

# Micro-Power Voltage Detectors

## General Description

The RT9808 is a micro-power voltage detector supervising the power supply voltage level for microprocessors ( $\mu$ P) or digital systems. It provides internally fixed threshold levels with 0.1V per step ranging from 1.5V to 5V, which covers most digital applications. It features low supply current of 3 $\mu$ A.

The RT9808 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. Once VDD recovered up-crossing the threshold level, the reset signal will be released if VDD is above threshold and last for the whole period of reset active time out.

RT9808 is n-channel, open-drain output.

## Applications

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

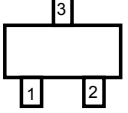
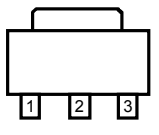
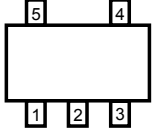
## Ordering Information

RT9808-□□□□	
□□□□	Package Type
V : SOT-23	
X : SOT-89	
B : SOT-25	
□□□□	Operating temperature range
C : Commercial standard	
□□□□	Reset Threshold
15 : 1.5V	
16 : 1.6V	
:	
49 : 4.9V	
50 : 5.0V	

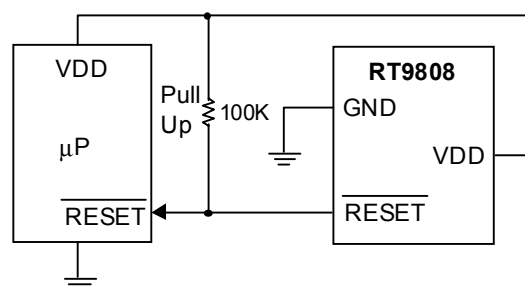
## Features

- Internally Fixed Threshold 1.5V to 5V in 0.1V Step
- $\pm 2\%$  Accuracy
- Low Supply Current 3 $\mu$ A
- Quick Reset within 20 $\mu$ S
- Built-in Recovery Delay 200mS
- Low Functional Supply Voltage 0.9V
- N-Channel Open Drain Output
- Small 3-Pin SOT-23/SOT89 and 5-Pin SOT-25 Packages

## Pin Configurations

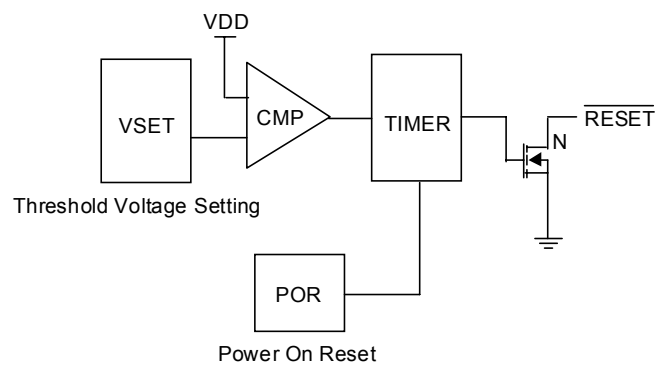
Part Number	Pin Configurations
RT9808-□□CV (Plastic SOT-23)	 <p>TOP VIEW</p> <ol style="list-style-type: none"> <li>1. <math>\overline{\text{RESET}}</math></li> <li>2. GND</li> <li>3. VDD</li> </ol>
RT9808-□□CX (Plastic SOT-89)	 <p>TOP VIEW</p> <ol style="list-style-type: none"> <li>1. <math>\overline{\text{RESET}}</math></li> <li>2. VDD</li> <li>3. GND</li> </ol>
RT9808-□□CB (Plastic SOT-25)	 <p>TOP VIEW</p> <ol style="list-style-type: none"> <li>1. <math>\overline{\text{RESET}}</math></li> <li>2. VDD</li> <li>3. GND</li> <li>4. NC</li> <li>5. NC</li> </ol>

## Typical Application Circuit



**Pin Description**

Pin Name	Pin Function
GND	Ground Pin
$\overline{\text{RESET}}$	Reset Pulse Output, Negative Pulse
VDD	Power Pin
NC	No Connected

**Function Block Diagram**

## 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
- Output Current,  $\overline{\text{RESET}}$  ..... 20mA
- Power Dissipation,  $P_D$  @  $T_A = 25^\circ\text{C}$ 
  - SOT-23 ..... 0.25W
  - SOT-89 ..... 0.5W
  - SOT-25 ..... 0.25W
- Operating Junction Temperature Range .....  $-40^\circ\text{C} \sim 125^\circ\text{C}$
- Storage Temperature Range .....  $-65^\circ\text{C} \sim 125^\circ\text{C}$
- Package Thermal Resistance
  - SOT-23,  $\theta_{JA}$  .....  $250^\circ\text{C/W}$
  - SOT-89,  $\theta_{JC}$  .....  $100^\circ\text{C/W}$
  - SOT-89,  $\theta_{JA}$  .....  $300^\circ\text{C/W}$
  - SOT-25,  $\theta_{JA}$  .....  $250^\circ\text{C/W}$
- Lead Temperature (Soldering, 5sec.) .....  $260^\circ\text{C}$

