NCP803

Very Low Supply Current 3-Pin Microprocessor Reset Monitor

The NCP803 is a cost–effective system supervisor circuit designed to monitor V_{CC} in digital systems and provide a reset signal to the host processor when necessary. No external components are required.

The reset output is driven active within 10 μsec of V_{CC} falling through the reset voltage threshold. Reset is maintained active for a minimum of 140 msec after V_{CC} rises above the reset threshold. The NCP803 has an open drain active–low $\overline{RESET}$ output. The output of the NCP803 is guaranteed valid down to $V_{CC} = 1.0$ V and is available in a SOT–23 package.

The NCP803 is optimized to reject fast transient glitches on the V_{CC} line. Low supply current of 1.0 μA ($V_{CC} = 3.2$ V) make this device suitable for battery powered applications.

Features

- Precision V_{CC} Monitor for 2.5 V, 3.0 V, 3.3 V, and 5.0 V Supplies
- Precision Monitoring Voltages from 1.6 V to 4.9 V Available in 100 mV Steps
- 140 msec Guaranteed Minimum $\overline{RESET}$ Output Duration
- $\overline{RESET}$ Output Guaranteed to $V_{CC} = 1.0$ V
- Low 1.0 μA Supply Current
- V_{CC} Transient Immunity
- Small SOT–23 Package
- No External Components
- Wide Operating Temperature: –40°C to 105°C
- Pb–Free Packages are Available

Typical Applications

- Computers
- Embedded Systems
- Battery Powered Equipment
- Critical μP Power Supply Monitoring
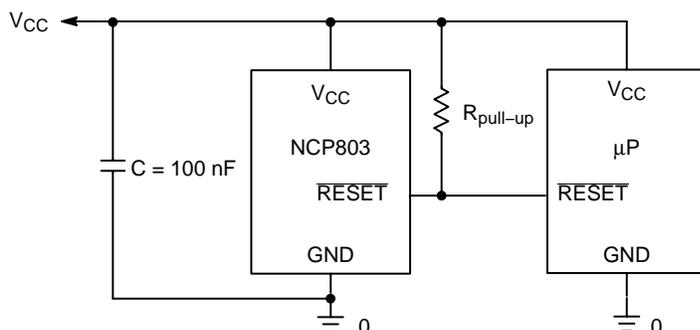
Figure 1. Typical Application Diagram

MARKING DIAGRAM
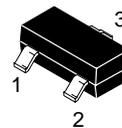
SOT–23
(TO–236)
CASE 318

xxxM
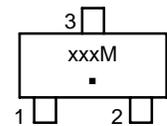
xxx	= Specific Device Code
M	= Date Code
▪	= Pb–Free Package

PIN CONFIGURATION

GND 1

RESET 2

3 V_{CC}
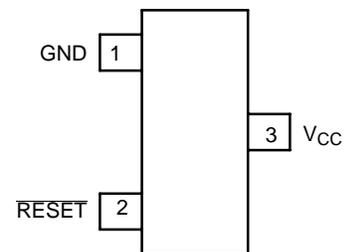
SOT–23
(Top View)

NOTE: SOT–23 is equivalent to JEDEC (TO–236).

ORDERING INFORMATION

Device	Package	Shipping[†]
NCP803SNxxxT1	SOT–23	3000/Tape & Reel
NCP803SNxxxT1G	SOT–23 (Pb–Free)	3000/Tape & Reel
NCP803SNxxxT3	SOT–23	10000/Tape & Reel
NCP803SNxxxT3G	SOT–23 (Pb–Free)	10000/Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

NOTE: The "xxx" denotes a suffix for V_{cc} voltage threshold options – see page 5 for more details.

*The "T3" suffix refers to a 13 inch reel.

DEVICE MARKING INFORMATION

See general marking information in the device marking section on page 5 of this data sheet.

