



TEST DATA OF ZUW64815  
(48.0V INPUT)

Regulated DC Power Supply

Date : Sep. 21. 1996

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Design Manager

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コーセル株式会社  
COSEL CO., LTD.

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<b>Model</b> ZUW64815		Temperature 25°C Testing Circuitry Figure A																																						
<b>Item</b>	Line Regulation 静的入力変動																																							
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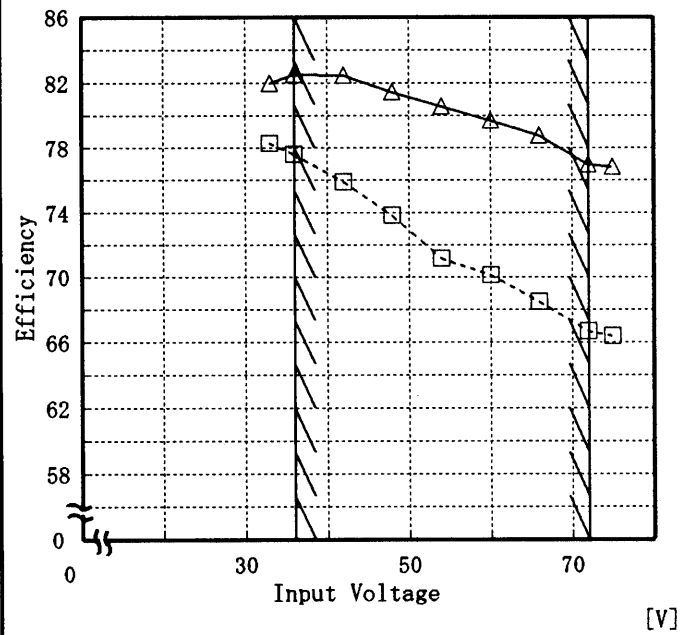
Model ZUW64815

Item Efficiency 効率

Temperature 25°C  
Testing Circuitry Figure A

Object

1. Graph  
 ---□--- Load 50%  
 ---△--- Load 100%



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 [%]
33.0	78.3	82.0
36.0	77.6	82.5
42.0	75.9	82.5
48.0	73.8	81.4
54.0	71.1	80.6
60.0	70.1	79.7
66.0	68.5	78.8
72.0	66.7	77.0
75.0	66.4	76.8
—	—	—
—	—	—
—	—	—



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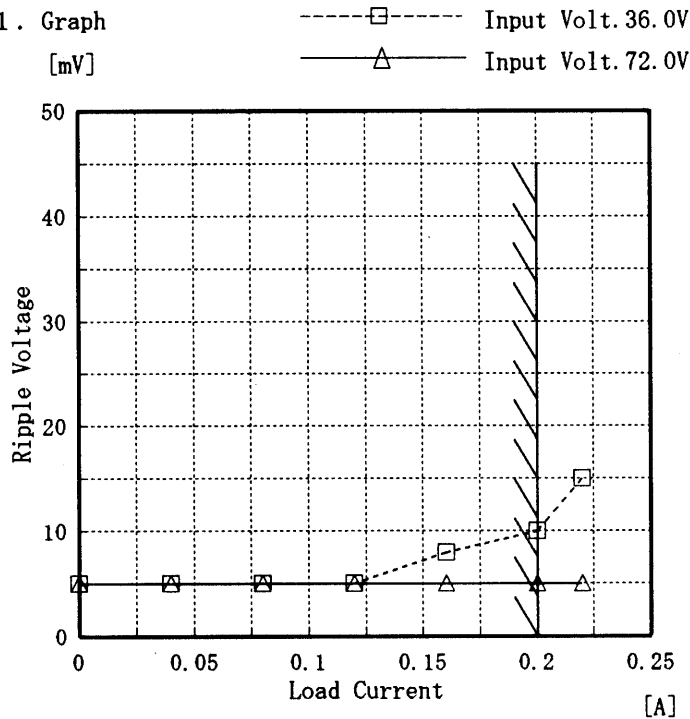
# COSEL

Model		ZUW64815	Temperature		25°C																																						
Item		Ripple Voltage (by Load Current) リップル電圧(負荷電流特性)	Testing Circuitry		Figure A																																						
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<p>Fig. Complex Ripple Wave Form</p> <p>図 リップル波形詳細図</p>																																											



Model	ZUW64815	Temperature	25°C
Item	Ripple Voltage (by Load Current) リップル電圧(負荷電流特性)	Testing Circuitry	Figure A
Object	-15V 0.2A		

1. Graph



2. Values

Load Current [A]	Input Volt. 36.0 [V]	Input Volt. 72.0 [V]
	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]
0.000	5	5
0.040	5	5
0.080	5	5
0.120	5	5
0.160	8	5
0.200	10	5
0.220	15	5
—	—	—
—	—	—
—	—	—
—	—	—

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  
スイッチング周期

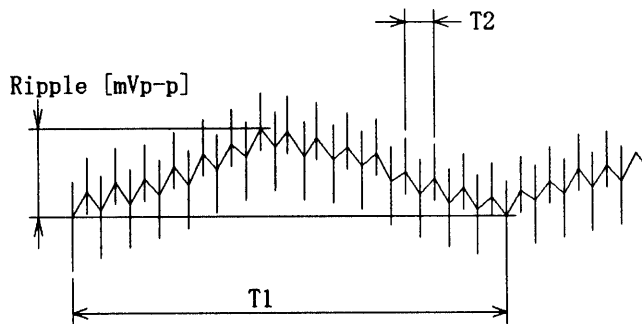
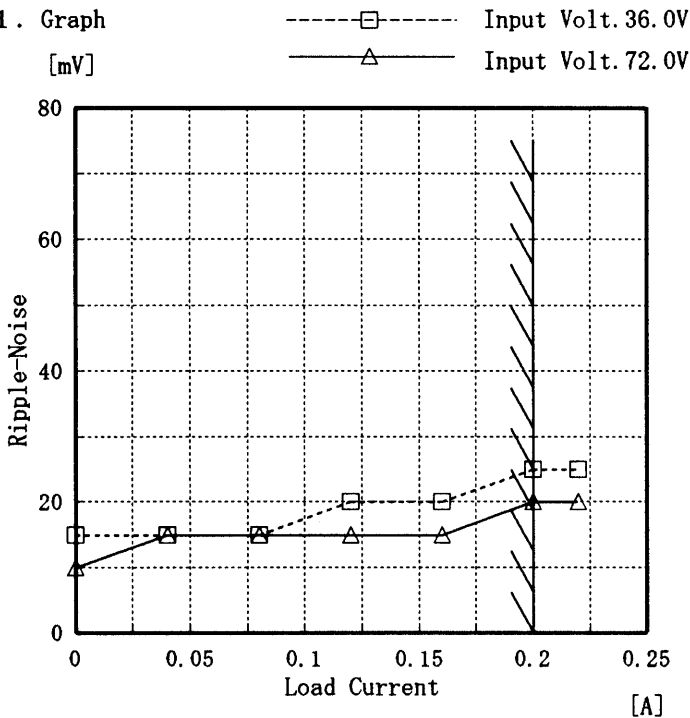