## Electrical Characteristics

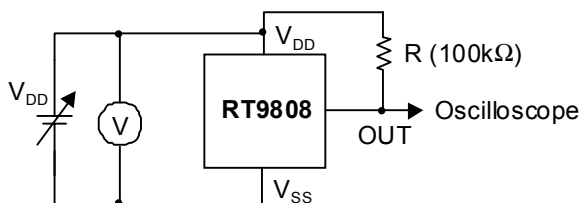
(VDD = 3.0, unless specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Operating VDD ( $V_{OUT}$ ) Range	$V_{DD}$		0.9	--	6	V
Supply Current	$I_{DD}$	$V_{DD} = 1.5V \sim 5V, I_{OUT} = 0$	--	3	--	$\mu\text{A}$
Reset Threshold	$V_{TH}$	$T_A = 27^\circ\text{C}$	--	Note1	--	V
Threshold Voltage Accuracy	$\Delta V_{TH}$	$T_A = 27^\circ\text{C}$	--	--	2	%
VCC Drop to Reset Delay	$t_{RD}$	Drop = -125mV	--	--	20	$\mu\text{S}$
Reset Active Time Out Period	$t_{RP}$	$V_{DD} \geq 1.02 \times V_{TH}$	--	200	--	mS
$\overline{\text{RESET}}$ Output Voltage	$V_{OL}$	$V_{DD} < V_{TH}, I_{SINK} > 3.5\text{mA}$	--	0.4	--	V

