



# TEST DATA OF ZTS1R50515

(5.0V INPUT)

Regulated DC Power Supply

Date : Mar.5. 1998

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Design Engineer

**コーセル株式会社**  
**COSEL CO.,LTD.**

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Model		ZTS1R50515	
Item		Line Regulation  静的入力変動	
Object		+15V0.1A	
1. Graph		2. Values	

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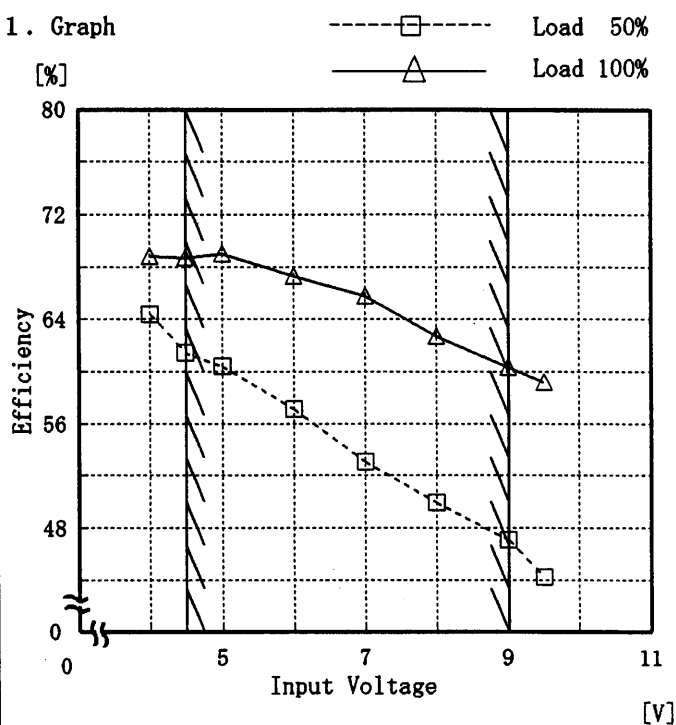
Model ZTS1R50515

Item Efficiency 効率

Object

Temperature 25°C  
Testing Circuitry Figure A

## 1. Graph



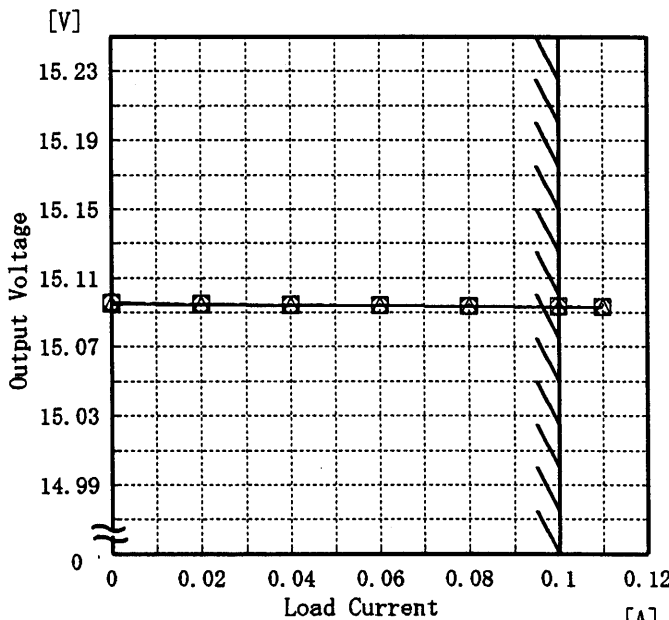
Note: Slanted line shows the range of the rated input voltage.

