参考資料

# TEST DATA OF SUW1R54815

Regulated DC Power Supply
Sep 29, 2004

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Tetsuo Sugimori Design Manager

Prepared by : Masahiro Shima
Masahiro Shima Design Engineer

**COSEL CO.,LTD.**

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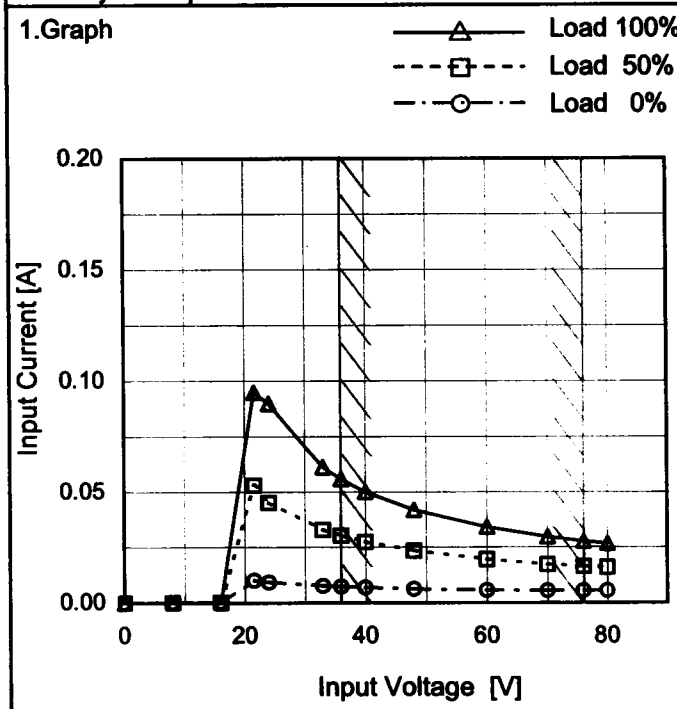
| | |
|---|---|
| Model | SUW1R54815 |
| Item | Input Current (by Input Voltage) |
| Object | ——————— |

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] | Input Current [A] | | |
|---|---|---|---|
| | Load 0% | Load 50% | Load 100% |
| 0 | 0.000 | 0.000 | 0.000 |
| 8.0 | 0.000 | 0.000 | 0.000 |
| 16.0 | 0.000 | 0.000 | 0.000 |
| 21.6 | 0.010 | 0.053 | 0.095 |
| 24.0 | 0.009 | 0.045 | 0.090 |
| 33.0 | 0.008 | 0.033 | 0.061 |
| 36.0 | 0.007 | 0.030 | 0.056 |
| 40.0 | 0.007 | 0.028 | 0.050 |
| 48.0 | 0.006 | 0.023 | 0.042 |
| 60.0 | 0.006 | 0.020 | 0.034 |
| 70.0 | 0.005 | 0.017 | 0.030 |
| 76.0 | 0.006 | 0.016 | 0.028 |
| 80.0 | 0.006 | 0.016 | 0.027 |
| – | - | - | - |
| – | - | - | - |
| – | - | - | - |



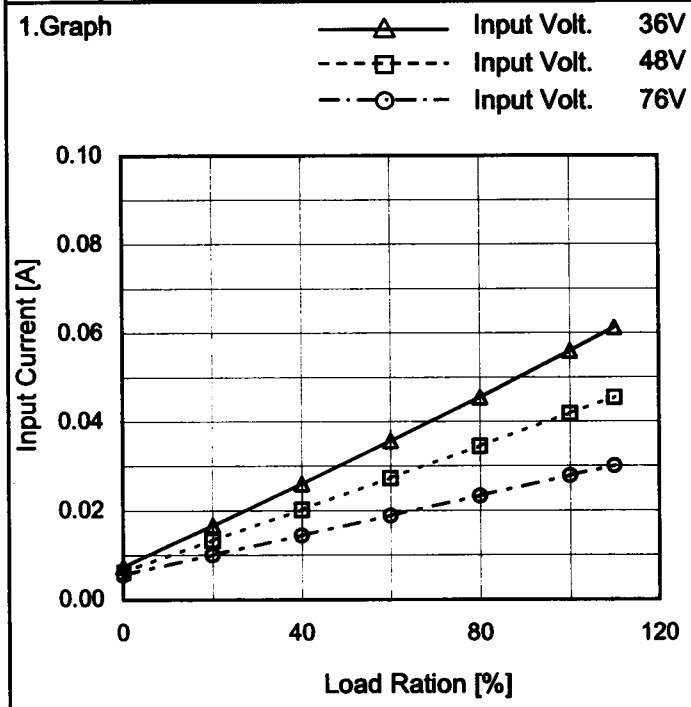
BC-3663

COSEL

| | |
|---|---|
| Model | SUW1R54815 |
| Item | Input Current (by Load Current) |
| Object | ——————— |

Temperature 25°C
Testing Circuitry Figure A

1.Graph




2.Values

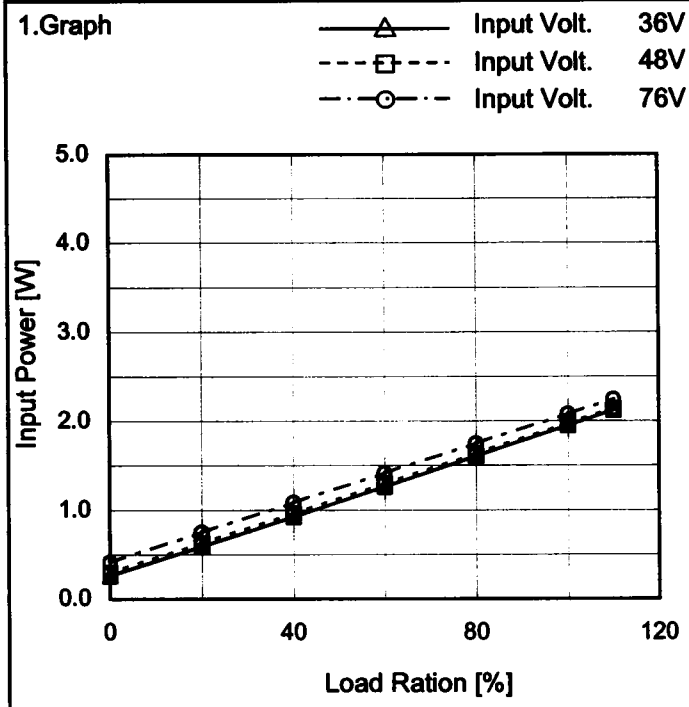
| Load Ration [%] | Input Current [A] | | |
|---|---|---|---|
| | Input Volt. 36[V] | Input Volt. 48[V] | Input Volt. 76[V] |
| 0 | 0.007 | 0.006 | 0.006 |
| 20 | 0.017 | 0.013 | 0.010 |
| 40 | 0.026 | 0.020 | 0.014 |
| 60 | 0.036 | 0.027 | 0.019 |
| 80 | 0.046 | 0.035 | 0.023 |
| 100 | 0.056 | 0.042 | 0.028 |
| 110 | 0.061 | 0.046 | 0.030 |
| – | - | - | - |
| – | - | - | - |
| – | - | - | - |
| – | - | - | - |

COSEL

| | |
|---|---|
| Model | SUW1R54815 |
| Item | Input Power (by Load Current) |
| Object | ——————— |

Temperature 25°C
Testing Circuitry Figure A

1.Graph




2.Values

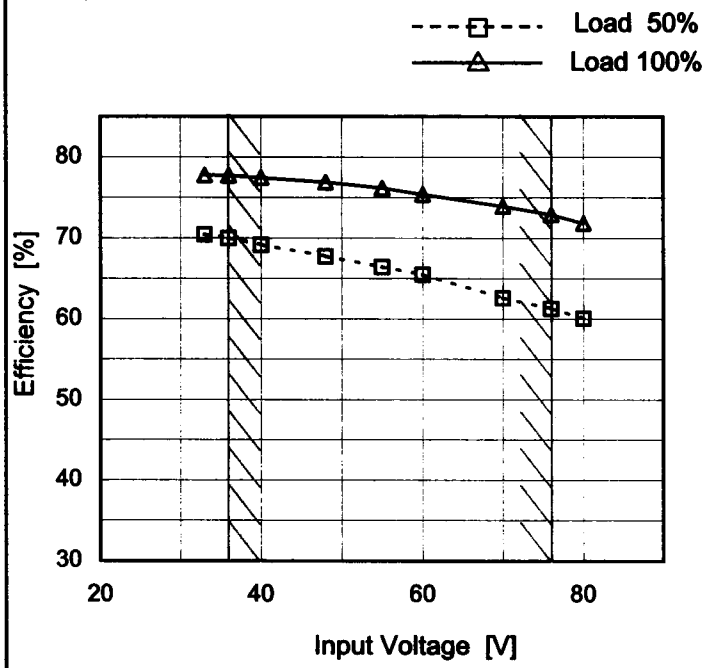
| Load Ration [%] | Input Power [W] | | |
|---|---|---|---|
| | Input Volt. 36[V] | Input Volt. 48[V] | Input Volt. 76[V] |
| 0 | 0.26 | 0.29 | 0.41 |
| 20 | 0.59 | 0.63 | 0.75 |
| 40 | 0.93 | 0.96 | 1.09 |
| 60 | 1.26 | 1.30 | 1.42 |
| 80 | 1.61 | 1.63 | 1.75 |
| 100 | 1.95 | 1.97 | 2.08 |
| 110 | 2.12 | 2.14 | 2.24 |
| — | - | - | - |
| — | - | - | - |
| — | - | - | - |
| — | - | - | - |

