MIC8115

Microprocessor Reset Circuit

Features

- Precision Voltage Monitor for 3.3V Power Supplies
- Specifically Tailored to the AMD Elan SC500 Series
- /RESET Remains Valid with V_{CC} as Low as 1.4V
- <15 µA Supply Current
- 1100 ms Minimum Reset Pulse Width
- Manual Reset Input
- Available in 4-Pin SOT-143 Package

Applications

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

General Description

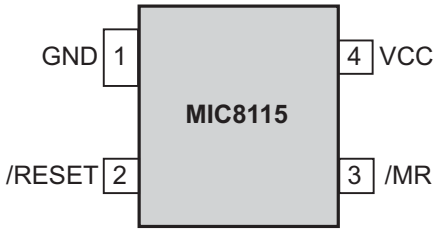
The MIC8115 is an inexpensive microprocessor supervisory circuit that monitors power supplies in microprocessor-based systems.

The function of the MIC8115 is to assert a reset if the power supply drops below a designated reset threshold level or if /MR is forced low.

The MIC8115 has an active-low /RESET output. The reset output is guaranteed to remain asserted for a minimum of 1100 ms after V_{CC} has risen above the designated reset threshold level. The MIC8115 comes in a 4-pin SOT-143 package.

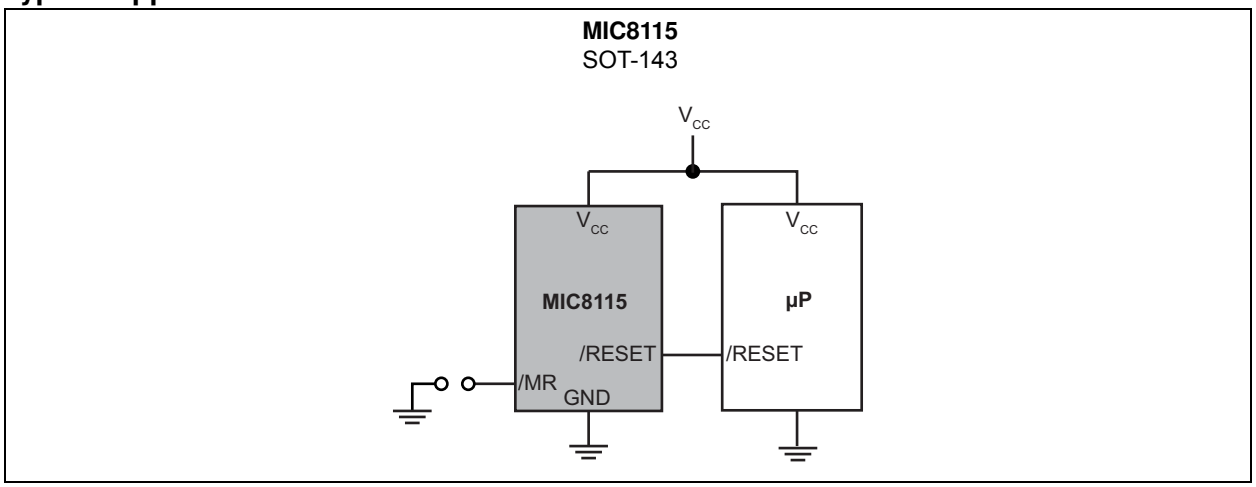
Package Type

MIC8115
4-Lead SOT-143 (TU)