(注) 斜線は定格入力電圧範囲を示す。

## 2. Values

Input Voltage [V]	Load 50%	Load 100%
	Efficiency [%]	Efficiency [%]
4.0	64.4	68.8
4.5	61.5	68.7
5.0	60.4	69.0
6.0	57.1	67.3
7.0	53.0	65.8
8.0	49.9	62.7
9.0	47.1	60.4
9.5	44.2	59.2
—	—	—
—	—	—
—	—	—
—	—	—

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Model		ZTS1R50515		Temperature		25℃																																																
Item		Load Regulation 静的負荷変動		Testing Circuitry		Figure A																																																
Object		+15V0.1A																																																				
1. Graph				2. Values																																																		
<div><div><div>—△—</div><div>Input Volt. 4.5V</div></div><div><div>- -□- -</div><div>Input Volt. 5.0V</div></div><div><div>—○—</div><div>Input Volt. 9.0V</div></div></div>  <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. 4.5[V]</th><th>Input Volt. 5.0[V]</th><th>Input Volt. 9.0[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>15.095</td><td>15.095</td><td>15.096</td></tr><tr><td>0.02</td><td>15.095</td><td>15.095</td><td>15.095</td></tr><tr><td>0.04</td><td>15.094</td><td>15.095</td><td>15.095</td></tr><tr><td>0.06</td><td>15.094</td><td>15.094</td><td>15.094</td></tr><tr><td>0.08</td><td>15.094</td><td>15.094</td><td>15.094</td></tr><tr><td>0.10</td><td>15.093</td><td>15.094</td><td>15.093</td></tr><tr><td>0.11</td><td>15.093</td><td>15.093</td><td>15.093</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td></tr></table>				Load Current [A]	Input Volt. 4.5[V]	Input Volt. 5.0[V]	Input Volt. 9.0[V]	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]	0.00	15.095	15.095	15.096	0.02	15.095	15.095	15.095	0.04	15.094	15.095	15.095	0.06	15.094	15.094	15.094	0.08	15.094	15.094	15.094	0.10	15.093	15.094	15.093	0.11	15.093	15.093	15.093	—	—	—	—	—	—	—	—	—	—	—	—
Load Current [A]	Input Volt. 4.5[V]	Input Volt. 5.0[V]	Input Volt. 9.0[V]																																																			
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# COSEL

Model		ZTS1R50515	
Item		Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)	
Object		+15V0.1A	
1. Graph		2.Values	

-----□----- Input Volt. 4.5V  
-----△----- Input Volt. 9.0V

[mV]

Ripple Voltage

Load Current [A]

Load Current [A]	Input Volt. 4.5 [V]	Input Volt. 9.0 [V]
	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]
0.00	5	5
0.02	8	5
0.04	10	10
0.06	10	10
0.08	10	15
0.10	15	15
0.11	15	20
—	—	—
—	—	—
—	—	—
—	—	—

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

Ripple [mVp-p]

T1

T2

Fig. Complex Ripple Wave Form

図 リップル波形詳細図

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Model		ZTS1R50515	Temperature		25℃																																												
Item		Ripple-Noise   リップルノイズ	Testing Circuitry		Figure A																																												
Object		+15V0.1A																																															
1. Graph			2. Values																																														
<div><div>-----□-----    Input Volt. 4.5V</div><div>-----△-----    Input Volt. 9.0V</div><div>[mV]</div><div><div>Ripple-Noise</div><div>Load Current</div><div>[A]</div></div></div> <table><tr><th rowspan="2">Load current</th><th>Input Volt.</th><th>Input Volt.</th></tr><tr><th>4.5 [V]</th><th>9.0 [V]</th></tr><tr><th>[A]</th><th>Ripple-Noise</th><th>Ripple-Noise</th></tr><tr><th></th><th>[mV]</th><th>[mV]</th></tr><tr><td>0.00</td><td>15</td><td>30</td></tr><tr><td>0.02</td><td>25</td><td>35</td></tr><tr><td>0.04</td><td>35</td><td>35</td></tr><tr><td>0.06</td><td>50</td><td>35</td></tr><tr><td>0.08</td><td>50</td><td>40</td></tr><tr><td>0.10</td><td>55</td><td>50</td></tr><tr><td>0.11</td><td>60</td><td>50</td></tr><tr><td>—</td><td>—</td><td>—</td></tr><tr><td>—</td><td>—</td><td>—</td></tr><tr><td>—</td><td>—</td><td>—</td></tr><tr><td>—</td><td>—</td><td>—</td></tr></table>			Load current	Input Volt.	Input Volt.	4.5 [V]	9.0 [V]	[A]	Ripple-Noise	Ripple-Noise		[mV]	[mV]	0.00	15	30	0.02	25	35	0.04	35	35	0.06	50	35	0.08	50	40	0.10	55	50	0.11	60	50	—	—	—	—	—	—	—	—	—	—	—	—	<p>Ripple-Noise is shown as p-p in the figure below.</p> <p>Note: Slanted line shows the range of the rated load current.</p> <p>リップルノイズは、下図 p - p 値で示される。</p> <p>(注) 斜線は定格負荷電流範囲を示す。</p> <div><div>T1: Due to AC Input Line 入力商用周期</div><div>T2: Due to Switching スイッチング周期</div><div><div>Ripple-Noise</div><div>[mVp-p]</div></div></div> <div><div>Fig. Complex Ripple Wave Form</div><div>図   リップル波形詳細図</div></div>		
Load current	Input Volt.	Input Volt.																																															
	4.5 [V]	9.0 [V]																																															
[A]	Ripple-Noise	Ripple-Noise																																															
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0.00	15	30																																															
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Model

