



# Test Report: DDR-30L-15

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30W DIN Rail Type DC-DC Converter

## ■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Control Function Test

Component Stress Test

## ■ SAFETY & E.M.C. TEST

Safety Test

E.M.C. Test

## ■ RELIABILITY TEST

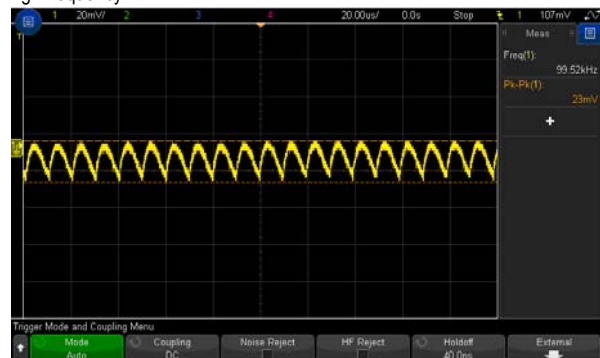
ENVIRONMENT TEST

## DESIGN VERIFY TEST

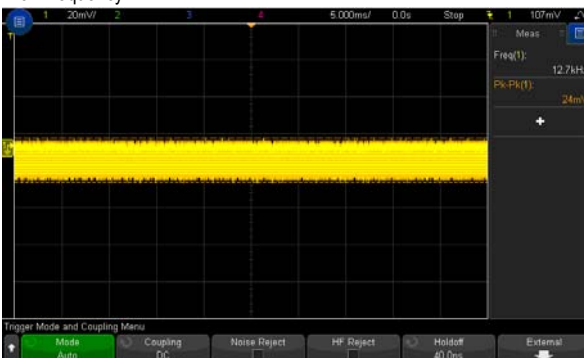
### OUTPUT FUNCTION TEST

| NO | TEST ITEM                      | SPECIFICATION   | TEST CONDITION                                       | RESULT              |
|----|--------------------------------|-----------------|--|---------------------|
| 1  | OUTPUT VOLTAGE TOLERANCE (Max) | V1: -2%~ 2%     | I/P:18 VDC / 75VDC<br>O/P:FULL/ MIN. LOAD<br>Ta:25°C | V1: -0.32 %~ 0.28 % |
| 2  | LINE REGULATION (Max)          | V1:-0.5%~ 0.5%  | I/P: 18 VDC / 75VDC<br>O/P:FULL LOAD<br>Ta:25°C      | V1: -0.02 %~ 0.01%  |
| 3  | LOAD REGULATION (Max)          | V1: -0.5%~ 0.5% | I/P: 48VDC<br>O/P:FULL ~MIN LOAD<br>Ta:25°C          | V1: -0.32 %~ 0.28 % |
| 4  | OVER/UNDERSHOOT TEST           | < ±5%           | I/P:48VDC<br>O/P:FULL LOAD<br>Ta:25°C                | TEST: 2%            |
| 5  | RIPPLE & NOISE (Max)           | V1: 75 mVp-p    | I/P: 48VDC<br>O/P:FULL LOAD<br>Ta:25°C               | V1: 24 mVp-p        |

high frequency :



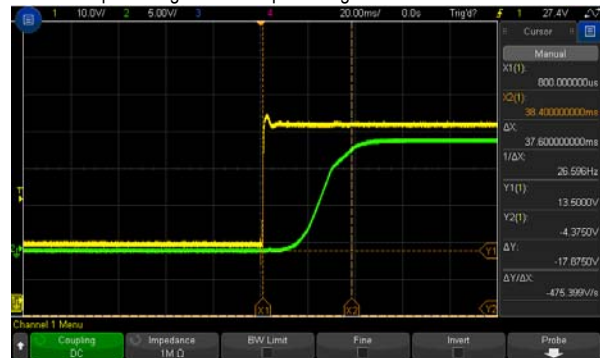
low frequency :



