Z\textsuperscript{+}200 Series

EVALUATION

DATA

<table>
<thead>
<tr>
<th>APPD</th>
<th>CHK</th>
<th>DWG</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Ron B.</td>
<td>yaMin</td>
</tr>
<tr>
<td>17/5/12</td>
<td>16/5/12</td>
<td>08/01/2012</td>
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DWG No.: IA709-53-01

TDK-Lambda
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<tr>
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</table>

### TERMINOLOGY USED

<table>
<thead>
<tr>
<th>Definition</th>
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<tbody>
<tr>
<td>Vin</td>
<td>Input voltage</td>
</tr>
<tr>
<td>Vout</td>
<td>Output voltage</td>
</tr>
<tr>
<td>ln</td>
<td>Input current</td>
</tr>
<tr>
<td>lout</td>
<td>Output current</td>
</tr>
<tr>
<td>Ta</td>
<td>Ambient temperature</td>
</tr>
<tr>
<td>C.V</td>
<td>Constant voltage mode</td>
</tr>
<tr>
<td>C.C</td>
<td>Constant current mode</td>
</tr>
</tbody>
</table>
1. EVALUATION METHOD

1.1 Circuit used for determination

(1) Steady state data

(2) Warm up voltage drift characteristic same as Steady state data

(3) Warm up current drift characteristic same as Steady state data

(4) Over voltage protection (OVP) characteristics

(5) Output voltage rise/fall characteristics same as Steady state data

(6) Output current rise/fall characteristics
1.1 Circuit used for determination

(7) Dynamic line voltage and current response characteristics

(8) Dynamic load voltage and current response characteristics

Constant Voltage mode

Output current waveform
\[ I_{out}^{0\%} \leftrightarrow 100\% \]

Output current waveform
\[ I_{out}^{50\%} \leftrightarrow 100\% \]
1.1 Circuit used for determination

(9) Response to brown-out characteristic

(10) Inrush current characteristics same as Response to brown-out

(11) Leakage current characteristics

(12) Output Voltage ripple & noise waveform 10V up to 100V models

(a) Normal mode (JEITA Standard RC-9131A)
1.1 Circuit used for determination

(12) Output Voltage ripple & noise waveform 10V up to 100V models

(b) Normal + Common mode

(13) Output Current rms ripple 10V to 100V models

Notes:
(*) Output Current rms ripple = Output Voltage rms ripple divided by the Load resistance.
<table>
<thead>
<tr>
<th>No.</th>
<th>EQUIPMENT USED</th>
<th>MANUFACTURER</th>
<th>MODEL No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Digital oscilloscope</td>
<td>YOKOGAWA</td>
<td>DL7100</td>
</tr>
<tr>
<td>2</td>
<td>Digital oscilloscope</td>
<td>YOKOGAWA</td>
<td>DL1740EL</td>
</tr>
<tr>
<td>3</td>
<td>Digital multimeter</td>
<td>AGILENT</td>
<td>34401A</td>
</tr>
<tr>
<td>4</td>
<td>Digital power meter</td>
<td>YOKOGAWA</td>
<td>WT230</td>
</tr>
<tr>
<td>5</td>
<td>AC Source</td>
<td>CHROMA</td>
<td>6590</td>
</tr>
<tr>
<td>6</td>
<td>AC Source</td>
<td>CHROMA</td>
<td>6530</td>
</tr>
<tr>
<td>7</td>
<td>Electronic load</td>
<td>H&amp;H</td>
<td>ZS6060 SC150</td>
</tr>
<tr>
<td>8</td>
<td>Electronic load</td>
<td>H&amp;H</td>
<td>ZS7006</td>
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<tr>
<td>9</td>
<td>Electronic load</td>
<td>H&amp;H</td>
<td>ZS7060</td>
</tr>
<tr>
<td>10</td>
<td>Electronic load</td>
<td>CHROMA</td>
<td>63203</td>
</tr>
<tr>
<td>11</td>
<td>Electronic load</td>
<td>CHROMA</td>
<td>63204</td>
</tr>
<tr>
<td>12</td>
<td>Electronic load</td>
<td>CHROMA</td>
<td>63206</td>
</tr>
<tr>
<td>13</td>
<td>Controlled temp. chamber</td>
<td>THERMOTRON</td>
<td>SM-16-3800</td>
</tr>
<tr>
<td>14</td>
<td>Controlled temp. chamber</td>
<td>THERMOTRON</td>
<td>SE-600-5-5</td>
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<tr>
<td>15</td>
<td>Controlled temp. chamber</td>
<td>THERMOTRON</td>
<td>SE-600-6-6</td>
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<td>16</td>
<td>Leakage Current Tester</td>
<td>KIKUSUI</td>
<td>TOS3200</td>
</tr>
<tr>
<td>17</td>
<td>Voltage probe</td>
<td>YOKOGAWA</td>
<td>700988</td>
</tr>
<tr>
<td>18</td>
<td>Current probe</td>
<td>YOKOGAWA</td>
<td>701933</td>
</tr>
<tr>
<td>19</td>
<td>Current probe</td>
<td>LEM Danfysik</td>
<td>IT 60-S Ultrastab</td>
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<tr>
<td>20</td>
<td>Inrush Current Meter</td>
<td>TAKAMISAWA</td>
<td>PSA-210</td>
</tr>
<tr>
<td>21</td>
<td>Data Acquisition/Switch Unit</td>
<td>AGILENT</td>
<td>34970A</td>
</tr>
</tbody>
</table>
2. CHARACTERISTIC