ZTS1R50515

Item

Overcurrent Protection

過電流保護

Object

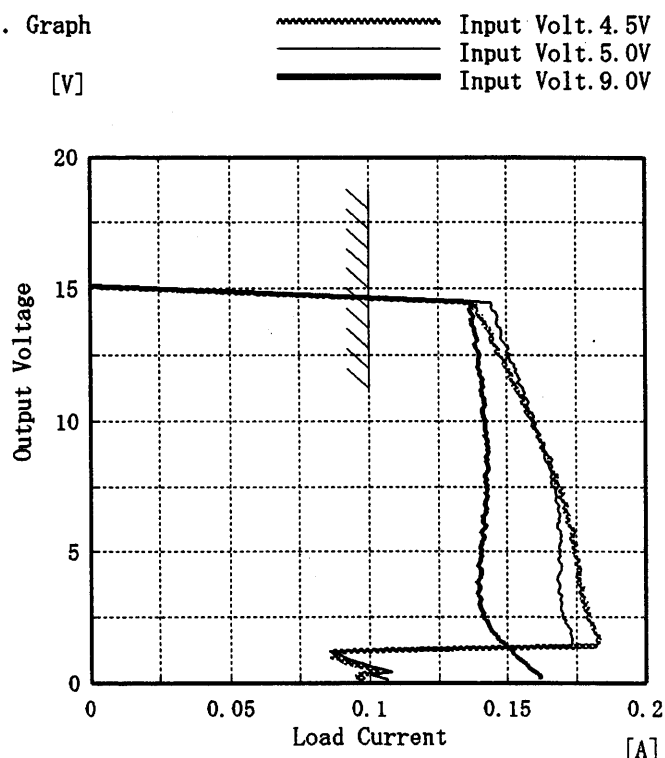
+15V0.1A

Temperature

25°C

Testing Circuitry Figure A

## 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. 4.5[V]	Input Volt. 5.0[V]	Input Volt. 9.0[V]
	Load Current [A]	Load Current [A]	Load Current [A]
15.00	0.14	0.14	0.14
14.25	0.14	0.14	0.14
13.50	0.14	0.15	0.14
12.00	0.15	0.15	0.14
10.50	0.16	0.16	0.14
9.00	0.16	0.16	0.14
7.50	0.17	0.17	0.14
6.00	0.17	0.17	0.14
4.50	0.17	0.17	0.14
3.00	0.18	0.17	0.14
1.50	0.18	0.17	0.15
0.00	0.10	0.11	0.16



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Model	ZTS1R50515		
Item	Dynamic Load Response 動的負荷変動	Temperature	25°C
Object	+15V0.1A	Testing Circuitry	Figure A

