参考資料

COSEL

# TEST DATA OF SUCW32415

Regulated DC Power Supply
Mar 16, 2005

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**COSEL CO.,LTD.**

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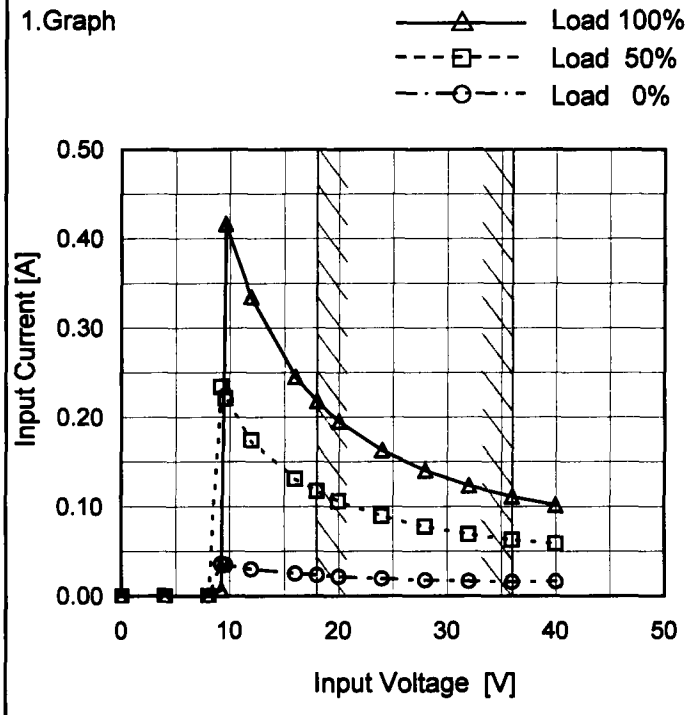
| | |
|---|---|
| Model | SUCW32415 |
| Item | Input Current (by Input Voltage) |
| Object | ———————— |

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 | 0.000 | 0.000 | 0.000 |
| 4.0 | 0.000 | 0.000 | 0.000 |
| 8.0 | 0.000 | 0.000 | 0.000 |
| 9.2 | 0.036 | 0.234 | 0.007 |
| 9.6 | 0.035 | 0.221 | 0.417 |
| 12.0 | 0.030 | 0.174 | 0.335 |
| 16.0 | 0.025 | 0.131 | 0.245 |
| 18.0 | 0.023 | 0.117 | 0.218 |
| 20.0 | 0.022 | 0.106 | 0.195 |
| 24.0 | 0.019 | 0.089 | 0.163 |
| 28.0 | 0.018 | 0.078 | 0.140 |
| 32.0 | 0.016 | 0.069 | 0.124 |
| 36.0 | 0.016 | 0.063 | 0.111 |
| 40.0 | 0.016 | 0.058 | 0.102 |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |



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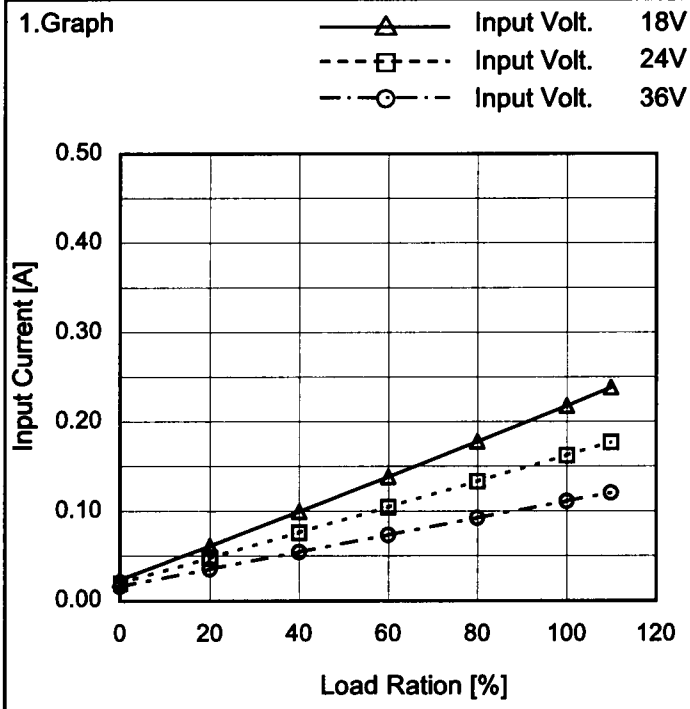
COSEL

| | |
|---|---|
| Model | SUCW32415 |
| Item | Input Current (by Load Current) |
| Object | ——————— |

Temperature 25°C
Testing Circuitry Figure A

1.Graph




2.Values

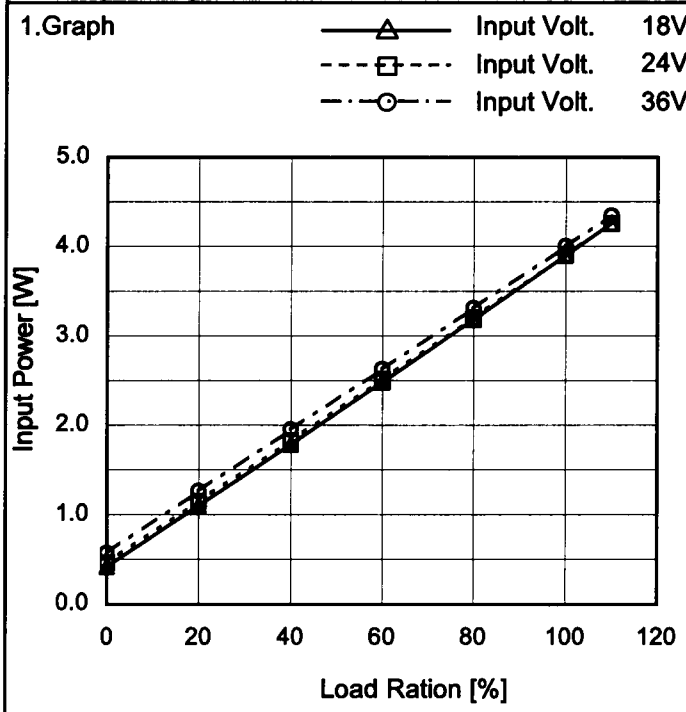
| Load Ration [%] | Input Current [A] | | |
|---|---|---|---|
| | Input Volt. 18[V] | Input Volt. 24[V] | Input Volt. 36[V] |
| 0 | 0.023 | 0.019 | 0.016 |
| 20 | 0.061 | 0.048 | 0.035 |
| 40 | 0.100 | 0.076 | 0.054 |
| 60 | 0.138 | 0.105 | 0.073 |
| 80 | 0.178 | 0.133 | 0.092 |
| 100 | 0.218 | 0.162 | 0.111 |
| 110 | 0.238 | 0.177 | 0.121 |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |

COSEL

| | |
|---|---|
| Model | SUCW32415 |
| Item | Input Power (by Load Current) |
| Object | ——————— |

Temperature 25°C
Testing Circuitry Figure A

1.Graph




2.Values

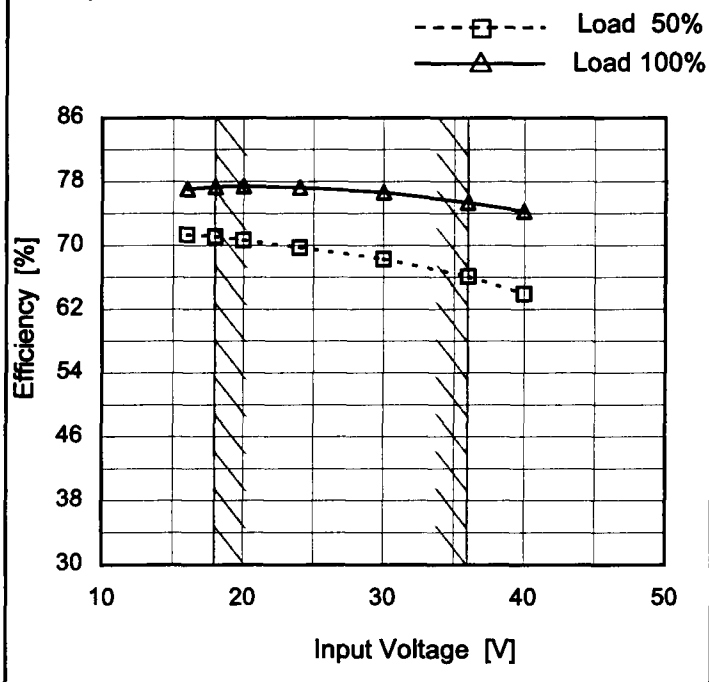
| Load Ration [%] | Input Power [W] | | |
|---|---|---|---|
| | Input Volt. 18[V] | Input Volt. 24[V] | Input Volt. 36[V] |
| 0 | 0.42 | 0.47 | 0.57 |
| 20 | 1.10 | 1.15 | 1.26 |
| 40 | 1.79 | 1.83 | 1.95 |
| 60 | 2.48 | 2.51 | 2.63 |
| 80 | 3.18 | 3.20 | 3.31 |
| 100 | 3.90 | 3.91 | 4.01 |
| 110 | 4.26 | 4.26 | 4.35 |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |

COSEL

| Model | SUCW32415 |
|---|---|
| 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

