

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

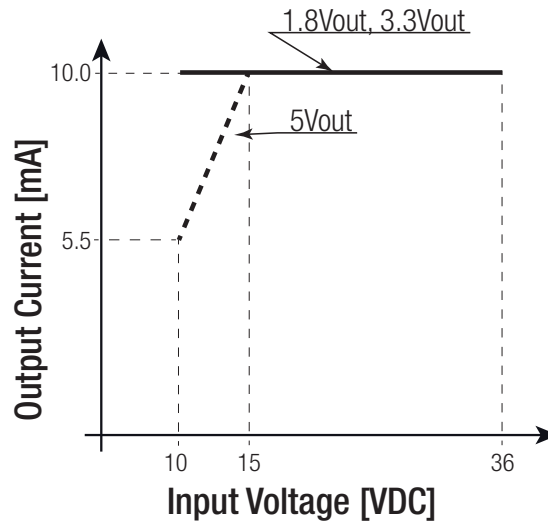
Low Current Regulator



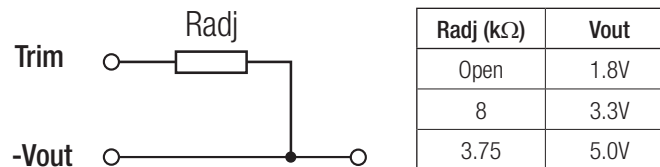
EN60950-1 Certified
EN55022 Certified

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 | ±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% <-> 50% load | ±75mV typ. / ±100mV max. |

PROTECTIONS

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

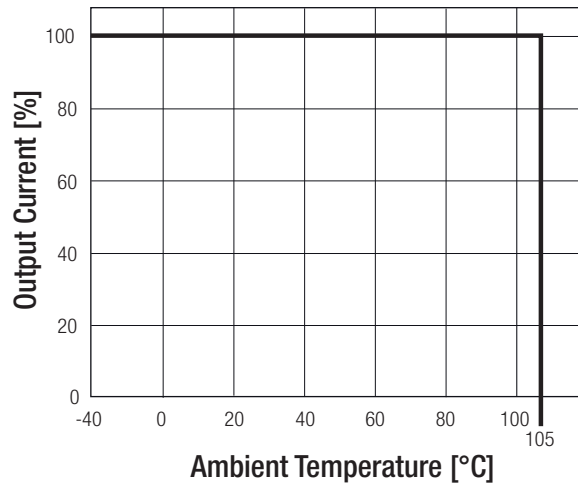
ENVIRONMENTAL

| 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 ³ hours |
| | MIL-HDBK 217F, G.B. | +71°C | 1242 x 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