Fig. Complex Ripple Wave Form  
図 リップル波形詳細図



Model	ZUW64815	Temperature	25°C
Item	Ripple-Noise リップルノイズ	Testing Circuitry	Figure A
Object	+15V0.2A		

1. Graph



2. Values

Load current [A]	Input Volt. 36.0 [V]	Input Volt. 72.0 [V]
	Ripple-Noise [mV]	Ripple-Noise [mV]
0.000	15	10
0.040	15	15
0.080	15	15
0.120	20	15
0.160	20	15
0.200	25	20
0.220	25	20
—	—	—
—	—	—
—	—	—
—	—	—

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  
 スイッチング周期

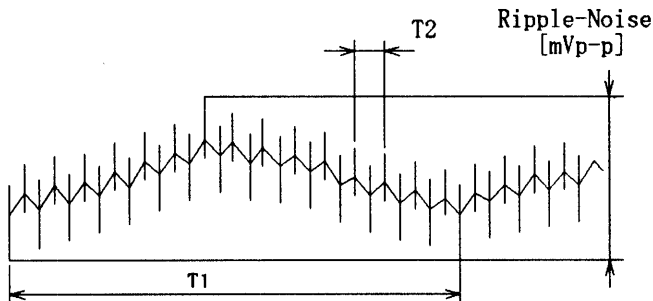


Fig. Complex Ripple Wave Form  
 図 リップル波形詳細図

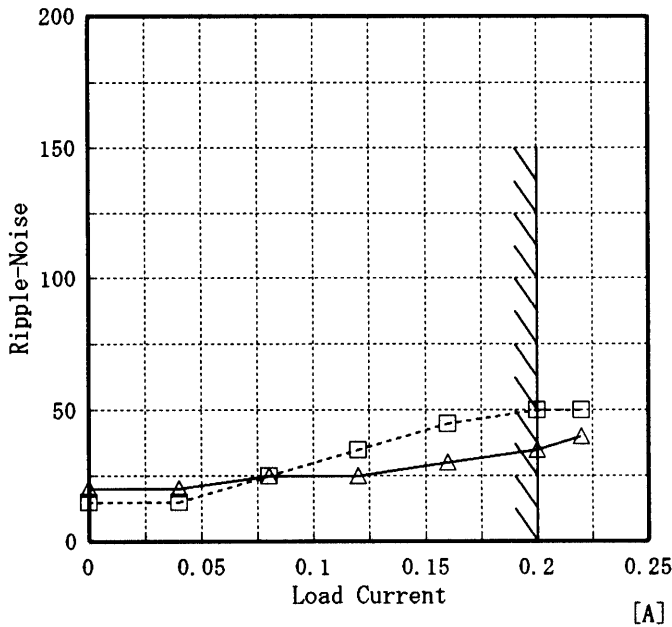




Model	ZUW654815	Temperature	25°C
Item	Ripple-Noise リップルノイズ	Testing Circuitry	Figure A

Object -15V0.2A

1. Graph  
 [mV]  
 -----□----- Input Volt. 36.0V  
 -----△----- Input Volt. 72.0V



2. Values

Load current [A]	Input Volt. 36.0 [V]	Input Volt. 72.0 [V]
	Ripple-Noise [mV]	Ripple-Noise [mV]
0.000	15	20
0.040	15	20
0.080	25	25
0.120	35	25
0.160	45	30
0.200	50	35
0.220	50	40
—	—	—
—	—	—
—	—	—
—	—	—

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  
 スイッチング周期

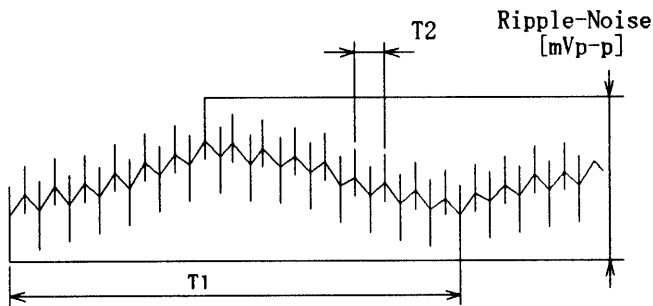
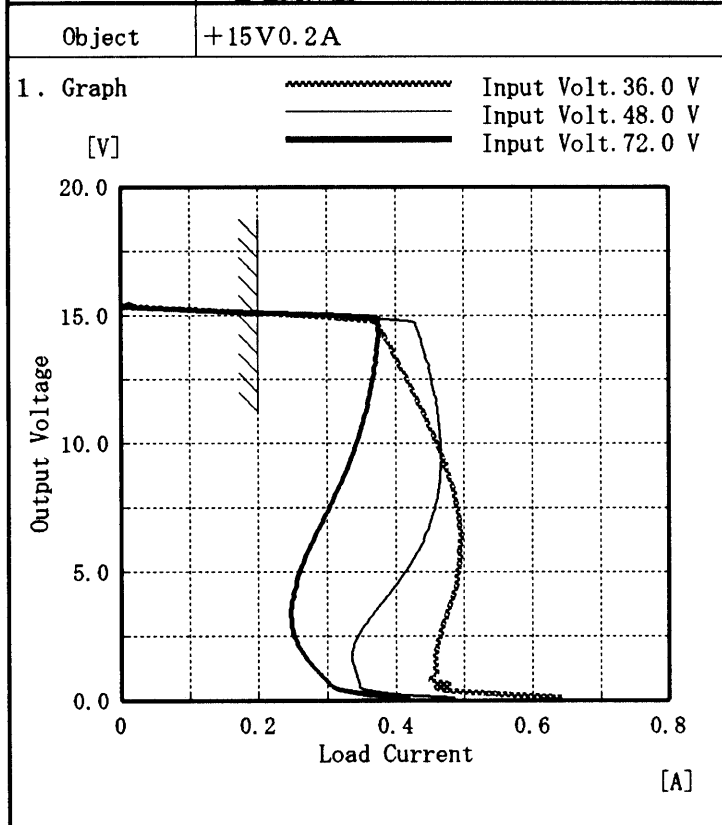


