## FEATURES

- No-load input current as low as 8mA
- Operating ambient temperature range: -40℃ to +105℃
- High efficiency up to 85%
- I/O isolation test voltage: 1.5k VDC
- Industry standard pin-out

1W isolated DC-DC converter

Fixed input voltage, unregulated dual/single output


3 years Warranty RoHS CE

*RE-xxxxS series are specially designed for applications where an(two) isolated voltage is required in a distributed power supply system. They are suitable for: pure digital circuits, low frequency analog circuits, relay-driven circuits and data switching circuits.*

## Selection Guide

| Certification | Part No. | Input Voltage (VDC) | Output | | Full Load Efficiency (%) Min./Typ. | Capacitive Load(μF)* Max. |
|---|---|---|---|---|---|---|
| | | Nominal (Range) | Voltage (VDC) | Current (mA) Max./Min. | | |
| -- | RE-3.33.3S | 3.3 (2.97-3.63) | 3.3 | 303/30 | 75/79 | 2400 |
| | RE-3.305S | | 5 | 200/20 | 78/82 | 2400 |
| | RE-3.312S | | 12 | 83/8 | 78/82 | 560 |
| | RE-3.315S | | 15 | 67/7 | 78/82 | 560 |
| | RE-3.324S | | 24 | 42/4 | 80/84 | 220 |
| | RE-053.3S | 5 (4.5-5.5) | 3.3 | 303/30 | 70/74 | 2400 |
| | RE-0505S | | 5 | 200/20 | 78/82 | 2400 |
| | RE-0512S | | 12 | 84/9 | 79/83 | 560 |
| | RE-0515S | | 15 | 67/7 | 79/83 | 560 |
| | RE-0524S | | 24 | 42/4 | 81/85 | 220 |
| | RE-123.3S | 12 (10.8-13.2) | 3.3 | 303/30 | 71/75 | 2400 |
| | RE-1205S | | 5 | 200/20 | 76/80 | 2400 |
| | RE-1212S | | 12 | 83/9 | 76/80 | 560 |
| | RE-1215S | | 15 | 67/7 | 77/81 | 560 |
| | RE-1224S | | 24 | 42/4 | 77/81 | 220 |
| | RE-153.3S | 15 (13.5-16.5) | 3.3 | 303/30 | 71/75 | 2400 |
| | RE-1505S | | 5 | 200/20 | 76/80 | 2400 |
| | RE-1512S | | 12 | 83/9 | 76/80 | 560 |
| | RE-1515S | | 15 | 67/7 | 77/81 | 560 |
| | RE-1524S | | 24 | 42/5 | 77/81 | 220 |
| | RE-243.3S | 24 (21.6-26.4) | 3.3 | 303/30 | 69/75 | 2400 |
| | RE-2405S | | 5 | 200/20 | 73/79 | 2400 |
| | RE-2412S | | 12 | 83/9 | 75/81 | 560 |
| | RE-2415S | | 15 | 67/7 | 75/81 | 560 |
| | RE-2424S | | 24 | 42/4 | 75/81 | 220 |

Note: * The specified maximum capacitive load for positive and negative output is identical.

## Input Specifications

| Item | Operating Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Input Current (full load / no-load) | 3.3VDC input | 3.3VDC output | -- | 384/10 | 405/-- | mA |
| | | Other output | -- | 370/18 | 389/-- | |
| | 5VDC input | 3.3VDC/5VDC output | -- | 270/8 | 286/-- | |
| | | 9VDC/12VDC output | -- | 241/12 | 254/-- | |
| | | 15VDC/24VDC output | -- | 241/18 | 254/-- | |
| | 12VDC input | | -- | 105/8 | 110/-- | |
| | 15VDC input | | -- | 84/8 | 88/-- | |
| | 24VDC input | | -- | 56/8 | 61/-- | |
| Reflected Ripple Current* | | | -- | 15 | -- | |
| Surge Voltage(1sec. max.) | 3.3VDC input | | -0.7 | -- | 5 | VDC |
| Surge Voltage(1sec. max.) | 5VDC input | | -0.7 | -- | 9 | VDC |
| | 12VDC input | | -0.7 | -- | 18 | |
| | 15VDC input | | -0.7 | -- | 21 | |
| | 24VDC input | | -0.7 | -- | 30 | |
| Input Filter | | | Capacitance filter | | | |
| Hot Plug | | | Unavailable | | | |

Note: * Refer to DC-DC Converter Application Notes for detailed description of reflected ripple current test method.

