TPTLV70012DDCR

20uA I_Q ,300mA Low- Dropout Linear Regulator

Features

- **Input Voltage Range : 1.2V to 5.5V**
- **20µA Ground Current (I_Q) at no Load**
- **PSRR = 75dB at 1kHz**
- **1.5% Output Accuracy**
- **Low (0.1µA) Shutdown Current**
- **Dropout Voltage : 0.17V at 300mA when $V_{OUT} \geq 3V$**
- **Support Fixed Output Voltage 0.8V, 1.0V, 1.05V, 1.1V, 1.2V, 1.25V, 1.3V, 1.5V, 1.8V, 1.85V, 2V, 2.5V, 2.8V, 2.85V, 3V, 3.1V, 3.3V, 3.45V**
- **Current Limit Protection**
- **Over Temperature Protection**
- **Output Active Discharge Function**
- **SOT23-5 Packages**

Applications

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

General Description

This production is a low-dropout (LDO) voltage regulator with enable function that operates from a 1.2V to 5.5V supply. It provides up to 300mA of output current in miniaturized packaging.

The feature of 20µA low quiescent current and 0.5µA shutdown current are ideal for the battery application with long service life. The other features include current limit function, over temperature protection and output discharge function.

Ordering Information

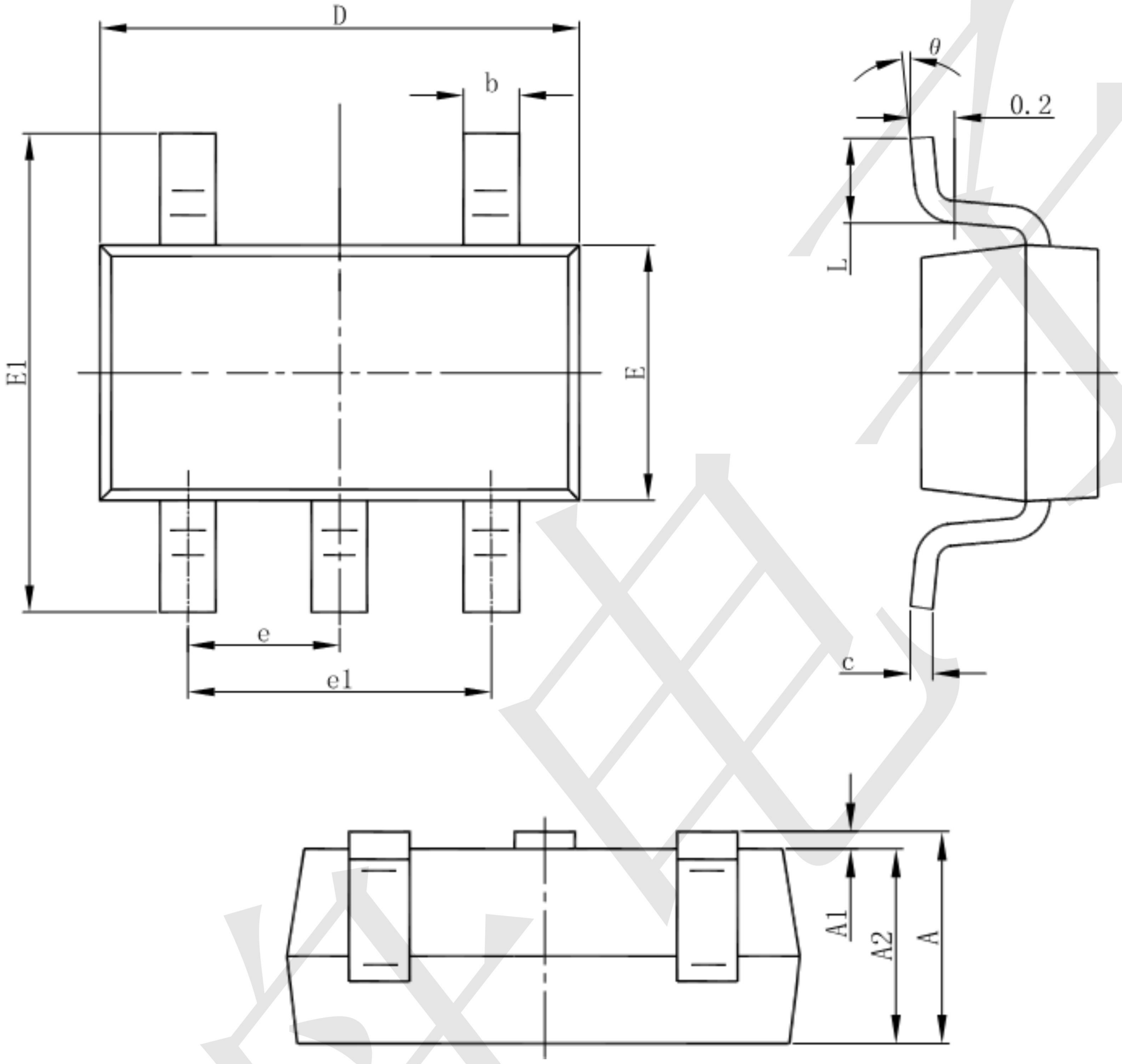
TPTLV70012DDCR

Package Type
DDCR=SOT23-5

Output Voltage:33=3.3V
30=3.0V
28=2.8V
18=1.8V
xx.xV

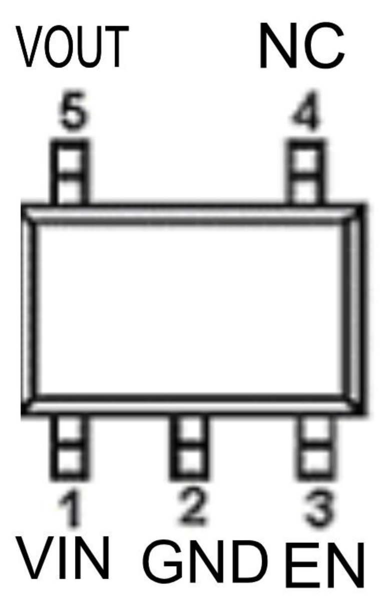
Package informantion

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°

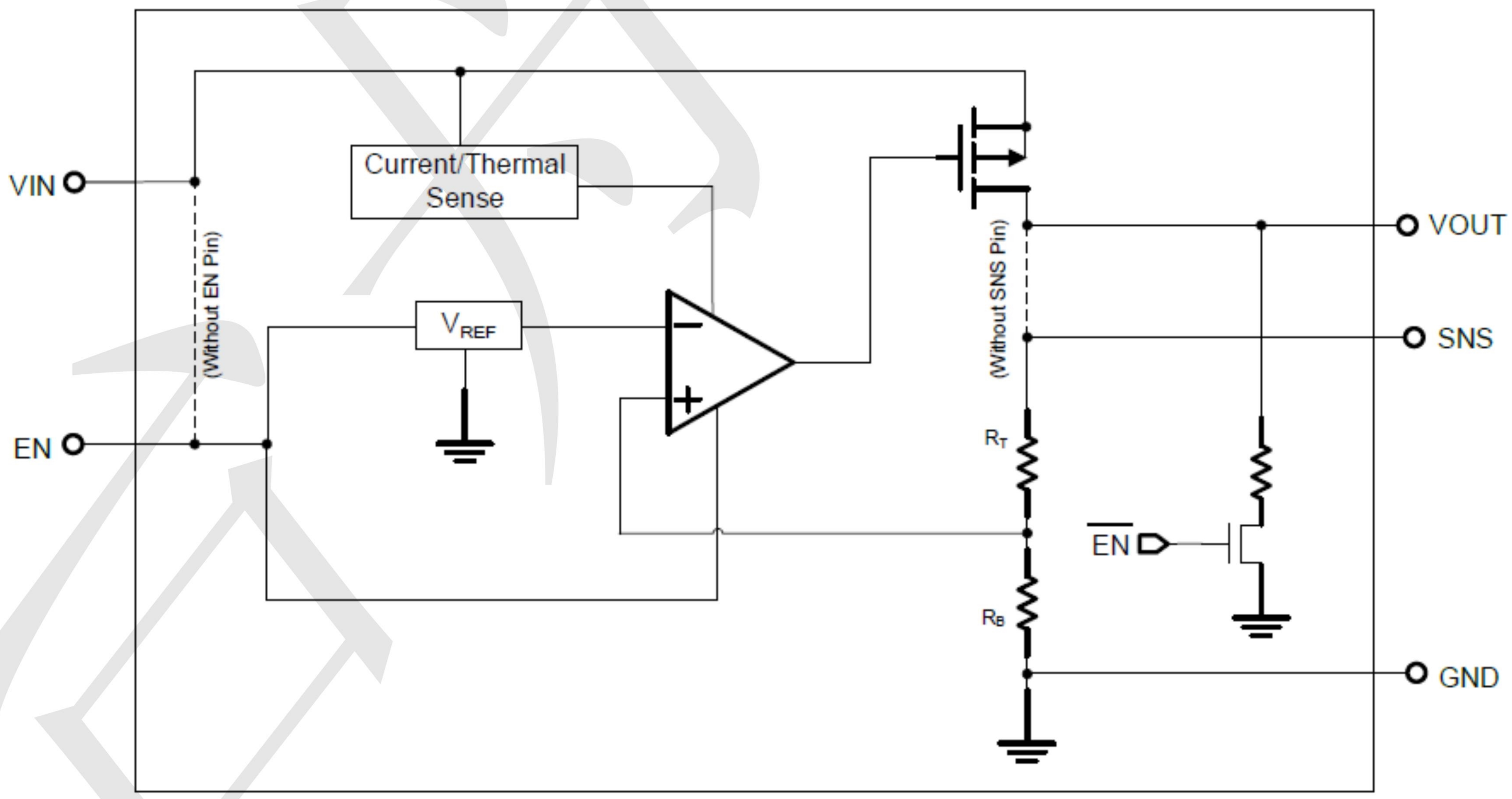
Pin Configuration



SOT23-5

Pin No	Pin Name	Pin Function
1	VIN	Input of Supply Voltage.
2	GND	Ground
3	EN	Enable Control Input.
4	NC	No Internal Connection.
5	VOUT	Output of the Regulator

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

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 .... -60ºC~150ºC
Lead Temperature (Soldering, 10 sec) 260ºC
Junction Temperature 150ºC
Operating Ambient Temperature Range T_A .... -40ºC~85ºC
Thermal Resistance Junction to Case, $R\theta_{JC}$ SOT23-5 .... 115°C/W
Thermal Resistance Junction to Ambient, $R\theta_{JA}$ SOT23-5 .... 250°C/W

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

(V_{OUT} + 1 < V_{IN} < 5.5V, T_A = 25°C, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Fixed Output Voltage Range	V_{OUT}		0.8	--	3.45	V
DC Output Accuracy		I_{LOAD} = 1mA	-2	--	2	%
Dropout Voltage (I_{LOAD} = 300mA) (Note 5)	V_{DROP}	0.8V ≤ V_{OUT} < 1.05V	--	0.7	0.97	V
		1.05V ≤ V_{OUT} < 1.2V	--	0.5	0.92	
		1.2V ≤ V_{OUT} < 1.5V	--	0.4	0.57	
		1.5V ≤ V_{OUT} < 1.8V	--	0.3	0.47	
		1.8V ≤ V_{OUT} < 2.1V	--	0.24	0.33	
		2.1V ≤ V_{OUT} < 2.5V	--	0.21	0.3	
		2.5V ≤ V_{OUT} < 2.8V	--	0.18	0.25	
		2.8V ≤ V_{OUT} < 3V	--	0.16	0.23	
		3V ≤ V_{OUT}	--	0.15	0.2	
Dropout Voltage (I_{LOAD} = 200mA) (Note 6)	V_{DROP}	1.8V ≤ V_{OUT} < 2.1V	--	0.16	0.2	V
V_{CC} Consumption Current	I_Q	I_{LOAD} = 0mA, V_{OUT} ≤ 5.5V V_{IN} ≥ V_{OUT} + V_{DROP}	--	20		µA

