

# Features

# Switching Regulator

- Designed for 4-20mA loop operation and energy scavenging applications
- Open frame SMD design
- -40°C to +105°C operating temperature @ full load
- Continuous short circuit protection
- No minimum load required
- 5000m operating altitude

# RECOM DC/DC Converter

## R420-1.8/PL

# Low Current Regulator



### Description

The R420 has been designed for auxiliary power from 4-20mA loops and other low power budget applications that require a maximum input current <3.6mA. This low profile SMD converter delivers a regulated, short-circuit protected output that can be adjusted between 1.8V and 5V with a single external resistor and delivers three times the output current of equivalent linear regulators to power microprocessors, data-loggers and HART digital modems without affecting the analog 4-20mA signal. The R420 will also find many applications in energy scavenging and indoor solar powered circuits.

### Selection Guide

Part Number	Input Voltage Range [VDC]	Adjustable Output Voltage Range [VDC]	Output Current [mA]	Efficiency typ. <sup>(1)</sup> [%]	Max. Capacitive Load <sup>(2)</sup> [µF]
R420-1.8/PL	10-36	1.8-5.0	10	76	1000

#### Notes:

- Note1: Efficiency is tested at 10-36VDC, full load and +25°C ambient  
 Note2: Max cap load is tested at nominal input and full resistive load

### Model Numbering

**R420-1.8/PL** └─ "Packaging <sup>(3)</sup>"

#### Notes:

Note3: add suffix "-R" for tape and reel packaging

#### Ordering Examples:

- R420-1.8/PL, standard tray packaging (40pcs/Tray)  
 R420-1.8/PL-R, tape and reel packaging (400pcs/T&R)

EN60950-1 certified  
 EN55032 compliant

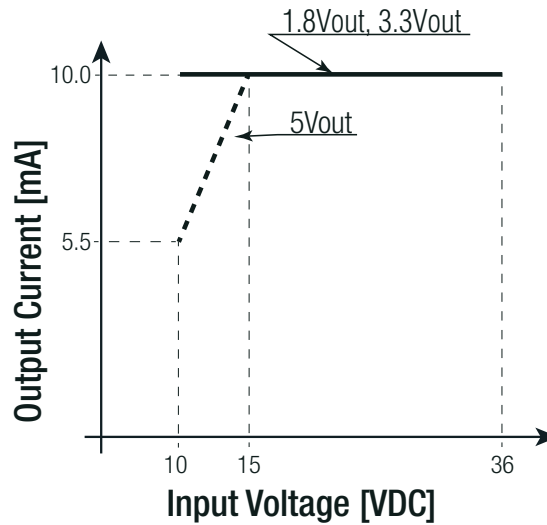
### Specifications (measured @ Ta= 25°C, full load, nominal input voltage and after warm-up)

BASIC CHARACTERISTICS					
Parameter	Condition	Min.	Typ.	Max.	
Internal Input Filter				1µF capacitor	
Input Voltage Range	nom. Vin= 24VDC	10VDC	24VDC	36VDC	
Quiescent Current			0.5mA	1mA	
Under Voltage Lockout	DC-DC ON DC-DC OFF		6VDC 5VDC		
Output Voltage Trimming	with 3.75kΩ			5VDC	
Minimum Load		0%			
ON/OFF CTRL	DC-DC ON DC-DC OFF			Open or 2V<Vr<5V Short or 0V<Vr<0.2Vr	
Internal Operating Frequency		45kHz	50kHz	52kHz	
Output Ripple and Noise	20MHz BW, 0-100% load			30mVp-p	

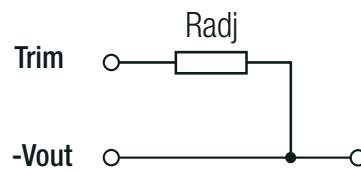
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**Specifications** (measured @ Ta= 25°C, full load, nominal input voltage and after warm-up)

**Output Current vs. Input Voltage**



**Output Voltage Trimming**



Radj (kΩ)	Vout
Open	1.8V
8	3.3V
3.75	5.0V

**REGULATIONS**

Parameter	Condition	Value
Output Voltage Accuracy	100% load	±2.0% typ.
Line Voltage Regulation	low line to high line, full load	0.2% typ. / 0.5% max.
Load Voltage Regulation	10% to 100% load	0.5% typ. / 0.8% max.
Transient Response	with 100µF output capacitor, 100% <-> 50% load	±75mV typ. / ±100mV max.

