Z⁺800 Series

EVALUATION

DATA

<table>
<thead>
<tr>
<th>APPD</th>
<th>CHK</th>
<th>DWG</th>
</tr>
</thead>
<tbody>
<tr>
<td>$F$</td>
<td>Yeun</td>
<td>D. Miron</td>
</tr>
<tr>
<td>2013/13</td>
<td>19/03/13</td>
<td>18-Mar-2013</td>
</tr>
</tbody>
</table>

TDK-Lambda
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TERMINOLOGY USED
Definition

Vin  Input voltage
Vout Output voltage
Iin  Input current
Iout Output current
Ta   Ambient temperature
f    Frequency
C.V  Constant voltage mode
C.C  Constant current mode

TDK-Lambda
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
\[ \text{lout 0\%} \leftrightarrow \text{100\%} \]

Output current waveform
\[ \text{lout 50\%} \leftrightarrow \text{100\%} \]
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 demetion

(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.
### List of Equipment Used

<table>
<thead>
<tr>
<th>EQUIPMENT USED</th>
<th>MANUFACTURER</th>
<th>MODEL No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Digital oscilloscope</td>
<td>YOKOGAWA</td>
<td>DL7100</td>
</tr>
<tr>
<td>2 Digital oscilloscope</td>
<td>YOKOGAWA</td>
<td>DL1740EL</td>
</tr>
<tr>
<td>3 Digital multimeter</td>
<td>AGILENT</td>
<td>34401A</td>
</tr>
<tr>
<td>4 Digital power meter</td>
<td>YOKOGAWA</td>
<td>WT230</td>
</tr>
<tr>
<td>5 AC Source</td>
<td>CHROMA</td>
<td>6590</td>
</tr>
<tr>
<td>6 AC Source</td>
<td>CHROMA</td>
<td>6530</td>
</tr>
<tr>
<td>7 Electronic load</td>
<td>H&amp;H</td>
<td>ZS6080 SC150</td>
</tr>
<tr>
<td>8 Electronic load</td>
<td>H&amp;H</td>
<td>ZS7006</td>
</tr>
<tr>
<td>9 Electronic load</td>
<td>H&amp;H</td>
<td>ZS7080</td>
</tr>
<tr>
<td>10 Electronic load</td>
<td>CHROMA</td>
<td>63203</td>
</tr>
<tr>
<td>11 Electronic load</td>
<td>CHROMA</td>
<td>63204</td>
</tr>
<tr>
<td>12 Electronic load</td>
<td>CHROMA</td>
<td>63206</td>
</tr>
<tr>
<td>13 Controlled temp. chamber</td>
<td>THERMOTRON</td>
<td>SM-16-3800</td>
</tr>
<tr>
<td>14 Controlled temp. chamber</td>
<td>THERMOTRON</td>
<td>SE-600-5-5</td>
</tr>
<tr>
<td>15 Controlled temp. chamber</td>
<td>THERMOTRON</td>
<td>SE-600-6-6</td>
</tr>
<tr>
<td>16 Leakage Current Tester</td>
<td>KIKUSUI</td>
<td>TOS3200</td>
</tr>
<tr>
<td>17 Voltage probe</td>
<td>YOKOGAWA</td>
<td>700988</td>
</tr>
<tr>
<td>18 Current probe</td>
<td>YOKOGAWA</td>
<td>701933</td>
</tr>
<tr>
<td>19 Current probe</td>
<td>LEM Danfysik</td>
<td>IT 60-S Ultrastab</td>
</tr>
<tr>
<td>20 Inrush Current Meter</td>
<td>TAKAMISAWA</td>
<td>PSA-210</td>
</tr>
<tr>
<td>21 Data Acquisition/Switch Unit</td>
<td>AGILENT</td>
<td>34970A</td>
</tr>
</tbody>
</table>
2. CHARACTERISTICS

