



# TEST DATA OF ZTS1R51212

(12.0V INPUT)

Regulated DC Power Supply

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**COSEL CO., LTD.**



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Model		ZTS1R51212		Temperature		25℃																																										
Item		Line Regulation 静的入力変動		Testing Circuitry		Figure A																																										
Object		+12V0.13A																																														
1. Graph				2. Values																																												
<div><div>-----□----- Load 50%</div><div>-----△----- Load 100%</div></div> <div><div>Output Voltage [V]</div><div><div>12.25</div><div>12.21</div><div>12.17</div><div>12.13</div><div>12.09</div><div>12.05</div><div>12.01</div><div>0</div></div><div><div>Input Voltage [V]</div><div><div>0</div><div>10</div><div>15</div><div>20</div></div></div></div> <div><div>Note: Slanted line shows the range of the rated input voltage.</div><div>(注)斜線は定格入力電圧範囲を示す。</div></div>				<table><tr><th rowspan="2">Input Voltage [V]</th><th>Load 50%</th><th>Load 100%</th></tr><tr><th>Output Volt. [V]</th><th>Output Volt. [V]</th></tr><tr><td>8.0</td><td>12.109</td><td>12.108</td></tr><tr><td>9.0</td><td>12.109</td><td>12.108</td></tr><tr><td>10.0</td><td>12.109</td><td>12.108</td></tr><tr><td>12.0</td><td>12.109</td><td>12.108</td></tr><tr><td>15.0</td><td>12.109</td><td>12.108</td></tr><tr><td>18.0</td><td>12.109</td><td>12.107</td></tr><tr><td>20.0</td><td>12.109</td><td>12.107</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><tr><td>—</td><td>—</td><td>—</td></tr></table>				Input Voltage [V]	Load 50%	Load 100%	Output Volt. [V]	Output Volt. [V]	8.0	12.109	12.108	9.0	12.109	12.108	10.0	12.109	12.108	12.0	12.109	12.108	15.0	12.109	12.108	18.0	12.109	12.107	20.0	12.109	12.107	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Input Voltage [V]	Load 50%	Load 100%																																														
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12.0	12.109	12.108																																														
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18.0	12.109	12.107																																														
20.0	12.109	12.107																																														
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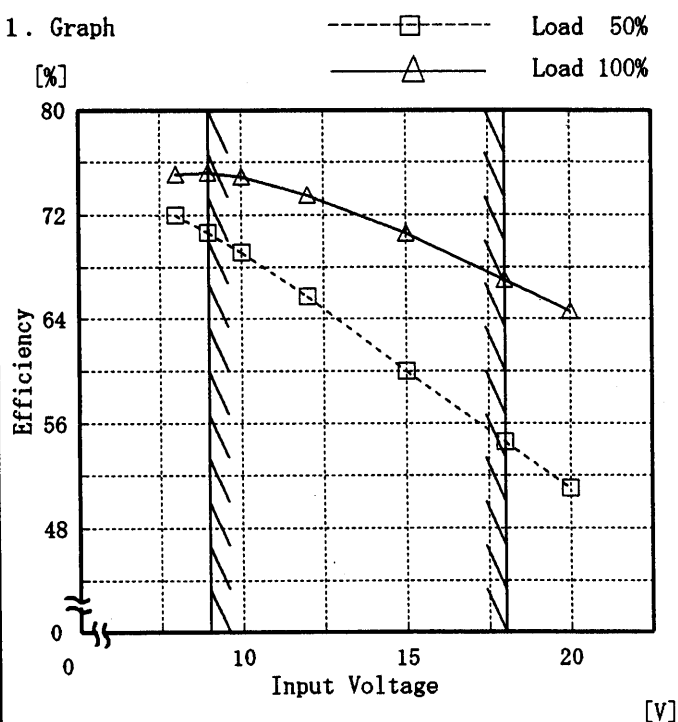
Model ZTS1R51212

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 [%]
8.0	72.0	75.1
9.0	70.6	75.2
10.0	69.1	74.9
12.0	65.7	73.5
15.0	60.0	70.6
18.0	54.6	67.0
20.0	51.0	64.6
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—	—	—
—	—	—
—	—	—
—	—	—



