参考資料

COSEL

TEST DATA OF ZTW1R54812

(48.0V INPUT)

Regulated DC Power Supply

Date : Mar.5. 1998

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Design Manager

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Design Engineer

コーセル株式会社

COSEL CO.,LTD.

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(Final Page 20)

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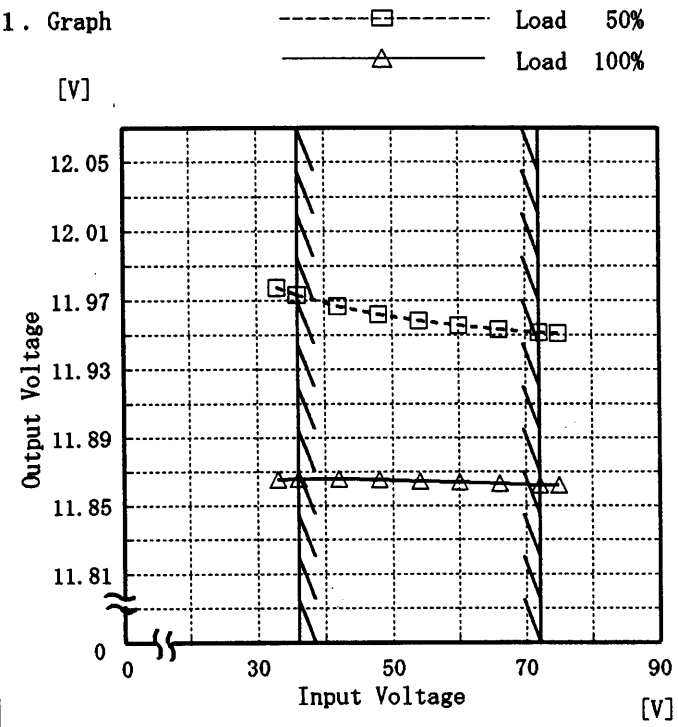
Model	ZTW1R54812
Item	Line Regulation 静的入力変動

Temperature 25℃
Testing Circuitry Figure A

Object +12V0.065A

1. Graph

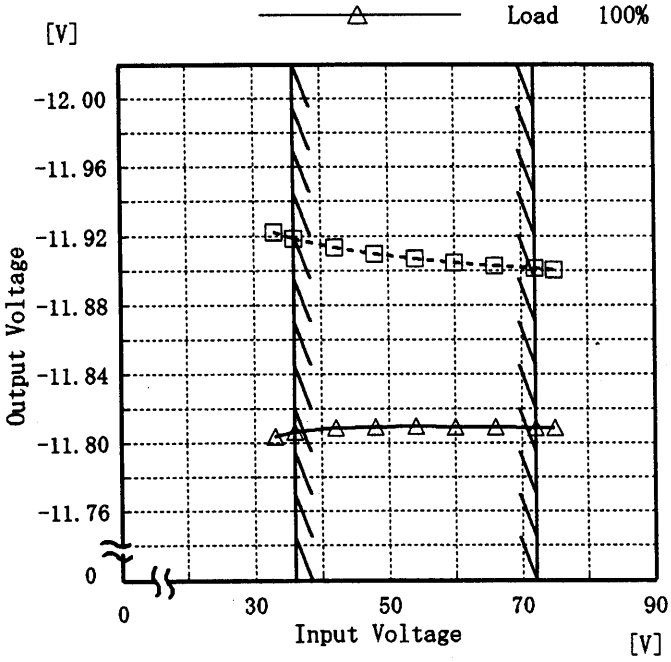


2. Values

Input Voltage [V]	Load 50% Output Volt. [V]	Load 100% Output Volt. [V]
33.0	11.977	11.865
36.0	11.973	11.866
42.0	11.967	11.866
48.0	11.962	11.865
54.0	11.959	11.865
60.0	11.956	11.864
66.0	11.953	11.863
72.0	11.952	11.862
75.0	11.951	11.862
—	—	—
—	—	—
—	—	—

Object −12V0.065A

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	-11.922	-11.804
36.0	-11.918	-11.806
42.0	-11.913	-11.809
48.0	-11.910	-11.809
54.0	-11.907	-11.810
60.0	-11.904	-11.809
66.0	-11.903	-11.809
72.0	-11.901	-11.809
75.0	-11.900	-11.809
—	—	—
—	—	—
—	—	—

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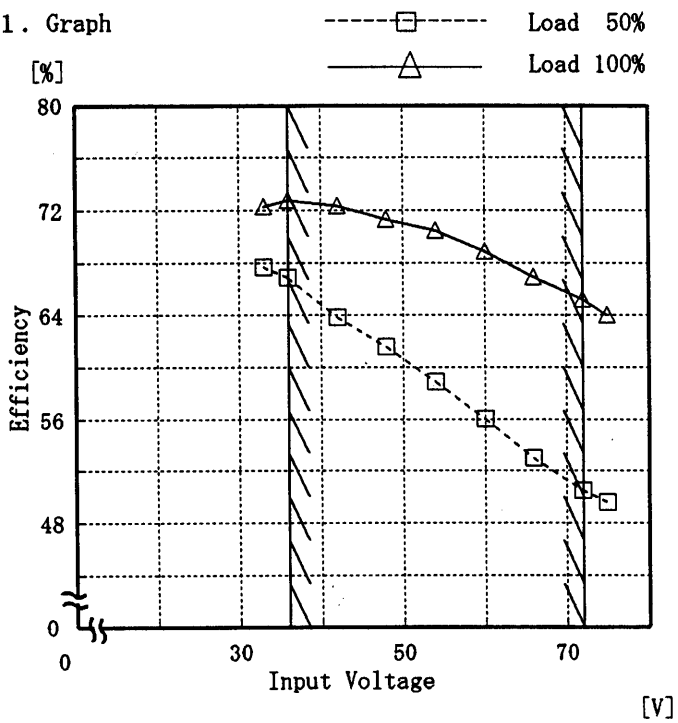
Model	ZTW1R54812
Item	Efficiency 効率
Object	――――――――――

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	67.7	72.3
36.0	66.9	72.8
42.0	63.8	72.3
48.0	61.6	71.3
54.0	58.9	70.5
60.0	56.0	68.9
66.0	53.0	67.0
72.0	50.5	65.3
75.0	49.6	64.0
—	—	—
—	—	—
—	—	—

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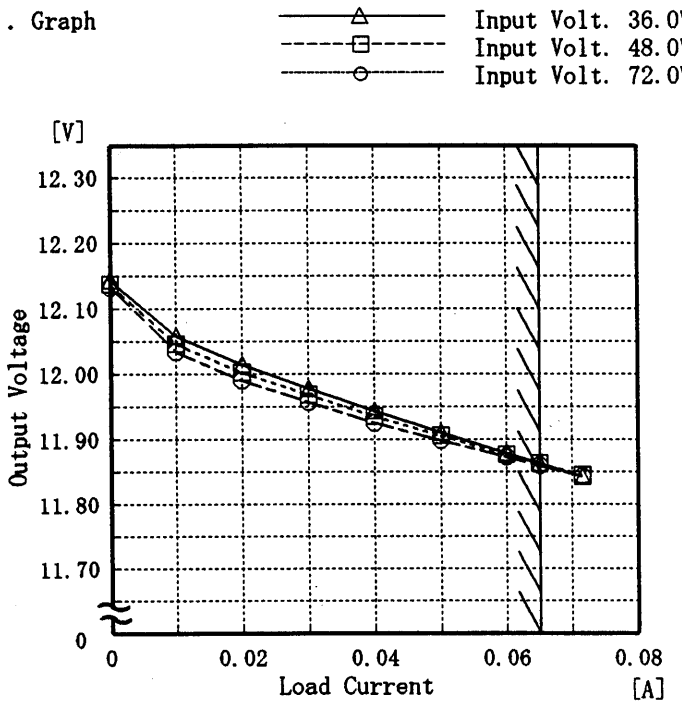
Model	ZTW1R54812	Temperature	25℃
Item	Load Regulation 静的負荷変動	Testing Circuitry	Figure A
Object	+12V0.065A		

