

## Features

- Precision supply-voltage monitor
  - 4.3V(HM811M), 4.0V(HM811J)
  - 3.08V(HM811T), 2.93V(HM811S)
  - 2.63V(HM811R), 2.32V(HM811Z)
  - 1.5~2.2V (Contact us)
- 140ms(min) reset pulse width
- Push-Pull /RESET Output Configurations
- Debounced CMOS-compatible manual-reset input
- 12 $\mu$ A Supply Current
- Guaranteed Reset(/Reset) Valid to  $V_{CC} = +1.0V$
- Power Supply Transient Immunity
- No External Components

## Ordering Information

Part Number	Package
HM811X	Lead free and Green SOT143

Note: "x" refers to voltage range, see below table.

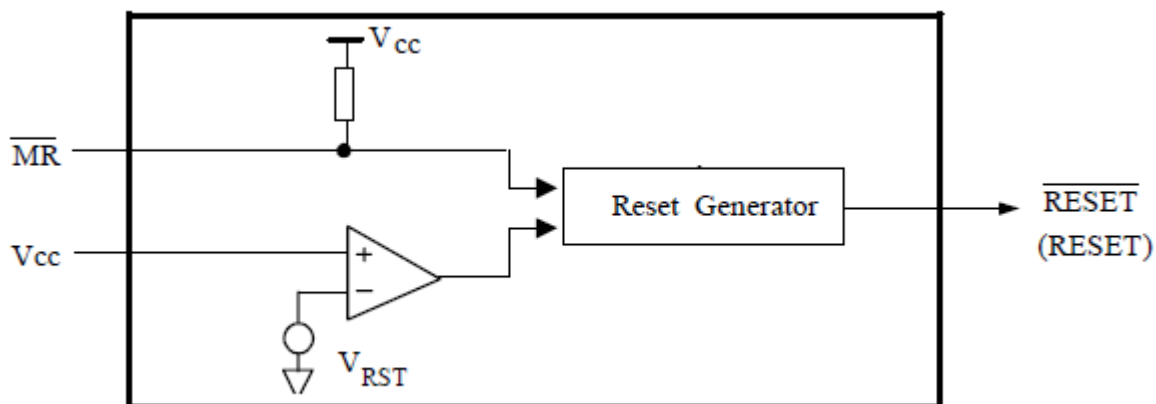
## Description

The **HM811** are microprocessor ( $\mu$ P) supervisory circuits used to monitor the power supplies in  $\mu$ P and

### Suffix: X—Monitored Voltage

X	M	J	T	S	R	Z
Reset Threshold (V)	4.3	4.0	3.08	2.93	2.63	2.32V

## Block Diagram



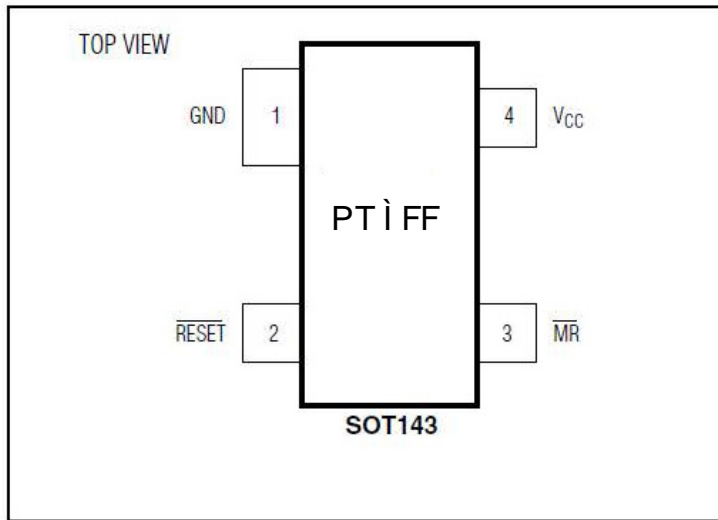
digital systems. They provide excellent circuit reliability and low cost by eliminating external components and adjustments when used with +3.3V, +3.0V, or 2.5V powered circuits.

These circuits perform a single function: they assert a reset signal whenever the VCC supply voltage declines below a preset threshold or Manual -reset, keeping it asserted for at least 140ms. Reset thresholds suitable for operation with a variety of supply voltages are available.

The HM811 have push-pull outputs and have an active-low /RESET output. The reset comparator is designed to ignore fast transients on  $V_{CC}$ , and the outputs are guaranteed to be in the correct logic state for  $V_{CC}$  down to 1V.

Low supply current makes the HM811 ideal for use in portable equipment. The ICs are available in 4 pin SOT143 packages.

