GENERAL DESCRIPTION

The ft809 series are power supply supervisory circuits used to monitor the power supplies in microprocessors and digital systems. The ft809 series provide a reset to the microprocessors during system power-up, power-down and brown-out conditions.

The ft809 is designed to monitor the V_{CC} supply voltage and asserts a reset signal whenever the supply voltage declines below the preset threshold.

The reset signal remains asserted for at least 140ms after V_{CC} has risen above the threshold. The ft809 provides an active-low reset output.

The ft809 series are optimized to reject fast transients on the V_{CC}. Low supply current of 10μA makes the ft809 ideal for use in portable devices.

The ft809 series are available in SOT23-3 package.

FEATURES

- Precision monitoring of 2.63V/ 2.70V/ 2.93V/ 3.08V
- Fully specified over temperatures
- 140ms (minimum) power-on-reset pulse width
- 10μA low supply current
- Power supply transient immunity

APPLICATIONS

- Set top box
- ADSL
- CPU
- Portable electronic devices

SOT23-3

APPLICATION CIRCUIT

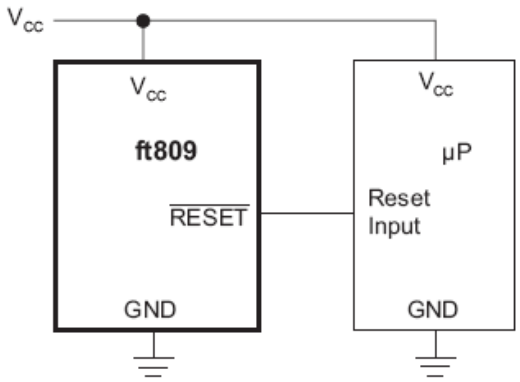
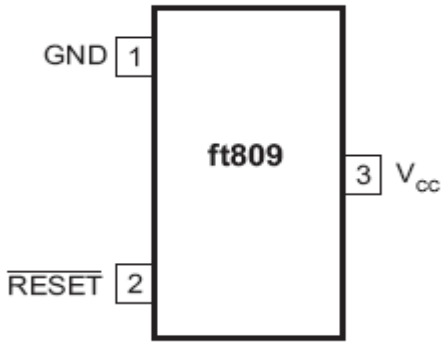


Figure 1: Typical Application Circuit

PIN CONFIGURATION



PIN DESCRIPTION

NAME	PIN #	DESCRIPTION
GND	1	Ground
$\overline{\text{RESET}}$	2	Active-Low Reset Output. It goes low when V_{CC} is below the reset threshold. It remains low for at least 140ms after V_{CC} rises above the reset threshold.
V_{CC}	3	Supply Voltage.

ORDERING INFORMATION

PART NUMBER	RESET THRESHOLD (V)	TEMPERATURE RANGE	PACKAGE
ft809R	2.63	-40°C to +85°C	SOT23-3
ft809V	2.70	-40°C to +85°C	SOT23-3
ft809S	2.93	-40°C to +85°C	SOT23-3
ft809T	3.08	-40°C to +85°C	SOT23-3

ABSOLUTE MAXIMUM RATINGS

PARAMETER	VALUE
Supply voltage, V_{CC}	-0.3V to +6.0 V
DC input voltage (all inputs except V_{CC} and GND)	-0.3V to (Vcc+0.3V)
DC input current (all inputs)	20mA
DC output current (all outputs)	20mA
Junction temperature	125°C
Ambient temperature range	-40°C to +105°C
Storage temperature Range	-65°C to +160°C
Power dissipation	320mW

Note: Stresses beyond those listed under absolute maximun ratings may cause permanent damage to the device. These are stress ratings only,and functional operation of the device at these or any other conditions beyond those indicated under recommended operating conditions is not implied.Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

V_{CC} = Full Range, T_A = −40℃ to +85℃, unless otherwise noted.

Typical values are at T_A = +25℃, V_{CC} = 3.3V for 2.93/3.08V version, and V_{CC} = 3V for 2.70V/2.63V version.

SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNIT
	V_{CC} Range	T_A = 0℃to +70℃		1.0		5.5	V
		T_A = -40℃ to +85℃		1.2		5.5	
I_{CC}	Supply Current	V_{CC} < 3.6V			10	20	μA
V_{TH}	Reset Threshold	ft809R	TA = + 25° C	2.55	2.63	2.70	V
		ft809V	TA = + 25° C	2.62	2.70	2.77	
		ft809S	TA = + 25° C	2.85	2.93	3.00	
		ft809T	TA = + 25° C	3.00	3.08	3.15	
	Reset Active Timeout	T_A = -40° C to +85° C		140	240	560	ms
V_{OL}	Reset Output Voltage Low	V_{CC} = V_{TH} min, I_{SINK} = 1.2mA				0.3	V
		V_{CC} > 1.4V, I_{SINK} = 50μA				0.3	
V_{OH}	Reset Output Voltage High	V_{CC} > V_{TH} max, I_{SOURCE} = 500μA		0.8 V_{CC}			V

TYPICAL PERFORMANCE CHARACTERISTICS

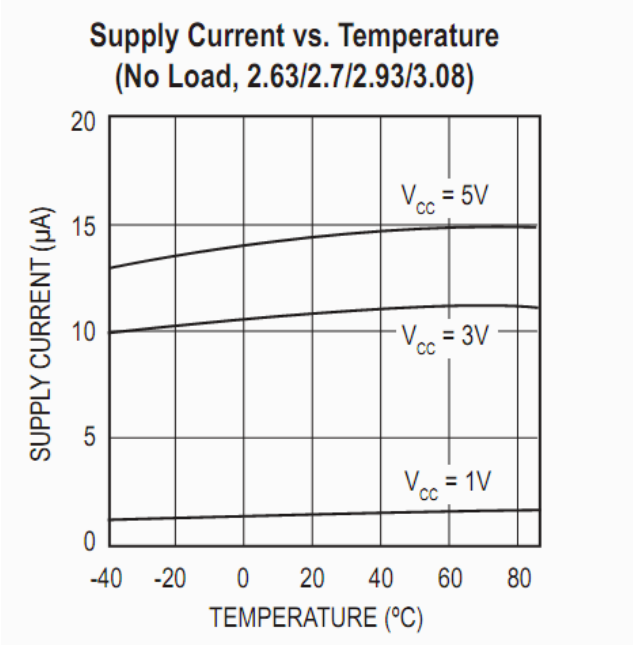


Figure 2: Supply Current vs. Temperature

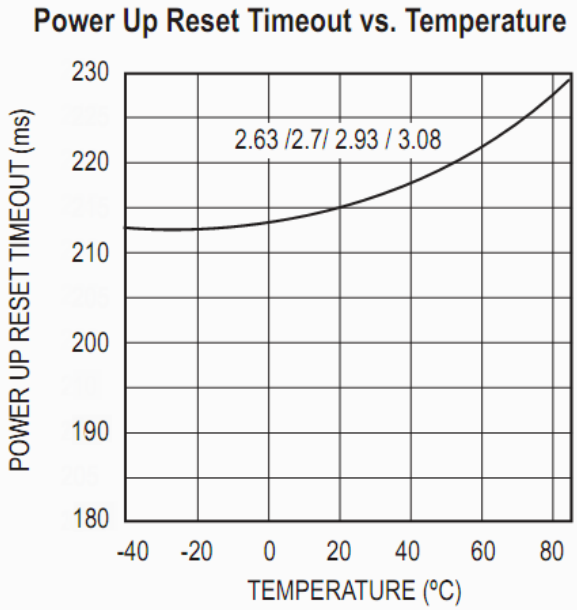


Figure 3: Power Up Reset Timeout vs. Temperature

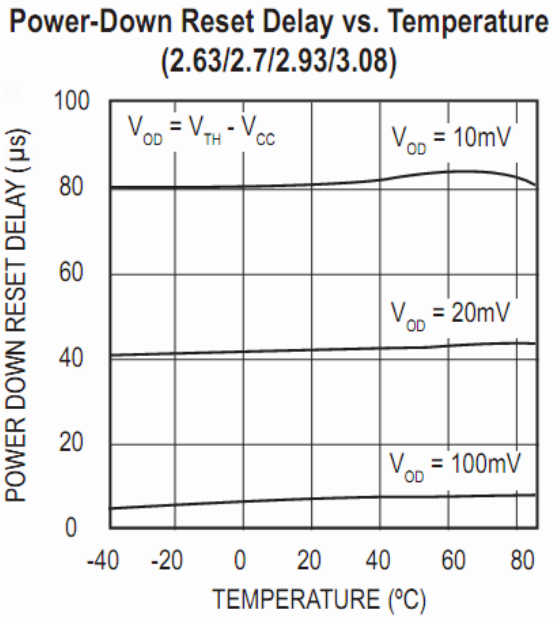


Figure 4: Power-Down Reset Delay vs. Temperature

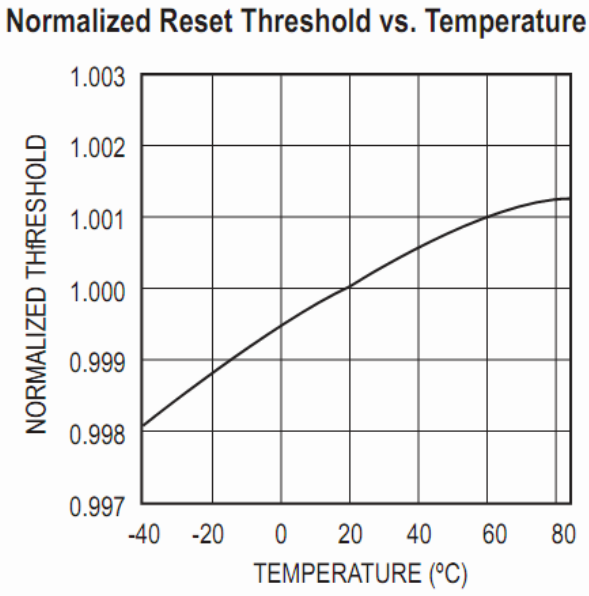


Figure 5: Threshold vs. Temperature

APPLICATION INFORMATION

Detailed Operation Description

The ft809 series microprocessor reset circuits are designed to monitor the power supplies in digital systems and provide a reset signal to the processor under the preset conditions. Figure 6 shows the timing diagram below. Initially consider that the input voltage (V_{CC}) is higher than the reset threshold (Vthr) for a long time, the RESET output pin of the ft809 