1. Graph

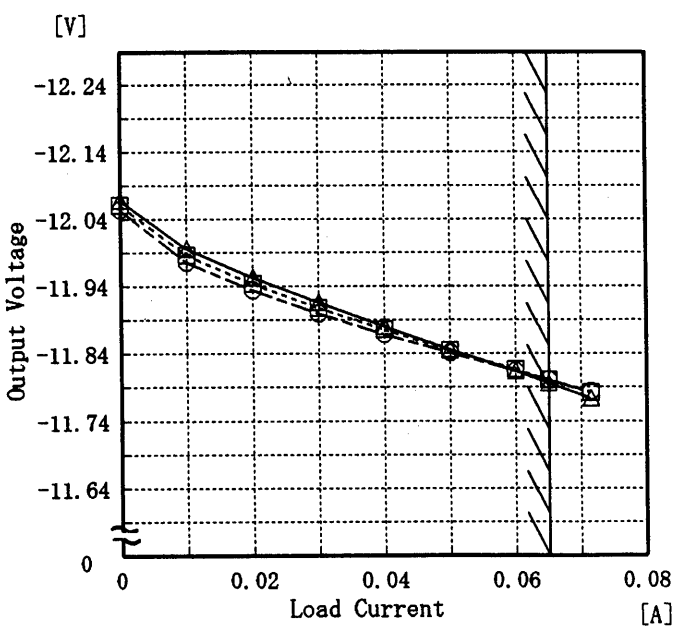


2. Values

Load Current [A]	Input Volt. 36.0[V] Output Volt. [V]	Input Volt. 48.0[V] Output Volt. [V]	Input Volt. 72.0[V] Output Volt. [V]
0.000	12.144	12.138	12.133
0.010	12.059	12.046	12.034
0.020	12.014	12.002	11.991
0.030	11.978	11.968	11.957
0.040	11.943	11.935	11.926
0.050	11.911	11.906	11.899
0.060	11.879	11.877	11.872
0.065	11.863	11.863	11.859
0.072	11.842	11.844	11.843
—	—	—	—

Object	−12V0.065A

1. Graph



Note: Slanted line shows the range of the rated load current.

(注)斜線は定格負荷電流範囲を示す。

2. Values

Load Current [A]	Input Volt. 36.0[V] Output Volt. [V]	Input Volt. 48.0[V] Output Volt. [V]	Input Volt. 72.0[V] Output Volt. [V]
0.000	-12.070	-12.061	-12.055
0.010	-11.997	-11.987	-11.976
0.020	-11.954	-11.945	-11.935
0.030	-11.916	-11.908	-11.900
0.040	-11.881	-11.876	-11.870
0.050	-11.847	-11.845	-11.841
0.060	-11.815	-11.817	-11.815
0.065	-11.797	-11.802	-11.801
0.072	-11.774	-11.782	-11.784
—	—	—	—

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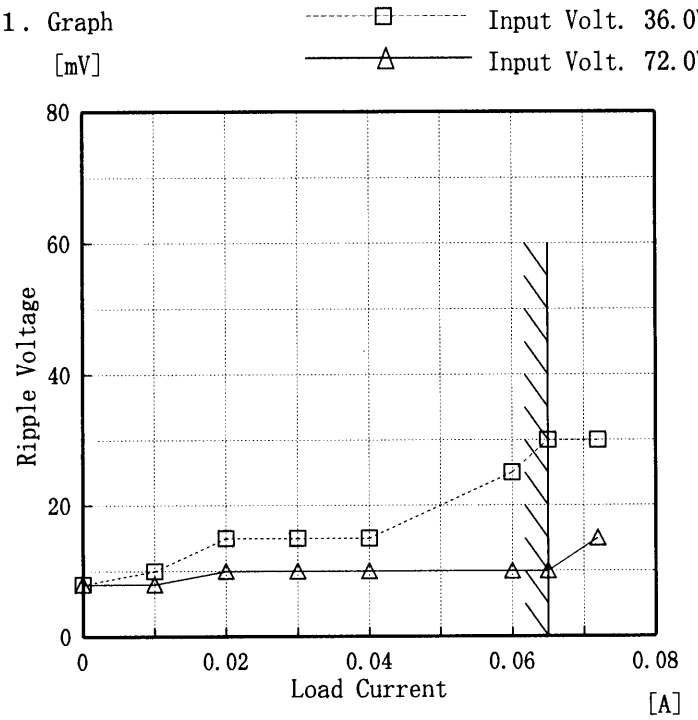
Model	ZTW1R54812
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	+12V0.065A

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

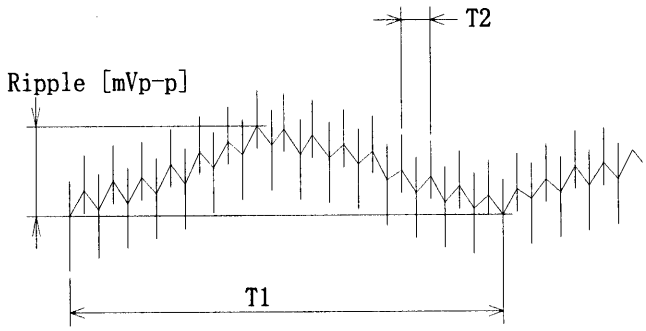


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

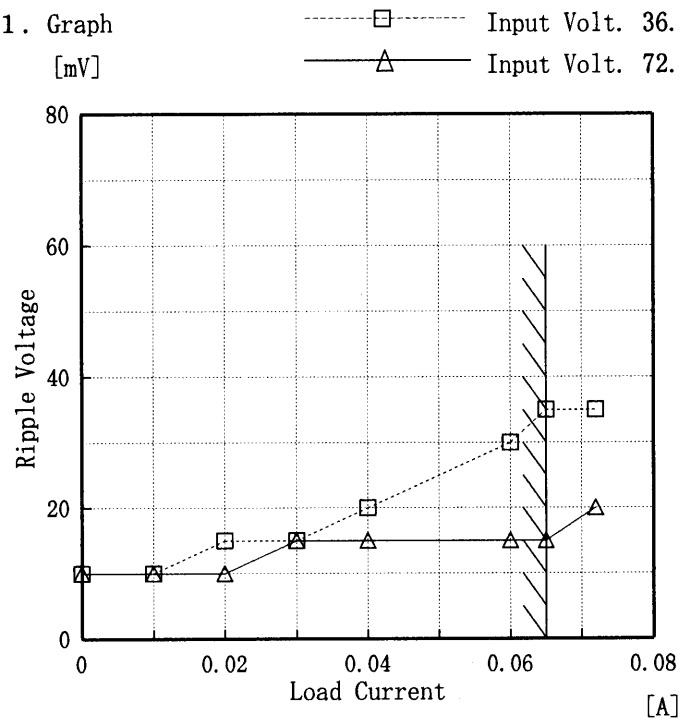
Load Current [A]	Input Volt. 36.0 [V] Ripple Output Volt. [mV]	Input Volt. 72.0 [V] Ripple Output Volt. [mV]
0.000	8	8
0.010	10	8
0.020	15	10
0.030	15	10
0.040	15	10
0.060	25	10
0.065	30	10
0.072	30	15
—	—	—
—	—	—
—	—	—

COSEL

Model	ZTW1R54812
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	-12V0.065A

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

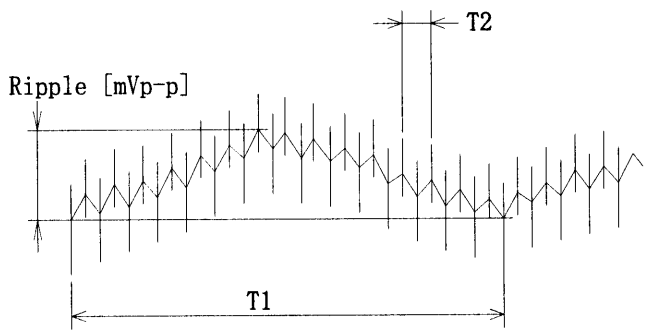


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

Load Current [A]	Input Volt. 36.0 [V] Ripple Output Volt. [mV]	Input Volt. 72.0 [V] Ripple Output Volt. [mV]
0.000	10	10
0.010	10	10
0.020	15	10
0.030	15	15
0.040	20	15
0.060	30	15
0.065	35	15
0.072	35	20
—	—	—
—	—	—
—	—	—

