



MIC2785

Dual Supply Voltage Monitor with Manual Reset

General Description

The MIC2785 is a micropower voltage monitor that provides undervoltage monitoring and manual reset capability in a tiny 1.2mm × 1.2mm QFN package. The MIC2785 provides a monitored voltage input (V_{IN}) separate from the supply input (V_{DD}). This insures that the reset ($/RST$) output maintains a valid output state when the voltage being monitored ramps up or down. The device also includes a manual reset input ($/MR$). The $/RST$ output is an active low push-pull output.

The undervoltage detector compares the V_{IN} pin voltage against the factory-programmed threshold of 1.62V. The reset output is asserted any time the input voltage drops below the programmed threshold voltage. A reset can be generated at any time by asserting the manual reset input, $/MR$. This reset output will remain active until the release of $/MR$. The $/MR$ input can also be used to daisy-chain the MIC2785 onto existing power monitoring circuitry or other supervisors. Hysteresis is included to prevent chattering due to noise.

The MIC2785 consumes a minimum of quiescent current, only 5 μ A, 1.5 μ A from the main supply pin and 3.5 μ A from the input pin. Offered in a tiny space saving 6-pin QFN 1.2mm × 1.2mm package.

Datasheets and support documentation are available on Micrel's web site at: www.micrel.com.

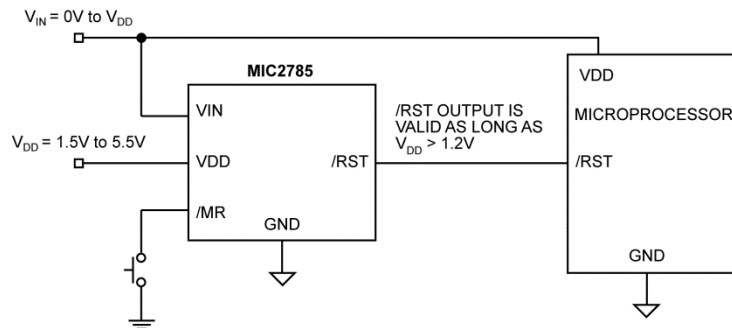
Features

- No external components
- Monitors input voltage for under-voltage condition
- Separate inputs for supply (V_{DD}) and monitor (V_{IN})
- +1.5% V_{IN} threshold voltage accuracy
- Valid $/RST$ state with V_{IN} down to 0.0V
- Valid $/RST$ state with V_{DD} down to 1.20V
- Factory-programmed 1.62V reference
- Manual reset input ($/MR$)
- Active low RESET ($/RST$) output
- Ultra-low input current – 5 μ A total (V_{IN} and V_{DD})
- Rejects brief input transients
- –40°C to 85°C operating temperature range
- RoHS lead-free compliant
- Available in 6-pin 1.2mm × 1.2mm Thin QFN package

Applications

- Mobile phones
- PDAs
- GPS Receivers

Typical Application



Memory or Microprocessor Voltage Monitor

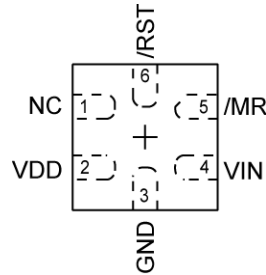
Ordering Information

| Part Number ⁽¹⁾ | Marking | Typical Application Voltage | Junction Temperature Range | Package |
|----------------------------|---------|-----------------------------|----------------------------|--------------------------------------|
| MIC2785-16YFT | U1C | 1.8V+10% | -40°C to +85°C | 6-Pin 1.2mm x 1.2mm Thin QFN Pb-Free |

Note:

- Other voltages are available. Contact Micrel for details.