2.1 Steady state data

(1) Regulation - Line & Load, Temperature drift

Conditions: $T_a = 25^\circ$C

1. Regulation - Line & Load, C.V mode (Readings in [V])

<table>
<thead>
<tr>
<th>Io</th>
<th>85</th>
<th>100</th>
<th>200</th>
<th>265</th>
<th>Line Regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>10.0004</td>
<td>10.0004</td>
<td>10.0004</td>
<td>10.0004</td>
<td>0.0</td>
</tr>
<tr>
<td>25%</td>
<td>10.0003</td>
<td>10.0003</td>
<td>10.0003</td>
<td>10.0003</td>
<td>0.0</td>
</tr>
<tr>
<td>60%</td>
<td>10.0002</td>
<td>10.0002</td>
<td>10.0002</td>
<td>10.0002</td>
<td>0.0</td>
</tr>
<tr>
<td>75%</td>
<td>10.0001</td>
<td>10.0001</td>
<td>10.0001</td>
<td>10.0001</td>
<td>0.0</td>
</tr>
<tr>
<td>100%</td>
<td>10.0000</td>
<td>10.0000</td>
<td>10.0000</td>
<td>10.0000</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Load Regulation: 0.4 0.4 0.4 0.4 $\Delta V$(mV) (%)

Regulation: 0.004 0.004 0.004 0.004 (%)

2. Temperature drift, C.V mode

Conditions: $V_{in}$:100Vac

<table>
<thead>
<tr>
<th>Ta</th>
<th>0°C</th>
<th>25°C</th>
<th>50°C</th>
<th>Temp. Coefficient (0°C-50°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vout</td>
<td>10.002</td>
<td>9.999</td>
<td>9.997</td>
<td>5 mV</td>
</tr>
</tbody>
</table>

TDK-Lambda
2.1 Steady state data

(1) Regulation - Line & Load, Temperature drift

Conditions: \( T_a = 25^\circ C \)

1. Regulation - Line & Load, C.V mode (Readings in [V])

<table>
<thead>
<tr>
<th>( \text{Line Regulation} )</th>
<th>85</th>
<th>100</th>
<th>200</th>
<th>265</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>36.0025</td>
<td>36.0025</td>
<td>36.0025</td>
<td>36.0025</td>
</tr>
<tr>
<td>25%</td>
<td>36.0024</td>
<td>36.0025</td>
<td>36.0025</td>
<td>36.0024</td>
</tr>
<tr>
<td>50%</td>
<td>36.0024</td>
<td>36.0024</td>
<td>36.0024</td>
<td>36.0024</td>
</tr>
<tr>
<td>75%</td>
<td>36.0023</td>
<td>36.0024</td>
<td>36.0024</td>
<td>36.0024</td>
</tr>
<tr>
<td>100%</td>
<td>36.0023</td>
<td>36.0023</td>
<td>36.0024</td>
<td>36.0024</td>
</tr>
<tr>
<td>Load Regulation</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.1</td>
</tr>
<tr>
<td>( \Delta V (mV) )</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.000</td>
</tr>
</tbody>
</table>

