参考資料

COSEL

TEST DATA OF ZUW100512

(5.0V INPUT)

Regulated DC Power Supply

Date : Sep 21. 1996

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Design Manager

Prepared by : M. Takashima
Design Engineer

コーセル株式会社

COSEL CO.,LTD.

参考資料

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(Final Page 20)

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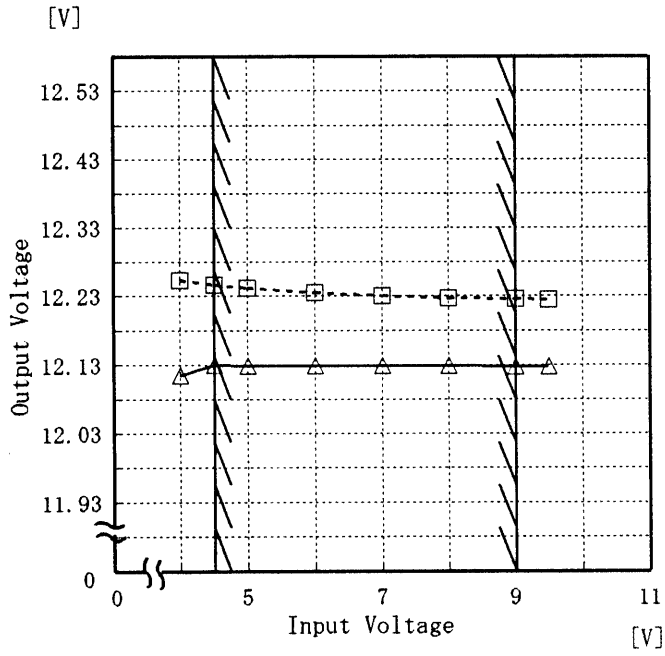
Model	ZUW100512
Item	Line Regulation 静的入力変動

Temperature 25℃
Testing Circuitry Figure A

Object +12V0.350A

1. Graph

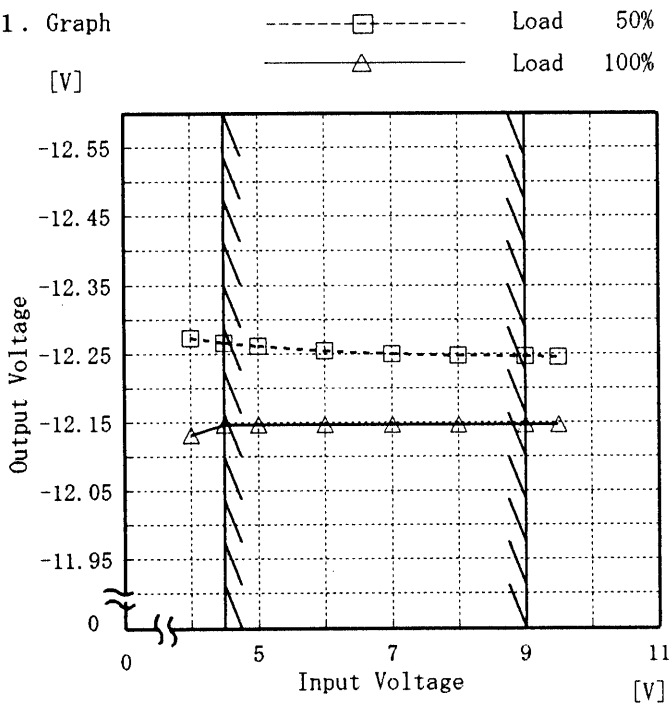


2. Values

Input Voltage [V]	Load 50% Output Volt. [V]	Load 100% Output Volt. [V]
4.0	12.254	12.115
4.5	12.247	12.129
5.0	12.242	12.129
6.0	12.235	12.129
7.0	12.231	12.128
8.0	12.228	12.128
9.0	12.226	12.128
9.5	12.225	12.128
—	—	—
—	—	—
—	—	—
—	—	—

Object −12V0.350A

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]
4.0	-12.273	-12.132
4.5	-12.266	-12.146
5.0	-12.261	-12.146
6.0	-12.254	-12.146
7.0	-12.250	-12.146
8.0	-12.247	-12.146
9.0	-12.246	-12.147
9.5	-12.245	-12.146
—	—	—
—	—	—
—	—	—
—	—	—

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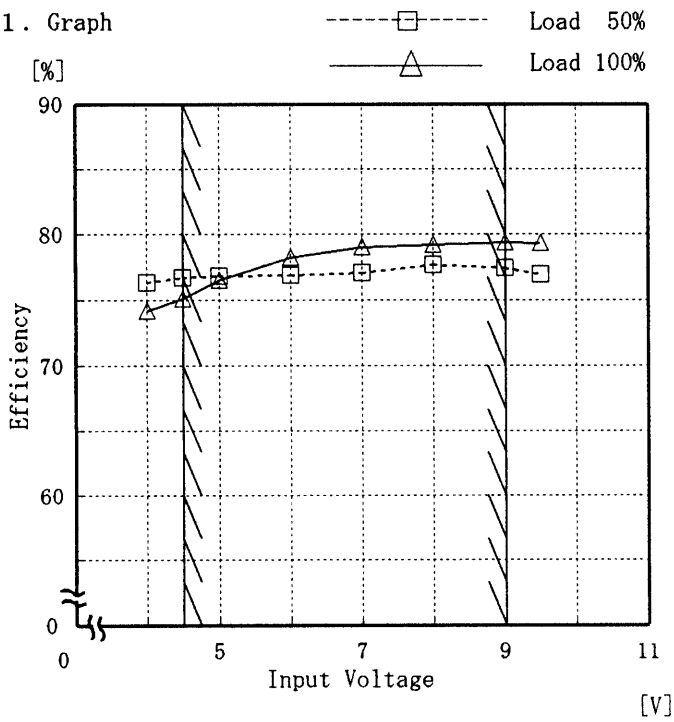
COSEL

Model	ZUW100512
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 [%]
4.0	76.3	74.2
4.5	76.7	75.1
5.0	76.8	76.5
6.0	76.9	78.2
7.0	77.1	79.0
8.0	77.7	79.2
9.0	77.4	79.4
9.5	76.9	79.3
—	—	—
—	—	—
—	—	—
—	—	—