Parameter		Symbol	Test Conditions		Min	Typ	Max	Unit
Shutdown GND Current (Note 7)			V_{EN} = 0V		--	0.1	0.5	μA
Shutdown Leakage Current (Note 7)			V_{EN} = 0V, V_{OUT} = 0V		--	0.1	0.5	μA
EN Input Current		I_{EN}	V_{EN} = 5.5V		--	--	0.1	μA
Line Regulation		ΔLINE	I_{LOAD} = 1mA	1.2V ≤ V_{IN} < 1.5V	--	0.3	0.6	%
				1.5V ≤ V_{IN} < 1.8V	--	0.15	0.3	
				1.8V ≤ V_{IN} ≤ 5.5V	--	0.13	0.35	
Load Regulation		ΔLOAD	1mA < I_{LOAD} < 300mA		--	0.5	1	%
Power Supply Rejection Ratio		PSRR	V_{IN} = 3V, I_{LOAD} = 50mA, C_{OUT} = 1μF, V_{OUT} = 2.5V, f = 1kHz		--	75	--	dB
Output Voltage Noise			C_{OUT} = 1μF, I_{LOAD} = 150mA, BW = 10Hz to 100kHz, V_{IN} = V_{OUT} + 1V	V_{OUT} = 0.8V	--	38	--	μV_{RMS}
				V_{OUT} = 1.2V	--	46	--	
				V_{OUT} = 1.8V	--	48	--	
				V_{OUT} = 3.3V	--	51	--	
Output Current Limit		I_{LIM}	V_{OUT} = 90% of $V_{OUT(NOM)}$		350	600	--	mA
Enable Threshold Voltage	H-Level	V_{ENH}	V_{IN} = 5V		0.5	0.7	0.9	V
	L-Level	V_{ENL}	V_{IN} = 5V		0.4	0.65	0.85	
Thermal Shutdown Temperature		T_{SD}	I_{LOAD} = 30mA, V_{IN} ≥ 1.5V		--	150	--	°C
Thermal Shutdown Hysteresis		ΔT_{SD}			--	20	--	°C
Discharge Resistance			EN = 0V, V_{OUT} = 0.1V		--	80	--	Ω

TYPICAL APPLICATION

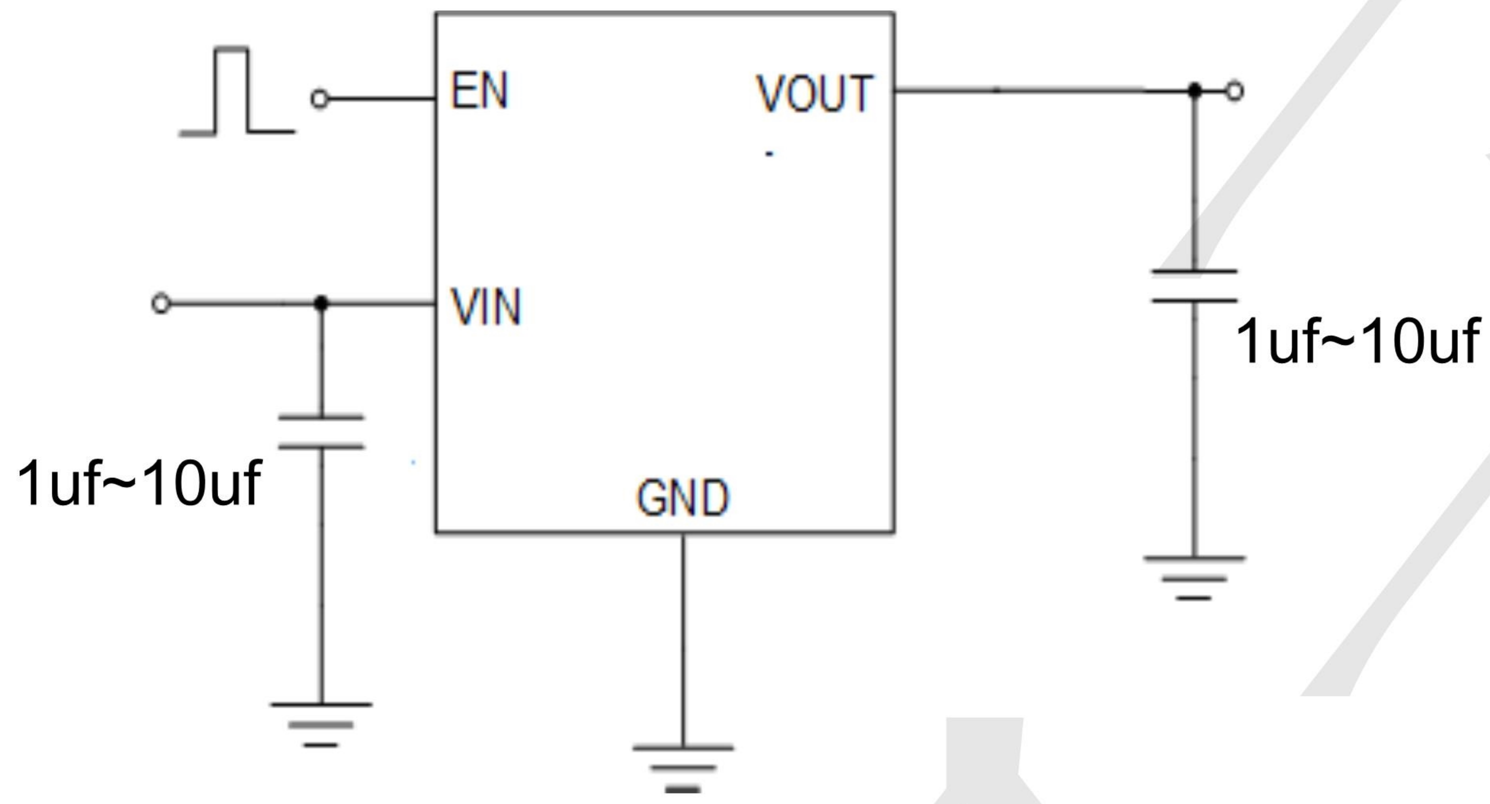
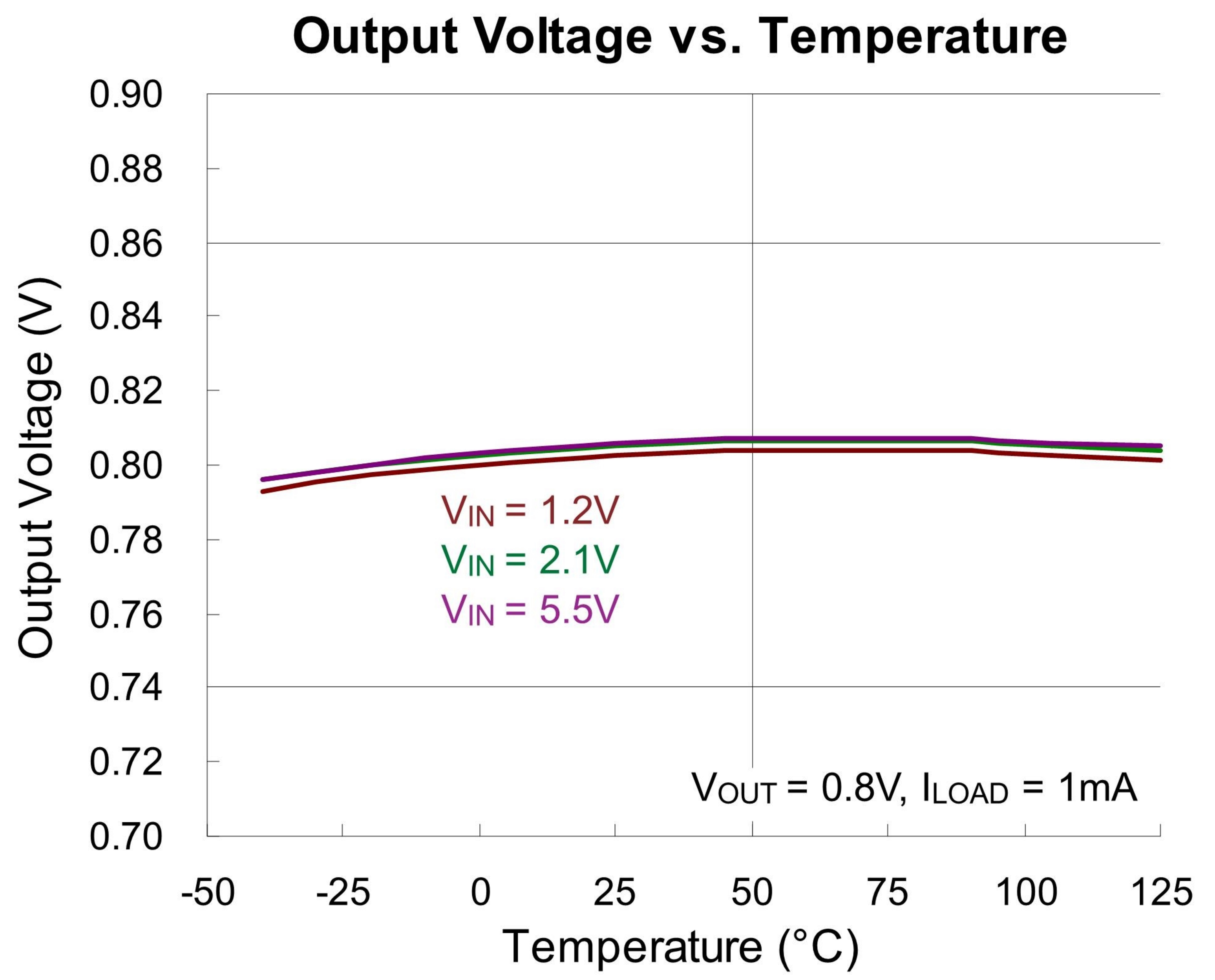
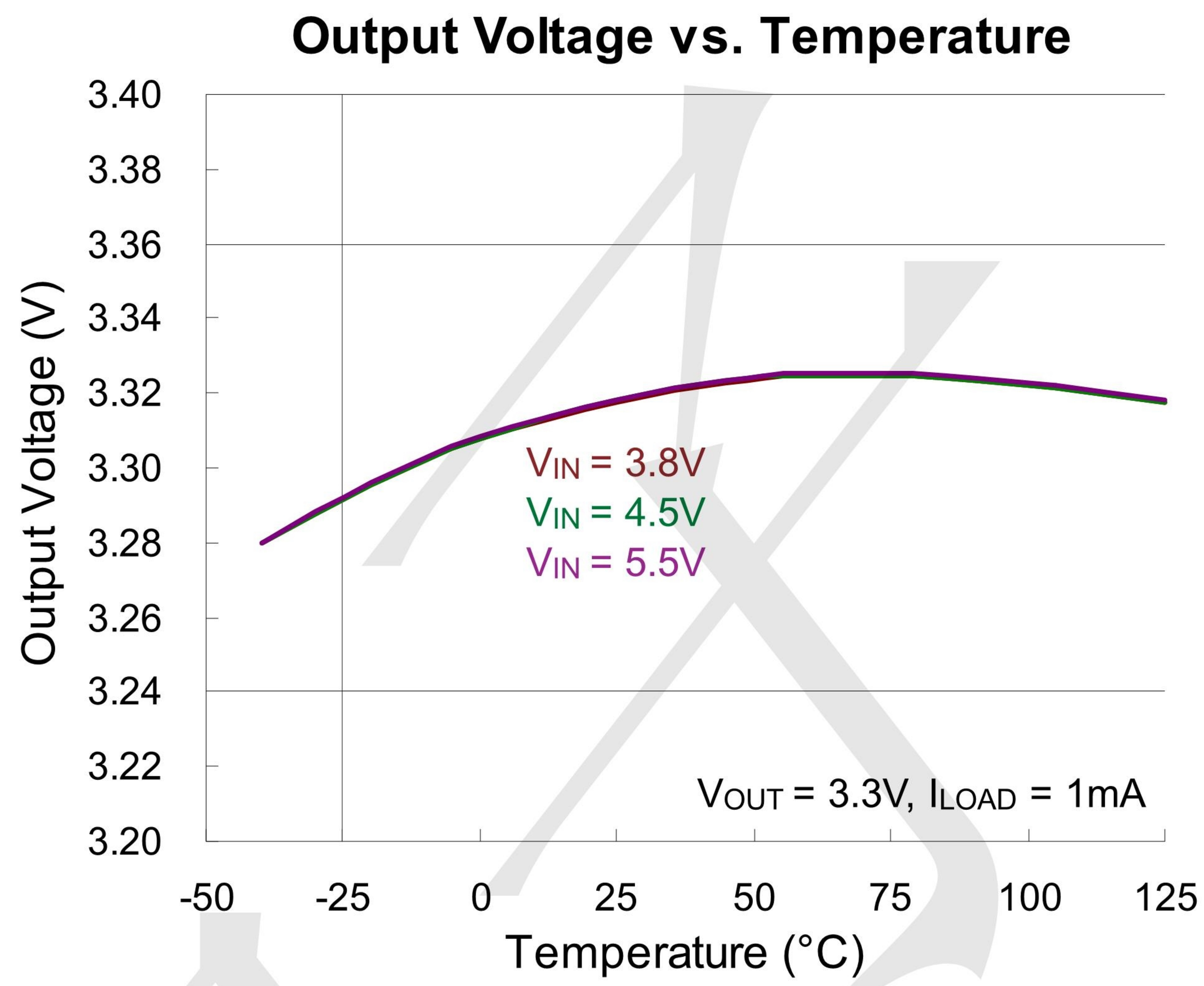
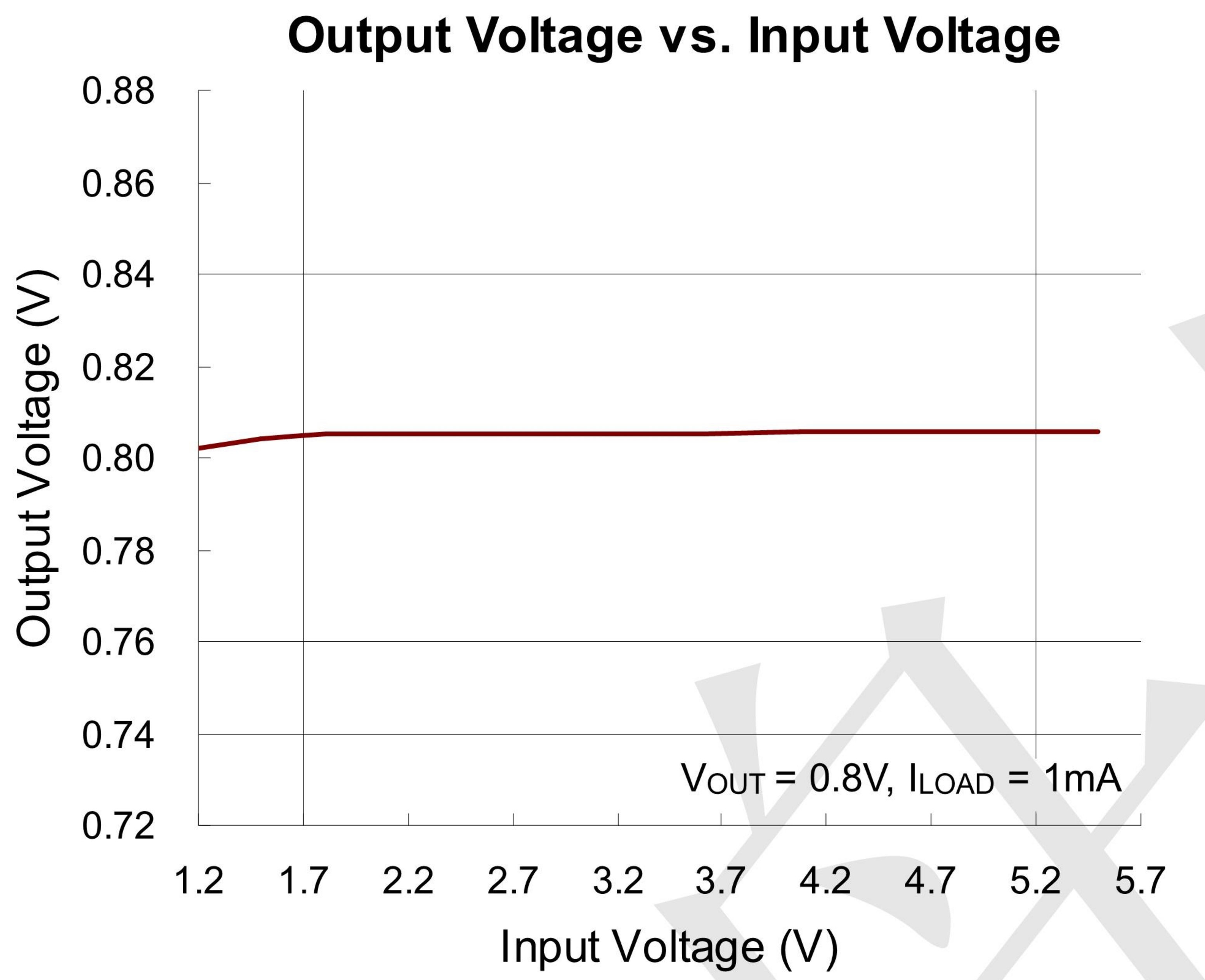