2. Temperature drift, C.V mode

Conditions: \( V_{in}:100\text{Vac} \)
\( I_{out}:100\%

<table>
<thead>
<tr>
<th>( \text{Temp. Coefficient (0}^\circ \text{C} - 50^\circ \text{C}) )</th>
<th>0(^\circ)C</th>
<th>25(^\circ)C</th>
<th>50(^\circ)C</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_{out} )</td>
<td>36.006</td>
<td>36.006</td>
<td>36.005</td>
</tr>
<tr>
<td>1 mV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 ppm/(^\circ)C</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.1 Steady state data

(1) Regulation - Line & Load, Temperature drift

Conditions: Ta = 25°C

1. Regulation - Line & Load, C.V mode  (Readings in [V])

<table>
<thead>
<tr>
<th>Io</th>
<th>85</th>
<th>100</th>
<th>200</th>
<th>266</th>
<th>Line Regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>100.0100</td>
<td>100.0100</td>
<td>100.0100</td>
<td>100.0100</td>
<td>0.0</td>
</tr>
<tr>
<td>25%</td>
<td>100.0100</td>
<td>100.0100</td>
<td>100.0100</td>
<td>100.0100</td>
<td>0.0</td>
</tr>
<tr>
<td>50%</td>
<td>100.0100</td>
<td>100.0100</td>
<td>100.0100</td>
<td>100.0100</td>
<td>0.0</td>
</tr>
<tr>
<td>75%</td>
<td>100.0099</td>
<td>100.0099</td>
<td>100.0099</td>
<td>100.0099</td>
<td>0.0</td>
</tr>
<tr>
<td>100%</td>
<td>100.0098</td>
<td>100.0098</td>
<td>100.0098</td>
<td>100.0098</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Load Regulation
0.000  0.000  0.000  0.000  ΔV(mV) (%)

2. Temperature drift, C.V mode

Conditions: Vin: 100Vac
Iout: 100%

<table>
<thead>
<tr>
<th>Ta</th>
<th>0°C</th>
<th>25°C</th>
<th>50°C</th>
<th>Temp. Coefficient (0°C–50°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vout</td>
<td>99.989</td>
<td>100.002</td>
<td>100.028</td>
<td>39 mV 8 ppm/°C</td>
</tr>
</tbody>
</table>
2.1 Steady state data

(1) Regulation - Line & Load, Temperature drift

Conditions: $T_a = 25^\circ C$

1. Regulation - Line & Load, C.C mode (*) (Readings in [A])

<table>
<thead>
<tr>
<th>Vin (AC)</th>
<th>85</th>
<th>100</th>
<th>200</th>
<th>265</th>
<th>Line Regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>20.0072</td>
<td>20.0061</td>
<td>20.0066</td>
<td>20.0084</td>
<td>1.1</td>
</tr>
<tr>
<td>25%</td>
<td>20.0079</td>
<td>20.0077</td>
<td>20.0064</td>
<td>20.0086</td>
<td>1.5</td>
</tr>
<tr>
<td>50%</td>
<td>20.0088</td>
<td>20.0087</td>
<td>20.0073</td>
<td>20.0069</td>
<td>1.9</td>
</tr>
<tr>
<td>75%</td>
<td>20.0095</td>
<td>20.0083</td>
<td>20.0080</td>
<td>20.0072</td>
<td>2.3</td>
</tr>
<tr>
<td>100%</td>
<td>20.0101</td>
<td>20.0099</td>
<td>20.0089</td>
<td>20.0073</td>
<td>2.8</td>
</tr>
<tr>
<td>Load Regulation</td>
<td>2.9</td>
<td>3.8</td>
<td>2.5</td>
<td>0.9</td>
<td>$\Delta I (mA)$ (%)</td>
</tr>
<tr>
<td></td>
<td>0.014</td>
<td>0.019</td>
<td>0.012</td>
<td>0.004</td>
<td>(%)</td>
</tr>
</tbody>
</table>

Notes:
(*) Not including load regulation thermal drift effect.

