

User Programmable Micro-Power Voltage Detectors

General Description

The RT9801A/B is a micro-power voltage detector supervising the power supply voltage level for microprocessors (μ P) or digital systems. It provides user programmable threshold levels with 0.1V step ranging from 1.5V to 5V, which covers most digital applications. It features low supply current of 3 μ A. Selection of V_{TH} is easily achieved through 3 pins connected to GND, VDD or floating for different threshold voltage settings. Two versions of threshold voltages, 1.5V to 4V and 2.5V to 5V, which are programmed in factory are offered by customer demands.

The RT9801A/B performs supervisory function by sending out a reset signal whenever the VDD voltage falls below a preset threshold level. This reset signal will last the whole period before VDD recovering. Reset signal will release after VDD is recovered and last for the whole period of Reset Active Time-out period.

RT9801A/B is N-channel, open-drain output and provided in SOT-26 package.

Ordering Information

RT9801□□□

- Package Type
E : SOT-26
- Operating Temperature Range
C : Commercial Standard
- Reset Threshold
A : 2.5V to 5V
B : 1.5V to 4V

Marking Information

For marking information, contact our sales representative directly or through a RichTek distributor located in your area, otherwise visit our website for detail.

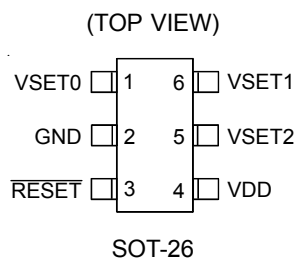
Features

- User Programmable Threshold 1.5V to 5V in 0.1V Step with $\pm 3\%$ Accuracy
- Low Supply Current 3 μ A
- Quick Reset within 20 μ s
- Built-in Recovery Delay 200ms
- Low Functional Supply Voltage 0.9V
- Small SOT-26 Package

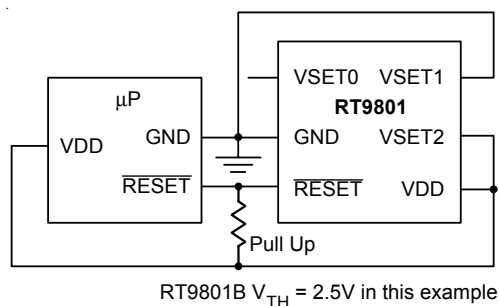
Applications

- Computers
- Controllers
- Intelligent Instruments
- Critical μ P and μ C Power Monitoring
- Portable/Battery-Powered Equipment

Pin Configurations



Typical Application Circuit

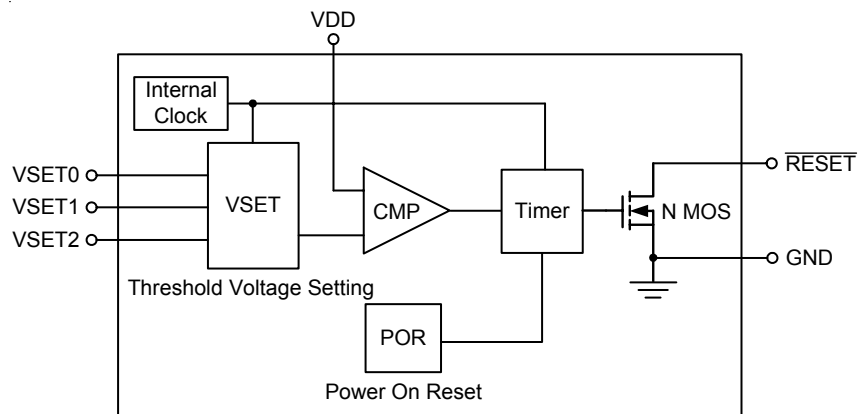


Functional Pin Description

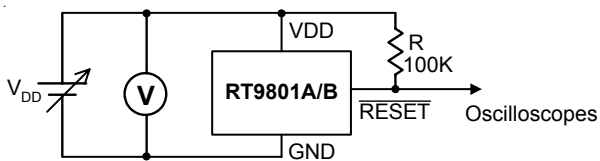
Pin Name	Pin Function
VSET0	Threshold Voltage Selection Pin
GND	Ground Pin
$\overline{\text{RESET}}$	Reset Pulse Output, Negative Pulse
VDD	Power Pin
VSET1	Threshold Voltage Selection Pin
VSET2	Threshold Voltage Selection Pin