Fig. Complex Ripple Wave Form  
 図 リップル波形詳細図

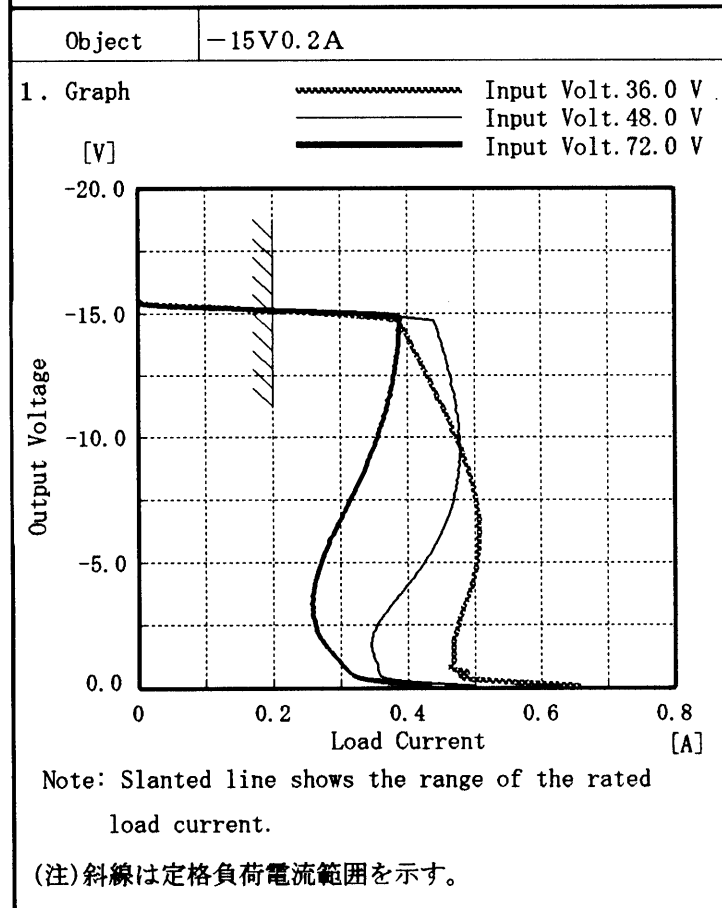


Model	ZUW64815	Temperature	25°C
Item	Overcurrent Protection 過電流保護	Testing Circuitry	Figure A



2. Values

Output Voltage [V]	Input Volt. 36.0[V]	Input Volt. 48.0[V]	Input Volt. 72.0[V]
	Load Current [A]	Load Current [A]	Load Current [A]
15.00	0.259	0.283	0.297
14.25	0.381	0.434	0.375
13.50	0.396	0.441	0.374
12.00	0.424	0.456	0.364
10.50	0.451	0.464	0.349
9.00	0.473	0.465	0.329
7.50	0.488	0.457	0.304
6.00	0.494	0.435	0.275
4.50	0.489	0.401	0.255
3.00	0.470	0.356	0.248
1.50	0.457	0.336	0.272
0.00	0.643	0.487	0.421



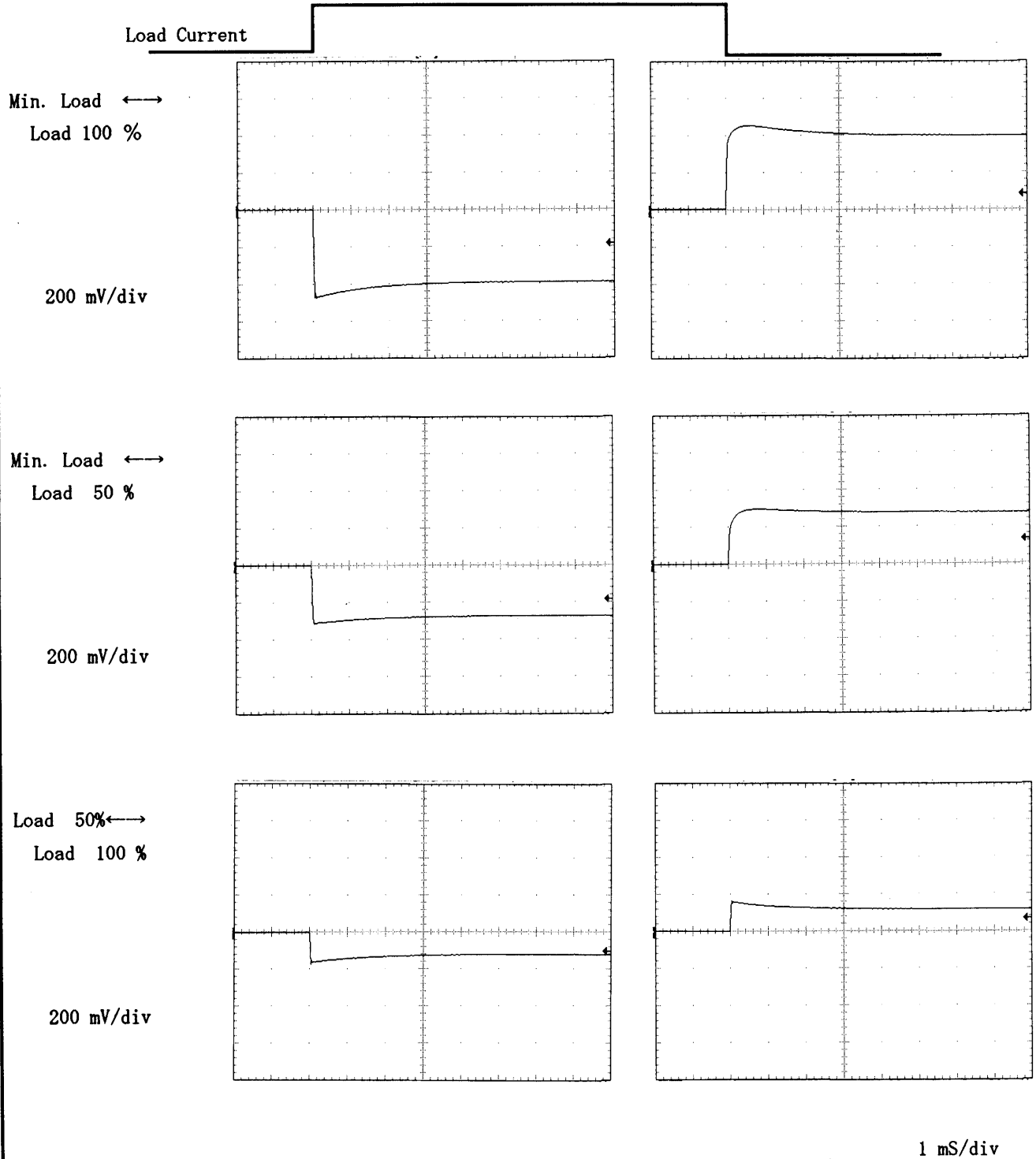
2. Values

Output Voltage [V]	Input Volt. 36.0[V]	Input Volt. 48.0[V]	Input Volt. 72.0[V]
	Load Current [A]	Load Current [A]	Load Current [A]
-15.00	0.248	0.263	0.281
-14.25	0.397	0.446	0.388
-13.50	0.409	0.452	0.386
-12.00	0.438	0.467	0.376
-10.50	0.466	0.476	0.362
-9.00	0.485	0.476	0.340
-7.50	0.501	0.469	0.316
-6.00	0.505	0.446	0.285
-4.50	0.499	0.411	0.265
-3.00	0.481	0.367	0.259
-1.50	0.468	0.346	0.281
0.00	0.659	0.501	0.436



Model		ZUW64815	Temperature		25°C
Item		Dynamic Load Responce 動的負荷変動	Testing Circuitry		Figure A
Object		+15V0.2A			

