参考資料

COSEL

TEST DATA OF ZUW1R54815

(48.0V INPUT)

Regulated DC Power Supply

Date : June 14. 1996

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Design Manager

Prepared by : K. Shimano
Design Engineer

コーセル株式会社

COSEL CO., LTD.

参考資料

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(Final Page 20)

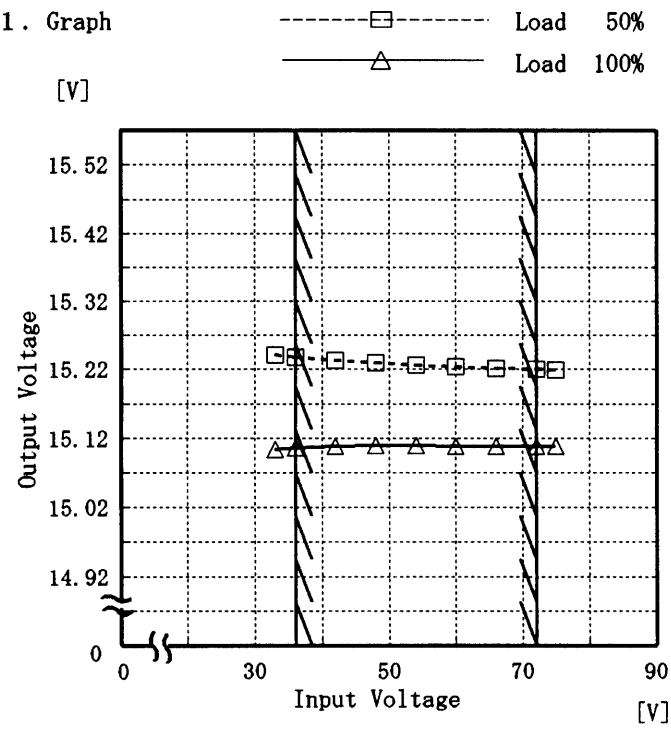
COSEL

Model	ZUW1R54815
Item	Line Regulation 静的入力変動

Temperature 25℃
Testing Circuitry Figure A

Object ＋15V0.05A

1. Graph

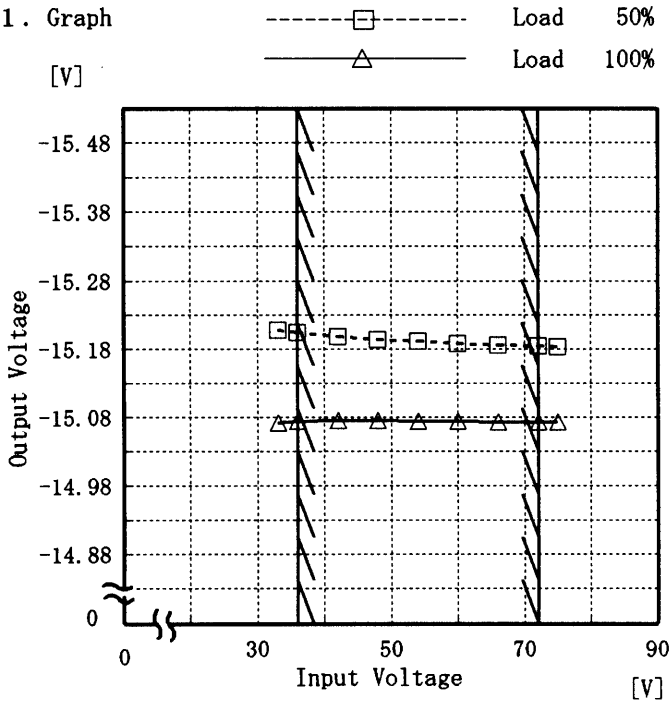


2. Values

Input Voltage [V]	Load 50% Output Volt. [V]	Load 100% Output Volt. [V]
33.0	15.241	15.104
36.0	15.238	15.106
42.0	15.233	15.109
48.0	15.230	15.109
54.0	15.227	15.109
60.0	15.224	15.109
66.0	15.222	15.108
72.0	15.220	15.108
75.0	15.219	15.108
—	—	—
—	—	—
—	—	—

Object －15V0.05A

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	-15.207	-15.072
36.0	-15.204	-15.074
42.0	-15.198	-15.075
48.0	-15.194	-15.075
54.0	-15.191	-15.075
60.0	-15.188	-15.074
66.0	-15.185	-15.073
72.0	-15.184	-15.073
75.0	-15.183	-15.073
—	—	—
—	—	—
—	—	—

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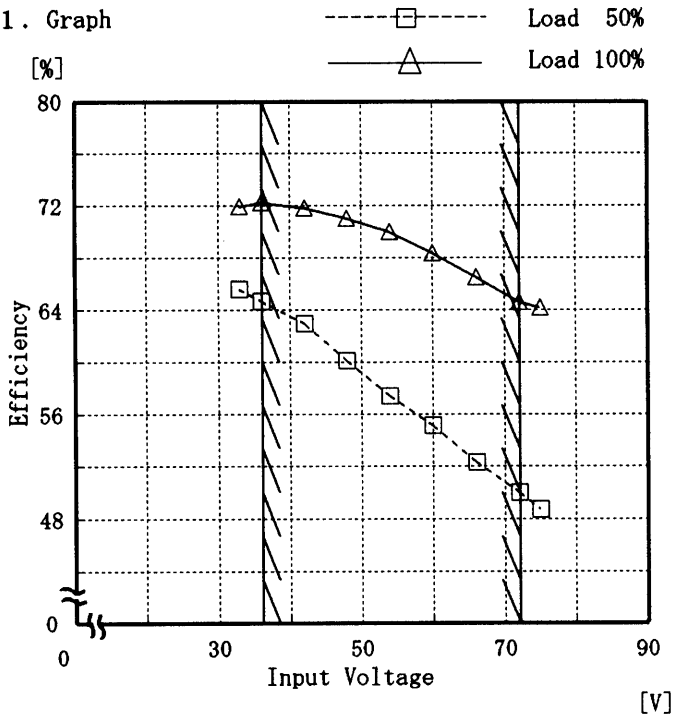
COSEL

Model	ZUW1R54815
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	65.6	71.9
36.0	64.7	72.2
42.0	63.0	71.8
48.0	60.1	71.0
54.0	57.4	70.0
60.0	55.1	68.4
66.0	52.3	66.5
72.0	50.0	64.6
75.0	48.7	64.2
—	—	—
—	—	—
—	—	—

