



TEST DATA OF ZUW1R54815  
(48.0V INPUT)

Regulated DC Power Supply

Date : June 14. 1996

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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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<p><b>Model</b> ZUW1R54815</p>		<p>Temperature 25°C Testing Circuitry Figure A</p>																																									
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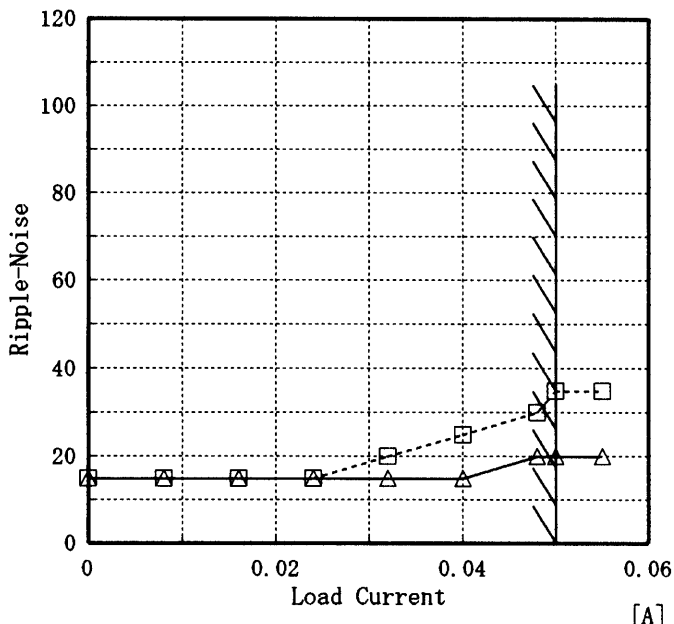


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Model	ZUW1R54815	Temperature	25°C
Item	Ripple-Noise リップルノイズ	Testing Circuitry	Figure A
Object	+15V0.05A		

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	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
—	—	—
—	—	—