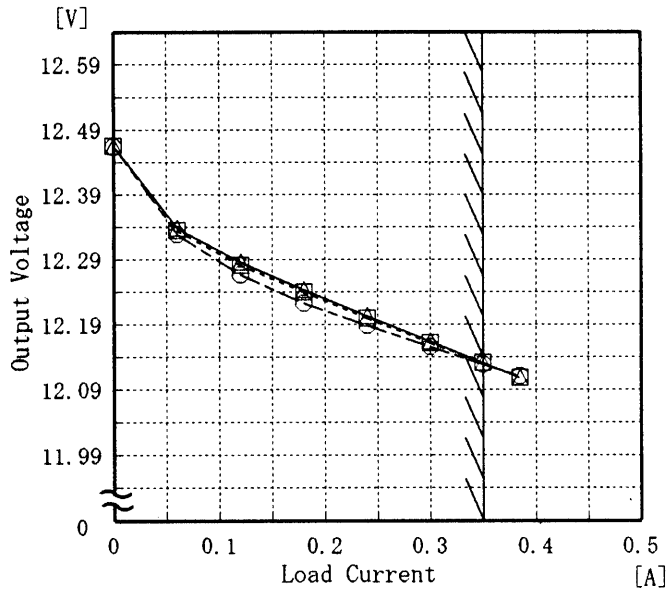
COSEL

Model	ZUW100512
Item	Load Regulation 静的負荷変動

Temperature 25℃
Testing Circuitry Figure A

Object +12V0.35A

1. Graph

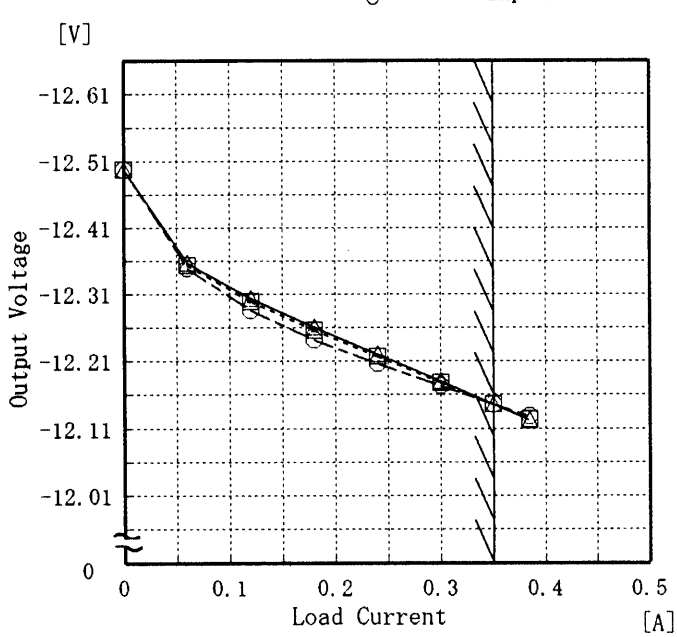


2. Values

Load Current [A]	Input Volt. 4.5[V] Output Volt. [V]	Input Volt. 5.0[V] Output Volt. [V]	Input Volt. 9.0[V] Output Volt. [V]
0.000	12.466	12.466	12.465
0.060	12.338	12.335	12.329
0.120	12.286	12.281	12.267
0.180	12.244	12.239	12.223
0.240	12.204	12.200	12.188
0.300	12.164	12.162	12.156
0.350	12.131	12.131	12.129
0.385	12.108	12.108	12.111
—	—	—	—
—	—	—	—

Object −12V0.35A

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. 4.5[V] Output Volt. [V]	Input Volt. 5.0[V] Output Volt. [V]	Input Volt. 9.0[V] Output Volt. [V]
0.000	-12.498	-12.498	-12.499
0.060	-12.358	-12.355	-12.350
0.120	-12.305	-12.300	-12.287
0.180	-12.261	-12.257	-12.242
0.240	-12.221	-12.218	-12.207
0.300	-12.180	-12.179	-12.174
0.350	-12.147	-12.147	-12.147
0.385	-12.123	-12.124	-12.128
—	—	—	—
—	—	—	—

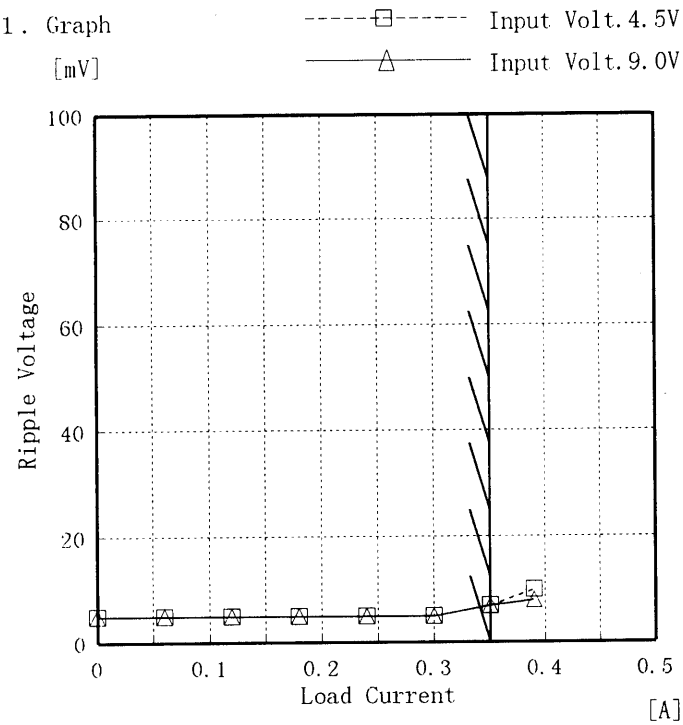
BC−2075

COSEL

Model	ZUW100512
Item	Ripple Voltage (by Load Current) リップル電圧(負荷電流特性)
Object	+12V0.35A

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

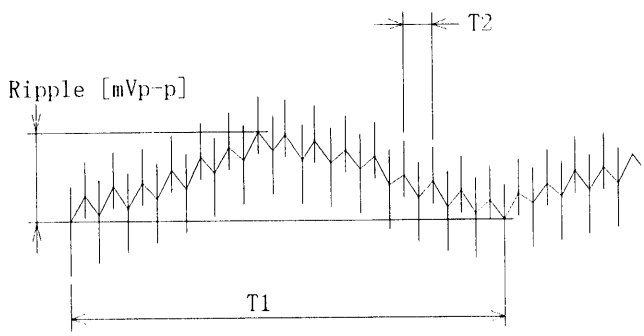


Fig. Complex Ripple Wave Form
図　リップル波形詳細図

2. Values

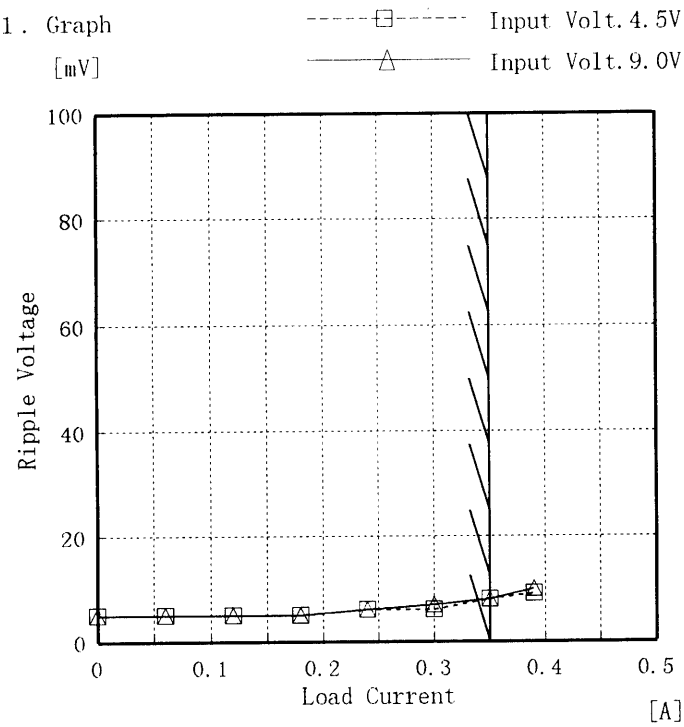
Load Current [A]	Input Volt. 4.5 [V] Ripple Output Volt. [mV]	Input Volt. 9.0 [V] Ripple Output Volt. [mV]
0.00	5	5
0.06	5	5
0.12	5	5
0.18	5	5
0.24	5	5
0.30	5	5
0.35	7	7
0.39	10	8
—	—	—
—	—	—
—	—	—

