

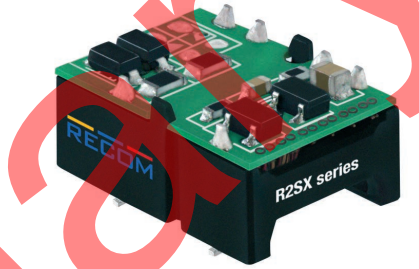
# Features

- 2 Watt power supply in SMD package
- -40°C to +100°C operating temperature
- 3kVDC/1 minute or 1kVDC/1 minute isolation
- No minimum load required
- IEC/EN/UL62368-1 certified, CB Report

# Unregulated Converters

## R2SX

### 2 Watt SMD Single Output



### Description

The R2SX is a low profile, open-frame 2W SMD isolated DC/DC converter with either 3kVDC/1 minute isolation (/H version) or 1kVDC/1 minute isolation options. There is no minimum load requirement and the efficiency stays high over a wide 20% to 100% load range. The operating temperature is from -40°C up to +75°C at full load, and up to +100°C with derating. The converters are fully certified to IEC/EN/UL62368-1 and are 10/10 RoHS-conform. A simple low cost LC filter is all that is needed for Class B EMC compliance. The R2SX comes with a 3-year warranty.

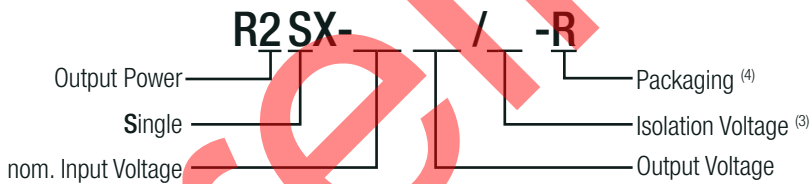
### Selection Guide

| Part Number | nom. Input Voltage [VDC] | Output Voltage [VDC] | Output Current [mA] | Efficiency typ. <sup>(1)</sup> [%] | max. Capacitive Load <sup>(2)</sup> [µF] |
|-------------|--------------------------|----------------------|---------------------|------------------------------------|--|
| R2SX-053.3  | 5                        | 3.3                  | 606                 | 79                                 | 3300                                     |
| R2SX-0505   | 5                        | 5                    | 400                 | 81                                 | 3300                                     |
| R2SX-2405   | 24                       | 5                    | 400                 | 85                                 | 3300                                     |
| R2SX-2415   | 24                       | 15                   | 133                 | 85                                 | 680                                      |
| R2SX-2424   | 24                       | 24                   | 84                  | 86                                 | 220                                      |

#### Notes:

- Note1: Efficiency is tested at nominal input and full load at +25°C ambient  
 Note2: Max Cap Load is tested at nominal input and full resistive load

### Model Numbering



#### Notes:

- Note3: without suffix, standard isolation voltage (1kVDC/1 second)  
 with suffix „/H“, high isolation voltage (3kVDC/1 second)  
 Note4: with suffix „-R“, standard packaging tape and reel  
 with suffix „-Tray“ for optional tray packaging

#### Ordering Examples:

|                  |       |        |               |                          |                         |
|------------------|-------|--------|---------------|--------------------------|-------------------------|
| R2SX-0505-R      | 5Vin  | 5Vout  | Single Output | 1kVDC/1 second isolation | tape and reel packaging |
| R2SX-2424/H-R    | 24Vin | 24Vout | Single Output | 3kVDC/1 second isolation | tape and reel packaging |
| R2SX-2424/H-Tray | 24Vin | 24Vout | Single Output | 3kVDC/1 second isolation | tray packaging          |

UL62368-1 pending  
 CAN/CSA-C22.2 No. 62368-1-14 pending  
 UL60950-1 pending  
 CAN/CSA-C22.2 No. 60950-1-07 pending  
 IEC/EN62368-1 certified  
 IEC/EN60950-1 pending  
 CB report  
 EN55032 compliant  
 EN55024 compliant