Input Volt. 5.0 V

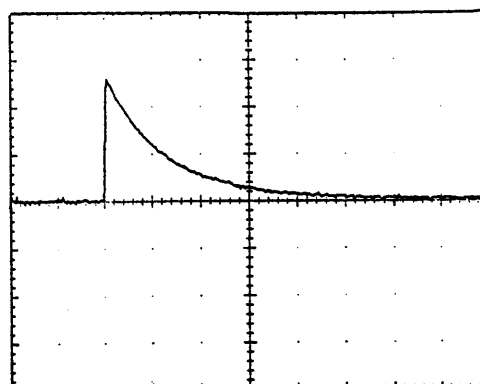
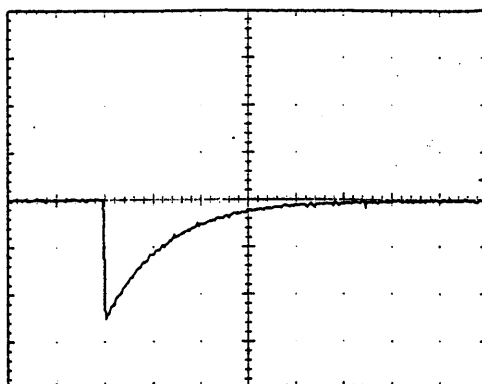
Cycle 100 mS

Load Current

Min. Load ←→

Load 100 %

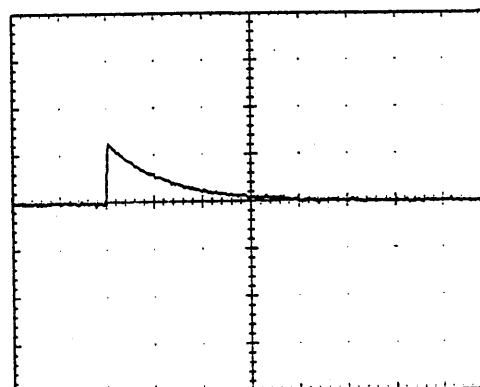
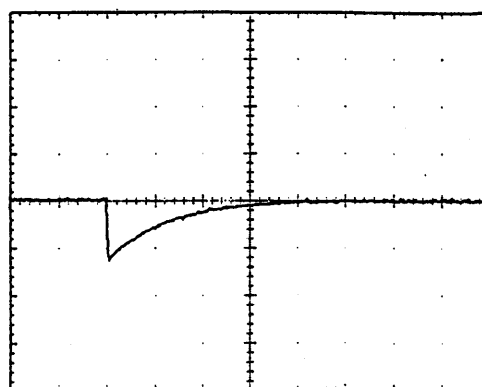
100 mV/div



Min. Load ←→

Load 50 %

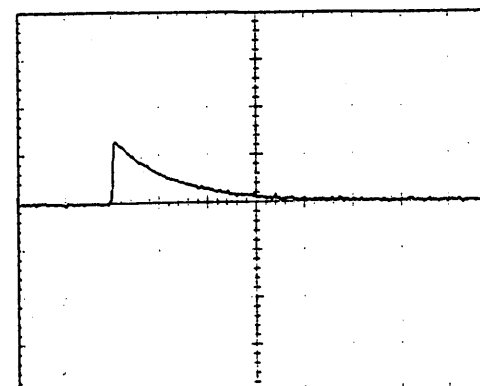
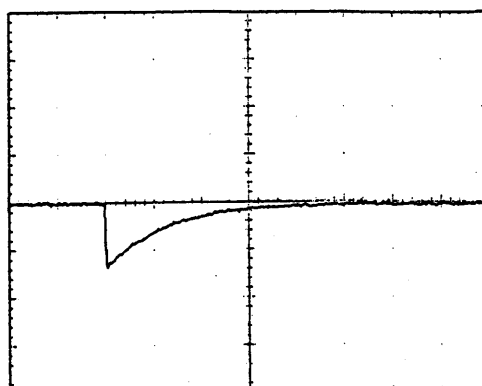
100 mV/div