## Output Specifications

| Item | Operating Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Voltage Accuracy | | | See output regulation curves (Fig. 1) | | | |
| Linear Regulation | Input voltage change: ±1% | 3.3VDC output | -- | -- | 1.5 | -- |
| | | Other output | -- | -- | 1.2 | |
| Load Regulation | 3.3VDC input 10% -100% load | 3.3VDC output | -- | 12 | 18 | % |
| | | Other output | -- | 8 | 15 | |
| | 5VDC input 10% -100% load | 3.3VDC output | -- | 15 | 20 | |
| | | 5VDC output | -- | 10 | 15 | |
| | | 9VDC output | -- | 8 | 10 | |
| | | 12VDC output | -- | 7 | 10 | |
| | | 15VDC output | -- | 6 | 10 | |
| | | 24VDC output | -- | 5 | 10 | |
| | 12/15/24VDC input 10% -100% load | 3.3VDC output | -- | 8 | 20 | |
| | | 5VDC output | -- | 5 | 15 | |
| | | 9VDC output | -- | 3 | 10 | |
| | | 12VDC output | -- | 3 | 10 | |
| | | 15VDC output | -- | 3 | 10 | |
| | | 24VDC output | -- | 2 | 10 | |
| Ripple & Noise* | 20MHz bandwidth | Other output | -- | 30 | 75 | mVp-p |
| | | 24VDC output | -- | 50 | 100 | |
| Temperature Coefficient | 100% load | | -- | ±0.02 | -- | %/℃ |
| Short-circuit Protection | | | -- | | | |

Note: * The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information.

## General Specifications

| Item | Operating Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Isolation | Input-output electric strength test for 1 minute with a leakage current of 1mA max. | | 1500 | -- | -- | VDC |
| Insulation Resistance | Input-output resistance at 500VDC | | 1000 | -- | -- | MΩ |
| Isolation Capacitance | Input-output capacitance at 100kHz/0.1V | | -- | 20 | -- | pF |
| Operating Temperature | 5VDC input | Derating when operating temperature≥85℃, (see Fig. 2) | -40 | -- | 105 | ℃ |
| | 3.3/12/15/24VDC input | Derating when operating temperature≥100℃, (see Fig. 2) | | | | |
| Storage Temperature | | | -55 | -- | 125 | |
| Case Temperature Rise | Ta=25℃ | | -- | 25 | -- | |
| Pin Soldering Resistance Temperature | Soldering spot is 1.5mm away from case for 10 seconds | | -- | -- | 300 | |
| Storage Humidity | Non-condensing | 3.3/12/15/24VDC input | 5 | -- | 95 | %RH |
| Storage Humidity | Non-condensing | 5VDC input | -- | -- | 95 | %RH |
| Vibration | 12/15/24VDC input | | 10-150Hz, 5G, 0.75mm. along X, Y and Z | | | |
| Switching Frequency | Full load, nominal input voltage | 3.3VDC input | -- | 220 | -- | kHz |
| | | 5VDC input | -- | 270 | -- | |
| | | 12/15/24VDC input | -- | 260 | -- | |
| MTBF | MIL-HDBK-217F@25℃ | | 3500 | -- | -- | k hours |

