参考資料

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# TEST DATA OF CBS1004815

(48V INPUT)

Regulated DC Power Supply

Mar.3, 2001

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**コーセル株式会社**

**COSEL CO.,LTD.**

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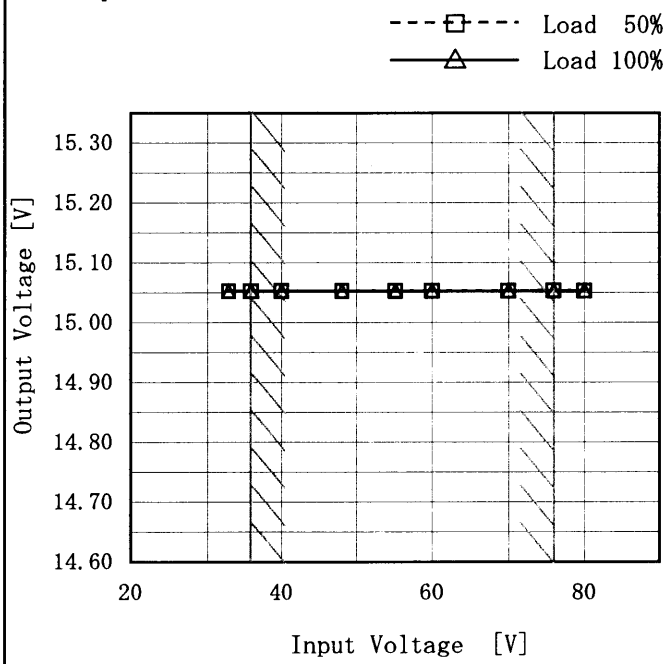
| | |
|---|---|
| Model | CBS1004815 |
| Item | Line Regulation<br>静的入力変動 |
| Object | +15V6.7A |

Temperature 25℃
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] | Output Voltage [V] | |
|---|---|---|
| | Load 50% | Load 100% |
| 33 | 15.053 | 15.053 |
| 36 | 15.053 | 15.053 |
| 40 | 15.053 | 15.053 |
| 48 | 15.053 | 15.053 |
| 55 | 15.053 | 15.053 |
| 60 | 15.053 | 15.053 |
| 70 | 15.053 | 15.053 |
| 76 | 15.054 | 15.054 |
| 80 | 15.053 | 15.054 |



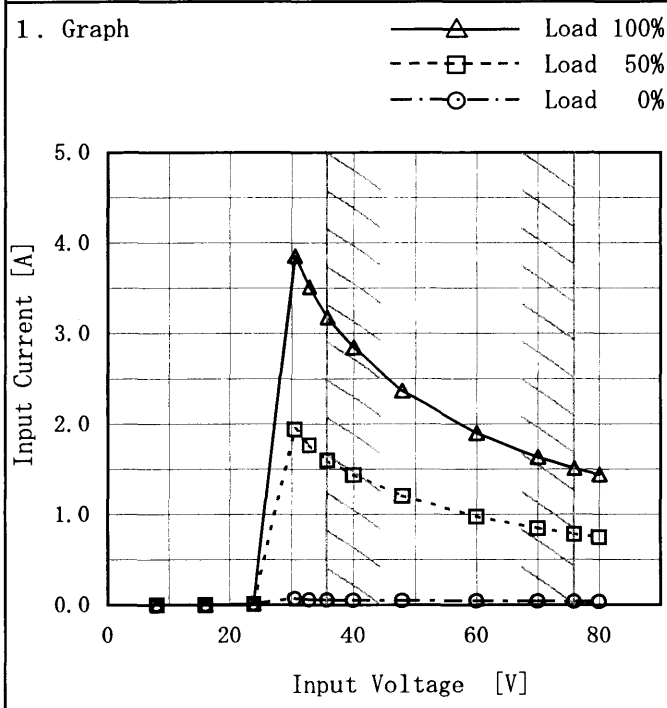
BC−3330

COSEL

| | |
|---|---|
| Model | CBS1004815 |
| Item | Input Current (by Input Voltage)<br>入力電流（入力電圧特性） |
| Object | ―――――――― |

Temperature 25℃
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

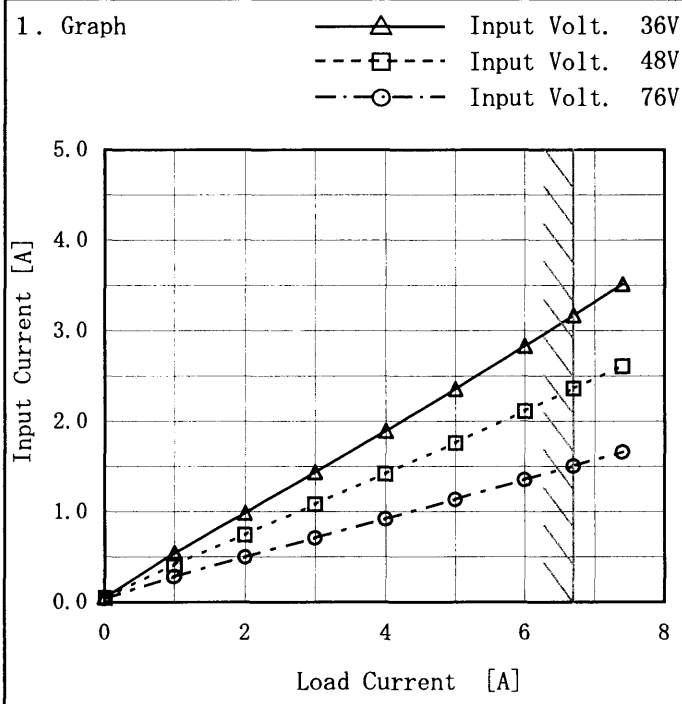
| Input Voltage [V] | Input Current [A] | | |
|---|---|---|---|
| | Load 0% | Load 50% | Load 100% |
| 8.0 | 0.000 | 0.000 | 0.000 |
| 16.0 | 0.000 | 0.000 | 0.000 |
| 24.0 | 0.009 | 0.009 | 0.009 |
| 30.6 | 0.069 | 1.944 | 3.856 |
| 33.0 | 0.057 | 1.765 | 3.514 |
| 36.0 | 0.053 | 1.598 | 3.180 |
| 40.0 | 0.049 | 1.434 | 2.848 |
| 48.0 | 0.045 | 1.202 | 2.368 |
| 60.0 | 0.041 | 0.973 | 1.900 |
| 70.0 | 0.037 | 0.843 | 1.633 |
| 76.0 | 0.036 | 0.782 | 1.509 |
| 80.0 | 0.035 | 0.747 | 1.438 |
| -- | — | — | — |
| -- | — | — | — |
| -- | — | — | — |
| -- | — | — | — |