COSEL

Model	ZUW100512
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	-12V0.35A

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

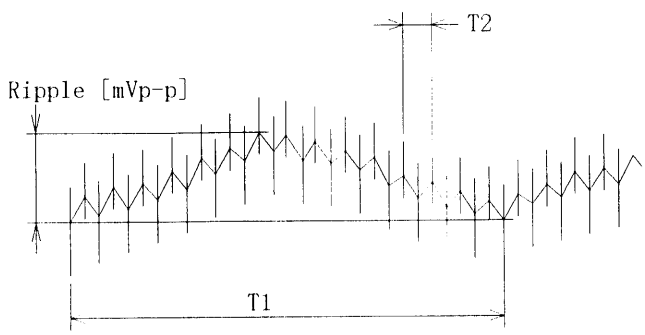


Fig. Complex Ripple Wave Form
図　リップル波形詳細図

2. Values

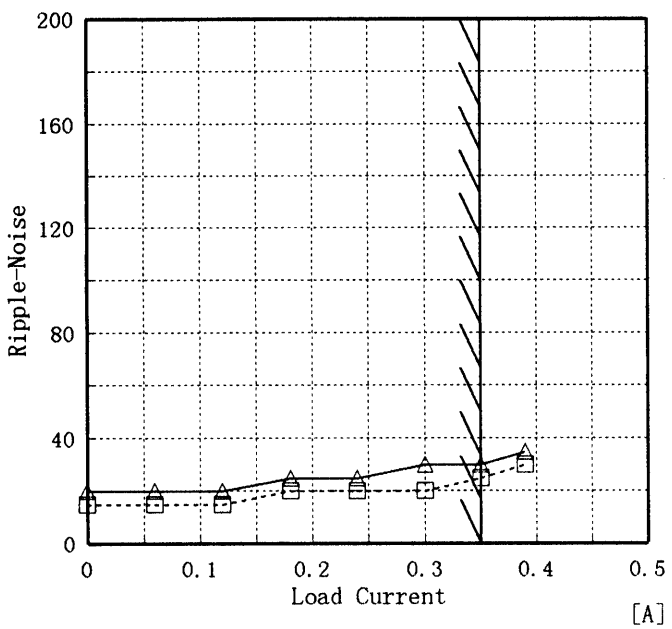
Load Current [A]	Input Volt. 4.5 [V] Ripple Output Volt. [mV]	Input Volt. 9.0 [V] Ripple Output Volt. [mV]
0.00	5	5
0.06	5	5
0.12	5	5
0.18	5	5
0.24	6	6
0.30	6	7
0.35	8	8
0.39	9	10
—	—	—
—	—	—
—	—	—

COSEL

Model	ZUW100512
Item	Ripple-Noise リップルノイズ
Object	+12V0.350A

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

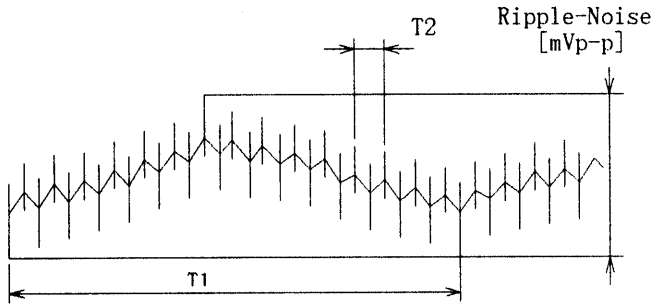


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

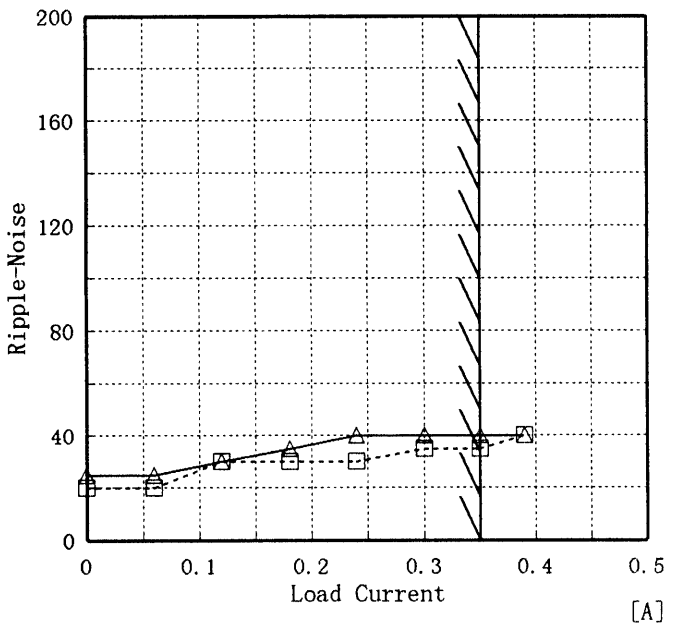
Load current [A]	Input Volt. 4.5 [V] Ripple-Noise [mV]	Input Volt. 9.0 [V] Ripple-Noise [mV]
0.00	15	20
0.06	15	20
0.12	15	20
0.18	20	25
0.24	20	25
0.30	20	30
0.35	25	30
0.39	30	35
—	—	—
—	—	—
—	—	—

COSEL

Model	ZUW100512
Item	Ripple-Noise　リップルノイズ
Object	-12V0.350A

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

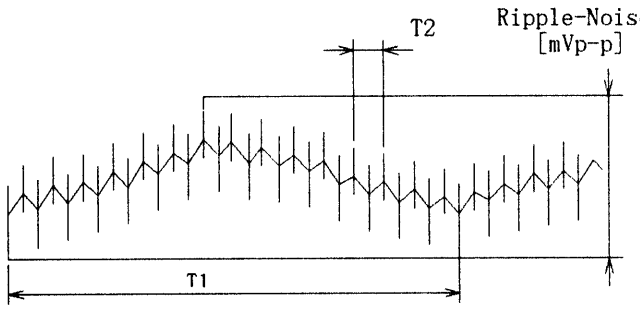


Fig. Complex Ripple Wave Form
図　リップル波形詳細図

2. Values

Load current [A]	Input Volt. 4.5 [V] Ripple-Noise [mV]	Input Volt. 9.0 [V] Ripple-Noise [mV]
0.00	20	25
0.06	20	25
0.12	30	30
0.18	30	35
0.24	30	40
0.30	35	40
0.35	35	40
0.39	40	40
—	—	—
—	—	—
—	—	—

