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参考資料

# TEST DATA OF SNDBS400B18

Regulated DC Power Supply
July 6, 2012

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Satoshi Kinoshita　Design Engineer

**COSEL CO.,LTD.**

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| | |
|---|---|
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| Item | Input Current (by Input Voltage) |
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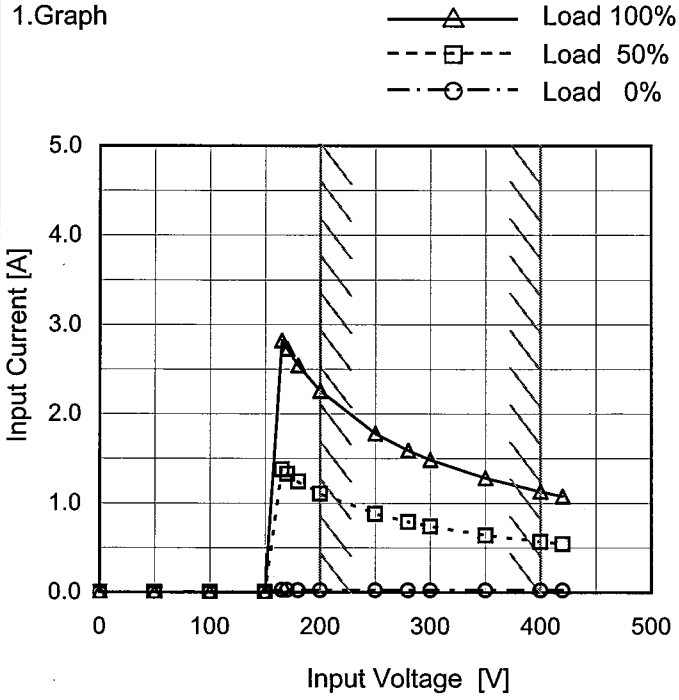
Temperature 25°C
Testing Circuitry Figure A

1.Graph




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

2.Values

| Input Voltage [V] | Input Current [A] | | |
|---|---|---|---|
| | Load 0% | Load 50% | Load 100% |
| 0 | 0.000 | 0.000 | 0.000 |
| 50 | 0.000 | 0.000 | 0.000 |
| 100 | 0.003 | 0.003 | 0.003 |
| 150 | 0.004 | 0.004 | 0.004 |
| 165 | 0.028 | 1.381 | 2.824 |
| 170 | 0.027 | 1.330 | 2.730 |
| 180 | 0.027 | 1.244 | 2.544 |
| 200 | 0.026 | 1.106 | 2.260 |
| 250 | 0.024 | 0.880 | 1.782 |
| 280 | 0.024 | 0.790 | 1.593 |
| 300 | 0.024 | 0.740 | 1.487 |
| 350 | 0.023 | 0.641 | 1.282 |
| 400 | 0.023 | 0.568 | 1.130 |
| 420 | 0.023 | 0.543 | 1.079 |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |



BC-10654

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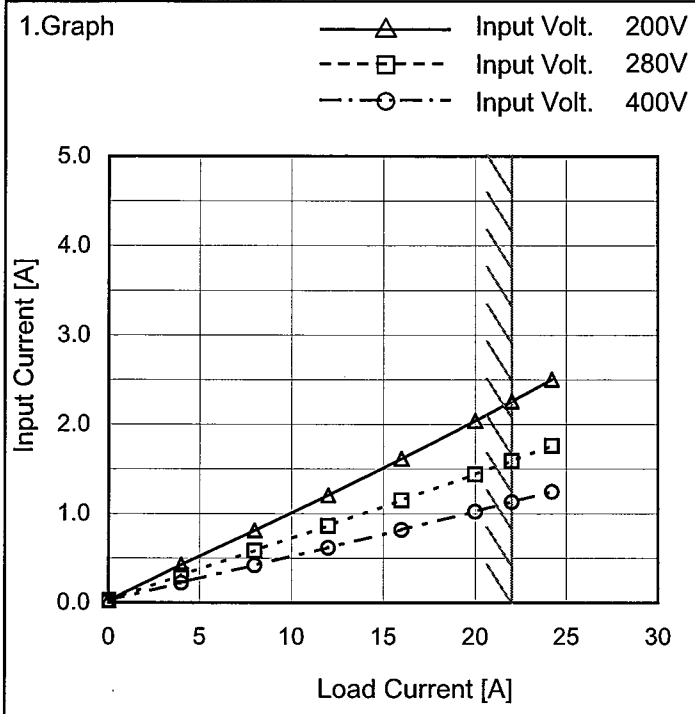
| | |
|---|---|
| Model | SNDBS400B18 |
| Item | Input Current (by Load Current) |
| Object | ———————— |

Temperature 25°C
Testing Circuitry Figure A

1.Graph




Note: Slanted line shows the range of the rated load current.

2.Values

| Load Current [A] | Input Current [A] | | |
|---|---|---|---|
| | Input Volt. 200[V] | Input Volt. 280[V] | Input Volt. 400[V] |
| 0.0 | 0.026 | 0.024 | 0.023 |
| 4.0 | 0.427 | 0.304 | 0.221 |
| 8.0 | 0.812 | 0.581 | 0.421 |
| 12.0 | 1.208 | 0.862 | 0.618 |
| 16.0 | 1.616 | 1.148 | 0.819 |
| 20.0 | 2.040 | 1.441 | 1.024 |
| 22.0 | 2.260 | 1.593 | 1.130 |
| 24.2 | 2.502 | 1.760 | 1.246 |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |

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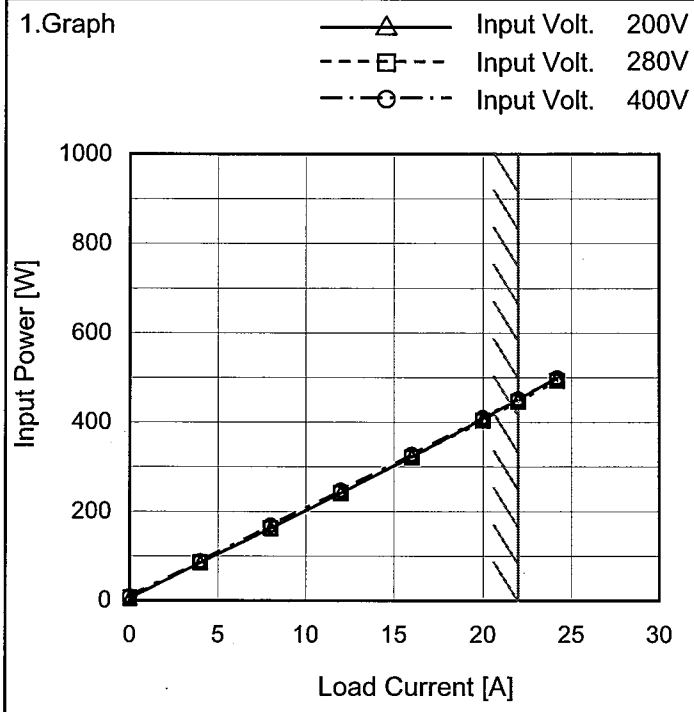
|---|---|
| Model | SNDBS400B18 |
| Item | Input Power (by Load Current) |
| Object | ———————— |

Temperature 25°C
Testing Circuitry Figure A

1.Graph




Note: Slanted line shows the range of the rated load current.