COSEL

| | |
|---|---|
| Model | CBS1004815 |
| Item | Input Current (by Load Current)<br>入力電流（負荷特性） |
| Object | ―――――― |

Temperature 25℃
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

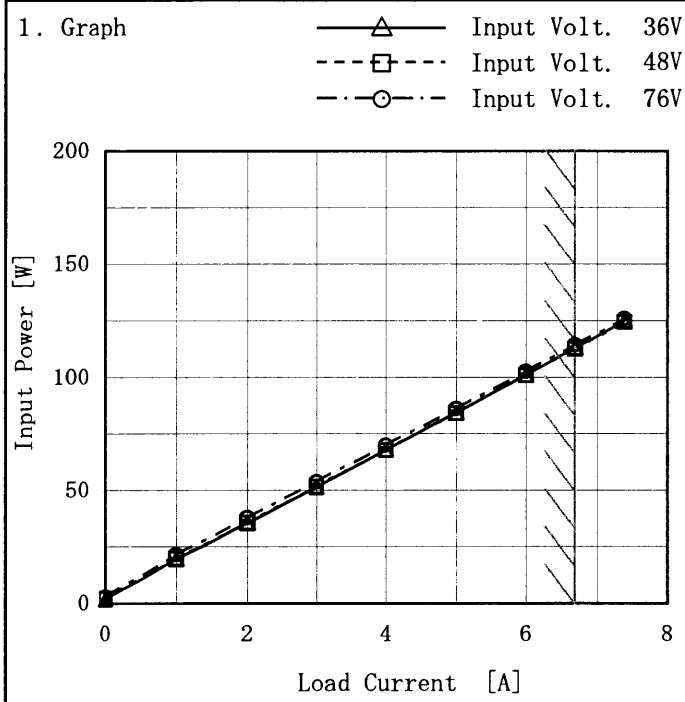
| Load Current [A] | Input Current [A] | | |
|---|---|---|---|
| | Input Volt. 36[V] | Input Volt. 48[V] | Input Volt. 76[V] |
| 0.0 | 0.052 | 0.045 | 0.035 |
| 1.0 | 0.542 | 0.415 | 0.282 |
| 2.0 | 0.985 | 0.744 | 0.496 |
| 3.0 | 1.434 | 1.079 | 0.706 |
| 4.0 | 1.894 | 1.417 | 0.918 |
| 5.0 | 2.358 | 1.759 | 1.133 |
| 6.0 | 2.834 | 2.112 | 1.350 |
| 6.7 | 3.172 | 2.360 | 1.503 |
| 7.4 | 3.514 | 2.608 | 1.658 |
| -- | - | - | - |
| -- | - | - | - |

COSEL

| | |
|---|---|
| Model | CBS1004815 |
| Item | Input Power (by Load Current)<br>入力電力（負荷特性） |
| Object | ———————— |

Temperature 25℃
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

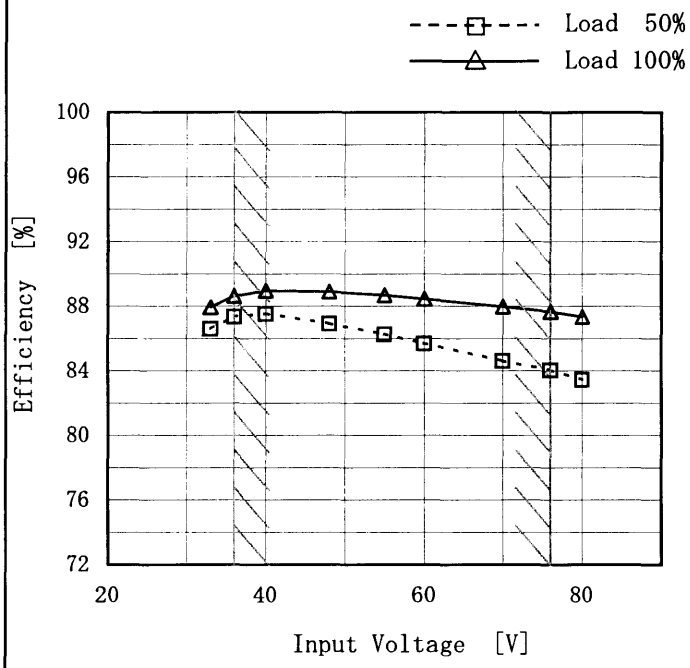
| Load Current [A] | Input Power [W] | | |
|---|---|---|---|
| | Input Volt. 36[V] | Input Volt. 48[V] | Input Volt. 76[V] |
| 0.0 | 1.9 | 2.2 | 2.8 |
| 1.0 | 19.5 | 19.9 | 21.6 |
| 2.0 | 35.4 | 35.7 | 37.8 |
| 3.0 | 51.4 | 51.7 | 53.7 |
| 4.0 | 67.8 | 67.8 | 69.9 |
| 5.0 | 84.3 | 84.1 | 86.1 |
| 6.0 | 101.0 | 100.9 | 102.6 |
| 6.7 | 113.0 | 112.6 | 114.3 |
| 7.4 | 125.0 | 124.4 | 125.9 |
| -- | - | - | - |
| -- | - | - | - |

COSEL

| | |
|---|---|
| Model | CBS1004815 |
| Item | Efficiency (by Input Voltage)<br>効率（入力電圧特性） |
| Object | ———————— |

Temperature 25℃
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

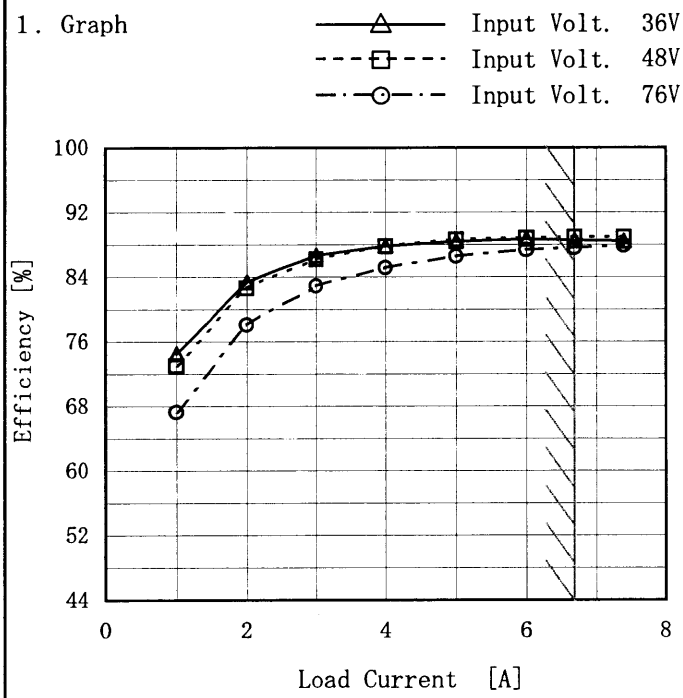
| Input Voltage [V] | Efficiency [%] | |
|---|---|---|
| | Load 50% | Load 100% |
| 33 | 86.6 | 87.9 |
| 36 | 87.3 | 88.6 |
| 40 | 87.5 | 89.0 |
| 48 | 86.9 | 88.9 |
| 55 | 86.3 | 88.7 |
| 60 | 85.7 | 88.4 |
| 70 | 84.6 | 88.0 |
| 76 | 84.0 | 87.7 |
| 80 | 83.5 | 87.4 |

