ETC6315
Open-Drain µP Reset Circuit

Description

The ETC6315 is an inexpensive reset generator circuit that monitor power supplies in microprocessor based systems.

The function of this device is to assert a reset if either the power supply drops below a designated reset threshold level or $\overline{MR}$ is forced low. Several different reset threshold levels are available to accomodate 3V, 3.3V or 5V powered systems.

The ETC6315 has an active low, open-drain $\overline{RESET}$ output. The reset output is guaranteed to remain asserted for a minimum of either 20, 140, or 1100 ms after VCC has risen above the designated reset threshold level. The ETC6315 comes in a 4-pin SOT-143 package.

Pin Configuration

Top View

Typical Applications

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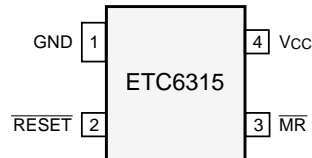- Critical Microprocessor Power Monitoring
- Printers/Computers
- Controllers

Features

- $\overline{RESET}$ Remains Valid with V_{CC} as Low as 1.4V
- Precision Voltage Monitor for 3V, 3.3V or 5V Power Supplies
- Available in 4-Pin SOT-143 Package
- <15µA Supply Current
- 20, 140, or 1100 ms Minimum Reset Pulse Widths Available
- Manual Reset Input

Ordering Information

Part	Package	Temp. Range
ETC6315-xxDyU	4-Lead SOT-143	-40°C to +85°C
ETC6315-xxDyD	Tested Die	0°C to +70°C

Replace xx with appropriate threshold code and y with appropriate delay code. See table on page 7 for details.

Typical Operating Circuit
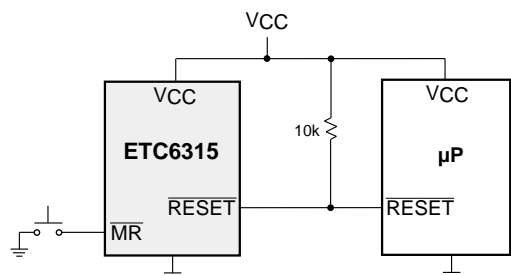
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Absolute Maximum Ratings

Terminal Voltage
  V_{CC} . . . . -0.3V to 6.0V
  $\overline{MR}$ . . . . -0.3V to (V_{CC} + 0.3V)
Input Current, V_{CC}, $\overline{MR}$ 20mA
Output Current, $\overline{RESET}$ 20mA
Rate of Rise, V_{CC} 100V/µs

Operating Temperature Range . . . .-40°C to 85°C
Storage Temperature Range . . . .-65°C to 150°C
Lead Temperature (Soldering - 10 sec.) . . . . 300°C
Power Dissipation (T_A = +70°C) 320mW

Stresses above those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent device failure. Functionality at or above these limits is not implied. Exposure to absolute maximum ratings for extended periods may affect device reliability. Operating ranges define those limits between which the functionality of the device is guaranteed.

Electrical Characteristics

V_{CC} = 2.5 to 5.5V, T_A = Operating Temperature Range, unless otherwise noted.

Parameter	Conditions	Min	Typ	Max	Units
Operating Voltage Range, V_{CC}		1.4		5.5	V
Supply Current, I_{CC}	V_{CC} = 5.5V, no load V_{CC} = 3.6V, no load		9 6	15 10	µA
Reset Voltage Threshold, V_{TH}	Note 1	V_{TH} - 2.5%	V_{TH}	V_{TH} + 2.5%	V
Reset Timeout Period		20 140 1100	28 200 1500	44 320 2500	ms ms ms
$\overline{RESET}$ Output Voltage, V_{OL}	V_{CC} > 4.25V, I_{Sink} = 3.2mA V_{CC} > 2.5V, I_{Sink} = 1.2mA V_{CC} > 1.4V, I_{Sink} = 50µA			0.4 0.3 0.3	V
$\overline{RESET}$ Output Leakage	$\overline{RESET}$ deasserted			1	µA
$\overline{MR}$ Minimum Pulse Width		10			µs
$\overline{MR}$ to Reset Delay			0.5		µs
$\overline{MR}$ Input Threshold, V_{IH}	V_{TH} > 4.0V V_{TH} < 4.0V	2.3 0.7 X V_{CC}			V V
$\overline{MR}$ Input Threshold, V_{IL}	V_{TH} > 4.0V V_{TH} < 4.0V			0.8 0.25 X V_{CC}	V V
$\overline{MR}$ Pull-Up Resistance		10	20	30	kΩ
$\overline{MR}$ Glitch Immunity			100		ns

