

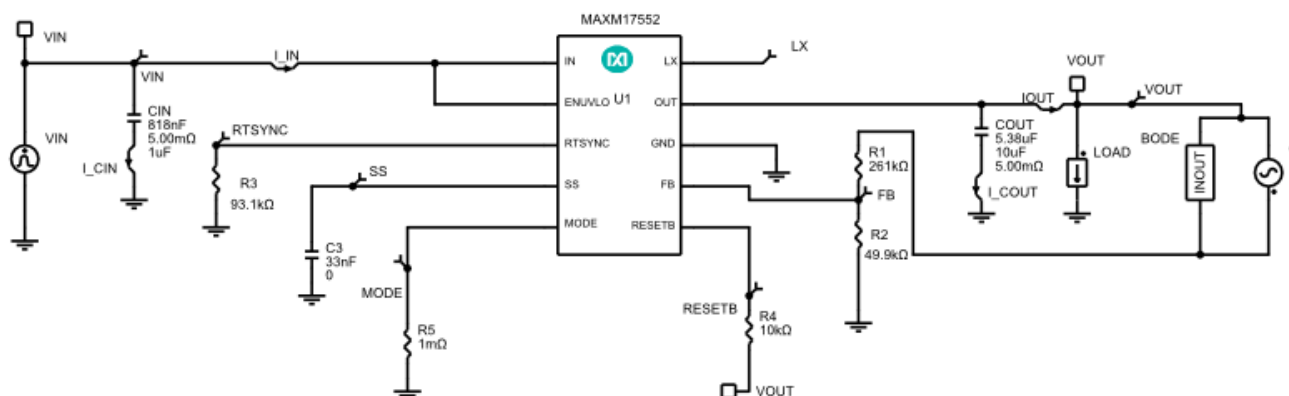
Initial Design

1.0

Design Requirements

Parameter	Value
Minimum Input Voltage	14V
Nominal Input Voltage	24V
Maximum Input Voltage	60V
Input Steady-State Ripple	0.48V
Input Undervoltage Lockout Level	4.2V
Output Voltage	5V
Output Current	0.1A
Output Voltage Load Step Overshoot/Undershoot	0.15V
BOM Priority	Cost
Switching Frequency	450kHz
MODE of Operation	PWM
Soft Start Time	5.1ms
Ambient Temperature	25°C

Schematic



The MAXM17900 MAXM17532 MAXM17552 employs PFM mode at light loads when this feature is selected. If the starting load current is too low, PFM will occur and the POP analysis will fail. It is difficult to predict across all circuit parameter variations precisely at what load current this will occur. Typically the SIMPLIS feature which runs a short transient simulation when POP fails will allow all but AC simulations to run.

BOM

Ref	Qty	Part Number	Manufacturer	Description
U1	1	MAXM17552	User-Defined	IC
C3	1	ECHU1H333GX5	Panasonic	Cap Film 0.033uF 50V PPS 2% (3.2 X 2.5 X 2.1mm) Stacked 125°C T/R
CIN	1	GRM31CR72A105KA01	Murata	Cap Ceramic 1uF 100V X7R 10% SMD 1206 125C
COUT	1	GRM21BR71A106KA73	Murata	Cap Ceramic 10uF 10V 0805 125C
R1	1	ERJ2RKF2613X	Panasonic	Res Thick Film 0402 261K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
R2	1	ERJ3EKF4992V	Panasonic	Res Thick Film 0603 49.9K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD Automotive T/R
				Res Thick Film 0603 93.1K Ohm 1%

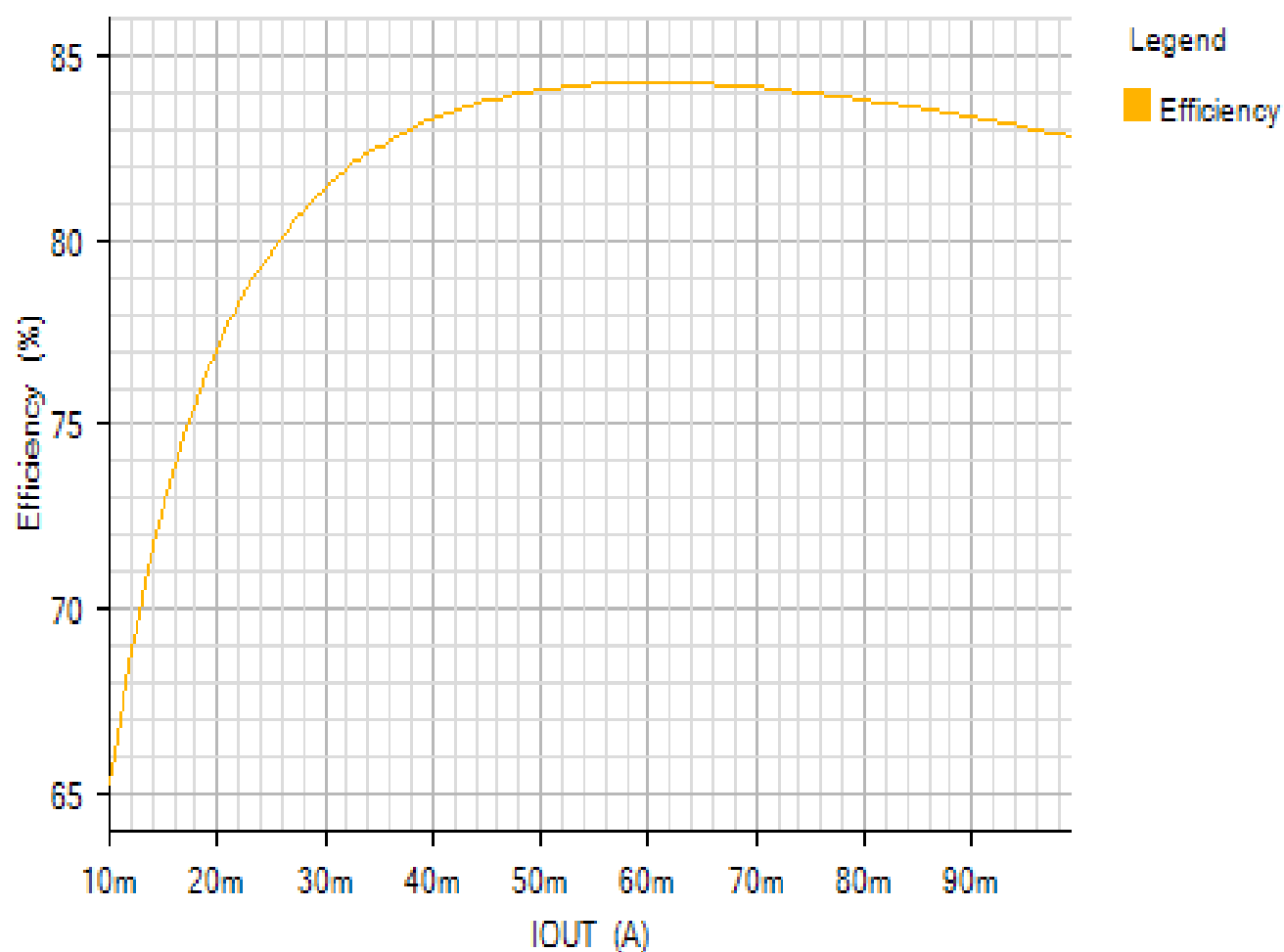
R3	1	ERJ3EKF9312V	Panasonic	0.1W(1/10W) $\pm 100\text{ppm}/^\circ\text{C}$ Pad SMD Automotive T/R
R4	1	ERJ3GEYJ103V	Panasonic	Res Thick Film 0603 10K Ohm 5% 0.1W(1/10W) $\pm 200\text{ppm}/^\circ\text{C}$ Pad SMD Automotive T/R