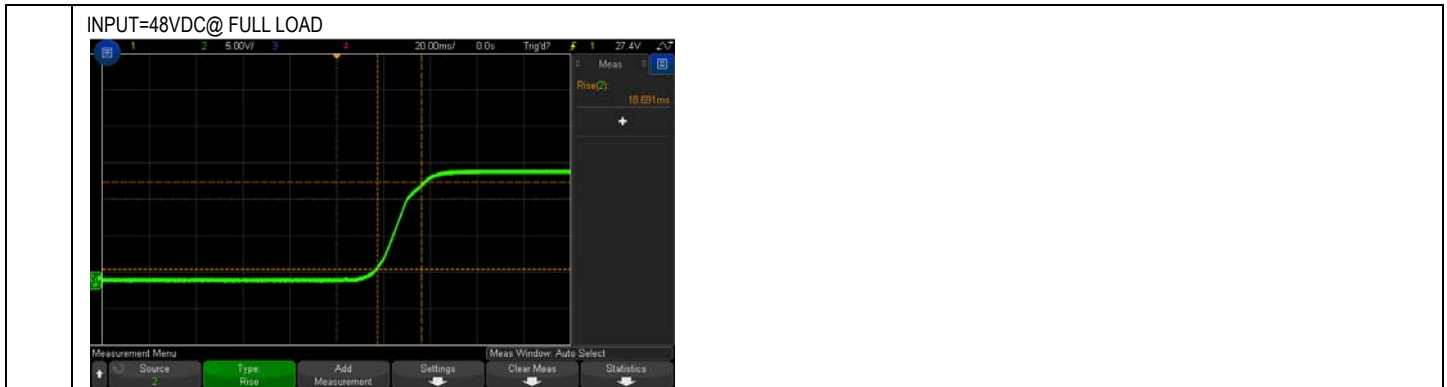
|   |                   |              |  |               |
|---|-------------------|--------------|--|---------------|
| 6 | SET UP TIME (Max) | 48VDC/120 ms | I/P:48 VDC<br>O/P:FULL LOAD<br>Ta:25°C | 48VDC/ 37.6ms |
|---|-------------------|--------------|--|---------------|

INPUT=48VDC @ FULL LOAD

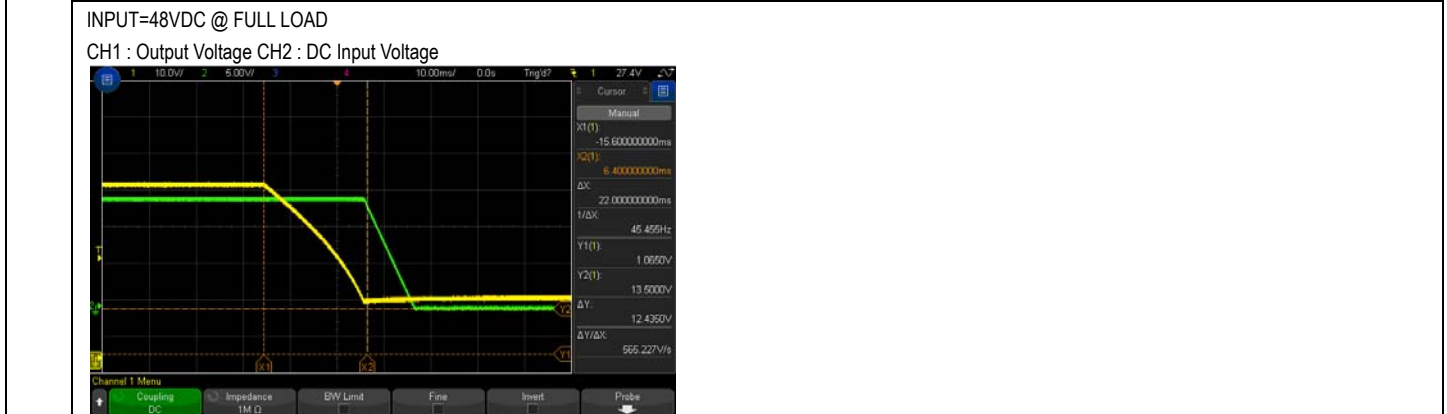
CH1 : DC Input Voltage CH2 : Output Voltage



|   |                 |              |   |                 |
|---|-----------------|--------------|---|-----------------|
| 7 | RISE TIME (Max) | 48VDC/ 85 ms | I/P: 48 VDC<br>O/P:FULL LOAD<br>Ta:25°C | 48VDC/ 18.69 ms |
|---|-----------------|--------------|---|-----------------|



|   |                    |            |  |               |
|---|--------------------|------------|--|---------------|
| 8 | HOLD UP TIME (TYP) | 48VDC/18ms | I/P: 48VDC<br>O/P:FULL LOAD<br>Ta:25°C | 48VDC/22.0 ms |
|---|--------------------|------------|--|---------------|



|   |              |                |  |                      |
|---|--------------|----------------|--|----------------------|
| 9 | DYNAMIC LOAD | V1: 1500 mVp-p | I/P: 48VDC<br>O/P:<br>(1)FULL /50% LOAD 50%DUTY / 120HZ<br>(2)FULL /50% LOAD 50%DUTY / 1KHZ<br>Ta:25°C | 422mVp-p<br>322mVp-p |
|---|--------------|----------------|--|----------------------|



