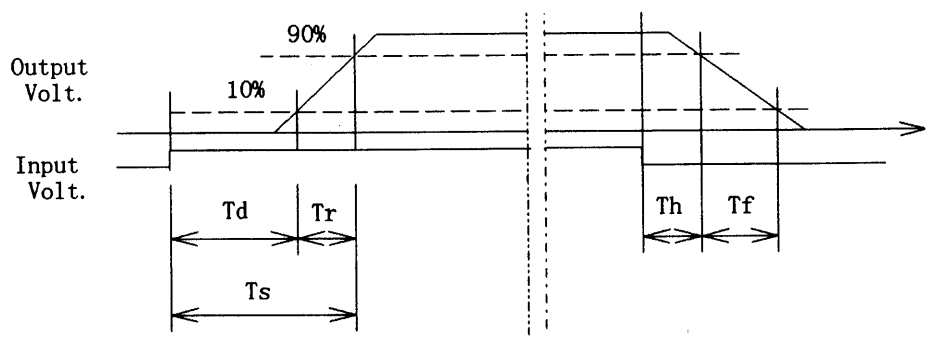
Input Volt. 36.0 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	8.90	1.60	10.50	0.35	4.35
100 %	8.90	1.75	10.65	0.23	2.24



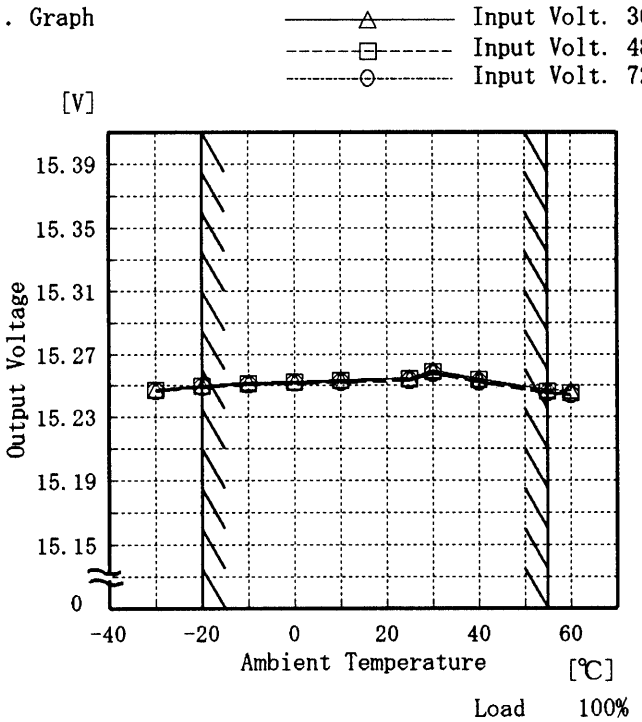
COSEL

Model	ZUW104815
Item	Ambient Temperature Drift 周囲温度変動

Testing Circuitry Figure A

Object ＋15V0.350A

1. Graph

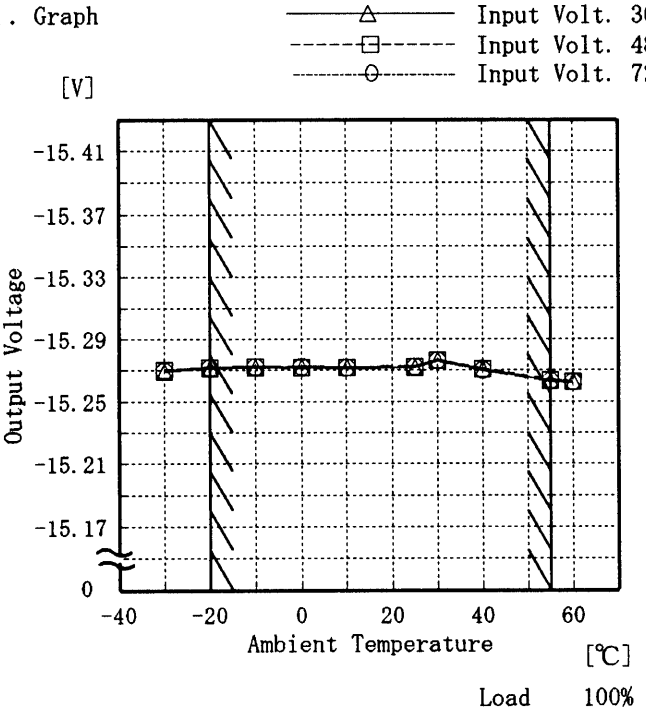


2. Values

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	15.248	15.247	15.246
-20	15.250	15.250	15.249
-10	15.252	15.251	15.251
0	15.253	15.252	15.252
10	15.254	15.253	15.252
25	15.255	15.254	15.253
30	15.260	15.259	15.258
40	15.254	15.253	15.252
55	15.247	15.246	15.245
60	15.246	15.245	15.244
70	15.23757	15.23644	15.23531

Object －15V0.350A

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	-15.269	-15.270	-15.270
-20	-15.271	-15.272	-15.272
-10	-15.272	-15.272	-15.272
0	-15.272	-15.272	-15.272
10	-15.272	-15.272	-15.272
25	-15.272	-15.272	-15.272
30	-15.276	-15.276	-15.276
40	-15.271	-15.271	-15.270
55	-15.263	-15.263	-15.263
60	-15.263	-15.263	-15.262
70	-15.25441	-15.25404	-15.25371