Specifications (measured @ Ta= 25°C, nominal input voltage, full load unless otherwise specified)

**BASIC CHARACTERISTICS**

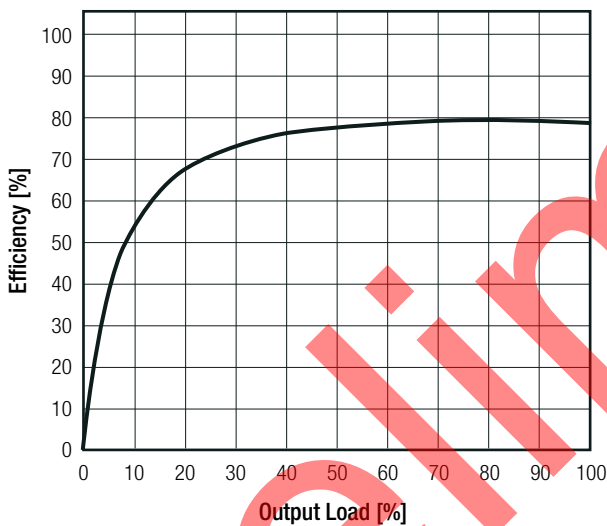
| Parameter                              | Condition                           | Min.  | Typ.           | Max.      |
|--|-------------------------------------|-------|----------------|-----------|
| Internal Input Filter                  |                                     |       |                | capacitor |
| Input Voltage Range                    |                                     |       | ±10.0%         |           |
| Input Current                          | nom. Vin = 5VDC<br>nom. Vin = 24VDC |       | 500mA<br>100mA |           |
| Quiescent Current                      | nom. Vin = 5VDC<br>nom. Vin = 24VDC |       | 40mA<br>15mA   |           |
| Minimum Load                           |                                     | 0%    |                |           |
| Internal Operating Frequency           |                                     | 20kHz |                |           |
| Output Ripple and Noise <sup>(5)</sup> | 20MHz BW                            |       |                | 150mVp-p  |

**Notes:**

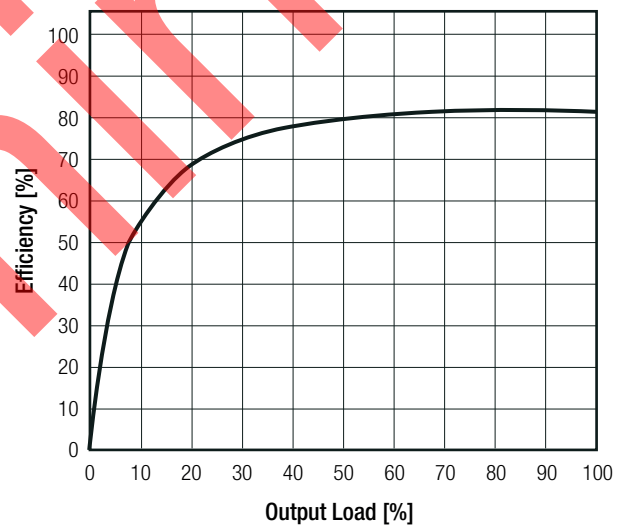
Note5: Measurements are made with a 0.1µF MLCC across output. (low ESR)

**Efficiency vs. Load**

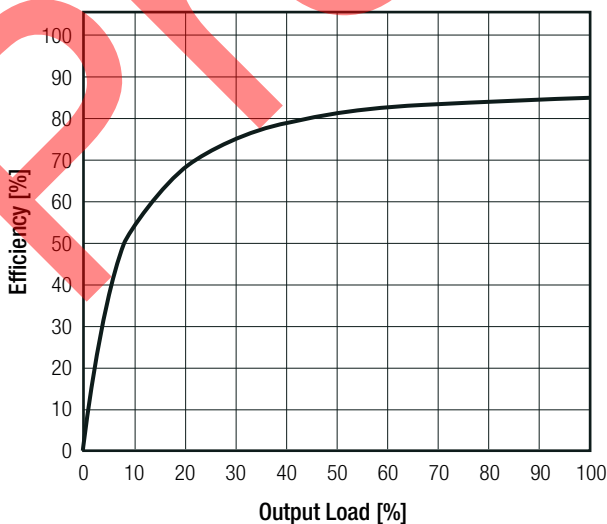
R2SX-053.3S(/H)



