

Microprocessor Reset Circuit

Features

- Precision Voltage Monitor for 3.3V Power Supplies
- Specifically Tailored to the AMD Elan SC400/410
- /RESET Remains Valid with V_{CC} as Low as 1V
- 5 μ A Typical Supply Current
- 790 ms Minimum Reset Pulse Width
- Manual Reset Input
- Available in a 4-Lead SOT-143 Package

Applications

- Portable Equipment
- Intelligent Instruments
- Critical Microprocessor Power Monitoring
- Printers/Computers
- Embedded Controllers

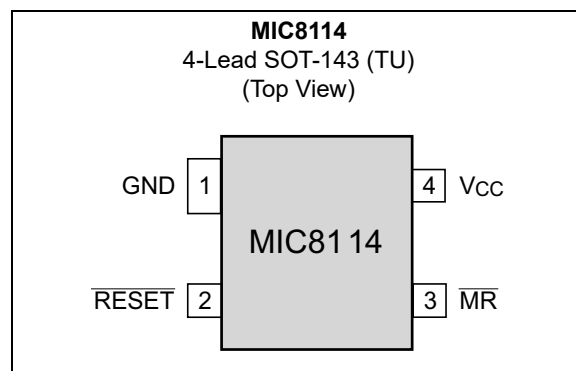
General Description

The MIC8114 is an inexpensive microprocessor supervisory circuit that monitors the power supply in microprocessor-based systems.

The function of this device is to assert a reset if the power supply drops below a designated reset threshold level or if /MR is forced low.

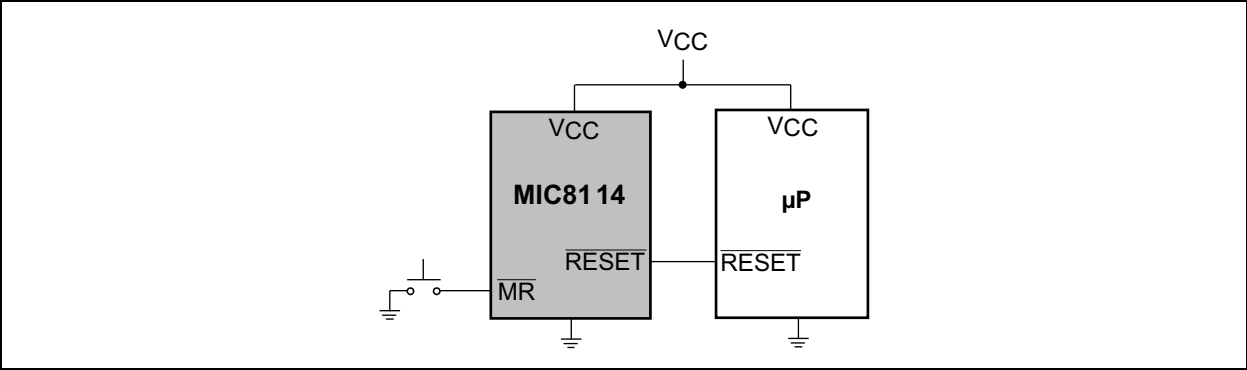
The MIC8114 has an active-low /RESET output. The reset output is ensured to remain asserted for a minimum of 790 ms after V_{CC} has risen above the designated reset threshold level. The MIC8114 comes in a 4-lead SOT-143 package.

