# onse 1 ---

#### **PIN DESCRIPTION**

Pin No.	Symbol	Description
1	GND	Ground
2	RESET (MAX809)	RESET output remains low while V <sub>CC</sub> is below the reset voltage threshold, and for a reset timeout period after V <sub>CC</sub> rises above reset threshold
2	RESET (MAX810)	RESET output remains high while $V_{CC}$ is below the reset voltage threshold, and for a reset timeout period after $V_{CC}$ rises above reset threshold
3	V <sub>CC</sub>	Supply Voltage (Typ)

#### ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Power Supply Voltage (V <sub>CC</sub> to GND)	V <sub>CC</sub>	-0.3 to 6.0	V
RESET Output Voltage (CMOS)		–0.3 to (V <sub>CC</sub> + 0.3)	V
Input Current, V <sub>CC</sub>		20	mA

**ELECTRICAL CHARACTERISTICS**  $T_A = -40$  C to +105 C unless otherwise noted. Typical values are at  $T_A = +25$  C. (Note 3)

Characteristic	Symbol	Min	Тур	Max	Unit
$V_{CC}$ Range $T_A = 0 \ C \ to +70 \ C$ $T_A = -40 \ C \ to +105 \ C \ (Note 4)$		1.0 1.2		5.5 5.5	V
Supply Current $V_{CC} = 3.3 V$ $T_A = -40 C \text{ to } +85 C$	Icc	_	0.5	1.2	μΑ
$T_{A} = 85 \text{ C to } +105 \text{ C (Note 5)}$ $V_{CC} = 5.5 \text{ V}$ $T_{A} = -40 \text{ C to } +85 \text{ C}$ $T_{A} = 85 \text{ C to } +105 \text{ C (Note 5)}$		- - -	- 0.8 -	2.0 1.8 2.5	
Reset Threshold (V <sub>in</sub> Decreasing) (Note 6)	V <sub>TH</sub>				V
$\begin{array}{c} \text{MAX809SN490} \\ \text{T}_{\text{A}} = +25 \text{ C} \\ \text{T}_{\text{A}} = -40 \text{ C to } +85 \text{ C} \\ \text{T}_{\text{A}} = +85 \text{ C to } +105 \text{ C (Note 5)} \end{array}$		4.83 4.78 4.66	4.9 - -	4.97 5.02 5.14	
MAX8xxLTR, MAX8xxSQ463 $T_A = +25 C$ $T_A = -40 C \text{ to } +85 C$ $T_A = +85 C \text{ to } +105 C \text{ (Note 5)}$		4.56 4.50 4.40	4.63 _ _	4.70 4.75 4.86	
MAX809HTR $T_A = +25 C$ $T_A = -40 C \text{ to } +85 C$ $T_A = +85 C \text{ to } +105 C \text{ (Note 5)}$		4.48 4.43 4.32	4.55	4.62 4.67 4.78	
MAX8xxMTR, MAX8xxSQ438 $T_A = +25 C$ $T_A = -40 C \text{ to } +85 C$ $T_A = +85 C \text{ to } +105 C (Note 5)$		4.31 4.27 4.16	4.38	4.45 4.49 4.60	
MAX809JTR, MAX8xxSQ400 $T_A = +25 C$ $T_A = -40 C \text{ to } +85 C$ $T_A = +85 C \text{ to } +105 C \text{ (Note 5)}$		3.94 3.90 3.80	4.00 _ _	4.06 4.10 4.20	
MAX8xxTTR, MAX809SQ308 $T_A = +25 C$ $T_A = -40 C \text{ to } +85 C$ $T_A = +85 C \text{ to } +105 C \text{ (Note 5)}$		3.04 3.00 2.92	3.08 _ _	3.11 3.16 3.24	
MAX8xxSTR, MAX8xxSQ293 $T_A = +25 C$ $T_A = -40 C \text{ to } +85 C$ $T_A = +85 C \text{ to } +105 C \text{ (Note 5)}$		2.89 2.85 2.78	2.93 _ _	2.96 3.00 3.08	
MAX8xxRTR, MAX8xxSQ263 $T_A = +25 C$ $T_A = -40 C \text{ to } +85 C$ $T_A = +85 C \text{ to } +105 C \text{ (Note 5)}$		2.59 2.56 2.49	2.63 _ _	2.66 2.70 2.77	
MAX809SN232, MAX809SQ232 $T_A = +25 C$ $T_A = -40 C \text{ to } +85 C$ $T_A = +85 C \text{ to } +105 C \text{ (Note 5)}$		2.28 2.25 2.21	2.32 _ _	2.35 2.38 2.45	
MAX809SN160 $T_A = +25 C$ $T_A = -40 C \text{ to } +85 C$ $T_A = +85 C \text{ to } +105 C \text{ (Note 5)}$		1.58 1.56 1.52	1.60 _ _	1.62 1.64 1.68	
MAX809SN120, MAX8xxSQ120 $T_A = +25 C$ $T_A = -40 C \text{ to } +85 C$ $T_A = +85 C \text{ to } +105 C \text{ (Note 5)}$		1.18 1.17 1.14	1.20 _ _	1.22 1.23 1.26	

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

3. Production testing done at  $T_A = 25$  C, over temperature limits guaranteed by design. 4. For NCV automotive devices, this temperature range is  $T_A = -40$  C to +125 C.