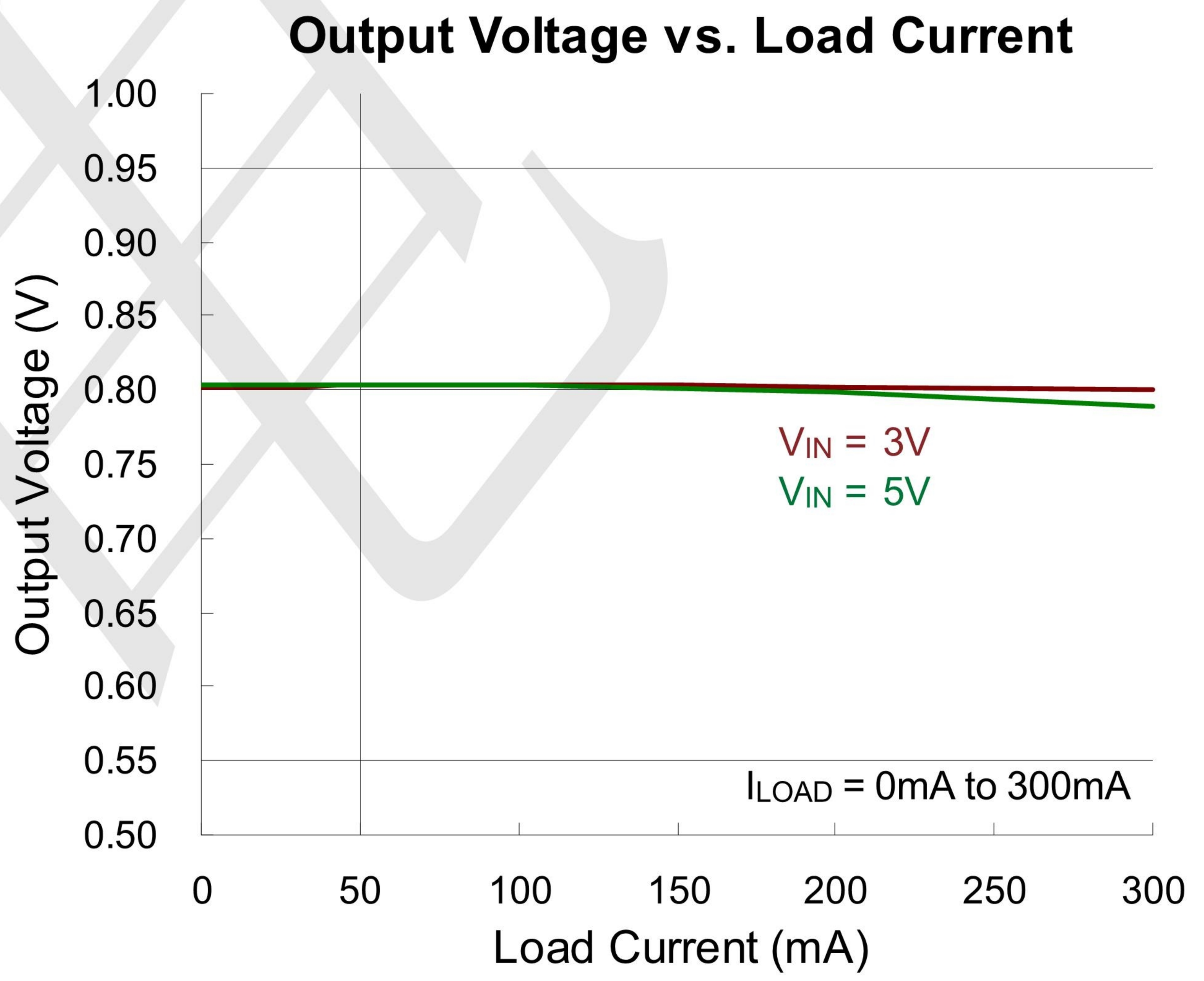
Figure 2: Application circuit of Fixed V_{OUT} LDO with enable function