NCP803

PIN DESCRIPTION

Pin No.	Symbol	Description
1	GND	Ground
2	$\overline{\text{RESET}}$	$\overline{\text{RESET}}$ output remains low while V_{CC} is below the reset voltage threshold, and for 240 msec (typ.) after V_{CC} rises above reset threshold.
3	V_{CC}	Supply Voltage: C = 100 nF is recommended as a bypass capacitor between V_{CC} and GND.

ABSOLUTE MAXIMUM RATINGS (Note 1)

Rating	Symbol	Value	Unit
Supply Voltage (V_{CC} to GND)	V_{CC}	6.0	V
$\overline{\text{RESET}}$		−0.3 to (V_{CC} + 0.3)	V
Input Current, V_{CC}		20	mA
Output Current, $\overline{\text{RESET}}$		20	mA
dV/dt (V_{CC})		100	V/μsec
Thermal Resistance, Junction to Air	$R_{\theta JA}$	491	°C/W
Operating Temperature Range	T_A	−40 to +105	°C
Storage Temperature Range	T_{stg}	−65 to +150	°C
Lead Temperature (Soldering, 10 Seconds)	T_{sol}	+260	°C
Latch−up performance: Negative	$I_{Latch-up}$	150	mA

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

1. This device series contains ESD protection and exceeds the following tests:
      Human Body Model 4000 V per MIL−STD−883, Method 3015.
      Machine Model Method 400 V.
2. The maximum package power dissipation limit must not be exceeded.

$$P_D = \frac{T_{J(max)} - T_A}{R_{\theta JA}} \qquad \text{with } T_{J(max)} = 150°C$$

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	Typ	Max	Unit

V_{CC} Range
  $T_A = 0°C$ to $+70°C$
  $T_A = -40°C$ to $+105°C$
		
		1.0
		1.2
			
			–
			–
				
				5.5
				5.5
					V

Supply Current
  $V_{CC} = 3.3$ V
    $T_A = -40°C$ to $+85°C$
    $T_A = 85°C$ to $+105°C$
  $V_{CC} = 5.5$ V
    $T_A = -40°C$ to $+85°C$
    $T_A = 85°C$ to $+105°C$
	I_{CC}	
		
		–
		–
		
		–
		–
			
			0.5
			–
			
			0.8
			–
				
				1.2
				2.0
				
				1.8
				2.5
					µA

Reset Threshold (Note 4)
 	
NCP803SN463
  $T_A = +25°C$
  $T_A = -40°C$ to $+85°C$
  $T_A = +85°C$ to $+105°C$
 	
NCP803SN438
  $T_A = +25°C$
  $T_A = -40°C$ to $+85°C$
  $T_A = +85°C$ to $+105°C$
 	
NCP803SN308
  $T_A = +25°C$
  $T_A = -40°C$ to $+85°C$
  $T_A = +85°C$ to $+105°C$
 	
NCP803SN293
  $T_A = +25°C$
  $T_A = -40°C$ to $+85°C$
  $T_A = +85°C$ to $+105°C$
 	
NCP803SN263
  $T_A = +25°C$
  $T_A = -40°C$ to $+85°C$
  $T_A = +85°C$ to $+105°C$
 	
NCP803SN232
  $T_A = +25°C$
  $T_A = -40°C$ to $+85°C$
  $T_A = +85°C$ to $+105°C$
 	
NCP803SN160
  $T_A = +25°C$
  $T_A = -40°C$ to $+85°C$
  $T_A = +85°C$ to $+105°C$
	V_{TH}	
		
		4.56
		4.51
		4.40
		
		4.31
		4.27
		4.16
		
		3.04
		3.00
		2.92
		
		2.89
		2.85
		2.78
		
		2.59
		2.55
		2.50
		
		2.29
		2.26
		2.20
		
		1.58
		1.56
		1.52
			
			4.63
			–
			–
			
			4.38
			–
			–
			
			3.08
			–
			–
			
			2.93
			–
			–
			
			2.63
			–
			–
			
			2.32
			–
			–
			
			1.60
			–
			–
				
				4.70
				4.75
				4.88
				
				4.45
				4.49
				4.60
				
				3.11
				3.15
				3.23
				
				2.96
				3.00
				3.08
				
				2.66
				2.70
				2.76
				
				2.35
				2.38
				2.45
				
				1.62
				1.64
				1.68
					V

Reset Temperature Coefficient		–	30	–	ppm/°C
V_{CC} to Reset Delay $V_{CC} = V_{TH}$ to $(V_{TH} - 100$ mV$)$		–	10	–	µsec
Reset Active Timeout Period		140	240	460	msec

