



# TEST DATA OF SUS101205 SUCS101205

Regulated DC Power Supply  
Mar 24, 2005

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**COSEL CO.,LTD.**

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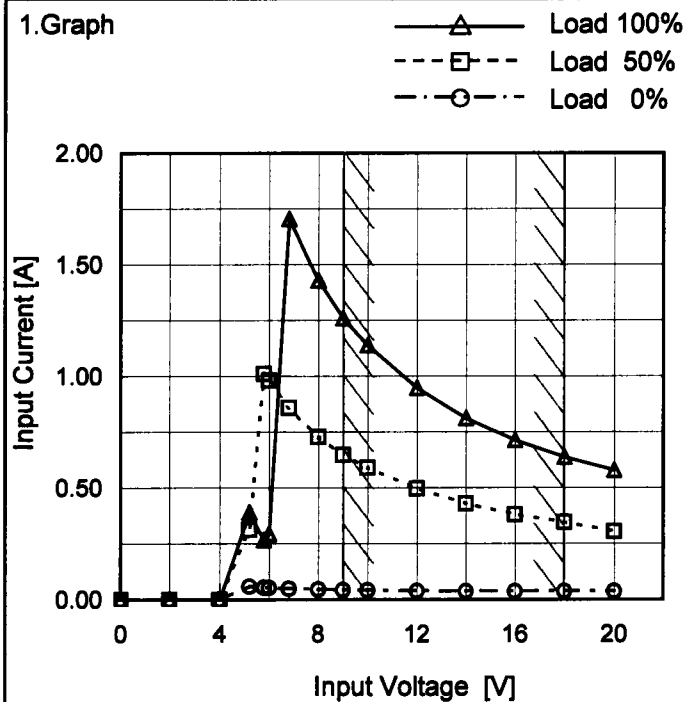
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**Model** SUS101205/SUCS101205

**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     |
| 2.0               | 0.000             | 0.000    | 0.000     |
| 4.0               | 0.000             | 0.000    | 0.000     |
| 5.2               | 0.060             | 0.314    | 0.391     |
| 5.8               | 0.054             | 1.011    | 0.268     |
| 6.0               | 0.053             | 0.981    | 0.294     |
| 6.8               | 0.049             | 0.859    | 1.705     |
| 8.0               | 0.046             | 0.728    | 1.429     |
| 9.0               | 0.043             | 0.648    | 1.259     |
| 10.0              | 0.042             | 0.591    | 1.139     |
| 12.0              | 0.040             | 0.497    | 0.948     |
| 14.0              | 0.038             | 0.430    | 0.812     |
| 16.0              | 0.037             | 0.381    | 0.713     |
| 18.0              | 0.038             | 0.346    | 0.638     |
| 20.0              | 0.038             | 0.305    | 0.579     |
| --                | -                 | -        | -         |
| --                | -                 | -        | -         |
| --                | -                 | -        | -         |

# COSEL

Model

SUS101205/SUCS101205

Item

Input Current (by Load Current)

Temperature

25°C

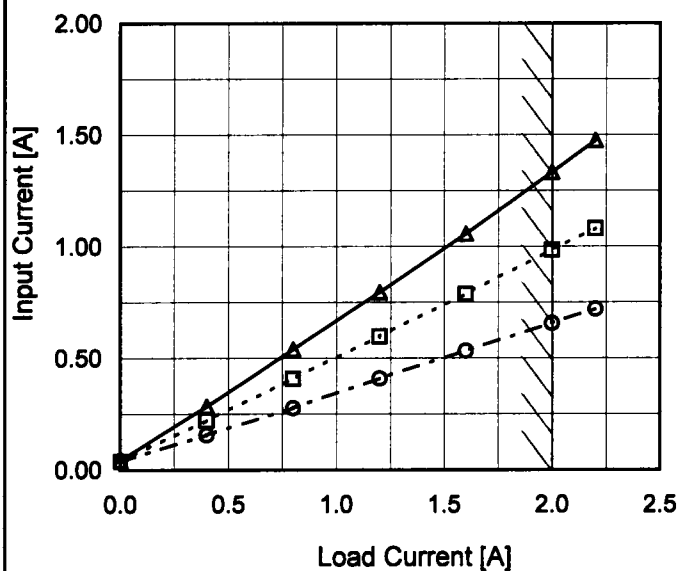
Testing Circuitry

Figure A

Object

1.Graph

—△— Input Volt. 9V  
 ---□--- Input Volt. 12V  
 ---○--- Input Volt. 18V



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

2.Values

| Load Current [A] | Input Current [A] |                   |                   |
|------------------|-------------------|-------------------|-------------------|
|                  | Input Volt. 9[V]  | Input Volt. 12[V] | Input Volt. 18[V] |
| 0.0              | 0.044             | 0.040             | 0.037             |
| 0.4              | 0.285             | 0.221             | 0.157             |
| 0.8              | 0.541             | 0.408             | 0.278             |
| 1.2              | 0.796             | 0.597             | 0.410             |
| 1.6              | 1.058             | 0.788             | 0.533             |
| 2.0              | 1.333             | 0.984             | 0.657             |
| 2.2              | 1.475             | 1.080             | 0.720             |
| —                | —                 | —                 | —                 |
| —                | —                 | —                 | —                 |
| —                | —                 | —                 | —                 |
| —                | —                 | —                 | —                 |