COSEL

| | |
|---|---|
| Model | SUW1R54815 |
| 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% |
| 33 | 70.4 | 77.8 |
| 36 | 70.0 | 77.7 |
| 40 | 69.2 | 77.4 |
| 48 | 67.7 | 76.9 |
| 55 | 66.4 | 76.2 |
| 60 | 65.5 | 75.4 |
| 70 | 62.6 | 73.9 |
| 76 | 61.3 | 72.9 |
| 80 | 60.1 | 71.9 |

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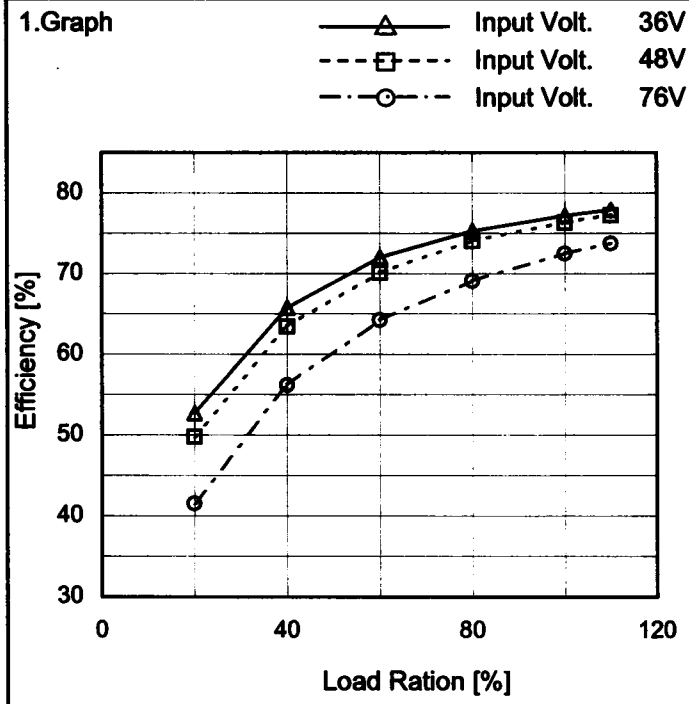
| | |
|---|---|
| Model | SUW1R54815 |
| Item | Efficiency (by Load Current) |
| Object | ———————— |

Temperature 25°C
Testing Circuitry Figure A

1.Graph




2.Values

| Load Ration [%] | Efficiency [%] Input Volt. 36[V] | Input Volt. 48[V] | Input Volt. 76[V] |
|---|---|---|---|
| 0 | - | - | - |
| 20 | 52.7 | 49.8 | 41.5 |
| 40 | 65.8 | 63.4 | 56.2 |
| 60 | 72.0 | 70.1 | 64.2 |
| 80 | 75.3 | 74.1 | 69.1 |
| 100 | 77.2 | 76.4 | 72.5 |
| 110 | 77.9 | 77.3 | 73.7 |
| — | - | - | - |
| — | - | - | - |
| — | - | - | - |
| — | - | - | - |

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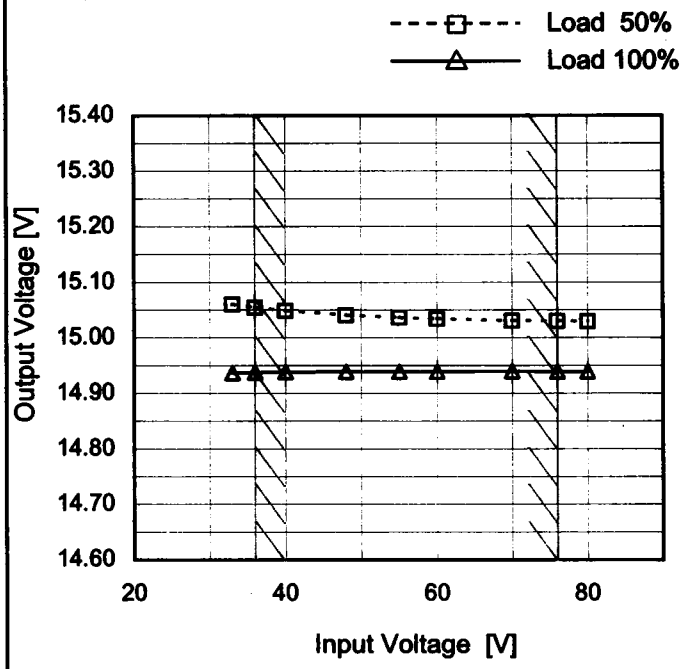
| Model | SUW1R54815 |
|---|---|
| Item | Line Regulation |
| Object | +15V0.05A |

Temperature 25°C
Testing Circuitry Figure A

1.Graph

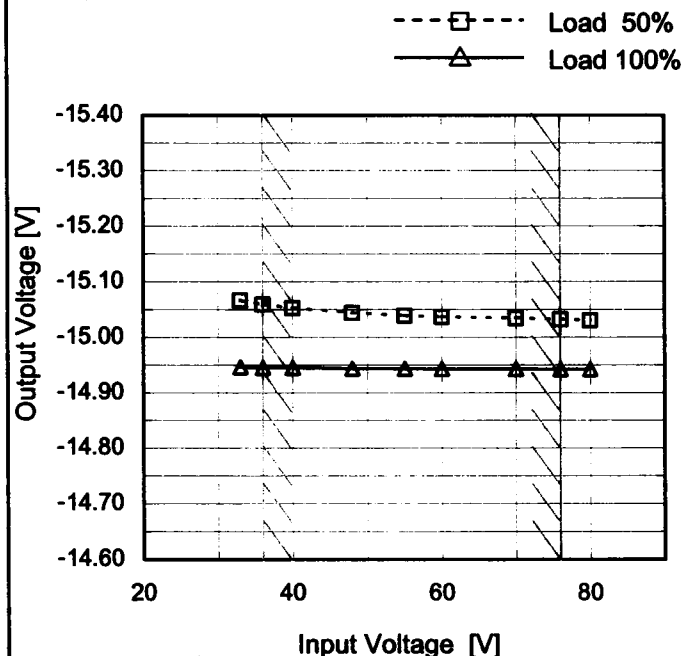



2.Values

| Input Voltage [V] | Output Voltage [V] | |
|---|---|---|
| | Load 50% | Load 100% |
| 33 | 15.060 | 14.937 |
| 36 | 15.054 | 14.938 |
| 40 | 15.049 | 14.939 |
| 48 | 15.041 | 14.939 |
| 55 | 15.036 | 14.939 |
| 60 | 15.034 | 14.939 |
| 70 | 15.031 | 14.940 |
| 76 | 15.030 | 14.939 |
| 80 | 15.029 | 14.939 |

| Object | -15V0.05A |
|---|---|

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% |
| 33 | -15.067 | -14.947 |
| 36 | -15.059 | -14.945 |
| 40 | -15.053 | -14.945 |
| 48 | -15.044 | -14.944 |
| 55 | -15.039 | -14.944 |
| 60 | -15.037 | -14.943 |
| 70 | -15.035 | -14.943 |
| 76 | -15.032 | -14.942 |
| 80 | -15.031 | -14.943 |

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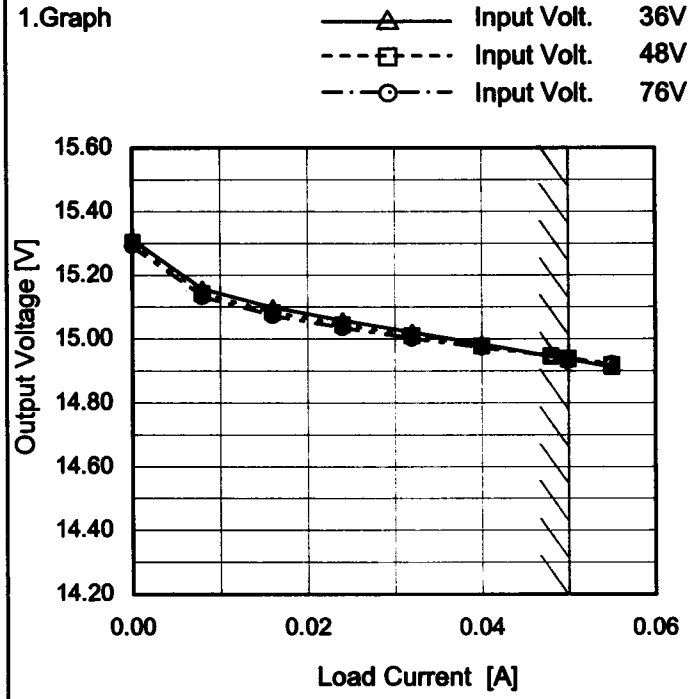
| Model | SUW1R54815 |
|---|---|
| Item | Load Regulation |
| Object | +15V0.05A |