## Pin Configuration



## Pin Description

Pin	Type	Description
V <sub>CC</sub>	-	<b>Supply Voltage.</b> Reset is asserted when V <sub>CC</sub> drops below the Reset Threshold Voltage (V <sub>RST</sub> ). Reset remains asserted until V <sub>CC</sub> rises above V <sub>RST</sub> and keep asserted for the duration of the Reset Timeout Period (t <sub>RS</sub> ) once V <sub>CC</sub> rises above V <sub>RST</sub> .
GND	-	<b>Ground</b>
$\overline{\text{RESET}}$	O	<b>Active-Low Reset Output (Push-Pull).</b> It goes low when V <sub>CC</sub> is below the reset threshold. It remains low for about 200ms after V <sub>CC</sub> rises above the reset threshold (V <sub>RST</sub> ).
$\overline{\text{MR}}$	I	Manual-Reset: (CMOS). Active low. Pull low to force a reset. Reset remains asserted for the duration of the Reset Timeout Period after MR transitions from low to high. Leave unconnected or connected to V <sub>CC</sub> if not used.

## Functional Description

### Reset Output

A microprocessor ( P ) reset input starts the P in a known state. Whenever the P is in an unknown state, it should be held in reset. The supervisory circuits assert reset during power-up and prevent code execution errors during power-down or brownout conditions.

On power-up, once V<sub>CC</sub> reaches about 1.0V, /RESET is a guaranteed logic low of 0.4V or less. As V<sub>CC</sub> rises, /RESET stays low. When V<sub>CC</sub> rises above the reset threshold, an internal timer releases /RESET after about 200ms. /RESET pulses low whenever V<sub>CC</sub> drops below the reset threshold, i.e. brownout condition. If brownout occurs in the middle of a previously initiated reset pulse, the pulse continues for at least another 200ms. On power-down, once V<sub>CC</sub> falls below the reset threshold, /RESET stays low and is guaranteed to be 0.4V or less until V<sub>CC</sub> drops below 1.0V. *Reset Timing Diagram* shows the timing relationship.

### Manual Reset

The manual-reset input (MR) allows reset to be triggered by a push button switch. MR has an internal pullup resistor, so it can be left open when not used.

## Maximum Ratings

Storage Temperature .....	-55°C to +150°C
Ambient Temperature with Power Applied.....	-40°C to +85°C
Supply Voltage to Ground Potential (Vcc to GND) .....	-0.3V to +6.0V
DC Input Voltage (All inputs except Vcc and GND).....	-0.3V to V <sub>CC</sub> +0.3V
DC Output Current (All outputs) .....	20mA
Power Dissipation .....	320mW

### Note:

Stresses greater than those listed under MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

## Recommended Operation Conditions

Sym	Description	Test Conditions	Min	Typ	Max	Unit
V <sub>CC</sub>	Supply Voltage for 811(L/M)	-	4.5	5.0	5.5	V
	Supply Voltage for 811(T/S)	-	3.0	3.3	5.5	V
	Supply Voltage for 811(R)	-	2.7	3.0	5.5	V
T <sub>A</sub>	Operating Temperature	-	-40	-	85	°C

## DC Electrical Characteristics

( $V_{CC} = V_{RN} + 5\%$  to 5.5V,  $T_A = -40 \sim 85^\circ\text{C}$ , unless otherwise noted.)(Note 1)

Symbol	Description	Test Conditions		Min	Typ	Max	Unit
$V_{CC}$	Operating Voltage Range	-		1.0	-	5.5	V
$I_{CC}$	Supply Current	$V_{CC} < 5.5\text{V}$ , IT8xxL/M		-	10	30	$\mu\text{A}$
$I_{CC}$	Supply Current	$V_{CC} < 3.6\text{V}$ , IT8xxR/S/T/Z		-	10	30	
$V_{RST}$ ( $V_{RTH-}$ )	Threshold Voltage(Falling-edge)(Note 2)	$T_A = 25^\circ\text{C}$	HM811M	$V_{RN} - 1.1\%$	$V_{RN}$	$V_{RN} + 1.1\%$	V
			All except 811M	$V_{RN} - 1.5\%$	$V_{RN}$	$V_{RN} + 1.5\%$	
		$T_A = -40 \sim 85^\circ\text{C}$	HM811M	$V_{RN} - 1.8\%$	$V_{RN}$	$V_{RN} + 2\%$	
		$T_A = -40 \sim 85^\circ\text{C}$	All except 811M	$V_{RN} - 2.5\%$	$V_{RN}$	$V_{RN} + 2.5\%$	
$V_{RTH+}$	Threshold Voltage(Rising-edge) (Note 2)	$T_A = -40 \sim 85^\circ\text{C}$	HM811M	4.232	4.31	4.396	
$V_{RTH}$	Reset Threshold Hysteresis (Note 2)	$V_{CC}$ varies between $V_{RN} \pm 5\%$ (Only for 811L/M)		-	50	-	mV
$V_{OH}$	Output High Voltage	$V_{CC} = 4.5\text{V}$ $I_{source} = 800\mu\text{A}$		$V_{CC} - 1.5$	-	-	V
		$V_{CC} = 2.7\text{V}$ $I_{source} = 500\mu\text{A}$		$0.8 \times V_{CC}$	-	-	
		$V_{CC} = 1.8\text{V}$ $I_{source} = 150\mu\text{A}$		$0.8 \times V_{CC}$	-	-	
		$V_{CC} = 1.0\text{V}$ $I_{source} = 4\mu\text{A}$		$0.8 \times V_{CC}$	-	-	
$V_{OL}$	Output Low Voltage	$V_{CC} = 4.5\text{V}$ $I_{sink} = 3.2\text{mA}$		-	-	0.4	V
		$V_{CC} = 2.7\text{V}$ $I_{sink} = 1.2\text{mA}$		-	-	0.3	
		$V_{CC} = 1.0\text{V}$ $I_{sink} = 100\mu\text{A}$		-	-	0.3	

