



TEST DATA OF ZUS102415

(24.0V 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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Model		ZUS102415	
Item		Line Regulation 静的入力変動	
Object		+15V0.700A	

1. Graph

-----□----- Load 50%

-----△----- Load 100%

[V]

Output Voltage

15.48

15.38

15.28

15.18

15.08

14.98

14.88

0

0

15

25

35

45

Input Voltage [V]

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。

Input Voltage [V]	Load 50%	Load 100%
	Output Volt. [V]	Output Volt. [V]
16.0	15.130	15.127
18.0	15.130	15.127
20.0	15.131	15.126
24.0	15.131	15.125
30.0	15.130	15.124
36.0	15.130	15.123
40.0	15.130	15.122
—	—	—
—	—	—
—	—	—
—	—	—
—	—	—

2. Values

COSEL

Model		ZUS102415	Temperature 25℃ Testing Circuitry Figure A
Item		Efficiency 効率	
Object			

1. Graph

-----□-----

Load 50%

——△——

Load 100%

Efficiency [%]

Input Voltage [V]

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。

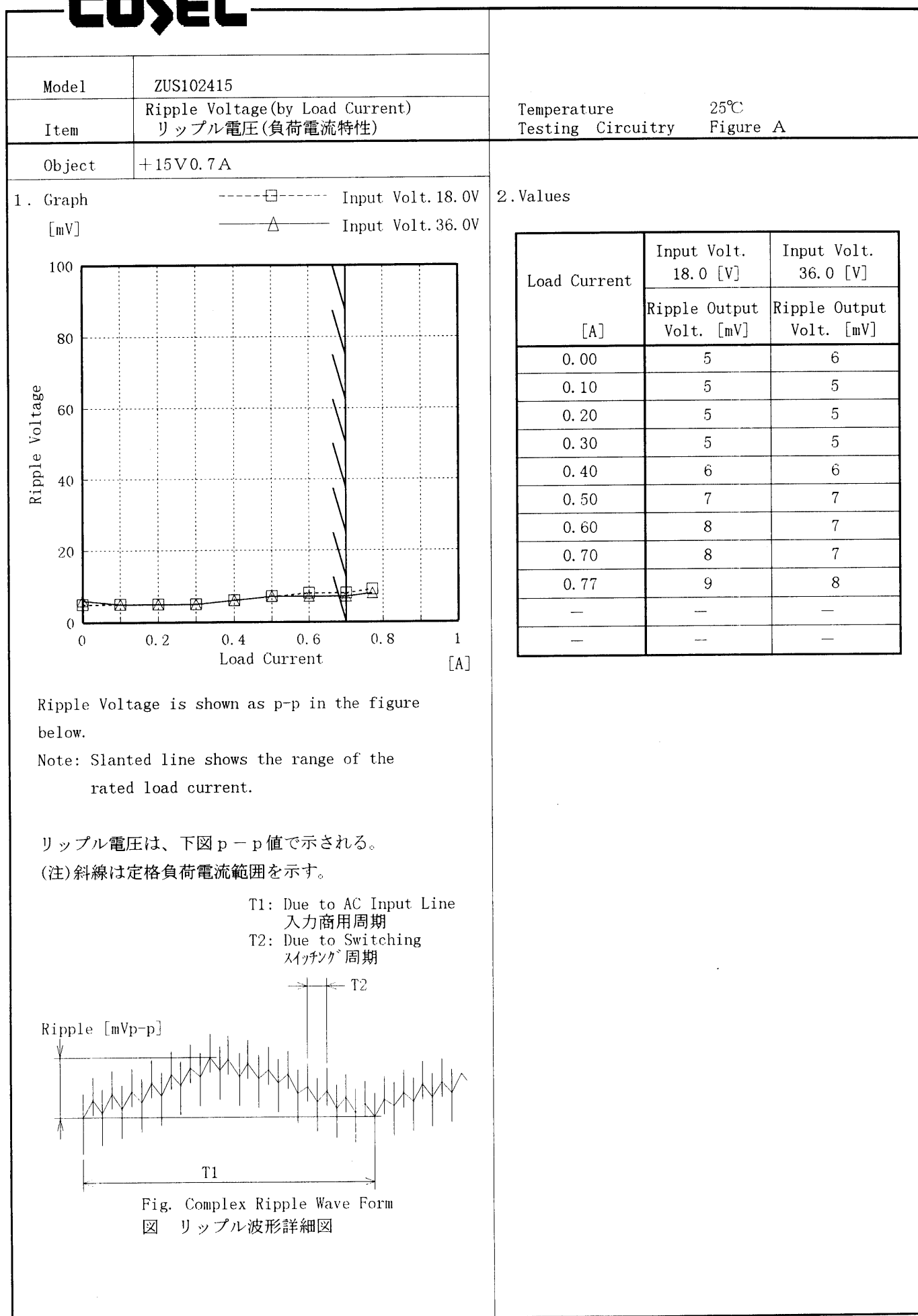
2. Values

Input Voltage [V]	Load 50%	Load 100%
	Efficiency [%]	Efficiency [%]
16.0	81.1	81.3
18.0	80.8	82.1
20.0	80.9	82.4
24.0	80.0	82.7
30.0	78.2	82.2
36.0	77.3	81.5
40.0	76.2	80.9
—	—	—
—	—	—
—	—	—
—	—	—
—	—	—

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Model		ZUS102415		Temperature		25℃																																																
Item		Load Regulation 静的負荷変動		Testing Circuitry		Figure A																																																
