

## General Description

The TP2803 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

## Features

- 2μA Ground Current at no Load
- ±2% Output Accuracy
- 400mA Output Current
- 10nA Disable Current (by option)
- Wide Operating Input Voltage Range: 1.2V to 5.5V
- Dropout Voltage: 0.18V at 300mA ( $V_{OUT}=3.3V$ )
- 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-23-5 Packages Available

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 TP2803 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 400mA).

## Applications

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

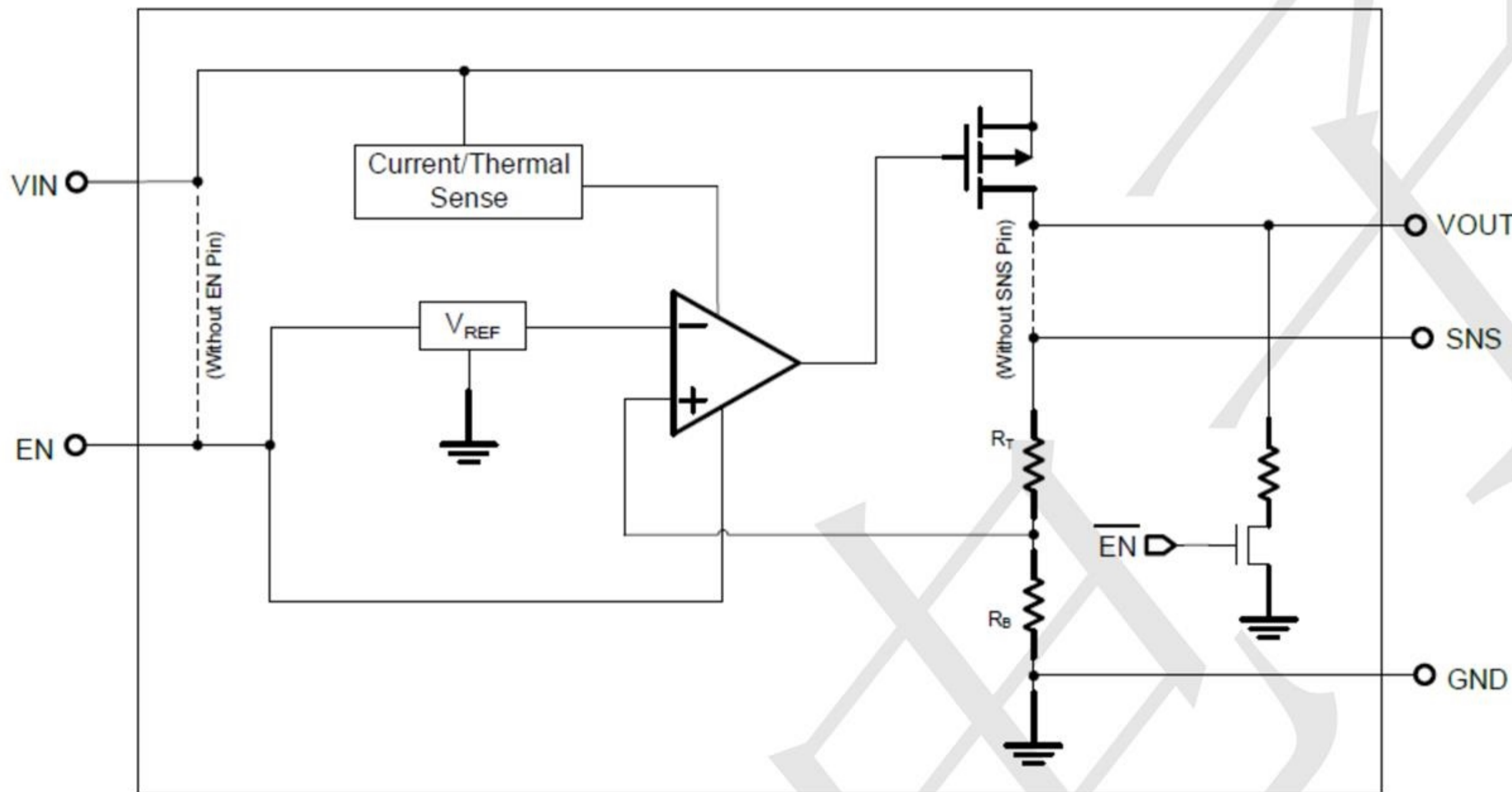
## Ordering Information

### TP2803E33-5

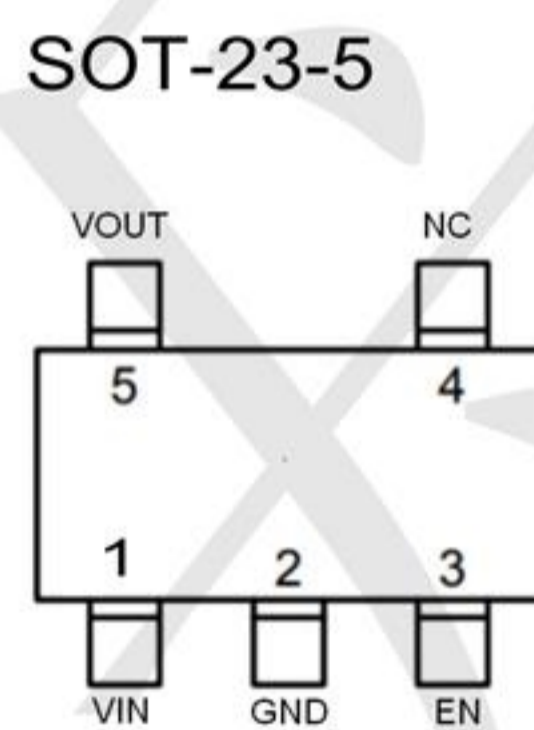
-5:SOT23-5 Package

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

**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 Pin to GND Pin Voltage .....		-0.3V to 6.5V
VOUT Pin and EN Pin to GND Pin Voltage .....		-0.3V to 6V
VOUT Pin to VIN Pin Voltage .....		-6V to 0.3V
Storage Temperature Range .....		-60°C~150°C
Lead Temperature (Soldering, 10 sec) .....		260°C
Junction Temperature .....		150°C
Operating Ambient Temperature Range $T_A$ .....		-40°C~85°C
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 =25°C unless otherwise noted)

(V<sub>IN</sub>=5V, V<sub>EN</sub>=5V, T<sub>A</sub>=25°C, unless otherwise specified) (Note 1)

PARAMETER	TEST CONDITIONS	SYMBOL	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	%
SNS Input Current	SNS=V <sub>OUT</sub>	I <sub>SNS</sub>		0.5		μA
Dropout Voltage (Note 2)	I <sub>LOAD</sub> =300mA, V <sub>OUT</sub> ≥3V	V <sub>DROP_3V</sub>		0.18		V
	I <sub>LOAD</sub> =300mA, V <sub>OUT</sub> =2.8V	V <sub>DROP_2.8V</sub>		0.23		
	I <sub>LOAD</sub> =300mA, V <sub>OUT</sub> =2.5V	V <sub>DROP_2.5V</sub>		0.23		
	I <sub>LOAD</sub> =300mA, V <sub>OUT</sub> =1.8V	V <sub>DROP_1.8V</sub>		0.28		
	I <sub>LOAD</sub> =300mA, V <sub>OUT</sub> =1.5V	V <sub>DROP_1.5V</sub>		0.36		
	I <sub>LOAD</sub> =300mA, V <sub>OUT</sub> =1.2V	V <sub>DROP_1.2V</sub>		0.45		
GND Current	I <sub>LOAD</sub> =0mA	I <sub>Q</sub>		2	5	μA
Shutdown GND Current	V <sub>EN</sub> =0V, V <sub>OUT</sub> =0V	I <sub>SD</sub>		0.1	0.5	μA
V <sub>OUT</sub> Shutdown Leakage Current	V <sub>EN</sub> =0V, V <sub>OUT</sub> =0V	I <sub>LEAK</sub>		0.1	0.5	μA
Enable Threshold Voltage	EN Rising	V <sub>IH</sub>	1.0			V
	EN Falling	V <sub>IL</sub>			0.4	
EN Input Current	V <sub>EN</sub> =5V	I <sub>EN</sub>		10	100	nA
Line Regulation	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	ΔLINE		0.2		%
Load Regulation	10mA≤I <sub>LOAD</sub> ≤300mA	ΔLOAD		0.2		%
Output Current Limit	V <sub>OUT</sub> =0V	I <sub>LIM</sub>	400	600		mA
Power Supply Rejection Ratio	V <sub>OUT</sub> =1.2V, I <sub>LOAD</sub> =5mA, V <sub>IN</sub> =2V, f=100Hz	PSRR		78		dB
	V <sub>OUT</sub> =1.2V, I <sub>LOAD</sub> =5mA, V <sub>IN</sub> =2V, f=1kHz			75		
Output Voltage Noise	V <sub>IN</sub> =3.5V, I <sub>LOAD</sub> =0.1A, BW=10Hz to 100kHz, C <sub>OUT</sub> =1μF, V <sub>OUT</sub> =1.2V			80		μV <sub>RMS</sub>
	V <sub>IN</sub> =3.5V, I <sub>LOAD</sub> =0.1A, BW=10Hz to 100kHz, C <sub>OUT</sub> =1μF, V <sub>OUT</sub> =2.8V			120		
Thermal Shutdown Temperature	I <sub>LOAD</sub> =10mA	T <sub>SD</sub>		155		°C
Thermal Shutdown Hysteresis	I <sub>LOAD</sub> =10mA	ΔT <sub>SD</sub>		15		°C
Discharge Resistance	V <sub>EN</sub> =0V, V <sub>OUT</sub> =0.1V			100		Ω

