# TPRT9080 Series

## 600mA,2uA, Higt PSRR Voltage Reaulators

www.sot23.com.tw

## Features

- 2μA Ground Current at no Load
- ±2% Output Accuracy
- 600mA Output Current
- 10nA Disable Current ( by option )
- Wide Operating Input Voltage Range: 1.2V to 5.5V
- Dropout Voltage: 0.32V at 600mA/ $V_{OUT}$ 3.3V
- Support Fixed Output Voltage 1.2V, 1.5V, 1.6V, 1.8V, 2.5V, 2.8V, 3.0V, 3.3V
- Stable with Ceramic or Tantalum Capacitor
- Current Limit Protection
  Over Temperature Protection
- SOT23-5 Packages

## Applications

- Portable, Battery Powered Equipment
- Low Power Microcontrollers
- Laptop, Palmtops and PDAs
- Wireless Communication Equipment
- Audio/Video Equipment
- Car Navigation Systems

## General Descri tion

The TPRT9080 series are a group of low-dropout ( LDO ) voltage regulators offering the benefits of wide input voltage range from 1.2V to 5.5V, low dropout voltage, low power consumption, and miniaturized packaging.

Quiescent current of only 2μA makes these devices ideal for powering the battery-powered, always-on systems that require very little idle-state power dissipation to a longer service life. There is an option of shutdown mode by selecting the parts with the EN pin and pulling it low. The shutdown current in this mode goes down to only 10nA ( typical ).

The TPRT9080 series of linear regulators are stable with the ceramic output capacitor over its wide input range from 1.2V to 5.5V and the entire range of output load current ( 0mA to 600mA ).

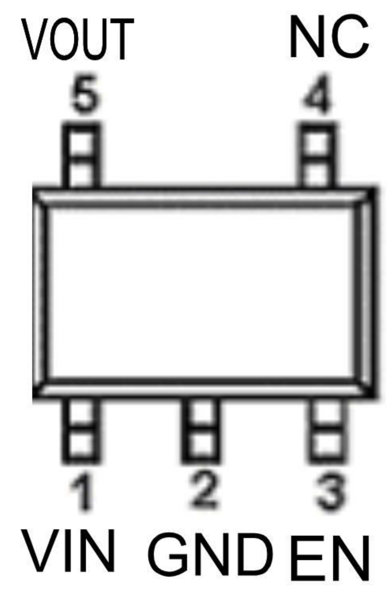
## Ordering Information

**TPRT9080-12GJ5**

GJ5:SOT23-5 Package

Output voltage: 12=1.2V
15=1.5V
18=1.8V
30=3.0V
33=3.3V
XX=X.XV

## PIN CONFIGURATION




SOT23-5

## Typical Application Circuit

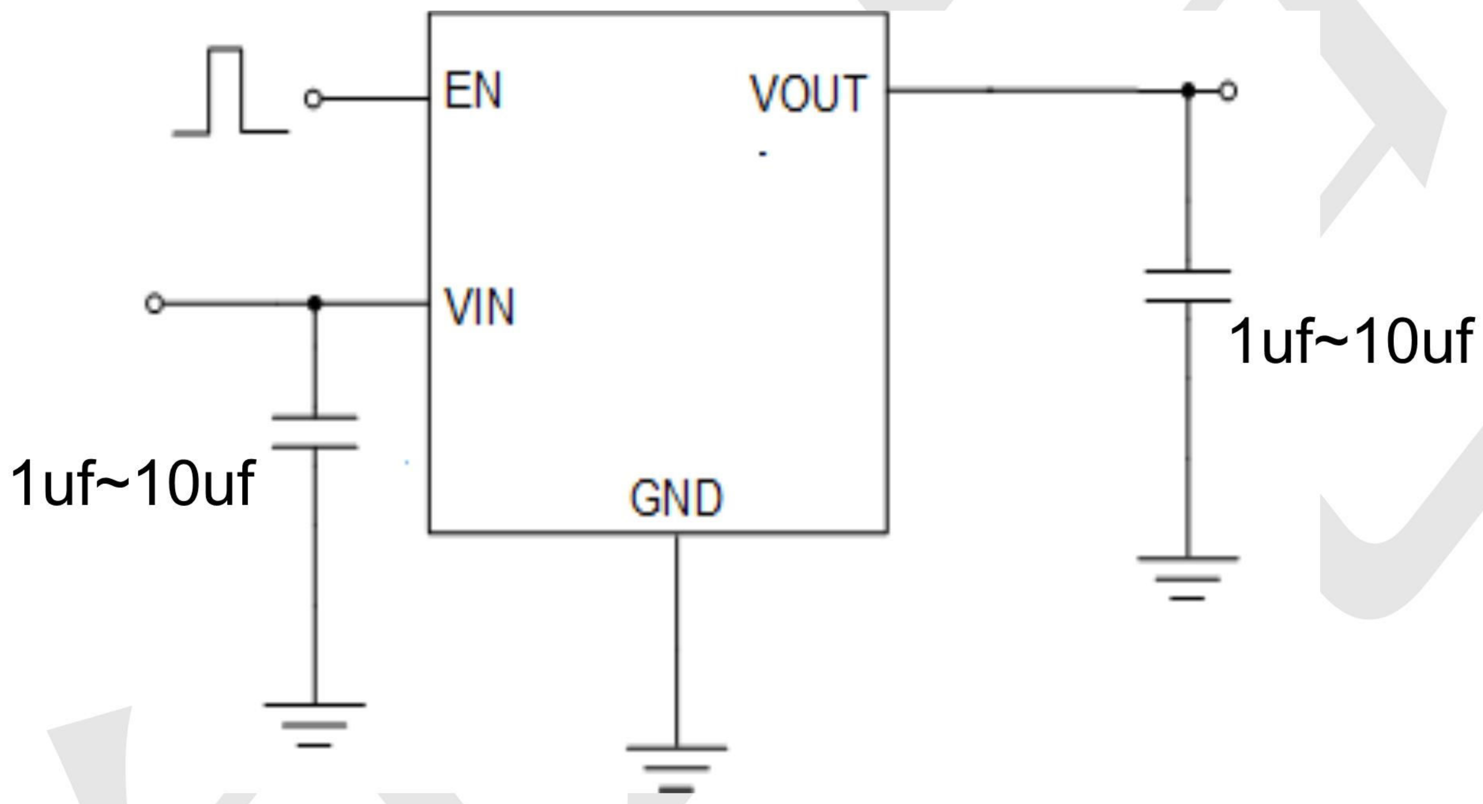



Figure 2: Application circuit of Fixed $V_{OUT}$ LDO with enable function

## ABSOLUTE MAXIMUM RATINGS

VIN Pin to GND Pin Voltage ........................................ -0.3V to 6.5V

VOUT Pin and EN [illegible]oltage ........................................ -0.3V to 6V

VOUT Pin to VIN Pin Voltage ........................................ -6V to 0.3V

Storage Temperature Range ........................................ -60ºC~150ºC

Lead Temperature (Soldering, 10 sec) ........................................ 260ºC

Junction Temperature ........................................ 150ºC

Operating Ambient Temperature Range $T_A$ ........................................ -40ºC~85ºC

| | | |
|---|---|---|
| Thermal Resistance Junction to Case, $R\theta_{JC}$ | SOT23-3 | 115°C/W |
| | SOT23-5 | 115°C/W |
| | DFN-4(1x1) | 65°C/W |
| | DFN-6(2x2) | 30°C/W |
| Thermal Resistance Junction to Ambient, $R\theta_{JA}$ | SOT23-3 | 250°C/W |
| | SOT23-5 | 250°C/W |
| | DFN-4(1x1) | 195°C/W |
| | DFN-6(2x2) | 165°C/W |