COSEL

| | |
|---|---|
| Model | CBS1004815 |
| Item | Efficiency (by Load Current)<br>効率 (負荷特性) |
| Object | ———————— |

Temperature 25℃
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

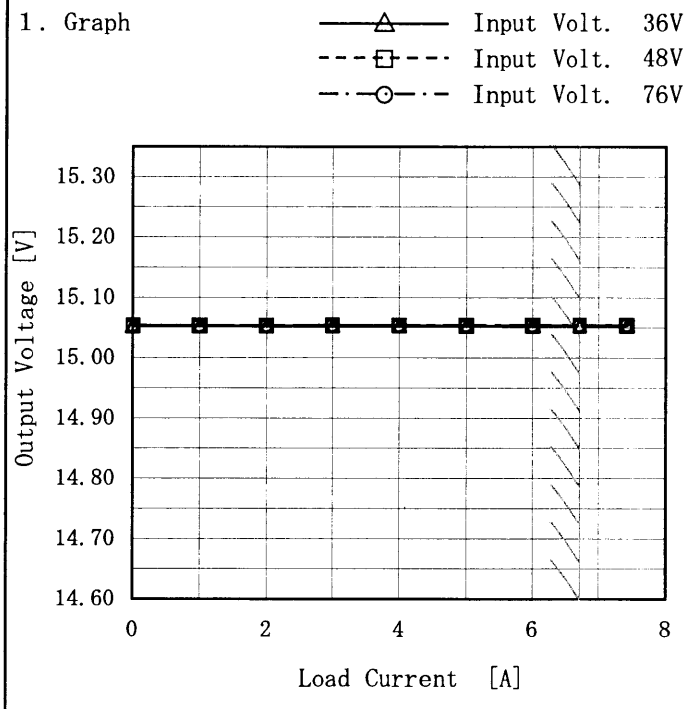
| Load Current [A] | Efficiency [%] | | |
|---|---|---|---|
| | Input Volt. 36[V] | Input Volt. 48[V] | Input Volt. 76[V] |
| 0.0 | – | – | – |
| 1.0 | 74.5 | 73.0 | 67.3 |
| 2.0 | 83.4 | 82.7 | 78.1 |
| 3.0 | 86.7 | 86.2 | 82.9 |
| 4.0 | 87.8 | 87.8 | 85.1 |
| 5.0 | 88.4 | 88.6 | 86.6 |
| 6.0 | 88.7 | 88.8 | 87.3 |
| 6.7 | 88.6 | 88.9 | 87.6 |
| 7.4 | 88.5 | 88.9 | 87.9 |
| -- | – | – | – |
| -- | – | – | – |

COSEL

| | |
|---|---|
| Model | CBS1004815 |
| Item | Load Regulation<br>静的負荷変動 |
| Object | +15V6.7A |

Temperature 25℃
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

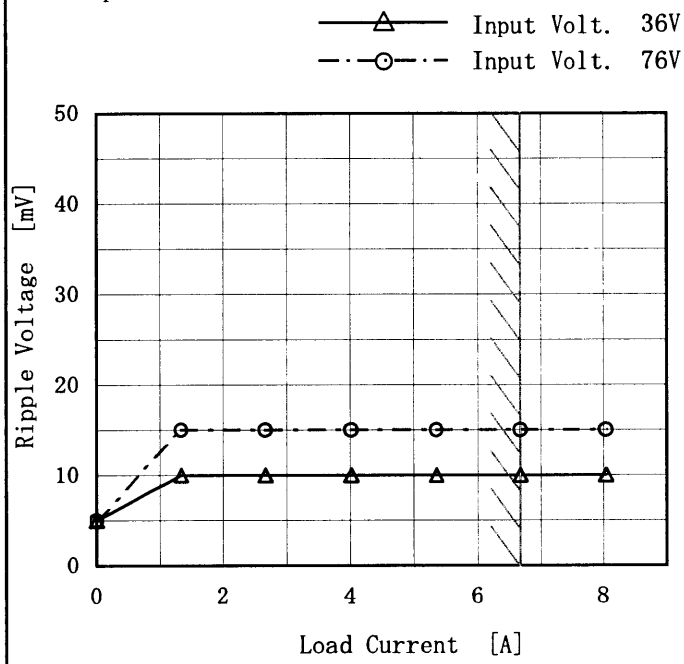
| Load Current [A] | Output Voltage [V] | | |
|---|---|---|---|
| | Input Volt. 36[V] | Input Volt. 48[V] | Input Volt. 76[V] |
| 0.0 | 15.053 | 15.053 | 15.053 |
| 1.0 | 15.053 | 15.053 | 15.054 |
| 2.0 | 15.053 | 15.053 | 15.054 |
| 3.0 | 15.054 | 15.054 | 15.054 |
| 4.0 | 15.054 | 15.054 | 15.054 |
| 5.0 | 15.054 | 15.054 | 15.054 |
| 6.0 | 15.054 | 15.054 | 15.054 |
| 6.7 | 15.054 | 15.054 | 15.054 |
| 7.4 | 15.054 | 15.054 | 15.054 |
| -- | - | - | - |

COSEL

| | |
|---|---|
| Model | CBS1004815 |
| Item | Ripple Voltage (by Load Current)<br>リップル電圧（負荷特性） |
| Object | +15V6.7A |