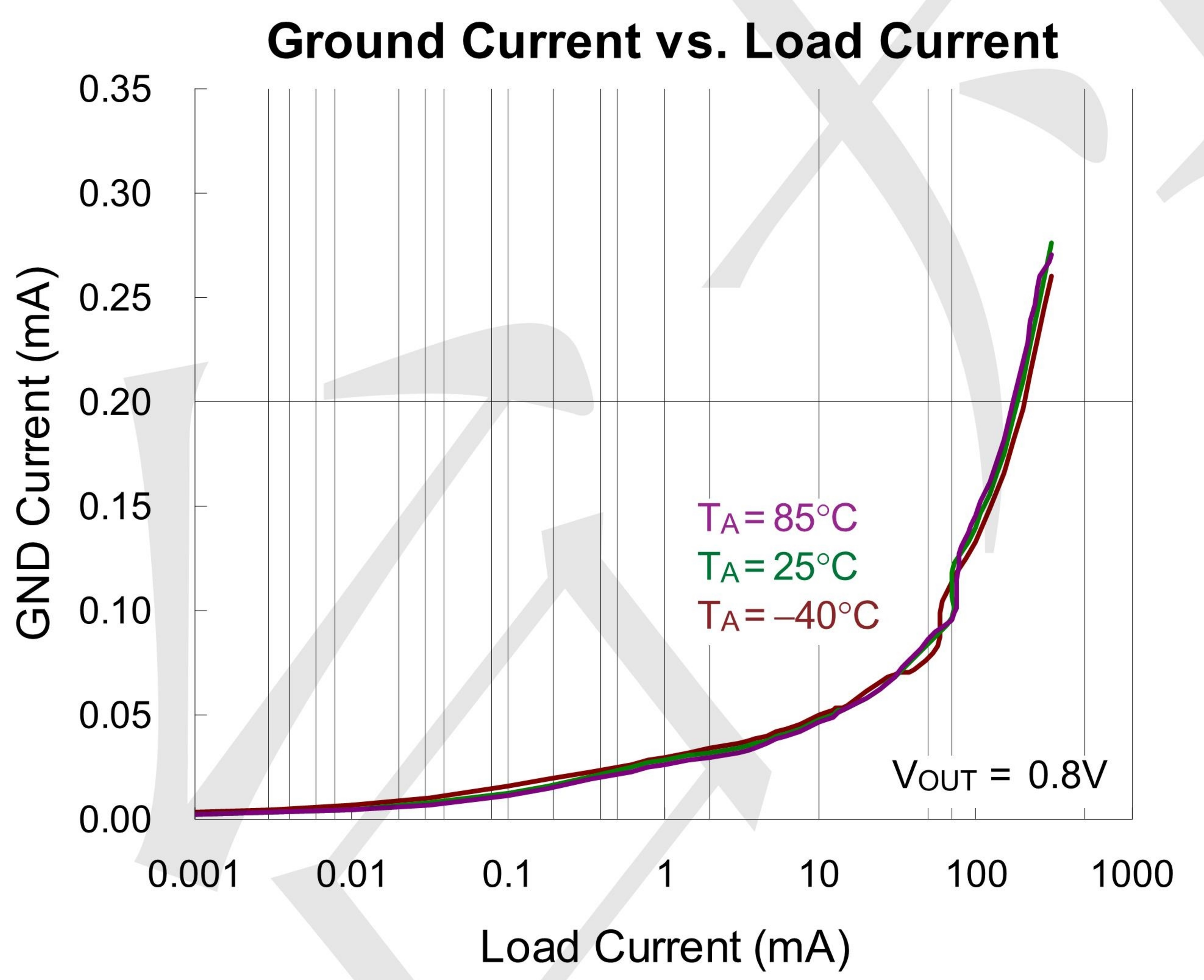
Typical Operating Characteristics

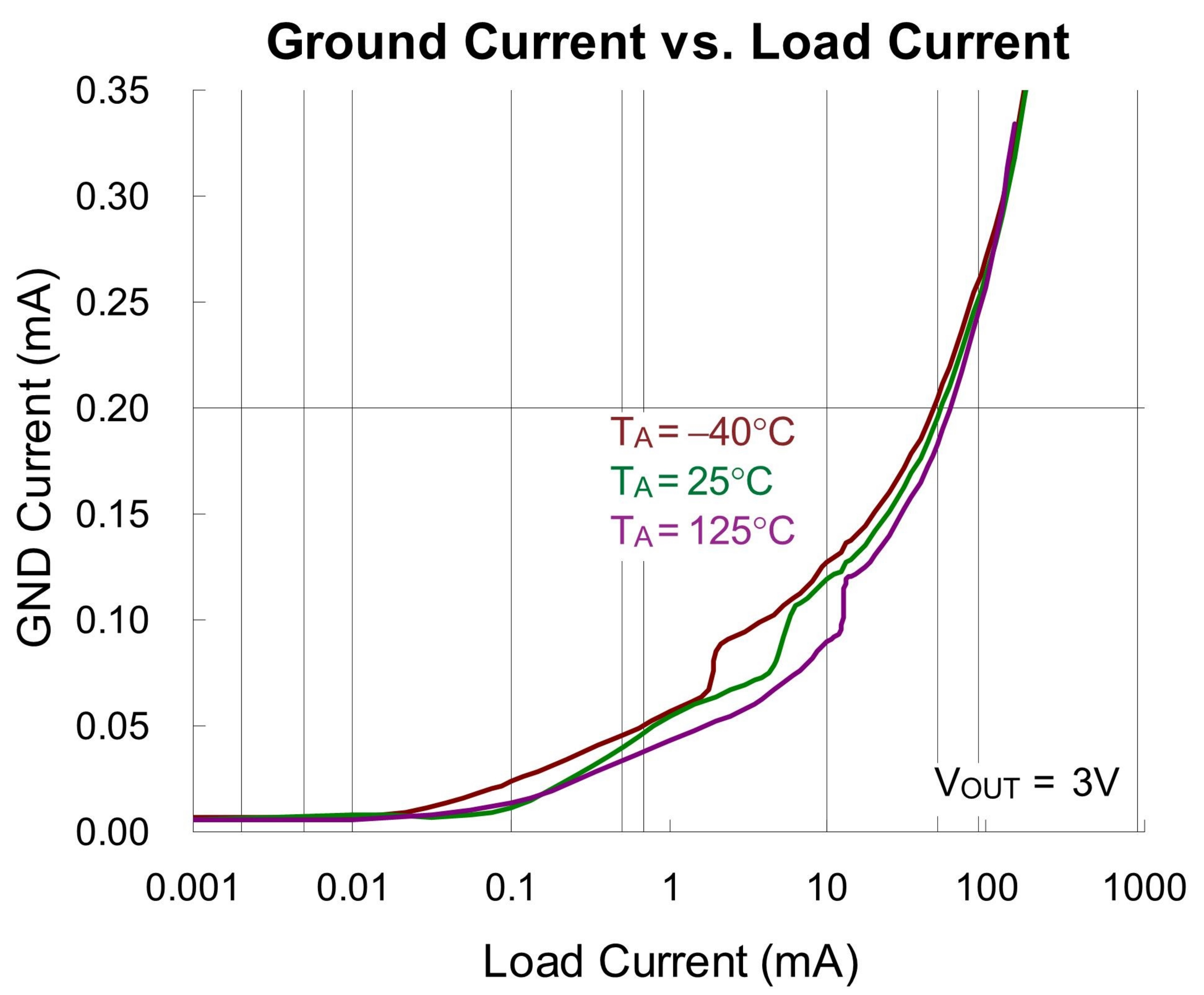




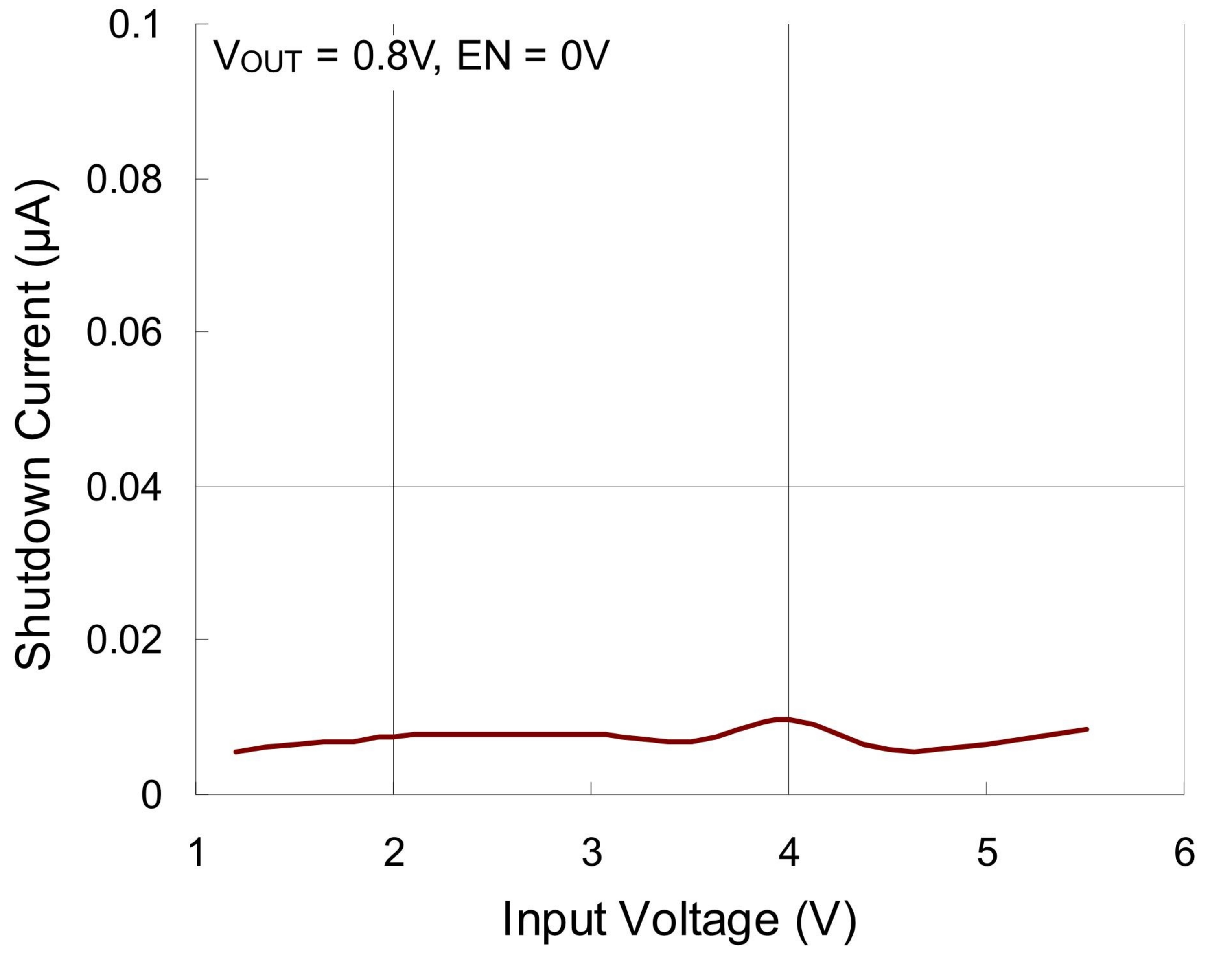