Load 50% ←→

Load 100 %

100 mV/div



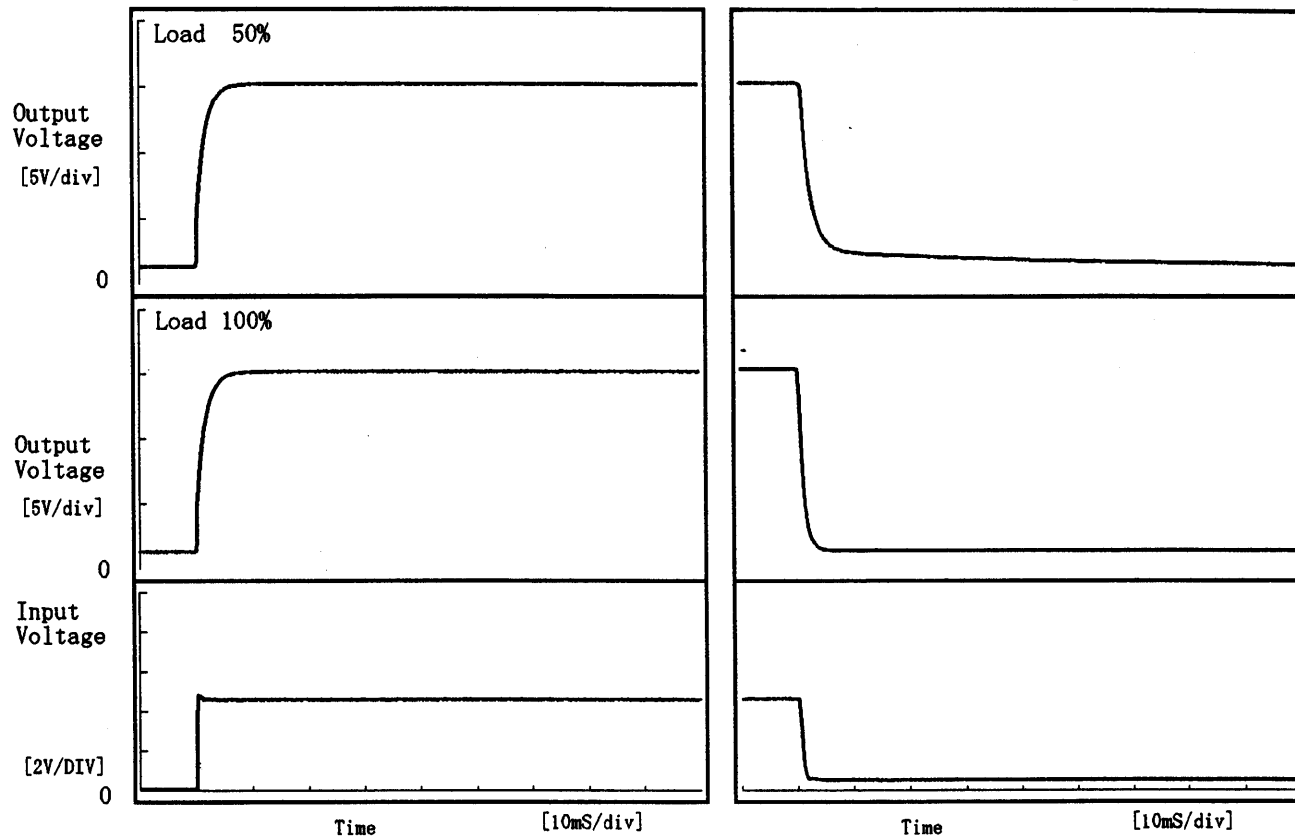
1 mS/div

**COSEL**

Model	ZTS1R50515		
Item	Rise and Fall Time 立上り、立下り時間	Temperature	25°C
Object	+15V0.1A	Testing Circuitry	Figure A

