



TEST DATA OF ZUW1R50515
(5.0V INPUT)

Regulated DC Power Supply

Date : June 14. 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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Model		ZUW1R50515	Temperature		25°C																																							
Item		Line Regulation 静的入力変動	Testing Circuitry		Figure A																																							
Object		+15V0.05A																																										
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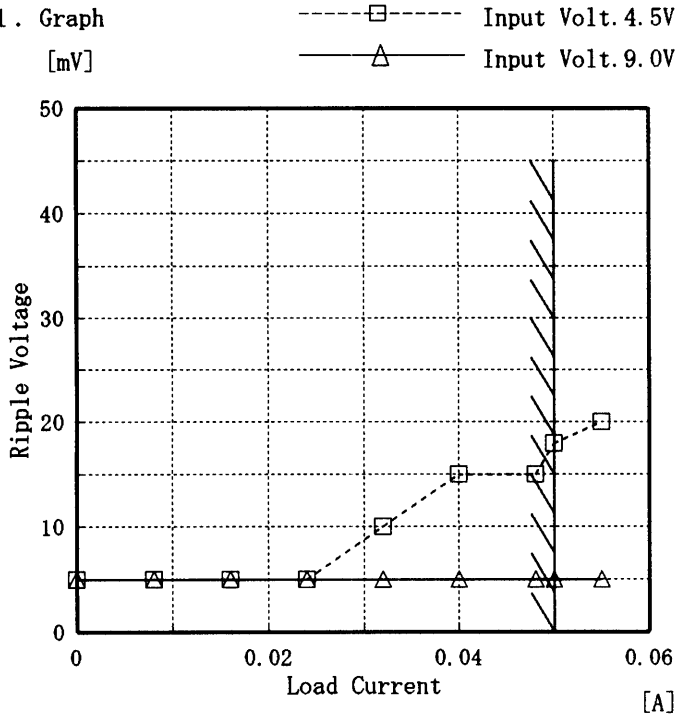


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Model	ZUW1R50515	Temperature	25°C
Item	Ripple Voltage (by Load Current) リップル電圧(負荷電流特性)	Testing Circuitry	Figure A
Object	+15V 0.05A		

1. Graph



2. Values

Load Current [A]	Input Volt. 4.5 [V]	Input Volt. 9.0 [V]
	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]
0.000	5	5
0.008	5	5
0.016	5	5
0.024	5	5
0.032	10	5
0.040	15	5
0.048	15	5
0.050	18	5
0.055	20	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

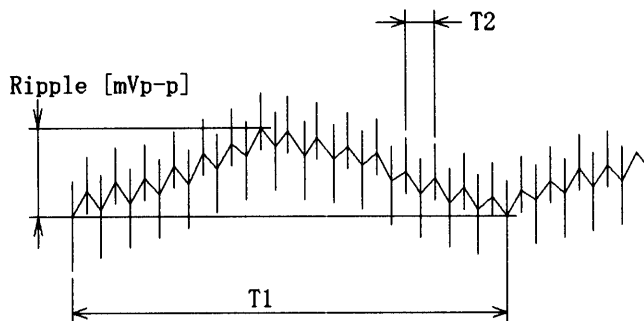
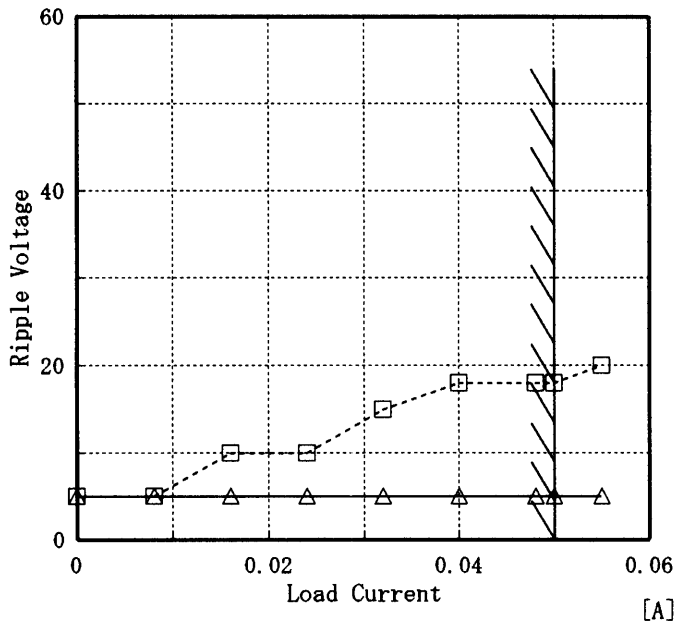


Fig. Complex Ripple Wave Form
 図 リップル波形詳細図



Model	ZUW1R50515	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 0.05A		

1. Graph
 [mV]
 -----□----- Input Volt. 4.5V
 -----△----- Input Volt. 9.0V



2. Values

Load Current [A]	Input Volt. 4.5 [V]	Input Volt. 9.0 [V]
	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]
0.000	5	5
0.008	5	5
0.016	10	5
0.024	10	5
0.032	15	5
0.040	18	5
0.048	18	5
0.050	18	5
0.055	20	5
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Ripple Voltage is shown as p-p in the figure below.