## Electrical Characteristics (T$_A$=25 C unless otherwise noted)

($V_{IN}$ =5V, $V_{EN}$ = 5V $T_A$=25°C unless otherwise specified)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Supply Voltage | $V_{IN}$ | | 1.2 | -- | 5.5 | V |
| DC Output Voltage Accuracy | | $I_{LOAD}$ =0.1mA | -2 | | 2 | % |
| Dropout Voltage ($I_{LOAD}$ =600mA) (Note 3) | $V_{DROP\_3V}$ | $V_{OUT} \geq 3V$ | | 0.32 | | V |
| | $V_{DROP\_2.8V}$ | $V_{OUT}$ = 2.8V | | 0.36 | | |
| | $V_{DROP\_2.5V}$ | $V_{OUT}$ = 2.5V | | 0.36 | | |
| | $V_{DROP\_1.8V}$ | $V_{OUT}$ = 1.8V | | 0.57 | | |
| | $V_{DROP\_1.5V}$ | $V_{OUT}$ = 1.5V | | 0.71 | | |
| | V | V = 1.2V | | 0.8 | | |
| Ground Current | $I_Q$ | $I_{LOAD}$ = 0mA | | 2 | | μA |
| Shutdown Ground Current | $I_{SD}$ | $V_{EN}$ = 0V, | | 0.01 | 0.5 | μA |
| $V_{OUT}$ Shutdown Leakage Current | $I_{LEAK}$ | $V_{OUT}$ = 0V | | 0.01 | 0.5 | |
| Enable Threshold Voltage | $V_{IH}$ | EN Rising | | | 2 | V |
| | $V_{IL}$ | EN Falling | 0.6 | | | |
| EN Input Current | $I_{EN}$ | $V_{EN}$ = 5V | | 10 | 100 | nA |
| Line Regulation | ΔLINE | $I_{LOAD}$ =30mA, 1.5V ≤ $V_{IN}$ ≤ 5.5V or ($V_{OUT}$ + 0.2V) ≤ $V_{IN}$ ≤ 5.5V | | 0.2 | | % |
| Load Regulation | ΔLOAD | 10mA ≤ $I_{LOAD}$ ≤ 0.3A | | 0.2 | | % |
| Output Current Limit | $I_{LIM}$ | $V_{OUT}$ =0 | 601 | 1100 | | mA |
| Power Supply Rejection Ratio ($I_{LOAD}$ =5mA) | PSRR | $V_{OUT}$ =1.2V, $V_{IN}$ = 2V; f = 100Hz | -- | 80 | -- | dB |
| | | f = 1kHz | -- | 75 | -- | |
| Output Voltage Noise (BW = 10Hz to 100kHz, $C_{OUT}$ =1μF,) | | $V_{IN}$ = 3.5V $I_{LOAD}$ =0.1A; $V_{OUT}$ =0.9V | -- | 40 | -- | $\mu V_{RMS}$ |
| | | $V_{OUT}$ =2.8V | -- | 50 | -- | |
| Thermal Shutdown Temperature | $T_{SD}$ | $I_{LOAD}$ =10mA | -- | 155 | -- | °C |
| Thermal Shutdown Hysteresis | $\Delta T_{SD}$ | | -- | 15 | -- | °C |
| Discharge Resistance | | EN = 0V , $V_{OUT}$ = 0.1V | -- | 100 | -- | Ω |

**Note 1.** Stresses beyond those listed “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions may affect device reliability.