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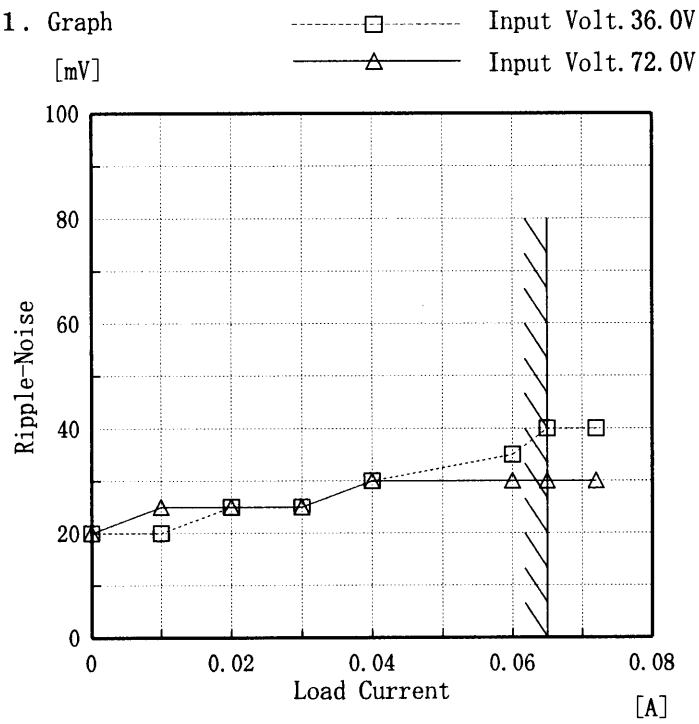
Model	ZTW1R54812
Item	Ripple-Noise　リップルノイズ
Object	+12V0.065A

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

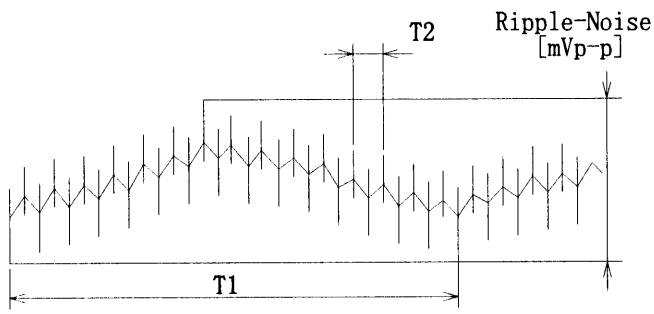


Fig. Complex Ripple Wave Form
図　リップル波形詳細図

2. Values

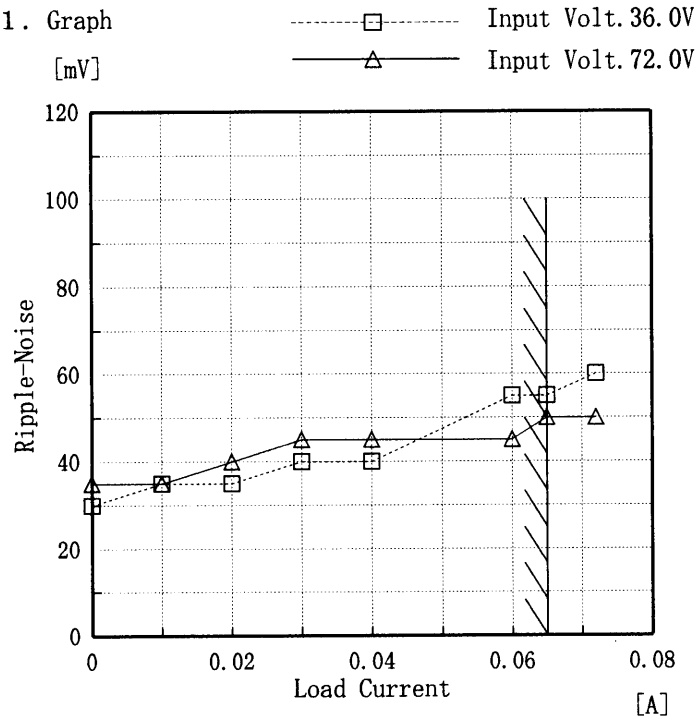
Load current [A]	Input Volt. 36.0 [V] Ripple-Noise [mV]	Input Volt. 72.0 [V] Ripple-Noise [mV]
0.000	20	20
0.010	20	25
0.020	25	25
0.030	25	25
0.040	30	30
0.060	35	30
0.065	40	30
0.072	40	30
—	—	—
—	—	—
—	—	—

COSEL

Model	ZTW1R54812
Item	Ripple-Noise　リップルノイズ
Object	-12V0.065A

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

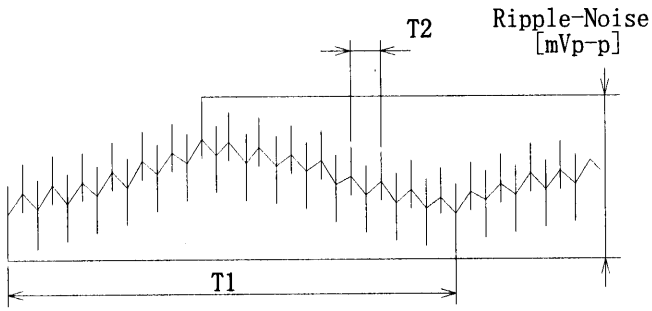


Fig. Complex Ripple Wave Form
図　リップル波形詳細図

2. Values

Load current [A]	Input Volt. 36.0 [V] Ripple-Noise [mV]	Input Volt. 72.0 [V] Ripple-Noise [mV]
0.000	30	35
0.010	35	35
0.020	35	40
0.030	40	45
0.040	40	45
0.060	55	45
0.065	55	50
0.072	60	50
—	—	—
—	—	—
—	—	—

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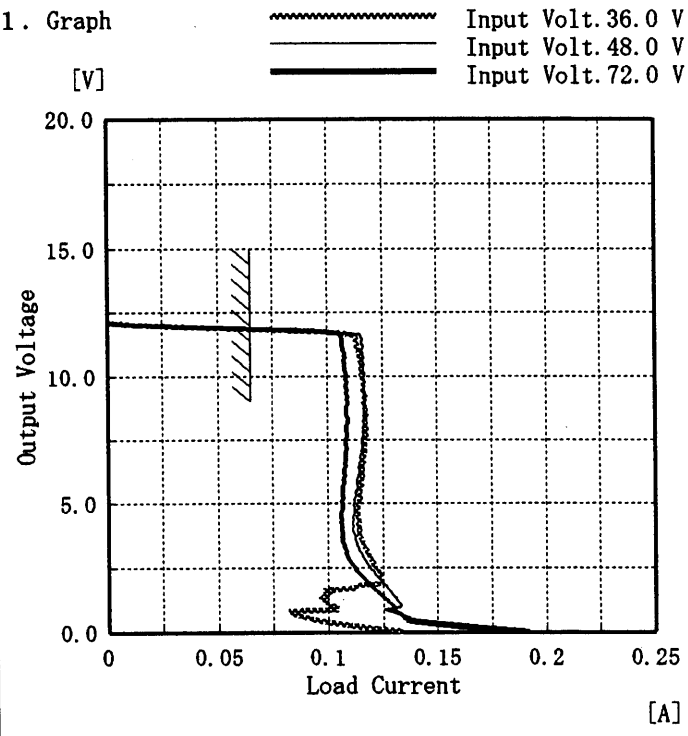
Model	ZTW1R54812
Item	Overcurrent Protection 過電流保護

