# COSEL

# TEST DATA OF CHS60483R3

Regulated DC Power Supply
November 17, 2014

Approved by : *Yoshimichi Hirokawa*

Yoshimichi Hirokawa      Design Manager

Prepared by : *Masashi Ueda*

Masashi Ueda      Design Engineer

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# CONTENTS

(Final Page  19)

**COSEL**

| | |
|---|---|
| Model | CHS60483R3 |
| Item | Input Current (by Input Voltage) |
| Object | |

Temperature 25°C
Testing Circuitry Figure A

1.Graph
△— Load 100%
---□--- Load 50%
—·○—·· Load 0%



Input Current [A] vs Input Voltage [V]

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 |
| 8.0 | 0.006 | 0.007 | 0.006 |
| 16.0 | 0.007 | 0.006 | 0.007 |
| 24.0 | 0.007 | 0.007 | 0.008 |
| 33.0 | 0.008 | 0.008 | 0.008 |
| 34.6 | 0.040 | 0.930 | 1.891 |
| 34.8 | 0.037 | 0.922 | 1.879 |
| 36.0 | 0.035 | 0.891 | 1.811 |
| 40.0 | 0.030 | 0.802 | 1.619 |
| 48.0 | 0.029 | 0.672 | 1.349 |
| 60.0 | 0.033 | 0.544 | 1.082 |
| 70.0 | 0.035 | 0.471 | 0.931 |
| 76.0 | 0.035 | 0.437 | 0.859 |
| 80.0 | 0.036 | 0.417 | 0.819 |
| 88.0 | 0.038 | 0.385 | 0.748 |
| -- | - | - | - |
| -- | - | - | - |
| -- | | - | - |

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# COSEL

| | |
|---|---|
| Model | CHS60483R3 |
| Item | Input Current (by Load Current) |
| Object | |

Temperature 25°C
Testing Circuitry Figure A

1.Graph

——△—— Input Volt. 36V
- - -□- - - Input Volt. 48V
—·—○—·— Input Volt. 76V



Input Current [A] vs Load Current [A]

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

2.Values

| Load Current [A] | Input Current [A] | | |
|---|---|---|---|
| | Input Volt. 36[V] | Input Volt. 48[V] | Input Volt. 76[V] |
| 0.0 | 0.035 | 0.029 | 0.035 |
| 3.0 | 0.313 | 0.240 | 0.167 |
| 6.0 | 0.597 | 0.454 | 0.300 |
| 9.0 | 0.891 | 0.672 | 0.437 |
| 12.0 | 1.191 | 0.896 | 0.579 |
| 15.0 | 1.515 | 1.129 | 0.723 |
| 18.0 | 1.811 | 1.349 | 0.859 |
| 19.8 | 2.035 | 1.508 | 0.959 |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |

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| Model | CHS60483R3 |
|---|---|
| Item | Input Power (by Load Current) |
| Object | |

| | |
|---|---|
| Temperature | 25°C |
| Testing Circuitry | Figure A |

1.Graph

——△—— Input Volt. 36V
- - -□- - - Input Volt. 48V
—·—○—·— Input Volt. 76V



Load Current [A]

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

2.Values

| Load Current [A] | Input Power [W] | | |
|---|---|---|---|
| | Input Volt. 36[V] | Input Volt. 48[V] | Input Volt. 76[V] |
| 0.0 | 1.26 | 1.41 | 2.64 |
| 3.0 | 11.25 | 11.53 | 12.70 |
| 6.0 | 21.52 | 21.75 | 22.79 |
| 9.0 | 32.08 | 32.27 | 33.25 |
| 12.0 | 42.97 | 43.04 | 43.95 |
| 15.0 | 54.13 | 53.99 | 54.88 |
| 18.0 | 65.49 | 65.20 | 65.91 |
| 19.8 | 72.57 | 72.02 | 72.70 |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |

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| | |
|---|---|
| Model | CHS60483R3 |
| Item | Efficiency (by Input Voltage) |
| Object | |