2. Temperature drift, C.C mode

Conditions: $V_{in:100V_{ac}}$
lout:100%

<table>
<thead>
<tr>
<th>$T_a$</th>
<th>0°C</th>
<th>25°C</th>
<th>50°C</th>
<th>Temp. Coefficient (0°C–50°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>lout</td>
<td>20.0401</td>
<td>20.0418</td>
<td>20.0376</td>
<td>4.2 mA</td>
</tr>
</tbody>
</table>
2.1 Steady state data

(1) Regulation - Line & Load, Temperature drift

Conditions: \( T_a = 25^\circ C \)

1. Regulation - Line & Load, C.C mode (*) (Readings in [A])

<table>
<thead>
<tr>
<th>Vo</th>
<th>85</th>
<th>100</th>
<th>200</th>
<th>265</th>
<th>Line Regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>5.9976</td>
<td>5.9976</td>
<td>5.9976</td>
<td>5.9976</td>
<td>0.0</td>
</tr>
<tr>
<td>25%</td>
<td>5.9972</td>
<td>5.9972</td>
<td>5.9972</td>
<td>5.9972</td>
<td>0.0</td>
</tr>
<tr>
<td>50%</td>
<td>5.9970</td>
<td>5.9970</td>
<td>5.9970</td>
<td>5.9970</td>
<td>0.0</td>
</tr>
<tr>
<td>75%</td>
<td>5.9968</td>
<td>5.9968</td>
<td>5.9968</td>
<td>5.9968</td>
<td>0.0</td>
</tr>
<tr>
<td>100%</td>
<td>5.9966</td>
<td>5.9966</td>
<td>5.9966</td>
<td>5.9965</td>
<td>0.1</td>
</tr>
</tbody>
</table>

\[ \Delta I(mA) \] \( (\%) \)

Load

<table>
<thead>
<tr>
<th>Regulation</th>
<th>I (mA)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>0.017</td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td>0.017</td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>0.018</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
(*) Not including load regulation thermal drift effect.

2. Temperature drift, C.C mode

Conditions: \( V_{in}:100V_{ac} \)
\( I_{out}:100\% \)

<table>
<thead>
<tr>
<th>Ta</th>
<th>0°C</th>
<th>25°C</th>
<th>50°C</th>
<th>Temp. Coefficient (0°C~50°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.0024</td>
<td>5.9979</td>
<td>5.9980</td>
<td>4.5 mA</td>
</tr>
</tbody>
</table>

TDK-Lambda
2.1 Steady state data

(1) Regulation - Line & Load, Temperature drift

<table>
<thead>
<tr>
<th>Vo</th>
<th>85</th>
<th>100</th>
<th>200</th>
<th>265</th>
<th>Line Regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>2.0012</td>
<td>2.0012</td>
<td>2.0012</td>
<td>2.0012</td>
<td>0.0</td>
</tr>
<tr>
<td>25%</td>
<td>2.0009</td>
<td>2.0009</td>
<td>2.0009</td>
<td>2.0009</td>
<td>0.0</td>
</tr>
<tr>
<td>50%</td>
<td>2.0007</td>
<td>2.0007</td>
<td>2.0008</td>
<td>2.0008</td>
<td>0.1</td>
</tr>
<tr>
<td>75%</td>
<td>2.0005</td>
<td>2.0005</td>
<td>2.0004</td>
<td>2.0004</td>
<td>0.1</td>
</tr>
<tr>
<td>100%</td>
<td>2.0002</td>
<td>2.0002</td>
<td>2.0002</td>
<td>2.0001</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Load Regulation: 1.0 1.0 1.0 1.1 ΔI(mA) (%) [0.050 0.050 0.050 0.055 (%)]

Notes:
(*) Not including load regulation thermal drift effect.

2. Temperature drift, C.C mode

<table>
<thead>
<tr>
<th>Ta</th>
<th>0°C</th>
<th>25°C</th>
<th>50°C</th>
<th>Temp. Coefficient (0°C-50°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iout</td>
<td>3.9992</td>
<td>3.9981</td>
<td>3.9983</td>
<td>1.2 mA 12 ppm/°C</td>
</tr>
</tbody>
</table>
2.1 Steady state data

(2) Output voltage and ripple voltage v.s input voltage

C.V mode

Conditions: \( I_{\text{out}}: 100\% \)

\begin{align*}
\text{Ta:} & \quad 0^\circ C & \quad - & \quad 25^\circ C & \quad - & \quad 50^\circ C & \quad - \\
\end{align*}

![Graph showing output voltage and ripple voltage vs input voltage.