Temperature 25℃
Testing Circuitry Figure A

Object +12V0.065A

1. Graph

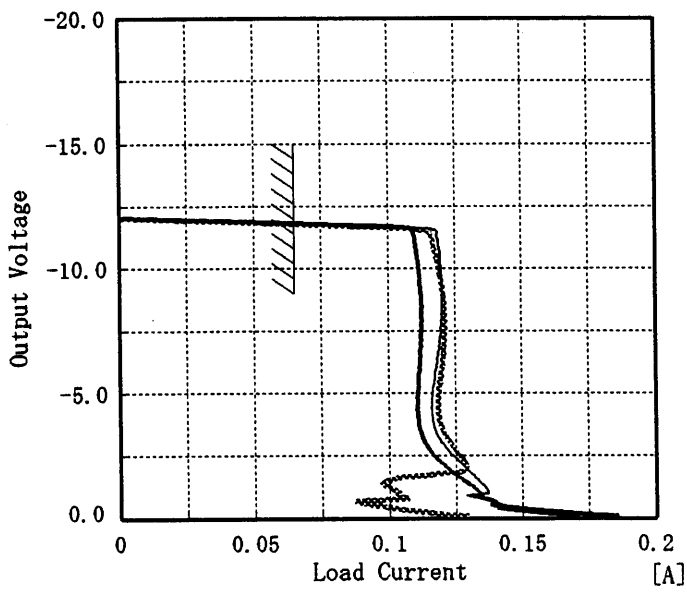


2. Values

Output Voltage [V]	Input Volt. 36.0[V] Load Current [A]	Input Volt. 48.0[V] Load Current [A]	Input Volt. 72.0[V] Load Current [A]
12.00	0.104	0.115	0.106
11.40	0.113	0.115	0.107
10.80	0.114	0.116	0.108
9.60	0.116	0.117	0.108
8.40	0.117	0.117	0.109
7.20	0.117	0.115	0.108
6.00	0.116	0.113	0.107
4.80	0.113	0.112	0.107
3.60	0.115	0.112	0.107
2.40	0.122	0.119	0.113
1.20	0.098	0.131	0.126
0.00	0.134	0.177	0.192

Object −12V0.065A

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	0.081	0.086	0.100
-11.40	0.116	0.118	0.110
-10.80	0.117	0.119	0.111
-9.60	0.119	0.120	0.112
-8.40	0.121	0.120	0.113
-7.20	0.121	0.119	0.112
-6.00	0.120	0.118	0.112
-4.80	0.118	0.116	0.111
-3.60	0.120	0.117	0.112
-2.40	0.127	0.124	0.118
-1.20	0.099	0.136	0.131
0.00	0.130	0.171	0.186

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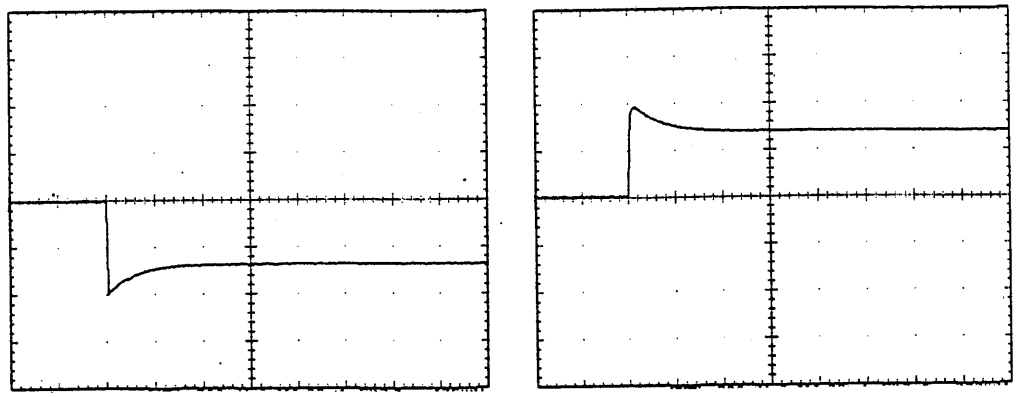
Model	ZTW1R54812		
Item	Dynamic Load Responce 動的負荷変動	Temperature Testing Circuitry	25℃ Figure A
Object	+12V0.065A		

Input Volt. 48.0 V

Cycle 100 mS

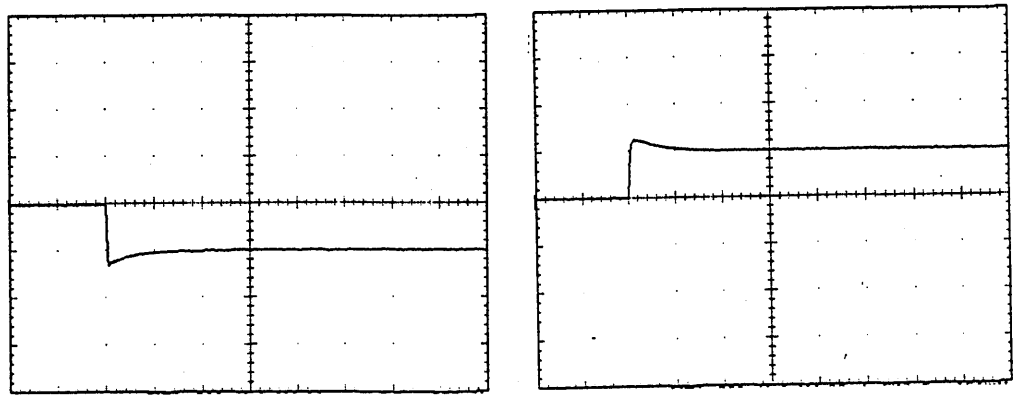
Load Current

Min. Load ⟷
Load 100 %



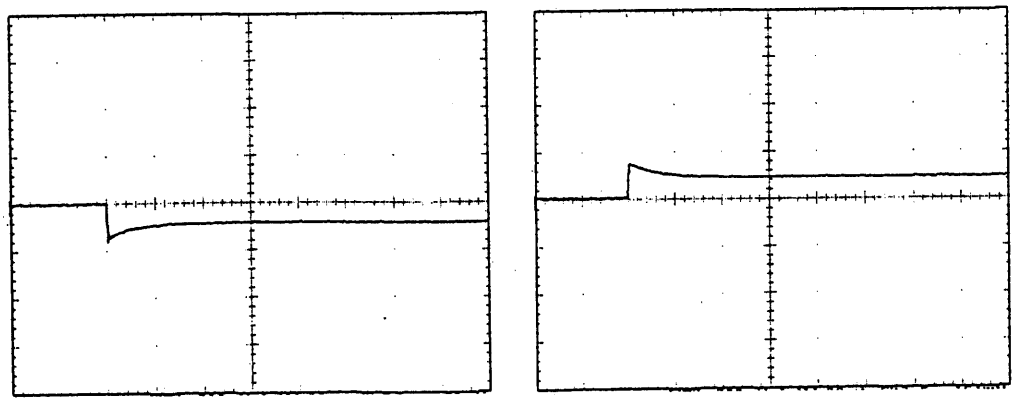
200 mV/div

Min. Load ⟷
Load 50 %



200 mV/div

Load 50%⟷
Load 100 %



200 mV/div

1 mS/div

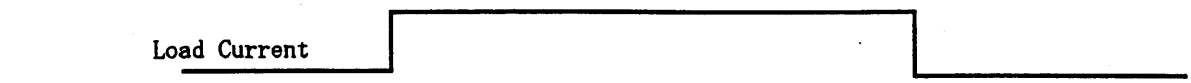
COSEL

Model	ZTW1R54812		
Item	Dynamic Load Responce 動的負荷変動	Temperature Testing Circuitry	25℃ Figure A
Object	−12V0.065A		