Temperature 25°C
Testing Circuitry Figure A

1.Graph

- - -☐- - - Load 50%
——△—— Load 100%



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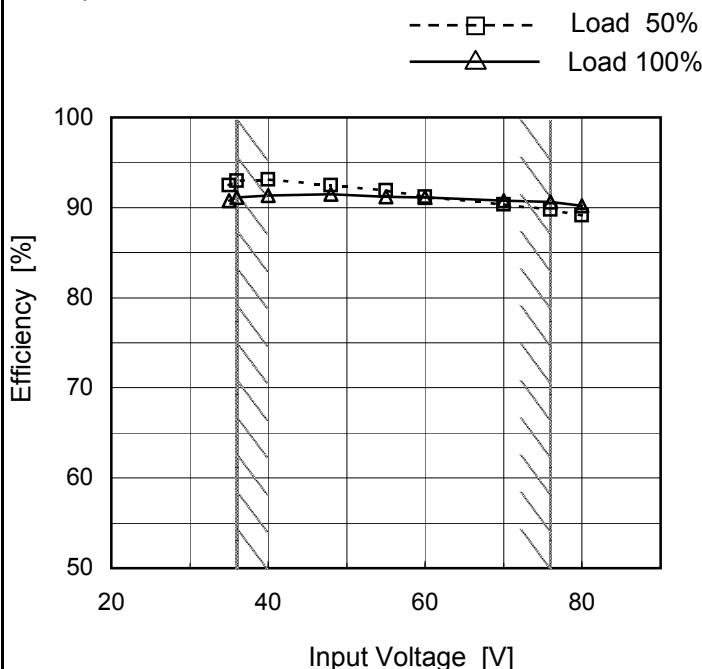
2.Values

| Input Voltage [V] | Efficiency [%] | |
|---|---|---|
| | Load 50% | Load 100% |
| 35 | 92.5 | 90.8 |
| 36 | 93.0 | 91.1 |
| 40 | 93.1 | 91.3 |
| 48 | 92.5 | 91.5 |
| 55 | 91.9 | 91.2 |
| 60 | 91.2 | 91.1 |
| 70 | 90.3 | 90.8 |
| 76 | 89.7 | 90.6 |
| 80 | 89.1 | 90.2 |

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| Model | CHS60483R3 |
|---|---|

| Item | Efficiency (by Load Current) |
|---|---|

| Object | |
|---|---|

| Temperature | 25°C |
|---|---|
| Testing Circuitry | Figure A |

1.Graph

———△——— Input Volt. 36V
– – –⊟– – – Input Volt. 48V
–·–⊙–·– Input Volt. 76V



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

2.Values

| Load Current [A] | Efficiency [%] | | |
|---|---|---|---|
| | Input Volt. 36[V] | Input Volt. 48[V] | Input Volt. 76[V] |
| 0.0 | - | - | - |
| 3.0 | 88.2 | 86.1 | 78.1 |
| 6.0 | 92.3 | 91.3 | 87.1 |
| 9.0 | 93.0 | 92.5 | 89.7 |
| 12.0 | 92.6 | 92.4 | 90.5 |
| 15.0 | 91.9 | 92.1 | 90.6 |
| 18.0 | 91.1 | 91.5 | 90.6 |
| 19.8 | 90.5 | 91.2 | 90.3 |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |

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| | |
|---|---|
| Model | CHS60483R3 |
| Item | Line Regulation |
| Object | +3.3V18A |

Temperature        25°C
Testing Circuitry    Figure A

1.Graph

- - -⊟- - -   Load  50%
———△———   Load 100%



Output Voltage [V] vs Input Voltage [V]

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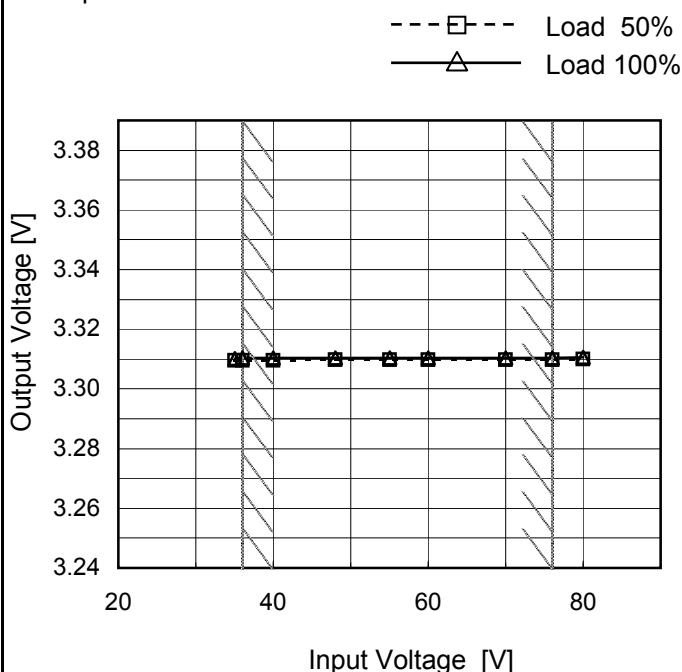
2.Values

| Input Voltage [V] | Output Voltage [V] | |
|---|---|---|
| | Load  50% | Load  100% |
| 35 | 3.310 | 3.310 |
| 36 | 3.310 | 3.310 |
| 40 | 3.310 | 3.310 |
| 48 | 3.310 | 3.310 |
| 55 | 3.310 | 3.310 |
| 60 | 3.310 | 3.310 |
| 70 | 3.310 | 3.310 |
| 76 | 3.310 | 3.310 |
| 80 | 3.310 | 3.311 |

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| Model | CHS60483R3 |
|---|---|
| Item | Load Regulation |
| Object | +3.3V18A |