**COSEL**

Model		ZTS1R51212	
Item	Load Regulation	静的負荷変動	
Object	+12V0.13A		

1. Graph

△

Input Volt. 9.0V

□

Input Volt. 12.0V

○

Input Volt. 18.0V

Output Voltage [V]

<



# COSEL

Model		ZTS1R51212	Temperature Testing Circuitry	25℃ Figure A																																					
Item		Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)																																							
Object		+12V0.13A																																							
1. Graph		<div><div>-----□----- Input Volt. 9.0V</div><div>-----△----- Input Volt. 18.0V</div></div> <p>Ripple Voltage is shown as p-p in the figure below.</p> <p>Note: Slanted line shows the range of the rated load current.</p> <p>リップル電圧は、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>	2.Values																																						
		<table><tr><th rowspan="2">Load Current [A]</th><th>Input Volt. 9.0 [V]</th><th>Input Volt. 18.0 [V]</th></tr><tr><th>Ripple Output Volt. [mV]</th><th>Ripple Output Volt. [mV]</th></tr><tr><td>0.00</td><td>5</td><td>5</td></tr><tr><td>0.02</td><td>5</td><td>5</td></tr><tr><td>0.04</td><td>5</td><td>8</td></tr><tr><td>0.06</td><td>5</td><td>8</td></tr><tr><td>0.08</td><td>8</td><td>8</td></tr><tr><td>0.10</td><td>10</td><td>8</td></tr><tr><td>0.12</td><td>15</td><td>10</td></tr><tr><td>0.13</td><td>15</td><td>10</td></tr><tr><td>0.14</td><td>15</td><td>10</td></tr><tr><td>—</td><td>—</td><td>—</td></tr><tr><td>—</td><td>—</td><td>—</td></tr></table>		Load Current [A]	Input Volt. 9.0 [V]	Input Volt. 18.0 [V]	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]	0.00	5	5	0.02	5	5	0.04	5	8	0.06	5	8	0.08	8	8	0.10	10	8	0.12	15	10	0.13	15	10	0.14	15	10	—	—	—	—	—	—
Load Current [A]	Input Volt. 9.0 [V]	Input Volt. 18.0 [V]																																							
	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]																																							
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0.04	5	8																																							
0.06	5	8																																							
0.08	8	8																																							
0.10	10	8																																							
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0.13	15	10																																							
0.14	15	10																																							
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—	—	—																																							
		<p>T1: Due to AC Input Line 入力商用周期</p> <p>T2: Due to Switching スイッチング周期</p> <p>Fig. Complex Ripple Wave Form 図 リップル波形詳細図</p>																																							



# COSEL

Model		ZTS1R51212	Temperature		25℃
Item		Ripple-Noise   リップルノイズ	Testing Circuitry		Figure A
Object		+12V0.13A			

1. Graph

-----□-----    Input Volt. 9.0V

-----△-----    Input Volt. 18.0V

[mV]

120

100

80

60

40

20

0

Ripple-Noise

0

0.05

0.1

0.15

Load Current

[A]

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

T2

Ripple-Noise

[mVp-p]

T1

Fig. Complex Ripple Wave Form

図   リップル波形詳細図

2. Values

Load current	Input Volt.	Input Volt.
	9.0 [V]	18.0 [V]
[A]	Ripple-Noise	Ripple-Noise
	[mV]	[mV]
0.00	10	15
0.02	15	20
0.04	20	20
0.06	25	20
0.08	30	25
0.10	35	30
0.12	40	30
0.13	40	30
0.14	40	35
—	—	—
—	—	—