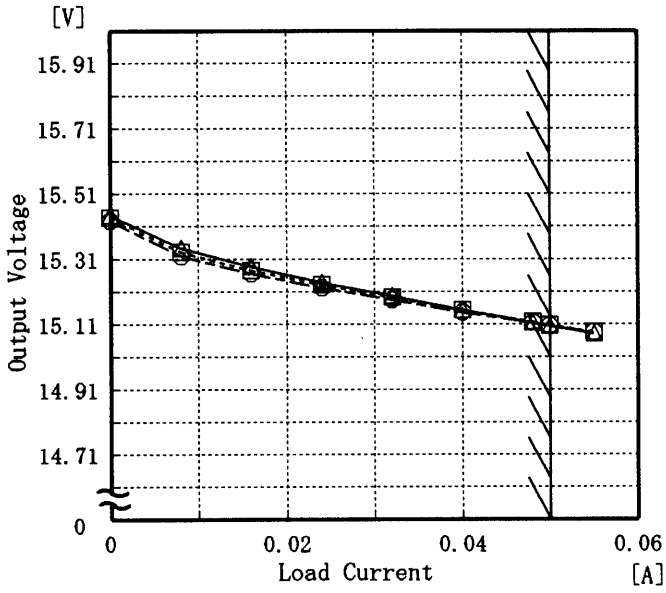
COSEL

Model	ZUW1R54815
Item	Load Regulation 静的負荷変動

Temperature 25℃
Testing Circuitry Figure A

Object ＋15V0.05A

1. Graph

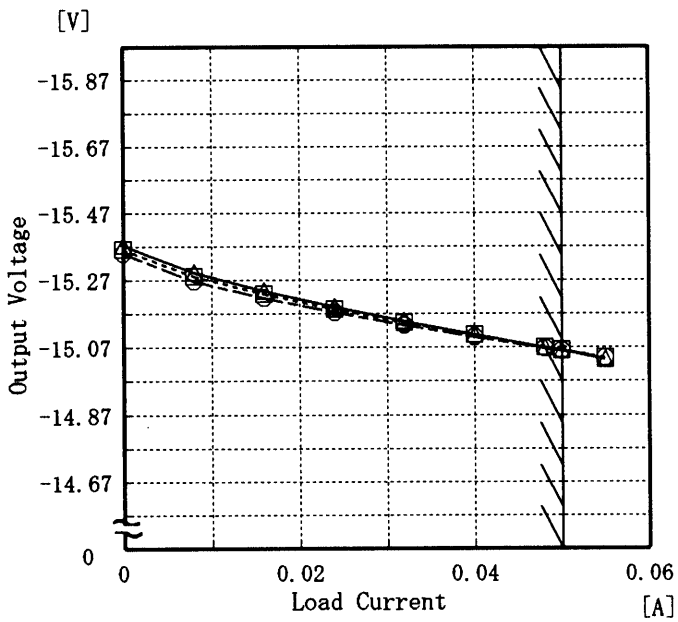


2. Values

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	15.445	15.437	15.428
0.008	15.344	15.332	15.319
0.016	15.287	15.277	15.265
0.024	15.240	15.232	15.222
0.032	15.197	15.192	15.184
0.040	15.155	15.153	15.147
0.048	15.115	15.117	15.114
0.050	15.105	15.108	15.106
0.055	15.080	15.086	15.086
—	—	—	—

Object −15V0.05A

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	-15.375	-15.364	-15.352
0.008	-15.294	-15.282	-15.270
0.016	-15.240	-15.230	-15.219
0.024	-15.194	-15.185	-15.176
0.032	-15.151	-15.146	-15.138
0.040	-15.110	-15.108	-15.103
0.048	-15.071	-15.072	-15.070
0.050	-15.061	-15.063	-15.061
0.055	-15.036	-15.041	-15.041
—	—	—	—

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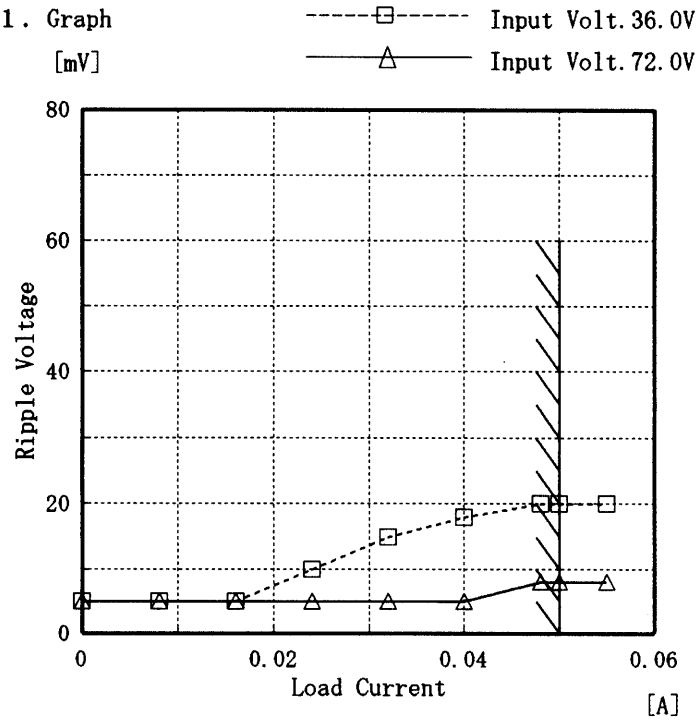
Model	ZUW1R54815
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	+15V 0.05A

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。

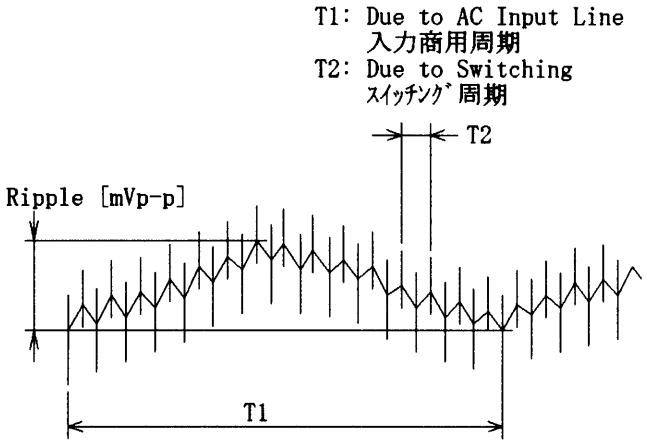


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

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
0.008	5	5
0.016	5	5
0.024	10	5
0.032	15	5
0.040	18	5
0.048	20	8
0.050	20	8
0.055	20	8
—	—	—
—	—	—

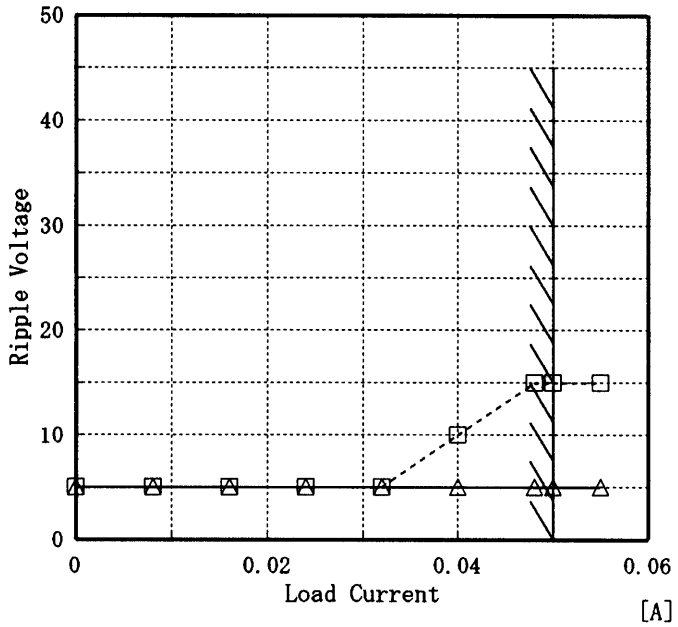
COSEL

Model	ZUW1R54815
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	−15V 0.05A

Temperature 25℃
Testing Circuitry Figure A

1. Graph

[mV]