$\overline{RESET}$ Output Voltage Low
  $V_{CC} = V_{TH} - 0.2$ 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
	V_{OL}	–	–	0.3	V

$\overline{RESET}$ Leakage Current $V_{CC} > V_{TH}$, $\overline{RESET}$ De–asserted	I_{LEAK}	–	–	1	µA

3. Production testing done at $T_A = 25°C$, over temperature limits guaranteed by design.
4. Contact your ON Semiconductor sales representative for other threshold voltage options.

NCP803

TYPICAL CHARACTERISTICS
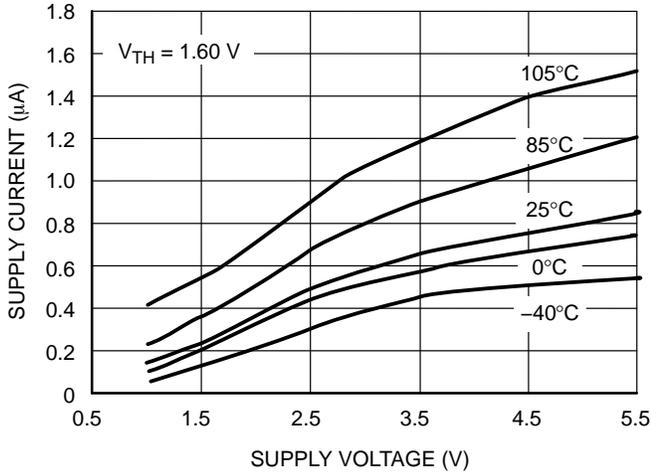
Figure 2. Supply Current vs. Supply Voltage
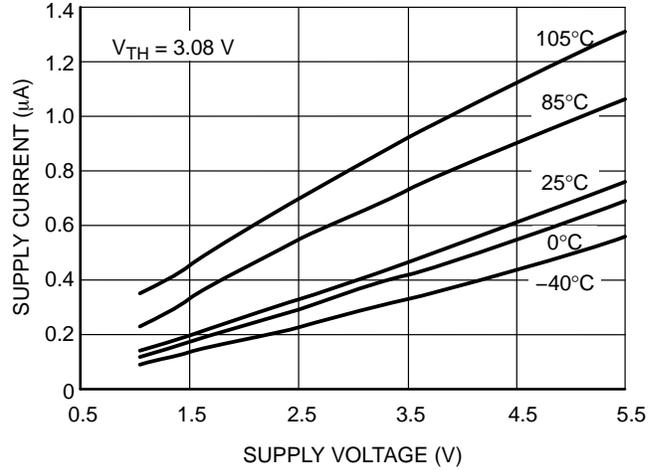
Figure 3. Supply Current vs. Supply Voltage
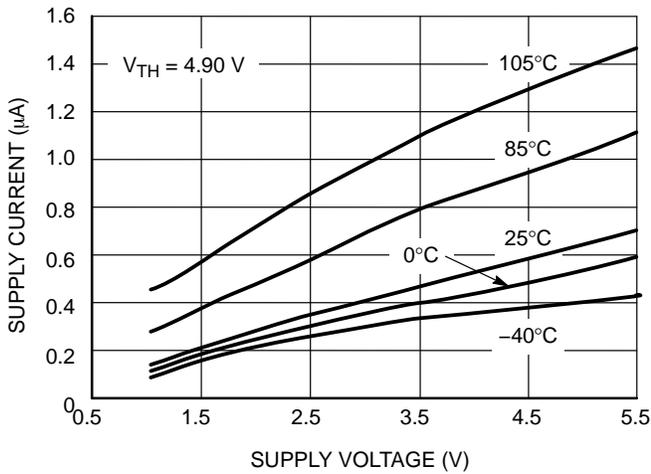