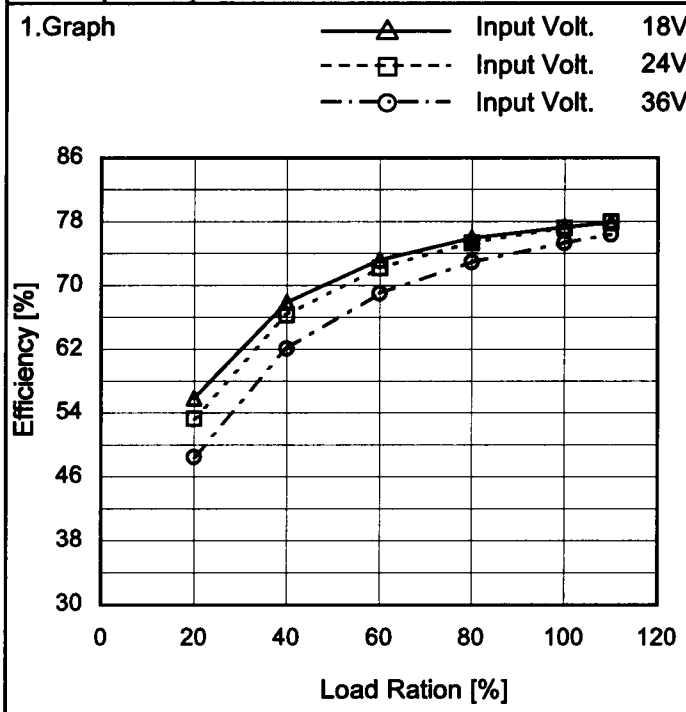
| Input Voltage [V] | Efficiency [%] | |
|---|---|---|
| | Load 50% | Load 100% |
| 16 | 71.4 | 77.1 |
| 18 | 71.1 | 77.3 |
| 20 | 70.7 | 77.4 |
| 24 | 69.7 | 77.3 |
| 30 | 68.3 | 76.6 |
| 36 | 66.1 | 75.4 |
| 40 | 64.0 | 74.3 |
| -- | - | - |
| -- | - | - |

COSEL

| | |
|---|---|
| Model | SUCW32415 |
| Item | Efficiency (by Load Current) |
| Object | ——————— |

Temperature 25°C
Testing Circuitry Figure A

1.Graph




2.Values

| Load Ration [%] | Efficiency [%] Input Volt. 18[V] | Input Volt. 24[V] | Input Volt. 36[V] |
|---|---|---|---|
| 0 | - | - | - |
| 20 | 55.9 | 53.3 | 48.5 |
| 40 | 67.9 | 66.3 | 62.1 |
| 60 | 73.2 | 72.2 | 69.0 |
| 80 | 75.9 | 75.4 | 72.9 |
| 100 | 77.3 | 77.2 | 75.3 |
| 110 | 77.9 | 78.0 | 76.4 |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |

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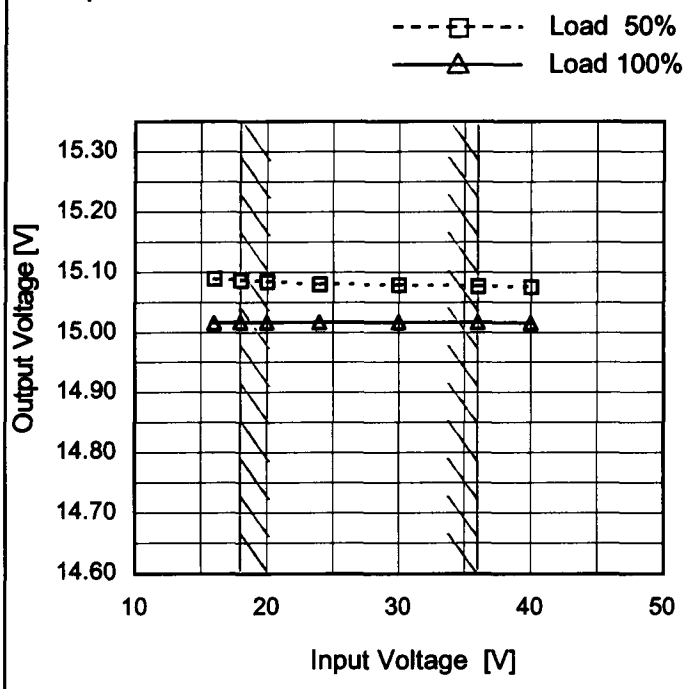
| Model | SUCW32415 |
|---|---|
| Item | Line Regulation |
| Object | +15V0.1A |

Temperature 25°C
Testing Circuitry Figure A

1.Graph

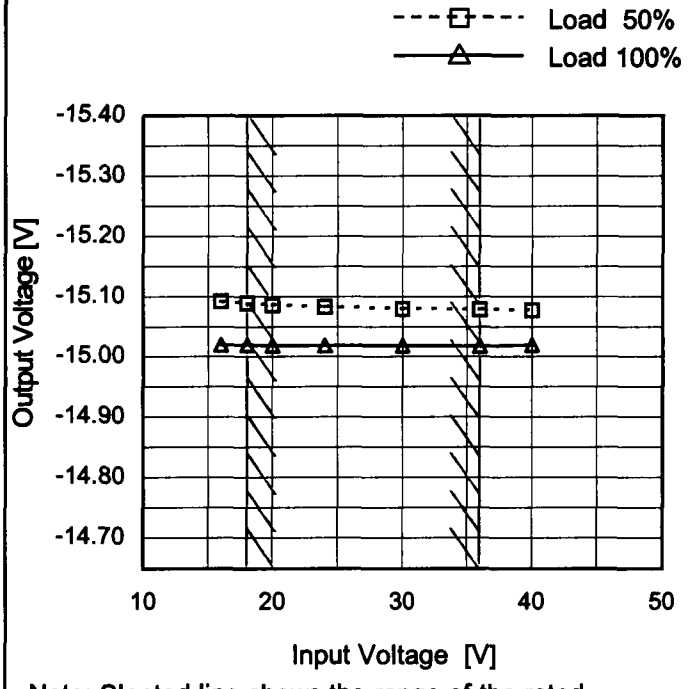



2.Values

| Input Voltage [V] | Output Voltage [V] | |
|---|---|---|
| | Load 50% | Load 100% |
| 16 | 15.089 | 15.015 |
| 18 | 15.086 | 15.016 |
| 20 | 15.084 | 15.016 |
| 24 | 15.080 | 15.017 |
| 30 | 15.079 | 15.016 |
| 36 | 15.076 | 15.017 |
| 40 | 15.075 | 15.016 |
| – | - | - |
| – | - | - |

| Object | -15V0.1A |
|---|---|

1.Graph




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

2.Values

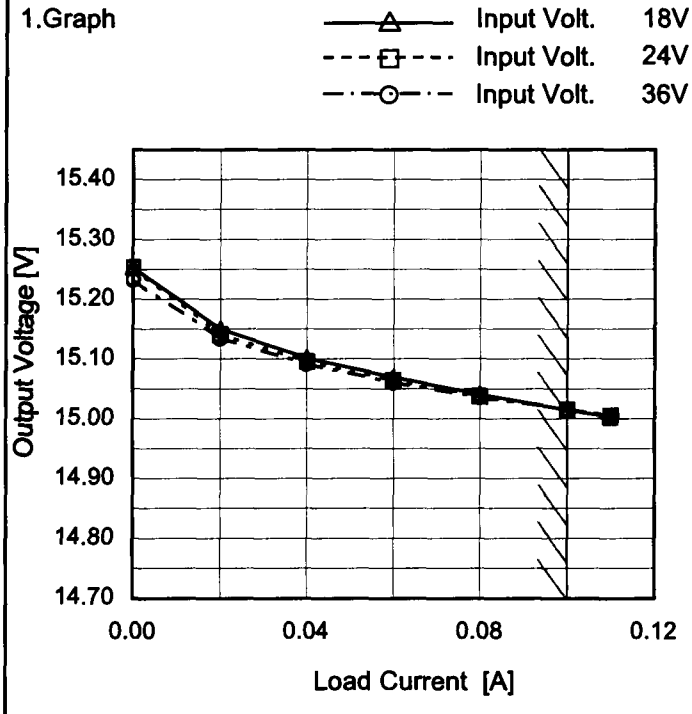
| Input Voltage [V] | Output Voltage [V] | |
|---|---|---|
| | Load 50% | Load 100% |
| 16 | -15.092 | -15.020 |
| 18 | -15.089 | -15.019 |
| 20 | -15.086 | -15.019 |
| 24 | -15.082 | -15.019 |
| 30 | -15.080 | -15.019 |
| 36 | -15.078 | -15.018 |
| 40 | -15.077 | -15.020 |
| – | - | - |
| – | - | - |