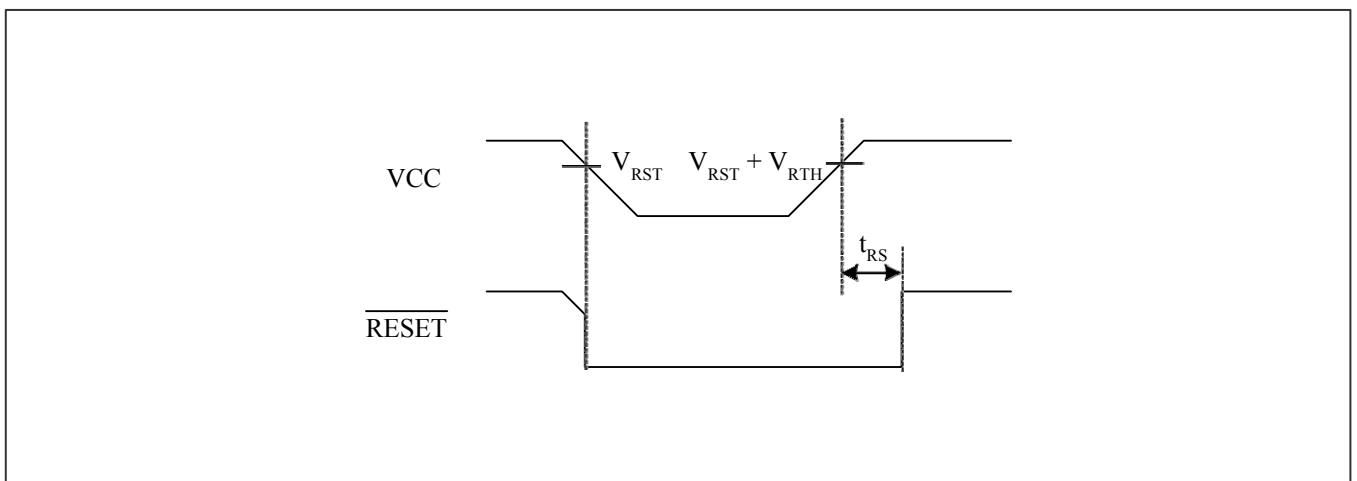
**Note: 1.** Parameters of room temperature guaranteed by production test and parameters of full-temperature guaranteed by design.

**2.**  $V_{RST}$  is Reset threshold voltage when  $V_{CC}$  falls from high to low level.  $V_{RN}$  is nominal reset threshold voltage.