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

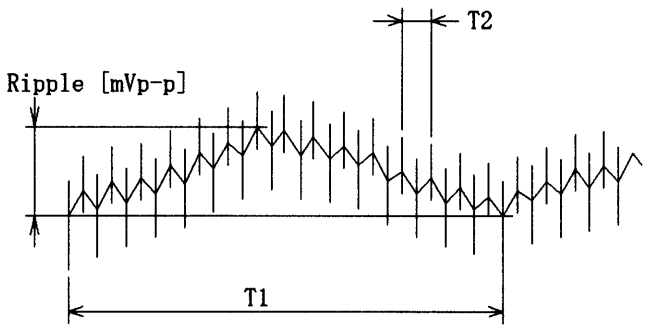


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

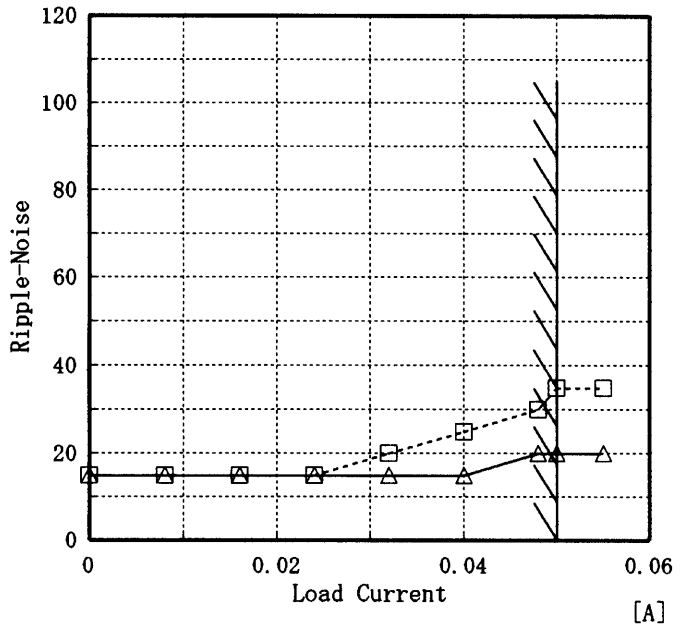
Load Current [A]	Input Volt. 36.0 [V] Ripple Output Volt. [mV]	Input Volt. 72.0 [V] Ripple Output Volt. [mV]
0.000	5	5
0.008	5	5
0.016	5	5
0.024	5	5
0.032	5	5
0.040	10	5
0.048	15	5
0.050	15	5
0.055	15	5
—	—	—
—	—	—

COSEL

Model	ZUW1R54815
Item	Ripple-Noise リップルノイズ
Object	+15V0.05A

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

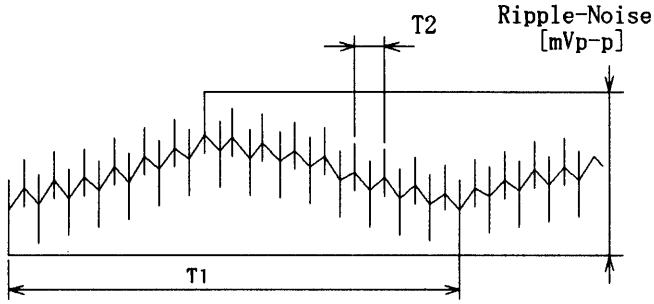


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

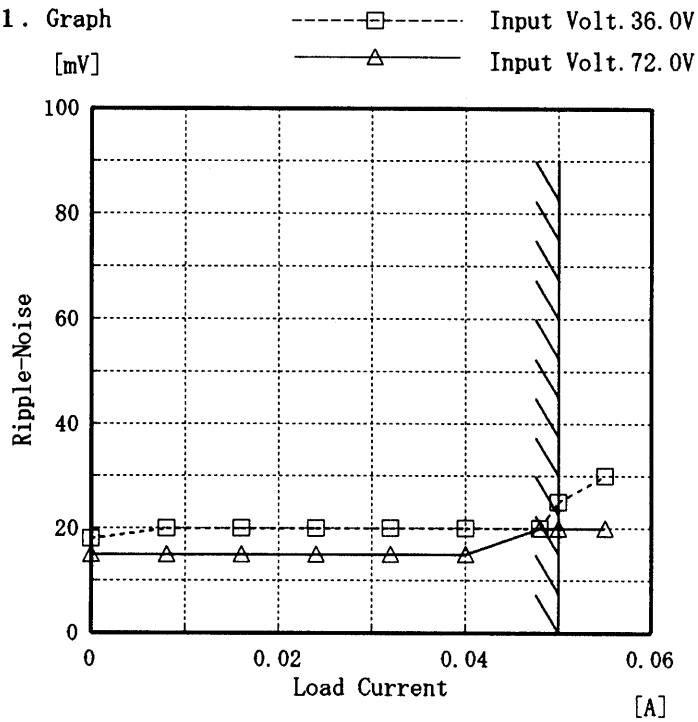
Load current [A]	Input Volt. 36.0 [V] Ripple-Noise [mV]	Input Volt. 72.0 [V] Ripple-Noise [mV]
0.000	15	15
0.008	15	15
0.016	15	15
0.024	15	15
0.032	20	15
0.040	25	15
0.048	30	20
0.050	35	20
0.055	35	20
—	—	—
—	—	—

COSEL

Model	ZUW1R54815
Item	Ripple-Noise リップルノイズ
Object	−15V0.05A

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

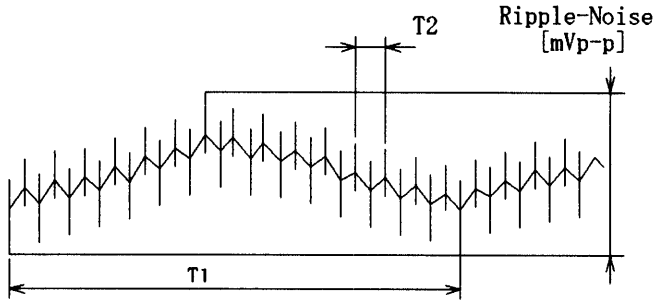


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

Load current [A]	Input Volt. 36.0 [V] Ripple-Noise [mV]	Input Volt. 72.0 [V] Ripple-Noise [mV]
0.000	18	15
0.008	20	15
0.016	20	15
0.024	20	15
0.032	20	15
0.040	20	15
0.048	20	20
0.050	25	20
0.055	30	20
—	—	—
—	—	—