**TYPICAL APPLICATION**

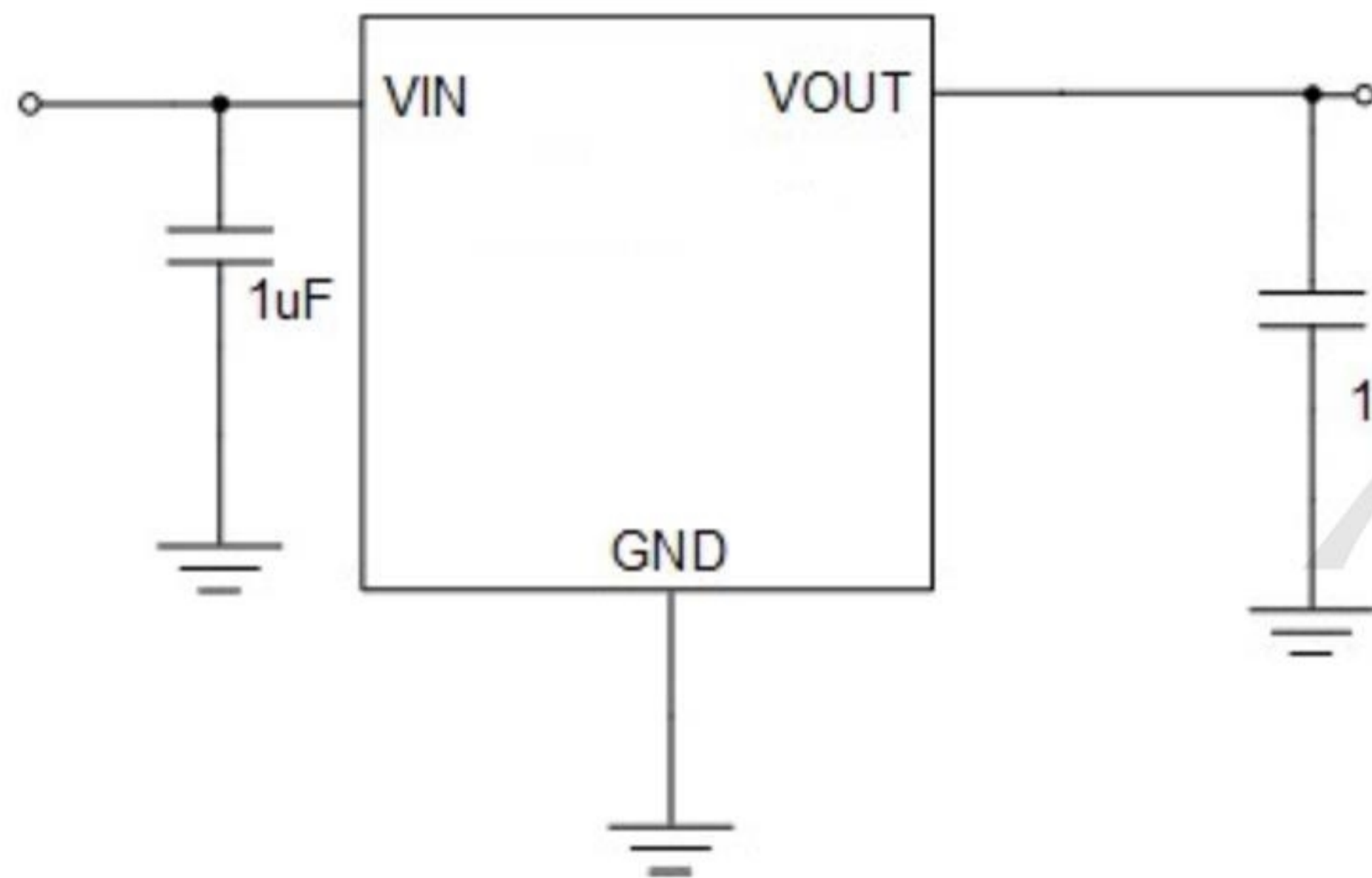


Figure 1: Application circuit of Fixed  $V_{OUT}$  LDO