COSEL

| Model | SUCW32415 |
|---|---|
| Item | Load Regulation |
| Object | +15V0.1A |

Temperature 25°C
Testing Circuitry Figure A

1.Graph

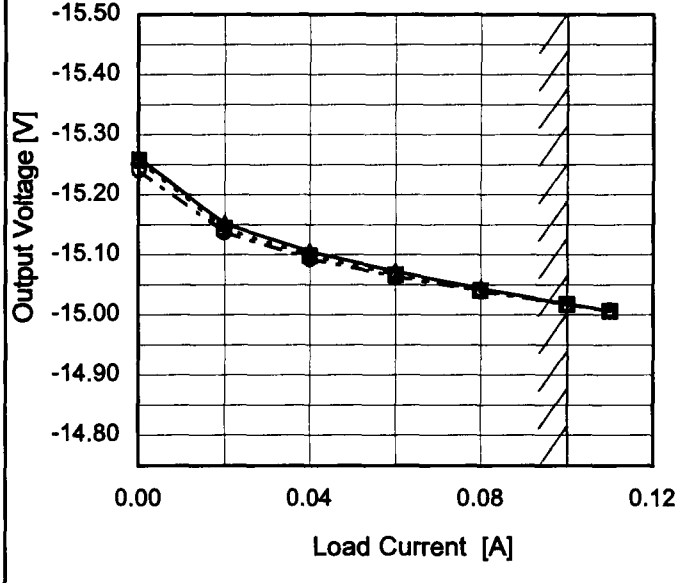



2.Values

| Load Current [A] | Output Voltage [V] | | |
|---|---|---|---|
| | Input Volt. 18[V] | Input Volt. 24[V] | Input Volt. 36[V] |
| 0.00 | 15.254 | 15.253 | 15.233 |
| 0.02 | 15.150 | 15.141 | 15.134 |
| 0.04 | 15.102 | 15.096 | 15.092 |
| 0.06 | 15.070 | 15.064 | 15.061 |
| 0.08 | 15.041 | 15.038 | 15.036 |
| 0.10 | 15.015 | 15.015 | 15.016 |
| 0.11 | 15.003 | 15.005 | 15.005 |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |

| Object | -15V0.1A |
|---|---|

1.Graph




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

2.Values

| Load Current [A] | Output Voltage [V] | | |
|---|---|---|---|
| | Input Volt. 18[V] | Input Volt. 24[V] | Input Volt. 36[V] |
| 0.00 | -15.262 | -15.259 | -15.241 |
| 0.02 | -15.152 | -15.144 | -15.138 |
| 0.04 | -15.105 | -15.098 | -15.093 |
| 0.06 | -15.073 | -15.067 | -15.064 |
| 0.08 | -15.044 | -15.041 | -15.040 |
| 0.10 | -15.018 | -15.018 | -15.017 |
| 0.11 | -15.007 | -15.007 | -15.008 |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |

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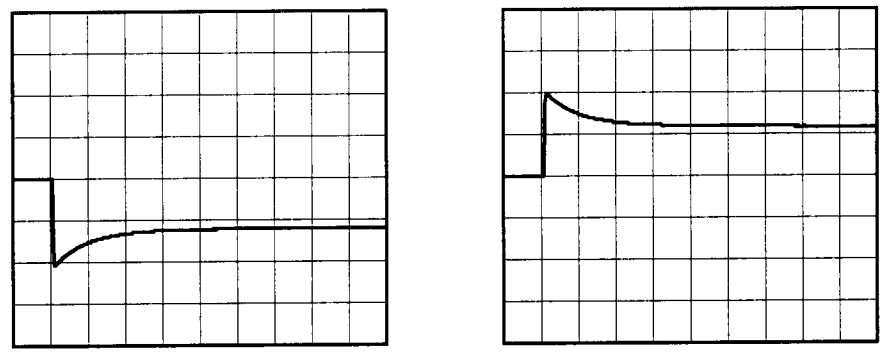
|---|---|
| Model | SUCW32415 |
| Item | Dynamic Load Response |
| Object | +15V0.1A |

Temperature 25°C
Testing Circuitry Figure A

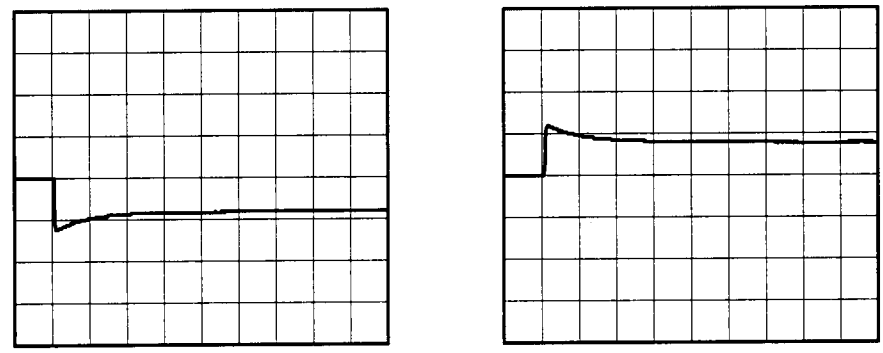
Input Volt. 24 V
Cycle 100 mS

$t_1$、$t_2$ = 50μs

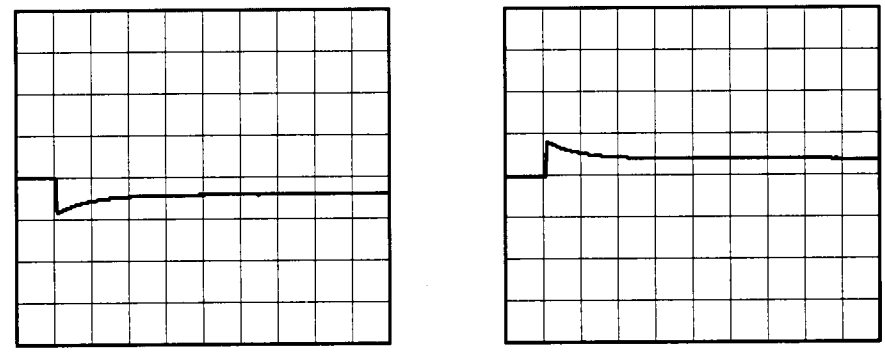

Min. Load (0A) ⟷
Load 100% (0.1A)




Min. Load (0A) ⟷
Load 50% (0.05A)




Load 50% (0.05A) ⟷
Load 100% (0.1A)



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COSEL

| | |
|---|---|
| Model | SUCW32415 |
| Item | Dynamic Load Response |
| Object | -15V0.1A |

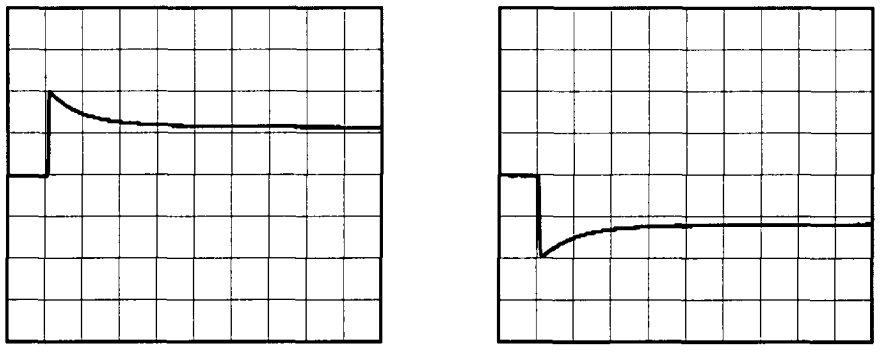
Temperature 25°C
Testing Circuitry Figure A

Input Volt. 24 V
Cycle 100 mS

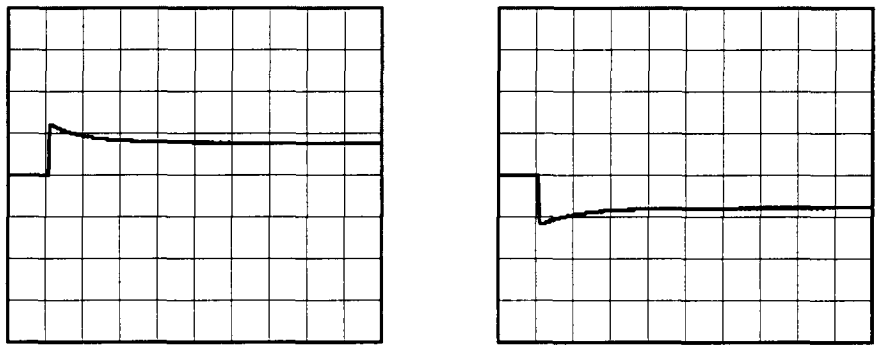
$t_1$、$t_2$ = 50μs

Load Current

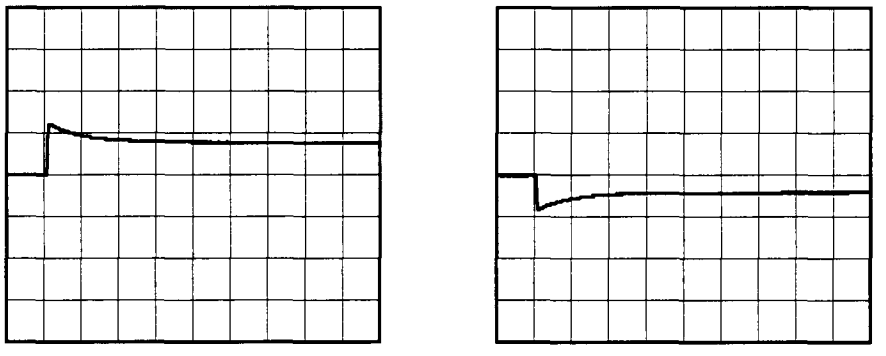

Min. Load (0A) ⟷ Load 100% (0.1A)




Min. Load (0A) ⟷ Load 50% (0.05A)




Load 50% (0.05A) ⟷ Load 100% (0.1A)

