Technical Data Sheet

# RxxC1TFxxS Series ◊ Isolated Power Module

## 1W ◊ Isolated ◊ Input 3V-5.5VDC ◊ 12 Pad LGA Package

RECOM DC/DC Converter

## FEATURES

- Ultra-compact 5x4mm SMD package
- Low profile (1.18mm)
- 3kVAC/1s isolation
- 3.3 or 5V selectable outputs
- 3 - 5.5V wide input range
- Up to 125°C ambient temperature with derating
- Integrated solution
- 3 years warranty




Dimensions (LxWxH): 5.0 x 4.0 x 1.18mm (0.196 x 0.157 x 0.046inch)
0.1g (0.0002lbs)

## APPLICATIONS




## SAFETY & EMC

RoHS² compliant 10 from 10

Reach compliant

## DESCRIPTION

The RxxC1TFxxS series is the latest breakthrough in isolated DC/DC converters. With an ultra-compact 5 x 4mm SMD package and a low profile of just 1.18mm, it sets a new standard for size and performance in its class. Offering 3kVAC/1s isolation and selectable 3.3V or 5V outputs, it's perfect for applications like COM port isolation, industrial automation, IoT, and sensor isolation. With a wide input range of 3V to 5.5V and an ambient temperature range up to 125°C with derating, it ensures reliability in diverse environments. Simplifying design with its integrated solution, the RxxC1TFxxS series is your compact, reliable choice for demanding electronic systems.

## SELECTION GUIDE

| Part Number | Input Voltage Range [VDC] | Output Voltage Range [VDC] | Output Current max. [mA] | Efficiency typ. [%] |
|---|---|---|---|---|
| R05C1TF05S | 3-5.5 | 3.3 | 200 | 44 |
| | 4.5-5.5 | 5 | 200 | 50.5 |

## MODEL NUMBERING

**R05C1TF05 S-**

- 05 — nom. Input Voltage
- 05 — nom. Output Voltage
- S — Single
- Packaging (1)

Note1: Add suffix "-R" for tape and reel packaging
Add suffix "-CT" for bag packaging (refer to **„Packaging information“**)

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### ABSOLUTE MAXIMUM RATINGS

| Parameter | Condition | Min. | Typ. | Max. |
|---|---|---|---|---|
| Absolute Maximum Voltage | $V_{IN+}$/CTRL to VIN- | -0.3VDC | | 6.5VDC |
| | $V_{OUT}$/$V_{SEL}$ to VOUT- | -0.3VDC | | 6.5VDC |
| Maximum Continuous Power Losses (2) | $T_{AMB}$ = +25°C | | | 2.05W |
| Junction Temperature | $T_J$ | | | +150°C |
| Lead Temperature | | | | +260°C |

Note2: Exceeding maximum allowable power dissipation causes device to enter thermal shutdown which protects device from permanent damage.

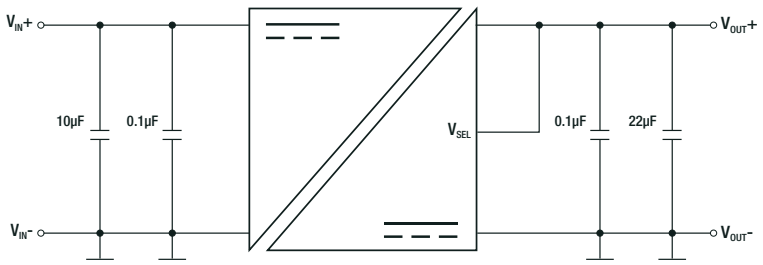
Note3: Stressed beyond those listed under absolute maximum ratings can cause permanent damage to the device.