**Note 2.** $\theta_{JA}$ is measured at $T_A$ = 25°C on a TECH PUBLICboard.

**Note 3.** $V_{DROP} = V_{IN} - V_{OUT}$ when the $V_{OUT}$ is 98% of its target value.

## Typical Characteristics

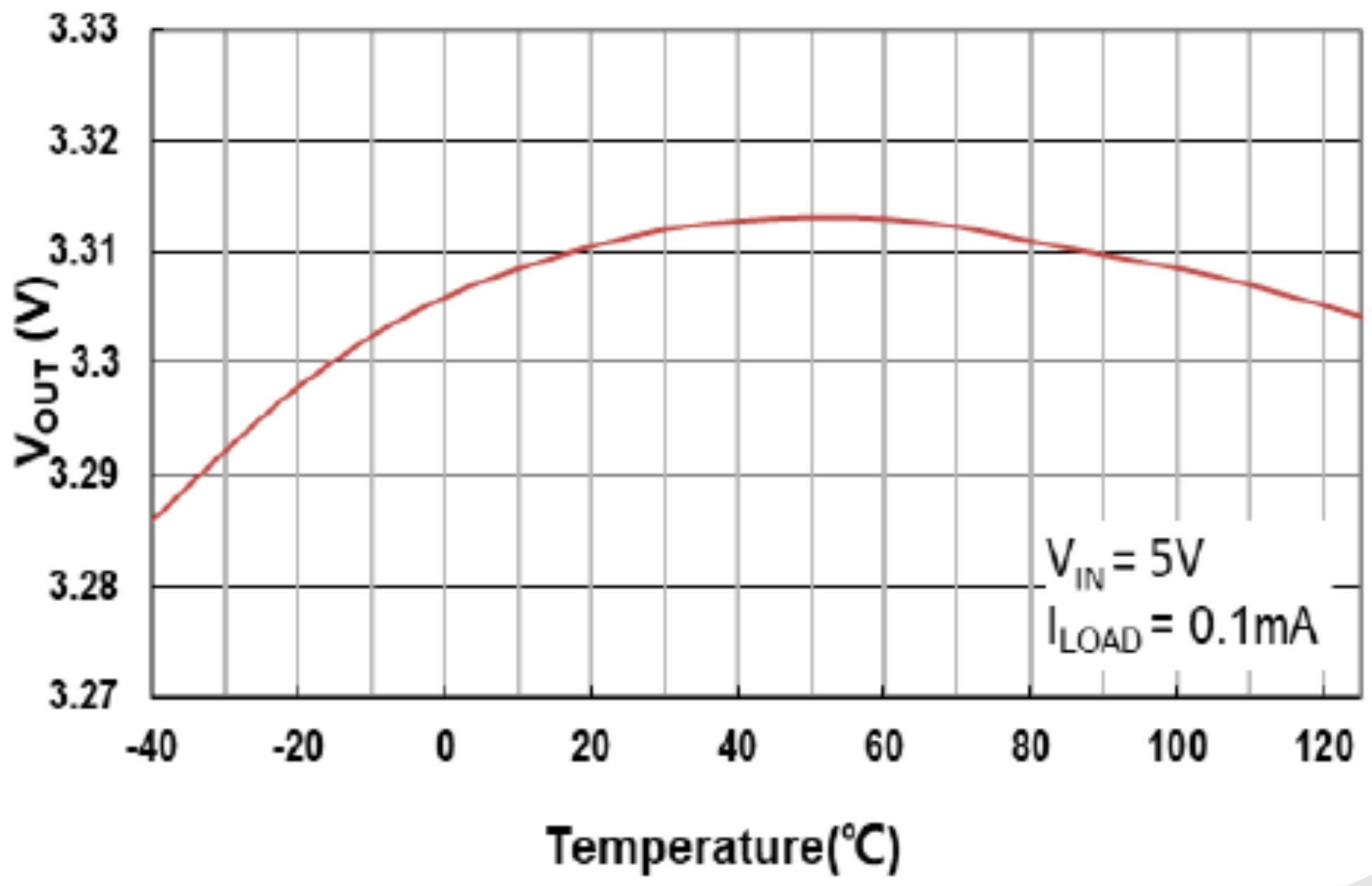



Fig. 5 Output Voltage vs. Temperature