Temperature  25°C
Testing Circuitry  Figure A

1.Graph

—△— Input Volt. 36V
---▣--- Input Volt. 48V
—·—○—·— Input Volt. 76V



Output Voltage [V] vs Load Current [A]

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

2.Values

| Load Current [A] | Output Voltage [V] | | |
|---|---|---|---|
| | Input Volt. 36[V] | Input Volt. 48[V] | Input Volt. 76[V] |
| 0.0 | 3.309 | 3.309 | 3.309 |
| 3.0 | 3.309 | 3.309 | 3.310 |
| 6.0 | 3.310 | 3.310 | 3.310 |
| 9.0 | 3.310 | 3.310 | 3.310 |
| 12.0 | 3.310 | 3.310 | 3.310 |
| 15.0 | 3.310 | 3.310 | 3.310 |
| 18.0 | 3.310 | 3.310 | 3.310 |
| 19.8 | 3.310 | 3.310 | 3.311 |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |

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参考資料

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| Model | CHS60483R3 |
|---|---|
| Item | Dynamic Load Response |
| Object | +3.3V18A |

Temperature 25°C
Testing Circuitry Figure A

Input Volt.　　48　V
Cycle　　10　ms

Load Current　　　　　　　　　　　　　t1,t2=100μS

t1　　　　　　t2

Min. Load (0A) ←→
　Load 100% (18A)

100mV/div

400 μs/div　　　　400 μs/div

Min. Load (0A) ←→
　Load 50% (9A)

100mV/div

400 μs/div　　　　400 μs/div

Load 50% (9A) ←→
　Load 100% (18A)

100mV/div

400 μs/div　　　　400 μs/div

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参考資料
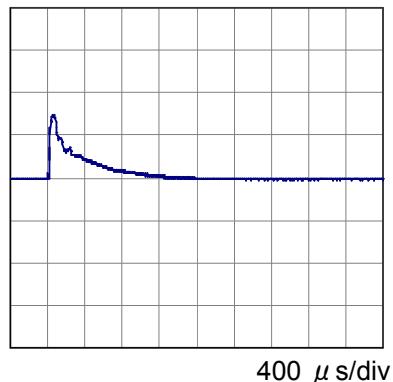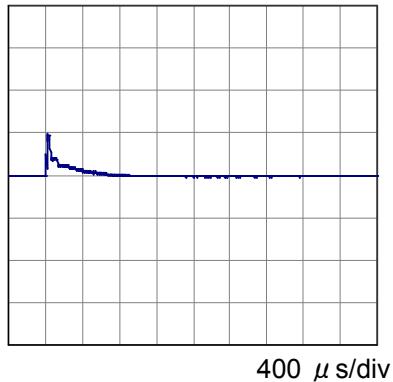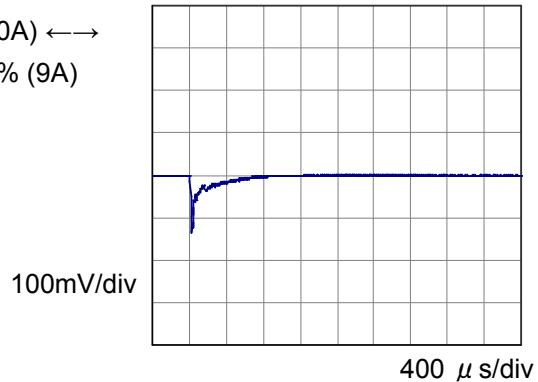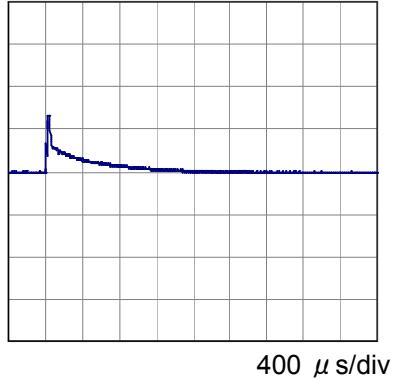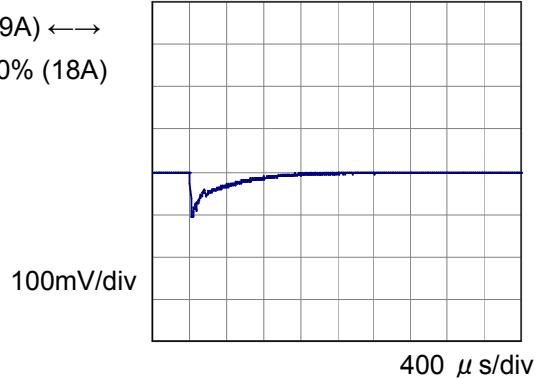
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| Model | CHS60483R3 |
|---|---|
| Item | Ripple Voltage (by Load Current) |
| Object | +3.3V18A |

