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-

- R05C1TF05: nom. Input Voltage / 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.

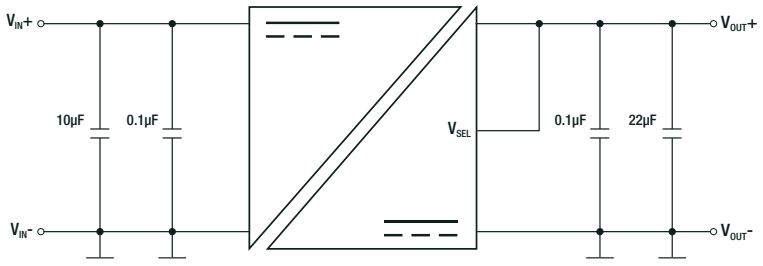
Note3: Stressed beyond those listed under absolute maximum ratings can cause permanent damage to the device.

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

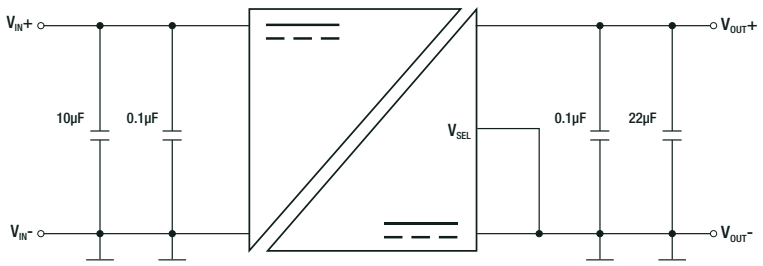
Parameter	Symbol	Condition		Min.	Typ.	Max.
Input Voltage Range	V_{IN}			3VDC		5.5VDC
Input Current		V_{IN}= 5VDC, V_{OUT}= 5VDC, Load= 0mA			8mA	
		V_{IN}= 5VDC, V_{OUT}= 5VDC, Load= 200mA			395mA	
		V_{IN}= 5VDC, V_{OUT}= 3.3VDC, Load= 0mA			5mA	
		V_{IN}= 5VDC, V_{OUT}= 3.3VDC, Load= 200mA			354mA	
		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	
Switching Frequency					26MHz	

Typical Application

V_{IN}= 4.5-5.5VDC, V_{OUT}= 5VDC, I_{OUT}= 50mA

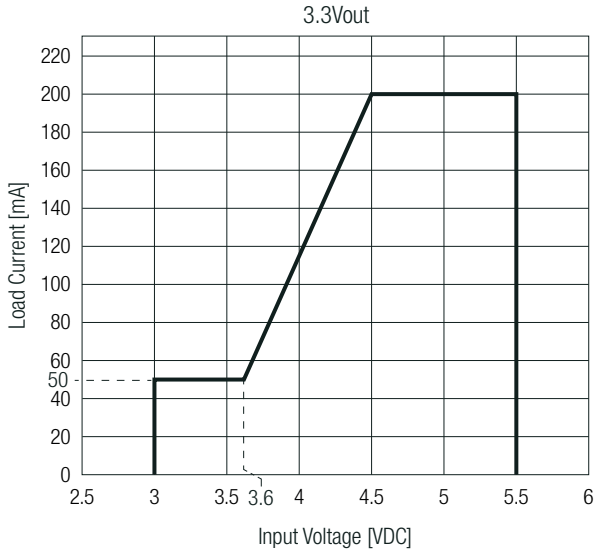


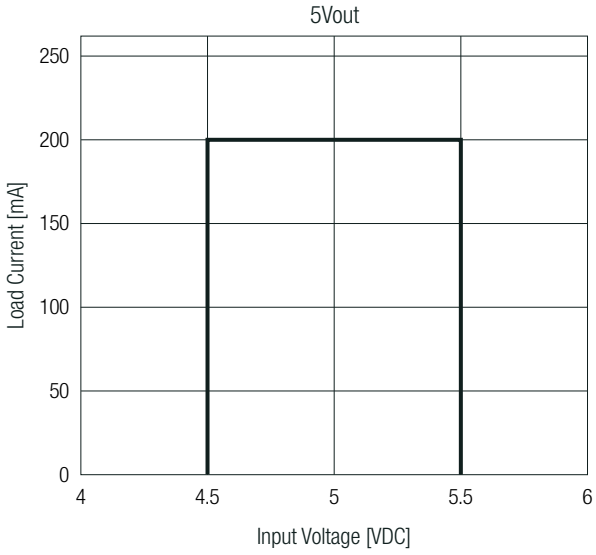
V_{IN}= 3-3.6VDC, V_{OUT}= 3.3VDC, I_{OUT}= 200mA