# COSEL

Model		ZTS1R51212																																																						
Item		Overcurrent Protection 過電流保護	Temperature 25℃ Testing Circuitry Figure A																																																					
Object		+12V0.13A																																																						
1. Graph		2. Values																																																						
<div><div>[V]</div><div><div>~~~~~ Input Volt. 9.0V —— Input Volt. 12.0V —— Input Volt. 18.0V</div></div><div><div>Output Voltage [V]</div><div>Load Current [A]</div></div></div>		<table><tr><th>Output Voltage [V]</th><th>Input Volt. 9.0[V] Load Curr-ent [A]</th><th>Input Volt. 12.0[V] Load Curr-ent [A]</th><th>Input Volt. 18.0[V] Load Curr-ent [A]</th></tr><tr><td>12.00</td><td>0.18</td><td>0.20</td><td>0.18</td></tr><tr><td>11.40</td><td>0.18</td><td>0.20</td><td>0.18</td></tr><tr><td>10.80</td><td>0.18</td><td>0.20</td><td>0.18</td></tr><tr><td>9.60</td><td>0.18</td><td>0.20</td><td>0.17</td></tr><tr><td>8.40</td><td>0.18</td><td>0.20</td><td>0.17</td></tr><tr><td>7.20</td><td>0.18</td><td>0.19</td><td>0.16</td></tr><tr><td>6.00</td><td>0.18</td><td>0.19</td><td>0.16</td></tr><tr><td>4.80</td><td>0.18</td><td>0.19</td><td>0.15</td></tr><tr><td>3.60</td><td>0.18</td><td>0.18</td><td>0.15</td></tr><tr><td>2.40</td><td>0.18</td><td>0.18</td><td>0.14</td></tr><tr><td>1.20</td><td>0.19</td><td>0.18</td><td>0.15</td></tr><tr><td>0.00</td><td>0.17</td><td>0.23</td><td>0.18</td></tr></table>			Output Voltage [V]	Input Volt. 9.0[V] Load Curr-ent [A]	Input Volt. 12.0[V] Load Curr-ent [A]	Input Volt. 18.0[V] Load Curr-ent [A]	12.00	0.18	0.20	0.18	11.40	0.18	0.20	0.18	10.80	0.18	0.20	0.18	9.60	0.18	0.20	0.17	8.40	0.18	0.20	0.17	7.20	0.18	0.19	0.16	6.00	0.18	0.19	0.16	4.80	0.18	0.19	0.15	3.60	0.18	0.18	0.15	2.40	0.18	0.18	0.14	1.20	0.19	0.18	0.15	0.00	0.17	0.23	0.18
Output Voltage [V]	Input Volt. 9.0[V] Load Curr-ent [A]	Input Volt. 12.0[V] Load Curr-ent [A]	Input Volt. 18.0[V] Load Curr-ent [A]																																																					
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3.60	0.18	0.18	0.15																																																					
2.40	0.18	0.18	0.14																																																					
1.20	0.19	0.18	0.15																																																					
0.00	0.17	0.23	0.18																																																					
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。																																																								



# COSEL

Model	ZTS1R51212	Temperature	25°C
Item	Dynamic Load Responce 動的負荷変動	Testing Circuitry	Figure A
Object	+12V0.13A		