### INPUT FUNCTION TEST

| NO | TEST ITEM           | SPECIFICATION | TEST CONDITION                          | RESULT     |
|----|---------------------|---------------|---|------------|
| 1  | INPUT VOLTAGE RANGE | 18VDC~ 75 VDC | I/P:TESTING<br>O/P:FULL LOAD<br>Ta:25°C | 17.4V~ 75V |

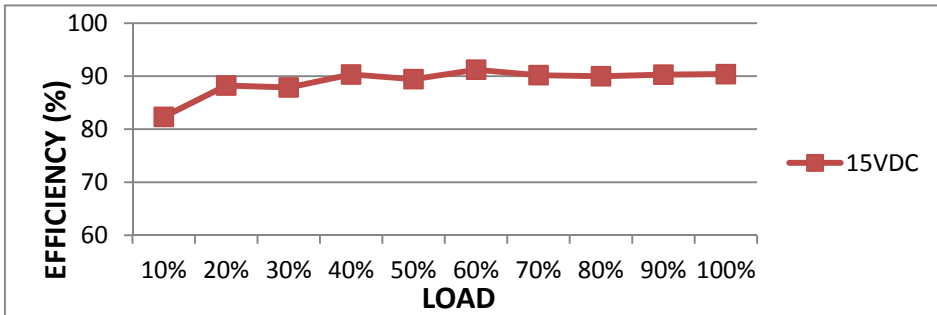


# 30W DIN Rail Type DC-DC Converter

# DDR-30L series

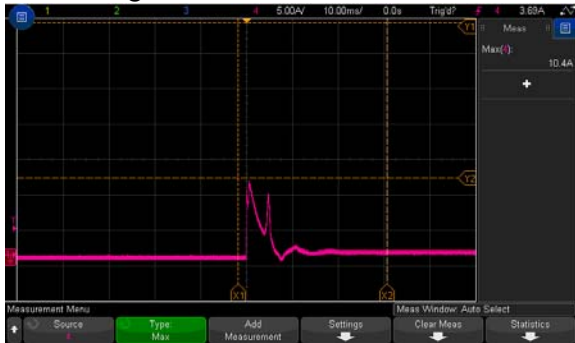
|   |                    |             |  |               |
|---|--------------------|-------------|--|---------------|
|   |                    |             | I/P:<br>LOW-LINE-0.2=17.8V<br>HIGH-LINE+3V=78V<br>O/P:FULL/MIN LOAD<br>(PLEASE CHECK DERATING CURVE)<br>ON: 30 Sec . OFF: 30 Sec 10MIN<br>( POWER ON/OFF NO DAMAGE ) | TEST:OK       |
| 2 | INPUT CURRENT(TYP) | 48VDC/0.8 A | I/P: 48VDC<br>O/P:FULL LOAD<br>Ta:25°C   | I=0.68A/48VDC |
| 3 | EFFICIENCY(TYP)    | 90 %        | I/P: 48VDC<br>O/P:FULL LOAD<br>Ta:25°C   | 90.39 %       |

EFFICIENCY vs LOAD



|   |                     |                           |  |                |
|---|---------------------|---------------------------|--|----------------|
| 4 | INRUSH CURRENT(TYP) | 48VDC/ 15 A<br>COLD START | I/P: 48VDC<br>O/P:FULL LOAD<br>Ta:25°C | I=10.4A/ 48VDC |
|---|---------------------|---------------------------|--|----------------|

INPUT=48VDC @ FULL LOAD



## PROTECTION FUNCTION TEST

| NO | TEST ITEM               | SPECIFICATION               | TEST CONDITION  | RESULT   |
|----|-------------------------|-----------------------------|---|--|
| 1  | OVER LOAD PROTECTION    | 110%~150%RATED OUTPUT POWER | I/P: 75VDC<br>I/P: 48 VDC<br>I/P: 18 VDC<br>O/P:TESTING<br>Ta:25°C  | 127%/ 75VDC<br>127%/ 48VDC<br>127.9%/ 18VDC<br>PROTECTION TYPE :<br>Constant current limiting, recovers automatically after fault condition is removed |
| 2  | OVER VOLTAGE PROTECTION | CH: 17.25V~ 20.25 V         | I/P: 75VDC<br>I/P: 48 VDC<br>I/P: 18 VDC<br>O/P:MIN LOAD<br>Ta:25°C | 18.9V/75VDC<br>18.9V/ 48VDC<br>18.9V/ 18VDC<br>PROTECTION TYPE :<br>Shut down O/P voltage,re-power on to recover                                       |