Temperature 25°C
Testing Circuitry Figure A

1.Graph

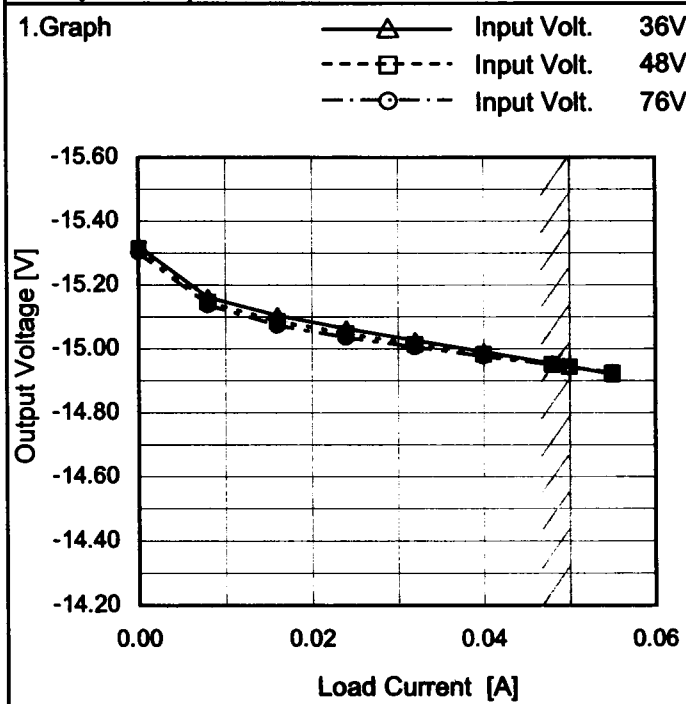



2.Values

| Load Current [A] | Output Voltage [V] | | |
|---|---|---|---|
| | Input Volt. 36[V] | Input Volt. 48[V] | Input Volt. 76[V] |
| 0.000 | 15.313 | 15.305 | 15.293 |
| 0.008 | 15.157 | 15.142 | 15.132 |
| 0.016 | 15.100 | 15.083 | 15.072 |
| 0.024 | 15.059 | 15.045 | 15.034 |
| 0.032 | 15.021 | 15.011 | 15.001 |
| 0.040 | 14.984 | 14.978 | 14.973 |
| 0.048 | 14.946 | 14.947 | 14.946 |
| 0.050 | 14.937 | 14.939 | 14.939 |
| 0.055 | 14.913 | 14.920 | 14.923 |
| – | - | - | - |
| – | - | - | - |

| Object | -15V0.05A |
|---|---|

1.Graph




2.Values

| Load Current [A] | Output Voltage [V] | | |
|---|---|---|---|
| | Input Volt. 36[V] | Input Volt. 48[V] | Input Volt. 76[V] |
| 0.000 | -15.323 | -15.314 | -15.304 |
| 0.008 | -15.162 | -15.147 | -15.137 |
| 0.016 | -15.105 | -15.087 | -15.074 |
| 0.024 | -15.064 | -15.048 | -15.036 |
| 0.032 | -15.027 | -15.015 | -15.005 |
| 0.040 | -14.991 | -14.983 | -14.977 |
| 0.048 | -14.955 | -14.952 | -14.949 |
| 0.050 | -14.945 | -14.944 | -14.943 |
| 0.055 | -14.922 | -14.925 | -14.926 |
| – | - | - | - |
| – | - | - | - |

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

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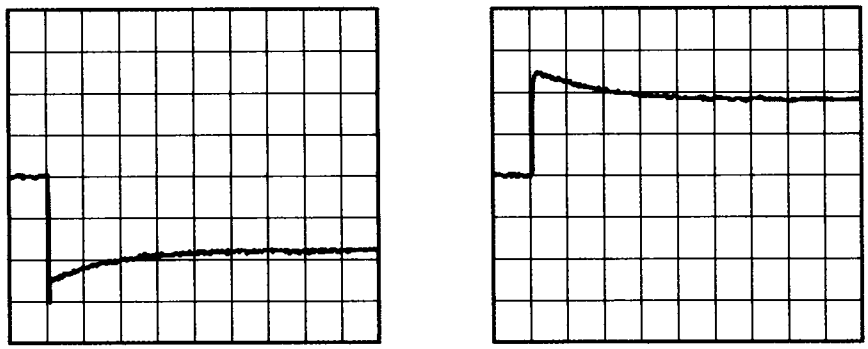
| | |
|---|---|
| Model | SUW1R54815 |
| Item | Dynamic Load Response |
| Object | +15V0.05A |

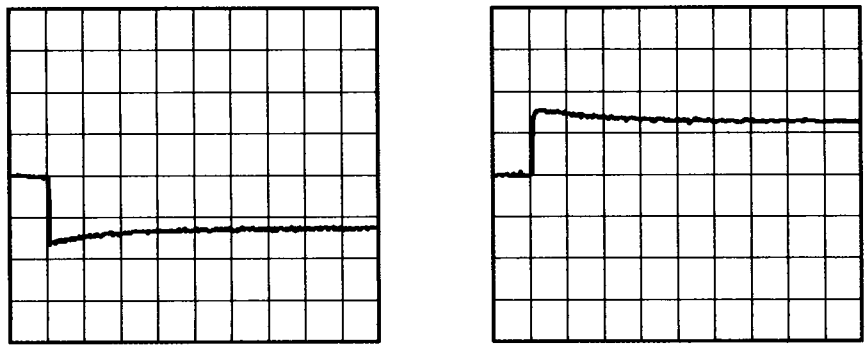
Temperature 25°C
Testing Circuitry Figure A

Input Volt. 48 V
Cycle 100 mS

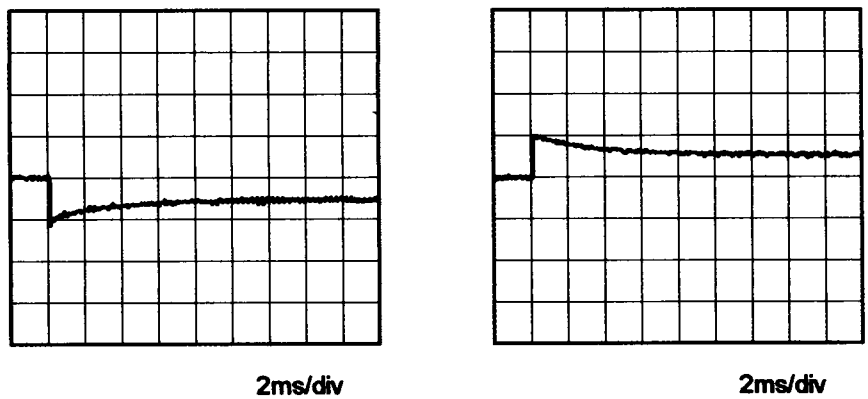
Min. Load (0A) ⟷
Load 100% (0.05A)




Min. Load (0A) ⟷
Load 50% (0.025A)




Load 50% (0.025A) ⟷
Load 100% (0.05A)

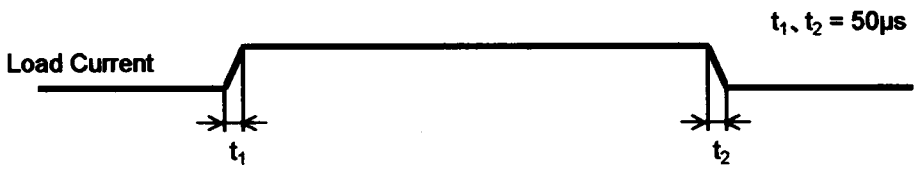


COSEL

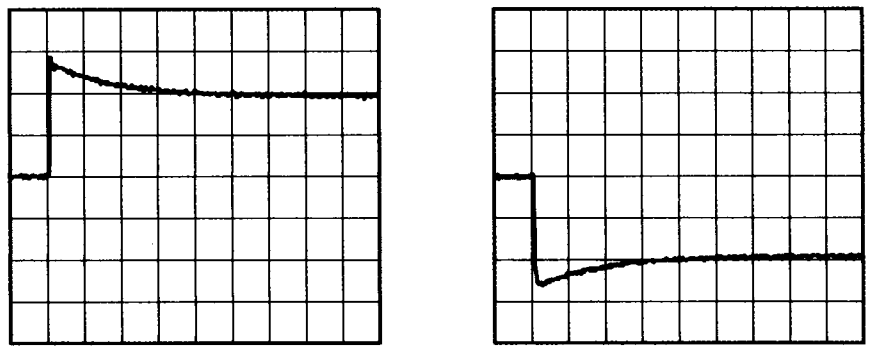
| | |
|---|---|
| Model | SUW1R54815 |
| Item | Dynamic Load Response |
| Object | -15V0.05A |

Temperature 25°C
Testing Circuitry Figure A

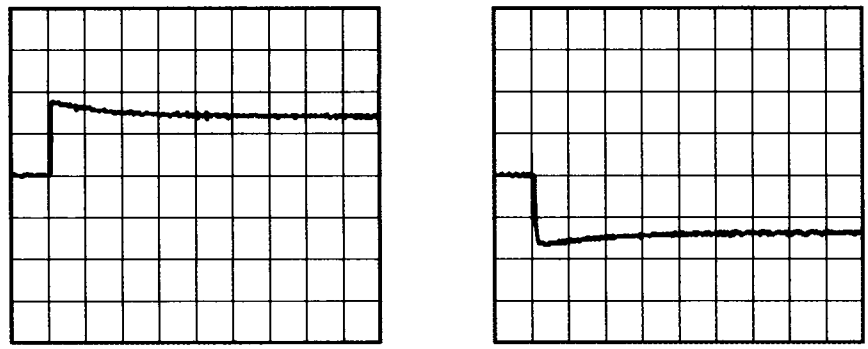
Input Volt. 48 V
Cycle 100 mS



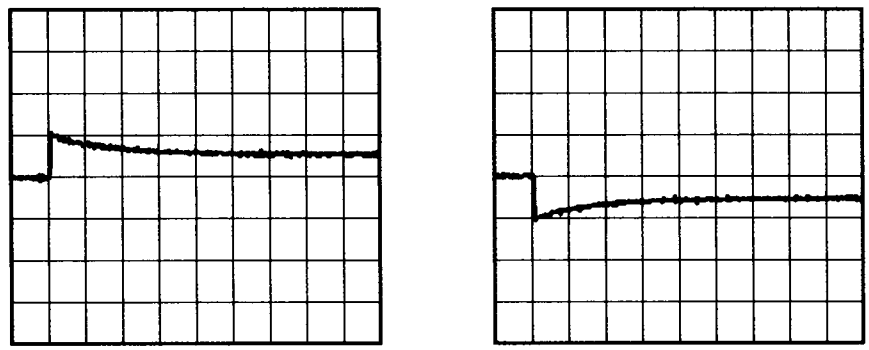

Min. Load (0A) ⟷
Load 100% (0.05A)