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<div><div><div>△</div><div>Input Volt. 18.0V</div></div><div><div>□</div><div>Input Volt. 24.0V</div></div><div><div>○</div><div>Input Volt. 36.0V</div></div></div> <p>Output Voltage [V]</p> <p>Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p> <p>(注)斜線は定格負荷電流範囲を示す。</p>				<table><tr><th rowspan="2">Load Current [A]</th><th>Input Volt. 18.0[V]</th><th>Input Volt. 24.0[V]</th><th>Input Volt. 36.0[V]</th></tr><tr><th>Output Volt. [V]</th><th>Output Volt. [V]</th><th>Output Volt. [V]</th></tr><tr><td>0.00</td><td>15.134</td><td>15.133</td><td>15.133</td></tr><tr><td>0.10</td><td>15.132</td><td>15.131</td><td>15.130</td></tr><tr><td>0.20</td><td>15.131</td><td>15.130</td><td>15.129</td></tr><tr><td>0.30</td><td>15.130</td><td>15.129</td><td>15.128</td></tr><tr><td>0.40</td><td>15.128</td><td>15.129</td><td>15.126</td></tr><tr><td>0.50</td><td>15.128</td><td>15.127</td><td>15.127</td></tr><tr><td>0.60</td><td>15.127</td><td>15.126</td><td>15.124</td></tr><tr><td>0.70</td><td>15.126</td><td>15.125</td><td>15.123</td></tr><tr><td>0.77</td><td>15.125</td><td>15.124</td><td>15.123</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td></tr></table>				Load Current [A]	Input Volt. 18.0[V]	Input Volt. 24.0[V]	Input Volt. 36.0[V]	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]	0.00	15.134	15.133	15.133	0.10	15.132	15.131	15.130	0.20	15.131	15.130	15.129	0.30	15.130	15.129	15.128	0.40	15.128	15.129	15.126	0.50	15.128	15.127	15.127	0.60	15.127	15.126	15.124	0.70	15.126	15.125	15.123	0.77	15.125	15.124	15.123	—	—	—	—
Load Current [A]	Input Volt. 18.0[V]	Input Volt. 24.0[V]	Input Volt. 36.0[V]																																																			
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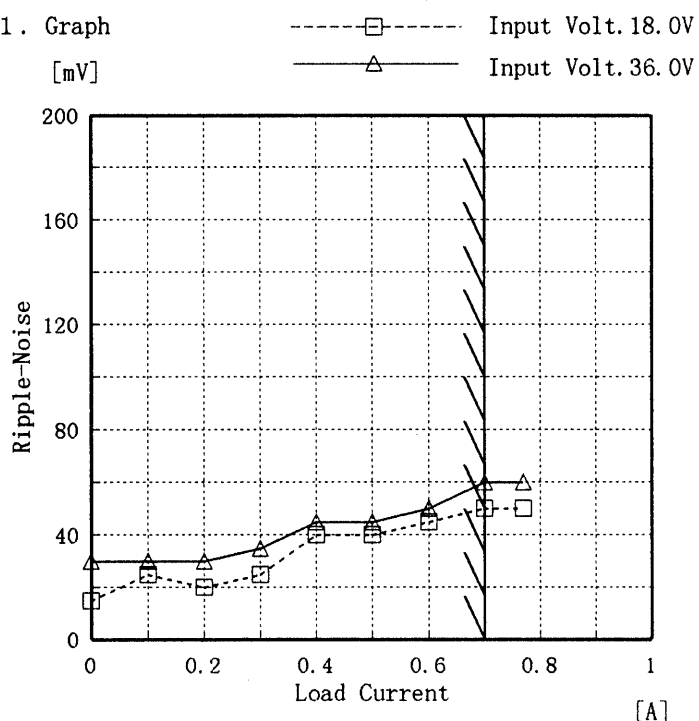
Model ZUS102415