Package Type

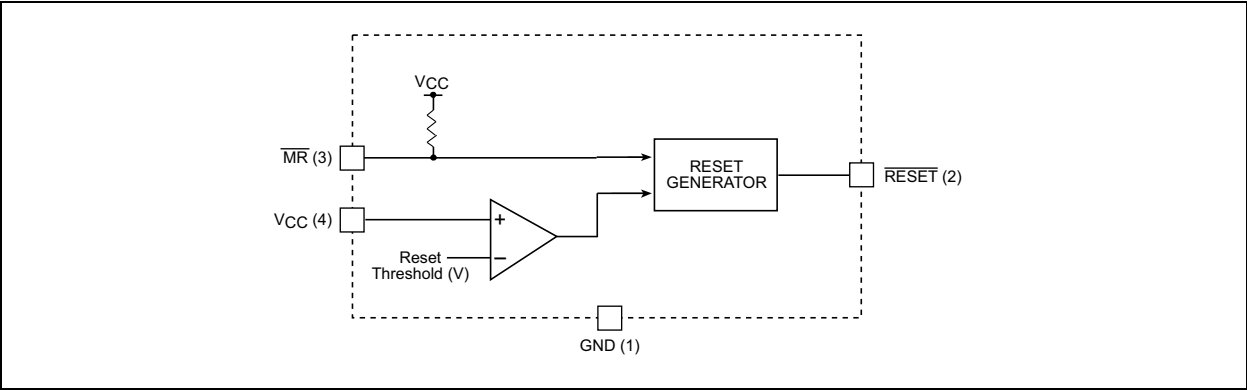


MIC8114

Typical Application Circuit



Functional Block Diagram



1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings †

| | |
|--------------------------------------|------------------------------|
| Terminal Voltage (V_{CC})..... | –0.3V to +6.0V |
| Terminal Voltage (/MR)..... | –0.3V to ($V_{CC} + 0.3V$) |
| Input Current (V_{CC} , /MR)..... | 20 mA |
| Output Current (/RESET)..... | 20 mA |
| Rate of Rise (V_{CC})..... | 100V/ μ s |
| ESD Rating (Note 1)..... | 3 kV |

Operating Ratings ‡

| | |
|------------------------------------------------------|--------|
| Power Dissipation ($T_A = +70^\circ\text{C}$)..... | 320 mW |
|------------------------------------------------------|--------|

† **Notice:** Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operational sections of this specification is not intended. Exposure to maximum rating conditions for extended periods may affect device reliability.

‡ **Notice:** The device is not guaranteed to function outside its operating ratings.

Note 1: Devices are ESD sensitive. Handling precautions recommended. Human body model, 1.5 k Ω in series with 100 pF.

ELECTRICAL CHARACTERISTICS

Electrical Characteristics: For typical values, $V_{CC} = 3.3V$; $T_A = +25^\circ\text{C}$, **bold** values valid for $-40^\circ\text{C} \leq T_A \leq +85^\circ\text{C}$; unless noted.

| Parameter | Symbol | Min. | Typ. | Max. | Units | Conditions |
|-------------------------|-----------|---------------------------------------|------|----------------------------------------|---------------|------------------------------------------------------------------------------------------------|
| Operating Voltage Range | V_{CC} | 1 | — | 5.5 | V | $T_A = -40^\circ\text{C}$ to 85°C |
| Supply Current | I_{CC} | — | 5 | 15 | μA | — |
| Reset Voltage Threshold | V_{TH} | 3.00 | 3.08 | 3.15 | V | — |
| Reset Timeout Period | t_{RST} | 790 | 1200 | 1800 | ms | — |
| /RESET Output Voltage | V_{OH} | $0.8 \times V_{CC}$ | — | — | V | $I_{SOURCE} = 500 \mu\text{A}$ |
| /RESET Output Voltage | V_{OL} | — | — | 0.3 | V | $V_{CC} = V_{TH(MIN)}$, $I_{SINK} = 1.2 \text{ mA}$ |
| | | — | — | 0.3 | | $V_{CC} = 1V$, $I_{SINK} = 50 \mu\text{A}$, $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$ |
| /MR Minimum Pulse Width | — | 10 | — | — | μs | — |
| /MR to Reset Delay | — | — | 0.5 | — | μs | — |
| /MR Input Threshold | V_{IH} | $0.7 \times V_{CC}$ | — | — | V | — |
| /MR Input Threshold | V_{IL} | — | — | $0.25 \times V_{CC}$ | V | — |
| /MR Pull-Up Resistance | — | 10 | 20 | 30 | k Ω | — |
| /MR Glitch Immunity | — | — | 100 | — | ns | — |

TEMPERATURE SPECIFICATIONS

| Parameters | Sym. | Min. | Typ. | Max. | Units | Conditions |
|-----------------------------|-------------------|------|------|------|-------|--------------------|
| Temperature Ranges | | | | | | |
| Operating Temperature Range | T _A | −40 | — | +85 | °C | — |
| Storage Temperature | T _S | −65 | — | +150 | °C | — |
| Lead Temperature | T _{LEAD} | — | — | +300 | °C | Soldering, 10 sec. |