Min. Load (0A) ⟷
Load 50% (0.025A)




Load 50% (0.025A) ⟷
Load 100% (0.05A)

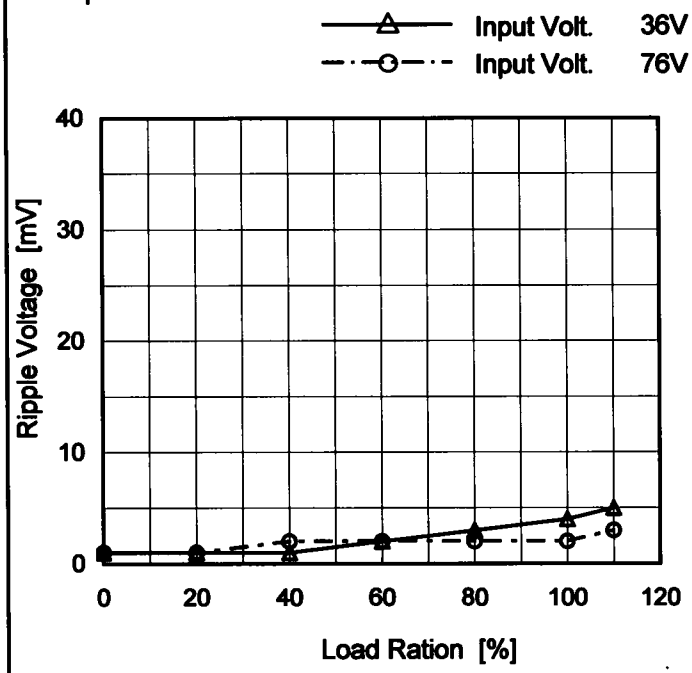


COSEL

| | |
|---|---|
| Model | SUW1R54815 |
| Item | Ripple Voltage (by Load Current) |
| Object | +15V0.05A |

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.

2.Values

| Load Ration [%] | Ripple Voltage [mV] Input Volt. 36 [V] | Ripple Voltage [mV] Input Volt. 76 [V] |
|---|---|---|
| 0 | 1 | 1 |
| 20 | 1 | 1 |
| 40 | 1 | 2 |
| 60 | 2 | 2 |
| 80 | 3 | 2 |
| 100 | 4 | 2 |
| 110 | 5 | 3 |
| – | - | - |
| – | - | - |
| – | - | - |
| – | - | - |

Ripple [mVp-p]

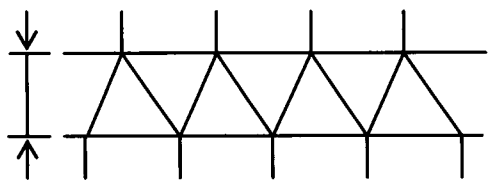


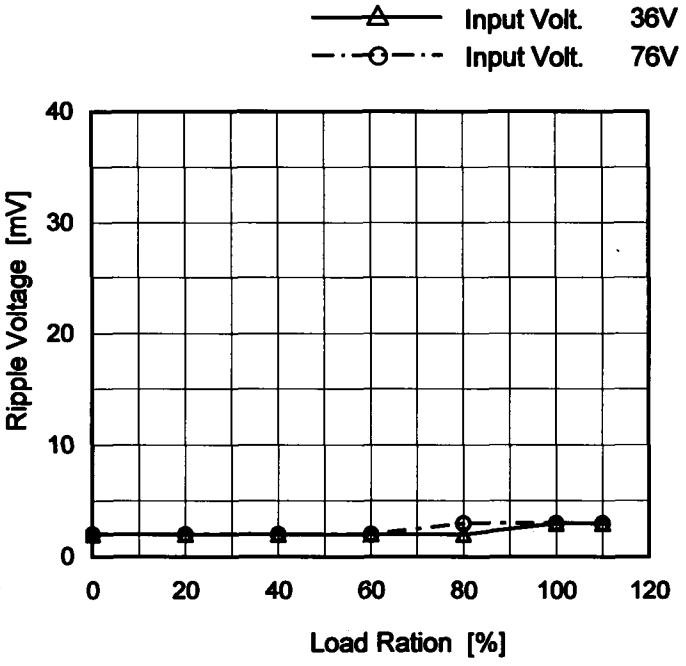
Fig.Complex Ripple Wave Form

COSEL

| | |
|---|---|
| Model | SUW1R54815 |
| Item | Ripple Voltage (by Load Current) |
| Object | -15V0.05A |

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.

Ripple [mVp-p]

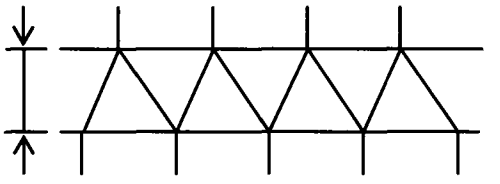


Fig.Complex Ripple Wave Form

2.Values

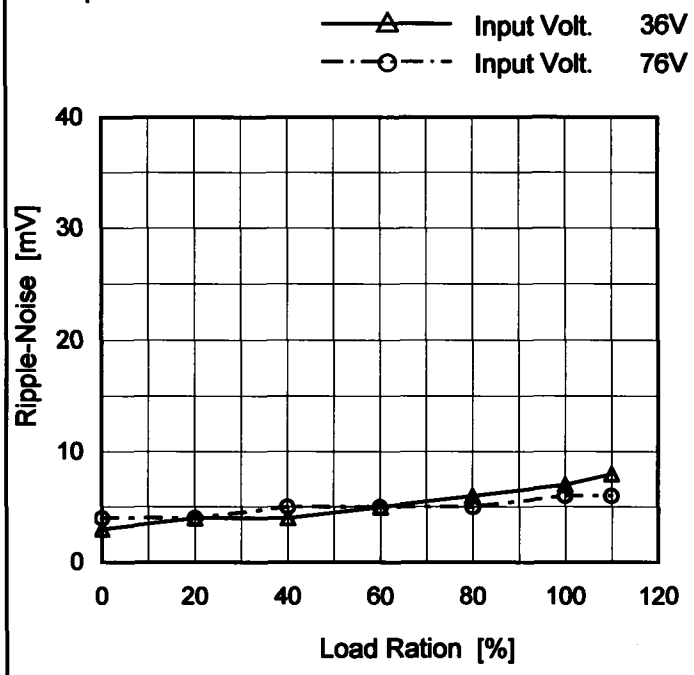
| Load Ration [%] | Ripple Voltage [mV] Input Volt. 36 [V] | Ripple Voltage [mV] Input Volt. 76 [V] |
|---|---|---|
| 0 | 2 | 2 |
| 20 | 2 | 2 |
| 40 | 2 | 2 |
| 60 | 2 | 2 |
| 80 | 2 | 3 |
| 100 | 3 | 3 |
| 110 | 3 | 3 |
| – | - | - |
| – | - | - |
| – | - | - |
| – | - | - |

COSEL

| | |
|---|---|
| Model | SUW1R54815 |
| Item | Ripple-Noise |
| Object | +15V0.05A |

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.

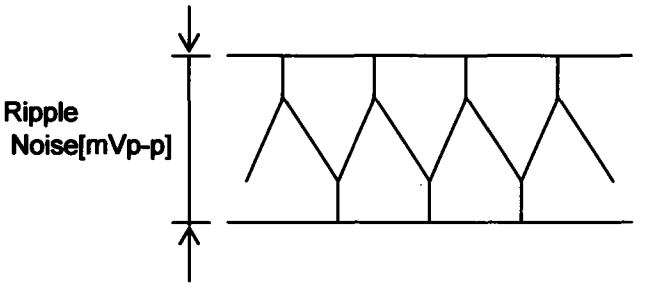



Fig.Complex Ripple Noise Wave Form

2.Values

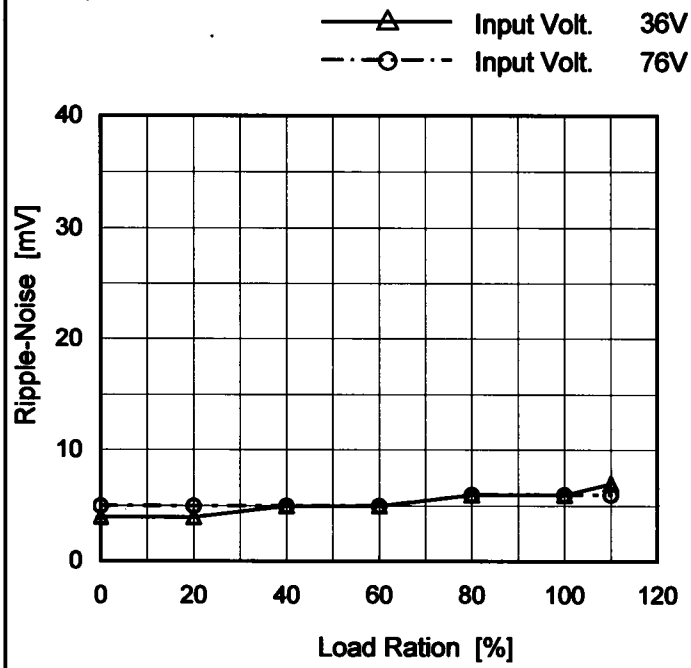
| Load Ration [%] | Ripple-Noise [mV] Input Volt. 36 [V] | Ripple-Noise [mV] Input Volt. 76 [V] |
|---|---|---|
| 0 | 3 | 4 |
| 20 | 4 | 4 |
| 40 | 4 | 5 |
| 60 | 5 | 5 |
| 80 | 6 | 5 |
| 100 | 7 | 6 |
| 110 | 8 | 6 |
| – | - | - |
| – | - | - |
| – | - | - |
| – | - | - |

COSEL

| | |
|---|---|
| Model | SUW1R54815 |
| Item | Ripple-Noise |
| Object | -15V0.05A |

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.