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

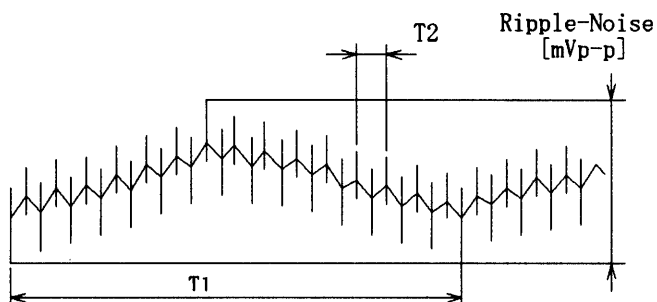


Fig. Complex Ripple Wave Form  
 図 リップル波形詳細図

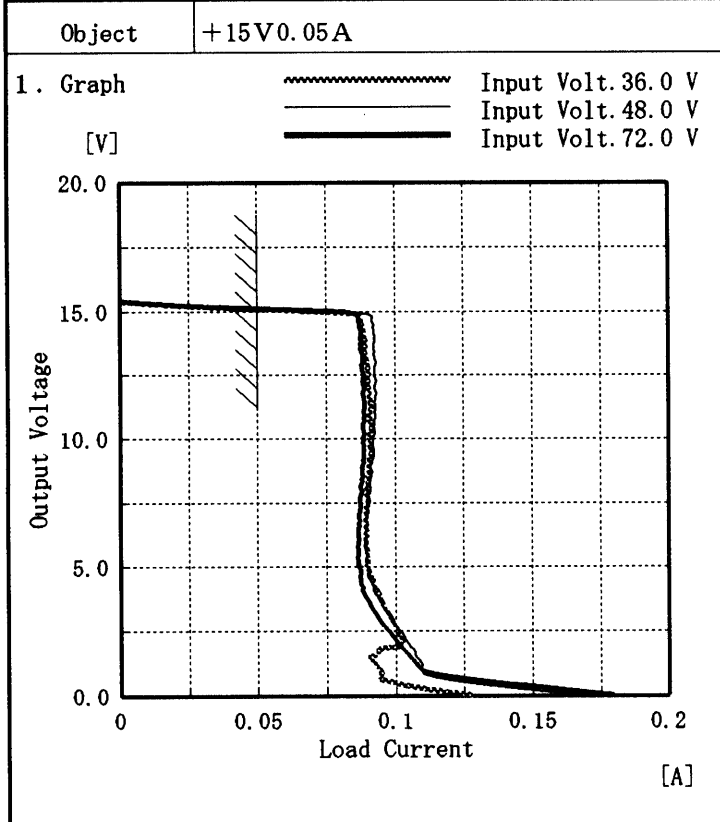




Model		ZUW1R54815	Temperature		25°C																																						
Item		Ripple-Noise リップルノイズ	Testing Circuitry		Figure A																																						
Object		-15V0.05A																																									
1. Graph			2. Values																																								
<p>-----□----- Input Volt. 36.0V                  [mV]                    —△— Input Volt. 72.0V</p>			<table border="1"> <thead> <tr> <th rowspan="2">Load current [A]</th> <th>Input Volt. 36.0 [V]</th> <th>Input Volt. 72.0 [V]</th> </tr> <tr> <th>Ripple-Noise [mV]</th> <th>Ripple-Noise [mV]</th> </tr> </thead> <tbody> <tr><td>0.000</td><td>18</td><td>15</td></tr> <tr><td>0.008</td><td>20</td><td>15</td></tr> <tr><td>0.016</td><td>20</td><td>15</td></tr> <tr><td>0.024</td><td>20</td><td>15</td></tr> <tr><td>0.032</td><td>20</td><td>15</td></tr> <tr><td>0.040</td><td>20</td><td>15</td></tr> <tr><td>0.048</td><td>20</td><td>20</td></tr> <tr><td>0.050</td><td>25</td><td>20</td></tr> <tr><td>0.055</td><td>30</td><td>20</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>			Load current [A]	Input Volt. 36.0 [V]	Input Volt. 72.0 [V]	Ripple-Noise [mV]	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	—	—	—	—	—	—
Load current [A]	Input Volt. 36.0 [V]	Input Volt. 72.0 [V]																																									
	Ripple-Noise [mV]	Ripple-Noise [mV]																																									
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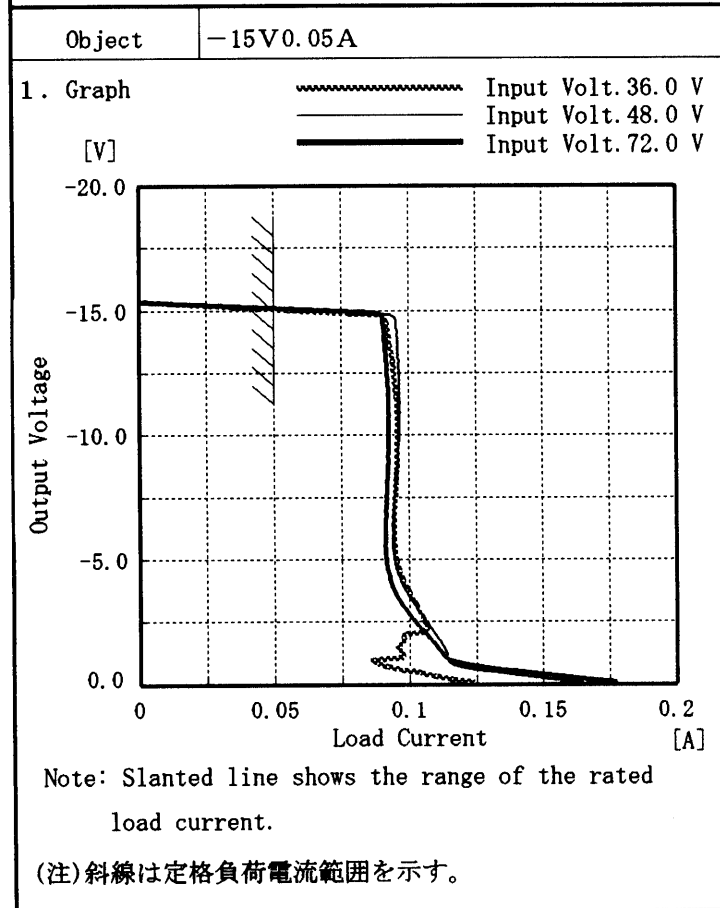


Model	ZUW1R54815	Temperature	25°C
Item	Overcurrent Protection 過電流保護	Testing Circuitry	Figure A



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	0.063	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



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	0.073	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