2.Values

| Load Current [A] | Input Power [W] | | |
|---|---|---|---|
| | Input Volt. 200[V] | Input Volt. 280[V] | Input Volt. 400[V] |
| 0.0 | 5.2 | 6.7 | 9.4 |
| 4.0 | 85.4 | 85.2 | 88.6 |
| 8.0 | 162.2 | 162.7 | 168.5 |
| 12.0 | 241.4 | 241.2 | 247.4 |
| 16.0 | 323.0 | 321.4 | 327.6 |
| 20.0 | 408.0 | 403.6 | 410.0 |
| 22.0 | 452.0 | 445.9 | 452.0 |
| 24.2 | 500.0 | 492.7 | 499.0 |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |

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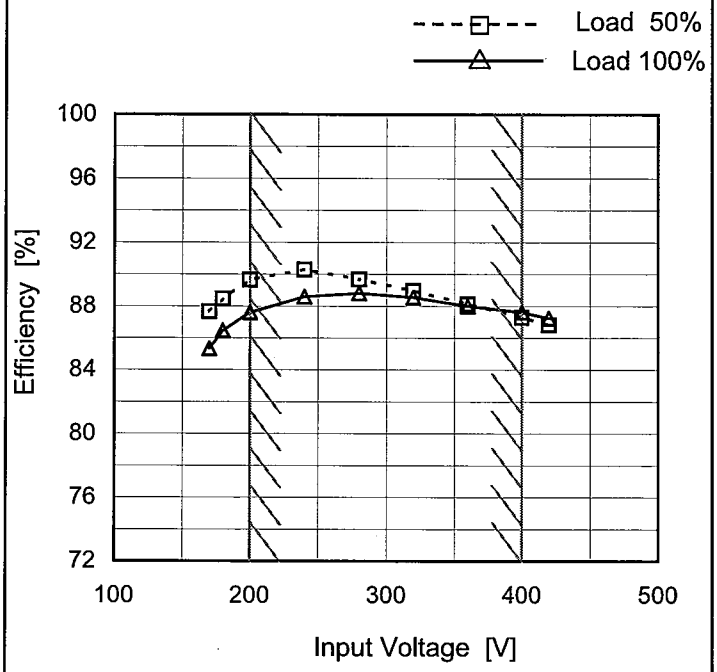
|---|---|
| Model | SNDBS400B18 |
| Item | Efficiency (by Input Voltage) |
| Object | ——————————— |

Temperature 25°C
Testing Circuitry Figure A

1.Graph




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

2.Values

| Input Voltage [V] | Efficiency [%] | |
|---|---|---|
| | Load 50% | Load 100% |
| 170 | 87.6 | 85.3 |
| 180 | 88.5 | 86.5 |
| 200 | 89.6 | 87.6 |
| 240 | 90.3 | 88.6 |
| 280 | 89.7 | 88.8 |
| 320 | 89.0 | 88.6 |
| 360 | 88.1 | 88.0 |
| 400 | 87.3 | 87.6 |
| 420 | 86.8 | 87.2 |

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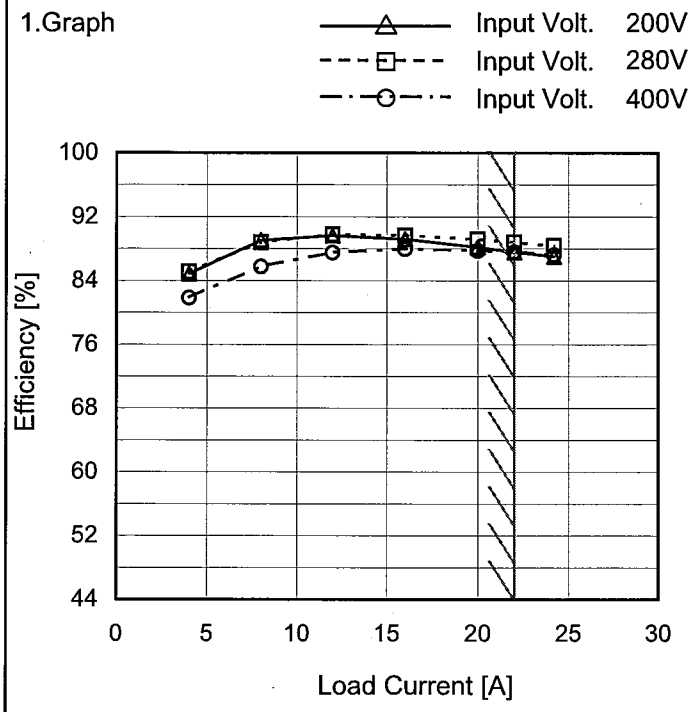
| | |
|---|---|
| Model | SNDBS400B18 |
| Item | Efficiency (by Load Current) |
| Object | ———————— |

Temperature 25°C
Testing Circuitry Figure A

1.Graph




Note: Slanted line shows the range of the rated load current.