Input Volt. 12.0 V

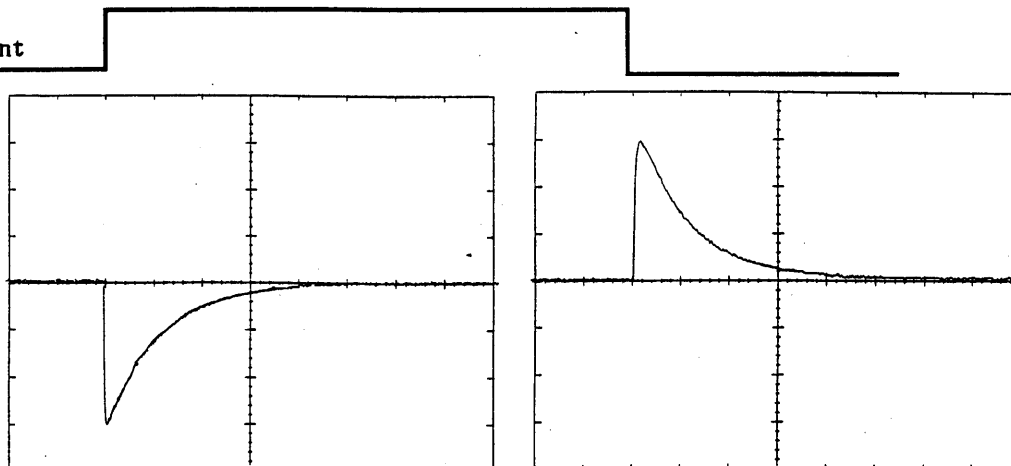
Cycle 100 mS

Load Current

Min. Load ↔

Load 100 %

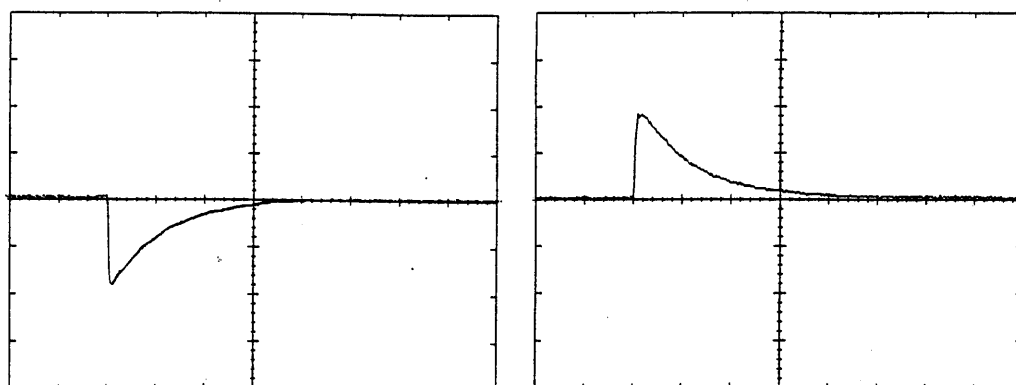
200 mV/div



Min. Load ↔

Load 50 %

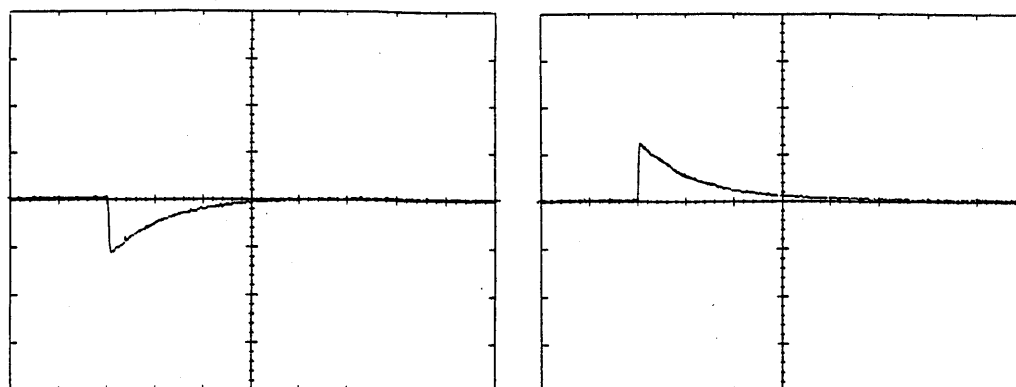
200 mV/div



Load 50% ↔

Load 100 %

200 mV/div



1 mS/div

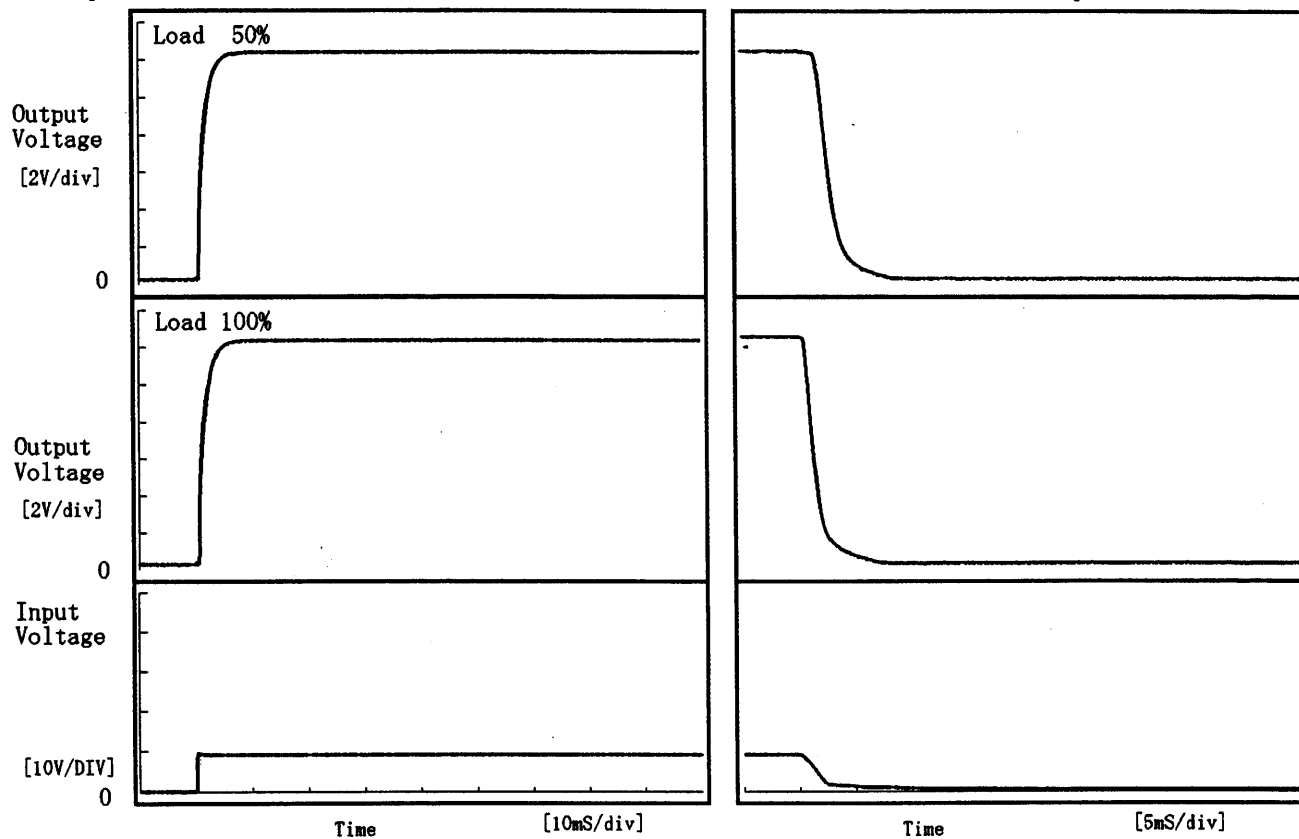


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Model	ZTS1R51212	Temperature	25°C
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	+12V0.13A		