Temperature       25°C
Testing Circuitry   Figure B

1.Graph

⎯△⎯ Input Volt.  36V
⎯·⊖⎯·· Input Volt.  76V
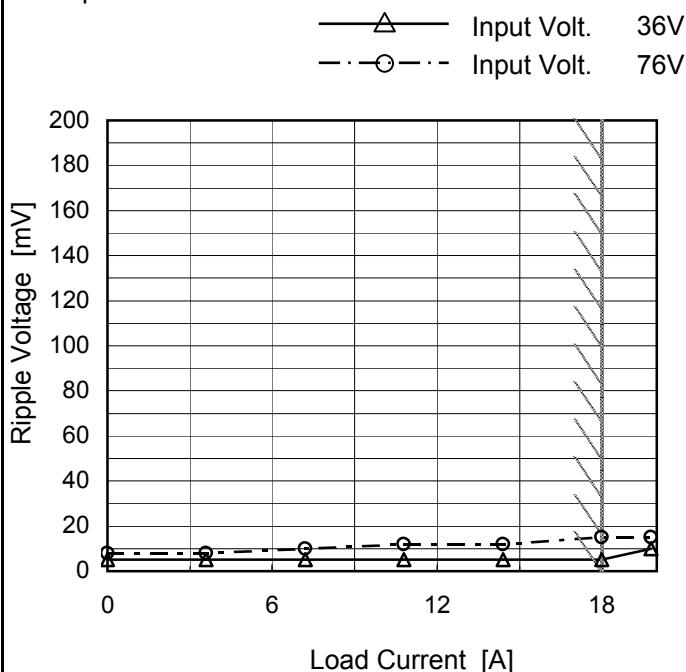
2.Values

| Load Current [A] | Ripple Voltage [mV] | |
|---|---|---|
| | Input Volt. 36 [V] | Input Volt. 76 [V] |
| 0.0 | 5 | 8 |
| 3.6 | 5 | 8 |
| 7.2 | 5 | 10 |
| 10.8 | 5 | 12 |
| 14.4 | 5 | 12 |
| 18.0 | 10 | 15 |
| 19.8 | 10 | 15 |
| -- | - | - |
| -- | - | - |
| -- | - | - |
| -- | - | - |

Ripple Voltage [mV] vs Load Current [A]

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]
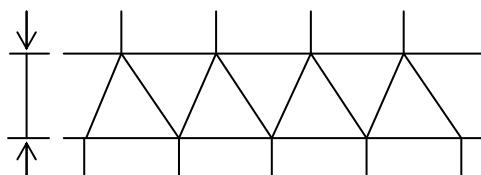
Fig.Complex Ripple Wave Form

- 9 -       BC-10848

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| Model | CHS60483R3 |
|---|---|
| Item | Ripple-Noise |
| Object | +3.3V18A |

Temperature 25°C
Testing Circuitry Figure B

1.Graph

—△— Input Volt. 36V
—·-○-·— Input Volt. 76V

Ripple-Noise [mV] vs Load Current [A]
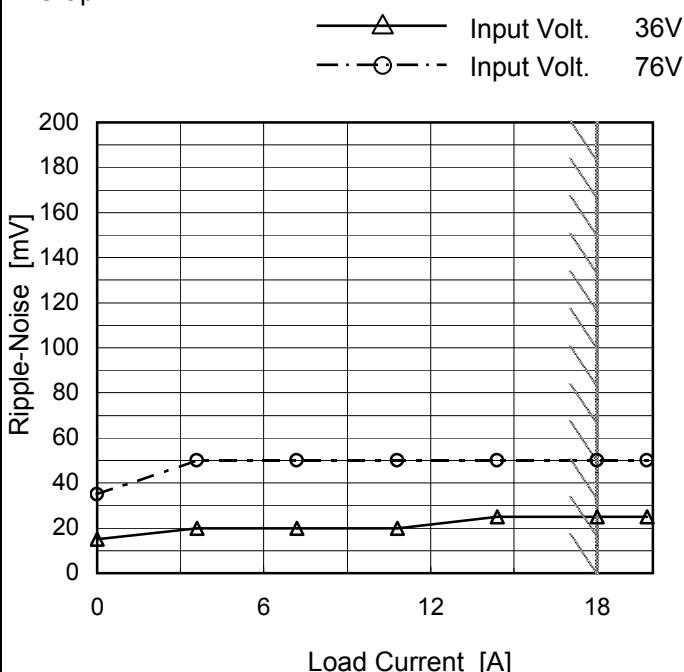
Measured by 100 MHz Oscilloscope.
Ripple-Noise is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated
load current.