## Mechanical Specifications

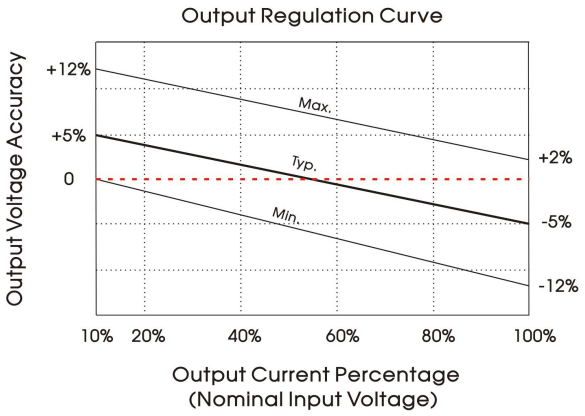
| | |
|---|---|
| Case Material | Black plastic; flame-retardant and heat-resistant (UL94V-0) |
| Dimensions | 19.65 x 6.00 x 10.16mm |
| Weight | 2.1g(Typ.) |
| Cooling Method | Free air convection |

## Electromagnetic Compatibility (EMC)

| | | |
|---|---|---|
| Emissions | CE | CISPR32/EN55032 CLASS B |
| | RE | CISPR32/EN55032 CLASS B |
| Immunity | ESD | IEC/EN61000-4-2 Air ±8kV, Contact ±6kV perf. Criteria B |
| Note: Refer to Fig. 4 for recommended circuit test. | | |

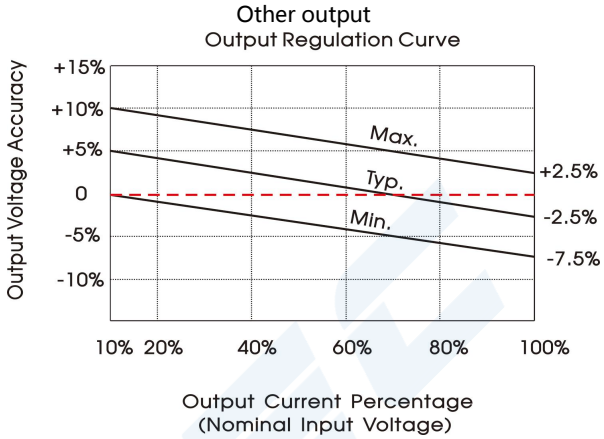
## Typical Performance Curves

3.3VDC output




3.3/5VDC input

Other output




12VDC/15VDC/24VDC input

Other output

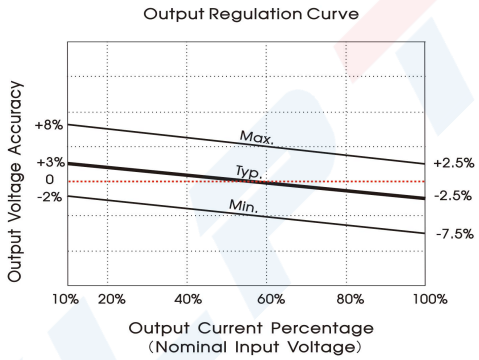
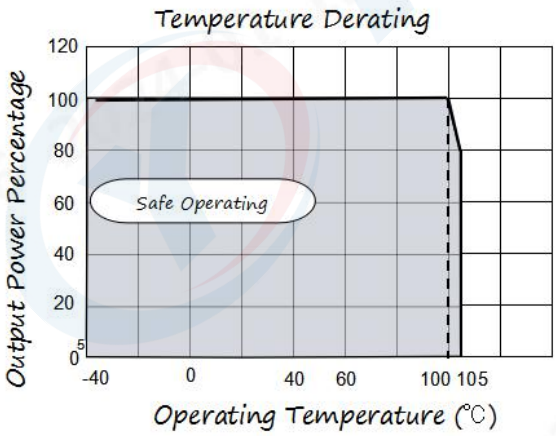