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

Input Volt. 48.0 V

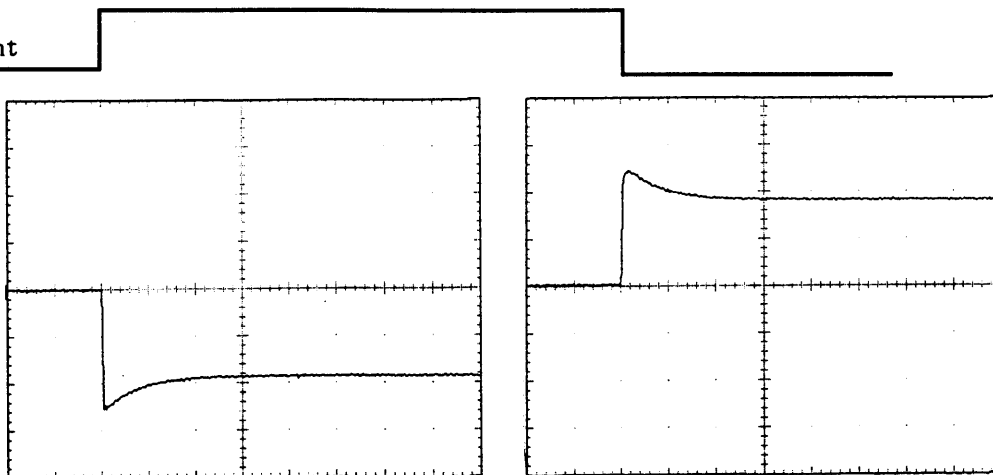
Cycle 100 mS

Load Current

Min. Load ↔

Load 100 %

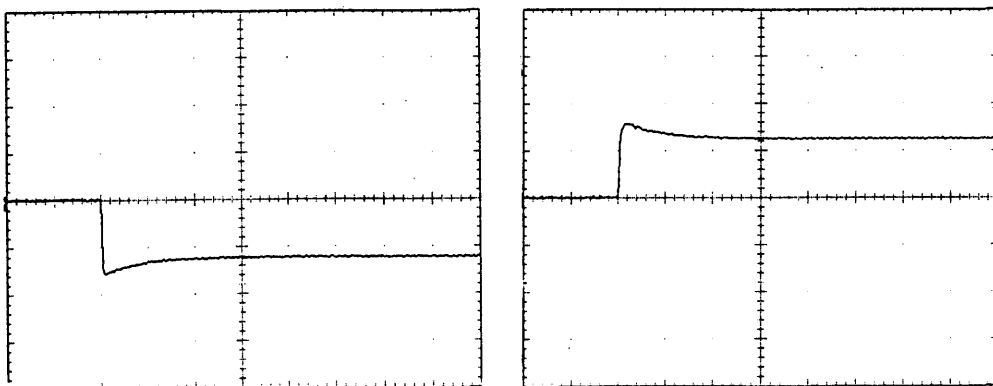
200 mV/div



Min. Load ↔

Load 50 %

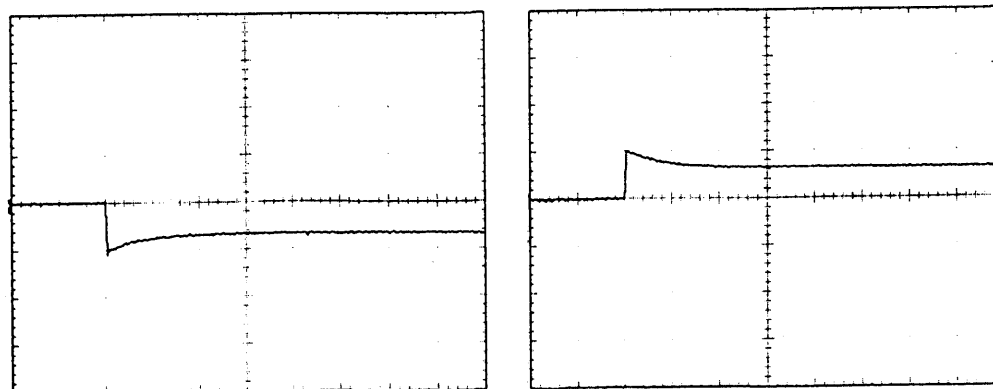
200 mV/div



Load 50% ↔

Load 100 %

200 mV/div



1 mS/div



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

Input Volt. 48.0 V

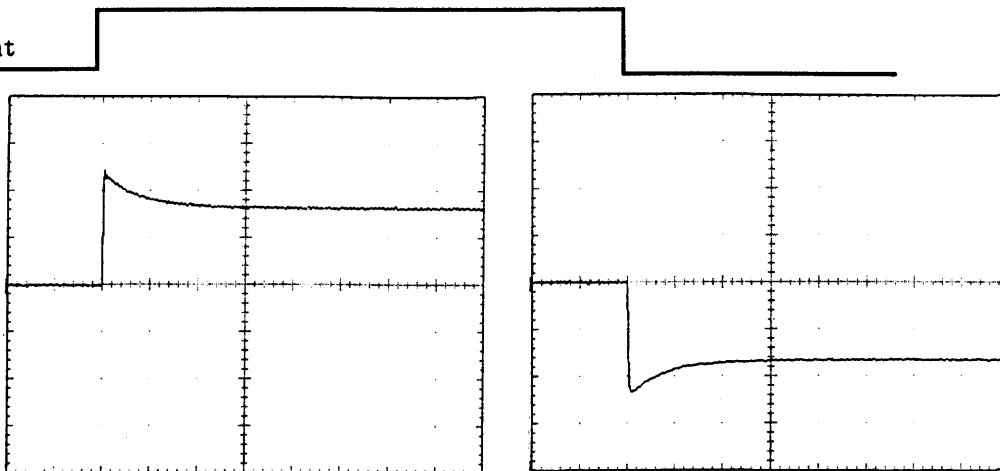
Cycle 100 mS

Load Current

Min. Load ←→