2.Values

| Load Current [A] | Ripple-Noise [mV] | |
|---|---|---|
| | Input Volt. 36 [V] | Input Volt. 76 [V] |
| 0.0 | 15 | 35 |
| 3.6 | 20 | 50 |
| 7.2 | 20 | 50 |
| 10.8 | 20 | 50 |
| 14.4 | 25 | 50 |
| 18.0 | 25 | 50 |
| 19.8 | 25 | 50 |
| -- | - | - |
| -- | - | - |
| -- | - | - |
| -- | - | - |

Ripple
Noise[mVp-p]

Fig.Complex Ripple Noise Wave Form

BC-10848

**COSEL**
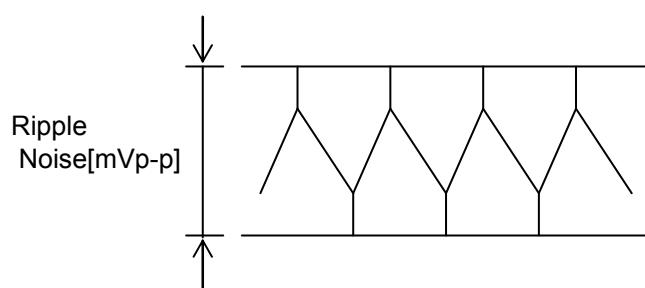
| Model | CHS60483R3 |
|---|---|
| Item | Ripple Voltage (by Ambient Temp.) |
| Object | +3.3V18A |

Testing Circuitry    Figure B

1.Graph

--□-- Load 50%
—△— Load 100%



Ambient Temperature [°C]

Input Volt.    48    V
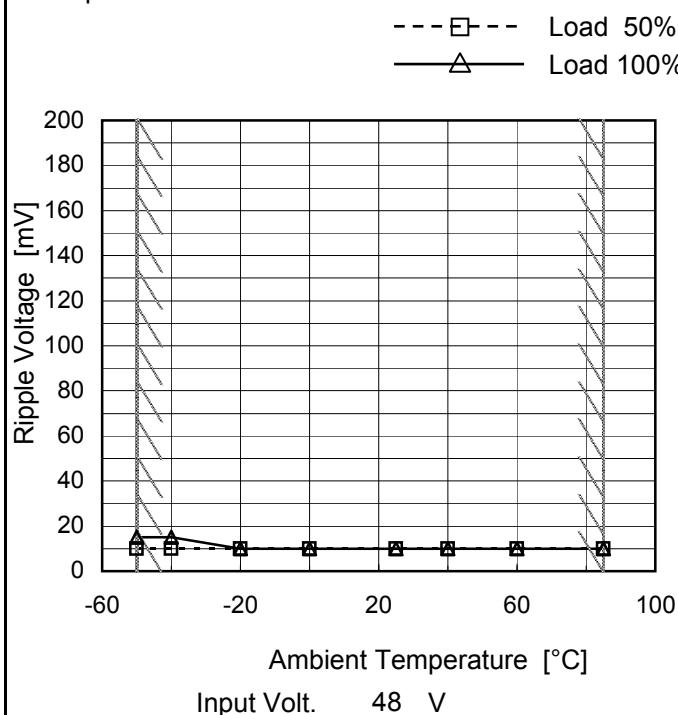
Measured by 100 MHz Oscilloscope.
Note: Slanted line shows the range of the rated ambient temperature.

Ripple [mVp-p]



Fig.Complex Ripple Wave Form

2.Values

| Ambient Temperature [°C] | Ripple Voltage [mV] | |
|---|---|---|
| | Load 50% | Load 100% |
| -50 | 10 | 15 |
| -40 | 10 | 15 |
| -20 | 10 | 10 |
| 0 | 10 | 10 |
| 25 | 10 | 10 |
| 40 | 10 | 10 |
| 60 | 10 | 10 |
| 85 | 10 | 10 |
| -- | - | - |
| -- | - | - |
| -- | - | - |

BC-10848

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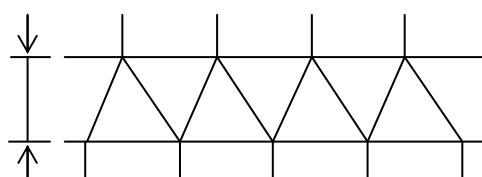
| Model | CHS60483R3 |
|---|---|