Note : Threshold Voltage Setting refer to the Table.1

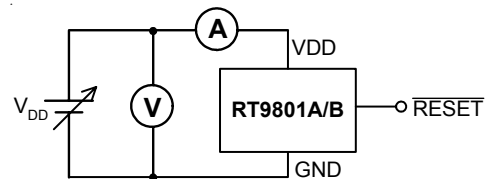
Function Block Diagram



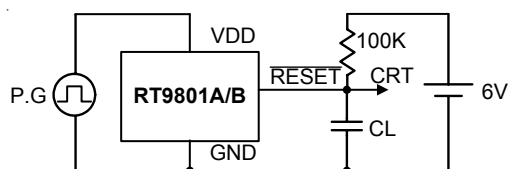
Test Circuits



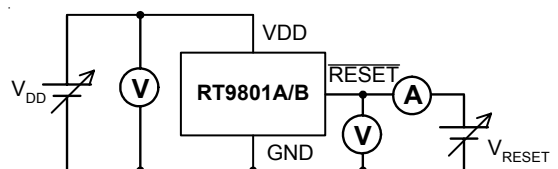
Detection Voltage



Current Consumption



Dynamic Response



Output Transistor Current

Absolute Maximum Ratings

- Terminal Voltage (with Respect to GND)
 - VDD ----- -0.3V to 6.0V
 - All Other Inputs ----- -0.3V to VDD+0.3V
- Input Current, VDD ----- 20mA
- Continuous Power Dissipation, P_D @ $T_A = 25^\circ\text{C}$
 - SOT-26 ----- 0.25W
- Operating Junction Temperature Range ----- -40°C to 125°C
- Storage Temperature Range ----- -65°C to 125°C
 - Package Thermal Resistance
 - SOT-26, θ_{JA} ----- 250°C/W
- Lead Temperature (Soldering, 10sec.) ----- 260°C

Electrical Characteristics

(VDD = 3V, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Operating VDD Range	VDD		0.9	--	6	V
Supply Current	IDD	VDD = 1.5V ~ 3.5V, ISINK = 0	--	--	3	μA
		VDD = 3.5V ~ 5V, ISINK = 0	--	--	3.3	
Reset Threshold	VTH	$T_A = 27^\circ\text{C}$	--	Note1	--	V
Threshold Voltage Accuracy	ΔV_{TH}	$T_A = 27^\circ\text{C}$	--	--	3	%
VDD Drop to Reset Delay	tRD	Drop = -125mV	--	--	20	μS
Reset Active Timeout Period	tRP	VDD $\geq 1.02 \times V_{TH}$, Programmable	120	200	280	ms
VSET Pin Input Threshold	VIL	$T_A = 27^\circ\text{C}$	--	$0.15V_{DD}$	--	V
	VIH	$T_A = 27^\circ\text{C}$	--	$0.85V_{DD}$	--	
RESET Output Voltage	VOL	VDD < VTH, ISINK = 3.5mA	--	0.4	--	V

Timing Diagram

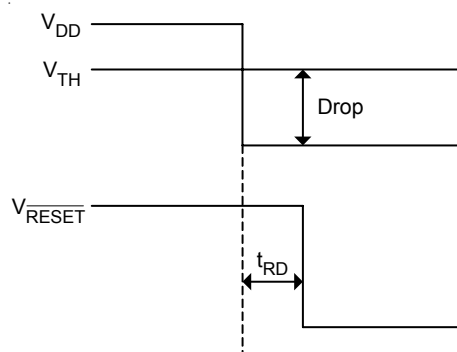
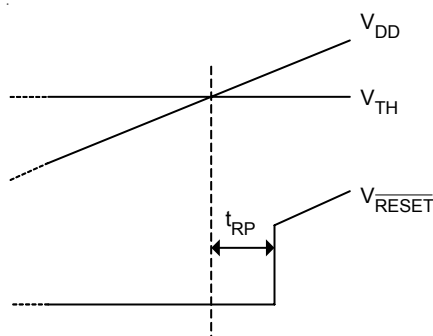