Temperature 25℃
Testing Circuitry Figure A

1. Graph




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。

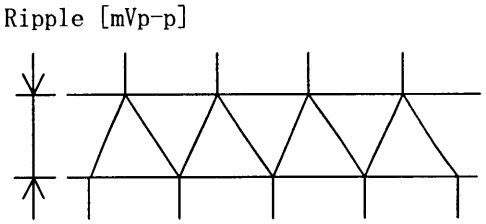



Fig. Complex Ripple Wave Form
図　リップル波形図

2. Values

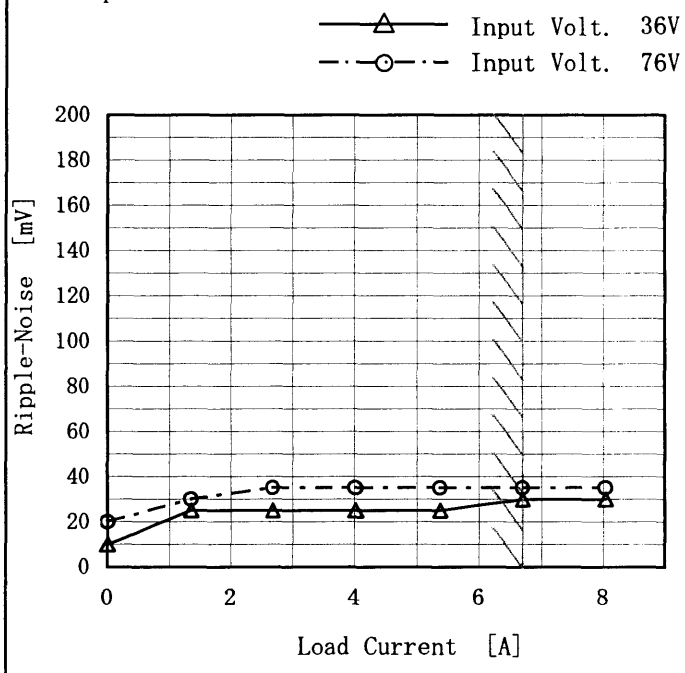
| Load Current [A] | Ripple Output Voltage [mV] | |
|---|---|---|
| | Input Volt. 36 [V] | Input Volt. 76 [V] |
| 0.0 | 5 | 5 |
| 1.3 | 10 | 15 |
| 2.7 | 10 | 15 |
| 4.0 | 10 | 15 |
| 5.4 | 10 | 15 |
| 6.7 | 10 | 15 |
| 8.0 | 10 | 15 |
| -- | — | — |
| -- | — | — |
| -- | — | — |
| -- | — | — |

COSEL

| | |
|---|---|
| Model | CBS1004815 |
| Item | Ripple-Noise<br>リップルノイズ |
| Object | +15V6.7A |

Temperature 25℃
Testing Circuitry Figure A

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。

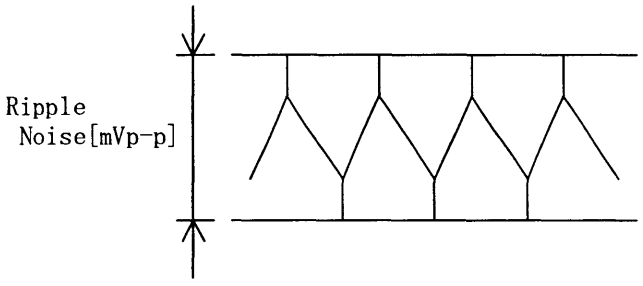



Fig. Complex Ripple Noise Wave Form
図　リップルノイズ波形

2. Values

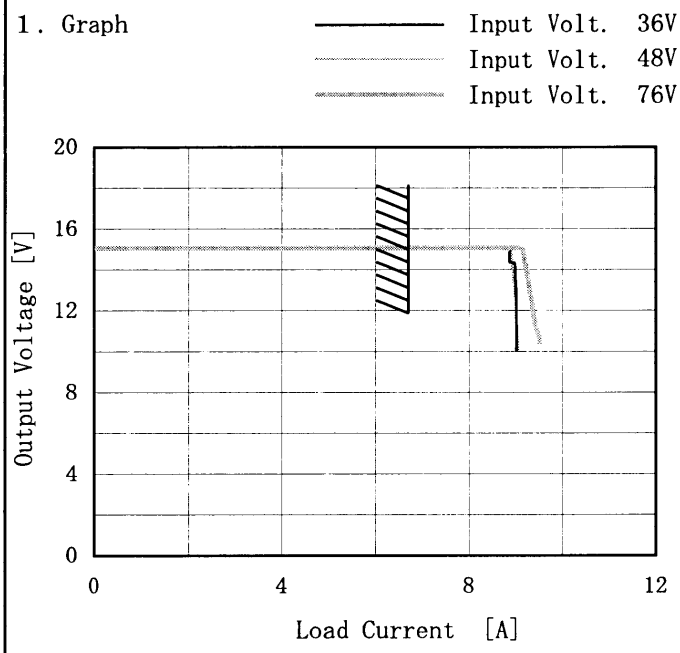
| Load Current [A] | Ripple-Noise [mV] | |
|---|---|---|
| | Input Volt. 36 [V] | Input Volt. 76 [V] |
| 0.0 | 10 | 20 |
| 1.3 | 25 | 30 |
| 2.7 | 25 | 35 |
| 4.0 | 25 | 35 |
| 5.4 | 25 | 35 |
| 6.7 | 30 | 35 |
| 8.0 | 30 | 35 |
| -- | — | — |
| -- | — | — |
| -- | — | — |
| -- | — | — |

COSEL

| | |
|---|---|
| Model | CBS1004815 |
| Item | Overcurrent Protection<br>過電流保護 |
| Object | +15V6.7A |

Temperature 25℃
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。

Intermittent operation occurs when the output voltage is from 10V to 0V.
10V～0V間は、間欠モードとなる。

2. Values

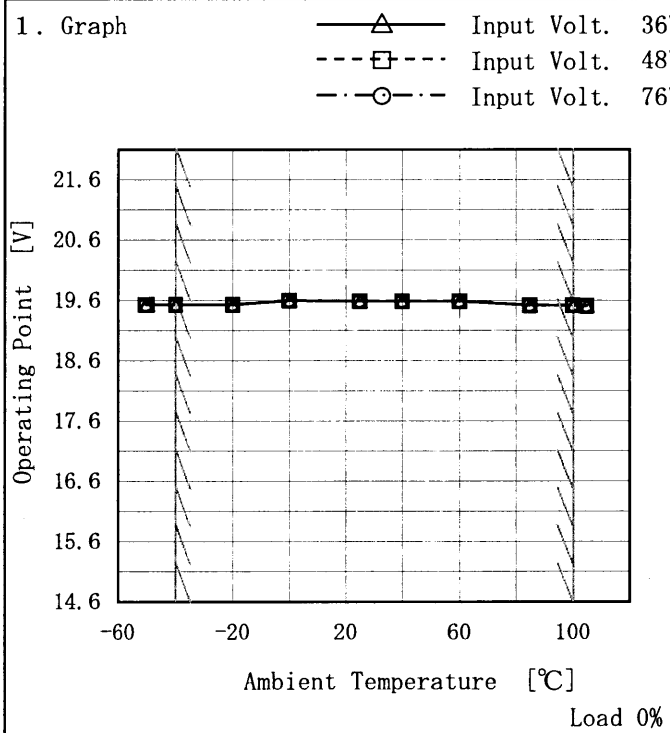
| Output Voltage [V] | Load Current [A] | | |
|---|---|---|---|
| | Input Volt. 36[V] | Input Volt. 48[V] | Input Volt. 76[V] |
| 15.00 | 6.95 | 6.82 | 6.96 |
| 14.25 | 8.99 | 8.92 | 9.21 |
| 13.50 | 9.00 | 8.95 | 9.26 |
| 12.00 | 9.02 | 9.00 | 9.36 |
| 10.50 | 9.02 | 9.05 | 9.50 |
| -- | — | — | — |
| -- | — | — | — |
| -- | — | — | — |
| -- | — | — | — |
| -- | — | — | — |
| -- | — | — | — |
| -- | — | — | — |