Timing Diagram

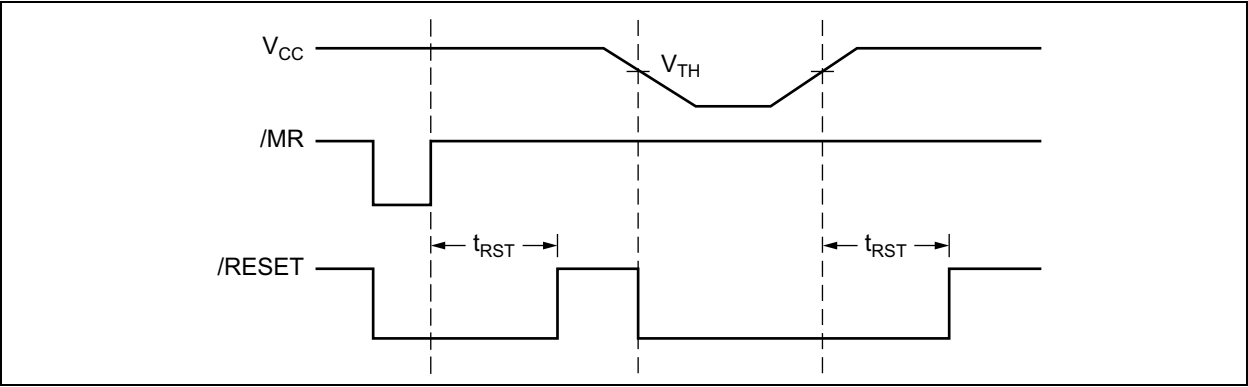


FIGURE 1-1: Reset Timing Diagram.

2.0 PIN DESCRIPTIONS

The descriptions of the pins are listed in [Table 2-1](#).

TABLE 2-1: PIN FUNCTION TABLE

| Pin Number | Pin Name | Description |
|------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | GND | IC ground pin. |
| 2 | /RESET | /RESET goes low if either V_{CC} falls below the supply reset threshold voltage or if /MR is asserted. /RESET remains asserted for one reset timeout period after both V_{CC} exceeds the supply reset threshold voltage and /MR is deasserted. |
| 3 | /MR | Manual Reset Input. A logic low on /MR forces a reset. The reset will remain asserted as long as /MR is held low and for one reset timeout period after /MR goes high. This input can be shorted to ground via a switch or driven from CMOS or TTL logic. Pulled high internally through a 20 k Ω resistor. Float if unused. |
| 4 | V_{CC} | Power supply input. |

3.0 APPLICATION INFORMATION

3.1 Microprocessor Reset

The /RESET pin is asserted whenever V_{CC} falls below the reset threshold voltage. The reset pin remains asserted for a period of 790 ms after V_{CC} has risen above the reset threshold voltage. The reset function ensures the microprocessor is properly reset and powers up into a known condition after a power failure. /RESET will remain valid with V_{CC} as low as 1V.

3.2 V_{CC} Transients

The MIC8114 is relatively immune to the negative-going V_{CC} glitches below the reset threshold. Typically, a negative-going transient 125 mV below the reset threshold with a duration of 20 μ s or less will not cause a reset.

3.3 /RESET Valid at Low Voltage

A resistor can be added from the /RESET pin to ground to ensure the /RESET output remains low with V_{CC} down to 0V. A 100 k Ω resistor connected from /RESET to ground is recommended. The resistor should be large enough not to load the /RESET output and small enough to pull-down any stray leakage currents.

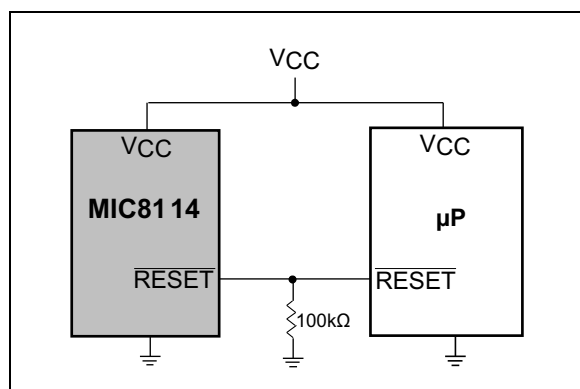


FIGURE 3-1: /RESET Valid to $V_{CC} = 0V$.

4.0 PACKAGING INFORMATION

4.1 Package Marking Information

4-Lead SOT-143*
(Front)

XX

Example

NV

4-Lead SOT-143*
(Back)

MNNN

Example

95RF

Legend:

XX...X

Y

YY

WW

NNN

(e3)

*

•, ▲, ▼

Product code or customer-specific information

Year code (last digit of calendar year)

Year code (last 2 digits of calendar year)

Week code (week of January 1 is week '01')

Alphanumeric traceability code

Pb-free JEDEC® designator for Matte Tin (Sn)

This package is Pb-free. The Pb-free JEDEC designator (e3) can be found on the outer packaging for this package.