## 30W DIN Rail Type DC-DC Converter

DDR-30L series

|   |                  |  |  |  |
|---|------------------|--|--|--|
| 3 | SHORT PROTECTION | SHORT EVERY OUTPUT<br>1 HOUR NO DAMAGE | I/P: 75 VDC<br>O/P: FULL LOAD<br>Ta:25°C | NO DAMAGE<br>PROTECTION TYPE :<br>Constant current limiting, recovers automatically after fault condition is removed |
| 4 | INPUT REVERSE    | POWER OK                               | I/P:75VDC<br>O/P: NO LOAD<br>Ta:25°C     | NO DAMAGE  |

### COMPONENT STRESS TEST

| NO | TEST ITEM  | SPECIFICATION                 | TEST CONDITION   | RESULT  |
|----|--|-------------------------------|--|---|
| 1  | PWM Transistor<br>( D to S) or (C to E) Peak Voltage | Q 3 Rated:<br>150 V           | I/P:High-Line +3V =78V<br>DC ON/OFF<br>VDS:<br>O/P: (1)Full Load<br>(2)Output Short<br>(3) full load continue<br>Ta : 25°C                                     | VDS:<br>(1)105.2V<br>(2)114.0V<br>(3)105.2V             |
| 2  | Diode Peak Voltage                                   | Q100 Rated:<br>100V           | I/P:High-Line +3V =78 V<br>DC ON/OFF<br>O/P: (1)Full Load<br>(2)Output Short<br>(3)full load continue<br>Ta : 25°C   | VDS:<br>(1)77V<br>(2)77.8V<br>(3)77V                    |
| 3  | Input Capacitor Voltage                              | C5 Rated:<br>680 $\mu$ / 80V  | I/P:High-Line +3V =78 V<br>O/P: (1)Full Load input on/off<br>(2) Min load input on /Off<br>(3)Full Load /Min load Change<br>(4)Full load continue<br>Ta : 25°C | C5:<br>(1)79.8V<br>(2)79.3V<br>(3)79.8V<br>(4)79.8V     |
| 4  | Control IC Voltage Test                              | PWM IC U1 Rated:<br>-0.3V~30V | I/P:High-Line +3V =78 V<br>DC ON/OFF<br>O/P(1)FULL LOAD<br>(2) Output Short<br>(3)O.L.P<br>(4)O.V.P.<br>Ta : 25°C  | U1:<br>(1) 15.5V<br>(2) 14.3V<br>(3) 14.3V<br>(4) 16.7V |
| 5  | Clamp Diode Peak Voltage                             | D4 Rated :<br>400V            | I/P : High-Line +3V = 78 V<br>DC ON/OFF<br>O/P : (1) Dynamic Load<br>90%Duty/1KHz<br>(2)Full load continue<br>Ta : 25°C  | D4:<br>(1)81.8V<br>(2)81.8V                             |

### SAFETY TEST

| NO | TEST ITEM            | SPECIFICATION                   | TEST CONDITION                  | RESULT                               |
|----|----------------------|---------------------------------|---------------------------------|--------------------------------------|
| 1  | WITHSTAND VOLTAGE    | EN 60950-1<br>I/P-O/P:4KVDC/min | I/P-O/P: 4.4KVDC/min<br>Ta:25°C | I/P-O/P: 0 $\mu$ A<br>NO DAMAGE      |
| 2  | ISOLATION RESISTANCE | I/P-O/P:500VDC>100M $\Omega$    | I/P-O/P: 500 VDC<br>Ta:25°C     | I/P-O/P: 9999M $\Omega$<br>NO DAMAGE |