BC-3799

# COSEL

| Model   |                         | SUS101205/SUCS101205          |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
|---|-------------------------|-------------------------------|-------------------------|--------------------------|---|------|------|---|------|------|----|------|------|----|------|------|----|------|------|----|------|------|----|------|------|----|---|---|----|---|---|---|--|-------------------|----------------|--|----------|-----------|---|------|------|---|------|------|----|------|------|----|------|------|----|------|------|----|------|------|----|------|------|----|---|---|----|---|---|
| Item  |                         | Efficiency (by Input Voltage) |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
| Object  |                         |                               |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
| 1.Graph   |                         | 2.Values                      |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
| <div><div><div><div><div></div><div></div></div><div></div></div><div><div><div></div><div></div></div><div></div></div></div><div>Load 50%</div><div>Load 100%</div></div> <table><thead><tr><th>Input Voltage [V]</th><th>Load 50% Efficiency [%]</th><th>Load 100% Efficiency [%]</th></tr></thead><tbody><tr><td>8</td><td>85.5</td><td>85.3</td></tr><tr><td>9</td><td>85.1</td><td>86.1</td></tr><tr><td>10</td><td>84.9</td><td>86.5</td></tr><tr><td>12</td><td>83.9</td><td>86.6</td></tr><tr><td>15</td><td>82.5</td><td>86.4</td></tr><tr><td>18</td><td>81.9</td><td>85.7</td></tr><tr><td>20</td><td>81.7</td><td>84.9</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></tbody></table> <p>Note: Slanted line shows the range of the rated input voltage.</p> |                         | Input Voltage [V]             | Load 50% Efficiency [%] | Load 100% Efficiency [%] | 8 | 85.5 | 85.3 | 9 | 85.1 | 86.1 | 10 | 84.9 | 86.5 | 12 | 83.9 | 86.6 | 15 | 82.5 | 86.4 | 18 | 81.9 | 85.7 | 20 | 81.7 | 84.9 | -- | - | - | -- | - | - | <table><thead><tr><th rowspan="2">Input Voltage [V]</th><th colspan="2">Efficiency [%]</th></tr><tr><th>Load 50%</th><th>Load 100%</th></tr></thead><tbody><tr><td>8</td><td>85.5</td><td>85.3</td></tr><tr><td>9</td><td>85.1</td><td>86.1</td></tr><tr><td>10</td><td>84.9</td><td>86.5</td></tr><tr><td>12</td><td>83.9</td><td>86.6</td></tr><tr><td>15</td><td>82.5</td><td>86.4</td></tr><tr><td>18</td><td>81.9</td><td>85.7</td></tr><tr><td>20</td><td>81.7</td><td>84.9</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></tbody></table> |  | Input Voltage [V] | Efficiency [%] |  | Load 50% | Load 100% | 8 | 85.5 | 85.3 | 9 | 85.1 | 86.1 | 10 | 84.9 | 86.5 | 12 | 83.9 | 86.6 | 15 | 82.5 | 86.4 | 18 | 81.9 | 85.7 | 20 | 81.7 | 84.9 | -- | - | - | -- | - | - |
| Input Voltage [V]   | Load 50% Efficiency [%] | Load 100% Efficiency [%]      |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
| 8   | 85.5                    | 85.3                          |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
| 9   | 85.1                    | 86.1                          |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
| 10  | 84.9                    | 86.5                          |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
| 12  | 83.9                    | 86.6                          |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
| 15  | 82.5                    | 86.4                          |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
| 18  | 81.9                    | 85.7                          |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
| 20  | 81.7                    | 84.9                          |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
| --  | -                       | -                             |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
| --  | -                       | -                             |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
| Input Voltage [V]   | Efficiency [%]          |                               |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
|   | Load 50%                | Load 100%                     |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
| 8   | 85.5                    | 85.3                          |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
| 9   | 85.1                    | 86.1                          |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
| 10  | 84.9                    | 86.5                          |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
| 12  | 83.9                    | 86.6                          |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
| 15  | 82.5                    | 86.4                          |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
| 18  | 81.9                    | 85.7                          |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
| 20  | 81.7                    | 84.9                          |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
| --  | -                       | -                             |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |
| --  | -                       | -                             |                         |                          |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |   |  |                   |                |  |          |           |   |      |      |   |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |   |   |    |   |   |

Model SUS101205/SUCS101205

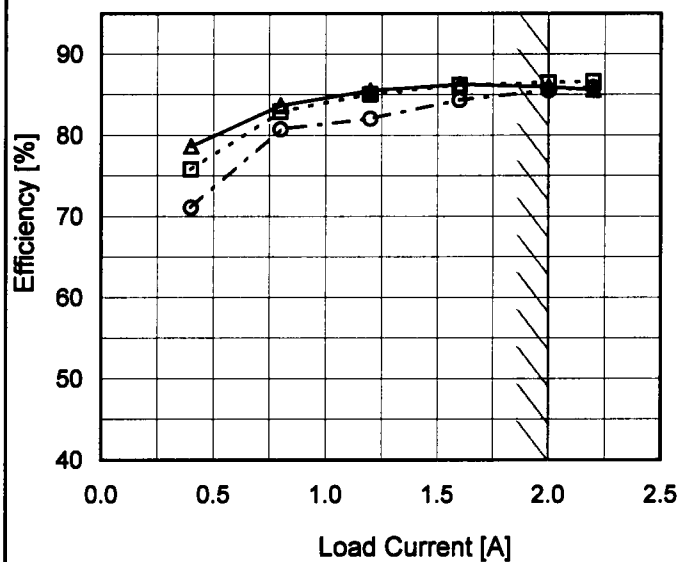
Item Efficiency (by Load Current)

Object

Temperature 25°C  
Testing Circuitry Figure A

## 1. Graph

—△— Input Volt. 9V  
---□--- Input Volt. 12V  
- -○- - Input Volt. 18V



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

## 2. Values

| Load Current [A] | Efficiency [%]   |                   |                   |
|------------------|------------------|-------------------|-------------------|
|                  | Input Volt. 9[V] | Input Volt. 12[V] | Input Volt. 18[V] |
| 0.0              | -                | -                 | -                 |
| 0.4              | 78.6             | 75.8              | 71.1              |
| 0.8              | 83.7             | 82.9              | 80.7              |
| 1.2              | 85.5             | 85.0              | 82.0              |
| 1.6              | 86.3             | 86.2              | 84.3              |
| 2.0              | 86.0             | 86.5              | 85.5              |
| 2.2              | 85.6             | 86.6              | 85.9              |
| --               | -                | -                 | -                 |
| --               | -                | -                 | -                 |
| --               | -                | -                 | -                 |
| --               | -                | -                 | -                 |

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| Model  | SUS101205/SUCS101205        |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|--|-----------------------------|------------------------------|-----------------------------|------------------------------|---|-------|-------|---|-------|-------|----|-------|-------|----|-------|-------|----|-------|-------|----|-------|-------|----|-------|-------|----|---|---|----|---|---|--|--|
| Item   | Line Regulation             | Temperature                  | 25°C                        |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
| Object   | +5V2A                       | Testing Circuitry            | Figure A                    |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
| 1.Graph  |                             | 2.Values                     |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
| <div><div><div>---□---</div><div>Load 50%</div></div><div><div>—△—</div><div>Load 100%</div></div></div> <table><thead><tr><th>Input Voltage [V]</th><th>Output Voltage [V] Load 50%</th><th>Output Voltage [V] Load 100%</th></tr></thead><tbody><tr><td>8</td><td>5.019</td><td>5.011</td></tr><tr><td>9</td><td>5.019</td><td>5.011</td></tr><tr><td>10</td><td>5.020</td><td>5.012</td></tr><tr><td>12</td><td>5.020</td><td>5.013</td></tr><tr><td>15</td><td>5.021</td><td>5.013</td></tr><tr><td>18</td><td>5.021</td><td>5.014</td></tr><tr><td>20</td><td>5.021</td><td>5.015</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></tbody></table> <p>Note: Slanted line shows the range of the rated input voltage.</p> |                             | Input Voltage [V]            | Output Voltage [V] Load 50% | Output Voltage [V] Load 100% | 8 | 5.019 | 5.011 | 9 | 5.019 | 5.011 | 10 | 5.020 | 5.012 | 12 | 5.020 | 5.013 | 15 | 5.021 | 5.013 | 18 | 5.021 | 5.014 | 20 | 5.021 | 5.015 | -- | - | - | -- | - | - |  |  |
| Input Voltage [V]  | Output Voltage [V] Load 50% | Output Voltage [V] Load 100% |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
| 8  | 5.019                       | 5.011                        |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
| 9  | 5.019                       | 5.011                        |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
| 10   | 5.020                       | 5.012                        |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
| 12   | 5.020                       | 5.013                        |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
| 15   | 5.021                       | 5.013                        |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
| 18   | 5.021                       | 5.014                        |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
| 20   | 5.021                       | 5.015                        |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
| --   | -                           | -                            |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
| --   | -                           | -                            |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
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|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
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|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
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|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
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|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
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|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
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|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
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|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
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|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
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|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |
|  |                             |                              |                             |                              |   |       |       |   |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |       |       |    |   |   |    |   |   |  |  |