Pin Configuration



6-Pin (1.2mm x 1.2mm) Thin QFN (FT)

Pin Description

| Pin Number | Pin Name | Pin Function |
|------------|----------|---|
| 1 | NC | Not Internally Connected. |
| 2 | VDD | Analog (Input). Independent supply input for internal circuitry. |
| 3 | GND | Ground. |
| 4 | VIN | Analog (Input). Monitored input voltage. An under-voltage condition will trigger a reset sequence. |
| 5 | /MR | Digital (Input): Asserting this pin low initiates an immediate and unconditional reset. Assuming VIN is above the threshold when /MR is released (returns high), the reset output will be de-asserted. /MR may be driven by a logic signal or a mechanical switch. /MR has an internal pull-up to VDD and may be left floating if unused. |
| 6 | /RST | Digital (Output): Asserted low whenever the VIN pin voltage falls below the reference voltage or Manual Reset pin (/MR) is asserted. It will remain asserted until VIN voltage rises above the threshold voltage and the /MR pin is released. The maximum output voltage of the /RST pin is VIN. /RST is a push-pull output. |

Absolute Maximum Ratings⁽²⁾

| | |
|--|-----------------|
| Supply Voltage (V_{DD}) | -0.3V to +6V |
| Monitor Input (V_{IN}) | -0.3V to +6V |
| Input Voltage ($V_{/MR}$) | -0.3V to +6V |
| /RST Current | ±20mA |
| Lead Temperature (soldering, 20sec.) | 260°C |
| Junction Temperature (T_J) | -40°C to +125°C |
| Storage Temperature (T_S) | -65°C to +150°C |
| ESD Rating ⁽⁴⁾ (Human Body Model) | ±1.5kV |

Operating Ratings⁽³⁾

| | |
|--|---------------------|
| Supply Voltage (V_{DD}) | +1.5V to +5.5V |
| Monitor Input (V_{IN}) | -0.3V to + V_{DD} |
| Input Voltage ($V_{/MR}$) | -0.3V to + 5.5V |
| Ambient Temperature (T_A) | -40°C to +85°C |
| Junction Thermal Resistance | |
| 6-pin 1.2mm x 1.2mm Thin QFN (θ_{JA}) | 140.7°C/W |

Electrical Characteristics⁽⁵⁾

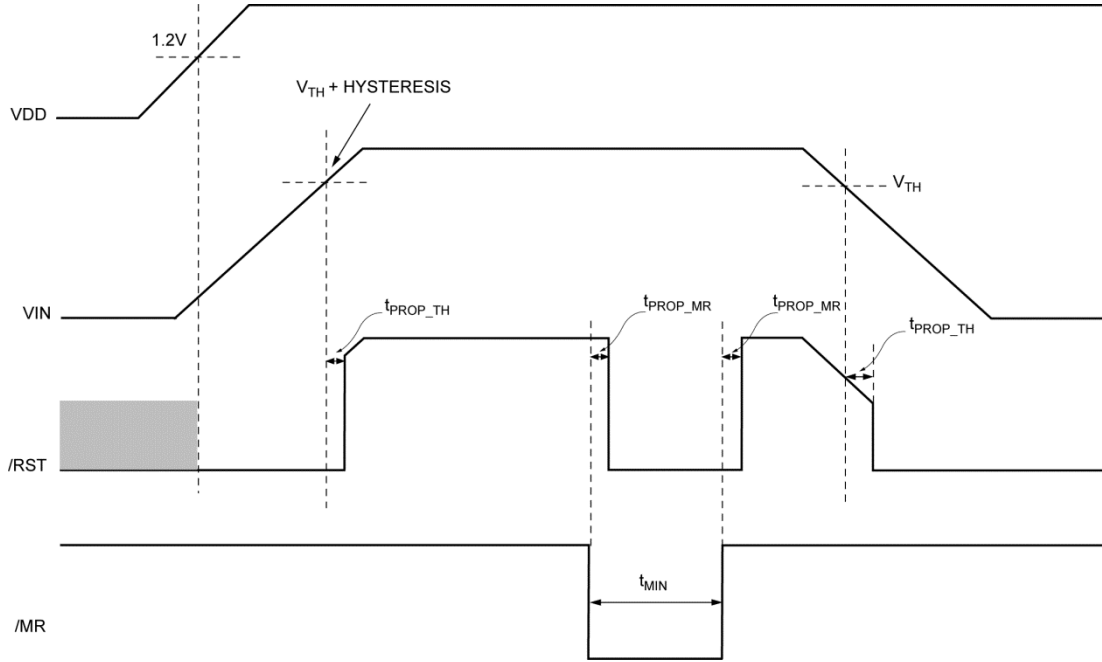
$V_{DD} = 3.1V$; $V_{IN} = V_{DD} = 3.1V$; $T_A = 25^\circ C$, **bold** values indicate $-40^\circ C < T_A < +85^\circ C$, unless noted.