5. For NCV automotive devices, this temperature range is  $T_A = +85$  C to +125 C. 6. Contact your **onsemi** sales representative for other threshold voltage options.

# **ELECTRICAL CHARACTERISTICS (continued)** $T_A = -40$ C to +105 C unless otherwise noted. Typical values are at $T_A = +25$ C. (Note 7)

Characteristic	Symbol	Min	Тур	Max	Unit
Detector Voltage Threshold Temperature Coefficient		-	30	-	ppm/ C
$V_{CC}$ to Reset Delay $V_{CC} = V_{TH}$ to ( $V_{TH} - 100 \text{ mV}$ )		-	10	-	μsec
Reset Active TimeOut Period (Note 8) MAX8xxSN(Q)293D1 MAX8xxSN(Q)293D2 MAX8xxSN(Q)293D3 MAX8xxSN(Q)293	t <sub>RP</sub>	1.0 20 100 140	- - - -	3.3 66 330 460	msec
$ \begin{array}{l} \hline \textbf{RESET} \mbox{ Output Voltage Low (No Load) (MAX809)} \\ V_{CC} = V_{TH} - 0.2 \ V \\ 1.6 \ V \leq V_{TH} \leq 2.0 \ V, \ \textbf{I}_{SINK} = 0.5 \ \text{mA} \\ 2.1 \ V \leq V_{TH} \leq 4.0 \ V, \ \textbf{I}_{SINK} = 1.2 \ \text{mA} \\ 4.1 \ V \leq V_{TH} \leq 4.9 \ V, \ \textbf{I}_{SINK} = 3.2 \ \text{mA} \end{array} $	V <sub>OL</sub>	-	_	0.3	V
$ \begin{array}{l} \hline \textbf{RESET} \mbox{ Output Voltage High (No Load) (MAX809)} \\ V_{CC} = V_{TH} + 0.2 \ V \\ 1.6 \ V \leq V_{TH} \leq 2.4 \ V, \ \textbf{I}_{SOURCE} = 200 \ \mu A \\ 2.5 \ V \leq V_{TH} \leq 4.9 \ V, \ \textbf{I}_{SOURCE} = 500 \ \mu A \end{array} $	V <sub>OH</sub>	0.8 V <sub>CC</sub>	_	-	V
$ \begin{array}{l} \mbox{RESET Output Voltage High (No Load) (MAX810)} \\ V_{CC} = V_{TH} - 0.2 \ V \\ 1.6 \ V \leq V_{TH} \leq 2.4 \ V, \ I_{SOURCE} = 200 \ \mu A \\ 2.5 \ V \leq V_{TH} \leq 4.9 \ V, \ I_{SOURCE} = 500 \ \mu A \end{array} $	V <sub>OH</sub>	0.8 V <sub>CC</sub>	_	-	V
$\begin{array}{l} \mbox{RESET Output Voltage Low (No Load) (MAX810)} \\ V_{CC} = V_{TH} + 0.2 \ V \\ 1.6 \ V \leq V_{TH} \leq 2.0 \ V, \ I_{SINK} = 0.5 \ mA \\ 2.1 \ V \leq V_{TH} \leq 4.0 \ V, \ I_{SINK} = 1.2 \ mA \\ 4.1 \ V \leq V_{TH} \leq 4.9 \ V, \ I_{SINK} = 3.2 \ mA \end{array}$	V <sub>OL</sub>	-	_	0.3	V

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

Production testing done at T<sub>A</sub> = 25 C, over temperature limits guaranteed by design.
Contact your **onsemi** sales representative for timeout options availability for other threshold voltage options.

#### **Detail Operation Description**

The MAX809/810 series microprocessor reset supervisory circuits are designed to monitor the power supplies in digital systems and provide a reset signal to the processor without any external components. Figure 2 shows the timing diagram and a typical application below. Initially consider that input voltage  $V_{CC}$  is at a nominal level greater than the voltage detector upper threshold ( $v_{TH}$ ). And the

RESET (RESET) output voltage (Pin 2) will be in the high state for MAX 809, or in the low state for MAX 810 devices.