| Model  |                    | SUS101205/SUCS101205  |                   | Temperature 25°C           |                    |  |  |                  |                   |                   |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |    |   |   |   |    |   |   |   |    |   |   |   |    |   |   |   |
|--|--------------------|---|-------------------|----------------------------|--------------------|--|--|------------------|-------------------|-------------------|-----|-------|-------|-------|-----|-------|-------|-------|-----|-------|-------|-------|-----|-------|-------|-------|-----|-------|-------|-------|-----|-------|-------|-------|-----|-------|-------|-------|----|---|---|---|----|---|---|---|----|---|---|---|----|---|---|---|
| Item   |                    | Load Regulation   |                   | Testing Circuitry Figure A |                    |  |  |                  |                   |                   |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |    |   |   |   |    |   |   |   |    |   |   |   |    |   |   |   |
| Object   |                    | +5V2A   |                   |                            |                    |  |  |                  |                   |                   |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |    |   |   |   |    |   |   |   |    |   |   |   |    |   |   |   |
| 1.Graph  |                    | <div><div>—△—</div>Input Volt. 9V</div> <div><div>---□---</div>Input Volt. 12V</div> <div><div>---○---</div>Input Volt. 18V</div>   |                   | 2.Values                   |                    |  |  |                  |                   |                   |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |    |   |   |   |    |   |   |   |    |   |   |   |    |   |   |   |
| <div><div>Output Voltage [V]</div><div><div><div>5.08</div><div>5.06</div><div>5.04</div><div>5.02</div><div>5.00</div><div>4.98</div><div>4.96</div><div>4.94</div></div><div><div>0.0</div><div>0.5</div><div>1.0</div><div>1.5</div><div>2.0</div><div>2.5</div></div><div>Load Current [A]</div></div></div> <div><div>Note: Slanted line shows the range of the rated load current.</div></div> |                    | <table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 9[V]</th><th>Input Volt. 12[V]</th><th>Input Volt. 18[V]</th></tr><tr><td>0.0</td><td>5.023</td><td>5.023</td><td>5.023</td></tr><tr><td>0.4</td><td>5.023</td><td>5.022</td><td>5.022</td></tr><tr><td>0.8</td><td>5.021</td><td>5.021</td><td>5.021</td></tr><tr><td>1.2</td><td>5.019</td><td>5.019</td><td>5.020</td></tr><tr><td>1.6</td><td>5.015</td><td>5.017</td><td>5.018</td></tr><tr><td>2.0</td><td>5.012</td><td>5.014</td><td>5.015</td></tr><tr><td>2.2</td><td>5.010</td><td>5.012</td><td>5.014</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table> |                   | Load Current [A]           | Output Voltage [V] |  |  | Input Volt. 9[V] | Input Volt. 12[V] | Input Volt. 18[V] | 0.0 | 5.023 | 5.023 | 5.023 | 0.4 | 5.023 | 5.022 | 5.022 | 0.8 | 5.021 | 5.021 | 5.021 | 1.2 | 5.019 | 5.019 | 5.020 | 1.6 | 5.015 | 5.017 | 5.018 | 2.0 | 5.012 | 5.014 | 5.015 | 2.2 | 5.010 | 5.012 | 5.014 | -- | - | - | - | -- | - | - | - | -- | - | - | - | -- | - | - | - |
| Load Current [A]   | Output Voltage [V] |   |                   |                            |                    |  |  |                  |                   |                   |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |    |   |   |   |    |   |   |   |    |   |   |   |    |   |   |   |
|  | Input Volt. 9[V]   | Input Volt. 12[V]   | Input Volt. 18[V] |                            |                    |  |  |                  |                   |                   |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |    |   |   |   |    |   |   |   |    |   |   |   |    |   |   |   |
| 0.0  | 5.023              | 5.023   | 5.023             |                            |                    |  |  |                  |                   |                   |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |    |   |   |   |    |   |   |   |    |   |   |   |    |   |   |   |
| 0.4  | 5.023              | 5.022   | 5.022             |                            |                    |  |  |                  |                   |                   |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |    |   |   |   |    |   |   |   |    |   |   |   |    |   |   |   |
| 0.8  | 5.021              | 5.021   | 5.021             |                            |                    |  |  |                  |                   |                   |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |    |   |   |   |    |   |   |   |    |   |   |   |    |   |   |   |
| 1.2  | 5.019              | 5.019   | 5.020             |                            |                    |  |  |                  |                   |                   |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |    |   |   |   |    |   |   |   |    |   |   |   |    |   |   |   |
| 1.6  | 5.015              | 5.017   | 5.018             |                            |                    |  |  |                  |                   |                   |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |    |   |   |   |    |   |   |   |    |   |   |   |    |   |   |   |
| 2.0  | 5.012              | 5.014   | 5.015             |                            |                    |  |  |                  |                   |                   |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |    |   |   |   |    |   |   |   |    |   |   |   |    |   |   |   |
| 2.2  | 5.010              | 5.012   | 5.014             |                            |                    |  |  |                  |                   |                   |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |    |   |   |   |    |   |   |   |    |   |   |   |    |   |   |   |
| --   | -                  | -   | -                 |                            |                    |  |  |                  |                   |                   |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |    |   |   |   |    |   |   |   |    |   |   |   |    |   |   |   |
| --   | -                  | -   | -                 |                            |                    |  |  |                  |                   |                   |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |    |   |   |   |    |   |   |   |    |   |   |   |    |   |   |   |
| --   | -                  | -   | -                 |                            |                    |  |  |                  |                   |                   |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |    |   |   |   |    |   |   |   |    |   |   |   |    |   |   |   |
| --   | -                  | -   | -                 |                            |                    |  |  |                  |                   |                   |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |    |   |   |   |    |   |   |   |    |   |   |   |    |   |   |   |
|  |                    |   |                   |                            |                    |  |  |                  |                   |                   |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |     |       |       |       |    |   |   |   |    |   |   |   |    |   |   |   |    |   |   |   |

