



TEST DATA OF ZUS32415 (24.0V INPUT)

Regulated DC Power Supply

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CONTENTS

1. Line Regulation	1
静的入力変動	
2. Efficiency	2
効率	
3. Load Regulation	3
静的負荷変動	
4. Ripple Voltage (by Load Current)	4
リップル電圧(負荷電流特性)	
5. Ripple-Noise	5
リップルノイズ	
6. Overcurrent Protection	6
過電流保護	
7. Dynamic Load Responce	7
動的負荷変動	
8. Rise and Fall Time	8
立上り、立下がり時間	
9. Ambient Temperature Drift	9
周囲温度変動	
10. Minimum Input Voltage for Regulated Output Voltage	10
最低レギュレーション電圧	
11. Ripple Voltage (by Ambient Temperature)	11
リップル電圧(周囲温度特性)	
12. Time Lapse Drift	12
経時ドリフト	
13. Output Voltage Accuracy	13
定電圧精度	
14. Condensation	14
結露特性	
15. Figure of Testing Circuitry	15
測定回路図	

(Final Page 15)

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Model	ZUS32415
Item	Line Regulation 静的入力変動
Object	+15V0.2A

Temperature 25℃
Testing Circuitry Figure A

1. Graph

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

Output Voltage [V]

Input Voltage [V]

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% Output Volt. [V]	Load 100% Output Volt. [V]
16.0	15.054	15.052
18.0	15.054	15.052
20.0	15.054	15.052
24.0	15.054	15.052
30.0	15.054	15.052
36.0	15.054	15.052
40.0	15.054	15.052
—	—	—
—	—	—
—	—	—
—	—	—
—	—	—

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Model		ZUS32415	
Item		Efficiency 効率	
Object			

1. Graph

-----□----- Load 50%

-----△----- Load 100%

Efficiency [%]

80

72

64

56

48

0

0

15

25

35

45

Input Voltage [V]

Input Voltage [V]	Load 50% Efficiency [%]	Load 100% Efficiency [%]
16.0	74.1	78.6
18.0	73.4	78.2
20.0	72.7	77.8
24.0	70.9	76.8
30.0	68.3	75.1
36.0	65.3	73.4
40.0	63.1	72.2
—	—	—
—	—	—
—	—	—
—	—	—
—	—	—

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% Efficiency [%]	Load 100% Efficiency [%]
16.0	74.1	78.6
18.0	73.4	78.2
20.0	72.7	77.8
24.0	70.9	76.8
30.0	68.3	75.1
36.0	65.3	73.4
40.0	63.1	72.2
—	—	—
—	—	—
—	—	—
—	—	—
—	—	—