# 30W DIN Rail Type DC-DC Converter

# DDR-30L series

## E.M.C TEST

| NO | TEST ITEM                                   | SPECIFICATION   | TEST CONDITION                          | RESULT   |
|----|---|---|---|--|
| 1  | RADIATION                                   | <input checked="" type="checkbox"/> EN55032 <input type="checkbox"/> EN55011<br><input type="checkbox"/> CLASS A<br><input checked="" type="checkbox"/> CLASS B | I/P:48 VDC<br>O/P:FULL LOAD<br>Ta:25°C  | <input checked="" type="checkbox"/> PASS<br><input type="checkbox"/> FAIL<br>Test by certified Lab |
| 2  | CONDUCTION                                  | <input checked="" type="checkbox"/> EN55032 <input type="checkbox"/> EN55011<br><input type="checkbox"/> CLASS A<br><input checked="" type="checkbox"/> CLASS B | I/P: 48 VDC<br>O/P:FULL LOAD<br>Ta:25°C | <input checked="" type="checkbox"/> PASS<br><input type="checkbox"/> FAIL<br>Test by certified Lab |
| 3  | E.S.D                                       | EN61000-4-2<br><input type="checkbox"/> Din rail Model :<br>AIR: 8KV / Contact: 6KV   | I/P:48VDC<br>O/P:FULL LOAD<br>Ta:25°C   | <input checked="" type="checkbox"/> CRITERIA A<br><input type="checkbox"/> CRITERIA B              |
| 4  | E.F.T                                       | EN61000-4-4<br><input type="checkbox"/> INDUSTRY<br>INPUT: 2KV  | I/P:48 VDC<br>O/P:FULL LOAD<br>Ta:25°C  | <input checked="" type="checkbox"/> CRITERIA A<br><input type="checkbox"/> CRITERIA B              |
| 5  | SURGE                                       | IEC61000-4-5<br><input type="checkbox"/> INDUSTRY<br>line-line :1KV   | I/P:48 VDC<br>O/P:FULL LOAD<br>Ta:25°C  | <input checked="" type="checkbox"/> CRITERIA A<br><input type="checkbox"/> CRITERIA B              |
| 6  | Test by certified Lab & Test Report Prepare |   |   |  |