COSEL

| | |
|---|---|
| Model | CBS1004815 |
| Item | Overvoltage Protection<br>過電圧保護 |
| Object | +15V6.7A |

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

| Ambient Temperature [℃] | Operating Point [V] | | |
|---|---|---|---|
| | Input Volt. 36[V] | Input Volt. 48[V] | Input Volt. 76[V] |
| -50 | 19.58 | 19.58 | 19.58 |
| -40 | 19.58 | 19.58 | 19.58 |
| -20 | 19.58 | 19.58 | 19.58 |
| 0 | 19.65 | 19.65 | 19.65 |
| 25 | 19.64 | 19.64 | 19.64 |
| 40 | 19.64 | 19.64 | 19.64 |
| 60 | 19.64 | 19.64 | 19.64 |
| 85 | 19.57 | 19.57 | 19.57 |
| 100 | 19.57 | 19.57 | 19.57 |
| 105 | 19.56 | 19.56 | 19.56 |
| -- | - | - | - |

COSEL

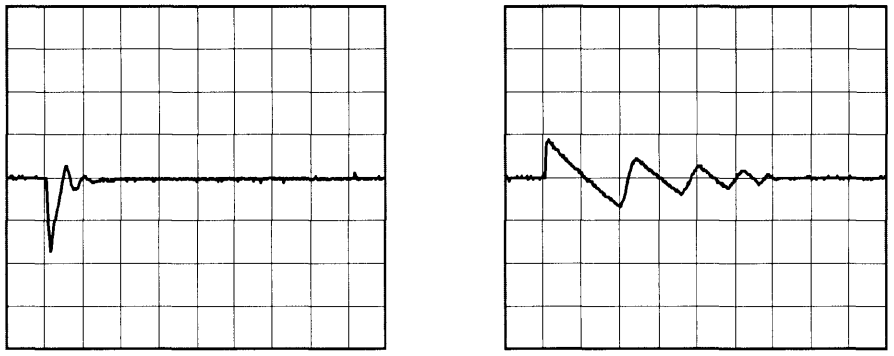
| | | | |
|---|---|---|---|
| Model | CBS1004815 | | |
| Item | Dynamic Load Response<br>動的負荷変動 | Temperature<br>Testing Circuitry | 25℃<br>Figure A |
| Object | +15V6.7A | | |

Input Volt. 48 V

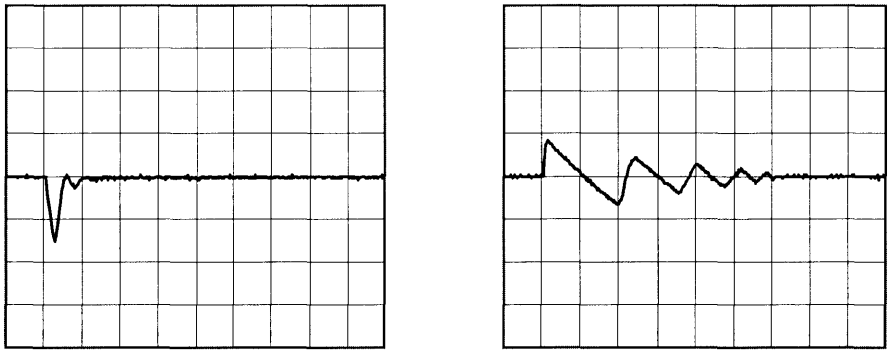
Cycle 1000 ms

Load Current

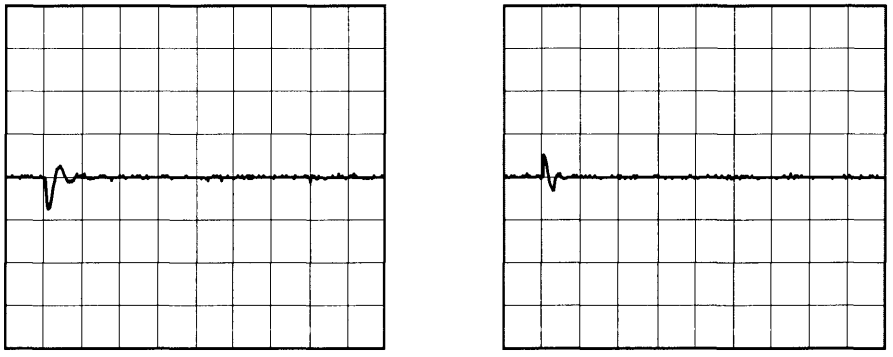
Min. Load (0A) ←→
Load 100% (6.7A)




Min. Load (0A) ←→
Load 50% (3.35A)