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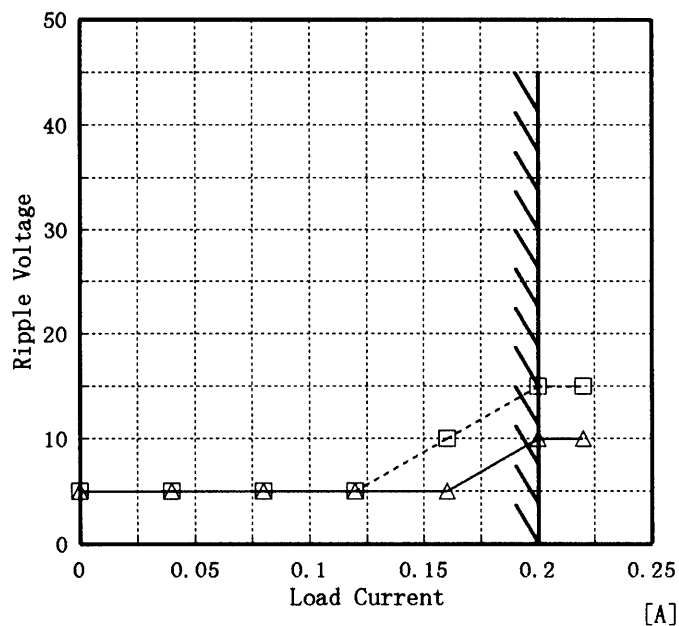
Model		ZUS32415		Temperature		25℃																																																				
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<div><div><div>△</div><div>Input Volt. 18.0V</div></div><div><div>□</div><div>Input Volt. 24.0V</div></div><div><div>○</div><div>Input Volt. 36.0V</div></div></div> <div><div><div><div>[V]</div><div>15.19</div><div>15.15</div><div>15.11</div><div>15.07</div><div>15.03</div><div>14.99</div><div>14.95</div><div>0</div></div><div>Output Voltage</div></div><div><div><div>0</div><div>0.05</div><div>0.1</div><div>0.15</div><div>0.2</div><div>0.25</div></div><div>Load Current</div><div>[A]</div></div></div> <div><div>Note: Slanted line shows the range of the rated load current.</div><div>(注)斜線は定格負荷電流範囲を示す。</div></div>				<table><tr><th rowspan="2">Load Current</th><th>Input Volt.</th><th>Input Volt.</th><th>Input Volt.</th></tr><tr><th>18.0[V]</th><th>24.0[V]</th><th>36.0[V]</th></tr><tr><th>[A]</th><th>Output Volt. [V]</th><th>Output Volt. [V]</th><th>Output Volt. [V]</th></tr><tr><td>0.00</td><td>15.056</td><td>15.056</td><td>15.057</td></tr><tr><td>0.04</td><td>15.055</td><td>15.055</td><td>15.055</td></tr><tr><td>0.08</td><td>15.054</td><td>15.054</td><td>15.054</td></tr><tr><td>0.12</td><td>15.054</td><td>15.054</td><td>15.054</td></tr><tr><td>0.16</td><td>15.054</td><td>15.054</td><td>15.053</td></tr><tr><td>0.20</td><td>15.053</td><td>15.053</td><td>15.053</td></tr><tr><td>0.22</td><td>15.053</td><td>15.053</td><td>15.053</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	Input Volt.	Input Volt.	Input Volt.	18.0[V]	24.0[V]	36.0[V]	[A]	Output Volt. [V]	Output Volt. [V]	Output Volt. [V]	0.00	15.056	15.056	15.057	0.04	15.055	15.055	15.055	0.08	15.054	15.054	15.054	0.12	15.054	15.054	15.054	0.16	15.054	15.054	15.053	0.20	15.053	15.053	15.053	0.22	15.053	15.053	15.053	—	—	—	—	—	—	—	—	—	—	—	—
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Model	ZUS32415
Item	Ripple Voltage (by Load Current) リップル電圧(負荷電流特性)
Object	+15V 0.2A

Temperature 25°C
Testing Circuitry Figure A

1. Graph
[mV] -----□----- Input Volt. 18.0V
 —△— Input Volt. 36.0V



2. Values

Load Current [A]	Input Volt. 18.0 [V]	Input Volt. 36.0 [V]
	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]
0.00	5	5
0.04	5	5
0.08	5	5
0.12	5	5
0.16	10	5
0.20	15	10
0.22	15	10
—	—	—
—	—	—
—	—	—
—	—	—