2.Values

| Load Current [A] | Efficiency [%] | | |
|---|---|---|---|
| | Input Volt. 200[V] | Input Volt. 280[V] | Input Volt. 400[V] |
| 0.0 | - | - | - |
| 4.0 | 84.9 | 85.1 | 81.9 |
| 8.0 | 89.0 | 88.8 | 85.7 |
| 12.0 | 89.7 | 89.8 | 87.5 |
| 16.0 | 89.2 | 89.7 | 88.0 |
| 20.0 | 88.2 | 89.2 | 87.8 |
| 22.0 | 87.6 | 88.8 | 87.6 |
| 24.2 | 87.1 | 88.4 | 87.3 |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |

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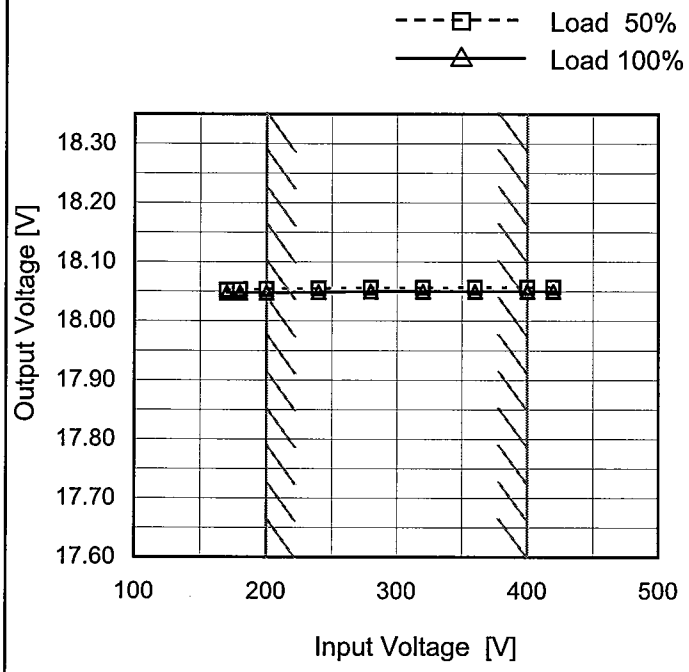
|---|---|
| Model | SNDBS400B18 |
| Item | Line Regulation |
| Object | +18V22A |

Temperature 25°C
Testing Circuitry Figure A

1.Graph




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

2.Values

| Input Voltage [V] | Output Voltage [V] | |
|---|---|---|
| | Load 50% | Load 100% |
| 170 | 18.052 | 18.048 |
| 180 | 18.053 | 18.048 |
| 200 | 18.054 | 18.048 |
| 240 | 18.055 | 18.049 |
| 280 | 18.056 | 18.050 |
| 320 | 18.056 | 18.050 |
| 360 | 18.057 | 18.050 |
| 400 | 18.057 | 18.050 |
| 420 | 18.057 | 18.050 |

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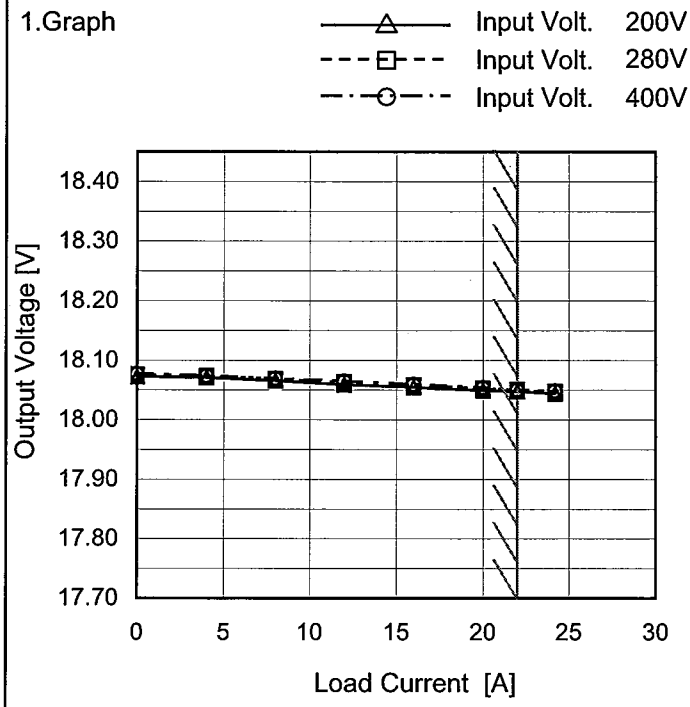
| | |
|---|---|
| Model | SNDBS400B18 |
| Item | Load Regulation |
| Object | +18V22A |

Temperature 25°C
Testing Circuitry Figure A

1.Graph




Note: Slanted line shows the range of the rated load current.

2.Values

| Load Current [A] | Output Voltage [V] | | |
|---|---|---|---|
| | Input Volt. 200[V] | Input Volt. 280[V] | Input Volt. 400[V] |
| 0.0 | 18.073 | 18.076 | 18.077 |
| 4.0 | 18.071 | 18.074 | 18.074 |
| 8.0 | 18.066 | 18.068 | 18.069 |
| 12.0 | 18.060 | 18.063 | 18.065 |
| 16.0 | 18.055 | 18.058 | 18.060 |
| 20.0 | 18.050 | 18.053 | 18.054 |
| 22.0 | 18.048 | 18.050 | 18.050 |
| 24.2 | 18.044 | 18.047 | 18.049 |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |

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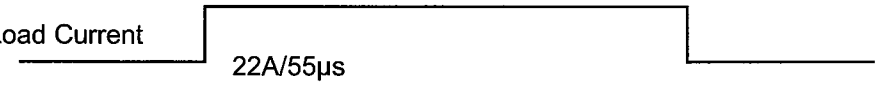
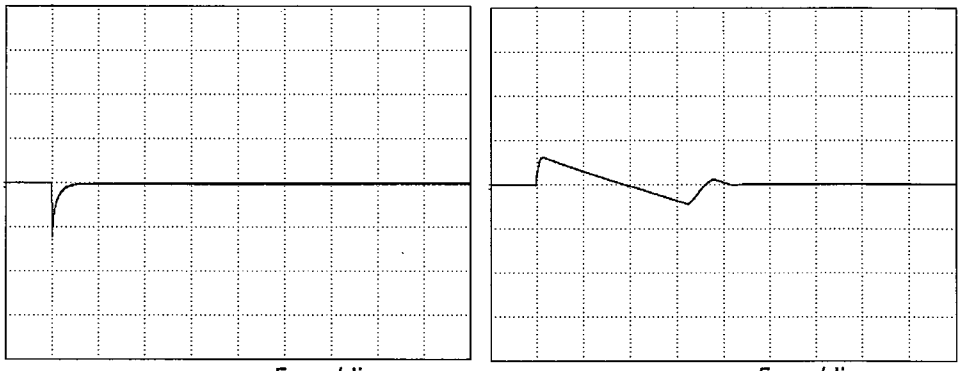
|---|---|
| Model | SNDBS400B18 |
| Item | Dynamic Load Response |
| Object | +18V22A |