Fig. 1

3.3/12/15/24VDC input




5VDC input

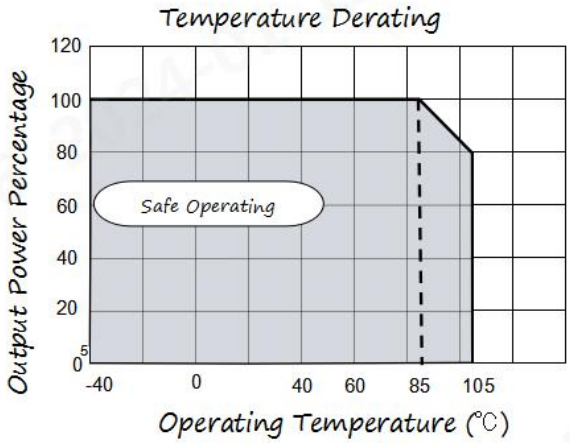
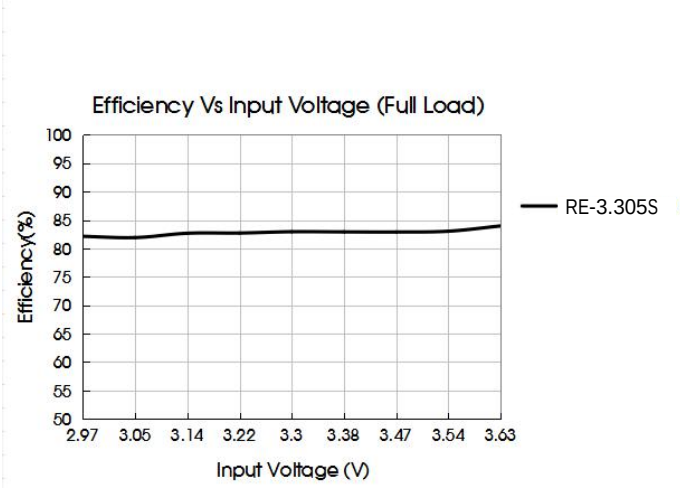
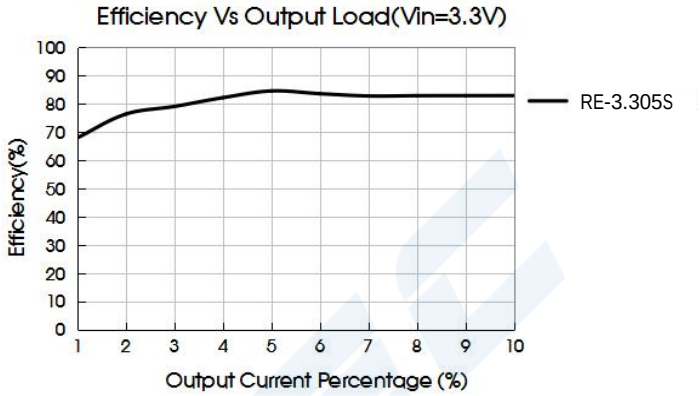
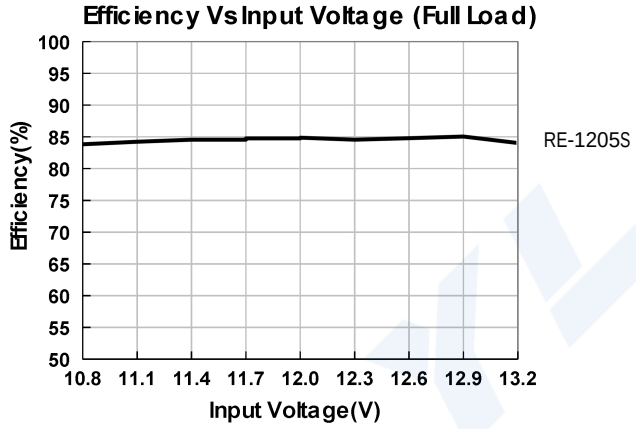
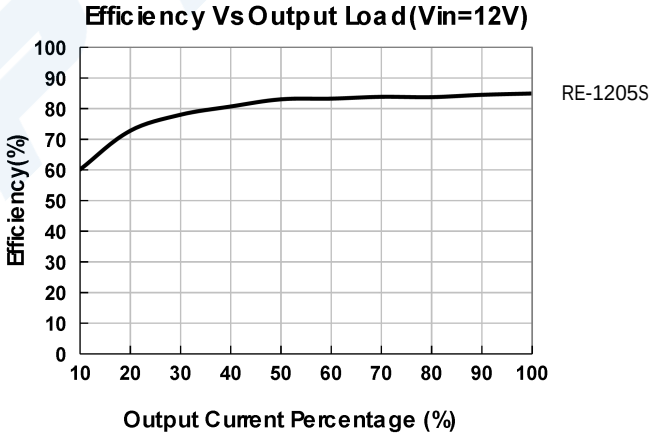