## 1. Graph

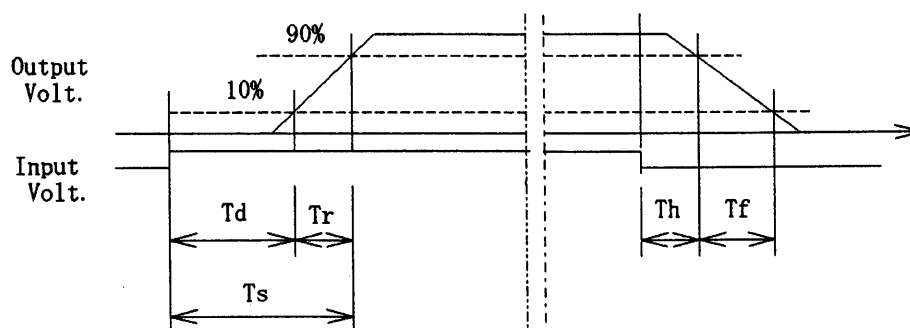
Input Volt. 9.0 V



## 2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	0.65	2.40	3.05	1.85	2.70
100 %	0.65	2.50	3.15	0.75	2.35





# COSEL

Model

ZTS1R51212

Item

Ambient Temperature Drift  
周囲温度変動

Object

+12V0.13A

1. Graph

△

Input Volt. 9.0V

□

Input Volt. 12.0V

○

Input Volt. 18.0V

Output Voltage [V]

-40

-20

0

20

40

60

Ambient Temperature [°C]

