

## General Description

The TP132C 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 TP132C 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 300mA).

## Features

- 2μA Ground Current at no Load
- ±2% Output Accuracy
- 300mA Output Current
- 10nA Disable Current (by option)
- Wide Operating Input Voltage Range: 1.2V to 5.5V
- Dropout Voltage: 0.16V at 300mA/ VOUT 3.3V
- Support Fixed Output Voltage 0.8V, 0.9V, 1.2V, 1.5V, 1.8V, 2.5V, 2.8V, 3.0V, 3.3V
- Adjustable Output Voltage Available by Specific Application
- Stable with Ceramic or Tantalum Capacitor
- Current Limit Protection
- Over-Temperature Protection
- SOT-23-3, SOT-23-5, DFN-4L 1x1 and DFN-6L 2x2 Packages Available

## Applications

- CDM/GSM mobile phone
- PDAs /MP3
- Audio/Video equipment

## Ordering Information

### TP132C15D4

S5:SOT23-5 Package  
S3:SOT23-3 Package  
D4:DFN1X1 Package  
D6:DFN2X2 Package

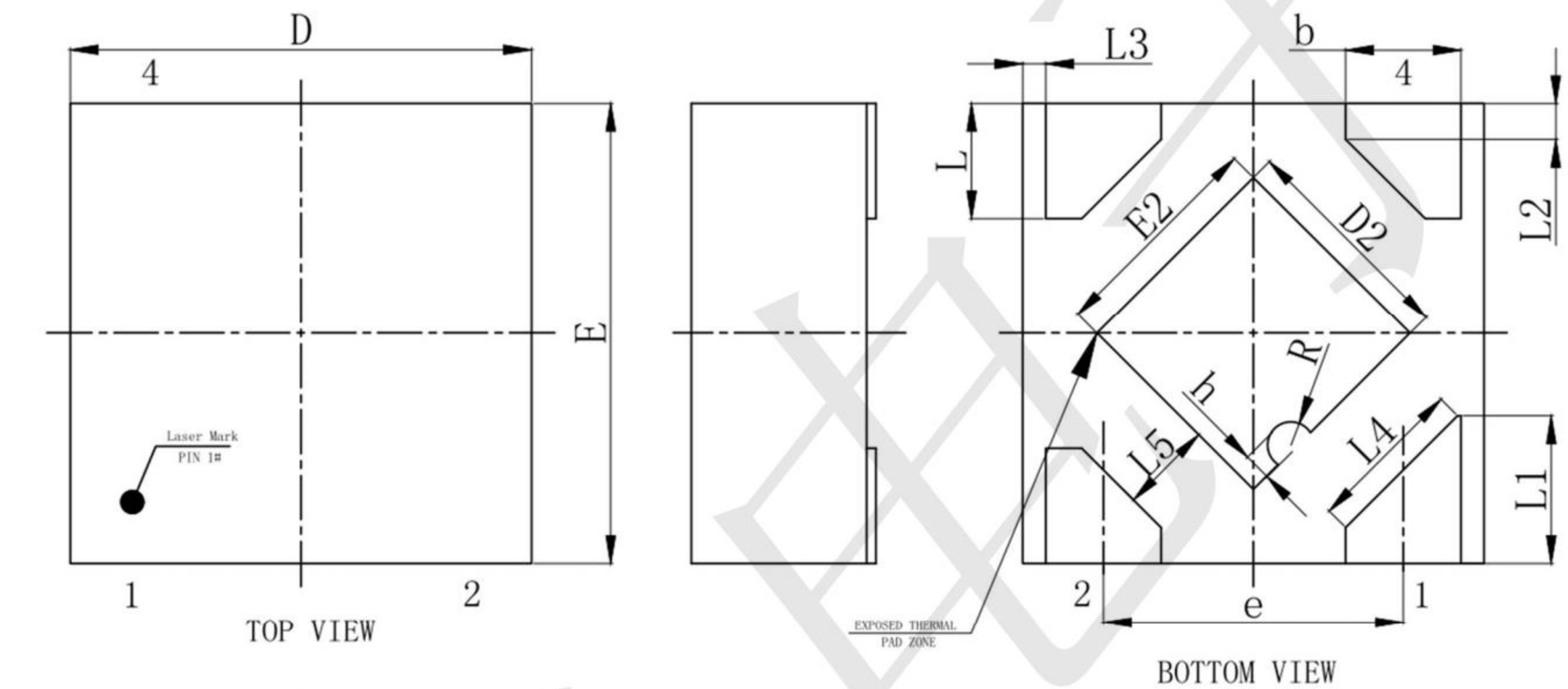
Output voltage: 12=1.2V  
15=1.5V  
18=1.8V  
30=3.0V  
33=3.3V  
XX=X.XV



**Package informantion**

DFN1X1-4 Outline Dimensions

DFN-4L

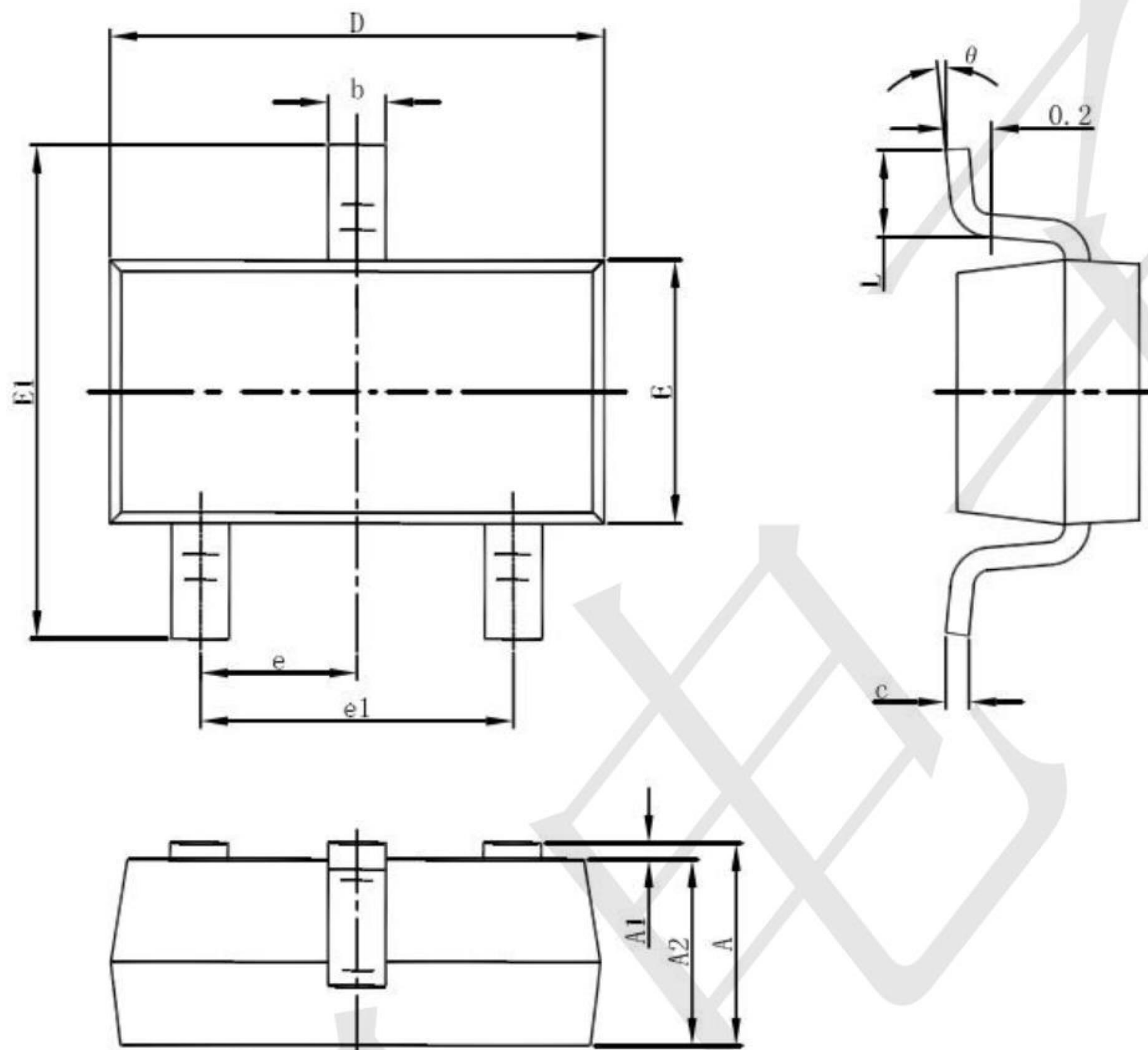


SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.35	-	0.40
A1	0.00	0.02	0.05
b	0.20	0.25	0.30
c	0.07	0.12	0.17
D	0.95	1.00	1.05
D2	0.38	0.48	0.58
e	0.65BSC		
E	0.95	1.00	1.05
E2	0.38	0.48	0.58
L	0.20	0.25	0.30
L1	0.27	0.32	0.37
L2	0.077REF		
L3	0.05REF		
L4	0.34REF		
L5	0.20REF		
R	0.05REF		
h	0.06REF		



**Package informantion**

**3-pin SOT23-3 Outline Dimensions**

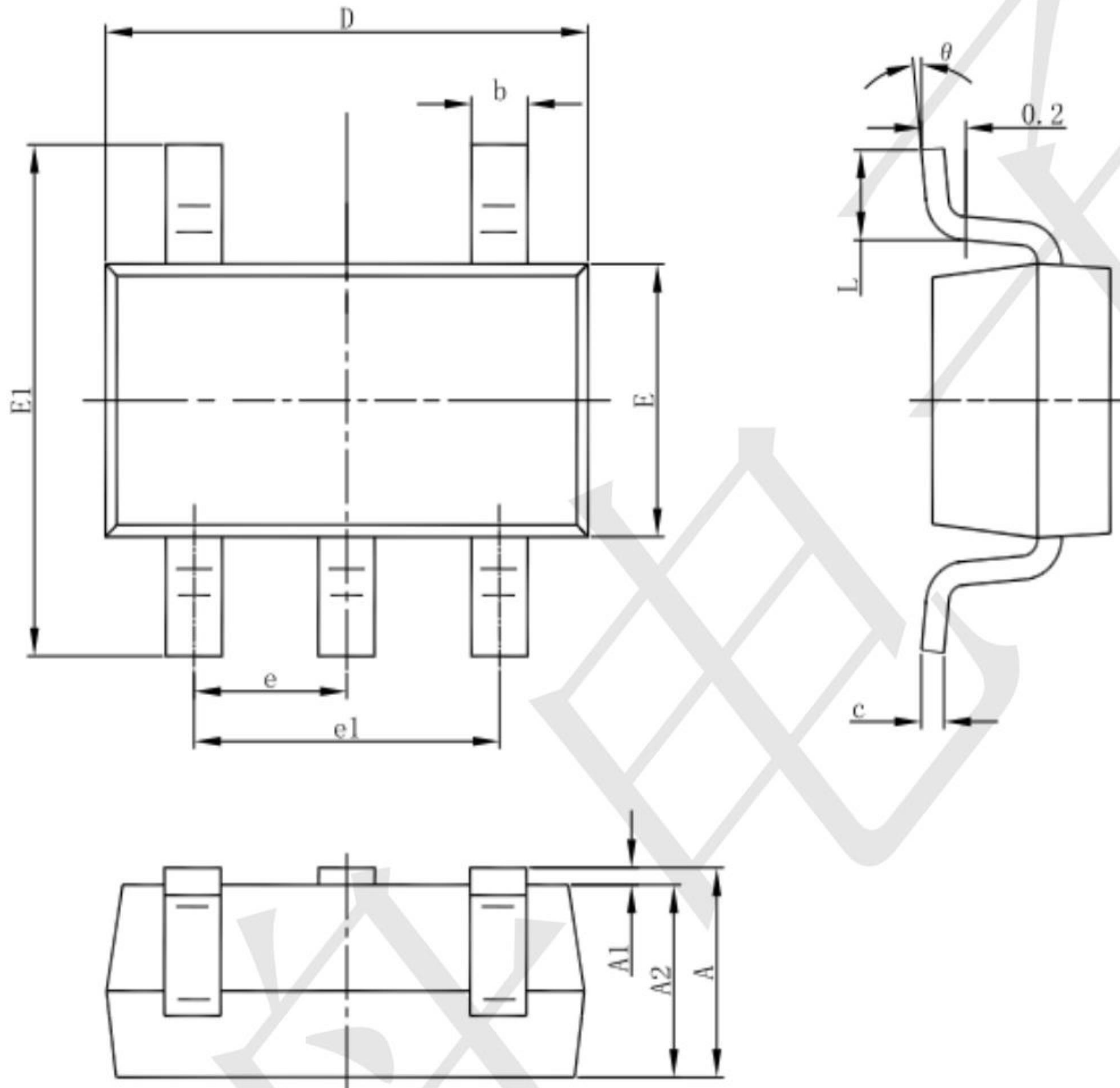


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)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