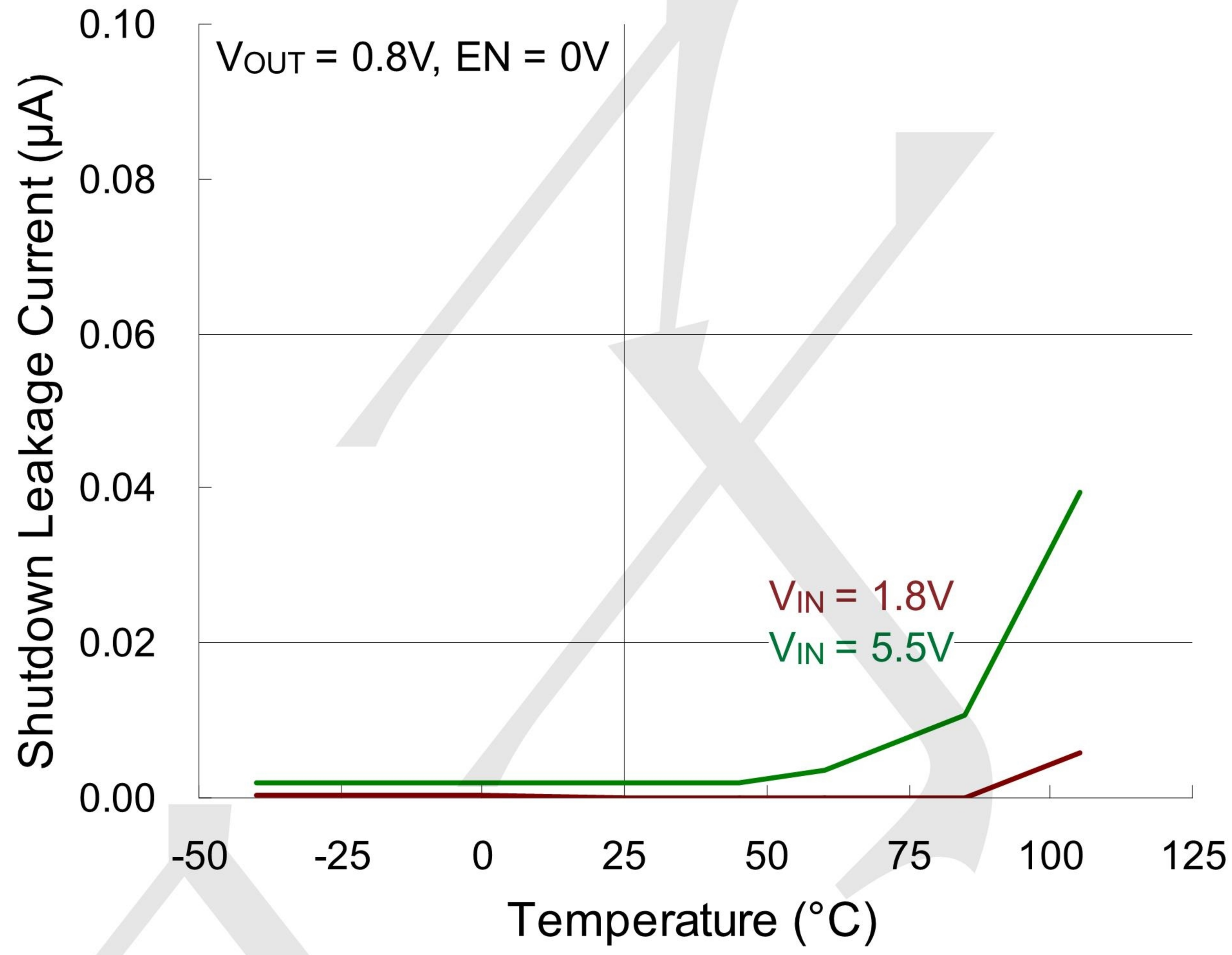




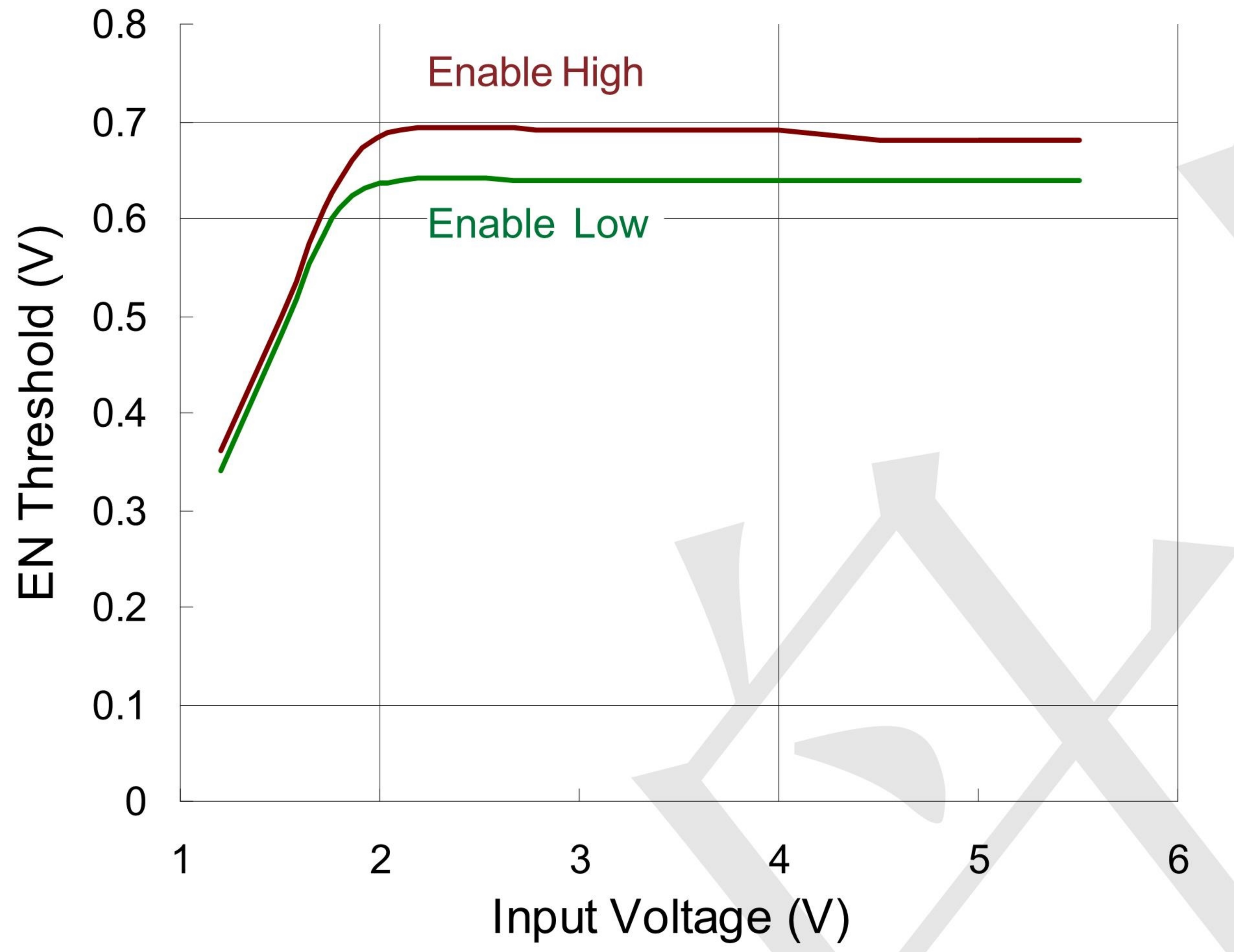
Shutdown Current vs. Input Voltage



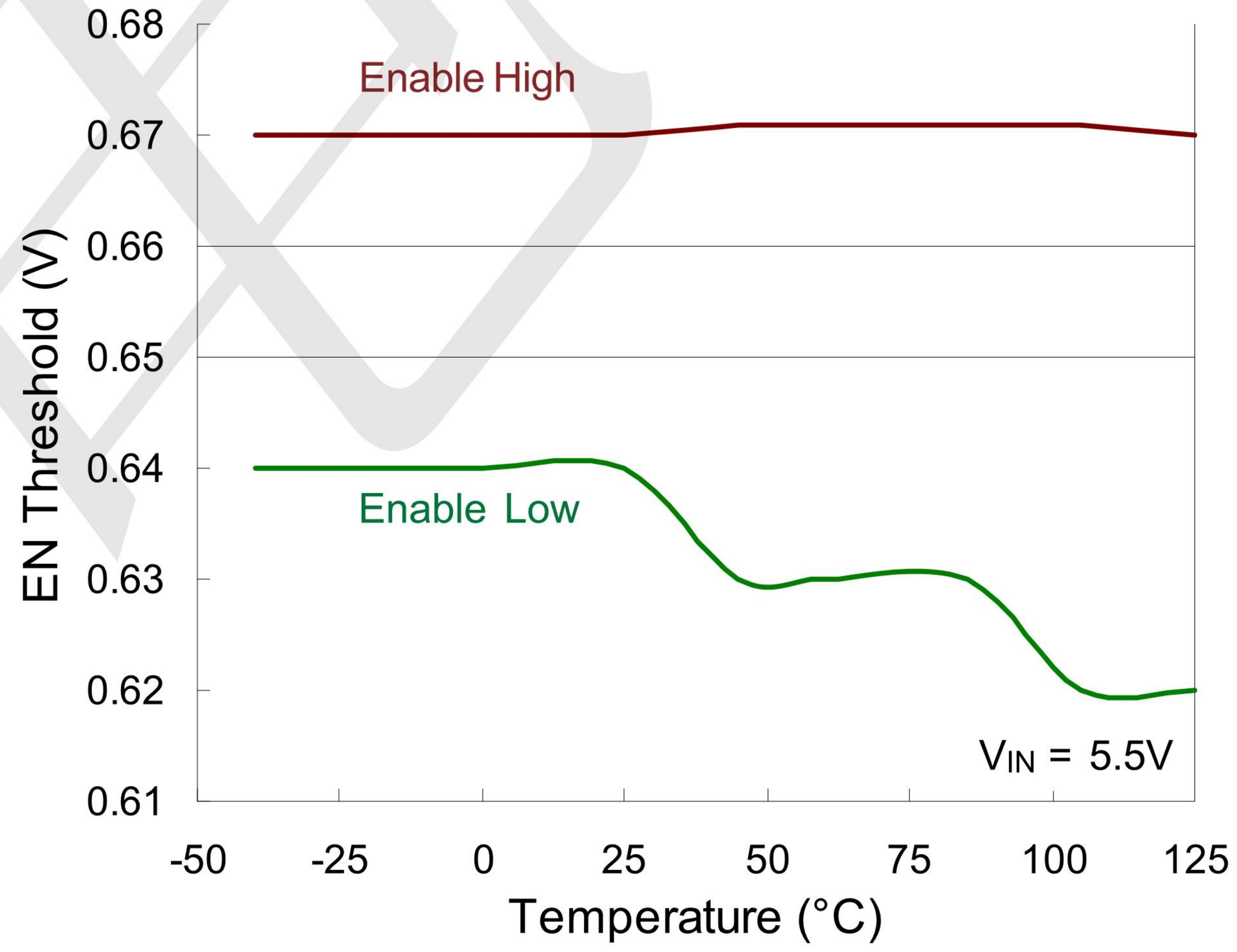
Shutdown Leakage Current vs. Temperature