Load 100 %

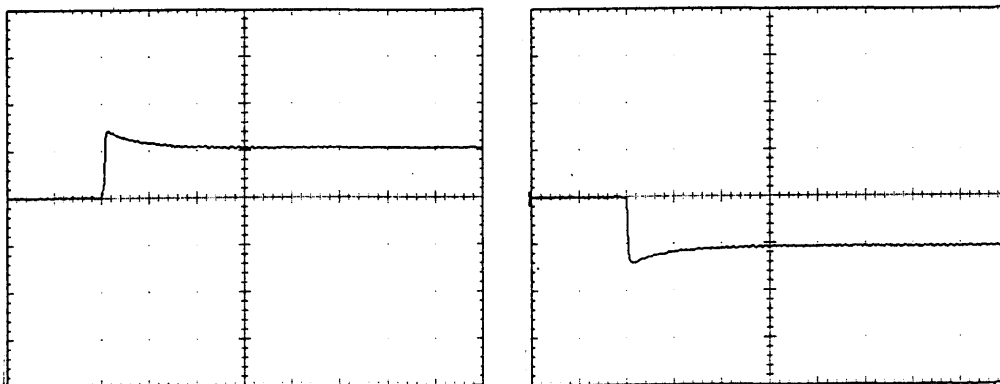
200 mV/div



Min. Load ←→

Load 50 %

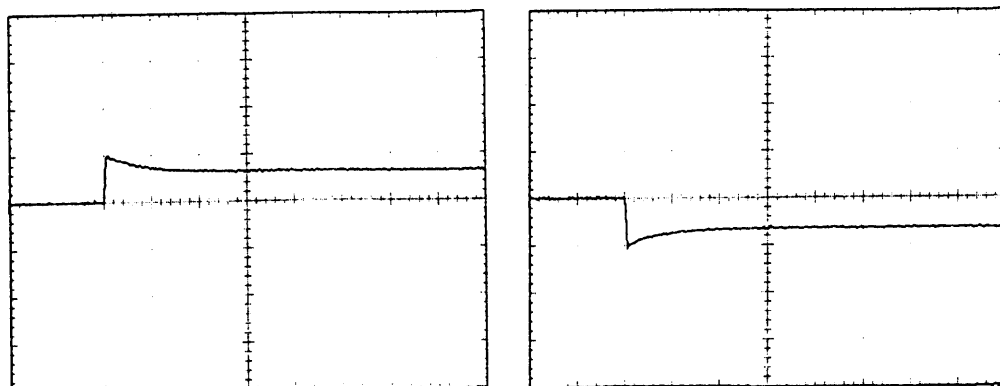
200 mV/div



Load 50% ←→

Load 100 %

200 mV/div



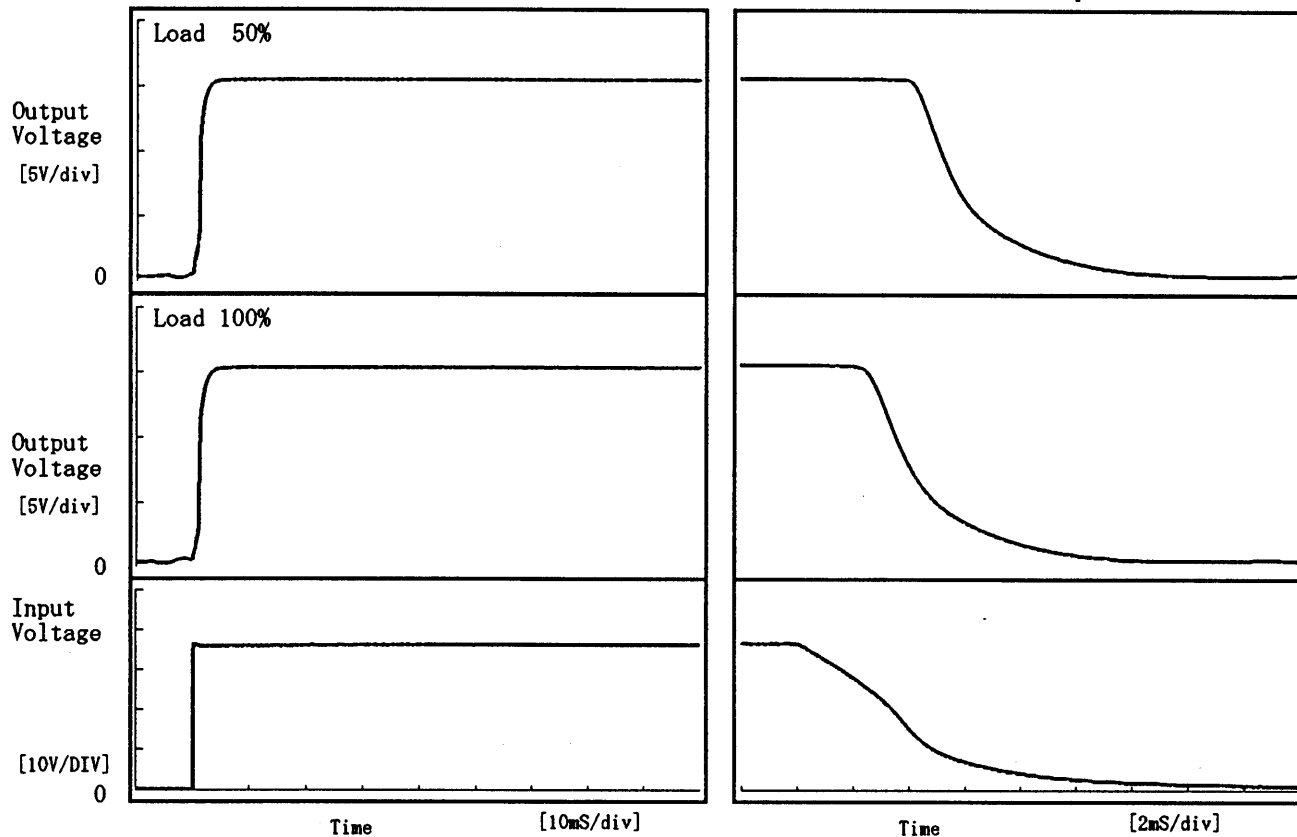
1 mS/div



Model	ZUW1R54815	Temperature	25°C
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	+15V 0.05A		

1. Graph

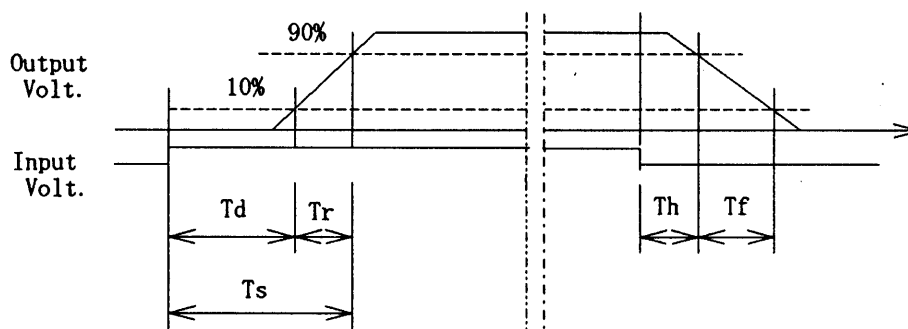
Input Volt. 36.0 V



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	1.85	1.95	4.49	5.05
100 %	0.15	2.00	2.15	2.84	5.27