Temperature 25°C
Testing Circuitry Figure A

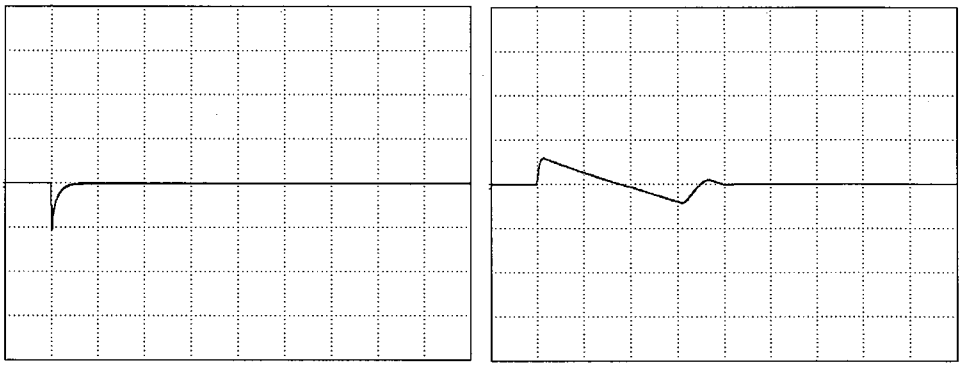
Input Volt. 280 V
Cycle 1000 ms



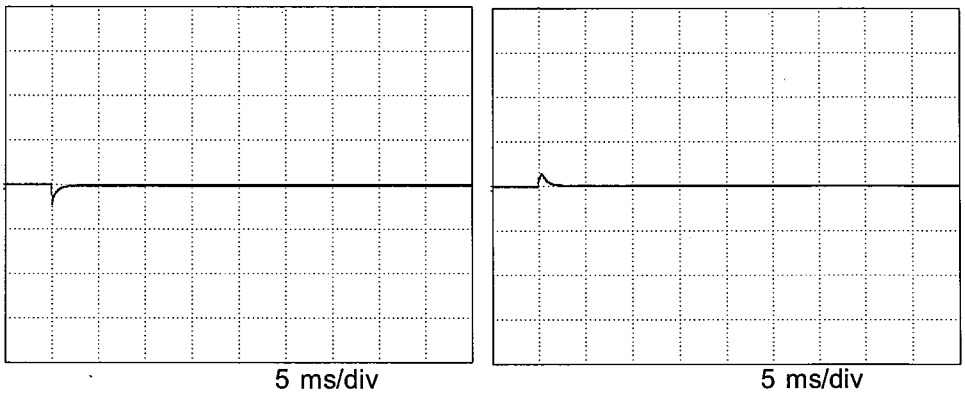

Min. Load (0A) ⟷
Load 100% (22A)




Min. Load (0A) ⟷
Load 50% (11A)




Load 10% (2.2A) ⟷
Load 100% (22A)

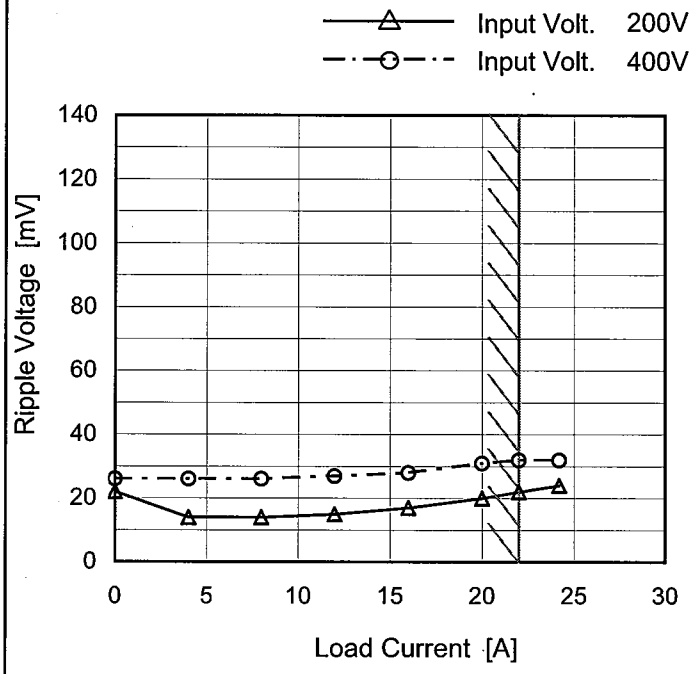


COSEL

| | |
|---|---|
| Model | SNDBS400B18 |
| Item | Ripple Voltage (by Load Current) |
| Object | +18V22A |

Temperature 25°C
Testing Circuitry Figure B

1.Graph




Measured by 100 MHz Oscilloscope.
Ripple Voltage is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated load current.

Ripple [mVp-p]

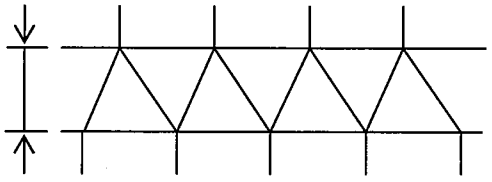


Fig.Complex Ripple Wave Form

2.Values

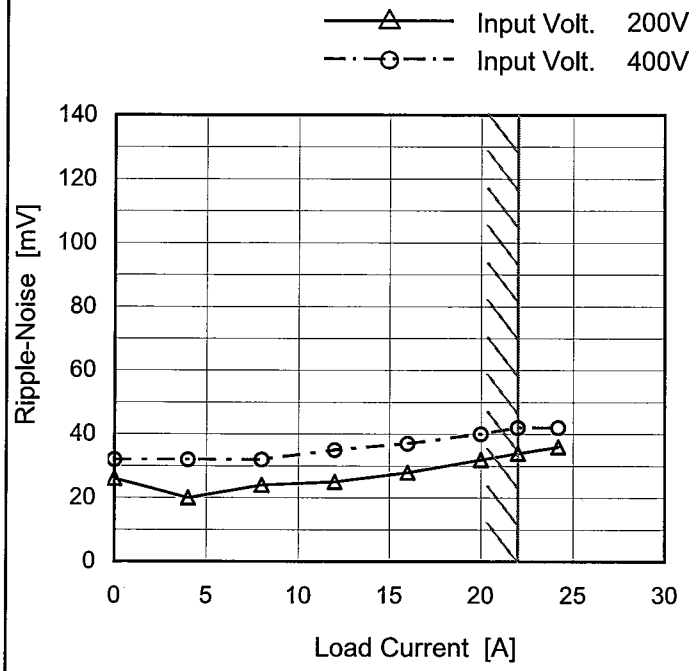
| Load Current [A] | Ripple Voltage [mV] | |
|---|---|---|
| | Input Volt. 200 [V] | Input Volt. 400 [V] |
| 0.0 | 22 | 26 |
| 4.0 | 14 | 26 |
| 8.0 | 14 | 26 |
| 12.0 | 15 | 27 |
| 16.0 | 17 | 28 |
| 20.0 | 20 | 31 |
| 22.0 | 22 | 32 |
| 24.2 | 24 | 32 |
| -- | - | - |
| -- | - | - |
| -- | - | - |

COSEL

| | |
|---|---|
| Model | SNDBS400B18 |
| Item | Ripple-Noise |
| Object | +18V22A |

Temperature 25°C
Testing Circuitry Figure B

1.Graph




Measured by 100 MHz Oscilloscope.
Ripple-Noise is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated load current.