## RELIABILITY TEST

### ENVIRONMENT TEST

| NO | TEST ITEM             | SPECIFICATION  | TEST CONDITION           | RESULT   |    |          |                          |                          |   |     |        |        |   |    |        |        |   |    |        |        |   |      |        |        |   |    |        |        |   |    |        |         |   |      |        |         |   |    |        |         |   |    |        |         |    |     |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |     |        |        |    |      |        |        |
|----|-----------------------|--|--------------------------|--|----|----------|--------------------------|--------------------------|---|-----|--------|--------|---|----|--------|--------|---|----|--------|--------|---|------|--------|--------|---|----|--------|--------|---|----|--------|---------|---|------|--------|---------|---|----|--------|---------|---|----|--------|---------|----|-----|--------|--------|----|----|--------|--------|----|----|--------|--------|----|------|--------|--------|----|------|--------|--------|----|-----|--------|--------|----|------|--------|--------|
| 1  | TEMPERATURE RISE TEST | MODEL : DDR-30L-24<br>1. ROOM AMBIENT BURN-IN : 1 HRS<br>I/P : 48VDC O/P : FULL LOAD Ta= 22.2 °C<br>2. HIGH AMBIENT BURN-IN : 1 HRS<br>I/P : 48VDC O/P : FULL LOAD Ta= 59.4 °C |                          |  |    |          |                          |                          |   |     |        |        |   |    |        |        |   |    |        |        |   |      |        |        |   |    |        |        |   |    |        |         |   |      |        |         |   |    |        |         |   |    |        |         |    |     |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |     |        |        |    |      |        |        |
|    |                       |  |                          | <table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 22.2 °C</th> <th>HIGH AMBIENT Ta= 59.4 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>LF1</td><td>37.8°C</td><td>78.4°C</td></tr> <tr><td>2</td><td>T1</td><td>59.4°C</td><td>96.1°C</td></tr> <tr><td>3</td><td>T2</td><td>51.8°C</td><td>91.2°C</td></tr> <tr><td>4</td><td>L100</td><td>40.8°C</td><td>76.5°C</td></tr> <tr><td>5</td><td>Q2</td><td>33.9°C</td><td>72.2°C</td></tr> <tr><td>6</td><td>Q3</td><td>62.7°C</td><td>109.1°C</td></tr> <tr><td>7</td><td>Q100</td><td>68.9°C</td><td>107.2°C</td></tr> <tr><td>8</td><td>D4</td><td>66.4°C</td><td>105.5°C</td></tr> <tr><td>9</td><td>R7</td><td>67.2°C</td><td>105.9°C</td></tr> <tr><td>10</td><td>C15</td><td>61.0°C</td><td>99.1°C</td></tr> <tr><td>11</td><td>U1</td><td>52.7°C</td><td>95.7°C</td></tr> <tr><td>12</td><td>C5</td><td>41.6°C</td><td>79.4°C</td></tr> <tr><td>13</td><td>C105</td><td>55.8°C</td><td>90.0°C</td></tr> <tr><td>14</td><td>C106</td><td>51.5°C</td><td>86.4°C</td></tr> <tr><td>15</td><td>C40</td><td>51.9°C</td><td>87.3°C</td></tr> <tr><td>16</td><td>C110</td><td>53.6°C</td><td>88.5°C</td></tr> </tbody> </table> | NO | Position | ROOM AMBIENT Ta= 22.2 °C | HIGH AMBIENT Ta= 59.4 °C | 1 | LF1 | 37.8°C | 78.4°C | 2 | T1 | 59.4°C | 96.1°C | 3 | T2 | 51.8°C | 91.2°C | 4 | L100 | 40.8°C | 76.5°C | 5 | Q2 | 33.9°C | 72.2°C | 6 | Q3 | 62.7°C | 109.1°C | 7 | Q100 | 68.9°C | 107.2°C | 8 | D4 | 66.4°C | 105.5°C | 9 | R7 | 67.2°C | 105.9°C | 10 | C15 | 61.0°C | 99.1°C | 11 | U1 | 52.7°C | 95.7°C | 12 | C5 | 41.6°C | 79.4°C | 13 | C105 | 55.8°C | 90.0°C | 14 | C106 | 51.5°C | 86.4°C | 15 | C40 | 51.9°C | 87.3°C | 16 | C110 | 53.6°C | 88.5°C |
| NO | Position              | ROOM AMBIENT Ta= 22.2 °C   | HIGH AMBIENT Ta= 59.4 °C |  |    |          |                          |                          |   |     |        |        |   |    |        |        |   |    |        |        |   |      |        |        |   |    |        |        |   |    |        |         |   |      |        |         |   |    |        |         |   |    |        |         |    |     |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |     |        |        |    |      |        |        |
| 1  | LF1                   | 37.8°C   | 78.4°C                   |  |    |          |                          |                          |   |     |        |        |   |    |        |        |   |    |        |        |   |      |        |        |   |    |        |        |   |    |        |         |   |      |        |         |   |    |        |         |   |    |        |         |    |     |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |     |        |        |    |      |        |        |
| 2  | T1                    | 59.4°C   | 96.1°C                   |  |    |          |                          |                          |   |     |        |        |   |    |        |        |   |    |        |        |   |      |        |        |   |    |        |        |   |    |        |         |   |      |        |         |   |    |        |         |   |    |        |         |    |     |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |     |        |        |    |      |        |        |
| 3  | T2                    | 51.8°C   | 91.2°C                   |  |    |          |                          |                          |   |     |        |        |   |    |        |        |   |    |        |        |   |      |        |        |   |    |        |        |   |    |        |         |   |      |        |         |   |    |        |         |   |    |        |         |    |     |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |     |        |        |    |      |        |        |
| 4  | L100                  | 40.8°C   | 76.5°C                   |  |    |          |                          |                          |   |     |        |        |   |    |        |        |   |    |        |        |   |      |        |        |   |    |        |        |   |    |        |         |   |      |        |         |   |    |        |         |   |    |        |         |    |     |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |     |        |        |    |      |        |        |