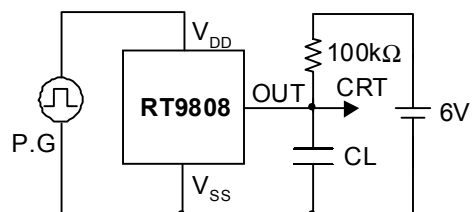
Note1: 1.5V ~ 5V, step 0.1V

## Measuring Circuit

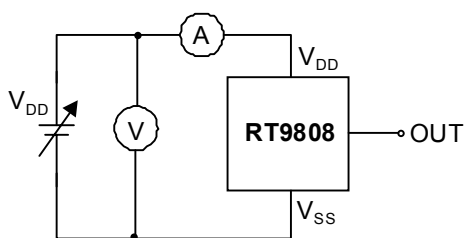
(1) Detection Voltage



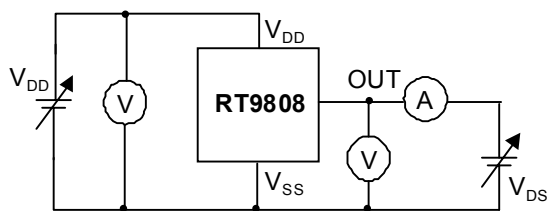
(3) Output Transistor Current



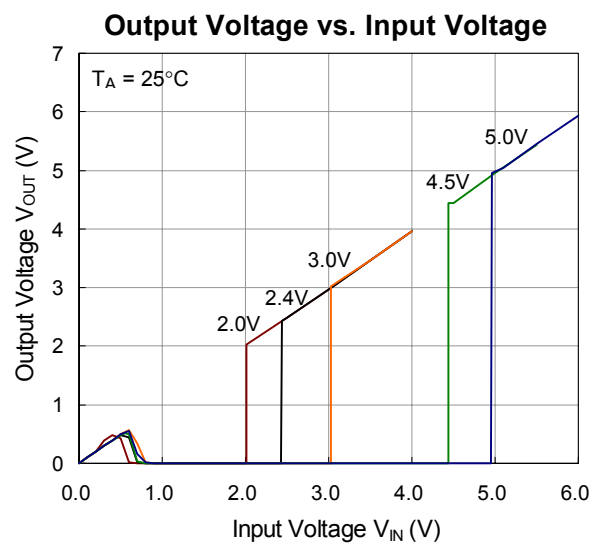
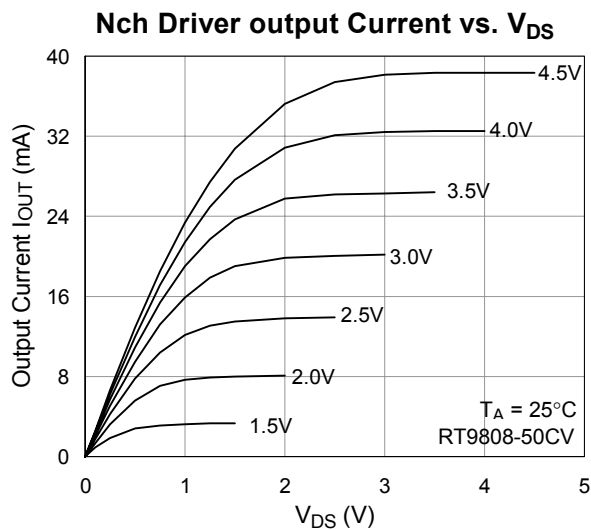
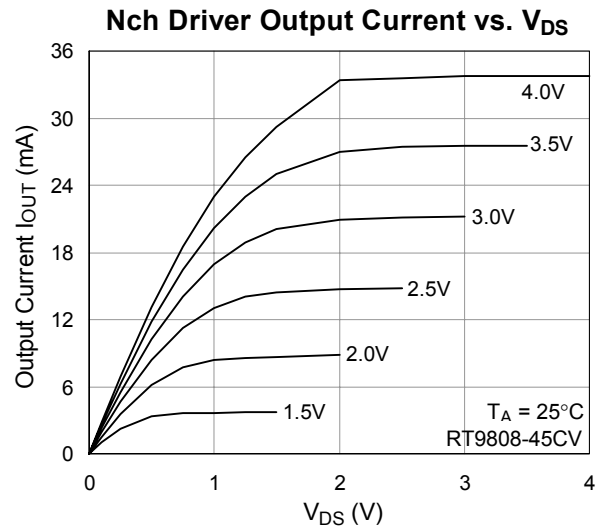
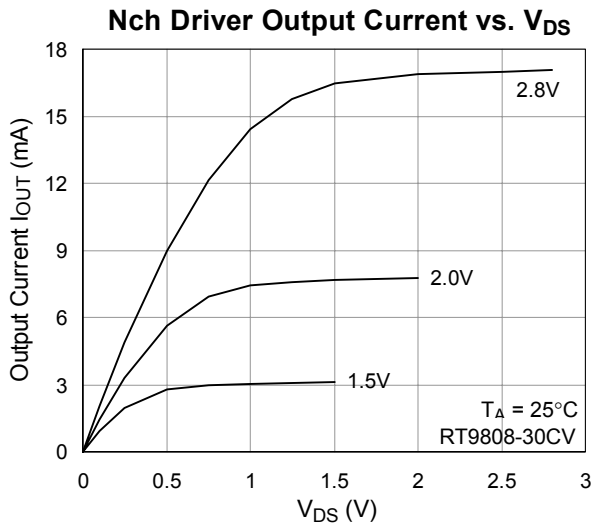
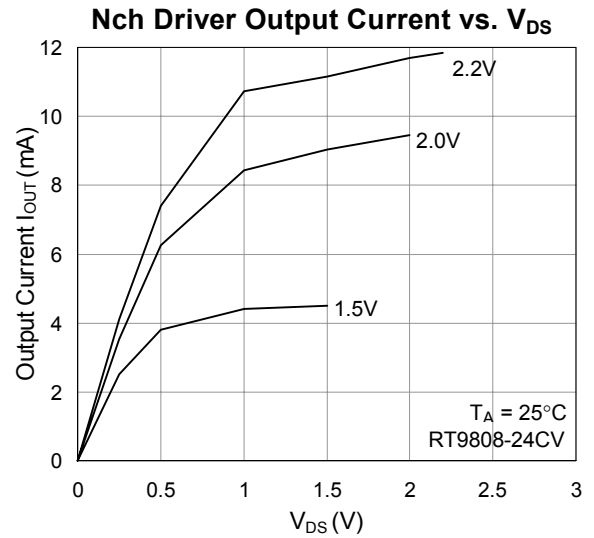
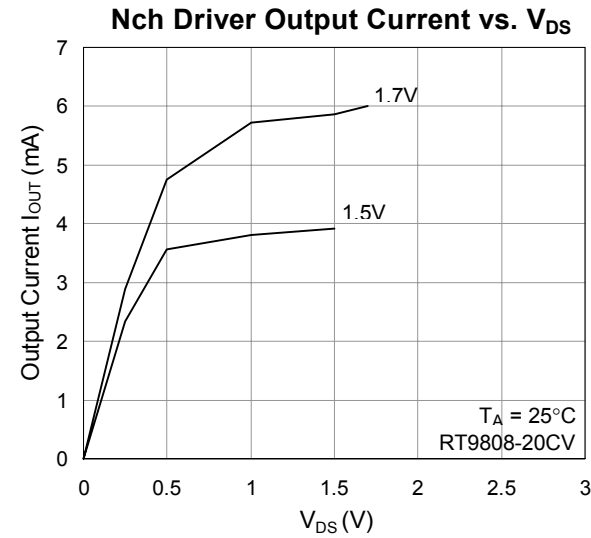
(2) Current Consumption