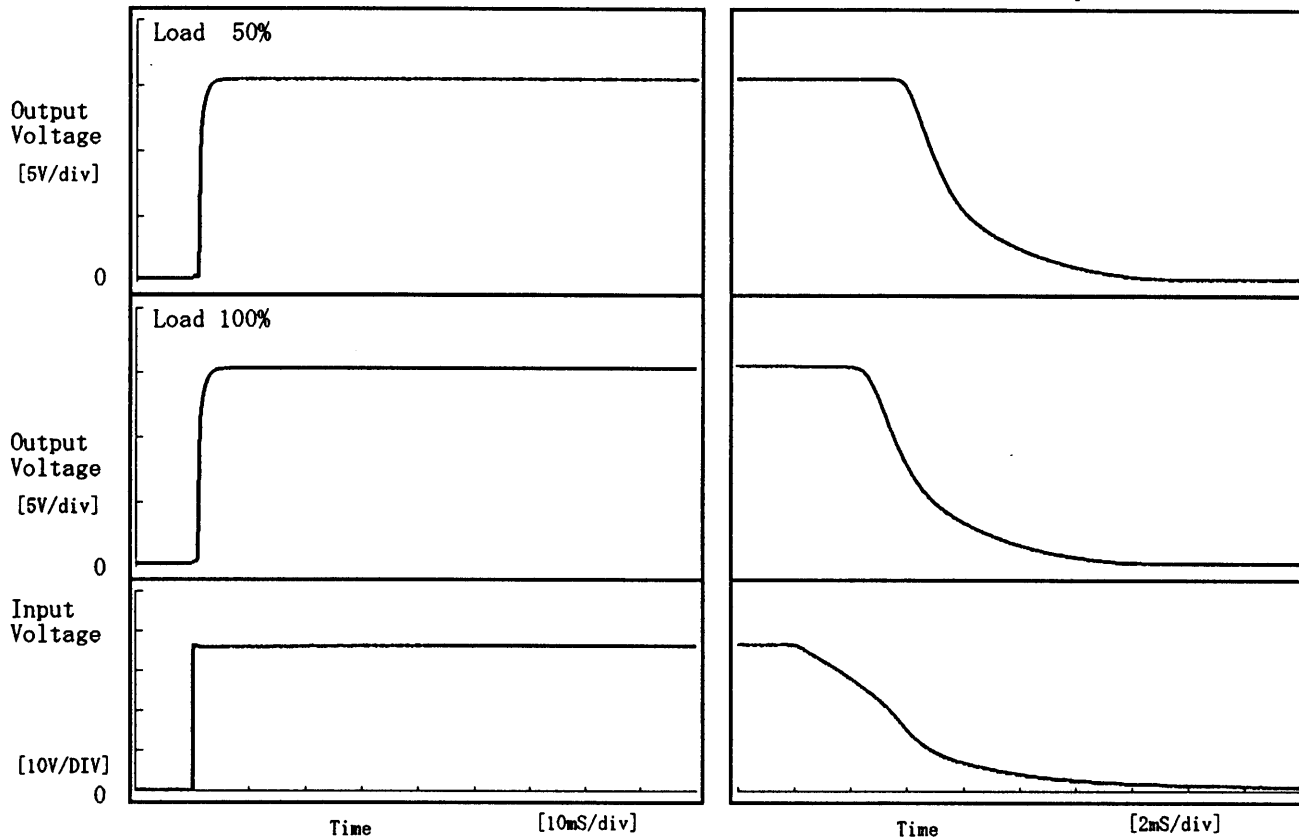




Model	ZUW1R54815	Temperature	25°C
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	-15V0.05A		