| 5  | Q2                    | 33.9°C   | 72.2°C                   |  |    |          |                          |                          |   |     |        |        |   |    |        |        |   |    |        |        |   |      |        |        |   |    |        |        |   |    |        |         |   |      |        |         |   |    |        |         |   |    |        |         |    |     |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |     |        |        |    |      |        |        |
| 6  | Q3                    | 62.7°C   | 109.1°C                  |  |    |          |                          |                          |   |     |        |        |   |    |        |        |   |    |        |        |   |      |        |        |   |    |        |        |   |    |        |         |   |      |        |         |   |    |        |         |   |    |        |         |    |     |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |     |        |        |    |      |        |        |
| 7  | Q100                  | 68.9°C   | 107.2°C                  |  |    |          |                          |                          |   |     |        |        |   |    |        |        |   |    |        |        |   |      |        |        |   |    |        |        |   |    |        |         |   |      |        |         |   |    |        |         |   |    |        |         |    |     |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |     |        |        |    |      |        |        |
| 8  | D4                    | 66.4°C   | 105.5°C                  |  |    |          |                          |                          |   |     |        |        |   |    |        |        |   |    |        |        |   |      |        |        |   |    |        |        |   |    |        |         |   |      |        |         |   |    |        |         |   |    |        |         |    |     |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |     |        |        |    |      |        |        |
| 9  | R7                    | 67.2°C   | 105.9°C                  |  |    |          |                          |                          |   |     |        |        |   |    |        |        |   |    |        |        |   |      |        |        |   |    |        |        |   |    |        |         |   |      |        |         |   |    |        |         |   |    |        |         |    |     |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |     |        |        |    |      |        |        |
| 10 | C15                   | 61.0°C   | 99.1°C                   |  |    |          |                          |                          |   |     |        |        |   |    |        |        |   |    |        |        |   |      |        |        |   |    |        |        |   |    |        |         |   |      |        |         |   |    |        |         |   |    |        |         |    |     |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |     |        |        |    |      |        |        |
| 11 | U1                    | 52.7°C   | 95.7°C                   |  |    |          |                          |                          |   |     |        |        |   |    |        |        |   |    |        |        |   |      |        |        |   |    |        |        |   |    |        |         |   |      |        |         |   |    |        |         |   |    |        |         |    |     |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |     |        |        |    |      |        |        |
| 12 | C5                    | 41.6°C   | 79.4°C                   |  |    |          |                          |                          |   |     |        |        |   |    |        |        |   |    |        |        |   |      |        |        |   |    |        |        |   |    |        |         |   |      |        |         |   |    |        |         |   |    |        |         |    |     |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |     |        |        |    |      |        |        |
| 13 | C105                  | 55.8°C   | 90.0°C                   |  |    |          |                          |                          |   |     |        |        |   |    |        |        |   |    |        |        |   |      |        |        |   |    |        |        |   |    |        |         |   |      |        |         |   |    |        |         |   |    |        |         |    |     |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |     |        |        |    |      |        |        |
| 14 | C106                  | 51.5°C   | 86.4°C                   |  |    |          |                          |                          |   |     |        |        |   |    |        |        |   |    |        |        |   |      |        |        |   |    |        |        |   |    |        |         |   |      |        |         |   |    |        |         |   |    |        |         |    |     |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |     |        |        |    |      |        |        |
| 15 | C40                   | 51.9°C   | 87.3°C                   |  |    |          |                          |                          |   |     |        |        |   |    |        |        |   |    |        |        |   |      |        |        |   |    |        |        |   |    |        |         |   |      |        |         |   |    |        |         |   |    |        |         |    |     |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |     |        |        |    |      |        |        |
| 16 | C110                  | 53.6°C   | 88.5°C                   |  |    |          |                          |                          |   |     |        |        |   |    |        |        |   |    |        |        |   |      |        |        |   |    |        |        |   |    |        |         |   |      |        |         |   |    |        |         |   |    |        |         |    |     |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |     |        |        |    |      |        |        |