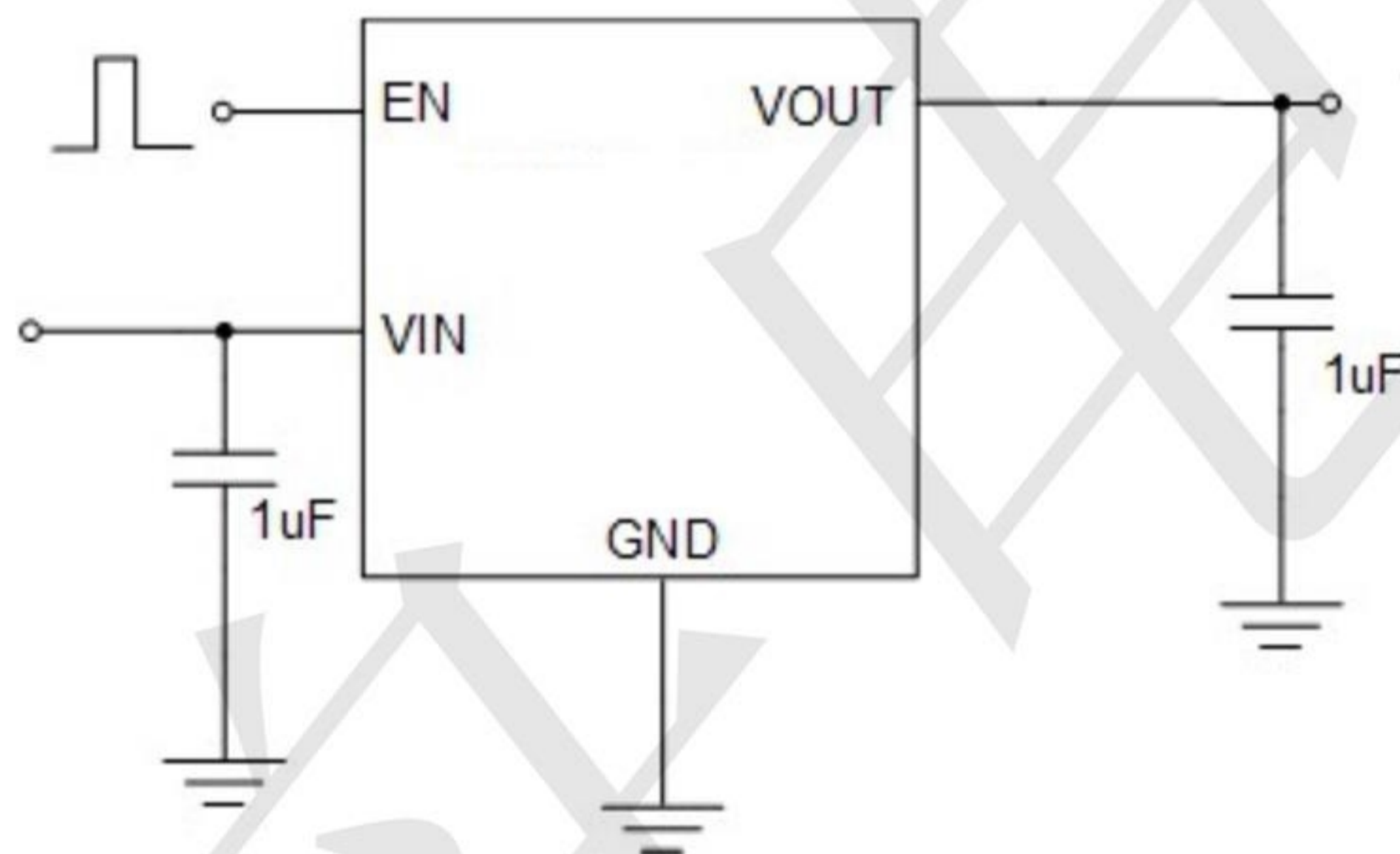


Figure 2: Application circuit of Fixed  $V_{OUT}$  LDO with enable function

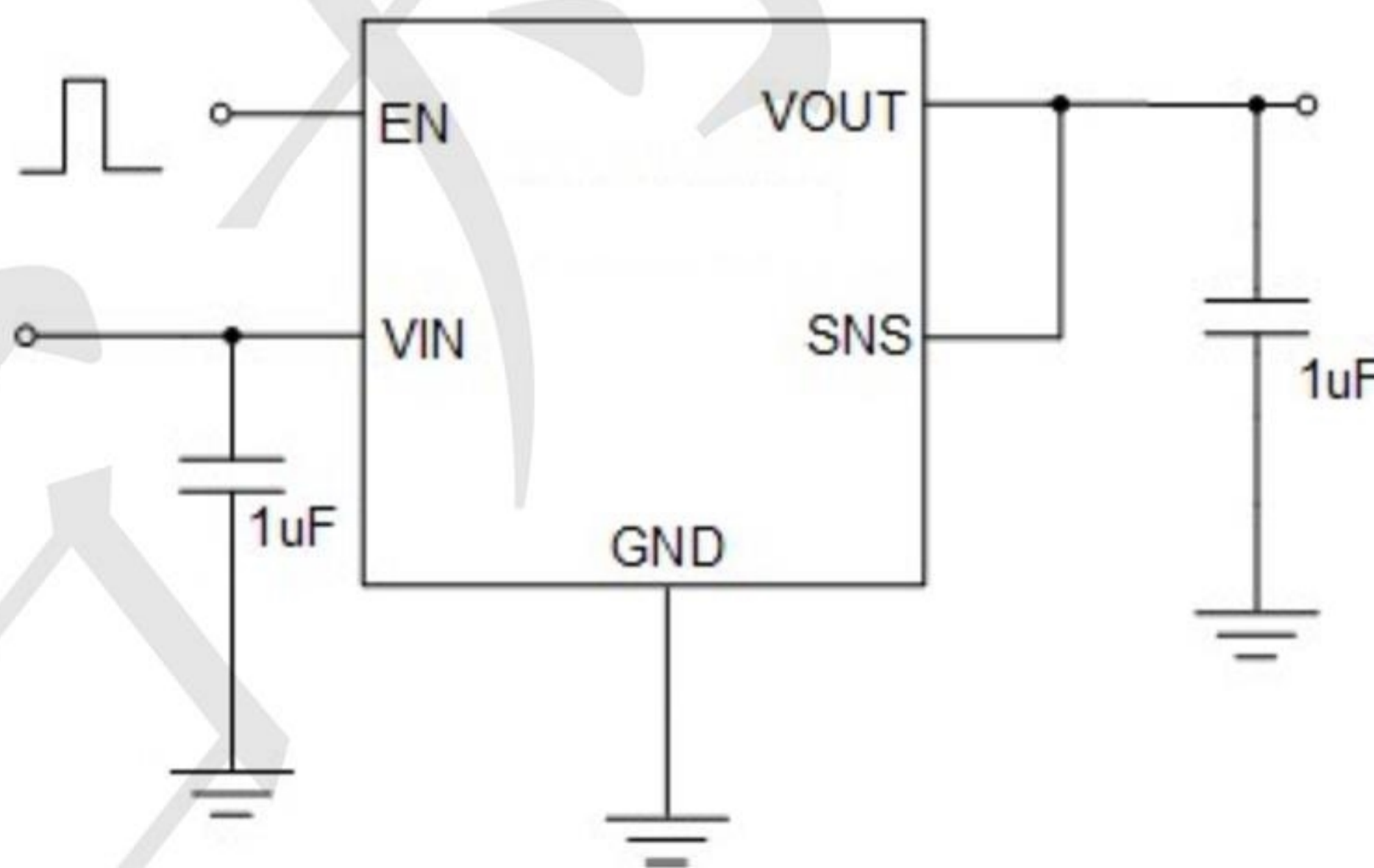