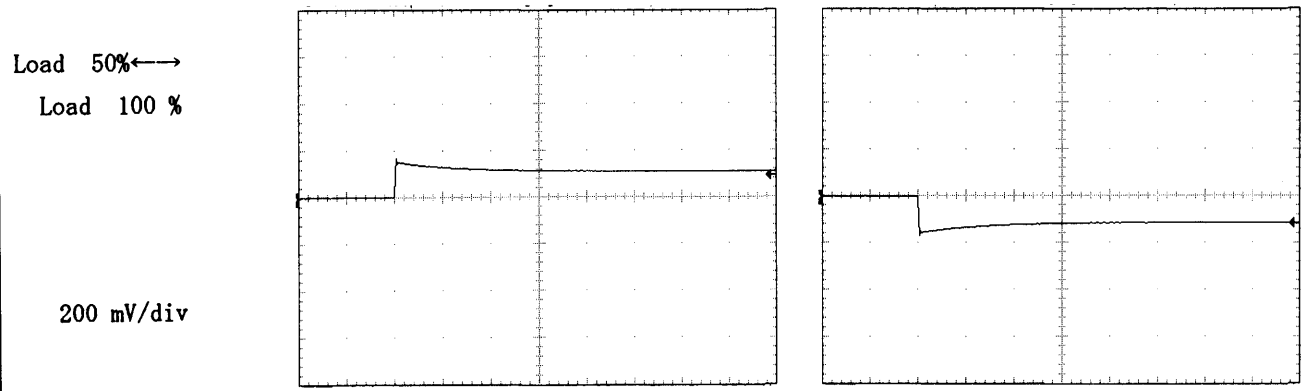
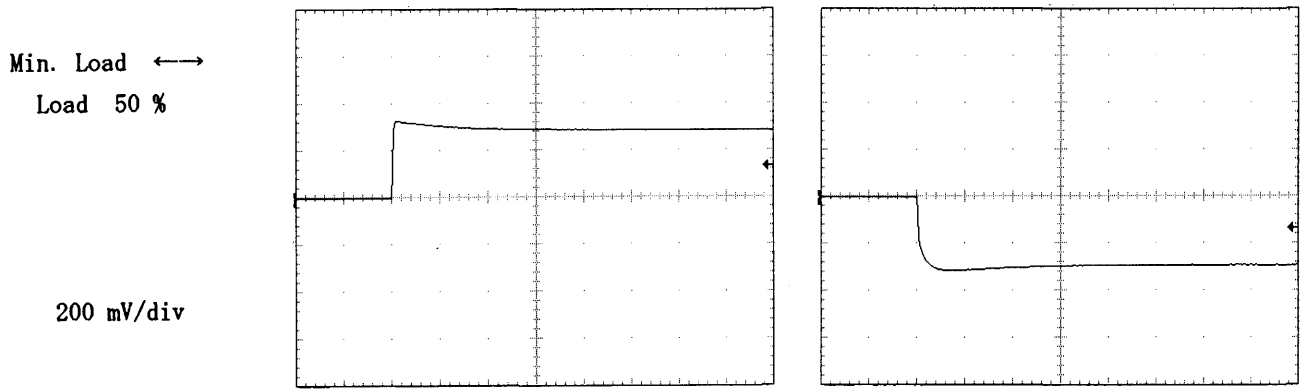
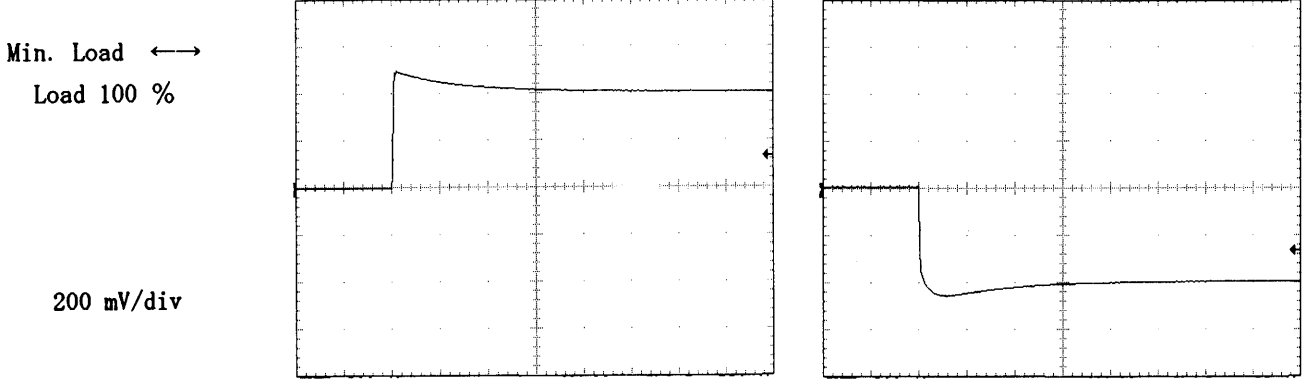
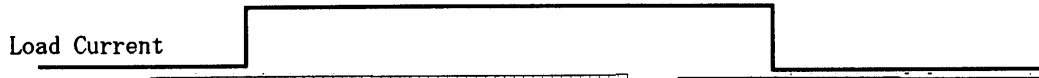
Input Volt. 48.0 V  
Cycle 100 mS





Model		ZUW64815	Temperature		25°C
Item		Dynamic Load Responce 動的負荷変動	Testing Circuitry		Figure A
Object		-15V0.2A			