is high. When the input voltage falls below Vthr, the RESET output pin will be driven low to assert reset to the microprocessor. After the power interruption, V_{CC} will rise to its nominal level above Vthr while the reset signal will remain asserted for a preset period. During the reset process, the ft809 internal oscillator circuitry is activated to count the signal asserting period. The reset signal will revert back to high when the preset asserting period times out.

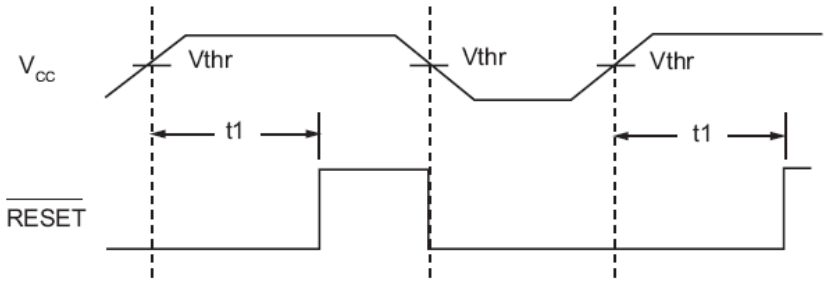


Figure 6: Reset Timing Diagram

V_{CC} Transient Rejection

While the ft809 series provide accurate power supply monitoring and issue a reset during power-up, power-down and brown-out conditions, they are relatively immune to short-duration, negative-going VCC transients. The VCC transient rejection can be best depicted in Figure7, which shows typical transient duration for which the ft809 do not generate a reset pulse as a function of reset comparator overdrive. It indicates the maximum pulse width a negative-going VCC transient can have without causing a reset pulse. As the magnitude of the transient increases, the maximum allowable pulse width decreases. Typically, for a VCC transient that goes 100mV below the reset threshold and lasts 20µs or less will not cause a reset pulse. Additional transient immunity can be obtained by mounting a 0.1µF bypass capacitor as close as possible to the V_{CC} pin.