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

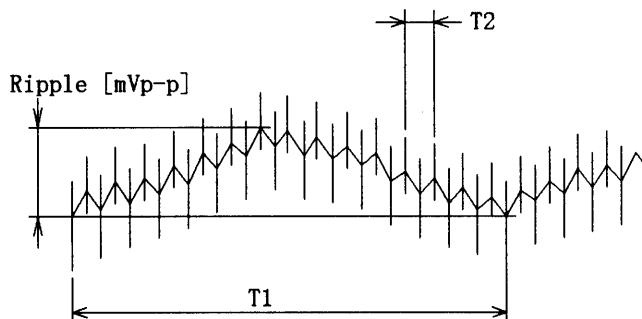
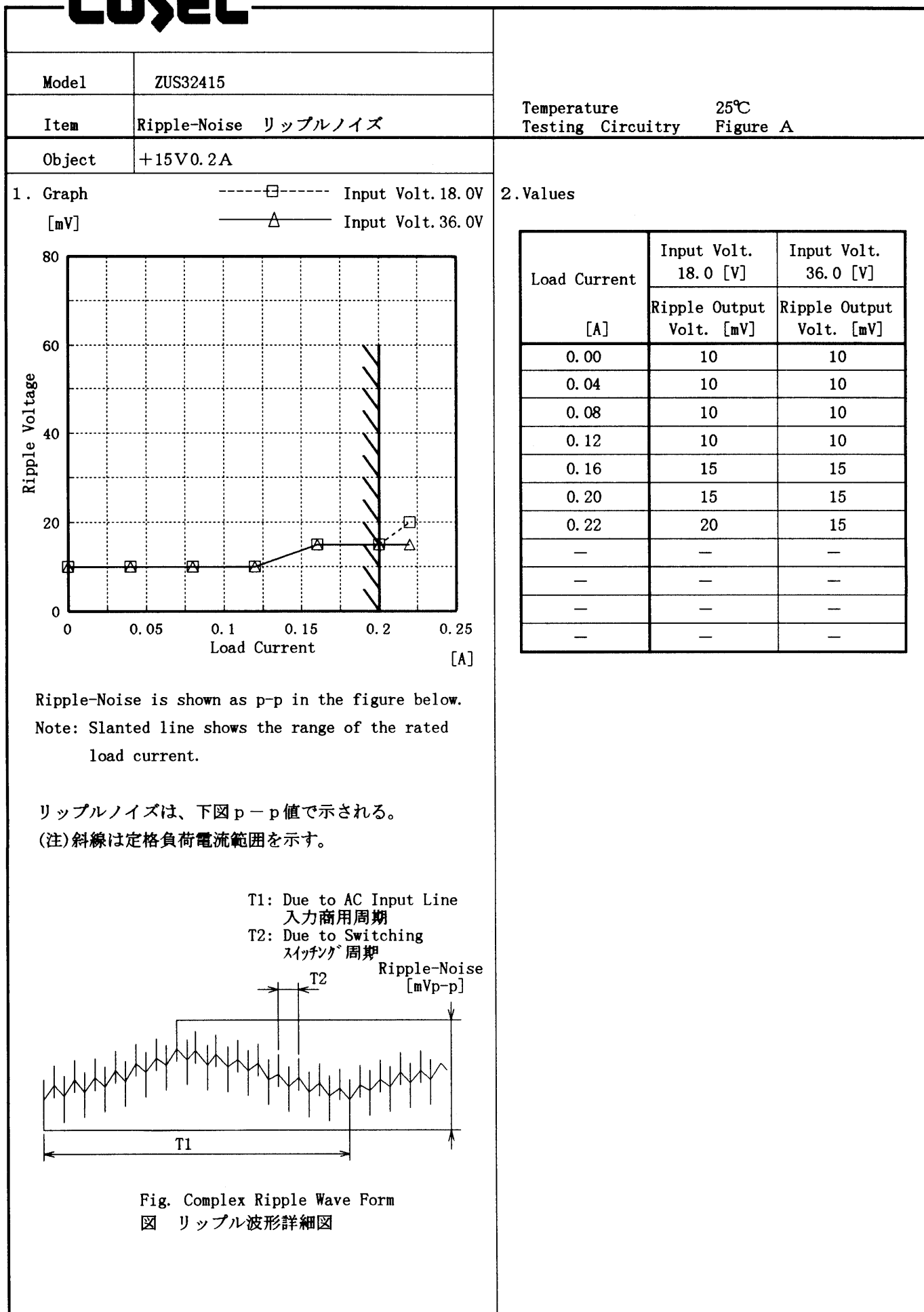
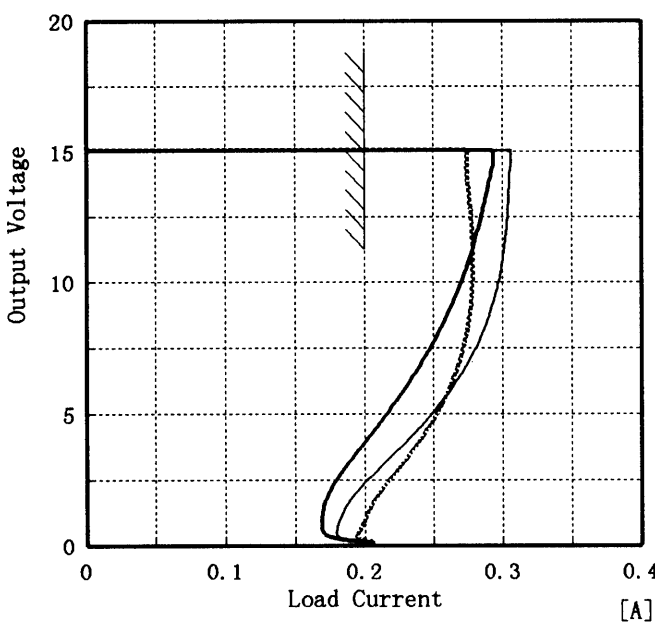