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。

BC－2082

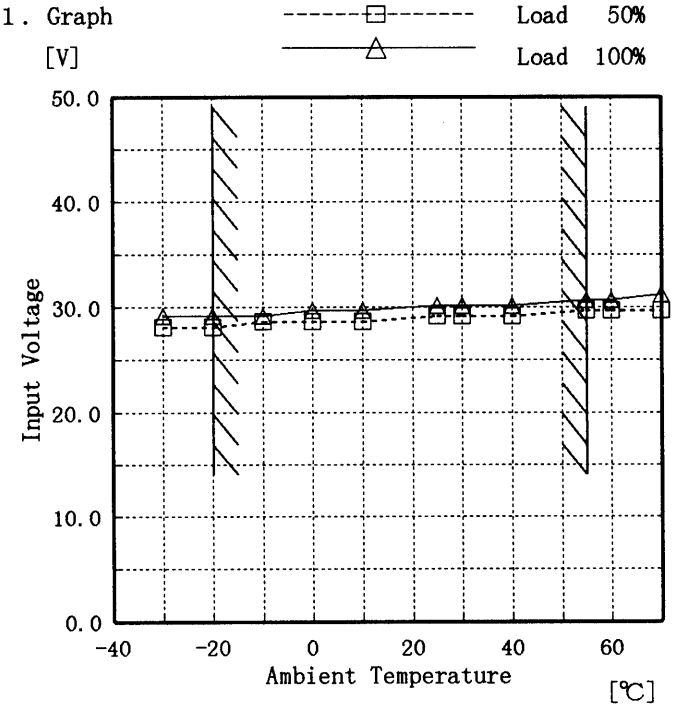
COSEL

Model	ZUW104815
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 ＋15V0.350A

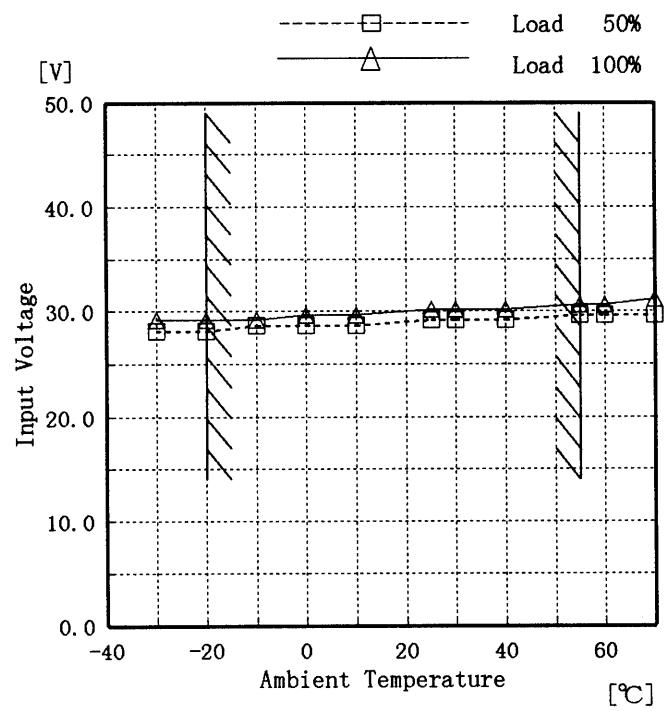
1. Graph



2. Values

Ambient Temp. [℃]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-30	28.1	29.2
-20	28.1	29.2
-10	28.6	29.2
0	28.6	29.7
10	28.6	29.7
25	29.2	30.2
30	29.2	30.2
40	29.2	30.2
55	29.7	30.7