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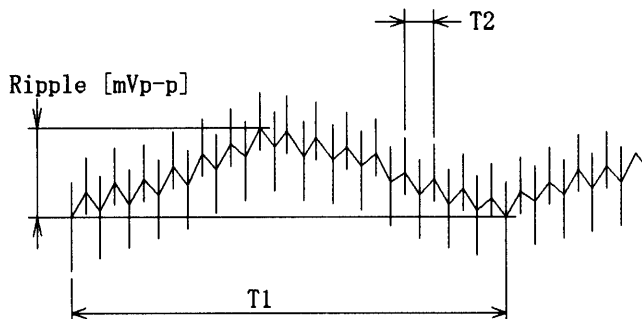
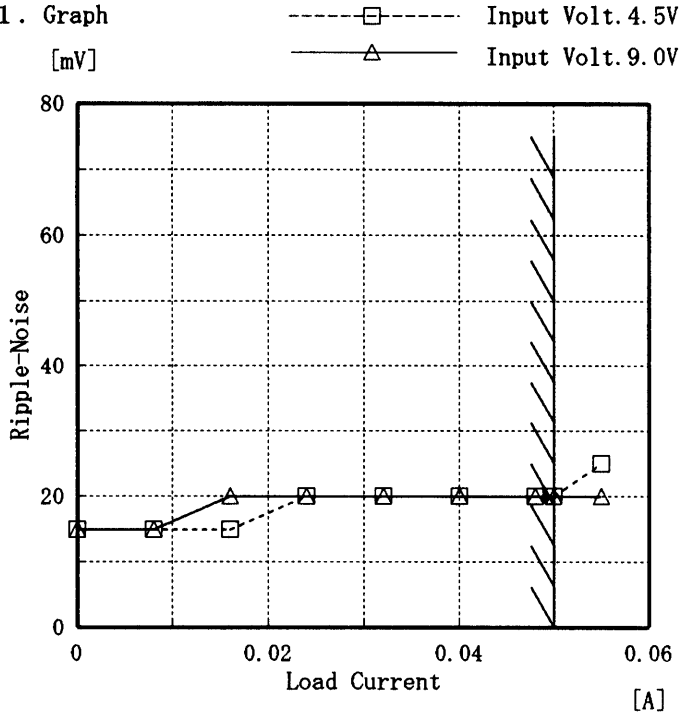


Fig. Complex Ripple Wave Form
 図 リップル波形詳細図



Model	ZUW1R50515	Temperature	25°C
Item	Ripple-Noise リップルノイズ	Testing Circuitry	Figure A
Object	+15V 0.05A		

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
 スイッチング周期

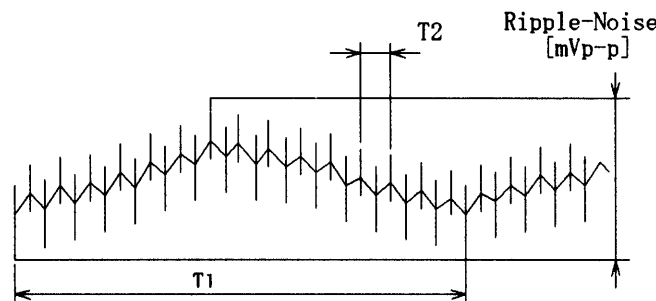


Fig. Complex Ripple Wave Form
 図 リップル波形詳細図

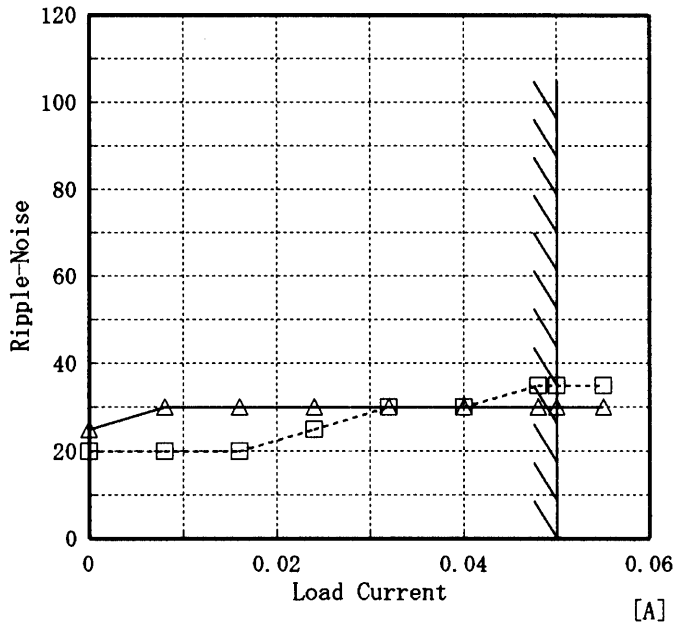
2. Values

Load current [A]	Input Volt. 4.5 [V]	Input Volt. 9.0 [V]
	Ripple-Noise [mV]	Ripple-Noise [mV]
0.000	15	15
0.008	15	15
0.016	15	20
0.024	20	20
0.032	20	20
0.040	20	20
0.048	20	20
0.050	20	20
0.055	25	20
—	—	—
—	—	—



Model	ZUW1R50515	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. 4.5V
 -----△----- Input Volt. 9.0V



2. Values

Load current [A]	Input Volt. 4.5 [V]	Input Volt. 9.0 [V]
	Ripple-Noise [mV]	Ripple-Noise [mV]
0.000	20	25
0.008	20	30
0.016	20	30
0.024	25	30
0.032	30	30
0.040	30	30
0.048	35	30
0.050	35	30
0.055	35	30
—	—	—
—	—	—

Ripple-Noise is shown as p-p in the figure below.
 Note: Slanted line shows the range of the rated load current.

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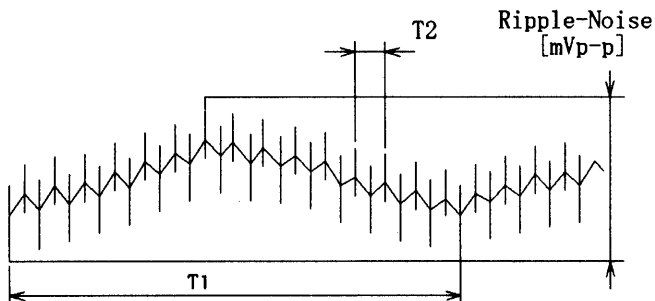


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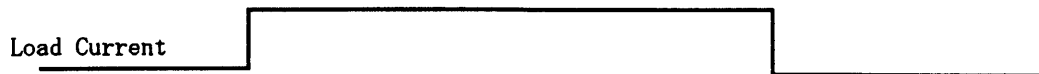