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

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Model	ZUS32415																																																						
Item	Overcurrent Protection 過電流保護	Temperature	25°C																																																				
Object	+15V0.2A	Testing Circuitry	Figure A																																																				
1. Graph [V]  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 <table border="1"> <thead> <tr> <th>Output Voltage [V]</th><th>Input Volt. 18.0[V] Load Curr-ent [A]</th><th>Input Volt. 24.0[V] Load Curr-ent [A]</th><th>Input Volt. 36.0[V] Load Curr-ent [A]</th></tr> </thead> <tbody> <tr><td>15.00</td><td>0.27</td><td>0.31</td><td>0.29</td></tr> <tr><td>14.25</td><td>0.27</td><td>0.31</td><td>0.29</td></tr> <tr><td>13.50</td><td>0.28</td><td>0.30</td><td>0.29</td></tr> <tr><td>12.00</td><td>0.28</td><td>0.30</td><td>0.28</td></tr> <tr><td>10.50</td><td>0.28</td><td>0.30</td><td>0.27</td></tr> <tr><td>9.00</td><td>0.28</td><td>0.29</td><td>0.26</td></tr> <tr><td>7.50</td><td>0.27</td><td>0.28</td><td>0.25</td></tr> <tr><td>6.00</td><td>0.26</td><td>0.26</td><td>0.23</td></tr> <tr><td>4.50</td><td>0.25</td><td>0.24</td><td>0.21</td></tr> <tr><td>3.00</td><td>0.23</td><td>0.21</td><td>0.19</td></tr> <tr><td>1.50</td><td>0.21</td><td>0.19</td><td>0.17</td></tr> <tr><td>0.00</td><td>0.21</td><td>0.20</td><td>0.21</td></tr> </tbody> </table>		Output Voltage [V]	Input Volt. 18.0[V] Load Curr-ent [A]	Input Volt. 24.0[V] Load Curr-ent [A]	Input Volt. 36.0[V] Load Curr-ent [A]	15.00	0.27	0.31	0.29	14.25	0.27	0.31	0.29	13.50	0.28	0.30	0.29	12.00	0.28	0.30	0.28	10.50	0.28	0.30	0.27	9.00	0.28	0.29	0.26	7.50	0.27	0.28	0.25	6.00	0.26	0.26	0.23	4.50	0.25	0.24	0.21	3.00	0.23	0.21	0.19	1.50	0.21	0.19	0.17	0.00	0.21	0.20	0.21
Output Voltage [V]	Input Volt. 18.0[V] Load Curr-ent [A]	Input Volt. 24.0[V] Load Curr-ent [A]	Input Volt. 36.0[V] Load Curr-ent [A]																																																				
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3.00	0.23	0.21	0.19																																																				
1.50	0.21	0.19	0.17																																																				
0.00	0.21	0.20	0.21																																																				