**Package informantion**

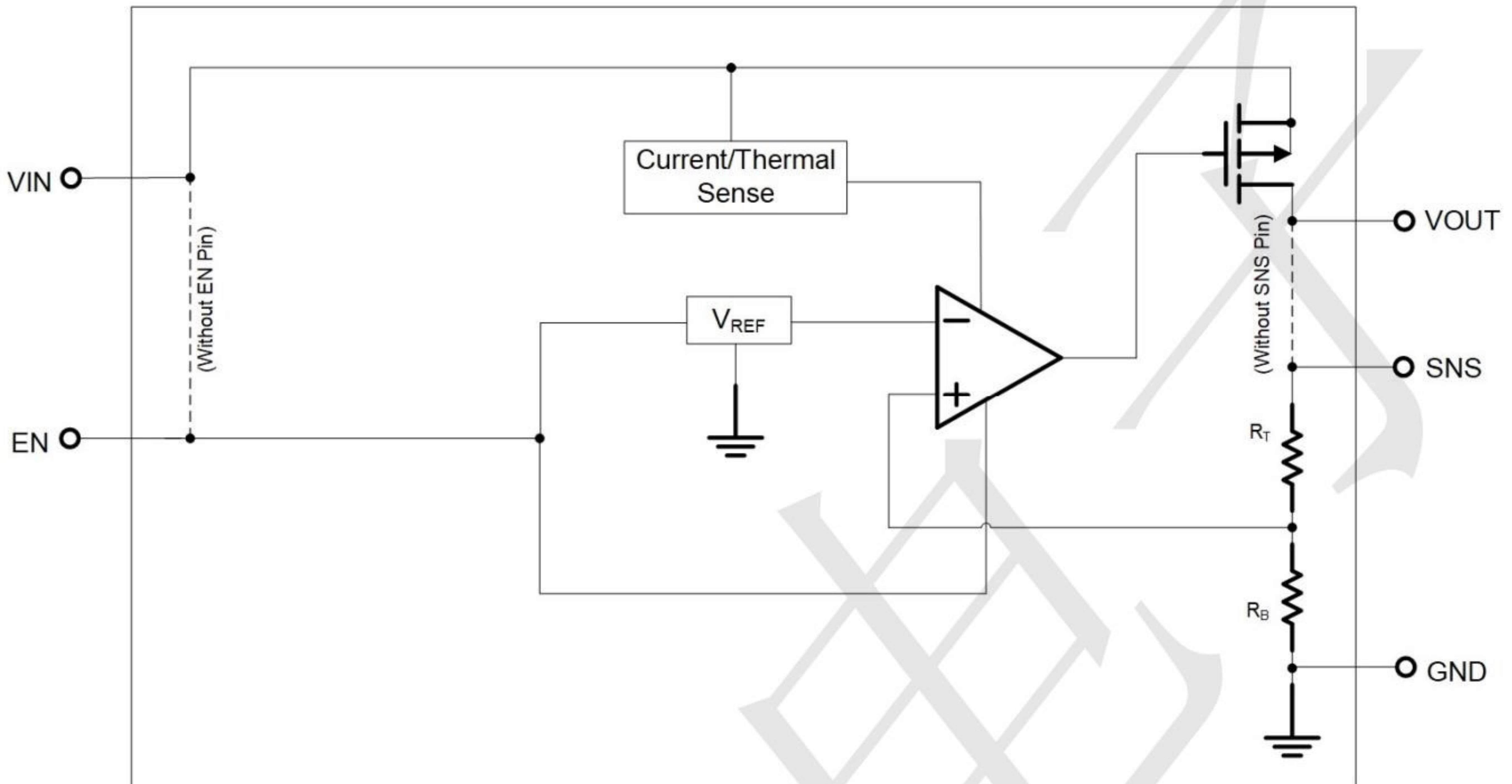
SOT23-5



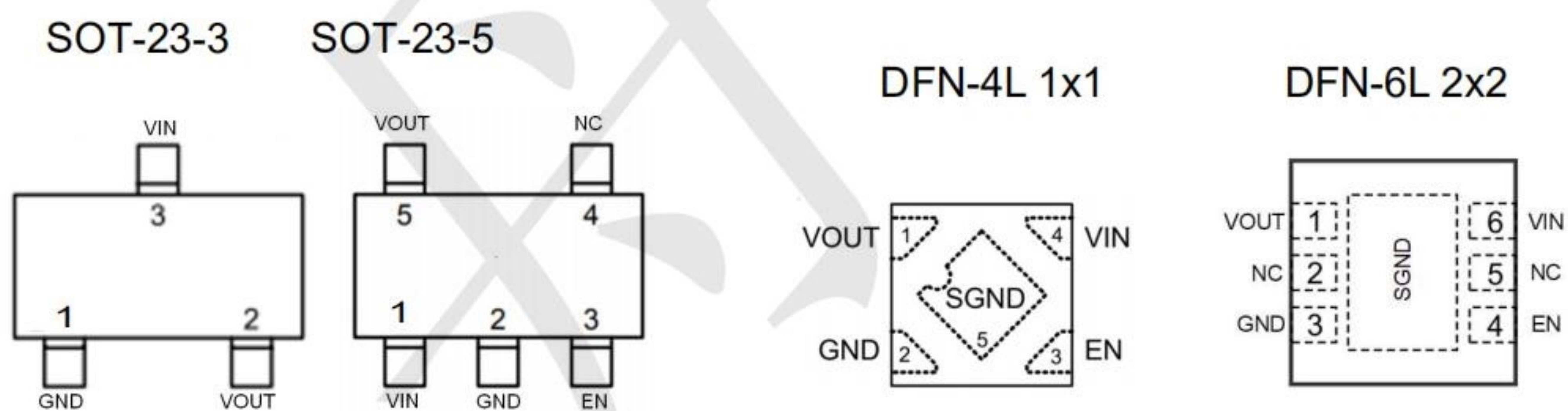
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
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theta	0°	8°	0°	8°



## BLOCK DIAGRAM



## PIN CONFIGURATION



Pin No				Pin Name	Pin Function
SOT-23-3	SOT-23-5	DFN-1X1	DFN-2X2		
1	2	2	3	GND	Ground
2	5	1	1	VOUT	Output of the Regulator
3	1	4	6	VIN	Input of Supply Voltage.
	3	3	4	EN	Enable Control Input.
	4		2,5	NC	No internal connection



**Absolute Maximum Rating** ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)

VIN to GND -----	-0.3V to 6.5V
VOUT, EN, SNS to GND -----	-0.3V to 6V
VOUT to VIN -----	-6V to 0.3V
Package Thermal Resistance (Note 2)	
SOT-23-5, SOT-23-3, $\theta_{JA}$ -----	200 $^{\circ}\text{C} / \text{W}$
DFN-4L 1x1, $\theta_{JA}$ -----	130 $^{\circ}\text{C} / \text{W}$
DFN-6L 2x2, $\theta_{JA}$ -----	95 $^{\circ}\text{C} / \text{W}$
Lead Temperature (Soldering, 10 sec.) -----	260 $^{\circ}\text{C}$
Junction Temperature -----	150 $^{\circ}\text{C}$
Storage Temperature Range -----	-60 $^{\circ}\text{C}$ to 150 $^{\circ}\text{C}$
ESD Susceptibility	
HBM -----	2KV
MM -----	200V
CDM -----	2KV

**Recommended Operating Conditions**

Input Voltage VIN -----	1.2V to 5.5V
Junction Temperature Range -----	-40 $^{\circ}\text{C}$ to 125 $^{\circ}\text{C}$
Ambient Temperature Range -----	-40 $^{\circ}\text{C}$ to 85 $^{\circ}\text{C}$



**Electrical Characteristics** (T =25°C unless otherwise noted)

(V<sub>IN</sub> =5V, V<sub>EN</sub> = 5V T<sub>A</sub>=25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
Supply Voltage	V <sub>IN</sub>		1.2	--	5.5	V	
DC Output Voltage Accuracy		I <sub>LOAD</sub> =0.1mA	-2		2	%	
Dropout Voltage (I <sub>LOAD</sub> =300mA) (Note 3)	V <sub>DROP_3V</sub>	V <sub>OUT</sub> ≥ 3V	--	0.16		V	
	V <sub>DROP_2.8V</sub>	V <sub>OUT</sub> = 2.8V		0.18			
	V <sub>DROP_2.5V</sub>	V <sub>OUT</sub> = 2.5V		0.2			
	V <sub>DROP_1.8V</sub>	V <sub>OUT</sub> = 1.8V		0.25			
	V <sub>DROP_1.5V</sub>	V <sub>OUT</sub> = 1.5V		0.31			
	V <sub>DROP_1.2V</sub>	V <sub>OUT</sub> = 1.2V		0.41			
	V <sub>DROP_0.9V</sub>	V <sub>OUT</sub> = 0.9V		0.61			
Ground Current	I <sub>Q</sub>	I <sub>LOAD</sub> = 0mA		2		μA	
Shutdown Ground Current	I <sub>SD</sub>	V <sub>EN</sub> = 0V,		0.01	0.5	μA	
V <sub>OUT</sub> Shutdown Leakage Current	I <sub>LEAK</sub>	V <sub>OUT</sub> = 0V		0.01	0.5		
SNS Input Current	I <sub>SNS</sub>	SNS = V <sub>OUT</sub>		0.7		μA	
Enable Threshold Voltage	V <sub>IH</sub>	EN Rising			2	V	
	V <sub>IL</sub>	EN Falling	0.6				
EN Input Current	I <sub>EN</sub>	V <sub>EN</sub> = 5V		10	100	nA	
Line Regulation	Δ <sub>LINE</sub>	I <sub>LOAD</sub> =30mA, 1.5V ≤ V <sub>IN</sub> ≤ 5.5V or (V <sub>OUT</sub> + 0.2V) ≤ V <sub>IN</sub> ≤ 5.5V		0.2		%	
Load Regulation	Δ <sub>LOAD</sub>	10mA ≤ I <sub>LOAD</sub> ≤ 0.3A		0.2		%	
Output Current Limit	I <sub>LIM</sub>	V <sub>OUT</sub> =0	301	600		mA	
Power Supply Rejection Ratio (I <sub>LOAD</sub> =5mA)	PSRR	V <sub>OUT</sub> =1.2V, V <sub>IN</sub> = 2V	f = 100Hz	--	80	--	dB
			f = 1kHz	--	75	--	
Output Voltage Noise (BW = 10Hz to 100kHz, C <sub>OUT</sub> =1μF,)		V <sub>IN</sub> = 3.5V I <sub>LOAD</sub> =0.1A	V <sub>OUT</sub> =0.9V	--	40	--	μV <sub>RMS</sub>
			V <sub>OUT</sub> =2.8V	--	50	--	
Thermal Shutdown Temperature	T <sub>SD</sub>	I <sub>LOAD</sub> =10mA	--	155	--	°C	
Thermal Shutdown Hysteresis	ΔT <sub>SD</sub>		--	15	--	°C	



