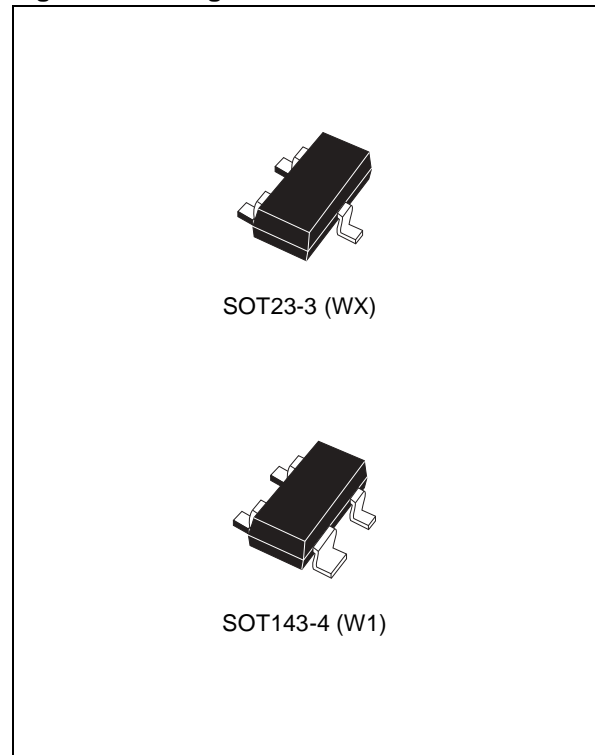# STM809, STM810
STM811, STM812

Reset Circuit

FEATURES SUMMARY

- PRECISION MONITORING OF 3V, 3.3V, and 5V SUPPLY VOLTAGES
- TWO OUTPUT CONFIGURATIONS
  - Push-pull $\overline{\text{RST}}$ Output (STM809/811)
  - Push-pull RST Output (STM810/812)
- 140ms RESET PULSE WIDTH (MIN)
- LOW SUPPLY CURRENT - 6µA (TYP)
- GUARANTEED $\overline{\text{RST}}$/RST ASSERTION DOWN TO V_{CC} = 1.0V
- OPERATING TEMPERATURE:
  –40°C to 85°C (Industrial Grade)
- LEAD-FREE, SMALL SOT23 and SOT143 PACKAGE

Figure 1. Packages

SOT23-3 (WX)

SOT143-4 (W1)

Table 1. Device Options

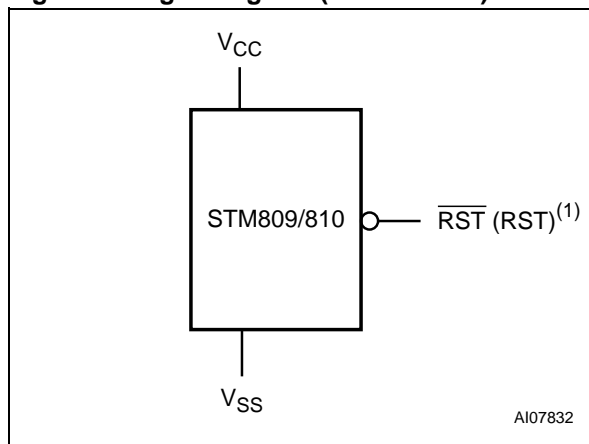|	Active-Low RESET	Active-High RESET	Manual RESET Input	Package
STM809	✔			SOT23-3
STM810		✔		SOT23-3
STM811	✔		✔	SOT143-4
STM812		✔	✔	SOT143-4

SUMMARY DESCRIPTION

The STM809/810/811/812 MICROPROCESSOR RESET Circuits are low-power supervisory devices used to monitor power supplies. They perform a single function: asserting a reset signal 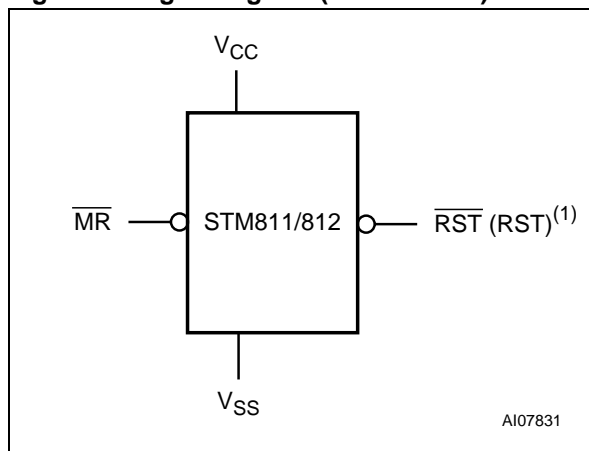whenever the V_{CC} supply voltage drops below a preset value and keeping it asserted until V_{CC} has risen above the preset threshold for a minimum period of time (t_{rec}). The STM811/812 also provide a push-button reset input ($\overline{MR}$).