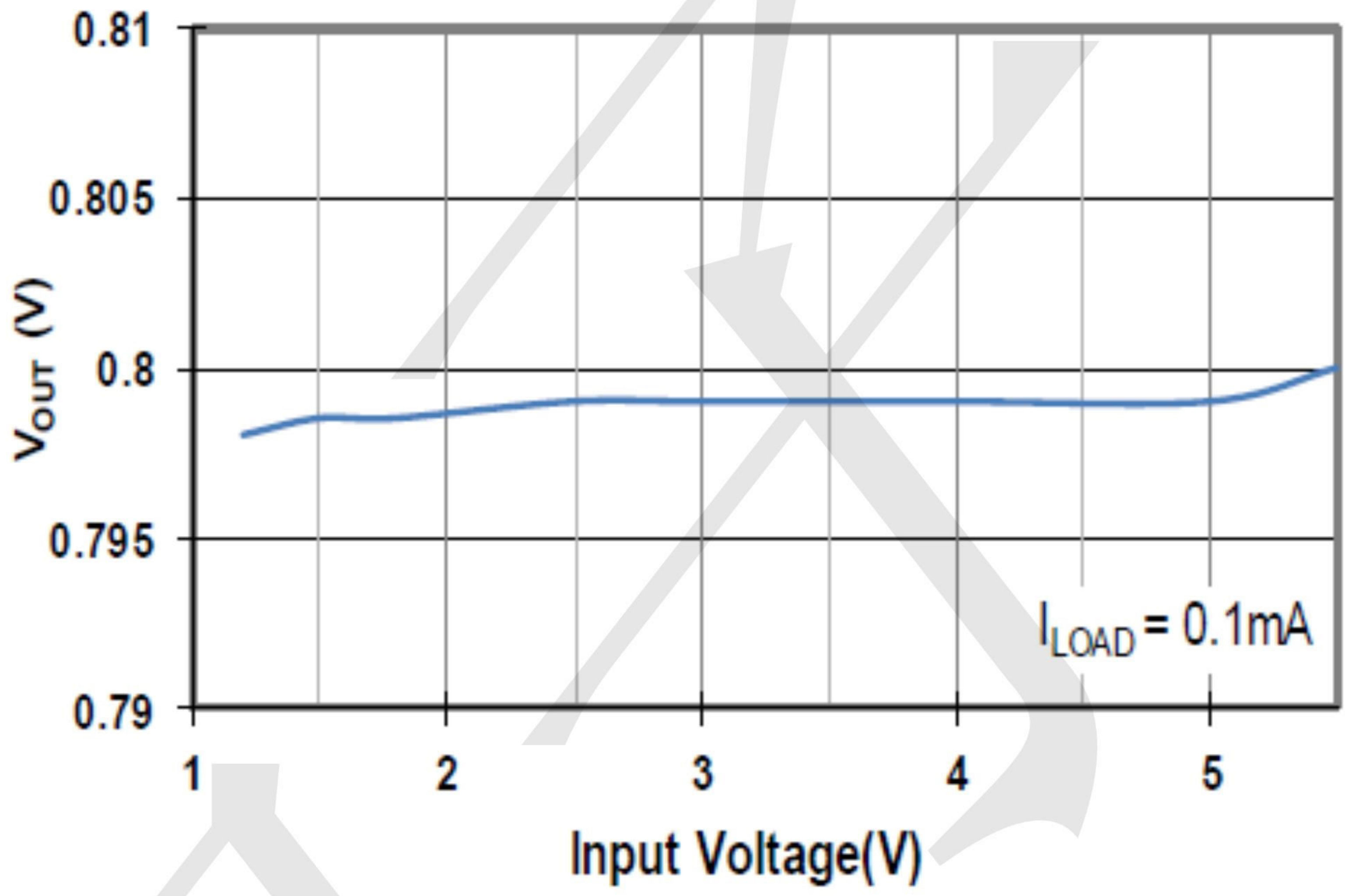



Fig. 6 Output Voltage vs. Input Voltage

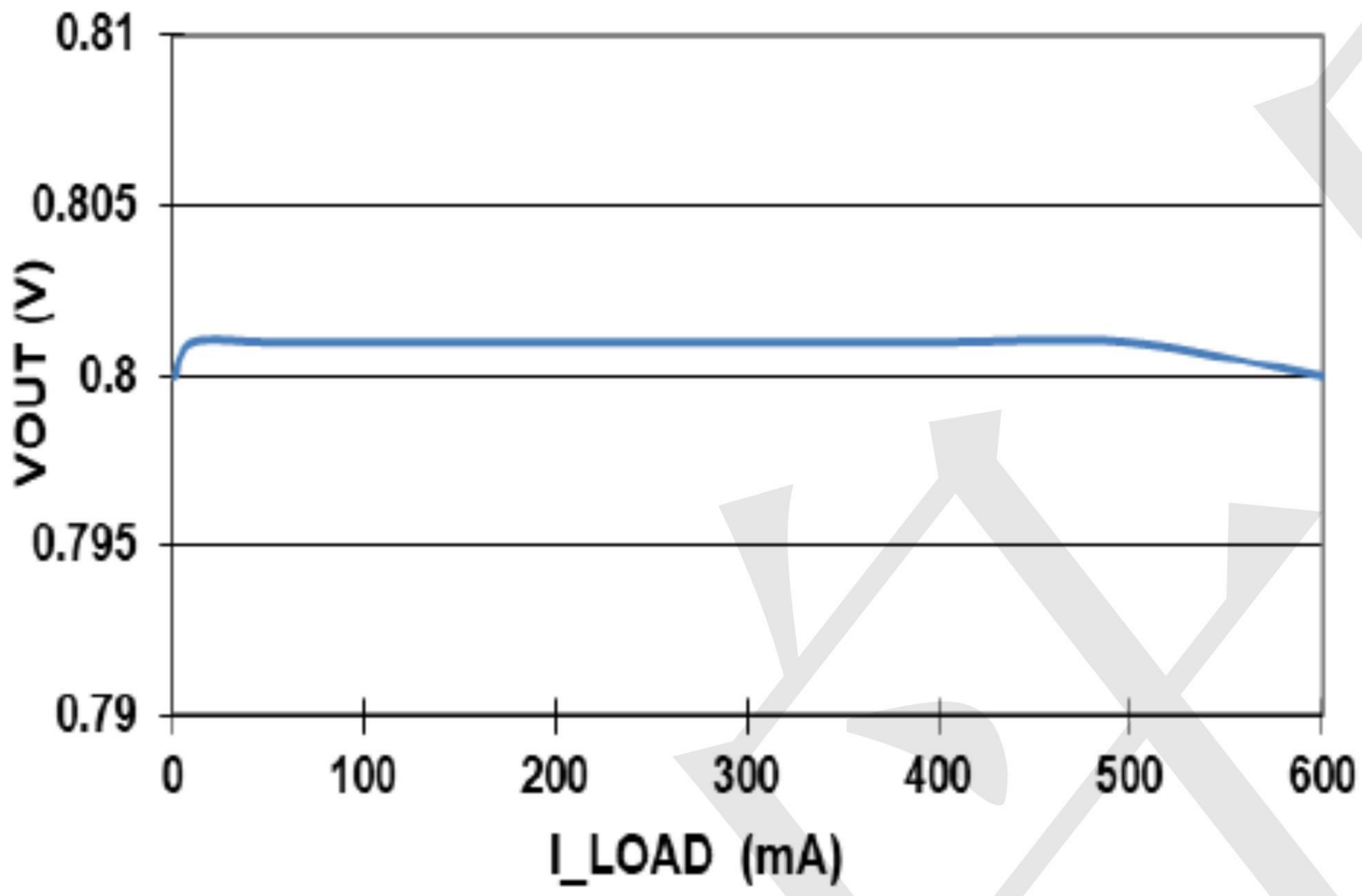



Fig. 7 Output Voltage vs. Load Current

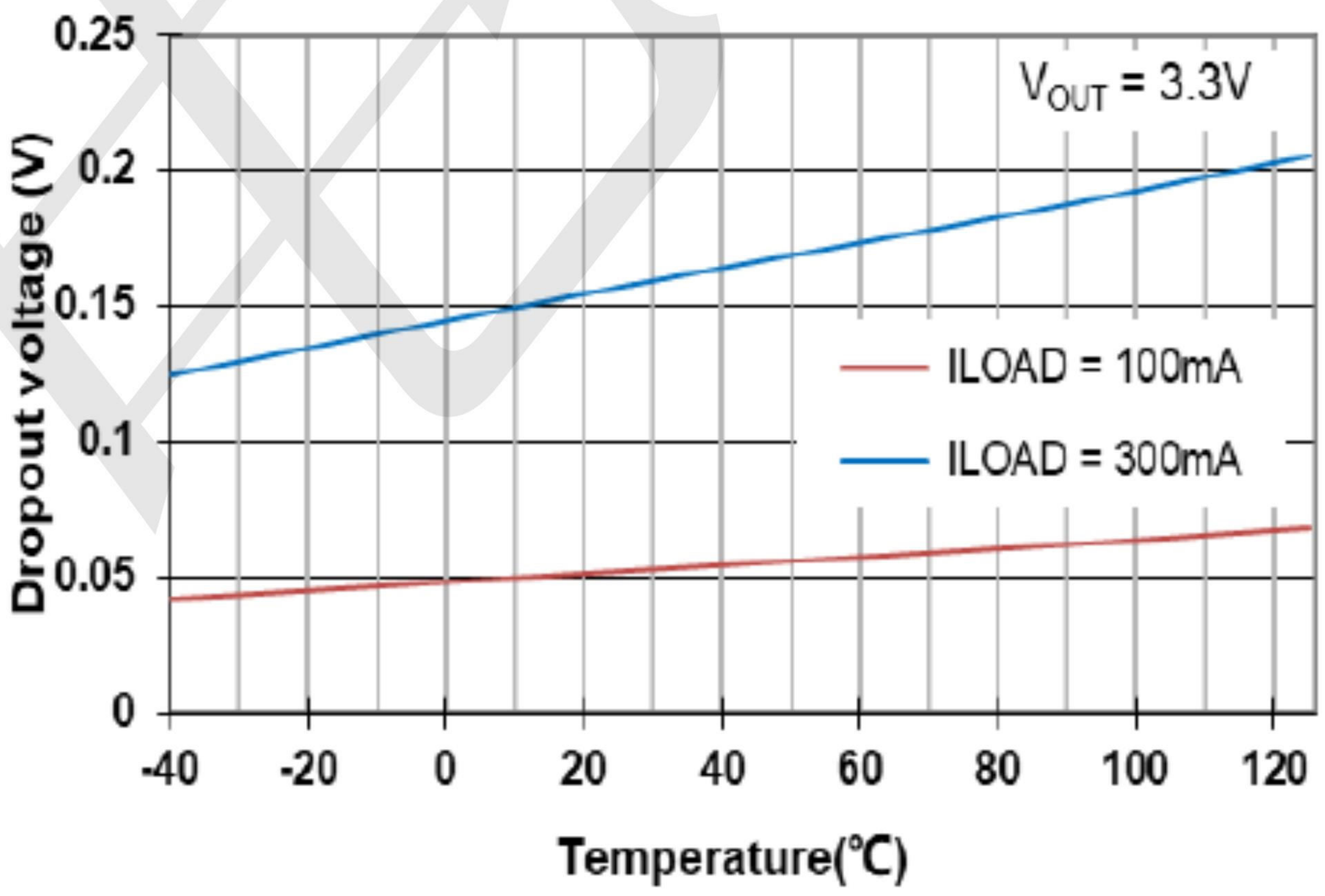



Fig. 8 Dropout Voltage vs. Temperature