**TYPICAL APPLICATION**

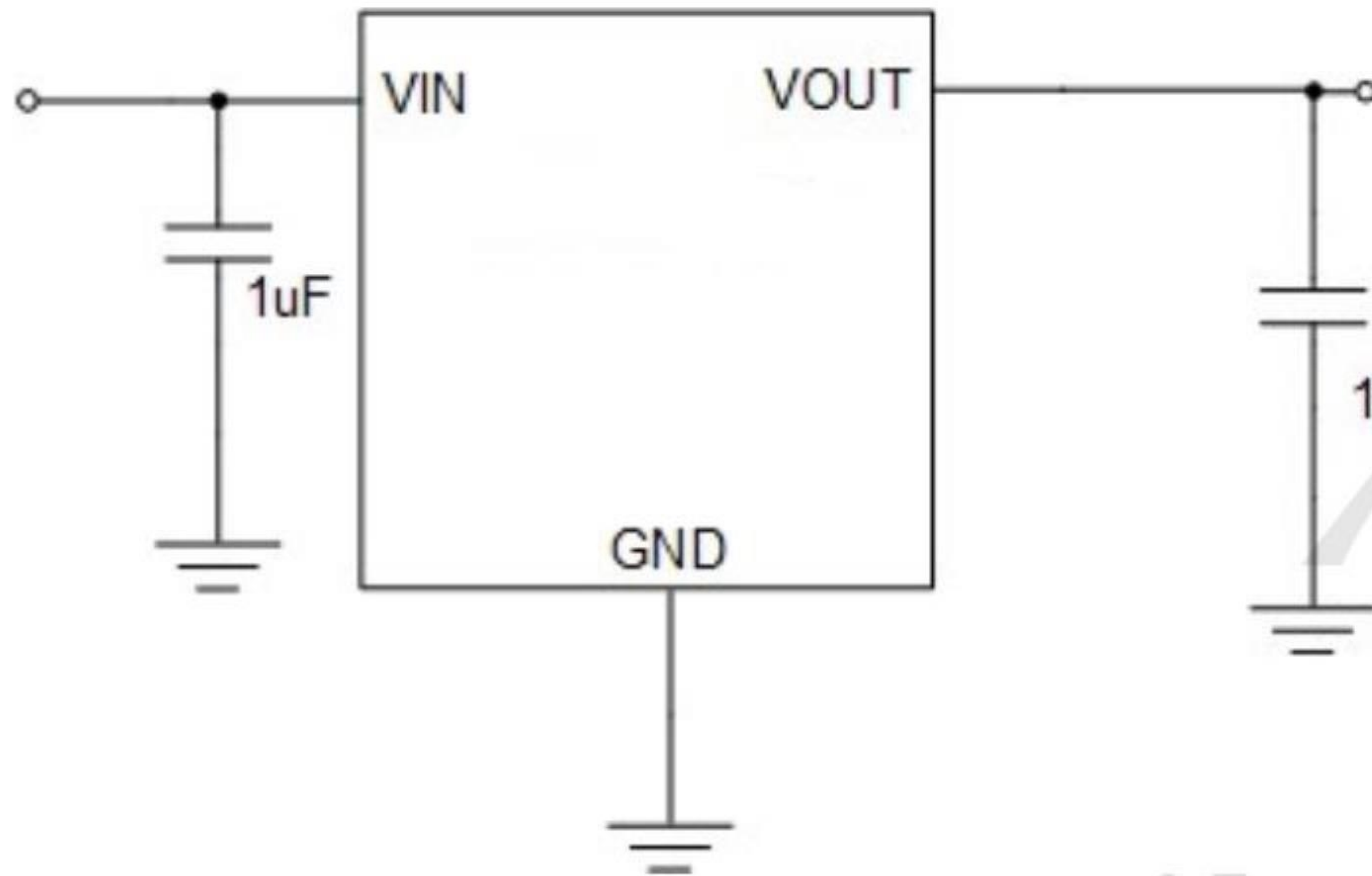


Figure 1: Application circuit of Fixed  $V_{OUT}$  LDO

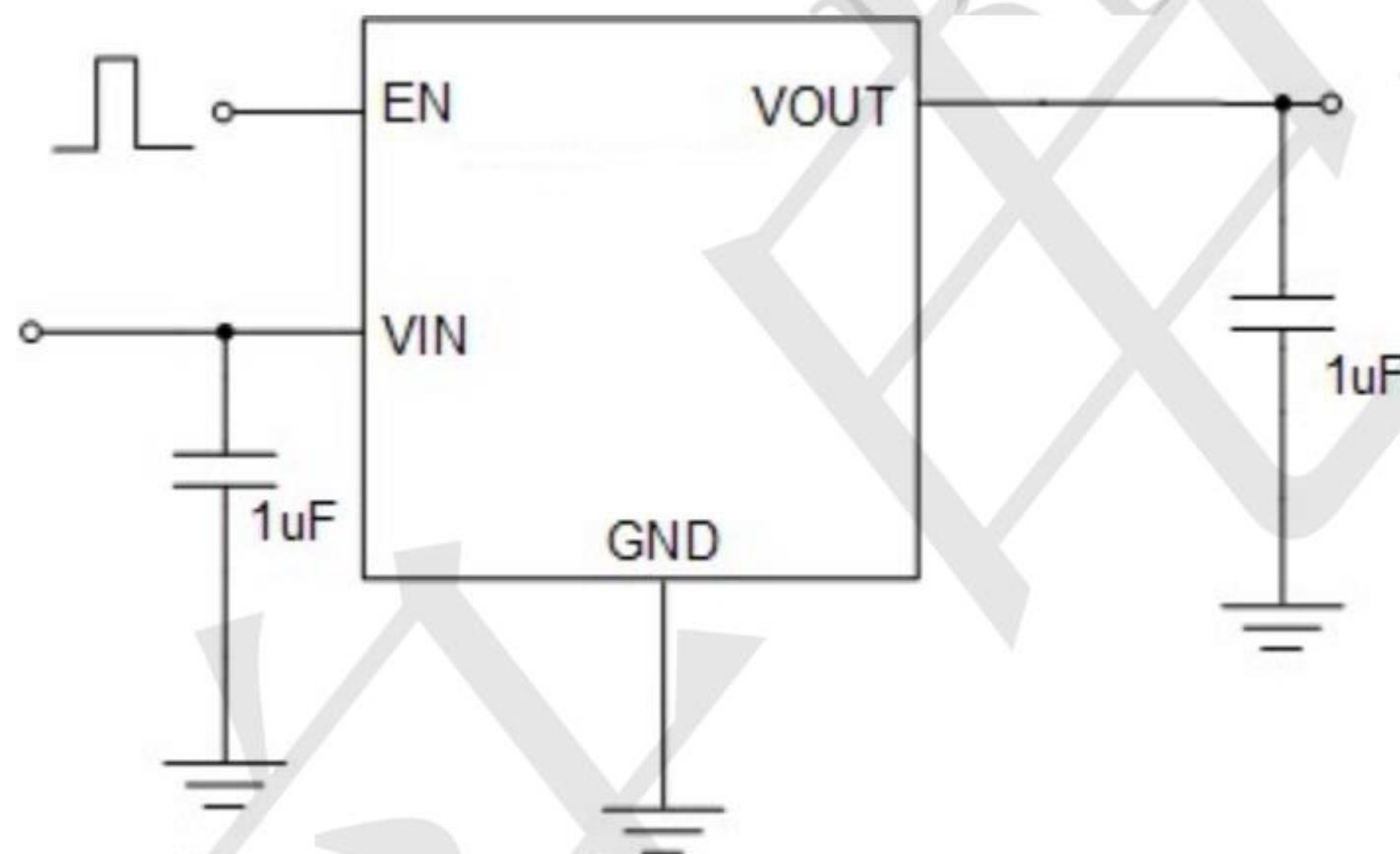