| Item | Ambient Temperature Drift |
|---|---|
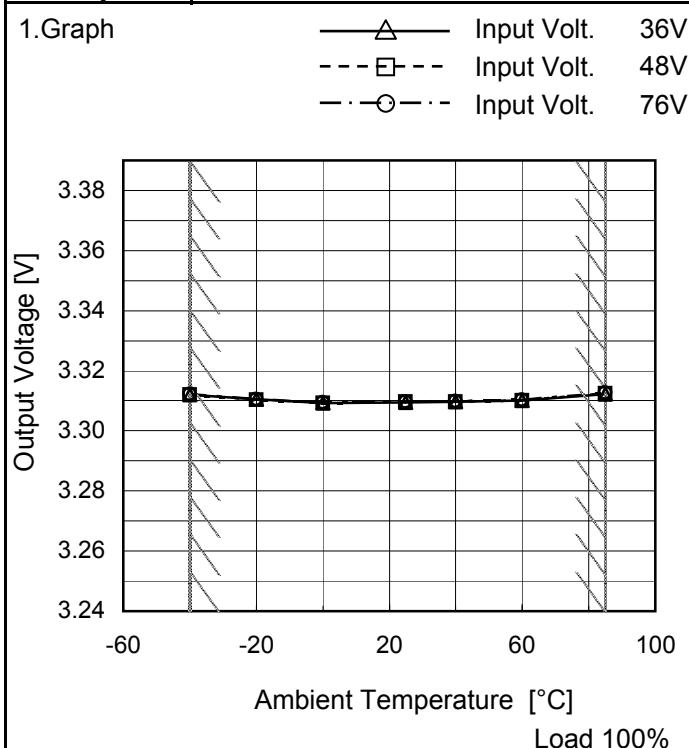
Testing Circuitry    Figure A

| Object | +3.3V18A |
|---|---|

1.Graph

———△——— Input Volt. 36V
- - -⊟- - - Input Volt. 48V
—·—⊙—·— Input Volt. 76V



Ambient Temperature  [°C]

Load 100%

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] |
| -40 | 3.312 | 3.312 | 3.312 |
| -20 | 3.311 | 3.310 | 3.311 |
| 0 | 3.309 | 3.309 | 3.309 |
| 25 | 3.310 | 3.310 | 3.310 |
| 40 | 3.310 | 3.310 | 3.310 |
| 60 | 3.310 | 3.310 | 3.310 |
| 85 | 3.312 | 3.313 | 3.313 |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |

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| | |
|---|---|
| Model | CHS60483R3 |
| Item | Output Voltage Accuracy |
| Object | +3.3V18A |

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 - 85°C

Input Voltage : 36 - 76V

Load Current : 0 - 18A

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

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

2.Values

| Item | Temperature [°C] | Input Voltage[V] | Output | | Output Voltage Accuracy | |
|---|---|---|---|---|---|---|
| | | | Current[A] | Voltage[V] | Value [mV] | Ration [%] |
| Maximum Voltage | 85 | 76 | 18 | 3.313 | ±3 | ±0.1 |
| Minimum Voltage | 0 | 36 | 0 | 3.308 | | |

BC-10848

参考資料

# COSEL

| Model | CHS60483R3 |
|---|---|
| Item | Time Lapse Drift |
| Object | +3.3V18A |

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Time [H]

Input Volt. 48V
Load 100%
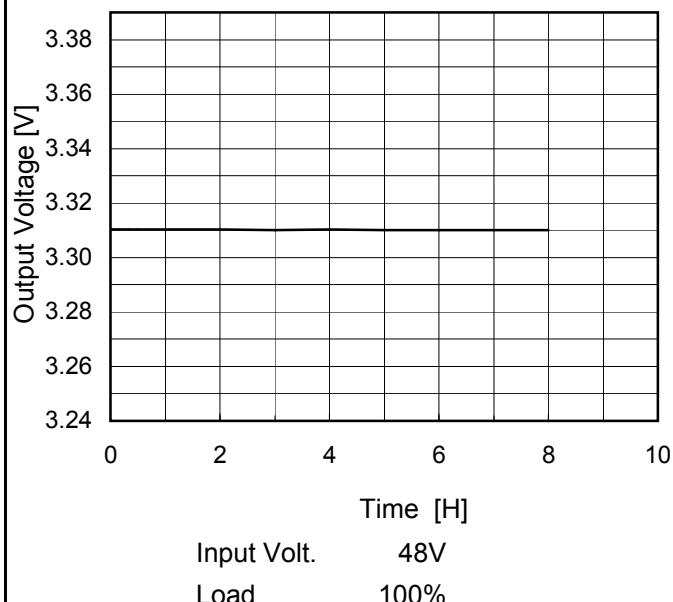
2.Values

| Time since start [H] | Output Voltage [V] |
|---|---|
| 0.0 | 3.310 |
| 0.5 | 3.310 |
| 1.0 | 3.310 |
| 2.0 | 3.310 |
| 3.0 | 3.310 |
| 4.0 | 3.310 |
| 5.0 | 3.310 |
| 6.0 | 3.310 |
| 7.0 | 3.310 |
| 8.0 | 3.310 |

BC-10848

参考資料

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| Model | CHS60483R3 |
|---|---|
| Item | Rise and Fall Time |
| Object | +3.3V18A |

Temperature 25°C
Testing Circuitry Figure A

1.Graph                                                          Input Volt.   48 V

Load 50%

Output
Volt.
[0.5V/div]

0

Load 100%

Output
Volt.
[0.5V/div]

0

Input
Volt.