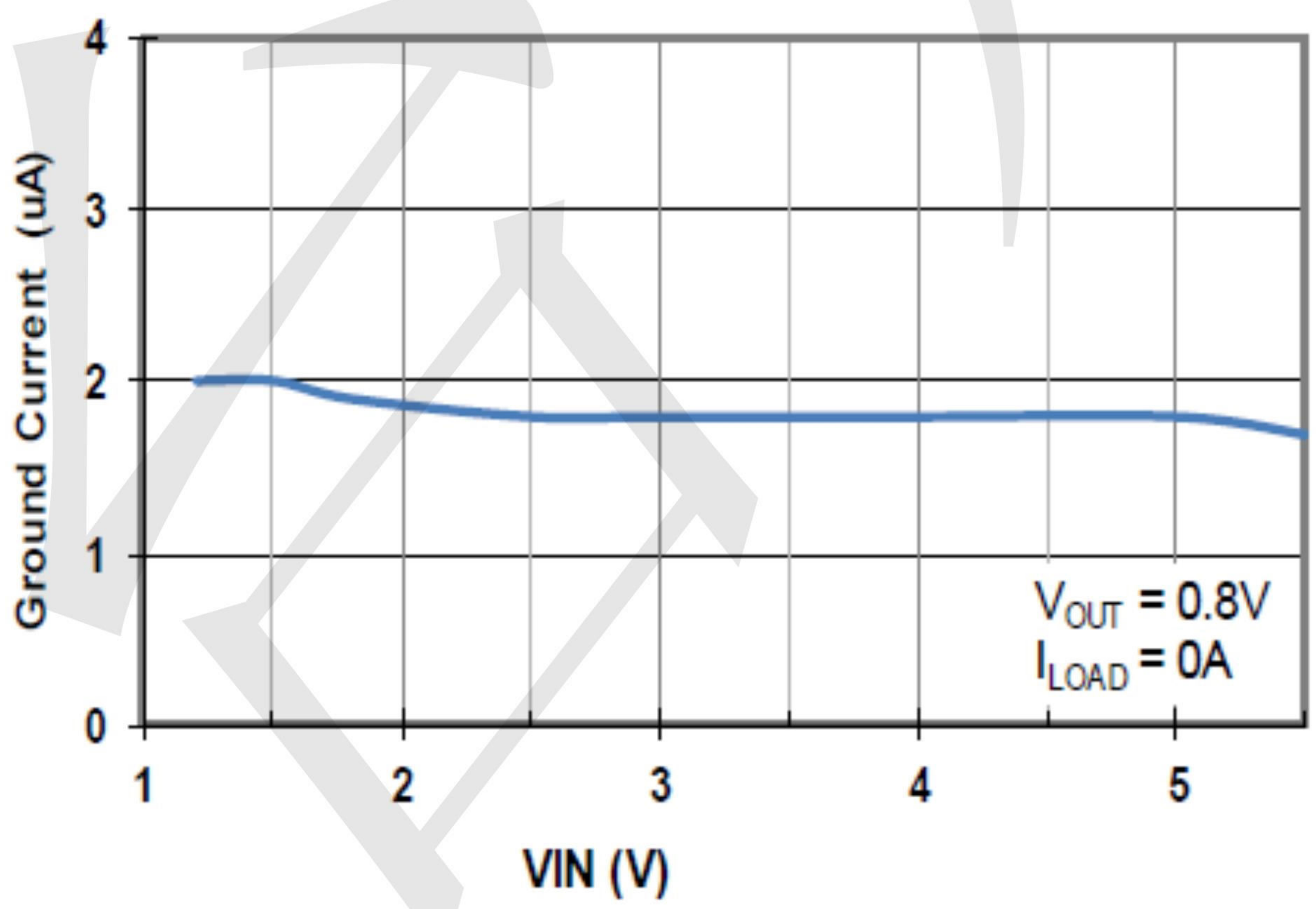



Fig. 9 Ground Current vs. Input Voltage

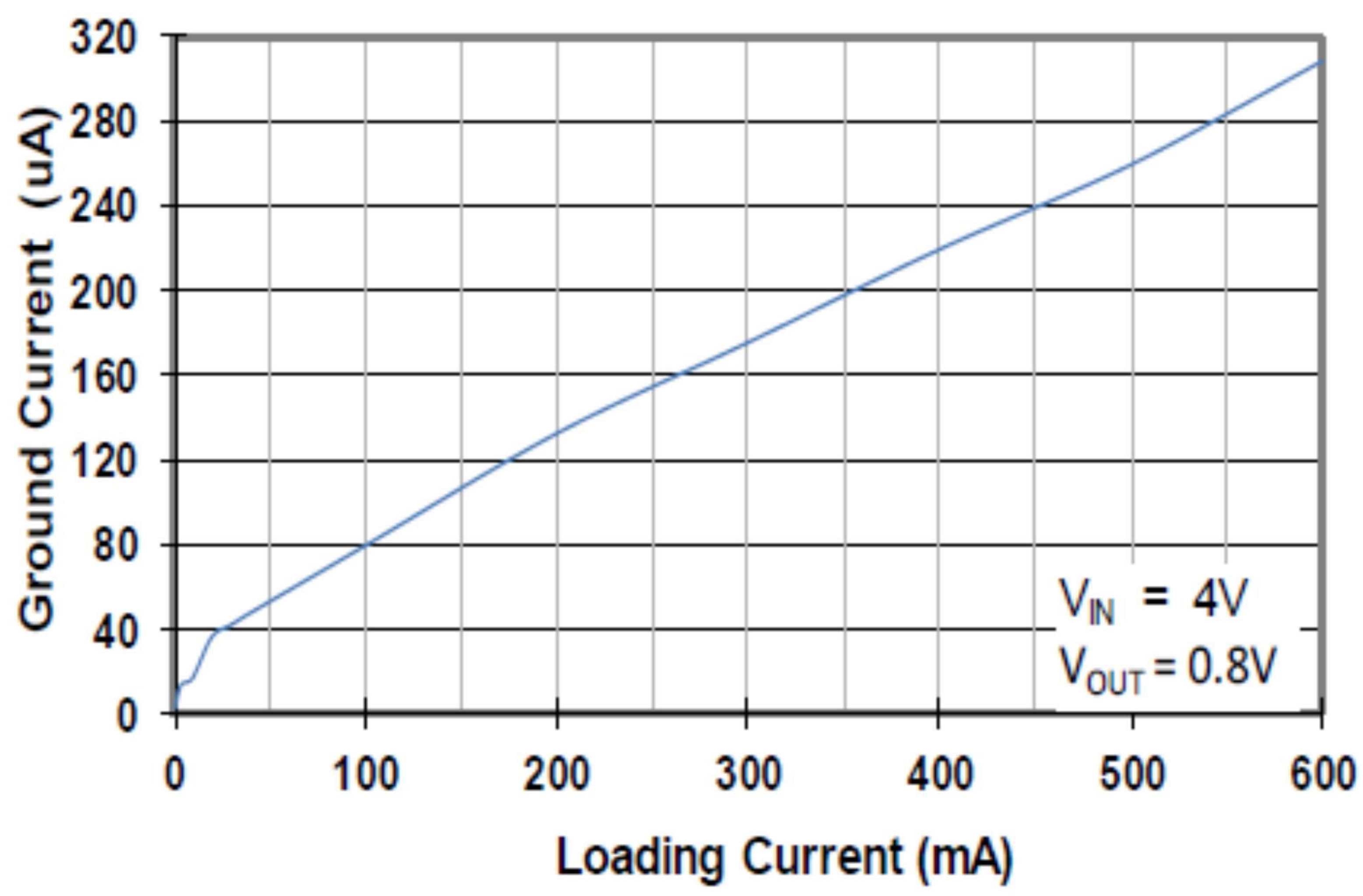
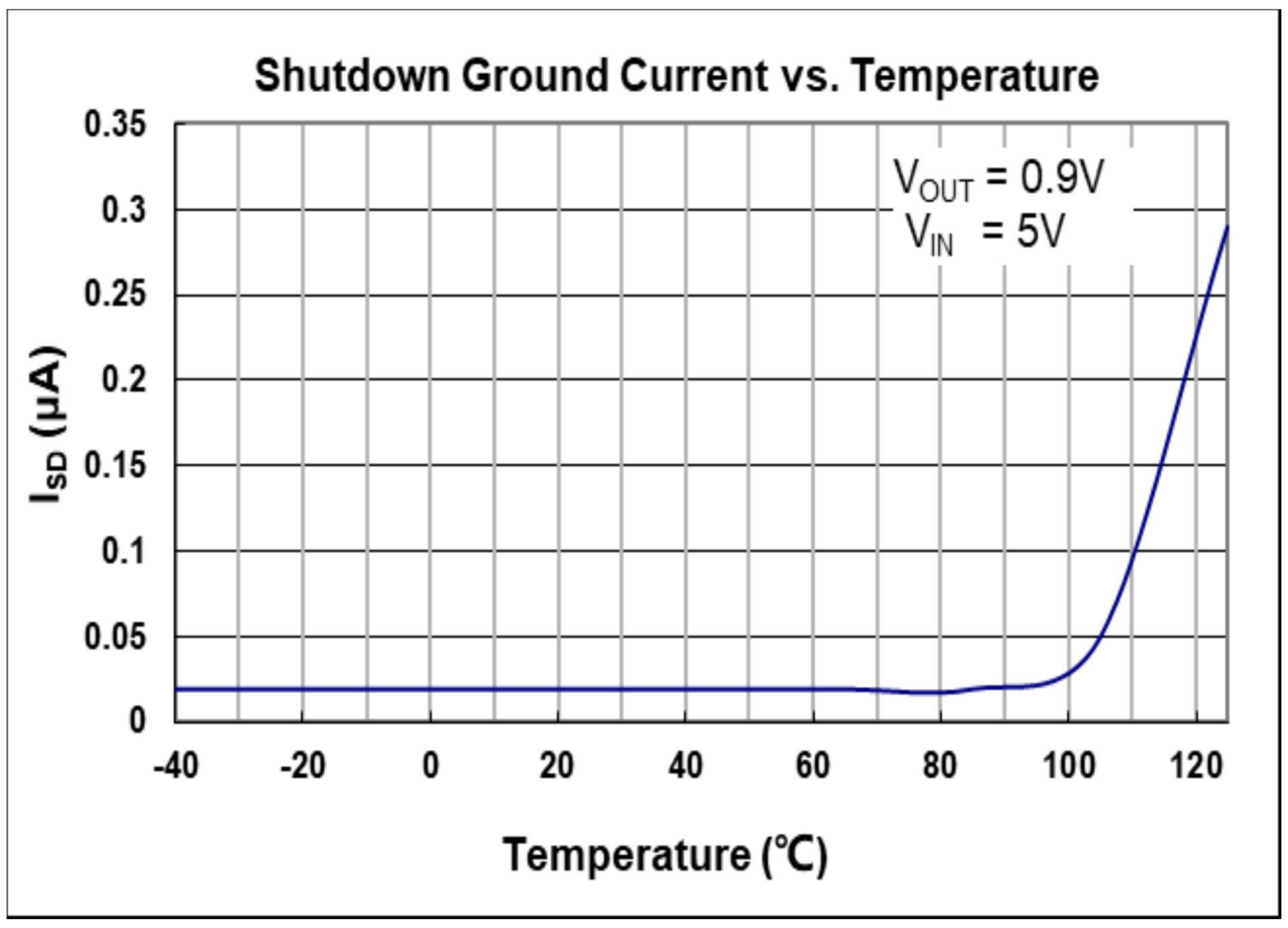
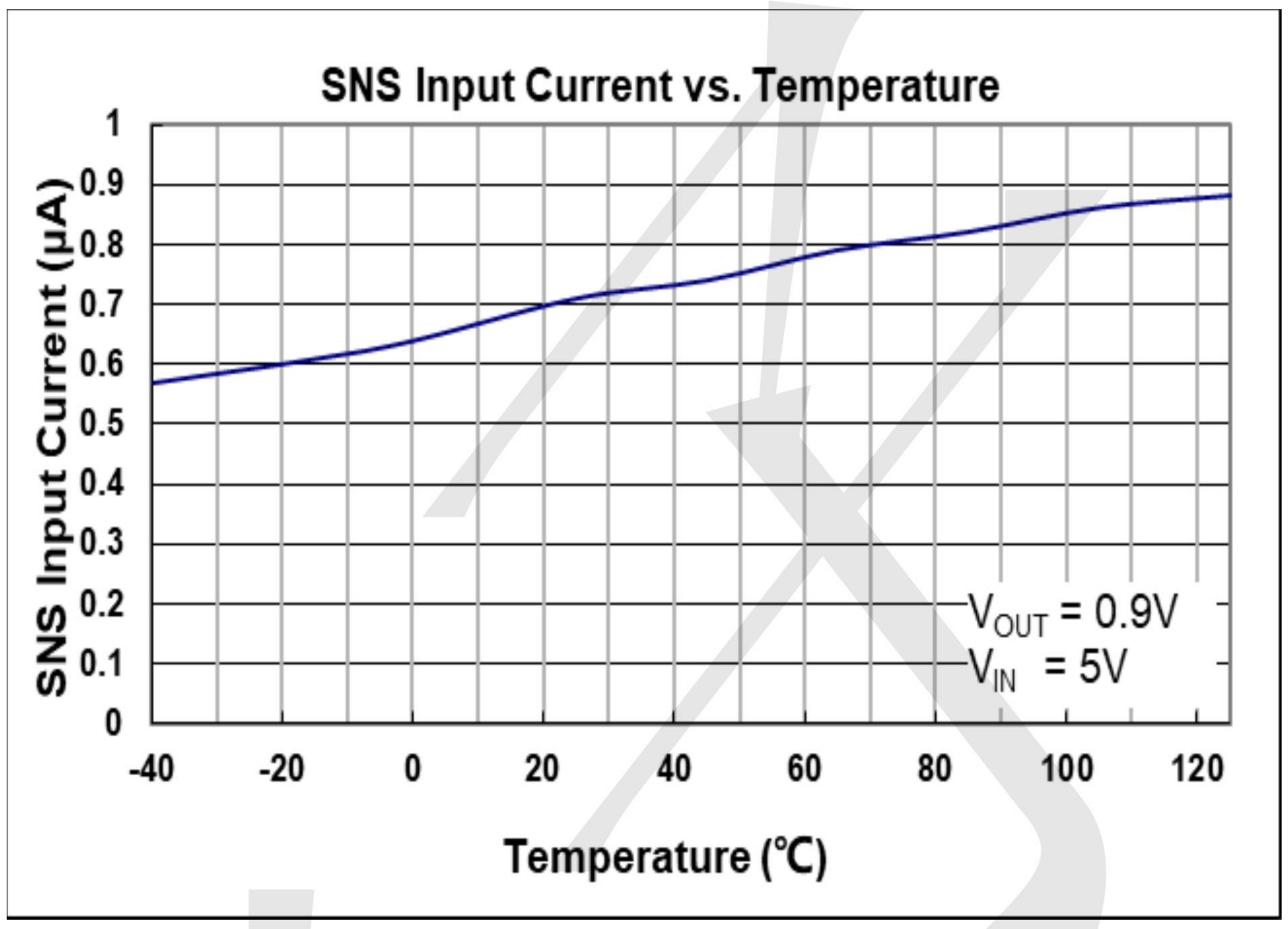
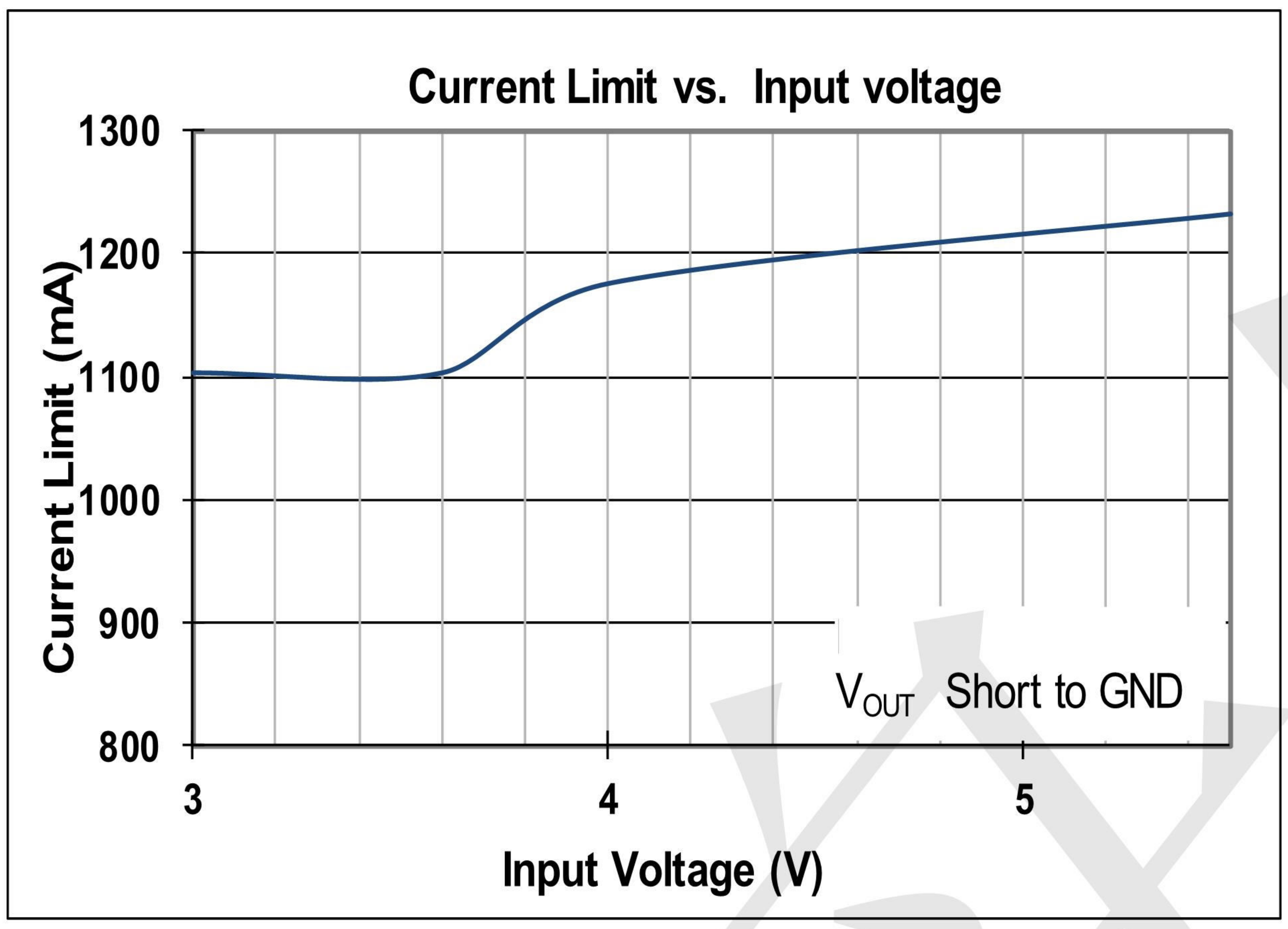