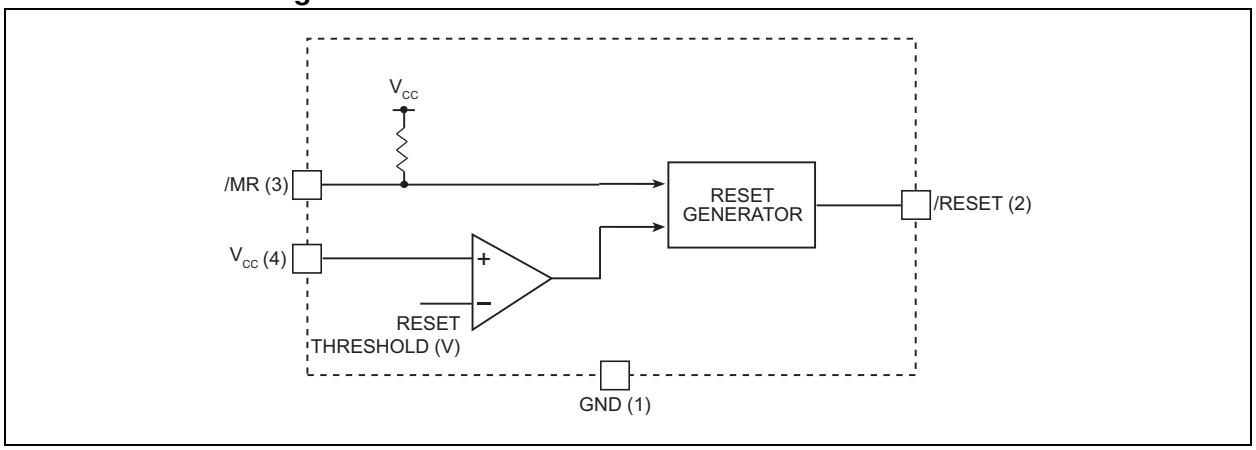


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Typical Application Circuit



Functional Block Diagram



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1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings †

Terminal Voltage
(V_{CC}) ..... –0.3V to +6.0V
(/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}) ..... 100 V/µs
ESD Rating, Note 1 ..... 3 kV

Operating Ratings ‡

Power Dissipation (T_A = +70°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 are recommended. Human body model, 1.5 kΩ in series with 100 pF.

TABLE 1-1: ELECTRICAL CHARACTERISTICS

Electrical Characteristics: For typical values, V_{CC} = 3.3V; T_A = +25°C, **bold** values indicate –40°C ≤ T_A ≤ +85°C, unless noted.

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Operating Voltage Range	V_{CC}	**1**	—	**5.5**	V	T_A = –40°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}	**1100**	1700	**2500**	ms	—
/RESET Output Voltage	V_{OH}	**0.8 x V_{CC}**	—	—	V	I_{SOURCE} = 500 µA
/RESET Output Voltage	V_{OL}	—	—	**0.3**	V	V_{CC} = $V_{TH(MIN)}$, I_{SINK} = 1.2 mA
		—	—	**0.3**		V_{CC} = 1V, I_{SINK} = 50 µA, T_A = –40°C to +85°C
/MR Minimum Pulse Width	—	**10**	—	—	µs	—
/MR to Reset Delay	—	—	0.5	—	µs	—
/MR Input Threshold	V_{IH}	**0.7 x V_{CC}**	—	—	V	—
	V_{IL}	—	—	**0.25 x V_{CC}**		—
/MR Pull-Up Resistance	—	**10**	20	**30**	kΩ	—
/MR Glitch Immunity	—	—	100	—	ns	—

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TEMPERATURE SPECIFICATIONS (Note 1)

Parameters	Sym.	Min.	Typ.	Max.	Units	Conditions
Temperature Ranges						
Operating Temperature Range	—	–40	—	+85	°C	—
Storage Temperature Range	T_S	–65	—	+150	°C	—
Lead Temperature	—	—	—	+300	°C	Soldering, 10s

Note 1: The maximum allowable power dissipation is a function of ambient temperature, the maximum allowable junction temperature and the thermal resistance from junction to air (i.e., T_A, T_J, θ_{JA}). Exceeding the maximum allowable power dissipation will cause the device operating junction temperature to exceed the maximum +85°C rating. Sustained junction temperatures above +85°C can impact the device reliability.