(3) Output current and ripple current v.s input voltage

C.C mode

Conditions: \( V_{\text{out}}: 100\% \)

\begin{align*}
\text{Ta:} & \quad 0^\circ C & \quad - & \quad 25^\circ C & \quad - & \quad 50^\circ C & \quad - \\
\end{align*}

![Graph showing output current and ripple current vs input voltage.]
2.1 Steady state data

(2) Output voltage and ripple voltage v.s input voltage

C.V mode

Conditions: I_{out}:100%

\[\begin{array}{c|c}
\text{Ta} & \hline \\
0°C & \hline \\
25°C & \hline \\
50°C & \hline
\end{array}\]

(3) Output current and ripple current v.s input voltage

C.C mode

Conditions: V_{out}:100%

\[\begin{array}{c|c}
\text{Ta} & \hline \\
0°C & \hline \\
25°C & \hline \\
50°C & \hline
\end{array}\]
2.1 Steady state data

(2) Output voltage and ripple voltage v.s input voltage

C.V mode

Conditions: Iout:100%

<table>
<thead>
<tr>
<th>Ta</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0°C</td>
<td>-------</td>
</tr>
<tr>
<td>25°C</td>
<td></td>
</tr>
<tr>
<td>50°C</td>
<td></td>
</tr>
</tbody>
</table>

(3) Output current and ripple current v.s input voltage

C.C mode

Conditions: Vout:100%

<table>
<thead>
<tr>
<th>Ta</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0°C</td>
<td>-------</td>
</tr>
<tr>
<td>25°C</td>
<td></td>
</tr>
<tr>
<td>50°C</td>
<td></td>
</tr>
</tbody>
</table>
2.1 Steady state data

(4) Efficiency and Input current vs. Output current

Conditions:
- Vin: 85 VAC
- 100 VAC
- 200 VAC
- 265 VAC
- Vout: 100%
- Ta: 25°C

![Graph showing efficiency and input current vs. output current](image-url)
2.1 Steady state data

(4) Efficiency and Input current vs. Output current

**Conditions:**
- Vin: 85 VAC
- 100 VAC
- 200 VAC
- 265 VAC
- Vout: 100%
- Ta: 25°C

![Graph showing Efficiency and Input current vs. Output current](image)

**Efficiency**

**Input current (A)**

**Output current (%)**
2.1 Steady state data

(4) Efficiency and Input current vs. Output current

Conditions:

- Vin: 85 VAC
- 100VAC
- 200 VAC
- 285 VAC
- Vout: 100%
- Ta: 25°C
2.2 Warm up drift & stability

C.V mode

Conditions: Vin: 100 Vac
Vout: 100%
Iout: 100%
Ta = 25°C

---

C.C mode
2.2 Warm up drift & stability

C.V mode

Conditions: Vin: 100Vac
Vout: 100%
Iout: 100%
Ta = 25°C

C.C mode
2.2 Warm up drift & stability

C.V mode

Conditions: Vin: 100Vac
Vout: 100%
lout: 100%
Ta = 25°C

C.C mode
2.3 Over voltage protection (OVP) characteristic

Conditions:
Vin: 100Vac
Iout: 0%
Ta = 25°C

OVP setting: 12V

Z10-20

OVP setting: 40V

Z36-6
2.3 Over voltage protection (OVP) characteristic

Conditions: Vin: 100Vac
Iout: 0%
Ta = 25°C

OVP setting: 110V
2.4 ON/OFF Output rise characteristics

C.V mode

Conditions: Vin: 100Vac
Vout: 100%
Iout: 0%
Iset=105%
Ta = 25°C
2.4 ON/OFF Output rise characteristics

C.V mode

Conditions: Vin: 100Vac
Vout: 100%
lout: 0%
Iset=105%
Ta = 25°C

$20V_{DIV}$
$5mA_{DIV}$
2.4 ON/OFF Output rise characteristics

C.V mode

Conditions: Vin: 100Vac
Vout: 100%
Iout: 100%
Iset=105%
Load: CR
Ta = 25°C
2.4 ON/OFF Output rise characteristics

C.V mode

Conditions: Vin: 100Vac
Vout: 100%
lout: 100%
Iset=105%
Load: CR
Ta = 25°C
2.4 ON/OFF Output rise characteristics

C.C mode

Conditions: Vin: 100Vac
Vout: 100%
lout: 100%
Vset=105%
Load: CR
Ta = 25°C
2.4 ON/OFF Output rise characteristics