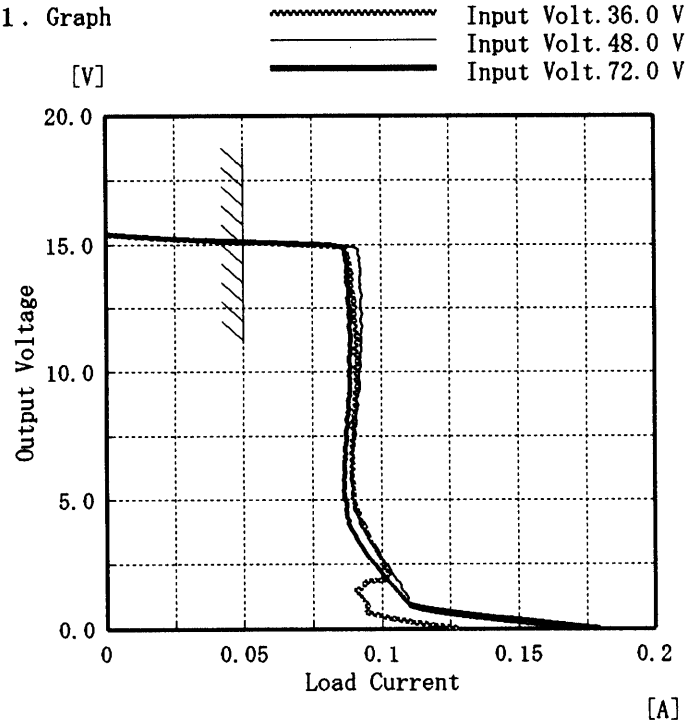
COSEL

Model	ZUW1R54815
Item	Overcurrent Protection 過電流保護

Temperature 25℃
Testing Circuitry Figure A

Object ＋15V0.05A

1. Graph

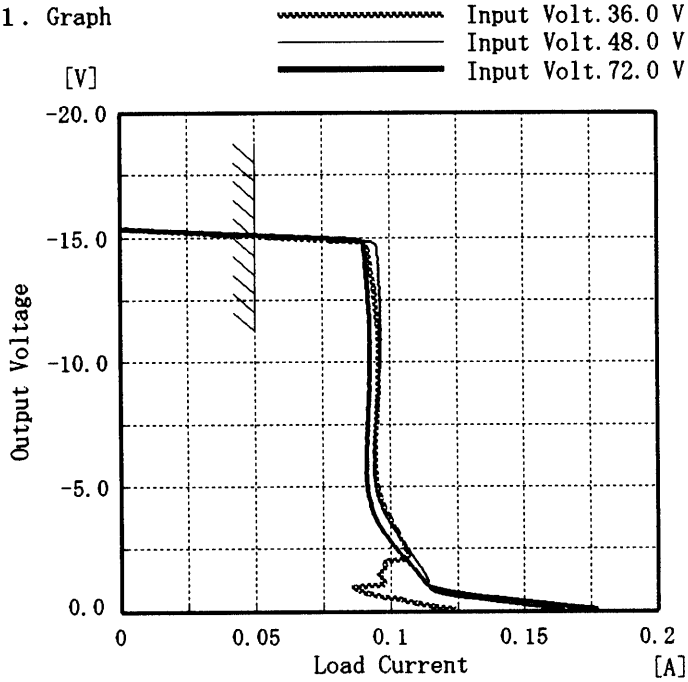


2. Values

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	0.063	0.079	0.081
14.25	0.088	0.092	0.088
13.50	0.089	0.092	0.088
12.00	0.090	0.092	0.089
10.50	0.091	0.092	0.088
9.00	0.091	0.091	0.088
7.50	0.090	0.090	0.087
6.00	0.089	0.089	0.087
4.50	0.091	0.090	0.087
3.00	0.098	0.097	0.093
1.50	0.093	0.107	0.104
0.00	0.128	0.168	0.180

Object −15V0.05A

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	0.073	0.078	0.087
-14.25	0.092	0.095	0.091
-13.50	0.093	0.096	0.091
-12.00	0.095	0.096	0.092
-10.50	0.096	0.097	0.093
-9.00	0.096	0.096	0.092
-7.50	0.095	0.095	0.092
-6.00	0.094	0.094	0.091
-4.50	0.096	0.095	0.092
-3.00	0.103	0.103	0.099
-1.50	0.097	0.112	0.110
0.00	0.125	0.165	0.178

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Model	ZUW1R24815		
Item	Dynamic Load Responce 動的負荷変動	Temperature Testing Circuitry	25℃ Figure A
Object	+15V0.05A		

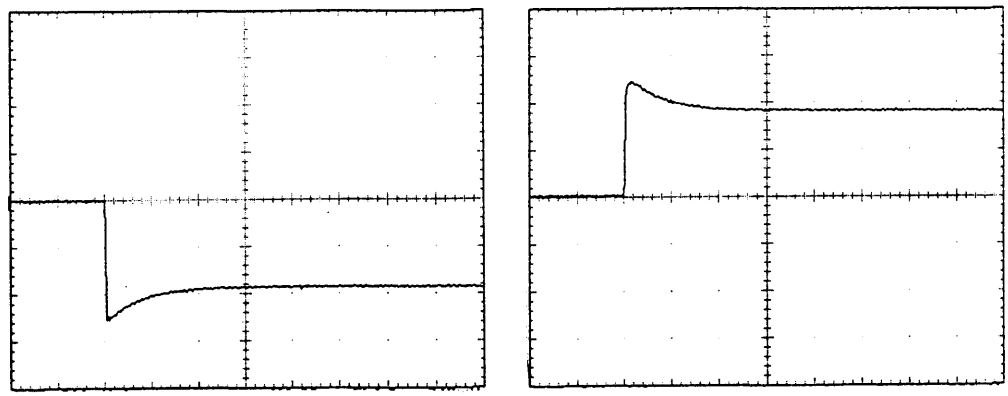
Input Volt. 48.0 V

Cycle 100 mS

Load Current

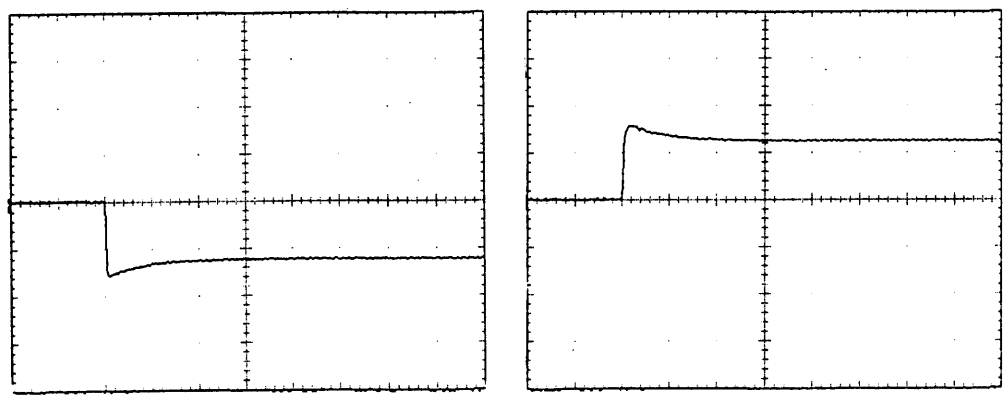
Min. Load ⟷
Load 100 %

200 mV/div



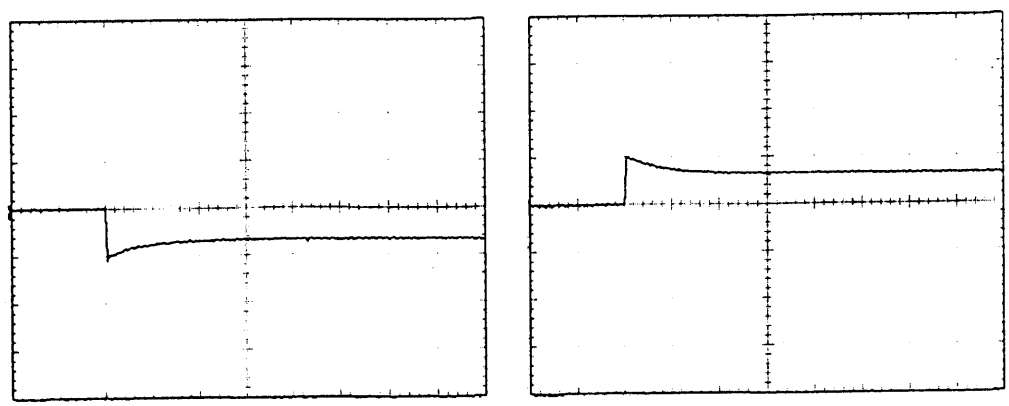
Min. Load ⟷
Load 50 %

200 mV/div



Load 50%⟷
Load 100 %

200 mV/div



1 mS/div

COSEL

Model	ZUW1R54815		
Item	Dynamic Load Responce 動的負荷変動	Temperature Testing Circuitry	25℃ Figure A
Object	−15V0.05A		