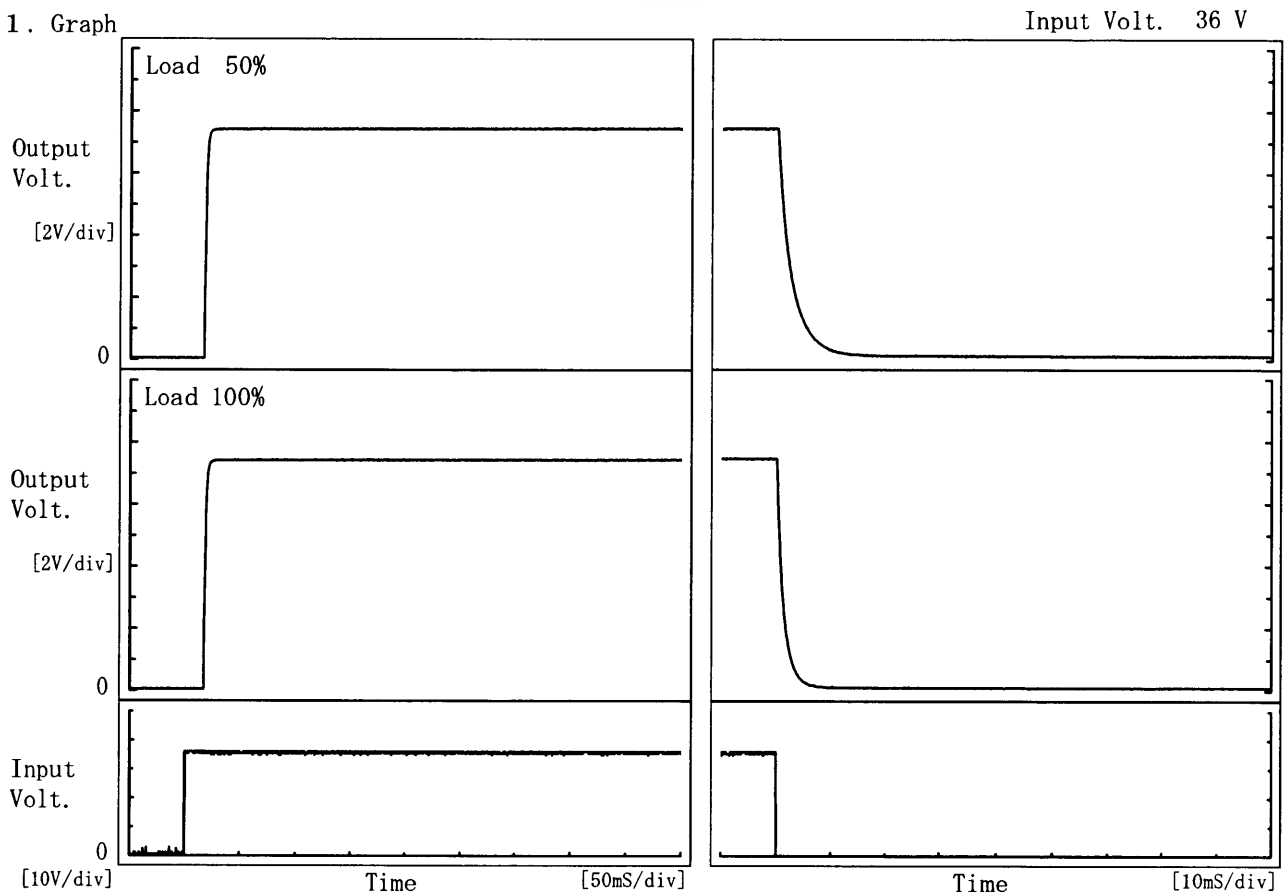

Load 10% (0.67A) ←→
Load 100% (6.7A)



COSEL

| | | | |
|---|---|---|---|
| Model | CBS1004815 | | |
| Item | Rise and Fall Time<br>立上り、立下り時間 | Temperature<br>Testing Circuitry | 25℃<br>Figure A |
| Object | +15V6.7A | | |

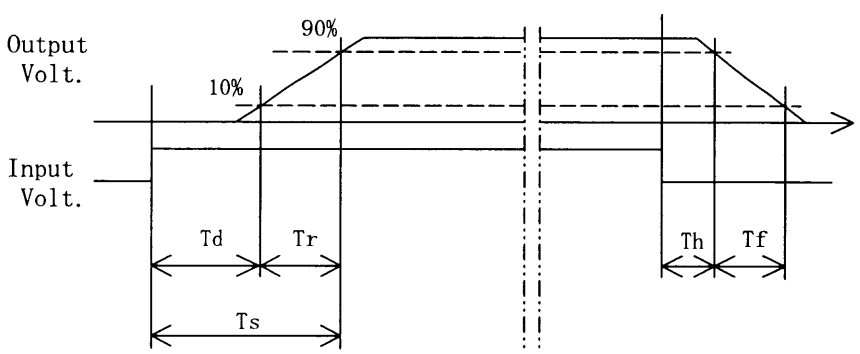
1. Graph




2. Values

[mS]

| Load \ Time | T d | T r | T s | T h | T f |
|---|---|---|---|---|---|
| 50 % | 16.3 | 3.8 | 20.0 | 0.3 | 6.1 |
| 100 % | 16.3 | 3.8 | 20.0 | 0.2 | 3.1 |

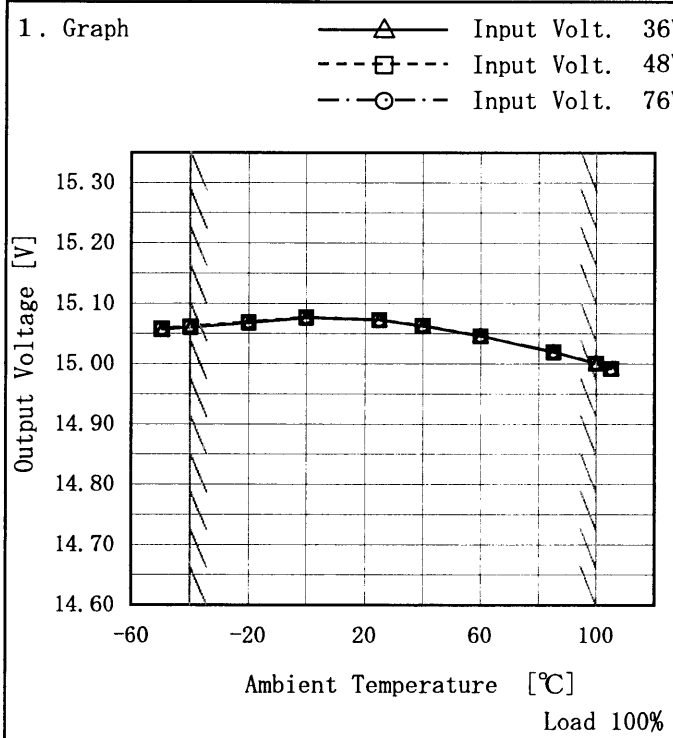


COSEL

| | |
|---|---|
| Model | CBS1004815 |
| Item | Ambient Temperature Drift<br>周囲温度変動 |
| Object | +15V6.7A |