<p>Model ZUW1R50515</p> <p>Item Overcurrent Protection 過電流保護</p> <p>Object +15V0.05A</p>		<p>Temperature 25°C</p> <p>Testing Circuitry Figure A</p>																																																						
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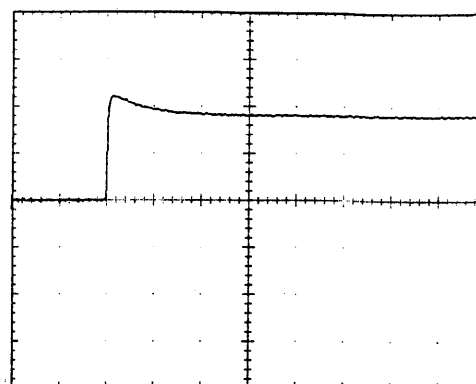
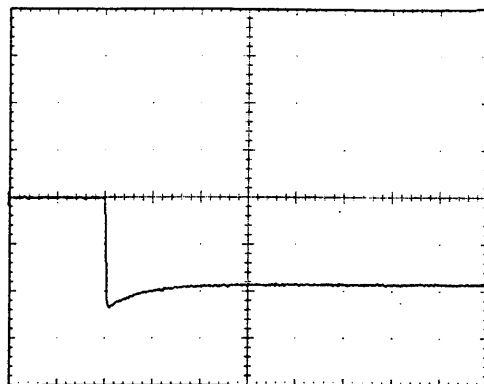
Model		ZUW1R50515	Temperature		25°C
Item		Dynamic Load Responce 動的負荷変動	Testing Circuitry		Figure A
Object		+15V0.05A			

Input Volt. 5.0 V
Cycle 100 mS



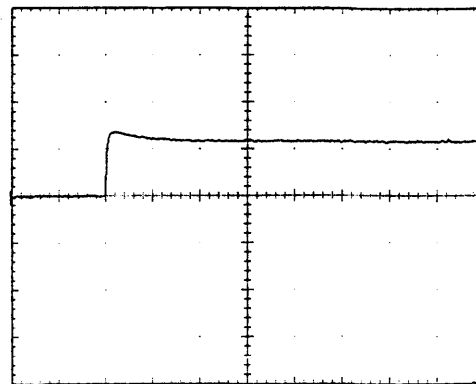
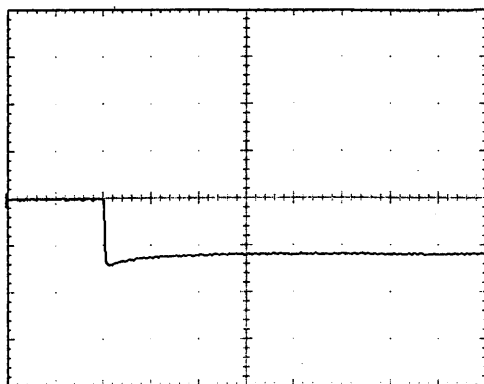
Min. Load ←→
Load 100 %

200 mV/div



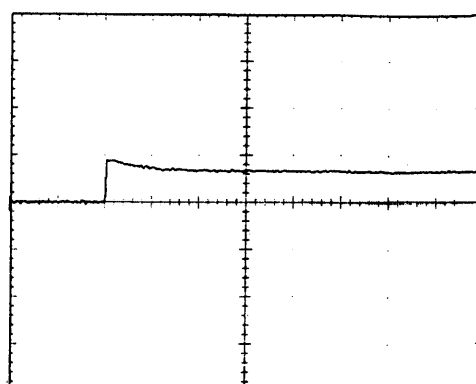
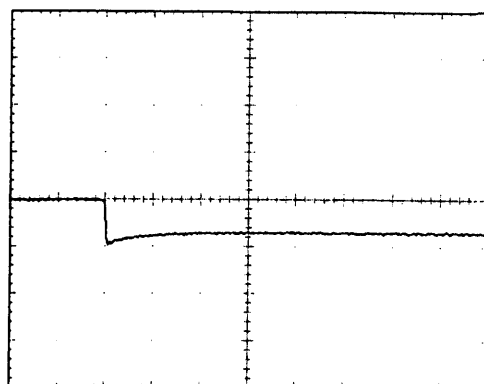
Min. Load ←→
Load 50 %

200 mV/div



Load 50% ←→
Load 100 %

200 mV/div



1 mS/div



Model	ZUW1R50515	Temperature	25°C
Item	Dynamic Load Response 動的負荷変動	Testing Circuitry	Figure A
Object	-15V0.05A		