12.00

12.04

12.08

12.12

12.16

12.20

12.24

0

12.00

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12.04

12.08

12.12

12.16

12.20

12.24

0

12.00

12.04

12.08

12.12

12.16

12.20

12.24

0

12.00

12.04

12.08

12.12

12.16

12.20

12.24

0

12.00

12.04

12.08

12.12

12.16

<



**COSEL**

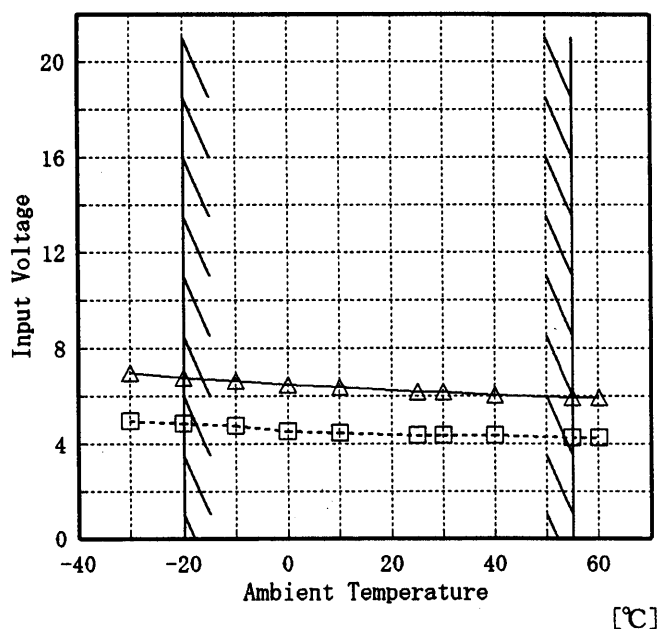
Model ZTS1R51212

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

Object +12V0.13A

Testing Circuitry Figure A

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



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	5.0	7.0
-20	4.9	6.8
-10	4.8	6.7
0	4.6	6.5
10	4.5	6.4
25	4.4	6.2
30	4.4	6.2
40	4.4	6.1
55	4.3	5.9
60	4.3	5.9
—	—	—



# COSEL

Model		ZTS1R51212	
Item		Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)	
Object		+12V0.13A	

1. Graph

-----□----- Load 50%

——△—— Load 100%

[mV]

80

60

40

20

0

Ripple Voltage

-40

-20

0

20

40

60

Ambient Temperature [°C]

Input Volt. 9.0 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%	Load 100%
	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]
-30	10	20
-20	10	20
-10	8	15
0	8	15
10	8	15
25	8	10
30	8	10
40	8	10
55	8	10
60	5	10
—	—	—



**COSEL**

Model

ZTS1R51212

Item

Time Lapse Drift 経時ドリフト

Object

+12V0.13A

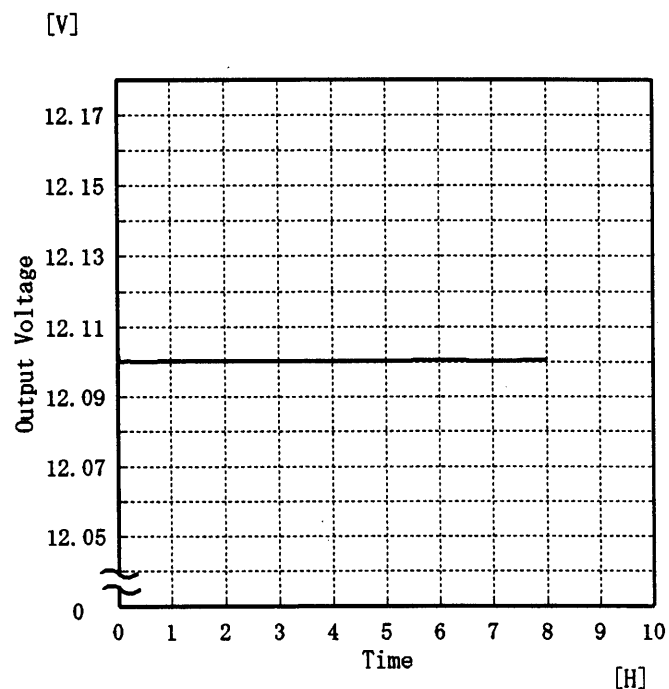
Temperature

25 °C

Testing Circuitry

Figure A

## 1. Graph



## 2. Values

Time since start [H]	Output Voltage [V]
0.0	12.103
0.5	12.100
1.0	12.100
2.0	12.100
3.0	12.100
4.0	12.100
5.0	12.100
6.0	12.101
7.0	12.101
8.0	12.101



**COSEL**

Model	ZTS1R51212	Testing Circuitry Figure A
Item	Output Voltage Accuracy 定電圧精度	
Object	+12V0.13A	

## 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 : 9.0~18.0 V

Load Current : 0.00~0.13 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 9.0~18.0 V

負荷電流 0.00~0.13 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	25	18.0	0.00	12.113	±9	±0.1
Minimum Voltage	-20	9.0	0.13	12.095		