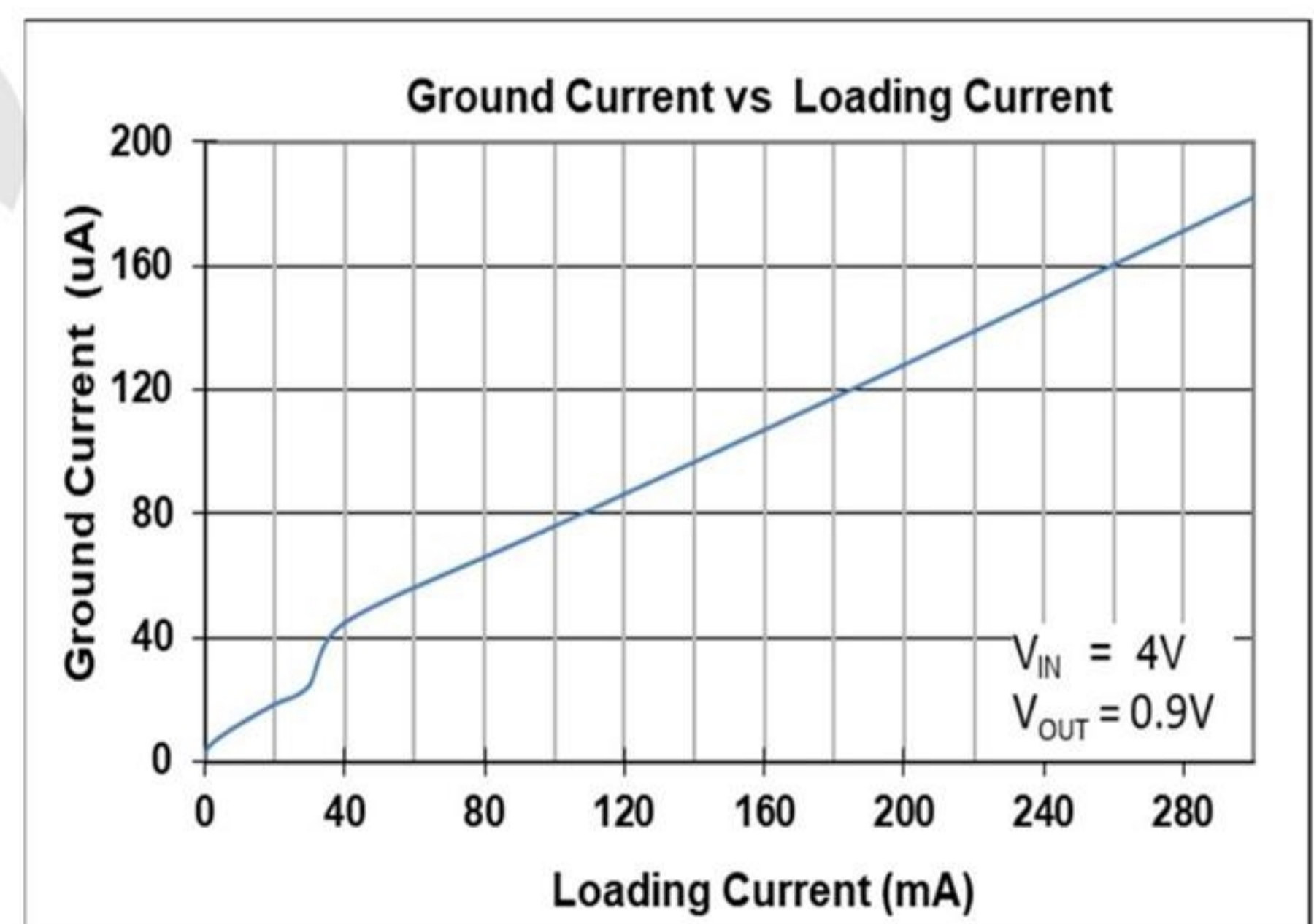
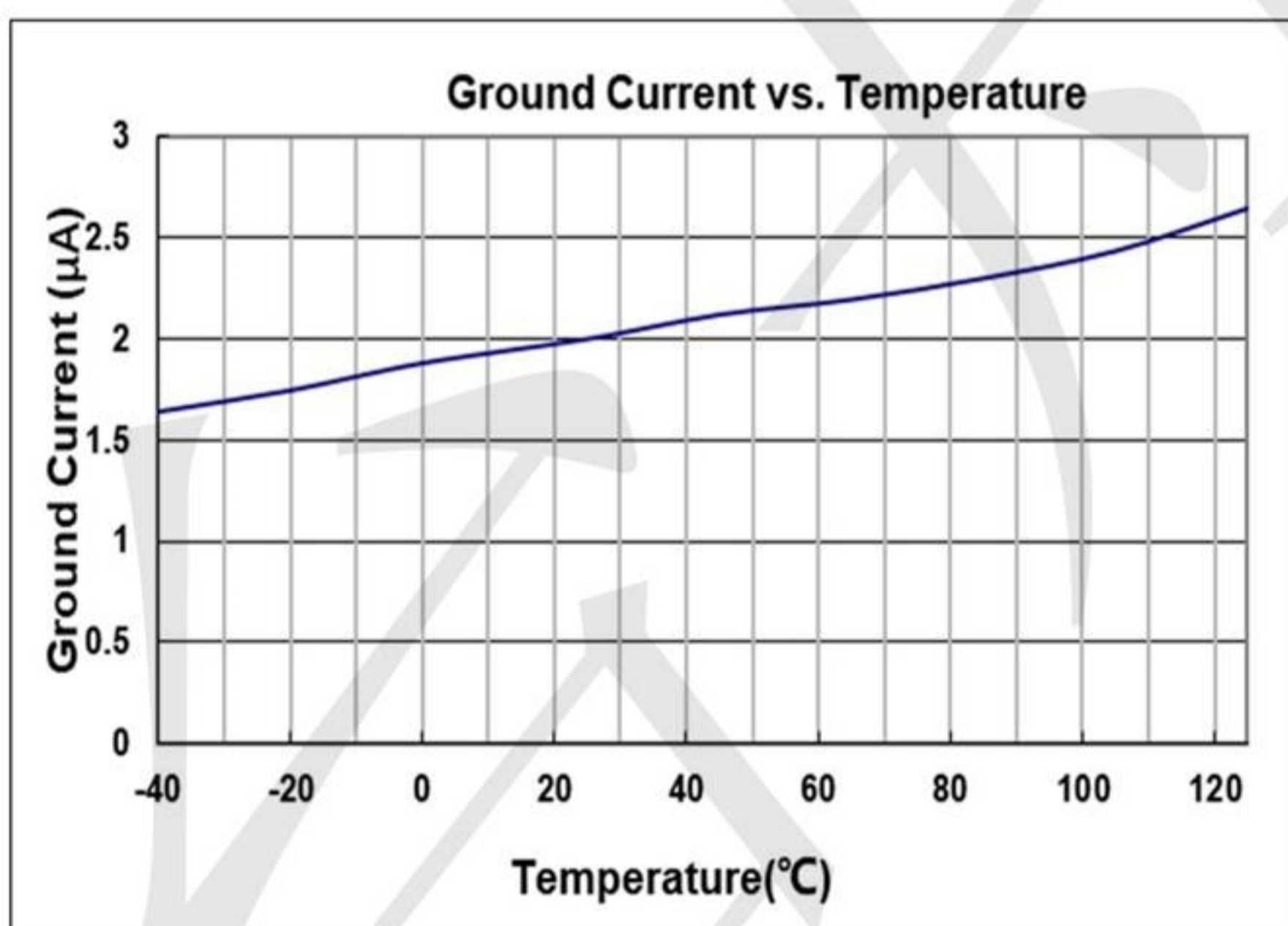
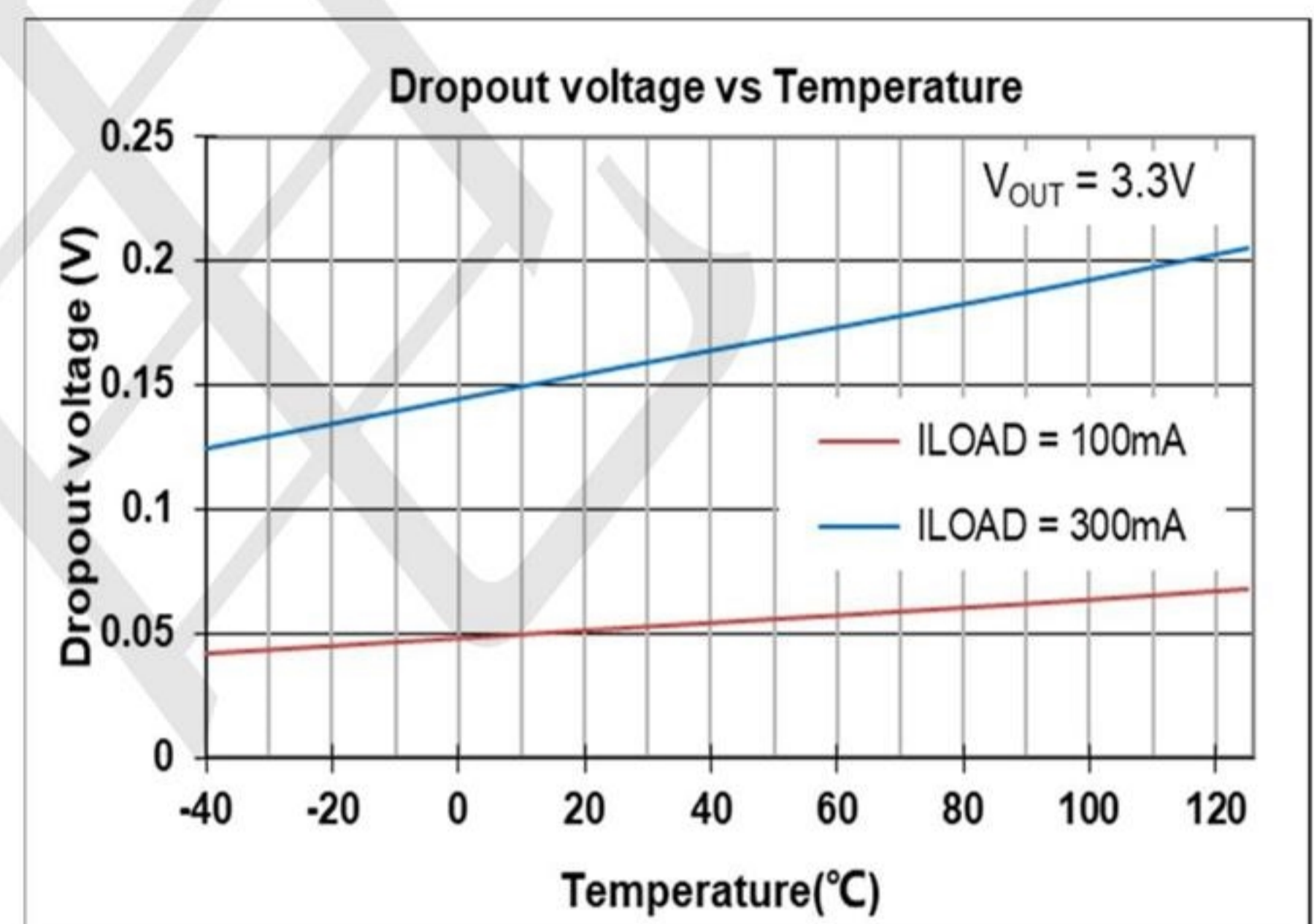