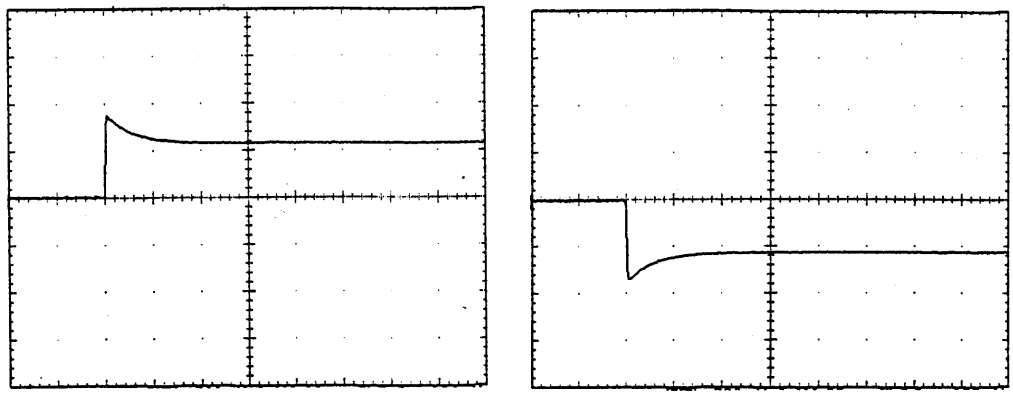
Input Volt. 48.0 V

Cycle 100 mS

Load Current

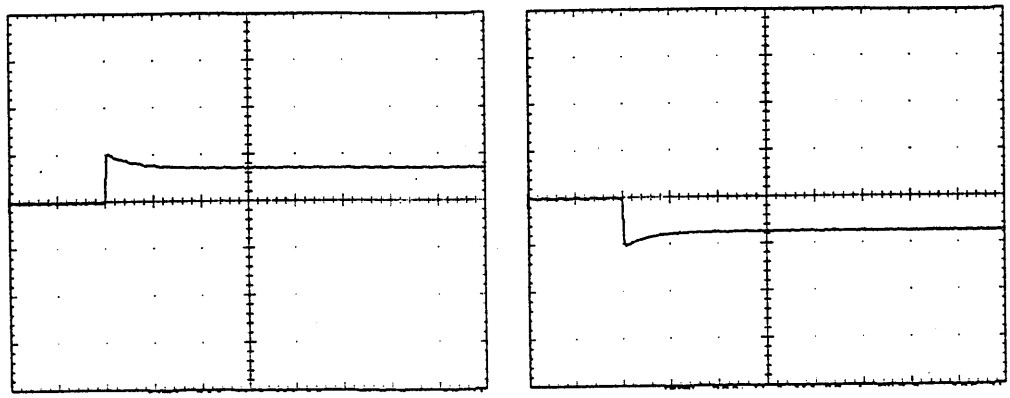


Min. Load ⟷
Load 100 %



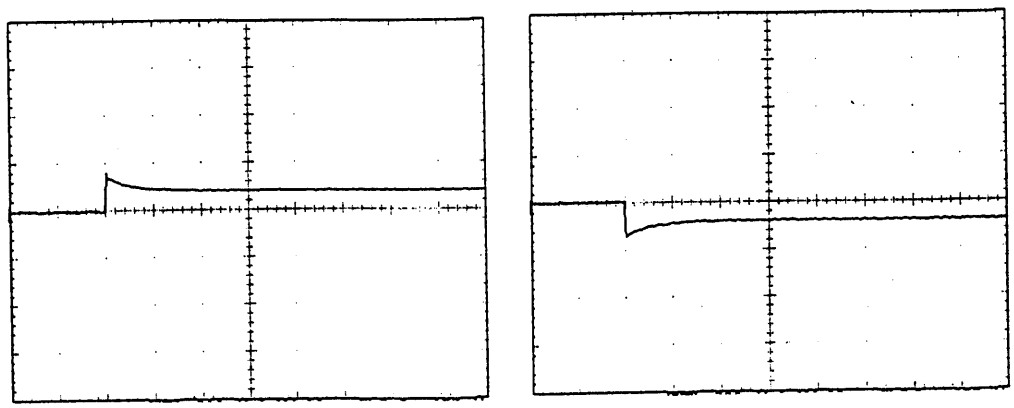
200 mV/div

Min. Load ⟷
Load 50 %



200 mV/div

Load 50%⟷
Load 100 %



200 mV/div

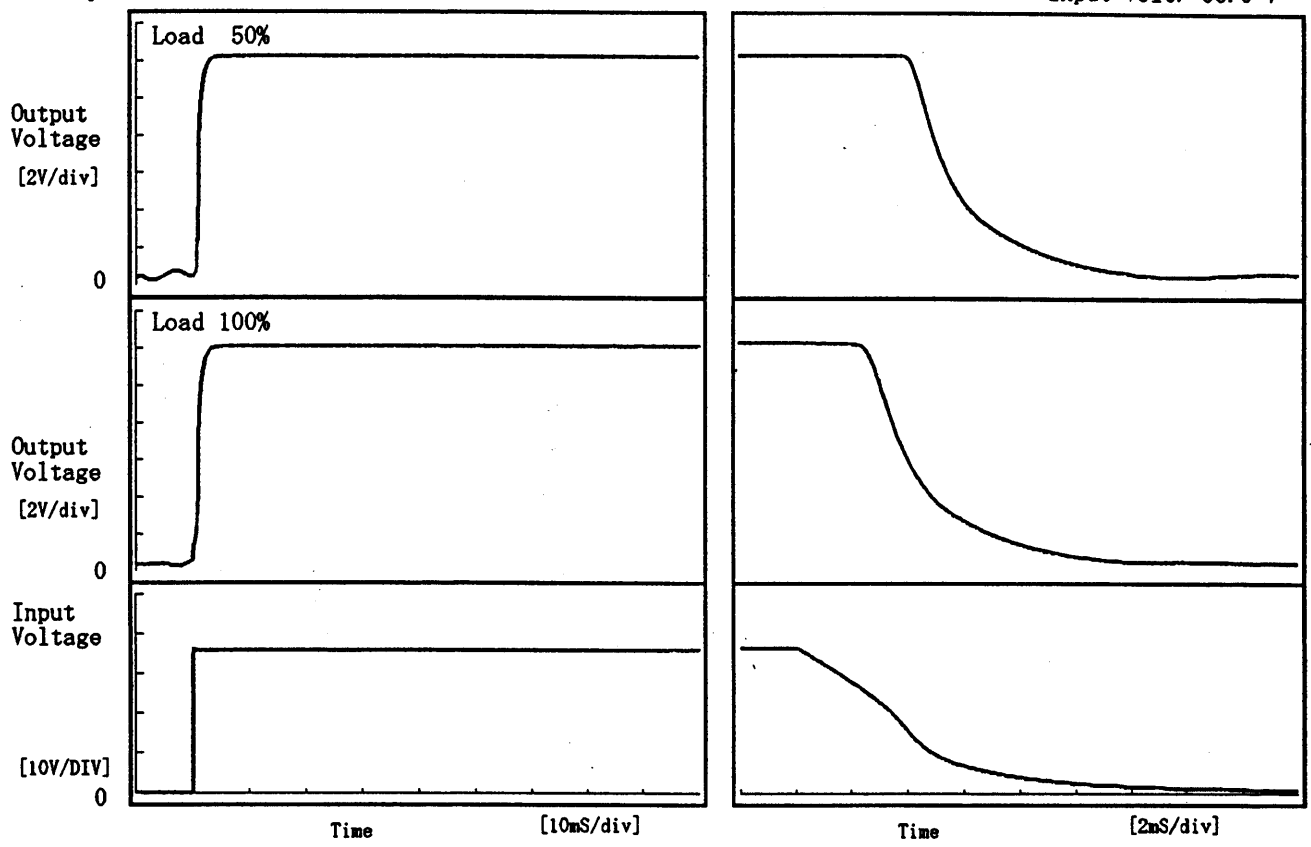
1 mS/div

COSEL

Model	ZTW1R54812		
Item	Rise and Fall Time 立上り、立下り時間	Temperature	25℃
		Testing Circuitry	Figure A
Object	+12V0.065A		

