

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

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. ⁽¹⁾ (%)	Max. Capacitive Load ⁽²⁾ (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 ⁽³⁾

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)

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= 24V	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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RECOM

DC/DC Converter

R420-1.8/PL

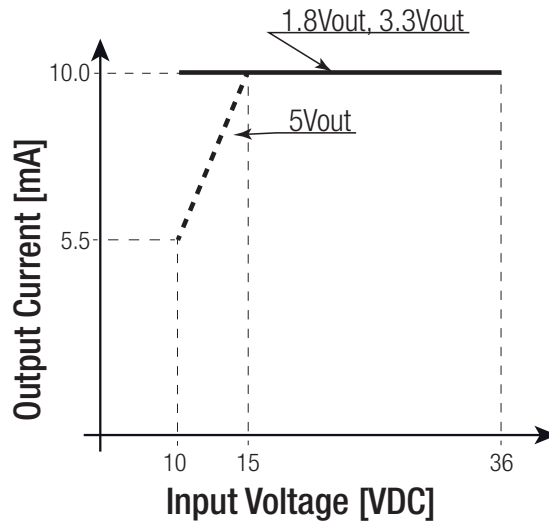
Low Current Regulator



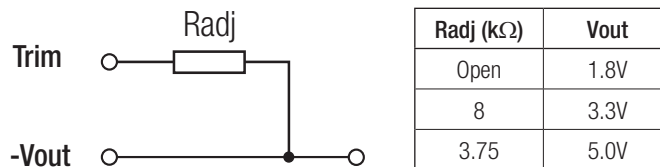
EN60950-1 Certified
EN55022 Certified

Specifications (measured @ $t_a = 25^\circ\text{C}$, full load, nominal input voltage and after warm-up)

Output Current vs. Input Voltage



Output Voltage Trimming



REGULATIONS

Parameter	Condition	Value
Output Voltage Accuracy	100% load	$\pm 2.0\%$ 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.
Dynamic Load Stability	with 100μF output capacitor, 100% \leftrightarrow 50% load	$\pm 75\text{mV}$ typ. / $\pm 100\text{mV}$ max.

PROTECTIONS

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

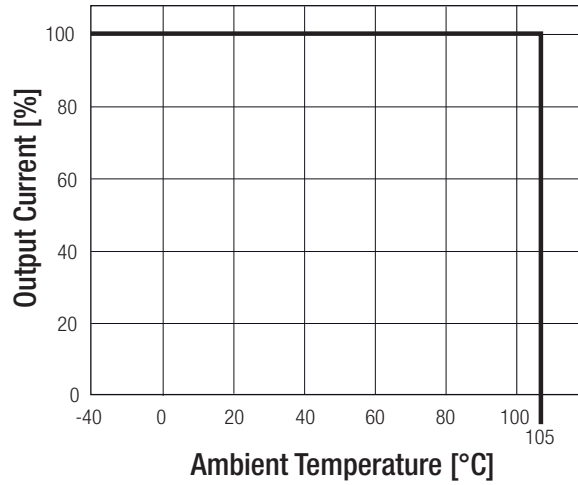
ENVIRONMENTAL

Parameter	Condition		Value
Operating Temperature Range	without derating (see graph)		-40°C to $+105^\circ\text{C}$
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.	$+25^\circ\text{C}$	7395×10^3 hours
	MIL-HDBK 217F, G.B.	$+71^\circ\text{C}$	1242×10^3 hours

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Specifications (measured @ $t_a = 25^\circ\text{C}$, full load, nominal input voltage and after warm-up)