Input Volt. 5.0 V

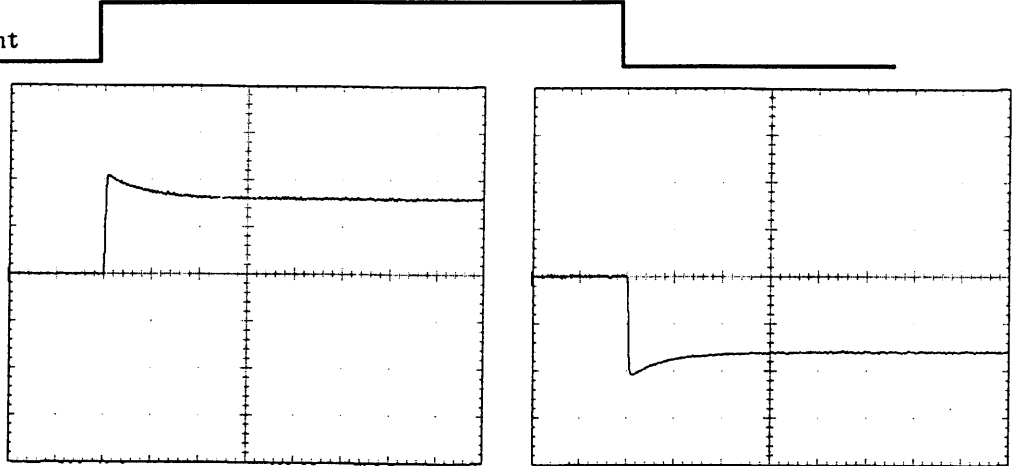
Cycle 100 mS

Load Current

Min. Load ←→

Load 100 %

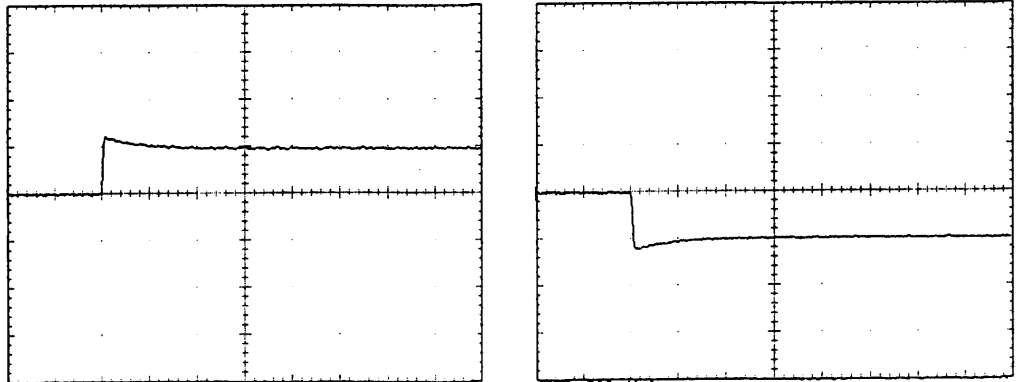
200 mV/div



Min. Load ←→

Load 50 %

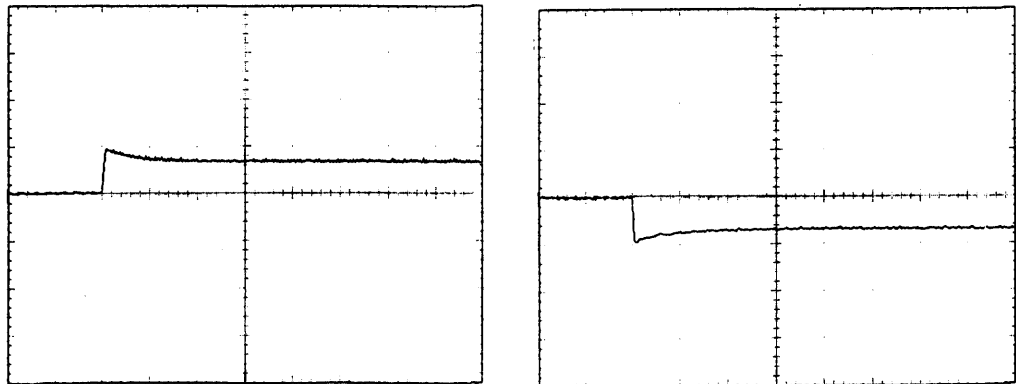
200 mV/div



Load 50% ←→

Load 100 %

200 mV/div



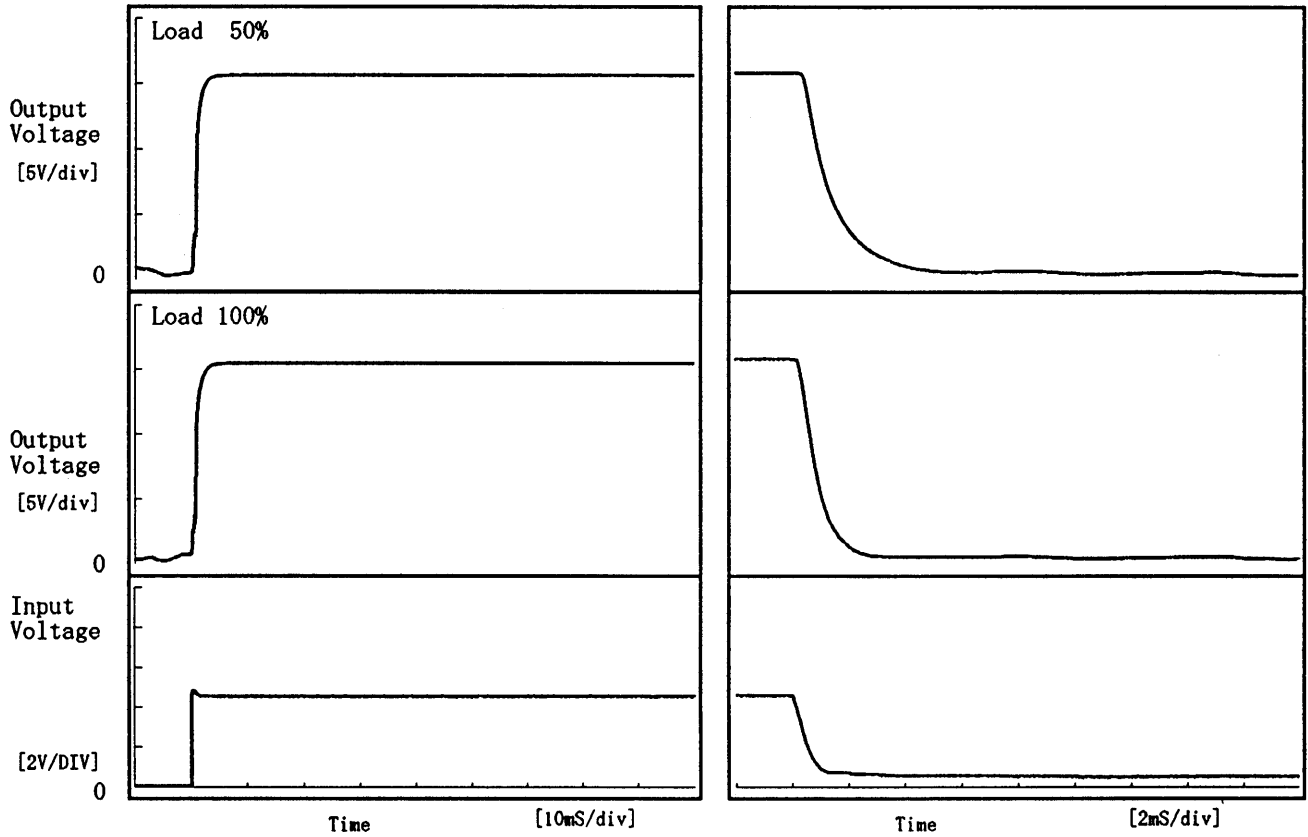
1 mS/div



Model	ZUW1R50515	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

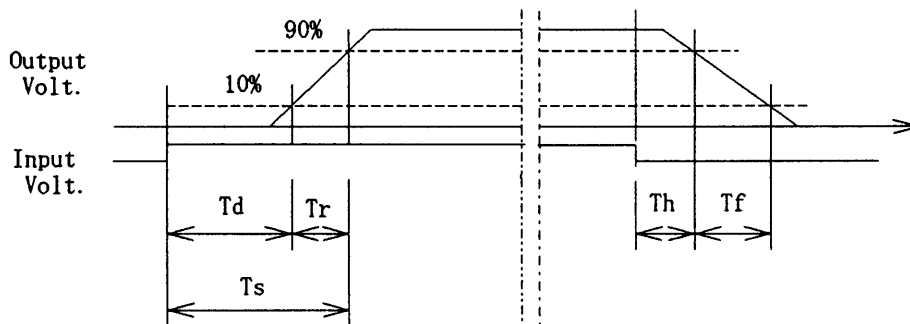
Input Volt. 4.5 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	0.10	1.55	1.65	0.59	2.56
100 %	0.10	1.60	1.70	0.39	1.43