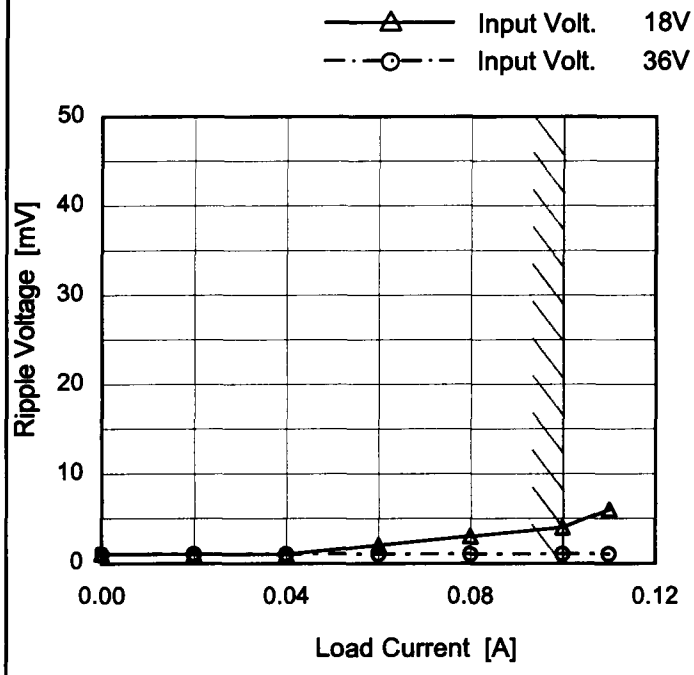


COSEL

| | |
|---|---|
| Model | SUCW32415 |
| Item | Ripple Voltage (by Load Current) |
| Object | +15V0.1A |

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]

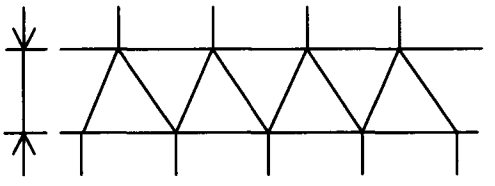


Fig.Complex Ripple Wave Form

2.Values

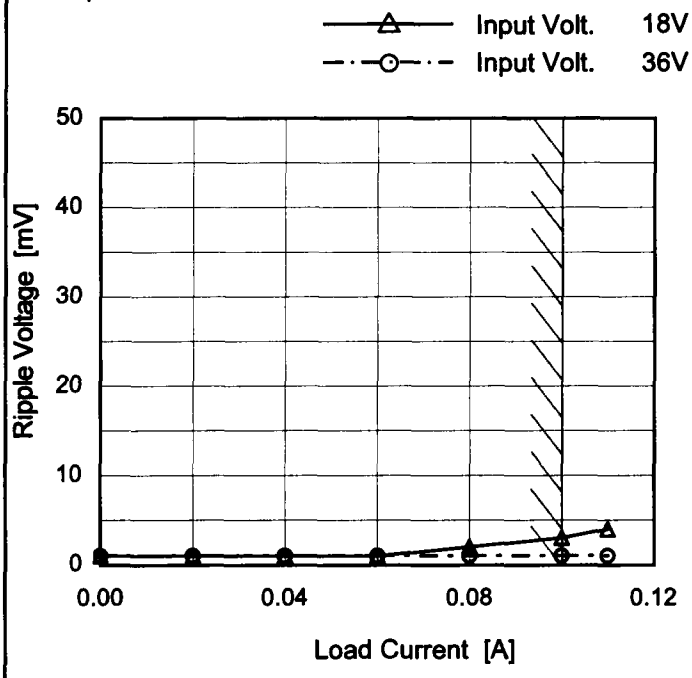
| Load Current [A] | Ripple Voltage [mV] | |
|---|---|---|
| | Input Volt. 18 [V] | Input Volt. 36 [V] |
| 0.00 | 1 | 1 |
| 0.02 | 1 | 1 |
| 0.04 | 1 | 1 |
| 0.06 | 2 | 1 |
| 0.08 | 3 | 1 |
| 0.10 | 4 | 1 |
| 0.11 | 6 | 1 |
| -- | - | - |
| -- | - | - |
| -- | - | - |
| -- | - | - |

COSEL

| Model | SUCW32415 |
|---|---|
| Item | Ripple Voltage (by Load Current) |
| Object | -15V0.1A |

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]

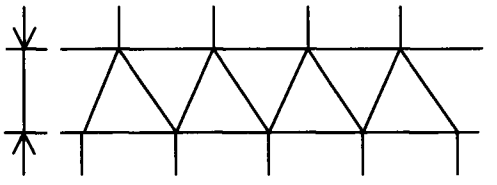


Fig.Complex Ripple Wave Form

2.Values

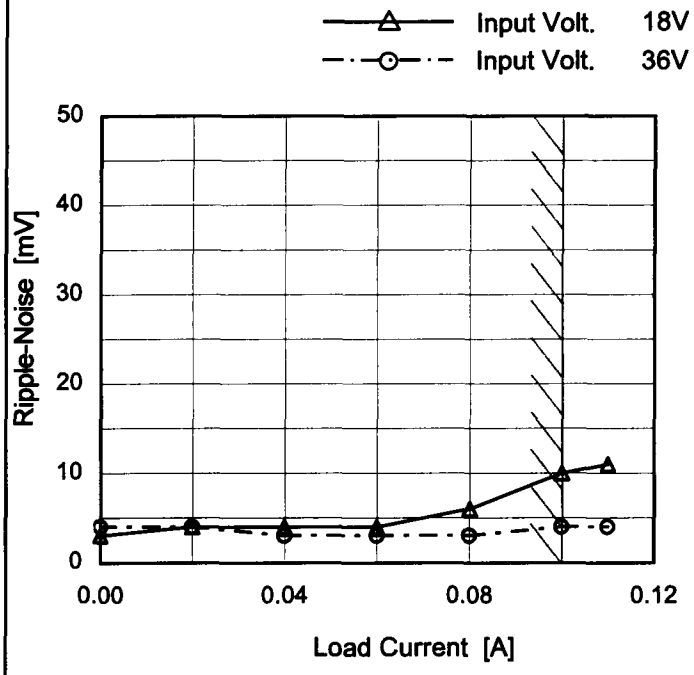
| Load Current [A] | Ripple Voltage [mV] | |
|---|---|---|
| | Input Volt. 18 [V] | Input Volt. 36 [V] |
| 0.00 | 1 | 1 |
| 0.02 | 1 | 1 |
| 0.04 | 1 | 1 |
| 0.06 | 1 | 1 |
| 0.08 | 2 | 1 |
| 0.10 | 3 | 1 |
| 0.11 | 4 | 1 |
| -- | - | - |
| -- | - | - |
| -- | - | - |
| -- | - | - |

COSEL

| | |
|---|---|
| Model | SUCW32415 |
| Item | Ripple-Noise |
| Object | +15V0.1A |

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.

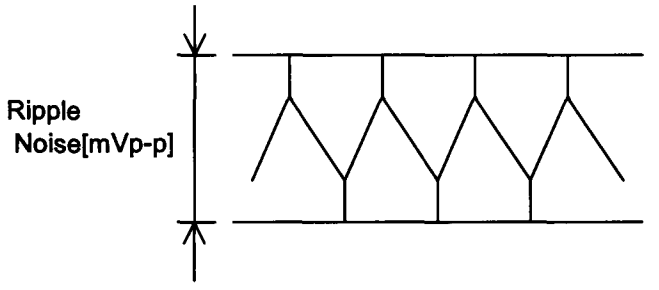



Fig.Complex Ripple Noise Wave Form

2.Values

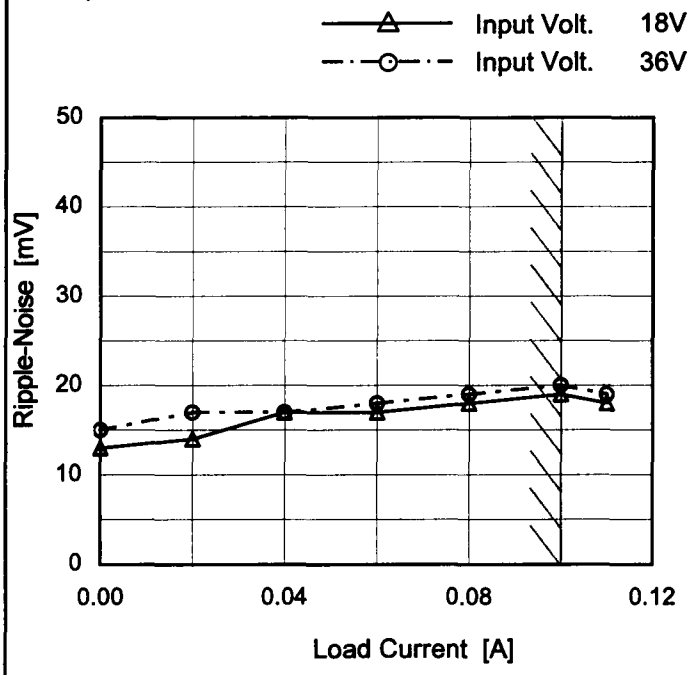
| Load Current [A] | Ripple-Noise [mV] | |
|---|---|---|
| | Input Volt. 18 [V] | Input Volt. 36 [V] |
| 0.00 | 3 | 4 |
| 0.02 | 4 | 4 |
| 0.04 | 4 | 3 |
| 0.06 | 4 | 3 |
| 0.08 | 6 | 3 |
| 0.10 | 10 | 4 |
| 0.11 | 11 | 4 |
| -- | - | - |
| -- | - | - |
| -- | - | - |
| -- | - | - |

COSEL

| Model | SUCW32415 |
|---|---|
| Item | Ripple-Noise |
| Object | -15V0.1A |

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.