Table 1: Pin Conditions for Programmable Threshold Voltage Setting

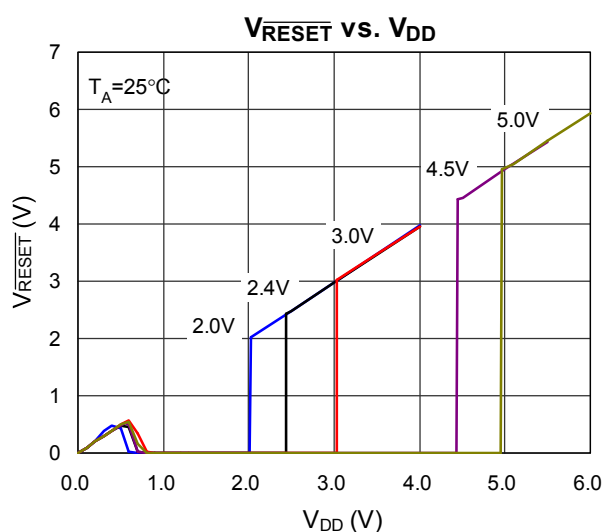
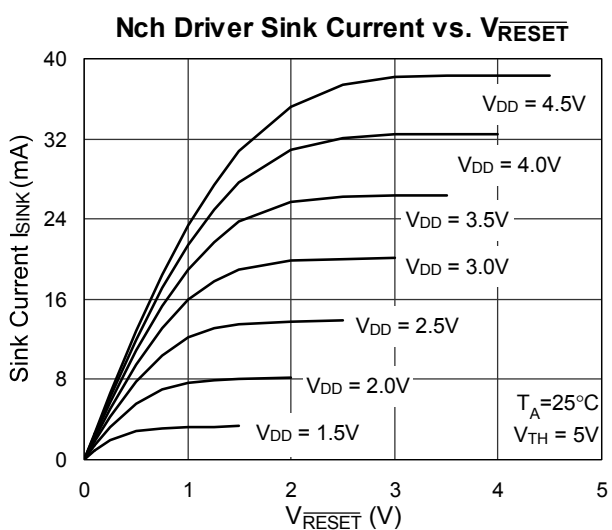
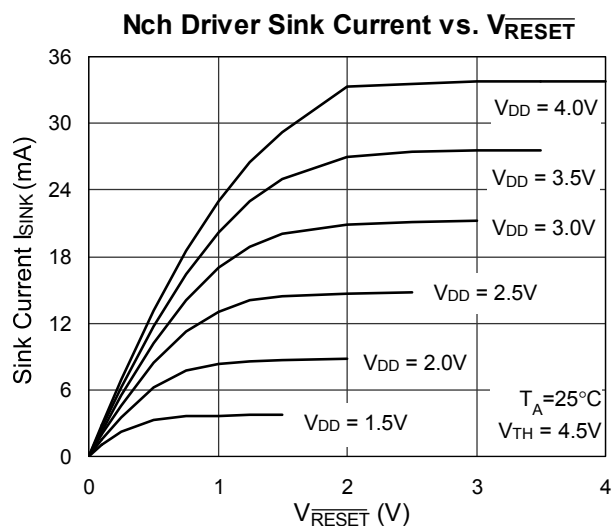
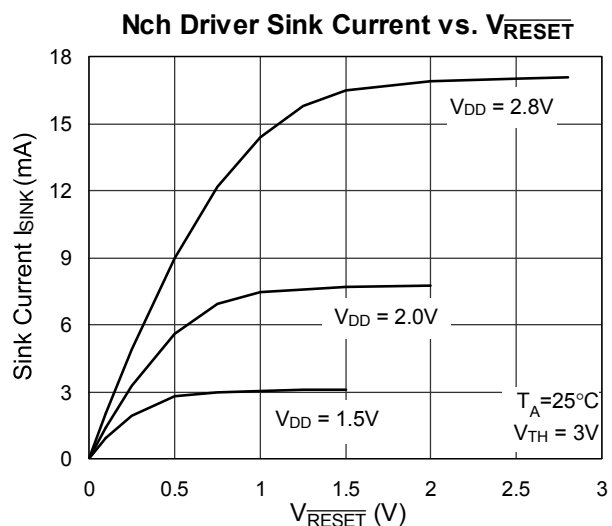
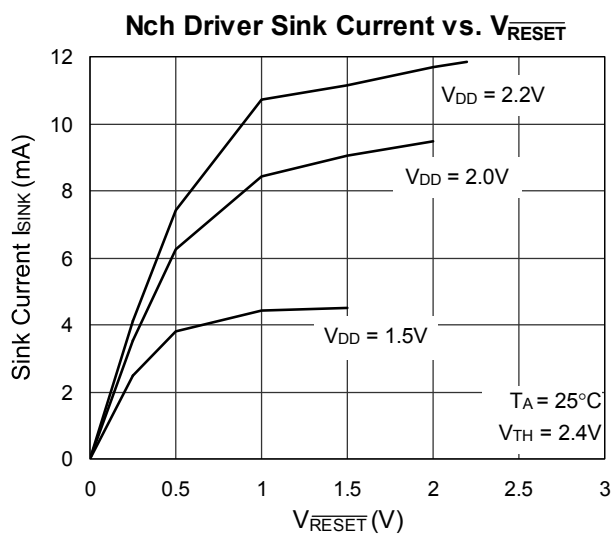
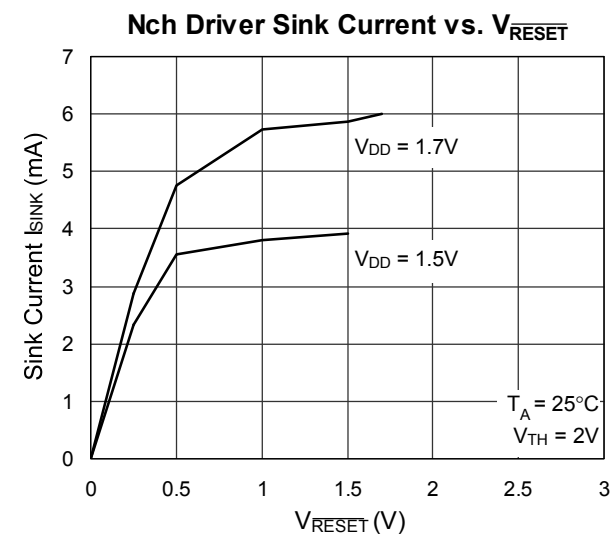
RT9801A	RT9801B	VSET0	VSET1	VSET2
5.0	4.0	H	H	H
4.9	3.9	H	H	F
4.8	3.8	H	H	L
4.7	3.7	H	F	H
4.6	3.6	H	F	F
4.5	3.5	H	F	L
4.4	3.4	H	L	H
4.3	3.3	H	L	F
4.2	3.2	H	L	L
4.1	3.1	F	H	H
4.0	3.0	F	H	F
3.9	2.9	F	H	L
3.8	2.8	F	F	H
3.7	2.7	F	F	F
3.6	2.6	F	F	L
3.5	2.5	F	L	H
3.4	2.4	F	L	F
3.3	2.3	F	L	L
3.2	2.2	L	H	H
3.1	2.1	L	H	F
3.0	2.0	L	H	L
2.9	1.9	L	F	H
2.8	1.8	L	F	F
2.7	1.7	L	F	L
2.6	1.6	L	L	H
2.5	1.5	L	L	F