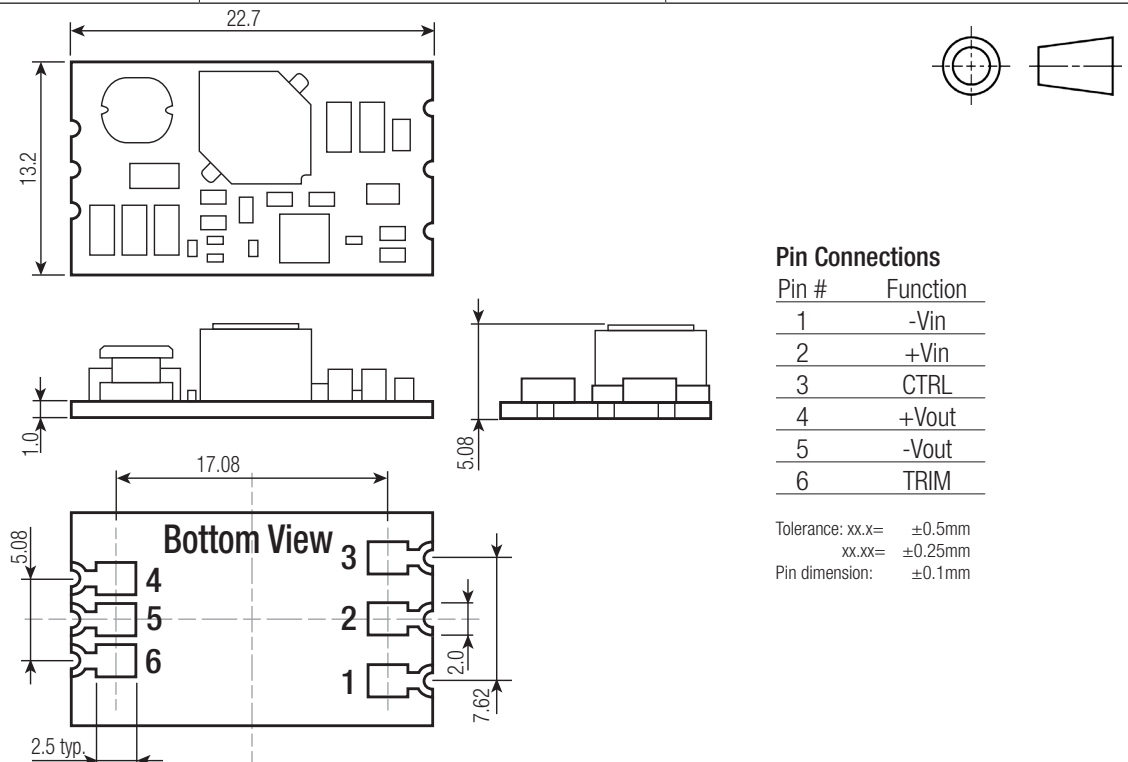
| Certificate Type | Report / File Number | Standard |
|--------------------------------------------------------------------------|----------------------|---------------------------------|
| Information Technology Equipment - General Requirements for Safety (LVD) | L0339m12-A-L | EN60950-1, 2nd Edition, 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. |

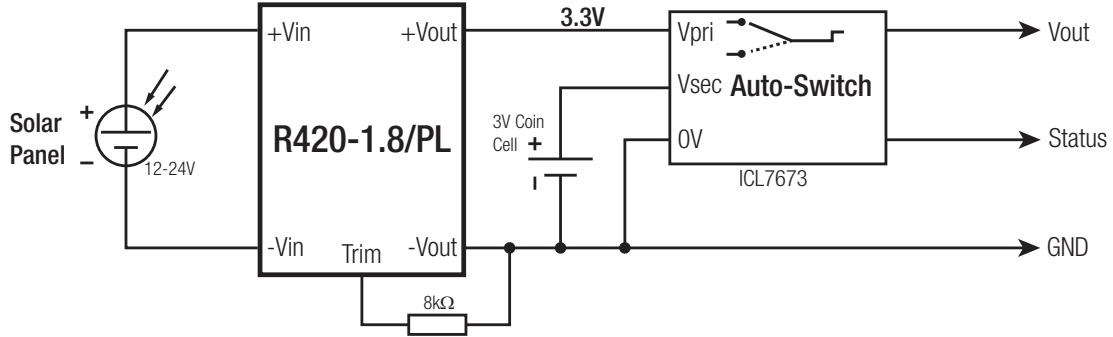
Dimension Drawing (mm)