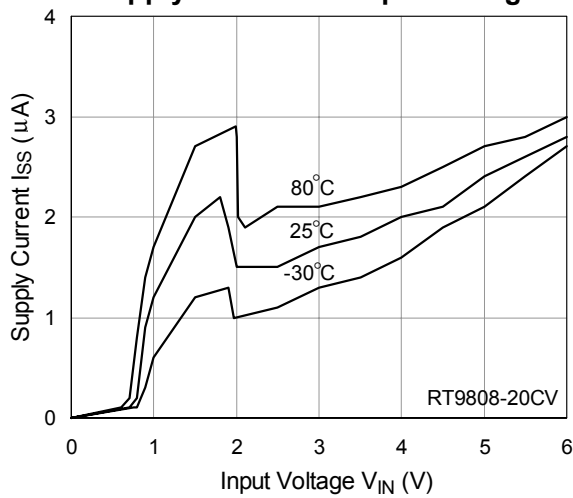
(4) Dynamic Response



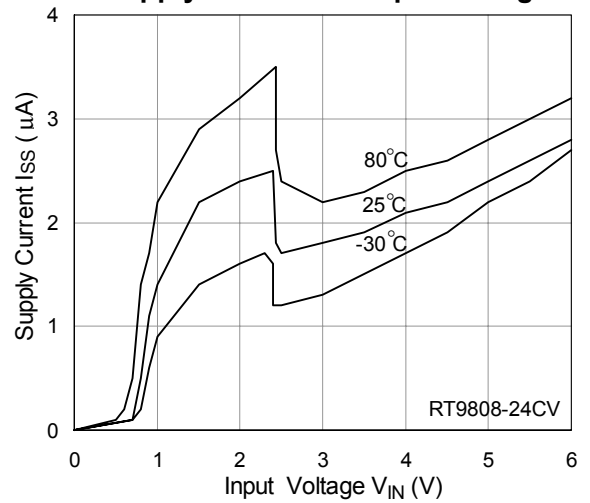
## Typical Operating Characteristics



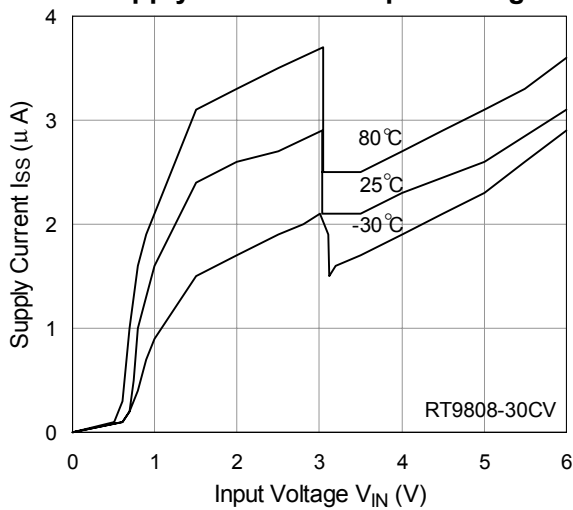
Supply Current vs. Input Voltage



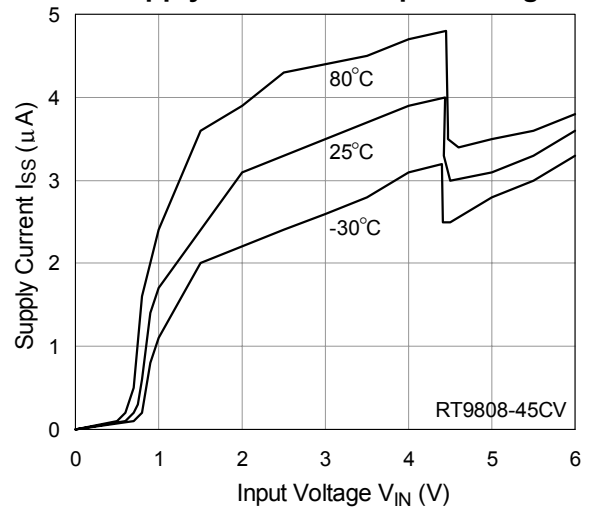
Supply Current vs. Input Voltage



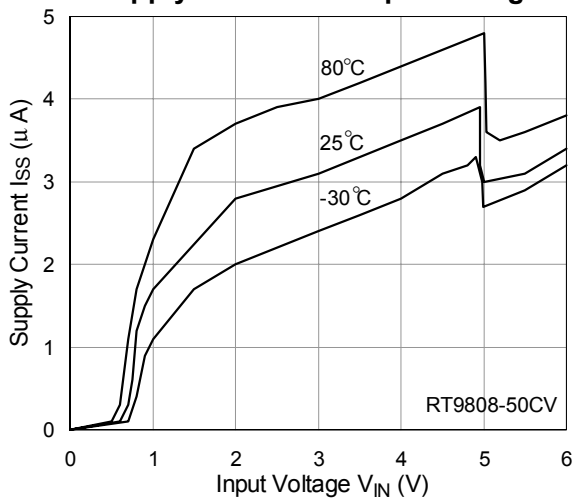
