



# TEST DATA OF ZUW31212

(12.0V INPUT)

Regulated DC Power Supply

Date : Nov. 5. 1996

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Design Manager

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| Model   |                           | ZUW31212   |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---------------------------|--|--|-------------------|---------------------------|----------------------------|-----|---------|---------|-----|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|------|---------|---------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Item  |                           | Line Regulation 静的入力変動   |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Object  |                           | +12V0.13A  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1. Graph  |                           | 2. Values  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| <div><div>-----□----- Load 50%</div><div>-----△----- Load 100%</div><div><div>Output Voltage [V]</div><div><div>Input Voltage [V]</div></div></div></div> |                           | <table><tr><th>Input Voltage [V]</th><th>Load 50% Output Volt. [V]</th><th>Load 100% Output Volt. [V]</th></tr><tr><td>8.0</td><td>12.062</td><td>11.939</td></tr><tr><td>9.0</td><td>12.057</td><td>11.946</td></tr><tr><td>10.0</td><td>12.054</td><td>11.951</td></tr><tr><td>12.0</td><td>12.050</td><td>11.955</td></tr><tr><td>15.0</td><td>12.044</td><td>11.955</td></tr><tr><td>18.0</td><td>12.038</td><td>11.950</td></tr><tr><td>20.0</td><td>12.035</td><td>11.946</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><tr><td>—</td><td>—</td><td>—</td></tr></table>               |  | Input Voltage [V] | Load 50% Output Volt. [V] | Load 100% Output Volt. [V] | 8.0 | 12.062  | 11.939  | 9.0 | 12.057  | 11.946  | 10.0 | 12.054  | 11.951  | 12.0 | 12.050  | 11.955  | 15.0 | 12.044  | 11.955  | 18.0 | 12.038  | 11.950  | 20.0 | 12.035  | 11.946  | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Input Voltage [V]   | Load 50% Output Volt. [V] | Load 100% Output Volt. [V]   |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 8.0   | 12.062                    | 11.939   |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 9.0   | 12.057                    | 11.946   |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 10.0  | 12.054                    | 11.951   |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 12.0  | 12.050                    | 11.955   |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 15.0  | 12.044                    | 11.955   |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 18.0  | 12.038                    | 11.950   |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 20.0  | 12.035                    | 11.946   |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| —   | —                         | —  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| —   | —                         | —  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| —   | —                         | —  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| —   | —                         | —  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| —   | —                         | —  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Object  |                           | -12V0.13A  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1. Graph  |                           | 2. Values  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| <div><div>-----□----- Load 50%</div><div>-----△----- Load 100%</div><div><div>Output Voltage [V]</div><div><div>Input Voltage [V]</div></div></div></div> |                           | <table><tr><th>Input Voltage [V]</th><th>Load 50% Output Volt. [V]</th><th>Load 100% Output Volt. [V]</th></tr><tr><td>8.0</td><td>-12.031</td><td>-11.909</td></tr><tr><td>9.0</td><td>-12.025</td><td>-11.915</td></tr><tr><td>10.0</td><td>-12.022</td><td>-11.919</td></tr><tr><td>12.0</td><td>-12.017</td><td>-11.923</td></tr><tr><td>15.0</td><td>-12.010</td><td>-11.921</td></tr><tr><td>18.0</td><td>-12.004</td><td>-11.916</td></tr><tr><td>20.0</td><td>-12.000</td><td>-11.912</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><tr><td>—</td><td>—</td><td>—</td></tr></table> |  | Input Voltage [V] | Load 50% Output Volt. [V] | Load 100% Output Volt. [V] | 8.0 | -12.031 | -11.909 | 9.0 | -12.025 | -11.915 | 10.0 | -12.022 | -11.919 | 12.0 | -12.017 | -11.923 | 15.0 | -12.010 | -11.921 | 18.0 | -12.004 | -11.916 | 20.0 | -12.000 | -11.912 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Input Voltage [V]   | Load 50% Output Volt. [V] | Load 100% Output Volt. [V]   |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 8.0   | -12.031                   | -11.909  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 9.0   | -12.025                   | -11.915  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 10.0  | -12.022                   | -11.919  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 12.0  | -12.017                   | -11.923  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 15.0  | -12.010                   | -11.921  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 18.0  | -12.004                   | -11.916  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 20.0  | -12.000                   | -11.912  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| —   | —                         | —  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| —   | —                         | —  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| —   | —                         | —  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| —   | —                         | —  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| —   | —                         | —  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Note: Slanted line shows the range of the rated input voltage.  |                           |  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| (注)斜線は定格入力電圧範囲を示す。  |                           |  |  |                   |                           |                            |     |         |         |     |         |         |      |         |         |      |         |         |      |         |         |      |         |         |      |         |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

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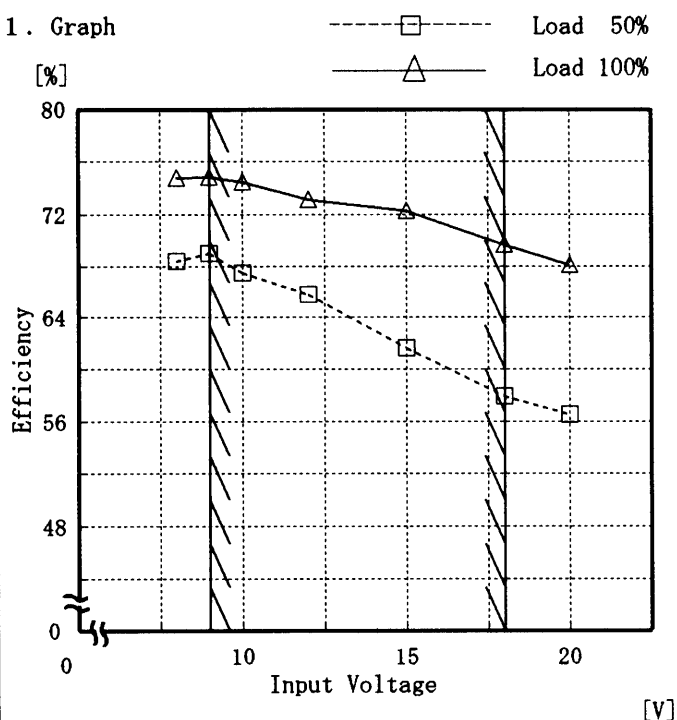
Model ZUW31212

Item Efficiency 効率

Object

Temperature 25°C  
Testing Circuitry Figure A

## 1. Graph



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

(注)斜線は定格入力電圧範囲を示す。

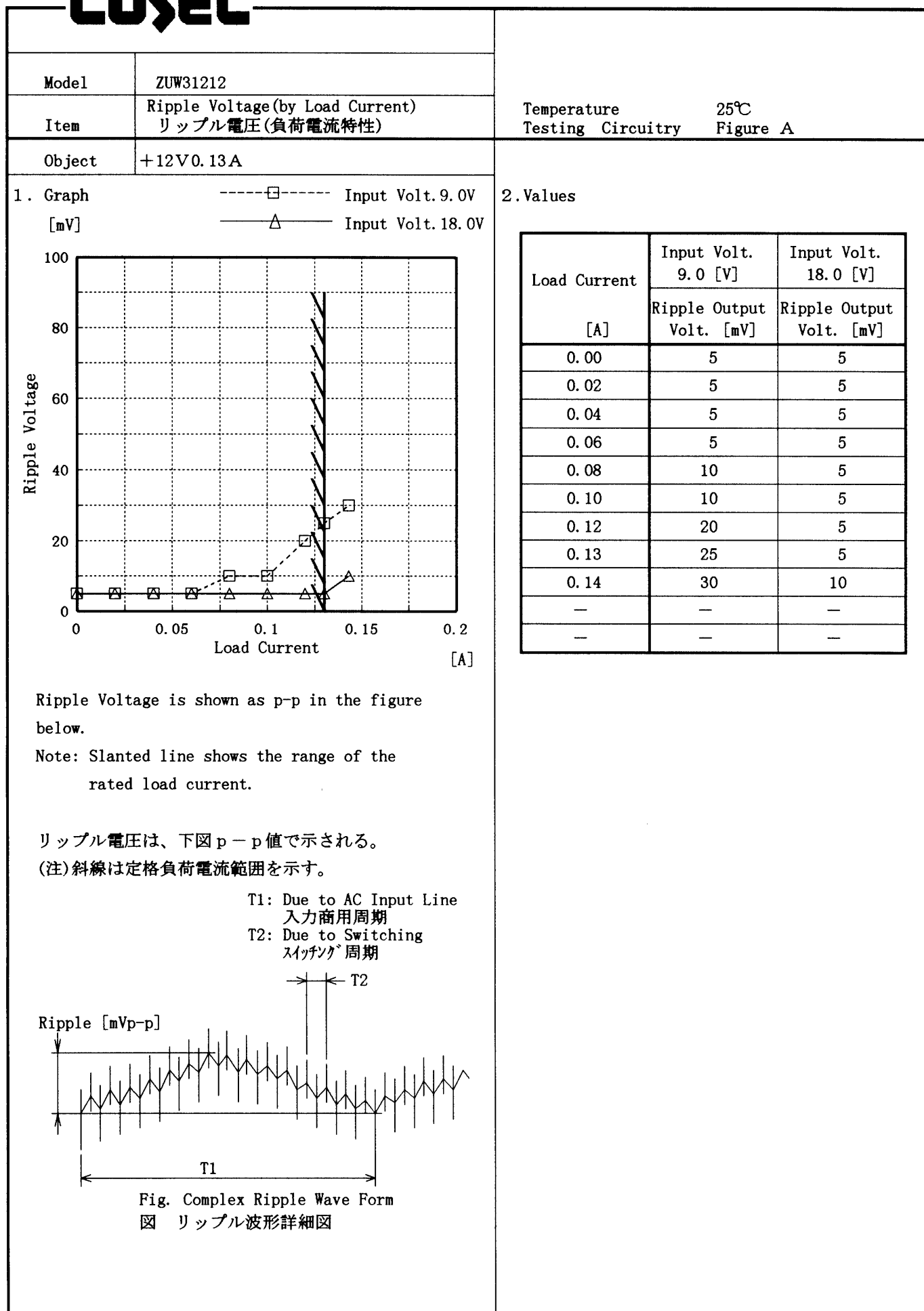
## 2. Values

| Input Voltage [V] | Load 50%       | Load 100%      |
|-------------------|----------------|----------------|
|                   | Efficiency [%] | Efficiency [%] |
| 8.0               | 68.4           | 74.8           |
| 9.0               | 69.0           | 74.8           |
| 10.0              | 67.5           | 74.5           |
| 12.0              | 65.8           | 73.1           |
| 15.0              | 61.6           | 72.3           |
| 18.0              | 57.9           | 69.7           |
| 20.0              | 56.5           | 68.1           |
| —                 | —              | —              |
| —                 | —              | —              |
| —                 | —              | —              |
| —                 | —              | —              |
| —                 | —              | —              |