Note : 1. H : Connected to VDD

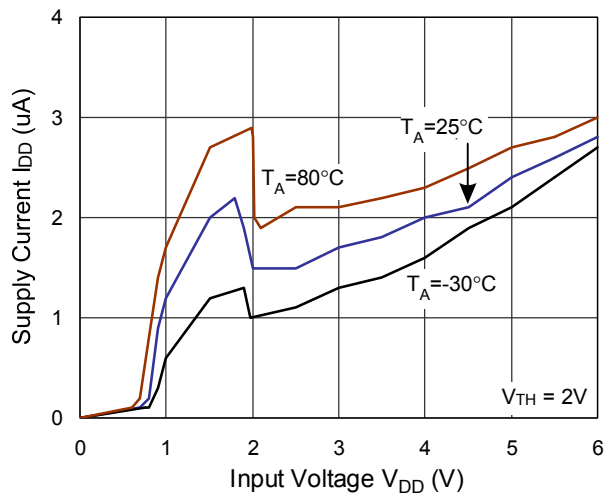
2. L : Connected to GND

3. F : Floating

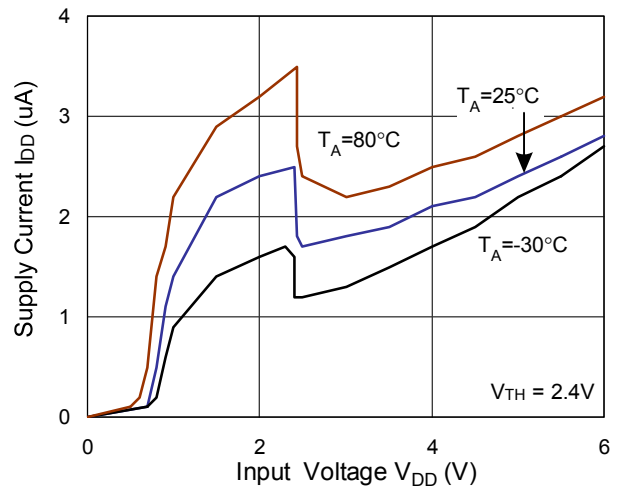
Typical Operating Characteristics



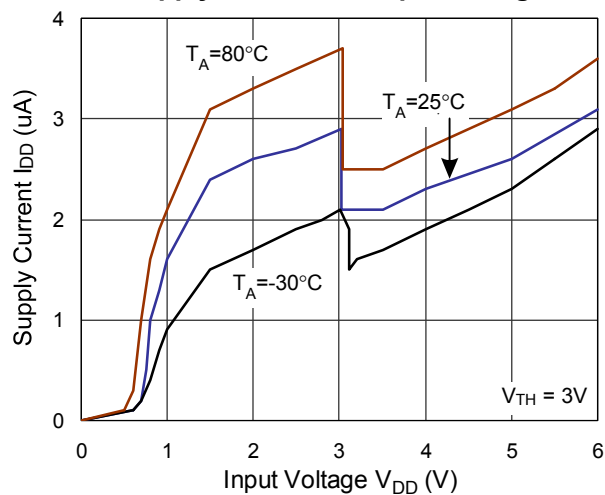
Supply Current vs. Input Voltage



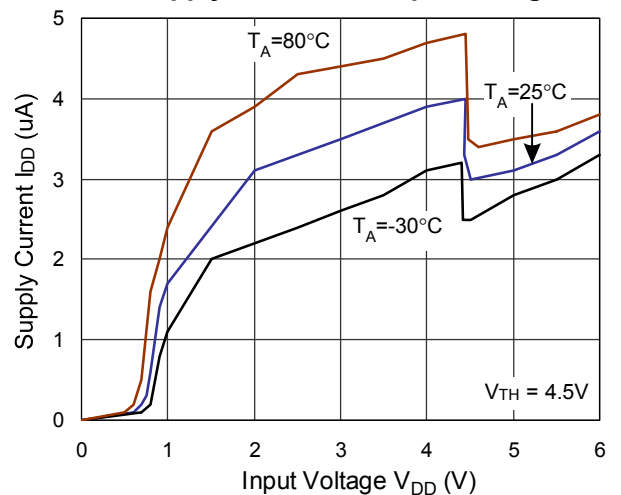
Supply Current vs. Input Voltage



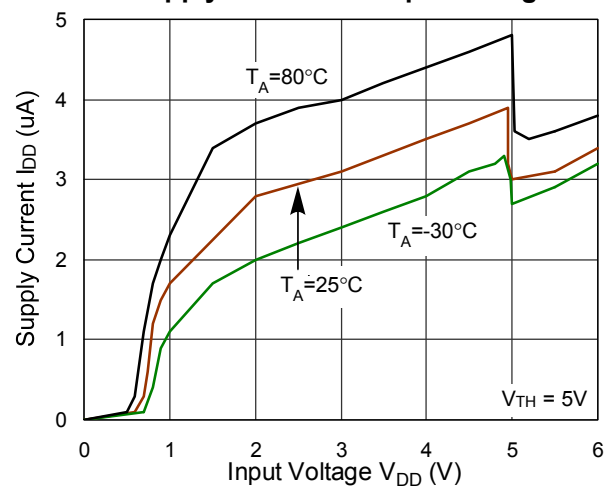
Supply Current vs. Input Voltage



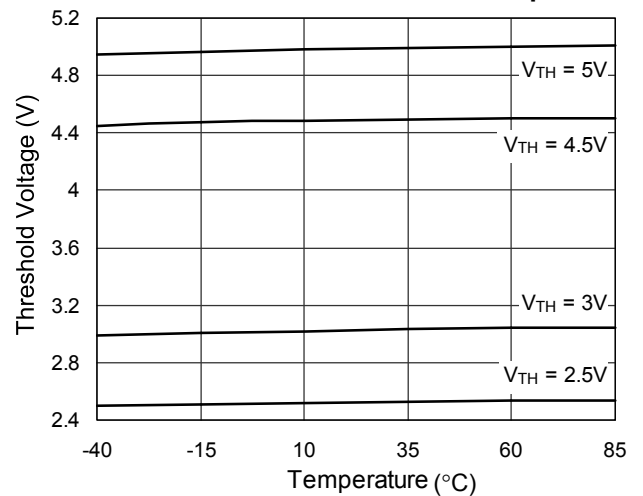