Figure 2: Application circuit of Fixed  $V_{OUT}$  LDO with enable function

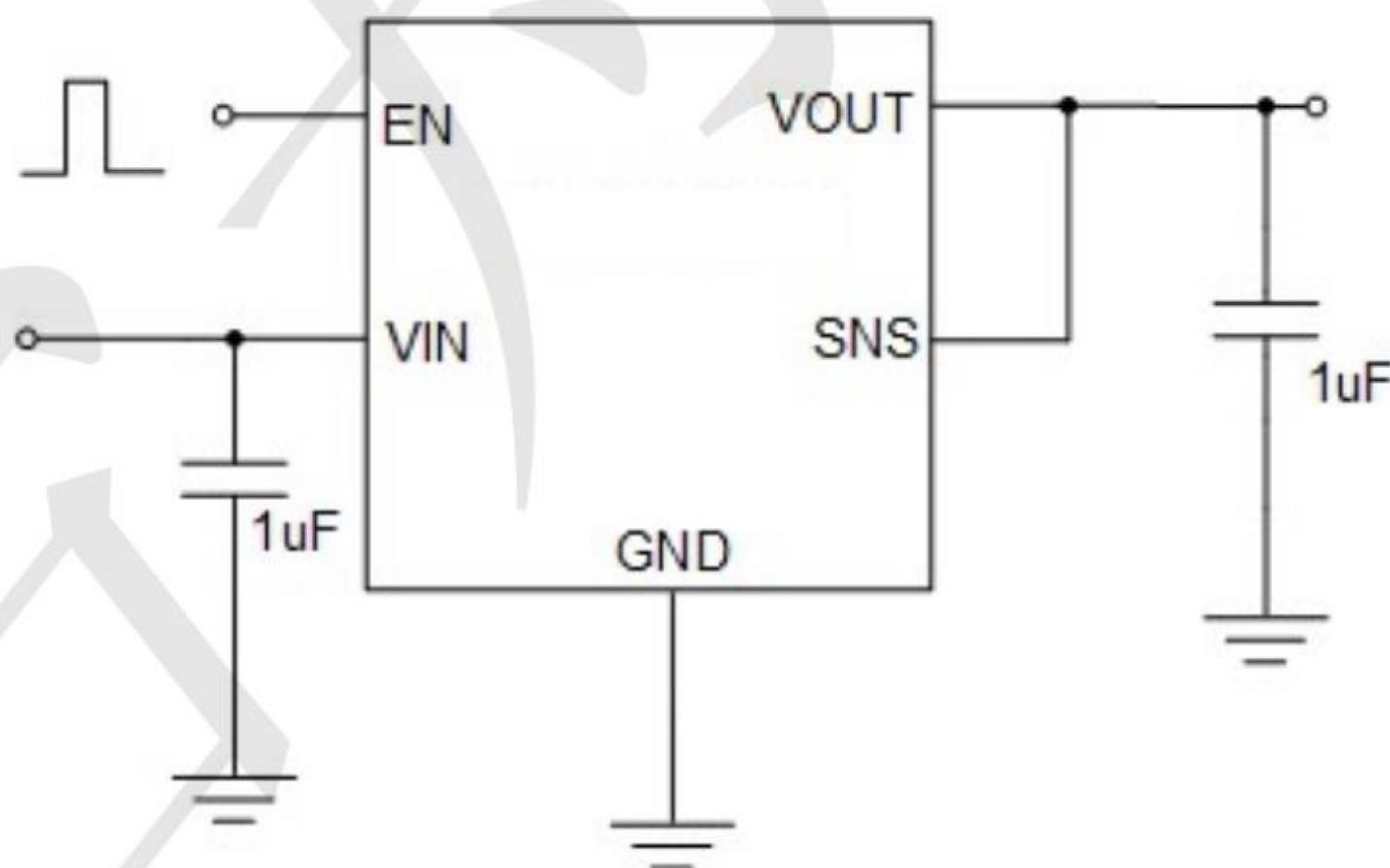
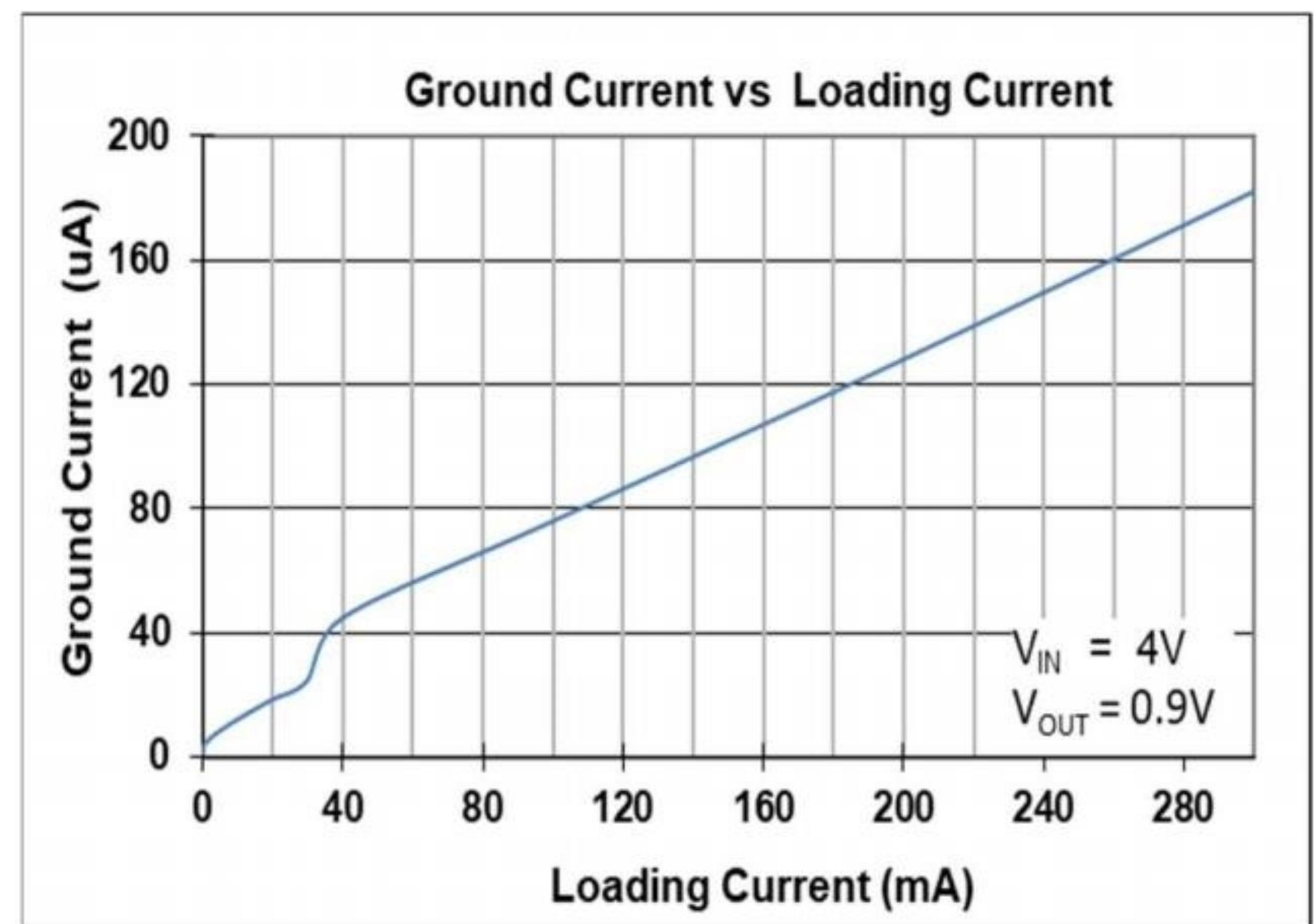