2.1 Steady state data

(1) Regulation - line and load, temperature drift

Condition: 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>265</th>
<th>Line Regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>9.9990</td>
<td>9.9990</td>
<td>9.9990</td>
<td>9.9990</td>
<td>0.0</td>
</tr>
<tr>
<td>25%</td>
<td>9.9987</td>
<td>9.9987</td>
<td>9.9987</td>
<td>9.9987</td>
<td>0.0</td>
</tr>
<tr>
<td>50%</td>
<td>9.9984</td>
<td>9.9984</td>
<td>9.9984</td>
<td>9.9984</td>
<td>0.0</td>
</tr>
<tr>
<td>75%</td>
<td>9.9980</td>
<td>9.9980</td>
<td>9.9980</td>
<td>9.9981</td>
<td>0.0</td>
</tr>
<tr>
<td>100%</td>
<td>9.9977</td>
<td>9.9977</td>
<td>9.9977</td>
<td>9.9977</td>
<td>0.0</td>
</tr>
<tr>
<td>Load</td>
<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
<td>ΔV (mV) (%)</td>
</tr>
<tr>
<td>Regulation</td>
<td>0.013</td>
<td>0.013</td>
<td>0.013</td>
<td>0.013</td>
<td>(%)</td>
</tr>
</tbody>
</table>

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>9.996</td>
<td>9.994</td>
<td>9.993</td>
<td>3 mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6 PPM/°C</td>
</tr>
</tbody>
</table>
2.1 Steady state data

(1) Regulation - line and load, temperature drift

<table>
<thead>
<tr>
<th>Io</th>
<th>Vin (AC)</th>
<th>Line Regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>85</td>
<td>100</td>
</tr>
<tr>
<td>0%</td>
<td>35.9985</td>
<td>35.9989</td>
</tr>
<tr>
<td>25%</td>
<td>35.9983</td>
<td>35.9985</td>
</tr>
<tr>
<td>50%</td>
<td>35.9981</td>
<td>35.9984</td>
</tr>
<tr>
<td>75%</td>
<td>35.9980</td>
<td>35.9981</td>
</tr>
<tr>
<td>100%</td>
<td>35.9979</td>
<td>35.9981</td>
</tr>
</tbody>
</table>

ΔV (mV) (%)

Load   0.6   0.8   0.6   0.4
Regulation 0.002 0.002 0.002 0.001

Condition: Ta = 25°C

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>36.001</td>
<td>35.992</td>
<td>35.986</td>
<td>15 mV</td>
</tr>
</tbody>
</table>
2.1 Steady state data

(1) Regulation - line and load, temperature drift

**Z100-8**

Condition: $T_a = 25^\circ C$

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

<table>
<thead>
<tr>
<th>Io (load)</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>99.9924</td>
<td>99.9923</td>
<td>99.9925</td>
<td>99.9925</td>
<td>0.3</td>
</tr>
<tr>
<td>25%</td>
<td>99.9921</td>
<td>99.9919</td>
<td>99.9922</td>
<td>99.9920</td>
<td>0.2</td>
</tr>
<tr>
<td>50%</td>
<td>99.9918</td>
<td>99.9917</td>
<td>99.9917</td>
<td>99.9918</td>
<td>0.1</td>
</tr>
<tr>
<td>75%</td>
<td>99.9913</td>
<td>99.9913</td>
<td>99.9913</td>
<td>99.9913</td>
<td>0.1</td>
</tr>
<tr>
<td>100%</td>
<td>99.9910</td>
<td>99.9912</td>
<td>99.9912</td>
<td>99.9913</td>
<td>0.2</td>
</tr>
</tbody>
</table>

| Load Regulation | 0.001 | 0.001 | 0.001 | 0.001 |
| ΔV (mV) (%)     | (%)   |

2. Temperature drift, C.V mode

Conditions: $V_{in}: 100 V_ac$

<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>$V_{out}$</td>
<td>99.999</td>
<td>99.978</td>
<td>99.969</td>
<td>30 mV</td>
</tr>
</tbody>
</table>