Simulation Results

Efficiency - Wed Dec 19 2018 16:38:01

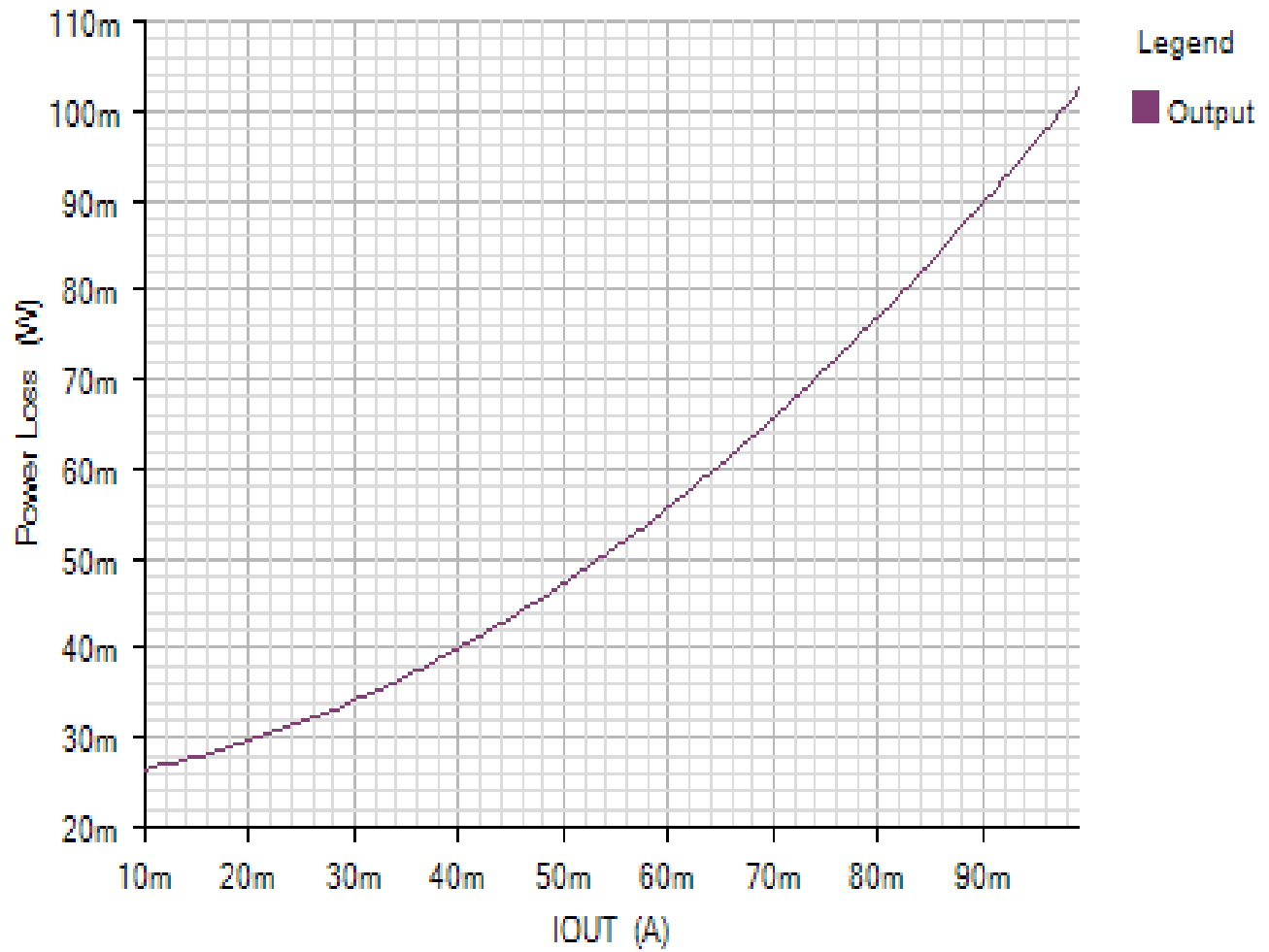
EFFICIENCY_PLOT

Default



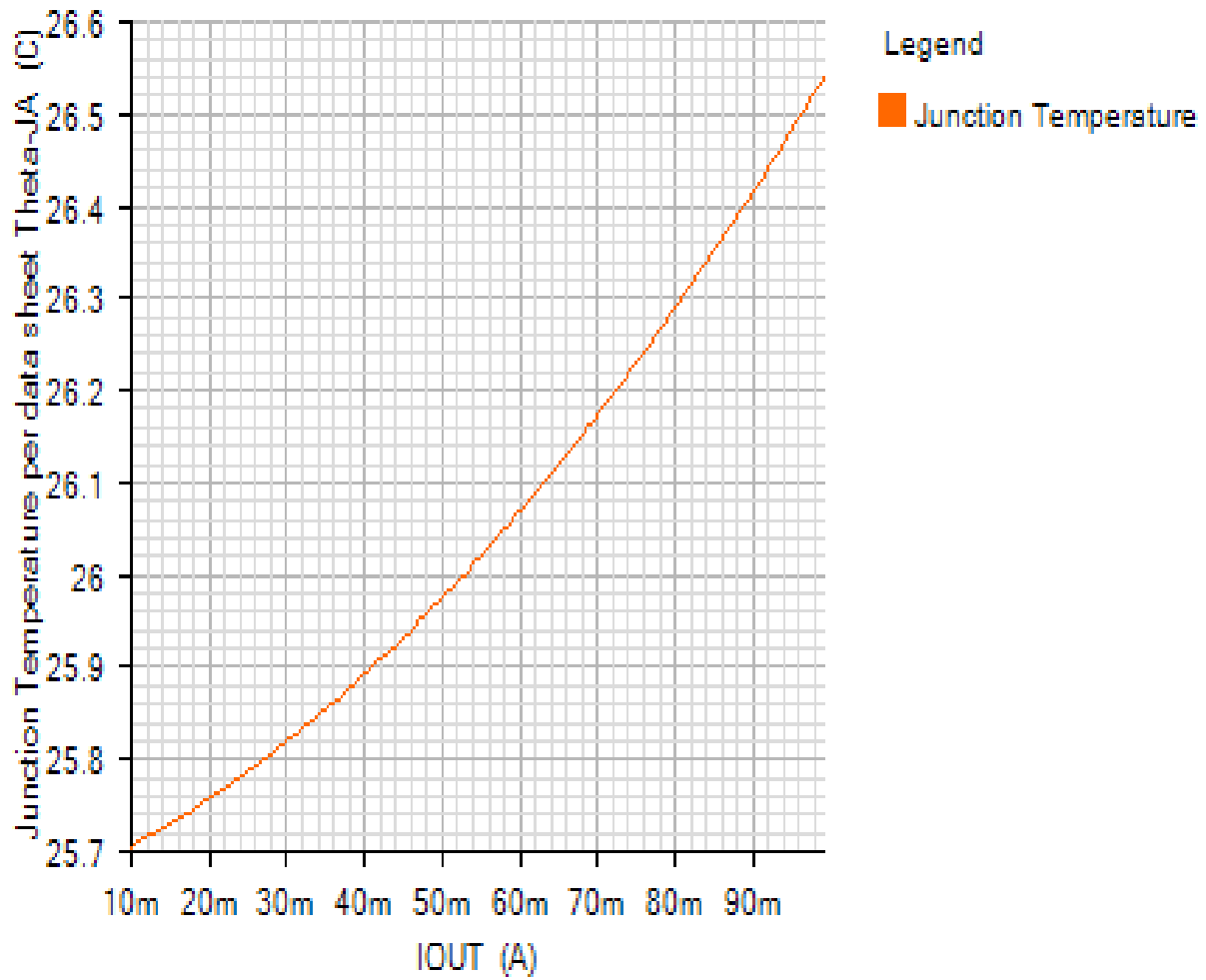
POWER_LOSS_PLOT

Default



JUNCTION_TEMPERATURE_PLOT