Item Ripple-Noise リップルノイズ

Object +15V0.700A

Temperature 25°C
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。

2. Values

Load current [A]	Input Volt. 18.0 [V]	Input Volt. 36.0 [V]
	Ripple-Noise [mV]	Ripple-Noise [mV]
0.00	15	30
0.10	25	30
0.20	20	30
0.30	25	35
0.40	40	45
0.50	40	45
0.60	45	50
0.70	50	60
0.77	50	60
—	—	—
—	—	—

T1: Due to AC Input Line
入力商用周期
T2: Due to Switching
スイッチング周期

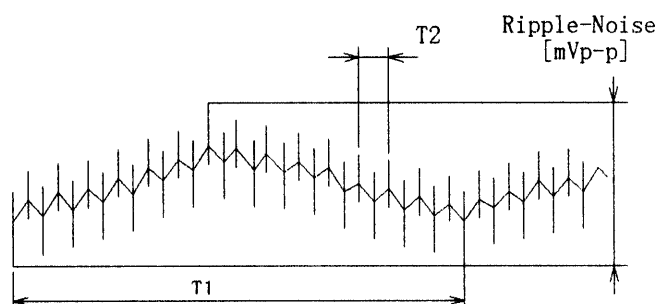


Fig. Complex Ripple Wave Form

図 リップル波形詳細図

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Model		ZUS102415	Temperature25℃ Testing Circuitry Figure A
Item		Overcurrent Protection 過電流保護	
Object		+15V0.700A	

1. Graph

[V]

20

15

10

5

0

0

0.2

0.4

0.6

0.8

1

1.2

1.4

Output Voltage

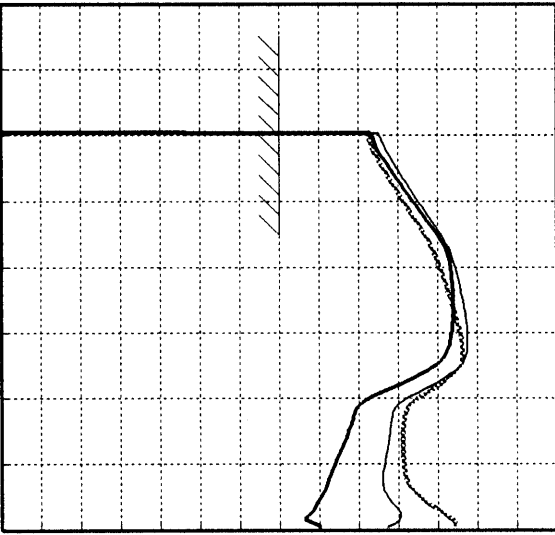
Load Current

[A]