## 1. Graph

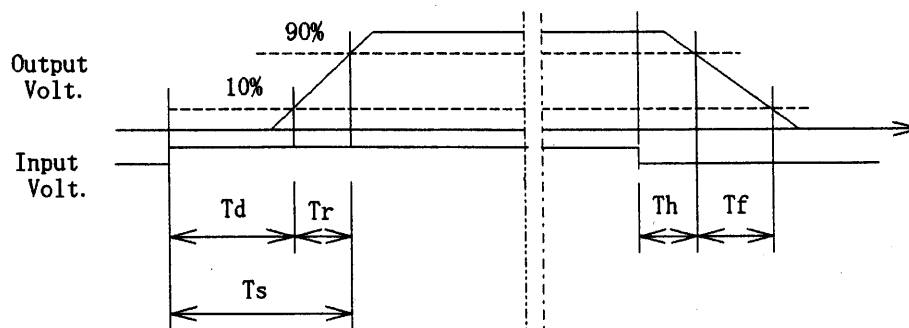
Input Volt. 4.5 V



## 2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	0.05	3.10	3.15	1.10	51.40
100 %	0.05	3.20	3.25	0.45	3.15



**COSEL**

Model

ZTS1R5Q515

Item

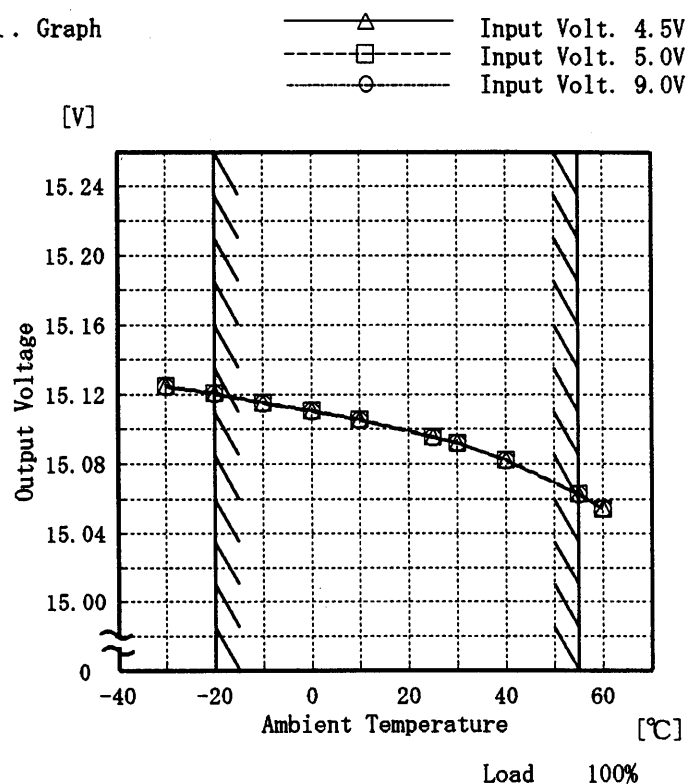
Ambient Temperature Drift  
周囲温度変動

Object

+15V0.1A

Testing Circuitry Figure A

## 1. Graph



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

Temperature [°C]	Input Volt. 4.5[V]	Input Volt. 5.0[V]	Input Volt. 9.0[V]
	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]
-30	15.125	15.125	15.125
-20	15.121	15.121	15.120
-10	15.115	15.115	15.115
0	15.111	15.111	15.110
10	15.106	15.106	15.105
25	15.095	15.095	15.095
30	15.092	15.092	15.092
40	15.082	15.082	15.082
55	15.063	15.063	15.063
60	15.055	15.054	15.054
—	—	—	—