Input Volt. 48.0 V  
Cycle 100 mS



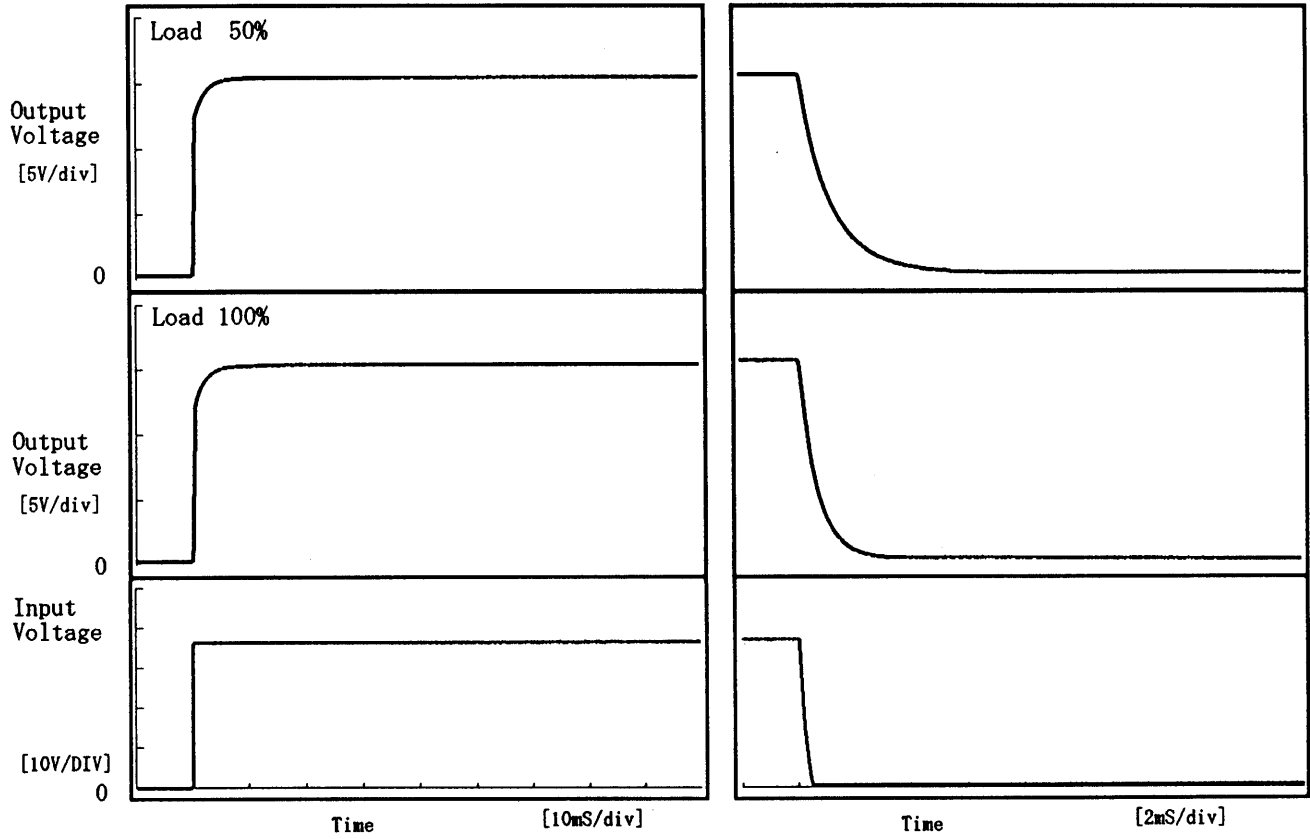
1 mS/div



Model	ZUW64815	Temperature	25°C
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	+15V0.2A		

1. Graph

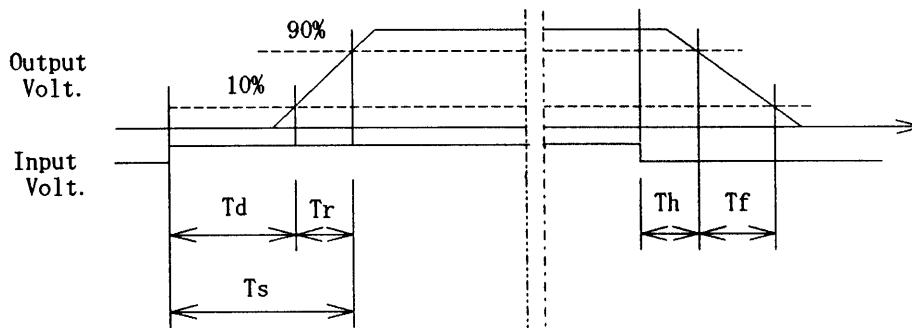
Input Volt. 36.0 V



2. Values

[mS]

Load \ Time	T <sub>d</sub>	T <sub>r</sub>	T <sub>s</sub>	T <sub>h</sub>	T <sub>f</sub>
50 %	0.10	1.45	1.55	0.26	2.70
100 %	0.10	1.55	1.65	0.18	1.47

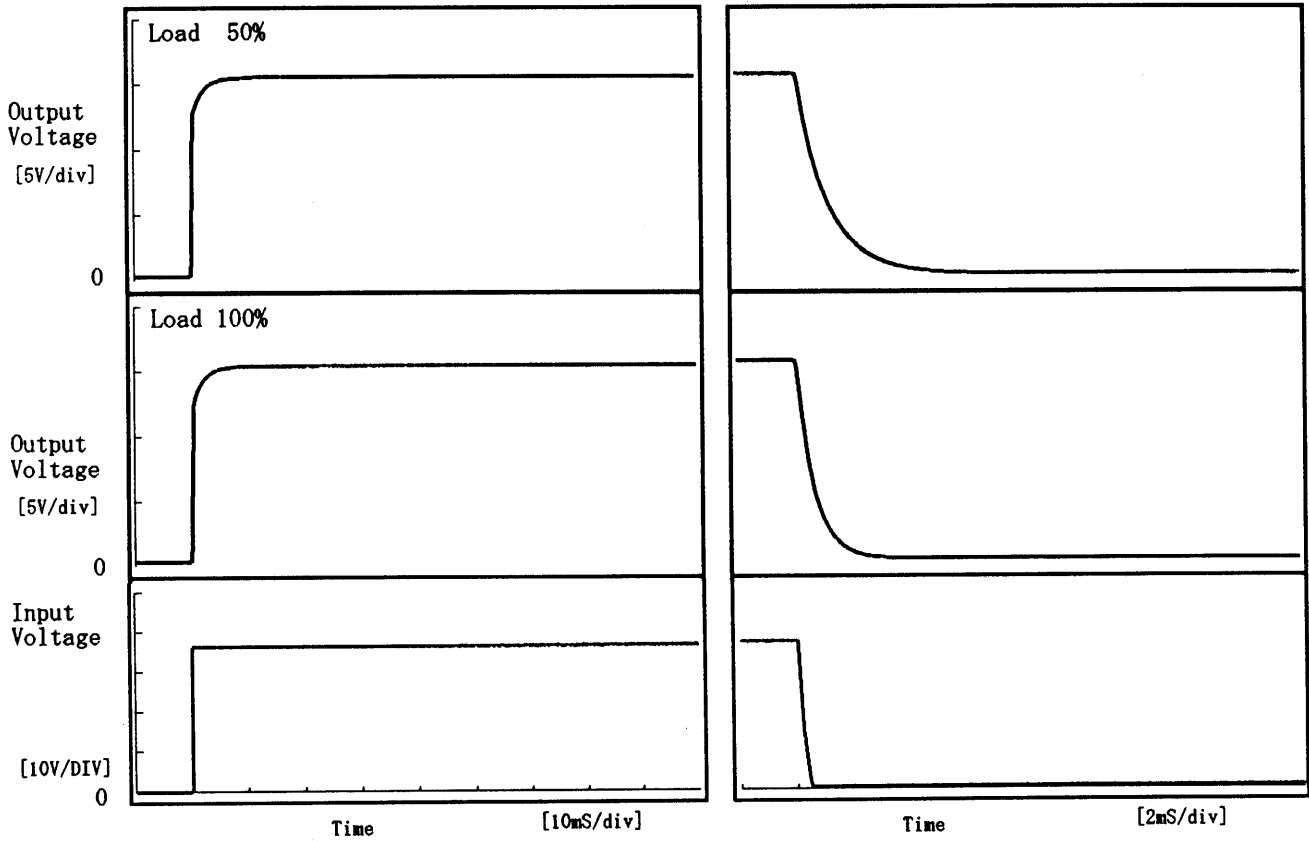


# COSEL

Model	ZUW64815	Temperature	25°C
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	-15V0.2A		

1. Graph

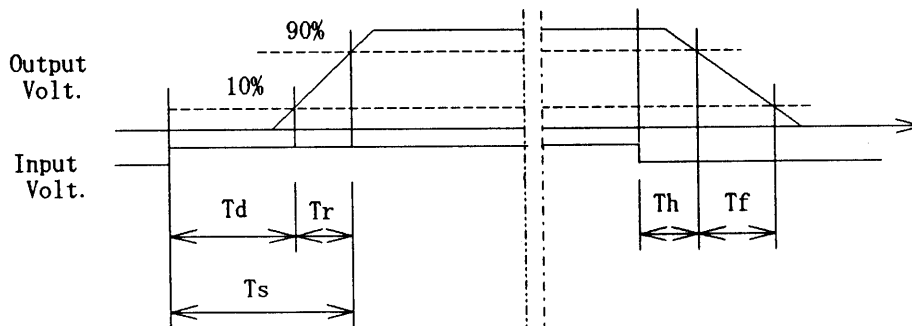
Input Volt. 36.0 V



2. Values

[mS]