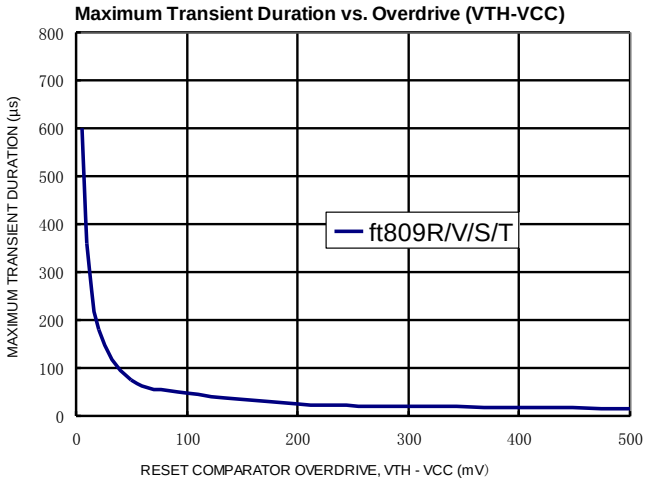


Figure 7: Maximum Transient Duration vs. Reset Comparator Overdrive

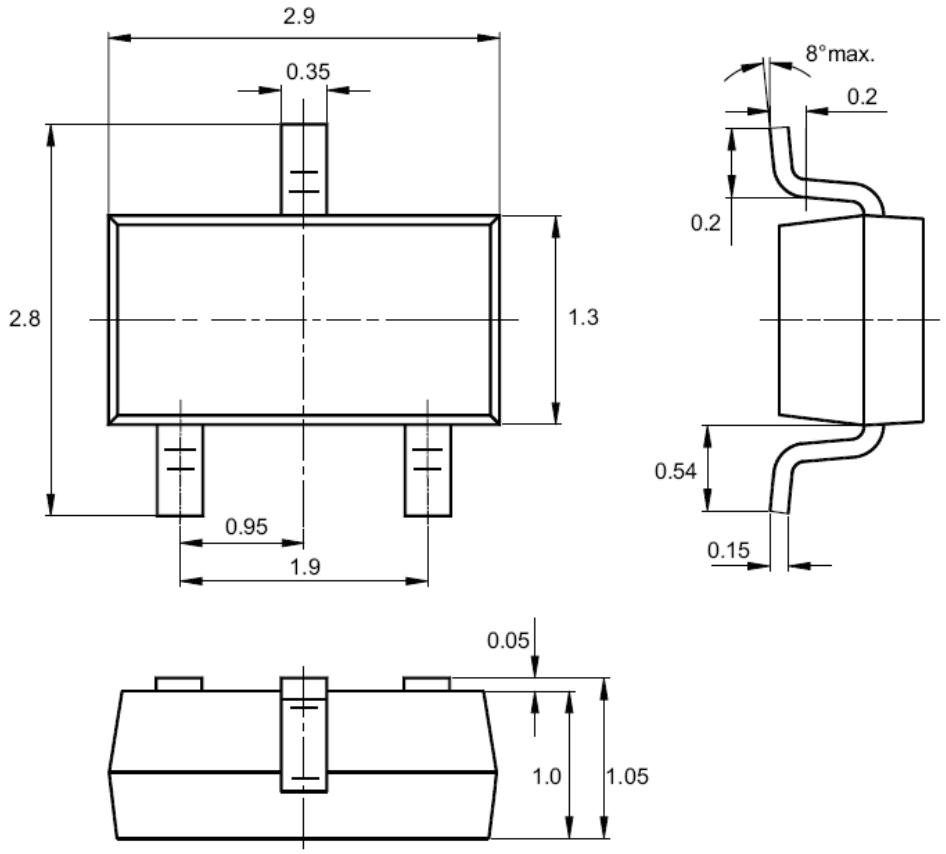
Enable Reset during Power-down

When V_{CC} falls below 1V, the ft809 $\overline{\text{RESET}}$ output no longer sinks current. This will cause the CMOS logic inputs to the microprocessor floating at an undetermined voltage. Most digital systems are shutdown well above this voltage. However, in situations where $\overline{\text{RESET}}$ must be maintained valid to V_{CC} = 0V, a pull-down resistor must be connected from $\overline{\text{RESET}}$ to ground to discharge stray capacitance and hold the output low. A 100kΩ resistor will be suitable for most applications.

Processors with Bi-directional I/O Pins

When the ft809 is to use with microprocessors with a bi-directional reset pin, logic conflict may take place and cause undermined logic level. To avoid such situation, a 4.7kΩ resistor shall be connected in series between the $\overline{\text{RESET}}$ pin and the microprocessor reset interface. If there are other components requiring a reset signal, a buffer shall be added between the reset pin and the other system components.

PHYSICAL DIMENSIONS



Unit: millimeters.

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