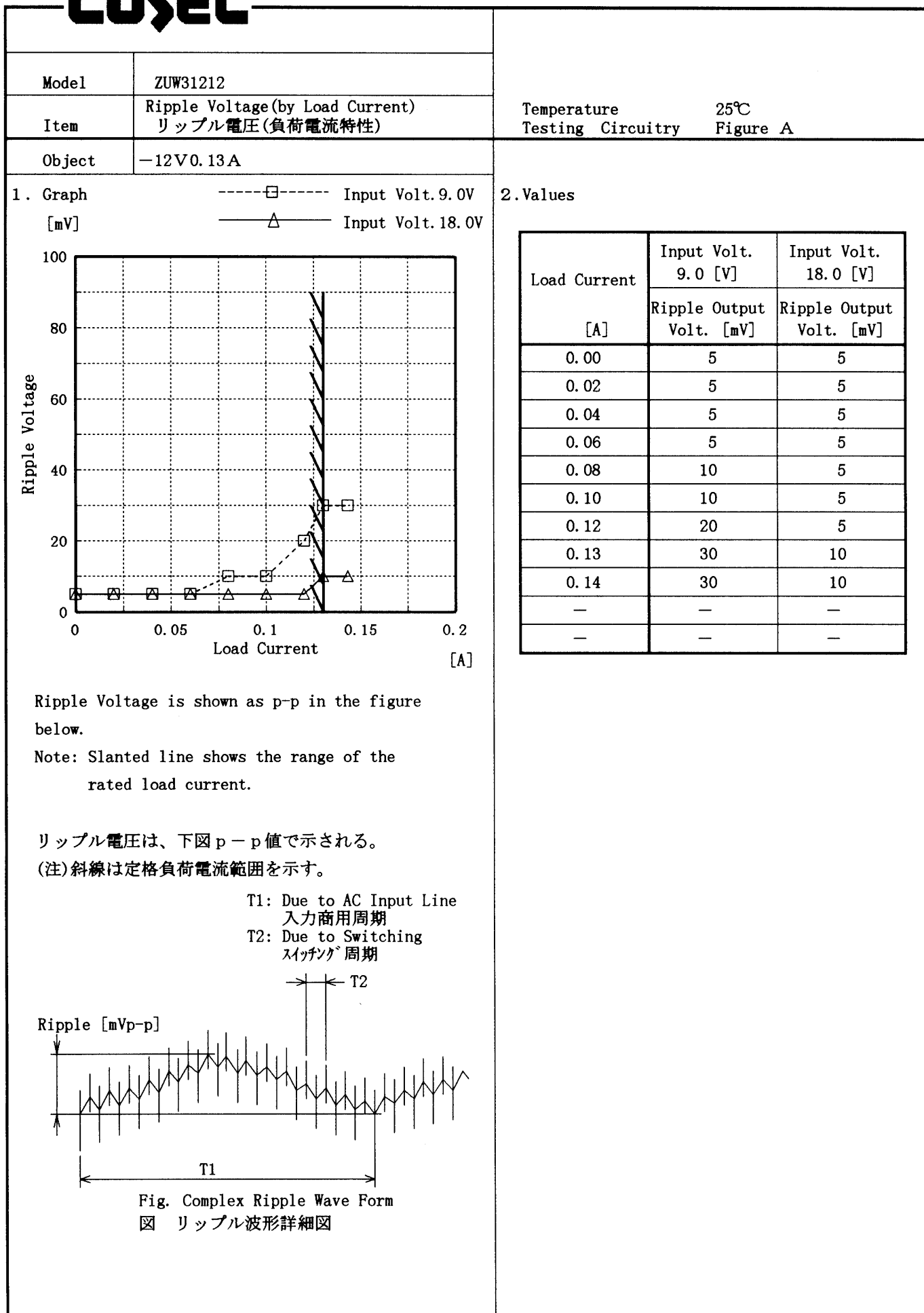
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| Model ZUW31212  |                        | Temperature 25°C   |                        |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
|---|------------------------|--|------------------------|---------------------|-----------------------|------------------------|------------------------|---------------------|---------------------|---------------------|-------|---------|---------|---------|-------|---------|---------|---------|-------|---------|---------|---------|-------|---------|---------|---------|-------|---------|---------|---------|-------|---------|---------|---------|-------|---------|---------|---------|-------|---------|---------|---------|-------|---------|---------|---------|---|---|---|---|
| Item  | Load Regulation 静的負荷変動 | Testing Circuitry Figure A   |                        |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| Object  | +12V0.13A              |  |                        |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| 1. Graph <div> <div>—△— Input Volt. 9.0V</div> <div>---□--- Input Volt. 12.0V</div> <div>---○--- Input Volt. 18.0V</div> </div> |                        | 2. Values <table border="1"> <thead> <tr> <th rowspan="2">Load Current<br/>[A]</th><th>Input Volt.<br/>9.0[V]</th><th>Input Volt.<br/>12.0[V]</th><th>Input Volt.<br/>18.0[V]</th></tr> <tr> <th>Output<br/>Volt. [V]</th><th>Output<br/>Volt. [V]</th><th>Output<br/>Volt. [V]</th></tr> </thead> <tbody> <tr><td>0.000</td><td>12.251</td><td>12.260</td><td>12.272</td></tr> <tr><td>0.020</td><td>12.135</td><td>12.129</td><td>12.123</td></tr> <tr><td>0.040</td><td>12.091</td><td>12.085</td><td>12.076</td></tr> <tr><td>0.060</td><td>12.057</td><td>12.052</td><td>12.042</td></tr> <tr><td>0.080</td><td>12.024</td><td>12.022</td><td>12.012</td></tr> <tr><td>0.100</td><td>11.992</td><td>11.993</td><td>11.985</td></tr> <tr><td>0.120</td><td>11.957</td><td>11.964</td><td>11.958</td></tr> <tr><td>0.130</td><td>11.940</td><td>11.950</td><td>11.946</td></tr> <tr><td>0.143</td><td>11.915</td><td>11.931</td><td>11.929</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>                            |                        | Load Current<br>[A] | Input Volt.<br>9.0[V] | Input Volt.<br>12.0[V] | Input Volt.<br>18.0[V] | Output<br>Volt. [V] | Output<br>Volt. [V] | Output<br>Volt. [V] | 0.000 | 12.251  | 12.260  | 12.272  | 0.020 | 12.135  | 12.129  | 12.123  | 0.040 | 12.091  | 12.085  | 12.076  | 0.060 | 12.057  | 12.052  | 12.042  | 0.080 | 12.024  | 12.022  | 12.012  | 0.100 | 11.992  | 11.993  | 11.985  | 0.120 | 11.957  | 11.964  | 11.958  | 0.130 | 11.940  | 11.950  | 11.946  | 0.143 | 11.915  | 11.931  | 11.929  | — | — | — | — |
| Load Current<br>[A]   | Input Volt.<br>9.0[V]  | Input Volt.<br>12.0[V]   | Input Volt.<br>18.0[V] |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
|   | Output<br>Volt. [V]    | Output<br>Volt. [V]  | Output<br>Volt. [V]    |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| 0.000   | 12.251                 | 12.260   | 12.272                 |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| 0.020   | 12.135                 | 12.129   | 12.123                 |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| 0.040   | 12.091                 | 12.085   | 12.076                 |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| 0.060   | 12.057                 | 12.052   | 12.042                 |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| 0.080   | 12.024                 | 12.022   | 12.012                 |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| 0.100   | 11.992                 | 11.993   | 11.985                 |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| 0.120   | 11.957                 | 11.964   | 11.958                 |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| 0.130   | 11.940                 | 11.950   | 11.946                 |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| 0.143   | 11.915                 | 11.931   | 11.929                 |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| —   | —                      | —  | —                      |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| Object  | -12V0.13A              |  |                        |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| 1. Graph <div> <div>—△— Input Volt. 9.0V</div> <div>---□--- Input Volt. 12.0V</div> <div>---○--- Input Volt. 18.0V</div> </div> |                        | 2. Values <table border="1"> <thead> <tr> <th rowspan="2">Load Current<br/>[A]</th><th>Input Volt.<br/>9.0[V]</th><th>Input Volt.<br/>12.0[V]</th><th>Input Volt.<br/>18.0[V]</th></tr> <tr> <th>Output<br/>Volt. [V]</th><th>Output<br/>Volt. [V]</th><th>Output<br/>Volt. [V]</th></tr> </thead> <tbody> <tr><td>0.000</td><td>-12.200</td><td>-12.204</td><td>-12.209</td></tr> <tr><td>0.020</td><td>-12.100</td><td>-12.093</td><td>-12.085</td></tr> <tr><td>0.040</td><td>-12.058</td><td>-12.051</td><td>-12.040</td></tr> <tr><td>0.060</td><td>-12.025</td><td>-12.018</td><td>-12.007</td></tr> <tr><td>0.080</td><td>-11.993</td><td>-11.989</td><td>-11.978</td></tr> <tr><td>0.100</td><td>-11.961</td><td>-11.960</td><td>-11.951</td></tr> <tr><td>0.120</td><td>-11.926</td><td>-11.931</td><td>-11.924</td></tr> <tr><td>0.130</td><td>-11.909</td><td>-11.917</td><td>-11.912</td></tr> <tr><td>0.143</td><td>-11.885</td><td>-11.898</td><td>-11.895</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> </tbody> </table> |                        | Load Current<br>[A] | Input Volt.<br>9.0[V] | Input Volt.<br>12.0[V] | Input Volt.<br>18.0[V] | Output<br>Volt. [V] | Output<br>Volt. [V] | Output<br>Volt. [V] | 0.000 | -12.200 | -12.204 | -12.209 | 0.020 | -12.100 | -12.093 | -12.085 | 0.040 | -12.058 | -12.051 | -12.040 | 0.060 | -12.025 | -12.018 | -12.007 | 0.080 | -11.993 | -11.989 | -11.978 | 0.100 | -11.961 | -11.960 | -11.951 | 0.120 | -11.926 | -11.931 | -11.924 | 0.130 | -11.909 | -11.917 | -11.912 | 0.143 | -11.885 | -11.898 | -11.895 | — | — | — | — |
| Load Current<br>[A]   | Input Volt.<br>9.0[V]  | Input Volt.<br>12.0[V]   | Input Volt.<br>18.0[V] |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
|   | Output<br>Volt. [V]    | Output<br>Volt. [V]  | Output<br>Volt. [V]    |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| 0.000   | -12.200                | -12.204  | -12.209                |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| 0.020   | -12.100                | -12.093  | -12.085                |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| 0.040   | -12.058                | -12.051  | -12.040                |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| 0.060   | -12.025                | -12.018  | -12.007                |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| 0.080   | -11.993                | -11.989  | -11.978                |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| 0.100   | -11.961                | -11.960  | -11.951                |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| 0.120   | -11.926                | -11.931  | -11.924                |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| 0.130   | -11.909                | -11.917  | -11.912                |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| 0.143   | -11.885                | -11.898  | -11.895                |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| —   | —                      | —  | —                      |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |
| Note: Slanted line shows the range of the rated load current.<br>(注) 斜線は定格負荷電流範囲を示す。  |                        |  |                        |                     |                       |                        |                        |                     |                     |                     |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |       |         |         |         |   |   |   |   |