Input Volt. 18.0V

Input Volt. 24.0V

Input Volt. 36.0V



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. 18.0[V]	Input Volt. 24.0[V]	Input Volt. 36.0[V]
	Load Curr- ent [A]	Load Curr- ent [A]	Load Curr- ent [A]
15.00	0.00	0.00	0.00
14.25	0.94	0.98	0.96
13.50	0.97	1.00	0.99
12.00	1.03	1.07	1.06
10.50	1.09	1.13	1.12
9.00	1.13	1.16	1.14
7.50	1.15	1.17	1.14
6.00	1.14	1.14	1.07
4.50	1.02	0.99	0.89
3.00	1.01	0.97	0.86
1.50	1.03	0.96	0.82
0.00	1.14	0.97	0.81

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Model	ZUS102415	Temperature	25°C
Item	Dynamic Load Response 動的負荷変動	Testing Circuitry	Figure A
Object	+15V0.350A		

Input Volt. 24 V

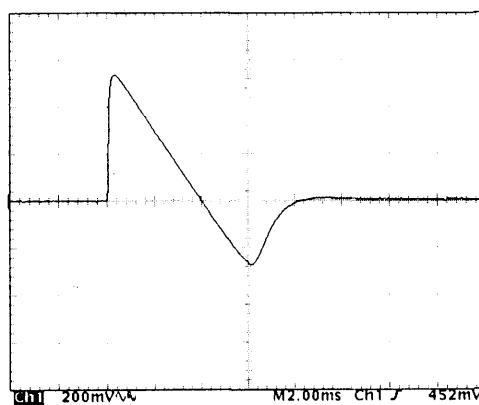
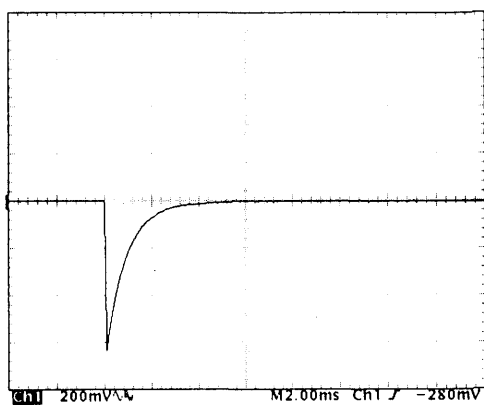
Cycle 100 mS

Load Current

Min. Load ↔

Load 100 %

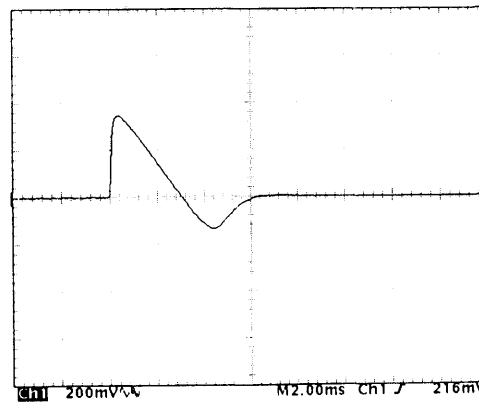
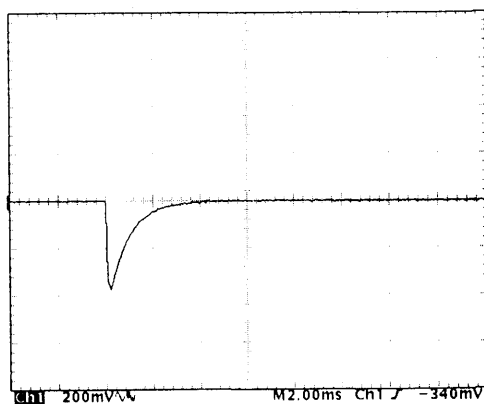
200 mV/div