**PROTECTIONS**

Parameter	Condition	Value
Short Circuit Protection (SCP)		continuous, automatic recovery

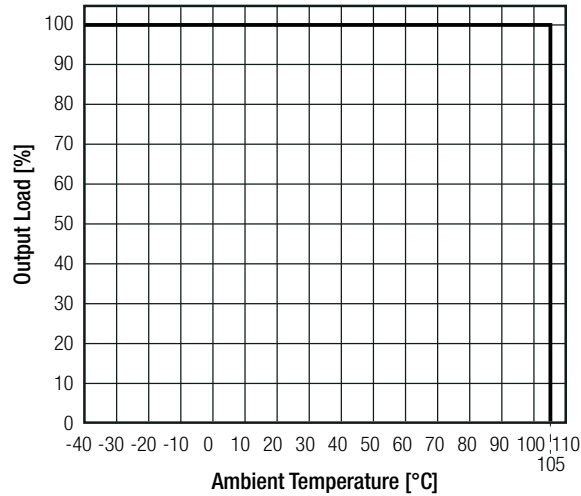
**ENVIRONMENTAL**

Parameter	Condition	Value	
Operating Temperature Range	without derating (see graph)	-40°C to +105°C	
Operating Altitude		5000m	
Operating Humidity	non-condensing	95% RH max.	
Pollution Degree		PD2	
Vibration		10-55Hz, 2G, 30min along X, Y and Z	
MTBF	MIL-HDBK 217F, G.B.	+25°C	7395 x 10 <sup>3</sup> hours
	MIL-HDBK 217F, G.B.	+71°C	1242 x 10 <sup>3</sup> hours

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**Specifications** (measured @ Ta= 25°C, full load, nominal input voltage and after warm-up)

Derating Graph



**SAFETY AND CERTIFICATIONS**

Certificate Type	Report / File Number	Standard
Information Technology Equipment - General Requirements for Safety	L0339m12-A-L	EN60950-1, 2nd Edition, A2:2013
EAC	RU-AT.49.09571	TP TC 004/2011
RoHS 2+		RoHS 2011/65/EU + AM2015/863

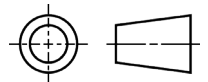
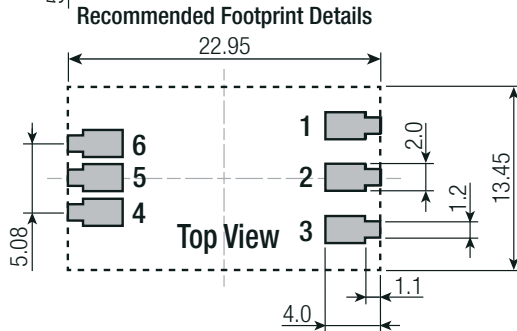
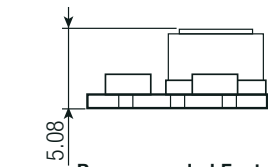
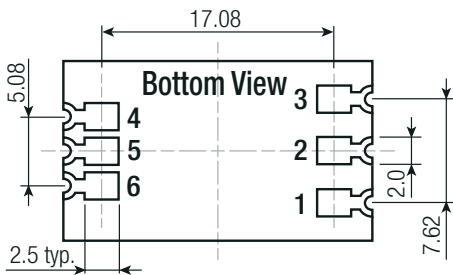
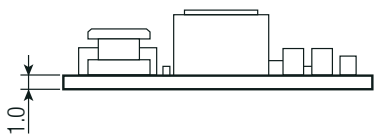
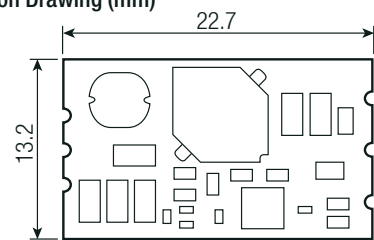
  

EMC Compliance	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment - Emission requirements	without external filter	EN55032, Class A and B

**DIMENSION and PHYSICAL CHARACTERISTICS**

Parameter	Type	Value
Material	PCB	FR4, (UL94 V-0)
Package Dimension (LxWxH)		22.7 x 13.2 x 5.08mm
Package Weight		2.2g typ.

Dimension Drawing (mm)



**Pin Connections**

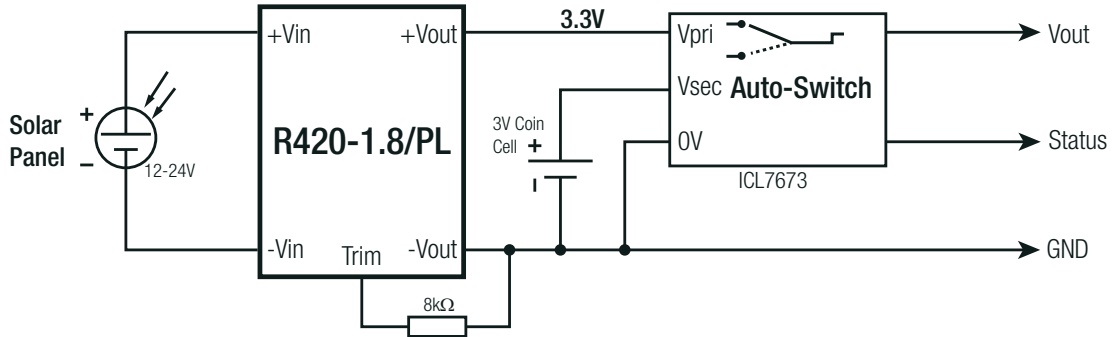
Pin #	Function
1	-Vin
2	+Vin
3	CTRL
4	+Vout
5	-Vout
6	TRIM