## AC Electrical Characteristics

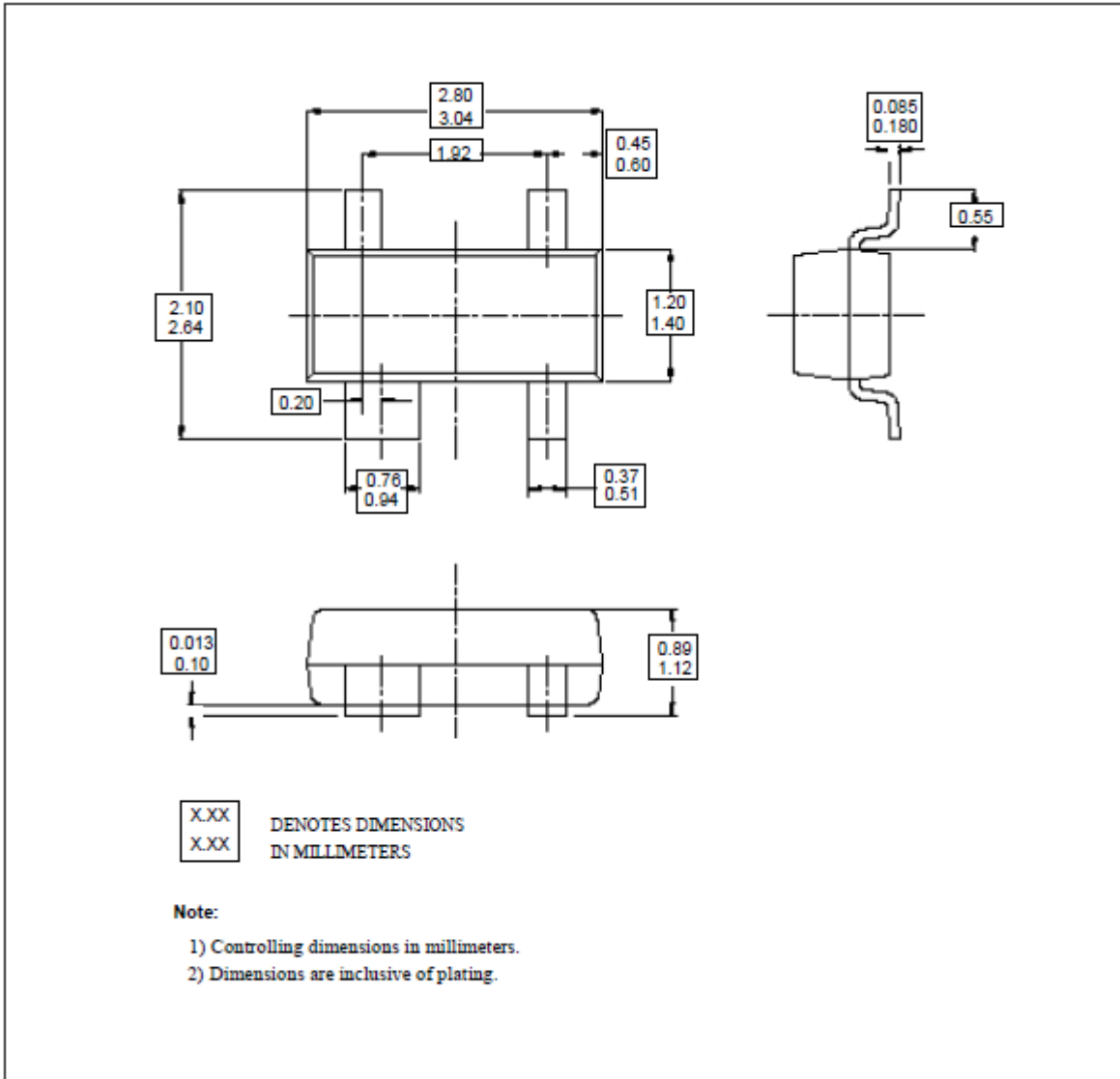
Symbol	Description	Test Conditions		Min	Typ	Max	Unit
$t_{RS}$	Reset Pulse Width	$T_A = 25^\circ\text{C}$		140	200	280	ms
$t_{MR}$	MR Pulse Width	$T_A = 25^\circ\text{C}$		1			us

## Reset Timing Diagram



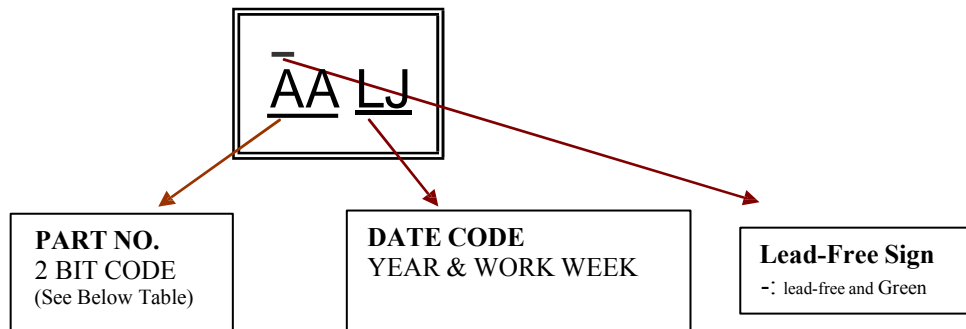
**Mechanical Information**

TBE (Lead free and Green SOT143)



Note: E Stands for Pb Free

**Marking Information**



Example: **AAPJ**

PART NO.: HM811L  
 DATE CODE: YEAR 2005 WW10

**AAPJ** PART NO.: HM811L  
 DATE CODE: YEAR 2005 WW10  
 Lead-free package