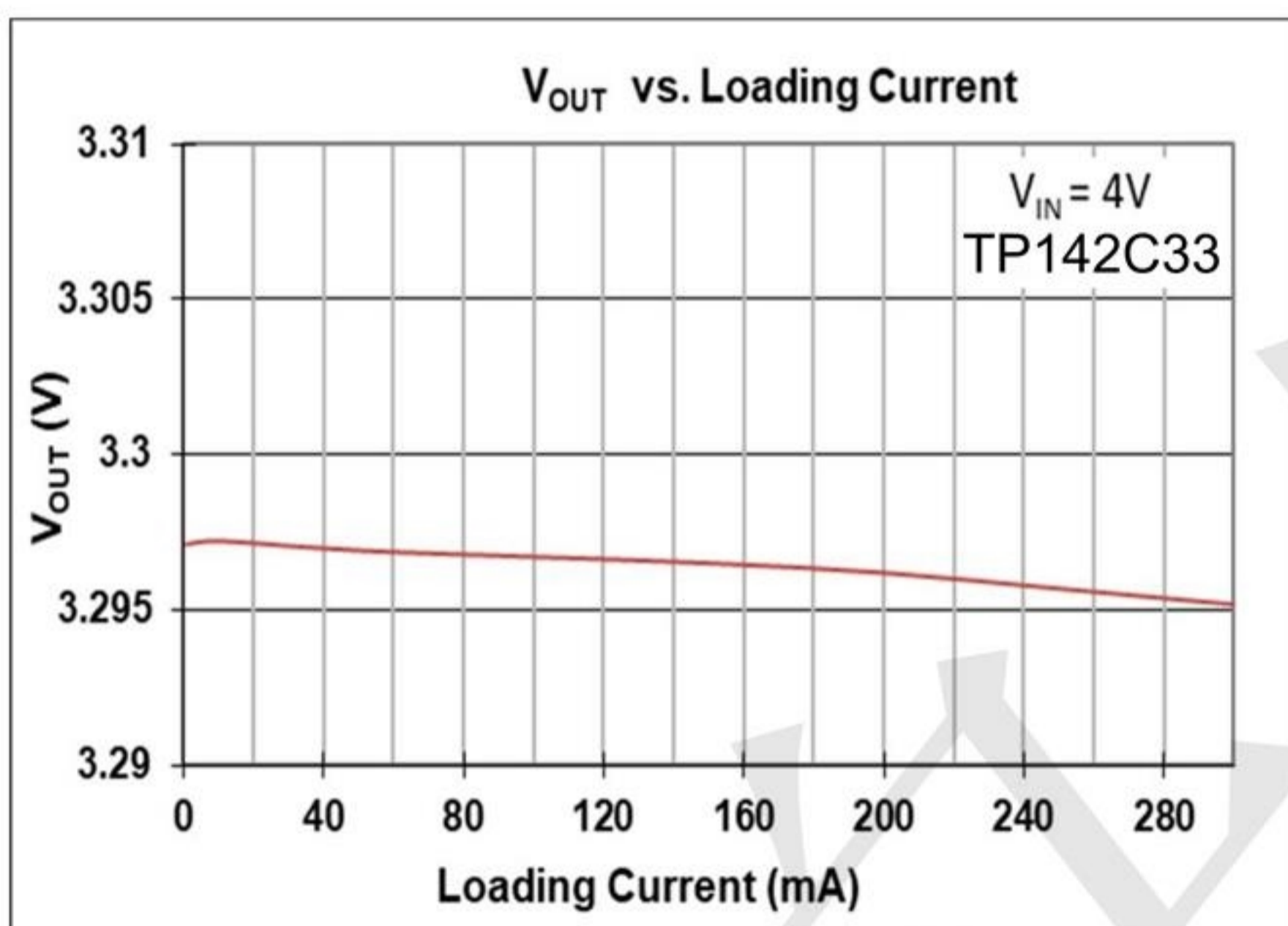
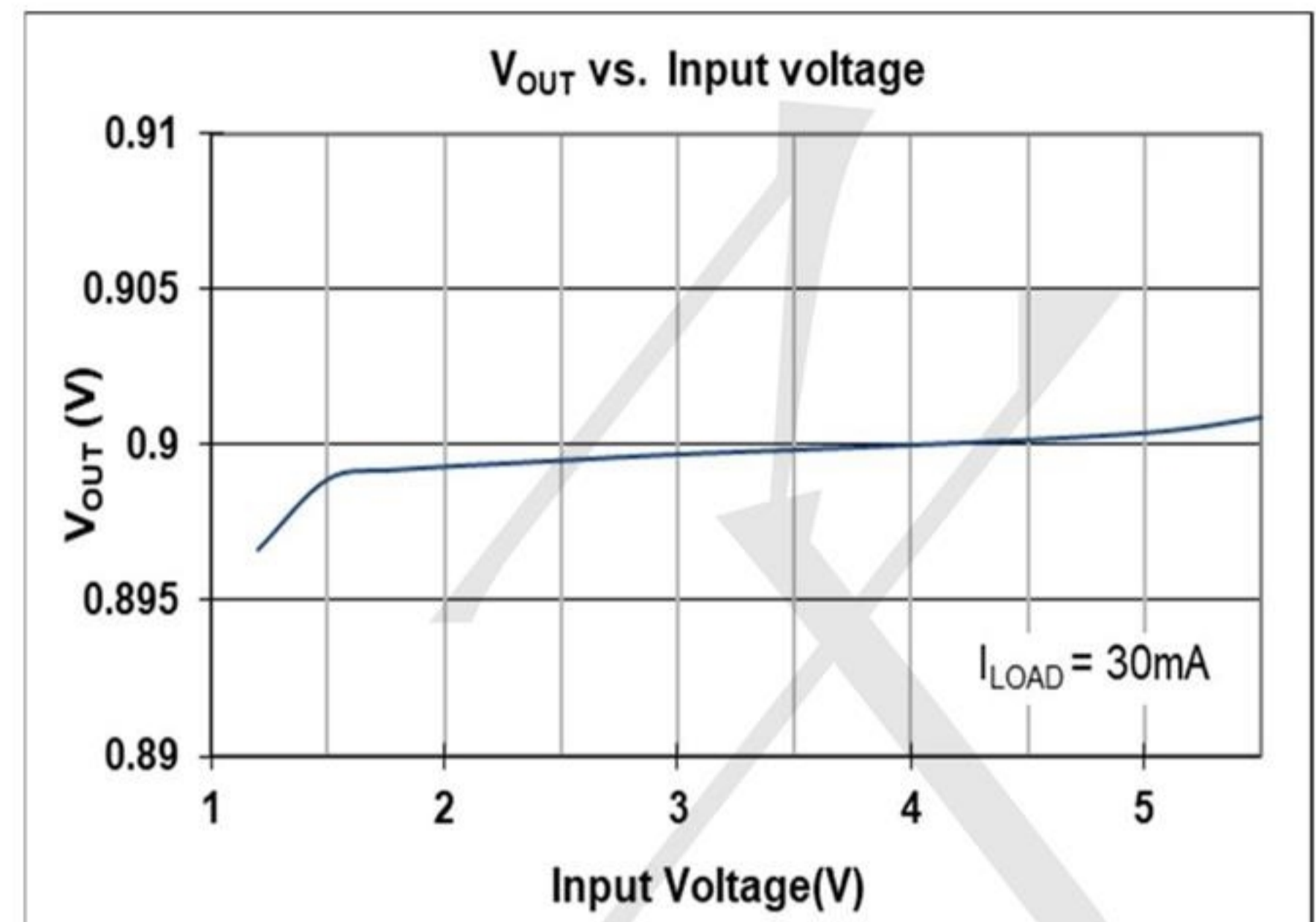
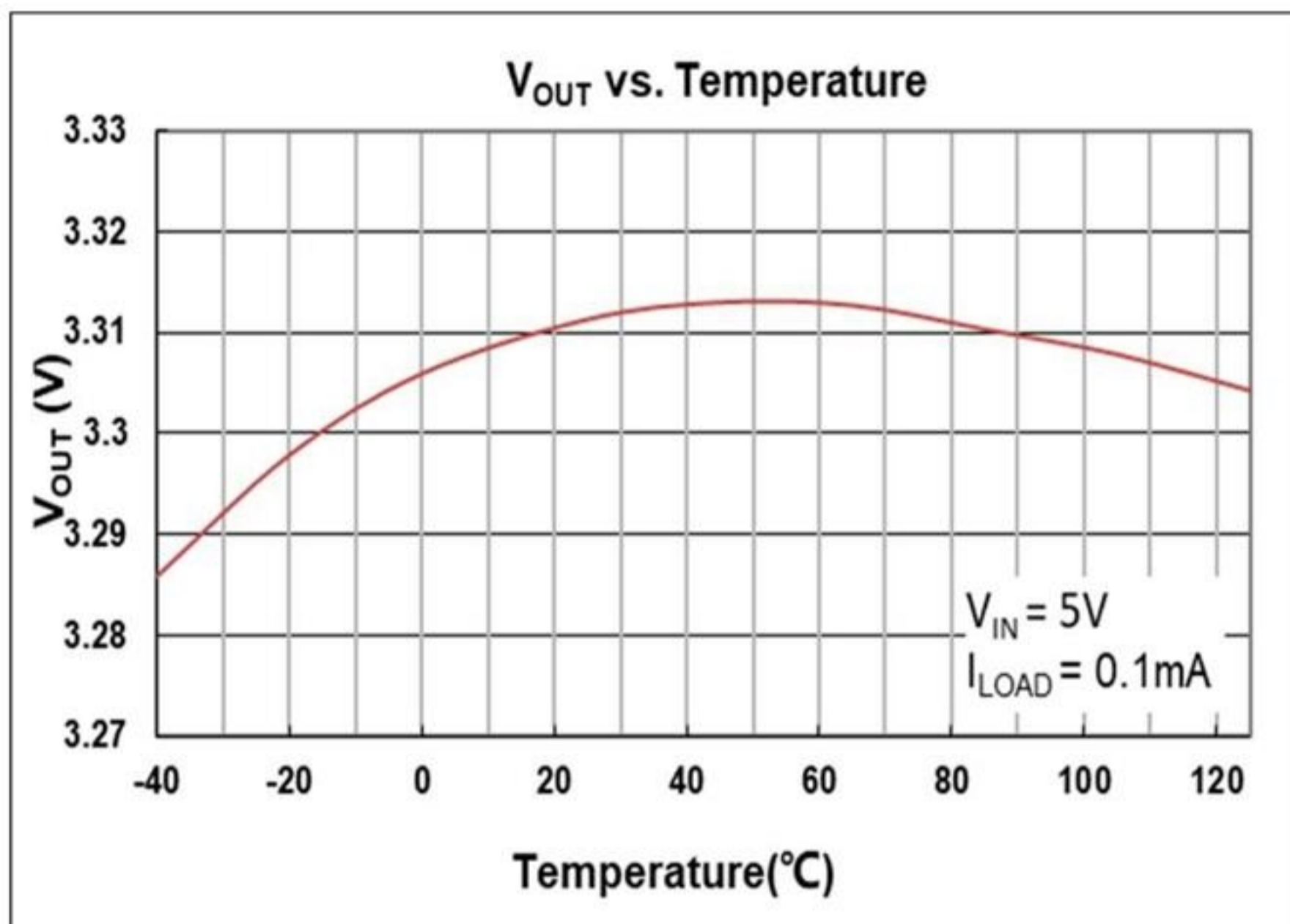
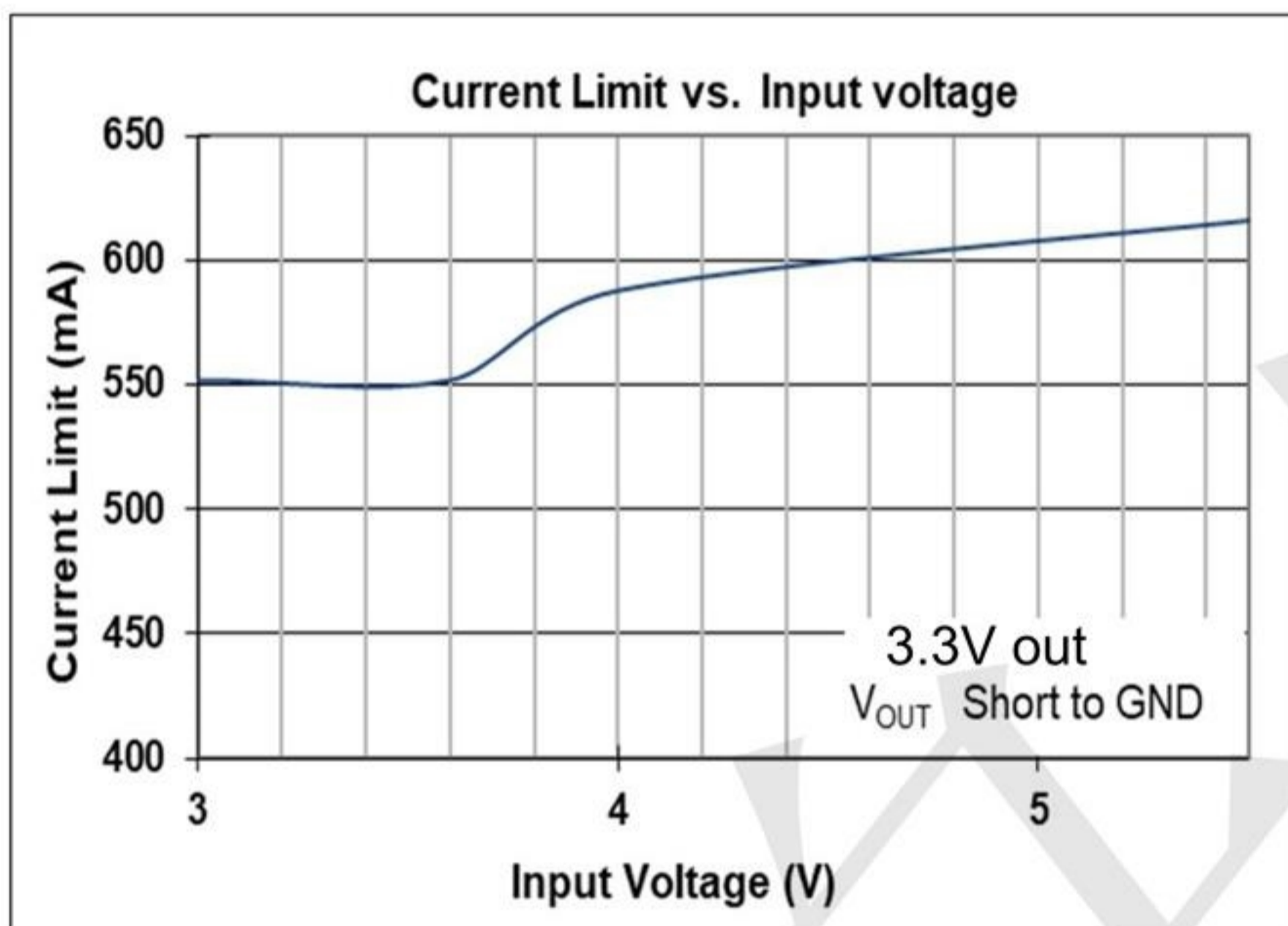