# COSEL



# COSEL

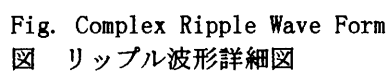


Temperature 25°C  
Testing Circuitry Figure A



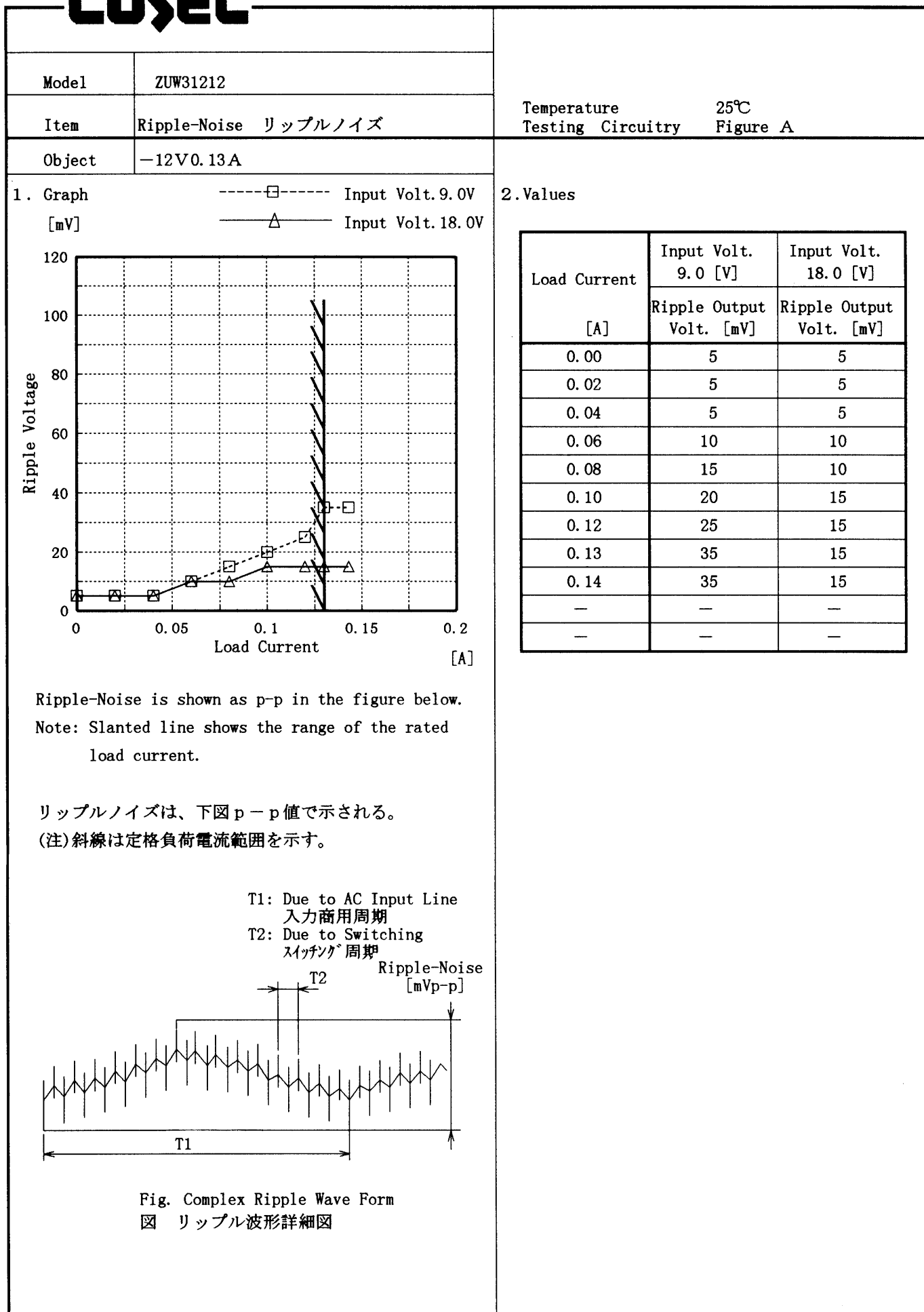
| Load Current<br>[A] | Input Volt.<br>9.0 [V]      | Input Volt.<br>18.0 [V]     |
|---------------------|-----------------------------|-----------------------------|
|                     | Ripple Output<br>Volt. [mV] | Ripple Output<br>Volt. [mV] |
| 0.00                | 5                           | 5                           |
| 0.02                | 5                           | 5                           |
| 0.04                | 10                          | 5                           |
| 0.06                | 15                          | 10                          |
| 0.08                | 15                          | 10                          |
| 0.10                | 20                          | 10                          |
| 0.12                | 30                          | 10                          |
| 0.13                | 35                          | 10                          |
| 0.14                | 40                          | 15                          |
| —                   | —                           | —                           |
| —                   | —                           | —                           |

T1: Due to AC Input Line  
入力商用周期  
T2: Due to Switching  
スイッチング周期

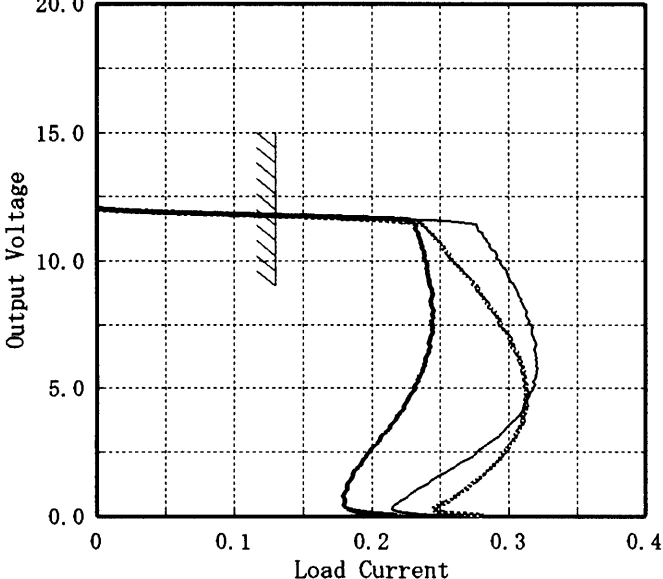
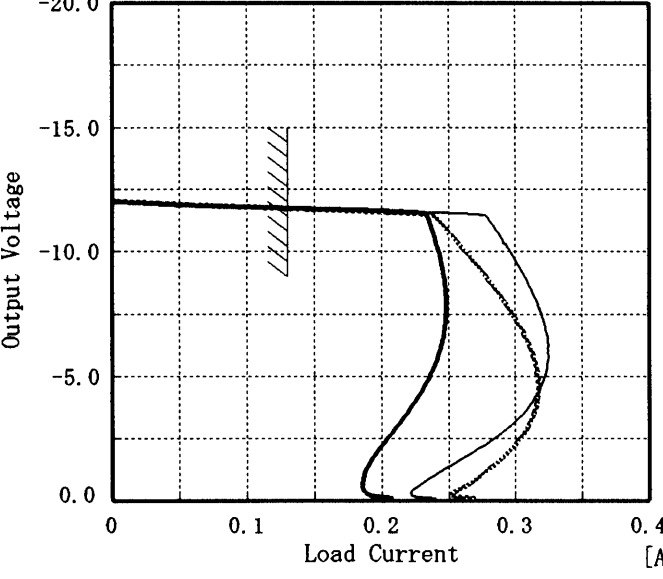