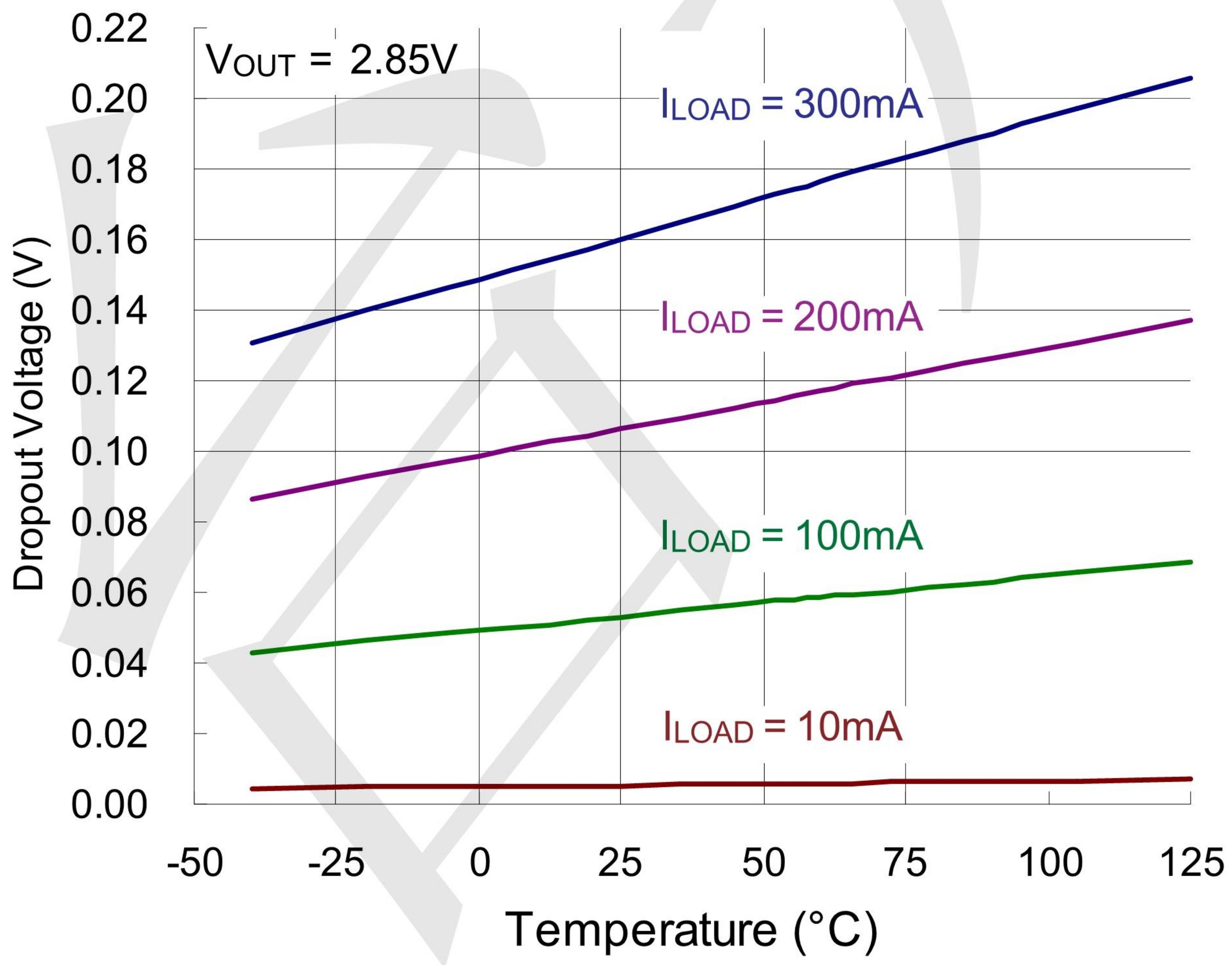
EN Threshold vs. Input Voltage



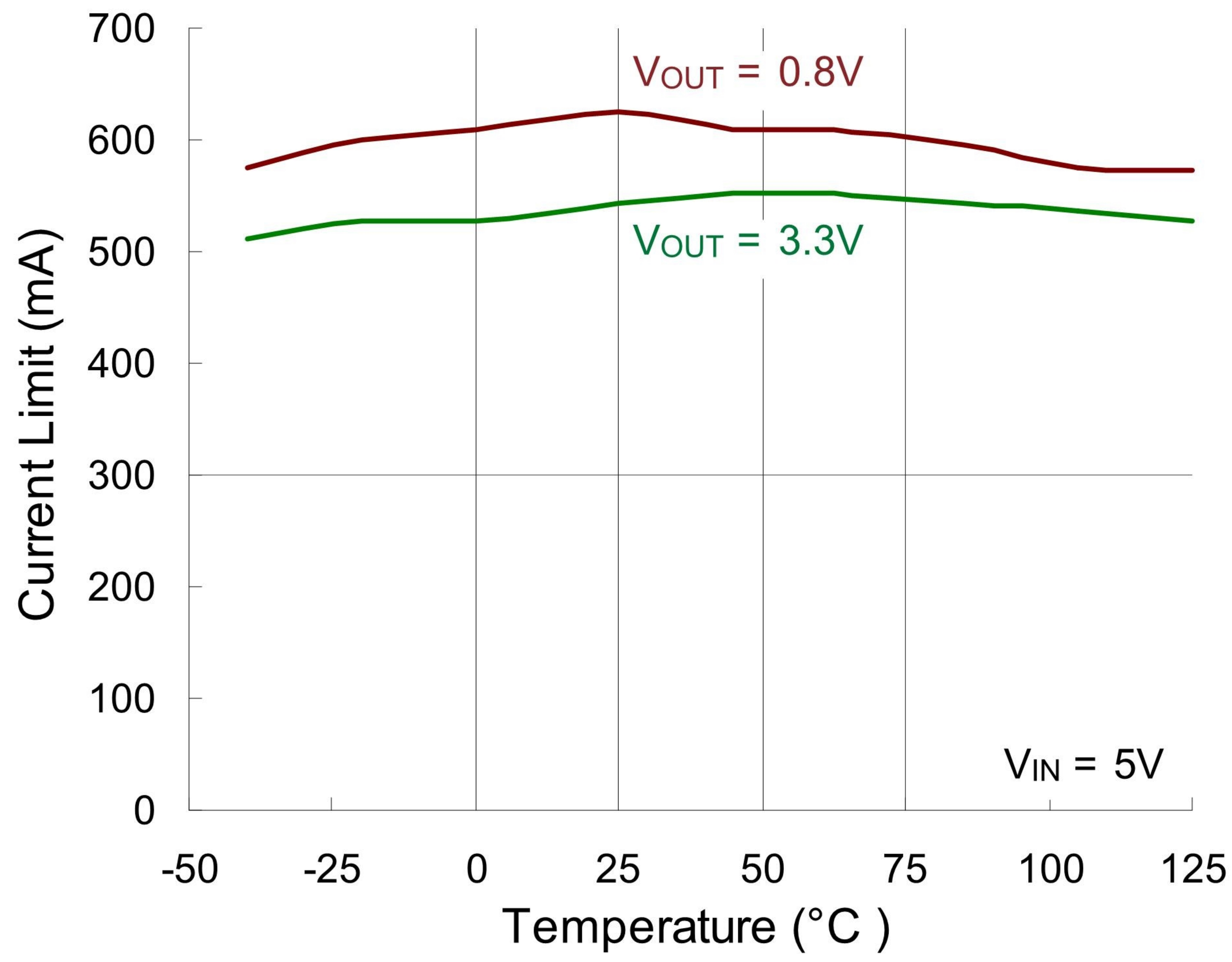
EN Threshold vs. Temperature



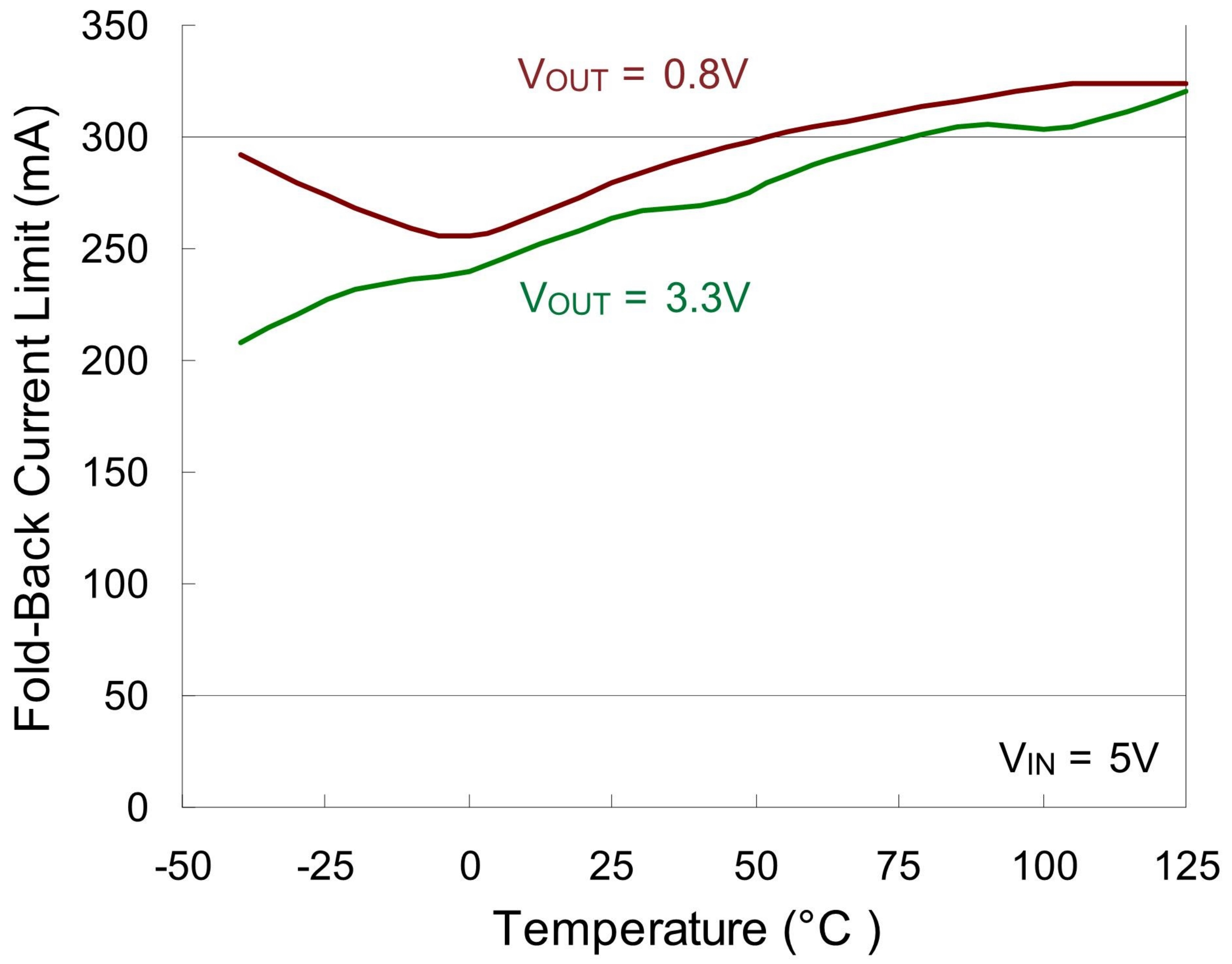
Dropout Voltage vs. Temperature



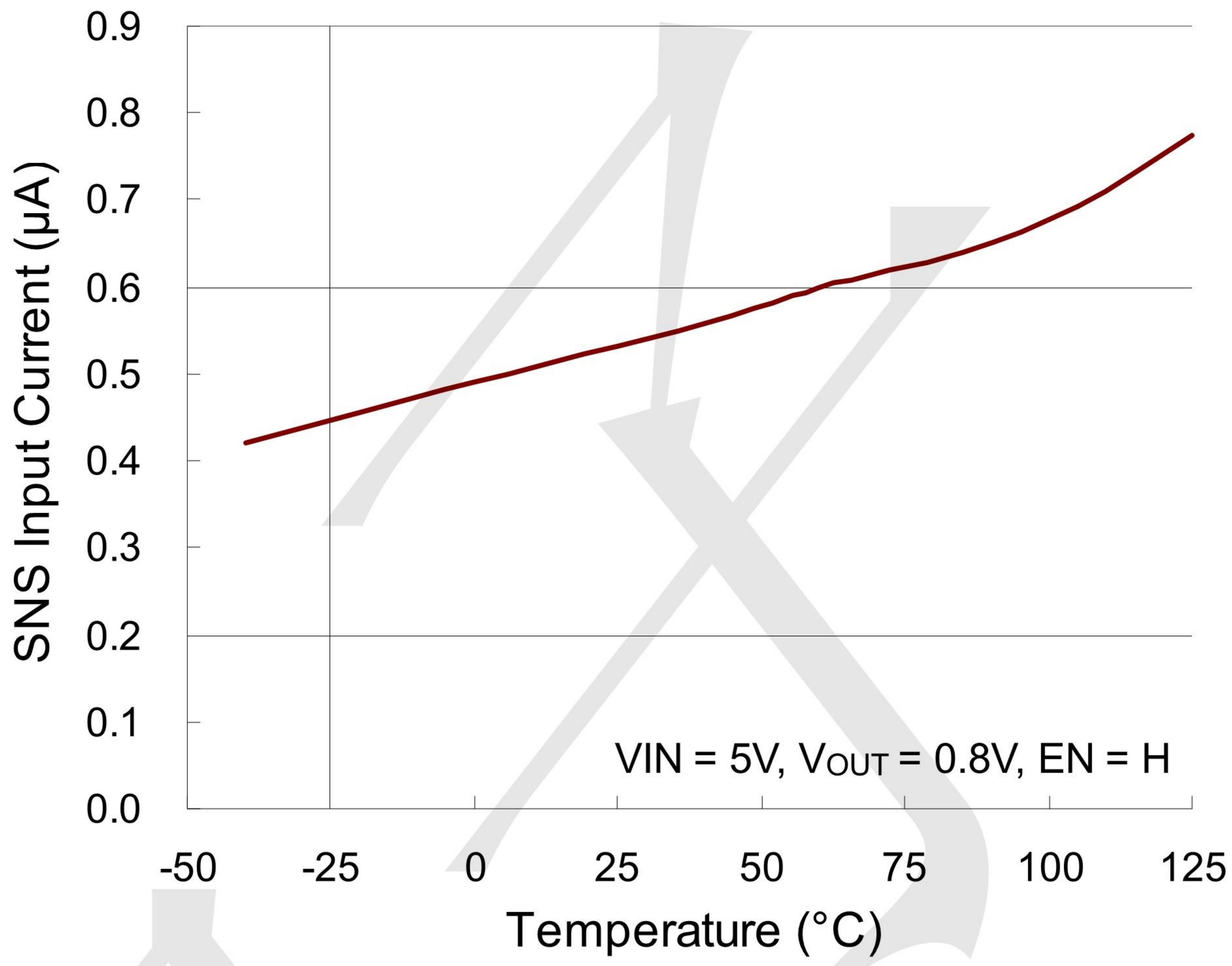
Current Limit vs. Temperature