Note 1: Various reset threshold option available. See Ordering Information on page 7 for details.

Pin Functions

| Pin No.	Pin Name	Description
GND	1	IC Ground Pin.
$\overline{\text{RESET}}$	2	$\overline{\text{RESET}}$ goes low if V_{CC} falls below the reset threshold and remains asserted for one reset timeout period after V_{CC} exceeds the reset threshold.
$\overline{\text{MR}}$	3	Manual reset input. A logic low on $\overline{\text{MR}}$ forces a reset. The reset will remain asserted as long as $\overline{\text{MR}}$ is held low and for one reset timeout period after $\overline{\text{MR}}$ goes high. This input can be shorted to ground via a switch or driven from CMOS or TTL logic. Float if unused.
V_{CC}	4	Power supply input, 3V, 3.3V or 5V.

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Block Diagram
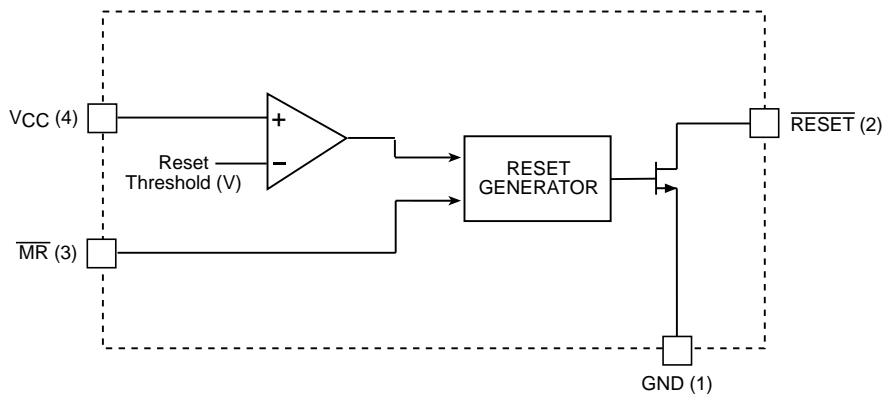
Figure 1. ETC6315 Block Diagram

Circuit Description

Microprocessor Reset

The $\overline{RESET}$ pin is asserted whenever V_{CC} falls below the reset threshold voltage or if $\overline{MR}$ (manual reset) is forced low. The $\overline{RESET}$ pin remains asserted for the duration of the reset timeout period after V_{CC} has risen above the reset threshold voltage or $\overline{MR}$ has returned high. The reset function ensures the microprocessor is properly reset and powers up into a known condition after a power failure. $\overline{RESET}$ will remain valid with V_{CC} as low as 1.4V.

The RESET output is a simple open-drain N-channel MOSFET structure. A pull-up resistor must be used to pull this output up to some voltage. For most applications, this voltage will be the same power supply that supplies VCC to the ETC6315. It is possible however to tie this resistor to some other voltage. This will allow the ETC6315 to monitor one voltage while level-shifting the RESET output to some other voltage. The pullup voltage must be limited to 6.0V or less to avoid damage to the ETC6315. The resistor must be small enough to supply
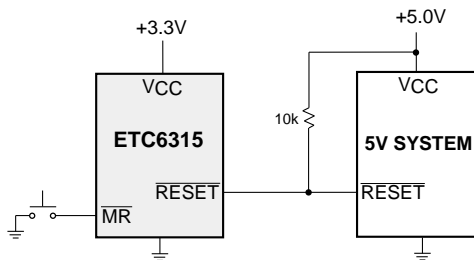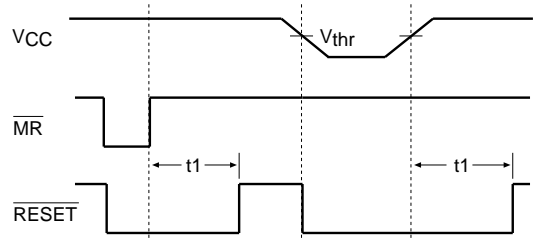

Figure 2. Reset Timing Diagram

current to the inputs and leakage paths that are driven by the RESET output.