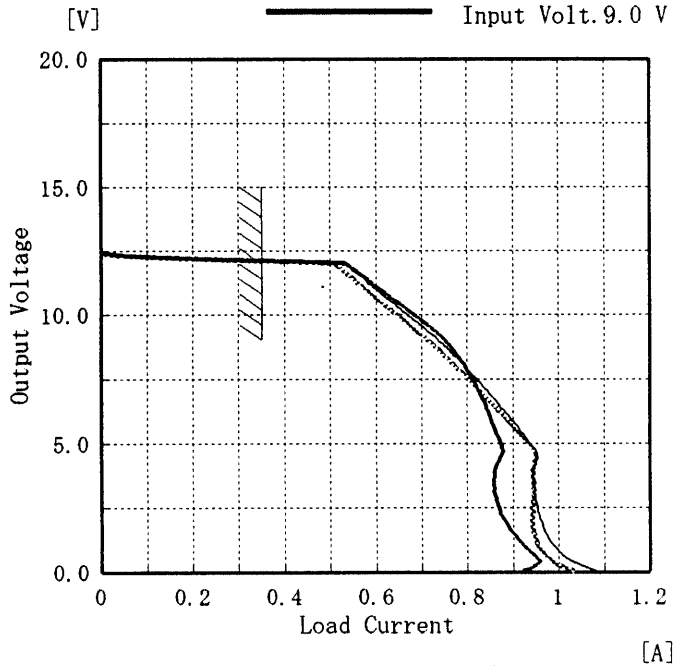
COSEL

Model	ZUW100512
Item	Overcurrent Protection 過電流保護

Temperature 25℃
Testing Circuitry Figure A

Object ＋12V0.350A

1. Graph

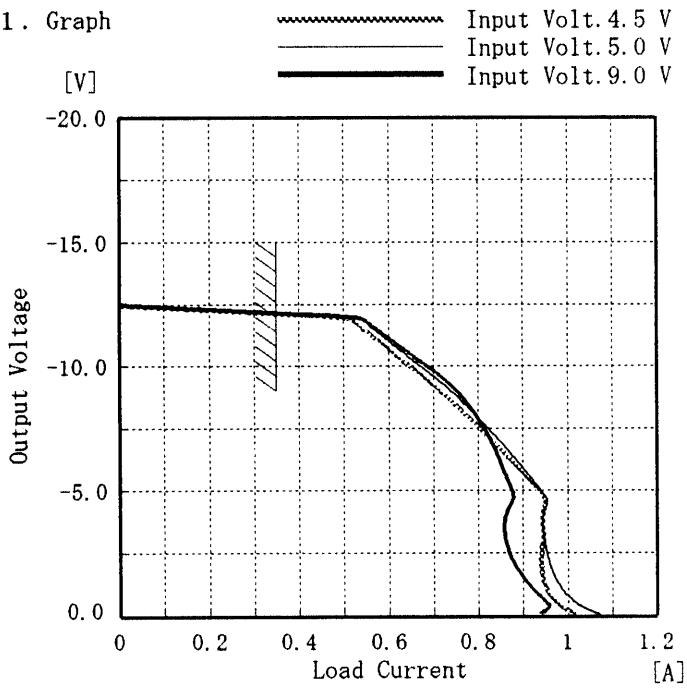


2. Values

Output Voltage [V]	Input Volt. 4.5[V] Load Current [A]	Input Volt. 5.0[V] Load Current [A]	Input Volt. 9.0[V] Load Current [A]
12.00	0.513	0.534	0.537
11.40	0.547	0.570	0.577
10.80	0.590	0.612	0.623
9.60	0.669	0.694	0.709
8.40	0.747	0.768	0.776
7.20	0.816	0.833	0.819
6.00	0.880	0.891	0.850
4.80	0.942	0.947	0.876
3.60	0.944	0.943	0.859
2.40	0.941	0.954	0.870
1.20	0.949	0.980	0.914
0.00	1.035	1.087	0.918

Object －12V0.350A

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. 4.5[V] Load Current [A]	Input Volt. 5.0[V] Load Current [A]	Input Volt. 9.0[V] Load Current [A]
-12.00	0.515	0.536	0.541
-11.40	0.552	0.574	0.581
-10.80	0.591	0.614	0.625
-9.60	0.668	0.691	0.707
-8.40	0.749	0.771	0.779
-7.20	0.818	0.835	0.822
-6.00	0.883	0.894	0.852
-4.80	0.943	0.947	0.878
-3.60	0.943	0.943	0.858
-2.40	0.940	0.953	0.870
-1.20	0.948	0.980	0.914
0.00	1.021	1.073	0.942

COSEL

Model	ZUW100512		
Item	Dynamic Load Responce 動的負荷変動	Temperature Testing Circuitry	25℃ Figure A
Object	+12V0.350A		

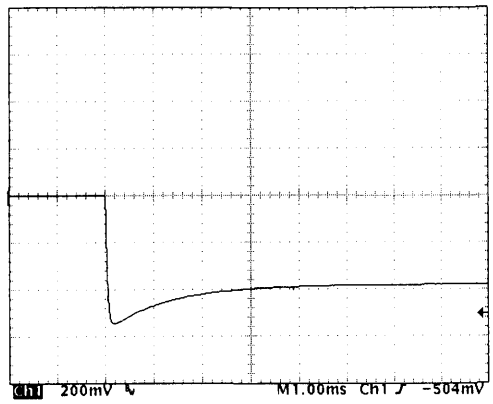
Input Volt. 5 V

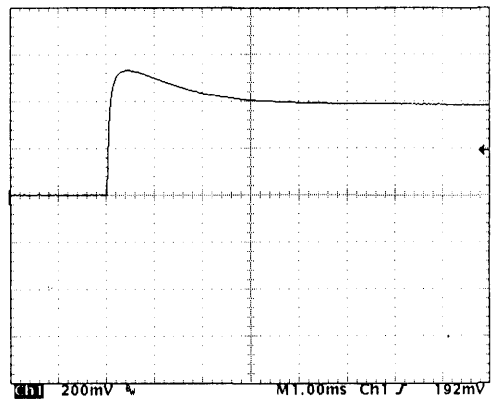
Cycle 100 mS

Load Current

Min. Load ←→
Load 100 %

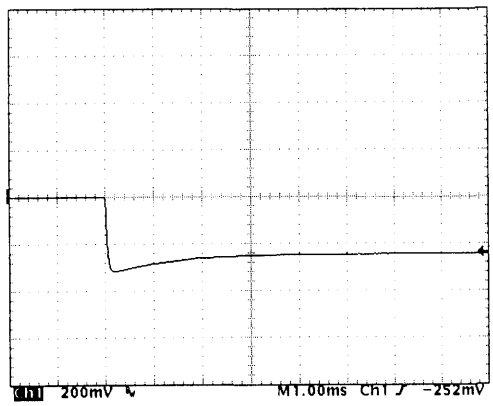
200 mV/div

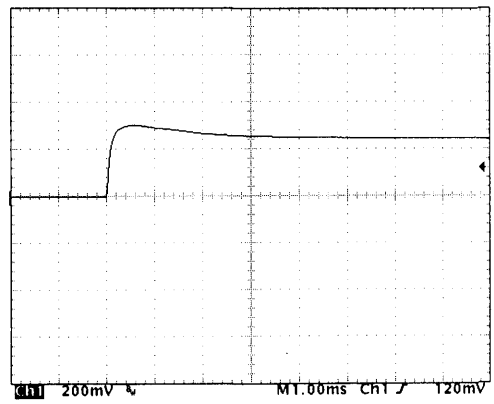




Min. Load ←→
Load 50 %

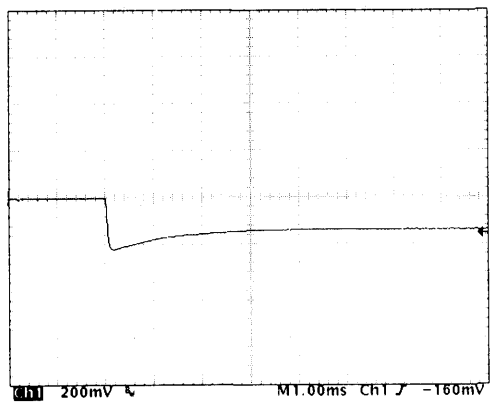
200 mV/div

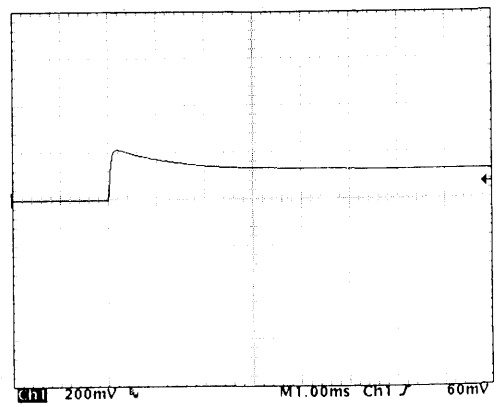




Load 50%←→
Load 100 %

200 mV/div





1 mS/div

COSEL

Model	ZUW100512		
Item	Dynamic Load Responce 動的負荷変動	Temperature Testing Circuitry	25℃ Figure A
Object	-12V0.350A		