Default



Losses



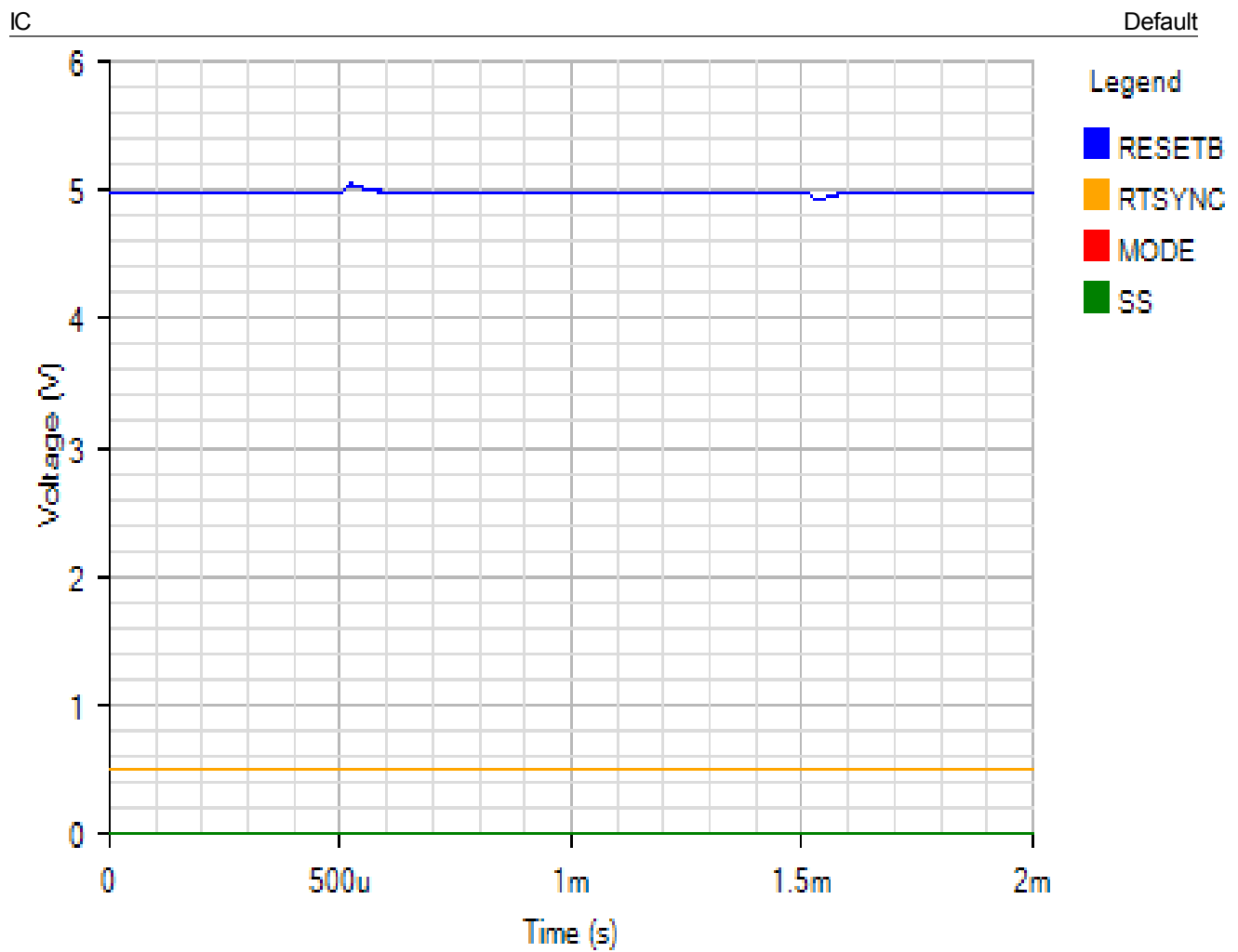
Component

Loss (W)

% of total

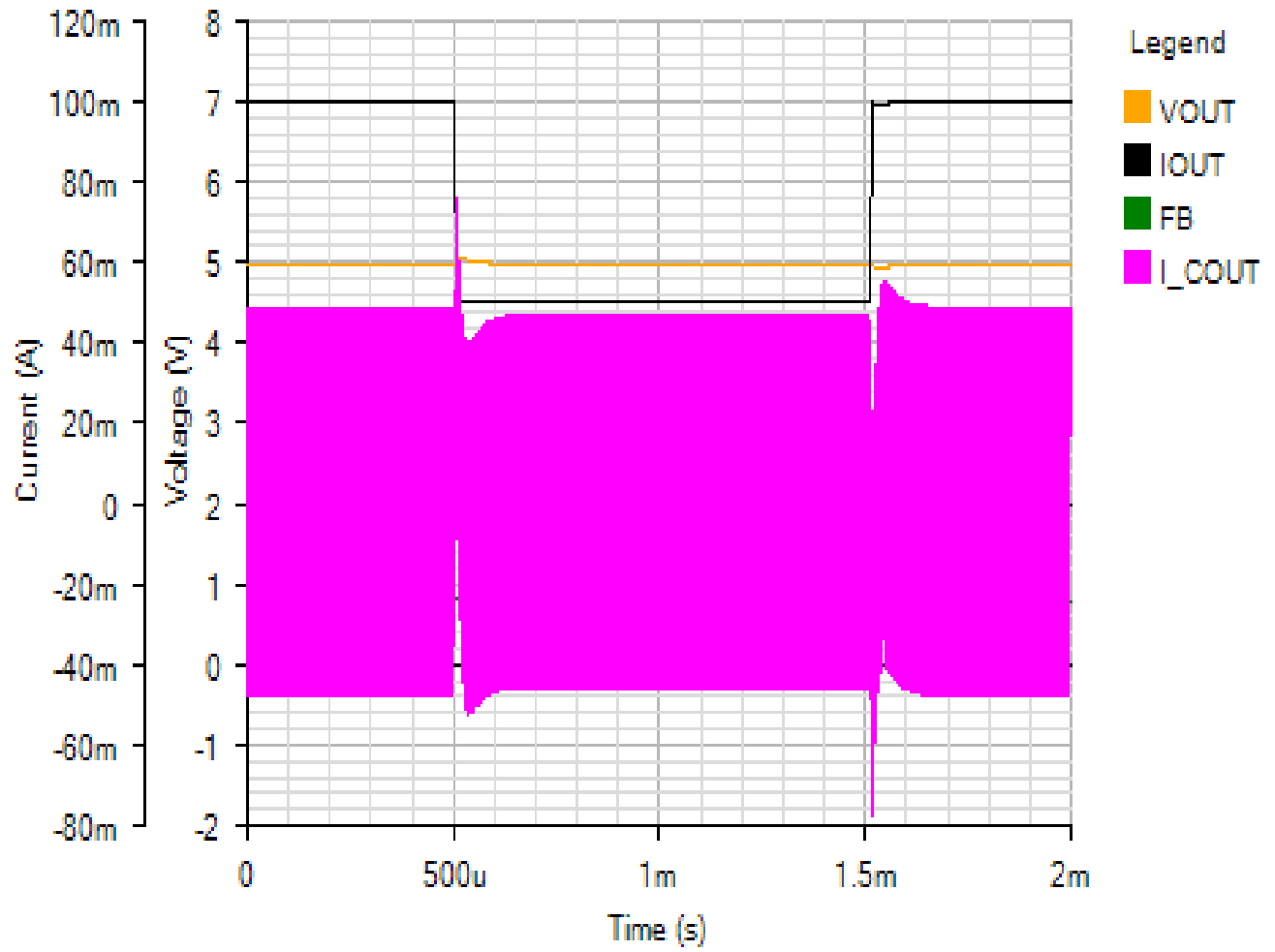
Component	Loss (W)	% of total
Inductor losses	0.05	50
Losses in IC	0.05	50
Total	0.1	100