As VCC drops to 0V, the ETC6315 will no longer be able to pull the RESET output low. At this point, the pullup resistor will pull the output high. The value of the pullup resistor and the voltage it is connected to will affect the point at which this happens.

Because the RESET output is open-drain, several reset sources can be wire-ORed in parallel to allow resets from multiple sources.

V_{CC} Transients

The ETC6315 is relatively immune to negative-going V_{CC} glitches below the reset threshold. Typically, a negative-going transient 125mV below the reset threshold with a duration of 25µs or less will not cause an unwanted reset. If additional transient immunity is needed, a bypass capacitor can be placed as close as possible to the ETC6315.

Figure 3. ETC6315 Used in a Mutiple Supply System

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Alternate Source Cross Reference Guide

Industry P/N	ETC Direct Replacement
MAX6315US26D2-T	ETC6315-26D2U
MAX6315US29D2-T	ETC6315-29D2U
MAX6315US31D2-T	ETC6315-31D2U
MAX6315US40D2-T	ETC6315-40D2U
MAX6315US10D2-T	ETC6315-41D2U
MAX6315US44D2-T	ETC6315-44D2U
MAX6315US46D2-T	ETC6315-46D2U
MAX6315US26D3-T	ETC6315-26D3U
MAX6315US29D3-T	ETC6315-29D3U
MAX6315US31D3-T	ETC6315-31D3U
MAX6315US40D3-T	ETC6315-40D3U
MAX6315US41D3-T	ETC6315-41D3U
MAX6315US44D3-T	ETC6315-44D3U
MAX6315US46D3-T	ETC6315-46D3U
MAX6315US26D4-T	ETC6315-26D4U
MAX6315US29D4-T	ETC6315-29D4U
MAX6315US31D4-T	ETC6315-31D4U
MAX6315US40D4-T	ETC6315-40D4U
MAX6315US41D4-T	ETC6315-41D4U
MAX6315US44D4-T	ETC6315-44D4U
MAX6315US46D4-T	ETC6315-46D4U

Ordering Information

PART	Nominal V_{TH} (V)	Min t_{RP} (ms)	Top Mark
ETC6315-26D2U	2.63	20	NYxx
ETC6315-29D2U	2.93	20	zzxx
ETC6315-31D2U	3.08	20	zzxx
ETC6315-40D2U	4.00	20	zzxx
ETC6315-41D2U	4.12	20	zzxx
ETC6315-44D2U	4.38	20	zzxx
ETC6315-46D2U	4.63	20	zzxx
ETC6315-26D3U	2.63	140	zzxx
ETC6315-29D3U	2.93	140	zzxx
ETC6315-31D3U	3.08	140	zzxx
ETC6315-40D3U	4.00	140	zzxx
ETC6315-41D3U	4.12	140	zzxx
ETC6315-44D3U	4.38	140	zzxx
ETC6315-46D3U	4.63	140	NXxx
ETC6315-26D4U	2.63	1100	zzxx
ETC6315-29D4U	2.93	1100	zzxx
ETC6315-31D4U	3.08	1100	zzxx
ETC6315-40D4U	4.00	1100	zzxx
ETC6315-41D2U	4.12	1100	zzxx
ETC6315-44D2U	4.38	1100	zzxx
ETC6315-46D4U	4.63	1100	NZxx