Load	Time	T d	T r	T s	T h	T f
50 %		0.10	1.25	1.35	0.27	2.56
100 %		0.10	1.40	1.50	0.19	1.40

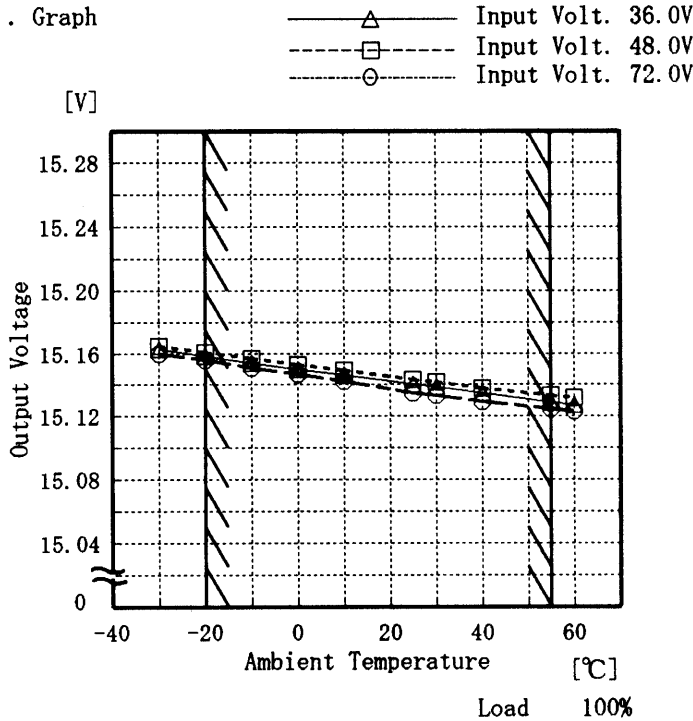




Model	ZUW64815
Item	Ambient Temperature Drift 周囲温度変動
Object	+15V0.2A

Testing Circuitry Figure A

1. Graph

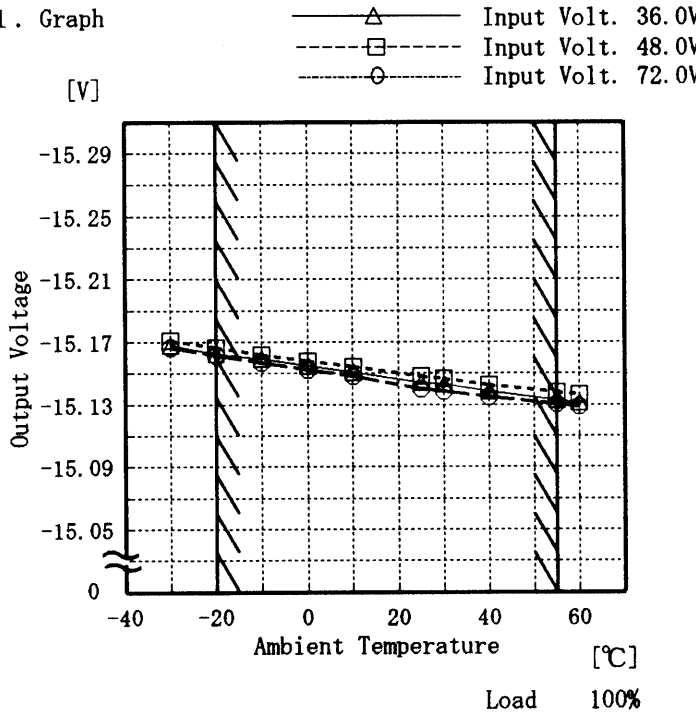


2. Values

Temperature [°C]	Input Volt. 36.0[V]	Input Volt. 48.0[V]	Input Volt. 72.0[V]
	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]
-30	15.162	15.165	15.160
-20	15.158	15.161	15.155
-10	15.154	15.156	15.151
0	15.150	15.153	15.146
10	15.146	15.149	15.142
25	15.140	15.143	15.134
30	15.139	15.141	15.133
40	15.134	15.138	15.129
55	15.129	15.133	15.125
60	15.127	15.131	15.123
-	-	-	-

Object	-15V0.2A
--------	----------

1. Graph



2. Values

Temperature [°C]	Input Volt. 36.0[V]	Input Volt. 48.0[V]	Input Volt. 72.0[V]
	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]
-30	-15.168	-15.171	-15.167
-20	-15.163	-15.166	-15.162
-10	-15.159	-15.162	-15.157
0	-15.155	-15.158	-15.152
10	-15.150	-15.154	-15.148
25	-15.144	-15.148	-15.140
30	-15.143	-15.146	-15.139
40	-15.139	-15.143	-15.135
55	-15.133	-15.138	-15.130
60	-15.131	-15.136	-15.129
-	-	-	-

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

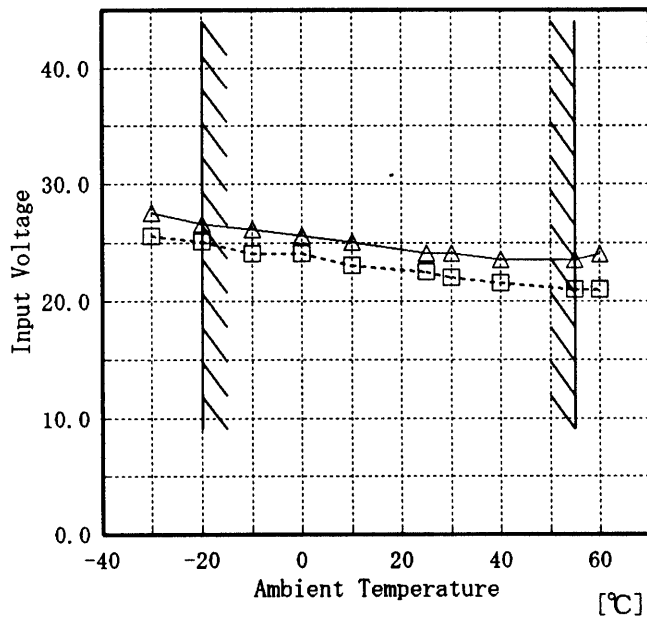
(注)斜線は定格周囲温度範囲を示す。



Model	ZUW64815
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+15V0.2A

Testing Circuitry Figure A

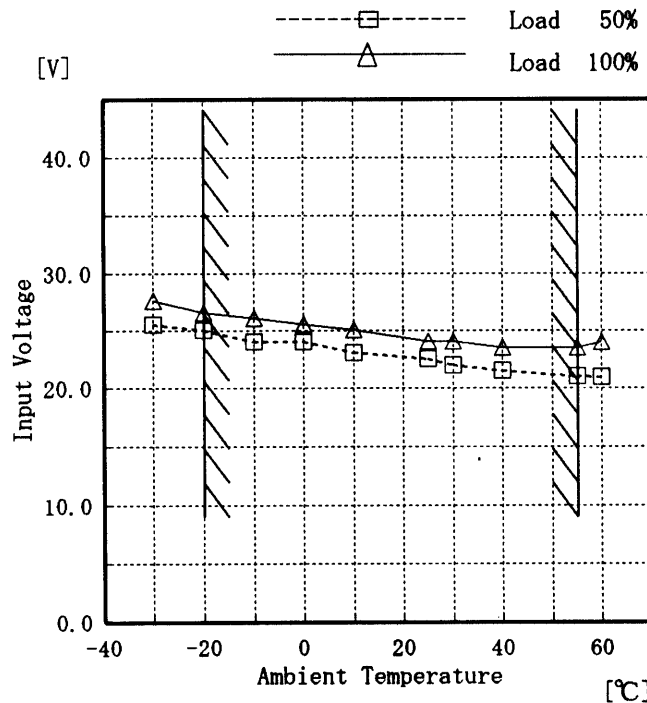
1. Graph [V]   
 ---□--- Load 50%   
 ---△--- Load 100%