Load Step - Wed Dec 19 2018 16:38:01



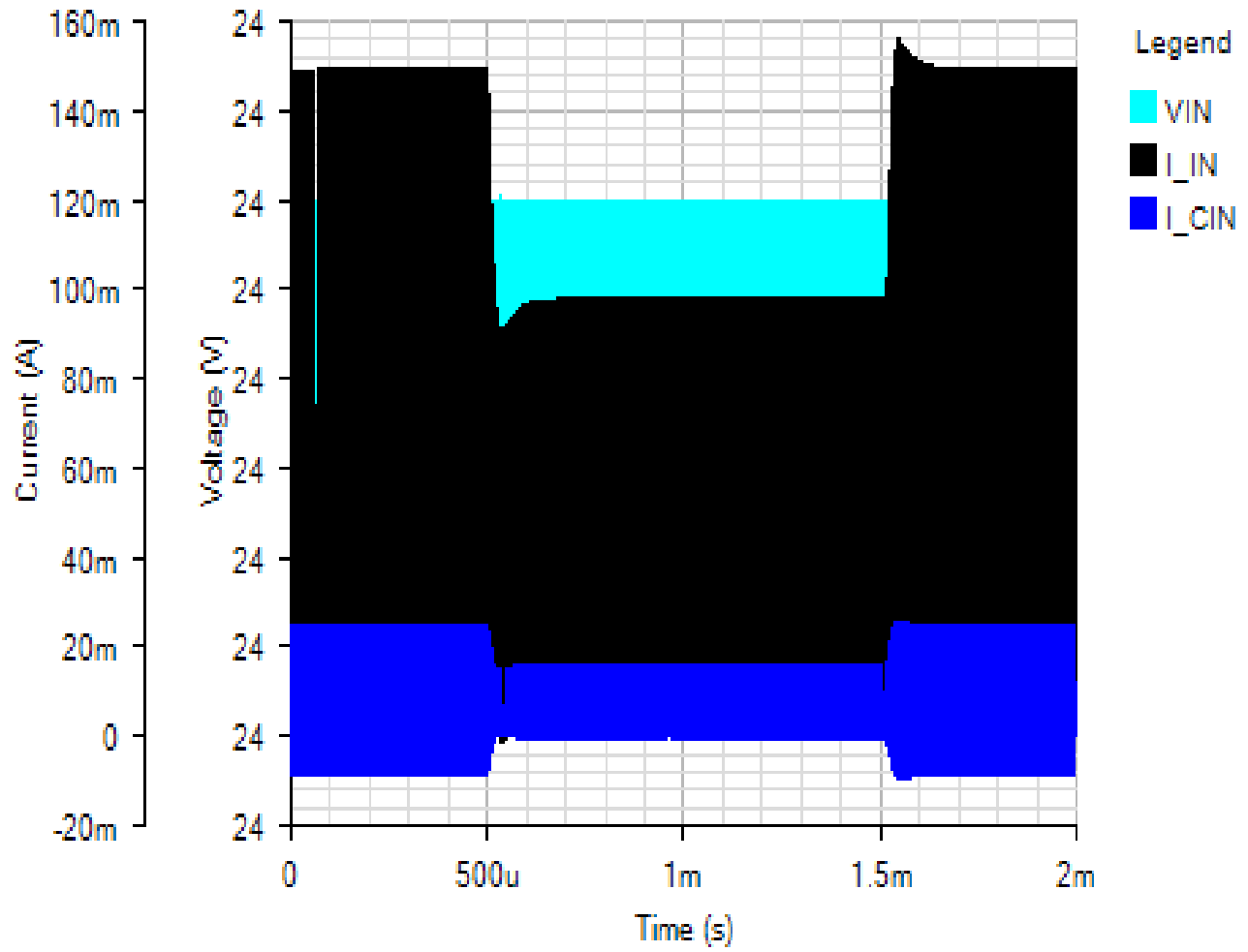
OUTPUT

Default



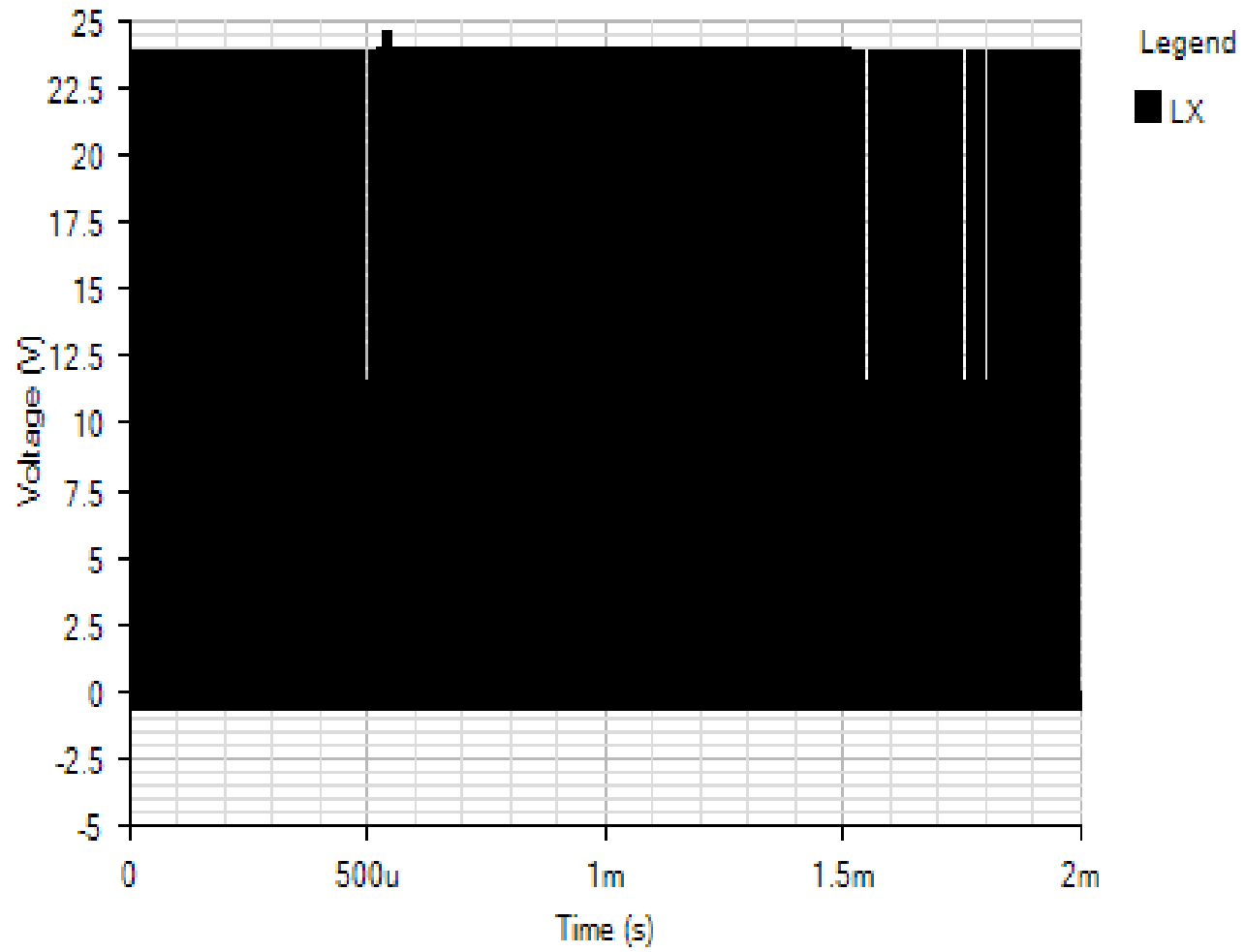
INPUT

Default

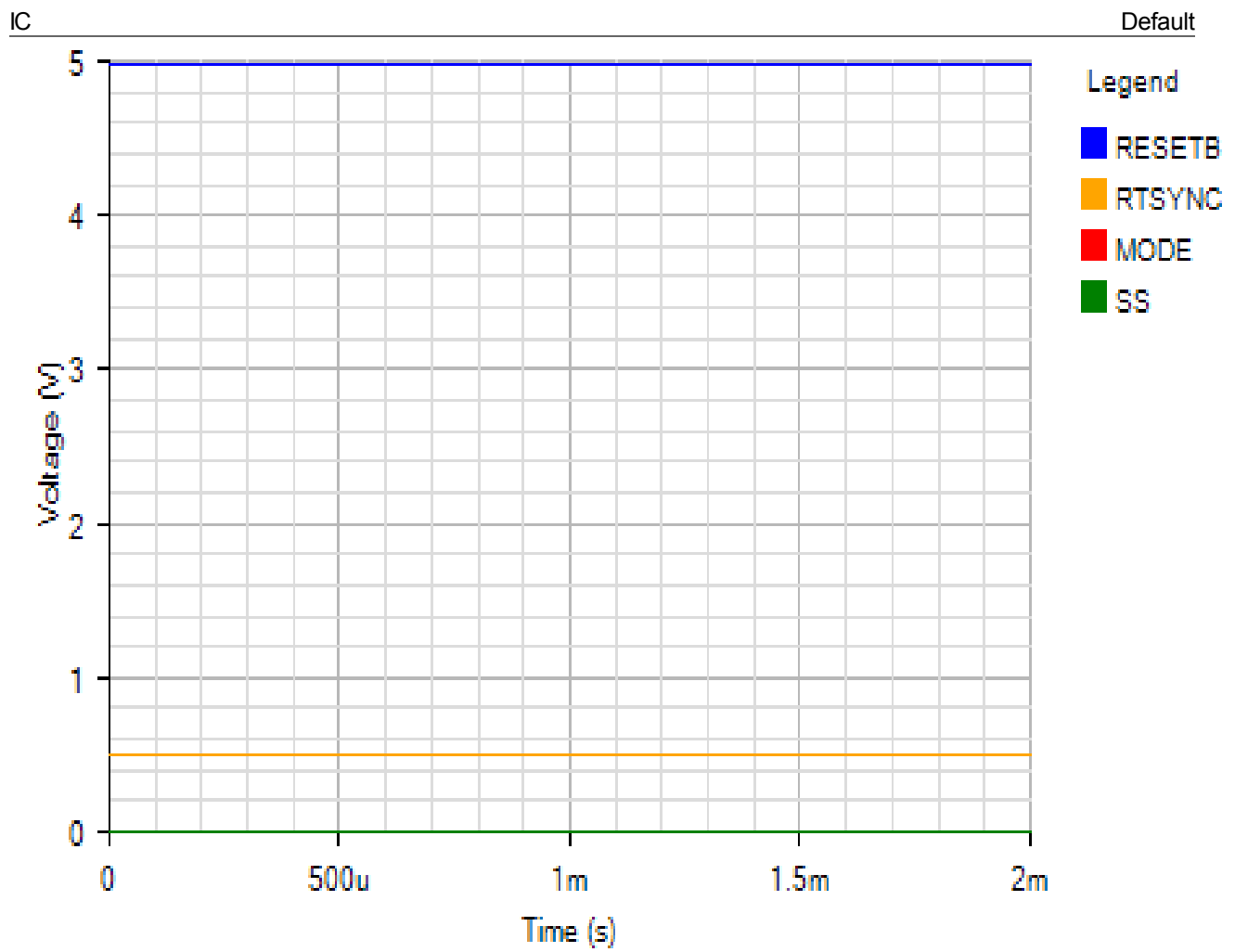