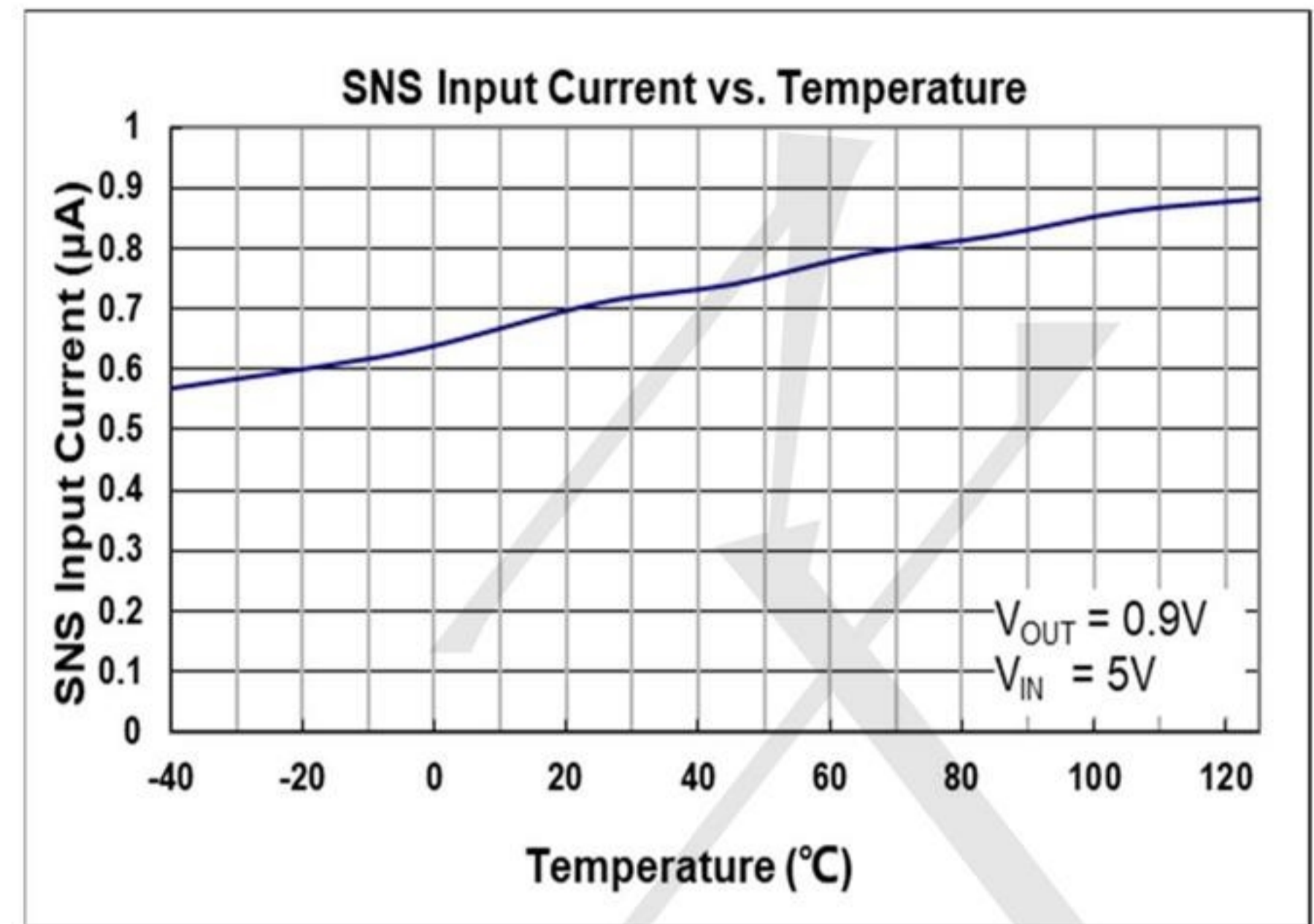
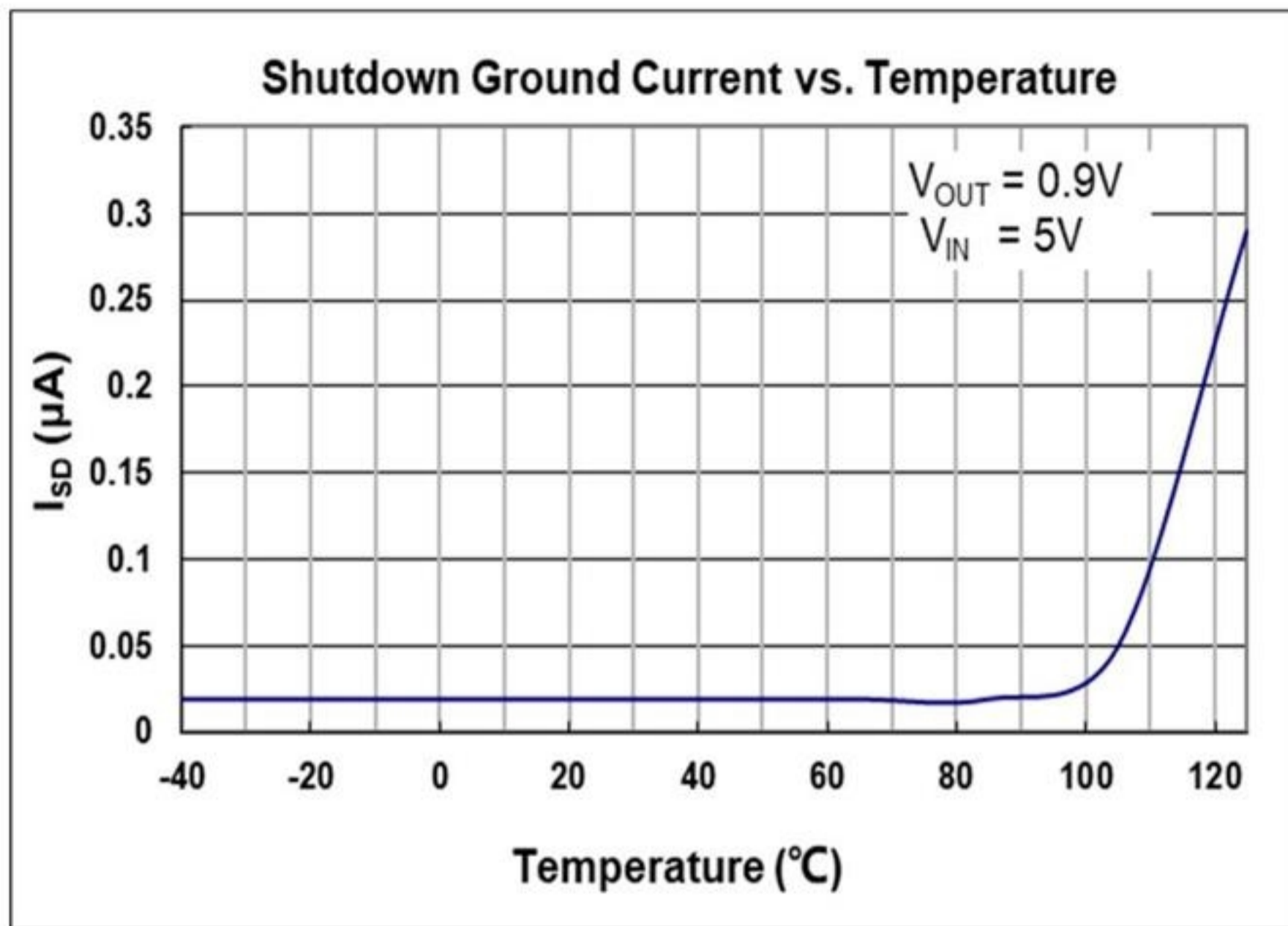
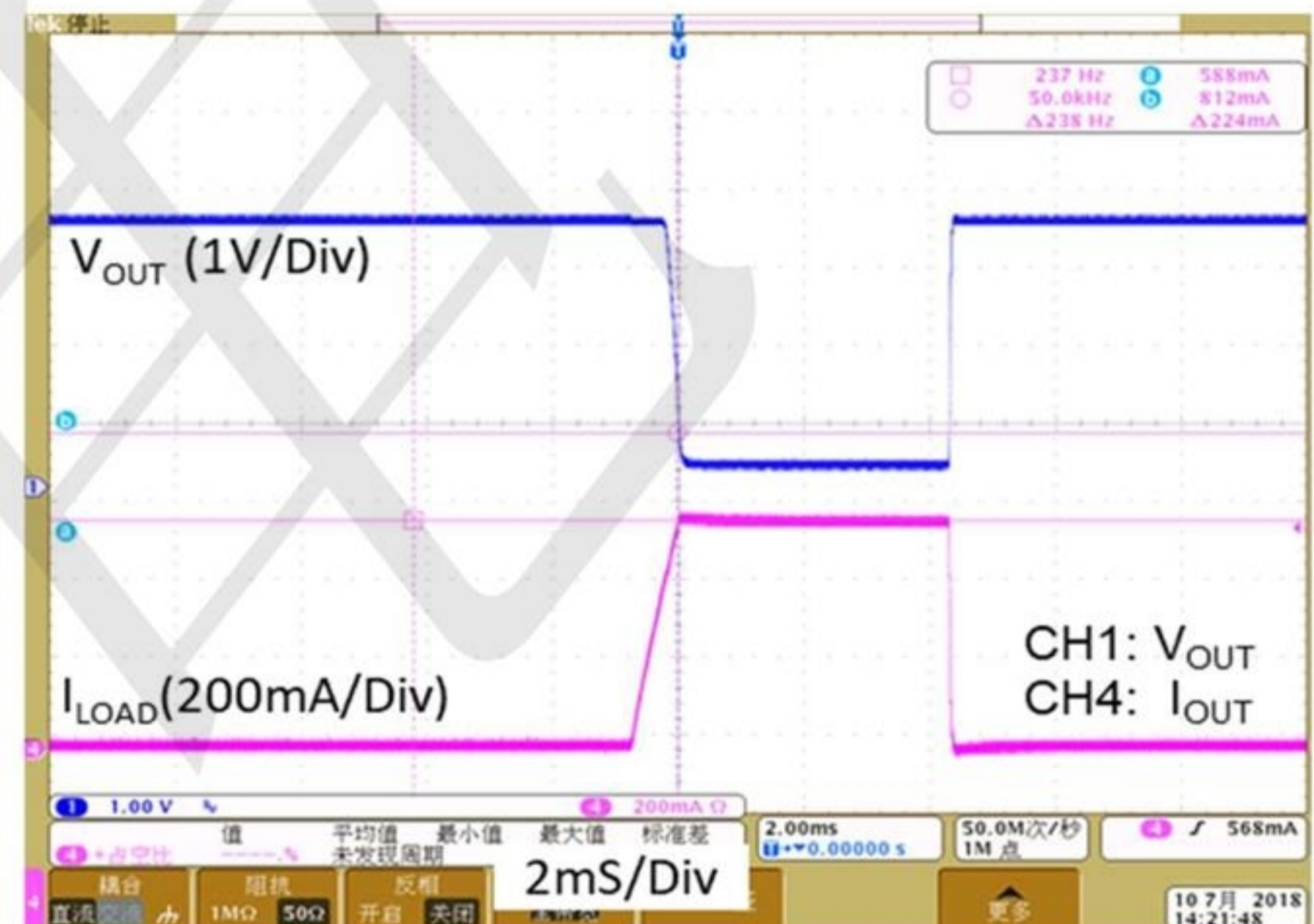