### BASIC CHARACTERISTICS (measured @ $T_{AMB}$= 25°C, nom. $V_{IN}$, full load and after warm-up unless otherwise stated)

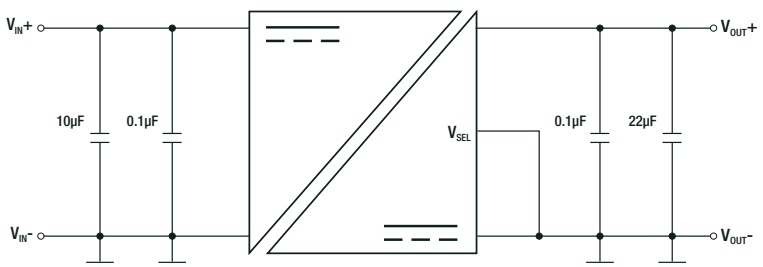
| Parameter | Symbol | Condition | | Min. | Typ. | Max. |
|---|---|---|---|---|---|---|
| Input Voltage Range | $V_{IN}$ | | | 3VDC | | 5.5VDC |
| Input Current | | $V_{IN}$= 5VDC, $V_{OUT}$= 5VDC, Load= 0mA | | | 8mA | |
| | | $V_{IN}$= 5VDC, $V_{OUT}$= 5VDC, Load= 200mA | | | 395mA | |
| | | $V_{IN}$= 5VDC, $V_{OUT}$= 3.3VDC, Load= 0mA | | | 5mA | |
| | | $V_{IN}$= 5VDC, $V_{OUT}$= 3.3VDC, Load= 200mA | | | 354mA | |
| | | $V_{IN}$= 3.3VDC, $V_{OUT}$= 3.3VDC, Load= 0A | | | 5mA | |
| | | $V_{IN}$= 3.3VDC, $V_{OUT}$= 3.3VDC, Load= 50mA | | | 115mA | |
| Under Voltage Lockout UVLO | | rising | | | 2.6VDC | 2.8VDC |
| Under Voltage Lockout Hysteresis | | | | | 220mV | |
| Output Voltage Accuracy | | $V_{OUT}$= 5VDC | | 4.9VDC | 5VDC | 5.1VDC |
| | | $V_{OUT}$= 3.3VDC | | 3.2VDC | 3.3VDC | 3.4VDC |
| Soft Start Time | | from 0-100% | $V_{IN}$= 5VDC, $V_{OUT}$= 5VDC | | 1.1ms | |
| | | | $V_{IN}$= 5VDC, $V_{OUT}$= 3.3VDC | | 0.6ms | |
| | | | $V_{IN}$= 3.3VDC, $V_{OUT}$= 3.3VDC | | 1.5ms | |
| Shutdown Current | | $V_{CTRL}$= 0VDC, measured on $V_{IN}$ pin | | | 7µA | |
| Output Ripple Voltage | | $V_{IN}$= 5VDC, $V_{OUT}$= 5VDC, Load= 200mA | | | 60mV | |
| | | $V_{IN}$= 5VDC, $V_{OUT}$= 3.3VDC, Load= 200mA | | | 50mV | |
| | | $V_{IN}$= 3.3VDC, $V_{OUT}$= 3.3VDC, Load= 50mA | | | 30mV | |

