

TEST DATA OF CBS502415

(24V INPUT)

Regulated DC Power Supply
Jun. 22, 2002

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コーセル株式会社
COSEL CO.,LTD.

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Model		CBS502415																																	
Item		Line Regulation 静の入力変動																																	
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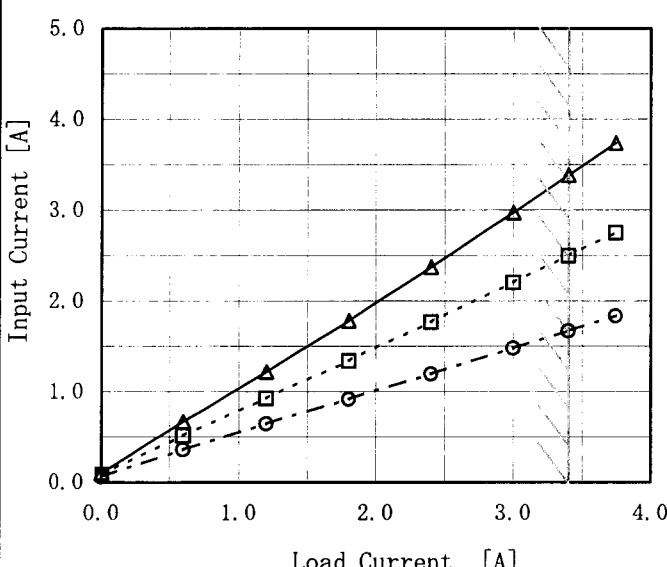
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COSEL

Model		CBS502415	
Item		Efficiency (by Input Voltage) 効率 (入力電圧特性)	
Object			

1. Graph

□

Load 50%

—

△

—

Load 100%

Efficiency [%]

100

96

92

88

84

80

76

72

10

20

30

40

50

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]	Efficiency [%]	
	Load 50%	Load 100%
16	85.6	86.8
18	86.2	87.3
20	86.0	87.3
24	85.1	87.1
30	83.7	86.5
36	82.3	85.9
40	81.2	85.4
--	—	—
--	—	—

COSEL

Model		CBS502415		Temperature		25℃																																																				
Item		Efficiency (by Load Current) 効率 (負荷特性)		Testing Circuitry		Figure A																																																				
Object																																																										
1. Graph				2. Values																																																						
<div><div>—△—</div>Input Volt. 18V</div> <div><div>---□---</div>Input Volt. 24V</div> <div><div>---○---</div>Input Volt. 36V</div> <p>Efficiency [%]</p> <p>Load Current [A]</p>				<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Efficiency [%]</th></tr><tr><th>Input Volt. 18[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>0.00</td><td>—</td><td>—</td><td>—</td></tr><tr><td>0.60</td><td>76.3</td><td>74.5</td><td>71.0</td></tr><tr><td>1.20</td><td>84.0</td><td>82.5</td><td>78.4</td></tr><tr><td>1.80</td><td>86.5</td><td>85.6</td><td>82.8</td></tr><tr><td>2.40</td><td>87.1</td><td>86.7</td><td>84.9</td></tr><tr><td>3.00</td><td>87.3</td><td>86.9</td><td>85.6</td></tr><tr><td>3.40</td><td>87.3</td><td>87.1</td><td>85.9</td></tr><tr><td>3.74</td><td>87.1</td><td>87.2</td><td>85.9</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]	Efficiency [%]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0.00	—	—	—	0.60	76.3	74.5	71.0	1.20	84.0	82.5	78.4	1.80	86.5	85.6	82.8	2.40	87.1	86.7	84.9	3.00	87.3	86.9	85.6	3.40	87.3	87.1	85.9	3.74	87.1	87.2	85.9	--	--	--	--	--	--	--	--	--	--	--	--
Load Current [A]	Efficiency [%]																																																									
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<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>																																																										