Min. Load ↔

Load 50 %

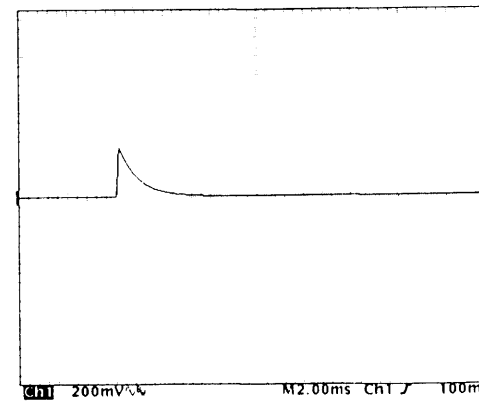
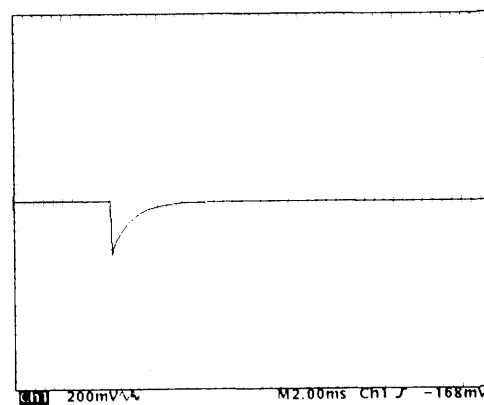
200 mV/div