| Symbol | Parameter | Condition | Min. | Typ. | Max. | Units |
|------------------|-----------------------------|--|----------------|------|------------|-------|
| I_{DD} | Supply Current (V_{DD}) | $V_{IN} = V_{TH} + 1.6\%$, /MR & /RST open | | 1.0 | | μA |
| I_{IN} | Supply Current (V_{IN}) | $V_{IN} = V_{TH} + 1.6\%$, /MR & /RST open | | 3.5 | | μA |
| | V_{TH} Accuracy | | -1.5 | | +1.5 | % |
| V_{HYST} | Hysteresis Voltage | | | 1.5 | | % |
| t_{PROP_TH} | Propagation Delay | $V_{IN} = V_{TH} \pm 1.5\%$, ±100mV | | 5 | 25 | μs |
| V_{OL} | Output Voltage Low | $V_{IN} \leq V_{TH} - 1.5\%$, $I_{SINK} = 100\mu A$, $V_{DD} > 1.2V$ | | | 0.3 | V |
| V_{OH} | Output Voltage High | $V_{IN} > V_{TH} + 1.5\%$, $I_{SOURCE} = 500\mu A$ | $0.8 * V_{IN}$ | | | V |
| /MR Input | | | | | | |
| V_{IH} | Input High Voltage | $V_{DD} = 3.1V$ | 1.7 | | | V |
| V_{IL} | Input Low Voltage | $V_{DD} = 3.1V$ | | | 0.4 | V |
| t_{PROP_MR} | Propagation Delay | $V_{/MR} < (V_{IL} - 100mV)$ | | 0.5 | 25 | μs |
| t_{MIN} | Minimum Input Pulse Width | $V_{/MR} < V_{IL}$ reset occurs | | 33 | | ns |
| I_{PU} | Internal Pull-up Current | | | 100 | | nA |

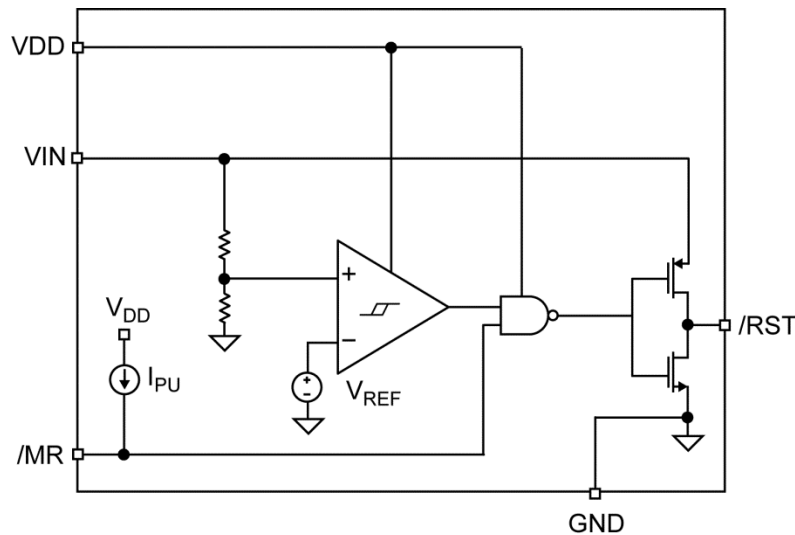
Notes:

- Exceeding the absolute maximum ratings may damage the device.
- The device is not guaranteed to function outside its operating ratings.
- Devices are ESD sensitive. Handling precautions are recommended. Human body model, 1.5kΩ in series with 100pF.
- Specification for packaged product only.

Timing Diagram



Functional Diagram



Application Information

Design and Product Advantages

The MIC2785's tiny 1.2mm x 1.2mm Thin QFN package combined with no external components offers several advantages compared to conventional voltage supervisors.

Tremendous savings are captured with decreased board size, reduced circuit complexity, and decreased bill of material (BOM) cost.

Power Supply Input (VDD)

The VDD pin provides a stable input power for the internal circuitry. This insures that the reference circuitry and monitoring circuitry have a stable voltage over the entire operating voltage range.

Supply bypassing is not required. However, bypassing may be valuable depending on the quality of the system voltage to which the VDD pin is connected. If bypassing is added, connect the capacitor(s) as closely as possible to the VDD pin. Place the lowest value capacitors closest to the VDD pin.