SWITCHING

Default

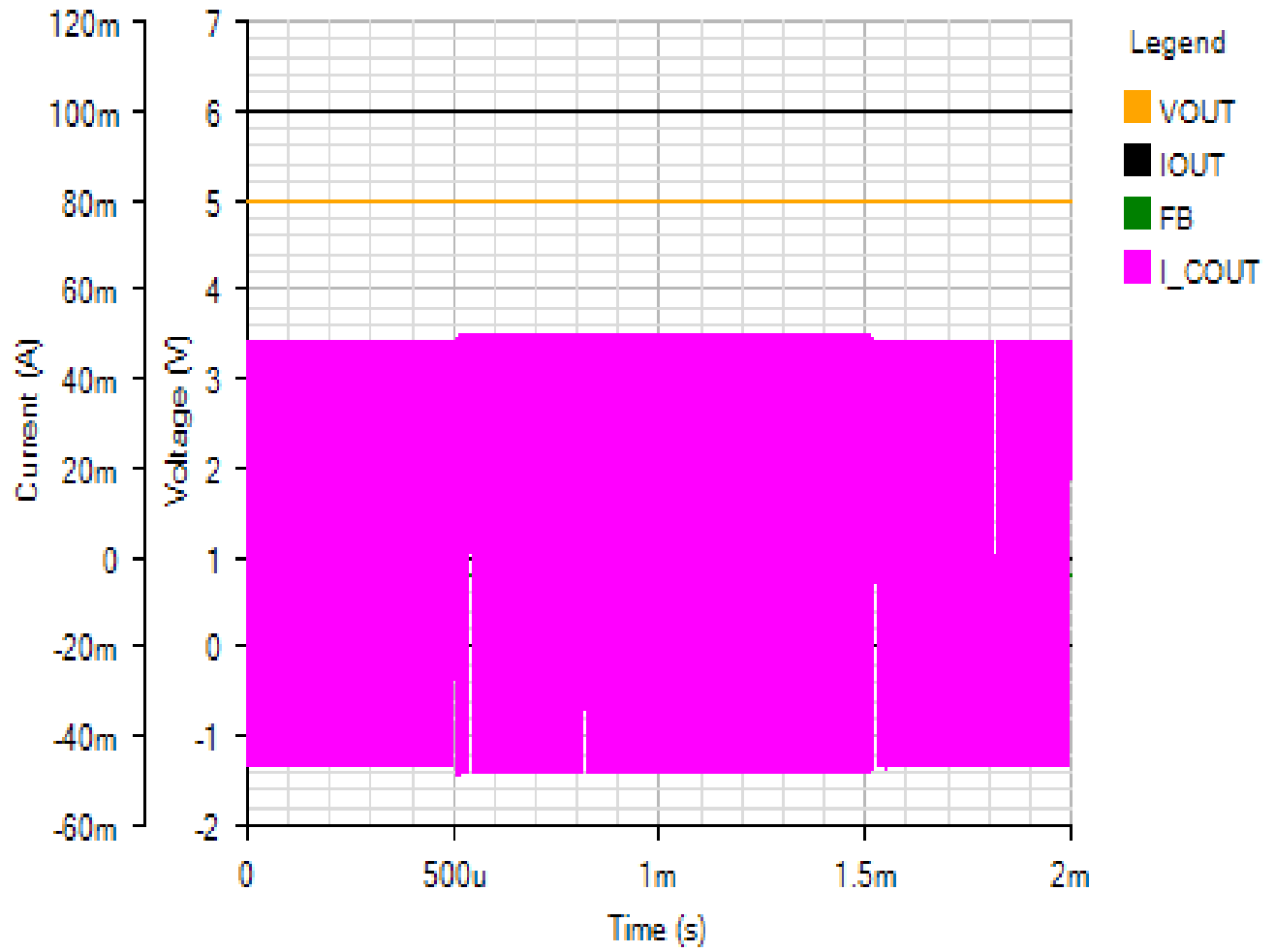


Line Transient - Wed Dec 19 2018 16:38:01



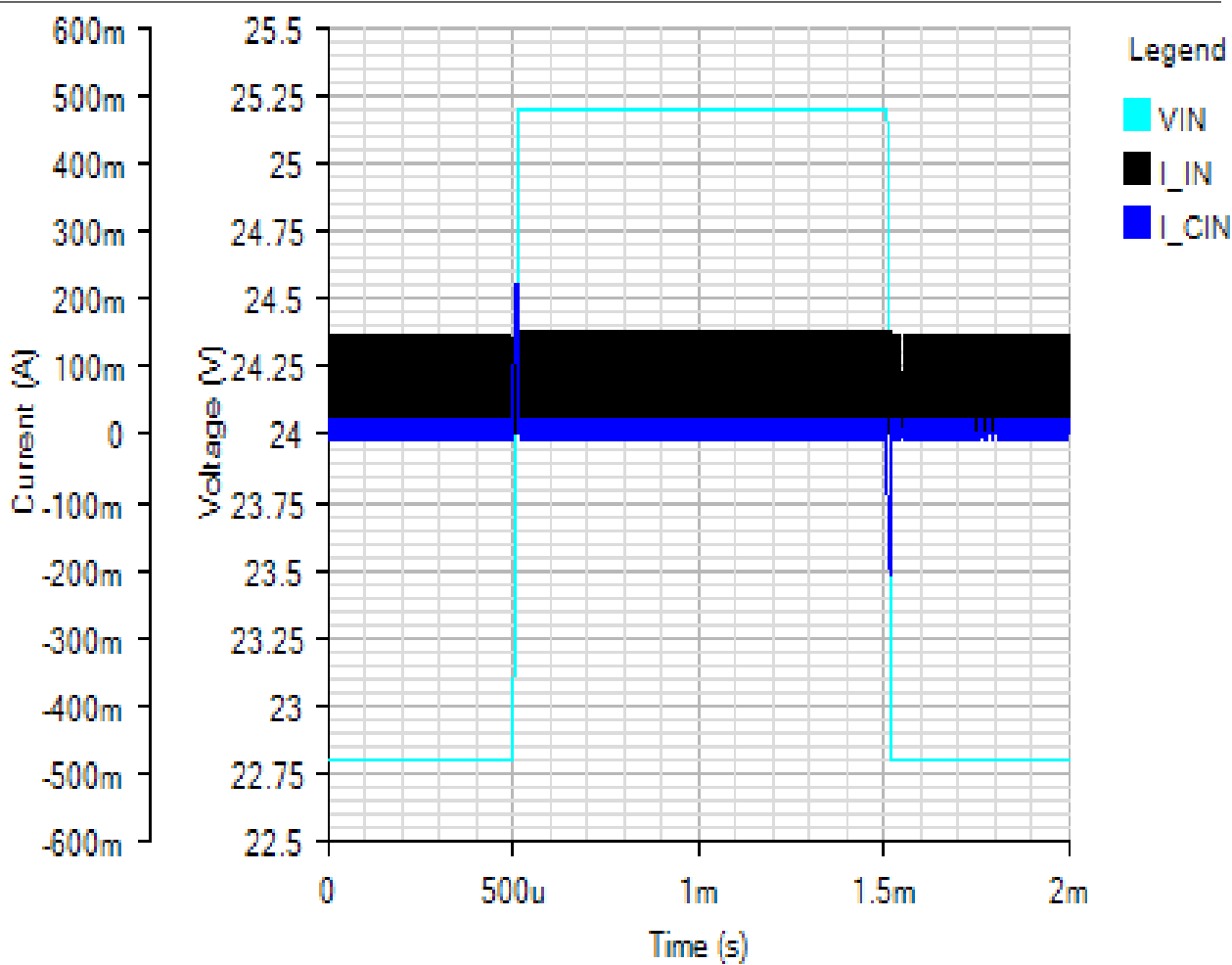
OUTPUT

Default