0
[10V/div]        Time        [20ms/div]              Time        [20ms/div]
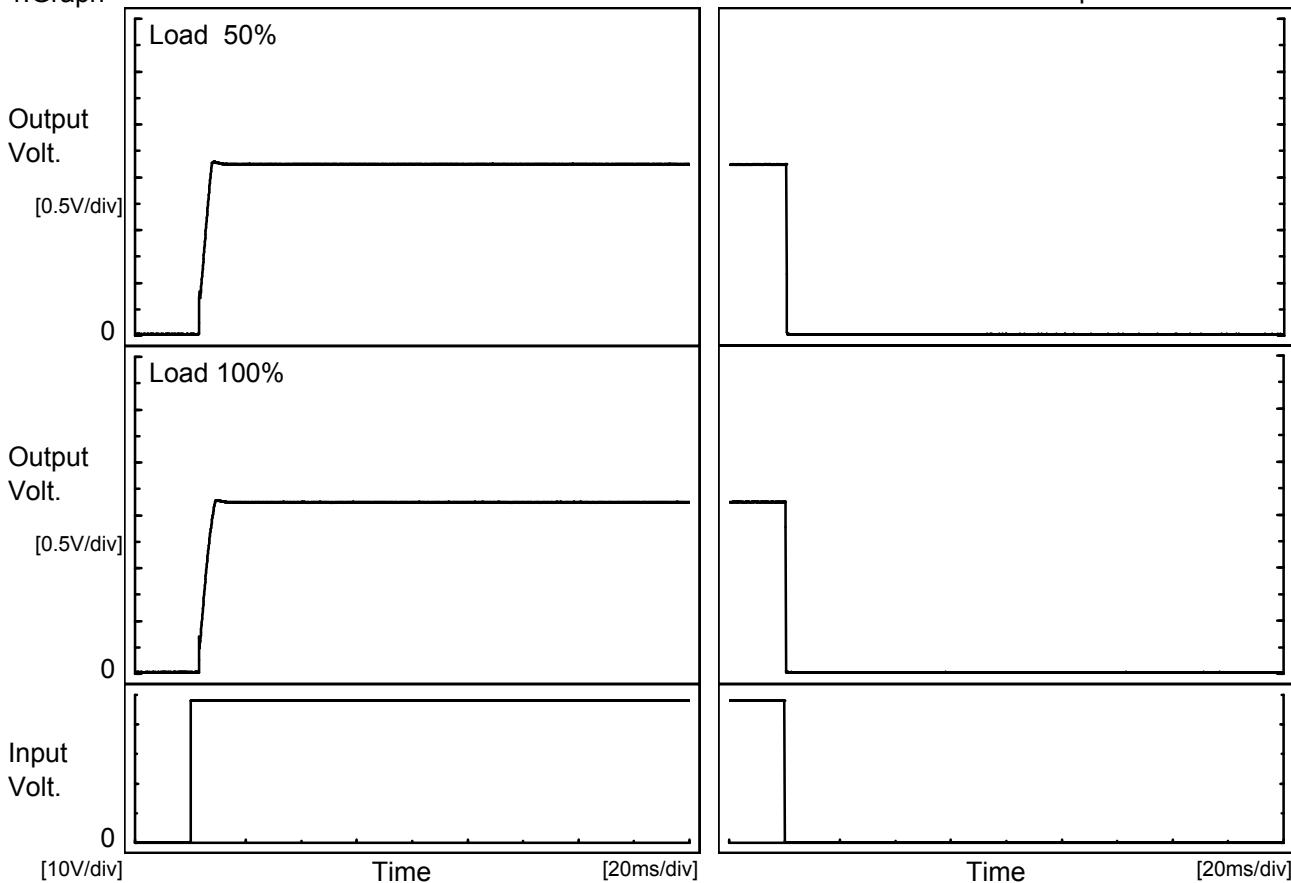
2.Values                                                                              [ms]

| Load \ Time | Td | Tr | Ts | Th | Tf |
|---|---|---|---|---|---|
| 50 % | 3.2 | 4.0 | 7.2 | 0.4 | 0.1 |
| 100 % | 3.2 | 4.8 | 8.0 | 0.3 | 0.1 |

Output
Volt.

90%

10%

Input
Volt.