1. Graph

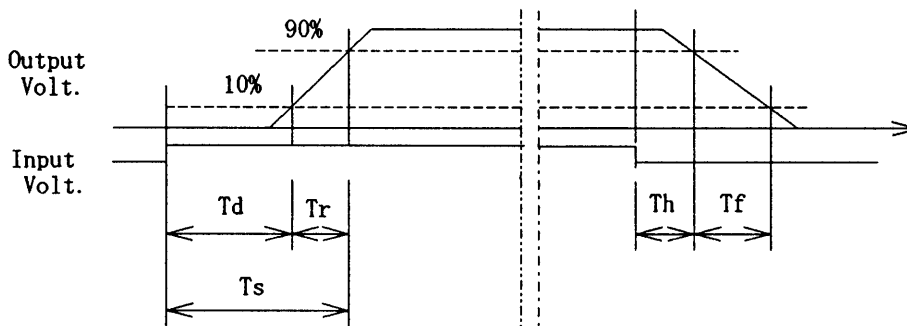
Input Volt. 36.0 V



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

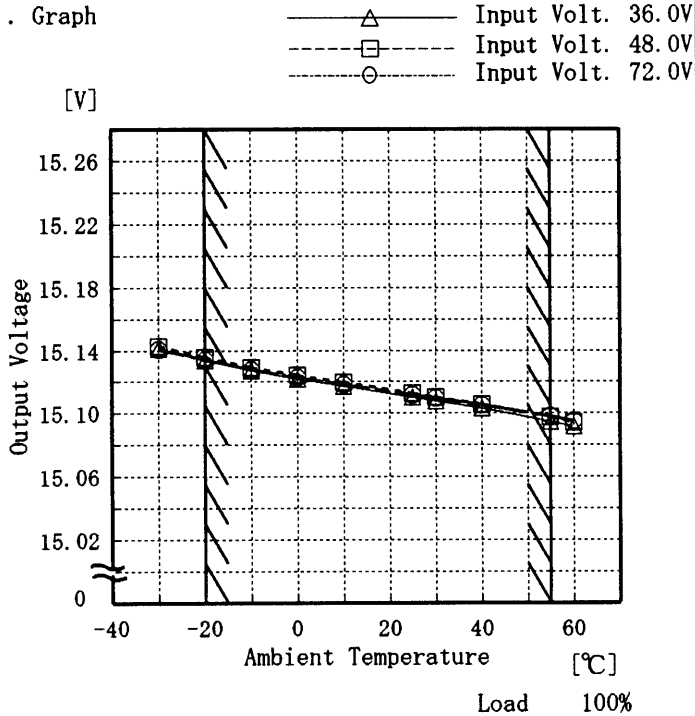




Model	ZUW1R54815
Item	Ambient Temperature Drift 周囲温度変動
Object	+15V0.05A

Testing Circuitry Figure A

1. Graph

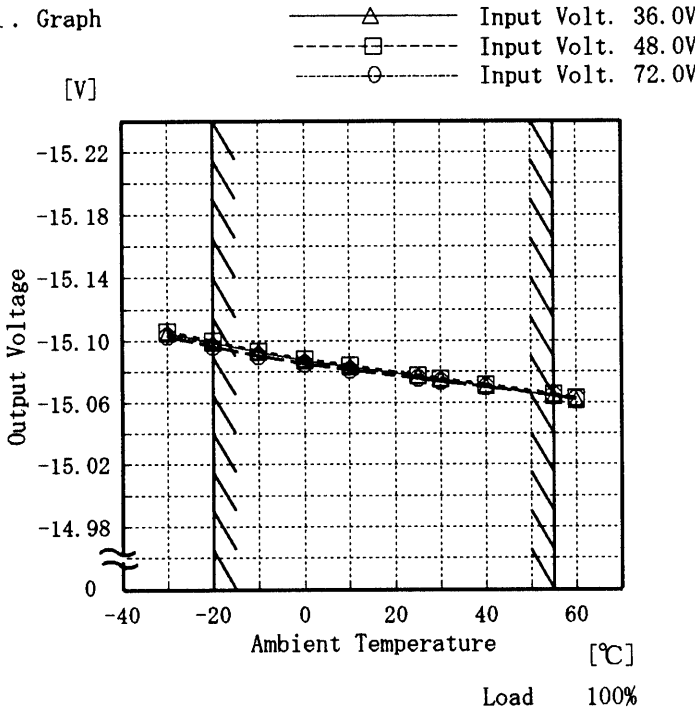


2. Values

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	15.141	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



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	-15.105	-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
-	-	-	-

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

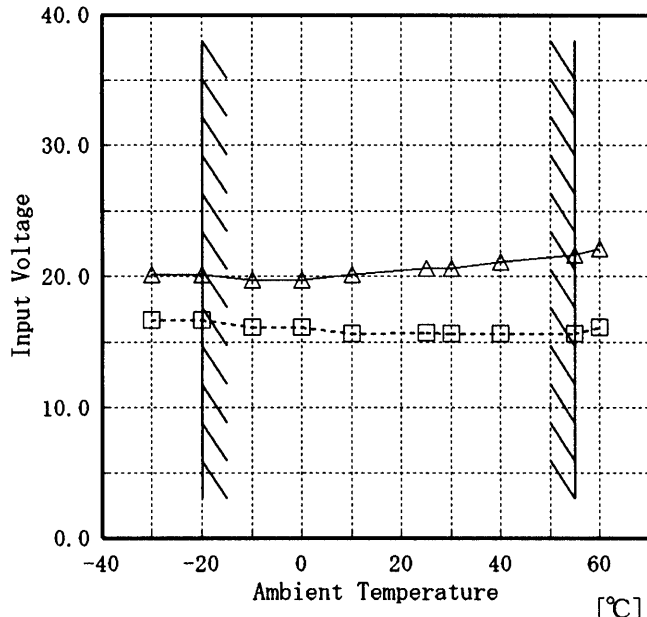
(注)斜線は定格周囲温度範囲を示す。



Model	ZUW1R54815
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+15V0.05A

Testing Circuitry Figure A

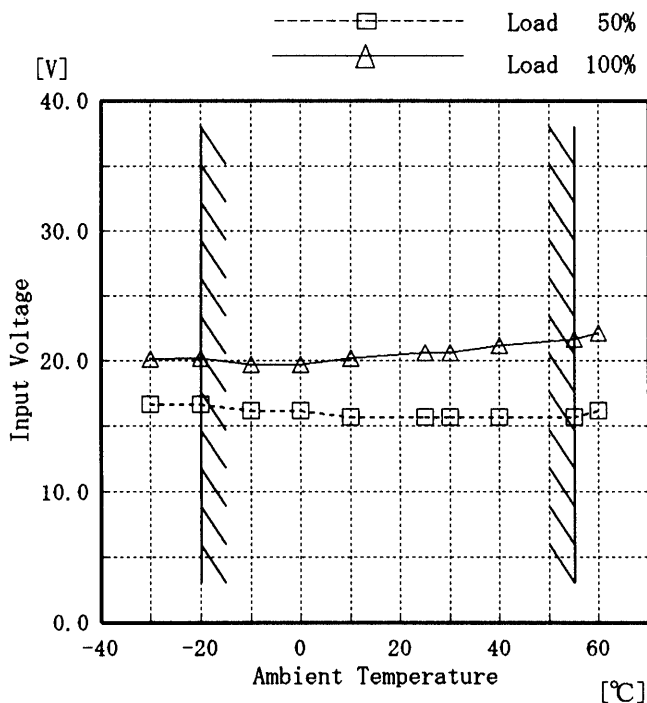
1. Graph  
 [V]  
 ---□--- Load 50%  
 ---△--- Load 100%



2. Values

Ambient Temp. [°C]	Load 50%	Load 100%
	Input Volt. [V]	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
--------	-----------