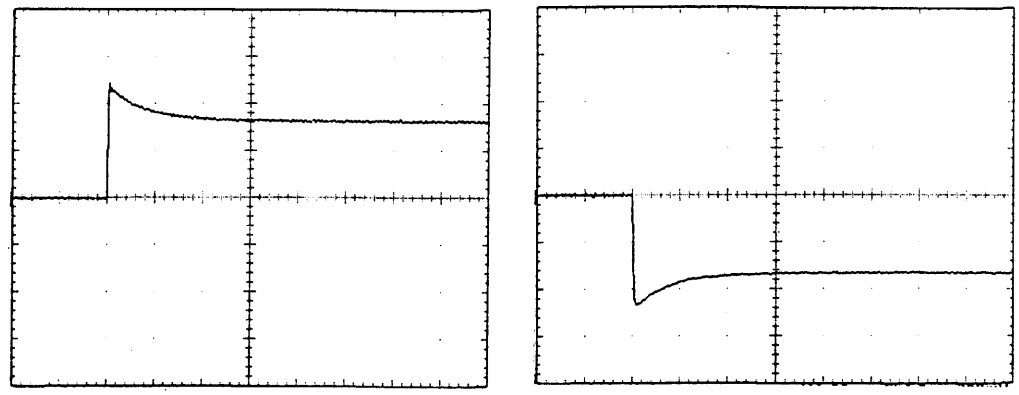
Input Volt. 48.0 V

Cycle 100 mS

Load Current

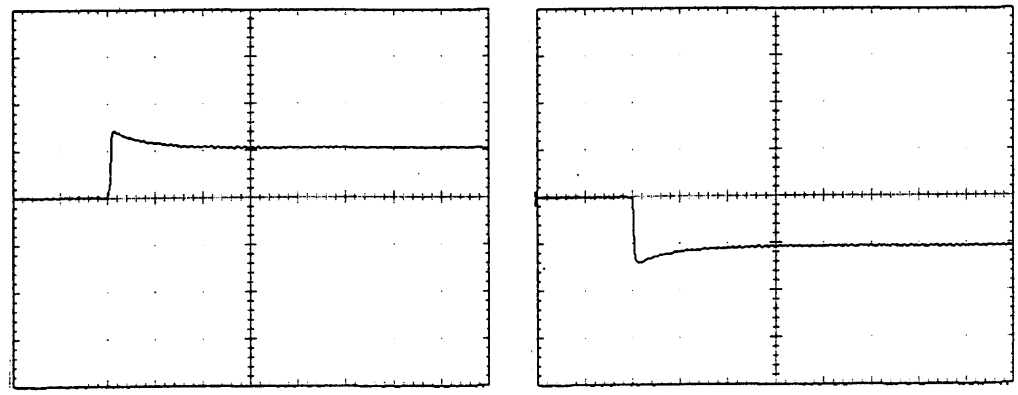
Min. Load ⟷
Load 100 %

200 mV/div



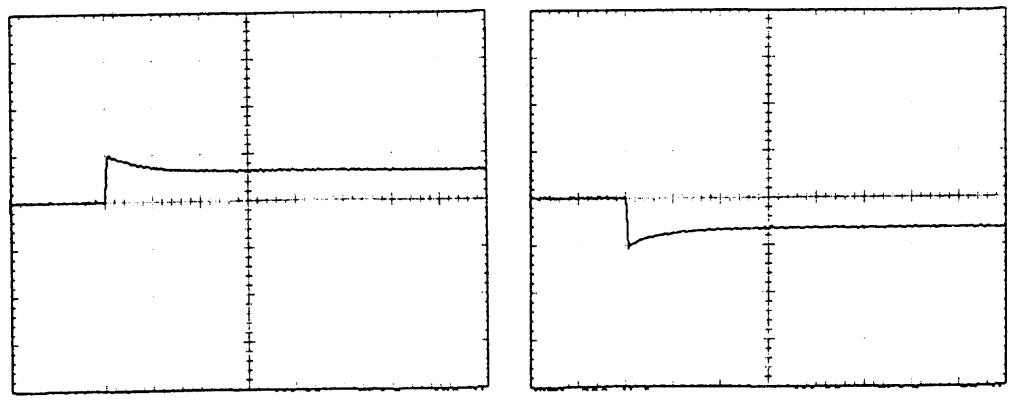
Min. Load ⟷
Load 50 %

200 mV/div



Load 50%⟷
Load 100 %

200 mV/div



1 mS/div

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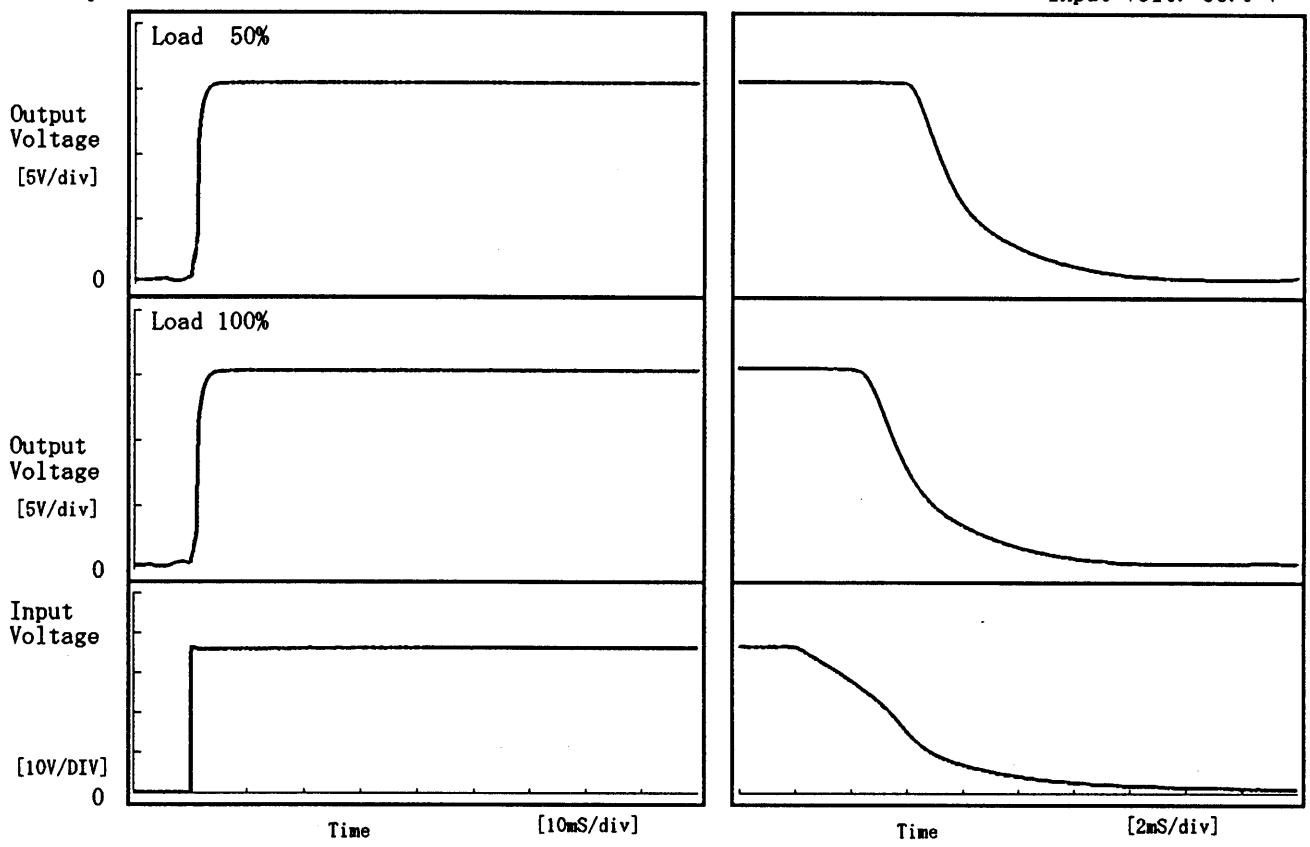
COSEL

Model	ZUW1R54815		
Item	Rise and Fall Time 立上り、立下り時間	Temperature Testing Circuitry	25℃ Figure A
Object	+15V0.05A		

1. Graph

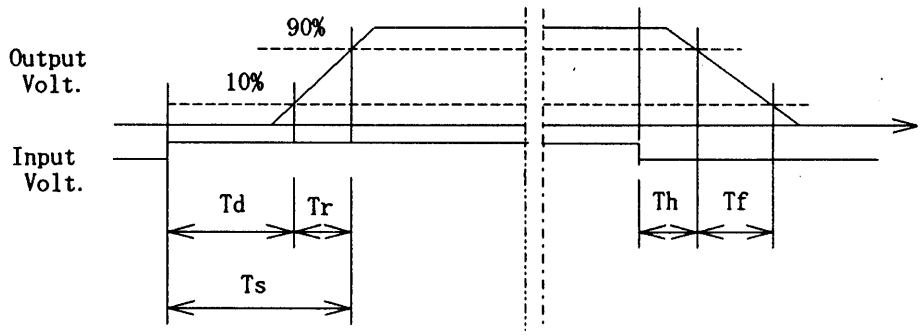
Input Volt. 36.0 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	0.10	1.85	1.95	4.49	5.05
100 %	0.15	2.00	2.15	2.84	5.27