Td   Tr          Th   Tf

Ts

- 15 -        BC-10848

参考資料

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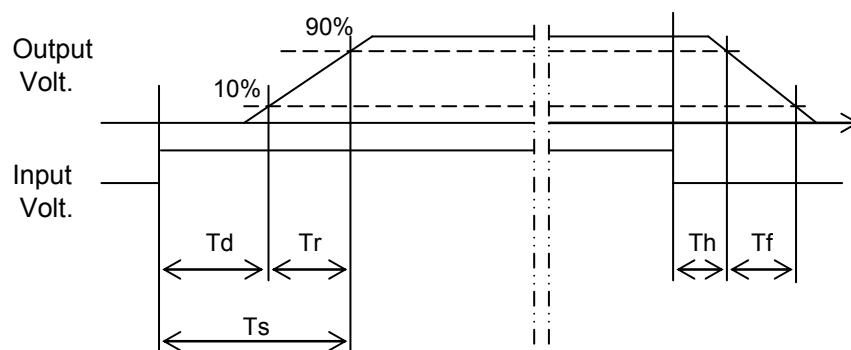
| Model | CHS60483R3 |
|---|---|
| Item | Minimum Input Voltage<br>for Regulated Output Voltage |
| Object | +3.3V18A |

Testing Circuitry   Figure A
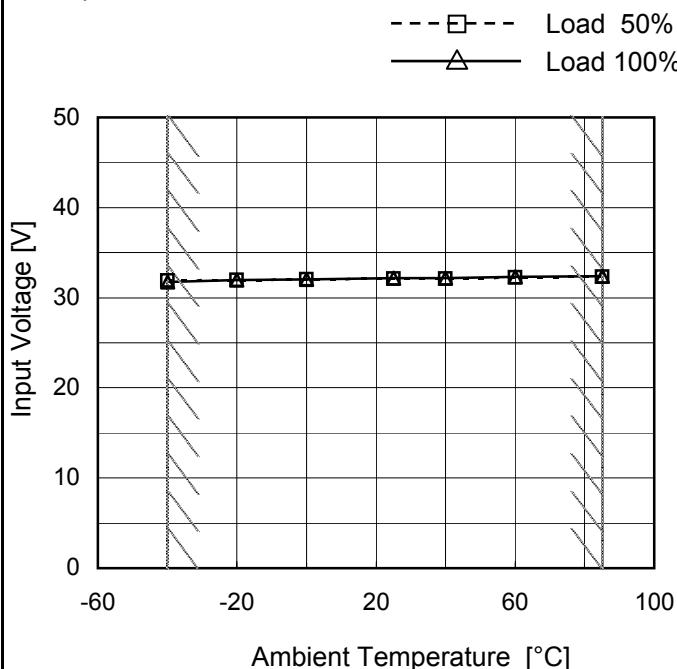
1.Graph

- - -⊟- - -  Load  50%
───△───  Load 100%



Ambient Temperature  [°C]

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

2.Values

| Ambient Temperature [°C] | Input Voltage [V] | |
|---|---|---|
| | Load  50% | Load  100% |
| -40 | 31.9 | 31.8 |
| -20 | 32.0 | 32.0 |
| 0 | 32.1 | 32.1 |
| 25 | 32.2 | 32.2 |
| 40 | 32.2 | 32.2 |
| 60 | 32.3 | 32.3 |
| 85 | 32.4 | 32.4 |
| -- | - | - |
| -- | - | - |
| -- | - | - |
| -- | - | - |

-  16  -

BC-10848

参考資料

| Model | CHS60483R3 |
| Item | Overcurrent Protection |
| Object | +3.3V18A |

Temperature 25°C
Testing Circuitry Figure A

## 1.Graph

———— Input Volt. 36V
———— Input Volt. 48V
———— Input Volt. 76V



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] |
| 3.14 | 22.17 | 22.13 | 22.27 |
| 2.97 | 22.28 | 22.31 | 22.58 |
| 2.64 | 22.60 | 22.81 | 23.32 |
| 2.31 | 22.98 | 23.39 | 24.23 |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |
| -- | - | - | - |

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参考資料

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| Model | CHS60483R3 |
|---|---|
| Item | Overvoltage Protection |
| Object | +3.3V18A |

Testing Circuitry    Figure A

1.Graph

Input Volt.    48V
Input Volt.    76V



Ambient Temperature  [°C]

Load 0%

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

2.Values

| Ambient Temperature [°C] | Operating Point [V] | |
|---|---|---|
| | Input Volt. 48[V] | Input Volt. 76[V] |
| -40 | 4.39 | 4.27 |
| -20 | 4.42 | 4.27 |
| 0 | 4.43 | 4.32 |
| 25 | 4.45 | 4.40 |
| 40 | 4.56 | 4.42 |
| 60 | 4.57 | 4.45 |
| 85 | 4.58 | 4.49 |
| -- | - | - |
| -- | - | - |
| -- | - | - |
| -- | - | - |

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## Figure A

DC Power Supply — Electronic Switch — Power Meter — Temperature Chamber [Power Supply] — Electronic DC Load — Oscilloscope

Relay Unit

DVM

Data Acquisition/Control Unit

Figure A

## Figure B

Input Pin   Output Pin

+VIN   +VOUT
       +S

RC

-VIN   -S
       -VOUT

DC Input

C1 68uF

Measuring board

C3 22uF

Load

50mm

1.5m 50Ω Coaxial cable

R
C

R=50Ω
C=0.01uF

Oscilloscope Bw:100MHz

Figure B

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