# COSEL



# COSEL

| Model ZUW31212   |  | Temperature 25°C   |   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
|--|--|--|---|--------------------|--|---|---|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|
| Item Overcurrent Protection<br>過電流保護   |  | Testing Circuitry Figure A   |   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| Object +12V0.13A   |  |  |   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| 1. Graph<br>[V]<br>  |  | 2. Values<br><table border="1"> <thead> <tr> <th>Output Voltage [V]</th><th>Input Volt. 9.0[V]<br/>Load Current [A]</th><th>Input Volt. 12.0[V]<br/>Load Current [A]</th><th>Input Volt. 18.0[V]<br/>Load Current [A]</th></tr> </thead> <tbody> <tr><td>12.00</td><td>0.018</td><td>0.015</td><td>0.013</td></tr> <tr><td>11.40</td><td>0.236</td><td>0.277</td><td>0.232</td></tr> <tr><td>10.80</td><td>0.248</td><td>0.284</td><td>0.235</td></tr> <tr><td>9.60</td><td>0.267</td><td>0.299</td><td>0.241</td></tr> <tr><td>8.40</td><td>0.283</td><td>0.308</td><td>0.243</td></tr> <tr><td>7.20</td><td>0.298</td><td>0.316</td><td>0.244</td></tr> <tr><td>6.00</td><td>0.309</td><td>0.320</td><td>0.239</td></tr> <tr><td>4.80</td><td>0.313</td><td>0.316</td><td>0.229</td></tr> <tr><td>3.60</td><td>0.310</td><td>0.301</td><td>0.215</td></tr> <tr><td>2.40</td><td>0.297</td><td>0.276</td><td>0.198</td></tr> <tr><td>1.20</td><td>0.271</td><td>0.239</td><td>0.182</td></tr> <tr><td>0.00</td><td>0.282</td><td>0.251</td><td>0.219</td></tr> </tbody> </table>            |   | Output Voltage [V] | Input Volt. 9.0[V]<br>Load Current [A] | Input Volt. 12.0[V]<br>Load Current [A] | Input Volt. 18.0[V]<br>Load Current [A] | 12.00  | 0.018 | 0.015 | 0.013 | 11.40  | 0.236 | 0.277 | 0.232 | 10.80  | 0.248 | 0.284 | 0.235 | 9.60  | 0.267 | 0.299 | 0.241 | 8.40  | 0.283 | 0.308 | 0.243 | 7.20  | 0.298 | 0.316 | 0.244 | 6.00  | 0.309 | 0.320 | 0.239 | 4.80  | 0.313 | 0.316 | 0.229 | 3.60  | 0.310 | 0.301 | 0.215 | 2.40  | 0.297 | 0.276 | 0.198 | 1.20  | 0.271 | 0.239 | 0.182 | 0.00 | 0.282 | 0.251 | 0.219 |
| Output Voltage [V]   | Input Volt. 9.0[V]<br>Load Current [A] | Input Volt. 12.0[V]<br>Load Current [A]  | Input Volt. 18.0[V]<br>Load Current [A] |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| 12.00  | 0.018                                  | 0.015  | 0.013                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| 11.40  | 0.236                                  | 0.277  | 0.232                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| 10.80  | 0.248                                  | 0.284  | 0.235                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| 9.60   | 0.267                                  | 0.299  | 0.241                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| 8.40   | 0.283                                  | 0.308  | 0.243                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| 7.20   | 0.298                                  | 0.316  | 0.244                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| 6.00   | 0.309                                  | 0.320  | 0.239                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| 4.80   | 0.313                                  | 0.316  | 0.229                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| 3.60   | 0.310                                  | 0.301  | 0.215                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| 2.40   | 0.297                                  | 0.276  | 0.198                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| 1.20   | 0.271                                  | 0.239  | 0.182                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| 0.00   | 0.282                                  | 0.251  | 0.219                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| Object -12V0.13A   |  |  |   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| 1. Graph<br>[V]<br> |  | 2. Values<br><table border="1"> <thead> <tr> <th>Output Voltage [V]</th><th>Input Volt. 9.0[V]<br/>Load Current [A]</th><th>Input Volt. 12.0[V]<br/>Load Current [A]</th><th>Input Volt. 18.0[V]<br/>Load Current [A]</th></tr> </thead> <tbody> <tr><td>-12.00</td><td>0.008</td><td>0.007</td><td>0.006</td></tr> <tr><td>-11.40</td><td>0.240</td><td>0.279</td><td>0.235</td></tr> <tr><td>-10.80</td><td>0.249</td><td>0.286</td><td>0.238</td></tr> <tr><td>-9.60</td><td>0.268</td><td>0.300</td><td>0.244</td></tr> <tr><td>-8.40</td><td>0.286</td><td>0.312</td><td>0.248</td></tr> <tr><td>-7.20</td><td>0.301</td><td>0.321</td><td>0.248</td></tr> <tr><td>-6.00</td><td>0.312</td><td>0.324</td><td>0.244</td></tr> <tr><td>-4.80</td><td>0.317</td><td>0.321</td><td>0.235</td></tr> <tr><td>-3.60</td><td>0.314</td><td>0.307</td><td>0.220</td></tr> <tr><td>-2.40</td><td>0.303</td><td>0.283</td><td>0.204</td></tr> <tr><td>-1.20</td><td>0.279</td><td>0.245</td><td>0.188</td></tr> <tr><td>0.00</td><td>0.270</td><td>0.240</td><td>0.209</td></tr> </tbody> </table> |   | Output Voltage [V] | Input Volt. 9.0[V]<br>Load Current [A] | Input Volt. 12.0[V]<br>Load Current [A] | Input Volt. 18.0[V]<br>Load Current [A] | -12.00 | 0.008 | 0.007 | 0.006 | -11.40 | 0.240 | 0.279 | 0.235 | -10.80 | 0.249 | 0.286 | 0.238 | -9.60 | 0.268 | 0.300 | 0.244 | -8.40 | 0.286 | 0.312 | 0.248 | -7.20 | 0.301 | 0.321 | 0.248 | -6.00 | 0.312 | 0.324 | 0.244 | -4.80 | 0.317 | 0.321 | 0.235 | -3.60 | 0.314 | 0.307 | 0.220 | -2.40 | 0.303 | 0.283 | 0.204 | -1.20 | 0.279 | 0.245 | 0.188 | 0.00 | 0.270 | 0.240 | 0.209 |
| Output Voltage [V]   | Input Volt. 9.0[V]<br>Load Current [A] | Input Volt. 12.0[V]<br>Load Current [A]  | Input Volt. 18.0[V]<br>Load Current [A] |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| -12.00   | 0.008                                  | 0.007  | 0.006                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| -11.40   | 0.240                                  | 0.279  | 0.235                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| -10.80   | 0.249                                  | 0.286  | 0.238                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| -9.60  | 0.268                                  | 0.300  | 0.244                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| -8.40  | 0.286                                  | 0.312  | 0.248                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| -7.20  | 0.301                                  | 0.321  | 0.248                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| -6.00  | 0.312                                  | 0.324  | 0.244                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| -4.80  | 0.317                                  | 0.321  | 0.235                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| -3.60  | 0.314                                  | 0.307  | 0.220                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| -2.40  | 0.303                                  | 0.283  | 0.204                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| -1.20  | 0.279                                  | 0.245  | 0.188                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| 0.00   | 0.270                                  | 0.240  | 0.209                                   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |
| Note: Slanted line shows the range of the rated load current.<br>(注)斜線は定格負荷電流範囲を示す。                    |  |  |   |                    |  |   |   |        |       |       |       |        |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |

# COSEL

|        |                                 |                   |          |
|--------|---------------------------------|-------------------|----------|
| Model  | ZUW31212                        | Temperature       | 25°C     |
| Item   | Dynamic Load Responce<br>動的負荷変動 | Testing Circuitry | Figure A |
| Object | +12V0.13A                       |                   |          |

Input Volt. 12.0 V

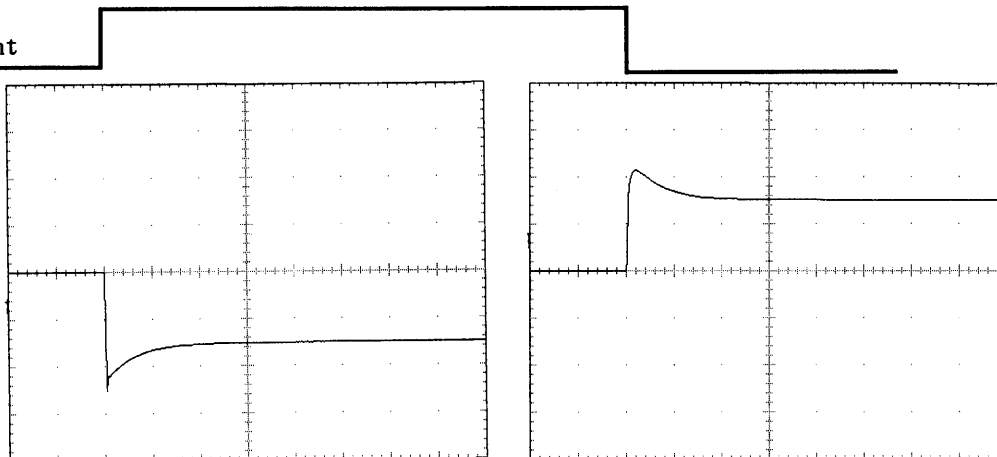
Cycle 100 mS

Load Current

Min. Load ↔

Load 100 %

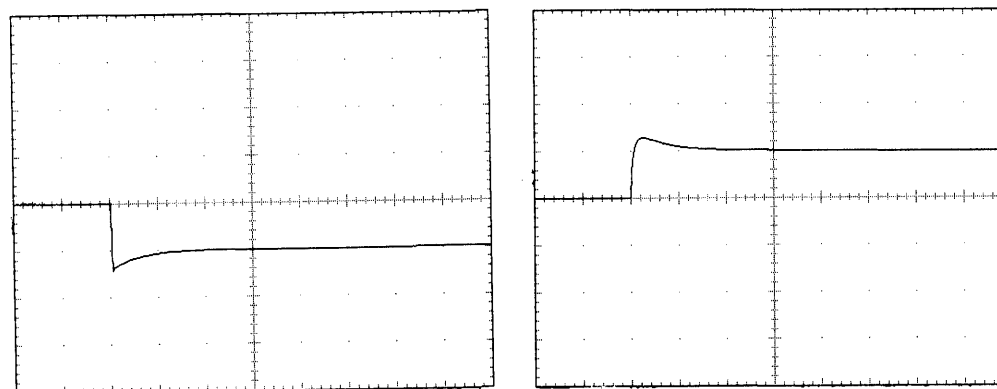
200 mV/div



Min. Load ↔

Load 50 %

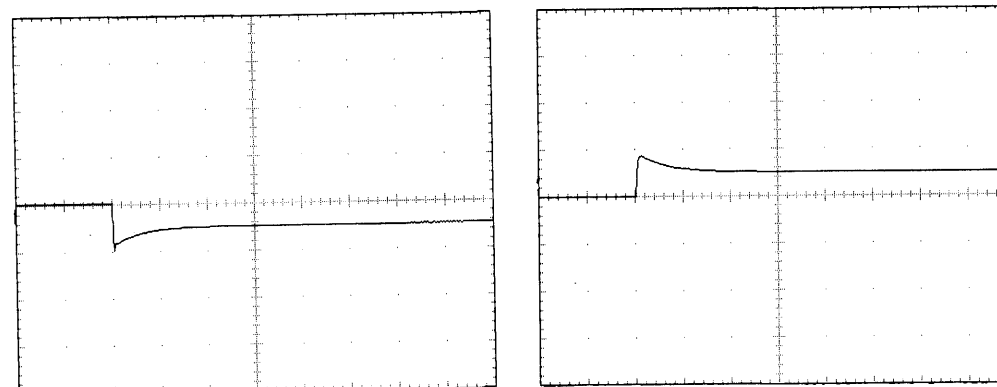
200 mV/div



Load 50% ↔

Load 100 %

200 mV/div



1 mS/div

# COSEL

|        |                                 |                   |          |
|--------|---------------------------------|-------------------|----------|
| Model  | ZUW31212                        | Temperature       | 25°C     |
| Item   | Dynamic Load Responce<br>動的負荷変動 | Testing Circuitry | Figure A |
| Object | -12V0.13A                       |                   |          |

Input Volt. 12.0 V

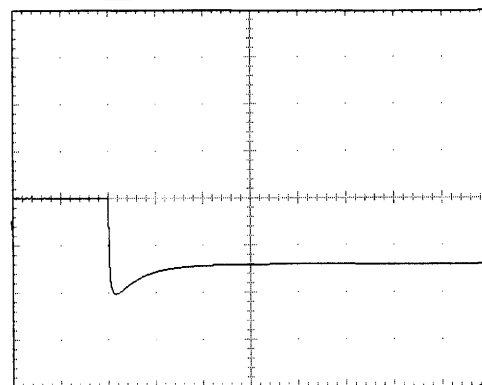
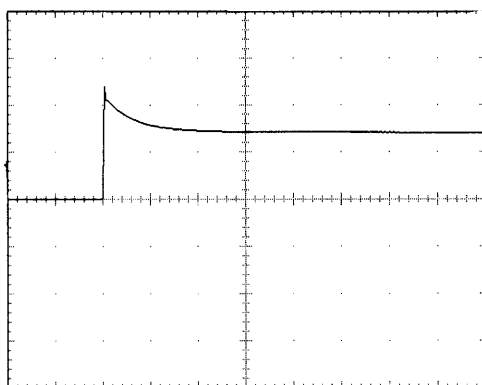
Cycle 100 mS