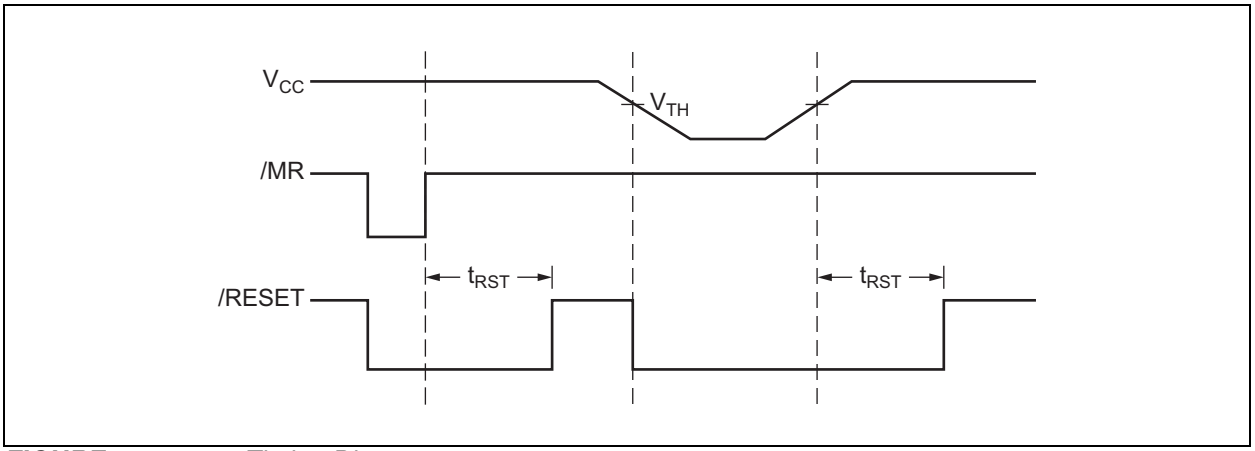


FIGURE 1-1: *Timing Diagram.*

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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 1100 ms (minimum) after both V_{CC} exceeds the supply reset threshold voltage and /MR is de-asserted.
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 (1100 ms, minimum) 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 kΩ resistor. Float if unused.
4	VCC	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 1100 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 1.4V.

3.2 VCC Transients

The MIC8115 is relatively immune to the negative-going V_{CC} glitches below the reset threshold. Typically, a negative-going transient 125 mV belt the reset threshold with duration of 20 µs or less will not cause a reset.

3.3 /RESET Valid at Low Voltage

A resistor can be added from the /RESET pin to the ground to ensure the /RESET output remains low with V_{CC} down to 0V. A 100 kΩ 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.

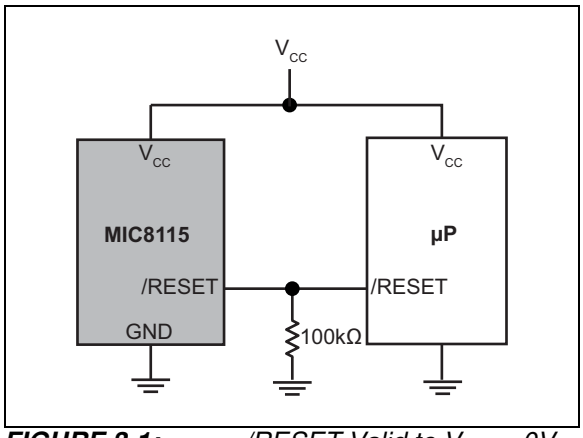


FIGURE 3-1: */RESET Valid to V_{CC} = 0V.*

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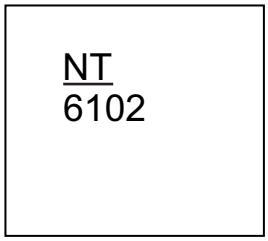
4.0 PACKAGING INFORMATION

4.1 Package Marking Information

4-Pin SOT-143*



Example



Legend:	XX...X	Product code or customer-specific information
	Y	Year code (last digit of calendar year)
	YY	Year code (last 2 digits of calendar year)
	WW	Week code (week of January 1 is week ‘01’)
	NNN	Alphanumeric traceability code
	(e3)	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).