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

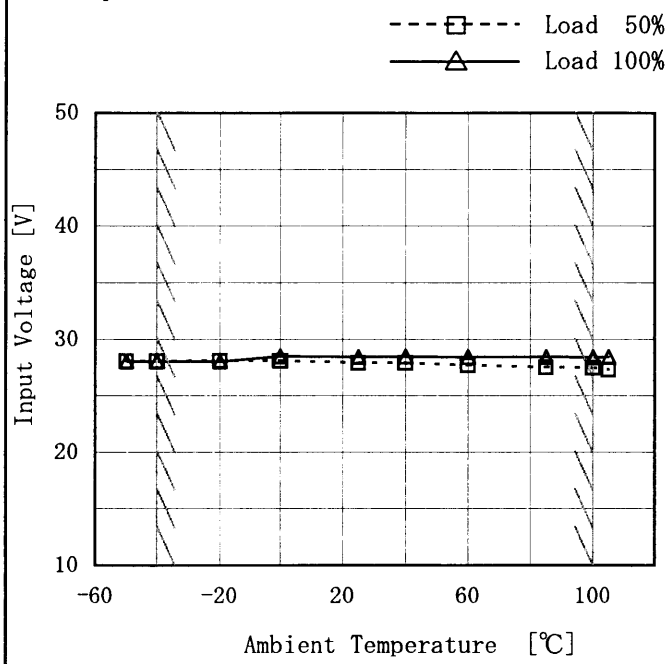
| Ambient Temperature [℃] | Output Voltage [V] | | |
|---|---|---|---|
| | Input Volt. 36[V] | Input Volt. 48[V] | Input Volt. 76[V] |
| -50 | 15.057 | 15.058 | 15.058 |
| -40 | 15.061 | 15.061 | 15.062 |
| -20 | 15.068 | 15.069 | 15.069 |
| 0 | 15.077 | 15.077 | 15.077 |
| 25 | 15.073 | 15.073 | 15.073 |
| 40 | 15.063 | 15.063 | 15.064 |
| 60 | 15.047 | 15.046 | 15.047 |
| 85 | 15.020 | 15.020 | 15.020 |
| 100 | 15.001 | 15.001 | 15.001 |
| 105 | 14.992 | 14.992 | 14.992 |
| -- | - | - | - |

COSEL

| | |
|---|---|
| Model | CBS1004815 |
| Item | Minimum Input Voltage for Regulated Output Voltage<br>最低レギュレーション電圧 |
| Object | +15V6.7A |

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

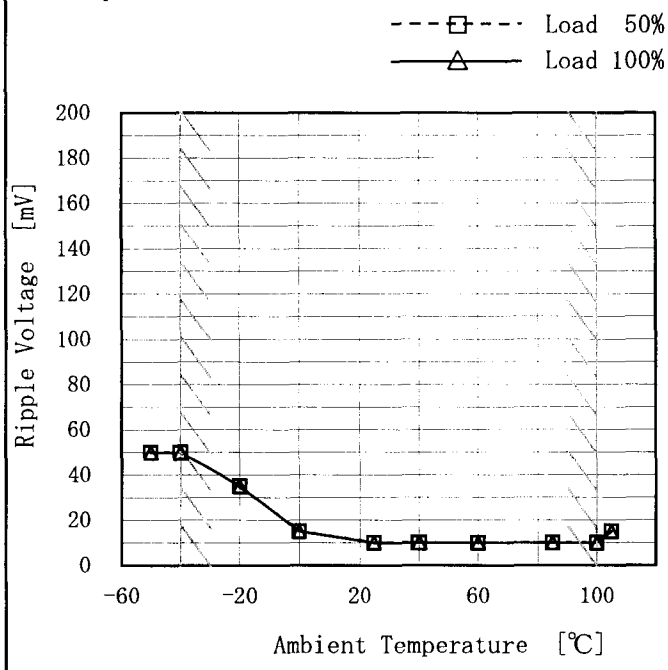
| Ambient Temperature [℃] | Input Voltage [V] | |
|---|---|---|
| | Load 50% | Load 100% |
| -50 | 28.1 | 28.0 |
| -40 | 28.1 | 28.0 |
| -20 | 28.1 | 28.0 |
| 0 | 28.1 | 28.5 |
| 25 | 27.9 | 28.5 |
| 40 | 27.9 | 28.5 |
| 60 | 27.7 | 28.4 |
| 85 | 27.5 | 28.4 |
| 100 | 27.5 | 28.4 |
| 105 | 27.3 | 28.4 |
| -- | - | - |

COSEL

| | |
|---|---|
| Model | CBS1004815 |
| Item | Ripple Voltage (by Ambient Temp.)<br>リップル電圧 (周囲温度特性) |
| Object | +15V6.7A |

Testing Circuitry Figure A

1. Graph




Input Volt. 48V

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

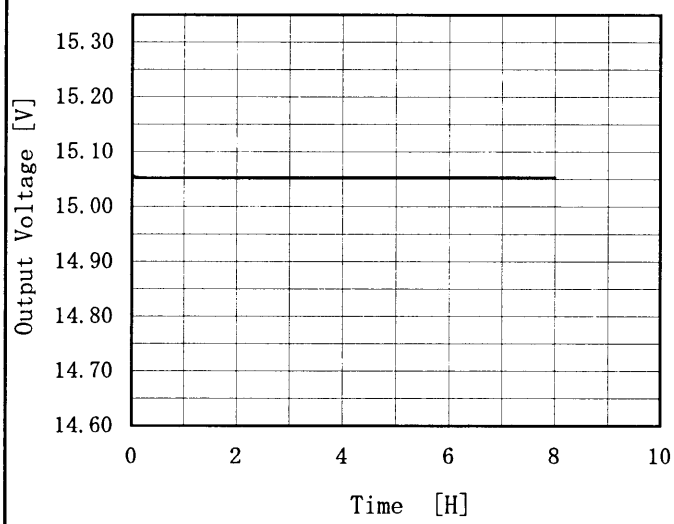
| Ambient Temperature [℃] | Ripple Voltage [mV] | |
|---|---|---|
| | Load 50% | Load 100% |
| -50 | 50 | 50 |
| -40 | 50 | 50 |
| -20 | 35 | 35 |
| 0 | 15 | 15 |
| 25 | 10 | 10 |
| 40 | 10 | 10 |
| 60 | 10 | 10 |
| 85 | 10 | 10 |
| 100 | 10 | 10 |
| 105 | 15 | 15 |
| -- | — | — |

COSEL

| | |
|---|---|
| Model | CBS1004815 |
| Item | Time Lapse Drift<br>経時ドリフト |
| Object | +15V6.7A |

Temperature 25℃
Testing Circuitry Figure A

1. Graph




Input Volt. 48V
Load 100%

2. Values

| Time since start [H] | Output Voltage [V] |
|---|---|
| 0.0 | 15.061 |
| 0.5 | 15.053 |
| 1.0 | 15.053 |
| 2.0 | 15.053 |
| 3.0 | 15.053 |
| 4.0 | 15.054 |
| 5.0 | 15.054 |
| 6.0 | 15.054 |
| 7.0 | 15.054 |
| 8.0 | 15.054 |

COSEL

| | |
|---|---|
| Model | CBS1004815 |
| Item | Output Voltage Accuracy<br>定電圧精度 |
| Object | +15V6.7A |

Testing Circuitry Figure A

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℃
Input Voltage : 36 ～ 76V
Load Current : 0 ～ 6.7A