Supply Current vs. Input Voltage



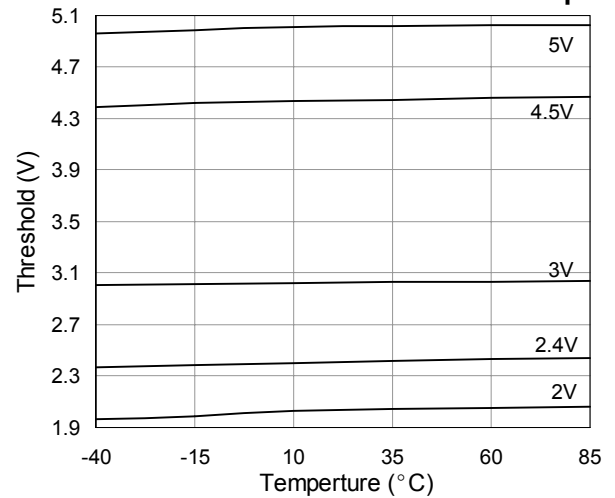
Supply Current vs. Input Voltage



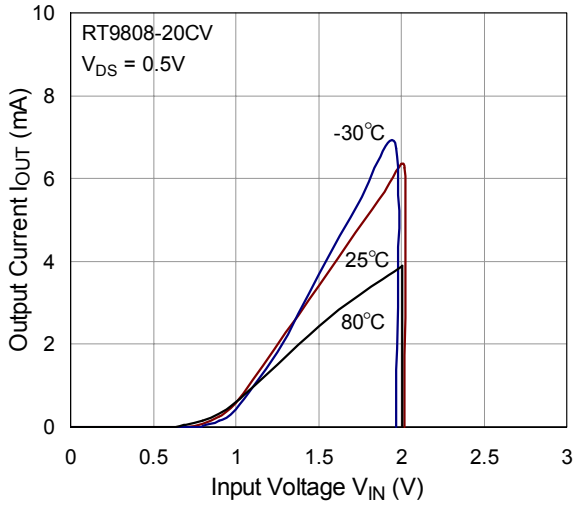
Supply Current vs. Input Voltage



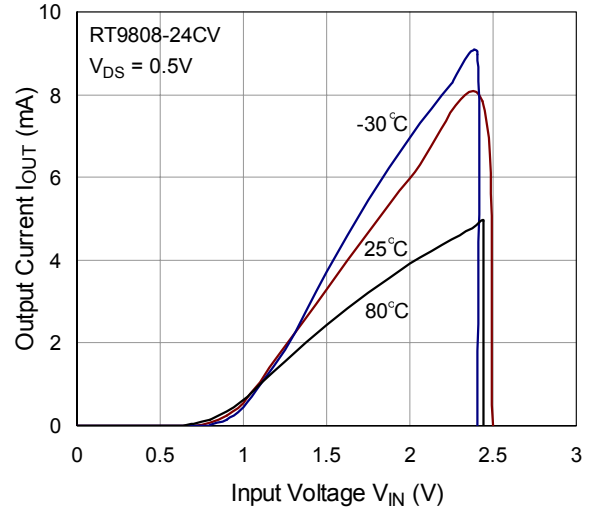
Reset Threshold Deviation vs. Temp.



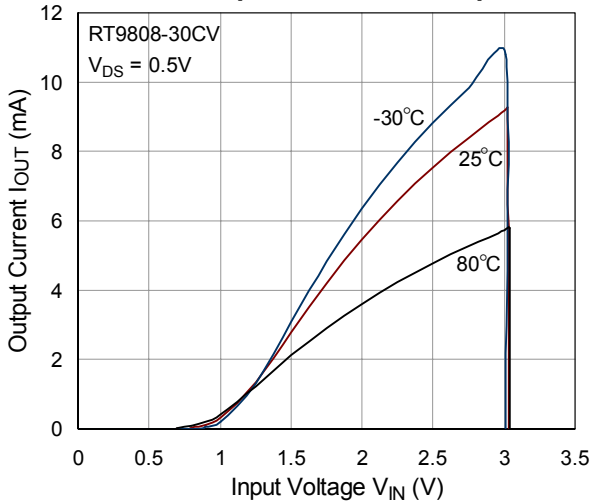
**Nch Driver Output Current vs. Input Voltage**