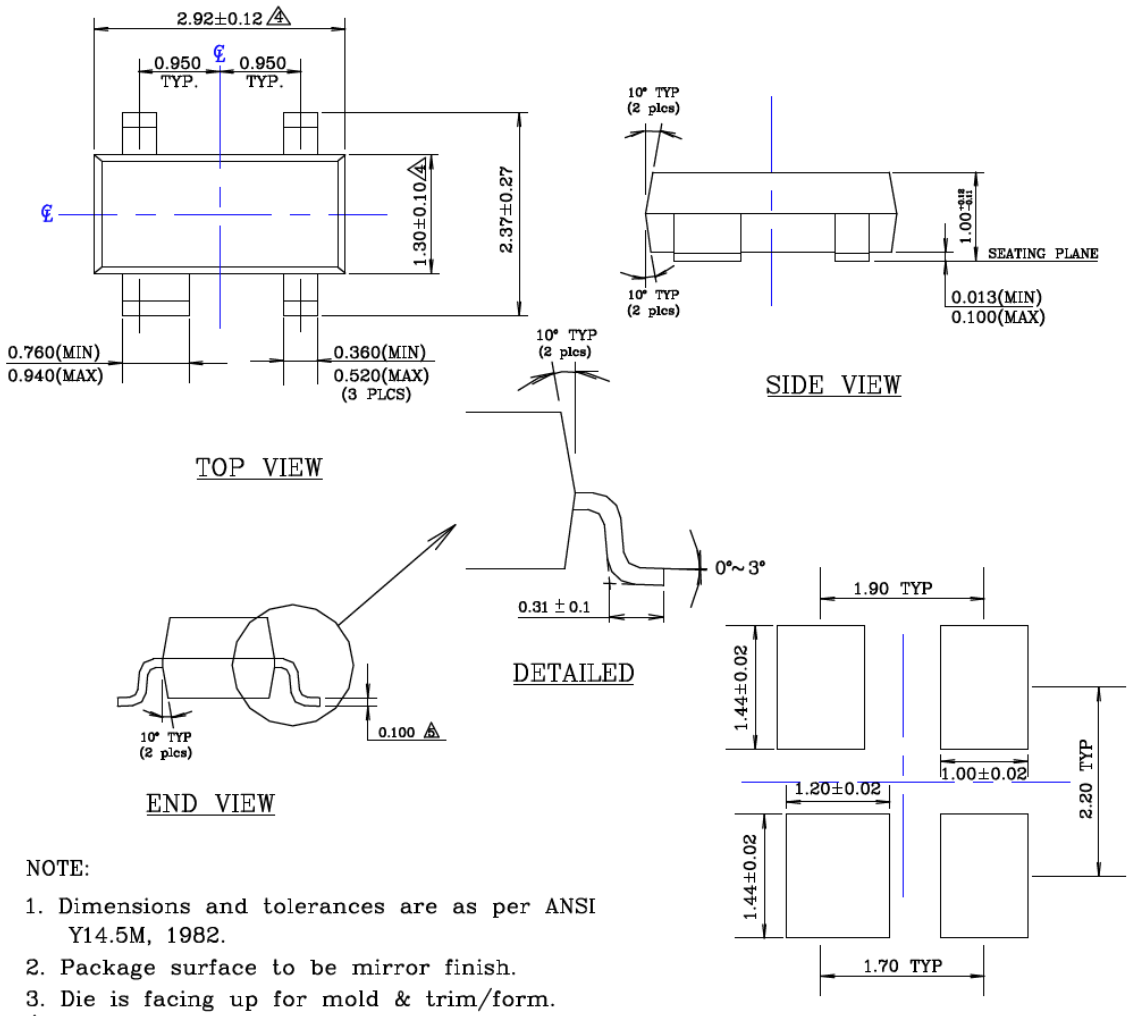
Note: In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for customer-specific information. Package may or may not include the corporate logo.

Underbar (_) and/or Overbar (¯) symbol may not be to scale.

4-Lead SOT-143 Package Outline and Recommended Land Pattern

TITLE
4 LEAD SOT143 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SOT143-4LD-PL-1	UNIT	MM



NOTE:

1. Dimensions and tolerances are as per ANSI Y14.5M, 1982.
2. Package surface to be mirror finish.
3. Die is facing up for mold & trim/form.
4. Dimension are exclusive of mold flash and gate burr.
5. Dimension are exclusive of solder plating.

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

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APPENDIX A: REVISION HISTORY

Revision A (August 2017)

- Converted Micrel document MIC8115 to Microchip data sheet DS20005829A.
- Minor text changes throughout.
- Corrected a pin numbering error in the Package Type image.

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PRODUCT IDENTIFICATION SYSTEM

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

PART NO.	XX	X	–XX
Device	Package	Temperature	Media Type

Device:	MIC8115:	Microprocessor Reset Circuit	
Package:	TU	=	4-Lead SOT-143
Temperature:	Y	=	–40°C to +85°C
Media Type:	TR	=	3,000/Reel

Examples:

a) MIC8115TUY-TR: Microprocessor Reset Circuit, 4-Lead SOT-143, –40°C to +85°C, 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.

NOTES:

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