**COSEL**

Model

ZTS1R50515

Item

Minimum Input Voltage for Regulated Output Voltage  
最低レギュレーション電圧

Object

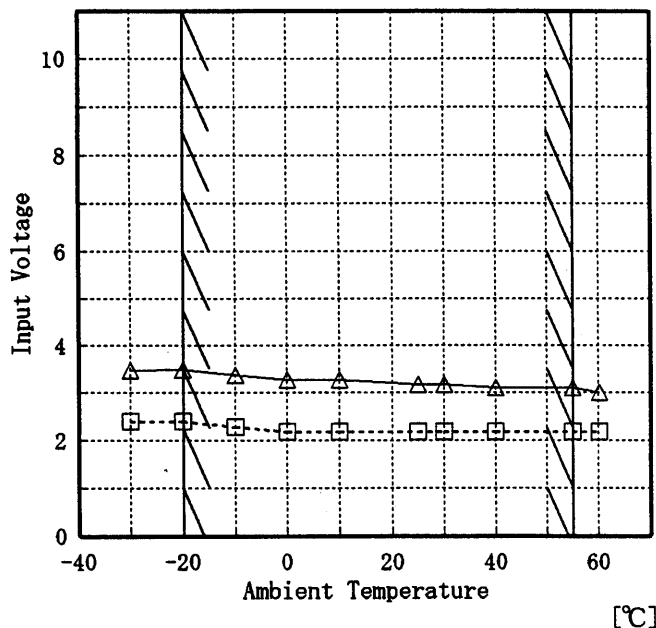
+15V0.1A

Testing Circuitry Figure A

## 1. Graph

-----□----- Load 50%  
 -----△----- Load 100%

[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. [°C]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-30	2.4	3.5
-20	2.4	3.5
-10	2.3	3.4
0	2.2	3.3
10	2.2	3.3
25	2.2	3.2
30	2.2	3.2
40	2.2	3.1
55	2.2	3.1
60	2.2	3.0
—	—	—

# COSEL

Model ZTS1R50515		Testing Circuitry Figure A																																						
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)																																							
Object	+15V0.1A																																							
1. Graph <div> <div> <div>-----□-----</div> <div>Load 50%</div> </div> <div> <div>-----△-----</div> <div>Load 100%</div> </div> </div> <div> <div> <div>[mV]</div> <div>80</div> <div>60</div> <div>40</div> <div>20</div> <div>0</div> </div> <div> <div>Ripple Voltage</div> <div>[mV]</div> </div> </div> <div> <div> <div>-40</div> <div>-20</div> <div>0</div> <div>20</div> <div>40</div> <div>60</div> </div> <div>Ambient Temperature</div> <div>[°C]</div> </div> <div>Input Volt. 4.5 V</div>		2. Values <table> <tr> <th rowspan="2">Ambient Temp. [°C]</th><th>Load 50%</th><th>Load 100%</th></tr> <tr> <th>Ripple Output Volt. [mV]</th><th>Ripple Output Volt. [mV]</th></tr> <tr><td>-30</td><td>10</td><td>20</td></tr> <tr><td>-20</td><td>10</td><td>15</td></tr> <tr><td>-10</td><td>8</td><td>15</td></tr> <tr><td>0</td><td>8</td><td>15</td></tr> <tr><td>10</td><td>8</td><td>15</td></tr> <tr><td>25</td><td>8</td><td>15</td></tr> <tr><td>30</td><td>8</td><td>15</td></tr> <tr><td>40</td><td>8</td><td>15</td></tr> <tr><td>55</td><td>8</td><td>15</td></tr> <tr><td>60</td><td>8</td><td>10</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> </table>	Ambient Temp. [°C]	Load 50%	Load 100%	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]	-30	10	20	-20	10	15	-10	8	15	0	8	15	10	8	15	25	8	15	30	8	15	40	8	15	55	8	15	60	8	10	—	—	—
Ambient Temp. [°C]	Load 50%	Load 100%																																						
	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]																																						
-30	10	20																																						
-20	10	15																																						
-10	8	15																																						
0	8	15																																						
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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。																																								