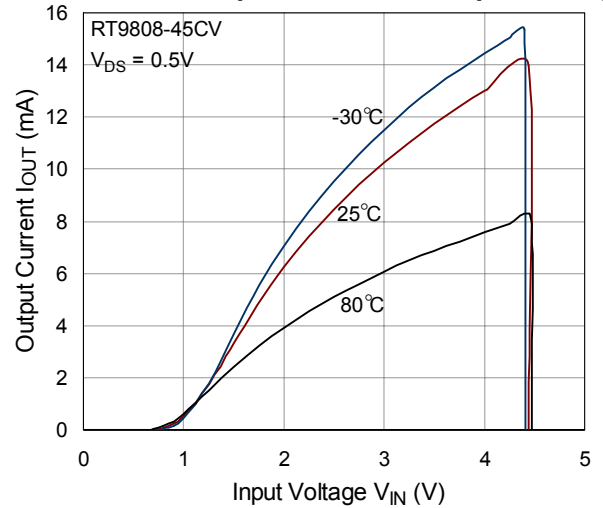
**Nch Driver Output Current vs. Input Voltage**



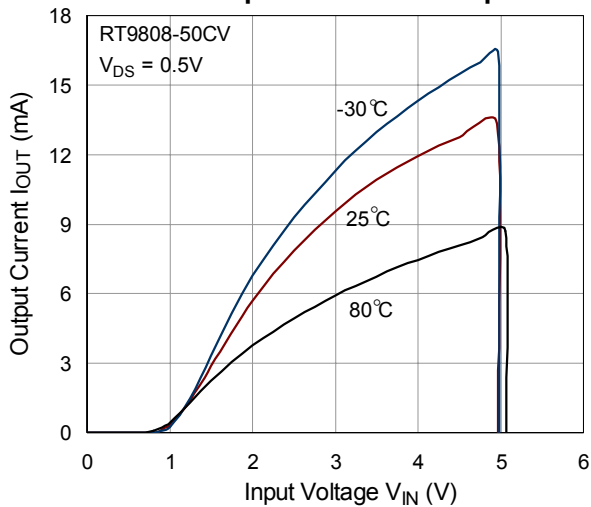
**Nch Driver Output Current vs. Input Voltage**



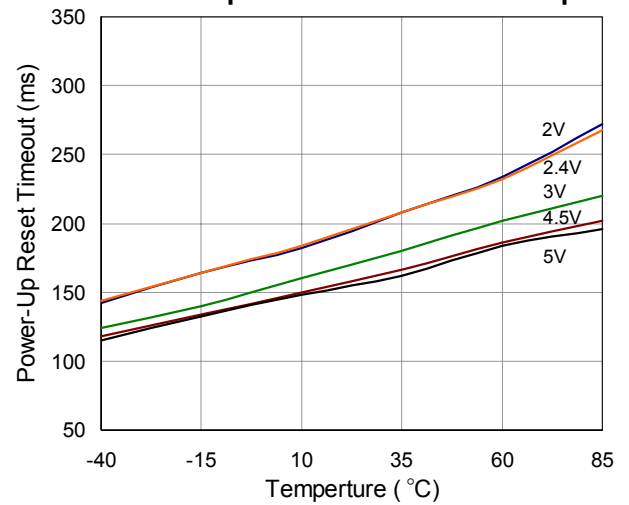
**Nch Driver Output Current vs. Input Voltage**



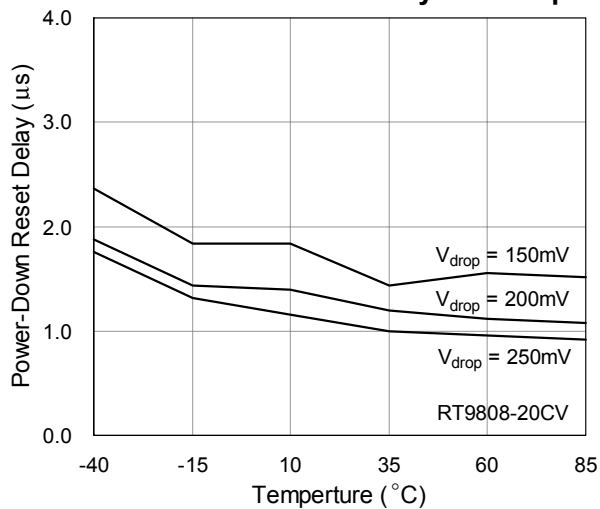
**Nch Driver Output Current vs. Input Voltage**