1. Graph

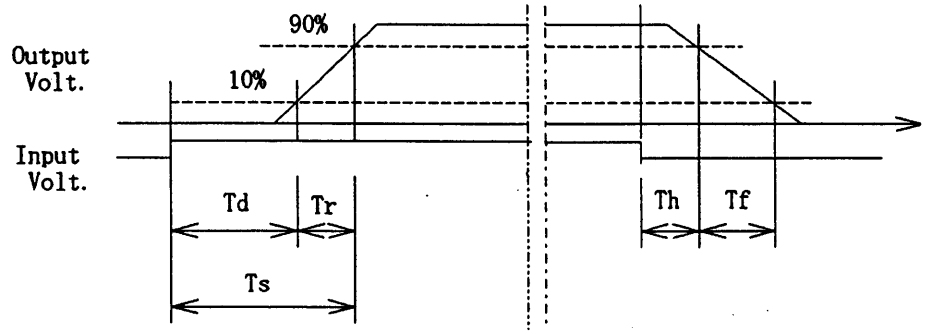
Input Volt. 36.0 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	0.10	1.75	1.85	4.33	4.97
100 %	0.10	1.85	1.95	2.79	5.14



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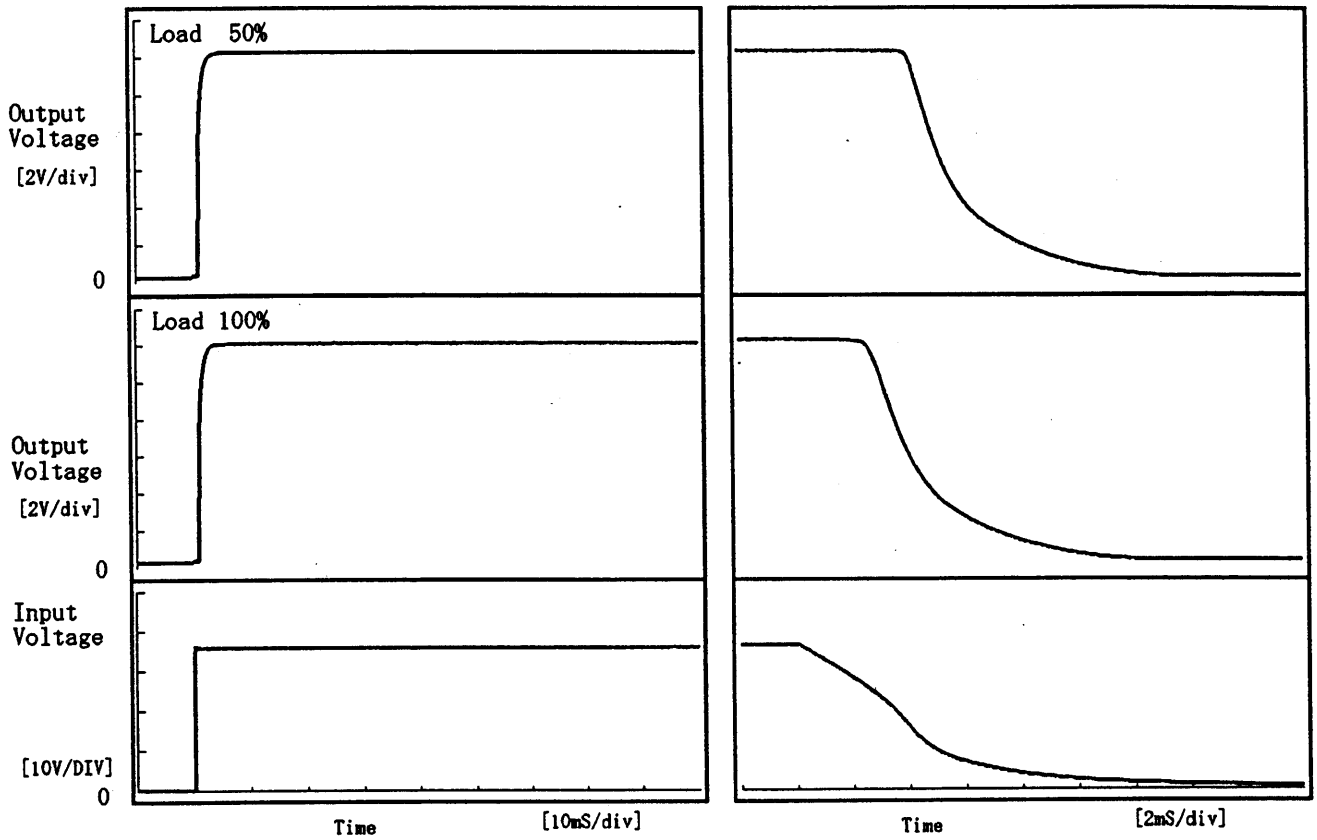
COSEL

Model	ZTW1R54812	...	
Item	Rise and Fall Time 立上り、立下り時間	Temperature	25℃
		Testing Circuitry	Figure A
Object	-12V0.065A		

1. Graph

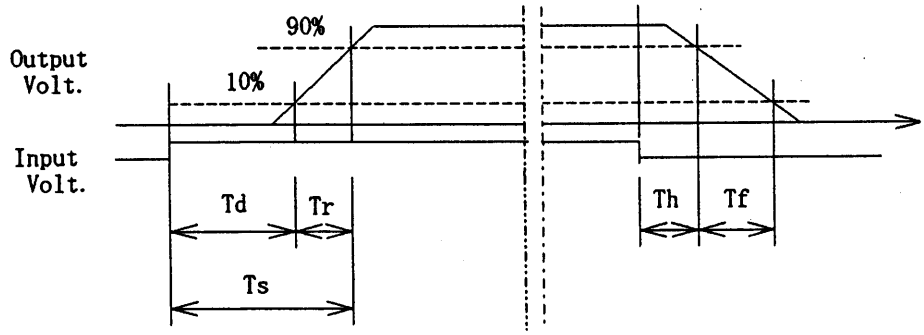
Input Volt. 36.0 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	0.85	1.00	1.85	4.22	4.78
100 %	0.85	1.10	1.95	2.78	4.97



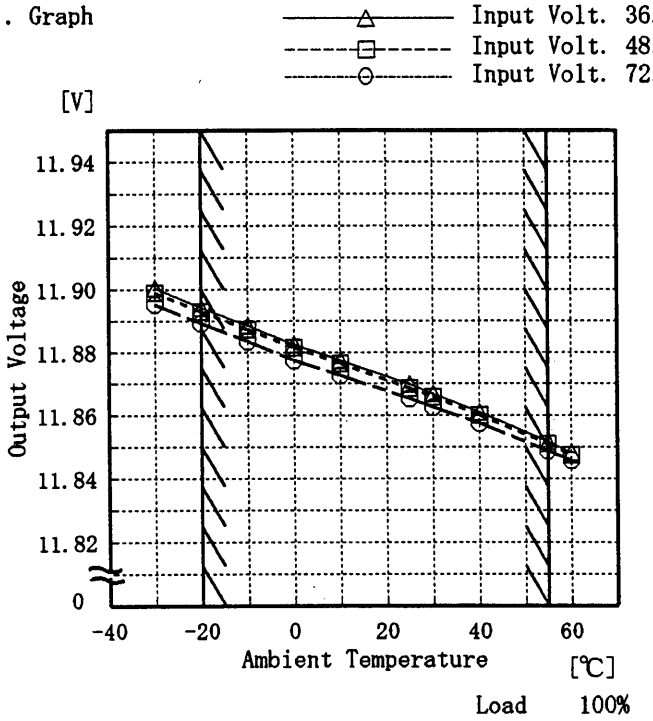
COSEL

Model	ZTW1R54812
Item	Ambient Temperature Drift 周囲温度変動

Testing Circuitry Figure A

Object +12V0.065A

1. Graph

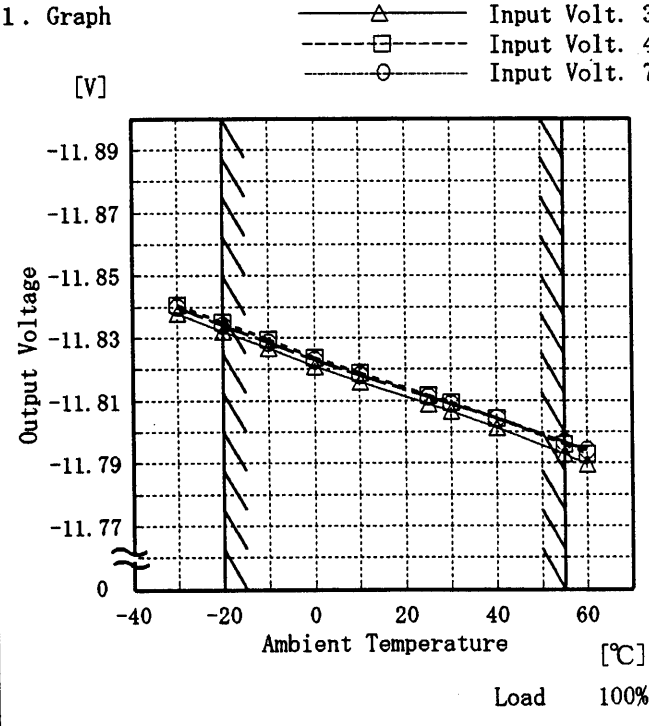


2. Values

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	11.900	11.899	11.895
-20	11.894	11.893	11.889
-10	11.888	11.887	11.883
0	11.882	11.881	11.877
10	11.877	11.876	11.873
25	11.870	11.869	11.865
30	11.867	11.866	11.863
40	11.861	11.860	11.857
55	11.852	11.851	11.849
60	11.848	11.847	11.846
—	—	—	—