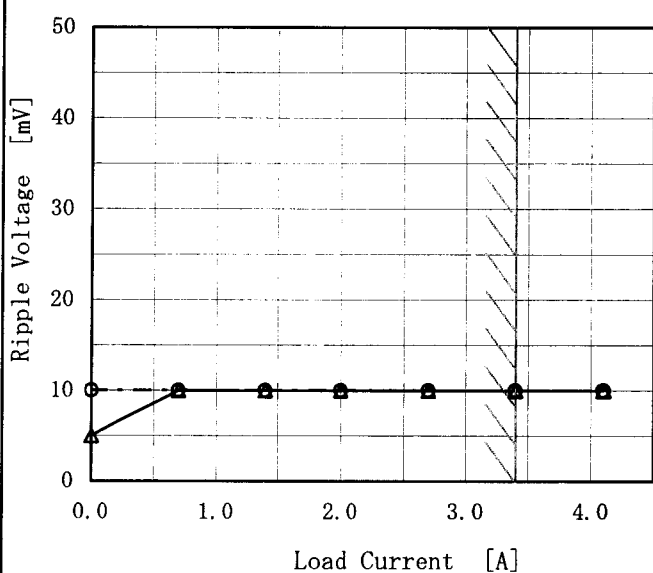
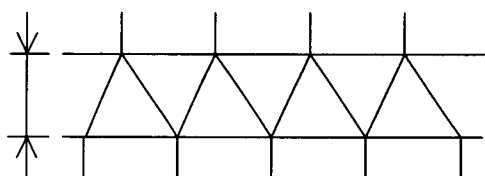
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BC-3440

COSEL

Model	CBS502415																																																	
Item	Load Regulation 静的負荷変動	Temperature	25℃																																															
Object	+15V3.4A	Testing Circuitry	Figure A																																															
1. Graph		2. Values																																																
<div><div>—△—</div>Input Volt. 18V</div> <div><div>---□---</div>Input Volt. 24V</div> <div><div>---○---</div>Input Volt. 36V</div> <p>Output Voltage [V]</p> <p>Load Current [A]</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 18[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>0.00</td><td>15.104</td><td>15.104</td><td>15.104</td></tr><tr><td>0.60</td><td>15.104</td><td>15.104</td><td>15.104</td></tr><tr><td>1.20</td><td>15.104</td><td>15.104</td><td>15.104</td></tr><tr><td>1.80</td><td>15.104</td><td>15.104</td><td>15.104</td></tr><tr><td>2.40</td><td>15.104</td><td>15.104</td><td>15.104</td></tr><tr><td>3.00</td><td>15.104</td><td>15.104</td><td>15.104</td></tr><tr><td>3.40</td><td>15.104</td><td>15.104</td><td>15.104</td></tr><tr><td>3.74</td><td>15.104</td><td>15.104</td><td>15.104</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]	Output Voltage [V]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0.00	15.104	15.104	15.104	0.60	15.104	15.104	15.104	1.20	15.104	15.104	15.104	1.80	15.104	15.104	15.104	2.40	15.104	15.104	15.104	3.00	15.104	15.104	15.104	3.40	15.104	15.104	15.104	3.74	15.104	15.104	15.104	--	--	--	--	--	--	--	--
Load Current [A]	Output Voltage [V]																																																	
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COSEL

Model		CBS502415		Temperature		25℃																																							
Item		Ripple Voltage (by Load Current) リップル電圧 (負荷特性)		Testing Circuitry		Figure A																																							
Object		+15V3.4A																																											
1. Graph				2. Values																																									
<div><div><div>—△— Input Volt. 18V</div><div>---○--- Input Volt. 36V</div></div><div></div></div>				<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 18 [V]</th><th>Input Volt. 36 [V]</th></tr><tr><td>0.0</td><td>5</td><td>10</td></tr><tr><td>0.7</td><td>10</td><td>10</td></tr><tr><td>1.4</td><td>10</td><td>10</td></tr><tr><td>2.0</td><td>10</td><td>10</td></tr><tr><td>2.7</td><td>10</td><td>10</td></tr><tr><td>3.4</td><td>10</td><td>10</td></tr><tr><td>4.1</td><td>10</td><td>10</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 [A]	Ripple Voltage [mV]		Input Volt. 18 [V]	Input Volt. 36 [V]	0.0	5	10	0.7	10	10	1.4	10	10	2.0	10	10	2.7	10	10	3.4	10	10	4.1	10	10	--	--	--	--	--	--	--	--	--	--	--	--
Load Current [A]	Ripple Voltage [mV]																																												
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0.0	5	10																																											
0.7	10	10																																											
1.4	10	10																																											
2.0	10	10																																											
2.7	10	10																																											
3.4	10	10																																											
4.1	10	10																																											
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<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>																																													
<div><div>Ripple [mVp-p]</div><div></div></div>																																													
<p>Fig. Complex Ripple Wave Form</p> <p>図 リップル波形詳細図</p>																																													

COSEL

Model		CBS502415	Temperature Testing Circuitry	25℃ Figure A
Item		Ripple-Noise リップルノイズ		
Object		+15V3.4A		