C.C mode

Conditions:
Vin: 100 Vac
Vout: 100%
lout: 100%
Vsel=105%
Load: CR
Ta = 25°C

[Diagram with axes labeled 0.5 V/div and 50 ms/div]
2.4 ON/OFF Output rise characteristics

C.C mode

Conditions: Vin: 100Vac
        Iout: 100%
        Vset=105%
        shorted output
        Ta = 25°C

---

Z10-20

---

Z38-6
2.4 ON/OFF Output rise characteristics

C.C mode

Conditions: Vin: 100Vac
Iout: 100%
Vset=105%
shorted output
Ta = 25°C

Z100-2
2.5 ON/OFF Output fall characteristics

C.V mode

Conditions:
- Vin: 100Vac
- Vout: 100%
- Iout: 0%
- Isel: 105%
- Ta = 25°C

Z10-20

Z36-6
2.5 ON/OFF Output fall characteristics

C.V mode

Conditions: Vin: 100Vac  
Vout: 100%  
lout: 0%  
Iset=105%  
Ta = 25°C

Z100-2

20°/DIV 100ms/DIV
2.5 ON/OFF Output fall characteristics

C.V mode

Conditions: Vin: 100Vac
Vout: 100%
lout: 100%
Iset=105%
Load: CR
Ta = 25°C
2.5 ON/OFF Output fall characteristics

C.V mode

Conditions: Vin: 100 Vac
Vout: 100%
Iout: 100%
Iset=105%
Load: CR
Ta = 25°C

20V/Div

20ms/Div
2.5 ON/OFF Output fall characteristics

C.C mode

Conditions: Vin: 100Vac
Vout: 100%
lout: 100%
Vset=105%
Load: CR
Ta = 25°C

Z10-20

Z36-6
2.5 ON/OFF Output fall characteristics

C.C mode

Conditions: Vin: 100 Vac
Vout: 100%
Iout: 100%
Vset=105%
Load: CR
Ta = 25°C
2.5 ON/OFF Output fall characteristics

C.C mode

Conditions: Vin: 100Vac
lout: 100%
Vset=105%
shorted output
Ta = 25°C
2.5 ON/OFF Output fall characteristics

C.C mode

Conditions: Vin: 100 Vac
Iout: 100%
Vset=105%
shorted output
Ta = 25°C
2.6 Hold up time characteristics

Conditions: Vin: 100Vac
Vout: 100%
Ta = 25°C

Z10-20
2.6 Hold up time characteristics

Conditions: Vin: 100Vac
Vout: 100%
Ta = 25°C
2.6 Hold up time characteristics

Conditions: Vin: 100Vac
Vout: 100%
Ta = 25°C
2.7 Dynamic line response characteristics

C.V mode

Conditions: Vin: 85 → 132V
Vout: 100%
Iout: 100%
Ta = 25°C

Conditions: Vin: 170 → 265V
Vout: 100%
Iout: 100%
Ta = 25°C
2.7 Dynamic line response characteristics

C.V mode

Conditions: Vin: 85→132V
Vout: 100%
Iout: 100%
Ta = 25°C

Vout: 100mV/Div
500μs/Div

Conditions: Vin: 170→265V
Vout: 100%
Iout: 100%
Ta = 25°C

Vout: 100mV/Div
500μs/Div
2.7 Dynamic line response characteristics

C.V mode

Conditions: Vin: 85→132V
Vout: 100%
Iout: 100%
Ta = 25°C

Conditions: Vin: 170→265V
Vout: 100%
Iout: 100%
Ta = 25°C
2.7 Dynamic line response characteristics

C.C mode

Conditions: Vin: 85→132V
Vout: 100%
lout: 100%
Ta = 25°C

Conditions: Vin: 170→265V
Vout: 100%
lout: 100%
Ta = 25°C
2.7 Dynamic line response characteristics

C.C mode

Conditions: Vin: 85\rightarrow132V
Vout: 100%
lout: 100%
Ta = 25°C

Conditions: Vin: 170\rightarrow265V
Vout: 100%
lout: 100%
Ta = 25°C
2.7 Dynamic line response characteristics

C.C mode

Conditions: Vin: 85→132V
Vout: 100%
lout: 100%
Ta = 25°C

Conditions: Vin: 170→265V
Vout: 100%
lout: 100%
Ta = 25°C
2.8 Dynamic load response characteristics