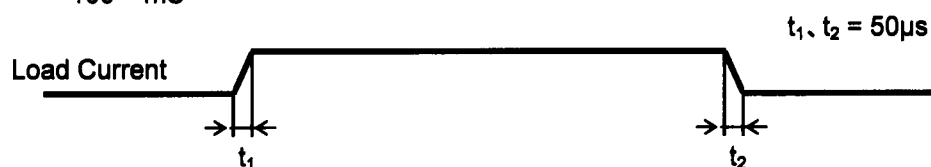
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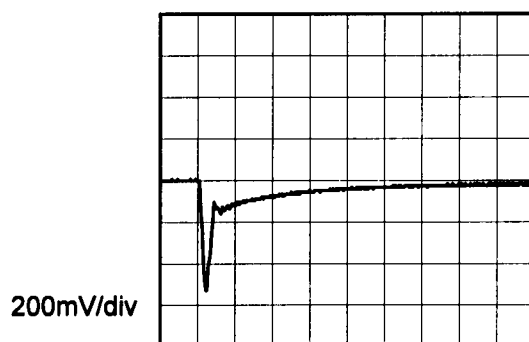
# COSEL

|        |                       |                   |          |
|--------|-----------------------|-------------------|----------|
| Model  | SUS101205/SUCS101205  | Temperature       | 25°C     |
| Item   | Dynamic Load Response | Testing Circuitry | Figure A |
| Object | +5V2A                 |                   |          |

Input Volt. 12 V  
Cycle 100 mS



Min. Load (0A)  $\longleftrightarrow$   
Load 100% (2A)

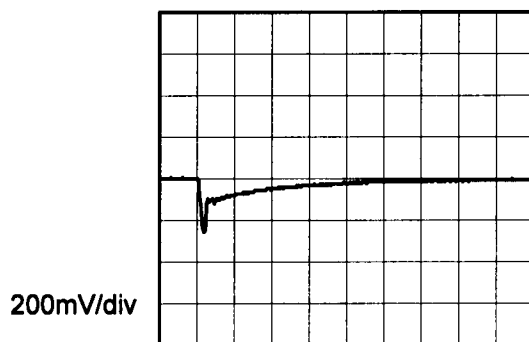


200µs/div

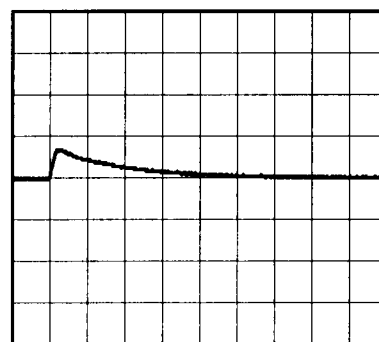


200µs/div

Min. Load (0A)  $\longleftrightarrow$   
Load 50% (1A)

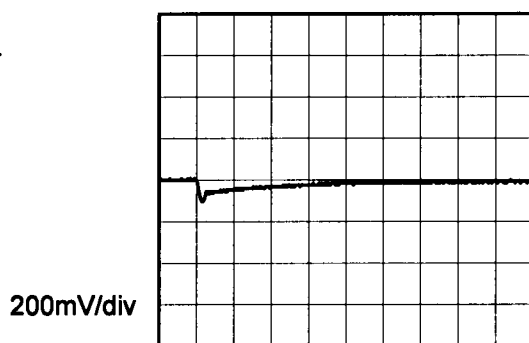


200µs/div

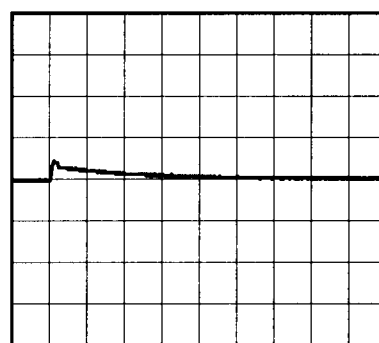


200µs/div

Load 50% (1A)  $\longleftrightarrow$   
Load 100% (2A)



200µs/div



200µs/div

# COSEL

| Model  | SUS101205/SUCS101205             |   |                            |                  |                     |  |                   |                    |     |   |    |     |   |   |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
|--|----------------------------------|---|----------------------------|------------------|---------------------|--|-------------------|--------------------|-----|---|----|-----|---|---|-----|----|----|-----|----|----|-----|----|----|-----|----|----|-----|----|----|---|---|---|---|---|---|---|---|---|---|---|---|
| Item   | Ripple Voltage (by Load Current) |   | Temperature 25°C           |                  |                     |  |                   |                    |     |   |    |     |   |   |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| Object   | +5V2A                            |   | Testing Circuitry Figure B |                  |                     |  |                   |                    |     |   |    |     |   |   |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| 1.Graph  |                                  | 2.Values  |                            |                  |                     |  |                   |                    |     |   |    |     |   |   |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| <div><div><div>—△— Input Volt. 9V</div><div>- - -○- - - Input Volt. 18V</div></div><div>Ripple Voltage [mV]</div><div>Load Current [A]</div></div>                                   |                                  | <table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 9 [V]</th><th>Input Volt. 18 [V]</th></tr><tr><td>0.0</td><td>3</td><td>10</td></tr><tr><td>0.4</td><td>7</td><td>8</td></tr><tr><td>0.8</td><td>10</td><td>11</td></tr><tr><td>1.2</td><td>15</td><td>13</td></tr><tr><td>1.6</td><td>19</td><td>15</td></tr><tr><td>2.0</td><td>24</td><td>16</td></tr><tr><td>2.2</td><td>26</td><td>18</td></tr><tr><td>—</td><td>-</td><td>-</td></tr><tr><td>—</td><td>-</td><td>-</td></tr><tr><td>—</td><td>-</td><td>-</td></tr><tr><td>—</td><td>-</td><td>-</td></tr></table> |                            | Load Current [A] | Ripple Voltage [mV] |  | Input Volt. 9 [V] | Input Volt. 18 [V] | 0.0 | 3 | 10 | 0.4 | 7 | 8 | 0.8 | 10 | 11 | 1.2 | 15 | 13 | 1.6 | 19 | 15 | 2.0 | 24 | 16 | 2.2 | 26 | 18 | — | - | - | — | - | - | — | - | - | — | - | - |
| Load Current [A]   | Ripple Voltage [mV]              |   |                            |                  |                     |  |                   |                    |     |   |    |     |   |   |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
|  | Input Volt. 9 [V]                | Input Volt. 18 [V]  |                            |                  |                     |  |                   |                    |     |   |    |     |   |   |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| 0.0  | 3                                | 10  |                            |                  |                     |  |                   |                    |     |   |    |     |   |   |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| 0.4  | 7                                | 8   |                            |                  |                     |  |                   |                    |     |   |    |     |   |   |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| 0.8  | 10                               | 11  |                            |                  |                     |  |                   |                    |     |   |    |     |   |   |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| 1.2  | 15                               | 13  |                            |                  |                     |  |                   |                    |     |   |    |     |   |   |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| 1.6  | 19                               | 15  |                            |                  |                     |  |                   |                    |     |   |    |     |   |   |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| 2.0  | 24                               | 16  |                            |                  |                     |  |                   |                    |     |   |    |     |   |   |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| 2.2  | 26                               | 18  |                            |                  |                     |  |                   |                    |     |   |    |     |   |   |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| —  | -                                | -   |                            |                  |                     |  |                   |                    |     |   |    |     |   |   |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| —  | -                                | -   |                            |                  |                     |  |                   |                    |     |   |    |     |   |   |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| —  | -                                | -   |                            |                  |                     |  |                   |                    |     |   |    |     |   |   |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| —  | -                                | -   |                            |                  |                     |  |                   |                    |     |   |    |     |   |   |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| <div>Measured by 100 MHz Oscilloscope.</div> <div>Ripple Voltage is shown as p-p in the figure below.</div> <div>Note: Slanted line shows the range of the rated load current.</div> |                                  |   |                            |                  |                     |  |                   |                    |     |   |    |     |   |   |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| <div><div>Ripple [mVp-p]</div><div>Fig.Complex Ripple Wave Form</div></div>  |                                  |   |                            |                  |                     |  |                   |                    |     |   |    |     |   |   |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |

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# COSEL

| Model   |                   | SUS101205/SUCS101205   |  |                  |                   |  |                   |                    |     |   |    |     |   |    |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
|---|-------------------|--|--|------------------|-------------------|--|-------------------|--------------------|-----|---|----|-----|---|----|-----|----|----|-----|----|----|-----|----|----|-----|----|----|-----|----|----|---|---|---|---|---|---|---|---|---|---|---|---|
| Item  |                   | Ripple-Noise   |  |                  |                   |  |                   |                    |     |   |    |     |   |    |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| Object  |                   | +5V2A  |  |                  |                   |  |                   |                    |     |   |    |     |   |    |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| 1.Graph   |                   | 2.Values   |  |                  |                   |  |                   |                    |     |   |    |     |   |    |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| <div><div><div>—△— Input Volt. 9V</div><div>- -○- - Input Volt. 18V</div></div><p>Measured by 100 MHz Oscilloscope.<br/>Ripple-Noise is shown as p-p in the figure below.<br/>Note: Slanted line shows the range of the rated load current.</p></div> |                   | <table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple-Noise [mV]</th></tr><tr><th>Input Volt. 9 [V]</th><th>Input Volt. 18 [V]</th></tr><tr><td>0.0</td><td>5</td><td>14</td></tr><tr><td>0.4</td><td>9</td><td>10</td></tr><tr><td>0.8</td><td>15</td><td>13</td></tr><tr><td>1.2</td><td>20</td><td>17</td></tr><tr><td>1.6</td><td>26</td><td>21</td></tr><tr><td>2.0</td><td>32</td><td>25</td></tr><tr><td>2.2</td><td>35</td><td>27</td></tr><tr><td>—</td><td>—</td><td>—</td></tr><tr><td>—</td><td>—</td><td>—</td></tr><tr><td>—</td><td>—</td><td>—</td></tr><tr><td>—</td><td>—</td><td>—</td></tr></table> |  | Load Current [A] | Ripple-Noise [mV] |  | Input Volt. 9 [V] | Input Volt. 18 [V] | 0.0 | 5 | 14 | 0.4 | 9 | 10 | 0.8 | 15 | 13 | 1.2 | 20 | 17 | 1.6 | 26 | 21 | 2.0 | 32 | 25 | 2.2 | 35 | 27 | — | — | — | — | — | — | — | — | — | — | — | — |
| Load Current [A]  | Ripple-Noise [mV] |  |  |                  |                   |  |                   |                    |     |   |    |     |   |    |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
|   | Input Volt. 9 [V] | Input Volt. 18 [V]   |  |                  |                   |  |                   |                    |     |   |    |     |   |    |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| 0.0   | 5                 | 14   |  |                  |                   |  |                   |                    |     |   |    |     |   |    |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| 0.4   | 9                 | 10   |  |                  |                   |  |                   |                    |     |   |    |     |   |    |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| 0.8   | 15                | 13   |  |                  |                   |  |                   |                    |     |   |    |     |   |    |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| 1.2   | 20                | 17   |  |                  |                   |  |                   |                    |     |   |    |     |   |    |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| 1.6   | 26                | 21   |  |                  |                   |  |                   |                    |     |   |    |     |   |    |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| 2.0   | 32                | 25   |  |                  |                   |  |                   |                    |     |   |    |     |   |    |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| 2.2   | 35                | 27   |  |                  |                   |  |                   |                    |     |   |    |     |   |    |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| —   | —                 | —  |  |                  |                   |  |                   |                    |     |   |    |     |   |    |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| —   | —                 | —  |  |                  |                   |  |                   |                    |     |   |    |     |   |    |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| —   | —                 | —  |  |                  |                   |  |                   |                    |     |   |    |     |   |    |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| —   | —                 | —  |  |                  |                   |  |                   |                    |     |   |    |     |   |    |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |
| <div><div><div><div></div><div></div></div><div>Ripple Noise[mVp-p]</div></div><p>Fig.Complex Ripple Noise Wave Form</p></div>  |                   |  |  |                  |                   |  |                   |                    |     |   |    |     |   |    |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |   |   |   |   |   |   |   |   |   |   |   |   |

- 10 -

BC-3799

# COSEL

Model

SUS101205/SUCS101205

Item

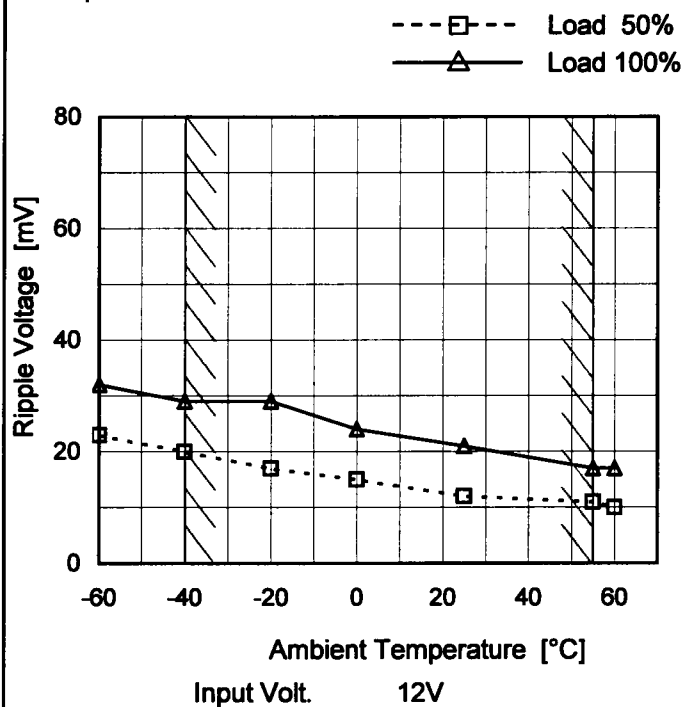
Ripple Voltage (by Ambient Temp.)