Under-Voltage Detector Input (VIN)

The largest portion of the monitoring circuitry is the VIN comparator. The VIN pin is connected to the non-inverting terminal of the comparator. The internal reference is connected to the inverting terminal of the comparator. A reset is triggered when VIN falls below

VREF. The VIN pin circuitry includes hysteresis to prevent /RST pin chattering due to noise. The VIN pin is relatively immune to very brief negative-going transients.

Reset Output (/RST)

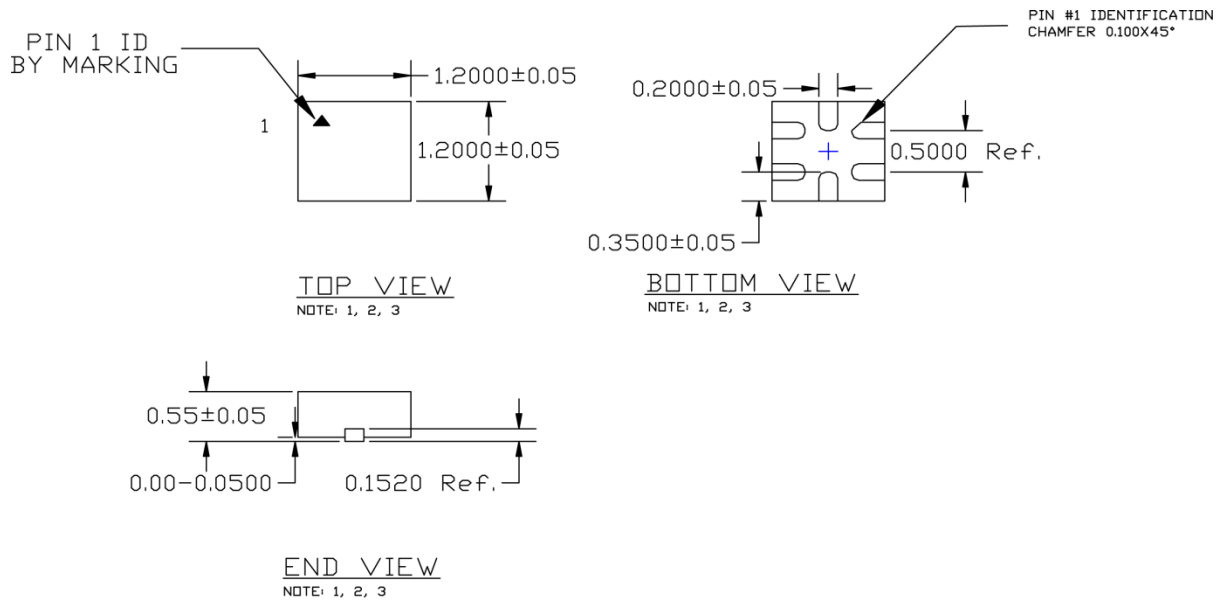
The /RST pin is a complementary push-pull output, which source and sink current. The reset output is asserted any time the VIN pin voltage is less than the threshold voltage ($V_{IN} < V_{TH}$) or the /MR pin is asserted. The /RST pin responds very quickly to reset conditions, typically asserting within 5 μ s of $V_{IN} < V_{TH}$.

The MIC2785 securely monitors the supply voltage of critical components like microcontrollers and microprocessors. With the MIC2785's /RST pin connected to the μ P's reset pin, the processor will be properly reset at power on and during power-down and brown-out conditions.

Manual Reset Input (/MR)

The /MR pin provides the ability to initiate a reset via external logic or a manual switch. This is in addition to the MIC2785's automatic voltage monitoring function. Asserting the /MR input to a logic low causes an immediate and unconditional reset. Assuming the VIN pin voltage is within tolerance when /MR is released (returns high), the reset output will be de-asserted. /MR is internally pulled-up to VDD and may be left floating/ open if unused.

Package Information and Recommended Landing Pattern⁽⁶⁾



- NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
 2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
 3. PIN #1 IS ON TOP WILL BE LASER MARKED
 4. GREEN COLORED RECTANGLES (SHADED AREAS) INDICATE SOLDER STENCIL OPENING ON EXPOSED METAL TRACE

6-Pin (1.2mm x 1.2mm) Thin QFN (FT)

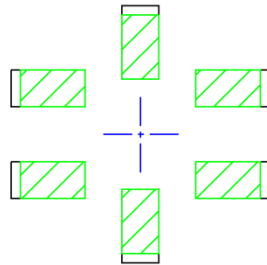
Note:

6. Package information is correct as of the publication date. For updates and most current information, go to www.micrel.com.