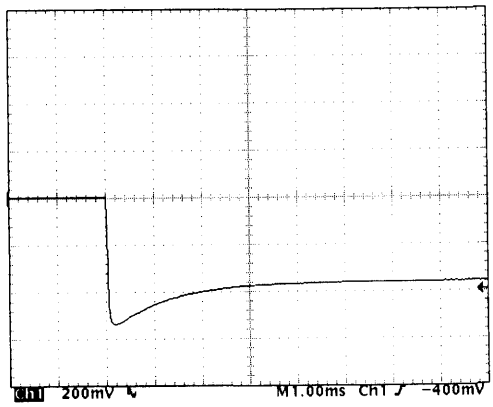
Input Volt. 5 V

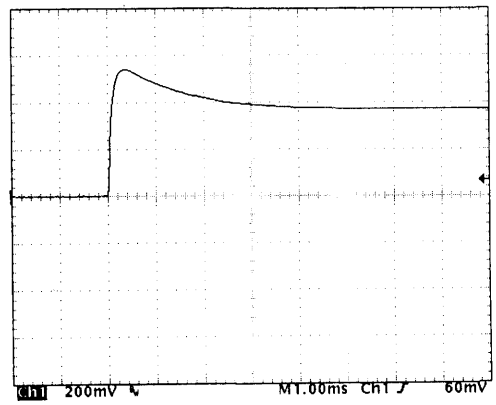
Cycle 100 mS

Load Current

Min. Load ←→
Load 100 %

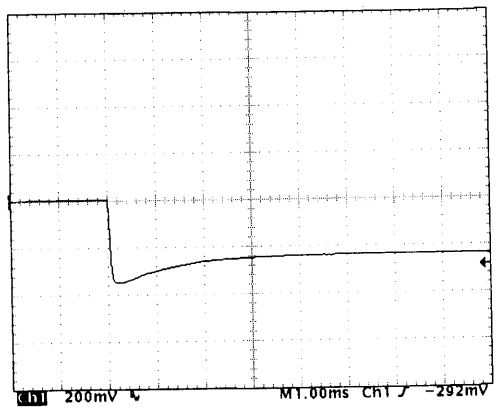
200 mV/div

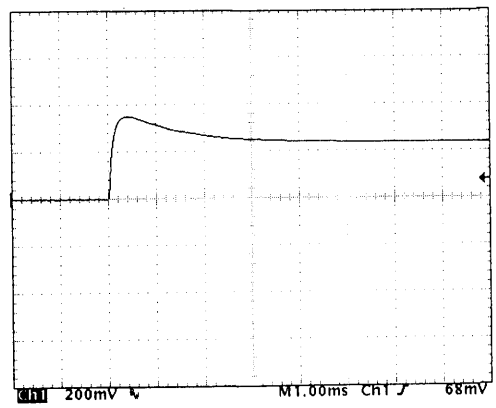




Min. Load ←→
Load 50 %

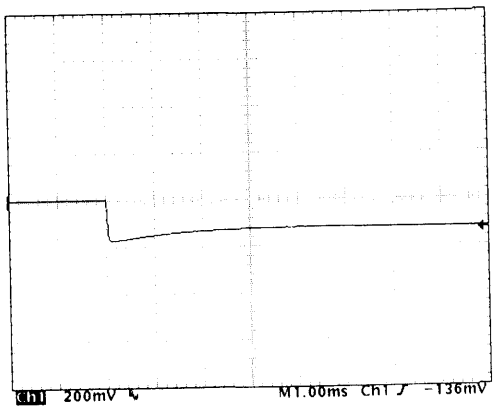
200 mV/div

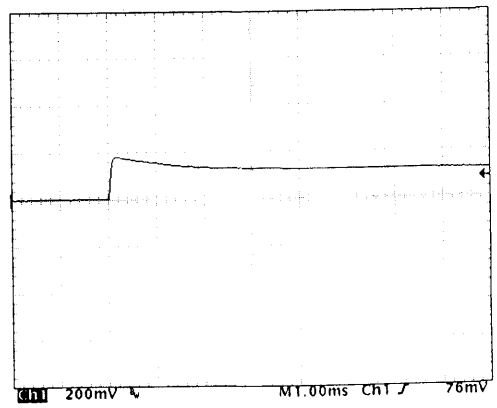




Load 50%←→
Load 100 %

200 mV/div





1 mS/div

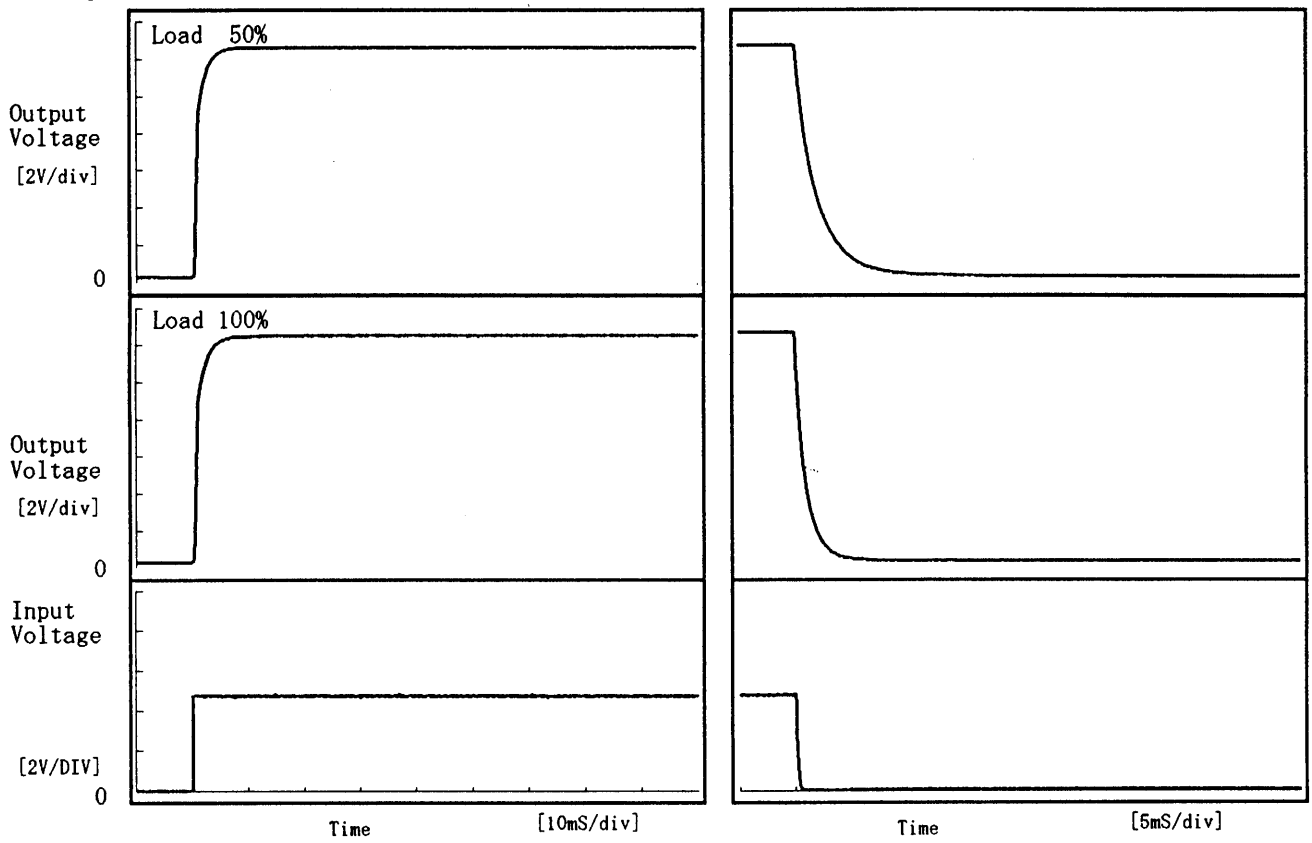
BC−2075

COSEL

Model	ZUW100512		
Item	Rise and Fall Time 立上り、立下り時間	Temperature Testing Circuitry	25℃ Figure A
Object	+12V0.350A		

1. Graph

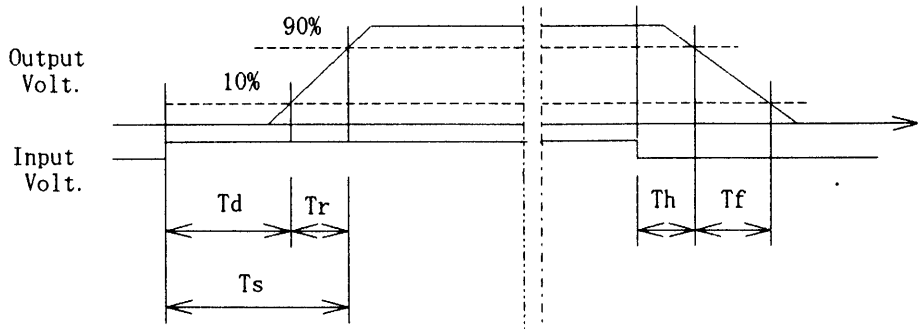
Input Volt. 4.5 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	0.35	1.95	2.30	0.28	4.68
100 %	0.35	2.15	2.50	0.15	2.33