Pin one index is identified by a dot, delta up, or delta down (triangle mark).

Note:

In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for customer-specific information. Package may or may not include the corporate logo.

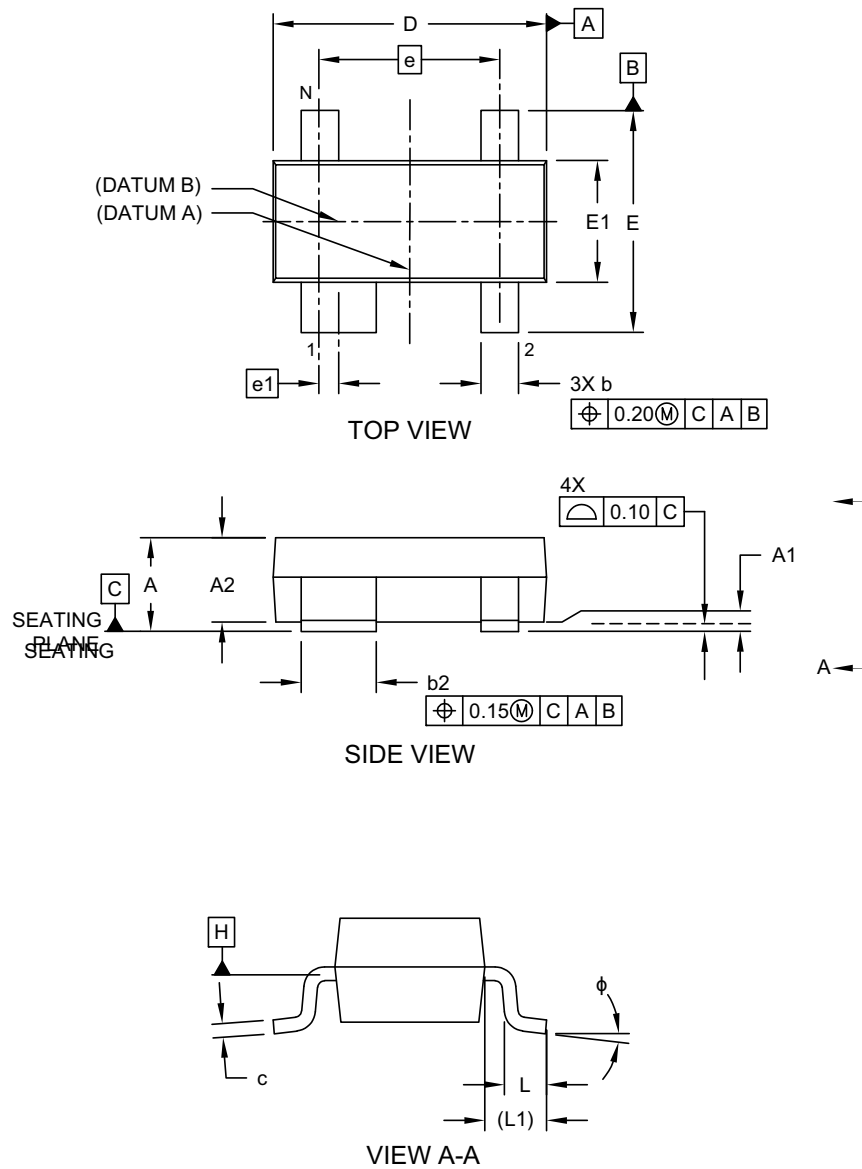
Underbar (_) symbol may not be to scale.

Note: If the full seven-character YYWWNNN code cannot fit on the package, the following truncated codes are used based on the available marking space:
6 Characters = YWWNNN; 5 Characters = WWNNN; 4 Characters = WNNN; 3 Characters = NNN;
2 Characters = NN; 1 Character = N

4-Lead Plastic Small Outline Transistor (DAA) [SOT-143]

Micrel Legacy Package

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

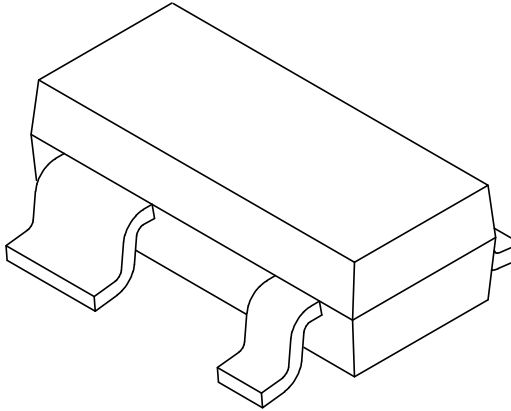


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4-Lead Plastic Small Outline Transistor (DAA) [SOT-143] Micrel Legacy Package