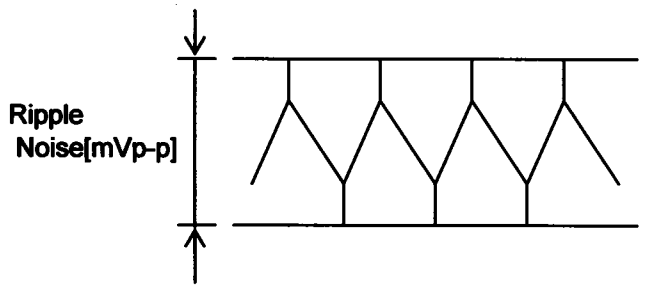



Fig.Complex Ripple Noise Wave Form

2.Values

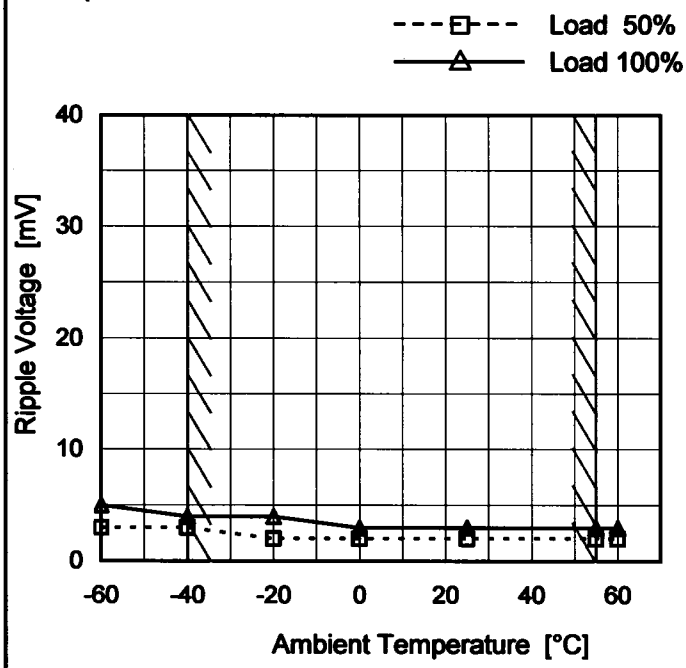
| Load Ration [%] | Ripple-Noise [mV] Input Volt. 36 [V] | Ripple-Noise [mV] Input Volt. 76 [V] |
|---|---|---|
| 0 | 4 | 5 |
| 20 | 4 | 5 |
| 40 | 5 | 5 |
| 60 | 5 | 5 |
| 80 | 6 | 6 |
| 100 | 6 | 6 |
| 110 | 7 | 6 |
| – | - | - |
| – | - | - |
| – | - | - |
| – | - | - |

COSEL

| Model | SUW1R54815 |
|---|---|
| Item | Ripple Voltage (by Ambient Temp.) |
| Object | +15V0.05A |

Testing Circuitry Figure B

1.Graph



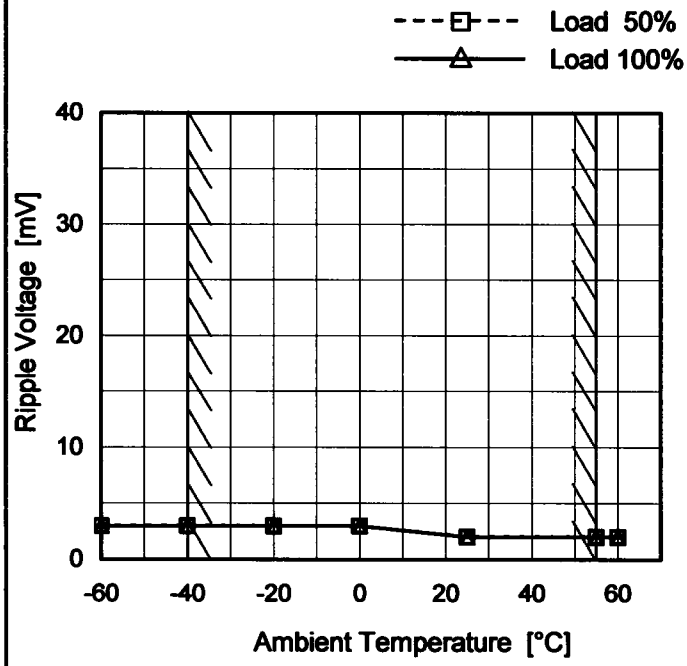

Input Volt. 48V

2.Values

| Ambient Temperature [°C] | Ripple Voltage [mV] | |
|---|---|---|
| | Load 50% | Load 100% |
| -60 | 3 | 5 |
| -40 | 3 | 4 |
| -20 | 2 | 4 |
| 0 | 2 | 3 |
| 25 | 2 | 3 |
| 55 | 2 | 3 |
| 60 | 2 | 3 |
| – | - | - |
| – | - | - |
| – | - | - |
| – | - | - |

| Object | -15V0.05A |
|---|---|

1.Graph




Input Volt. 48V

Measured by 100 MHz Oscilloscope.

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

2.Values

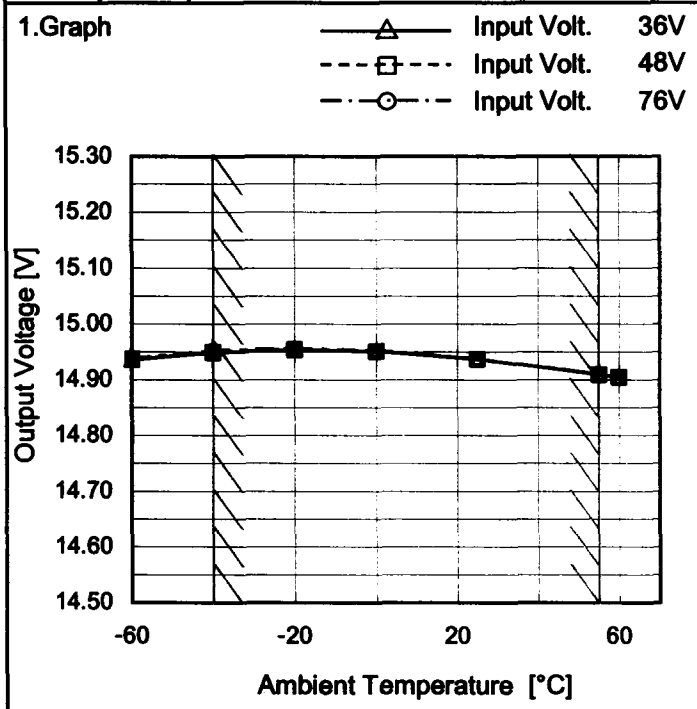
| Ambient Temperature [°C] | Ripple Voltage [mV] | |
|---|---|---|
| | Load 50% | Load 100% |
| -60 | 3 | 3 |
| -40 | 3 | 3 |
| -20 | 3 | 3 |
| 0 | 3 | 3 |
| 25 | 2 | 2 |
| 55 | 2 | 2 |
| 60 | 2 | 2 |
| – | - | - |
| – | - | - |
| – | - | - |
| – | - | - |

COSEL

| Model | SUW1R54815 |
|---|---|
| Item | Ambient Temperature Drift |
| Object | +15V0.05A |

Testing Circuitry Figure A

1.Graph

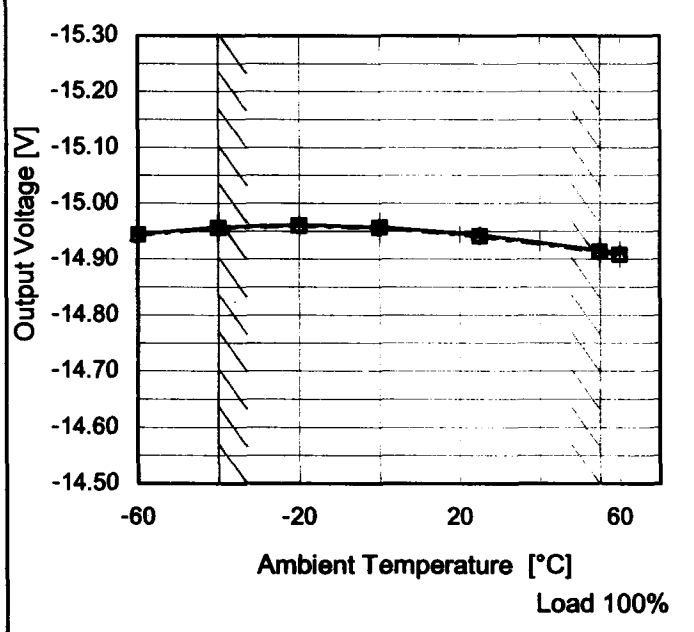



2.Values

| Ambient Temperature [°C] | Output Voltage [V] | | |
|---|---|---|---|
| | Input Volt. 36[V] | Input Volt. 48[V] | Input Volt. 76[V] |
| -60 | 14.936 | 14.938 | 14.938 |
| -40 | 14.949 | 14.950 | 14.952 |
| -20 | 14.954 | 14.955 | 14.956 |
| 0 | 14.951 | 14.951 | 14.952 |
| 25 | 14.937 | 14.937 | 14.937 |
| 55 | 14.910 | 14.910 | 14.910 |
| 60 | 14.905 | 14.905 | 14.904 |
| – | - | - | - |
| – | - | - | - |
| – | - | - | - |
| – | - | - | - |

| Object | -15V0.05A |
|---|---|

1.Graph




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

2.Values

| Ambient Temperature [°C] | Output Voltage [V] | | |
|---|---|---|---|
| | Input Volt. 36[V] | Input Volt. 48[V] | Input Volt. 76[V] |
| -60 | -14.945 | -14.944 | -14.942 |
| -40 | -14.958 | -14.956 | -14.955 |
| -20 | -14.962 | -14.960 | -14.959 |
| 0 | -14.958 | -14.957 | -14.955 |
| 25 | -14.944 | -14.942 | -14.940 |
| 55 | -14.916 | -14.914 | -14.912 |
| 60 | -14.911 | -14.908 | -14.907 |
| – | - | - | - |
| – | - | - | - |
| – | - | - | - |
| – | - | - | - |