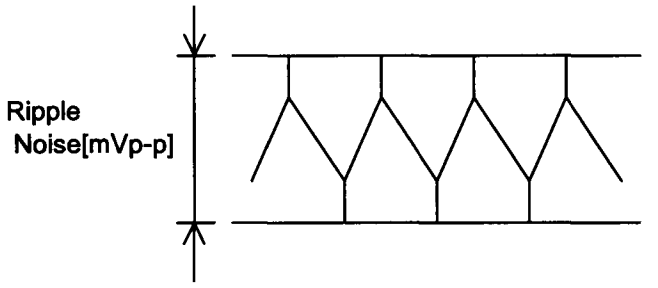



Fig.Complex Ripple Noise Wave Form

2.Values

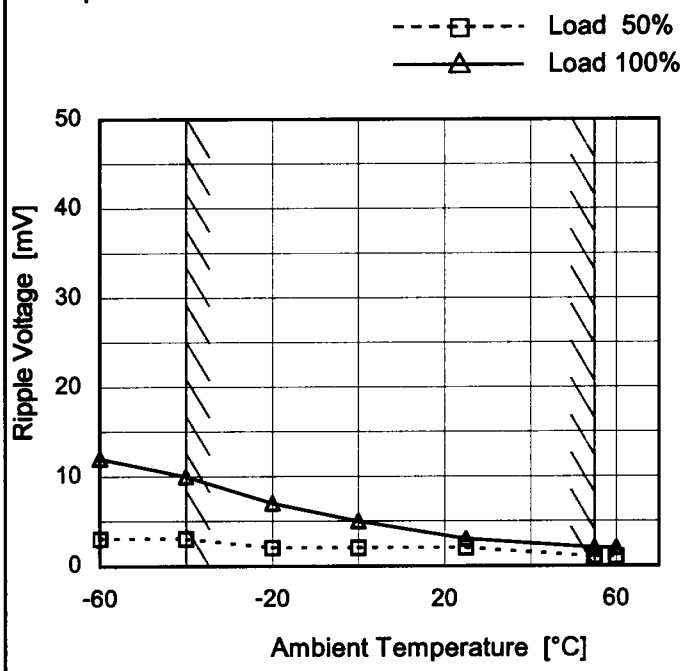
| Load Current [A] | Ripple-Noise [mV] | |
|---|---|---|
| | Input Volt. 18 [V] | Input Volt. 36 [V] |
| 0.00 | 13 | 15 |
| 0.02 | 14 | 17 |
| 0.04 | 17 | 17 |
| 0.06 | 17 | 18 |
| 0.08 | 18 | 19 |
| 0.10 | 19 | 20 |
| 0.11 | 18 | 19 |
| -- | - | - |
| -- | - | - |
| -- | - | - |
| -- | - | - |

COSEL

| Model | SUCW32415 |
|---|---|
| Item | Ripple Voltage (by Ambient Temp.) |
| Object | +15V0.1A |

Testing Circuitry Figure B

1.Graph



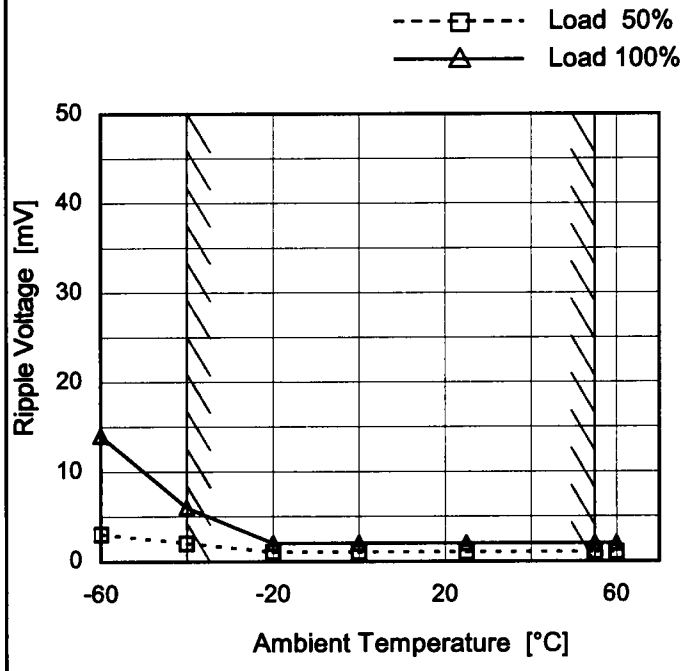

Input Volt. 24V

2.Values

| Ambient Temperature [°C] | Ripple Voltage [mV] | |
|---|---|---|
| | Load 50% | Load 100% |
| -60 | 3 | 12 |
| -40 | 3 | 10 |
| -20 | 2 | 7 |
| 0 | 2 | 5 |
| 25 | 2 | 3 |
| 55 | 1 | 2 |
| 60 | 1 | 2 |
| -- | - | - |
| -- | - | - |
| -- | - | - |
| -- | - | - |

| Object | -15V0.1A |
|---|---|

1.Graph




Input Volt. 24V

Measured by 100 MHz Oscilloscope.

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

2.Values

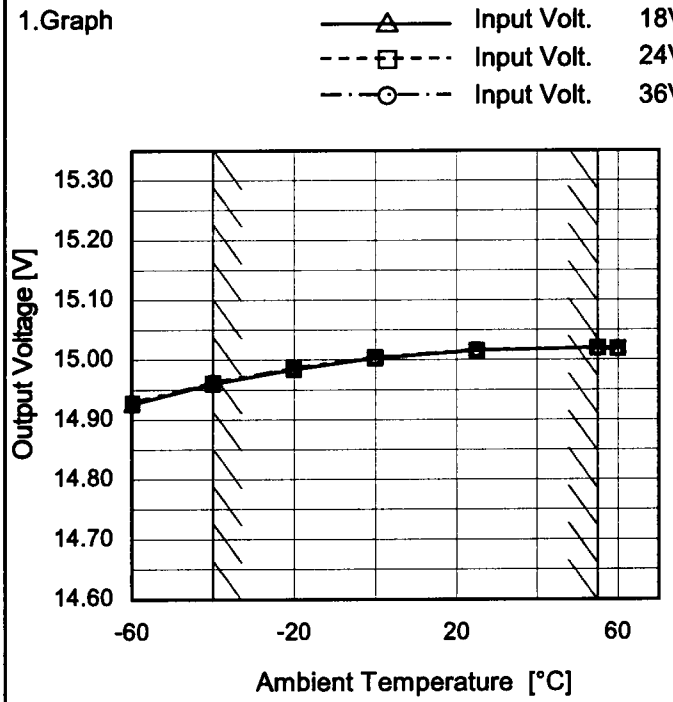
| Ambient Temperature [°C] | Ripple Voltage [mV] | |
|---|---|---|
| | Load 50% | Load 100% |
| -60 | 3 | 14 |
| -40 | 2 | 6 |
| -20 | 1 | 2 |
| 0 | 1 | 2 |
| 25 | 1 | 2 |
| 55 | 1 | 2 |
| 60 | 1 | 2 |
| -- | - | - |
| -- | - | - |
| -- | - | - |
| -- | - | - |

COSEL

| Model | SUCW32415 |
|---|---|
| Item | Ambient Temperature Drift |
| Object | +15V0.1A |

Testing Circuitry Figure A

1.Graph

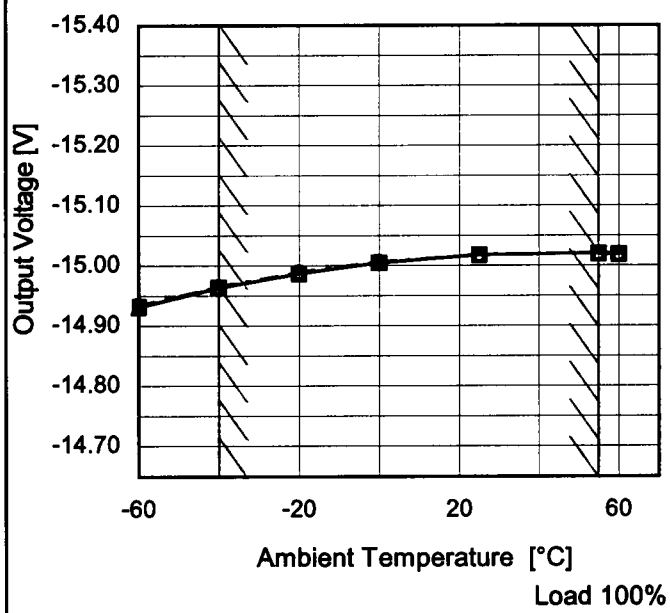



2.Values

| Ambient Temperature [°C] | Output Voltage [V] | | |
|---|---|---|---|
| | Input Volt. 18[V] | Input Volt. 24[V] | Input Volt. 36[V] |
| -60 | 14.926 | 14.928 | 14.929 |
| -40 | 14.960 | 14.961 | 14.962 |
| -20 | 14.984 | 14.985 | 14.986 |
| 0 | 15.003 | 15.004 | 15.004 |
| 25 | 15.016 | 15.016 | 15.017 |
| 55 | 15.020 | 15.020 | 15.019 |
| 60 | 15.019 | 15.019 | 15.018 |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |

| Object | -15V0.1A |
|---|---|

1.Graph




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

2.Values

| Ambient Temperature [°C] | Output Voltage [V] | | |
|---|---|---|---|
| | Input Volt. 18[V] | Input Volt. 24[V] | Input Volt. 36[V] |
| -60 | -14.931 | -14.932 | -14.934 |
| -40 | -14.963 | -14.964 | -14.965 |
| -20 | -14.987 | -14.987 | -14.989 |
| 0 | -15.005 | -15.005 | -15.006 |
| 25 | -15.018 | -15.018 | -15.018 |
| 55 | -15.021 | -15.020 | -15.020 |
| 60 | -15.020 | -15.019 | -15.019 |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |