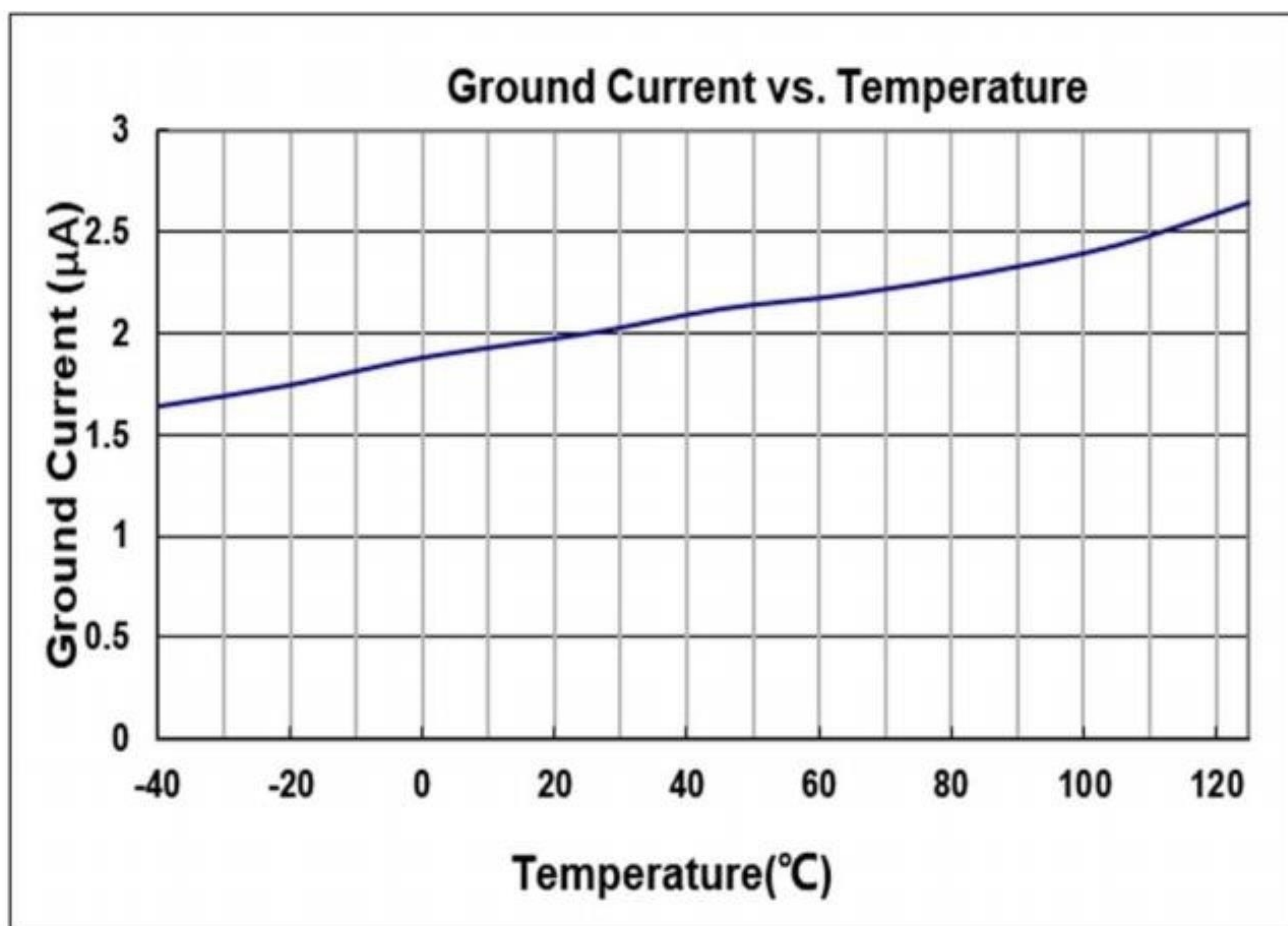
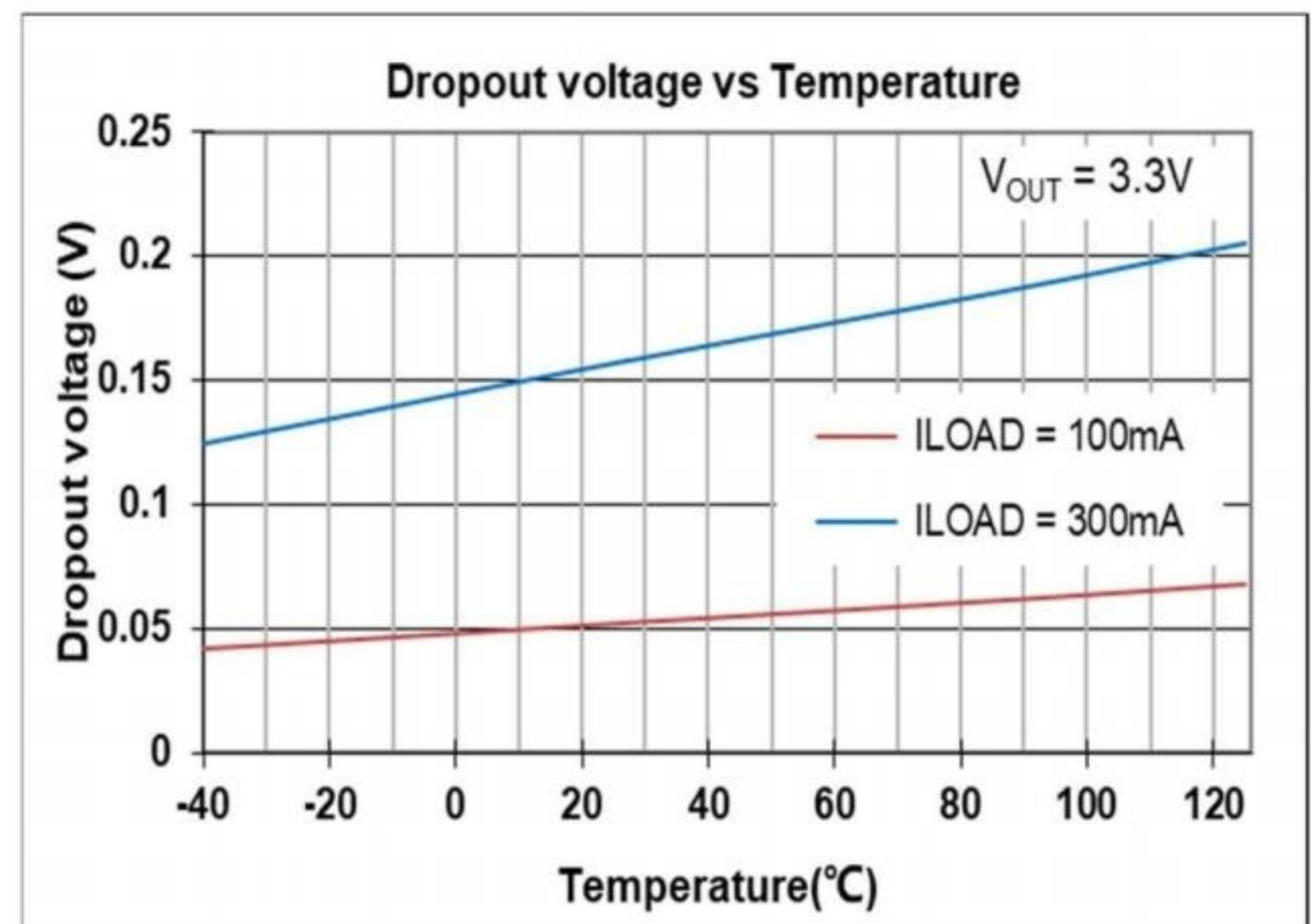
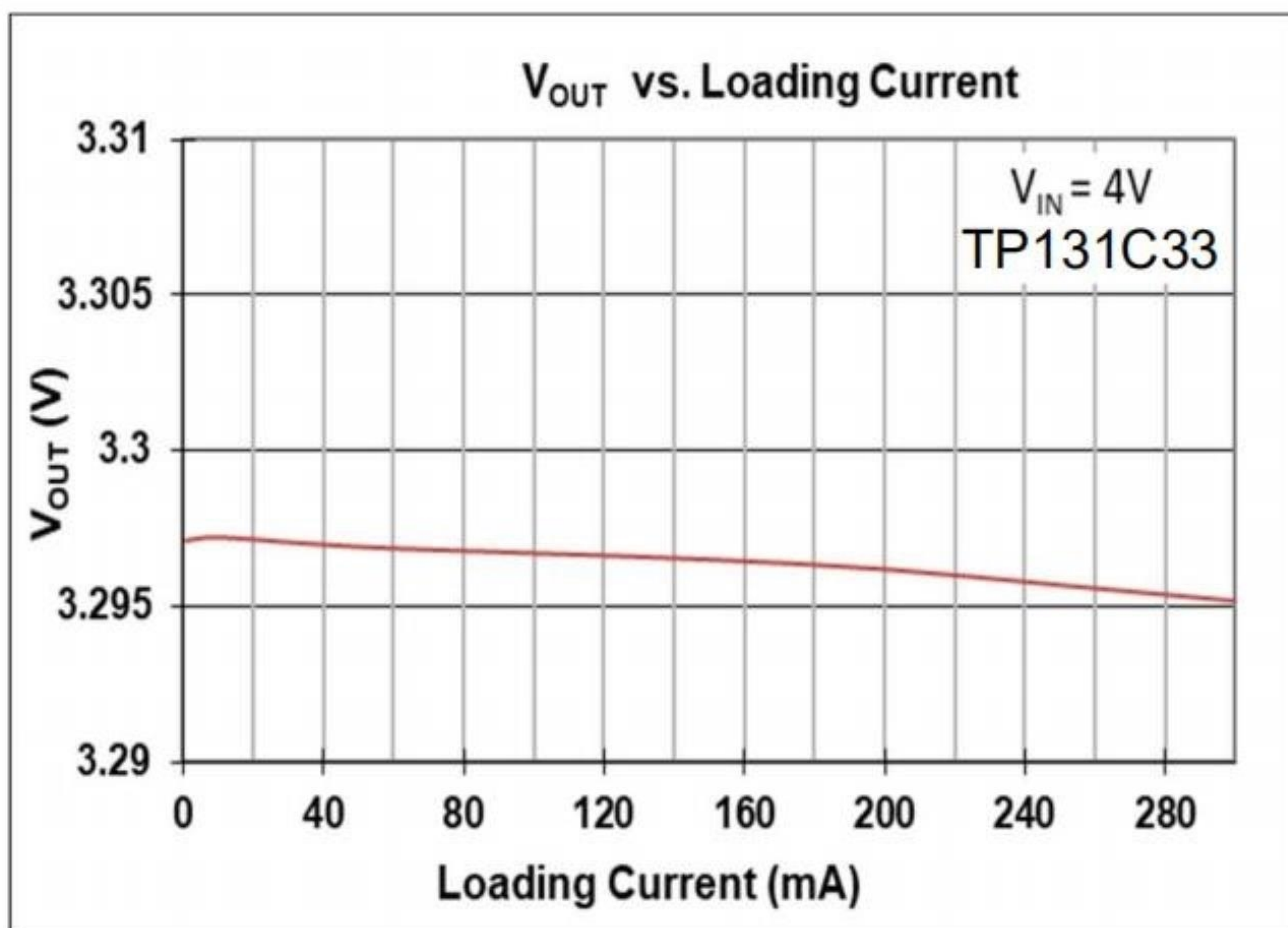
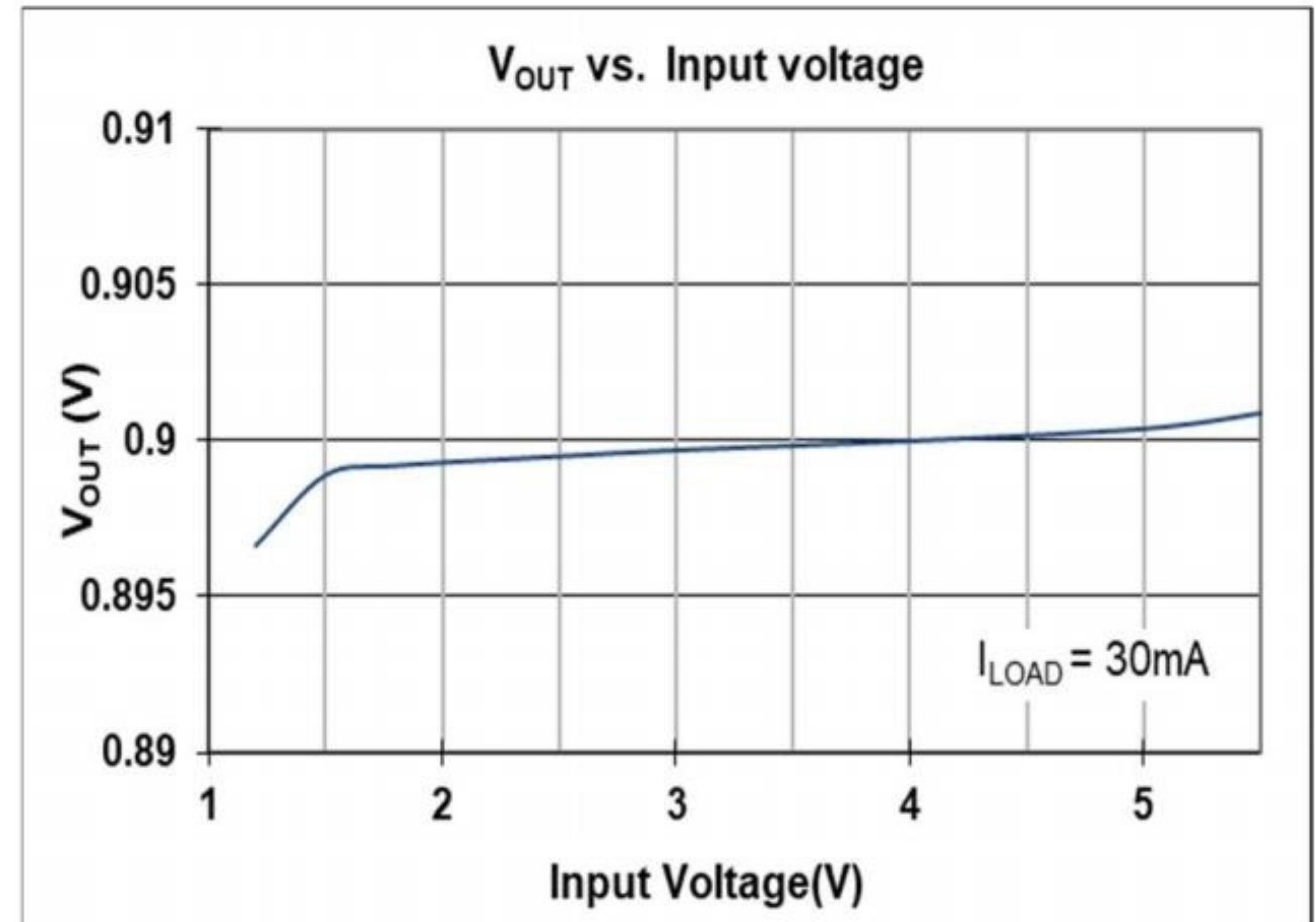