1. Graph

—△— Input Volt. 18V

- -○- - Input Volt. 36V

200

180

160

140

120

100

80

60

40

20

0

0.0

1.0

2.0

3.0

4.0

Load Current [A]

Ripple-Noise [mV]

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。

Ripple Noise[mVp-p]

Fig.Complex Ripple Noise Wave Form

図 リップルノイズ波形

2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 18 [V]	Input Volt. 36 [V]
0.0	15	25
0.7	20	25
1.4	20	25
2.0	15	25
2.7	15	25
3.4	15	20
4.1	15	20
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COSEL

Model	CBS502415																																																													
Item	Overcurrent Protection 過電流保護	Temperature	25℃																																																											
Object	+15V3.4A	Testing Circuitry	Figure A																																																											
1. Graph		2. Values																																																												
<div><div><div></div><div></div><div></div></div><div><div>Input Volt. 18V</div><div>Input Volt. 24V</div><div>Input Volt. 36V</div></div></div> <p>Output Voltage [V]</p> <p>Load Current [A]</p> <p>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。</p> <p>Intermittent operation occurs when the output voltage is from 10.5V to 0V. 10.5V～0V間は、間欠モードとなる。</p>		<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="3">Load Current [A]</th></tr><tr><th>Input Volt. 18[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>15.00</td><td>3.41</td><td>3.48</td><td>3.48</td></tr><tr><td>14.25</td><td>4.42</td><td>4.43</td><td>4.48</td></tr><tr><td>13.50</td><td>4.44</td><td>4.44</td><td>4.51</td></tr><tr><td>12.00</td><td>4.47</td><td>4.48</td><td>4.56</td></tr><tr><td>10.50</td><td>4.52</td><td>4.52</td><td>4.62</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><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><tr><td>--</td><td>--</td><td>--</td><td>--</td></tr><tr><td>--</td><td>--</td><td>--</td><td>--</td></tr></table>		Output Voltage [V]	Load Current [A]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	15.00	3.41	3.48	3.48	14.25	4.42	4.43	4.48	13.50	4.44	4.44	4.51	12.00	4.47	4.48	4.56	10.50	4.52	4.52	4.62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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COSEL

Model	CBS502415																																																					
Item	Overvoltage Protection 過電圧保護	Testing Circuitry Figure A																																																				
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<div><div><div>—△—</div><div>Input Volt. 18V</div></div><div><div>---□---</div><div>Input Volt. 24V</div></div><div><div>---○---</div><div>Input Volt. 36V</div></div></div> <div>Operating Point [V]</div> <div>Ambient Temperature [°C]</div> <div>Load 0%</div>		<table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="3">Operating Point [V]</th></tr><tr><th>Input Volt. 18[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>-50</td><td>19.67</td><td>19.67</td><td>19.67</td></tr><tr><td>-40</td><td>19.67</td><td>19.67</td><td>19.67</td></tr><tr><td>-20</td><td>19.73</td><td>19.73</td><td>19.72</td></tr><tr><td>0</td><td>19.72</td><td>19.72</td><td>19.72</td></tr><tr><td>25</td><td>19.72</td><td>19.72</td><td>19.72</td></tr><tr><td>40</td><td>19.72</td><td>19.72</td><td>19.72</td></tr><tr><td>60</td><td>19.72</td><td>19.72</td><td>19.72</td></tr><tr><td>85</td><td>19.66</td><td>19.66</td><td>19.66</td></tr><tr><td>100</td><td>19.66</td><td>19.66</td><td>19.66</td></tr><tr><td>105</td><td>19.66</td><td>19.66</td><td>19.66</td></tr><tr><td>--</td><td>—</td><td>—</td><td>—</td></tr></table>		Ambient Temperature [°C]	Operating Point [V]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	-50	19.67	19.67	19.67	-40	19.67	19.67	19.67	-20	19.73	19.73	19.72	0	19.72	19.72	19.72	25	19.72	19.72	19.72	40	19.72	19.72	19.72	60	19.72	19.72	19.72	85	19.66	19.66	19.66	100	19.66	19.66	19.66	105	19.66	19.66	19.66	--	—	—	—
Ambient Temperature [°C]	Operating Point [V]																																																					
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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	CBS502415	Temperature	25°C
Item	Dynamic Load Response 動的負荷変動	Testing Circuitry	Figure A
Object	+15V3.4A		