Figure 2. Logic Diagram (STM809/810)

AI07832

Note: 1. For STM810

Figure 3. Logic Diagram (STM811/812)

AI07831

Note: 1. For STM812

Table 2. Signal Names

V_{SS}	Ground
$\overline{RST}$	Active-Low RESET Output
RST[1]	Active-High RESET Output
V_{CC}	Supply Voltage
$\overline{MR}$[2]	Manual Reset Input

Note: 1. STM810/812 only
2. STM811/812 only
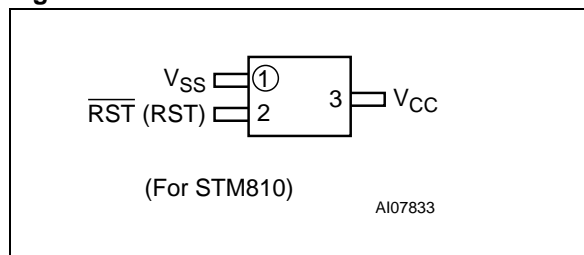
Figure 4. SOT23-3 Connections

(For STM810)

AI07833

Figure 5. SOT143-4 Connections
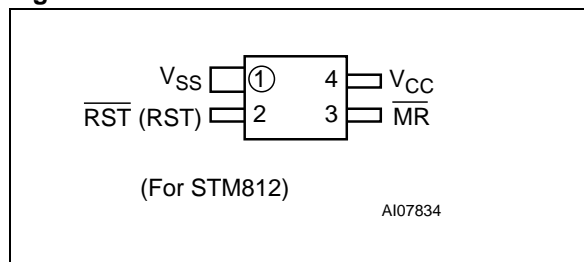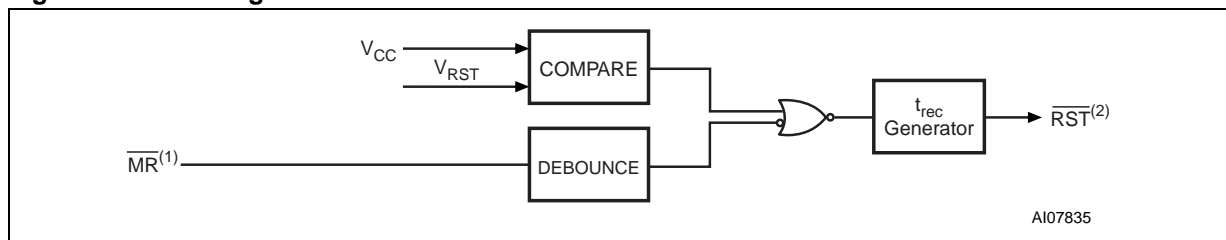

(For STM812)

AI07834

Figure 6. Block Diagram

AI07835

Note: 1. STM811/812 only
2. RST for STM810/812

MAXIMUM RATING

Stressing the device above the rating listed in the Absolute Maximum Ratings" table may cause permanent damage to the device. These are stress ratings only and operation of the device at these or any other conditions above those indicated in the Operating sections of this specification is not im-

plied. Exposure to Absolute Maximum Rating conditions for extended periods may affect device reliability. Refer also to the STMicroelectronics SURE Program and other relevant quality documents.

Table 3. Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
T_{STG}	Storage Temperature (V_{CC} Off)	−55 to 150	°C
T_{SLD}[1]	Lead Solder Temperature for 10 seconds	260	°C
V_{IO}	Input or Output Voltage	−0.3 to V_{CC} +0.3	V
V_{CC}	Supply Voltage	−0.3 to 7.0	V
I_O	Output Current	20	mA
P_D	Power Dissipation	320	mW

Note: 1. Reflow at peak temperature of 255°C to 260°C for < 30 seconds (total thermal budget not to exceed 180°C for between 90 to 150 seconds).

DC AND AC PARAMETERS

This section summarizes the operating measurement conditions, and the DC and AC characteristics of the device. The parameters in the DC and AC characteristics Tables that follow, are derived from tests performed under the Measurement Conditions summarized in Table 4., Operating and AC Measurement Conditions. Designers should check that the operating conditions in their circuit match the operating conditions when relying on the quoted parameters.