* Output Voltage Accuracy = ±(Maximum of Output Voltage − Minimum of Output Voltage)／2

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

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℃
入力電圧 : 36 ～ 76V
負荷電流 : 0 ～ 6.7A

* 定電圧精度(変動値) ＝ ±(出力電圧の最高値−出力電圧の最低値)／2

$$* \text{定電圧精度(変動率)} = \frac{\text{変動値}}{\text{定格出力電圧}} \times 100$$

2. Values

| Item | Temperature [℃] | Input Voltage[V] | Output | | Output Voltage Accuracy | |
|---|---|---|---|---|---|---|
| | | | Current[A] | Voltage[V] | Value [mV] | Ration [%] |
| Maximum Voltage | 25 | 36 | 0 | 15.071 | ±38 | ±0.3 |
| Minimum Voltage | 100 | 48 | 6.7 | 14.995 | | |

COSEL

| | |
|---|---|
| Model | CBS1004815 |
| Item | Condense<br>結露特性 |
| Object | +15V6.7A |

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.

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] | 15.069 | Input Volt.:48V, Load Current.:6.7A |
| Line Regulation [mV] | 5 | Input Volt.:36～76V, Load Current.:6.7A |
| Load Regulation [mV] | 1 | Input Volt.:48V, Load Current.:0～6.7A |

COSEL

| | | | |
|---|---|---|---|
| Model | CBS1004815 | | |
| Item | Line Noise Tolerance<br>入力雑音耐量 | Temperature<br>Testing Circuitry | 25℃<br>Figure B |
| Object | +15V6.7A | | |

1. Conditions

- Input Voltage : 48 V
- Pulse Voltage : 2000 V
- Pulse Cycle : 16.7 ms
- Pulse Input Duration : 1 min. or more
- Load : 100 %

2. Results

| Pulse Width [ns] | MODE | POLARITY | No protection failure should occur<br>保護回路の誤動作がない | DC-like Regulation of Output Voltage<br>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 |

COSEL

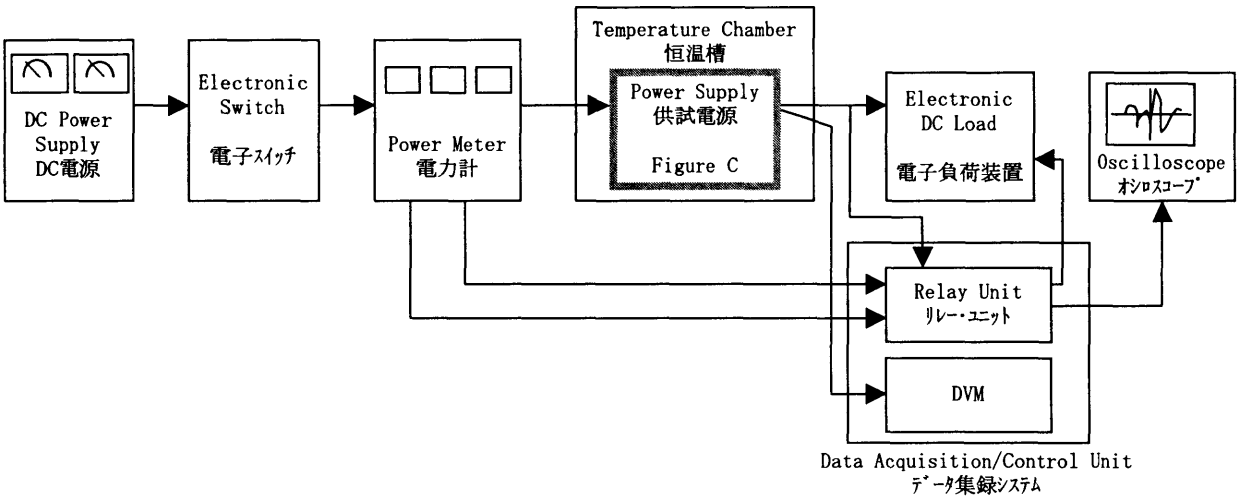



Figure A

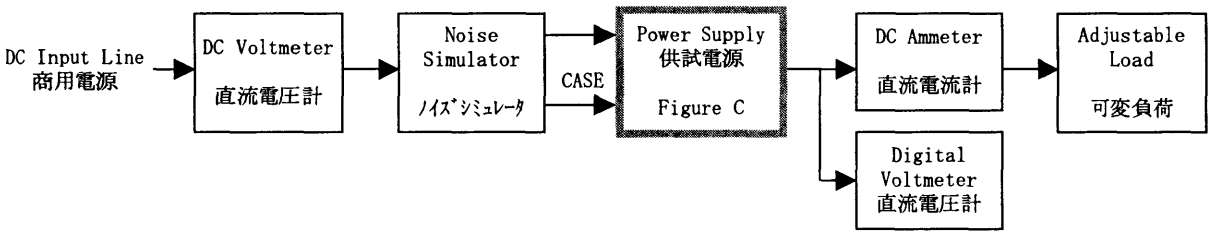



Figure B

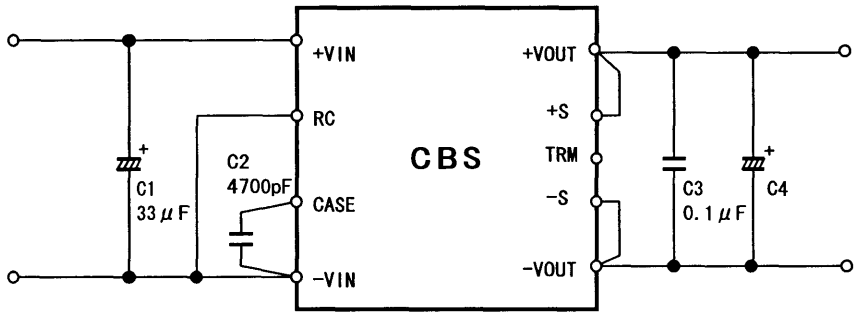



Figure C

C1 : 100V 33μF
C2 : 4700pF
C3 : 50V 0.1μF

($-40℃ \leqq T_B \leqq -20℃$)

| | | | |
|---|---|---|---|
| C4 : CBS1004803, 05 | 10V | 2200μF | ×2 |
| CBS1004812, 15 | 35V | 470μF | ×2 |
| CBS1004824, 28 | 35V | 220μF | ×2 |

($-20℃ < T_B \leqq 100℃$)

| | | |
|---|---|---|
| C4 : CBS1004803, 05 | 10V | 2200μF |
| CBS1004812, 15 | 35V | 470μF |
| CBS1004824, 28 | 35V | 220μF |

$T_B$:Base Plate Temp.