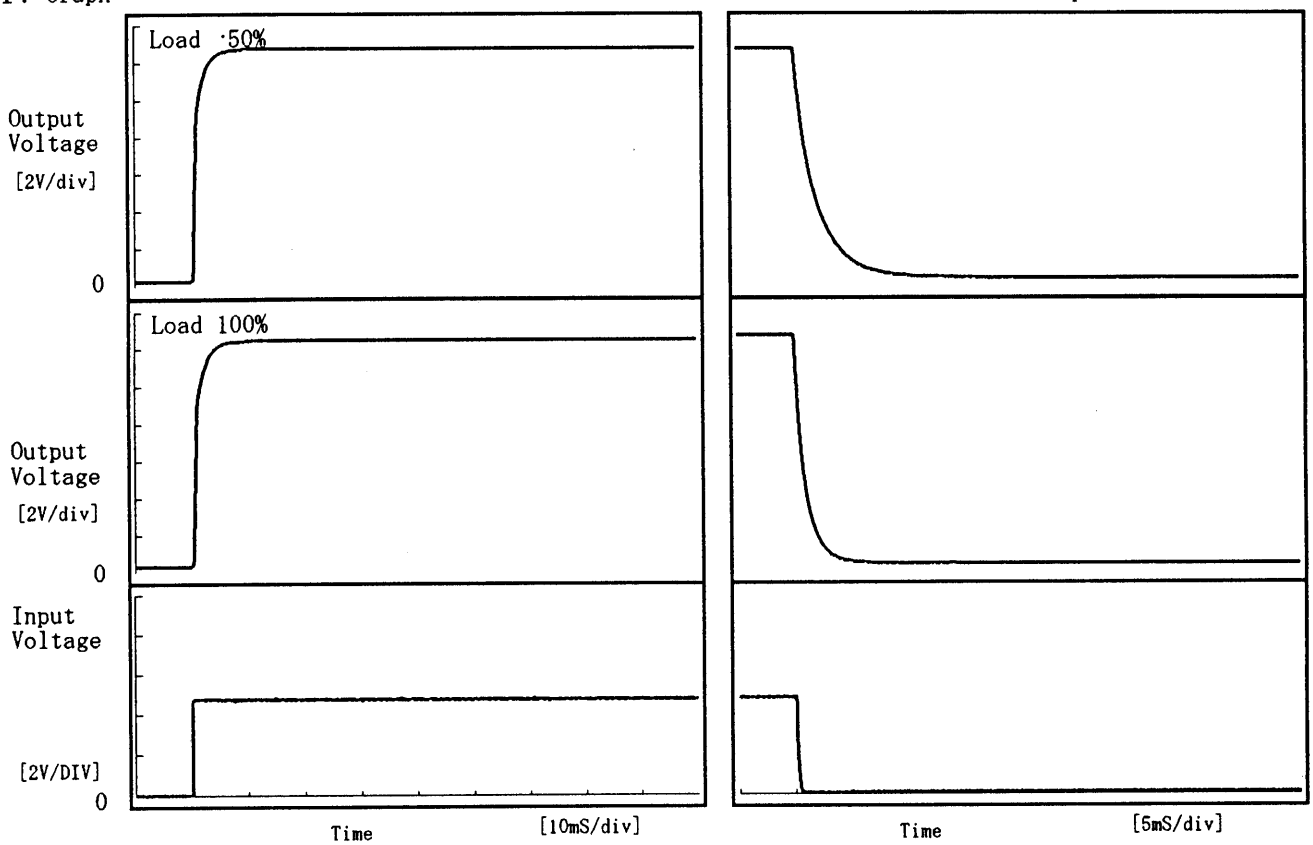


COSEL

Model	ZUW100512	Temperature	25℃
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	-12V0.35A		

1. Graph

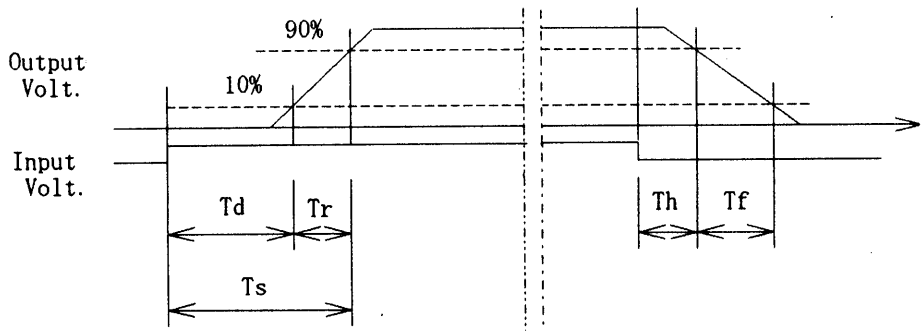
Input Volt. 4.5 V



2. Values

[mS]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	0.40	1.80	2.20	0.28	4.68
100 %	0.40	2.10	2.50	0.15	2.33