60	29.7	30.7
70	29.7	31.2

Object －15V0.350A



2. Values

Ambient Temp. [℃]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-30	28.1	29.2
-20	28.1	29.2
-10	28.6	29.2
0	28.6	29.7
10	28.6	29.7
25	29.2	30.2
30	29.2	30.2
40	29.2	30.2
55	29.7	30.7
60	29.7	30.7
70	29.7	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。

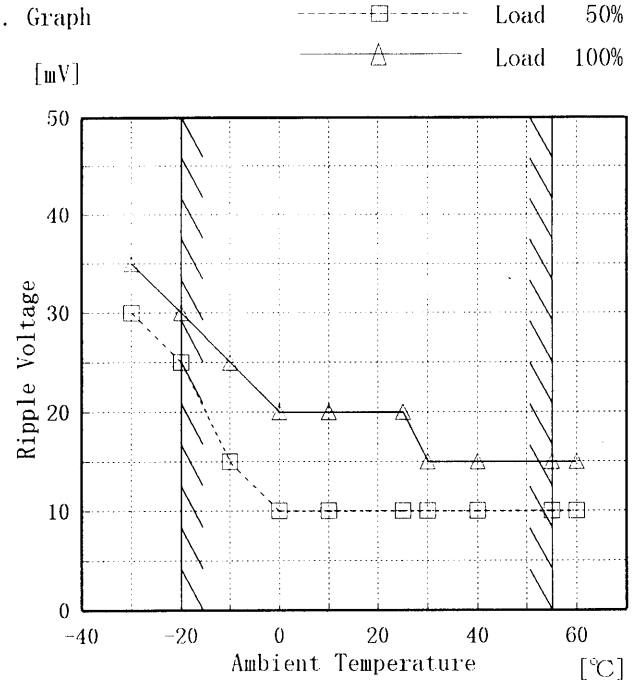
COSEL

Model	ZUW104815
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)