### Typical Application

$V_{IN}$= 4.5-5.5VDC, $V_{OUT}$= 5VDC, $I_{OUT}$= 200mA



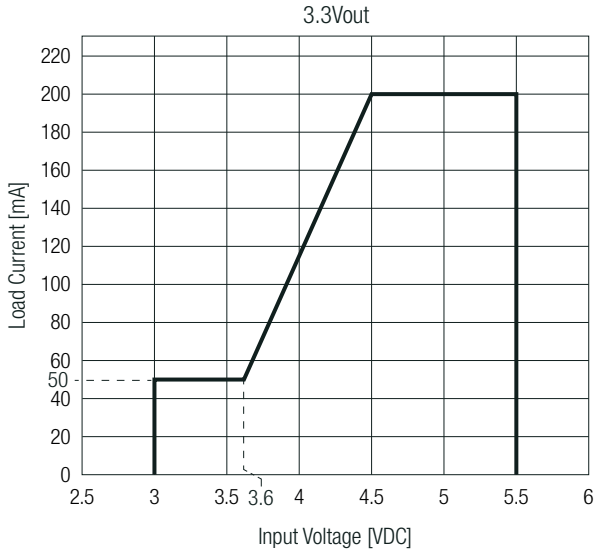

$V_{IN}$= 3-3.6VDC, $V_{OUT}$= 3.3VDC, $I_{OUT}$= 200mA

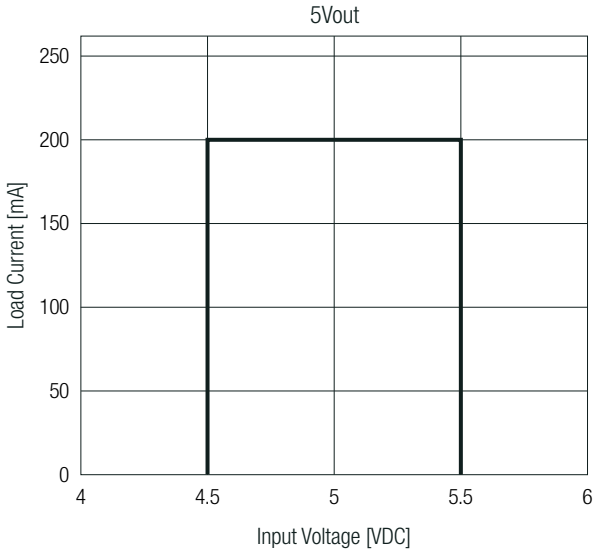



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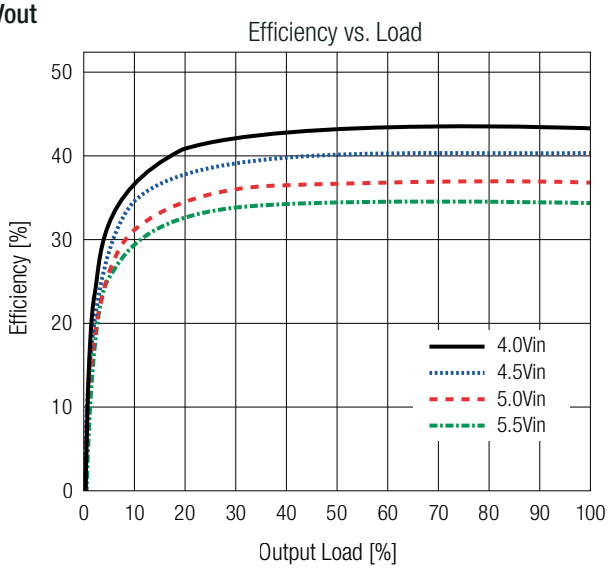
## BASIC CHARACTERISTICS