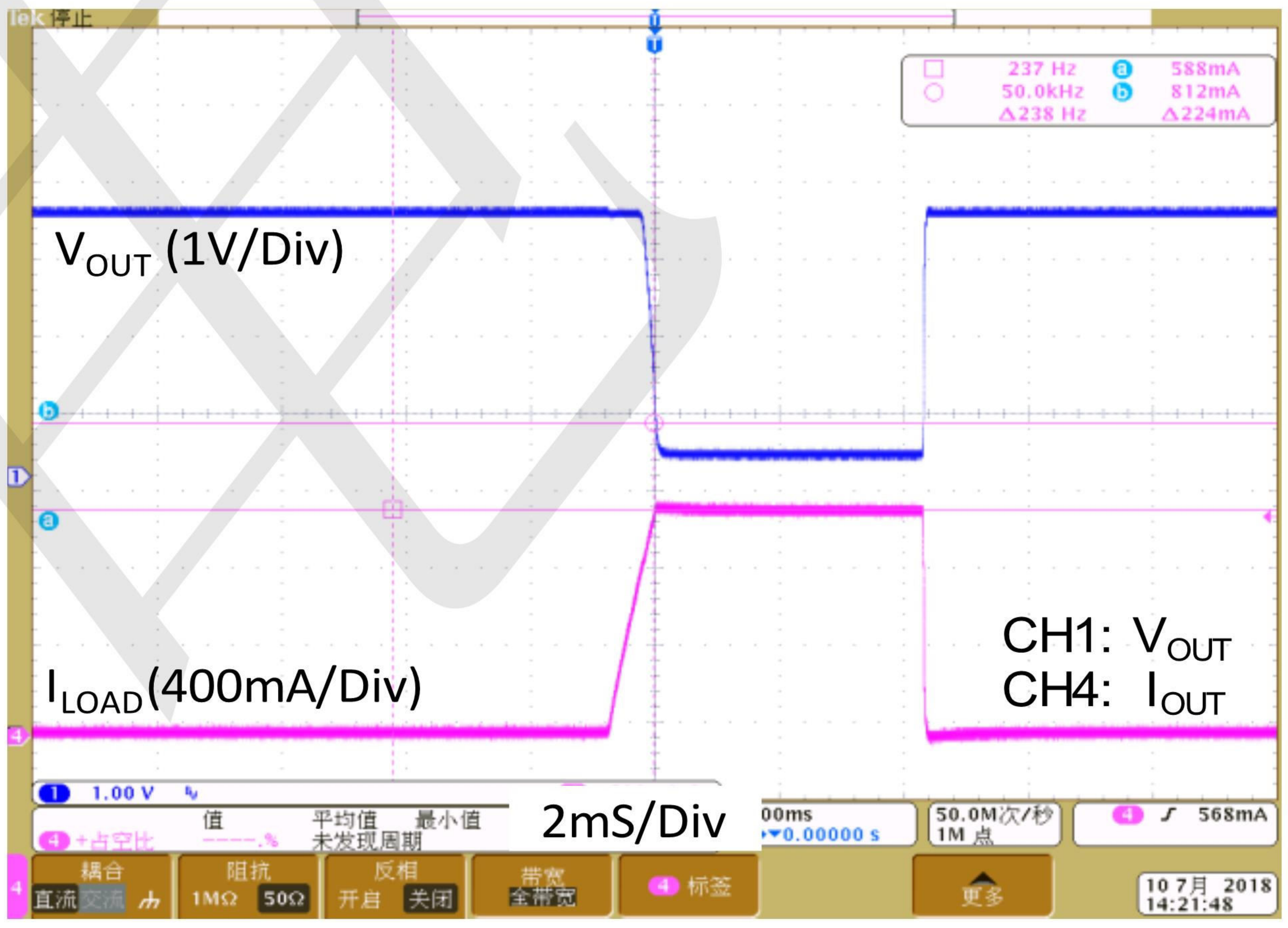

Fig. 10 Ground Current vs. Loading Current



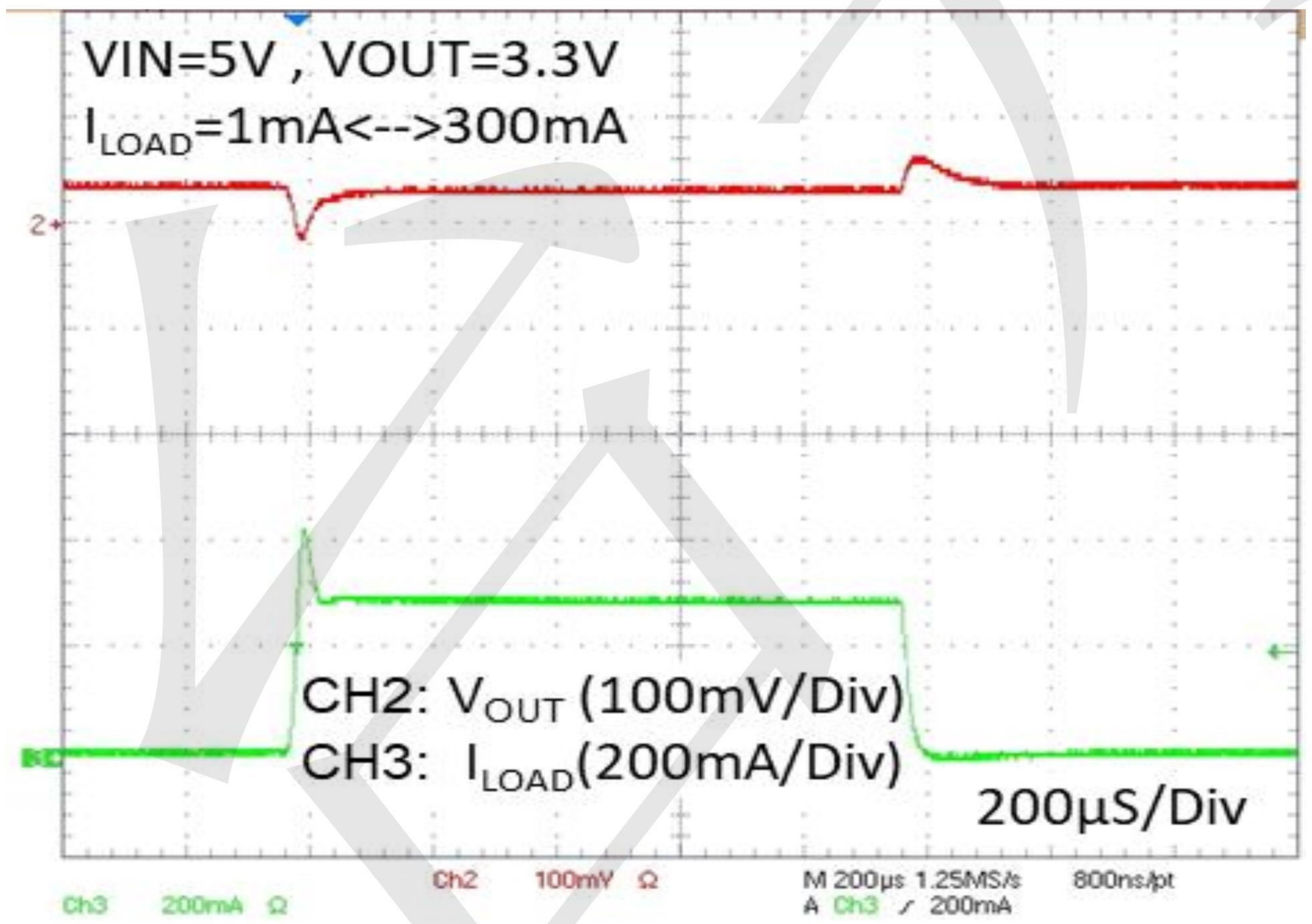



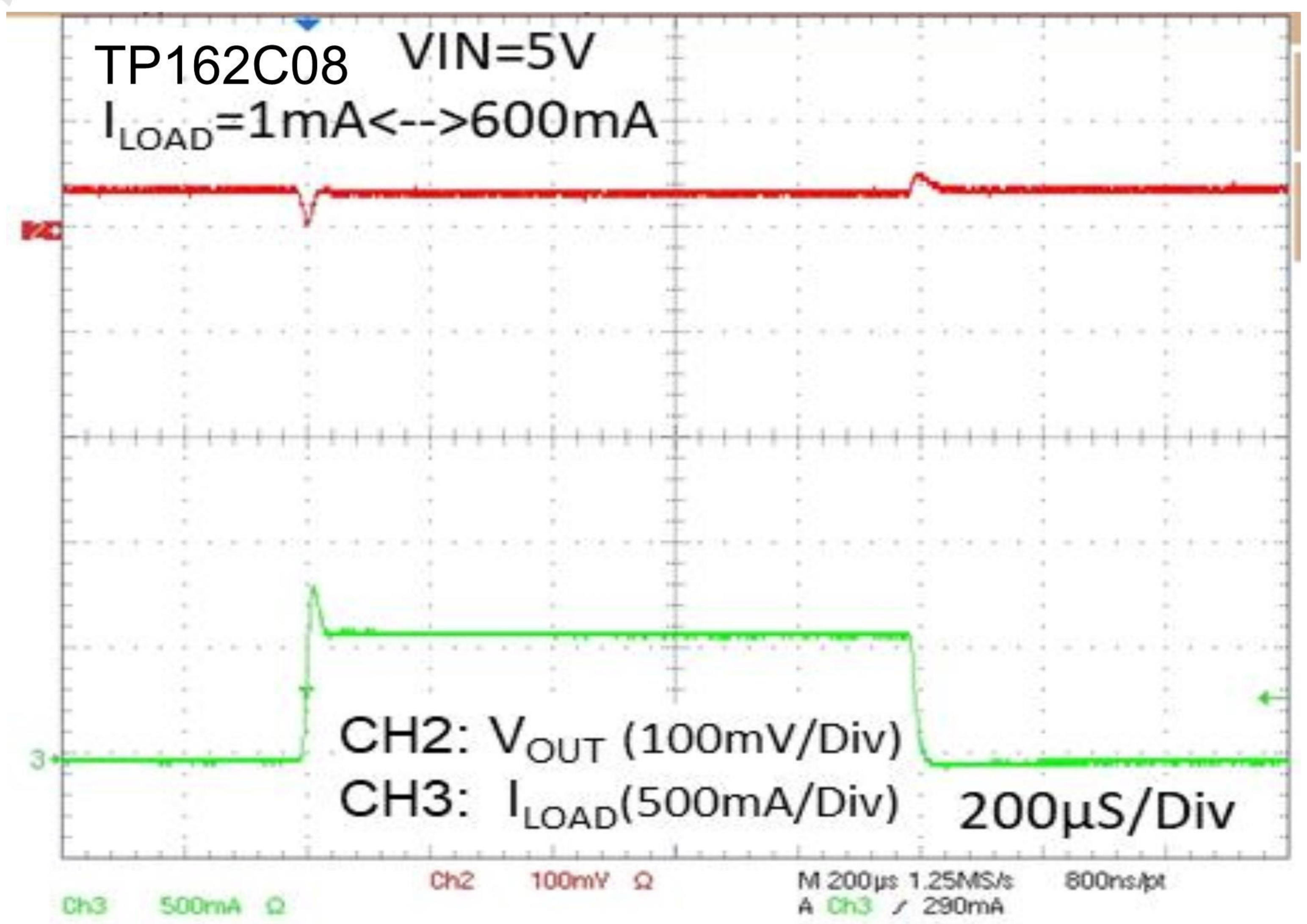

## Current Limit Response




## Load Transient Response I




## Load Transient Response II



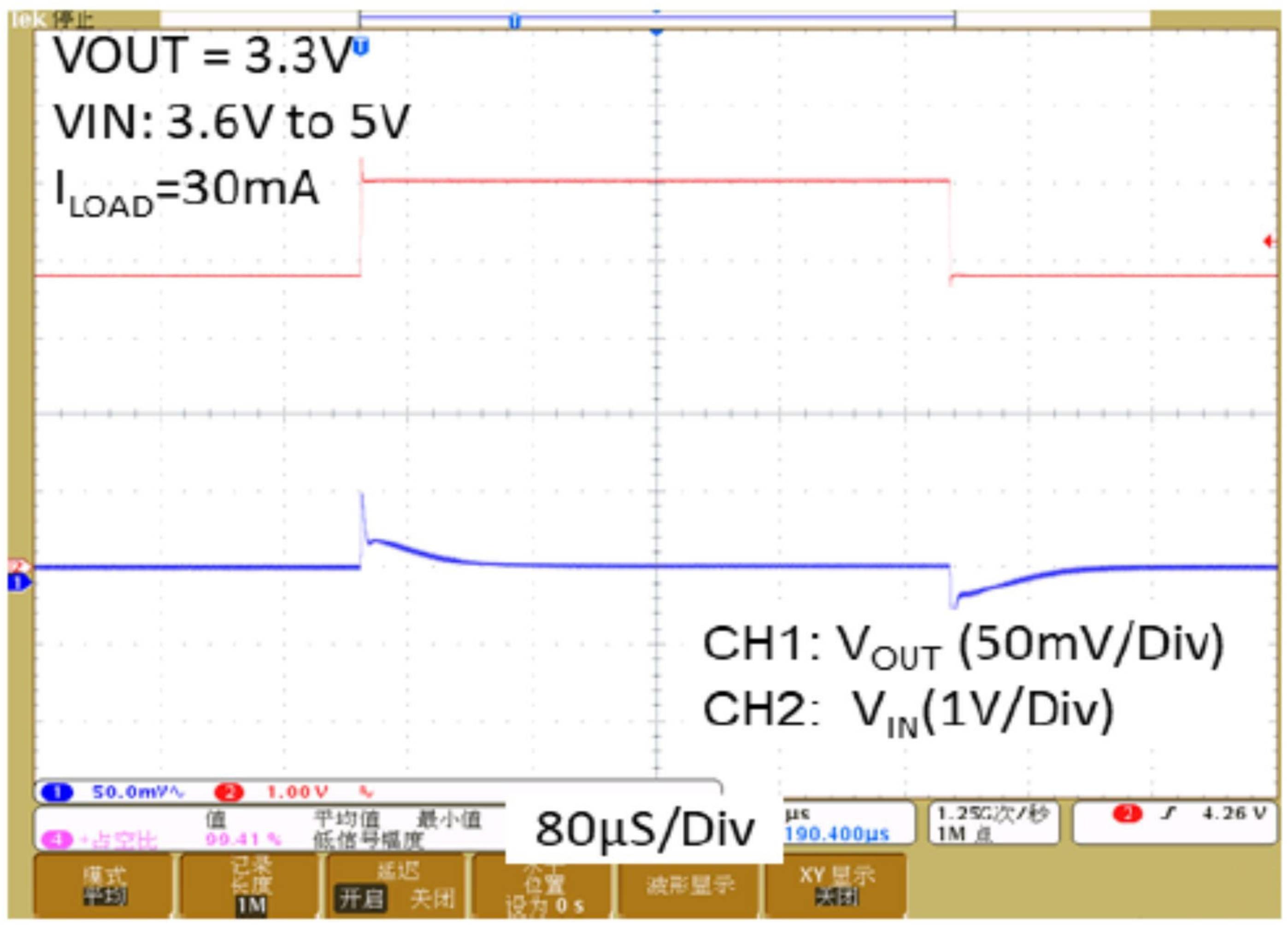