Input Volt. 24 V
Cycle 1000 ms

Load Current

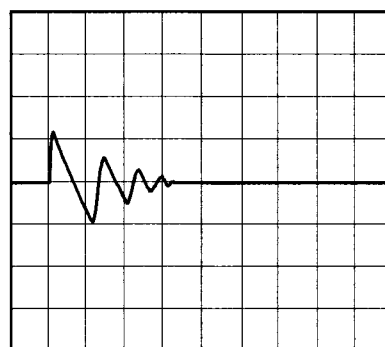
Min. Load (0A) ←→

Load 100% (3.4A)

200 mV/div



500 μ s/div



5 ms/div

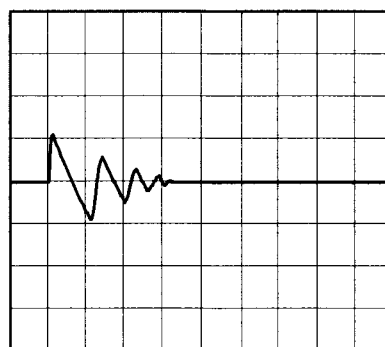
Min. Load (0A) ←→

Load 50% (1.7A)

200 mV/div



500 μ s/div

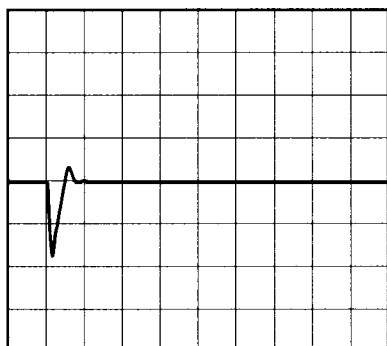


5 ms/div

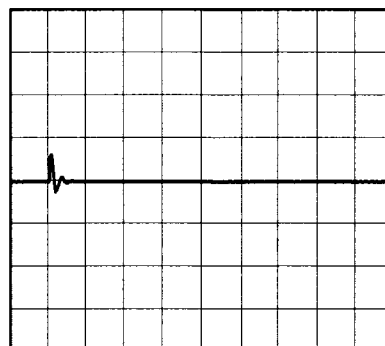
Load 10% (0.34A) ←→

Load 100% (3.4A)