Table 4. Operating and AC Measurement Conditions

Parameter	STM809/810/811/812	Unit
V_{CC} Supply Voltage	1.0 to 5.5	V
Ambient Operating Temperature (T_A)	−40 to 85	°C
Input Rise and Fall Times	≤ 5	ns
Input Pulse Voltages	0.2 to $0.8V_{CC}$	V
Input and Output Timing Ref. Voltages	0.3 to $0.7V_{CC}$	V

Figure 14. AC Testing Input/Output Waveforms
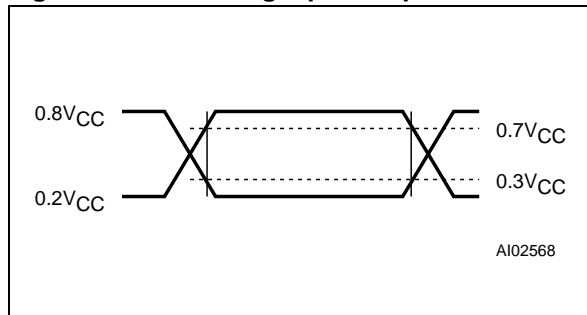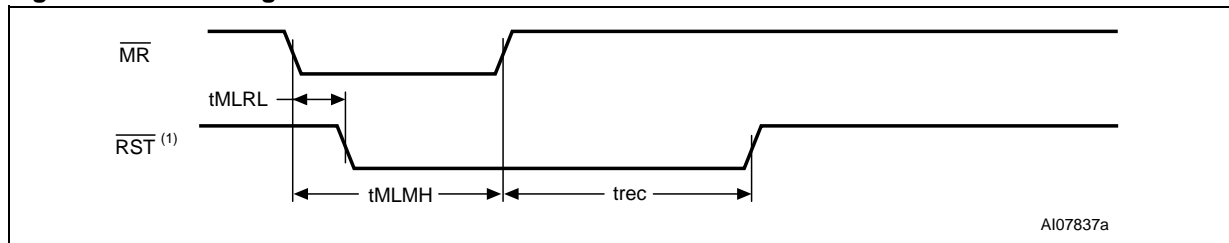

Figure 15. $\overline{MR}$ Timing Waveform

Note: 1. RST for STM810/812

Table 5. DC and AC Characteristics

Sym	Alter-native	Description	Test Condition[1]		Min	Typ	Max	Unit
V_{CC}		Operating Voltage	T_A = −40 to +85°C		1.2		5.5	V
			T_A = 0 to +70°C		1.0		5.5	V
I_{CC}		V_{CC} Supply Current	V_{CC} < 3.6V			5.5	10	µA
			V_{CC} < 5.5V			7	15	µA
V_{IH}		$\overline{MR}$ Input High Voltage	V_{CC} > V_{RST} (max), STM8XXL/M		2.2			V
			V_{CC} > V_{RST} (max), STM8XXR/S/T		0.7V_{CC}			V
V_{IL}		$\overline{MR}$ Input Low Voltage	V_{CC} > V_{RST} (max), STM8XXL/M				0.8	V
			V_{CC} > V_{RST} (max), STM8XXR/S/T				0.25V_{CC}	V
V_{OL}		$\overline{RST}$ Output Low Voltage (Active High[2] or Low)	STM8XXR/S/T only, I_{OL} = 1.2mA V_{CC} = V_{RST} (min)				0.3	V
			STM8XXL/M only, I_{OL} = 3.2mA V_{CC} = V_{RST} (min)				0.4	V
V_{OL}		$\overline{RST}$ Output Low Voltage	I_{OL} = 50µA; V_{CC} > 1.0V				0.3	V
V_{OH}		$\overline{RST}$ Output High Voltage	STM8XXR/S/T only, I_{OH} = 500µA		0.8V_{CC}			V
			STM8XXL/M only, I_{OH} = 800µA		0.8V_{CC}			V
		RST Output High Voltage	I_{OH} = 150µA, 1.8V < V_{CC} < V_{RST} (min)		0.8V_{CC}			V
RESET Thresholds								
V_{RST}		Reset Threshold	STM8XXL	25°C	4.56	4.63	4.70	V
				−40 to 85°C	4.50		4.75	V
			STM8XXM	25°C	4.31	4.38	4.45	V
				−40 to 85°C	4.25		4.50	V
			STM8XXT	25°C	3.04	3.08	3.11	V
				−40 to 85°C	3.00		3.15	V
			STM8XXS	25°C	2.89	2.93	2.96	V
				−40 to 85°C	2.85		3.00	V
			STM8XXR	25°C	2.59	2.63	2.66	V
				−40 to 85°C	2.55		2.70	V
		V_{RST} Temperature Coefficient	V_{CC} = 3.3V			45		ppm/C
		V_{CC} to $\overline{RST}$ Delay	V_{CC} = V_{RST} to (V_{RST} − 100mV)	STM8XXL/M		40		µs
				STM8XXR/S/T		20		µs
Push-Button RESET Input								
$t_{\overline{MLMH}}$	$t_{\overline{MR}}$	$\overline{MR}$ Pulse Width			10			µs
$t_{\overline{MLRL}}$	$t_{\overline{MRD}}$	$\overline{MR}$ to $\overline{RST}$ Output Delay[3]				0.5		µs
		$\overline{MR}$ Glitch Immunity[4]				100		ns
		$\overline{MR}$ Pull-up Resistance			10	20	30	kΩ
	t_{rec}	$\overline{RST}$ Pulse Width			140	210	280	ms