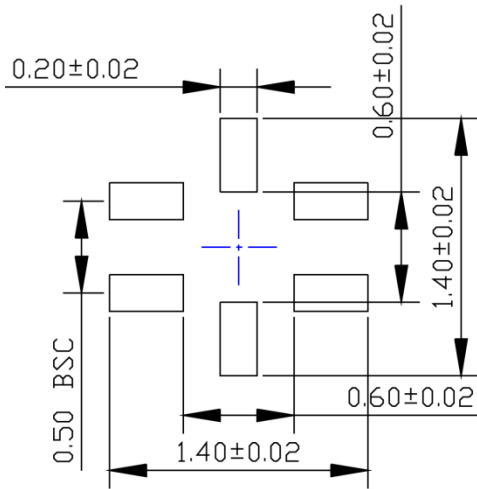
Package Information and Recommended Landing Pattern⁽⁶⁾ (Continued)

RECOMMENDED LAND PATTERN

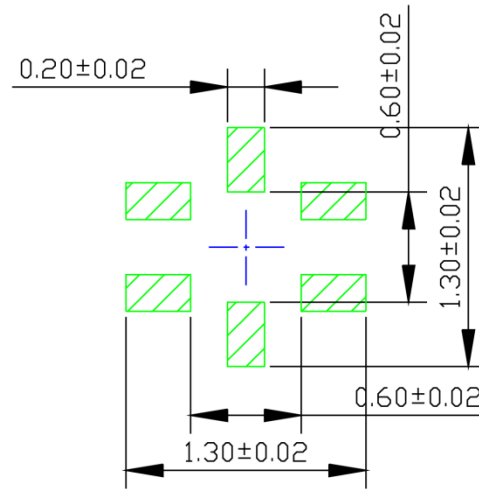
NOTE : 4



STACKED-UP



EXPOSED METAL TRACE



SOLDER STENCIL OPENING

MICREL, INC. 2180 FORTUNE DRIVE SAN JOSE, CA 95131 USA
TEL +1 (408) 944-0800 FAX +1 (408) 474-1000 WEB <http://www.micrel.com>

Micrel, Inc. is a leading global manufacturer of IC solutions for the worldwide high performance linear and power, LAN, and timing & communications markets. The Company's products include advanced mixed-signal, analog & power semiconductors; high-performance communication, clock management, MEMs-based clock oscillators & crystal-less clock generators, Ethernet switches, and physical layer transceiver ICs. Company customers include leading manufacturers of enterprise, consumer, industrial, mobile, telecommunications, automotive, and computer products. Corporation headquarters and state-of-the-art wafer fabrication facilities are located in San Jose, CA, with regional sales and support offices and advanced technology design centers situated throughout the Americas, Europe, and Asia. Additionally, the Company maintains an extensive network of distributors and reps worldwide.

Micrel makes no representations or warranties with respect to the accuracy or completeness of the information furnished in this datasheet. This information is not intended as a warranty and Micrel does not assume responsibility for its use. Micrel reserves the right to change circuitry, specifications and descriptions at any time without notice. No license, whether express, implied, arising by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Micrel's terms and conditions of sale for such products, Micrel assumes no liability whatsoever, and Micrel disclaims any express or implied warranty relating to the sale and/or use of Micrel products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

Micrel Products are not designed or authorized for use as components in life support appliances, devices or systems where malfunction of a product can reasonably be expected to result in personal injury. Life support devices or systems are devices or systems that (a) are intended for surgical implant into the body or (b) support or sustain life, and whose failure to perform can be reasonably expected to result in a significant injury to the user. A Purchaser's use or sale of Micrel Products for use in life support appliances, devices or systems is a Purchaser's own risk and Purchaser agrees to fully indemnify Micrel for any damages resulting from such use or sale.

© 2009 Micrel, Incorporated.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Micrel:](#)

[MIC2785-16YFT-TR](#)

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели,
кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: ocean@oceanchips.ru

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А