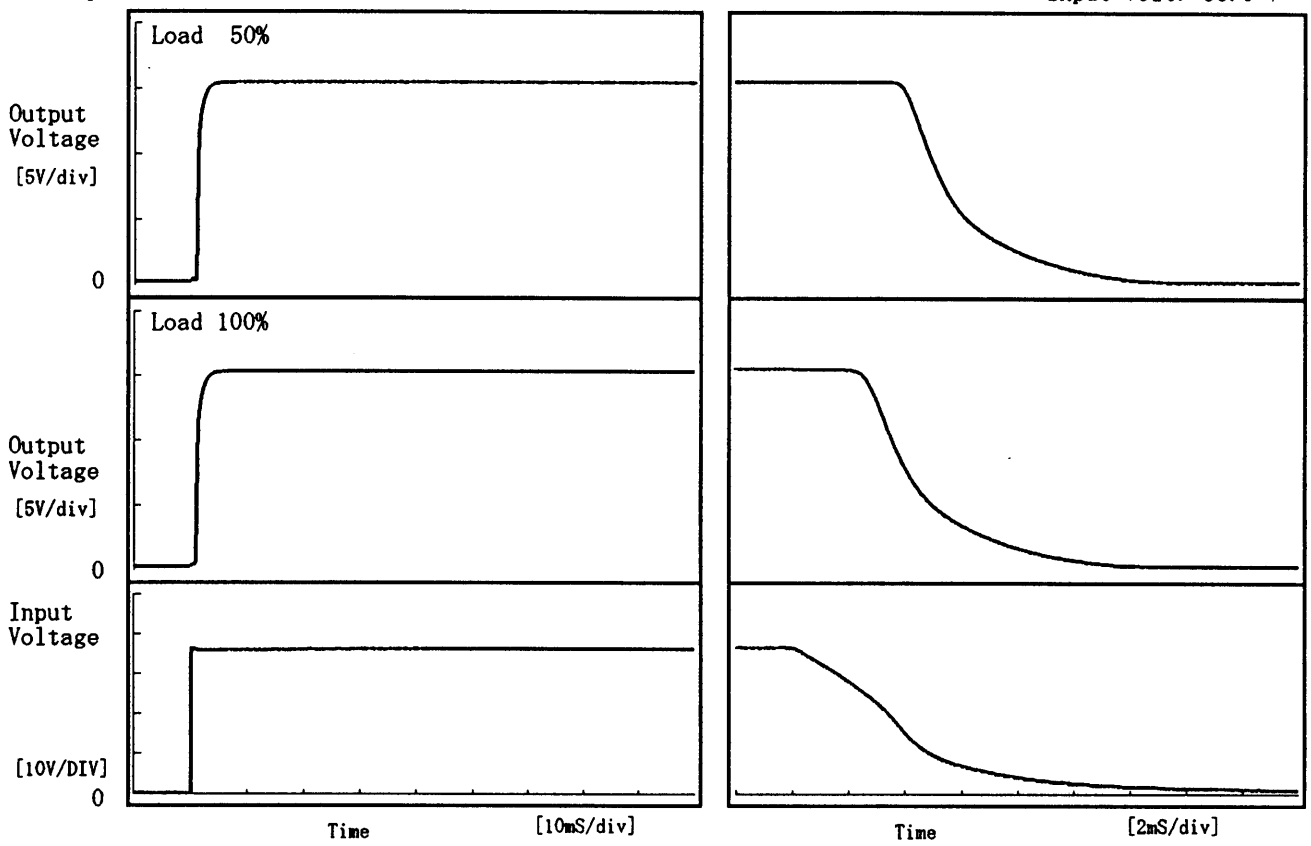


COSEL

Model	ZUW1R54815		
Item	Rise and Fall Time 立上り、立下り時間	Temperature Testing Circuitry	25℃ Figure A
Object	-15V0.05A		

1. Graph

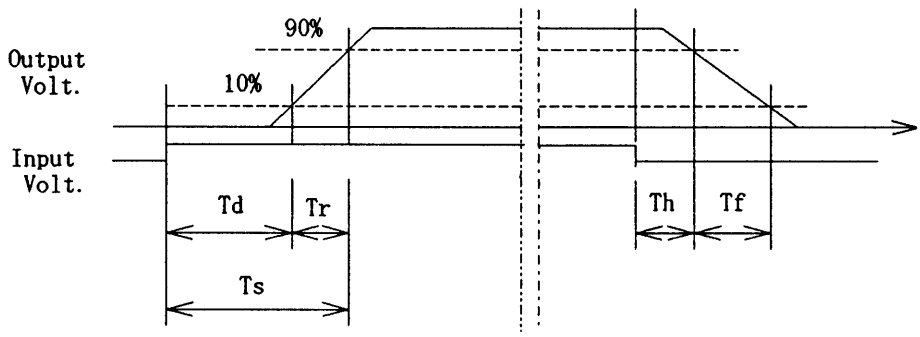
Input Volt. 36.0 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	0.90	1.10	2.00	4.22	4.94
100 %	0.85	1.25	2.10	2.84	5.15



BC−2022

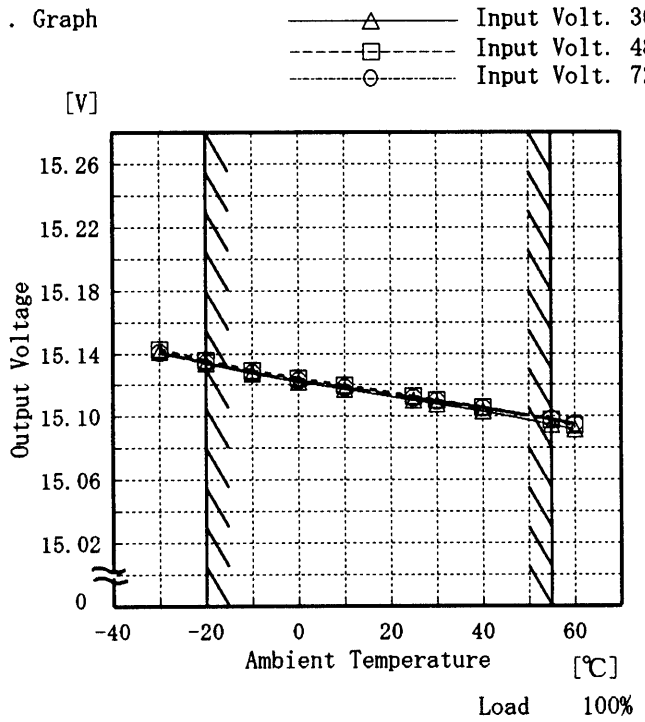
COSEL

Model	ZUW1R54815
Item	Ambient Temperature Drift 周囲温度変動

Testing Circuitry Figure A

Object ＋15V0.05A

1. Graph

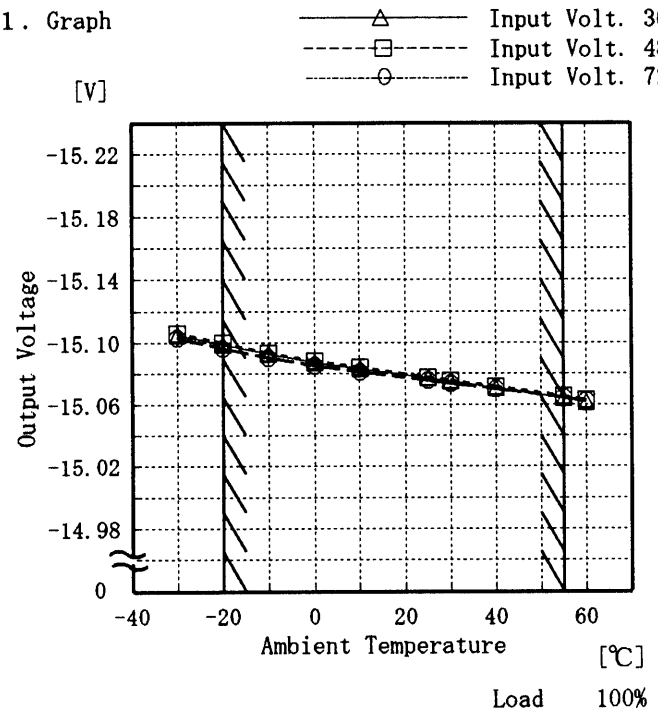


2. Values

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	15.141	15.143	15.141
-20	15.134	15.136	15.134
-10	15.127	15.129	15.128
0	15.122	15.124	15.123
10	15.117	15.120	15.118
25	15.110	15.113	15.112
30	15.108	15.110	15.109
40	15.103	15.105	15.105
55	15.094	15.098	15.098
60	15.091	15.094	15.095
—	—	—	—