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Model	ZUS32415	Temperature	25°C
Item	Dynamic Load Responce 動的負荷変動	Testing Circuitry	Figure A
Object	+15V0.2A		

Input Volt. 24.0 V

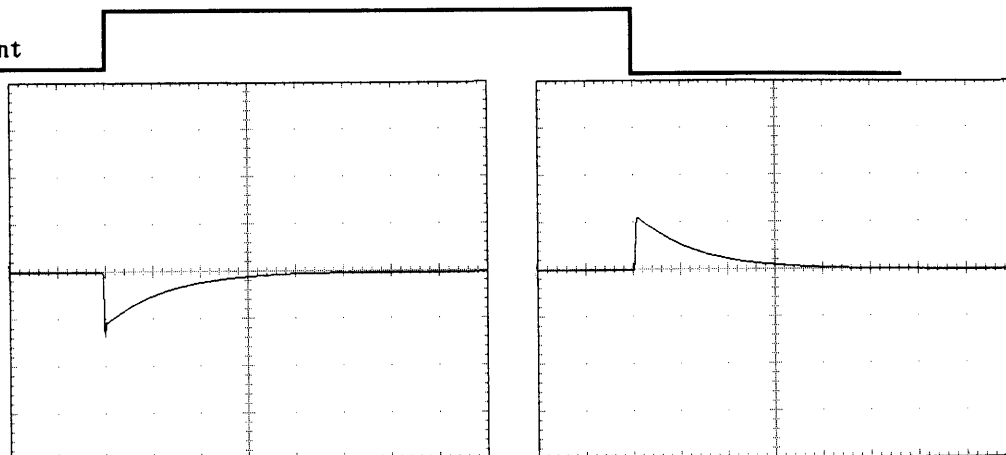
Cycle 100 mS

Load Current

Min. Load ↔

Load 100 %

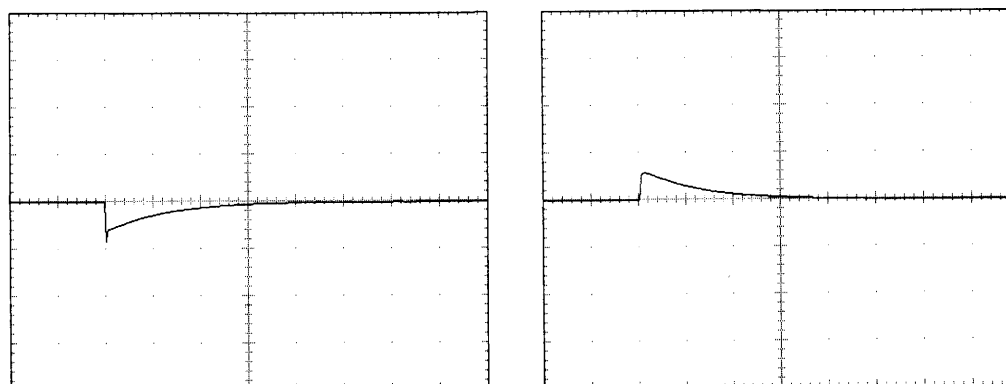