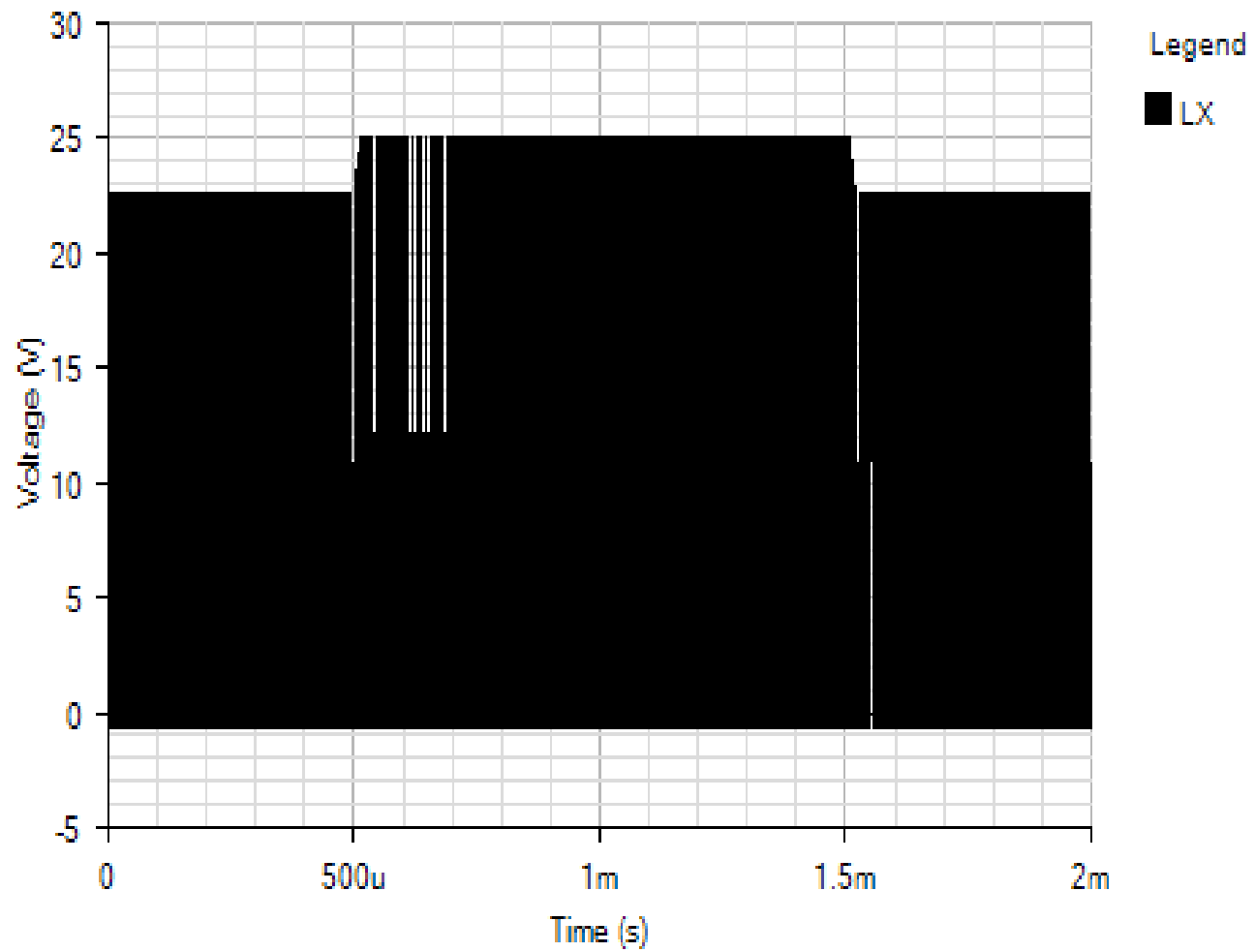
INPUT

Default



SWITCHING

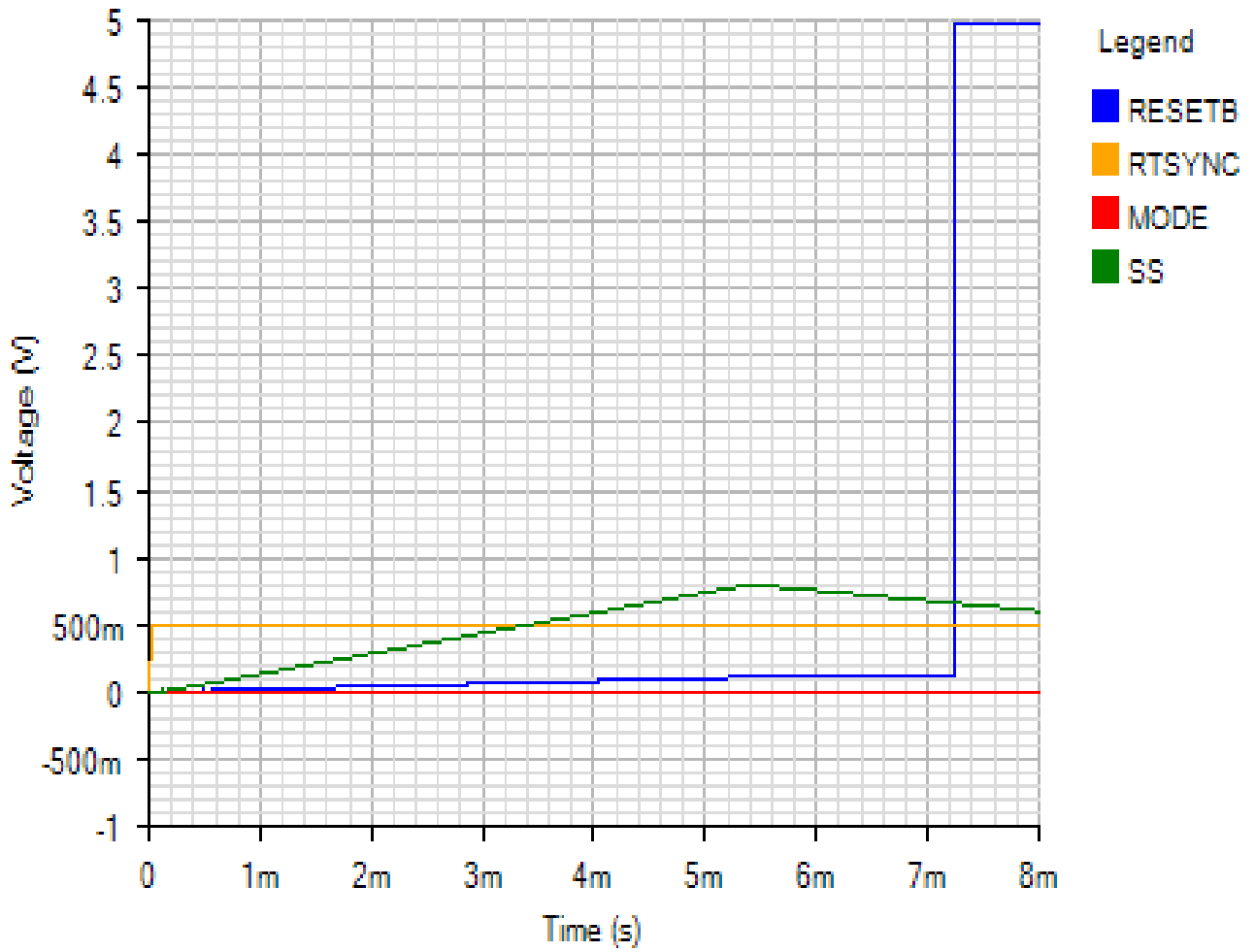
Default



Start Up - Wed Dec 19 2018 16:38:01

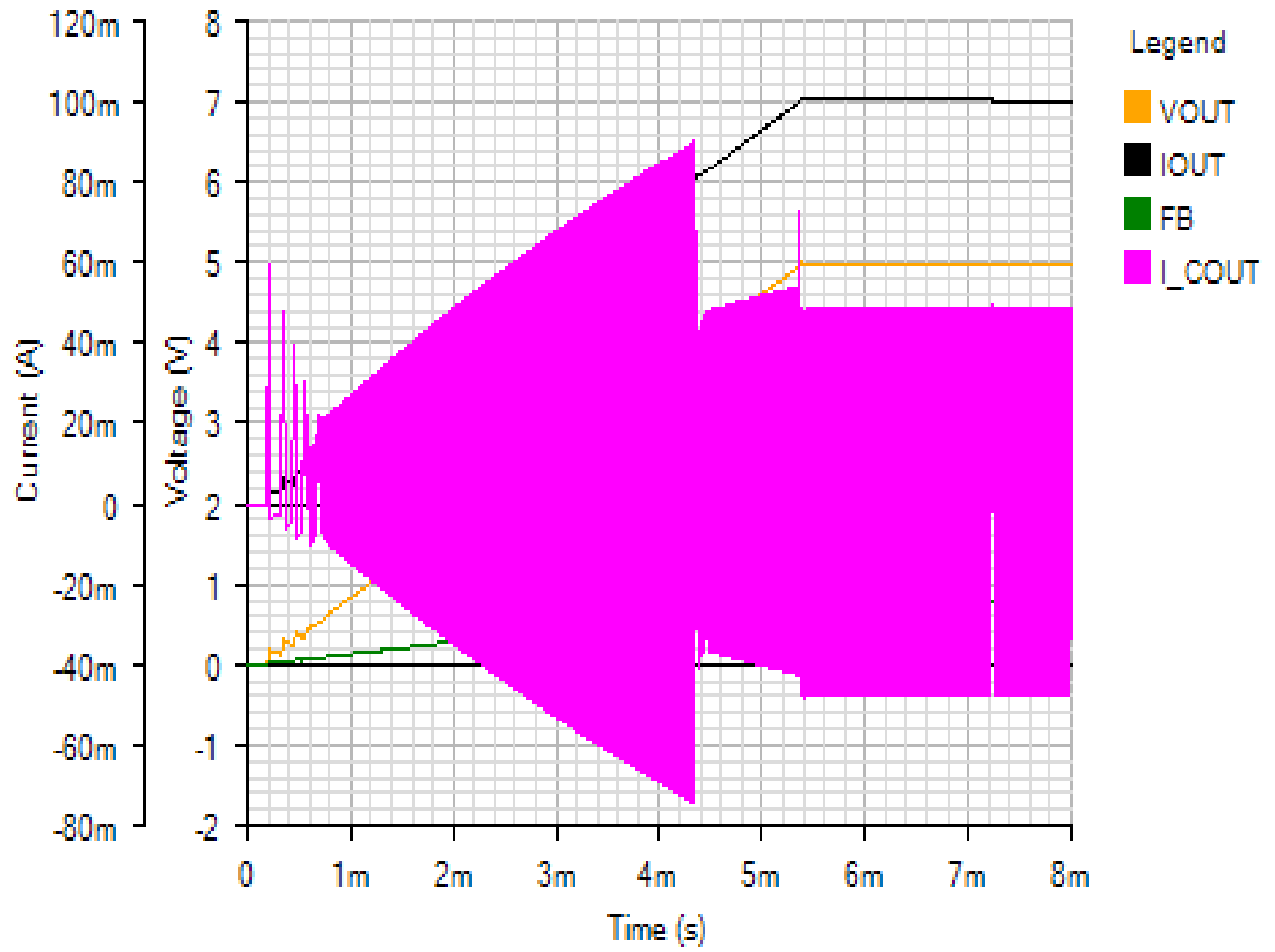