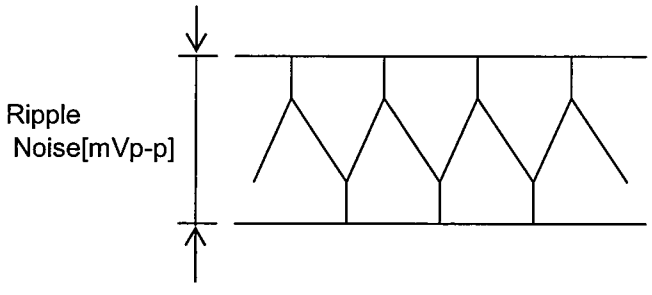



Fig.Complex Ripple Noise Wave Form

2.Values

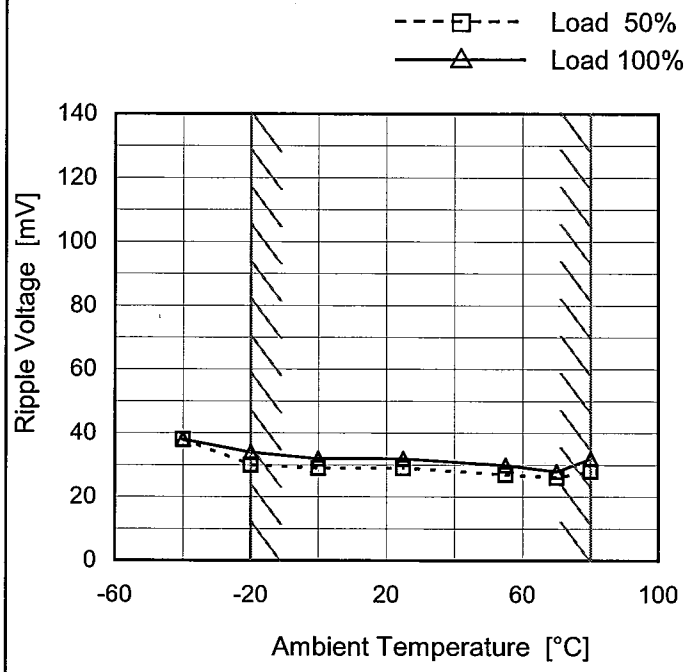
| Load Current [A] | Ripple-Noise [mV] | |
|---|---|---|
| | Input Volt. 200 [V] | Input Volt. 400 [V] |
| 0.0 | 26 | 32 |
| 4.0 | 20 | 32 |
| 8.0 | 24 | 32 |
| 12.0 | 25 | 35 |
| 16.0 | 28 | 37 |
| 20.0 | 32 | 40 |
| 22.0 | 34 | 42 |
| 24.2 | 36 | 42 |
| -- | - | - |
| -- | - | - |
| -- | - | - |

COSEL

| | |
|---|---|
| Model | SNDBS400B18 |
| Item | Ripple Voltage (by Ambient Temp.) |
| Object | +18V22A |

Testing Circuitry Figure B

1.Graph




Input Volt. 280V

Measured by 100 MHz Oscilloscope.

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

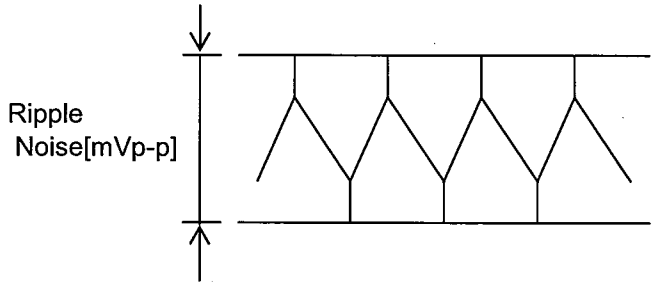



Fig.Complex Ripple Noise Wave Form

2.Values

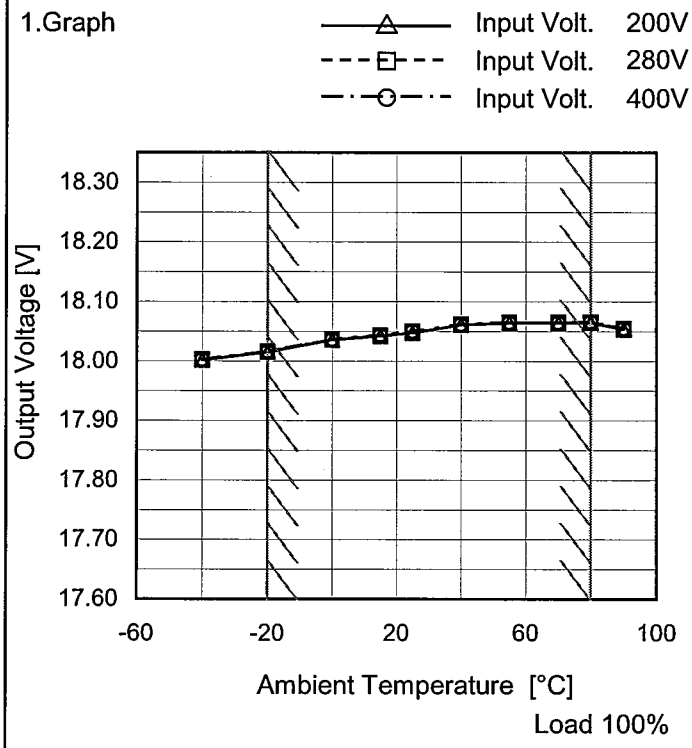
| Ambient Temperature [°C] | Ripple Voltage [mV] | |
|---|---|---|
| | Load 50% | Load 100% |
| -40 | 38 | 38 |
| -20 | 30 | 34 |
| 0 | 29 | 32 |
| 25 | 29 | 32 |
| 55 | 27 | 30 |
| 70 | 26 | 28 |
| 80 | 28 | 32 |
| -- | - | - |
| -- | - | - |
| -- | - | - |
| -- | - | - |

COSEL

| | |
|---|---|
| Model | SNDBS400B18 |
| Item | Ambient Temperature Drift |
| Object | +18V22A |