Object −12V0.065A

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	-11.838	-11.841	-11.840
-20	-11.832	-11.835	-11.834
-10	-11.827	-11.829	-11.829
0	-11.821	-11.824	-11.823
10	-11.816	-11.819	-11.818
25	-11.809	-11.812	-11.811
30	-11.807	-11.809	-11.809
40	-11.801	-11.804	-11.804
55	-11.793	-11.796	-11.797
60	-11.790	-11.793	-11.794
—	—	—	—

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。

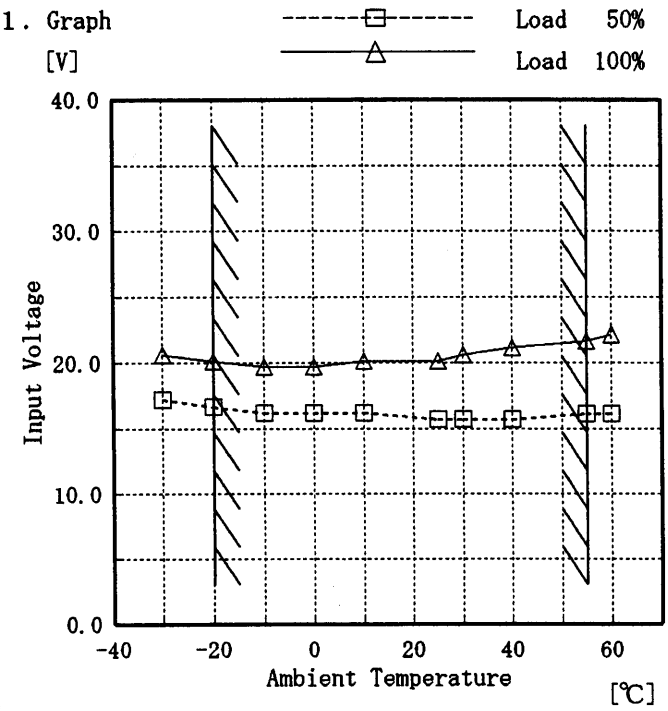
COSEL

Model	ZTW1R54812
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 +12V0.065A

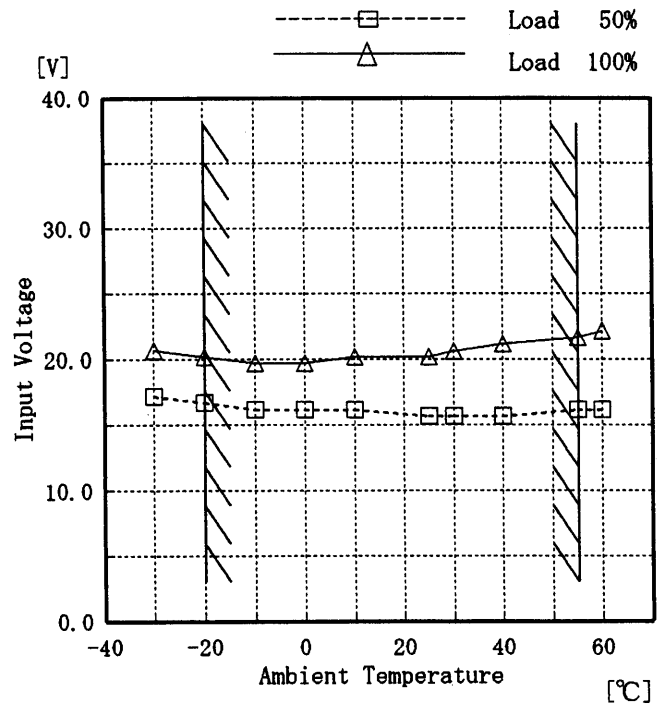
1. Graph



2. Values

Ambient Temp. [℃]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-30	17.2	20.7
-20	16.7	20.2
-10	16.2	19.7
0	16.2	19.7
10	16.2	20.2
25	15.7	20.2
30	15.7	20.6
40	15.7	21.1
55	16.2	21.6
60	16.2	22.1
—	—	—

Object −12V0.065A



2. Values

Ambient Temp. [℃]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-30	17.2	20.7
-20	16.7	20.2
-10	16.2	19.7
0	16.2	19.7
10	16.2	20.2
25	15.7	20.2
30	15.7	20.6
40	15.7	21.1
55	16.2	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。

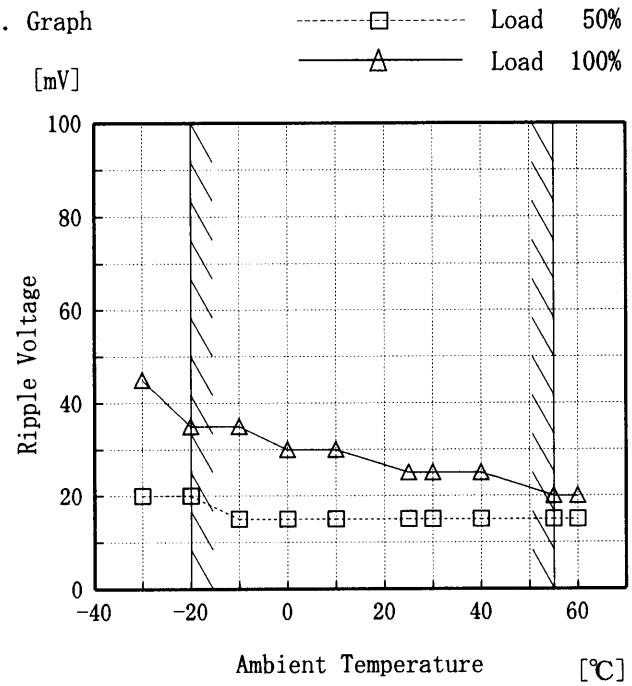
COSEL

Model	ZTW1R54812
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)

Testing Circuitry Figure A

Object ＋12V0.065A

1. Graph



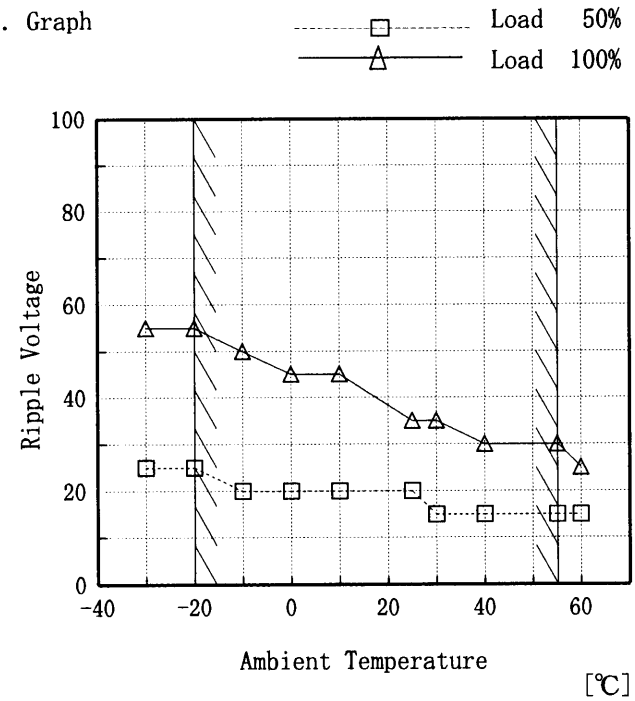
Input Volt. 36.0 V

2. Values

Ambient Temp. [℃]	Load 50% Ripple Output Volt. [mV]	Load 100% Ripple Output Volt. [mV]
-30	20	45
-20	20	35
-10	15	35
0	15	30
10	15	30
25	15	25
30	15	25
40	15	25
55	15	20
60	15	20
—	—	—