TDK-Lambda
2.1 Steady state data

(1) Regulation - line and load, temperature drift

Condition: Ta = 25°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>71.9741</td>
<td>71.9741</td>
<td>71.9741</td>
<td>71.9747</td>
<td>0.6</td>
</tr>
<tr>
<td>25%</td>
<td>71.9733</td>
<td>71.9733</td>
<td>71.9733</td>
<td>71.9726</td>
<td>0.7</td>
</tr>
<tr>
<td>50%</td>
<td>71.9719</td>
<td>71.9719</td>
<td>71.9719</td>
<td>71.9716</td>
<td>0.3</td>
</tr>
<tr>
<td>75%</td>
<td>71.9712</td>
<td>71.9712</td>
<td>71.9712</td>
<td>71.9712</td>
<td>0.0</td>
</tr>
<tr>
<td>100%</td>
<td>71.9712</td>
<td>71.9712</td>
<td>71.9712</td>
<td>71.9712</td>
<td>0.0</td>
</tr>
<tr>
<td>Load</td>
<td>2.9</td>
<td>2.9</td>
<td>2.9</td>
<td>3.5</td>
<td>ΔI (mA)</td>
</tr>
<tr>
<td>Regulation</td>
<td>0.004</td>
<td>0.004</td>
<td>0.004</td>
<td>0.005</td>
<td>(%)</td>
</tr>
</tbody>
</table>

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

2. Temperature drift, C.C mode

Conditions: Vin:100Vac
Vout: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>Iout</td>
<td>71.9869</td>
<td>71.9673</td>
<td>71.9463</td>
<td>41 mA</td>
</tr>
</tbody>
</table>
2.1 Steady state data

(1) Regulation - line and load, temperature drift

Condition: Ta = 25°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>23.9780</td>
<td>23.9783</td>
<td>23.9782</td>
<td>23.9783</td>
<td>0.3</td>
</tr>
<tr>
<td>25%</td>
<td>23.9765</td>
<td>23.9767</td>
<td>23.9770</td>
<td>23.9772</td>
<td>0.7</td>
</tr>
<tr>
<td>50%</td>
<td>23.9779</td>
<td>23.9778</td>
<td>23.9778</td>
<td>23.9772</td>
<td>0.7</td>
</tr>
<tr>
<td>75%</td>
<td>23.9768</td>
<td>23.9764</td>
<td>23.9764</td>
<td>23.9764</td>
<td>0.4</td>
</tr>
<tr>
<td>100%</td>
<td>23.9776</td>
<td>23.9772</td>
<td>23.9768</td>
<td>23.9768</td>
<td>0.9</td>
</tr>
<tr>
<td>Load</td>
<td>1.5</td>
<td>1.9</td>
<td>1.8</td>
<td>1.9</td>
<td>ΔI (mA) (%)</td>
</tr>
<tr>
<td>Regulation</td>
<td>0.006</td>
<td>0.008</td>
<td>0.007</td>
<td>0.008</td>
<td>(%)</td>
</tr>
</tbody>
</table>

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

2. Temperature drift, C.C mode

Conditions: Vin:100Vac
Vout:100%

<table>
<thead>
<tr>
<th>Ta lout</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>23.9956</td>
<td>23.9866</td>
<td>23.9795</td>
<td>16 mA</td>
<td>13 PPM/°C</td>
</tr>
</tbody>
</table>
2.1 Steady state data

(1) Regulation - line and load, temperature drift

<table>
<thead>
<tr>
<th>Vo</th>
<th>Vin (AC)</th>
<th>Line Regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>8.0116</td>
<td>0.1</td>
</tr>
<tr>
<td>25%</td>
<td>8.0111</td>
<td>0.1</td>
</tr>
<tr>
<td>50%</td>
<td>8.0107</td>
<td>0.2</td>
</tr>
<tr>
<td>75%</td>
<td>8.0102</td>
<td>0.2</td>
</tr>
<tr>
<td>100%</td>
<td>8.0096</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Load Regulation: 0.025 0.026 0.026 0.027 (%)