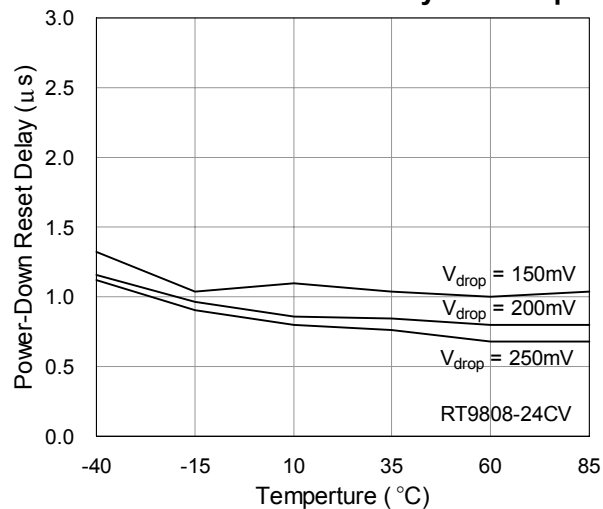
**Power-Up reset Timeout vs. Temp.**



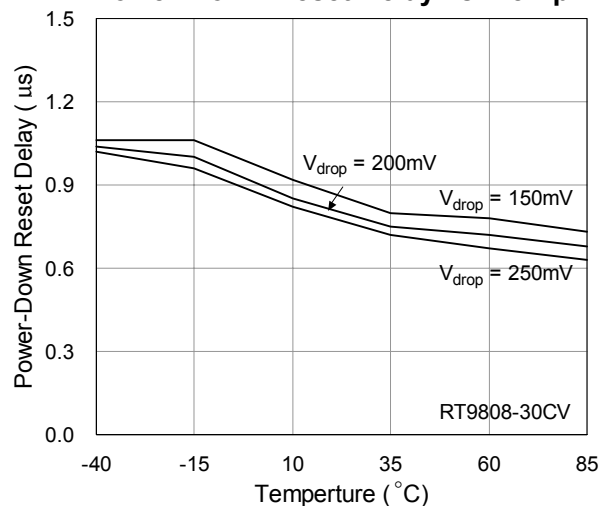
Power-Down Reset Delay vs. Temp.



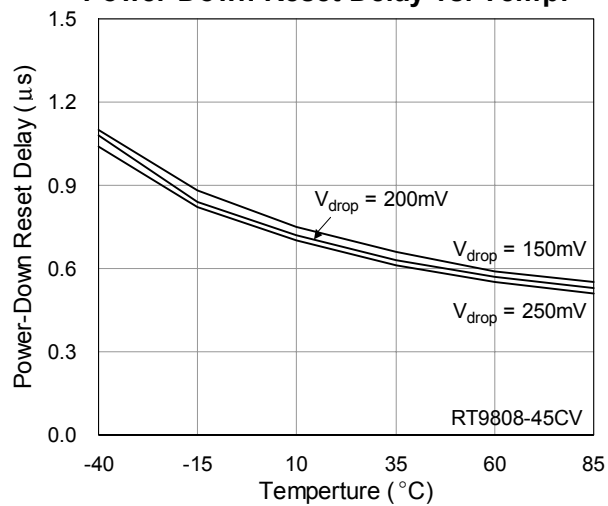
Power-Down Reset Delay vs. Temp.



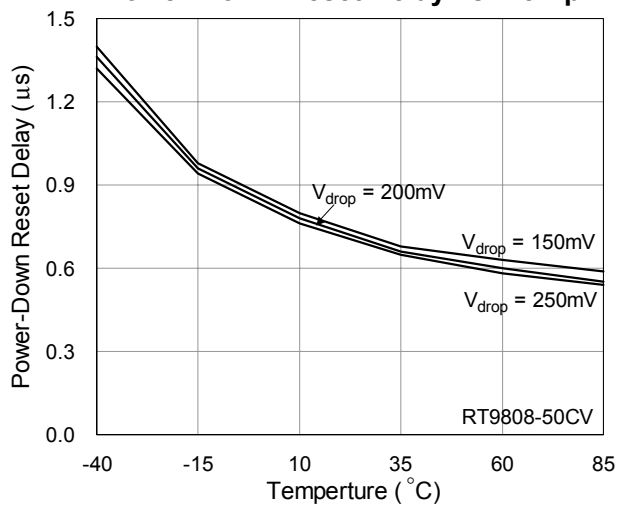
Power-Down Reset Delay vs. Temp.



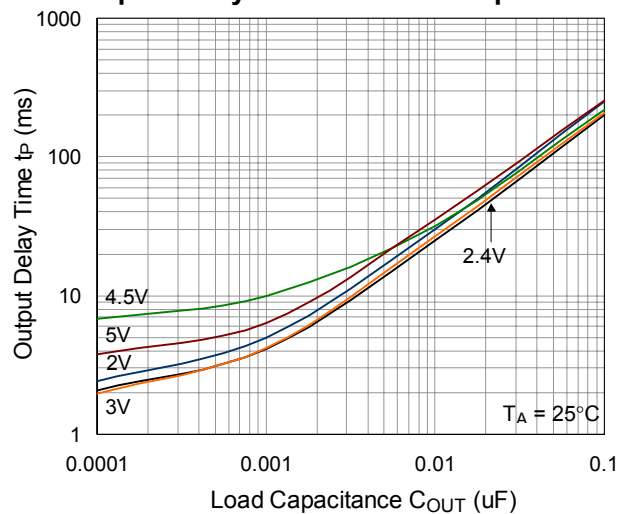
Power-Down Reset Delay vs. Temp.