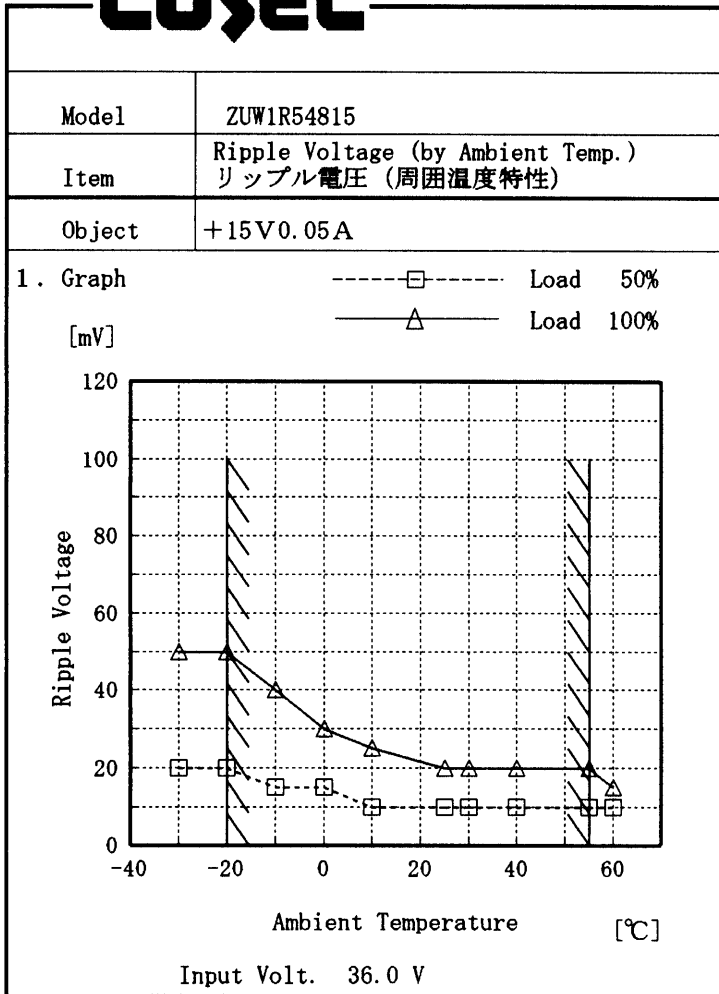
2. Values

Ambient Temp. [°C]	Load 50%	Load 100%
	Input Volt. [V]	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。

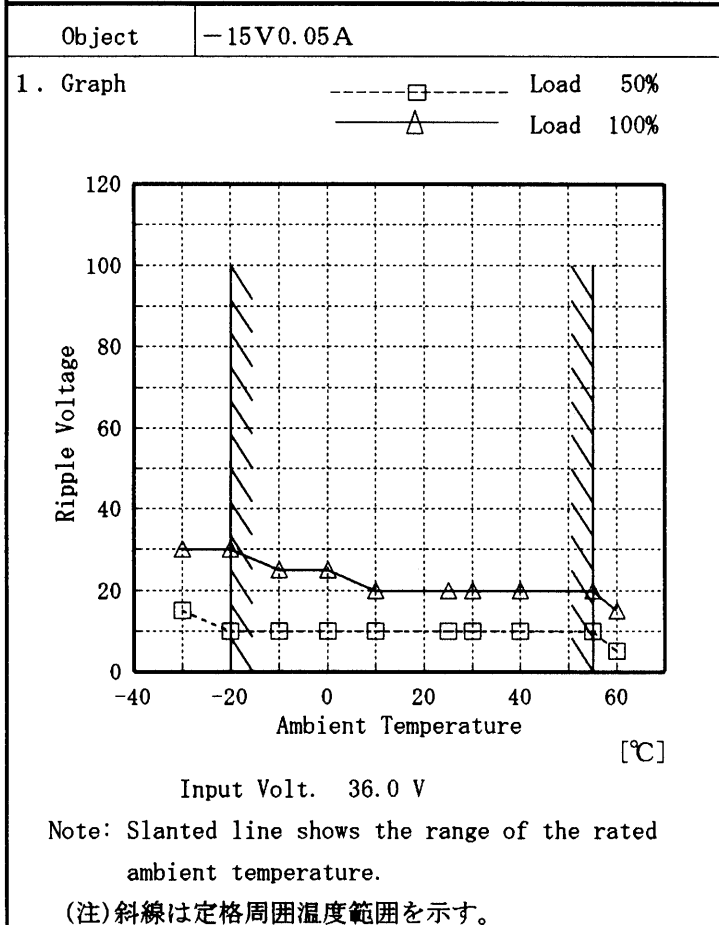




Testing Circuitry Figure A

2. Values

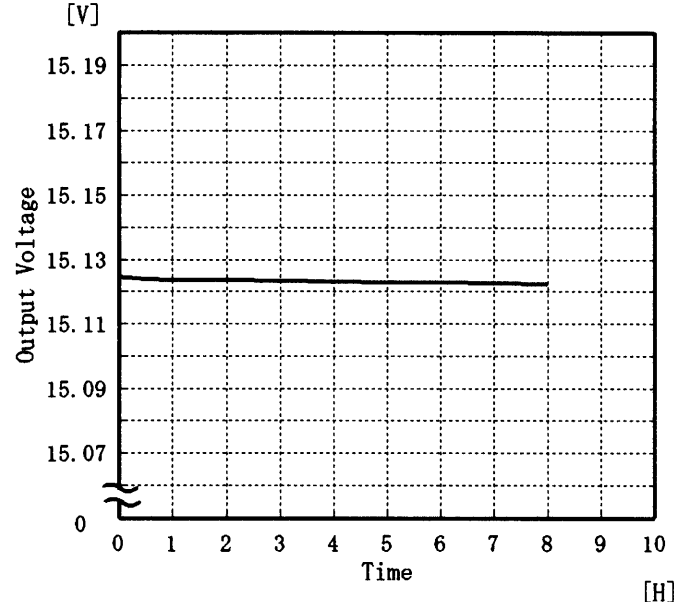
Ambient Temp. [°C]	Load 50%	Load 100%
	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]
-30	20	50
-20	20	50
-10	15	40
0	15	30
10	10	25
25	10	20
30	10	20
40	10	20
55	10	20
60	10	15
—	—	—