Testing Circuitry Figure A

Object +15V0.350A

1. Graph



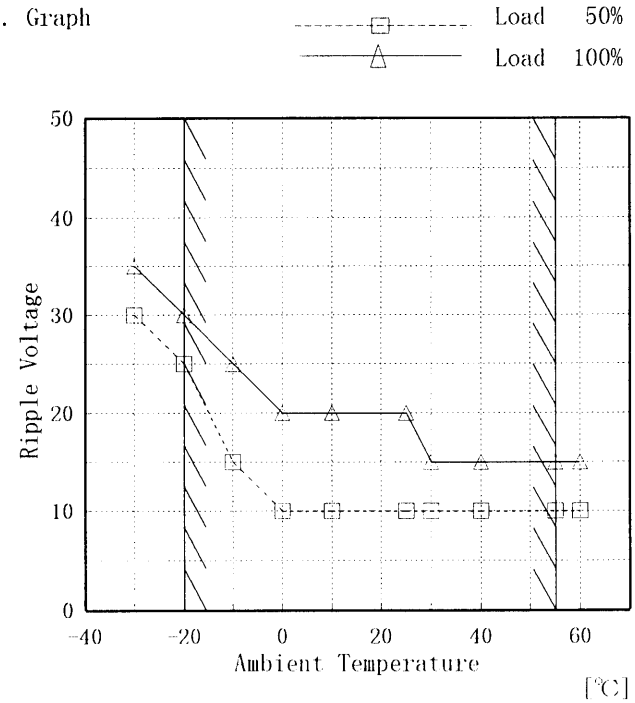
Input Volt. 36.0 V

2. Values

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

Object −15V0.350A

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	30	45
-20	30	40
-10	25	30
0	20	25
10	15	20
25	15	20
30	15	20
40	10	15
55	10	15
60	10	15
—	—	—

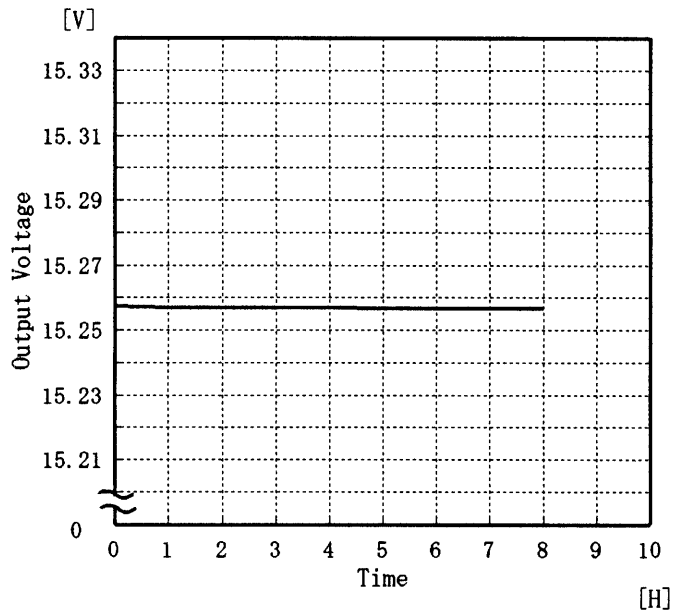
COSEL

Model	ZUW104815
Item	Time Lapse Drift 経時ドリフト

Temperature 25 ℃
Testing Circuitry Figure A

Object ＋15V0.350A

1. Graph



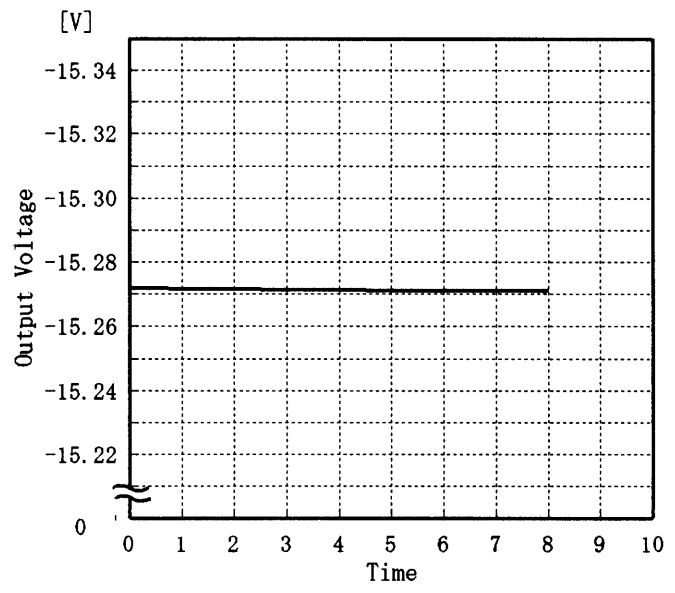
Input Volt. 48.0V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	15.258
0.5	15.257
1.0	15.257
2.0	15.257
3.0	15.257
4.0	15.257
5.0	15.257
6.0	15.257
7.0	15.257
8.0	15.257