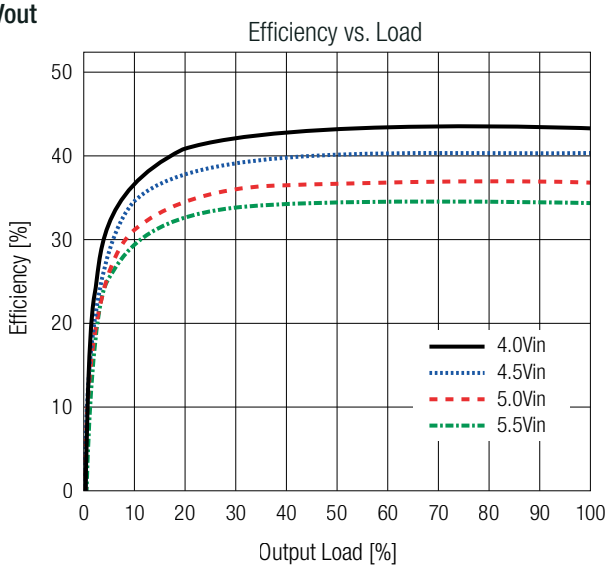
BASIC CHARACTERISTICS

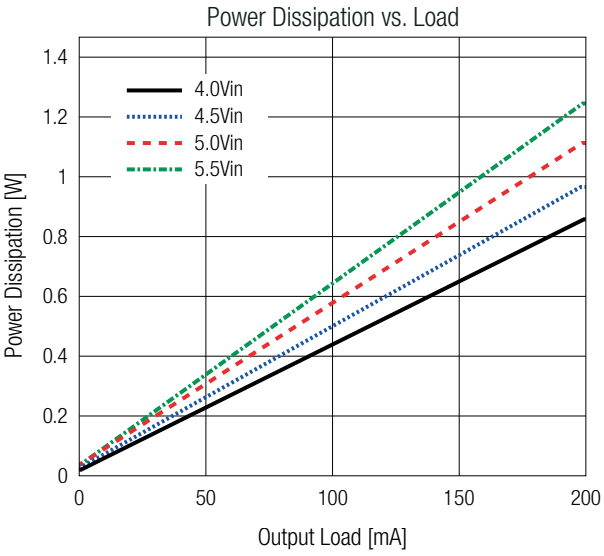
Safe Operating Area



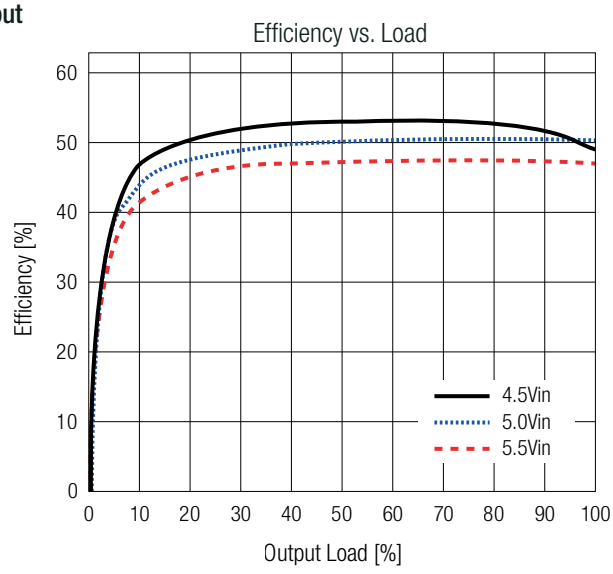


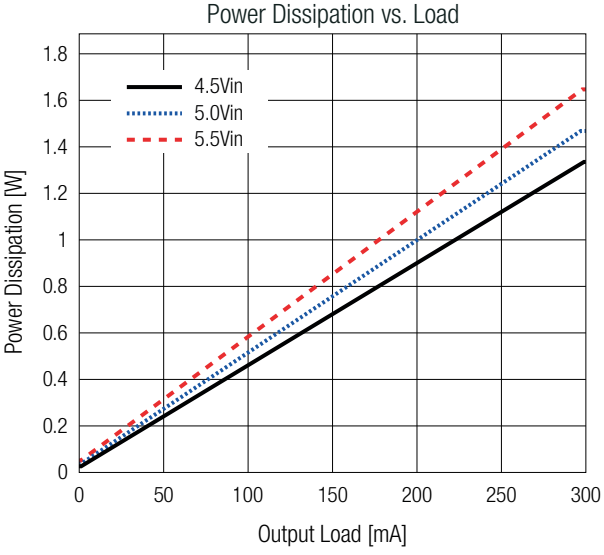
3.3Vout





5Vout





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 (5)	DC-DC ON			2VDC
CTRL Input Low Threshold (5)	DC-DC OFF	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.

Note5: When applying a voltage higher than 2V and input voltage is higher than V_{IN} UVLO, R05C1TF05S will enable all functions and start switching operation. Switching operation is disabled when the CTRL voltage falls below its lower threshold and shutdown occurs when CTRL < 0.4V. For automatic startup, connect the CTRL pin to V_{IN} directly or through a resistor divider. Operation between these 2 thresholds is not specified.