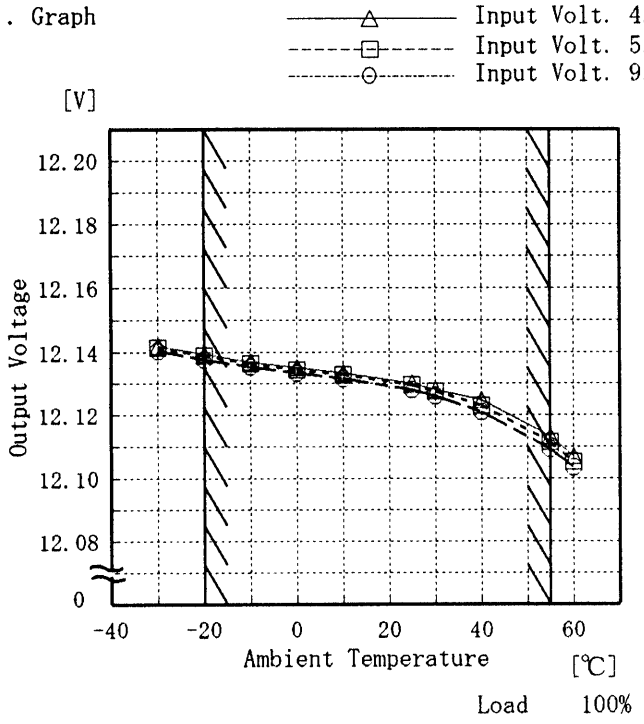
COSEL

Model	ZUW100512
Item	Ambient Temperature Drift 周囲温度変動

Testing Circuitry Figure A

Object ＋12V0.350A

1. Graph

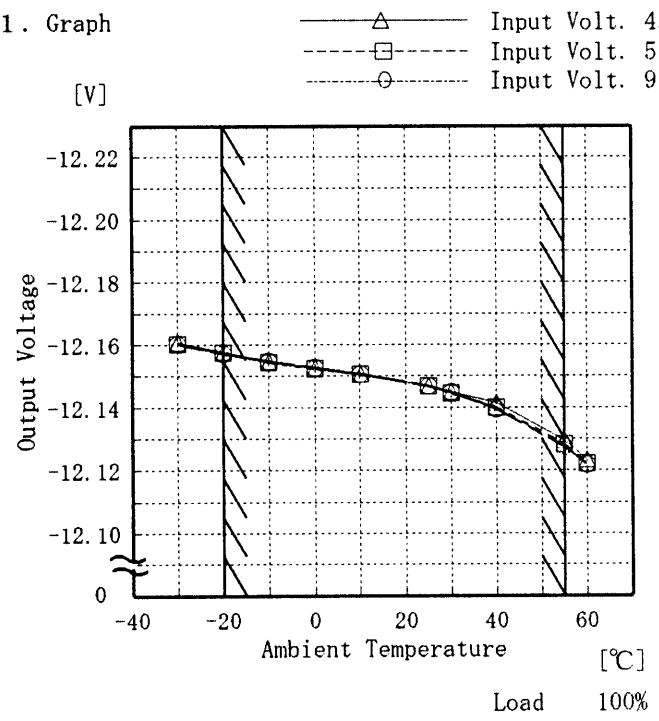


2. Values

Temperature [℃]	Input Volt. 4.5[V] Output Volt. [V]	Input Volt. 5.0[V] Output Volt. [V]	Input Volt. 9.0[V] Output Volt. [V]
-30	12.142	12.141	12.140
-20	12.139	12.139	12.138
-10	12.137	12.136	12.135
0	12.135	12.134	12.133
10	12.133	12.133	12.132
25	12.130	12.129	12.128
30	12.128	12.128	12.126
40	12.125	12.123	12.121
55	12.113	12.111	12.109
60	12.107	12.105	12.104
—	—	—	—

Object －12V0.350A

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. 4.5[V] Output Volt. [V]	Input Volt. 5.0[V] Output Volt. [V]	Input Volt. 9.0[V] Output Volt. [V]
-30	-12.161	-12.160	-12.160
-20	-12.158	-12.157	-12.157
-10	-12.155	-12.154	-12.155
0	-12.153	-12.152	-12.153
10	-12.151	-12.150	-12.151
25	-12.147	-12.147	-12.147
30	-12.145	-12.144	-12.145
40	-12.141	-12.140	-12.139
55	-12.129	-12.128	-12.128
60	-12.123	-12.122	-12.122
—	—	—	—

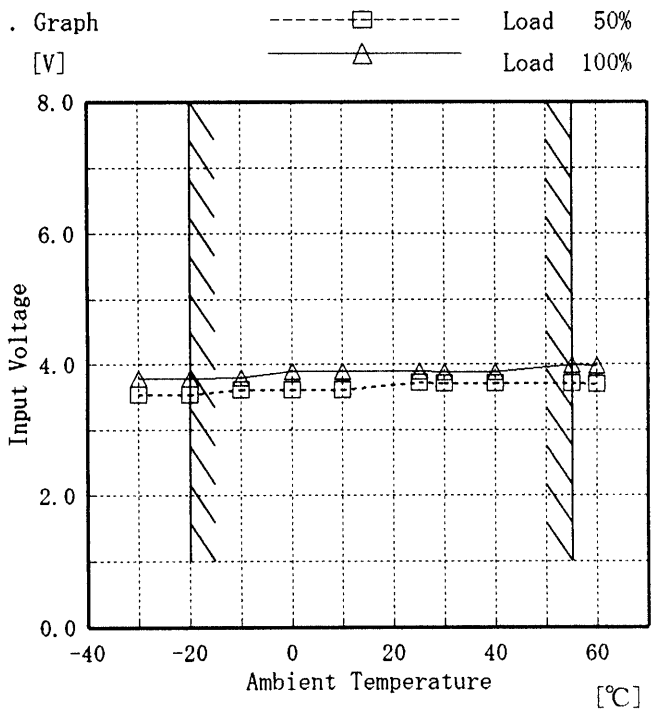
COSEL

Model	ZUW100512
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 ＋12V0.350A

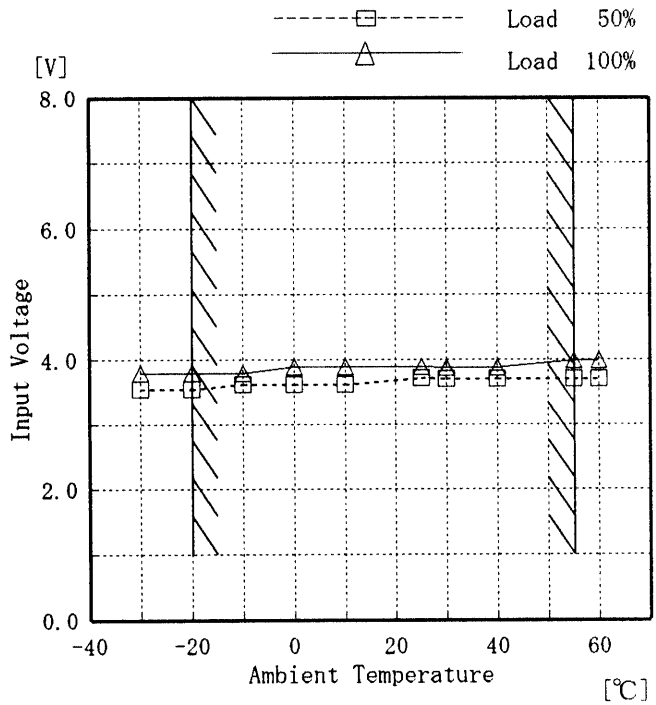
1. Graph



2. Values

Ambient Temp. [℃]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-30	3.5	3.8
-20	3.5	3.8
-10	3.6	3.8
0	3.6	3.9
10	3.6	3.9
25	3.7	3.9
30	3.7	3.9
40	3.7	3.9
55	3.7	4.0
60	3.7	4.0
—	—	—

Object －12V0.350A



2. Values

Ambient Temp. [℃]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-30	3.5	3.8
-20	3.5	3.8
-10	3.6	3.8
0	3.6	3.9
10	3.6	3.9
25	3.7	3.9
30	3.7	3.9
40	3.7	3.9
55	3.7	4.0
60	3.7	4.0
—	—	—