Object −15V0.05A

1. Graph



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

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	-15.105	-15.106	-15.103
-20	-15.099	-15.100	-15.097
-10	-15.093	-15.093	-15.090
0	-15.088	-15.088	-15.085
10	-15.083	-15.084	-15.081
25	-15.077	-15.078	-15.075
30	-15.075	-15.076	-15.073
40	-15.071	-15.072	-15.070
55	-15.064	-15.065	-15.064
60	-15.061	-15.063	-15.062
—	—	—	—

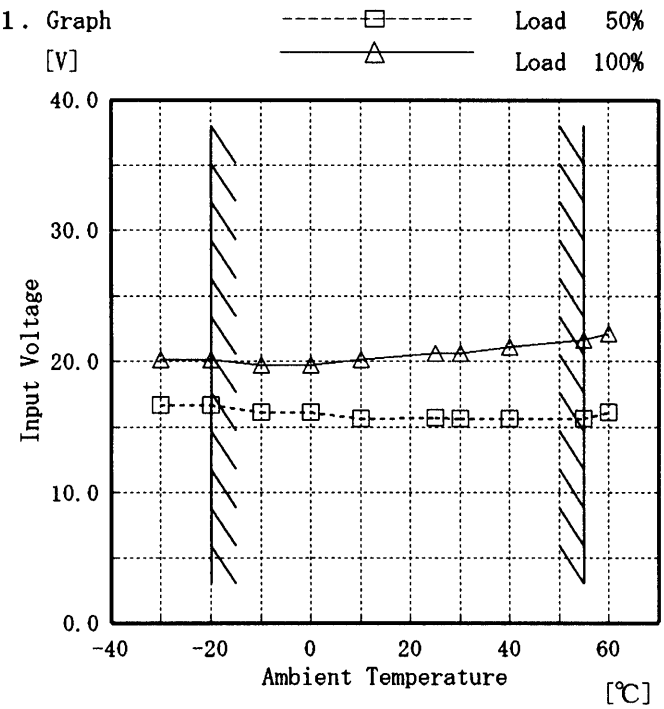
COSEL

Model	ZUW1R54815
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 ＋15V0.05A

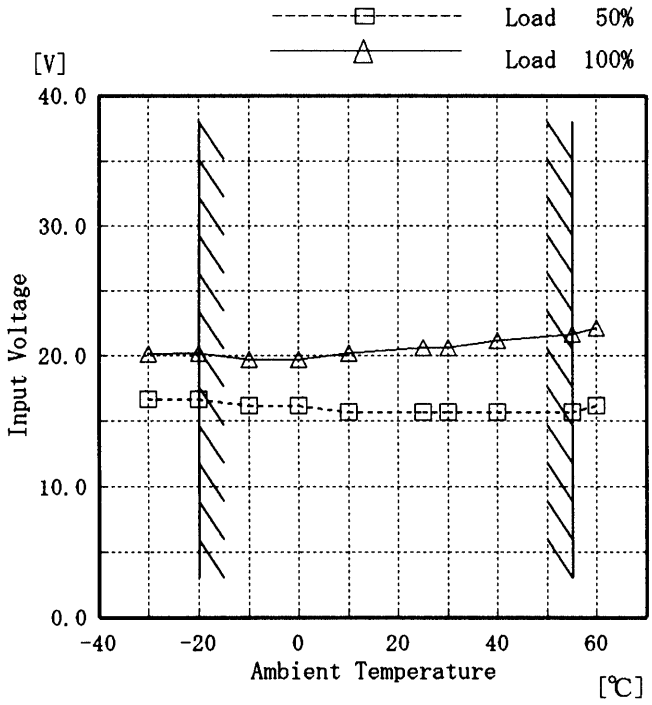
1. Graph



2. Values

Ambient Temp. [℃]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-30	16.7	20.1
-20	16.7	20.2
-10	16.2	19.7
0	16.2	19.7
10	15.7	20.2
25	15.7	20.6
30	15.7	20.6
40	15.7	21.1
55	15.7	21.6
60	16.2	22.1
—	—	—

Object −15V0.05A



2. Values

Ambient Temp. [℃]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-30	16.7	20.1
-20	16.7	20.2
-10	16.2	19.7
0	16.2	19.7
10	15.7	20.2
25	15.7	20.6
30	15.7	20.6
40	15.7	21.1
55	15.7	21.6
60	16.2	22.1
—	—	—