Derating Graph



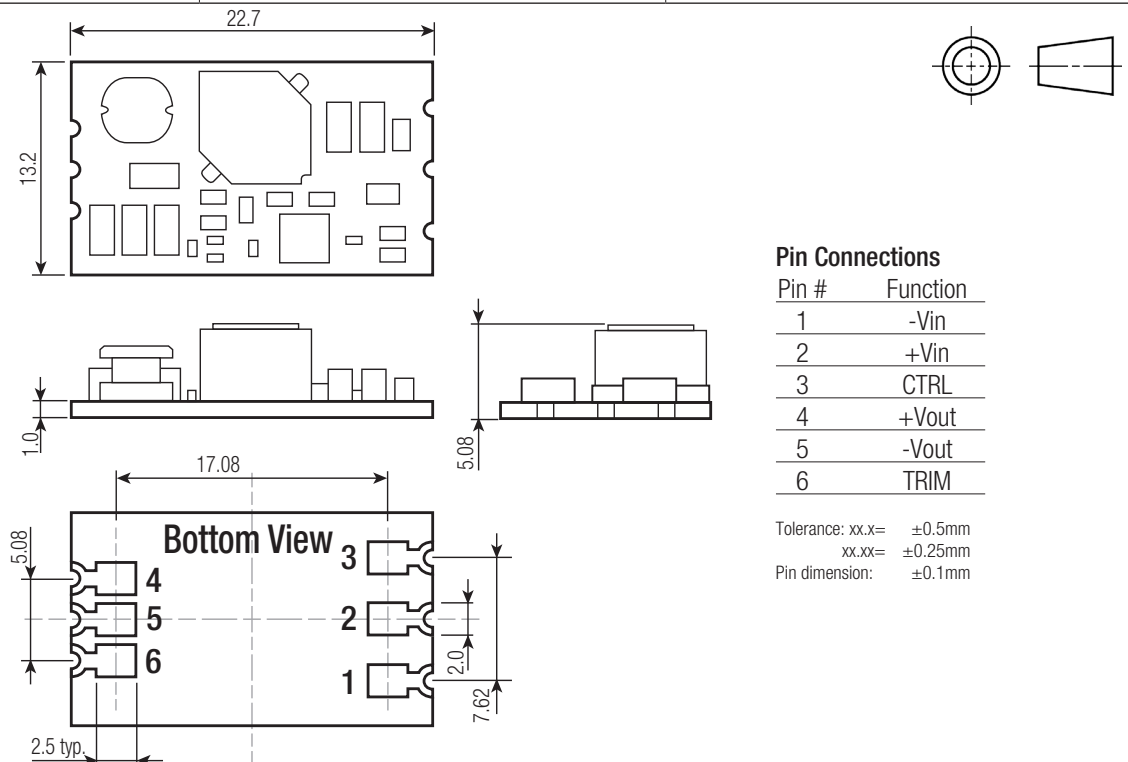
SAFETY AND CERTIFICATIONS

Certificate Type	Report / File Number	Standard
Information Technology Equipment - General Requirements for Safety (LVD)	L0339m12-A-L	EN60950-1, 2nd Edition, A2:2013
RoHs2		RoHS 2011/65/EU + AM2015/863
EMI Compliance	Condition	Standard / Criterion
Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	without external filter	EN55022, Class A and B

DIMENSION and PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	PCB	FR4 (UL94V-0)
Package Dimension (LxWxH)		22.7 x 13.2 x 5.08mm
Package Weight		2.2g typ.

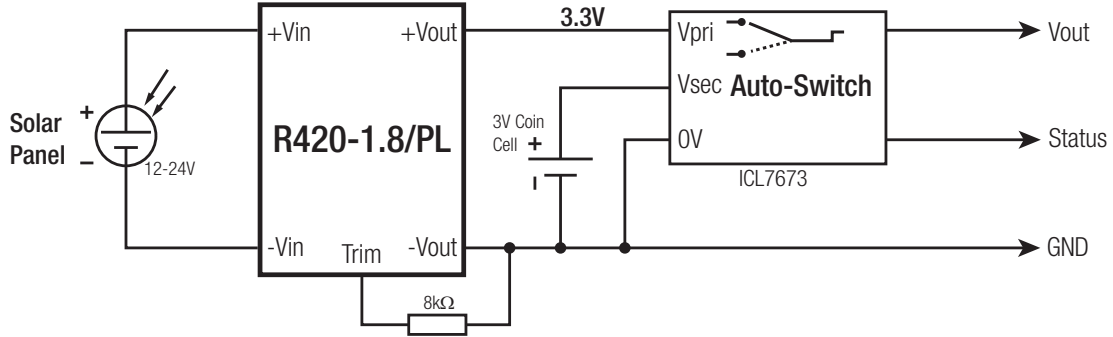
Dimension Drawing (mm)



Specifications (measured @ $t_a = 25^\circ\text{C}$, full load, nominal input voltage and after warm-up)