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



| Dimension Limits | Units | MILLIMETERS | | |
|----------------------|--------|-------------|------|------|
| | | MIN | NOM | MAX |
| Number of Pins | N | 4 | | |
| Pitch | e | 1.90 BSC | | |
| Pin 1 Offset | e1 | 0.20 BSC | | |
| Overall Height | A | 0.89 | 1.00 | 1.14 |
| Standoff ϕ | A1 | 0.013 | - | 0.20 |
| Overall Width | E | 2.10 | 2.37 | 2.64 |
| Molded Package Width | E1 | 1.20 | 1.30 | 1.40 |
| Overall Length | D | 2.72 | 2.92 | 3.04 |
| Foot Length | L | 0.21 | 0.31 | 0.41 |
| Footprint | L1 | 0.54 REF | | |
| Foot Angle | ϕ | 0° | - | 3° |
| Lead Thickness | c | - | .10 | - |
| Lead 1 Width | b1 | 0.69 | - | 0.94 |
| Leads 2, 3 & 4 Width | b | 0.30 | - | 0.52 |

Notes:

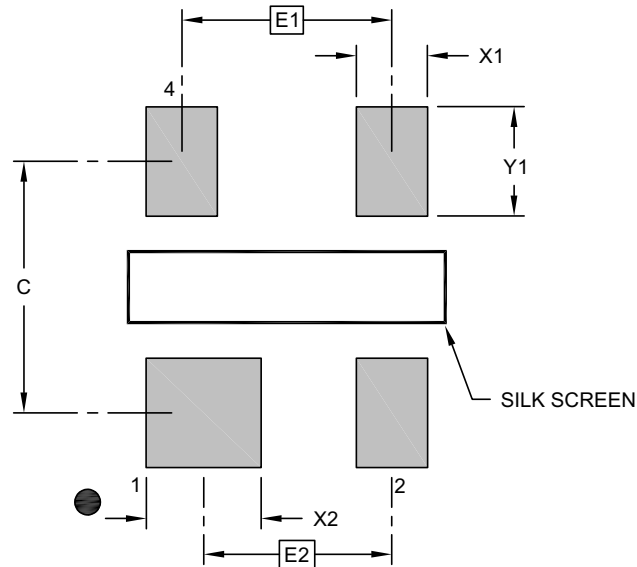
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127mm per side.
- Dimensioning and tolerancing per ASME Y14.5M
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.

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4-Lead Plastic Small Outline Transistor (DAA) [SOT-143] Micrel Legacy Package

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

| | Units | MILLIMETERS | | |
|-------------------------|-------|-------------|----------|------|
| | | MIN | NOM | MAX |
| Contact Pitch | E1 | | 1.90 BSC | |
| Contact Pitch | E2 | | 1.72 BSC | |
| Contact Pad Spacing | C | | 2.30 | |
| Contact Pad Width (X3) | X1 | | | 0.65 |
| Contact Pad Width | X2 | | | 1.05 |
| Contact Pad Length (X4) | Y1 | | | 1.10 |

Notes:

- Dimensioning and tolerancing per ASME Y14.5M
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

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APPENDIX A: REVISION HISTORY

Revision A (October 2022)

- Converted Micrel document MIC8114 to Microchip data sheet DS20006738A.
- Minor text changes throughout.
- Updated package outline drawing to current standard.

MIC8114

NOTES:

PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, contact your local Microchip representative or sales office.

| <u>Part Number</u> | <u>XX</u> | <u>X</u> | <u>-XX</u> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------|------------|
| Device | Package | Temperature Range | Media Type |
| <div> <div> Device: MIC8114: Microprocessor Reset Circuit </div> <div> Package: TU = 4-Lead SOT-143 </div> <div> Temperature Range: Y = −40°C to +85°C </div> <div> Media Type: TR = 3,000/Reel </div> </div> | | | |
| Examples: a) MIC8114TU-Y-TR: MIC8114, 4-Lead SOT-143, −40°C to +125°C Temperature Range, 3,000/Reel Note 1: Tape and Reel identifier only appears in the catalog part number description. This identifier is used for ordering purposes and is not printed on the device package. Check with your Microchip Sales Office for package availability with the Tape and Reel option. | | | |

MIC8114

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