2. Values

Ambient Temp. [°C]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-30	25.6	27.6
-20	25.1	26.6
-10	24.1	26.1
0	24.1	25.6
10	23.1	25.1
25	22.5	24.1
30	22.0	24.1
40	21.5	23.6
55	21.0	23.5
60	21.0	24.0
—	—	—

Object	-15V0.2A
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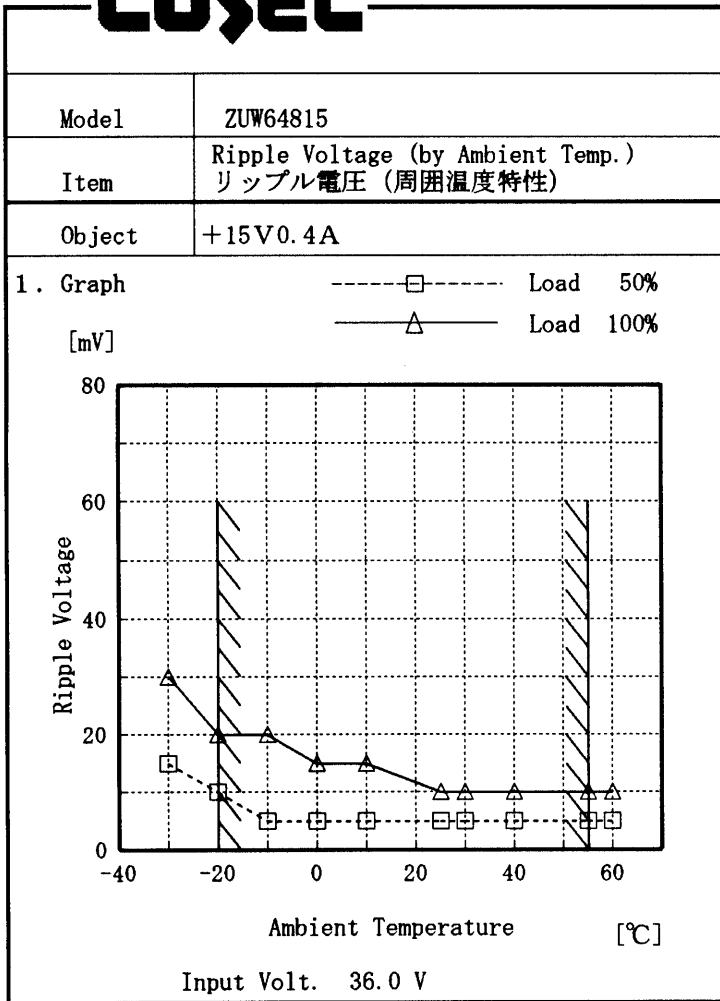
2. Values

Ambient Temp. [°C]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-30	25.6	27.6
-20	25.1	26.6
-10	24.1	26.1
0	24.1	25.6
10	23.1	25.1
25	22.5	24.1
30	22.0	24.1
40	21.5	23.6
55	21.0	23.5
60	21.0	24.0
—	—	—