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

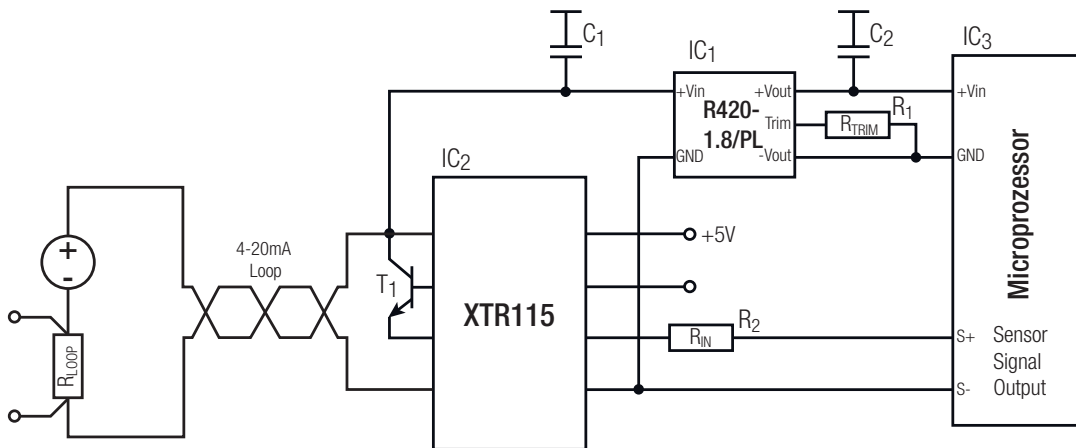
INSTALLATION and APPLICATION

Solar Application

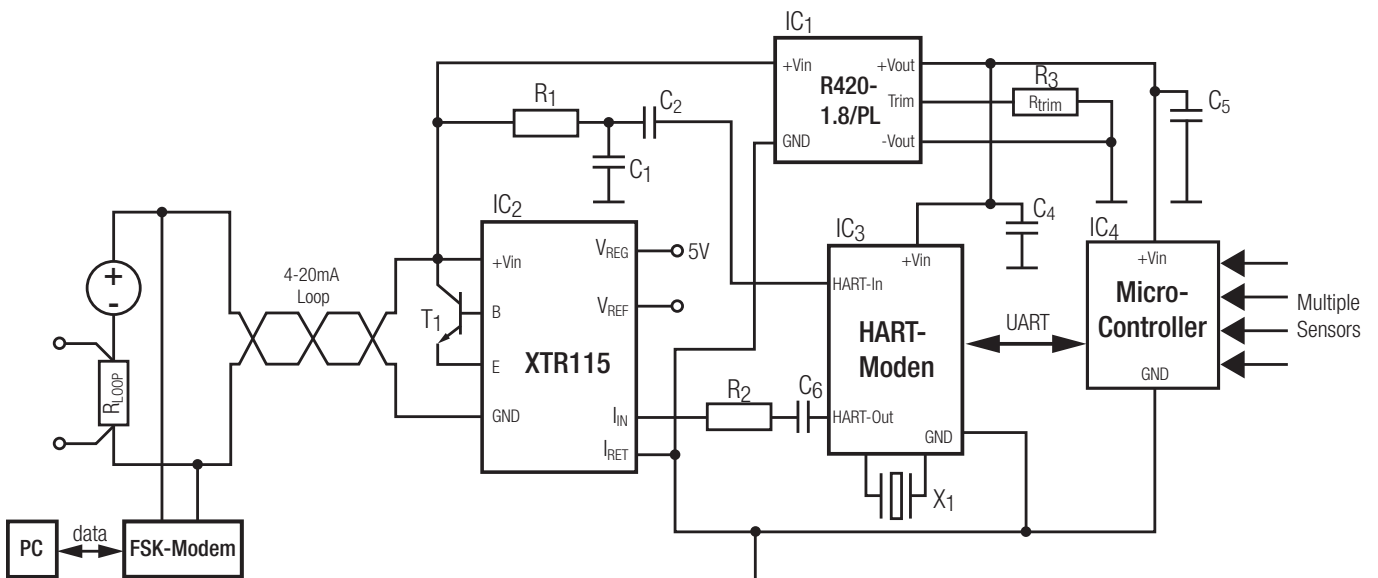


Solar-powered regulated 3.3V supply with automatic switch-over to 3V battery back-up.

Sensor Application



HART-Application



Specifications (measured @ $t_a = 25^\circ\text{C}$, 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 $+125^\circ\text{C}$ |
| Storage Humidity | non-condensing | 95%, RH max. |