COSEL

| Model | SUW1R54815 | |
|---|---|---|
| Item | Output Voltage Accuracy | 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 - 55°C
Input Voltage : 36 - 76V
Load Current (AVR 1) : 0 - 0.05A (AVR 2):0 - 0.05A

* 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

| Object | +15V0.05A | | | | | |
|---|---|---|---|---|---|---|
| Item | Temperature [°C] | Input Voltage[V] | Output | | Output Voltage Accuracy | |
| | | | Current[A] | Voltage[V] | Value [mV] | Ration [%] |
| Maximum Voltage | 0 | 36 | 0 | 15.313 | ±202 | ±1.3 |
| Minimum Voltage | 55 | 76 | 0.05 | 14.910 | | |

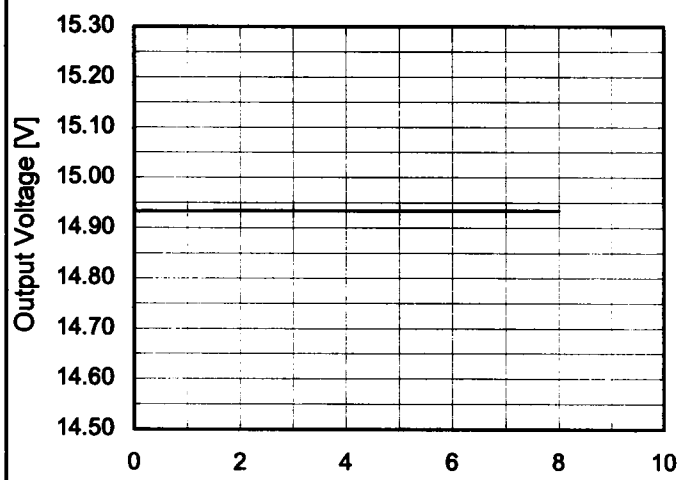
| Object | -15V0.05A | | | | | |
|---|---|---|---|---|---|---|
| Item | Temperature [°C] | Input Voltage[V] | Output | | Output Voltage Accuracy | |
| | | | Current[A] | Voltage[V] | Value [mV] | Ration [%] |
| Maximum Voltage | 0 | 36 | 0 | -15.322 | ±205 | ±1.4 |
| Minimum Voltage | 55 | 76 | 0.05 | -14.912 | | |

COSEL

| Model | SUW1R54815 |
|---|---|
| Item | Time Lapse Drift |
| Object | +15V0.05A |

Temperature 25°C
Testing Circuitry Figure A

1.Graph



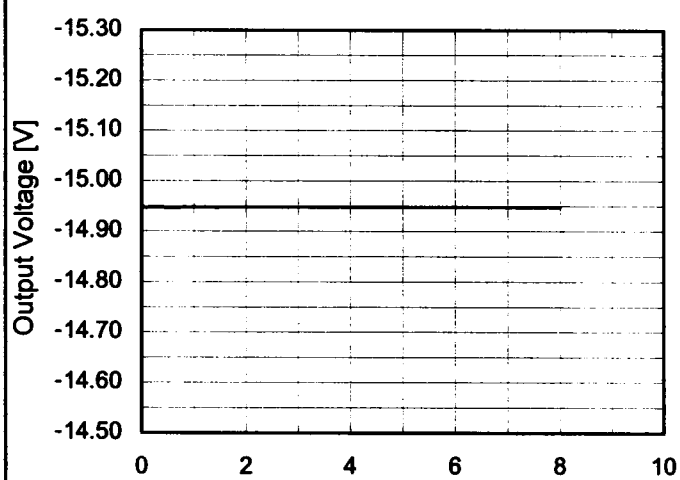

Input Volt. 48V
Load 100%

2.Values

| Time since start [H] | Output Voltage [V] |
|---|---|
| 0.0 | 14.942 |
| 0.5 | 14.933 |
| 1.0 | 14.934 |
| 2.0 | 14.934 |
| 3.0 | 14.934 |
| 4.0 | 14.934 |
| 5.0 | 14.934 |
| 6.0 | 14.934 |
| 7.0 | 14.934 |
| 8.0 | 14.934 |

| Object | -15V0.05A |
|---|---|

1.Graph




Input Volt. 48V
Load 100%

2.Values

| Time since start [H] | Output Voltage [V] |
|---|---|
| 0.0 | -14.955 |
| 0.5 | -14.947 |
| 1.0 | -14.948 |
| 2.0 | -14.948 |
| 3.0 | -14.948 |
| 4.0 | -14.948 |
| 5.0 | -14.948 |
| 6.0 | -14.948 |
| 7.0 | -14.948 |
| 8.0 | -14.948 |

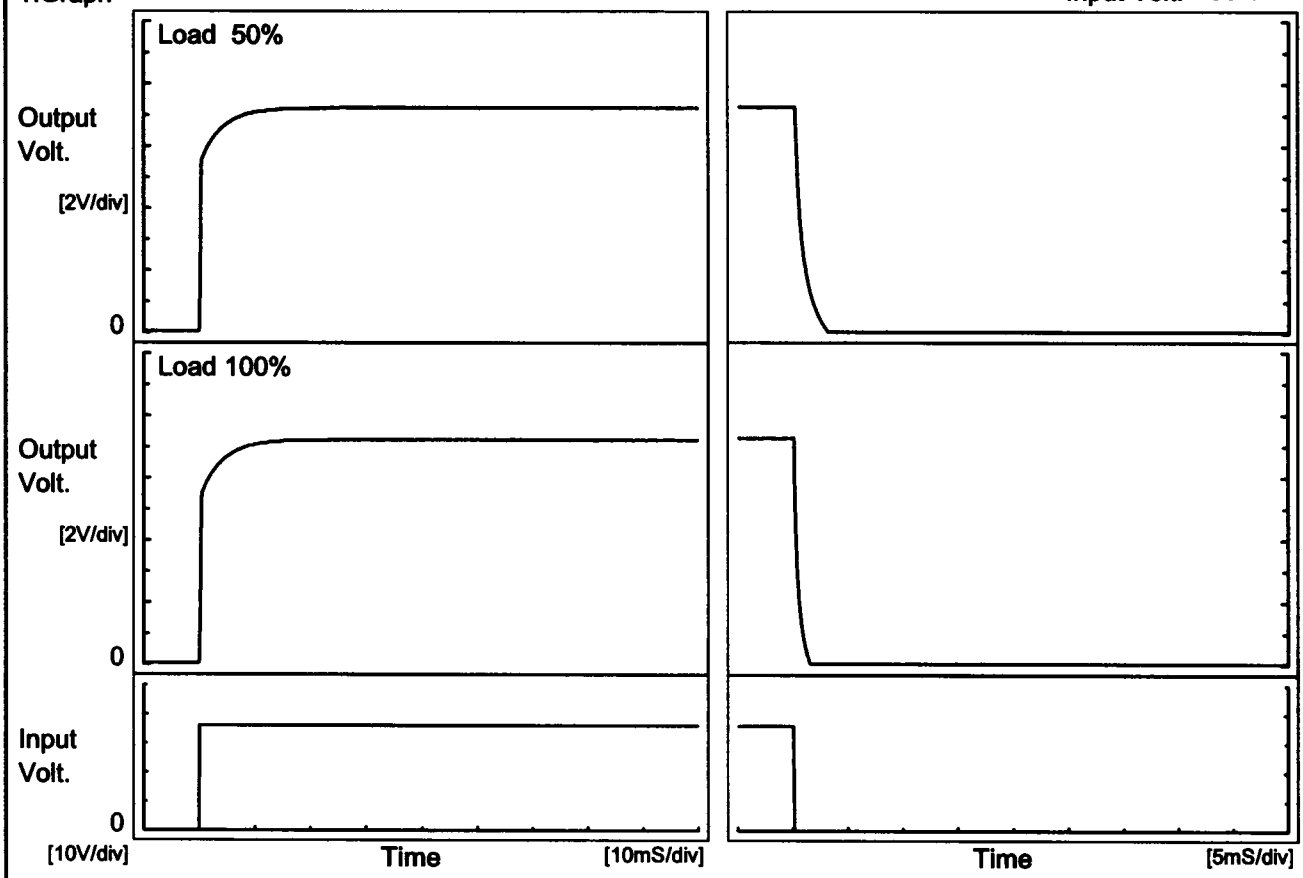
COSEL

| | |
|---|---|
| Model | SUW1R54815 |
| Item | Rise and Fall Time |
| Object | +15V0.05A |