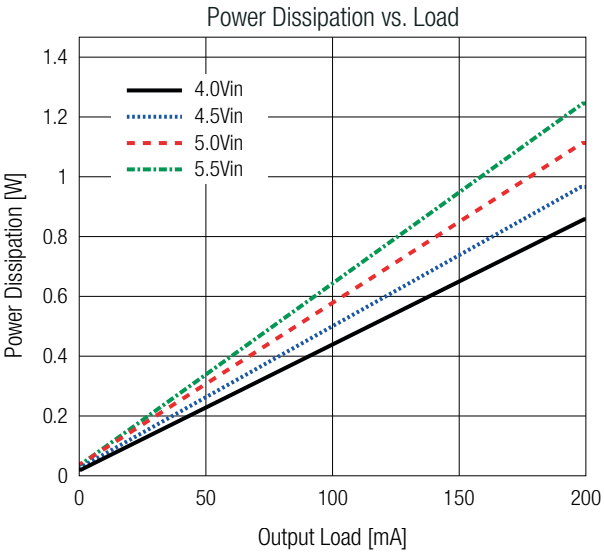
### Safe Operating Area



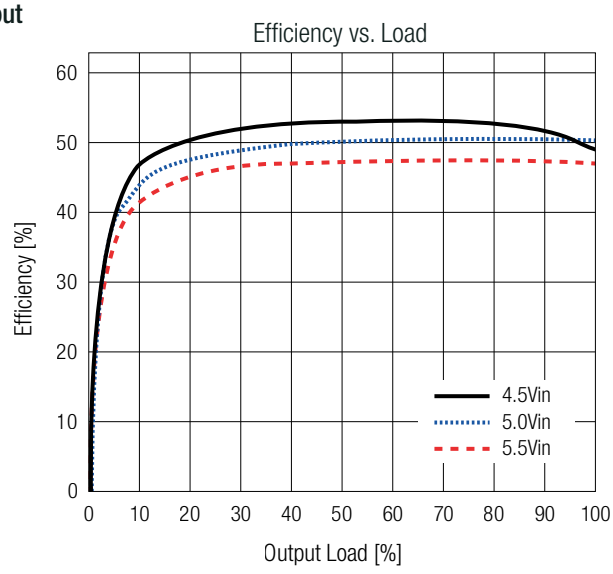



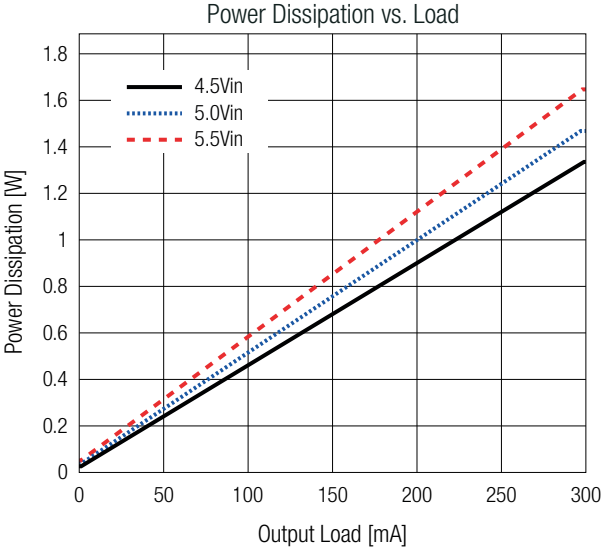

### 3.3Vout




### 5Vout




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## REGULATIONS

| Parameter | Condition | Value |
|---|---|---|
| Line Regulation | $V_{IN}$= 3V-3.6VDC, full load | ±0.5% typ. |
| | $V_{IN}$= 4.5V-5.5VDC, full load | ±0.5% typ. |
| Load Regulation | from 0-100% | ±0.4% typ. |

## CTRL AND SYNC OPERATING CONDITIONS

| Parameter | Condition | Min. | Typ. | Max. |
|---|---|---|---|---|
| CTRL Input High Threshold | | | | 2VDC |
| CTRL Input Low Threshold | | 0.4VDC | | |
| CTRL Input Leakage Current | $V_{IN}$= 5VDC, CTRL connect to VIN- | | -5µA | |
| | $V_{IN}$= 3.3VDC, CTRL connect to VIN- | | -3.3µA | |

Note4: CTRL pin shouldn't be floating and can connect to Vin+ directly or through resistor divider.

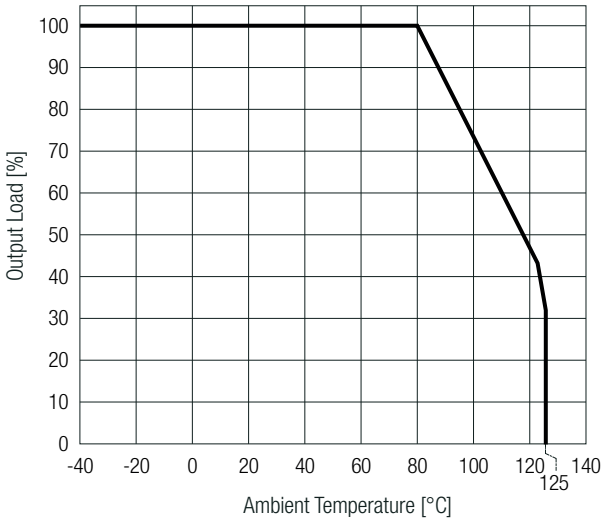
## THERMAL OPERATING CONDITIONS (measured @ $T_{AMB}$= 25°C, $V_{IN}$= 3V-5.5VDC, full load and after warm-up unless otherwise stated)

| Parameter | Symbol | Condition | Min. | Typ. | Max. |
|---|---|---|---|---|---|
| Operating Junction Temperature | $T_J$ | refer to **„Derating Graph“** | -40°C | | +125°C |
| Thermal Resistance (4) | $R_{th_{JA}}$ | junction to ambient | | 61K/W | |
| | $R_{th_{JC}}$ | junction to case | | 19K/W | |

Note4: Test PCB= 6.4 x 6.4cm double sided PCB with 2oz copper, natural convection

### Derating Graph

(@ Chamber and natural convection 0.1m/s)