Supply Current vs. Input Voltage



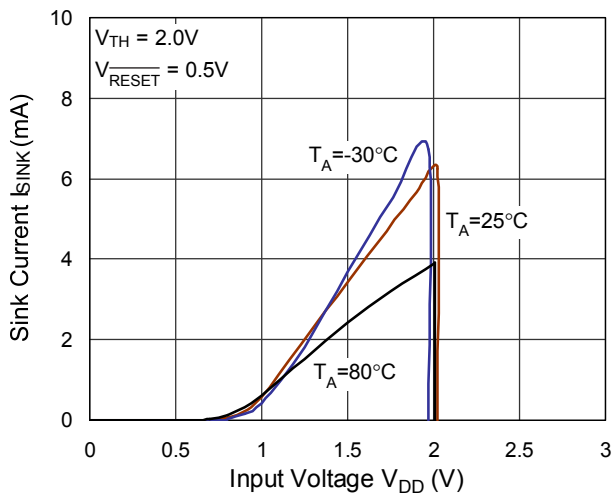
Supply Current vs. Input Voltage



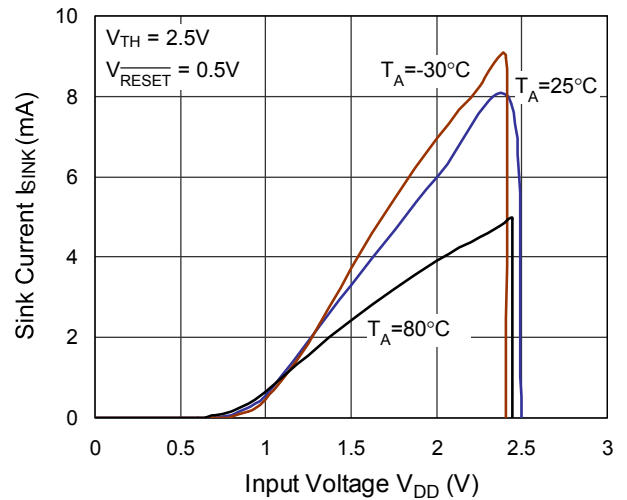
Reset Threshold Deviation vs. Temperature



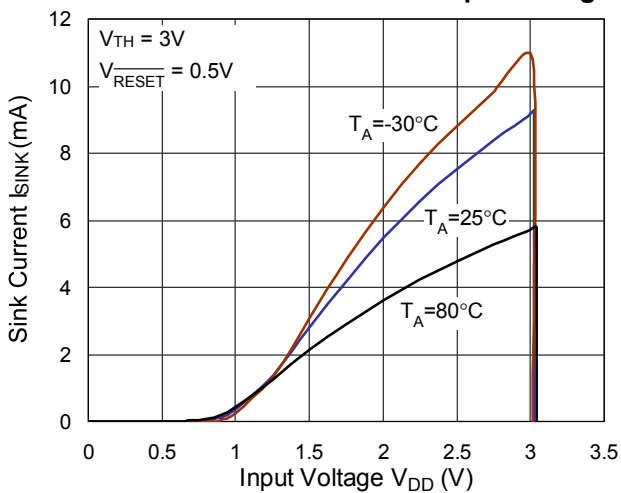
Nch Driver Sink Current vs. Input Voltage



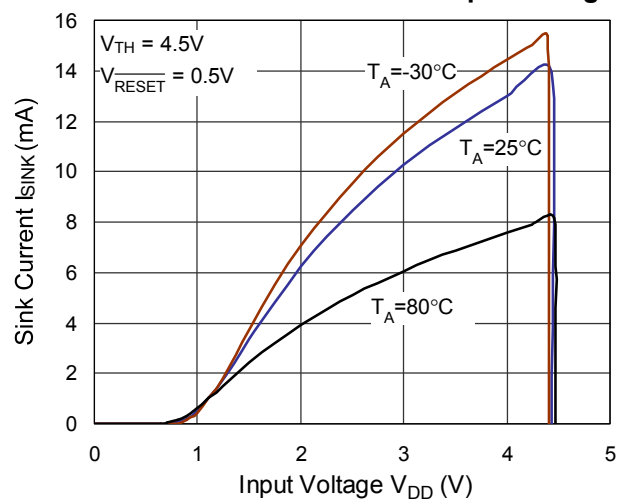
Nch Driver Sink Current vs. Input Voltage



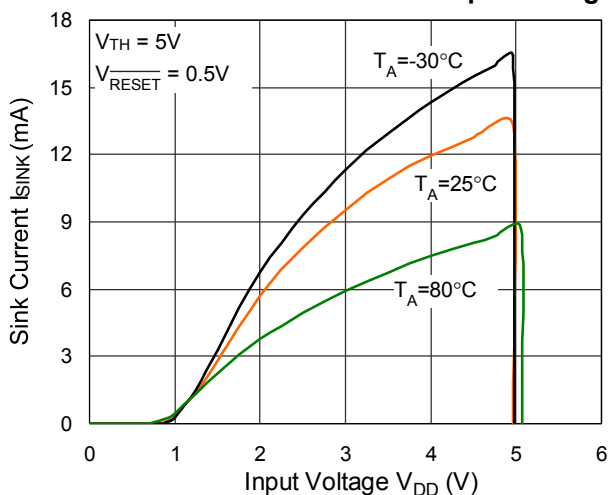
Nch Driver Sink Current vs. Input Voltage



