ETC809/ETC810
Microprocessor Reset Circuits

Description

The ETC809/ETC810 are inexpensive microprocessor supervisory circuits that monitor power supplies in microprocessor based systems.

The function of these devices is to assert a reset if the power supply drops below a designated reset threshold level. Several different reset threshold levels are available to accomodate 3V, 3.3V or 5V powered systems.

The ETC809 has an active low $\overline{\text{RESET}}$ output, while the ETC810 offers an active high RESET output. The reset output is guaranteed to remain asserted for a minimum of 140ms after VCC has risen above the designated reset threshold level. The ETC809/ETC810 come in a 3-pin SOT-23 package.

Typical Applications

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

Reset Threshold Voltage (V)	Device Suffix
4.63	L
4.38	M
4.00	J
3.08	T
2.93	S
2.63	R

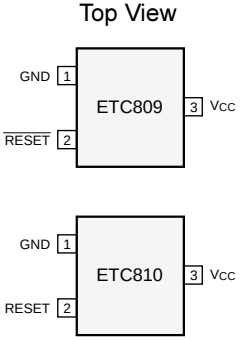
Ordering Information

Part	Package	Temp. Range
ETC809_U	3-Lead SOT23	-40°C to +85°C
ETC809_D	Tested Die	0°C to +70°C
ETC810_U	3-Lead SOT23	-40°C to +85°C
ETC810_D	Tested Die	0°C to +70°C

Place the device suffix of desired reset threshold voltage from table above in blank to complete the part number.

Pin Configuration

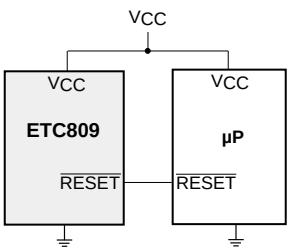
Top View



Features

- $\overline{\text{RESET}}$ Remains Valid with V_{CC} as Low as 1.4V
- Precision Voltage Monitor for 3V, 3.3V or 5V Power Supplies
- Available in 3-Pin SOT23 Package
- <15µA Supply Current
- 140ms Minimum Reset Pulse Width
- No External Components Required

Typical Operating Circuit



Absolute Maximum Ratings

Terminal Voltage
V_{CC} . . . . . -0.3V to 6.0V

Input Current, V_{CC}, ... 20mA
Output Current, $\overline{RESET}$, $\overline{RESET}$ 20mA
Rate of Rise, V_{CC} 100V/µs

Operating Temperature Range
ETC809_U, ETC810_U . . . . . -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} = 5V for ETC8__L/M/J, V_{CC} = 3.3V for ETC8__S/T, V_{CC} = 3V for ETC8__R, T_A = Operating Temperature Range, unless otherwise noted.

Parameter	Conditions	Min	Typ	Max	Units
Operating Voltage Range, V_{CC}	T_A = 0°C to 70°C T_A = -40°C to 85°C	1.4 1.6		5.5 5.5	V
Supply Current, I_{CC}	ETC809L/M/J, ETC810L/M/J V_{CC} < 3.6V, ETC809R/S/T, ETC810R/S/T		9 6	15 10	µA
Reset Voltage Threshold, V_{TH}	ETC809L, ETC810L ETC809M, ETC810M ETC809J, ETC810J ETC809T, ETC810T ETC809S, ETC810S ETC809R, ETC810R	4.50 4.25 3.89 3.00 2.85 2.55	4.63 4.38 4.00 3.08 2.93 2.63	4.75 4.50 4.10 3.15 3.00 2.70	V
Reset Timeout Period		140	240	560	ms
$\overline{RESET}$ Output Voltage, V_{OH}	I_{Source} = 800µA, ETC809L/M/J I_{Source} = 500µA, ETC809R/S/T	V_{CC} - 1.5V 0.8 X V_{CC}			V
$\overline{RESET}$ Output Voltage, V_{OL}	V_{CC}=V_{TH} Min., I_{Sink}=3.2mA, ETC809L/M/J V_{CC}=V_{TH} Min., I_{Sink} =1.2mA, ETC809R/S/T V_{CC}>1.4V, I_{Sink} =50µA, T_A = 0°C to 70°C V_{CC}>1.6V, I_{Sink} =50µA, T_A = -40°C to 85°C			0.4 0.3 0.3 0.3	V
RESET Output Voltage, V_{OH}	1.8V < V_{CC} < V_{TH} Min., I_{Source} = 150µA	0.8 X V_{CC}			V
RESET Output Voltage, V_{OL}	I_{Sink}=3.2mA, ETC810L/M/J I_{Sink}=1.2mA, ETC810R/S/T			0.4 0.3	V