Figure 3: Application circuit of Fixed  $V_{OUT}$  LDO with enable and sense functions

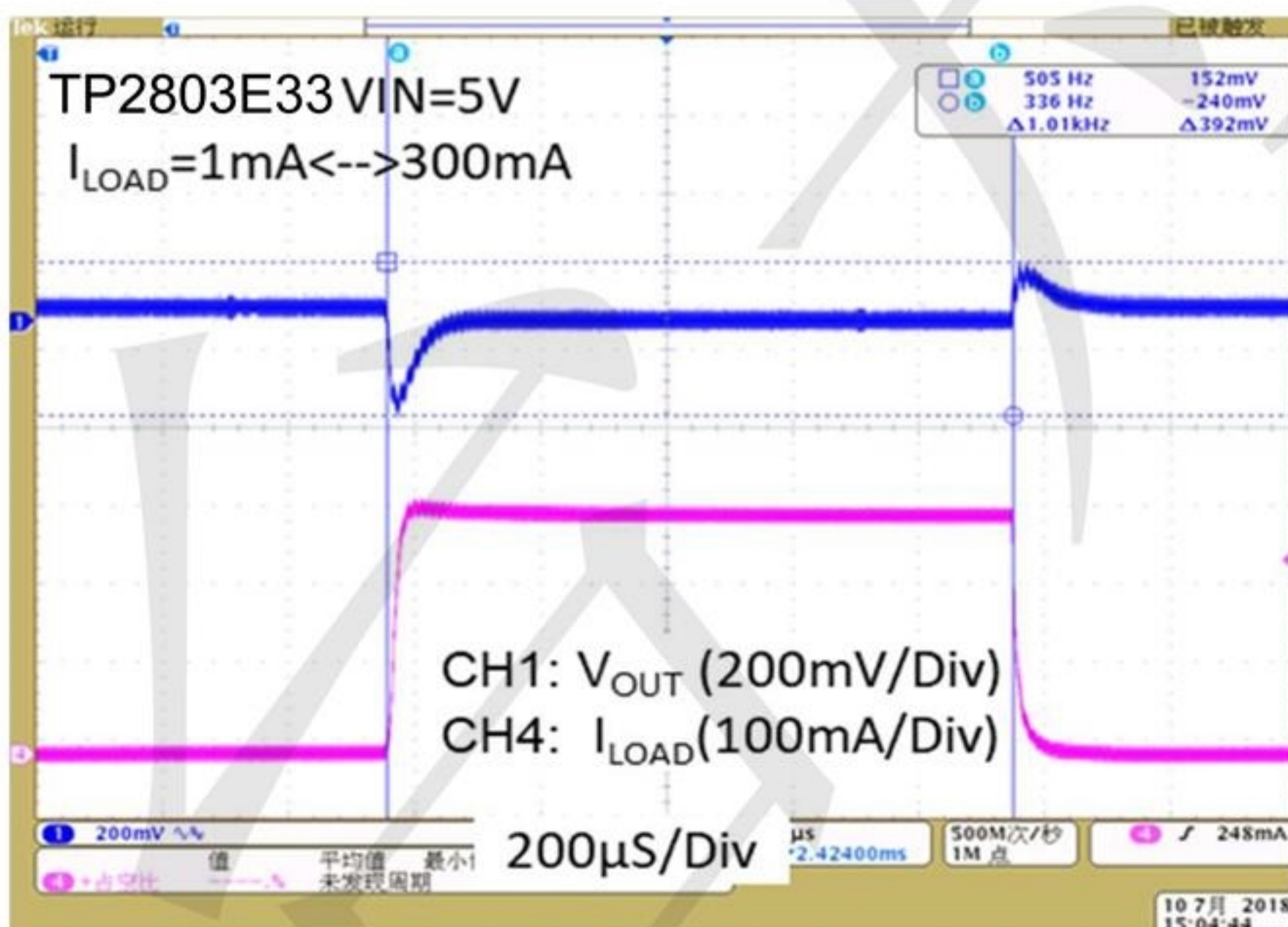




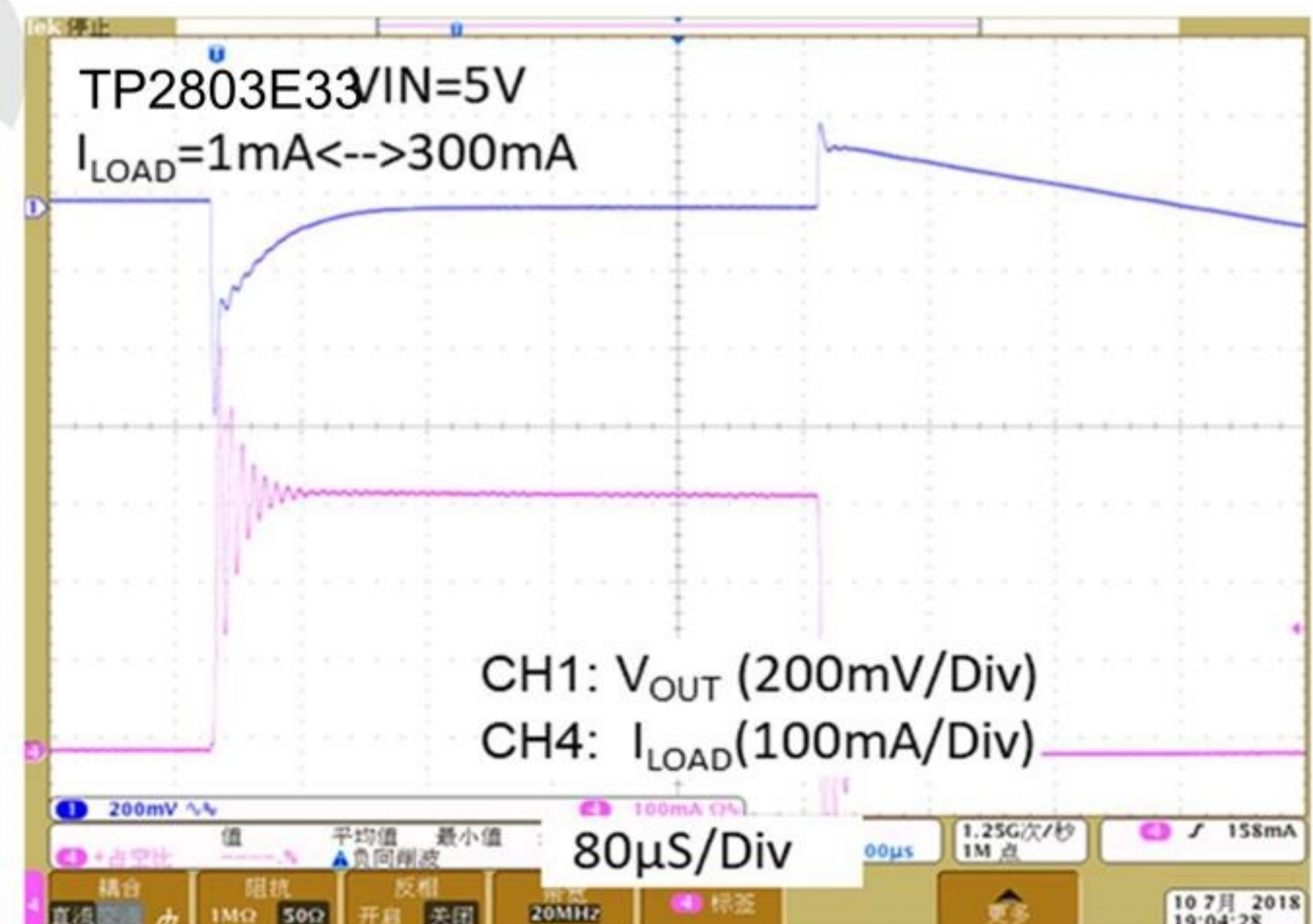
**Current Limit Response**



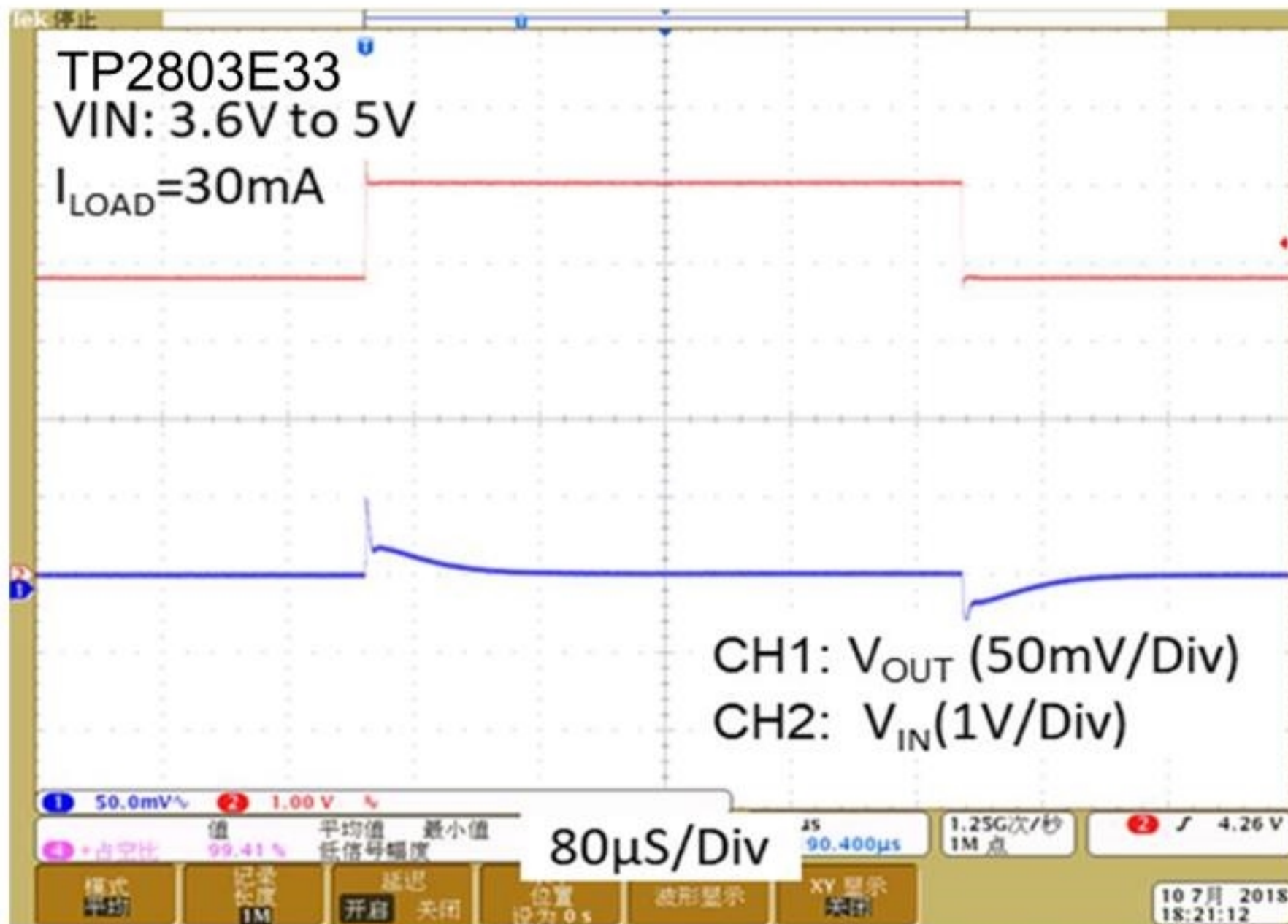
**Load Transient Response I**



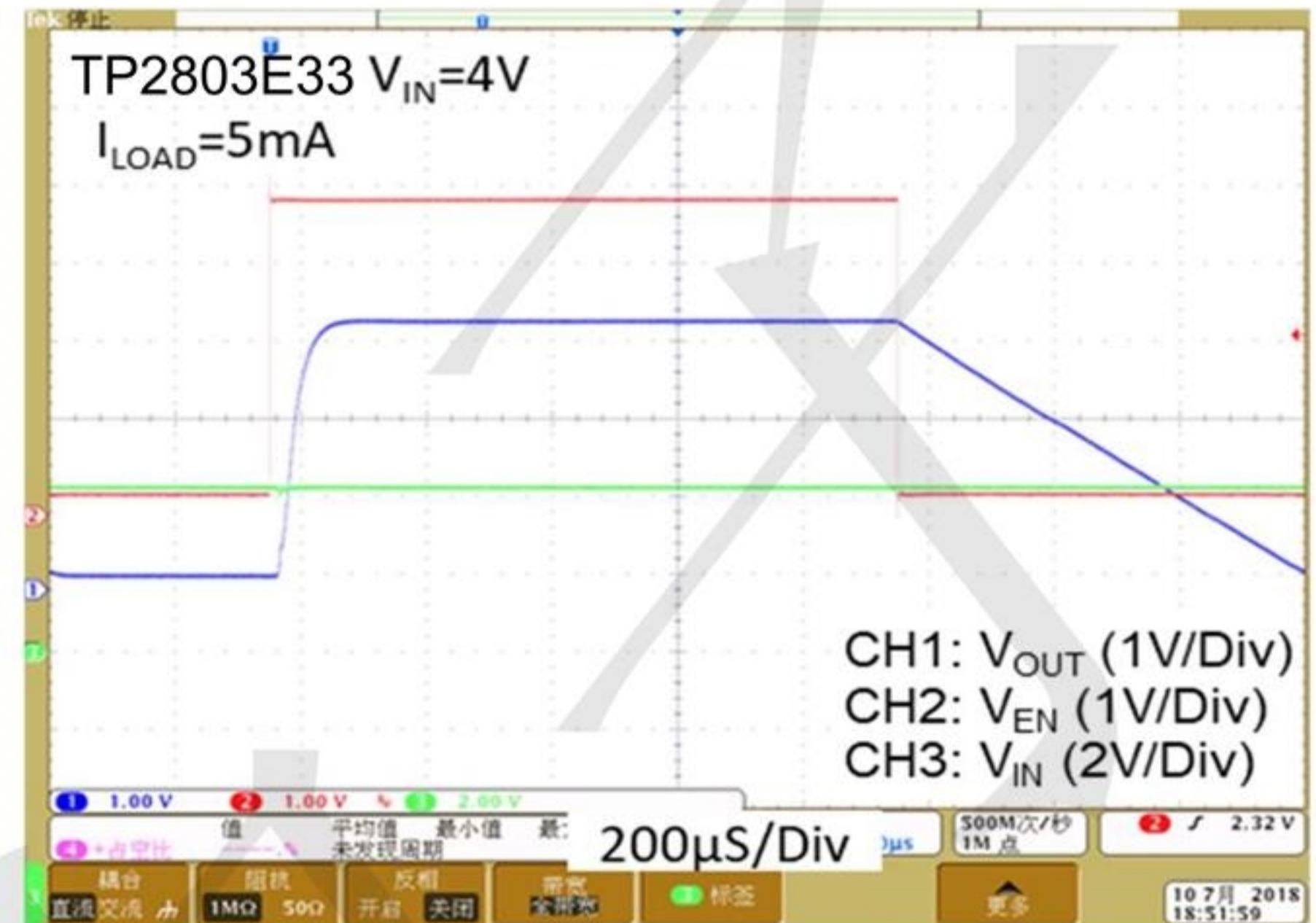