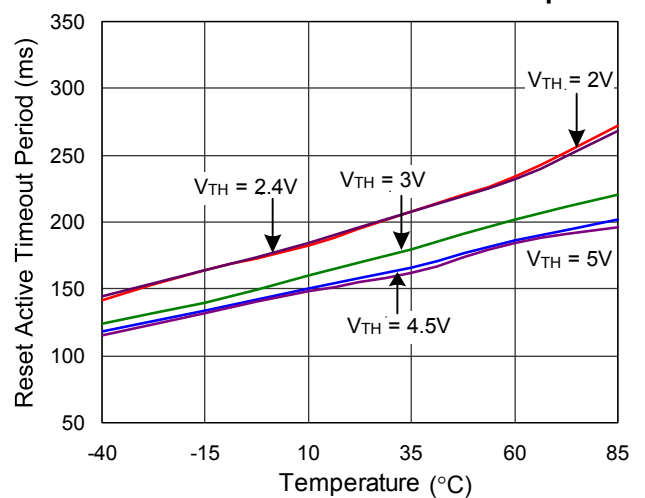
Nch Driver Sink Current vs. Input Voltage

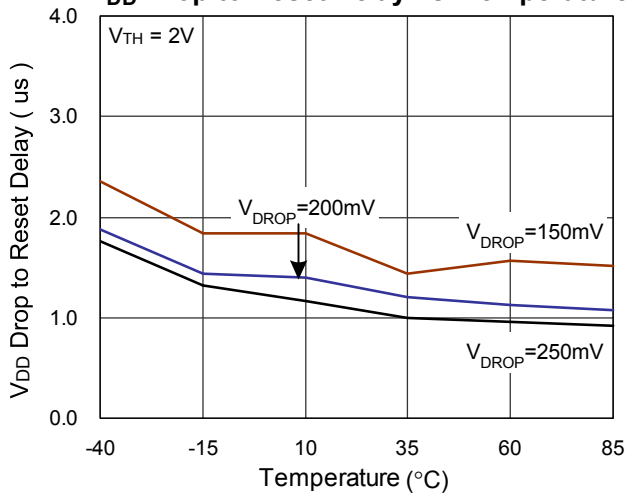
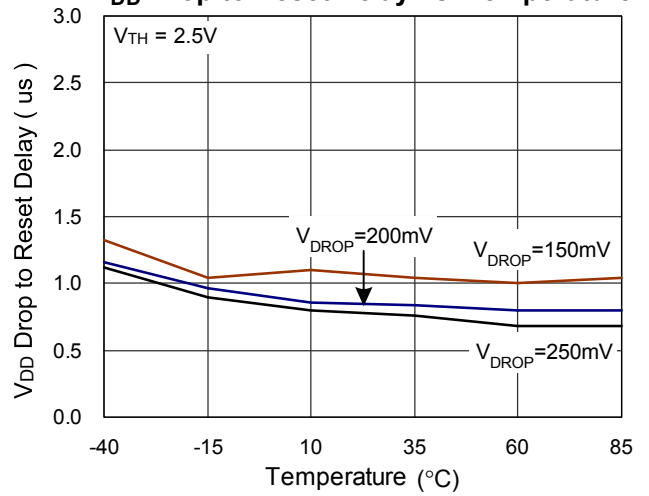