Fig. 2


Efficiency Vs Input Voltage (Full Load)
Efficiency(%)
100
95
90
85
80
75
70
65
60
55
50
2.97 3.05 3.14 3.22 3.3 3.38 3.47 3.54 3.63
Input Voltage (V)
RE-3.305S


Efficiency Vs Output Load(Vin=3.3V)
Efficiency(%)
100
90
80
70
60
50
40
30
20
10
0
1 2 3 4 5 6 7 8 9 10
Output Current Percentage (%)
RE-3.305S


Efficiency Vs Input Voltage (Full Load)
Efficiency(%)
100
95
90
85
80
75
70
65
60
55
50
10.8 11.1 11.4 11.7 12.0 12.3 12.6 12.9 13.2
Input Voltage(V)
RE-1205S


Efficiency Vs Output Load(Vin=12V)
Efficiency(%)
100
90
80
70
60
50
40
30
20
10
0
10 20 30 40 50 60 70 80 90 100
Output Current Percentage (%)
RE-1205S

## Design Reference

### 1. Typical application

Input and/or output ripple can be further reduced, by connecting a filter capacitor from the input and/or output terminals to ground as shown in Fig. 3.

Choosing suitable filter capacitor values is very important for a smooth operation of the modules, particularly to avoid start-up problems caused by capacitor values that are too high. For recommended input and output capacitor values refer to Table 1.

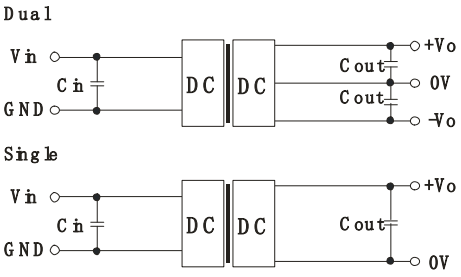


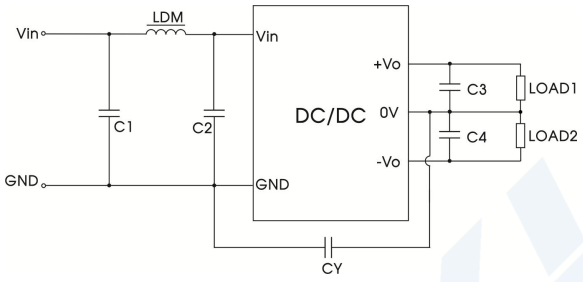

Fig. 3

Table 1：Recommended input and output capacitor values

| Vin | | Cin | Single Vout | Cout | Dual Vout | Cout |
|---|---|---|---|---|---|---|
| 3.3V | 3.3VDC | 10uF/16V | 3.3/5VDC | 10uF/16 | ±3.3/±5VDC | 10uF/16V |
| | -- | -- | 9/12VDC | 2.2uF/25 | ±9/±12VDC | 2.2uF/25V |
| | -- | -- | 15/24VDC | 1uF/50V | ±15/±24VDC | 1uF/50V |
| other | 5VDC | 4.7μF/16V | 3.3/5VDC | 10μF/16 | ±3.3/5VDC | 4.7μF/16V |
| | 12VDC | 2.2μF/25V | 7.2/9VDC | 2.2μF/16 | ±9VDC | 1μF/16V |
| | 15VDC | 2.2μF/25V | 12VDC | 2.2μF/25 | ±12VDC | 1μF/25V |
| | 24VDC | 1μF/50V | 15VDC | 1μF/25V | ±15VDC | 0.47μF/25V |
| | -- | -- | 24VDC | 1μF/50V | ±24VDC | 0.47μF/50V |