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>7.9992</td>
<td>7.9969</td>
<td>7.9980</td>
<td>1.2 mA</td>
</tr>
</tbody>
</table>

Conditions: Vin:100Vac Vout:100%
2.1 Steady state data

(2) Output voltage and Ripple noise voltage vs. Input voltage

C.V mode

Conditions: I_{out}:100\%

\[\text{Ta:} \quad 0^\circ C \quad \quad 25^\circ C \quad \quad 50^\circ C\]

(3) Output current and Ripple noise current vs. Input voltage

C.C mode

Conditions: V_{out}:100\%

\[\text{Ta:} \quad 0^\circ C \quad \quad 25^\circ C \quad \quad 50^\circ C\]
2.1 Steady state data

(2) Output voltage and Ripple noise voltage vs. Input voltage

C.V mode

Conditions: Iout: 100%

Ta: 0°C ---------
    25°C ---------
    50°C ---------

![Graph showing output voltage and ripple noise vs. input voltage](image)

(3) Output current and Ripple noise current vs. Input voltage

C.C mode

Conditions: Vout: 100%

Ta: 0°C ---------
    25°C ---------
    50°C ---------

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

(2) Output voltage and Ripple noise voltage vs. Input voltage

C.V mode

Conditions: Iout:100%

Ta: 0°C ----------------------------------
25°C ----------------------------------
50°C ----------------------------------

(3) Output current and Ripple noise current vs. Input voltage

C.C mode

Conditions: Vout:100%

Ta: 0°C ----------------------------------
25°C ----------------------------------
50°C ----------------------------------
2.1 Steady state data

(4) Efficiency and Input current vs. Output current

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

[Graph showing Efficiency vs. Output current (%) and Input current (A)]
2.1 Steady state data

(4) Efficiency and Input current vs. Output current

Conditions:
- $V_{in}$: 85Vac
- 100Vac
- 200Vac
- 265Vac
- $V_{out}$: 100%
- $T_a$: 25°C

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

(4) Efficiency and Input current vs. Output current

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

![Graph showing Efficiency vs. Output current]
2.2 Warm up drift and stability

C.V mode

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

Output voltage drift

C.C mode

Output current drift
2.2 Warm up drift and stability

C.V mode

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

C.C mode
2.2 Warm up drift and stability

C.V mode

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

Z100-8

C.C mode

Z100-8

Output voltage drift vs Time (hrs)

Output current drift vs Time (hrs)
2.3 Over voltage protection (OVP) characteristics

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

Z10-72

OVP setting: 12V

Z36-24

OVP setting: 40V
2.3 Over voltage protection (OVP) characteristics

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%
lout: 0%
lset= 105%
Ta = 25°C
2.4 ON/OFF Output rise characteristics

C.V mode

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

Z100-8

20V/div
5ms/div
2.4 ON/OFF Output rise characteristics

C.V mode

Z10-72

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

C.V mode

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

C.C mode

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

C.C mode

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

C.V mode

```
Z10-72
```

![Graph of Z10-72 with 2V/div and 50ms/div]

```
Z36-24
```

![Graph of Z36-24 with 10V/div and 100ms/div]

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

C.V mode

Conditions: Vin: 100Vac
Vout: 100%
lout: 0%
lset: 105%
Ta = 25°C
2.5 ON/OFF Output fall characteristics

C.V mode

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

Z10-72

---

Z36-24

---

TDK-Lambda
2.5 ON/OFF Output fall characteristics

C.V mode

Conditions: Vin: 100Vac
            Vout: 100%
            Iout: 0%
            Isel: 105%
            Load: CR
            Ta = 25°C
2.5 ON/OFF Output fall characteristics