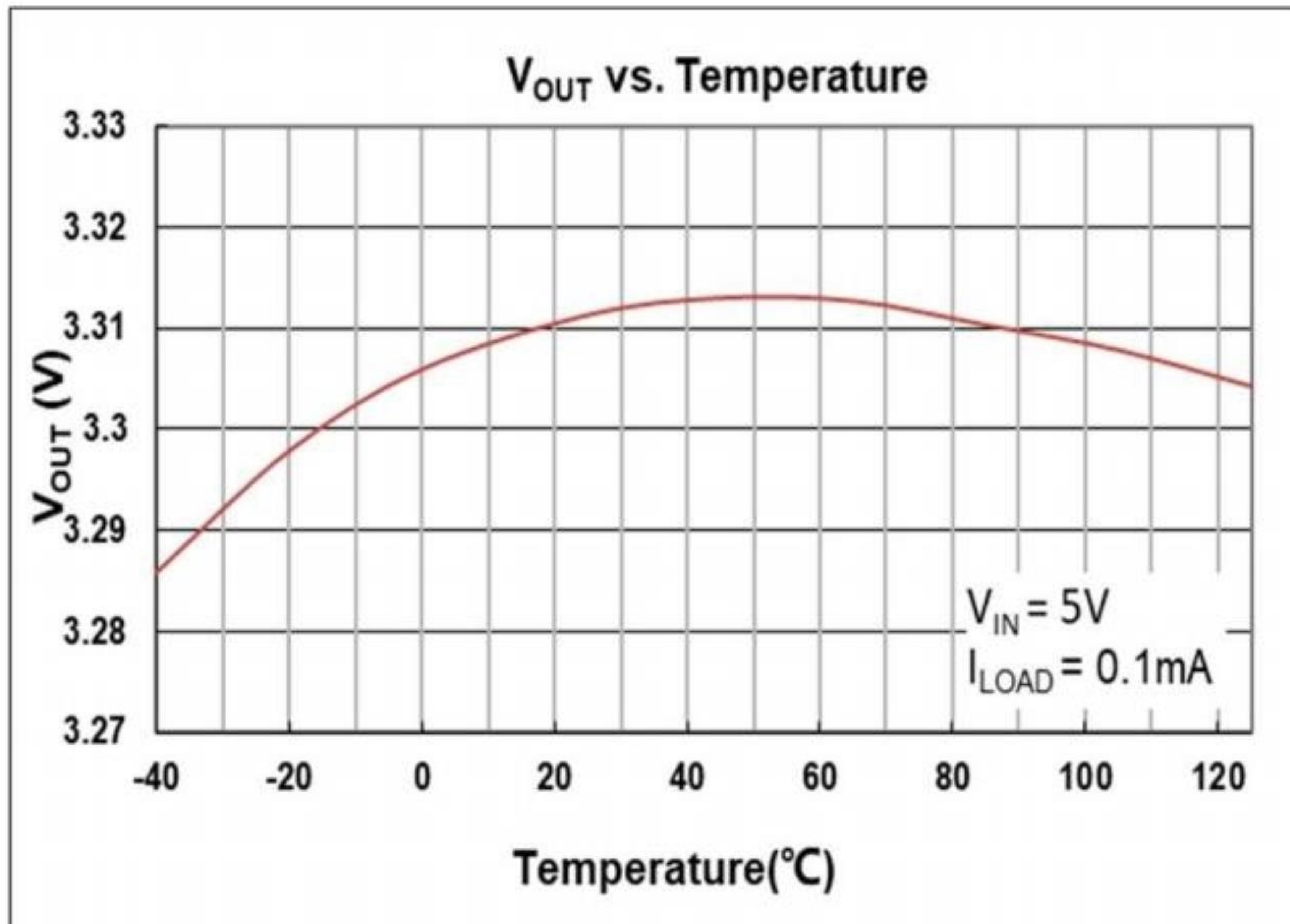
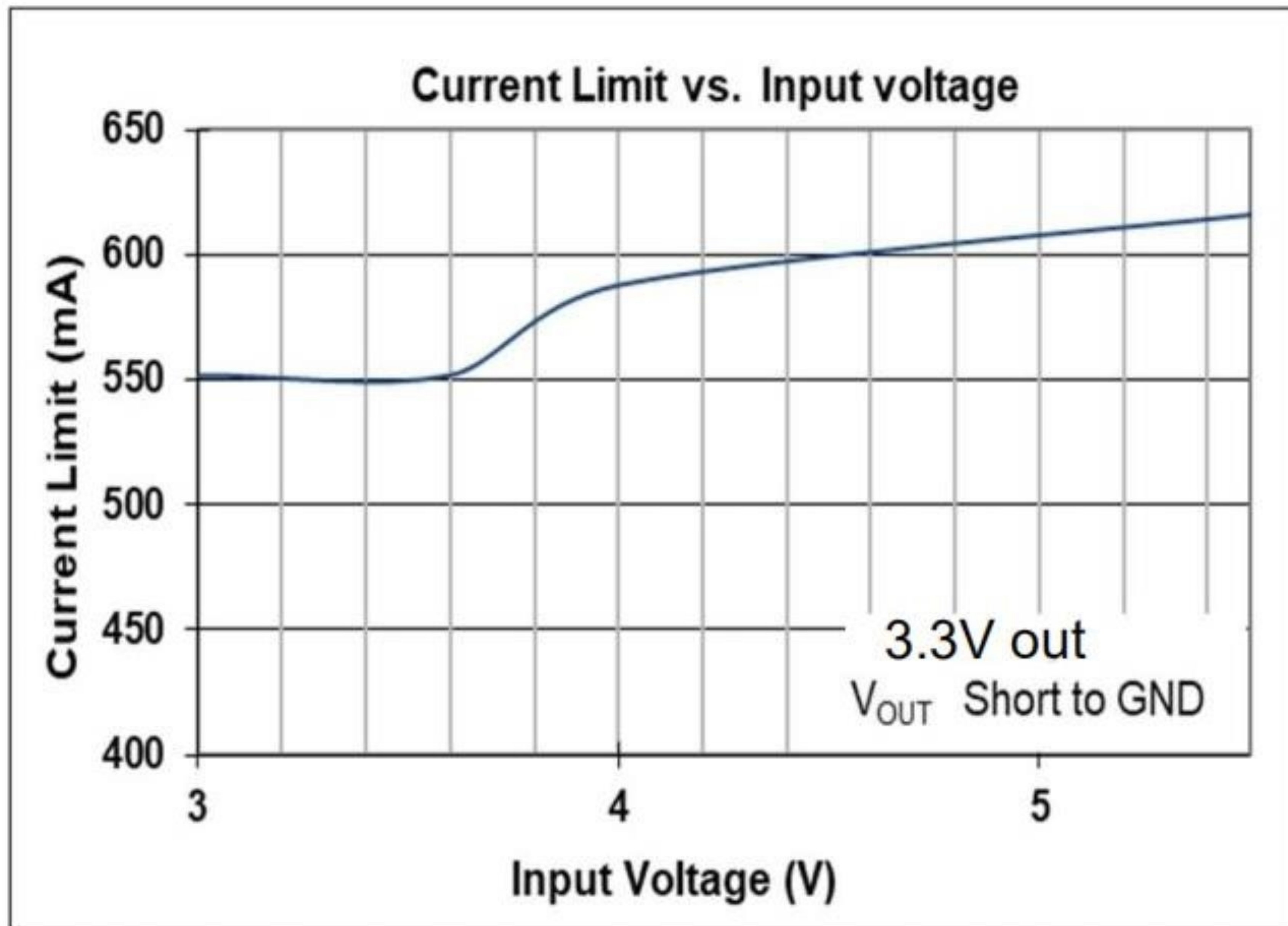
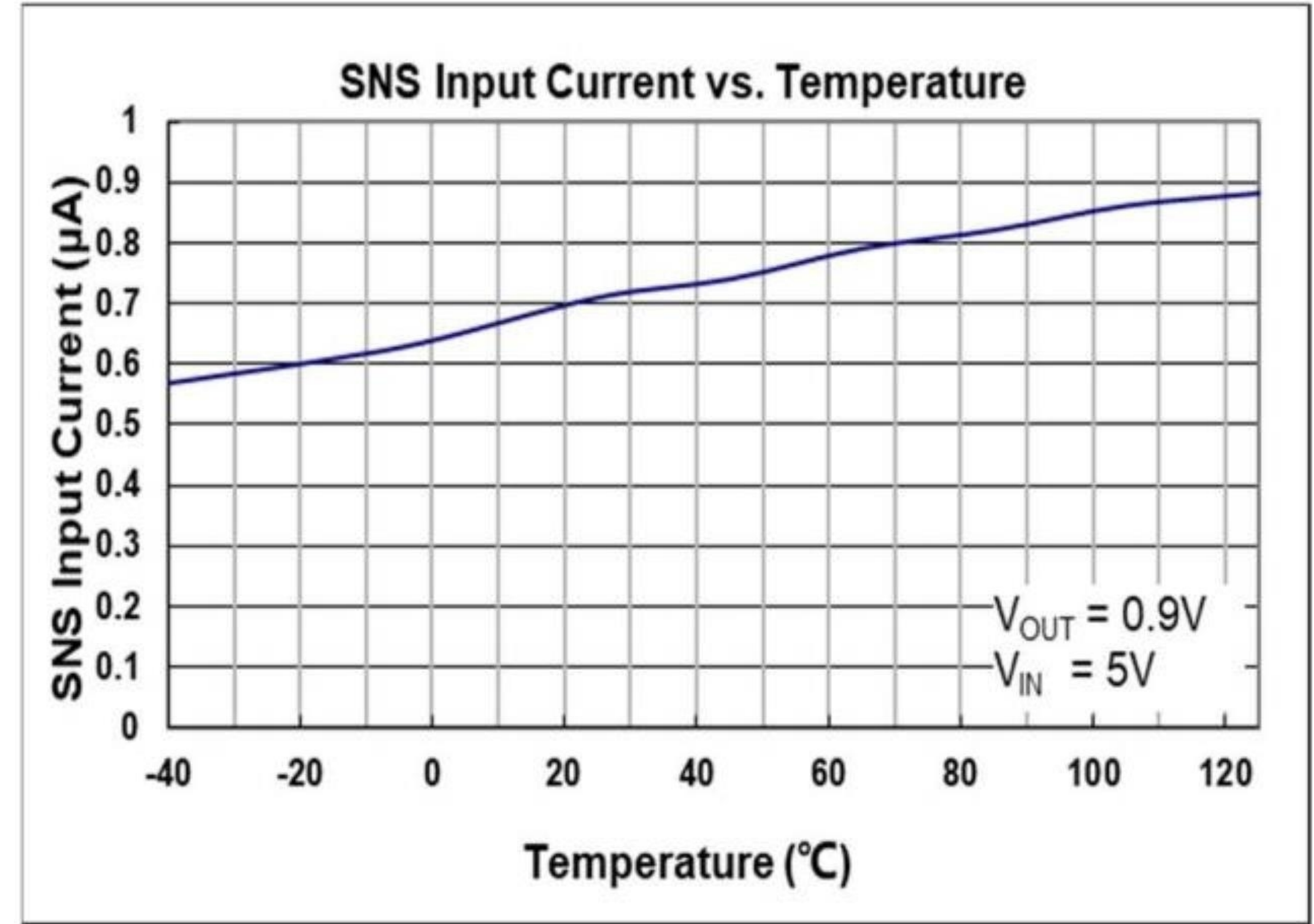
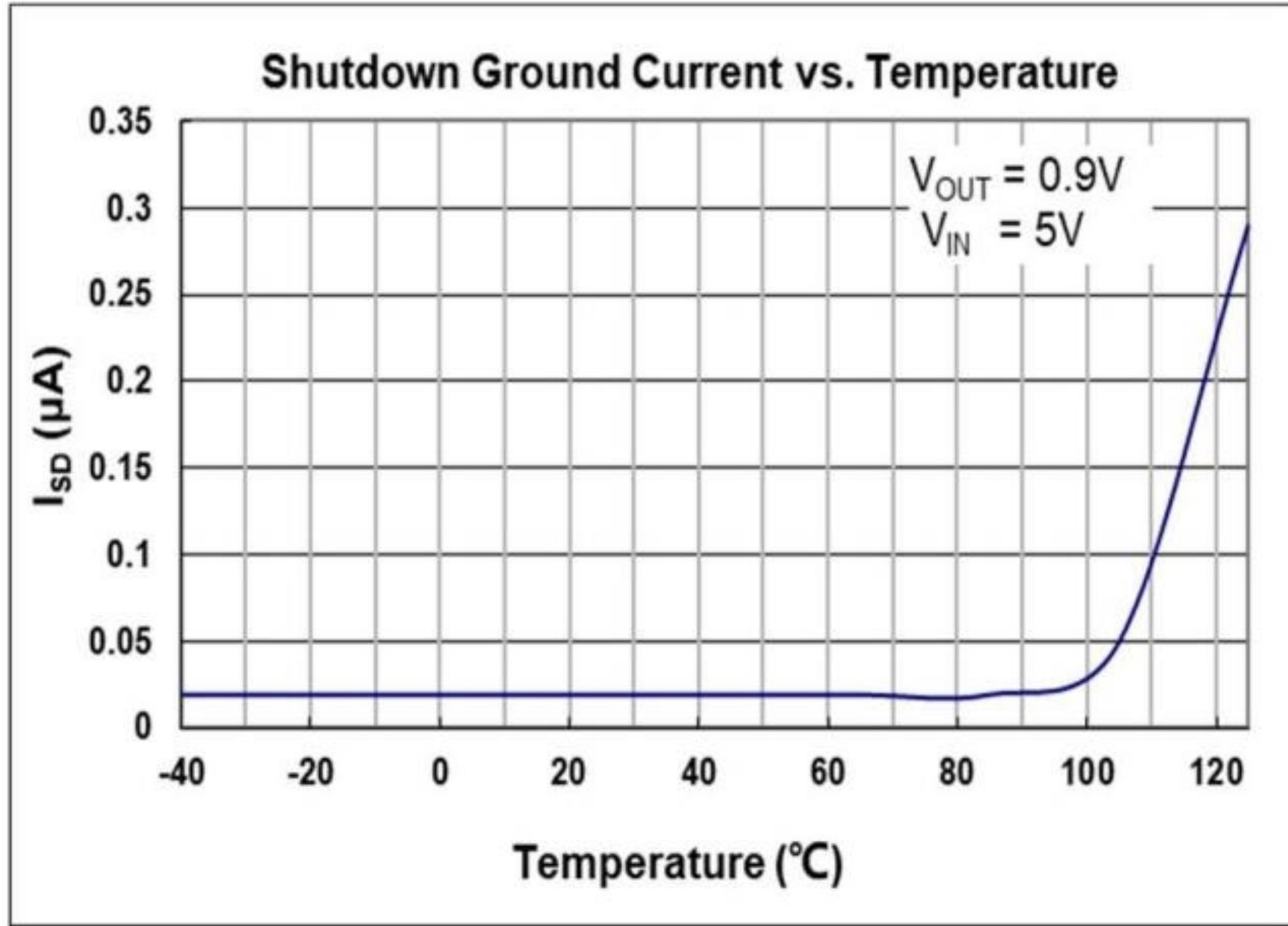