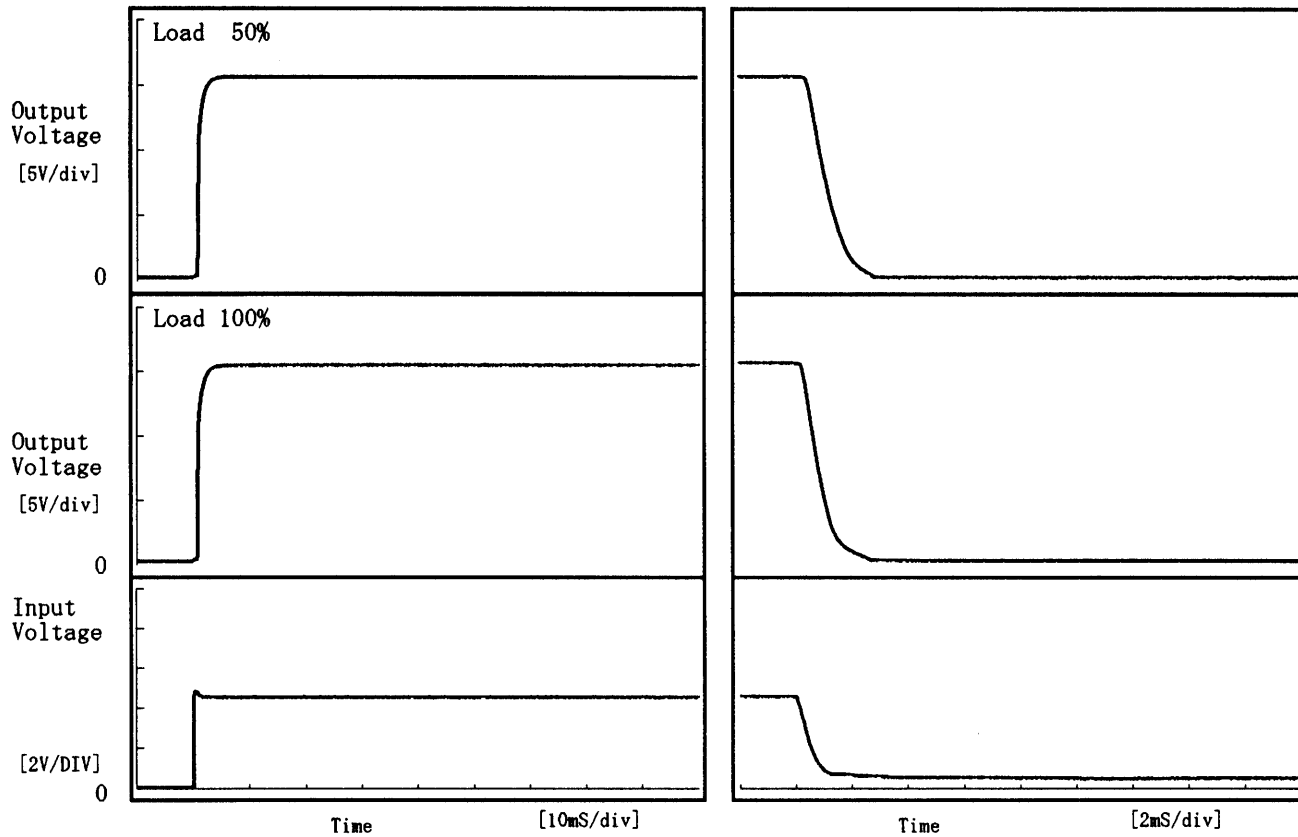
...



Model	ZUW1R50515	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

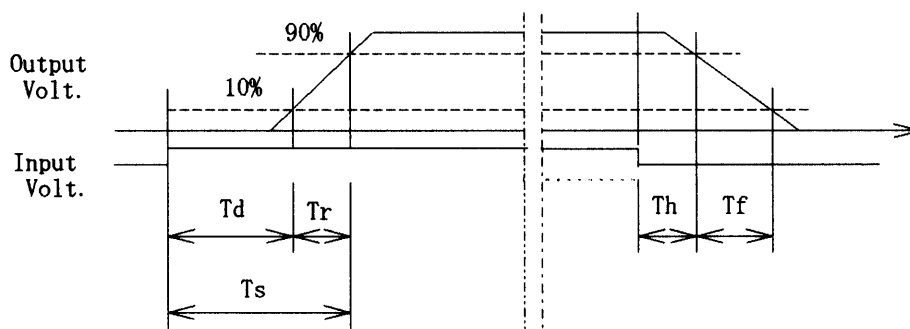
Input Volt. 4.5 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	0.65	1.00	1.65	0.57	1.44
100 %	0.65	1.05	1.70	0.37	1.25