C.V mode

Conditions: Vin: 100Vac
Vout: 100%
Ta = 25°C

Load current: tr=tf=100us

Z10-20

<table>
<thead>
<tr>
<th>lout:0%→100%</th>
<th>f:100Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2V/Div</td>
<td>2ms/Div</td>
</tr>
<tr>
<td>1.48%</td>
<td>-5.19%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>lout:50%→100%</th>
<th>f:100Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1V/Div</td>
<td>2ms/Div</td>
</tr>
<tr>
<td>0.95%</td>
<td>-0.85%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>lout:0%→100%</th>
<th>f:1000Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1V/Div</td>
<td>200ms/Div</td>
</tr>
<tr>
<td>1.23%</td>
<td>-1.91%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>lout:50%→100%</th>
<th>f:1000Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05V/Div</td>
<td>100ms/Div</td>
</tr>
<tr>
<td>0.82%</td>
<td>-0.83%</td>
</tr>
</tbody>
</table>
2.8 Dynamic load response characteristics

C.V mode

Conditions: Vin: 100 Vac
Vout: 100%
Ta = 25°C
Load current: tr=tf=100µs

![Graphs showing dynamic load response characteristics with different conditions and parameters.](image-url)
2.8 Dynamic load response characteristics

C.V mode

<table>
<thead>
<tr>
<th>Conditions: Vin: 100Vac</th>
<th>Vout: 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ta = 25°C</td>
<td></td>
</tr>
<tr>
<td>Load current: tr=tf=100us</td>
<td></td>
</tr>
</tbody>
</table>

### Z100-2

<table>
<thead>
<tr>
<th>I_{out}: 0%→100%</th>
<th>f: 100HZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05V/Div</td>
<td>2^{m3}/Div</td>
</tr>
<tr>
<td>0.32%</td>
<td>-0.74%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I_{out}: 50%→100%</th>
<th>f: 100HZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01V/Div</td>
<td>2^{m3}/Div</td>
</tr>
<tr>
<td>0.16%</td>
<td>-0.16%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I_{out}: 0%→100%</th>
<th>f: 1000HZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.02V/Div</td>
<td>200\micro s/Div</td>
</tr>
<tr>
<td>0.22%</td>
<td>-0.24%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I_{out}: 50%→100%</th>
<th>f: 1000HZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01V/Div</td>
<td>200\micro s/Div</td>
</tr>
<tr>
<td>0.13%</td>
<td>-0.12%</td>
</tr>
</tbody>
</table>
2.8 Dynamic load response characteristics

C.C mode

Conditions: Vin:100Vac
Ta = 25°C

Z10-20

<table>
<thead>
<tr>
<th>Io=20A</th>
<th>Vout:9-7.5V</th>
<th>f:10HZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>3A/DIV</td>
<td>20μs/DIV</td>
<td>16.35%</td>
</tr>
</tbody>
</table>

Z36-6

<table>
<thead>
<tr>
<th>Io=8A</th>
<th>Vout:32.4-27V</th>
<th>f:10HZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5A/DIV</td>
<td>20μs/DIV</td>
<td>18.38%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Io=10A</th>
<th>Vout:9-7.5V</th>
<th>f:10HZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2A/DIV</td>
<td>20μs/DIV</td>
<td>10.05%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Io=3A</th>
<th>Vout:32.4-27V</th>
<th>f:10HZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2A/DIV</td>
<td>20μs/DIV</td>
<td>9.26%</td>
</tr>
</tbody>
</table>
2.8 Dynamic load response characteristics

C.C mode

Conditions: Vin: 100Vac
Ta = 25°C

<table>
<thead>
<tr>
<th>Z100-Z</th>
<th>Io=2A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vout: 90→75V</td>
<td>f: 10HZ</td>
</tr>
<tr>
<td>0.2A/Div</td>
<td>20ms/Div</td>
</tr>
<tr>
<td>17.95%</td>
<td>-15.32%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Io=1A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vout: 90→75V</td>
<td>f: 10HZ</td>
</tr>
<tr>
<td>0.1A/Div</td>
<td>20ms/Div</td>
</tr>
<tr>
<td>8.65%</td>
<td>-7.52%</td>
</tr>
</tbody>
</table>
2.9 Response to brown-out characteristics