Figure 4. Supply Current vs. Supply Voltage
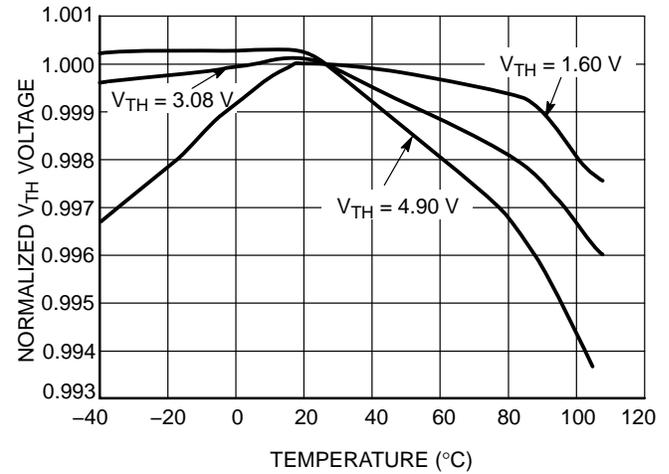
Figure 5. Normalized Reset Threshold Voltage vs. Temperature
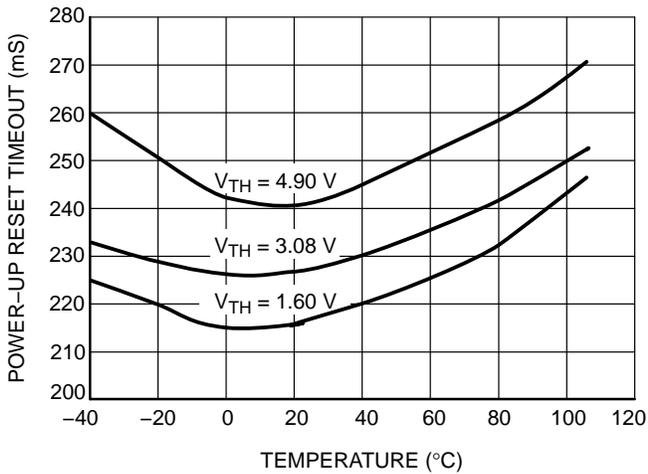
Figure 6. Power−up Reset Timeout vs. Temperature
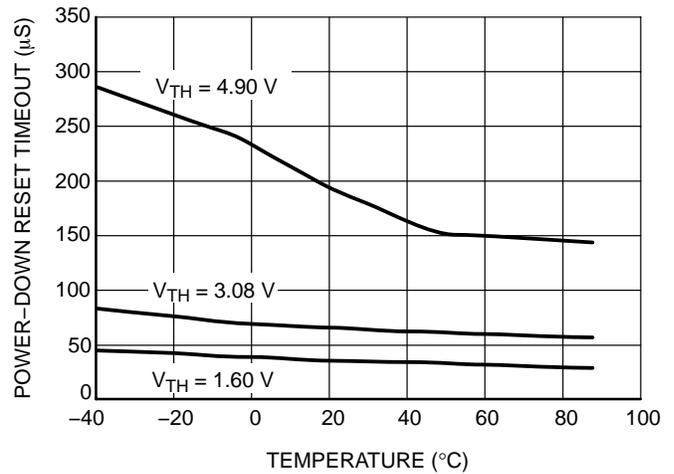
Figure 7. Power−down Reset Timeout vs. Temperature (Overdrive = 20 mV)