Load Current

Min. Load ↔

Load 100 %

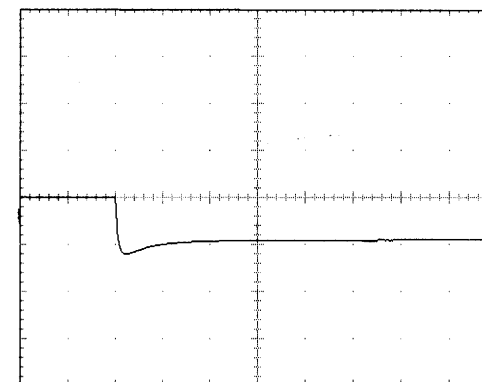
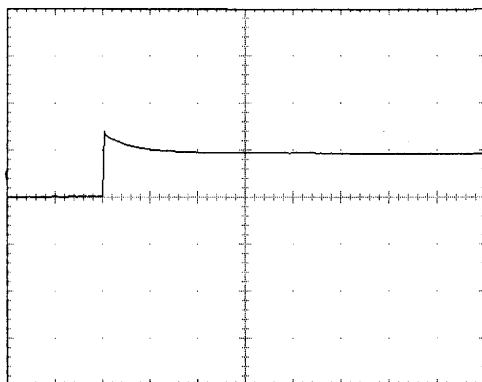
200 mV/div



Min. Load ↔

Load 50 %

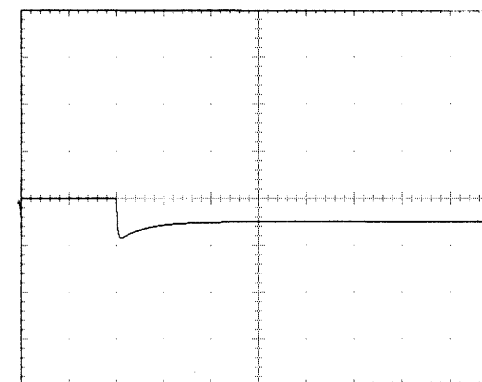
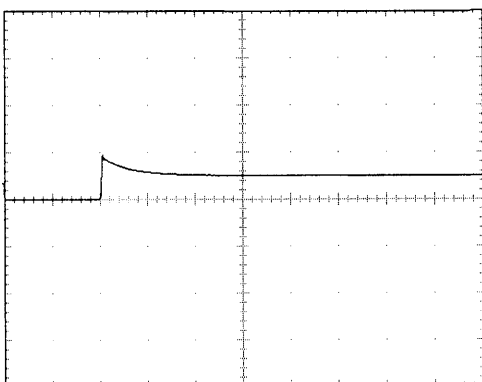
200 mV/div



Load 50% ↔

Load 100 %

200 mV/div



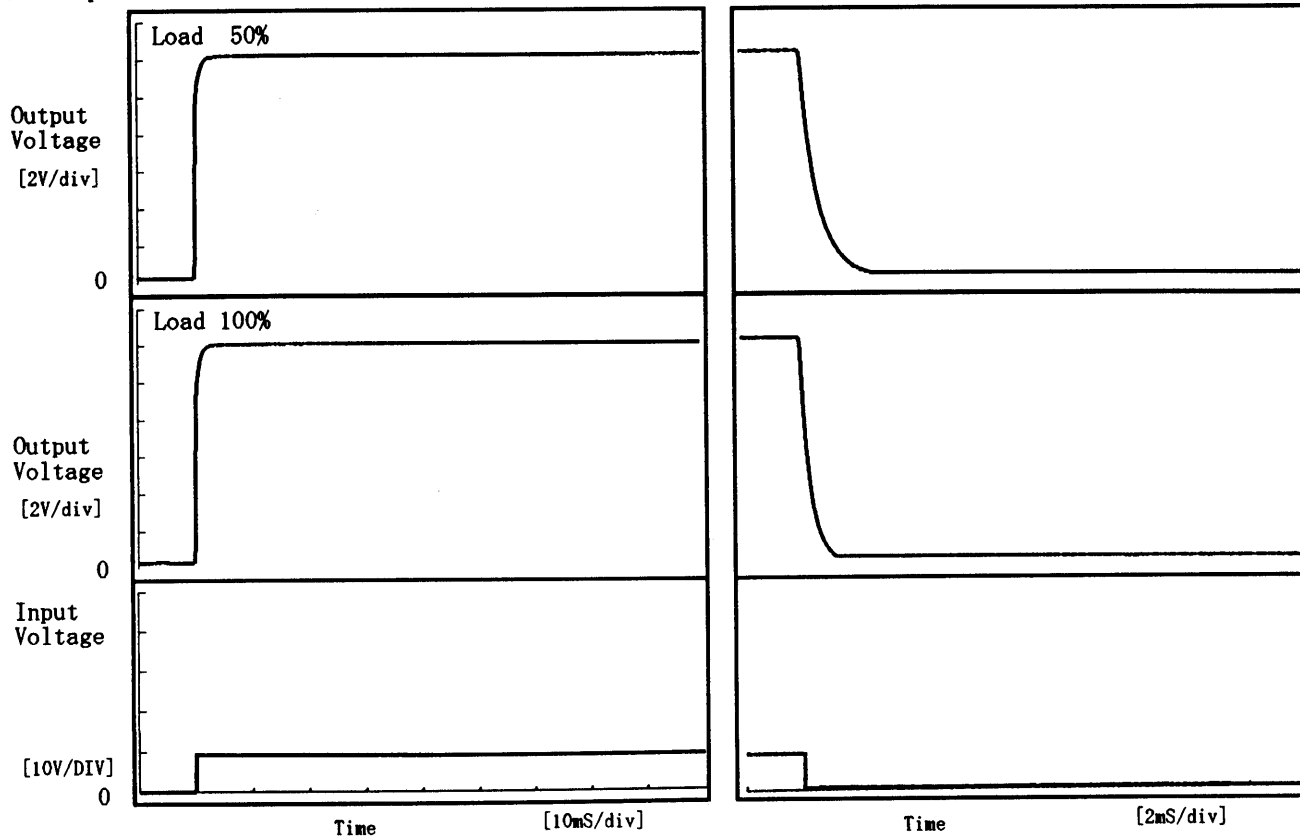
1 mS/div

**COSEL**

|        |                              |                   |          |
|--------|------------------------------|-------------------|----------|
| Model  | ZUW31212                     | Temperature       | 25°C     |
| Item   | Rise and Fall Time 立上り、立下り時間 | Testing Circuitry | Figure A |
| Object | +12V0.13A                    |                   |          |

## 1. Graph

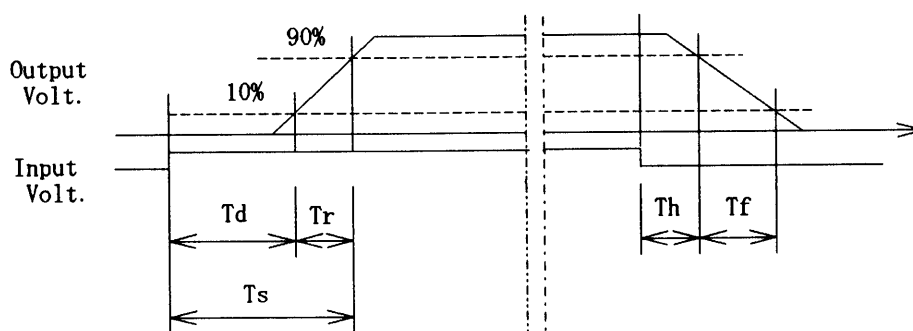
Input Volt. 9.0 V



## 2. Values

[mS]

| Load \ Time | T d  | T r  | T s  | T h  | T f  |
|-------------|------|------|------|------|------|
| 50 %        | 0.05 | 0.80 | 0.85 | 0.18 | 1.38 |
| 100 %       | 0.10 | 0.90 | 1.00 | 0.12 | 0.77 |