IC

Default



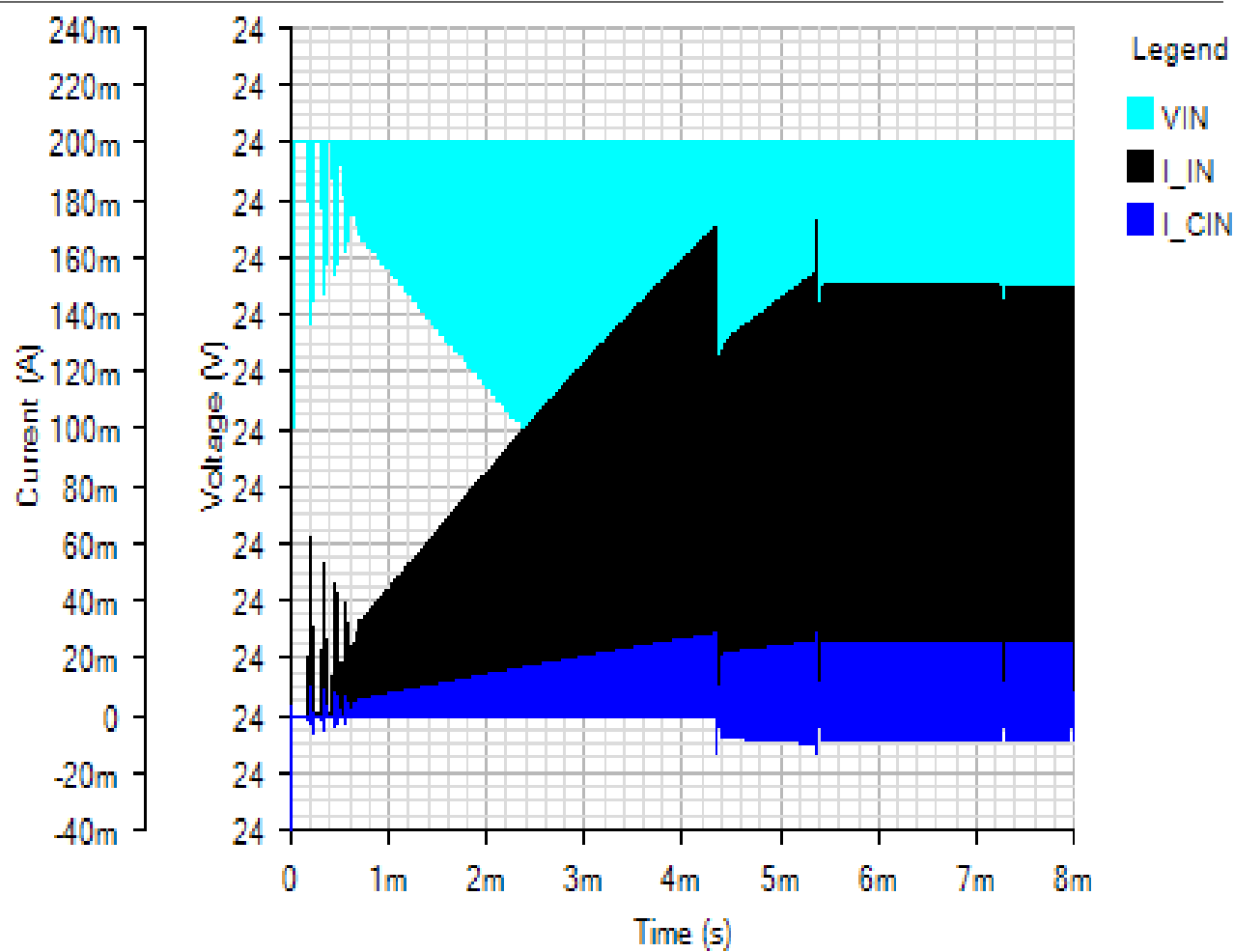
OUTPUT

Default



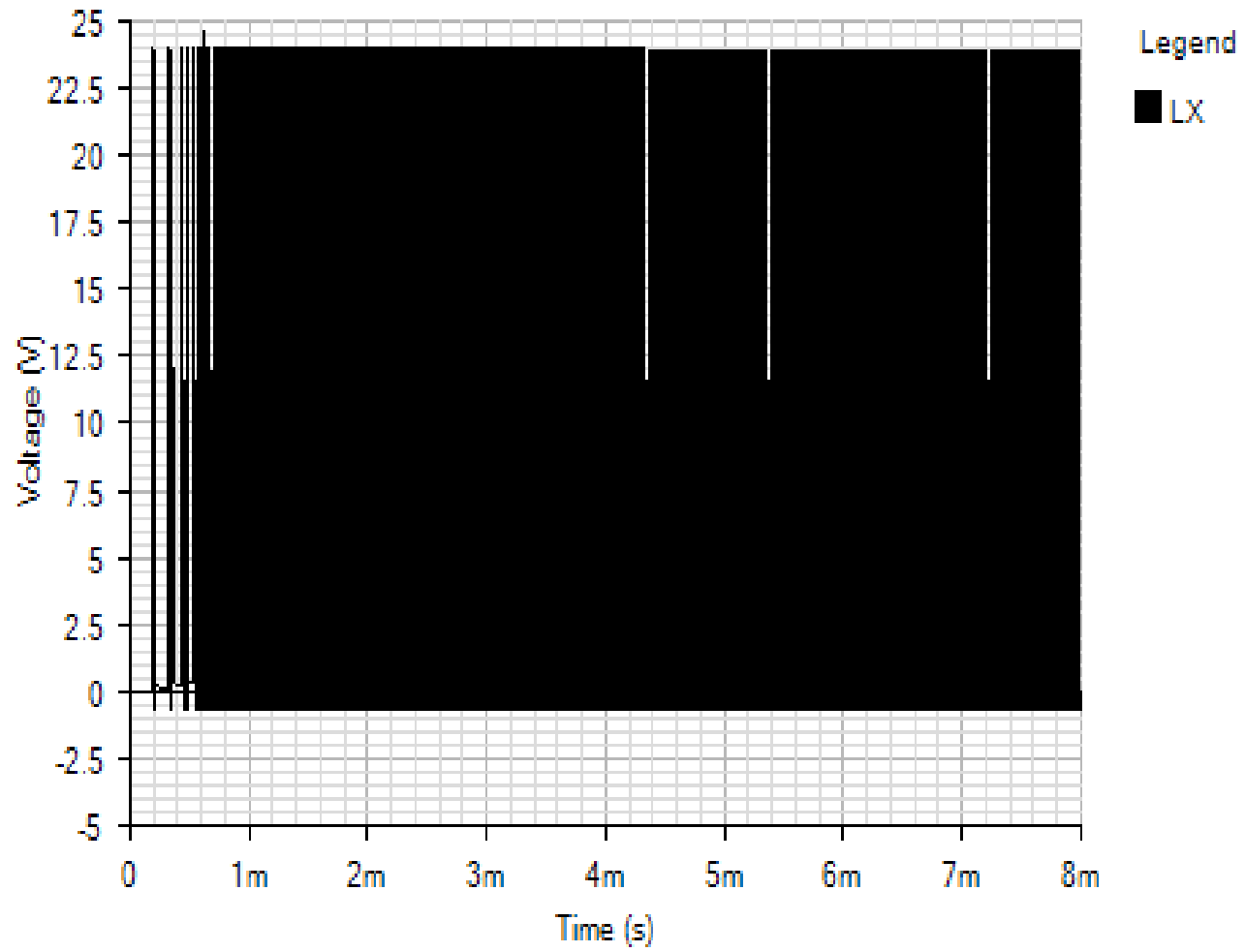
INPUT

Default



SWITCHING

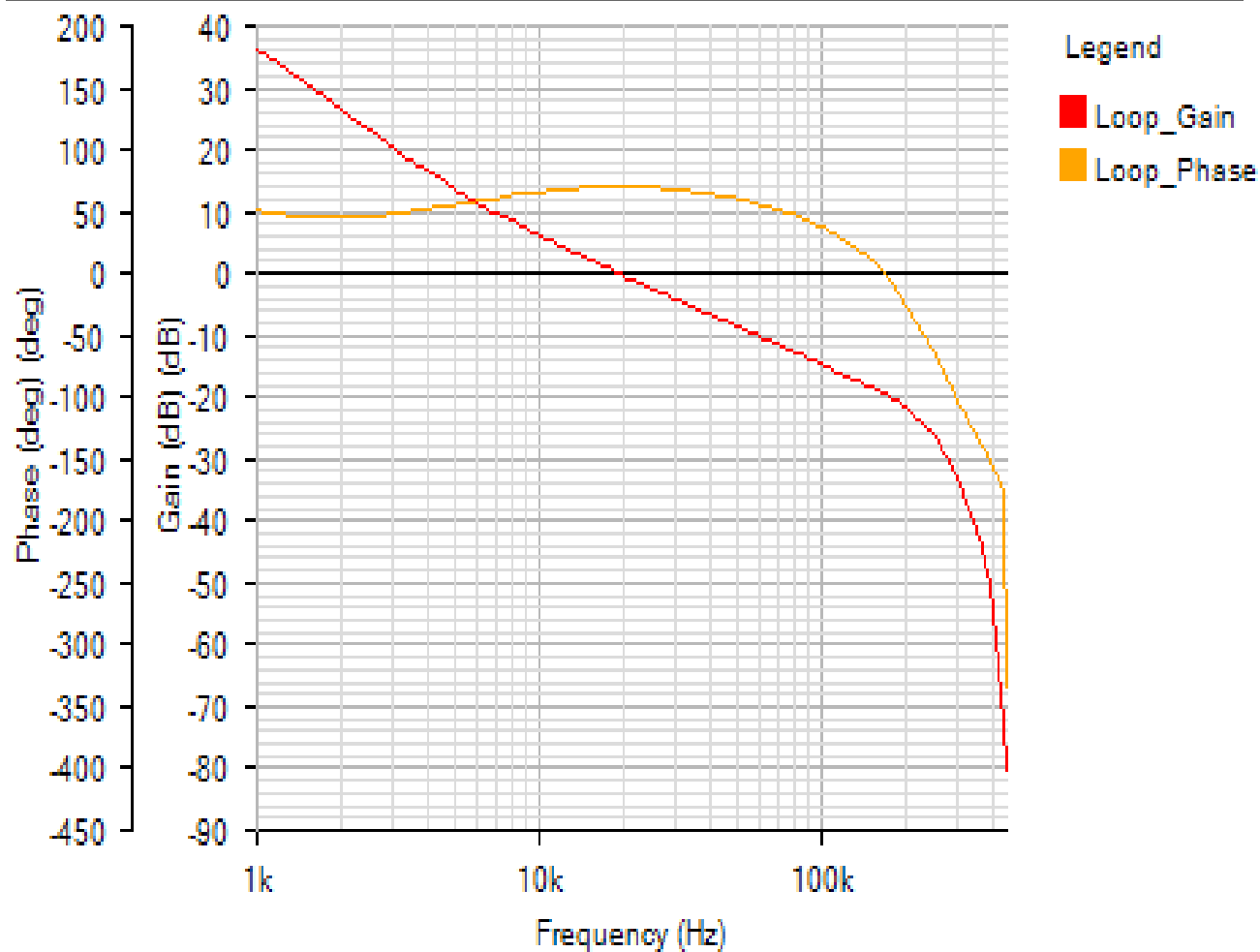