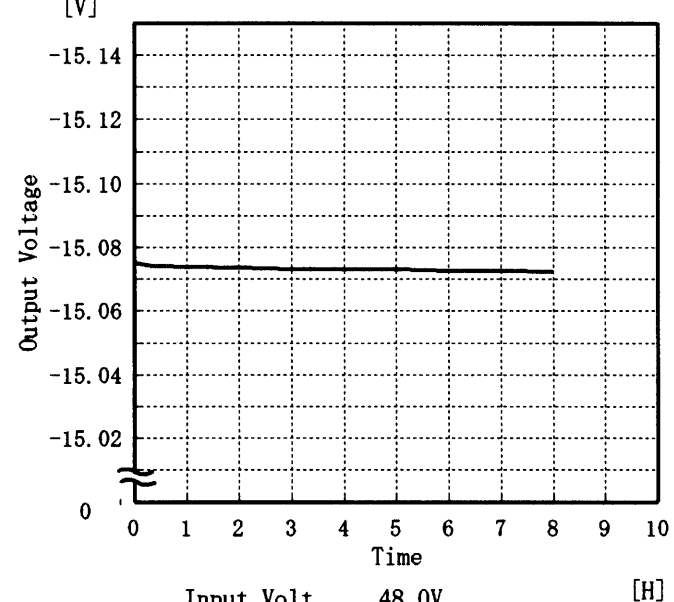


2. Values

Ambient Temp. [°C]	Load 50%	Load 100%
	Ripple Output Volt. [mV]	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
—	—	—



<b>Model</b> ZUW1R54815		Temperature 25 °C Testing Circuitry Figure A																						
<b>Item</b>	Time Lapse Drift 経時ドリフト																							
<b>Object</b>	+15V0.05A																							
1. Graph  <p>Input Volt. 48.0V Load 100%</p>		2. Values <table border="1"> <thead> <tr> <th>Time since start [H]</th> <th>Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>15.124</td></tr> <tr><td>0.5</td><td>15.124</td></tr> <tr><td>1.0</td><td>15.124</td></tr> <tr><td>2.0</td><td>15.124</td></tr> <tr><td>3.0</td><td>15.124</td></tr> <tr><td>4.0</td><td>15.123</td></tr> <tr><td>5.0</td><td>15.123</td></tr> <tr><td>6.0</td><td>15.123</td></tr> <tr><td>7.0</td><td>15.123</td></tr> <tr><td>8.0</td><td>15.123</td></tr> </tbody> </table>	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
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																							

<b>Object</b>	-15V0.05A	Temperature 25 °C Testing Circuitry Figure A																							
1. Graph  <p>Input Volt. 48.0V Load 100%</p>			2. Values <table border="1"> <thead> <tr> <th>Time since start [H]</th> <th>Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>-15.076</td></tr> <tr><td>0.5</td><td>-15.074</td></tr> <tr><td>1.0</td><td>-15.074</td></tr> <tr><td>2.0</td><td>-15.074</td></tr> <tr><td>3.0</td><td>-15.073</td></tr> <tr><td>4.0</td><td>-15.073</td></tr> <tr><td>5.0</td><td>-15.073</td></tr> <tr><td>6.0</td><td>-15.073</td></tr> <tr><td>7.0</td><td>-15.073</td></tr> <tr><td>8.0</td><td>-15.073</td></tr> </tbody> </table>	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
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																								



Model		ZUW1R54815	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 ) : 0.00~0.05 A
- ( AVR 2 ) : 0.00~0.05 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) 0.00~0.05 A
- (AVR 2) 0.00~0.05 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	+15V0.05A
--------	-----------

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	0.05	15.133	±167	±1.2
Minimum Voltage	55	36.0	0.00	14.800		

Object	-15V0.05A
--------	-----------

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	0.05	-15.098	±175	±1.2
Minimum Voltage	55	36.0	0.00	-14.748		



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

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  $25^{\circ}\text{C}$  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 $25^{\circ}\text{C}$ 、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	15.125	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



Model		ZUW1R54815	Testing Circuitry	Figure A
Item		Condensation 結露特性		
Object		-15V 0.05A		

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 25°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.

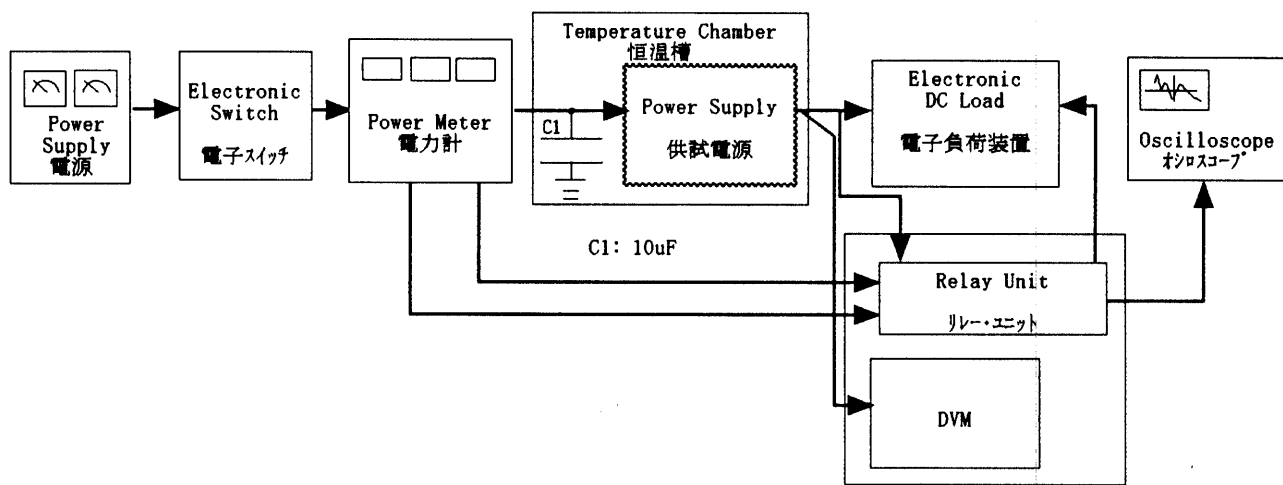
1. 結露特性試験

入力を切った状態で、恒温槽で-10℃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



Data Acquisition/Control Unit  
データ集録システム

Figure A