C.V mode

Conditions: Vin: 100VAC
Vout: 100%
lout: 100%
Ta = 25°C

Brown-out time
A - 17mS
B - 24mS

VIN

VOUT

Vout: $2V_{DIV}$
100ms$_{DIV}$
2.9 Response to brown-out characteristics

C.V mode

Conditions: Vin: 100VAC
Vout: 100%
lout: 100%
Ta = 25°C

Brown-out time
A - 18ms
B - 22ms
2.9 Response to brown-out characteristics

C.V mode

Conditions: Vin: 100VAC
Vout: 100%
lout: 100%
Ta = 25°C

Brown-out time
A - 23ms
B - 24ms
2.9 Response to brown-out characteristics

C.C mode

Conditions: Vin: 100VAC
Vout: 100%
lout: 100%
Ta = 25°C

Brown-out time
A - 20mS
B - 23mS

lout: δ/\text{DIV}
100\text{ms}/\text{DIV}
2.9 Response to brown-out characteristics

C.C mode

Conditions: Vin: 100VAC
Vout: 100%
Iout: 100%
Ta = 25°C

Brown-out time
A - 19ms
B - 23ms
2.9 Response to brown-out characteristics

C.C mode

Conditions: Vin: 100VAC
Vout: 100%
lout: 100%
Ta = 25°C

Brown-out time
A - 23ms
B - 24ms
2.10 Inrush Current Characteristics during line brown outs

Conditions: Vin: 100VAC
Vout: 100%
lout: 0%
lout: 100%
Ta = 25°C

Max Inrush Current (A)

Brown out time (s)
2.10 Inrush Current Characteristics during line brown outs

Conditions: Vin: 200VAC
Vout: 100%
lout: 0%
lout: 100%
Ta = 25°C

Max Inrush Current (A)

Brown out time (s)
2.11 Inrush current waveform

Conditions: Vin: 100V
Vout: 100%
lout: 100%
Ta = 25°C
2.11 Inrush current waveform

Switch on phase angle of input AC voltage
\( \Phi = 0^\circ \)

Conditions:
Vin: 200V
Vout: 100%
lout: 100%
Ta = 25°C
2.11 Inrush current waveform

Conditions: Vin: 100V
Vout: 100%
lout: 100%
Ta = 25°C

Switch on phase angle of input AC voltage
\( \phi = 0^\circ \)

Switch on phase angle of input AC voltage
\( \phi = 90^\circ \)
2.11 Inrush current waveform

Conditions: Vin: 200V
Vout: 100%
lout: 100%
Ta = 25°C

Switch on phase angle of input AC voltage
\( \phi = 0^\circ \)

\( \text{lin} \)

\( \text{Vin} \)

\( 10^6/\text{DIV} \)

\( 100\text{ms}/\text{DIV} \)

Switch on phase angle of input AC voltage
\( \phi = 90^\circ \)

\( \text{lin} \)

\( \text{Vin} \)

\( 10^6/\text{DIV} \)

\( 100\text{ms}/\text{DIV} \)

TDK-Lambda
2.12 Input current waveform

Conditions: Vin: 100VAC
Vout: 100%
lout: 100%
Ta = 25°C

Conditions: Vin: 200VAC
Vout: 100%
lout: 100%
Ta = 25°C
2.12 Input current waveform

Conditions: Vin: 100VAC
                     Vout: 100%
                     Iout: 100%
                     Ta = 25°C

Conditions: Vin: 200VAC
                     Vout: 100%
                     Iout: 100%
                     Ta = 25°C
2.13 Leakage current characteristics

Conditions: Vin: 100-265Vac
I_{out}: 0\%
I_{out}: 100\%
T_a = 25^\circ C
f=50HZ

![Leakage current graph](image-url)
2.14 Output voltage ripple & noise waveform

C.V mode

Conditions: Vin: 100VAC
Vout: 100%
lout: 100%
Ta = 25°C

Normal Mode

Z10-20

10 mV/Div 5 μs/Div

Z36-6

5 mV/Div 5 μs/Div
2.14 Output voltage ripple & noise waveform
C.V mode

Normal Mode

Conditions:
Vin: 100VAC
Vout: 100%
lout: 100%
Ta = 25°C

\[ 5 \text{mV/Div} \quad 5 \text{us/Div} \]