COSEL

| Model | SUCW32415 | |
|---|---|---|
| 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 : 18 - 36V
Load Current (AVR 1) : 0 - 0.1A (AVR 2):0 - 0.1A
* Other Output : Rated Load

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

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

2.Values

| Object | +15V0.1A | | | | | |
|---|---|---|---|---|---|---|
| Item | Temperature [°C] | Input Voltage[V] | Output | | Output Voltage Accuracy | |
| | | | Current[A] | Voltage[V] | Value [mV] | Ration [%] |
| Maximum Voltage | 55 | 18 | 0 | 15.261 | ±151 | ±1.0 |
| Minimum Voltage | -40 | 18 | 0.1 | 14.960 | | |

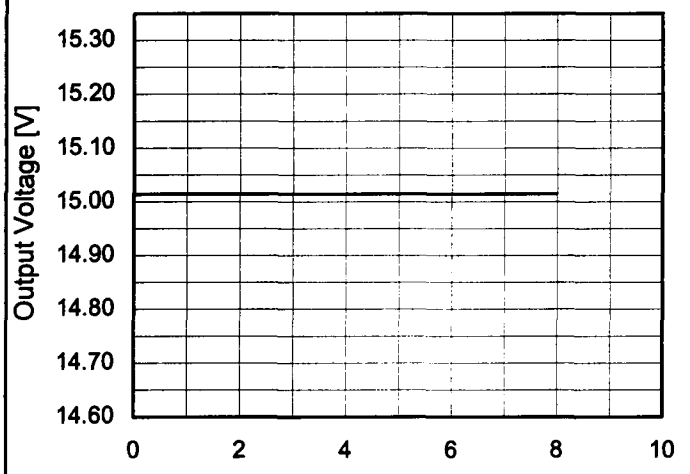
| Object | -15V0.1A | | | | | |
|---|---|---|---|---|---|---|
| Item | Temperature [°C] | Input Voltage[V] | Output | | Output Voltage Accuracy | |
| | | | Current[A] | Voltage[V] | Value [mV] | Ration [%] |
| Maximum Voltage | 55 | 18 | 0 | -15.268 | ±153 | ±1.0 |
| Minimum Voltage | -40 | 18 | 0.1 | -14.963 | | |

COSEL

| Model | SUCW32415 |
|---|---|
| Item | Time Lapse Drift |
| Object | +15V0.1A |

Temperature 25°C
Testing Circuitry Figure A

1.Graph



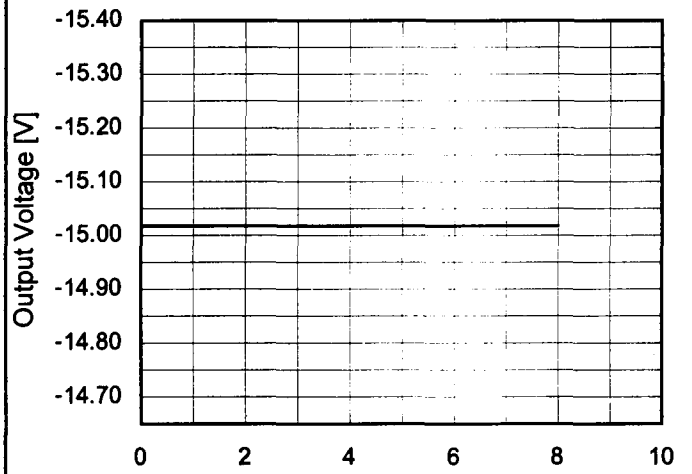

Input Volt. 24V
Load 100%

2.Values

| Time since start [H] | Output Voltage [V] |
|---|---|
| 0.0 | 15.012 |
| 0.5 | 15.015 |
| 1.0 | 15.015 |
| 2.0 | 15.015 |
| 3.0 | 15.015 |
| 4.0 | 15.015 |
| 5.0 | 15.015 |
| 6.0 | 15.015 |
| 7.0 | 15.015 |
| 8.0 | 15.015 |

| Object | -15V0.1A |
|---|---|

1.Graph




Input Volt. 24V
Load 100%

2.Values

| Time since start [H] | Output Voltage [V] |
|---|---|
| 0.0 | -15.017 |
| 0.5 | -15.018 |
| 1.0 | -15.018 |
| 2.0 | -15.018 |
| 3.0 | -15.018 |
| 4.0 | -15.018 |
| 5.0 | -15.018 |
| 6.0 | -15.018 |
| 7.0 | -15.018 |
| 8.0 | -15.018 |

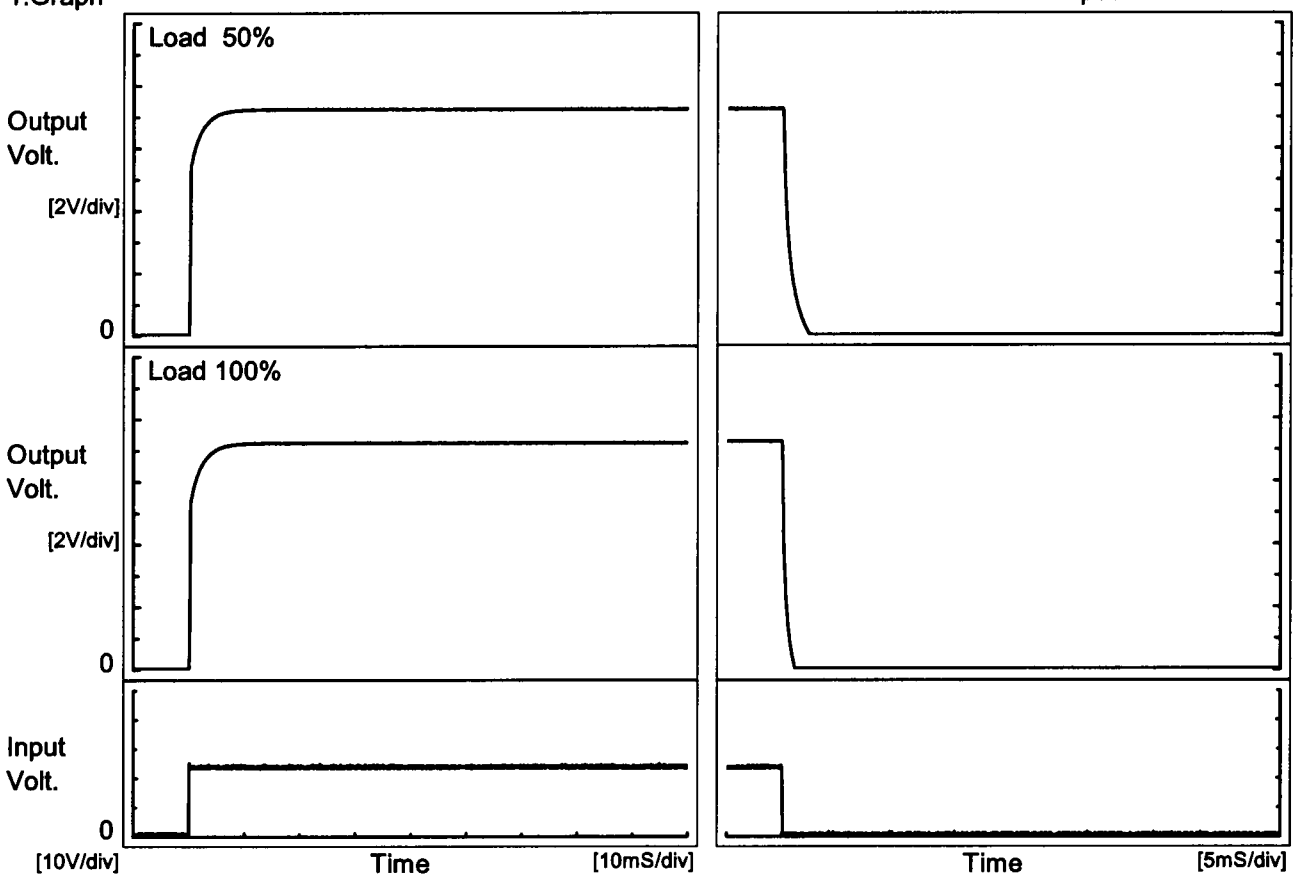
COSEL

| | |
|---|---|
| Model | SUCW32415 |
| Item | Rise and Fall Time |
| Object | +15V0.1A |

Temperature 25°C
Testing Circuitry Figure A

1.Graph

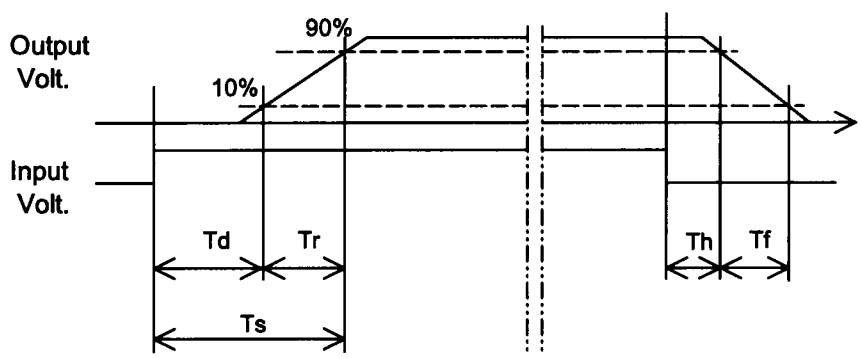
Input Volt. 24 V




2.Values

[mS]

| Load \ Time | Td | Tr | Ts | Th | Tf |
|---|---|---|---|---|---|
| 50 % | 0.1 | 3.2 | 3.3 | 0.1 | 1.5 |
| 100 % | 0.1 | 3.3 | 3.4 | 0.1 | 0.7 |