C.C mode

**Z10-72**

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

**Z36-24**

TDK-Lambda
2.5 ON/OFF Output fall characteristics

C.C mode

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

C.C mode

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

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

C.V mode

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

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

C.V mode

Conditions: Vin: 85–132 Vac
Vout: 100%
lout: 100%
Ta = 25°C

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

C.V mode

Conditions: Vin: 85±132Vac  
Vout: 100%  
Iout: 100%  
Ta = 25°C

Conditions: Vin: 170±265Vac  
Vout: 100%  
Iout: 100%  
Ta = 25°C

TDK-Lambda
2.7 Dynamic line response characteristics

C.C mode

Z10-72

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

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

C.C mode

Conditions: Vin: 85\text{ Vac}\Rightarrow132\text{ Vac}
Vout: 100%
Iout: 100%
Ta = 25°C

Conditions: Vin: 170\text{ Vac}\Rightarrow265\text{ Vac}
Vout: 100%
Iout: 100%
Ta = 25°C
2.7 Dynamic line response characteristics

C.C mode

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

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

C.V mode

Load current: tr=tf=100us

<table>
<thead>
<tr>
<th>f: 100Hz</th>
<th>f: 1000Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>lout: 0% to 100%</td>
<td>lout: 50% to 100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Voltage (V)</th>
<th>Time (ms)</th>
<th>Voltage (V)</th>
<th>Time (ms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2 V/div</td>
<td>2 ms/div</td>
<td>0.1 V/div</td>
<td>2 ms/div</td>
</tr>
<tr>
<td>3.46%</td>
<td>-4.06%</td>
<td>1.70%</td>
<td>-1.73%</td>
</tr>
<tr>
<td>0.2 V/div</td>
<td>200 µs/div</td>
<td>0.1 V/div</td>
<td>200 µs/div</td>
</tr>
<tr>
<td>3.09%</td>
<td>-4.09%</td>
<td>1.68%</td>
<td>-1.70%</td>
</tr>
</tbody>
</table>
2.8 Dynamic load response characteristics

C.V mode

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

Load current: tr=tf=100us
2.8 Dynamic load response characteristics

C.V mode

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

Load current: tr=tf=100us

Z100-8

<table>
<thead>
<tr>
<th>Iout: 0%→100%</th>
<th>f: 100Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>V/V_DIV</td>
<td>1.28%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Iout: 0%→100%</th>
<th>f: 100Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>V/V_DIV</td>
<td>0.35%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Iout: 0%→100%</th>
<th>f: 1000Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>V/V_DIV</td>
<td>0.90%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Iout: 0%→100%</th>
<th>f: 1000Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>V/V_DIV</td>
<td>0.22%</td>
</tr>
</tbody>
</table>

TDK-Lambda
2.8 Dynamic load response characteristics

C.C mode

**Z10-72**
- \( I_o = 72A \)
- \( V_{out} = 9\rightarrow 7.5V \)
- \( f = 10Hz \)
- \( 7A/\text{DIV} \)
- \( 20mV/\text{DIV} \)
- 16.53\%  
- -13.71\%

**Z36-24**
- \( I_o = 24A \)
- \( V_{out} = 32.4\rightarrow 27V \)
- \( f = 10Hz \)
- \( 2A/\text{DIV} \)
- \( 20mV/\text{DIV} \)
- 18.46\%  
- -15.42\%

**Z+800**
- Conditions: \( V_{in} = 100\text{Vac} \)
- \( T_a = 25^\circ C \)

**lo=36A**
- \( V_{out} = 9\rightarrow 7.5V \)
- \( f = 10Hz \)
- \( 3.5A/\text{DIV} \)
- \( 20mV/\text{DIV} \)
- 8.46\%  
- -7.00\%

**lo=12A**
- \( V_{out} = 32.4\rightarrow 27V \)
- \( f = 10Hz \)
- \( 1A/\text{DIV} \)
- \( 20mV/\text{DIV} \)
- 9.08\%  
- -7.58\%
### 2.8 Dynamic load response characteristics

