Microcontrollers in Flow Meters

Microcontrollers for your gas, water and heat meter

With TI’s MSP430™ ultra-low-power microcontrollers, designers are given several design options to differentiate and to drive innovation with their meter designs. In addition to sensing, data-logging, processing and communications support, the MSP430 family enables rapid development for next-generation gas, water and heat meter systems.

<table>
<thead>
<tr>
<th>Flow meter MCUs with low-power scan interface unit</th>
<th>LCD</th>
<th>RF</th>
<th>MCU family of devices</th>
<th>Examples of key flow meter devices</th>
<th>Active mode</th>
<th>Standby mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow meter MCUs with low-power scan interface unit</td>
<td>•</td>
<td></td>
<td>MSP430FW4xx</td>
<td>MSP430FW429</td>
<td>200 µA/MHz</td>
<td>0.7 µA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MCUs with embedded FRAM</th>
<th>LCD</th>
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<th>MCU family of devices</th>
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<tr>
<td>MCUs with embedded FRAM</td>
<td>•</td>
<td>•</td>
<td>MSP430FR57xx, MSP430FR59xx</td>
<td>MSP430FR5793, MSP430FR5969</td>
<td>80 µA/MHz</td>
<td>1.5 µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100 µA/MHz</td>
<td>0.5 µA</td>
</tr>
</tbody>
</table>

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<tr>
<th>General MCUs</th>
<th>LCD</th>
<th>RF</th>
<th>MCU family of devices</th>
<th>Examples of key flow meter devices</th>
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<th>Standby mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>General MCUs</td>
<td>•</td>
<td>•</td>
<td>MSP430F2xx, MSP430F4xx</td>
<td>MSP430F2272, MSP430F4481</td>
<td>270 µA/MHz</td>
<td>0.7 µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>280 µA/MHz</td>
<td>1.1 µA</td>
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</tbody>
</table>

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<tr>
<th>High-performance MCUs</th>
<th>LCD</th>
<th>RF</th>
<th>MCU family of devices</th>
<th>Examples of key flow meter devices</th>
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<tr>
<td>High-performance MCUs</td>
<td>•</td>
<td>•</td>
<td>MSP430F5xx, MSP430F6xx</td>
<td>MSP430F5438A, MSP430F6721</td>
<td>230 µA/MHz</td>
<td>1.7 µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>256 µA/MHz</td>
<td>1.7 µA</td>
</tr>
</tbody>
</table>

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<tr>
<th>MCU + RF SoC</th>
<th>LCD</th>
<th>RF</th>
<th>MCU family of devices</th>
<th>Examples of key flow meter devices</th>
<th>Active mode</th>
<th>Standby mode</th>
</tr>
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<tbody>
<tr>
<td>MCU + RF SoC</td>
<td>•</td>
<td>•</td>
<td>CC430F51xx, CC430F61xx</td>
<td>CC430F5137, CC430F6147</td>
<td>160 µA/MHz</td>
<td>2.0 µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>160 µA/MHz</td>
<td>1.0 µA</td>
</tr>
</tbody>
</table>

For tools, software, and support options for your MSP430 microcontroller, visit www.ti.com/msp430.

Getting Started

Solution highlights

- TI flow meter landing page: www.ti.com/flowmeter
- Smart grid landing page: www.ti.com/smartgrid
- Smart grid solutions brochure: www.ti.com/lit/slym071
- TI end-equipment folders:
  - Gas meters: www.ti.com/solution/gas_meter
  - Water meters: www.ti.com/solution/water_meter
  - Heat meters: www.ti.com/solution/heat_meter

Use on-demand support

- Introducing TI’s Complete WMBus Solution (www.ti.com/lit/slyt433)
- An Electronic Water Meter Design Using MSP430F41x (www.ti.com/lit/slaa138a)
- Rotation Detection with the MSP430 Scan Interface (www.ti.com/lit/slaa222)
- Rotary/Linear Motion Detection Using the MSP430 Scan Interface and Optical Sensors (www.ti.com/lit/slaa289)
- Using GMR Sensors with the MSP430 Scan Interface (www.ti.com/lit/slaa358)
Key Flow Metering Solutions

Complement your microcontroller with other key flow metering solutions.

RF communications
Integrate AMR/AMI abilities with RF ICs and protocols for the sub-1 GHz and 2.4 GHz frequency bands.
- Sub-1 GHz (CC11x1, CC112x, CC119x)
- 2.4 GHz (CC25xx, CC259x)
- wMBus Software (WMBus protocol stack)

Power management
Optimize power consumption with solutions designed for battery-powered applications.
- DC/DC converters
  - Boost converters (TPS61xxx)
  - Buck converters (TPS62xxx)
  - Buck-boost converters (TPS63xxx)
- Power management ICs
  - Flow metering PMIC (TPS65290)

Optional functionalities
Address additional design requirements for smart meters.
- Prepayment
  - RFID (TRF796xA)
  - RFID or NFC (TRF7970A)
- Low-voltage motor drivers for valve control
  - Brushed motors (DRV883x)
  - Stepper motors (DRV883x except DRV8830)

Explore more options for your meter design
Wireless connectivity solutions: www.ti.com/lprf
WMBus solutions: www.ti.com/wmbus
Power management solutions: www.ti.com/power
RFID solutions: www.ti.com/rfid
NFC solutions: www.ti.com/nfc
Motor driver solutions: www.ti.com/motor
Analog solutions: www.ti.com/analog
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