Testing Circuitry Figure A

1.Graph




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

2.Values

| Ambient Temperature [°C] | Output Voltage [V] | | |
|---|---|---|---|
| | Input Volt. 200[V] | Input Volt. 280[V] | Input Volt. 400[V] |
| -40 | 18.002 | 18.003 | 18.003 |
| -20 | 18.015 | 18.016 | 18.016 |
| 0 | 18.036 | 18.036 | 18.036 |
| 15 | 18.042 | 18.043 | 18.043 |
| 25 | 18.048 | 18.050 | 18.050 |
| 40 | 18.061 | 18.062 | 18.062 |
| 55 | 18.064 | 18.065 | 18.065 |
| 70 | 18.064 | 18.065 | 18.065 |
| 80 | 18.065 | 18.066 | 18.066 |
| 90 | 18.054 | 18.055 | 18.055 |
| -- | - | - | - |

COSEL

| | | |
|---|---|---|
| Model | SNDBS400B18 | |
| Item | Output Voltage Accuracy | Testing Circuitry Figure A |
| Object | +18V22A | |

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 : -20 - 80°C
Input Voltage : 200 - 400V
Load Current : 0 - 22A

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

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

2.Values

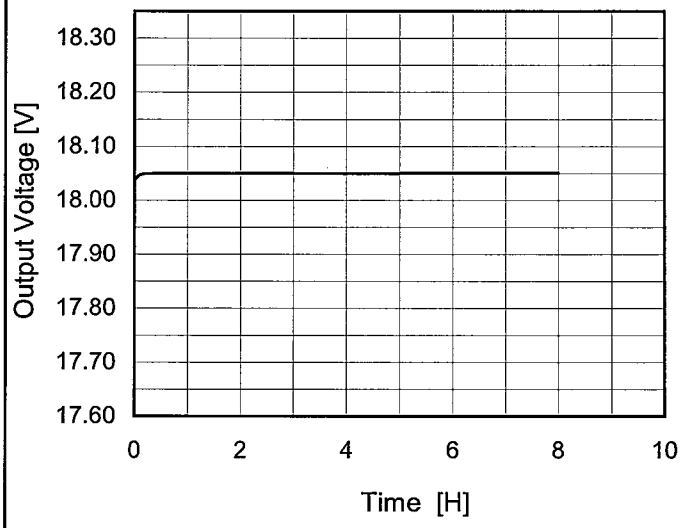
| Item | Temperature [°C] | Input Voltage[V] | Output | | Output Voltage Accuracy | |
|---|---|---|---|---|---|---|
| | | | Current[A] | Voltage[V] | Value [mV] | Ration [%] |
| Maximum Voltage | 80 | 400 | 0 | 18.096 | ±41 | ±0.2 |
| Minimum Voltage | -20 | 200 | 22 | 18.015 | | |

COSEL

| | |
|---|---|
| Model | SNDBS400B18 |
| Item | Time Lapse Drift |
| Object | +18V22A |

Temperature 25°C
Testing Circuitry Figure A

1.Graph




Input Volt. 280V
Load 100%

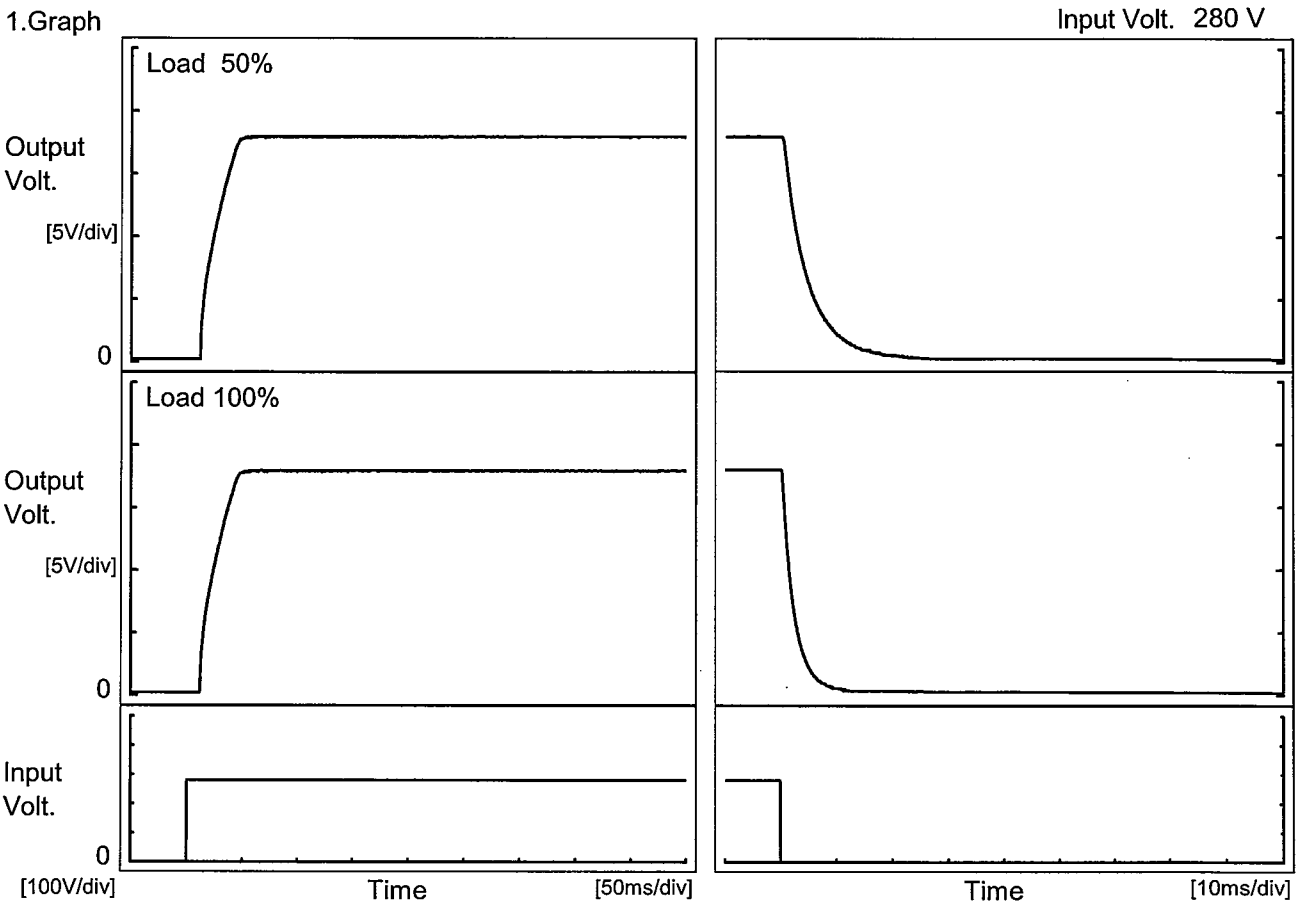
2.Values

| Time since start [H] | Output Voltage [V] |
|---|---|
| 0.0 | 18.039 |
| 0.5 | 18.050 |
| 1.0 | 18.050 |
| 2.0 | 18.051 |
| 3.0 | 18.051 |
| 4.0 | 18.050 |
| 5.0 | 18.051 |
| 6.0 | 18.051 |
| 7.0 | 18.051 |
| 8.0 | 18.052 |