C.C mode

<table>
<thead>
<tr>
<th>Vout:90→75V</th>
<th>f:10Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A_{DIV}</td>
<td>20ms/DIV</td>
</tr>
<tr>
<td>22.31%</td>
<td>-17.86%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vout:90→75V</th>
<th>f:10Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5A_{DIV}</td>
<td>20ms/DIV</td>
</tr>
<tr>
<td>11.96%</td>
<td>-9.59%</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-12mS
B-13mS
2.9 Response to brown out characteristics

C.V mode

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

Brown-out time
- A: 16mS
- B: 17mS
2.9 Response to brown out characteristics

C.V mode

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

Brown-out time
A-16mS  
B-19mS

Z100-8

Vout

0V

Vin

Vout: 20V/Div

100ms/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: 14mS
- B: 20mS
2.9 Response to brown out characteristics

C.C mode

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

Brown-out time
A-16mS
B-17mS
2.9 Response to brown out characteristics

C.C mode

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

Brown-out time
A-16mS
B-19mS
2.10 Inrush current characteristics during line brown outs

Conditions: Vin: 100Vac
Vout: 100%
lout: 0%  
lout: 100%  
Ta = 25°C
2.10 Inrush current characteristics during line brown outs

Conditions:  
Vin: 200Vac
Vout: 100%
lout: 0%  
lout: 100%  
Ta = 25°C
2.11 Inrush current waveform

Conditions: Vin: 100Vac
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

$\phi = 90^\circ$

* Inrush current more than 30A is charge current into input film capacitor for EMI. This pulse width is less than 200usec.
2.11 Inrush current waveform

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

Switch on phase angle of input AC voltage

$\Phi = 0^\circ$

$\text{lin}$

$\text{Vin}$

$20^\circ/\text{DIV}$

$100^\text{ms}/\text{DIV}$

Switch on phase angle of input AC voltage

$\Phi = 90^\circ$

$\text{lin}$

$\text{Vin}$

$20^\circ/\text{DIV}$

$100^\text{ms}/\text{DIV}$

* Inrush current more than 30A is charge current into input film capacitor for EMI. This pulse width is less than 200usec.
2.11 Inrush current waveform

Switch on phase angle of input AC voltage

\[ \Phi = 0^\circ \]

\[
\begin{array}{|c|c|}
\hline
20^\circ/\text{DIV} & 100\text{ms}/\text{DIV} \\
\hline
\end{array}
\]

\[
\begin{array}{|c|c|}
\hline
\text{lin} & \text{Vin} \\
\hline
\end{array}
\]

Switch on phase angle of input AC voltage

\[ \Phi = 90^\circ \]

\[
\begin{array}{|c|c|}
\hline
20^\circ/\text{DIV} & 100\text{ms}/\text{DIV} \\
\hline
\end{array}
\]

\[
\begin{array}{|c|c|}
\hline
\text{lin} & \text{Vin} \\
\hline
\end{array}
\]

* Inrush current more than 30A is charge current into input film capacitor for EMI. This pulse width is less than 200usec.
2.11 Inrush current waveform

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

Switch on phase angle of input AC voltage

\[ \Phi = 0° \]

Switch on phase angle of input AC voltage

\[ \Phi = 90° \]

* Inrush current more than 30A is charge current into input film capacitor for EMI. This pulse width is less than 200usec.
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%
lout: 100%
Ta = 25°C

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

Conditions:
- Vin: 100–265Vac
- Iout: 0%
- Iout: 100%
- Ta = 25°C
- f=50Hz

Leakage current (mA) vs. Input voltage (VAC) graph.
2.14 Output voltage ripple and noise waveform

C.V mode

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

Normal Mode

Z10-72

Z38-24
2.14 Output voltage ripple and noise waveform

C.V mode

Normal Mode

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