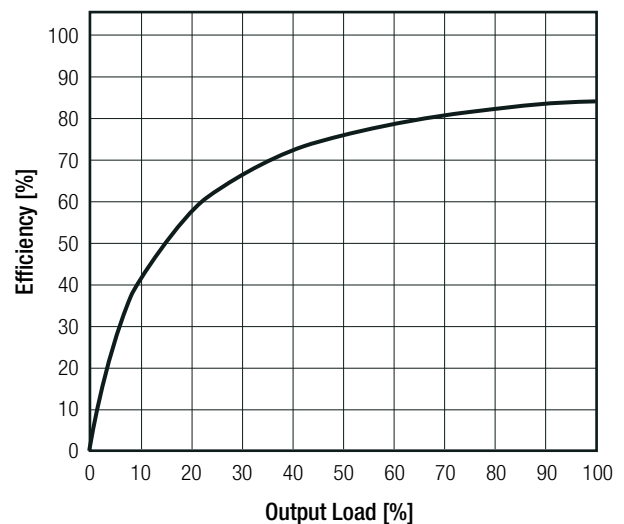
R2SX-0505S(/H)



R2SX-2405S(/H)



R2SX-2424S(/H)



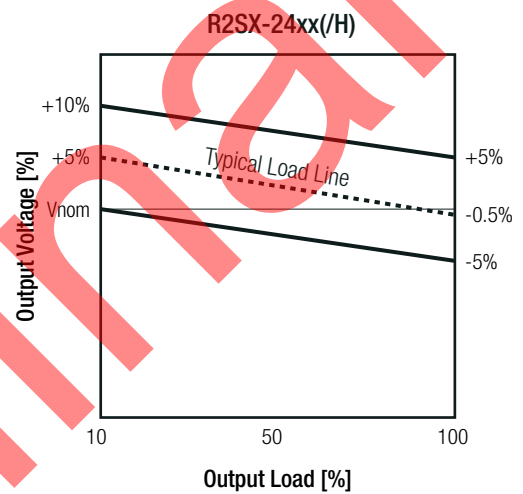
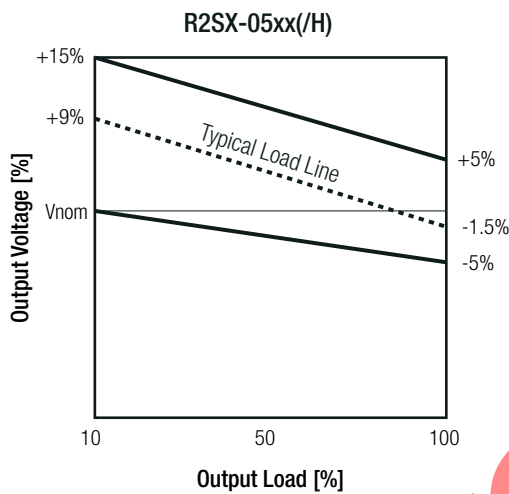
**Specifications** (measured @ Ta= 25°C, nominal input voltage, full load unless otherwise specified)

| REGULATIONS                    |                       |                |                                |
|--------------------------------|-----------------------|----------------|--------------------------------|
| Parameter                      | Condition             |                | Value                          |
| Output Accuracy                |                       |                | ±5.0% max.                     |
| Line Regulation                | low line to high line |                | ±1.2% typ. at 1.0% of Vin typ. |
| Load Regulation <sup>(6)</sup> | 10% to 100% load      | 3.3Vout, 5Vout | 15.0% max.                     |
|                                |                       | 15Vout, 24Vout | 10.0% max.                     |