COSEL

| | | |
|---|---|---|
| Model | SNDBS400B18 | |
| Item | Rise and Fall Time | Temperature 25°C<br>Testing Circuitry Figure A |
| Object | +18V22A | |

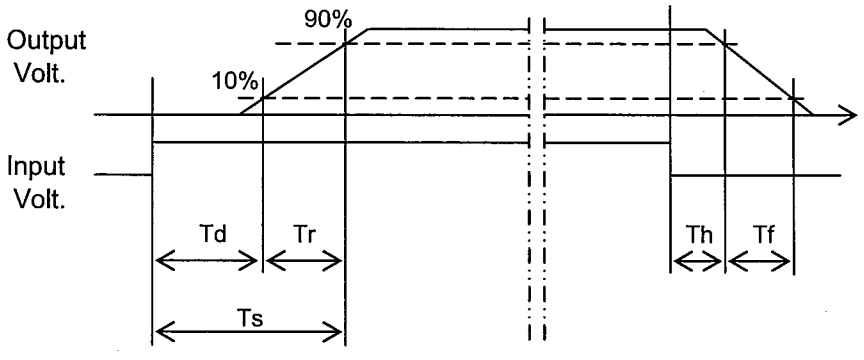
1.Graph




2.Values

[ms]

| Load \ Time | Td | Tr | Ts | Th | Tf |
|---|---|---|---|---|---|
| 50 % | 12.3 | 29.5 | 41.8 | 0.8 | 9.8 |
| 100 % | 12.5 | 29.3 | 41.8 | 0.4 | 4.9 |

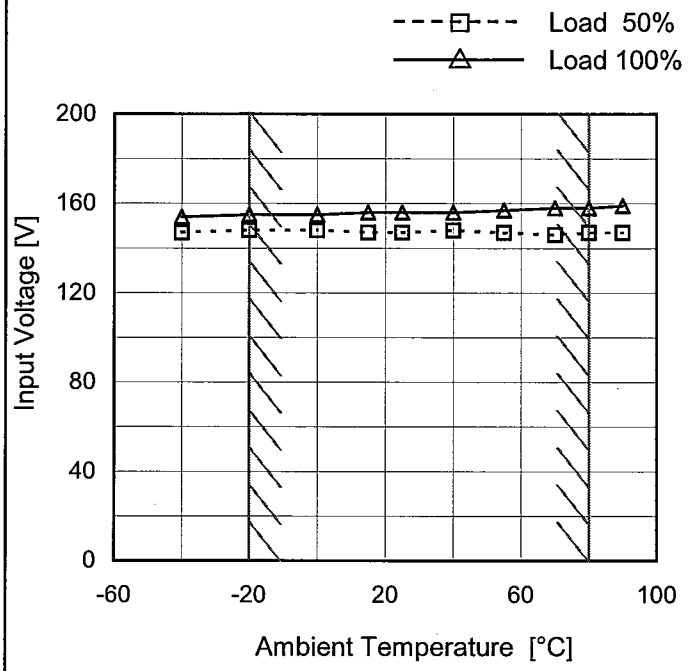


COSEL

| | |
|---|---|
| Model | SNDBS400B18 |
| Item | Minimum Input Voltage for Regulated Output Voltage |
| Object | +18V22A |

Testing Circuitry Figure A

1.Graph




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

2.Values

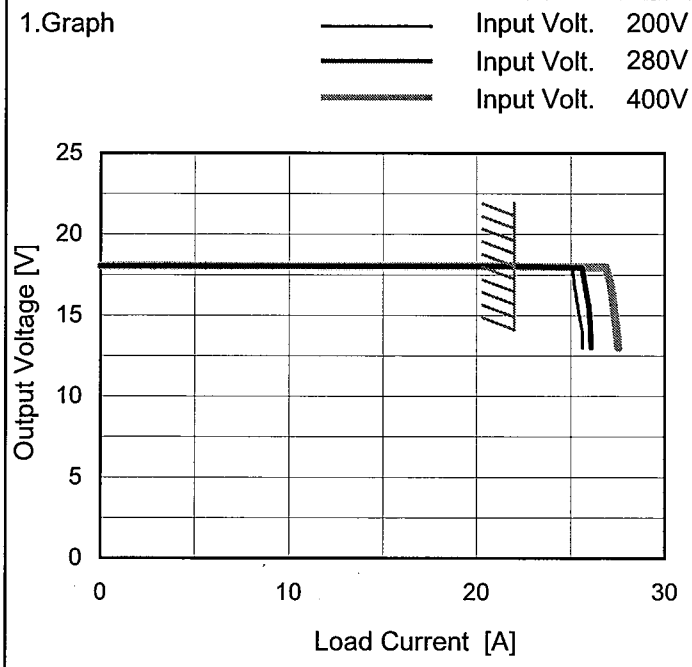
| Ambient Temperature [°C] | Input Voltage [V] | |
|---|---|---|
| | Load 50% | Load 100% |
| -40 | 147 | 154 |
| -20 | 148 | 155 |
| 0 | 148 | 155 |
| 15 | 147 | 156 |
| 25 | 147 | 156 |
| 40 | 148 | 156 |
| 55 | 147 | 157 |
| 70 | 146 | 158 |
| 80 | 147 | 158 |
| 90 | 147 | 159 |
| -- | - | - |

COSEL

| | |
|---|---|
| Model | SNDBS400B18 |
| Item | Overcurrent Protection |
| Object | +18V22A |

Temperature 25°C
Testing Circuitry Figure A

1.Graph




Note: Slanted line shows the range of the rated load current.

Intermittent operation occurs when the output voltage is from 13V to 0V.