Load 50% ↔

Load 100 %

200 mV/div



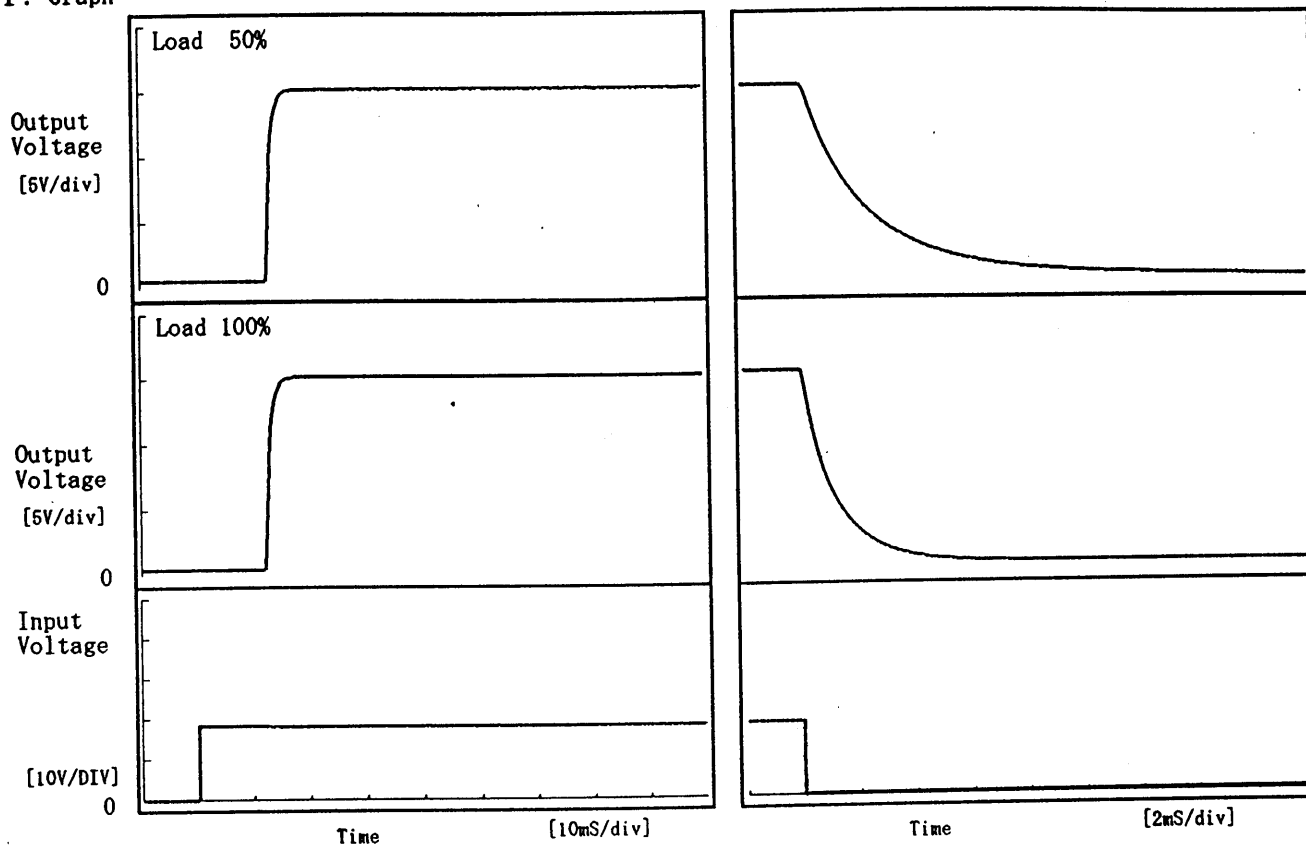
2 mS/div

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Model	ZUS102415	Temperature	25°C
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	+15V0.700A		

1. Graph

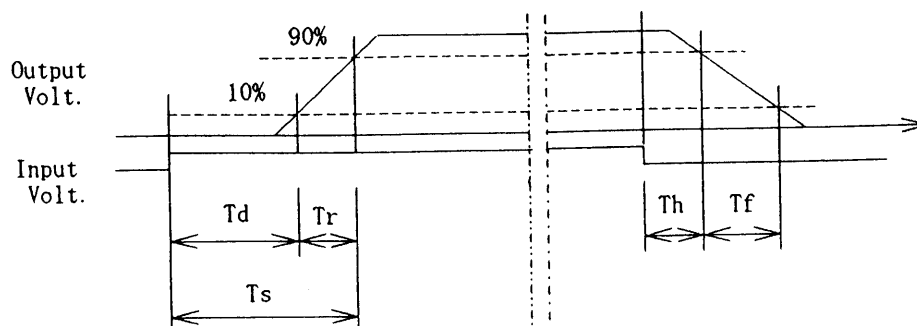
Input Volt. 18.0 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	12.45	1.85	14.30	0.38	6.27
100 %	12.80	1.75	14.55	0.17	2.91



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Model		ZUS102415	Testing Circuitry Figure A																																																			
Item		Ambient Temperature Drift 周囲温度変動																																																				
Object		+15V0.700A																																																				
1. Graph		<div> <div> <div>△</div> <div>Input Volt. 18.0V</div> </div> <div> <div>□</div> <div>Input Volt. 24.0V</div> </div> <div> <div>○</div> <div>Input Volt. 36.0V</div> </div> </div> <p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p> <p>Note: Slanted line shows the range of the rated ambient temperature.</p> <p>(注)斜線は定格周囲温度範囲を示す。</p>																																																				
2. Values		<table> <tr> <th>Temperature</th><th>Input Volt. 18.0[V]</th><th>Input Volt. 24.0[V]</th><th>Input Volt. 36.0[V]</th></tr> <tr> <th>[°C]</th><th>Output Volt. [V]</th><th>Output Volt. [V]</th><th>Output Volt. [V]</th></tr> <tr><td>-30</td><td>15.150</td><td>15.149</td><td>15.151</td></tr> <tr><td>-20</td><td>15.146</td><td>15.142</td><td>15.143</td></tr> <tr><td>-10</td><td>15.141</td><td>15.139</td><td>15.137</td></tr> <tr><td>0</td><td>15.137</td><td>15.136</td><td>15.133</td></tr> <tr><td>10</td><td>15.134</td><td>15.132</td><td>15.130</td></tr> <tr><td>25</td><td>15.128</td><td>15.126</td><td>15.124</td></tr> <tr><td>30</td><td>15.124</td><td>15.122</td><td>15.120</td></tr> <tr><td>40</td><td>15.114</td><td>15.111</td><td>15.109</td></tr> <tr><td>55</td><td>15.097</td><td>15.094</td><td>15.092</td></tr> <tr><td>60</td><td>15.088</td><td>15.085</td><td>15.083</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> </table>		Temperature	Input Volt. 18.0[V]	Input Volt. 24.0[V]	Input Volt. 36.0[V]	[°C]	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]	-30	15.150	15.149	15.151	-20	15.146	15.142	15.143	-10	15.141	15.139	15.137	0	15.137	15.136	15.133	10	15.134	15.132	15.130	25	15.128	15.126	15.124	30	15.124	15.122	15.120	40	15.114	15.111	15.109	55	15.097	15.094	15.092	60	15.088	15.085	15.083	—	—	—
Temperature	Input Volt. 18.0[V]	Input Volt. 24.0[V]	Input Volt. 36.0[V]																																																			
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—	—	—	—																																																			