# COSEL

<div> <div>LOGEL</div> </div>																			
Model	ZTS1R51212																		
Item	Condensation 結露特性	Testing Circuitry	Figure A																
Object	+12V0.13A																		
<div> <div>1. Condensation test</div> <div>Testing procedure is as follows.</div> <div> <div>① Keeping and cooling the unit in a tank at -10℃ for an hour with the input off.</div> <div>② Taking it out of the tank and dewing itself in a room where the temperature is 25℃ and the humidity is 40%RH.</div> <div>③ Testing electrical characteristics of the unit to confirm there be no fault.</div> </div> </div>																			
<div> <div>1. 結露特性試験</div> <div> <div>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。</div> </div> </div>																			
<div>2. Values</div> <table> <tr> <th>Item</th><th>Data</th><th colspan="2">Testing Conditions</th></tr> <tr> <td>Output Voltage [V]</td><td>11.741</td><td colspan="2">Input Volt.: 12V, Load Current:0.13A</td></tr> <tr> <td>Line Regulation [mV]</td><td>1</td><td colspan="2">Input Volt.: 9～18V, Load Current:0.13A</td></tr> <tr> <td>Load Regulation [mV]</td><td>4</td><td colspan="2">Input Volt.: 12V, Load Current:0～0.13A</td></tr> </table>				Item	Data	Testing Conditions		Output Voltage [V]	11.741	Input Volt.: 12V, Load Current:0.13A		Line Regulation [mV]	1	Input Volt.: 9～18V, Load Current:0.13A		Load Regulation [mV]	4	Input Volt.: 12V, Load Current:0～0.13A	
Item	Data	Testing Conditions																	
Output Voltage [V]	11.741	Input Volt.: 12V, Load Current:0.13A																	
Line Regulation [mV]	1	Input Volt.: 9～18V, Load Current:0.13A																	
Load Regulation [mV]	4	Input Volt.: 12V, Load Current:0～0.13A																	
		<div> <div>BC-3110</div> </div>																	



COSEL

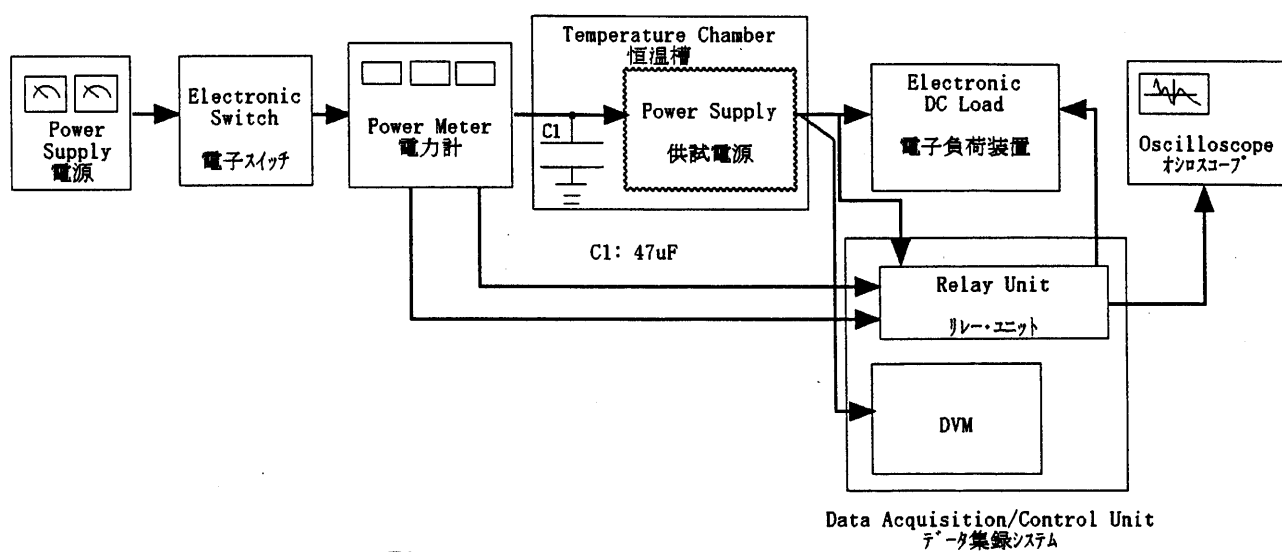


Figure A