Temperature 25°C
Testing Circuitry Figure A

1.Graph

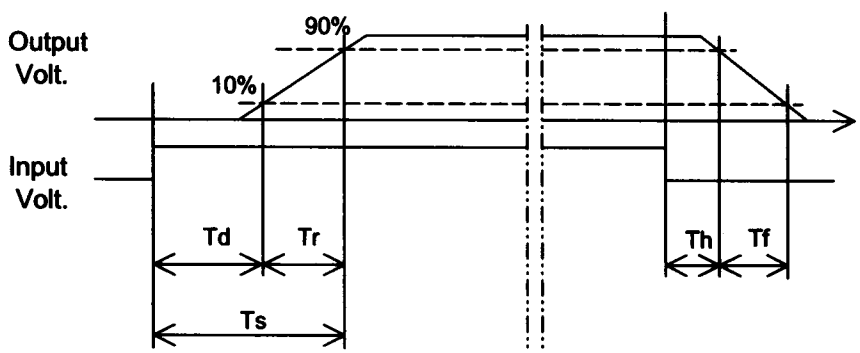
Input Volt. 36 V




2.Values

[mS]

| Load \ Time | Td | Tr | Ts | Th | Tf |
|---|---|---|---|---|---|
| 50 % | 0.1 | 5.6 | 5.7 | 0.2 | 1.8 |
| 100 % | 0.1 | 5.8 | 5.9 | 0.1 | 0.9 |



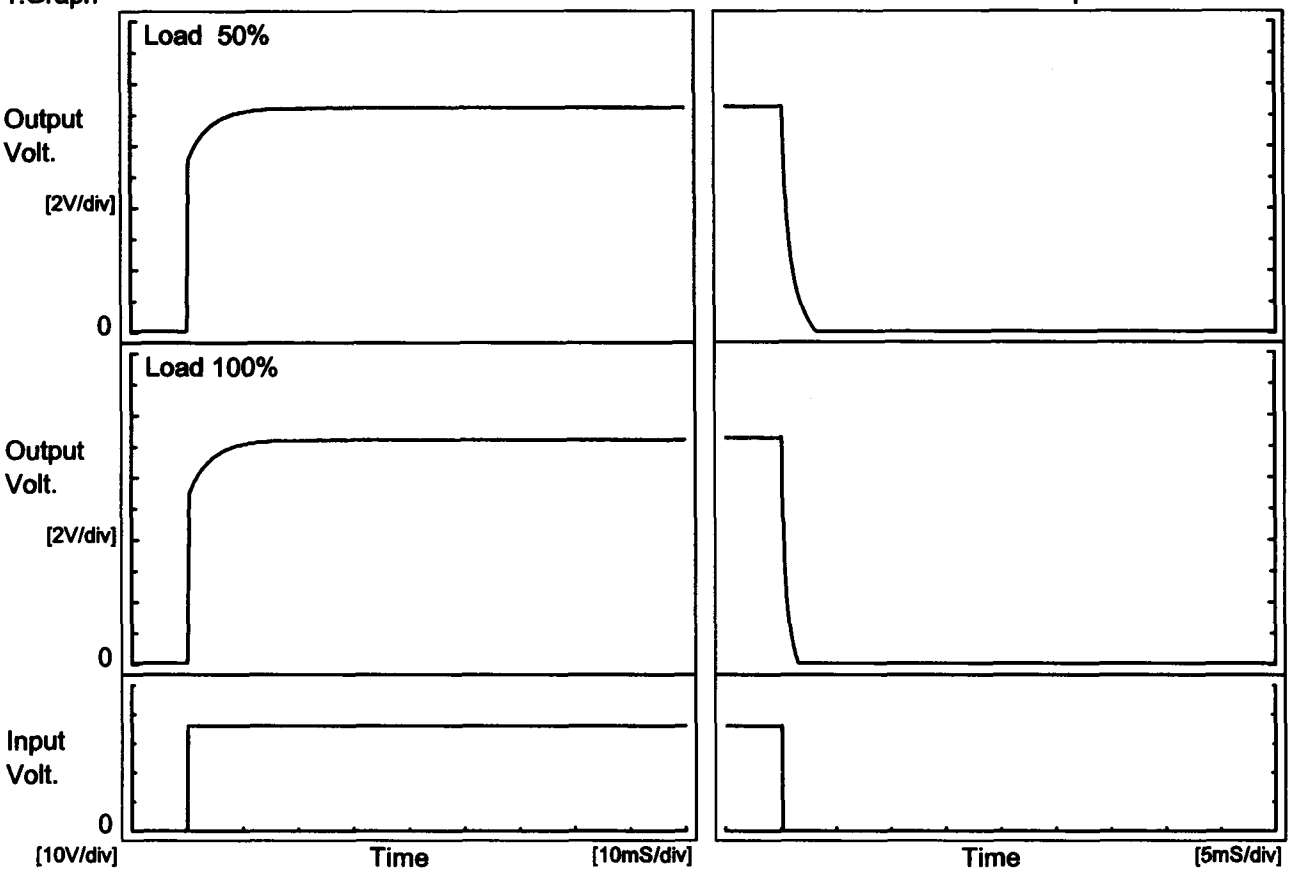
COSEL

| | |
|---|---|
| Model | SUW1R54815 |
| Item | Rise and Fall Time |
| Object | -15V0.05A |

Temperature 25°C
Testing Circuitry Figure A

1.Graph

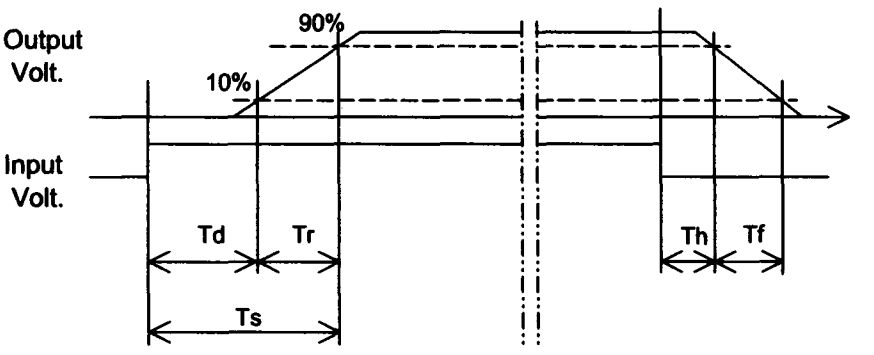
Input Volt. 36 V




2.Values

[mS]

| Load \ Time | Td | Tr | Ts | Th | Tf |
|---|---|---|---|---|---|
| 50 % | 0.1 | 5.6 | 5.7 | 0.2 | 1.8 |
| 100 % | 0.1 | 5.8 | 5.9 | 0.1 | 0.9 |

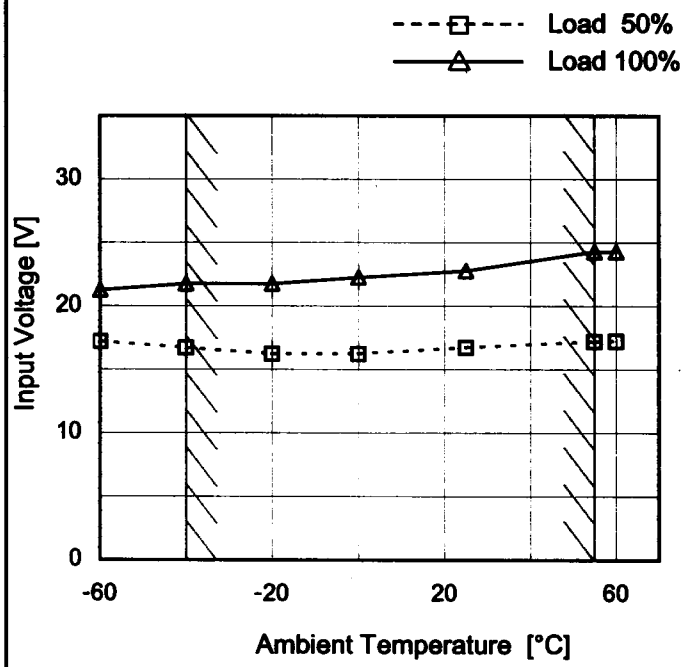


COSEL

| Model | SUW1R54815 |
|---|---|
| Item | Minimum Input Voltage for Regulated Output Voltage |
| Object | +15V0.05A |

Testing Circuitry Figure A

1.Graph

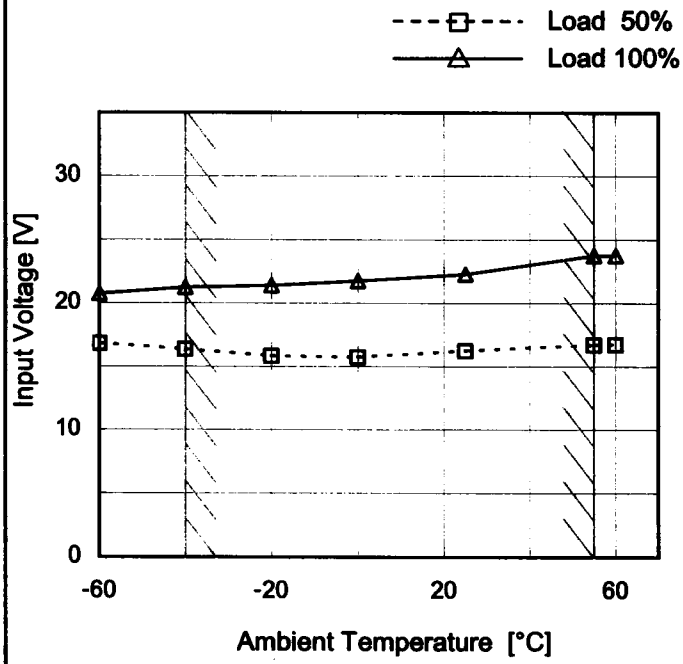



2.Values

| Ambient Temperature [°C] | Input Voltage [V] | |
|---|---|---|
| | Load 50% | Load 100% |
| -60 | 17.3 | 21.3 |
| -40 | 16.8 | 21.8 |
| -20 | 16.3 | 21.8 |
| 0 | 16.3 | 22.3 |
| 25 | 16.8 | 22.8 |
| 55 | 17.3 | 24.3 |
| 60 | 17.3 | 24.3 |
| – | - | - |
| – | - | - |
| – | - | - |
| – | - | - |