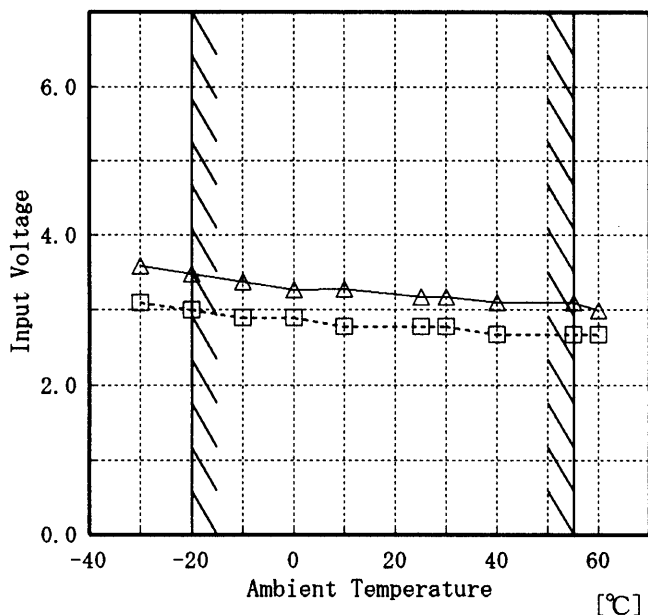
Model		ZUW1R50515		Testing Circuitry Figure A																																																	
Item		Ambient Temperature Drift 周囲温度変動																																																			
Object		+15V0.05A		2. Values																																																	
1. Graph		<p> <input type="checkbox"/> —△— Input Volt. 4.5V <input type="checkbox"/> - - -□- - - Input Volt. 5.0V <input type="checkbox"/> - - -○- - - Input Volt. 9.0V </p> <p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p>		<table border="1"> <thead> <tr> <th>Temperature [°C]</th> <th>Input Volt. 4.5[V] Output Volt. [V]</th> <th>Input Volt. 5.0[V] Output Volt. [V]</th> <th>Input Volt. 9.0[V] Output Volt. [V]</th> </tr> </thead> <tbody> <tr><td>-30</td><td>15.264</td><td>15.264</td><td>15.260</td></tr> <tr><td>-20</td><td>15.259</td><td>15.260</td><td>15.256</td></tr> <tr><td>-10</td><td>15.256</td><td>15.256</td><td>15.253</td></tr> <tr><td>0</td><td>15.252</td><td>15.253</td><td>15.250</td></tr> <tr><td>10</td><td>15.250</td><td>15.251</td><td>15.248</td></tr> <tr><td>25</td><td>15.247</td><td>15.248</td><td>15.246</td></tr> <tr><td>30</td><td>15.246</td><td>15.247</td><td>15.246</td></tr> <tr><td>40</td><td>15.244</td><td>15.245</td><td>15.244</td></tr> <tr><td>55</td><td>15.239</td><td>15.241</td><td>15.242</td></tr> <tr><td>60</td><td>15.237</td><td>15.239</td><td>15.241</td></tr> <tr><td>-</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>		Temperature [°C]	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	15.264	15.264	15.260	-20	15.259	15.260	15.256	-10	15.256	15.256	15.253	0	15.252	15.253	15.250	10	15.250	15.251	15.248	25	15.247	15.248	15.246	30	15.246	15.247	15.246	40	15.244	15.245	15.244	55	15.239	15.241	15.242	60	15.237	15.239	15.241	-	-	-	-
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Temperature [°C]	Input Volt. 4.5[V] Output Volt. [V]	Input Volt. 5.0[V] Output Volt. [V]	Input Volt. 9.0[V] Output Volt. [V]																																																		
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(注)斜線は定格周囲温度範囲を示す。																																																					



Model	ZUW1R50515
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

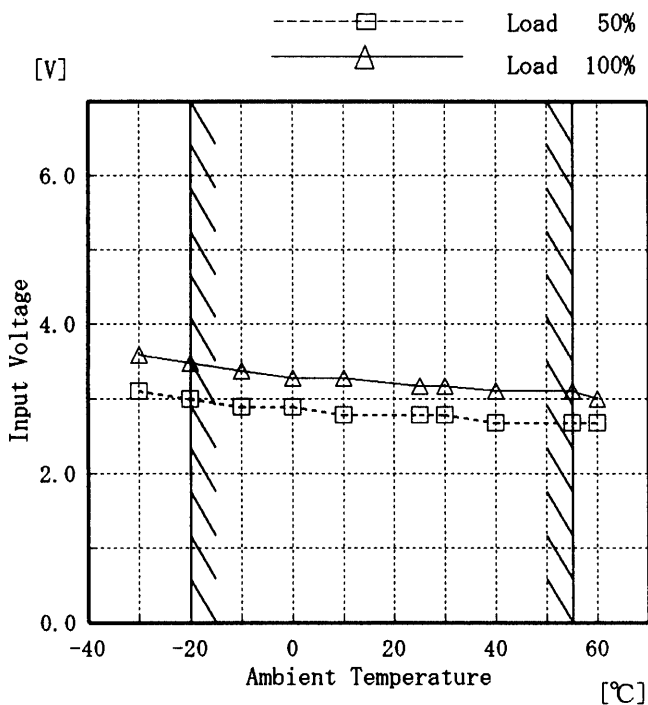
1. Graph
[V] ---□--- Load 50%
 ---△--- Load 100%



2. Values

Ambient Temp. [°C]	Load 50%	Load 100%
	Input Volt. [V]	Input Volt. [V]
-30	3.1	3.6
-20	3.0	3.5
-10	2.9	3.4
0	2.9	3.3
10	2.8	3.3
25	2.8	3.2
30	2.8	3.2
40	2.7	3.1
55	2.7	3.1
60	2.7	3.0
—	—	—