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

(注)斜線は定格周囲温度範囲を示す。

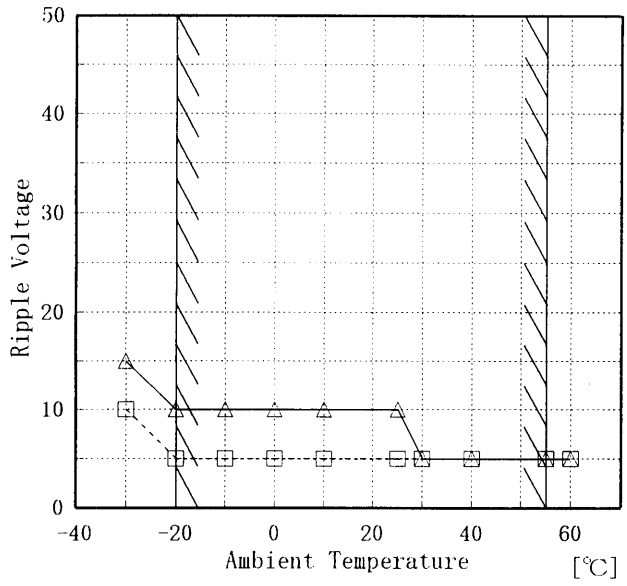
COSEL

Model	ZUW100512
Item	Ripple Voltage (by Ambient Temp.) リップル電圧（周囲温度特性）

Testing Circuitry　Figure A

Object　+12V0.350A

1. Graph



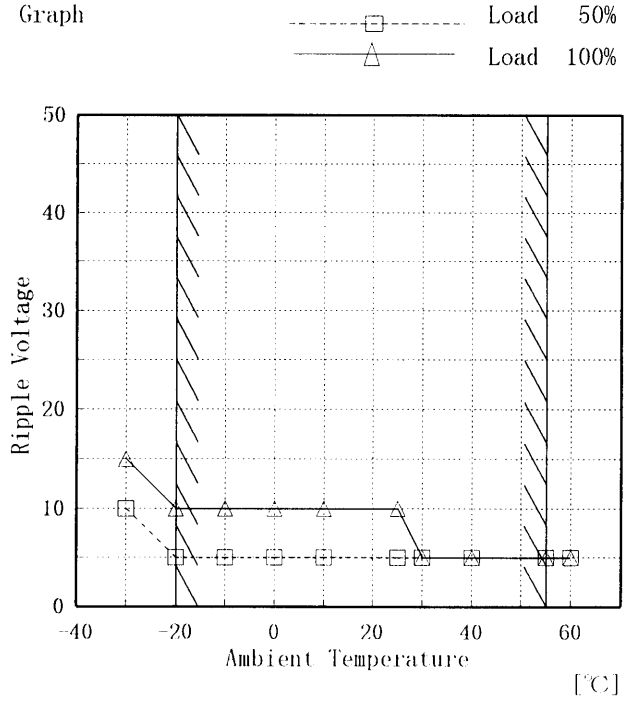
Input Volt.　4.5 V

2. Values

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

Object　−12V0.350A

1. Graph



Input Volt.　4.5 V

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

(注)斜線は定格周囲温度範囲を示す。

2. Values

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

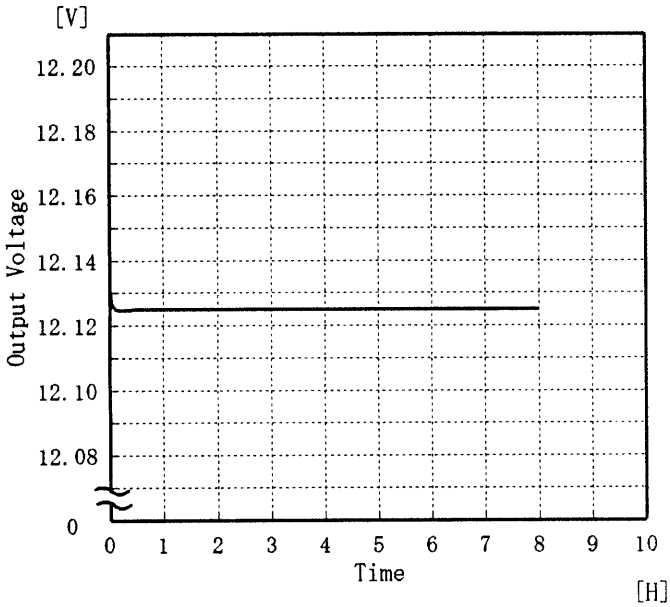
COSEL

Model	ZUW100512
Item	Time Lapse Drift 経時ドリフト

Temperature 25 ℃
Testing Circuitry Figure A

Object ＋12V0.350A

1. Graph



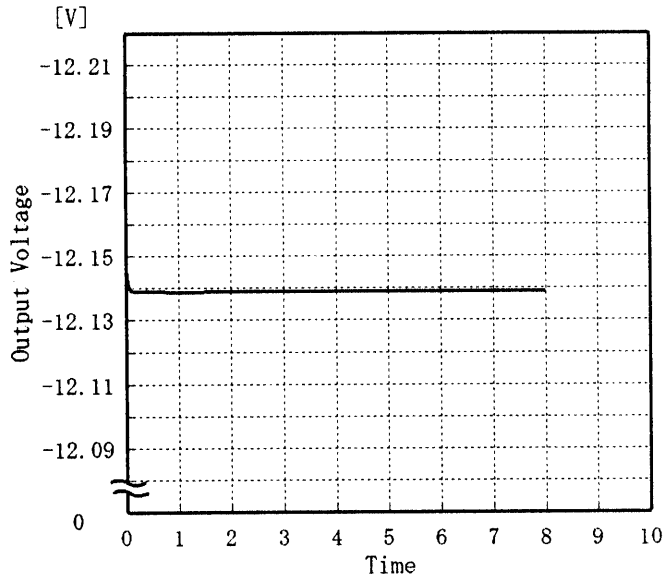
Input Volt. 5.0V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	12.131
0.5	12.125
1.0	12.125
2.0	12.125
3.0	12.125
4.0	12.125
5.0	12.125
6.0	12.125
7.0	12.125
8.0	12.125

Object －12V0.350A

1. Graph



Input Volt. 5.0V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	-12.146
0.5	-12.139
1.0	-12.139
2.0	-12.139
3.0	-12.139
4.0	-12.139
5.0	-12.139
6.0	-12.139
7.0	-12.139
8.0	-12.139

BC－2075

COSEL

Model	ZUW100512
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 : 4.5～9.0 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 4.5～9.0 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 ＋12V0.350A

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ration) [%]
Maximum Voltage	-20	4.5	0.350	12.139	±201	±1.7
Minimum Voltage	55	9.0	0.000	11.738		

Object －12V0.350A

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ration) [%]
Maximum Voltage	-20	4.5	0.350	-12.157	±194	±1.7
Minimum Voltage	55	4.5	0.000	-11.769		

COSEL

Model	ZUW100512
Item	Condensation 結露特性
Object	+12V0.350A

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	12.230	5	25
	2	12.235	5	25
	3	12.230	5	25
Load 100 %	1	12.136	10	40
	2	12.138	10	40
	3	12.131	15	40

Input Volt. 5.0 V

COSEL

Model	ZUW100512
Item	Condensation 結露特性
Object	−12V0.350A

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	12.252	10	30
	2	12.248	10	30
	3	12.251	10	30
Load 100 %	1	12.143	15	30
	2	12.139	15	30
	3	12.145	15	30

Input Volt. 5.0 V

COSEL

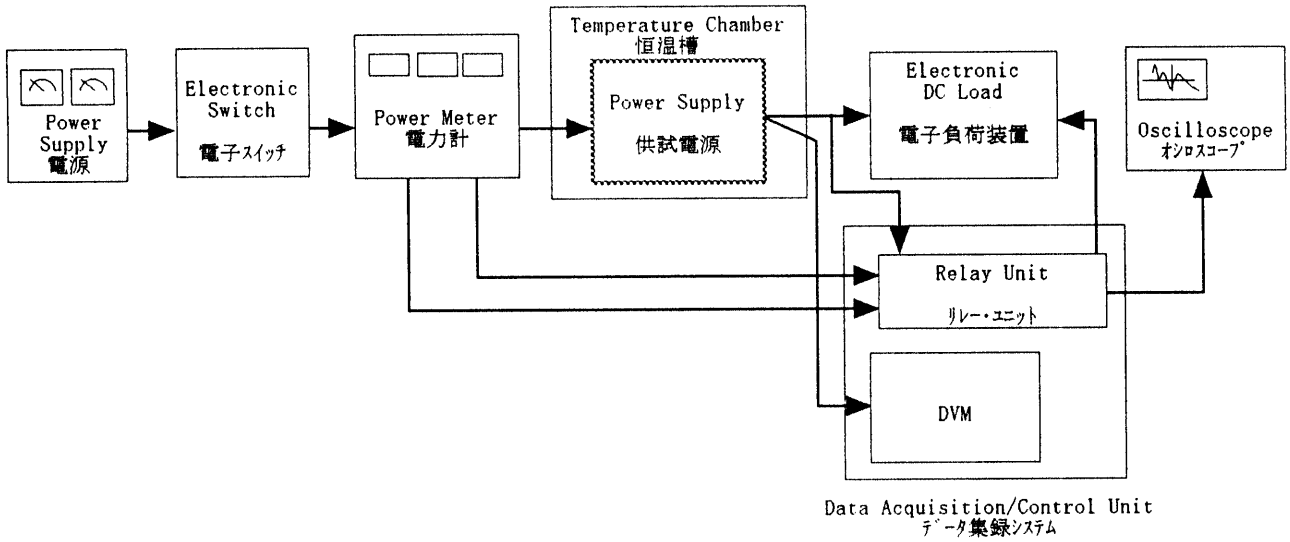


Figure A