200 mV/div



Min. Load ↔

Load 50 %

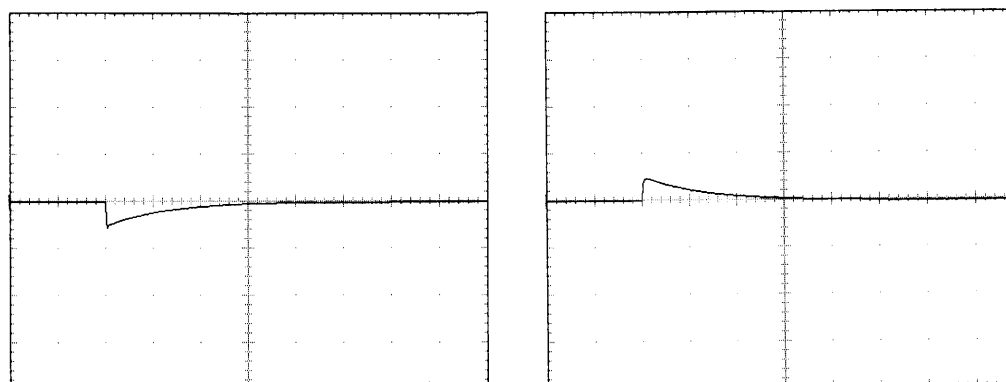
200 mV/div



Load 50% ↔

Load 100 %

200 mV/div



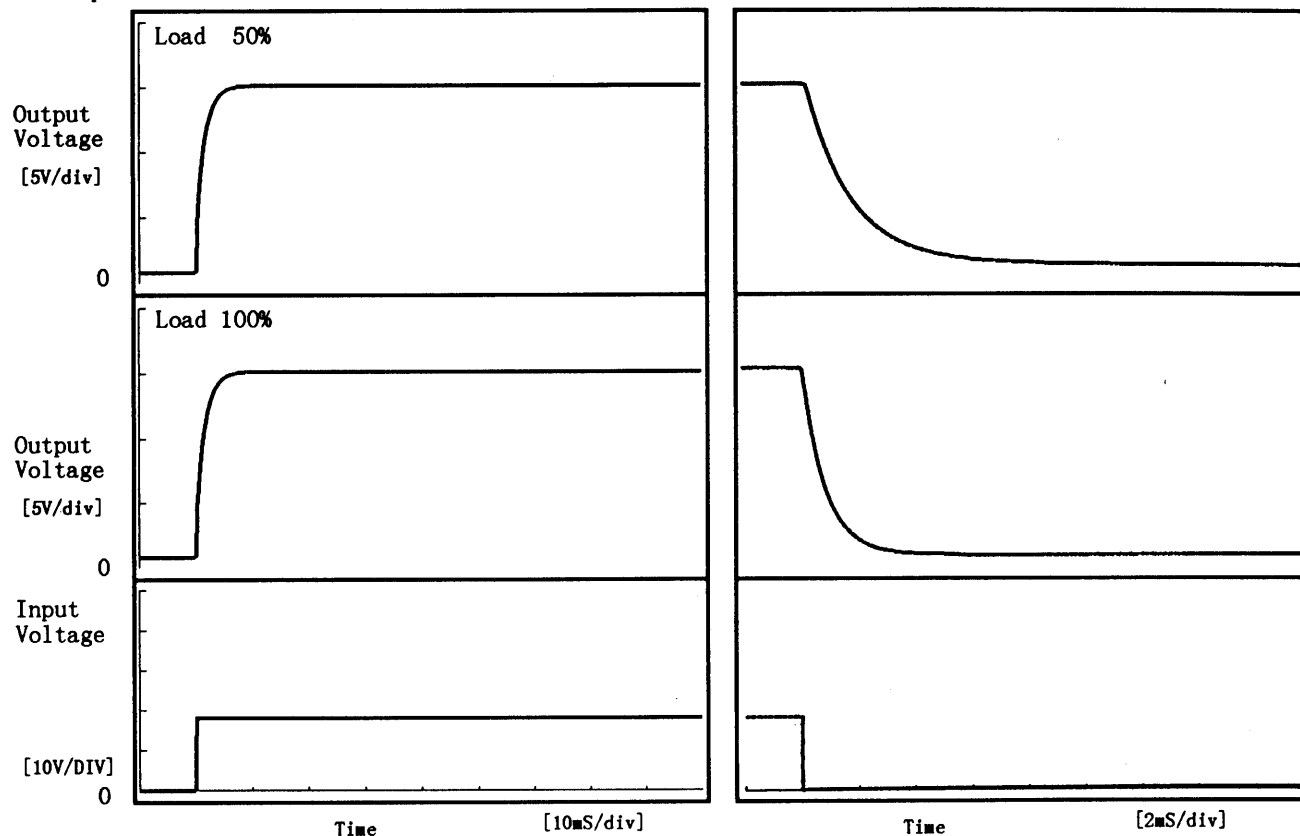
1 mS/div

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Model	ZUS32415	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