Object －12V0.065A

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	25	55
-20	25	55
-10	20	50
0	20	45
10	20	45
25	20	35
30	15	35
40	15	30
55	15	30
60	15	25
—	—	—

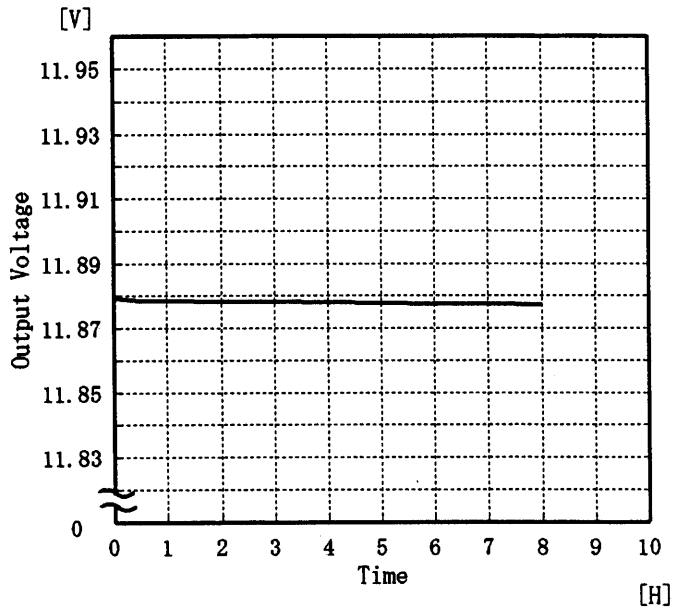
COSEL

Model	ZTW1R54812
Item	Time Lapse Drift 経時ドリフト

Temperature 25 ℃
Testing Circuitry Figure A

Object +12V0.065A

1. Graph



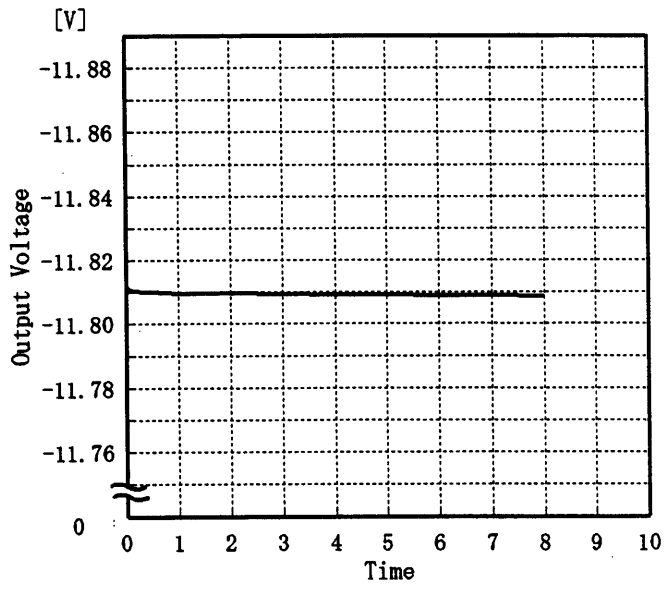
Input Volt. 48.0V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	11.879
0.5	11.879
1.0	11.879
2.0	11.878
3.0	11.878
4.0	11.878
5.0	11.878
6.0	11.878
7.0	11.878
8.0	11.877

Object −12V0.065A

1. Graph



Input Volt. 48.0V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	-11.812
0.5	-11.810
1.0	-11.810
2.0	-11.810
3.0	-11.810
4.0	-11.809
5.0	-11.809
6.0	-11.809
7.0	-11.809
8.0	-11.809

COSEL

Model	ZTW1R54812	
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) : 0.000～0.065 A

(AVR 2) : 0.000～0.065 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) 0.000～0.065 A

(AVR 2) 0.000～0.065 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 +12V0.065A

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration)[%]
Maximum Voltage	-20	36.0	0.065	11.892	±148	±1.3
Minimum Voltage	55	36.0	0.000	11.597		

Object −12V0.065A

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration)[%]
Maximum Voltage	-20	48.0	0.065	-11.833	±150	±1.3
Minimum Voltage	55	36.0	0.000	-11.533		

COSEL

Model	ZTW1R54812
Item	Condensation 結露特性
Object	+12V0.065A

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.

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行い、異常のないことを確認する。

2．Values

Item	Data	Testing Conditions
Output Voltage [V]	11.949	Input Volt.: 48V, Load Current:0.065A
Line Regulation [mV]	5	Input Volt.: 36～72V, Load Current:0.065A
Load Regulation [mV]	291	Input Volt.: 48V, Load Current:0～0.065A

COSEL

Model	ZTW1R54812	
Item	Condensation 結露特性	Testing Circuitry Figure A
Object	−12V0.065A	

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.

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行い、異常のないことを確認する。

2．Values

Item	Data	Testing Conditions
Output Voltage [V]	-11.913	Input Volt.: 48V, Load Current:0.065A
Line Regulation [mV]	3	Input Volt.: 36～72V, Load Current:0.065A
Load Regulation [mV]	266	Input Volt.: 48V, Load Current:0～0.065A

COSEL

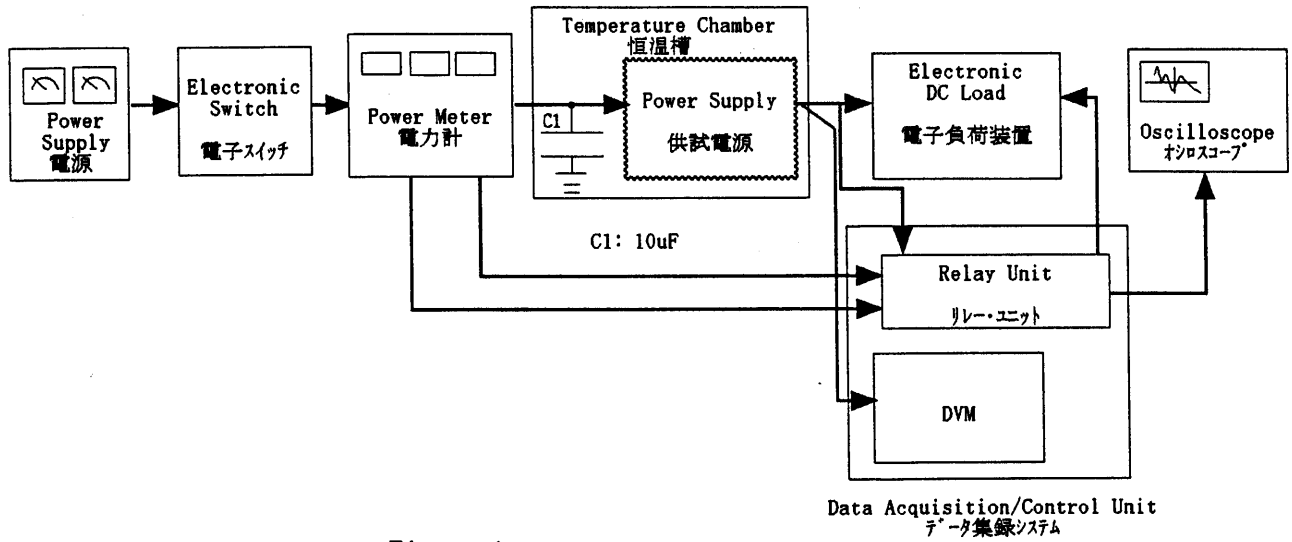


Figure A