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Model

ZTS1R50515

Item

Time Lapse Drift 経時ドリフト

Object

+15V0.1A

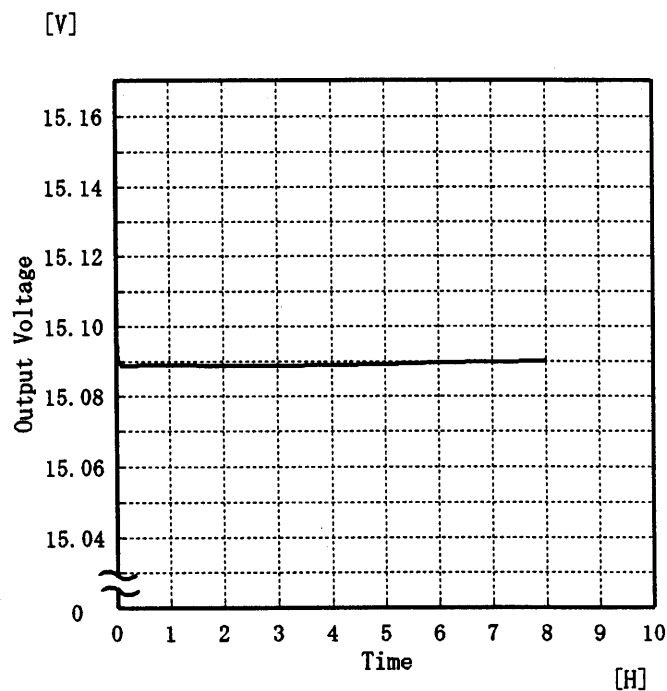
Temperature

25 °C

Testing Circuitry

Figure A

## 1. Graph



## 2. Values

Time since start [H]	Output Voltage [V]
0.0	15.097
0.5	15.089
1.0	15.089
2.0	15.089
3.0	15.089
4.0	15.089
5.0	15.089
6.0	15.090
7.0	15.090
8.0	15.090

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Model		ZTS1R50515	Testing Circuitry Figure A
Item		Output Voltage Accuracy 定電圧精度	
Object		+15V0.1A	

## 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 : 0.0~0.1 A

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

\* Output Voltage Accuracy (Ratio) =  $\frac{\text{Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$

## 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 0.0~0.1 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 (Ratio) [%]
Maximum Voltage	-20	9.0	0.0	15.124	±33	±0.3
Minimum Voltage	55	5.0	0.1	15.058		

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		Testing Circuitry      Figure A
Model	ZTS1R50515	
Item	Condensation    結露特性	
Object	+15V0.1A	

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]	14.771	Input Volt.：5V, Load Current:0.1A
Line Regulation [mV]	1	Input Volt.：4.5～9V, Load Current:0.1A
Load Regulation [mV]	3	Input Volt.：5V, Load Current:0～0.1A



**COSEL**

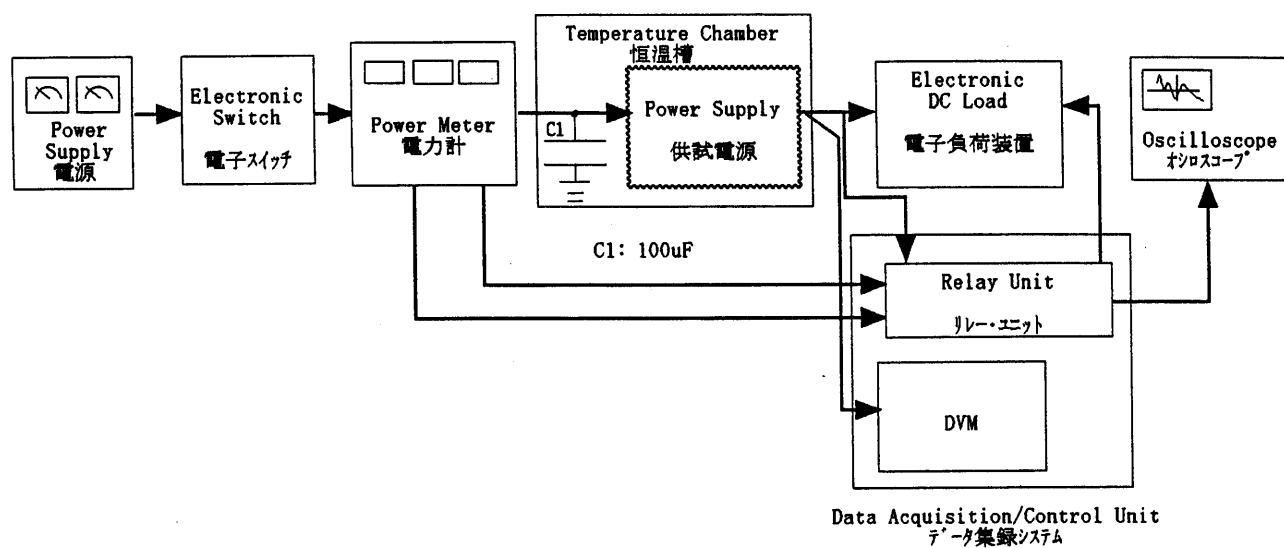


Figure A