COSEL

Model		ZUS102415
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧	
Object	+15V0.700A	

1. Graph

-----□-----

Load 50%

-----△-----

Load 100%

Input Voltage

[V]

28

24

20

16

12

8

4

0

-40

-20

0

20

40

60

Ambient Temperature

[°C]

2. Values

Ambient Temp.	Load 50%	Load 100%
Input Volt.	Input Volt.	Input Volt.
[°C]	[V]	[V]
-30	13.7	14.6
-20	13.7	14.7
-10	13.7	14.7
0	13.8	14.7
10	13.9	14.8
25	14.0	14.9
30	14.0	15.0
40	14.0	15.1
55	14.1	15.1
60	14.2	15.1
—	—	—

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		ZUS102415	Testing Circuitry	Figure A																																			
Item		Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)																																					
Object		+15V0.700A																																					
1. Graph		<div><div>-----□----- Load 50%</div><div>-----△----- Load 100%</div></div> <p>Input Volt. 18.0 V</p> <p>Note: Slanted line shows the range of the rated ambient temperature.</p> <p>(注)斜線は定格周囲温度範囲を示す。</p>	2. Values																																				
		<table><tr><th>Ambient Temp. [°C]</th><th>Load 50% Ripple Output Volt. [mV]</th><th>Load 100% Ripple Output Volt. [mV]</th></tr><tr><td>-30</td><td>5</td><td>10</td></tr><tr><td>-20</td><td>5</td><td>10</td></tr><tr><td>-10</td><td>5</td><td>10</td></tr><tr><td>0</td><td>5</td><td>5</td></tr><tr><td>10</td><td>5</td><td>5</td></tr><tr><td>25</td><td>5</td><td>5</td></tr><tr><td>30</td><td>5</td><td>5</td></tr><tr><td>40</td><td>5</td><td>5</td></tr><tr><td>55</td><td>5</td><td>5</td></tr><tr><td>60</td><td>5</td><td>5</td></tr><tr><td>—</td><td>—</td><td>—</td></tr></table>	Ambient Temp. [°C]	Load 50% Ripple Output Volt. [mV]	Load 100% Ripple Output Volt. [mV]	-30	5	10	-20	5	10	-10	5	10	0	5	5	10	5	5	25	5	5	30	5	5	40	5	5	55	5	5	60	5	5	—	—	—	
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COSEL

COSEL																									
Model	ZUS102415	Temperature 25℃ Testing Circuitry Figure A																							
Item	Time Lapse Drift 経時ドリフト																								
Object	+15V0.700A																								
1. Graph		2.Values																							
<p>[V]</p> <p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 24V Load 100%</p>		<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>15.127</td></tr><tr><td>0.5</td><td>15.116</td></tr><tr><td>1.0</td><td>15.116</td></tr><tr><td>2.0</td><td>15.116</td></tr><tr><td>3.0</td><td>15.116</td></tr><tr><td>4.0</td><td>15.116</td></tr><tr><td>5.0</td><td>15.116</td></tr><tr><td>6.0</td><td>15.116</td></tr><tr><td>7.0</td><td>15.116</td></tr><tr><td>8.0</td><td>15.116</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	15.127	0.5	15.116	1.0	15.116	2.0	15.116	3.0	15.116	4.0	15.116	5.0	15.116	6.0	15.116	7.0	15.116	8.0	15.116
Time since start [H]	Output Voltage [V]																								
0.0	15.127																								
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3.0	15.116																								
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7.0	15.116																								
8.0	15.116																								