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。

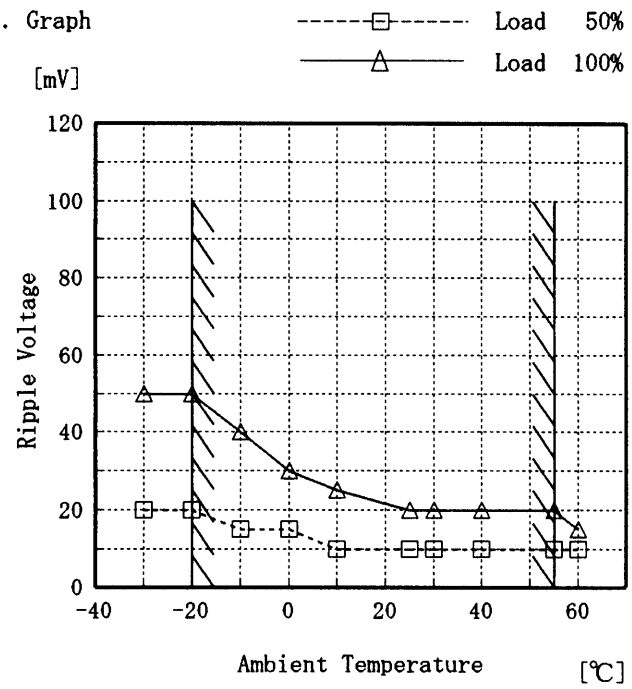
COSEL

Model	ZUW1R54815
Item	Ripple Voltage (by Ambient Temp.) リップル電圧（周囲温度特性）

Testing Circuitry Figure A

Object ＋15V0.05A

1. Graph



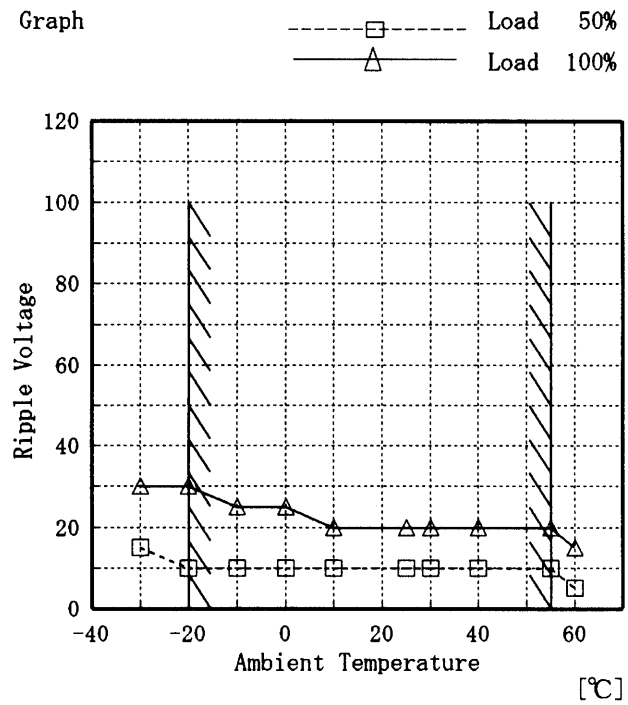
Input Volt. 36.0 V

2. Values

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

Object −15V0.05A

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

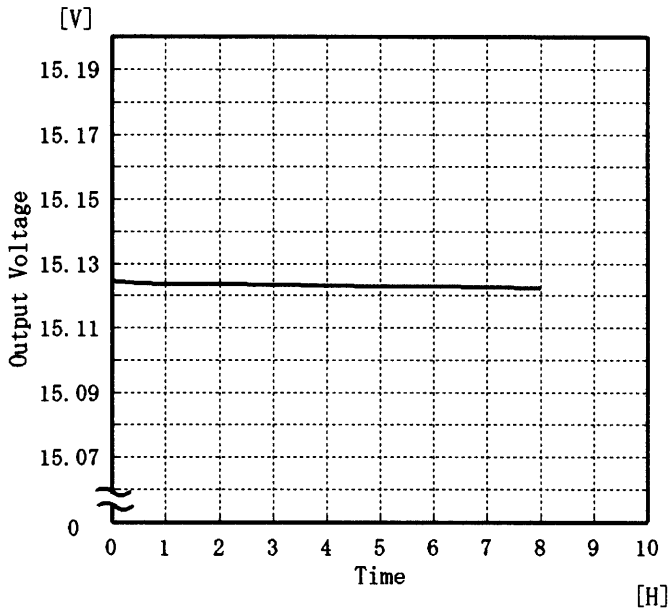
COSEL

Model	ZUW1R54815
Item	Time Lapse Drift 経時ドリフト

Temperature 25 ℃
Testing Circuitry Figure A

Object ＋15V0.05A

1. Graph



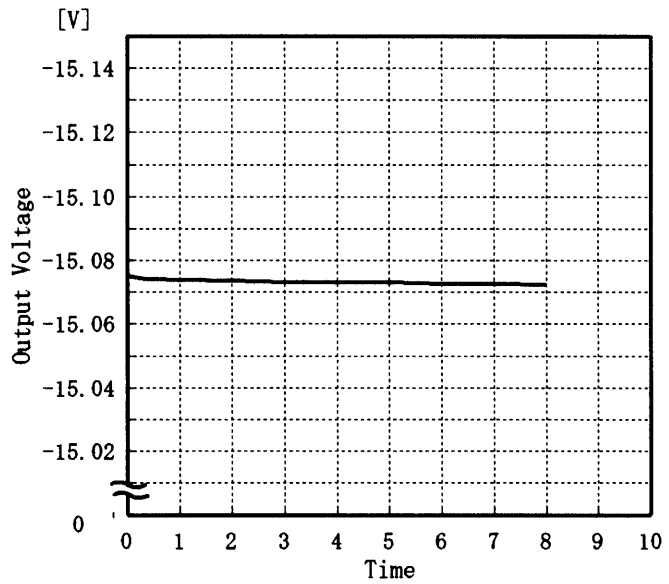
Input Volt. 48.0V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	15.124
0.5	15.124
1.0	15.124
2.0	15.124
3.0	15.124
4.0	15.123
5.0	15.123
6.0	15.123
7.0	15.123
8.0	15.123

Object －15V0.05A

1. Graph



Input Volt. 48.0V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	-15.076
0.5	-15.074
1.0	-15.074
2.0	-15.074
3.0	-15.073
4.0	-15.073
5.0	-15.073
6.0	-15.073
7.0	-15.073
8.0	-15.073

BC－2022

COSEL

Model	ZUW1R54815
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) : 0.00～0.05 A

(AVR 2) : 0.00～0.05 A

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

* 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) 0.00～0.05 A

(AVR 2) 0.00～0.05 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

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

Object ＋15V0.05A

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ration) [%]
Maximum Voltage	-20	48.0	0.05	15.133	±167	±1.2
Minimum Voltage	55	36.0	0.00	14.800		

Object －15V0.05A

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ration) [%]
Maximum Voltage	-20	48.0	0.05	-15.098	±175	±1.2
Minimum Voltage	55	36.0	0.00	-14.748		

COSEL

Model	ZUW1R54815
Item	Condensation 結露特性
Object	+15V 0.05A

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	15.125	10	15
	2	15.126	10	15
	3	15.124	10	15
Load 100 %	1	15.105	20	25
	2	15.106	20	25
	3	15.105	20	25

Input Volt. 48.0 V

COSEL

Model	ZUW1R54815
Item	Condensation 結露特性
Object	−15V 0.05A

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	-15.123	10	15
	2	-15.128	10	15
	3	-15.122	10	15
Load 100 %	1	-15.106	20	25
	2	-15.103	20	25
	3	-15.105	20	25

Input Volt. 48.0 V

COSEL

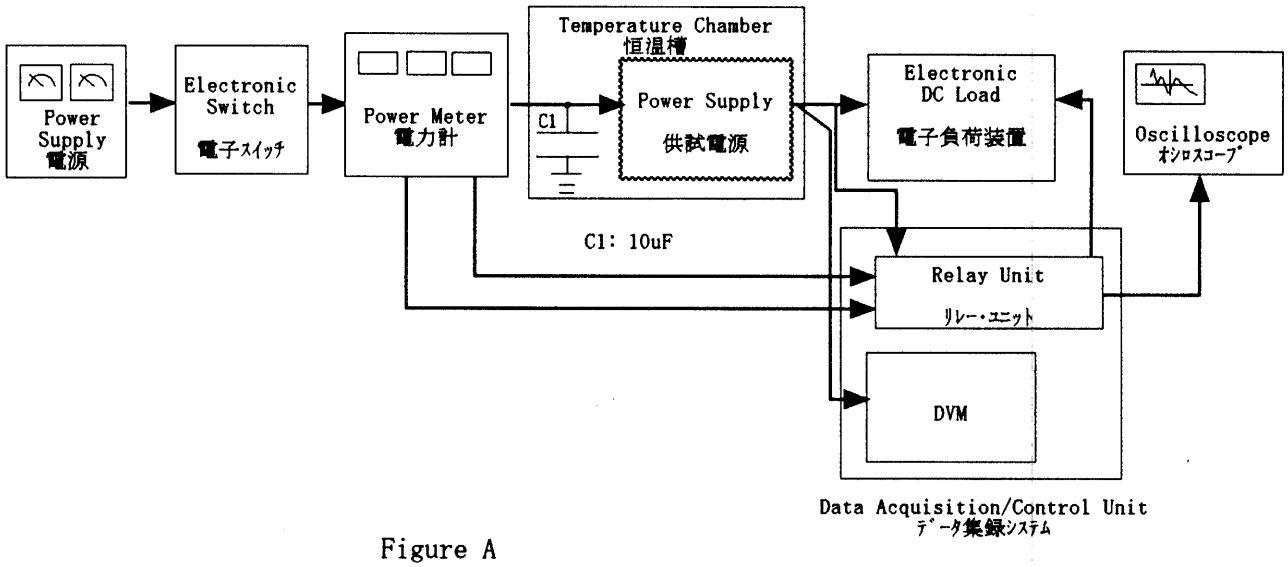


Figure A