# 30W DIN Rail Type DC-DC Converter

# DDR-30L series

| 2                       | OVER LOAD BURN-IN TEST  | NO DAMAGE<br>1 HOUR ( MIN )   | I/P : 48 VDC<br>O/P : 123 % LOAD<br>Ta : 25°C                     | TEST : OK   |              |              |                         |         |       |                 |       |      |            |                     |  |           |
|-------------------------|---|---|---|---|--------------|--------------|-------------------------|---------|-------|-----------------|-------|------|------------|---------------------|--|-----------|
| 3                       | LOW TEMPERATURE<br>TURN ON TEST                                   | TURN ON AFTER 2 HOUR  | I/P : 24 VDC/ 75 VDC<br>O/P : 100 % LOAD<br>Ta= -45 °C            | TEST : OK   |              |              |                         |         |       |                 |       |      |            |                     |  |           |
| 4                       | HIGH HUMIDITY<br>HIGH TEMPERATURE<br>HIGH VOLTAGE<br>TURN ON TEST | AFTER 12 HOURS<br>IN CHAMBER ON<br>CONTROL 60 °C<br>NO DAMAGE   | I/P : 78 VDC<br>O/P : FULL LOAD<br>Ta= 60 °C<br>HUMIDITY= 95 %R.H | TEST : OK   |              |              |                         |         |       |                 |       |      |            |                     |  |           |
| 5                       | TEMPERATURE<br>COEFFICIENT  | ± 0.03 %(0~60°C)  | I/P : 48 VDC<br>O/P : FULL LOAD                                   | ± 0.0022 %(0~60°C)  |              |              |                         |         |       |                 |       |      |            |                     |  |           |
| 6                       | STORAGE TEMPERATURE TEST  | 1. Thermal shock Temperature : -45°C~ +90°C<br>2. Temperature change rate : 25°C / MIN<br>3. Dwell time low and high temperature : 30 MIN/EACH<br>4. Total test cycle : 10 CYCLE<br>5. Input/Output condition : STATIC  |   | TEST : OK   |              |              |                         |         |       |                 |       |      |            |                     |  |           |
| 7                       | THERMAL SHOCK TEST  | 1. Thermal shock Temperature : -45°C~ +65°C<br>2. Temperature change rate : 25°C / MIN<br>3. Dwell time low and high temperature : 30 MIN/EACH<br>4. Total test cycle : 16 CYCLE<br>5. Input/Output condition : 48VDC/Full Load DC ON/OFF TEST<br>turn on 3sec ; turn off 1sec@15cycle\ 48VDC/Full Load DC ON@1cycle  |   | TEST : OK   |              |              |                         |         |       |                 |       |      |            |                     |  |           |
| 8                       | VIBRATION TEST  | 1 Carton & 1 Set<br>(1) Waveform : Sine Wave<br>(2) Frequency : 10~500Hz<br>(3) Sweep Time : 10min/sweep cycle<br>(4) Acceleration : 3G<br>(5) Test Time : 60min in each axis (X.Y.Z)<br>(6) Ta : 25°C<br><br>2 Din Rail <table border="1" style="margin-left: 20px;"> <thead> <tr> <th></th> <th>Displacement</th> <th>Acceleration</th> </tr> </thead> <tbody> <tr> <td>2 (+3/-0) Hz up to 15Hz</td> <td>± 2.5mm</td> <td>-----</td> </tr> <tr> <td>15Hz up to 50Hz</td> <td>-----</td> <td>2.3g</td> </tr> <tr> <td>Sweep rate</td> <td colspan="2">Max 1 Octave/minute</td> </tr> </tbody> </table> |   |   | Displacement | Acceleration | 2 (+3/-0) Hz up to 15Hz | ± 2.5mm | ----- | 15Hz up to 50Hz | ----- | 2.3g | Sweep rate | Max 1 Octave/minute |  | TEST : OK |
|                         | Displacement  | Acceleration  |   |   |              |              |                         |         |       |                 |       |      |            |                     |  |           |
| 2 (+3/-0) Hz up to 15Hz | ± 2.5mm   | -----   |   |   |              |              |                         |         |       |                 |       |      |            |                     |  |           |
| 15Hz up to 50Hz         | -----   | 2.3g  |   |   |              |              |                         |         |       |                 |       |      |            |                     |  |           |
| Sweep rate              | Max 1 Octave/minute   |   |   |   |              |              |                         |         |       |                 |       |      |            |                     |  |           |
| 9                       | CAPACITOR<br>LIFE CYCLE   | SUPPOSE C105 IS THE MOST CRITICAL COMPONENT<br>(1) I/P : 48VDC O/P : FULL LOAD Ta= 25 °C LIFE TIME<br>(2) I/P : 48VDC O/P : FULL LOAD Ta= 60 °C LIFE TIME<br>(3) I/P : 48VDC O/P : 75% LOAD Ta= 60 °C LIFE TIME<br>(4) I/P : 48VDC O/P : 50% LOAD Ta= 60 °C LIFE TIME   |   | (1) 219882.6 HRS<br>(2) 23902.2 HRS<br>(3) 37486.3 HRS<br>(4) 56997.7 HRS |              |              |                         |         |       |                 |       |      |            |                     |  |           |
| 10                      | MTBF  | Conducted by Parts Stress Analysis Prediction<br>483.3K hrs min. MIL-HDBK-217F (25°C)   |   |   |              |              |                         |         |       |                 |       |      |            |                     |  |           |
| 11                      | DMTBF/Accelerated Life Test                                       | Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 60°C   |   |   |              |              |                         |         |       |                 |       |      |            |                     |  |           |

| TEST RESULT | TESTER | REVIEW | APPROVAL |
|-------------|--------|--------|----------|
| PASS        | LIUTT  |        | WANGDZ   |

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