Figure 3: Application circuit of Fixed  $V_{OUT}$  LDO with enable and sense functions

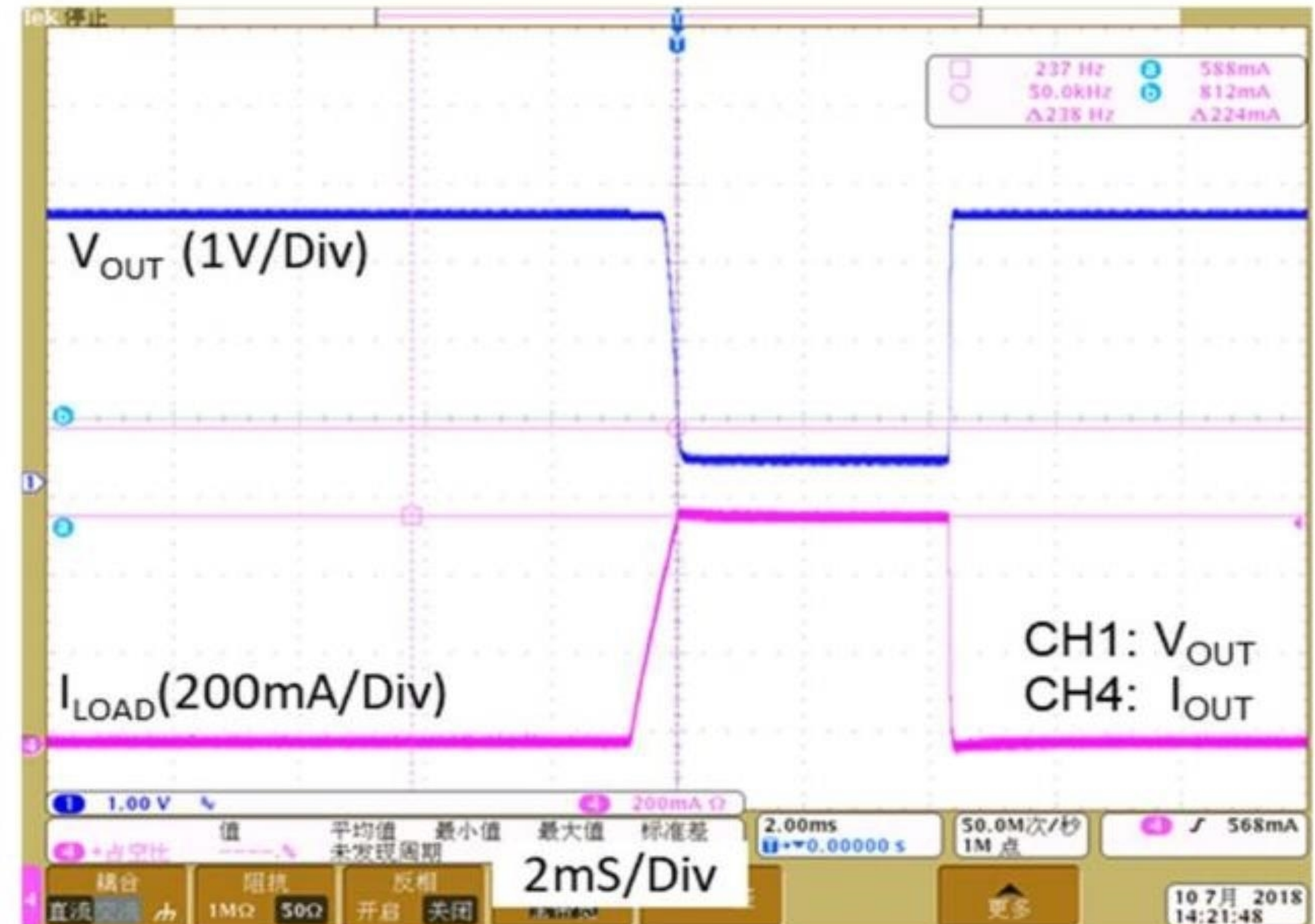




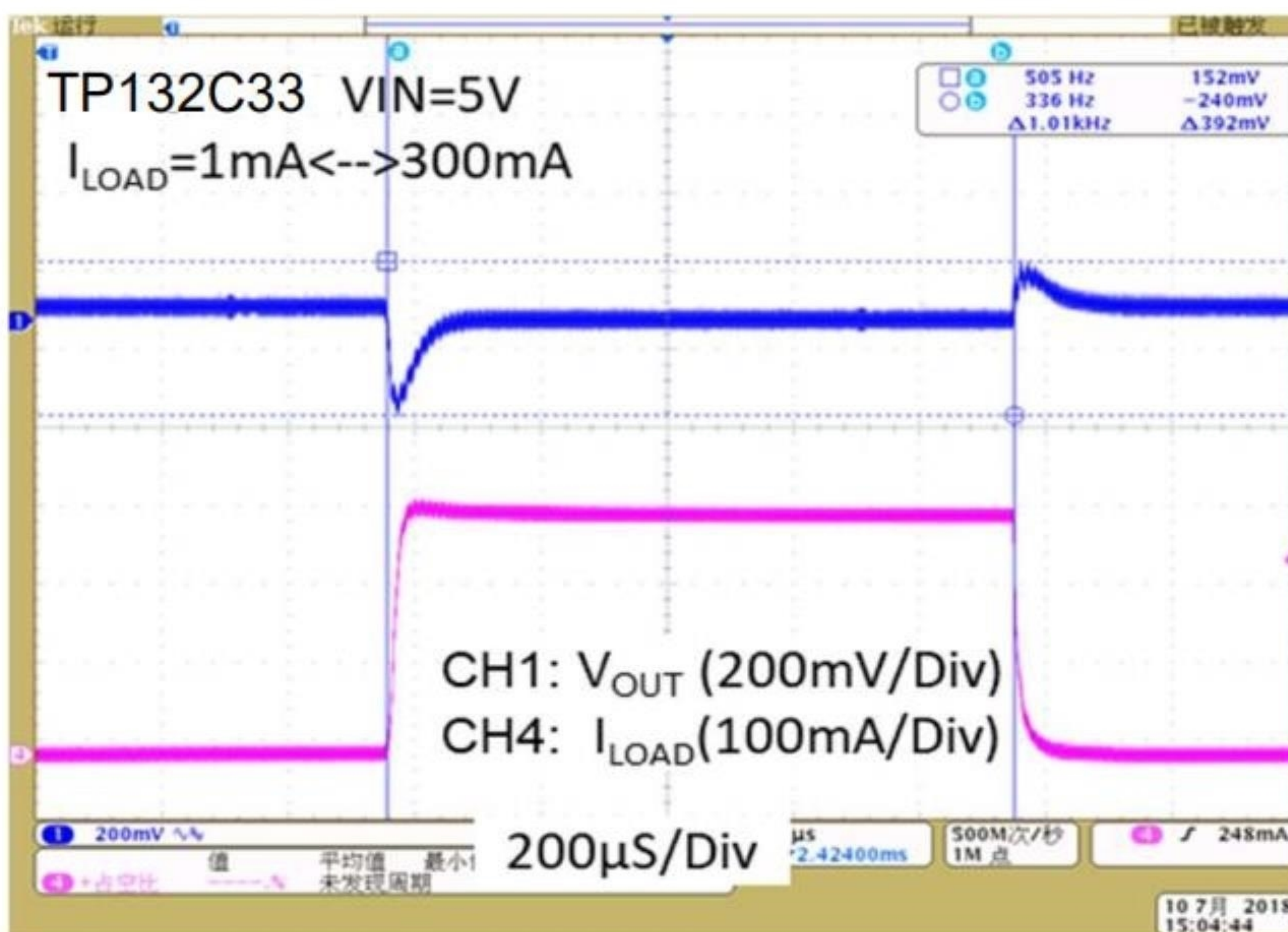




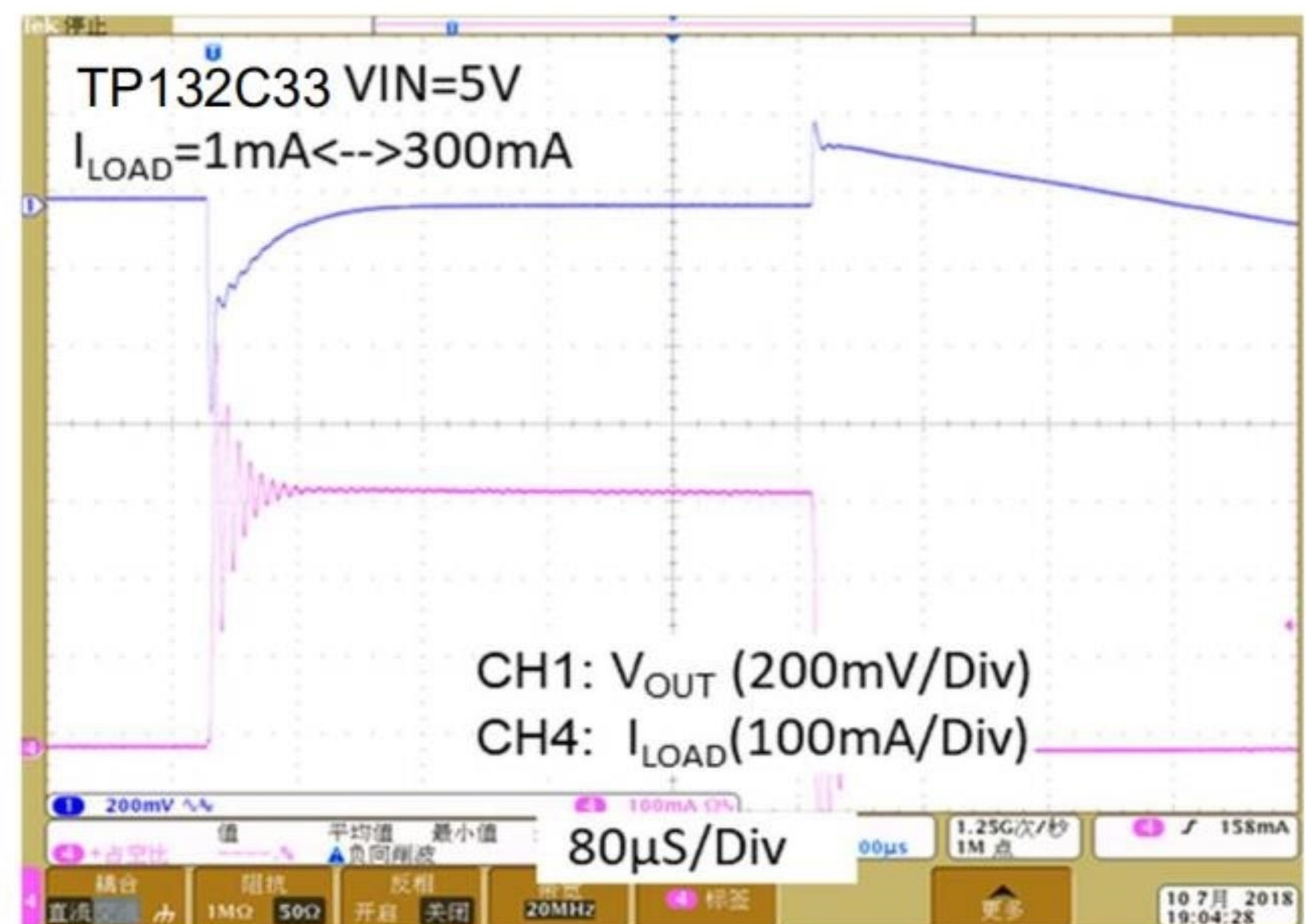
**Current Limit Response**



**Load Transient Response I**

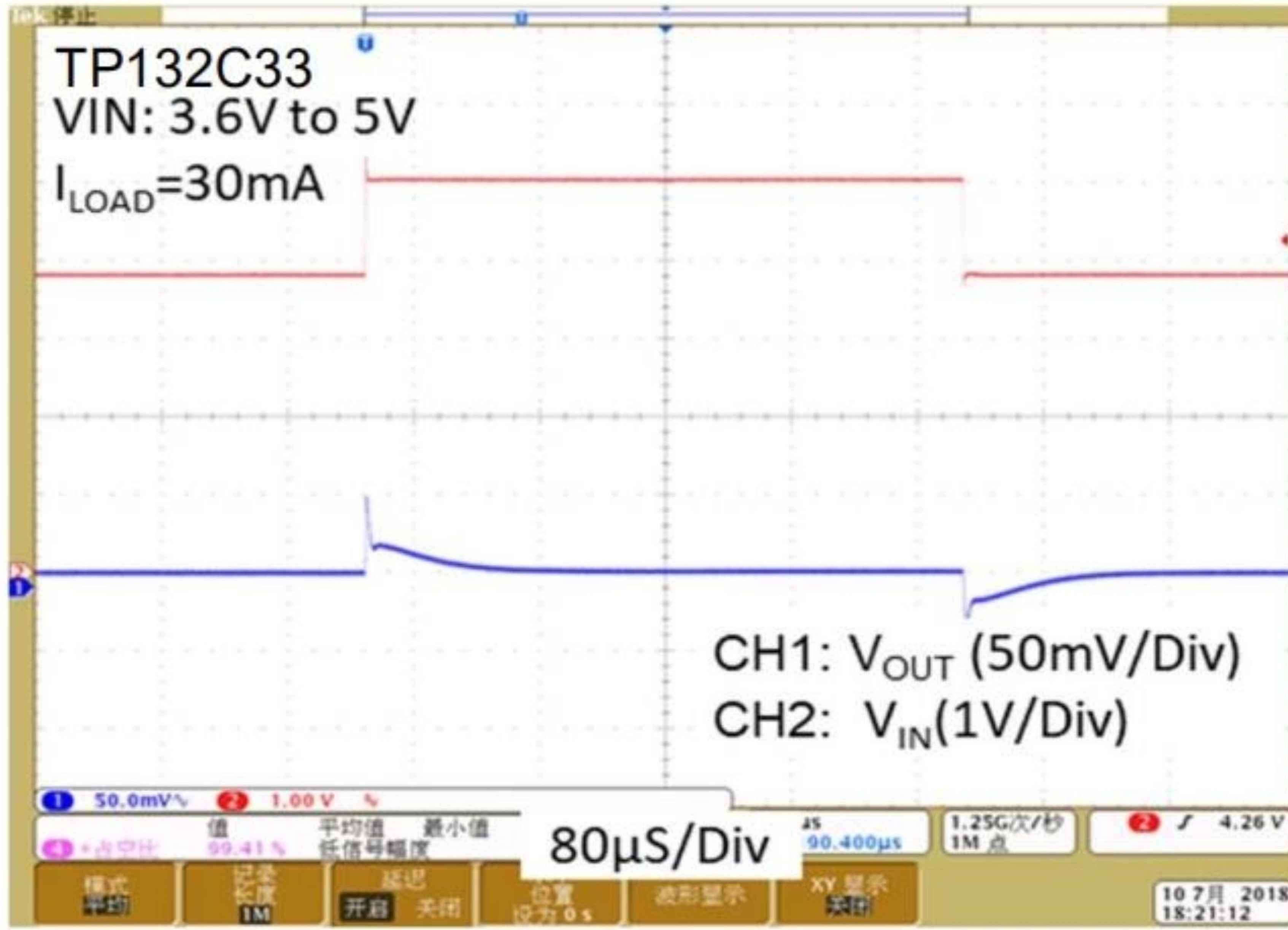


**Load Transient Response II**

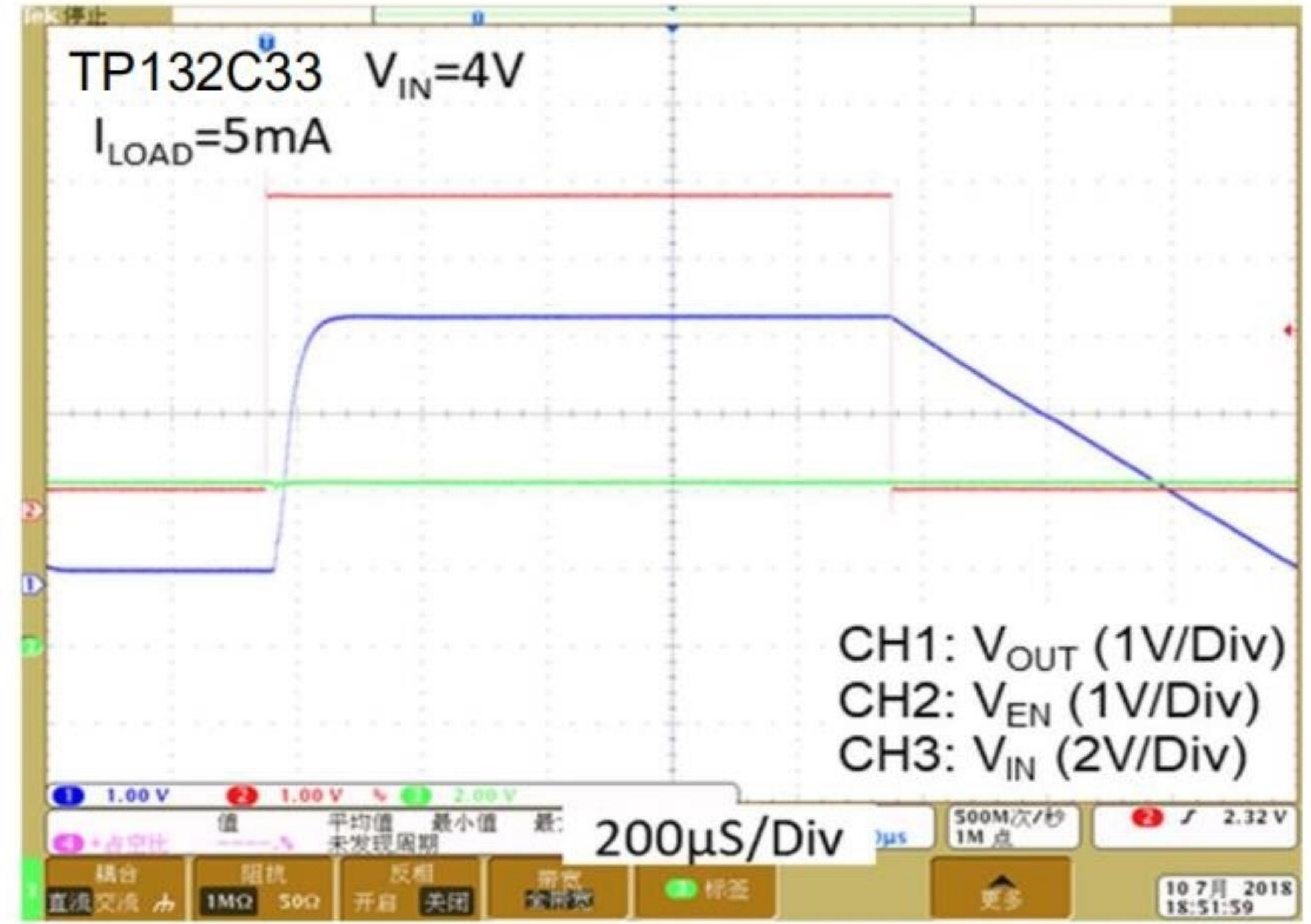




Line Transient Response



$V_{OUT}$  Turn On/Off by EN

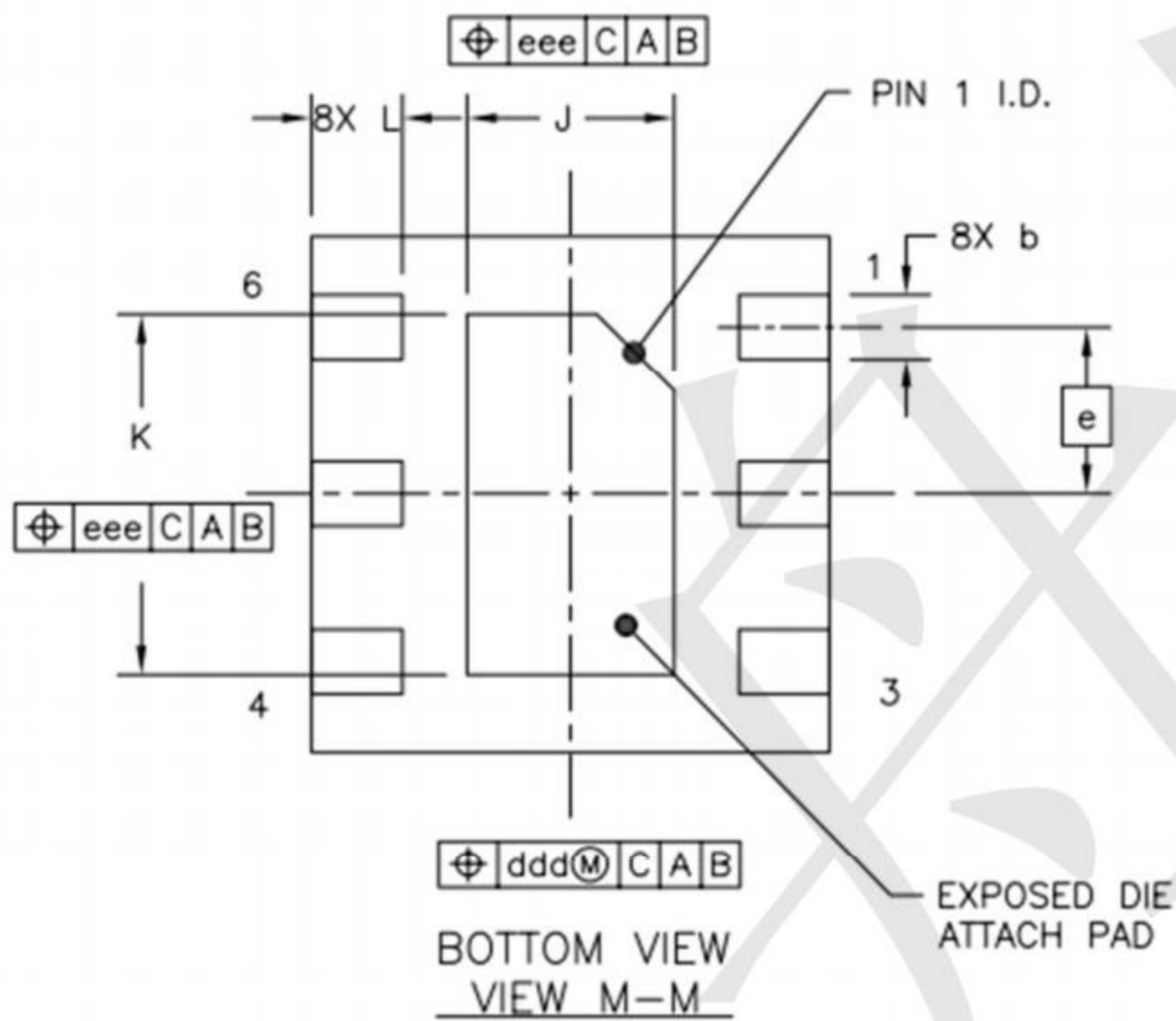
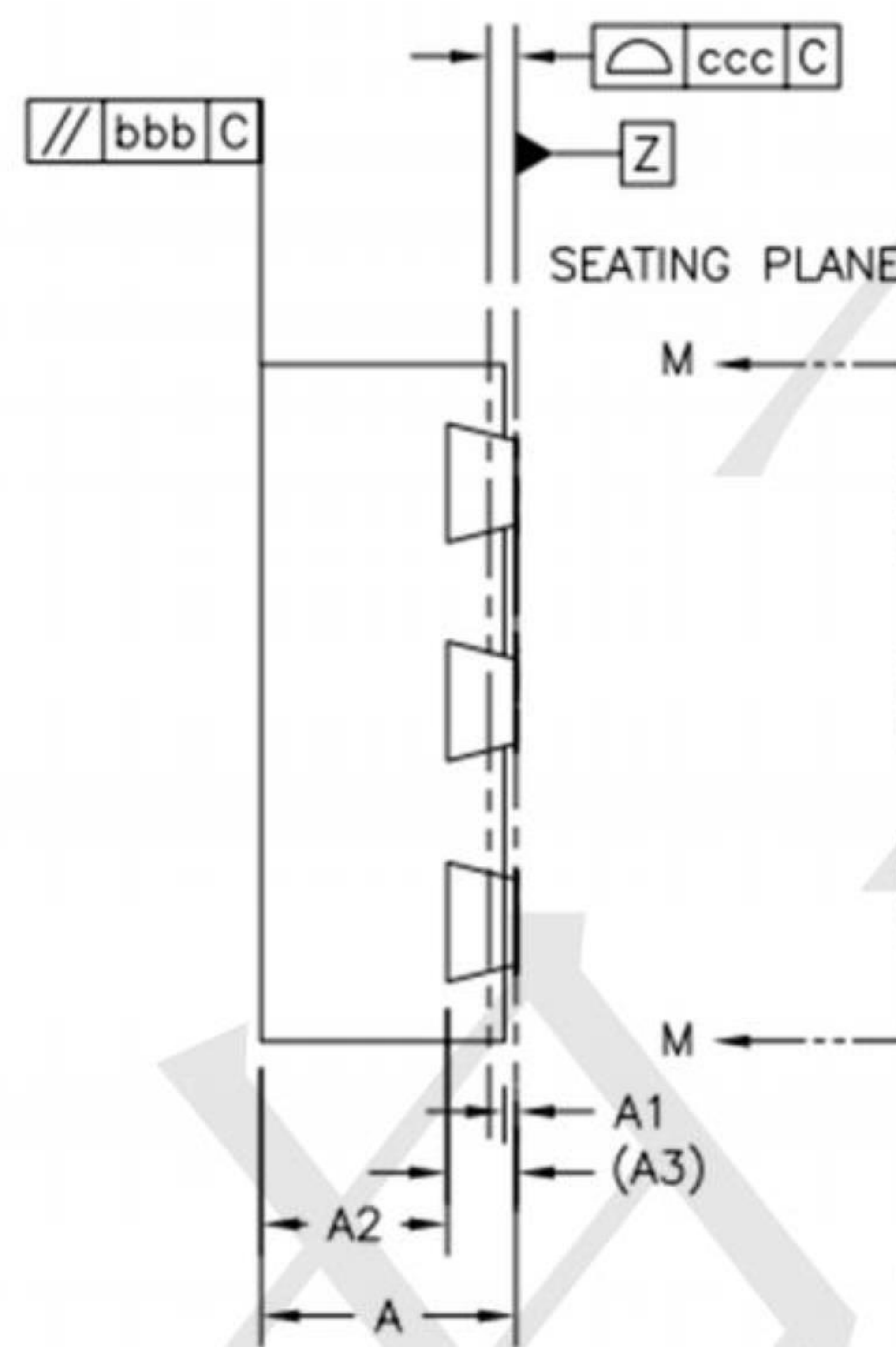
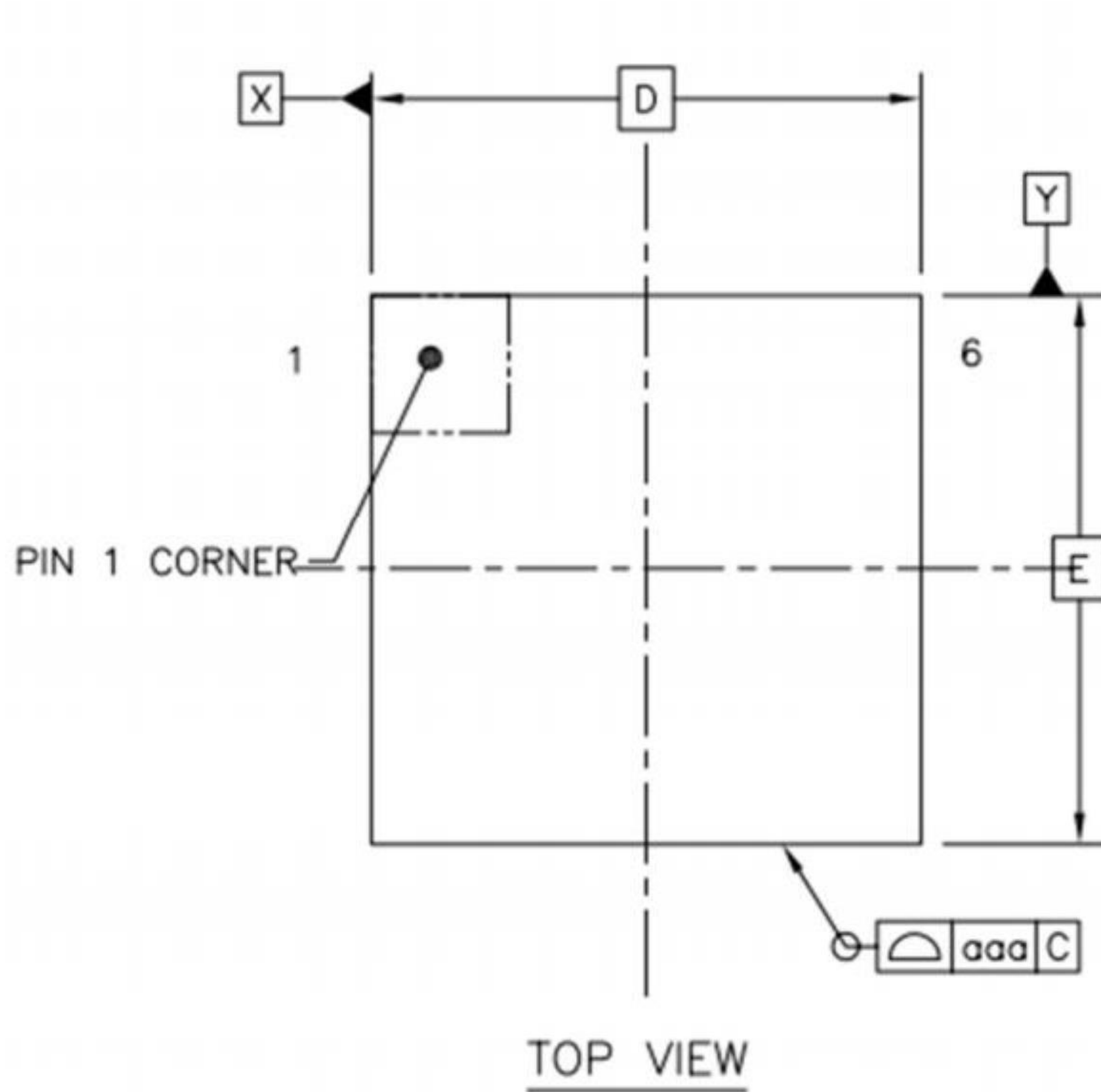




**Package informantion**

**DFN2X2-6 Outline Dimensions**

**DFN-6L**



DESCRIPTION	SYMBOL	MILLIMETER		
		MIN	NOM	MAX
TOTAL THICKNESS	A	0.7	0.75	0.8
STAND OFF	A1	0	0.035	0.05
MOLD THICKNESS	A2	---	0.55	0.575
L/F THICKNESS	A3	0.203 REF		
LEAD WIDTH	b	0.20	0.25	0.30
BODY SIZE	X D	2 BSC		
	Y E	2 BSC		
LEAD PITCH	e	0.65 BSC		
EP SIZE	X J	0.75	0.8	0.85
	Y K	1.35	1.4	1.45
LEAD LENGTH	L	0.30	0.35	0.40
PACKAGE EDGE TOLERANCE	aaa	0.05		
MOLD FLATNESS	bbb	0.1		
COPLANARITY	ccc	0.08		
LEAD OFFSET	ddd	0.1		
EXPOSED PAD OFFSET	eee	0.1		

**NOTES**

1.0 COPLANARITY APPLIES TO LEADS, CORNER LEADS AND DIE ATTACH PAD.