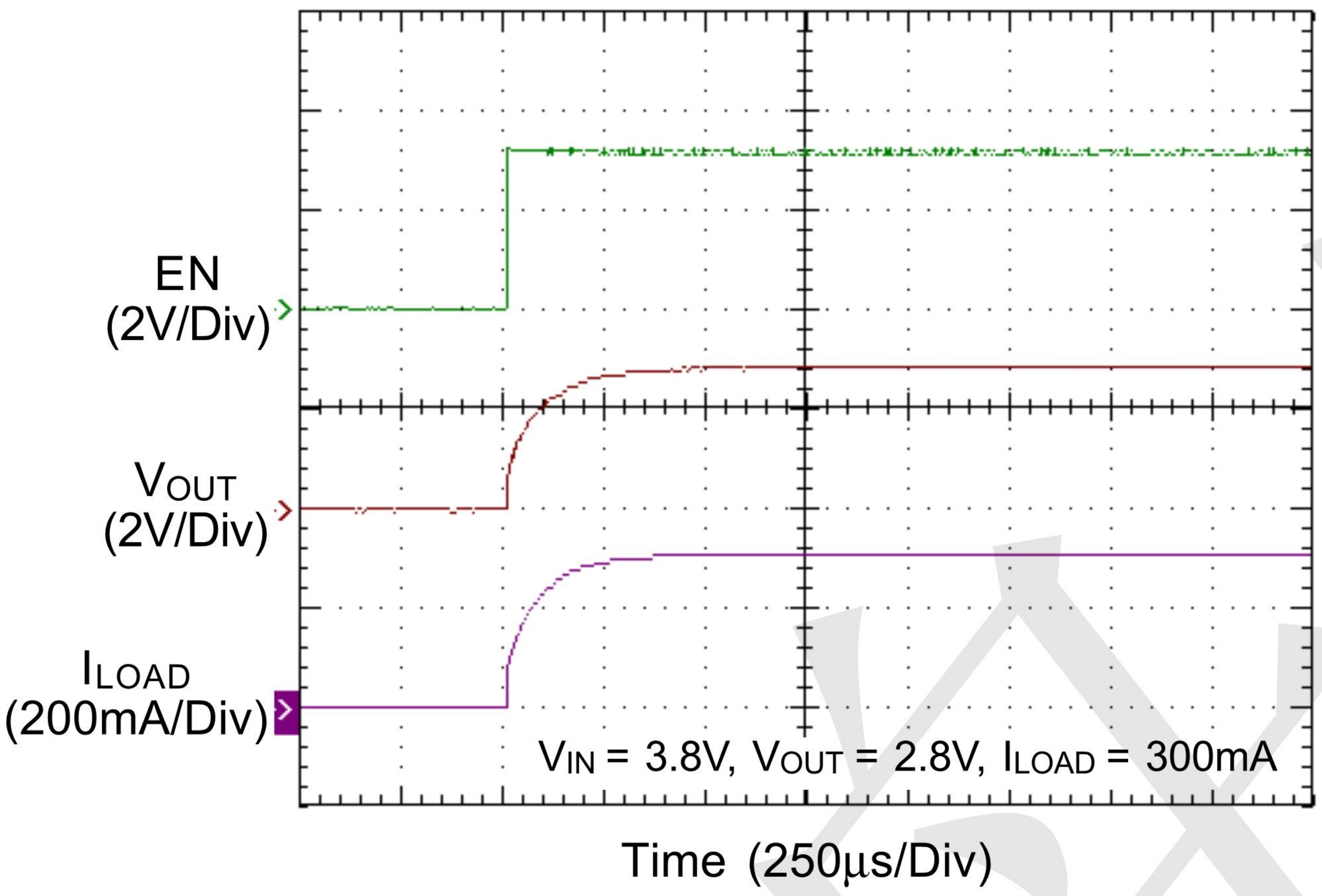
Fold-Back Current Limit vs. Temperature



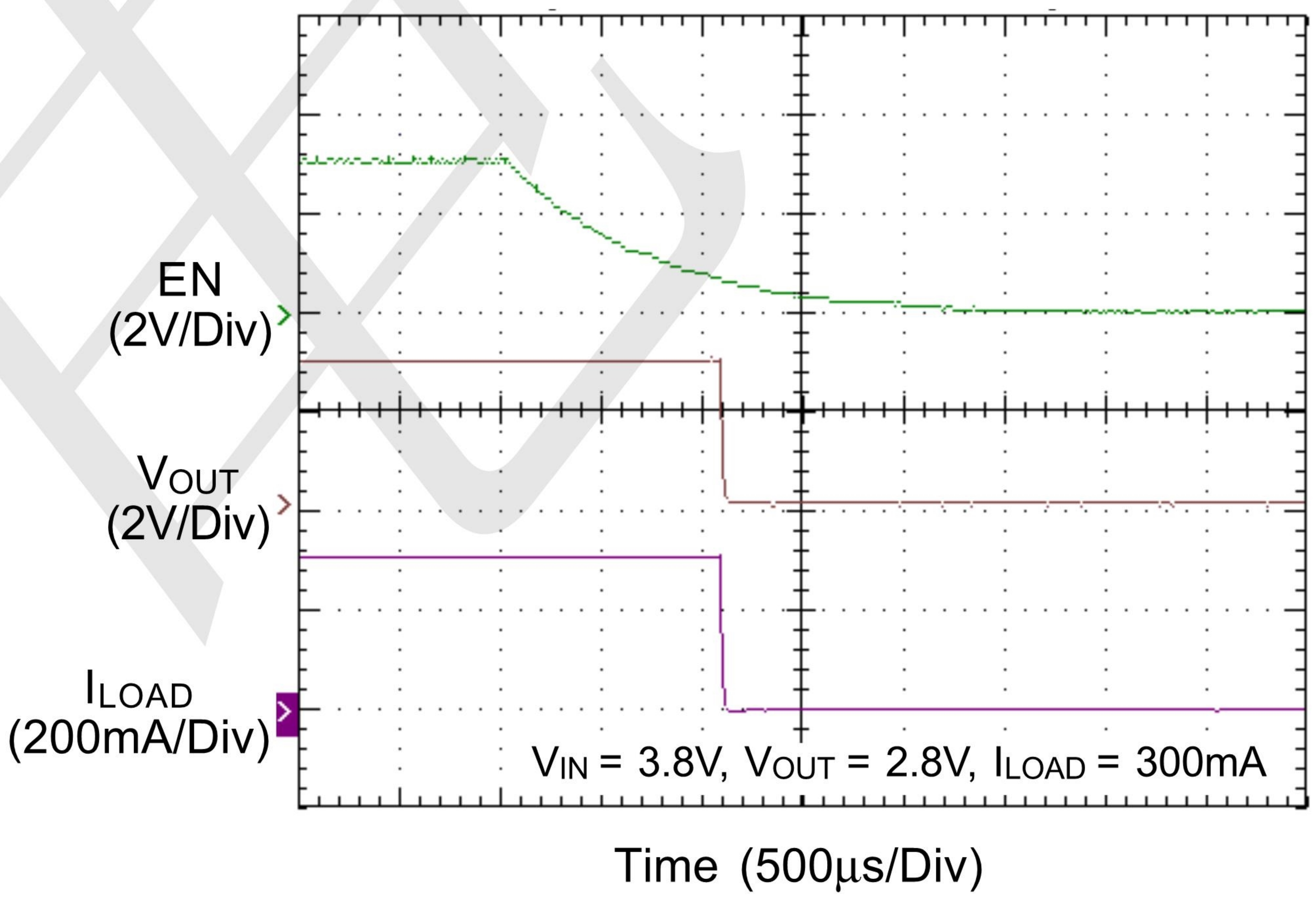
SNS Input Current vs. Temperature



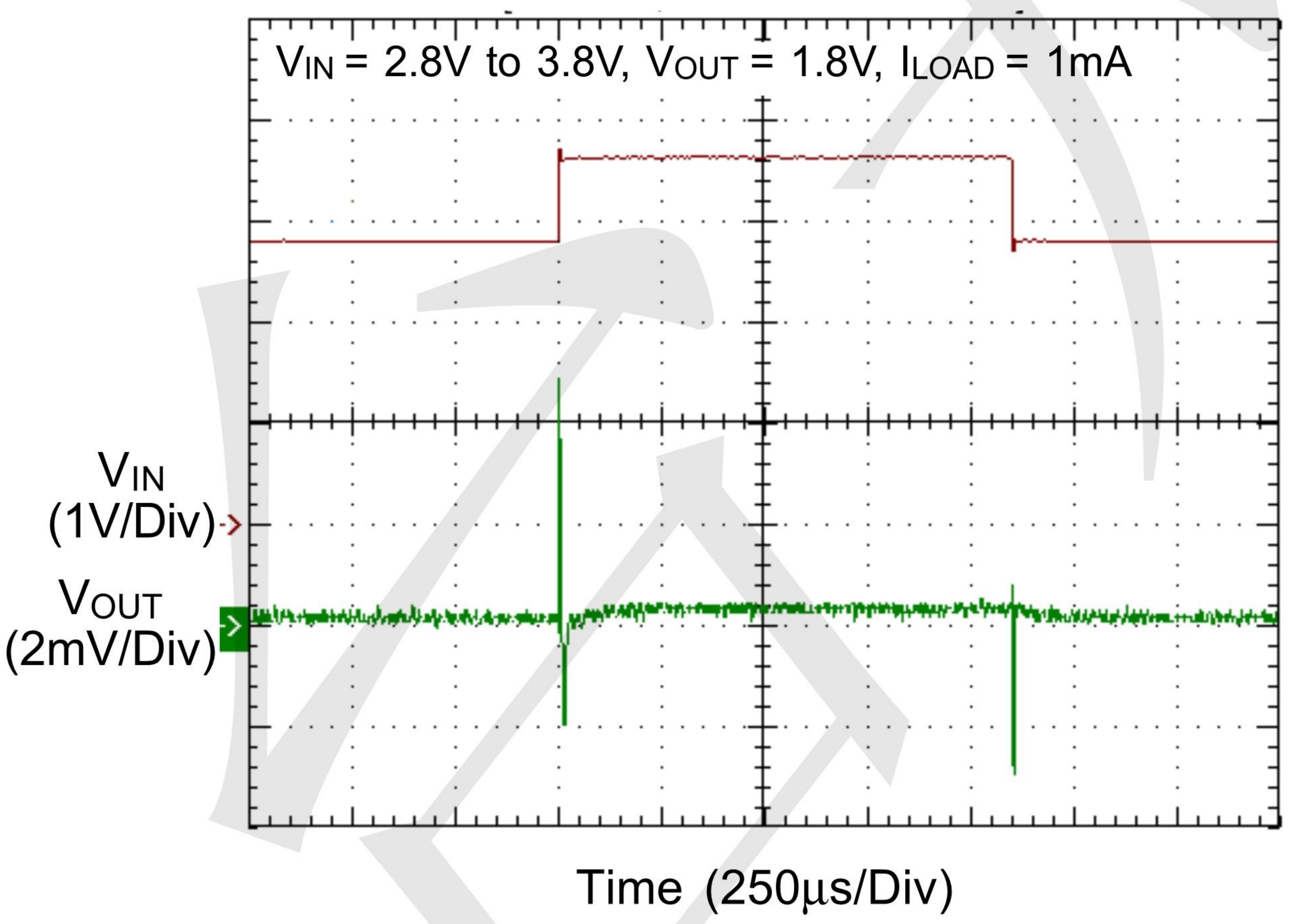
Power On from EN



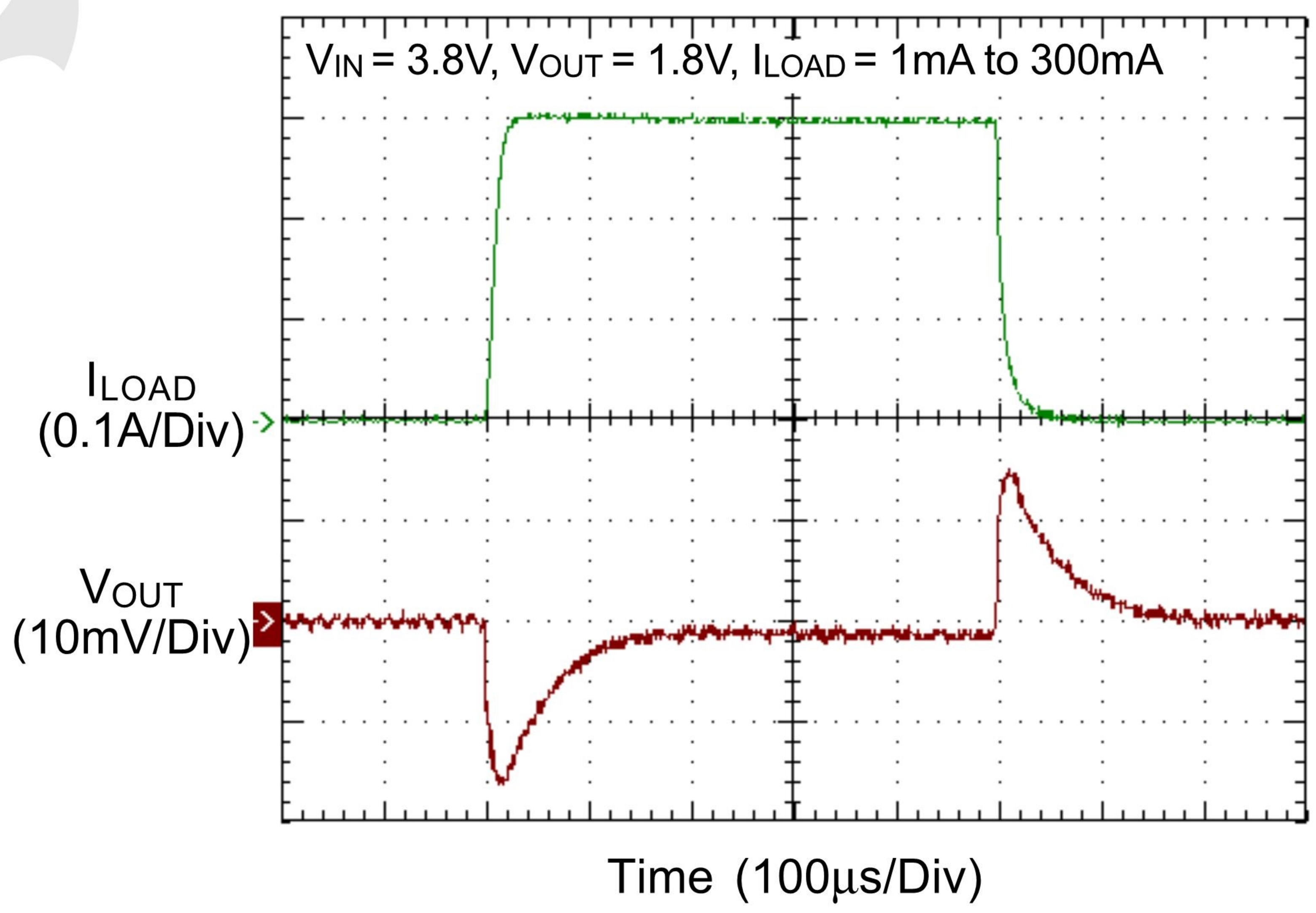