| Object | -15V0.05A |
|---|---|

1.Graph




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

2.Values

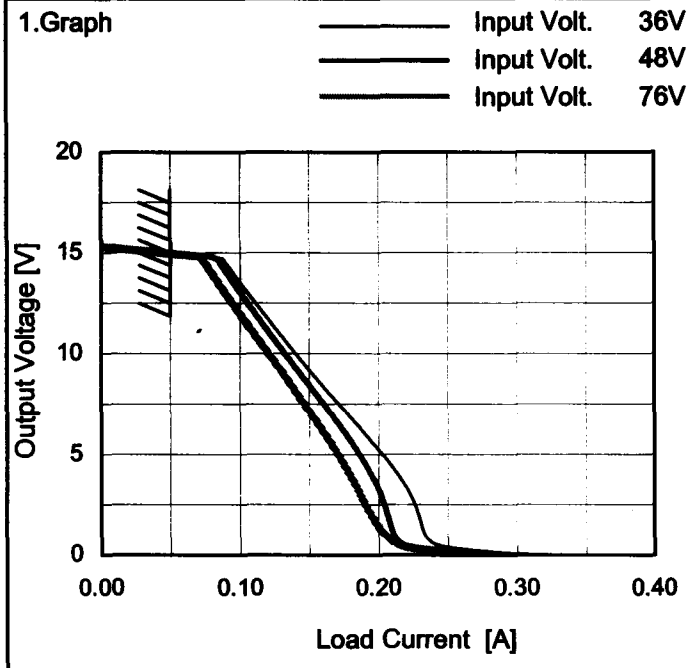
| Ambient Temperature [°C] | Input Voltage [V] | |
|---|---|---|
| | Load 50% | Load 100% |
| -60 | 16.9 | 20.8 |
| -40 | 16.4 | 21.3 |
| -20 | 15.9 | 21.4 |
| 0 | 15.8 | 21.8 |
| 25 | 16.3 | 22.3 |
| 55 | 16.8 | 23.8 |
| 60 | 16.8 | 23.8 |
| – | - | - |
| – | - | - |
| – | - | - |
| – | - | - |

COSEL

| Model | SUW1R54815 |
|---|---|
| Item | Overcurrent Protection |
| Object | +15V0.05A |

Temperature 25°C
Testing Circuitry Figure A

1.Graph

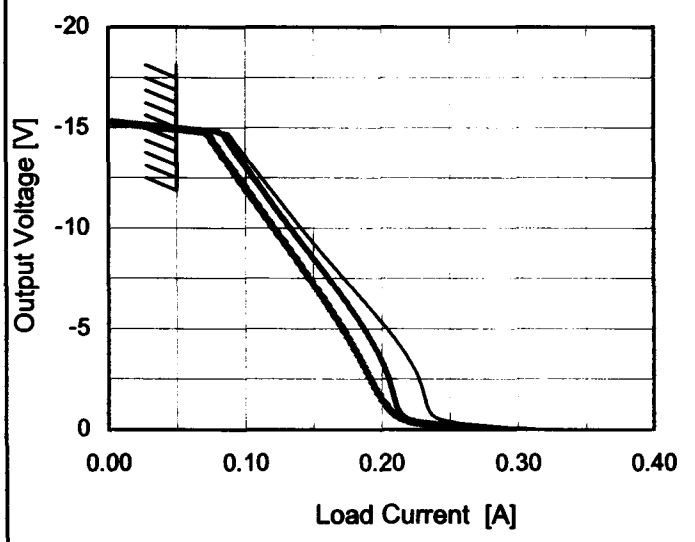



2.Values

| Output Voltage [V] | Load Current [A] | | |
|---|---|---|---|
| | Input Volt. 36[V] | Input Volt. 48[V] | Input Volt. 76[V] |
| 15.0 | 0.05 | 0.05 | 0.05 |
| 14.3 | 0.09 | 0.09 | 0.08 |
| 13.5 | 0.10 | 0.10 | 0.08 |
| 12.0 | 0.12 | 0.11 | 0.10 |
| 10.5 | 0.13 | 0.13 | 0.12 |
| 9.0 | 0.15 | 0.14 | 0.13 |
| 7.5 | 0.17 | 0.16 | 0.15 |
| 6.0 | 0.19 | 0.18 | 0.16 |
| 4.5 | 0.21 | 0.19 | 0.18 |
| 3.0 | 0.22 | 0.20 | 0.19 |
| 1.5 | 0.23 | 0.21 | 0.20 |
| 0.0 | 0.31 | 0.28 | 0.28 |

| Object | -15V0.05A |
|---|---|

1.Graph




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

2.Values

| Output Voltage [V] | Load Current [A] | | |
|---|---|---|---|
| | Input Volt. 36[V] | Input Volt. 48[V] | Input Volt. 76[V] |
| -15.00 | 0.05 | 0.05 | 0.05 |
| -14.25 | 0.09 | 0.09 | 0.08 |
| -13.50 | 0.10 | 0.10 | 0.08 |
| -12.00 | 0.12 | 0.11 | 0.10 |
| -10.50 | 0.14 | 0.13 | 0.12 |
| -9.00 | 0.15 | 0.14 | 0.13 |
| -7.50 | 0.17 | 0.16 | 0.15 |
| -6.00 | 0.19 | 0.18 | 0.16 |
| -4.50 | 0.21 | 0.19 | 0.18 |
| -3.00 | 0.22 | 0.20 | 0.19 |
| -1.50 | 0.23 | 0.21 | 0.20 |
| 0.00 | 0.32 | 0.29 | 0.28 |

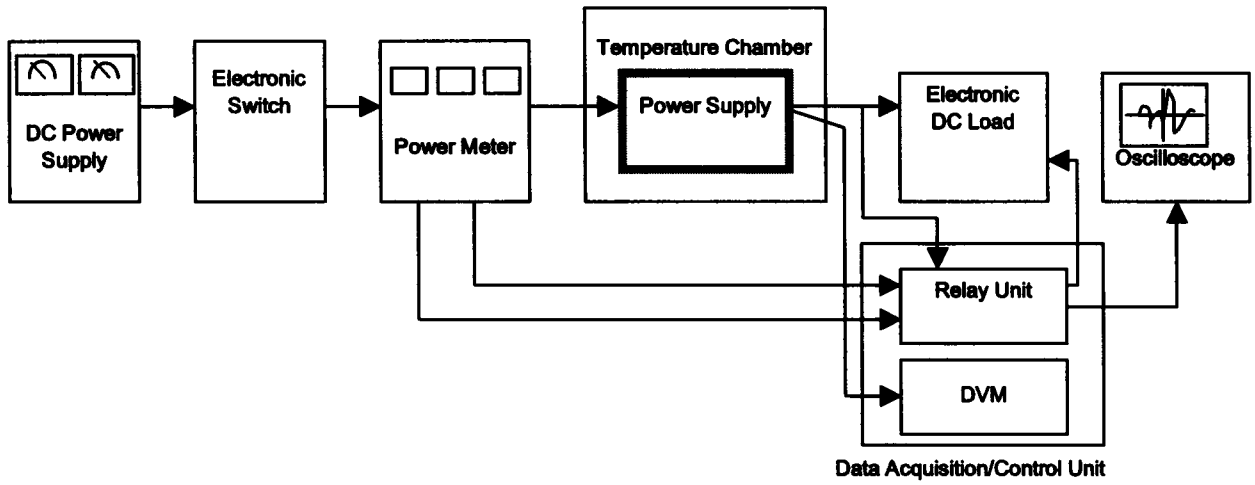



Figure A

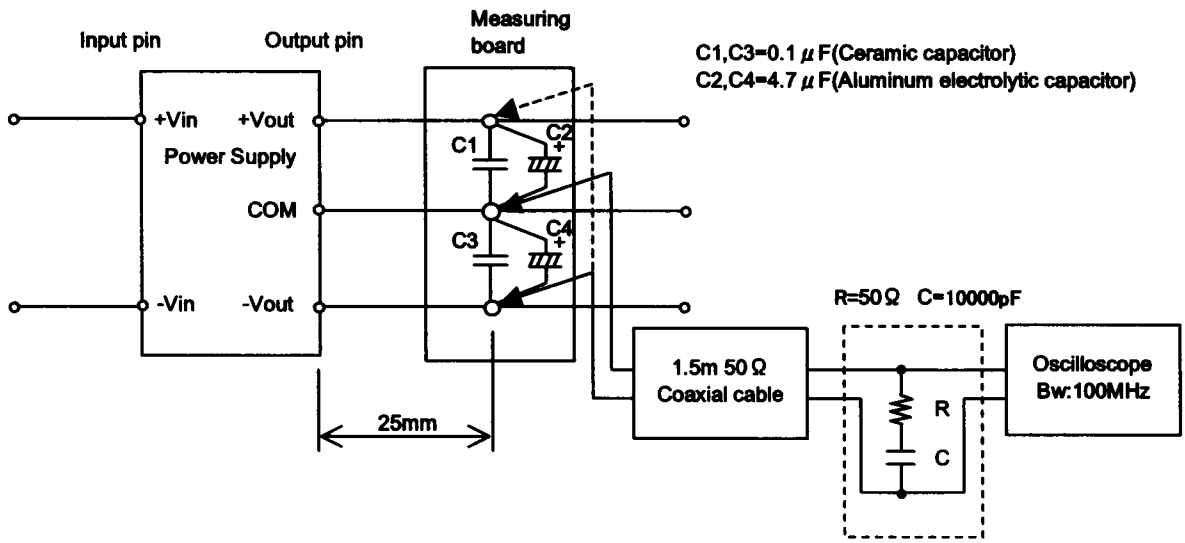



Figure B (Ripple and Ripple noise Characteristic)