Pin Functions

Pin Name	Pin No. ETC809	Pin No. ETC810	
GND	1	1	IC Ground Pin.
$\overline{\text{RESET}}$	2	N/A	$\overline{\text{RESET}}$ goes low if V_{CC} falls below the reset threshold and remains asserted for one reset timeout period (140ms min.) after V_{CC} exceeds the reset threshold.
RESET	N/A	2	RESET goes high if V_{CC} falls below the reset threshold and remains asserted for one reset timeout period (140ms min.) after V_{CC} exceeds the reset threshold.
V_{CC}	3	3	Power supply input, 3V, 3.3V or 5V.

Block Diagram

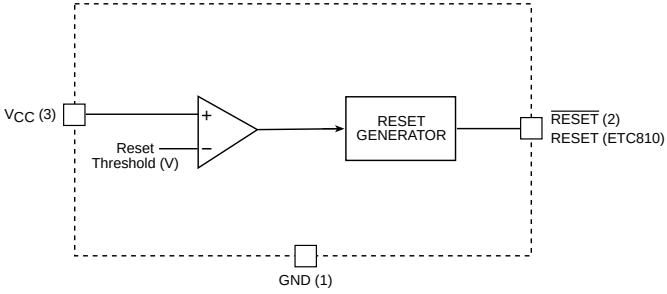


Figure 1. ETC809/810 Block Diagram

Circuit Description

Microprocessor Reset

The $\overline{\text{RESET}}$ pin is asserted whenever V_{CC} falls below the reset threshold voltage. The reset pin remains asserted for a period of 240ms 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. $\overline{\text{RESET}}$ will remain valid with V_{CC} as low as 1.4V.

V_{CC} Transients

The ETC809/ETC810 are 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 50µs (25µs for ETC8__R/S/T) or less will not cause an unwanted reset.

Interfacing to Bidirectional Reset Pins

The ETC809/ETC810 can interface with µPs with bidirectional reset pins by connecting a 4.7KΩ resistor in series with the ETC809/ETC810 output and the µP reset pin.