Object

+5V2A

Testing Circuitry Figure B

## 1. Graph



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                      | 23                  | 32        |
| -40                      | 20                  | 29        |
| -20                      | 17                  | 29        |
| 0                        | 15                  | 24        |
| 25                       | 12                  | 21        |
| 55                       | 11                  | 17        |
| 60                       | 10                  | 17        |
| —                        | —                   | —         |
| —                        | —                   | —         |
| —                        | —                   | —         |
| —                        | —                   | —         |

Model SUS101205/SUCS101205

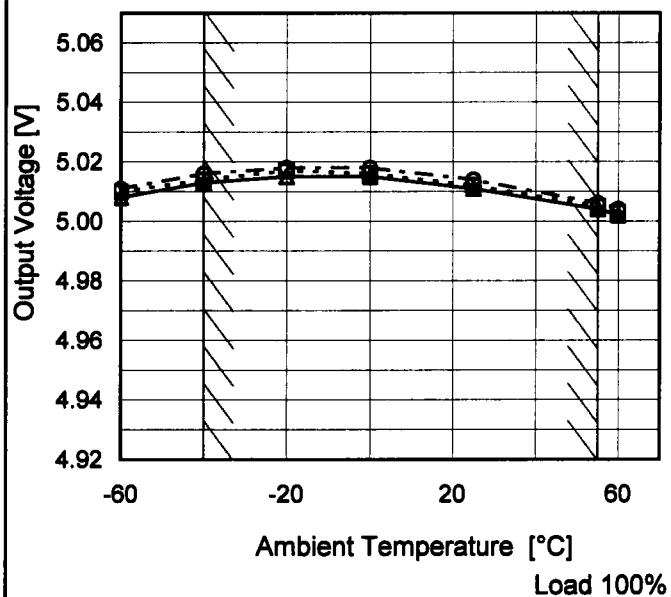
Item Ambient Temperature Drift

Object +5V2A

Testing Circuitry Figure A

## 1. Graph

—△— Input Volt. 9V  
 ---□--- Input Volt. 12V  
 -·-○-·- Input Volt. 18V



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

## 2. Values

| Ambient Temperature [°C] | Output Voltage [V] |                   |                   |
|--------------------------|--------------------|-------------------|-------------------|
|                          | Input Volt. 9[V]   | Input Volt. 12[V] | Input Volt. 18[V] |
| -60                      | 5.008              | 5.010             | 5.011             |
| -40                      | 5.013              | 5.014             | 5.016             |
| -20                      | 5.015              | 5.017             | 5.018             |
| 0                        | 5.015              | 5.016             | 5.018             |
| 25                       | 5.011              | 5.012             | 5.014             |
| 55                       | 5.004              | 5.005             | 5.006             |
| 60                       | 5.002              | 5.003             | 5.004             |
| -                        | -                  | -                 | -                 |
| -                        | -                  | -                 | -                 |
| -                        | -                  | -                 | -                 |
| -                        | -                  | -                 | -                 |



|        |                         |                            |
|--------|-------------------------|----------------------------|
|        |                         | Testing Circuitry Figure A |
| Model  | SUS101205/SUCS101205    |                            |
| Item   | Output Voltage Accuracy |                            |
| Object | +5V2A                   |                            |

### 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 : 9 - 18V

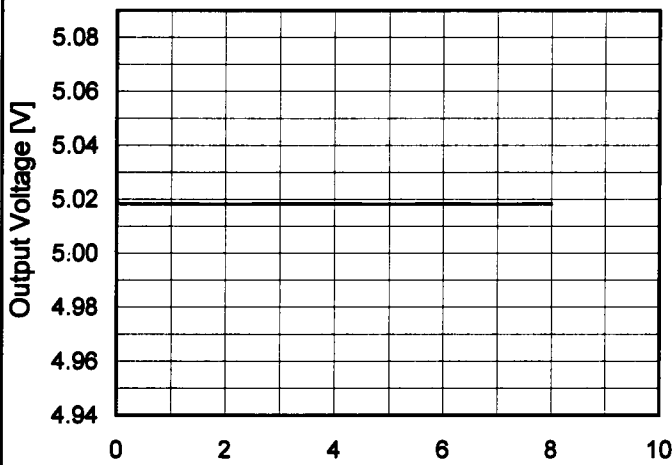
Load Current : 0 - 2A

\* Output Voltage Accuracy =  $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

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

### 2. Values

| Item            | Temperature<br>[°C] | Input<br>Voltage[V] | Output     |            | Output Voltage Accuracy |           |
|-----------------|---------------------|---------------------|------------|------------|-------------------------|-----------|
|                 |                     |                     | Current[A] | Voltage[V] | Value [mV]              | Ratio [%] |
| Maximum Voltage | -20                 | 9                   | 0          | 5.027      | ±12                     | ±0.2      |
| Minimum Voltage | 55                  | 9                   | 2          | 5.004      |                         |           |

| Model   | SUS101205/SUCS101205 |  |  |                      |                    |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |
|---|----------------------|--|--|----------------------|--------------------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| Item  | Time Lapse Drift     |  |  |                      |                    |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |
| Object  | +5V2A                |  |  |                      |                    |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |
| 1.Graph   |                      | 2.Values   |  |                      |                    |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |
| <div><p>Output Voltage [V]</p><p>Time [H]</p><p>Input Volt. 12V</p><p>Load 100%</p></div> |                      | <table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>5.020</td></tr><tr><td>0.5</td><td>5.018</td></tr><tr><td>1.0</td><td>5.018</td></tr><tr><td>2.0</td><td>5.018</td></tr><tr><td>3.0</td><td>5.018</td></tr><tr><td>4.0</td><td>5.018</td></tr><tr><td>5.0</td><td>5.018</td></tr><tr><td>6.0</td><td>5.018</td></tr><tr><td>7.0</td><td>5.018</td></tr><tr><td>8.0</td><td>5.018</td></tr></table> |  | Time since start [H] | Output Voltage [V] | 0.0 | 5.020 | 0.5 | 5.018 | 1.0 | 5.018 | 2.0 | 5.018 | 3.0 | 5.018 | 4.0 | 5.018 | 5.0 | 5.018 | 6.0 | 5.018 | 7.0 | 5.018 | 8.0 | 5.018 |
| Time since start [H]  | Output Voltage [V]   |  |  |                      |                    |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |
| 0.0   | 5.020                |  |  |                      |                    |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |
| 0.5   | 5.018                |  |  |                      |                    |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |
| 1.0   | 5.018                |  |  |                      |                    |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |
| 2.0   | 5.018                |  |  |                      |                    |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |
| 3.0   | 5.018                |  |  |                      |                    |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |
| 4.0   | 5.018                |  |  |                      |                    |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |
| 5.0   | 5.018                |  |  |                      |                    |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |
| 6.0   | 5.018                |  |  |                      |                    |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |
| 7.0   | 5.018                |  |  |                      |                    |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |
| 8.0   | 5.018                |  |  |                      |                    |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |



# COSEL

Model

SUS101205/SUCS101205

Item

Rise and Fall Time

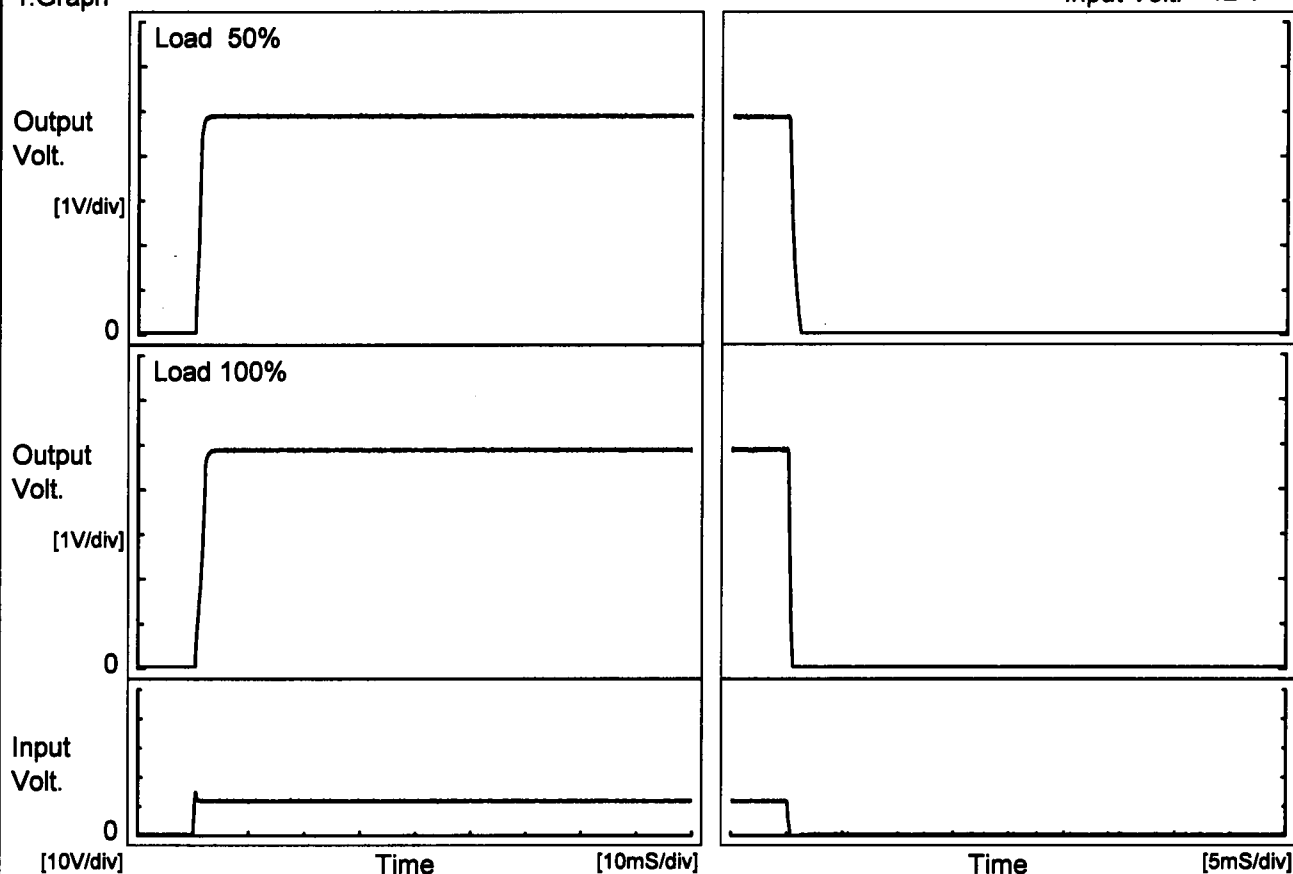
Temperature  
Testing Circuitry25°C  
Figure A

Object

+5V2A

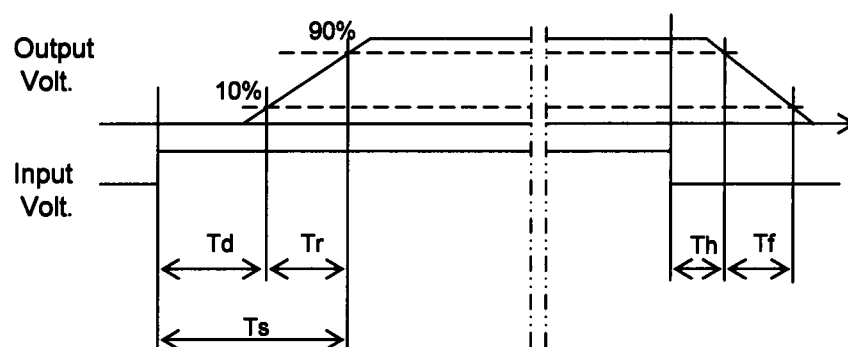
## 1. Graph

Input Volt. 12 V



## 2. Values

|       |      | [mS] |     |     |     |     |
|-------|------|------|-----|-----|-----|-----|
| Load  | Time | Td   | Tr  | Ts  | Th  | Tf  |
| 50 %  |      | 0.5  | 1.2 | 1.7 | 0.2 | 0.8 |
| 100 % |      | 0.5  | 1.8 | 2.3 | 0.2 | 0.3 |



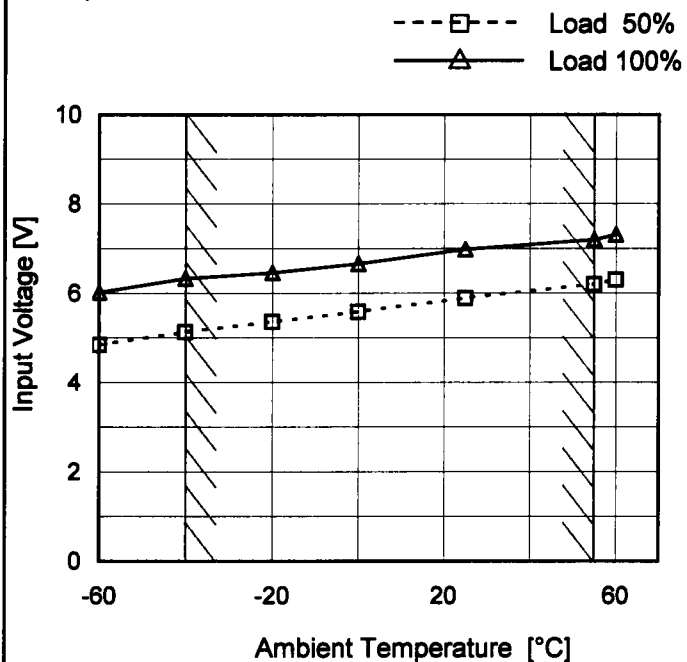
Model SUS101205/SUCS101205

Item Minimum Input Voltage  
for Regulated Output Voltage

Object +5V2A

Testing Circuitry Figure A

## 1. Graph



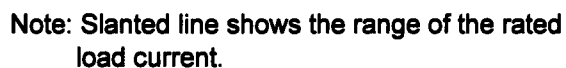
Note: Slanted line shows the range of the rated ambient temperature.