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



2. Values

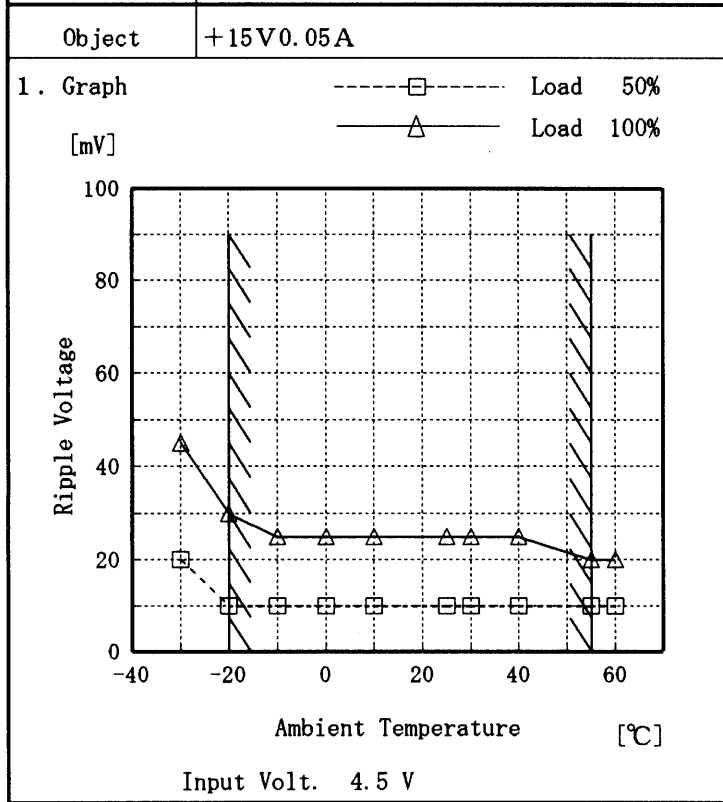
Ambient Temp. [°C]	Load 50%	Load 100%
	Input Volt. [V]	Input Volt. [V]
-30	3.1	3.6
-20	3.0	3.5
-10	2.9	3.4
0	2.9	3.3
10	2.8	3.3
25	2.8	3.2
30	2.8	3.2
40	2.7	3.1
55	2.7	3.1
60	2.7	3.0
—	—	—

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。

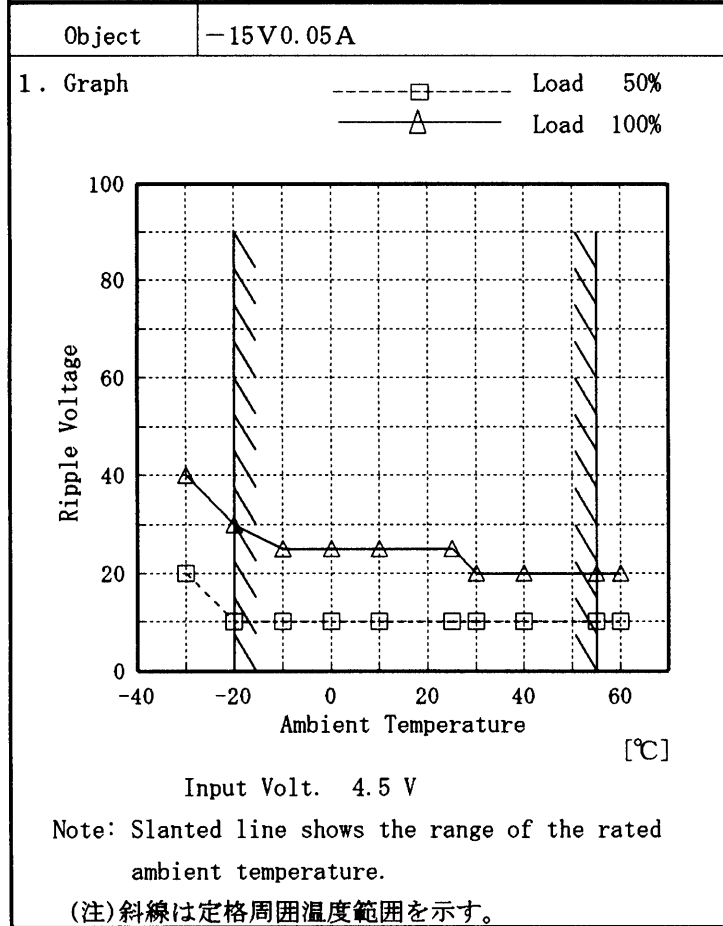


Model	ZUW1R50515	Testing Circuitry Figure A
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)	
Object	+15V0.05A	