Tolerance: xx.x= ±0.5mm  
xx.xx= ±0.25mm

Specifications (measured @ Ta= 25°C, full load, nominal input voltage and after warm-up)

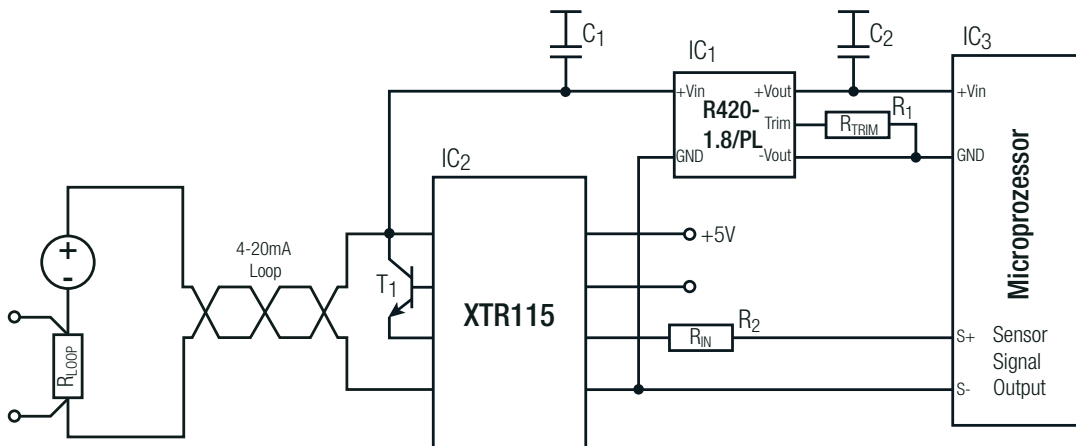
### INSTALLATION and APPLICATION

#### Solar Application

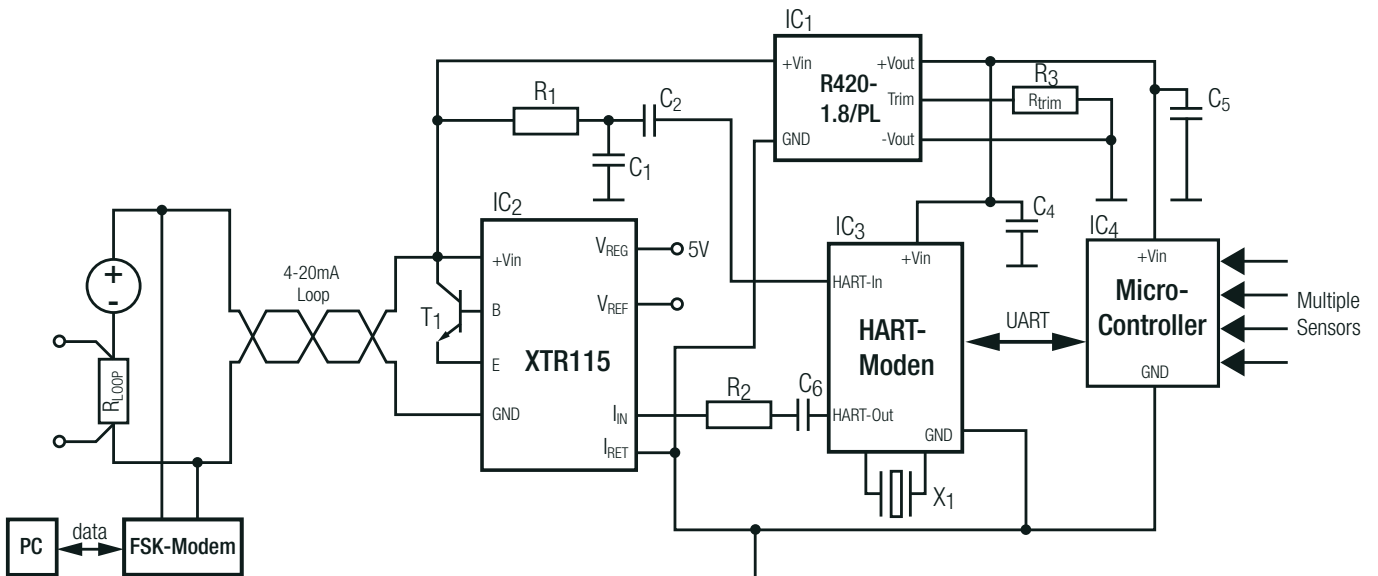


Solar-powered regulated 3.3V supply with automatic switch-over to 3V battery back-up.

#### Sensor Application



#### HART-Application



**Specifications** (measured @ Ta= 25°C, full load, nominal input voltage and after warm-up)

PACKAGING INFORMATION		
Packaging Dimension (LxWxH)	tray (carton)	260.0 x 205.0 x 25.0mm
	tape and reel (carton)	385.0 x 375.0 x 70.0mm
	reel	330.0 x 330.0 x 50.0mm
Packaging Quantity	tray	40pcs
	tape and reel	400pcs
Tape and Reel Width		44mm
Storage Temperature Range		-55°C to +125°C
Storage Humidity	non-condensing	95%, RH max.

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