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。

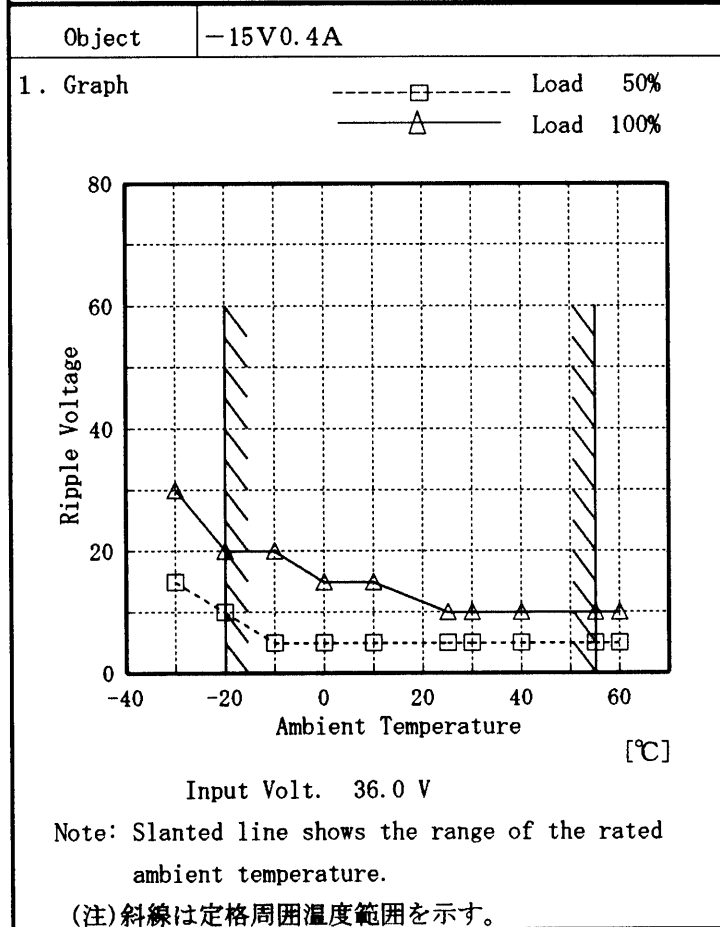




Testing Circuitry Figure A

2. Values

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



2. Values

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



<b>COSEL</b>																									
Model	ZUW64815	Temperature	25 °C																						
Item	Time Lapse Drift 経時ドリフト	Testing Circuitry	Figure A																						
Object	+15V0.2A																								
<p>1. Graph</p> <p style="text-align: center;">Time [H]</p> <p style="text-align: center;">Input Volt. 48.0V Load 100%</p>		<p>2. Values</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Time since start [H]</th> <th style="text-align: center;">Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">0.0</td><td style="text-align: center;">15.146</td></tr> <tr><td style="text-align: center;">0.5</td><td style="text-align: center;">15.142</td></tr> <tr><td style="text-align: center;">1.0</td><td style="text-align: center;">15.142</td></tr> <tr><td style="text-align: center;">2.0</td><td style="text-align: center;">15.142</td></tr> <tr><td style="text-align: center;">3.0</td><td style="text-align: center;">15.142</td></tr> <tr><td style="text-align: center;">4.0</td><td style="text-align: center;">15.142</td></tr> <tr><td style="text-align: center;">5.0</td><td style="text-align: center;">15.142</td></tr> <tr><td style="text-align: center;">6.0</td><td style="text-align: center;">15.142</td></tr> <tr><td style="text-align: center;">7.0</td><td style="text-align: center;">15.142</td></tr> <tr><td style="text-align: center;">8.0</td><td style="text-align: center;">15.142</td></tr> </tbody> </table>		Time since start [H]	Output Voltage [V]	0.0	15.146	0.5	15.142	1.0	15.142	2.0	15.142	3.0	15.142	4.0	15.142	5.0	15.142	6.0	15.142	7.0	15.142	8.0	15.142
Time since start [H]	Output Voltage [V]																								
0.0	15.146																								
0.5	15.142																								
1.0	15.142																								
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4.0	15.142																								
5.0	15.142																								
6.0	15.142																								
7.0	15.142																								
8.0	15.142																								
Object		-15V0.2A																							
<p>1. Graph</p> <p style="text-align: center;">Time [H]</p> <p style="text-align: center;">Input Volt. 48.0V Load 100%</p>		<p>2. Values</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Time since start [H]</th> <th style="text-align: center;">Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">0.0</td><td style="text-align: center;">-15.148</td></tr> <tr><td style="text-align: center;">0.5</td><td style="text-align: center;">-15.144</td></tr> <tr><td style="text-align: center;">1.0</td><td style="text-align: center;">-15.144</td></tr> <tr><td style="text-align: center;">2.0</td><td style="text-align: center;">-15.144</td></tr> <tr><td style="text-align: center;">3.0</td><td style="text-align: center;">-15.144</td></tr> <tr><td style="text-align: center;">4.0</td><td style="text-align: center;">-15.144</td></tr> <tr><td style="text-align: center;">5.0</td><td style="text-align: center;">-15.144</td></tr> <tr><td style="text-align: center;">6.0</td><td style="text-align: center;">-15.144</td></tr> <tr><td style="text-align: center;">7.0</td><td style="text-align: center;">-15.144</td></tr> <tr><td style="text-align: center;">8.0</td><td style="text-align: center;">-15.144</td></tr> </tbody> </table>		Time since start [H]	Output Voltage [V]	0.0	-15.148	0.5	-15.144	1.0	-15.144	2.0	-15.144	3.0	-15.144	4.0	-15.144	5.0	-15.144	6.0	-15.144	7.0	-15.144	8.0	-15.144
Time since start [H]	Output Voltage [V]																								
0.0	-15.148																								
0.5	-15.144																								
1.0	-15.144																								
2.0	-15.144																								
3.0	-15.144																								
4.0	-15.144																								
5.0	-15.144																								
6.0	-15.144																								
7.0	-15.144																								
8.0	-15.144																								



Model		ZUW64815	Testing Circuitry Figure A
Item	Output Voltage Accuracy 定電圧精度		

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 : 36.0~72.0 V

Load Current ( AVR 1 ) : 0.0~0.2 A

( AVR 2 ) : 0.0~0.2 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 36.0~72.0 V

負荷電流 (AVR 1) 0.0~0.2 A

(AVR 2) 0.0~0.2 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) =  $\frac{\text{変動値}}{\text{定格出力電圧}} \times 100$

Object	+15V0.2A
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Item	Temperature [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration) [%]
Maximum Voltage	-20	48.0	0.2	15.157	±194	±1.3
Minimum Voltage	25	72.0	0.0	14.770		

Object	-15V0.2A
--------	----------

Item	Temperature [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration) [%]
Maximum Voltage	-20	48.0	0.2	-15.164	±183	±1.3
Minimum Voltage	55	72.0	0.0	-14.798		



Model		ZUW64815	Testing Circuitry	Figure A
Item		Condensation 結露特性		
Object		+15V 0.2A		

1. Condensation test

Testing procedure is as follows.

- ① Keeping and cooling the unit in a tank at -10°C for an hour with the input off.
- ② Taking it out of the tank and dewing itself in a room where the temperature is 26°C 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°Cに冷却しておき、約1時間後に恒温槽から取り出し、室温26°C、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	15.165	5	25
	2	15.171	5	25
	3	15.173	5	30
Load 100%	1	15.053	10	35
	2	15.055	10	35
	3	15.055	15	35

Input Volt. 48.0 V

# COSEL

Model	ZUW64815	Testing Circuitry	Figure A
Item	Condensation 結露特性		
Object	-15V 0.2A		

## 1. Condensation test

Testing procedure is as follows.

- ① Keeping and cooling the unit in a tank at  $-10^{\circ}\text{C}$  for an hour with the input off.
- ② Taking it out of the tank and dewing itself in a room where the temperature is  $26^{\circ}\text{C}$  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 $-10^{\circ}\text{C}$ に冷却しておき、約1時間後に恒温槽から取り出し、室温 $26^{\circ}\text{C}$ 、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	-15.152	5	30
	2	-15.170	5	30
	3	-15.172	5	30
Load 100 %	1	-15.025	10	35
	2	-15.035	10	35
	3	-15.030	15	35

Input Volt. 48.0 V

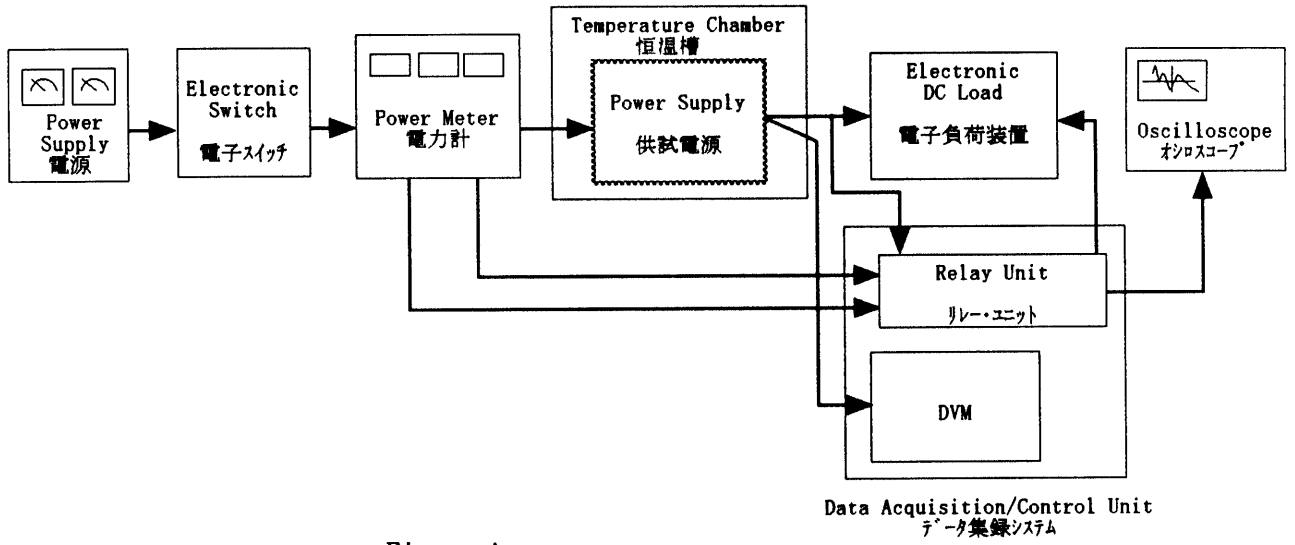


Figure A