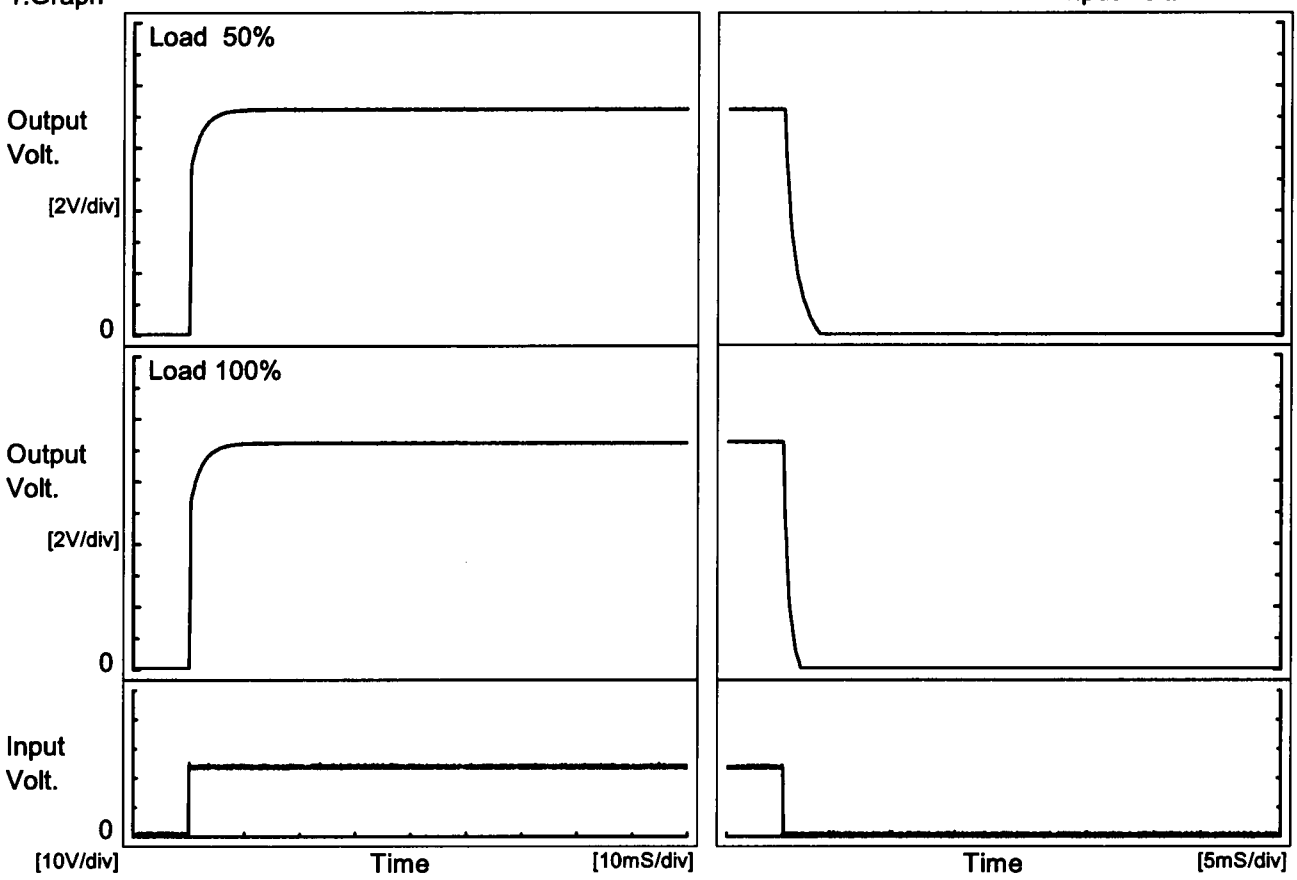
COSEL

| | |
|---|---|
| Model | SUCW32415 |
| Item | Rise and Fall Time |
| Object | -15V0.1A |

Temperature 25°C
Testing Circuitry Figure A

1.Graph

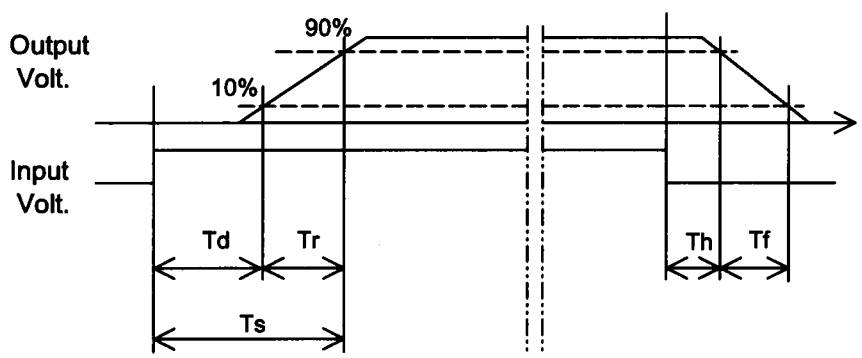
Input Volt. 24 V




2.Values

[mS]

| Load \ Time | Td | Tr | Ts | Th | Tf |
|---|---|---|---|---|---|
| 50 % | 0.1 | 3.2 | 3.3 | 0.1 | 2.1 |
| 100 % | 0.1 | 3.3 | 3.4 | 0.1 | 1.1 |

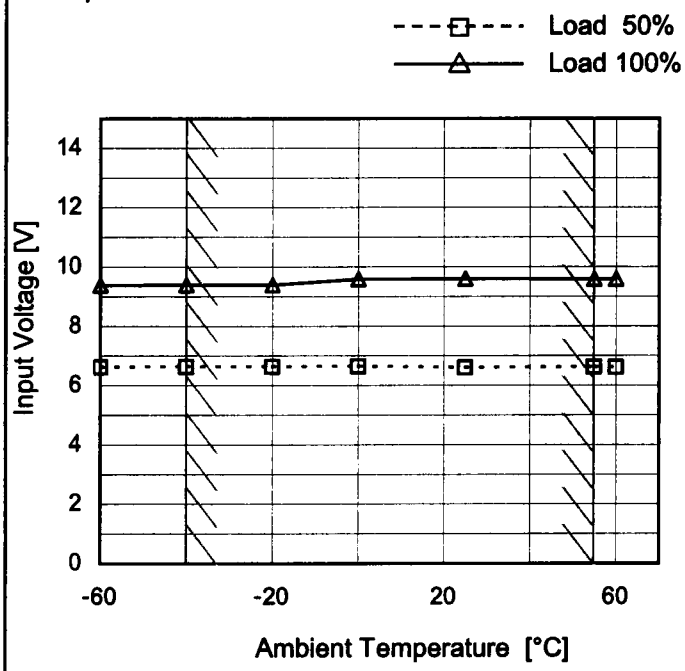


COSEL

| Model | SUCW32415 |
|---|---|
| Item | Minimum Input Voltage for Regulated Output Voltage |
| Object | +15V0.1A |

Testing Circuitry Figure A

1.Graph

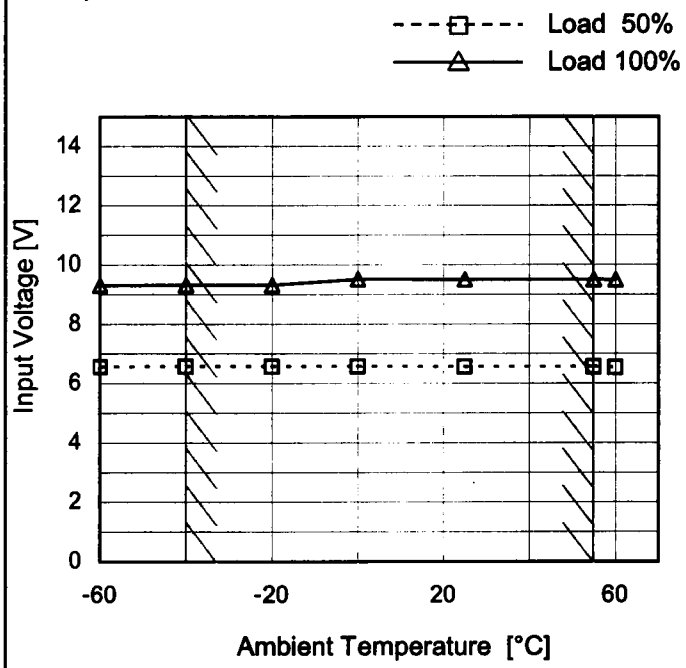



2.Values

| Ambient Temperature [°C] | Input Voltage [V] | |
|---|---|---|
| | Load 50% | Load 100% |
| -60 | 6.7 | 9.4 |
| -40 | 6.7 | 9.4 |
| -20 | 6.7 | 9.4 |
| 0 | 6.7 | 9.6 |
| 25 | 6.7 | 9.6 |
| 55 | 6.7 | 9.6 |
| 60 | 6.7 | 9.6 |
| -- | - | - |
| -- | - | - |
| -- | - | - |
| -- | - | - |

| Object | -15V0.1A |
|---|---|

1.Graph




2.Values

| Ambient Temperature [°C] | Input Voltage [V] | |
|---|---|---|
| | Load 50% | Load 100% |
| -60 | 6.6 | 9.4 |
| -40 | 6.6 | 9.4 |
| -20 | 6.6 | 9.4 |
| 0 | 6.6 | 9.6 |
| 25 | 6.6 | 9.5 |
| 55 | 6.6 | 9.5 |
| 60 | 6.6 | 9.5 |
| -- | - | - |
| -- | - | - |
| -- | - | - |
| -- | - | - |