### 2. EMC (CLASS B) compliance circuit

Dual




Single

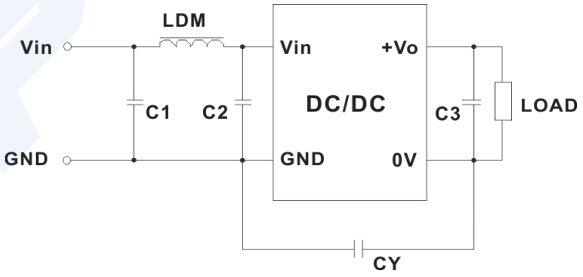
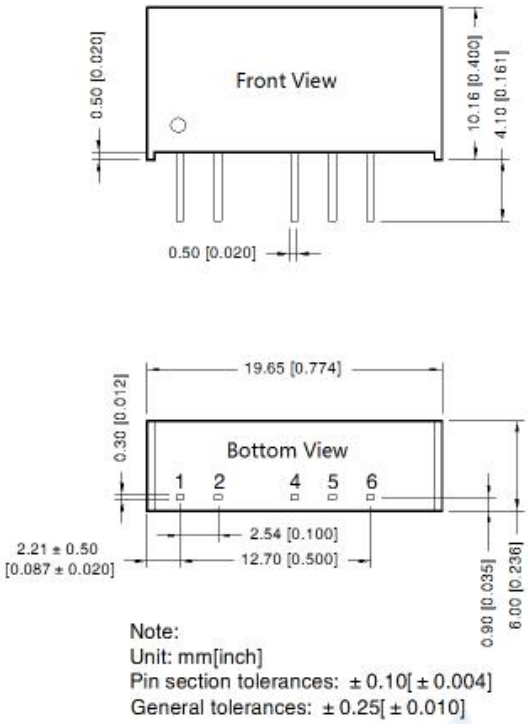



Fig. 4

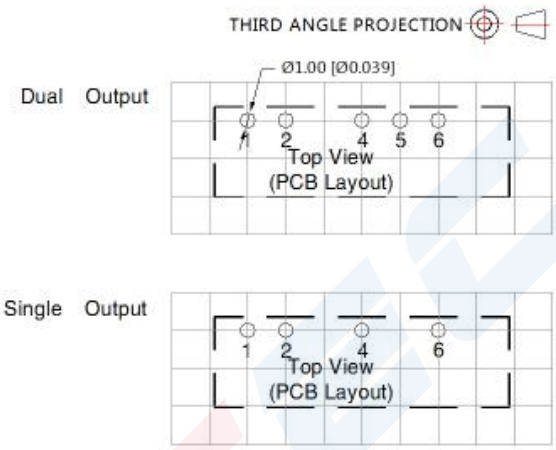
Table 2: EMC recommended circuit value table

| Input Voltage | | 3.3VDC | | 5VDC | | Other input |
|---|---|---|---|---|---|---|
| Output Voltage | | 3.3/5VDC | 3.3/5VDC | 3.3/5/9VDC | 12/15/24VDC | -- |
| Emissions | C1/C2 | 4.7μF /16V | 4.7μF /16V | 4.7μF /25V | 4.7μF /25V | 4.7μF /50V |
| | CY | -- | 270pF /4kVDC<br>VISHAY HGZ102MBP<br>TDK CD45-E2GA102M-GKA | 100pF/2kV | 1000pF/2kV | 270pF /2kV |
| | C3/C4 | Refer to the Cout in table 1 | | | | |
| | LDM | 6.8μH | | | | |

## Dimensions and Recommended Layout




Note:
Unit: mm[inch]
Pin section tolerances: ± 0.10[ ± 0.004]
General tolerances: ± 0.25[ ± 0.010]




Note: Grid 2.54*2.54mm

| Pin-Out | | |
|---|---|---|
| Pin | Single | Dual |
| 1 | Vin | Vin |
| 2 | GND | GND |
| 4 | 0V | -Vo |
| 5 | No Pin | 0V |
| 6 | +Vo | +Vo |