Fig. 17 Line Transient Response

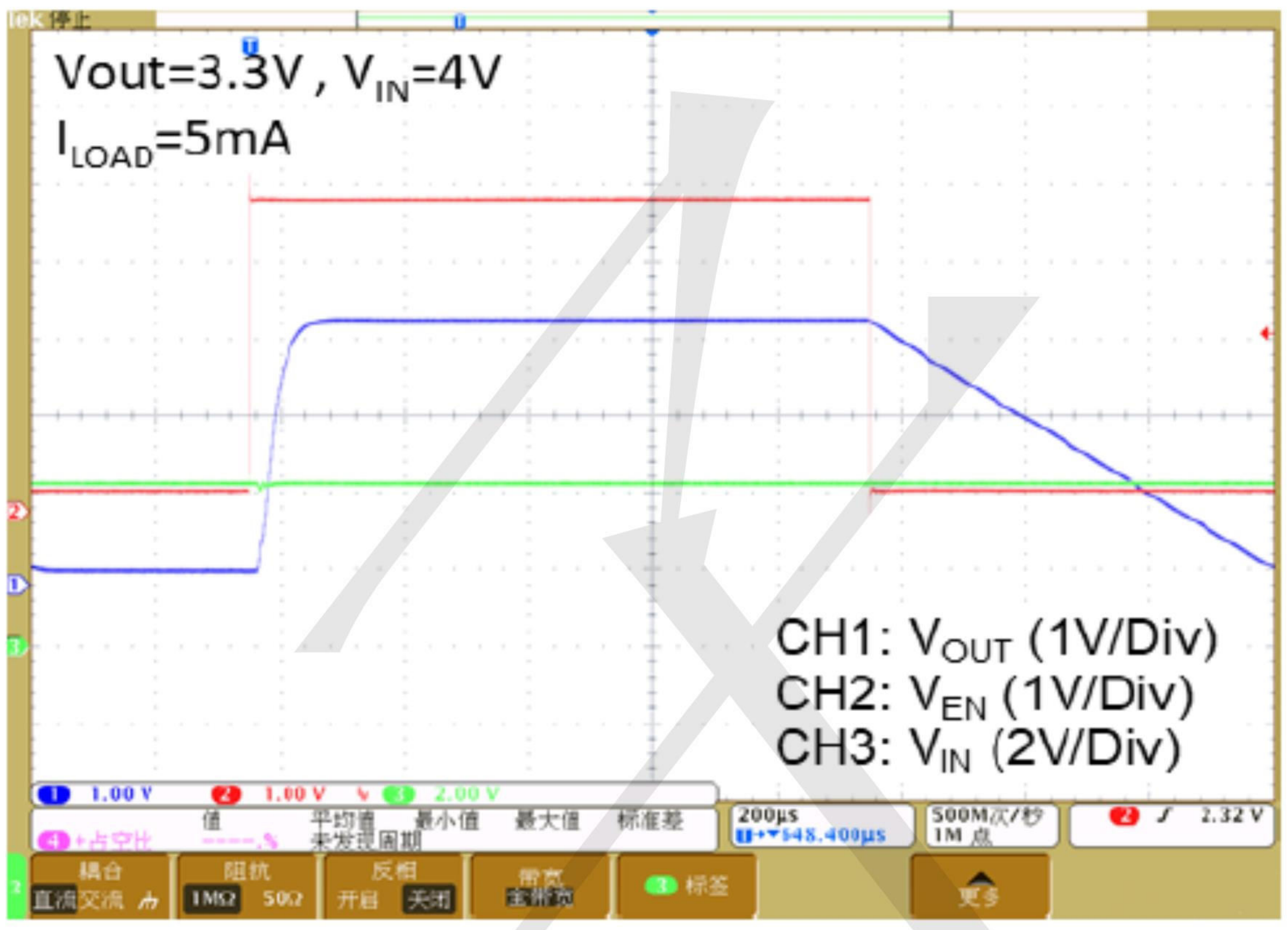
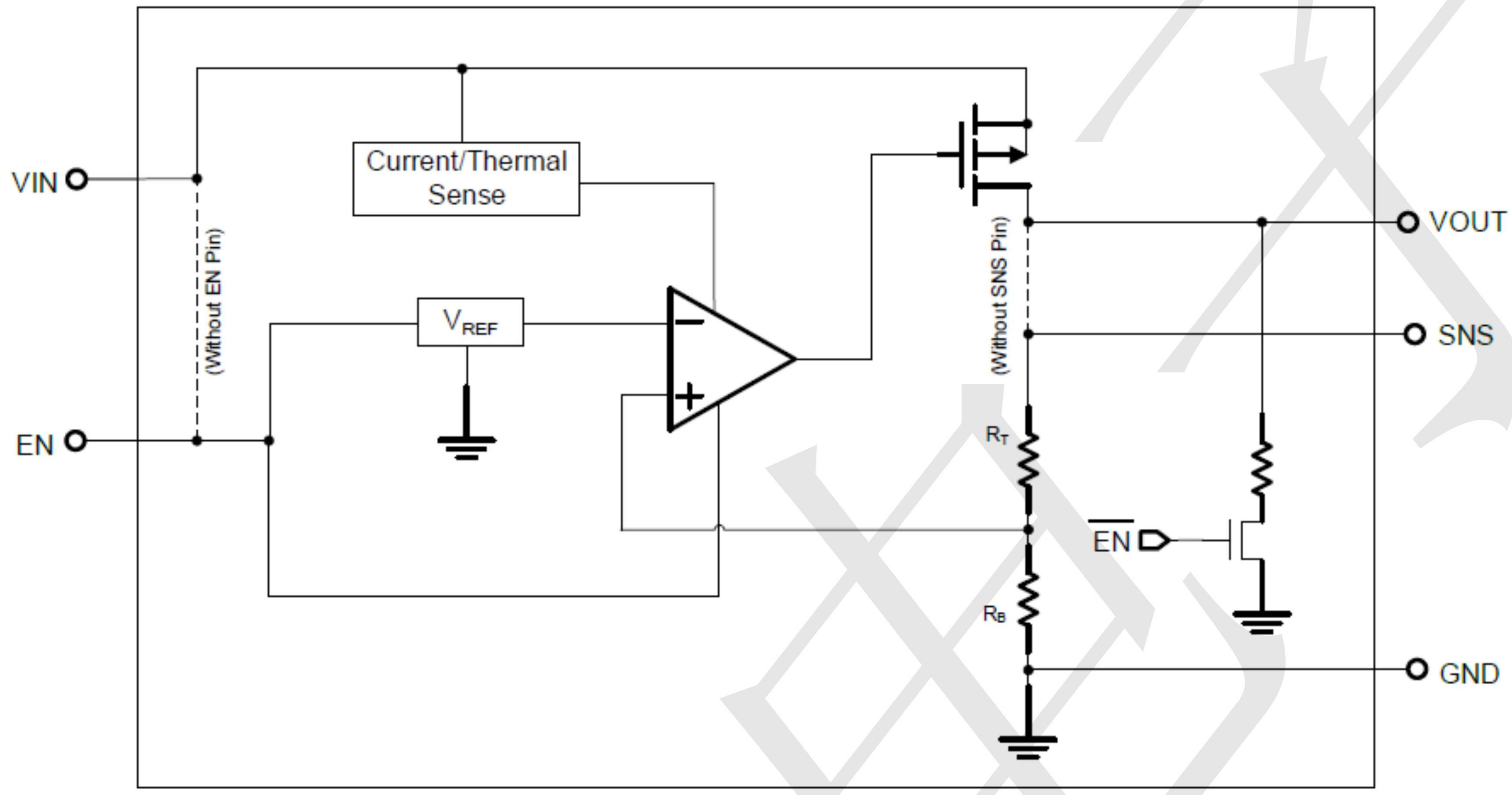


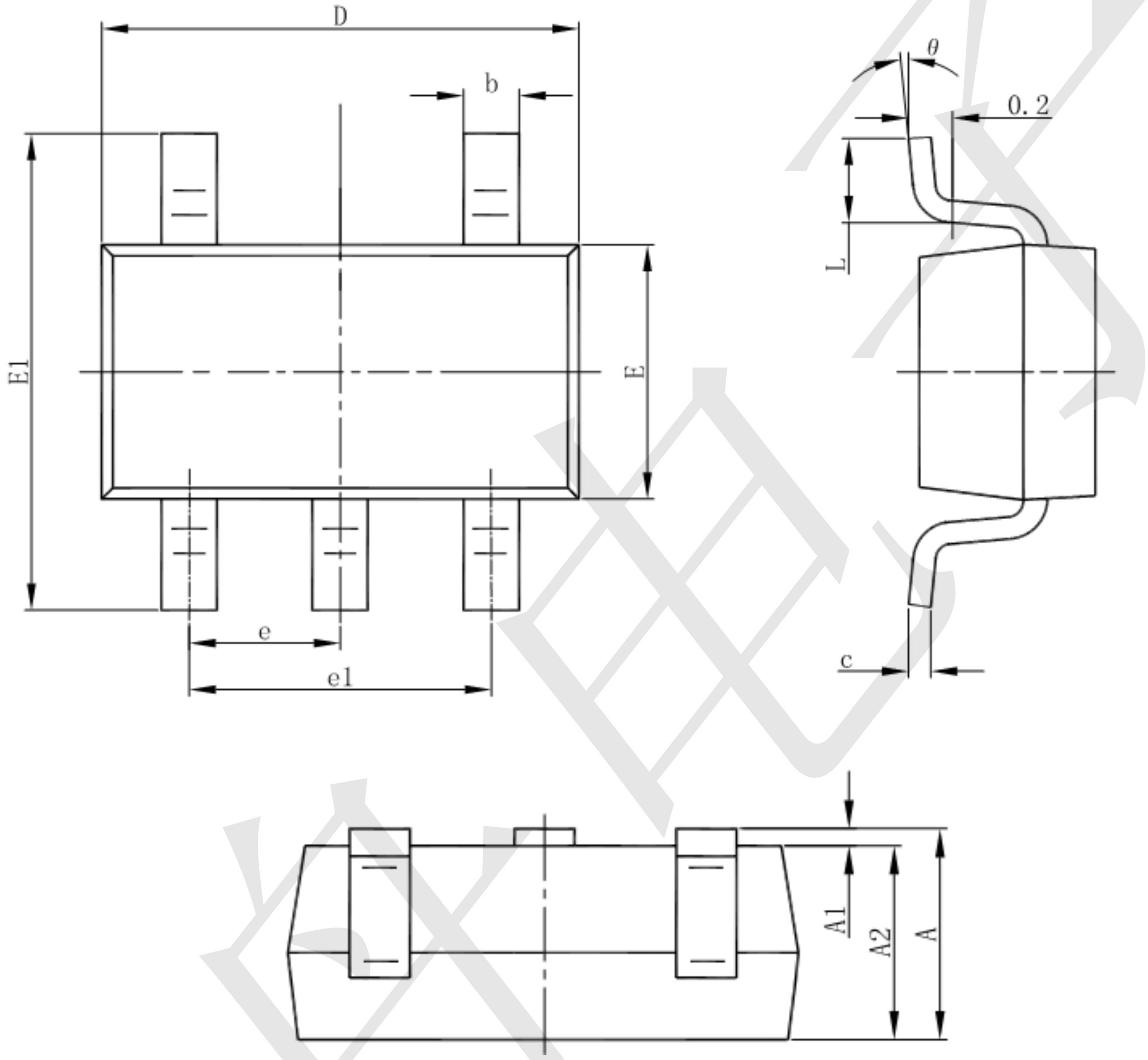

Fig. 18 $V_{OUT}$ Turn On/Off by EN

## BLOCK DIAGRAM



## Package informantion

**SOT23-5**




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 2.820 | 3.020 | 0.111 | 0.119 |
| E | 1.500 | 1.700 | 0.059 | 0.067 |
| E1 | 2.650 | 2.950 | 0.104 | 0.116 |
| e | 0.950(BSC) | | 0.037(BSC) | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.300 | 0.600 | 0.012 | 0.024 |
| θ | 0° | 8° | 0° | 8° |