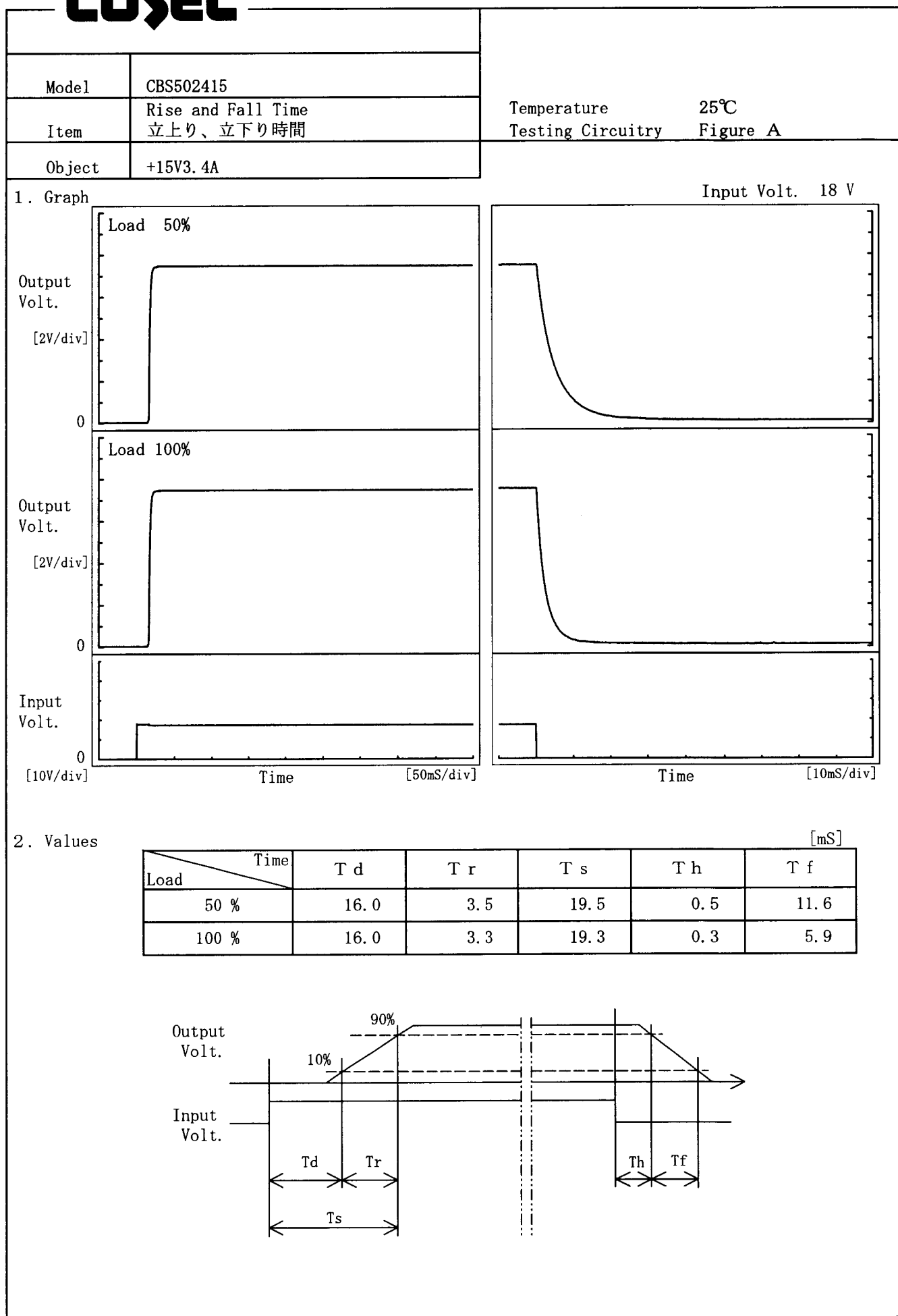
200 mV/div



500 μ s/div



5 ms/div

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Model		CBS502415	
Item		Ambient Temperature Drift 周囲温度変動	
Object		+15V3.4A	

1. Graph

—△—

Input Volt. 18V

---□---

Input Volt. 24V

---○---

Input Volt. 36V

Output Voltage [V]

</

COSEL

Model		CBS502415
Item		Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object		+15V3.4A

1. Graph

---□---

Load 50%

—△—

Load 100%

Input Voltage [V]

32

24

16

8

0

-60

-20

20

60

100

Ambient Temperature [°C]

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。

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-50	12.9	13.3
-40	12.8	13.3
-20	12.9	13.4
0	13.0	13.5
25	13.0	13.7
40	13.1	13.6
60	13.1	13.7
85	13.1	13.7
100	13.1	13.8
105	13.1	13.8
--	—	—

2. Values

COSEL

COSEL

Model		CBS502415	
Item		Time Lapse Drift 経時ドリフト	
Object		+15V3.4A	

1. Graph

Output Voltage [V]

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Model	CBS502415	Testing Circuitry Figure A
Item	Output Voltage Accuracy 定電圧精度	
Object	+15V3.4A	

1. 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 : -40 ~ 100°C

Input Voltage : 18 ~ 36V

Load Current : 0 ~ 3.4A

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

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

1. 定電圧精度

周囲温度、入力電圧、負荷電流を下記仕様内で、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 : -40 ~ 100°C

入力電圧 : 18 ~ 36V

負荷電流 : 0 ~ 3.4A

* 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) = $\frac{\text{変動値}}{\text{定格出力電圧}} \times 100$

2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	25	18	3.4	15.113	±40	±0.3
Minimum Voltage	100	18	0	15.034		

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		Testing Circuitry Figure A
Model	CBS502415	
Item	Condense 結露特性	
Object	+15V3.4A	

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]	15.120	Input Volt.:24V, Load Current.:3.4A
Line Regulation [mV]	1	Input Volt.:18~36V, Load Current.:3.4A
Load Regulation [mV]	1	Input Volt.:24V, Load Current.:0~3.4A

COSEL

Model	CBS502415		
Item	Line Noise Tolerance 入力雑音耐量	Temperature	25℃
Object	+15V3.4A	Testing Circuitry	Figure B

1. Conditions

- | | | | |
|-----------------|-----------|------------------------|------------------|
| • Input Voltage | : 24 V | • Pulse Input Duration | : 1 min. or more |
| • Pulse Voltage | : 2000 V | • Load | : 100 % |
| • Pulse Cycle | : 16.7 mS | | |

2. Results

Pulse Width [nS]	MODE		No protection failure should occur	DC-like Regulation of Output Voltage
		POLARITY	保護回路の誤動作がない	出力電圧の直流的変動
50	COMMON	+	OK	no fluctuation
		—	OK	no fluctuation
	NORMAL	+	OK	no fluctuation
		—	OK	no fluctuation
1000	COMMON	+	OK	no fluctuation
		—	OK	no fluctuation
	NORMAL	+	OK	no fluctuation
		—	OK	no fluctuation

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