**COSEL**

Model ZUW31212

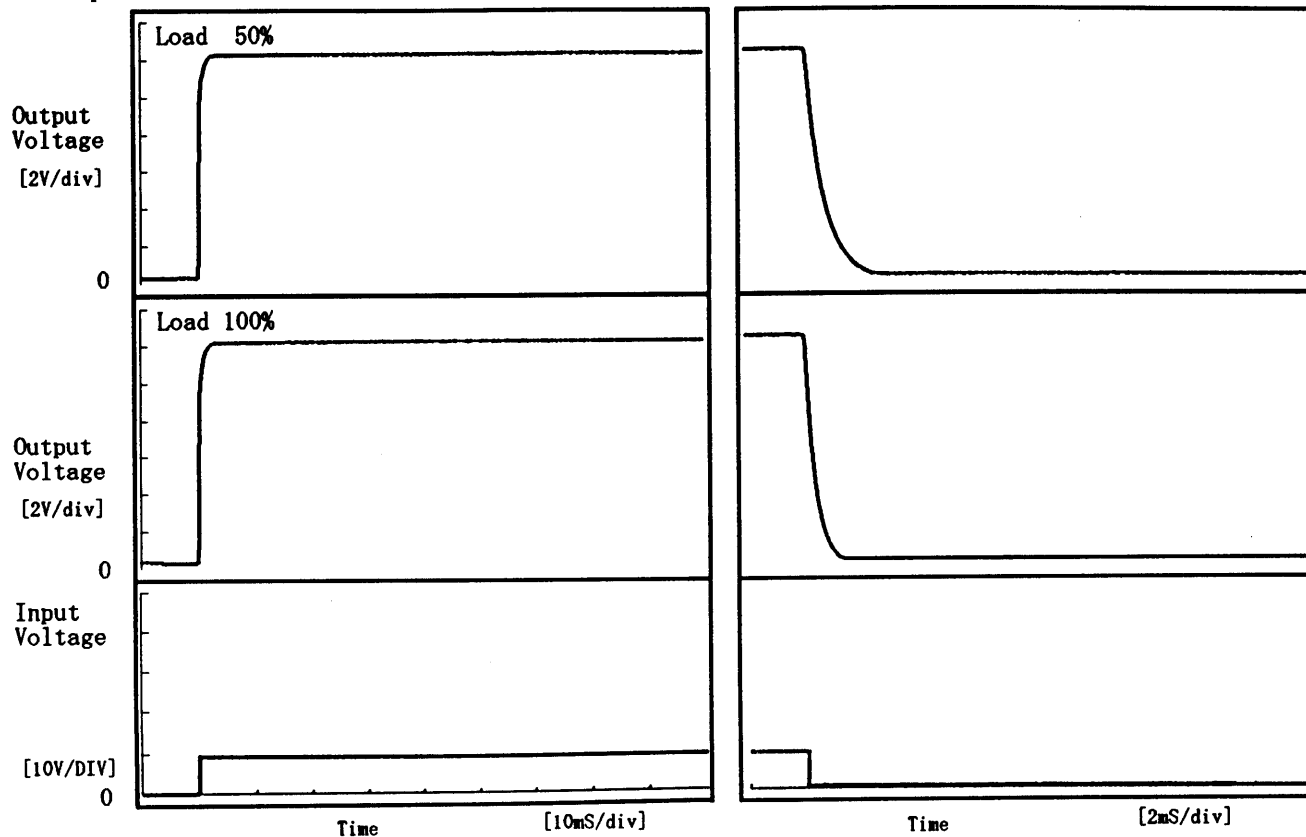
Item Rise and Fall Time 立上り、立下り時間

Object -12V0.13A

Temperature 25°C  
Testing Circuitry Figure A

## 1. Graph

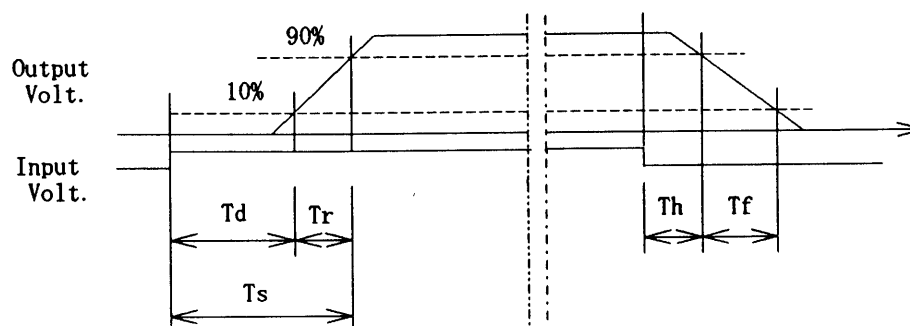
Input Volt. 9.0 V



## 2. Values

[mS]

| Load \ Time | T d  | T r  | T s  | T h  | T f  |
|-------------|------|------|------|------|------|
| 50 %        | 0.10 | 0.70 | 0.80 | 0.18 | 1.41 |
| 100 %       | 0.05 | 0.85 | 0.90 | 0.13 | 0.76 |



# COSEL

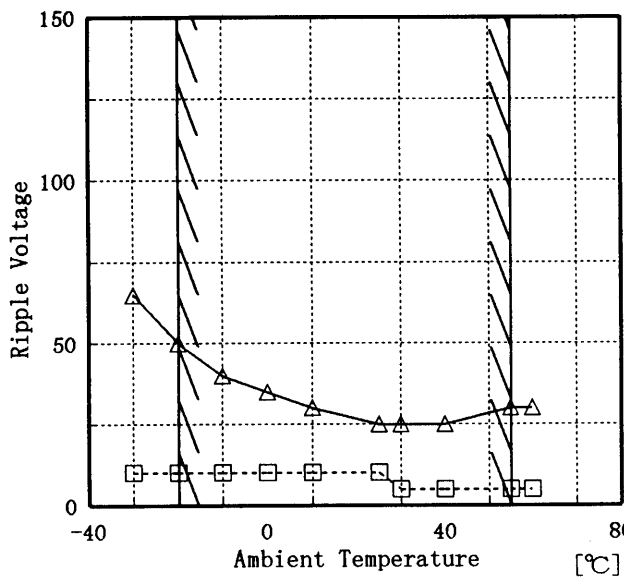
| Model  |                    | ZUW31212  |                     |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
|--|--------------------|---|---------------------|-------------|--------------------|---------------------|---------------------|------|------------------|------------------|------------------|-----|---------|---------|---------|-----|---------|---------|---------|-----|---------|---------|---------|---|---------|---------|---------|----|---------|---------|---------|----|---------|---------|---------|----|---------|---------|---------|----|---------|---------|---------|----|---------|---------|---------|----|---------|---------|---------|---|---|---|---|
| Item   |                    | Ambient Temperature Drift<br>周囲温度変動   |                     |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| Object   |                    | +12V0.13A   |                     |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| 1. Graph   |                    | 2. Values   |                     |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| <div><div><div>—△—</div><div>—□—</div><div>—○—</div></div><div>Input Volt. 9.0V</div><div>Input Volt. 12.0V</div><div>Input Volt. 18.0V</div></div> <p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p> |                    | <table><tr><th>Temperature</th><th>Input Volt. 9.0[V]</th><th>Input Volt. 12.0[V]</th><th>Input Volt. 18.0[V]</th></tr><tr><th>[°C]</th><th>Output Volt. [V]</th><th>Output Volt. [V]</th><th>Output Volt. [V]</th></tr><tr><td>-30</td><td>11.943</td><td>11.950</td><td>11.946</td></tr><tr><td>-20</td><td>11.945</td><td>11.953</td><td>11.949</td></tr><tr><td>-10</td><td>11.947</td><td>11.955</td><td>11.950</td></tr><tr><td>0</td><td>11.948</td><td>11.956</td><td>11.952</td></tr><tr><td>10</td><td>11.949</td><td>11.957</td><td>11.952</td></tr><tr><td>25</td><td>11.948</td><td>11.957</td><td>11.951</td></tr><tr><td>30</td><td>11.947</td><td>11.957</td><td>11.951</td></tr><tr><td>40</td><td>11.945</td><td>11.955</td><td>11.949</td></tr><tr><td>55</td><td>11.941</td><td>11.953</td><td>11.947</td></tr><tr><td>60</td><td>11.939</td><td>11.951</td><td>11.945</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td></tr></table>                               |                     | Temperature | Input Volt. 9.0[V] | Input Volt. 12.0[V] | Input Volt. 18.0[V] | [°C] | Output Volt. [V] | Output Volt. [V] | Output Volt. [V] | -30 | 11.943  | 11.950  | 11.946  | -20 | 11.945  | 11.953  | 11.949  | -10 | 11.947  | 11.955  | 11.950  | 0 | 11.948  | 11.956  | 11.952  | 10 | 11.949  | 11.957  | 11.952  | 25 | 11.948  | 11.957  | 11.951  | 30 | 11.947  | 11.957  | 11.951  | 40 | 11.945  | 11.955  | 11.949  | 55 | 11.941  | 11.953  | 11.947  | 60 | 11.939  | 11.951  | 11.945  | — | — | — | — |
| Temperature  | Input Volt. 9.0[V] | Input Volt. 12.0[V]   | Input Volt. 18.0[V] |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| [°C]   | Output Volt. [V]   | Output Volt. [V]  | Output Volt. [V]    |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| -30  | 11.943             | 11.950  | 11.946              |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| -20  | 11.945             | 11.953  | 11.949              |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| -10  | 11.947             | 11.955  | 11.950              |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| 0  | 11.948             | 11.956  | 11.952              |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| 10   | 11.949             | 11.957  | 11.952              |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| 25   | 11.948             | 11.957  | 11.951              |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| 30   | 11.947             | 11.957  | 11.951              |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| 40   | 11.945             | 11.955  | 11.949              |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| 55   | 11.941             | 11.953  | 11.947              |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| 60   | 11.939             | 11.951  | 11.945              |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| —  | —                  | —   | —                   |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| Object   |                    | -12V0.13A   |                     |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| 1. Graph   |                    | 2. Values   |                     |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| <div><div><div>—△—</div><div>—□—</div><div>—○—</div></div><div>Input Volt. 9.0V</div><div>Input Volt. 12.0V</div><div>Input Volt. 18.0V</div></div> <p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p> |                    | <table><tr><th>Temperature</th><th>Input Volt. 9.0[V]</th><th>Input Volt. 12.0[V]</th><th>Input Volt. 18.0[V]</th></tr><tr><th>[°C]</th><th>Output Volt. [V]</th><th>Output Volt. [V]</th><th>Output Volt. [V]</th></tr><tr><td>-30</td><td>-11.916</td><td>-11.919</td><td>-11.914</td></tr><tr><td>-20</td><td>-11.917</td><td>-11.921</td><td>-11.916</td></tr><tr><td>-10</td><td>-11.918</td><td>-11.923</td><td>-11.917</td></tr><tr><td>0</td><td>-11.918</td><td>-11.924</td><td>-11.917</td></tr><tr><td>10</td><td>-11.918</td><td>-11.924</td><td>-11.918</td></tr><tr><td>25</td><td>-11.917</td><td>-11.924</td><td>-11.917</td></tr><tr><td>30</td><td>-11.917</td><td>-11.924</td><td>-11.917</td></tr><tr><td>40</td><td>-11.914</td><td>-11.922</td><td>-11.915</td></tr><tr><td>55</td><td>-11.911</td><td>-11.920</td><td>-11.913</td></tr><tr><td>60</td><td>-11.908</td><td>-11.918</td><td>-11.911</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td></tr></table> |                     | Temperature | Input Volt. 9.0[V] | Input Volt. 12.0[V] | Input Volt. 18.0[V] | [°C] | Output Volt. [V] | Output Volt. [V] | Output Volt. [V] | -30 | -11.916 | -11.919 | -11.914 | -20 | -11.917 | -11.921 | -11.916 | -10 | -11.918 | -11.923 | -11.917 | 0 | -11.918 | -11.924 | -11.917 | 10 | -11.918 | -11.924 | -11.918 | 25 | -11.917 | -11.924 | -11.917 | 30 | -11.917 | -11.924 | -11.917 | 40 | -11.914 | -11.922 | -11.915 | 55 | -11.911 | -11.920 | -11.913 | 60 | -11.908 | -11.918 | -11.911 | — | — | — | — |
| Temperature  | Input Volt. 9.0[V] | Input Volt. 12.0[V]   | Input Volt. 18.0[V] |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| [°C]   | Output Volt. [V]   | Output Volt. [V]  | Output Volt. [V]    |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| -30  | -11.916            | -11.919   | -11.914             |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| -20  | -11.917            | -11.921   | -11.916             |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| -10  | -11.918            | -11.923   | -11.917             |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| 0  | -11.918            | -11.924   | -11.917             |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| 10   | -11.918            | -11.924   | -11.918             |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| 25   | -11.917            | -11.924   | -11.917             |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| 30   | -11.917            | -11.924   | -11.917             |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| 40   | -11.914            | -11.922   | -11.915             |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| 55   | -11.911            | -11.920   | -11.913             |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| 60   | -11.908            | -11.918   | -11.911             |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| —  | —                  | —   | —                   |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| Note: Slanted line shows the range of the rated ambient temperature.   |                    |   |                     |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |
| (注)斜線は定格周囲温度範囲を示す。   |                    |   |                     |             |                    |                     |                     |      |                  |                  |                  |     |         |         |         |     |         |         |         |     |         |         |         |   |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |    |         |         |         |   |   |   |   |