Note: 1. Valid for Ambient Operating Temperature: T_A = −40 to 85°C; V_{CC} = 1.2V to 5.5V (except where noted).
    2. For Active High (RST); V_{CC} = V_{RST} (max)
    3. RST output for STM810/812
    4. "Glitches" of 100ns or less typically will not generate a RESET pulse.

Figure 17. SOT143-4 – 4-lead Small Outline Transistor Package Outline

E
E1
⊕ 0.15 Ⓜ C A B
B
①
e1
e/2
e
D
⊕ 0.20 Ⓜ C A B
3X b
A

A1
⊕ 0.15 Ⓜ C A B
b2
4X
C 0.10
A2
C
A

C
θ
L1 C
L

SOT143-4

Note: Drawing is not to scale.

Table 7. SOT143-4 – 4-lead Small Outline Transistor Package Mechanical Data

Symbol	mm			inches		
	Typ	Min	Max	Typ	Min	Max
A		0.89	1.12		0.035	0.044
A1		0.01	0.10		0.001	0.004
A2		0.88	1.02		0.035	0.042
b		0.37	0.51		0.015	0.020
b2		0.76	0.94		0.030	0.037
C		0.09	0.18		0.004	0.007
D		2.80	3.04		0.110	0.120
E		2.10	2.64		0.083	0.104
E1		1.20	1.40		0.047	0.055
e	1.92			0.076		
e1	0.20			0.008		
L	0.55			0.022		
L1		0.40	0.60		0.016	0.024
Θ		0°	10°		0°	10°
N	4			4		

PART NUMBERING

Table 8. Ordering Information Scheme

Example: STM8XX   L   WX   6   F

Device Type

STM8XX

Reset Threshold Voltage

L = V_{RST} = 4.50V to 4.75V

M = V_{RST} = 4.25V to 4.50V

T = V_{RST} = 3.00V to 3.15V

S = V_{RST} = 2.85V to 3.00V

R = V_{RST} = 2.55V to 2.70V

Package

WX = SOT23-3 (STM809, STM810)

W1 = SOT143-4 (STM811, STM812)

Temperature Range

6 = −40 to 85°C

Shipping Method

F = Pb-Free Package (ECO❀PACK®), Tape & Reel

For a list of available options (e.g., Speed, Package) or for further information on any aspect of this device, please contact the ST Sales Office nearest to you.

Table 9. Marking Description

Part Number	Reset Threshold	Output	Topside Marking
STM809L	4.63V	Push-Pull $\overline{RST}$	8AAx
STM809M	4.38V	Push-Pull $\overline{RST}$	8ABx
STM809T	3.08V	Push-Pull $\overline{RST}$	8ACx
STM809S	2.93V	Push-Pull $\overline{RST}$	8ADx
STM809R	2.63V	Push-Pull $\overline{RST}$	8AEx
STM810L	4.63V	Push-Pull RST	8AFx
STM810M	4.38V	Push-Pull RST	8AGx
STM810T	3.08V	Push-Pull RST	8AHx
STM810S	2.93V	Push-Pull RST	8AJx
STM810R	2.63V	Push-Pull RST	8AKx
STM811L	4.63V	Push-Pull $\overline{RST}$	8ALx
STM811M	4.38V	Push-Pull $\overline{RST}$	8AMx
STM811T	3.08V	Push-Pull $\overline{RST}$	8ANx
STM811S	2.93V	Push-Pull $\overline{RST}$	8APx
STM811R	2.63V	Push-Pull $\overline{RST}$	8AQx
STM812L	4.63V	Push-Pull RST	8ARx
STM812M	4.38V	Push-Pull RST	8ASx
STM812T	3.08V	Push-Pull RST	8ATx
STM812S	2.93V	Push-Pull RST	8AUx
STM812R	2.63V	Push-Pull RST	8AVx