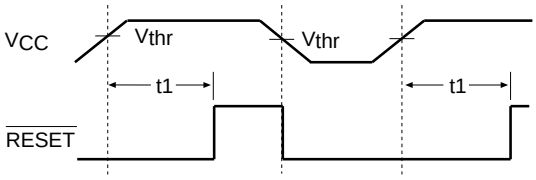


Figure 2. Reset Timing Diagram

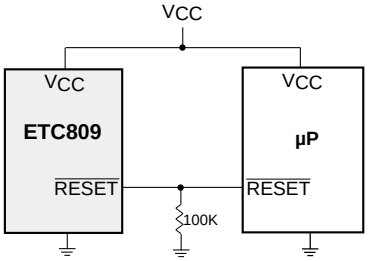


Figure 3. RESET Valid to V_{CC} = OV

$\overline{\text{RESET}}$ Valid to 0V

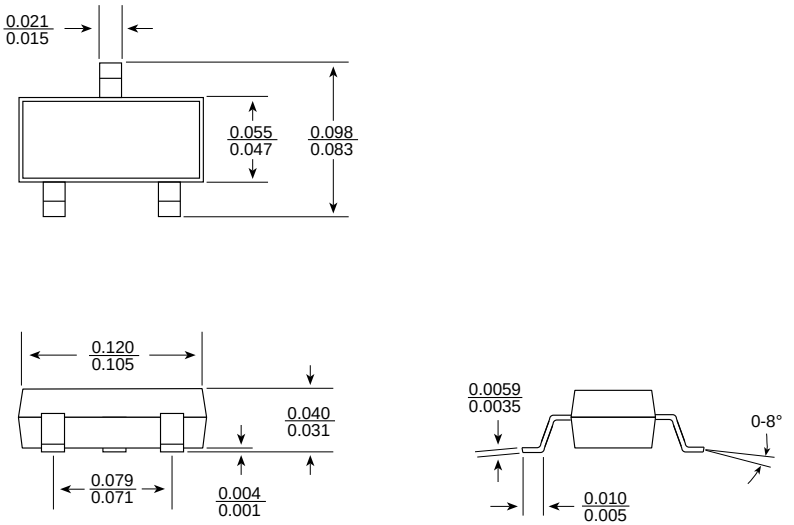
A resistor can be added from the $\overline{\text{RESET}}$ pin to ground to ensure the $\overline{\text{RESET}}$ output remains low with V_{CC} down to 0V. A 100KΩ resistor connected from $\overline{\text{RESET}}$ to ground is recommended. The size of the resistor should be large enough to not load the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

Alternate Source Cross Reference Guide

Industry P/N	ETC Direct Replacement
MAX809JEUR-T	ETC809JU
MAX809LEUR-T	ETC809LU
MAX809MEUR-T	ETC809MU
MAX809REUR-T	ETC809RU
MAX809SEUR-T	ETC809SU
MAX809TEUR-T	ETC809TU
MAX810JEUR-T	ETC810JU
MAX810LEUR-T	ETC810LU
MAX810MEUR-T	ETC810MU
MAX810REUR-T	ETC810RU
MAX810SEUR-T	ETC810SU
MAX810TEUR-T	ETC810TU

Packaging Information

U Package, 3-Pin SOT-23 Small-Outline Transistor Package



Dimensions are in inches.

Device Marking Information

Lot Code

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IJXX = ETC809J
ILXX = ETC809L
IMXX = ETC809M
IRXX = ETC809R
ISXX = ETC809S
ITXX = ETC809T
JJXX = ETC810J
JLXX = ETC810L
JMXX = ETC810M
JRXX = ETC810R
JSXX = ETC810S
JTXX = ETC810T
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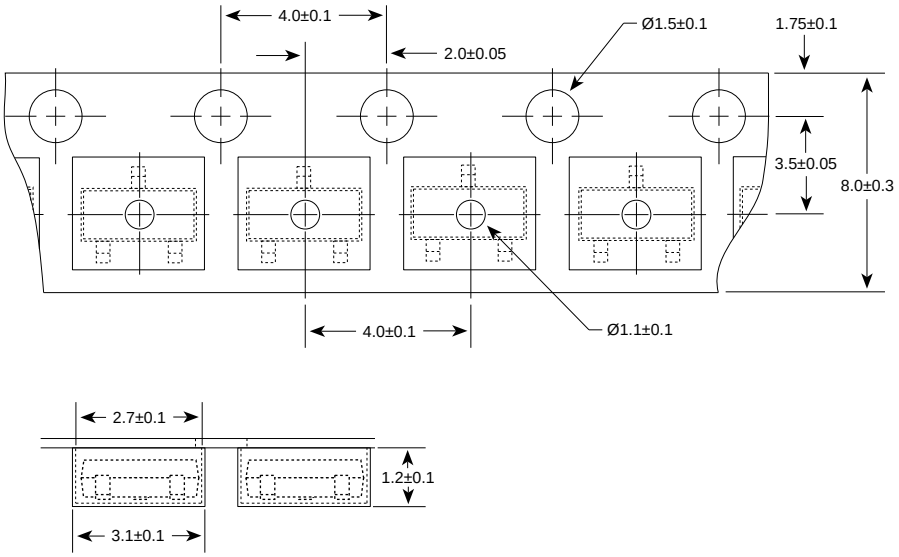
Packaging Information

Tape and Reel Information



Dimensions are in millimeters.