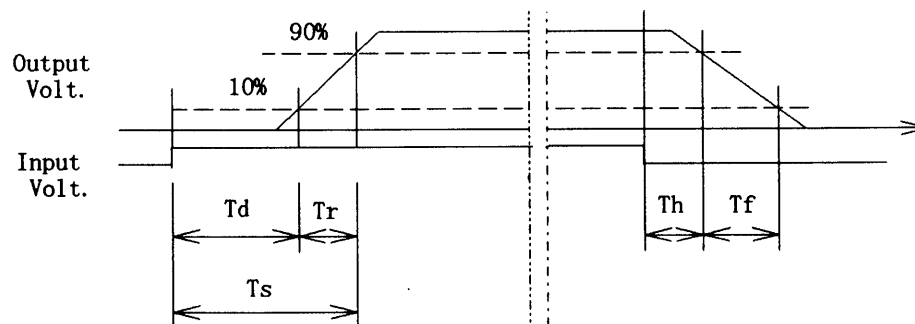
Input Volt. 18.0 V



2. Values

[ms]

Load \ Time	T d	T r	T s	T h	T f
50 %	0.10	3.30	3.40	0.43	5.62
100 %	0.10	3.30	3.40	0.21	2.17



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Model		ZUS32415	
Item		Ambient Temperature Drift 周囲温度変動	
Object		+15V0.2A	

1. Graph

△

Input Volt. 18.0V

□

Input Volt. 24.0V

○

Input Volt. 36.0V

Output Voltage

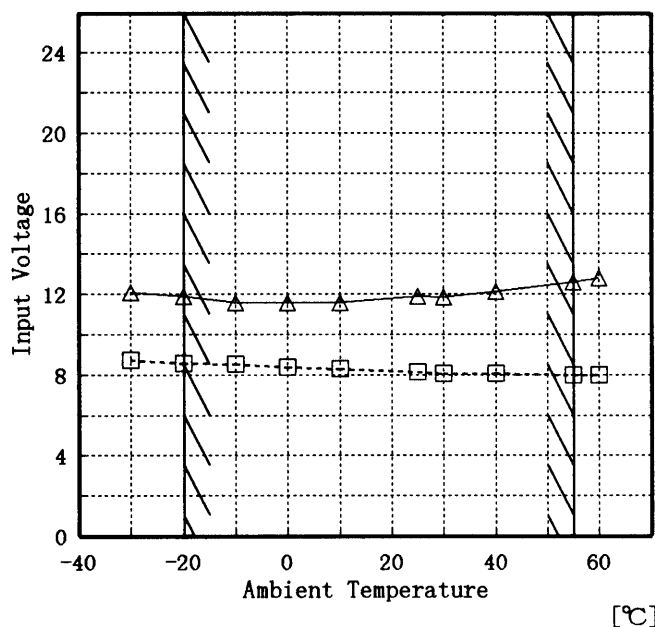
[V]

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Model	ZUS32415
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
- 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%	Load 100%
	Input Volt. [V]	Input Volt. [V]
-30	8.7	12.1
-20	8.6	11.9
-10	8.5	11.6
0	8.4	11.6
10	8.3	11.6
25	8.2	11.9
30	8.1	11.9
40	8.1	12.1
55	8.0	12.6
60	8.0	12.8
—	—	—

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Model	ZUS32415
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)
Object	+15V0.2A

1. Graph

-----□-----

Load 50%

—△—

Load 100%

[mV]

60

40

20

0

Ripple Voltage

40

20

0

-40

-20

0

20

40

60

Ambient Temperature

[°C]