**Notes:**

Note6: Operation below 10% load will not harm the converter, but specifications may not be met

**Tolerance Envelope**



| PROTECTIONS           |            |                  |  |                  |
|-----------------------|------------|------------------|--|------------------|
| Parameter             | Type       |                  |  | Value            |
| Isolation Voltage     | I/P to O/P | standard         | tested for 1 second<br>rated for 1 minute <sup>(7)</sup> | 1kVDC<br>500VAC  |
|                       | I/P to O/P | with suffix "/H" | tested for 1 second<br>rated for 1 minute <sup>(7)</sup> | 3kVDC<br>1.5kVAC |
| Isolation Resistance  |            |                  |  | 10GΩ min.        |
| Isolation Capacitance |            |                  |  | 100pF max.       |
| Insulation Grade      |            |                  |  | functional       |

**Notes:**

Note7: For repeat Hi-Pot testing, reduce the time and/or the test voltage

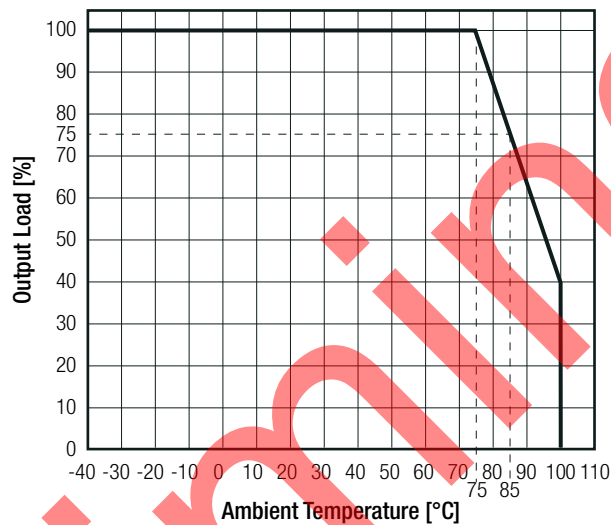
Note8: Refer to local safety regulations if input over-current protection is also required. Recommended fuse: slow blow type

Specifications (measured @ Ta= 25°C, nominal input voltage, full load unless otherwise specified)

| ENVIRONMENTAL               |  |                |   |
|-----------------------------|--|----------------|---|
| Parameter                   | Condition  |                | Value   |
| Operating Temperature Range | @ natural convection and full load (refer to derating graph) |                | -40°C to +75°C  |
| Operating Altitude          |  |                | 5000m   |
| Operating Humidity          | non-condensing   |                | 5% - 95% RH max.  |
| Pollution Degree            |  |                | PD2   |
| Vibration                   |  |                | according to MIL-STD-202G                                     |
| MTBF                        | according to MIL-HDBK-217F, G.B.                             | +25°C<br>+75°C | 12100 x 10 <sup>3</sup> hours<br>4400 x 10 <sup>3</sup> hours |

**Derating Graph**

(@ Chamber and natural convection 0.1m/s)