COSEL

Model		ZUS102415	Testing Circuitry Figure A
Item		Output Voltage Accuracy 定電圧精度	
Object		+15V0.700A	

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 °C

Input Voltage : 18.0~36.0 V

Load Current : 0.000~0.700 A

* Output Voltage Accuracy = $\pm (\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

* 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 °C

入力電圧 : 18.0~36.0 V

負荷電流 : 0.000~0.700 A

* 定電圧精度(変動値) = $\pm (\text{出力電圧の最高値} - \text{出力電圧の最低値}) / 2$

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

Item	Temperature [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ration) [%]
Maximum Voltage	-20	36.0	0.000	15.156	±37	±0.3
Minimum Voltage	55	36.0	0.700	15.083		

COSEL

LUCEL

Model	ZUS102415
Item	Condensation 結露特性
Object	+15V0.700A

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、その電氣的特性の測定を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	15.121	5	30
	2	15.121	5	30
	3	15.123	5	30
Load 100 %	1	15.120	10	50
	2	15.117	10	50
	3	15.119	10	50

Input Volt. 24.0 V

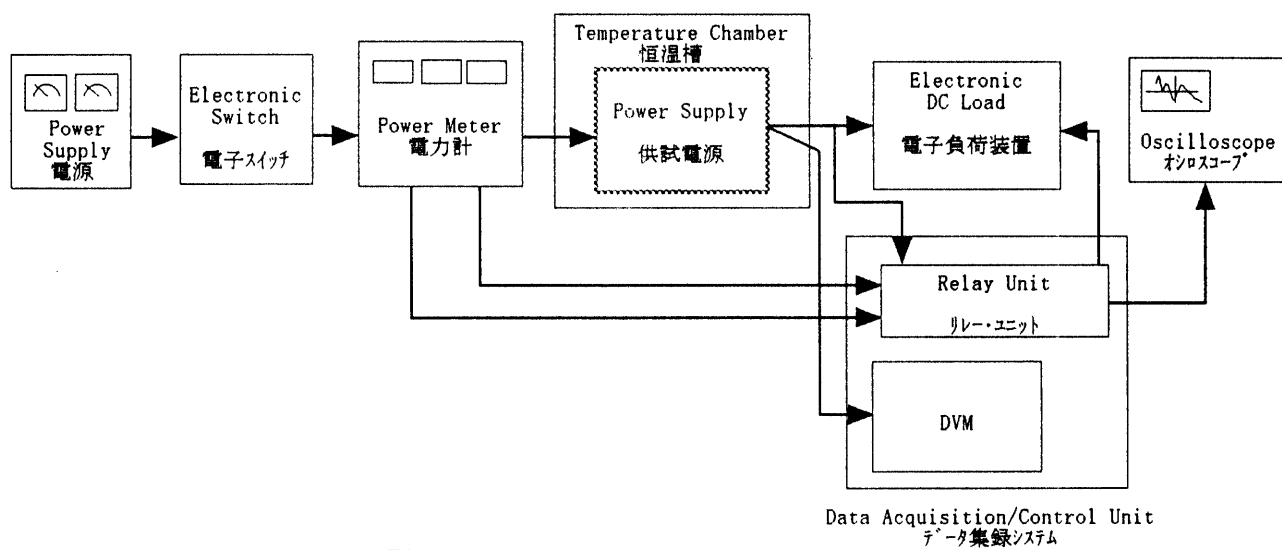
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Figure A