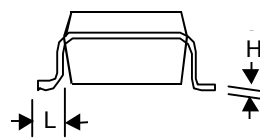
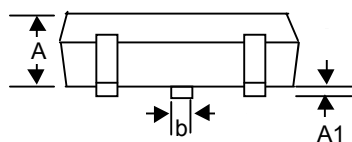
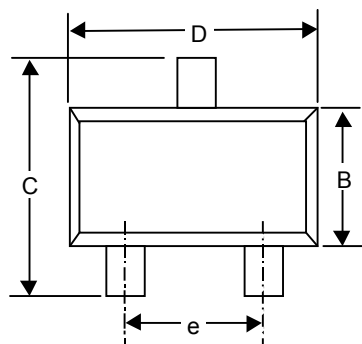
Power-Down Reset Delay vs. Temp.



Output Delay Time vs. Load Capacitance

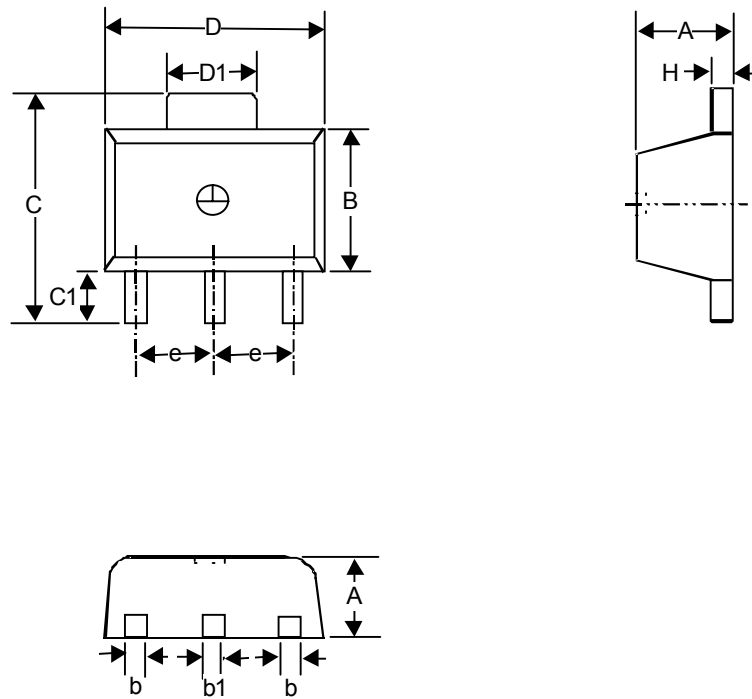




**Package Information**


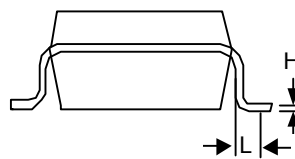
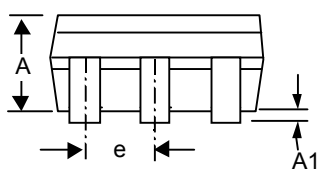
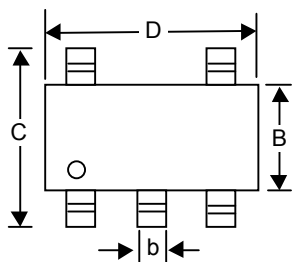
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.889	1.295	0.035	0.051
A1	--	0.152	--	0.006
B	1.397	1.803	0.055	0.071
b	0.356	0.508	0.014	0.020
C	2.591	2.997	0.102	0.118
D	2.692	3.099	0.106	0.122
e	1.803	2.007	0.071	0.079
H	0.102	0.254	0.004	0.010
L	0.356	0.610	0.014	0.024

**SOT-23 Plastic Surface Mount**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.397	1.600	0.055	0.063
b	0.356	0.483	0.014	0.019
B	2.388	2.591	0.094	0.102
b1	0.406	0.533	0.016	0.021
C	--	4.242	--	0.167
C1	0.787	1.194	0.031	0.047
D	4.394	4.597	0.173	0.181
D1	1.397	1.753	0.055	0.069
e	1.448	1.549	0.057	0.061
H	0.381	0.432	0.015	0.017

### 3-Lead SOT-89 Surface Mount



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.889	1.295	0.035	0.051
A1	0.000	0.152	0.000	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- 25 Surface Mount Package

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