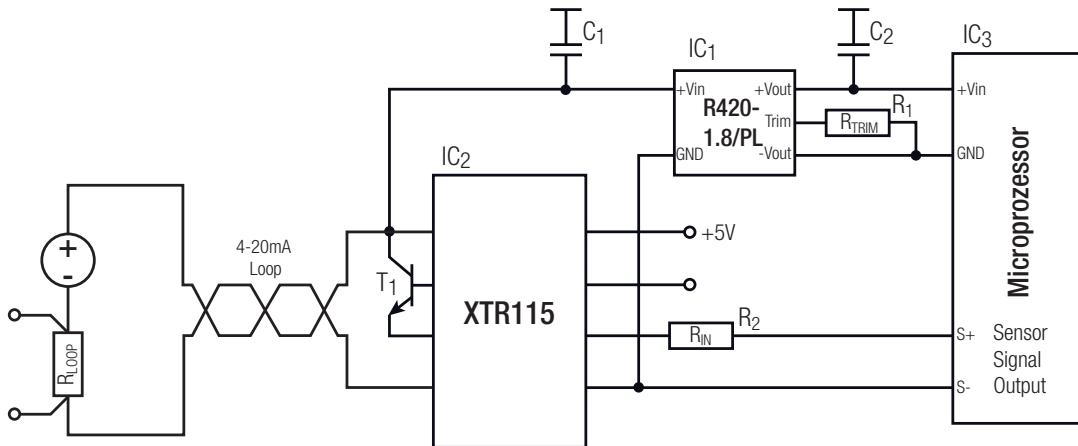
INSTALLATION and APPLICATION

Solar Application

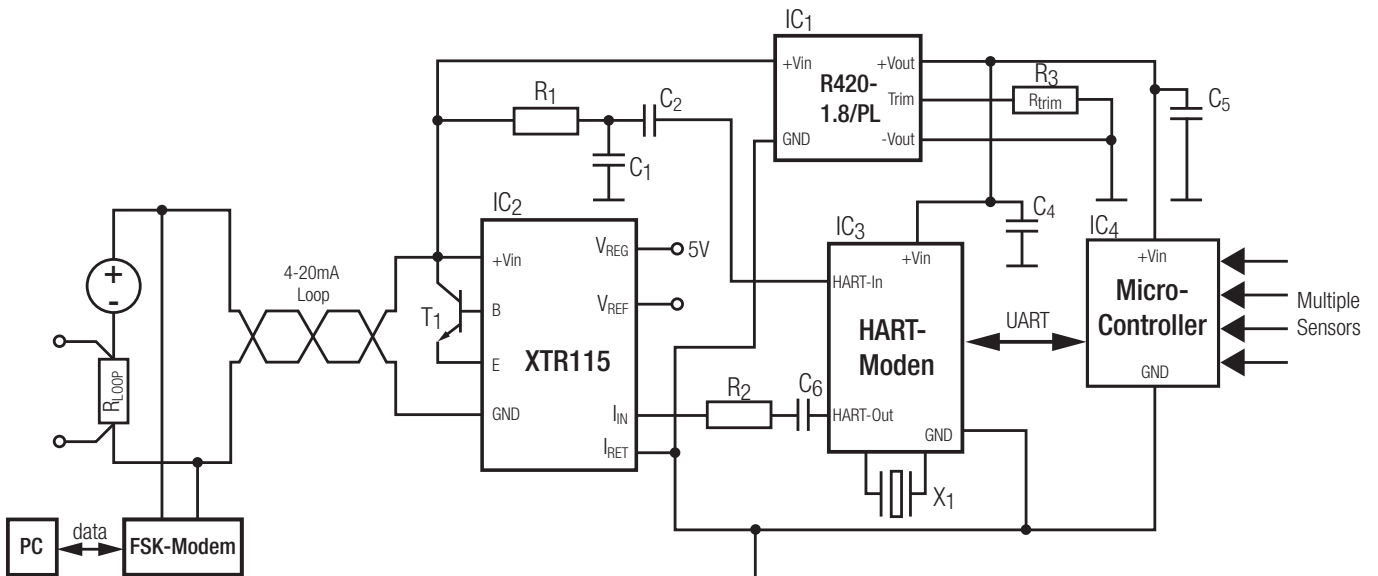


Solar-powered regulated 3.3V supply with automatic switch-over to 3V battery back-up.

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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