2. Values

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

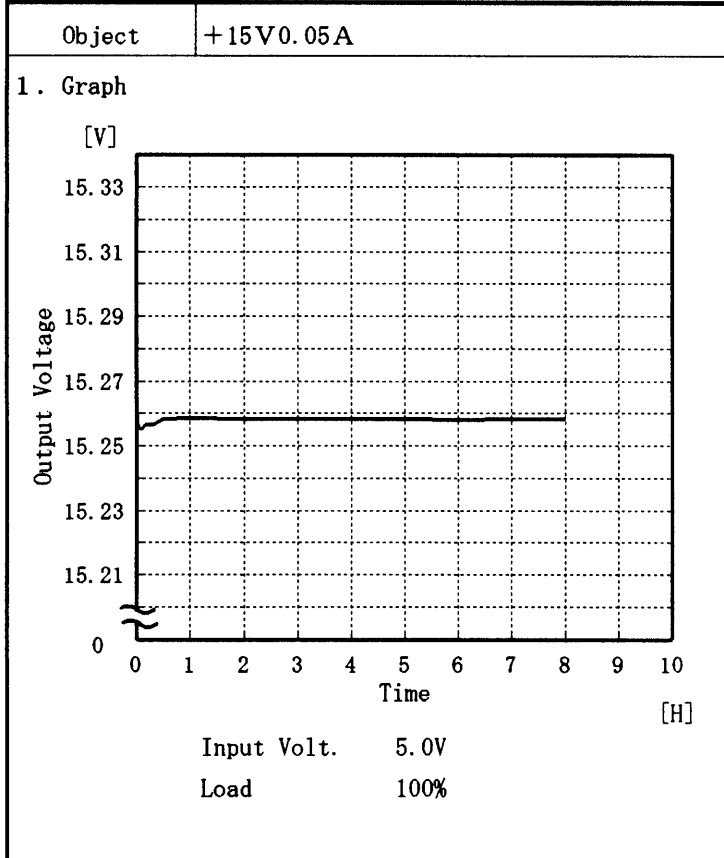


2. Values

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

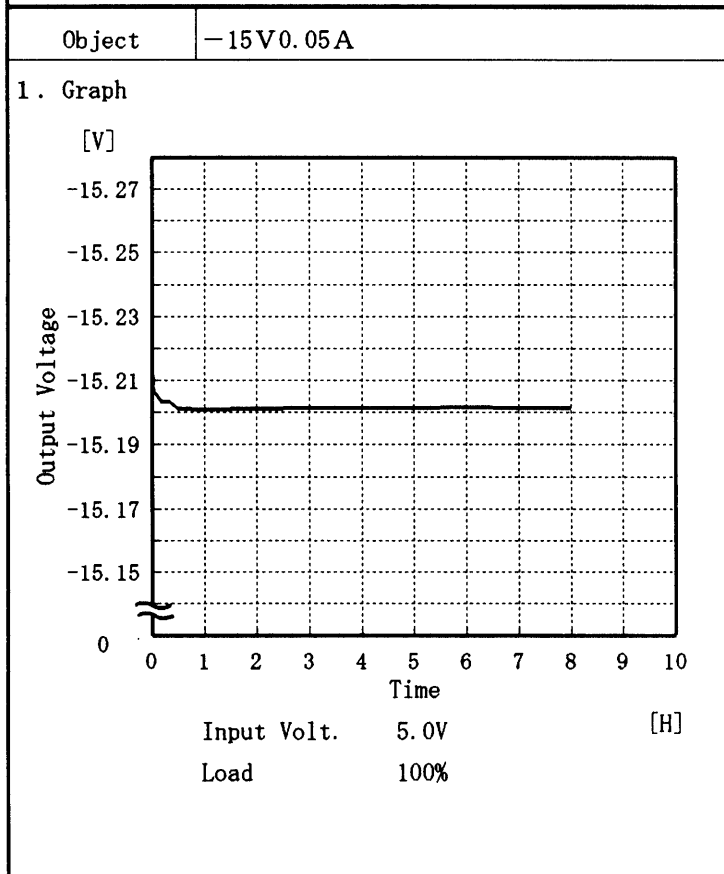


Model	ZUW1R50515	Temperature	25 °C
Item	Time Lapse Drift 経時ドリフト	Testing Circuitry	Figure A



2. Values

Time since start [H]	Output Voltage [V]
0.0	15.262
0.5	15.259
1.0	15.259
2.0	15.258
3.0	15.258
4.0	15.258
5.0	15.258
6.0	15.258
7.0	15.258
8.0	15.258



2. Values

Time since start [H]	Output Voltage [V]
0.0	-15.215
0.5	-15.201
1.0	-15.201
2.0	-15.201
3.0	-15.201
4.0	-15.202
5.0	-15.202
6.0	-15.202
7.0	-15.201
8.0	-15.202



Model		ZUW1R50515	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 : 4.5~9.0 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 4.5~9.0 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
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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	5.0	0.05	15.257	±155	±1.1
Minimum Voltage	25	4.5	0.00	14.948		

Object	-15V0.05A
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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	5.0	0.05	-15.223	±161	±1.1
Minimum Voltage	55	4.5	0.00	-14.902		

COSEL

Model		ZUW1R50515		
Item		Condensation 結露特性		
Object		+15V 0.05A		
		Testing Circuitry Figure A		
<p>1. Condensation test</p> <p>Testing procedure is as follows.</p> <p>① Keeping and cooling the unit in a tank at -10°C for an hour with the input off.</p> <p>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.</p> <p>③ Testing electrical characteristics of the unit to confirm there be no fault.</p> <p>④ Repeating ①, ② and ③ three times.</p>				
<p>1. 結露特性試験</p> <p>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25°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。</p>				
<p>2. Values</p>				
	Times	Output Voltage [V]	Ripple Voltage [mV]	Ripple Noise [mV]
Load 50%	1	15.102	5	15
	2	15.111	5	15
	3	15.097	5	15
Load 100%	1	15.021	20	20
	2	15.063	20	20
	3	15.005	20	20

Input Volt. 5.0 V



Model		ZUW1R50515	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°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°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	-14.887	10	25
	2	-14.935	10	25
	3	-14.876	10	25
Load 100%	1	-14.847	20	35
	2	-14.893	20	35
	3	-14.841	20	35

Input Volt. 5.0 V

COSEL

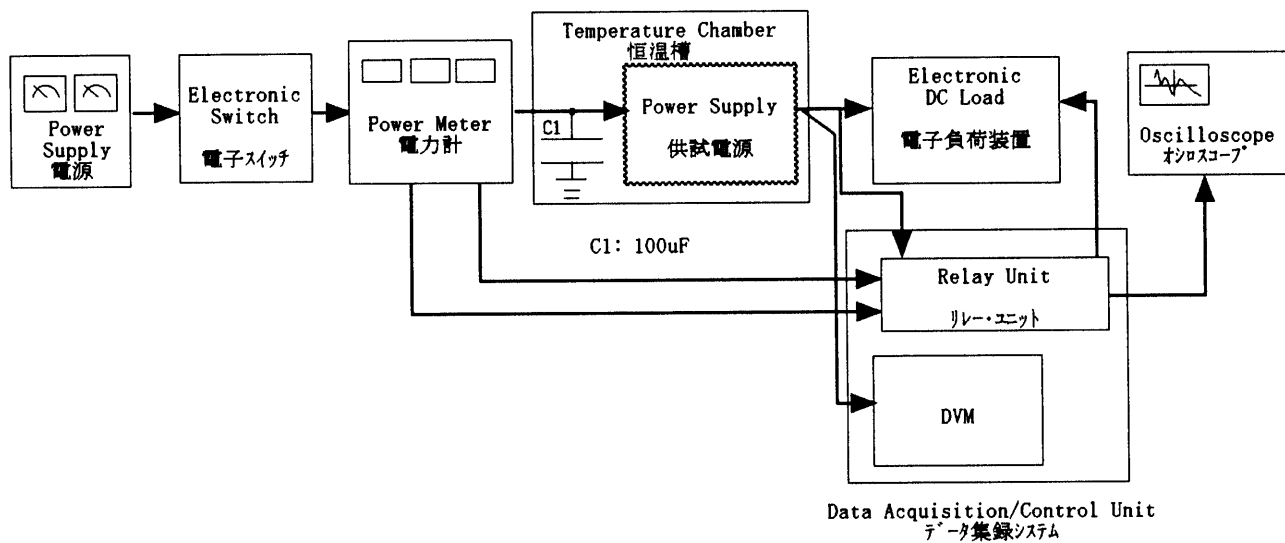


Figure A