Power Off from EN



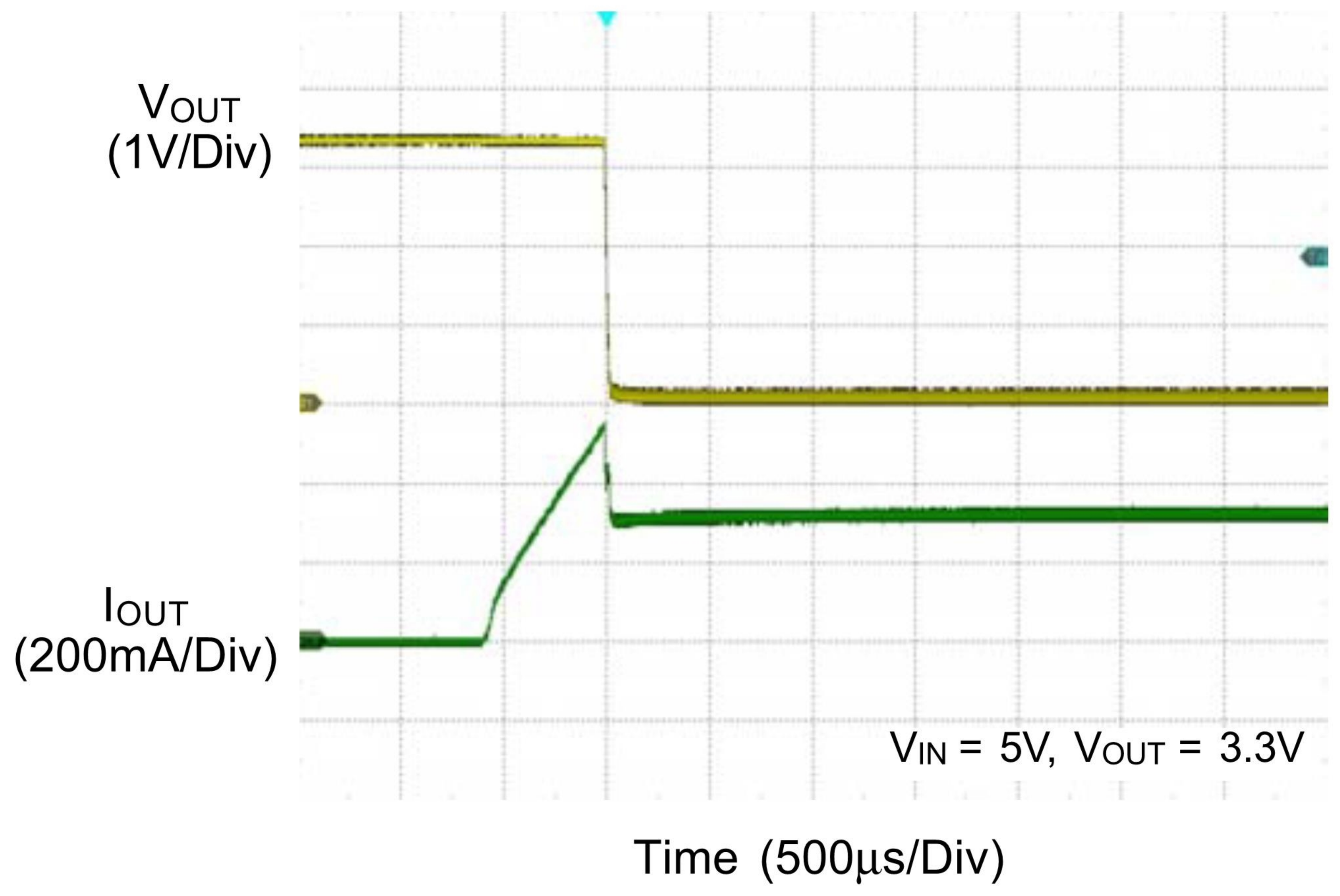
Line Transient



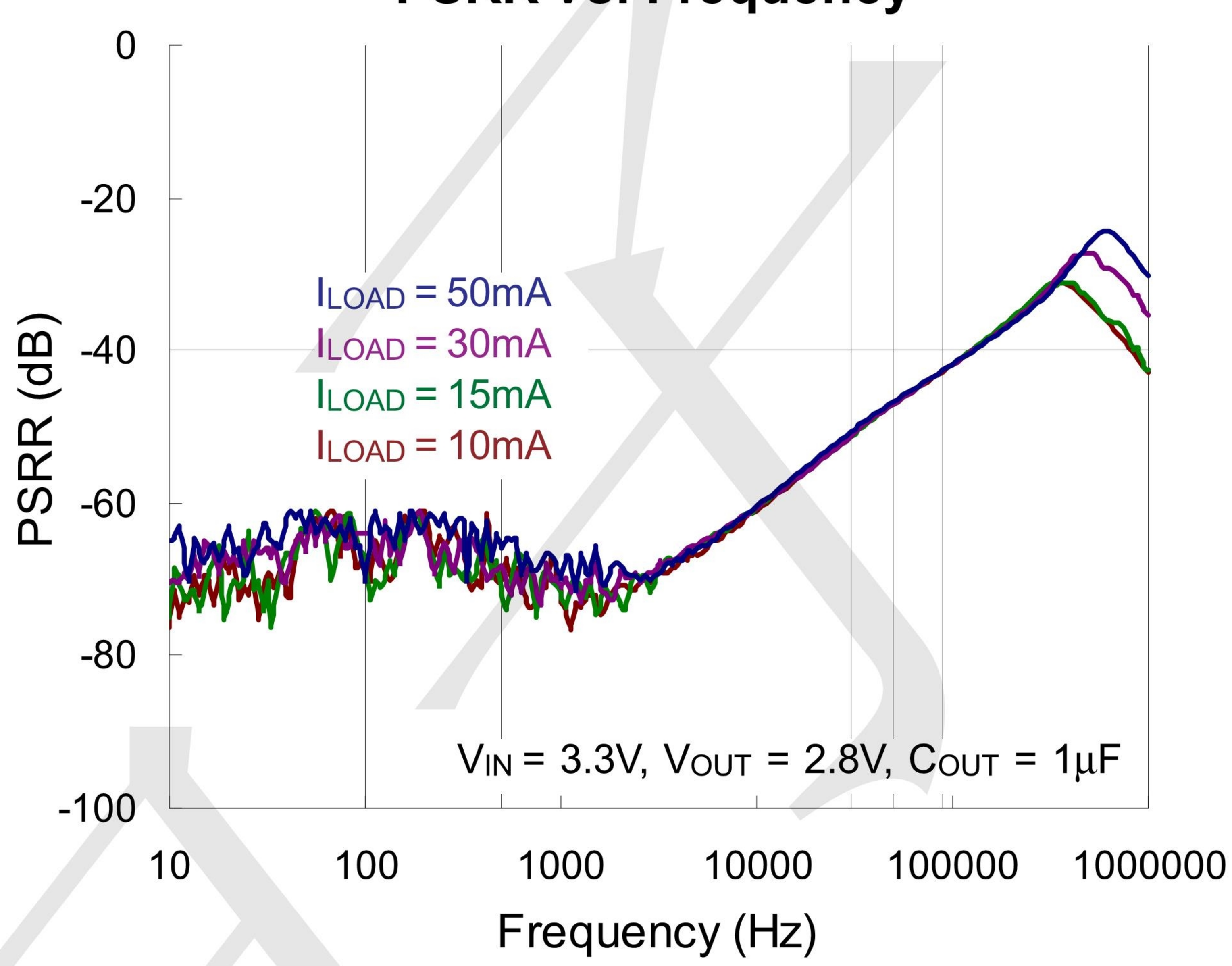
Load Transient



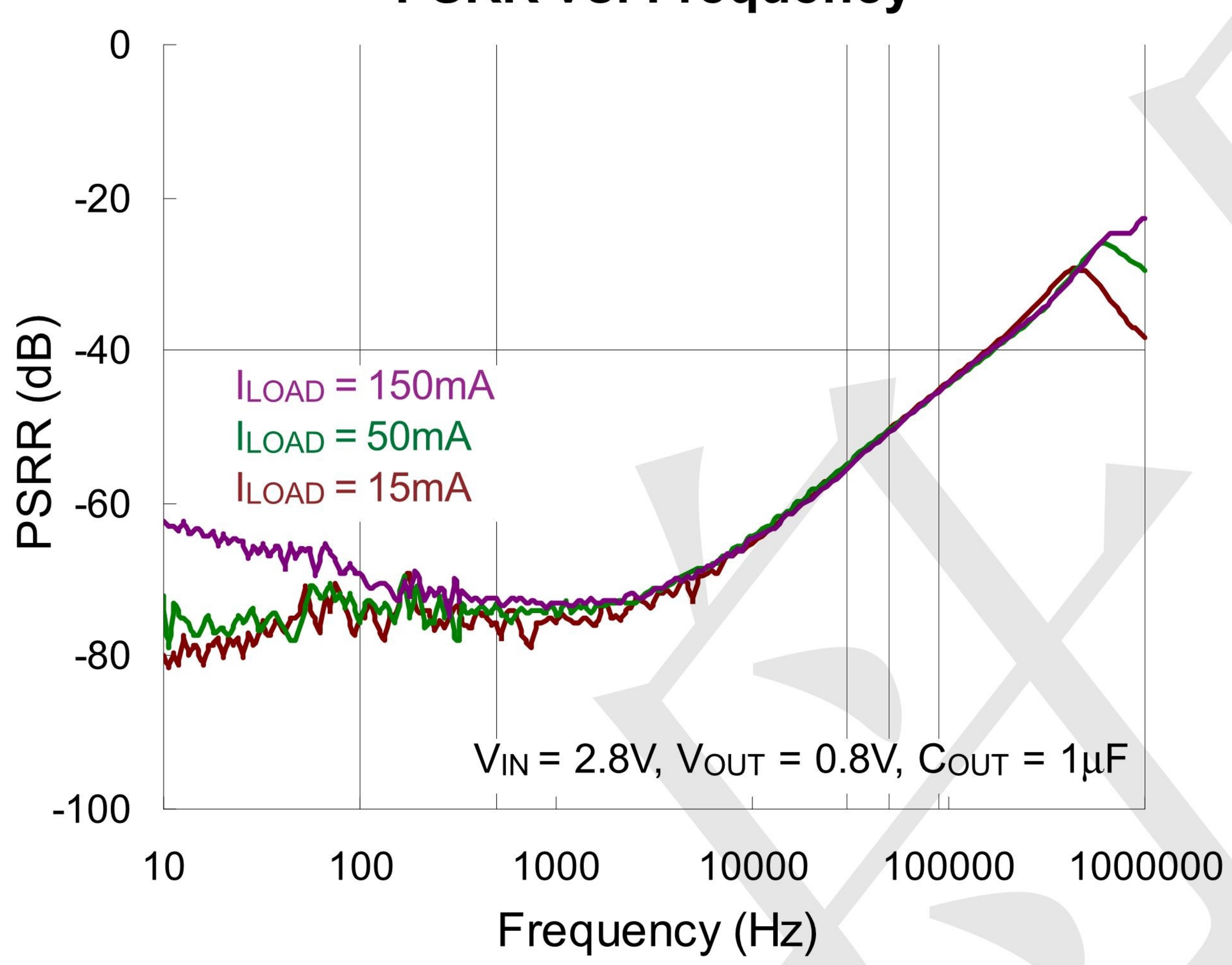
Output Current Limit Protection



PSRR vs. Frequency



PSRR vs. Frequency



Output Noise vs. Frequency