## ENVIRONMENTAL

| Parameter | Condition | Value |
|---|---|---|
| Moisture Sensitive Level | | Level 3 |
| ESD | human-body-model | ±5kV |
| | charged-device-model | ±2kV |

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## PROTECTIONS

| Parameter | Condition | Value |
|---|---|---|
| Short Circuit Protection (SCP) | | current limited, continuous |
| Over Load Protection (OLP) (5) | | current limited, continuous |
| Isolation Voltage | rated for 60 seconds | 2.5kVAC |
| | tested for 1 second | 3kVAC |
| Isolation Resistance | $V_{ISO}$= 500VDC | 50GΩ min. |
| Isolation Capacitance | | 5pF typ. |
| Thermal Shutdown | IC junction | 150°C typ. |
| | hysteresis | 20°C |

Note5: During over load or output short circuit condition, the output voltage drops due to internal current limit. After over current or short circuit condition removed, RxxC1TFxxS will resume.

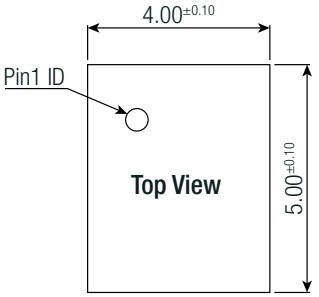
## SAFETY & CERTIFICATIONS

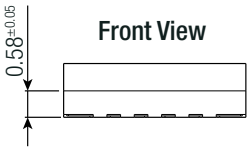
| Certificate Type (Safety) | Report Number | Standard |
|---|---|---|
| RoHS2 | | RoHS 2011/65EU + AM2015/863 |

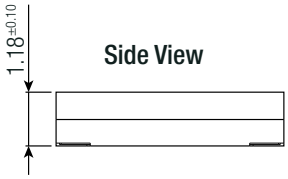
## DIMENSION & PHYSICAL CHARACTERISTICS

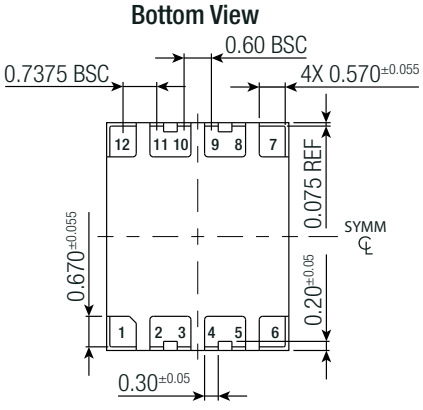
| Parameter | Type | Value |
|---|---|---|
| Dimension (LxWxH) | | 5.0 x 4.0 x 1.18mm<br>0.197 x 0.157 x 0.046inch |
| Weight | | 0.1g typ.<br>0.0002lbs |

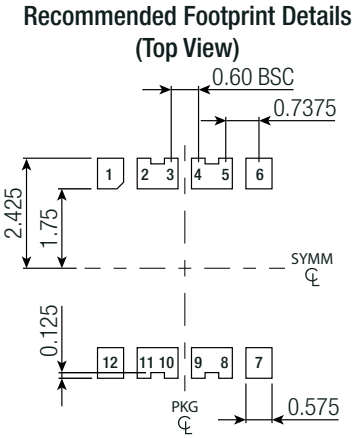
### Dimension Drawing (mm)




### Pad Information

| Pad # | Function |
|---|---|
| 1, 2, 3 | VIN- |
| 4, 5 | VIN+ |
| 6 | CTRL |
| 7 | $V_{SEL}$ |
| 8, 9 | VOUT+ |
| 10, 11, 12 | VOUT- |

Tolerances:
x.x= ±0.1mm
x.xx= ±0.05mm

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## PACKAGING INFORMATION

| Parameter | Type | Value |
|---|---|---|
| Packaging Dimension (LxWxH) | Suffix -R: tape & reel (diameter) | Ø330.2 |
| | tape and reel (carton) | 370 x 350 x 55mm |
| | Suffix -CT: moisture barrier bag | 100 x 100 x 30mm |
| Packaging Quantity | Suffix -R: tape & reel | 500pcs |
| | Suffix -CT: moisture barrier bag | 10pcs |
| Tape Width | | 12mm |
| Storage Temperature Range | | -65°C to +150°C |
| Storage Humidity | non-condensing | 60% RH max. |

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