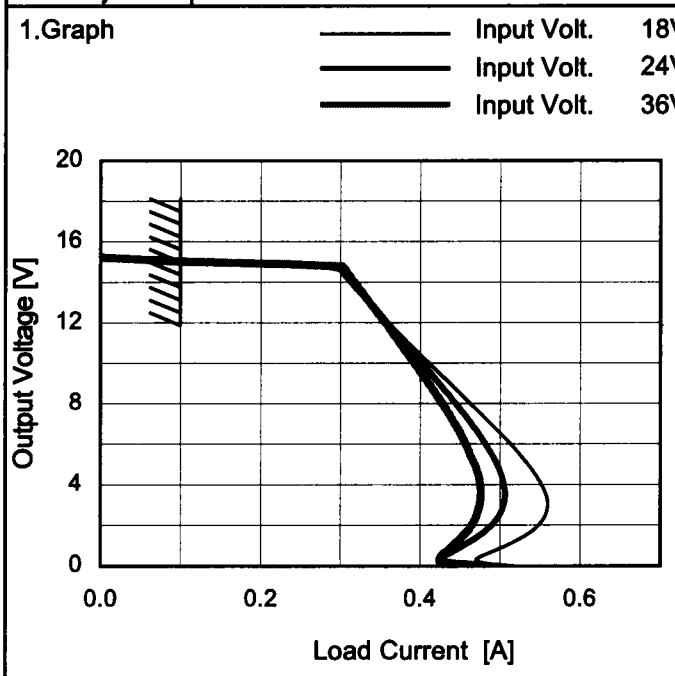
Note: Slanted line shows the range of the rated ambient temperature.

COSEL

| Model | SUCW32415 |
|---|---|
| Item | Overcurrent Protection |
| Object | +15V0.1A |

Temperature 25°C
Testing Circuitry Figure A

1.Graph

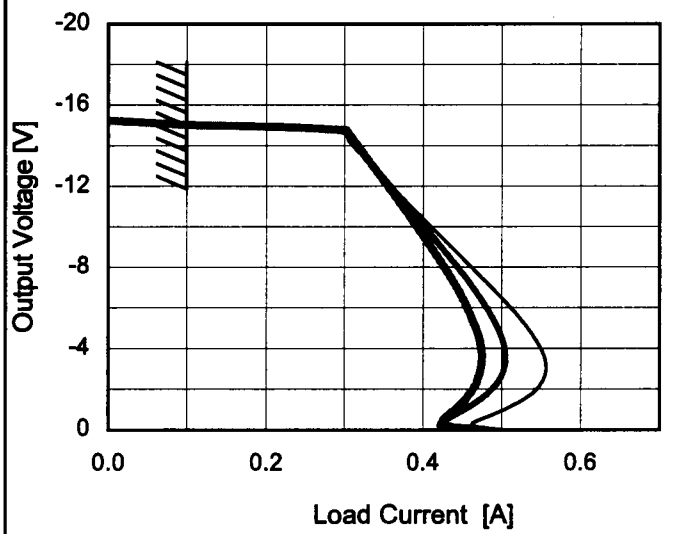



2.Values

| Output Voltage [V] | Load Current [A] Input Volt. 18[V] | Input Volt. 24[V] | Input Volt. 36[V] |
|---|---|---|---|
| 15.0 | 0.10 | 0.10 | 0.10 |
| 14.3 | 0.31 | 0.31 | 0.31 |
| 13.5 | 0.32 | 0.33 | 0.33 |
| 12.0 | 0.36 | 0.36 | 0.36 |
| 10.5 | 0.40 | 0.39 | 0.38 |
| 9.0 | 0.44 | 0.42 | 0.41 |
| 7.5 | 0.47 | 0.45 | 0.44 |
| 6.0 | 0.51 | 0.48 | 0.46 |
| 4.5 | 0.54 | 0.50 | 0.47 |
| 3.0 | 0.56 | 0.50 | 0.47 |
| 1.5 | 0.53 | 0.48 | 0.46 |
| 0.0 | 0.52 | 0.45 | 0.48 |

| Object | -15V0.1A |
|---|---|

1.Graph




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

2.Values

| Output Voltage [V] | Load Current [A] Input Volt. 18[V] | Input Volt. 24[V] | Input Volt. 36[V] |
|---|---|---|---|
| -15.0 | 0.10 | 0.10 | 0.10 |
| -14.3 | 0.31 | 0.31 | 0.31 |
| -13.5 | 0.32 | 0.33 | 0.33 |
| -12.0 | 0.36 | 0.36 | 0.36 |
| -10.5 | 0.40 | 0.39 | 0.38 |
| -9.0 | 0.44 | 0.42 | 0.41 |
| -7.5 | 0.47 | 0.46 | 0.43 |
| -6.0 | 0.51 | 0.48 | 0.46 |
| -4.5 | 0.54 | 0.50 | 0.47 |
| -3.0 | 0.56 | 0.50 | 0.47 |
| -1.5 | 0.53 | 0.47 | 0.45 |
| 0.0 | 0.50 | 0.45 | 0.48 |

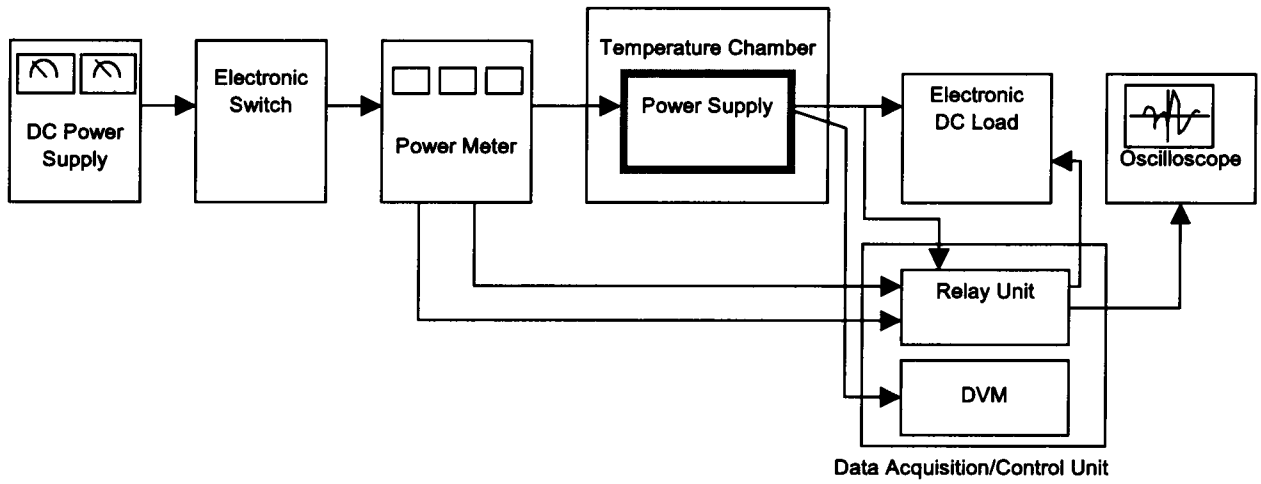



Figure A

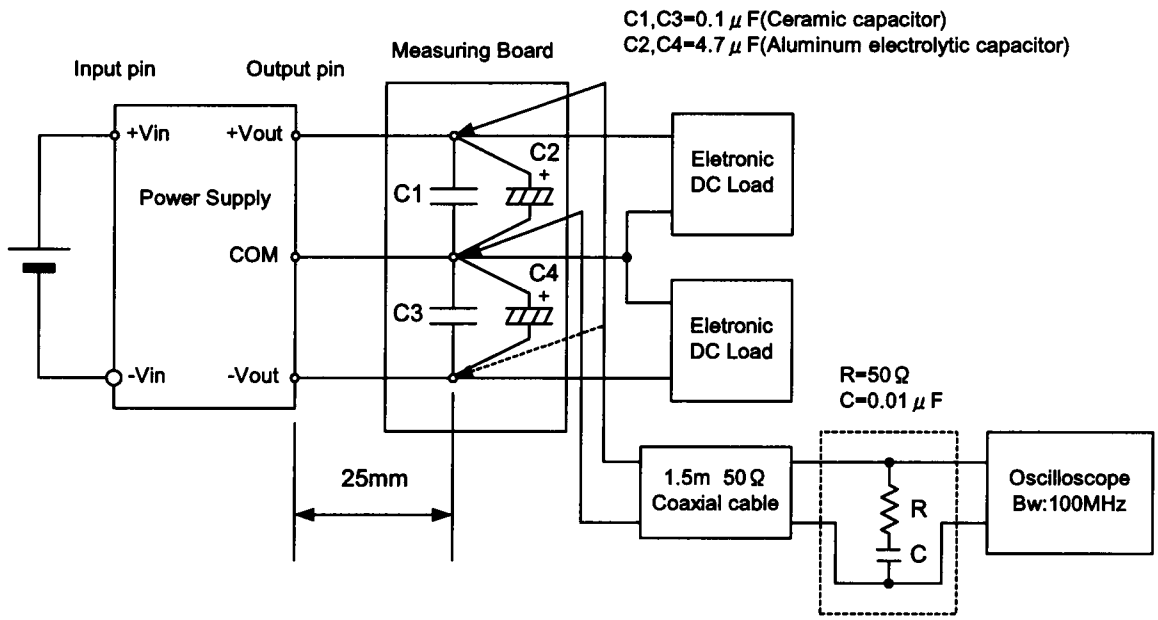



Figure B (Ripple and Ripple noise Characteristic)