If there is an input power interruption and V<sub>CC</sub> becomes significantly deficient, it will fall below the lower detector threshold (V<sub>TH</sub>). This event causes the RESET output to be in the low state for the MAX809, or in the high state for the NCP810 devices. After completion of the power interruption, V<sub>CC</sub> will rise to its nominal level and become greater than the V<sub>TH</sub>. This sequence activates the internal oscillator circuitry and digital counter to count. After the count of the timeout period, the reset output will revert back to the original state.

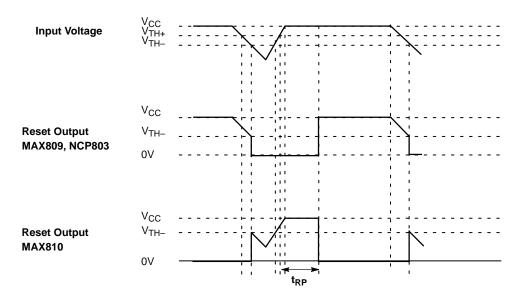
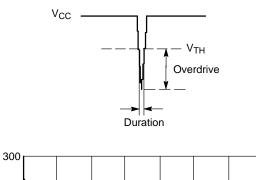


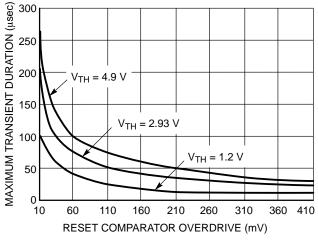
Figure 15. Timing Waveforms

#### **APPLICATIONS INFORMATION**

#### V<sub>CC</sub> Transient Rejection

The MAX809 provides accurate  $V_{CC}$  monitoring and reset timing during power up, power down, and brownout/sag conditions, and rejects negative going transients (glitches) on the power supply line. Figure 16 shows the maximum transient duration vs. maximum negative excursion (overdrive) for glitch rejection. Any combination of duration and overdrive which lies **under** the curve will **not** generate a reset signal. Combinations above the curve are detected as a brownout or power down. Typically, transient that goes 100 mV below the reset threshold and lasts 5.0  $\mu$ s or less will not cause a reset pulse. Transient immunity can be improved by adding a capacitor in close proximity to the V<sub>CC</sub> pin of the MAX809.







**RESET Signal Integrity During Power–Down** The MAX809 RESET output is valid to  $V_{CC} = 1.0$  V. Below

#### ORDERING, MARKING AND THRESHOLD INFORMATION

Part Number     VTH* (V)     Timedeality ((neight=f6800))     Example     Timedeality ((neight=f6800))     Example     Timedeality ((neight=f6800))     Example     Timedeality ((neight=f6800))     Example     Timedeality ((neight=f6800))     SOT23-3 (Pb-Free)     SOT23-3 (Pb-Free)     SOT23-3 (Pb-Free)     SOT00 / Tape & Reel				-			
3000 / Tape & Reel	Part Number	V <sub>TH</sub> * (V)	Timë¢ûû®((716))ecî	4606 <b>3105225566885509</b> 7027	E( <b>Maaking</b> oo	T240 <b>673718334</b> 6883	≬n2e67 <b>3HIPping</b> †17.90
ACE (Pb-Free) 30007 hipe & Reel	MAX809STRG	2.93	140–460		SPT	SOT23-3	2000 / Tapa & Real
					ACE	(Pb-Free)	SUUU / Tape & Reel

#### ORDERING, MARKING AND THRESHOLD INFORMATION

Part Number	V <sub>TH</sub> * (V)	Timeout* (ms)	Description	Marking	Package	Shipping <sup>†</sup>

#### DISCONTINUED (Note 9)

MAX809TTRG	3.08	140–460	Push-Pull RESET	SPU	SOT23–3 (Pb–Free)	3000 / Tape & Reel
NCV809SN293D1T1G*	2.93					



**SC-70 (SOT-323)** CASE 419 ISSUE R

DATE 11 OCT 2022

# GENERIC MARKING DIAGRAM



ΧХ = Specific Device Code

М = Date Code •

= Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-

STYLE 1: CANCELLED	STYLE 2: PIN 1. ANODE 2. N.C. 3. CATHODE	STYLE 3: PIN 1. BASE 2. EMITTER 3. COLLECTOR	STYLE 4: PIN 1. CATHODE 2. CATHODE 3. ANODE	STYLE 5: PIN 1. ANODE 2. ANODE 3. CATHODE	
STYLE 6:	STYLE 7:	STYLE 8:	STYLE 9:	STYLE 10:	STYLE 11:
PIN 1. EMITTER	PIN 1. BASE	PIN 1. GATE	PIN 1. ANODE	PIN 1. CATHODE	PIN 1. CATHODE
2. BASE	2. EMITTER	2. SOURCE	2. CATHODE	2. ANODE	2. CATHODE
3. COLLECTOR	3. COLLECTOR	3. DRAIN	3. CATHODE-ANODE	3. ANODE-CATHODE	3. CATHODE

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