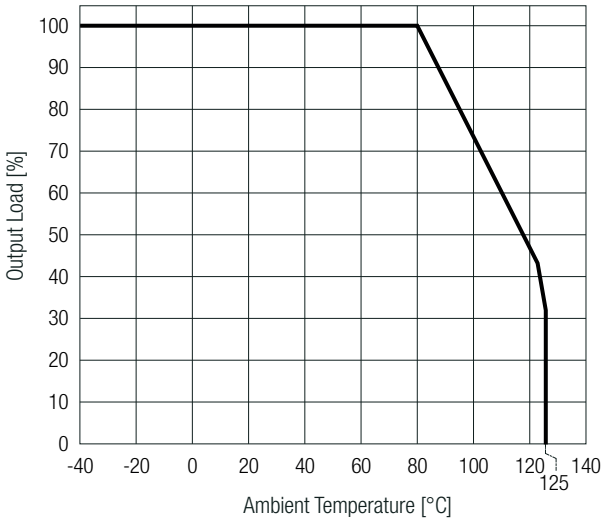
THERMAL OPERATING CONDITIONS (measured @ T_{AMB}= 25°C, V_{IN}= 3V-5.5VDC, full load and after warm-up unless otherwise stated)

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

Note6: 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.

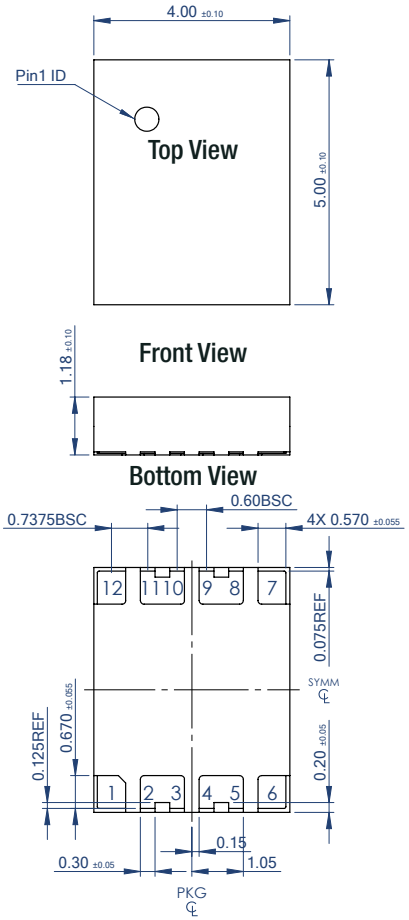
SAFETY & CERTIFICATIONS

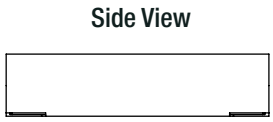
Certificate Type (Safety)	Report Number	Standard
RoHS2		RoHS 2011/65EU + AM2015/863

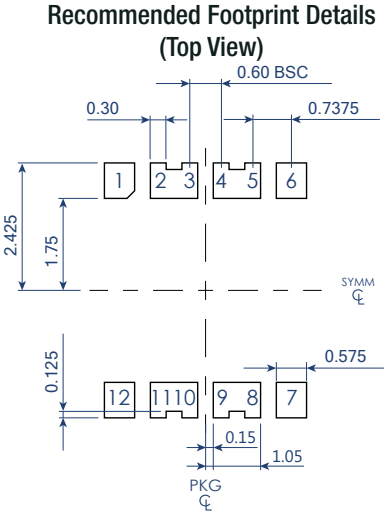
DIMENSION & PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Dimension (LxWxH)		5.0 x 4.0 x 1.18mm 0.197 x 0.157 x 0.046inch
Weight		0.1g typ. 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

DIMENSION & PHYSICAL CHARACTERISTICS

Pad Information

Pad #	Function	Description
1, 2, 3	VIN-	Side 1 Ground Pin. Use large copper for GND1, and add multiple vias to improve thermal performance.
4, 5	VIN+	Power Supply Input Pin. Connect to a 3V-5.5V power supply, typically connect a 10µF plus 0.1µF between V_{IN} and GND1 to make IC work stable.
6	CTRL	Power Enable Pin. Pull high to enable RxxC1TFxxS, pull low to disable RxxC1TFxxS. Don't let this pin floating.
7	V_{SEL}	Output voltage set pin. Must connect to V_{OUT} or float for 5V output and must connect to GND2 for 3.3V output. Don't bias V_{SEL} with other power and 5V output can't switch to 3.3V output after startup. Refer to **„Typical Application".**
8, 9	VOUT+	Power Output Pin. Typically connect a 22µF plus 0.1µF between V_{OUT} and GND2 to decrease V_{OUT} ripple and noise.
10, 11, 12	VOUT-	Side 2 Ground Pin. Don't use large copper for GND2 for EMI concern.

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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