## 2. Values

| Ambient Temperature<br>[°C] | Input Voltage<br>[V] |           |
|-----------------------------|----------------------|-----------|
|                             | Load 50%             | Load 100% |
| -60                         | 4.9                  | 6.1       |
| -40                         | 5.2                  | 6.4       |
| -20                         | 5.4                  | 6.5       |
| 0                           | 5.6                  | 6.7       |
| 25                          | 5.9                  | 7.0       |
| 55                          | 6.2                  | 7.2       |
| 60                          | 6.3                  | 7.4       |
| -                           | -                    | -         |
| -                           | -                    | -         |
| -                           | -                    | -         |
| -                           | -                    | -         |

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

|       |             |     |
|-------|-------------|-----|
| _____ | Input Volt. | 9V  |
| _____ | Input Volt. | 12V |
| _____ | Input Volt. | 18V |



| Output Voltage [V] | Load Current [A] |                   |                   |
|--------------------|------------------|-------------------|-------------------|
|                    | Input Volt. 9[V] | Input Volt. 12[V] | Input Volt. 18[V] |
| 5.00               | 2.38             | 2.41              | 2.99              |
| 4.75               | 2.67             | 2.91              | 3.10              |
| 4.50               | 2.73             | 2.95              | 3.12              |
| 4.00               | 2.72             | 2.92              | 3.06              |
| 3.50               | 2.71             | 2.89              | 2.99              |
| 3.00               | 2.70             | 2.85              | 2.90              |
| 2.50               | 2.68             | 2.81              | 2.83              |
| 2.00               | 2.68             | 2.78              | 2.74              |
| 1.50               | 2.70             | 2.75              | 2.63              |
| 1.00               | 2.76             | 2.74              | 2.50              |
| 0.50               | 2.78             | 2.69              | 2.48              |
| 0.00               | 2.96             | 3.26              | 2.89              |

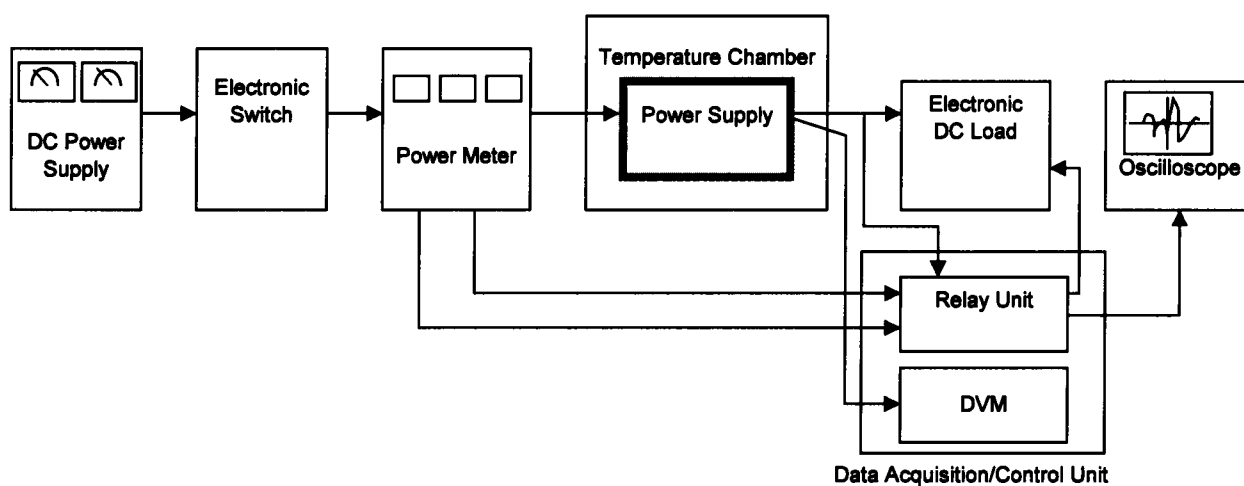


Figure A

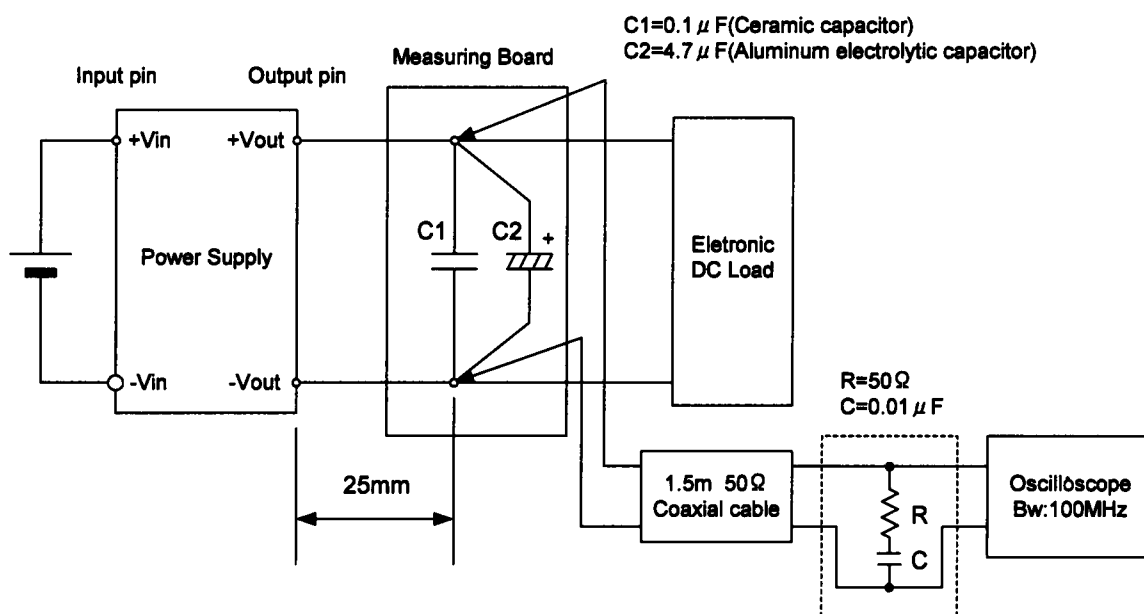


Figure B (Ripple and Ripple noise Characteristic)