TAPING FORM

Component Taping Orientation for 3L SOT−23 (JEDEC−236) Devices

USER DIRECTION OF FEED

DEVICE MARKING

PIN 1

Standard Reel Component Orientation
(Mark Right Side Up)
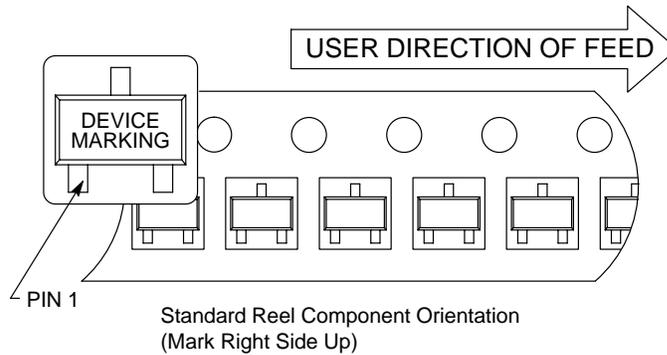
Tape & Reel Specifications Table

Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
SOT−23	8 mm	4 mm	3000	7 inches
SOT−23	8 mm	4 mm	10000	13 inches

MARKING AND THRESHOLD INFORMATION

ON Semiconductor Part #	V_{TH}*	Marking (Note 5)
NCP803SN160T1	1.60	SCQM
NCP803SN160T1G	1.60	SCQM
NCP803SN232T1	2.32	SQRM
NCP803SN232T1G	2.32	SQRM
NCP803SN263T1	2.63	SQCM
NCP803SN263T1G	2.63	SQCM
NCP803SN293T1	2.93	SQDM
NCP803SN293T1G	2.93	SQDM
NCP803SN293T3	2.93	SQDM
NCP803SN293T3G	2.93	SQDM
NCP803SN308T1	3.08	SQEM
NCP803SN308T1G	3.08	SQEM
NCP803SN438T1	4.38	SQFM
NCP803SN438T1G	4.38	SQFM
NCP803SN463T1	4.63	SQGM
NCP803SN463T1G	4.63	SQGM

NOTE: The "G" suffix indicates Pb−Free package available.
*Contact your ON Semiconductor sales representative for other threshold voltage options.
5. M = Monthly Date Code

NCP803

PACKAGE DIMENSIONS

SOT–23 (TO–236)
CASE 318–08
ISSUE AL
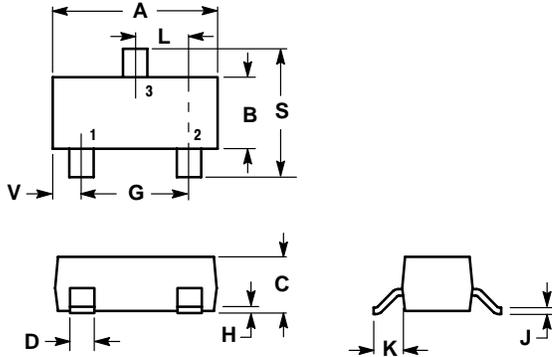
NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318–01 THRU –07 AND –09 OBSOLETE, NEW STANDARD 318–08.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60

STYLE 8:
PIN 1. ANODE
2. NO CONNECTION
3. CATHODE

SOLDERING FOOTPRINT*

$\frac{0.95}{0.037}$

$\frac{0.95}{0.037}$

$\frac{2.0}{0.079}$

$\frac{0.9}{0.035}$

$\frac{0.8}{0.031}$

SCALE 10:1 $\left(\frac{mm}{inches}\right)$
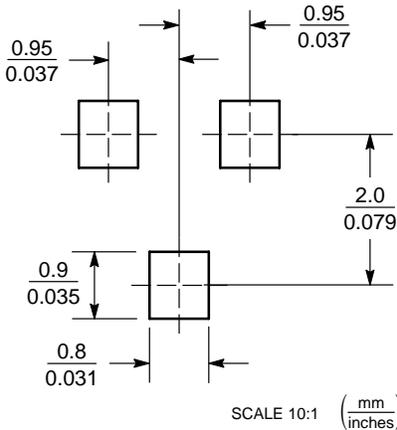
*For additional information on our Pb–Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.