2.Values

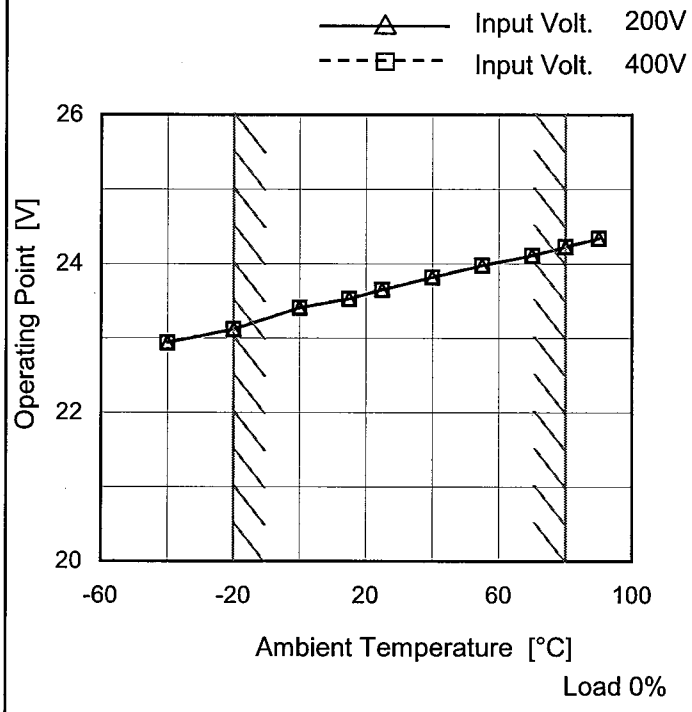
| Output Voltage [V] | Load Current [A] | | |
|---|---|---|---|
| | Input Volt. 200[V] | Input Volt. 280[V] | Input Volt. 400[V] |
| 17 | 25.18 | 25.73 | 27.09 |
| 16 | 25.28 | 22.12 | 22.24 |
| 14 | 25.53 | 26.02 | 27.39 |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |

COSEL

| | |
|---|---|
| Model | SNDBS400B18 |
| Item | Overvoltage Protection |
| Object | +18V22A |

Testing Circuitry Figure A

1.Graph




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

2.Values

| Ambient Temperature [°C] | Operating Point [V] | |
|---|---|---|
| | Input Volt. 200[V] | Input Volt. 400[V] |
| -40 | 22.94 | 22.94 |
| -20 | 23.12 | 23.12 |
| 0 | 23.41 | 23.41 |
| 15 | 23.53 | 23.53 |
| 25 | 23.65 | 23.65 |
| 40 | 23.82 | 23.82 |
| 55 | 23.98 | 23.98 |
| 70 | 24.11 | 24.11 |
| 80 | 24.23 | 24.23 |
| 90 | 24.34 | 24.34 |
| -- | - | - |

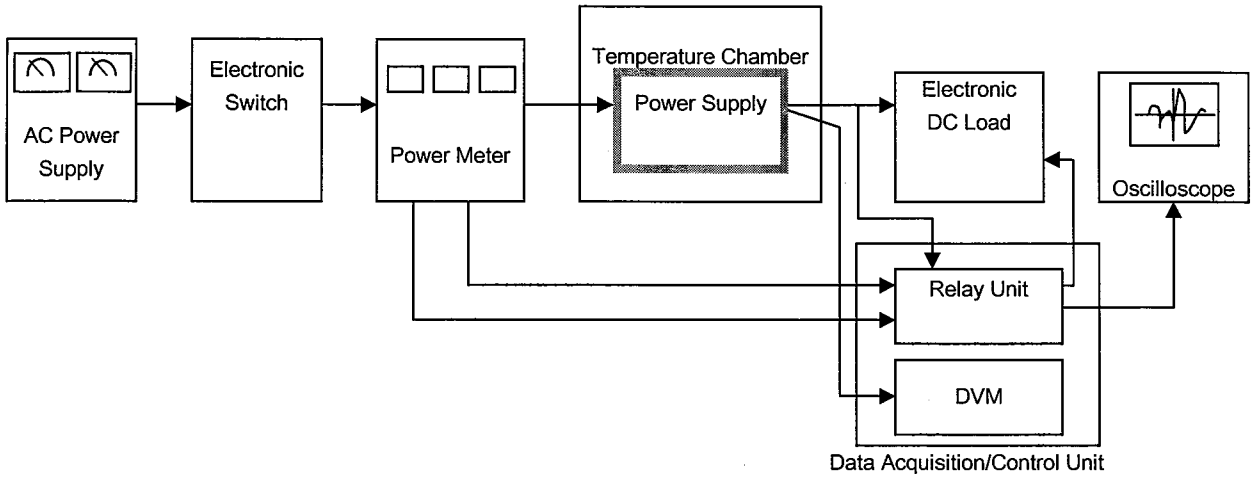



Figure A

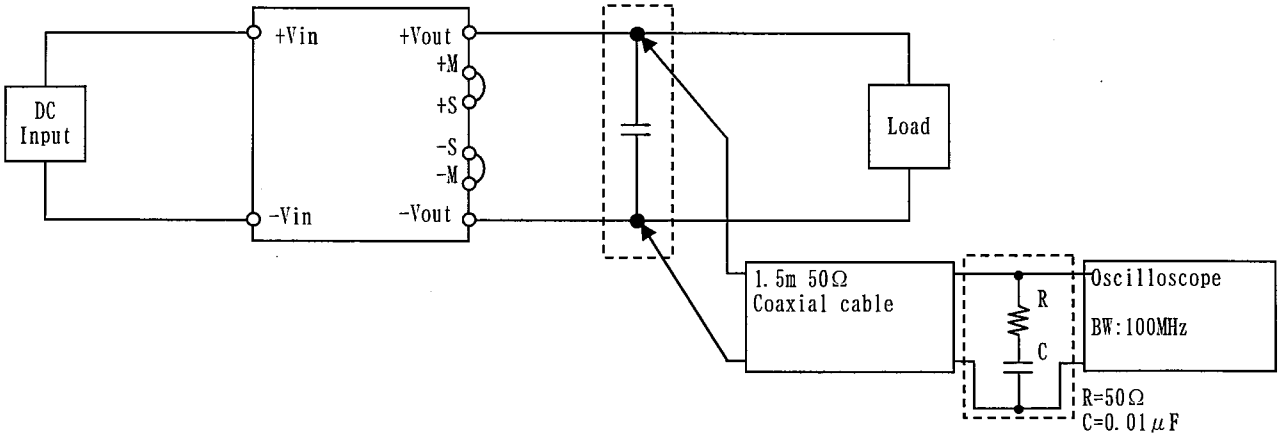



Figure B ( Ripple and Ripple noise Characteristic )