The first two characters in the top mark identify the part. Parts not yet assigned an identification code are shown as 'zz'. The last two characters are used for lot tracking purposes.
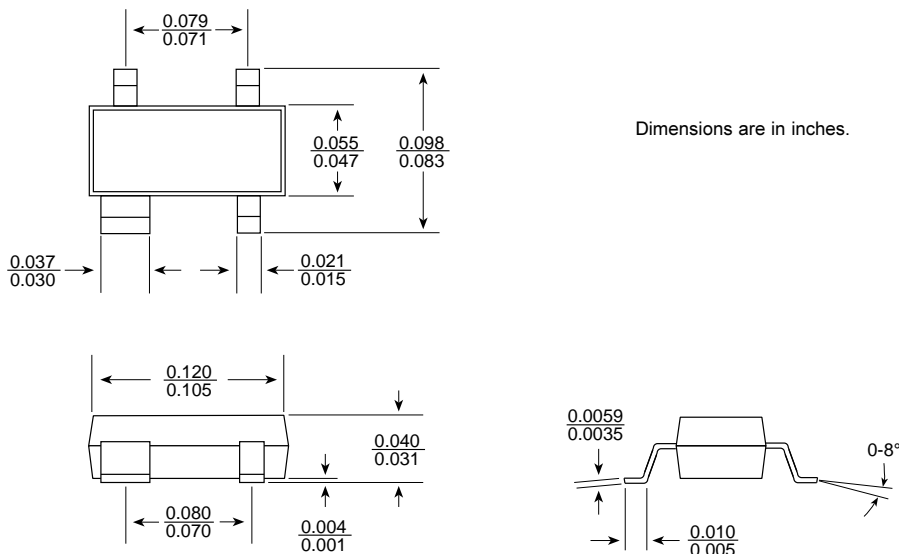
All devices available in tap-and-reel only. Contact factory for availability and minimum order quantities.
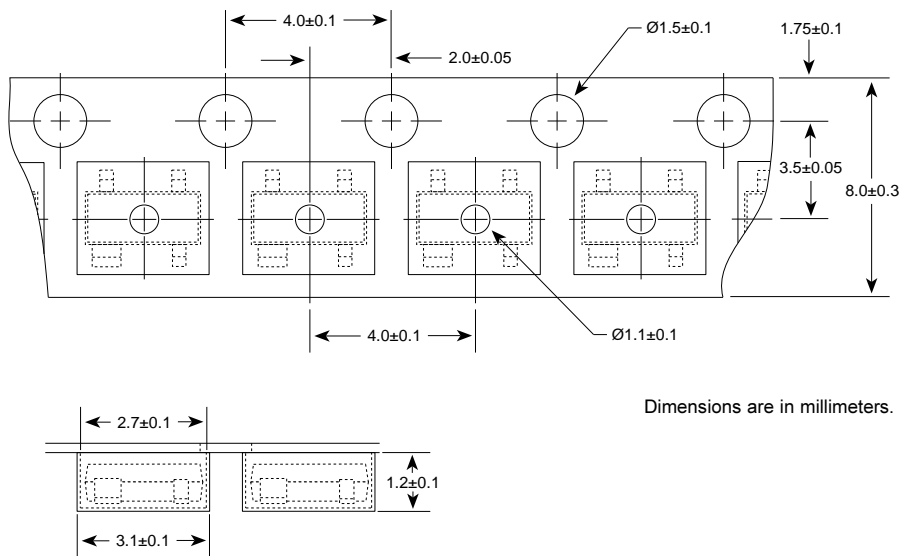
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Packaging Information

U Package, 4-Pin SOT-143 Small-Outline Transistor Package

0.079 / 0.071

0.055 / 0.047

0.098 / 0.083

0.037 / 0.030

0.021 / 0.015

Dimensions are in inches.

0.120 / 0.105

0.040 / 0.031

0.080 / 0.070

0.004 / 0.001

0.0059 / 0.0035

0-8°

0.010 / 0.005

Tape and Reel Information

4.0±0.1

2.0±0.05

Ø1.5±0.1

1.75±0.1

3.5±0.05

8.0±0.3

4.0±0.1

Ø1.1±0.1

2.7±0.1

1.2±0.1

3.1±0.1

Dimensions are in millimeters.

Electronic Technology

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