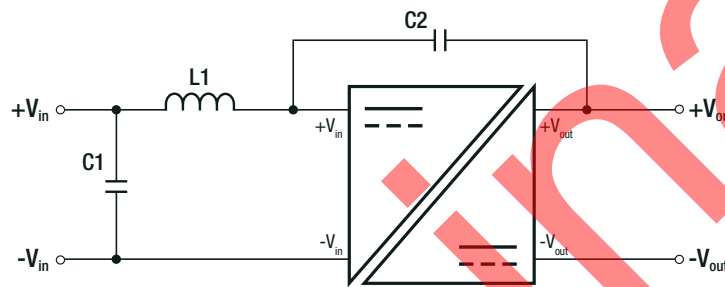
| SAFETY AND CERTIFICATIONS   |                      |  |
|---|----------------------|--|
| Certificate Type (Safety)   | Report / File Number | Standard   |
| Audio/video, information and communication technology equipment - Safety requirements             | pending              | UL62368-1, 2nd Edition, 2014<br>CAN/CSA -C22.2 No. 62368-1-14, 2nd Edition |
| Information Technology Equipment, General Requirements for Safety                                 | pending              | UL60950-1, 2nd Edition, 2014<br>CAN/CSA-C22.2 No. 60950-1-07, 2nd Edition  |
| Audio/video, information and communication technology equipment - Safety requirements (CB Scheme) | WD-ITAV-190016-A0    | IEC62368-1:2014, 2nd Edition   |
| Audio/video, information and communication technology equipment - Safety requirements             |                      | EN62368-1:2014 + A11:2017  |
| Information Technology Equipment, General Requirements for Safety (CB Scheme)                     | pending              | IEC60950-1:2005, 2nd Edition + A2:2013                                     |
| Information Technology Equipment, General Requirements for Safety                                 |                      | EN60950-1:2006 + A2:2013   |
| RoHS2+  |                      | RoHS 2011/65/EU + AM2015/863   |

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**Specifications** (measured @ Ta= 25°C, nominal input voltage, full load unless otherwise specified)

| EMC Compliance  | Condition                                       | Standard / Criterion            |
|---|---|---------------------------------|
| Electromagnetic Compatibility of Multimedia Equipment - Emission Requirements                   | with external filter<br>(see filter suggestion) | EN55032:2015 + AC:2016, Class B |
| Information technology equipment - Immunity characteristics - Limits and methods of measurement |   | EN55024:2010 + A1:2015          |
| ESD Electrostatic discharge immunity test   | Air: ±8kV; Contact: ±4kV                        | EN61000-4-2:2009, Criteria A    |
| Radiated, radio-frequency, electromagnetic field immunity test                                  | 10V/m   | EN61000-4-3:2010, Criteria A    |
| Fast Transient and Burst Immunity   | DC Power Port: ±2kV                             | EN61000-4-4:2012, Criteria A    |
| Surge Immunity  | DC Power Port: ±1kV                             | EN61000-4-5:2017, Criteria B    |
| Immunity to conducted disturbances, induced by radio-frequency fields                           | 10V r.m.s                                       | EN61000-4-6:2014, Criteria A    |
| Power Magnetic Field Immunity   | 50Hz / 1A/m                                     | EN61000-4-8:2010, Criteria A    |