Input Volt. 18.0 V

Ambient Temp. [°C]	Ripple Voltage [mV] (Load 50%)	Ripple Voltage [mV] (Load 100%)
-30	5	20
-20	5	20
-10	5	15
0	5	15
10	5	15
20	5	15
30	5	10
40	5	10
50	5	10
60	5	10

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

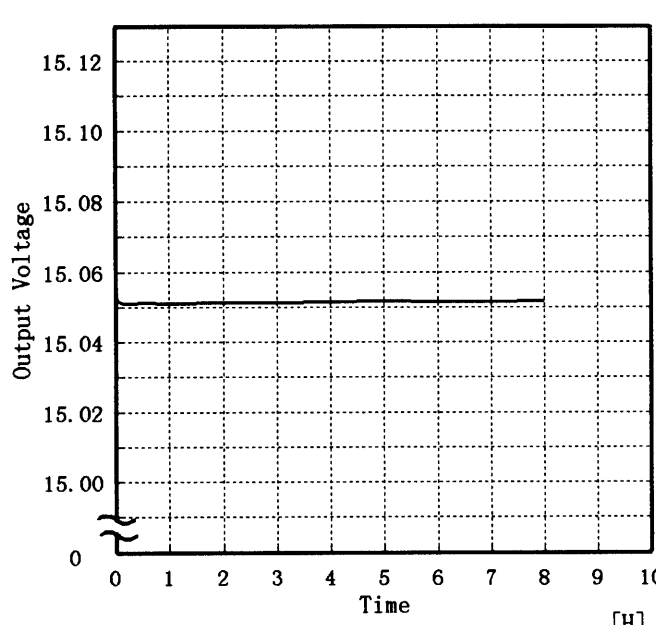
(注)斜線は定格周囲温度範囲を示す。

Testing Circuitry Figure A

2.Values

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

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COSEL																									
Model	ZUS32415																								
Item	Time Lapse Drift 経時ドリフト	Temperature	25 ℃																						
Object	+15V0.2A	Testing Circuitry	Figure A																						
1. Graph		2.Values																							
<div>[V]</div> <div></div> <div>Output Voltage</div> <div>Time [H]</div> <div>Input Volt. 24V</div> <div>Load 100%</div>		<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>15.056</td></tr><tr><td>0.5</td><td>15.051</td></tr><tr><td>1.0</td><td>15.051</td></tr><tr><td>2.0</td><td>15.051</td></tr><tr><td>3.0</td><td>15.051</td></tr><tr><td>4.0</td><td>15.051</td></tr><tr><td>5.0</td><td>15.052</td></tr><tr><td>6.0</td><td>15.052</td></tr><tr><td>7.0</td><td>15.051</td></tr><tr><td>8.0</td><td>15.052</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	15.056	0.5	15.051	1.0	15.051	2.0	15.051	3.0	15.051	4.0	15.051	5.0	15.052	6.0	15.052	7.0	15.051	8.0	15.052
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7.0	15.051																								
8.0	15.052																								

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Model		ZUS32415	Testing Circuitry Figure A
Item		Output Voltage Accuracy 定電圧精度	
Object		+15V0.2A	

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 : 18.0~36.0 V

Load Current : 0.0~0.2 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 : 18.0~36.0 V

負荷電流 : 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) = $\frac{\text{変動値}}{\text{定格出力電圧}} \times 100$

Item	Temperature [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ratio) [%]
Maximum Voltage	-20	36.0	0.0	15.060	±14	±0.1
Minimum Voltage	55	18.0	0.2	15.033		

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Model	ZUS32415
Item	Condensation 結露特性
Object	+15V0.2A

Testing Circuitry Figure A

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.
- 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	15.059	5	15
	2	15.061	5	15
	3	15.062	5	15
Load 100 %	1	15.057	10	20
	2	15.059	10	20
	3	15.060	10	20

Input Volt. 24.0 V

COSEL