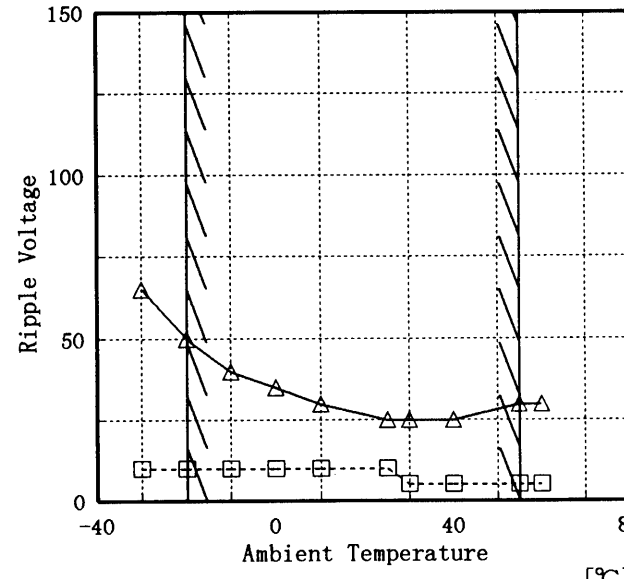
# COSEL

| Model  |   | ZUW31212   |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
|--|---|--|---------------|----------|-----------|------|-----------------|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|-----|-----|----|-----|-----|----|-----|-----|----|-----|-----|----|-----|-----|----|-----|-----|----|-----|-----|---|---|---|--|
| Item   | Minimum Input Voltage for Regulated Output Voltage<br>最低レギュレーション電圧                        |  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| Object   | +12V0.13A   |  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| 1. Graph   |   | 2. Values  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| [V]  | <div><div>-----□-----</div><div>-----△-----</div></div> <div>Load 50%<br/>Load 100%</div> |  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
|  |   |  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
|  |   | <table><tr><th>Ambient Temp.</th><th>Load 50%</th><th>Load 100%</th></tr><tr><th>[°C]</th><th>Input Volt. [V]</th><th>Input Volt. [V]</th></tr><tr><td>-30</td><td>6.1</td><td>6.8</td></tr><tr><td>-20</td><td>6.0</td><td>6.6</td></tr><tr><td>-10</td><td>5.8</td><td>6.5</td></tr><tr><td>0</td><td>5.7</td><td>6.4</td></tr><tr><td>10</td><td>5.6</td><td>6.3</td></tr><tr><td>25</td><td>5.6</td><td>6.2</td></tr><tr><td>30</td><td>5.5</td><td>6.1</td></tr><tr><td>40</td><td>5.4</td><td>6.1</td></tr><tr><td>55</td><td>5.2</td><td>6.0</td></tr><tr><td>60</td><td>5.1</td><td>5.9</td></tr><tr><td>—</td><td>—</td><td>—</td></tr></table> | Ambient Temp. | Load 50% | Load 100% | [°C] | Input Volt. [V] | Input Volt. [V] | -30 | 6.1 | 6.8 | -20 | 6.0 | 6.6 | -10 | 5.8 | 6.5 | 0 | 5.7 | 6.4 | 10 | 5.6 | 6.3 | 25 | 5.6 | 6.2 | 30 | 5.5 | 6.1 | 40 | 5.4 | 6.1 | 55 | 5.2 | 6.0 | 60 | 5.1 | 5.9 | — | — | — |  |
| Ambient Temp.  | Load 50%  | Load 100%  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| [°C]   | Input Volt. [V]   | Input Volt. [V]  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| -30  | 6.1   | 6.8  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| -20  | 6.0   | 6.6  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| -10  | 5.8   | 6.5  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| 0  | 5.7   | 6.4  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| 10   | 5.6   | 6.3  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| 25   | 5.6   | 6.2  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| 30   | 5.5   | 6.1  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| 40   | 5.4   | 6.1  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| 55   | 5.2   | 6.0  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| 60   | 5.1   | 5.9  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| —  | —   | —  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| Object   |   | -12V0.13A  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| [V]  | <div><div>-----□-----</div><div>-----△-----</div></div> <div>Load 50%<br/>Load 100%</div> | 2. Values  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
|  |   |  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
|  |   | <table><tr><th>Ambient Temp.</th><th>Load 50%</th><th>Load 100%</th></tr><tr><th>[°C]</th><th>Input Volt. [V]</th><th>Input Volt. [V]</th></tr><tr><td>-30</td><td>6.1</td><td>6.8</td></tr><tr><td>-20</td><td>6.0</td><td>6.6</td></tr><tr><td>-10</td><td>5.8</td><td>6.5</td></tr><tr><td>0</td><td>5.7</td><td>6.4</td></tr><tr><td>10</td><td>5.6</td><td>6.3</td></tr><tr><td>25</td><td>5.6</td><td>6.2</td></tr><tr><td>30</td><td>5.5</td><td>6.1</td></tr><tr><td>40</td><td>5.4</td><td>6.1</td></tr><tr><td>55</td><td>5.2</td><td>6.0</td></tr><tr><td>60</td><td>5.1</td><td>5.9</td></tr><tr><td>—</td><td>—</td><td>—</td></tr></table> | Ambient Temp. | Load 50% | Load 100% | [°C] | Input Volt. [V] | Input Volt. [V] | -30 | 6.1 | 6.8 | -20 | 6.0 | 6.6 | -10 | 5.8 | 6.5 | 0 | 5.7 | 6.4 | 10 | 5.6 | 6.3 | 25 | 5.6 | 6.2 | 30 | 5.5 | 6.1 | 40 | 5.4 | 6.1 | 55 | 5.2 | 6.0 | 60 | 5.1 | 5.9 | — | — | — |  |
| Ambient Temp.  | Load 50%  | Load 100%  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| [°C]   | Input Volt. [V]   | Input Volt. [V]  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| -30  | 6.1   | 6.8  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| -20  | 6.0   | 6.6  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| -10  | 5.8   | 6.5  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| 0  | 5.7   | 6.4  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| 10   | 5.6   | 6.3  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| 25   | 5.6   | 6.2  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| 30   | 5.5   | 6.1  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| 40   | 5.4   | 6.1  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| 55   | 5.2   | 6.0  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| 60   | 5.1   | 5.9  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| —  | —   | —  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
| Note: Slanted line shows the range of the rated ambient temperature.<br>(注)斜線は定格周囲温度範囲を示す。 |   |  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |
|  |   | BC-2037  |               |          |           |      |                 |                 |     |     |     |     |     |     |     |     |     |   |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |    |     |     |   |   |   |  |



**COSEL**

| Model              |                                      | ZUW31212  |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
|--------------------|--------------------------------------|---|--|--------------------|--------------------------------------|---------------------------------------|-----|----|----|-----|----|----|-----|----|----|---|----|----|----|----|----|----|----|----|----|---|----|----|---|----|----|---|----|----|---|----|---|---|---|
| Item               |                                      | Ripple Voltage (by Ambient Temp.)<br>リップル電圧 (周囲温度特性)  |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| Object             |                                      | +12V0.13A   |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| 1. Graph           |                                      | <div><div>-----□----- Load 50%</div><div>-----△----- Load 100%</div></div>  <p>Input Volt. 9.0 V</p>  |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
|                    |                                      | 2. Values   |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
|                    |                                      | <table><tr><th>Ambient Temp. [°C]</th><th>Load 50%<br/>Ripple Output Volt. [mV]</th><th>Load 100%<br/>Ripple Output Volt. [mV]</th></tr><tr><td>-30</td><td>10</td><td>65</td></tr><tr><td>-20</td><td>10</td><td>50</td></tr><tr><td>-10</td><td>10</td><td>40</td></tr><tr><td>0</td><td>10</td><td>35</td></tr><tr><td>10</td><td>10</td><td>30</td></tr><tr><td>25</td><td>10</td><td>25</td></tr><tr><td>30</td><td>5</td><td>25</td></tr><tr><td>40</td><td>5</td><td>25</td></tr><tr><td>55</td><td>5</td><td>30</td></tr><tr><td>60</td><td>5</td><td>30</td></tr><tr><td>—</td><td>—</td><td>—</td></tr></table> |  | Ambient Temp. [°C] | Load 50%<br>Ripple Output Volt. [mV] | Load 100%<br>Ripple Output Volt. [mV] | -30 | 10 | 65 | -20 | 10 | 50 | -10 | 10 | 40 | 0 | 10 | 35 | 10 | 10 | 30 | 25 | 10 | 25 | 30 | 5 | 25 | 40 | 5 | 25 | 55 | 5 | 30 | 60 | 5 | 30 | — | — | — |
| Ambient Temp. [°C] | Load 50%<br>Ripple Output Volt. [mV] | Load 100%<br>Ripple Output Volt. [mV]   |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| -30                | 10                                   | 65  |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| -20                | 10                                   | 50  |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| -10                | 10                                   | 40  |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| 0                  | 10                                   | 35  |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| 10                 | 10                                   | 30  |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| 25                 | 10                                   | 25  |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| 30                 | 5                                    | 25  |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| 40                 | 5                                    | 25  |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| 55                 | 5                                    | 30  |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| 60                 | 5                                    | 30  |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| —                  | —                                    | —   |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |    |    |    |    |    |    |    |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |

| Object             |                                      | -12V0.13A  |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
|--------------------|--------------------------------------|--|--|--------------------|--------------------------------------|---------------------------------------|-----|----|----|-----|----|----|-----|----|----|---|---|----|----|---|----|----|---|----|----|---|----|----|---|----|----|---|----|----|---|----|---|---|---|
| 1. Graph           |                                      | <div><div>-----□----- Load 50%</div><div>-----△----- Load 100%</div></div>  <p>Input Volt. 9.0 V</p>  |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
|                    |                                      | 2. Values  |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
|                    |                                      | <table><tr><th>Ambient Temp. [°C]</th><th>Load 50%<br/>Ripple Output Volt. [mV]</th><th>Load 100%<br/>Ripple Output Volt. [mV]</th></tr><tr><td>-30</td><td>10</td><td>60</td></tr><tr><td>-20</td><td>10</td><td>45</td></tr><tr><td>-10</td><td>10</td><td>40</td></tr><tr><td>0</td><td>5</td><td>35</td></tr><tr><td>10</td><td>5</td><td>30</td></tr><tr><td>25</td><td>5</td><td>30</td></tr><tr><td>30</td><td>5</td><td>25</td></tr><tr><td>40</td><td>5</td><td>25</td></tr><tr><td>55</td><td>5</td><td>25</td></tr><tr><td>60</td><td>5</td><td>25</td></tr><tr><td>—</td><td>—</td><td>—</td></tr></table> |  | Ambient Temp. [°C] | Load 50%<br>Ripple Output Volt. [mV] | Load 100%<br>Ripple Output Volt. [mV] | -30 | 10 | 60 | -20 | 10 | 45 | -10 | 10 | 40 | 0 | 5 | 35 | 10 | 5 | 30 | 25 | 5 | 30 | 30 | 5 | 25 | 40 | 5 | 25 | 55 | 5 | 25 | 60 | 5 | 25 | — | — | — |
| Ambient Temp. [°C] | Load 50%<br>Ripple Output Volt. [mV] | Load 100%<br>Ripple Output Volt. [mV]  |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| -30                | 10                                   | 60   |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| -20                | 10                                   | 45   |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| -10                | 10                                   | 40   |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| 0                  | 5                                    | 35   |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| 10                 | 5                                    | 30   |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| 25                 | 5                                    | 30   |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| 30                 | 5                                    | 25   |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| 40                 | 5                                    | 25   |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| 55                 | 5                                    | 25   |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| 60                 | 5                                    | 25   |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |
| —                  | —                                    | —  |  |                    |                                      |                                       |     |    |    |     |    |    |     |    |    |   |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |    |   |    |   |   |   |

|  |  |
|--|--|
| Note: Slanted line shows the range of the rated ambient temperature. |  |
| (注) 斜線は定格周囲温度範囲を示す。  |  |

**COSEL**

# COSEL

Model ZUW31212

Item Time Lapse Drift 経時ドリフト

Object +12V0.13A

Temperature 25 °C  
Testing Circuitry Figure A

## 1. Graph

Output Voltage [V]

Time [H]

Input Volt. 12.0V  
Load 100%

## 2. Values

| Time since start [H] | Output Voltage [V] |
|----------------------|--------------------|
| 0.0                  | 11.958             |
| 0.5                  | 11.955             |
| 1.0                  | 11.955             |
| 2.0                  | 11.955             |
| 3.0                  | 11.955             |
| 4.0                  | 11.955             |
| 5.0                  | 11.955             |
| 6.0                  | 11.955             |
| 7.0                  | 11.955             |
| 8.0                  | 11.955             |

Object -12V0.13A

## 1. Graph

Output Voltage [V]

Time [H]

Input Volt. 12.0V  
Load 100%

## 2. Values

| Time since start [H] | Output Voltage [V] |
|----------------------|--------------------|
| 0.0                  | -11.931            |
| 0.5                  | -11.928            |
| 1.0                  | -11.928            |
| 2.0                  | -11.928            |
| 3.0                  | -11.928            |
| 4.0                  | -11.928            |
| 5.0                  | -11.928            |
| 6.0                  | -11.928            |
| 7.0                  | -11.928            |
| 8.0                  | -11.928            |

**COSEL**

COLL

|       |                               |
|-------|-------------------------------|
|       |                               |
| Model | ZUW31212                      |
| Item  | Output Voltage Accuracy 定電圧精度 |

|                   |          |
|-------------------|----------|
| Testing Circuitry | Figure A |
|-------------------|----------|

Output Voltage Accuracy

This is defined as the value of the output voltage, regulation load, ambient temperature and input voltage varied at random in the range as specified below.

- Temperature : -20~55 ℃
- Input Voltage : 9.0~18.0 V
- Load Current ( AVR 1 ) : 0.00~0.13 A
- ( AVR 2 ) : 0.00~0.13 A

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

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

定電圧精度

周囲温度、入力電圧、負荷を下記仕様内で、任意に変動させたときの出力電圧の変動をいう。

- 周囲温度 -20~55 ℃
- 入力電圧 9.0~18.0 V
- 負荷電流 (AVR 1) 0.00~0.13 A
- (AVR 2) 0.00~0.13 A

\* 定電圧精度(変動値) = ±(出力電圧の最高値－出力電圧の最低値)／2

\* 定電圧精度(変動率) =  $\frac{\text{変動値}}{\text{定格出力電圧}} \times 100$

|        |           |
|--------|-----------|
| Object | +12V0.13A |
|--------|-----------|

| Item            | Temperature<br>[℃] | Input<br>Voltage [V] | Output<br>Current [A] | Output<br>Voltage [V] | Output Voltage<br>Accuracy [mV] | Output Voltage<br>Accuracy(Ration) [%] |
|-----------------|--------------------|----------------------|-----------------------|-----------------------|---------------------------------|--|
| Maximum Voltage | 25                 | 12.0                 | 0.13                  | 11.956                | ±139                            | ±1.2                                   |
| Minimum Voltage | -20                | 18.0                 | 0.00                  | 11.679                |                                 |  |

|        |           |
|--------|-----------|
| Object | －12V0.13A |
|--------|-----------|

| Item            | Temperature<br>[℃] | Input<br>Voltage [V] | Output<br>Current [A] | Output<br>Voltage [V] | Output Voltage<br>Accuracy [mV] | Output Voltage<br>Accuracy(Ration) [%] |
|-----------------|--------------------|----------------------|-----------------------|-----------------------|---------------------------------|--|
| Maximum Voltage | 25                 | 12.0                 | 0.13                  | -11.922               | ±162                            | ±1.4                                   |
| Minimum Voltage | -20                | 18.0                 | 0.00                  | -11.599               |                                 |  |

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BC-2037

# COSEL

LOVEL

|        |                   |                   |          |
|--------|-------------------|-------------------|----------|
|        |                   |                   |          |
| Model  | ZUW31212          |                   |          |
| Item   | Condensation 結露特性 | Testing Circuitry | Figure A |
| Object | +12V0.13A         |                   |          |

1. Condensation test

Testing procedure is as follows.

① Keeping and cooling the unit in a tank at -10℃ for an hour with the input off.

② Taking it out of the tank and dewing itself in a room where the temperature is 25℃ and the humidity is 40%RH.

③ Testing electrical characteristics of the unit to confirm there be no fault.

④ Repeating ①,② and ③ three times.

1. 結露特性試験

入力を切った状態で、恒温槽で－10℃に冷却しておき、約1時間後に恒温槽から取り出し、室温25℃、湿度40%RHの状態におき結露させ、その電気的特性の測定を3度行い、異常のないことを確認する。

|                  |       |                       |                        |                      |
|------------------|-------|-----------------------|------------------------|----------------------|
|                  |       |                       |                        |                      |
| 2. Values        |       |                       |                        |                      |
|                  | Times | Output Voltage<br>[V] | Ripple Voltage<br>[mV] | Ripple Noise<br>[mV] |
| Load<br>50<br>%  | 1     | 11.892                | 5                      | 15                   |
|                  | 2     | 11.897                | 5                      | 15                   |
|                  | 3     | 11.895                | 5                      | 15                   |
| Load<br>100<br>% | 1     | 11.801                | 10                     | 20                   |
|                  | 2     | 11.806                | 10                     | 20                   |
|                  | 3     | 11.804                | 10                     | 20                   |

Input Volt. 12.0 V

# COSEL

COSEL

|        |                   |
|--------|-------------------|
| Model  | ZUW31212          |
| Item   | Condensation 結露特性 |
| Object | −12V0.13A         |

Testing Circuitry      Figure A

1. Condensation test

Testing procedure is as follows.

- ① Keeping and cooling the unit in a tank at −10℃ for an hour with the input off.
- ② Taking it out of the tank and dewing itself in a room where the temperature is 25℃ and the humidity is 40%RH.
- ③ Testing electrical characteristics of the unit to confirm there be no fault.
- ④ Repeating ①,② and ③ three times.

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2. Values

|                  | Times | Output Voltage<br>[V] | Ripple Voltage<br>[mV] | Ripple Noise<br>[mV] |
|------------------|-------|-----------------------|------------------------|----------------------|
| Load<br>50<br>%  | 1     | −11.865               | 5                      | 15                   |
|                  | 2     | −11.861               | 5                      | 15                   |
|                  | 3     | −11.859               | 5                      | 15                   |
| Load<br>100<br>% | 1     | −11.777               | 10                     | 20                   |
|                  | 2     | −11.766               | 10                     | 20                   |
|                  | 3     | −11.770               | 10                     | 20                   |

Input Volt. 12.0 V

**COSEL**

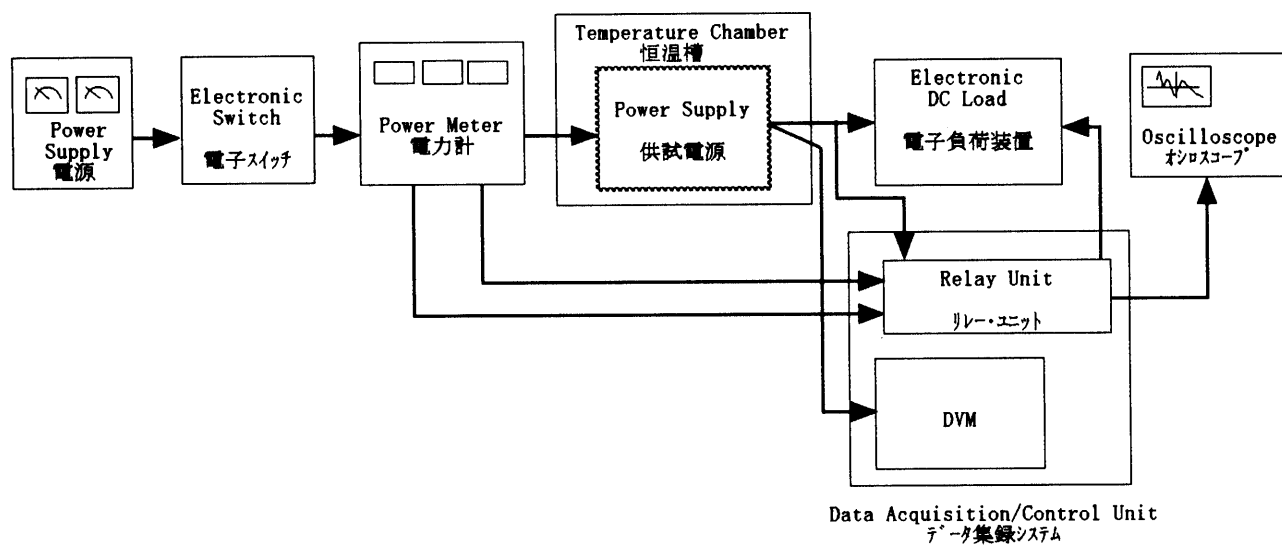


Figure A