**EMC Filtering Suggestions for EN55032 Class B**



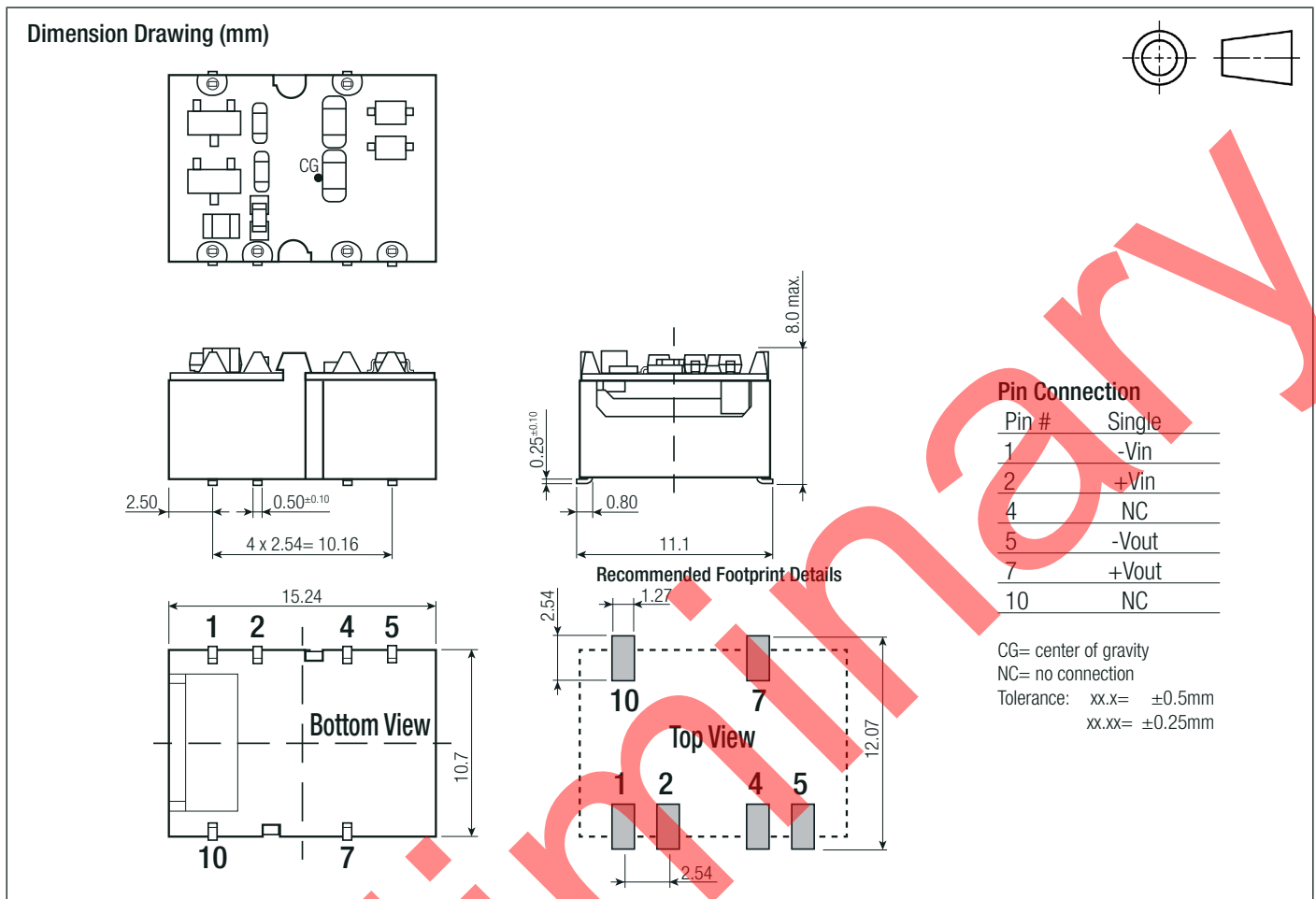
| Component List |           |                   |             |
|----------------|-----------|-------------------|-------------|
| Model          | C1        | L1                | C2          |
| R2SX-05xx      | 10µF MLCC | 10µH SMD Inductor | 470pF/4kVDC |
| R2SX-24xx      |           | 47µH SMD Inductor |             |

**DIMENSION and PHYSICAL CHARACTERISTICS**

| Parameter                 | Type        | Value                                    |
|---------------------------|-------------|--|
| Material                  | base<br>PCB | black plastic (UL94V-0)<br>FR4 (UL94V-0) |
| Package Dimension (LxWxH) |             | 15.24 x 11.1 x 8.0mm                     |
| Package Weight            |             | 1.6g typ.                                |

continued on next page

Specifications (measured @ Ta= 25°C, nominal input voltage, full load unless otherwise specified)



| PACKAGING INFORMATION       |                        |                        |
|-----------------------------|------------------------|------------------------|
| Packaging Dimension (LxWxH) | tape and reel (carton) | 355.0 x 340.0 x 35.0mm |
|                             | reel                   | 330.2 x 330.2 x 30.0mm |
|                             | tray                   | 260.0 x 205.0 x 27.0mm |
| Packaging Quantity          | tape and reel          | 250pcs                 |
|                             | tray                   | 30pcs                  |
| Tape Width                  |                        | 24.0mm                 |
| Storage Temperature Range   | non-condensing         | -55°C to +125°C        |
| Storage Humidity            |                        | 5% - 95% RH max.       |

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