Object －15V0.350A

1. Graph



Input Volt. 48.0V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	-15.272
0.5	-15.272
1.0	-15.272
2.0	-15.272
3.0	-15.272
4.0	-15.271
5.0	-15.271
6.0	-15.271
7.0	-15.271
8.0	-15.271

COSEL

Model	ZUW104815	
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) : 0.000～0.350 A

(AVR 2) : 0.000～0.350 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) 0.000～0.350 A

(AVR 2) 0.000～0.350 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 +15V0.350A

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ration) [%]
Maximum Voltage	25	36.0	0.350	15.256	±274	±1.9
Minimum Voltage	55	36.0	0.000	14.709		

Object −15V0.350A

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ration) [%]
Maximum Voltage	25	48.0	0.350	-15.273	±272	±1.9
Minimum Voltage	55	72.0	0.000	-14.729		

COSEL

Model	ZUW104815
Item	Condensation 結露特性
Object	+15V0.350A

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	15.374	15	35
	2	15.387	15	35
	3	15.383	15	35
Load 100 %	1	15.256	20	40
	2	15.263	20	40
	3	15.257	20	40

Input Volt. 48.0 V

COSEL

Model	ZUW104815
Item	Condensation 結露特性
Object	−15V0.350A

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	15.408	10	35
	2	15.410	10	35
	3	15.402	10	35
Load 100 %	1	15.272	15	60
	2	15.278	15	60
	3	15.278	15	60

Input Volt. 48.0 V

COSEL

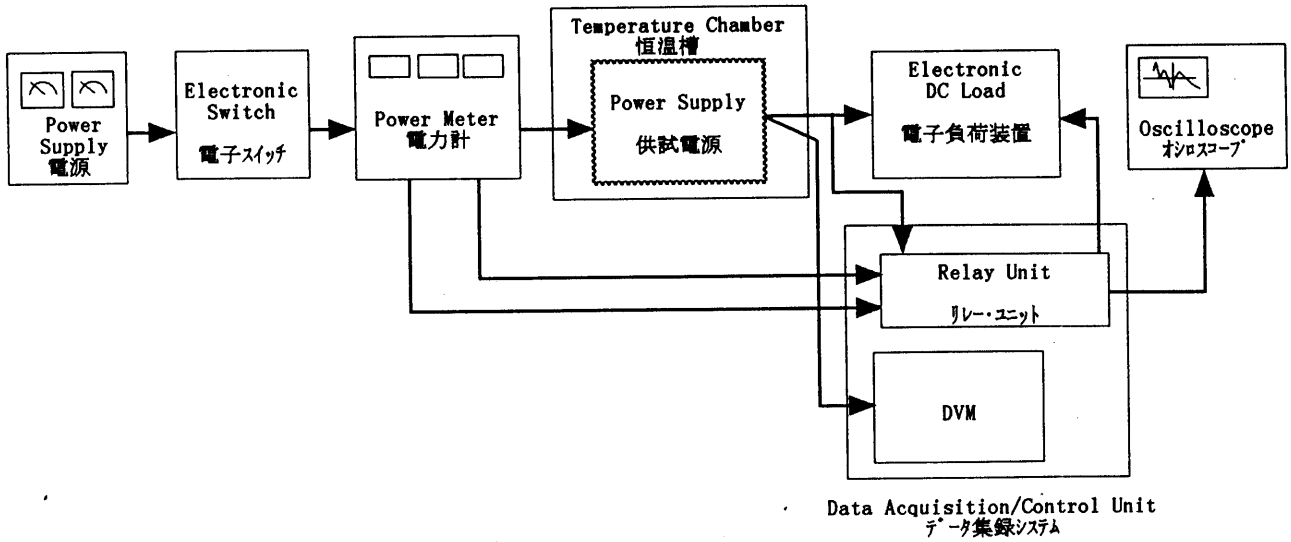


Figure A