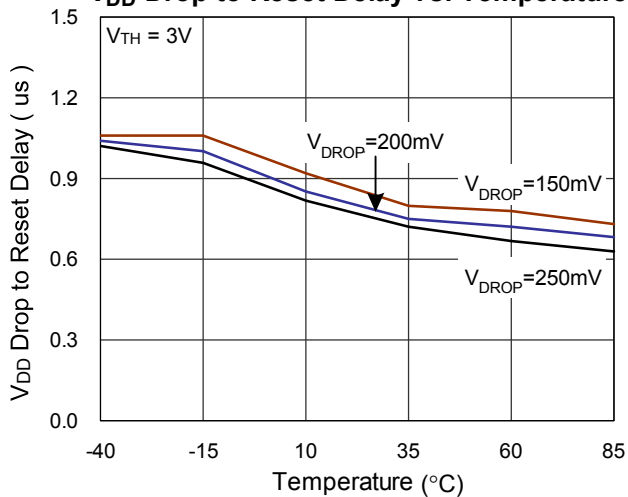
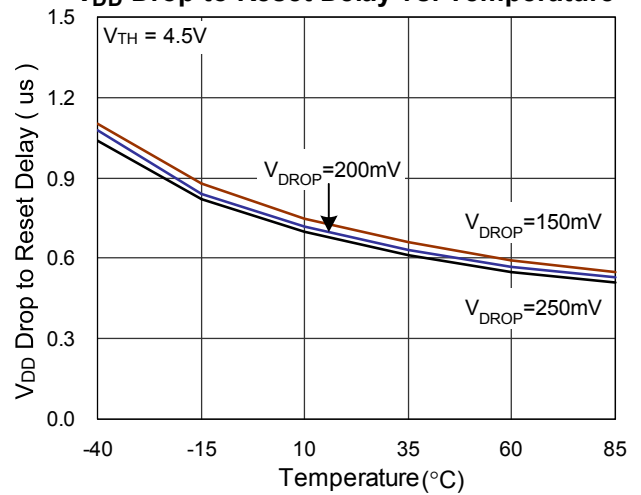
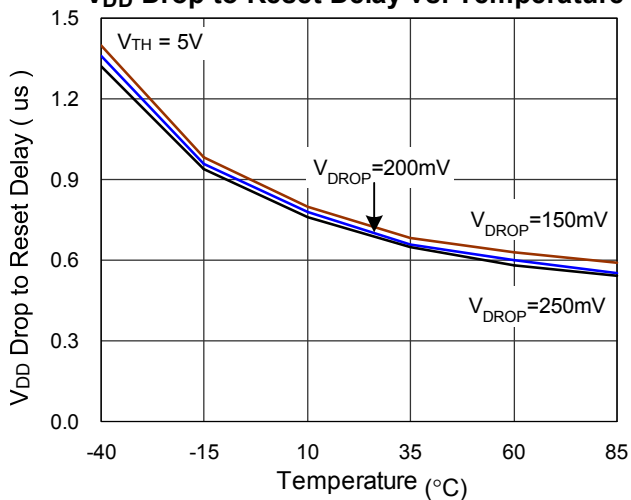
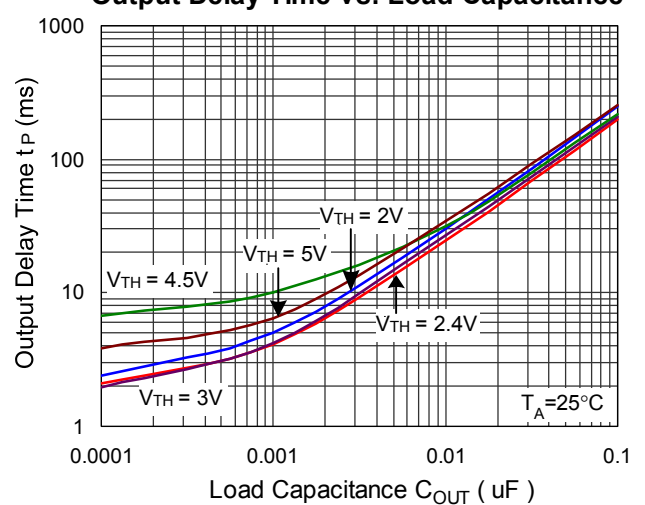