**Load Transient Response II**



Line Transient Response



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

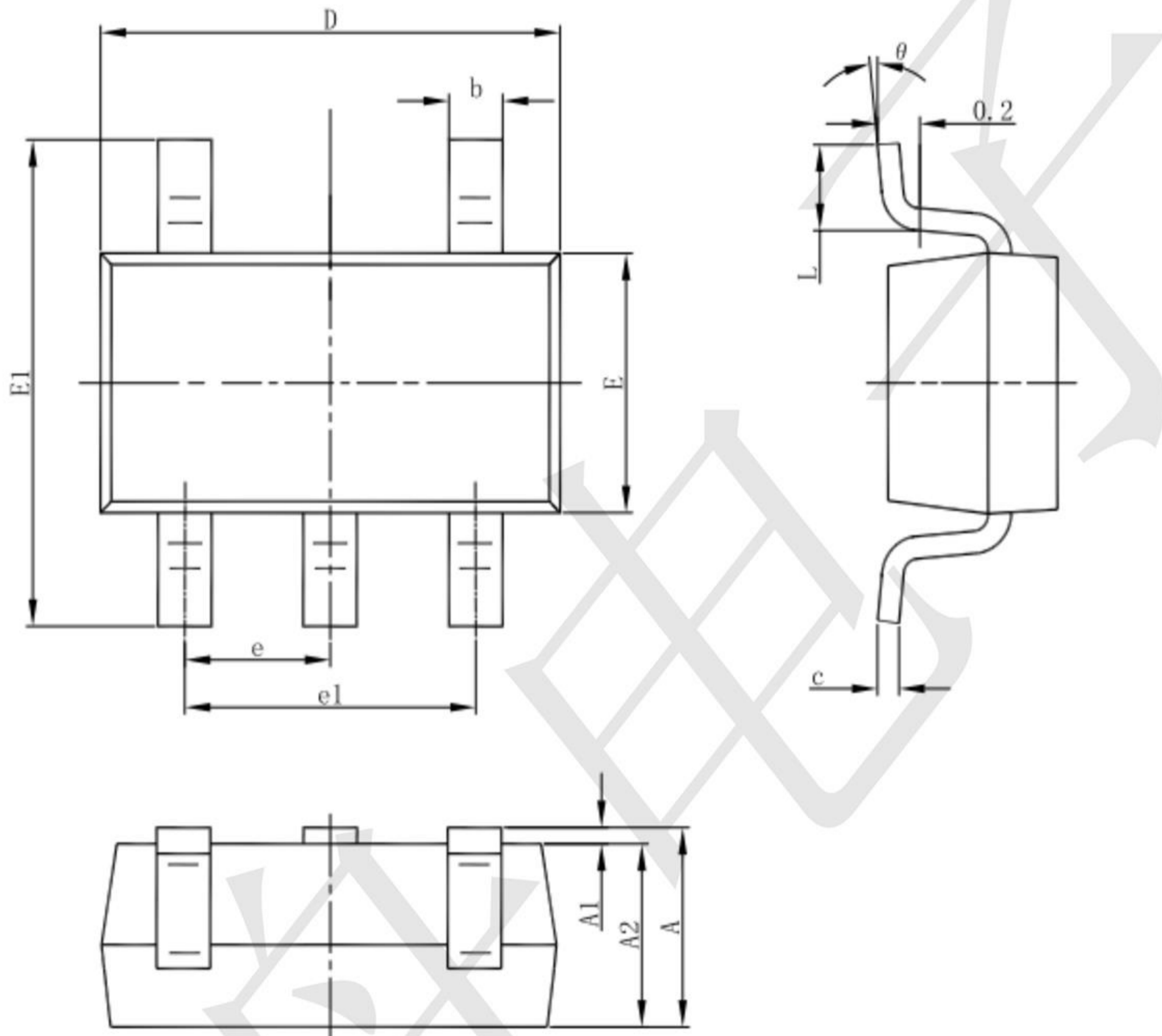






Package informantion

3-pin SOT23-5 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°