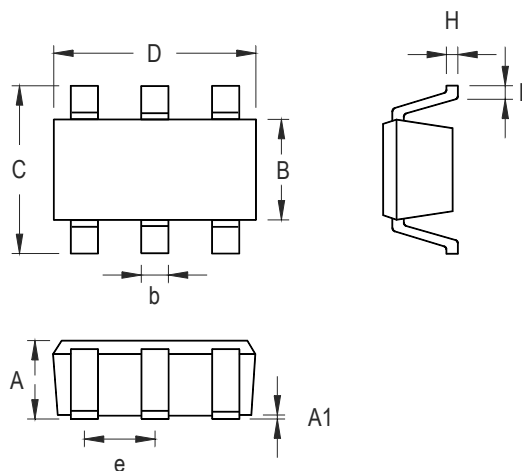
Nch Driver Sink Current vs. Input Voltage



Reset Active Timeout Period vs. Temperature



V_{DD} Drop to Reset Delay vs. Temperature**V_{DD} Drop to Reset Delay vs. Temperature****V_{DD} Drop to Reset Delay vs. Temperature****V_{DD} Drop to Reset Delay vs. Temperature****V_{DD} Drop to Reset Delay vs. Temperature****Output Delay Time vs. Load Capacitance**

Outline Dimension


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.889	1.295	0.035	0.051
A1	--	0.152	--	0.006
B	1.397	1.803	0.055	0.071
b	0.356	0.559	0.014	0.022
C	2.591	2.997	0.102	0.118
D	2.692	3.099	0.106	0.122
e	0.838	1.041	0.033	0.041
H	0.102	0.254	0.004	0.010
L	0.356	0.610	0.014	0.024

SOT- 26 Surface Mount Package
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