Default



AC Loop - Wed Dec 19 2018 16:38:01

BODE

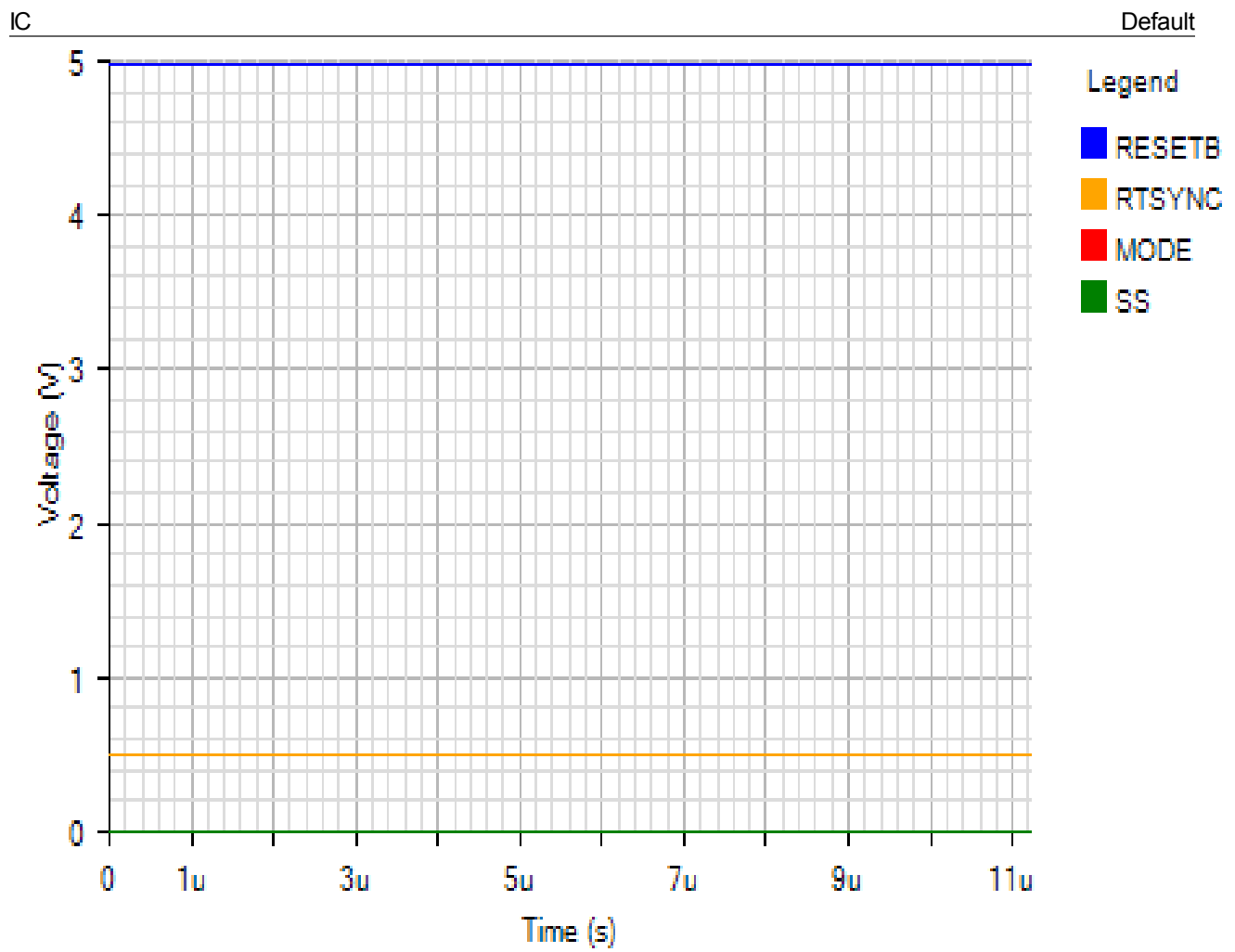
Default



Phase Margin: 70.09° at a crossover frequency of 19.2kHz

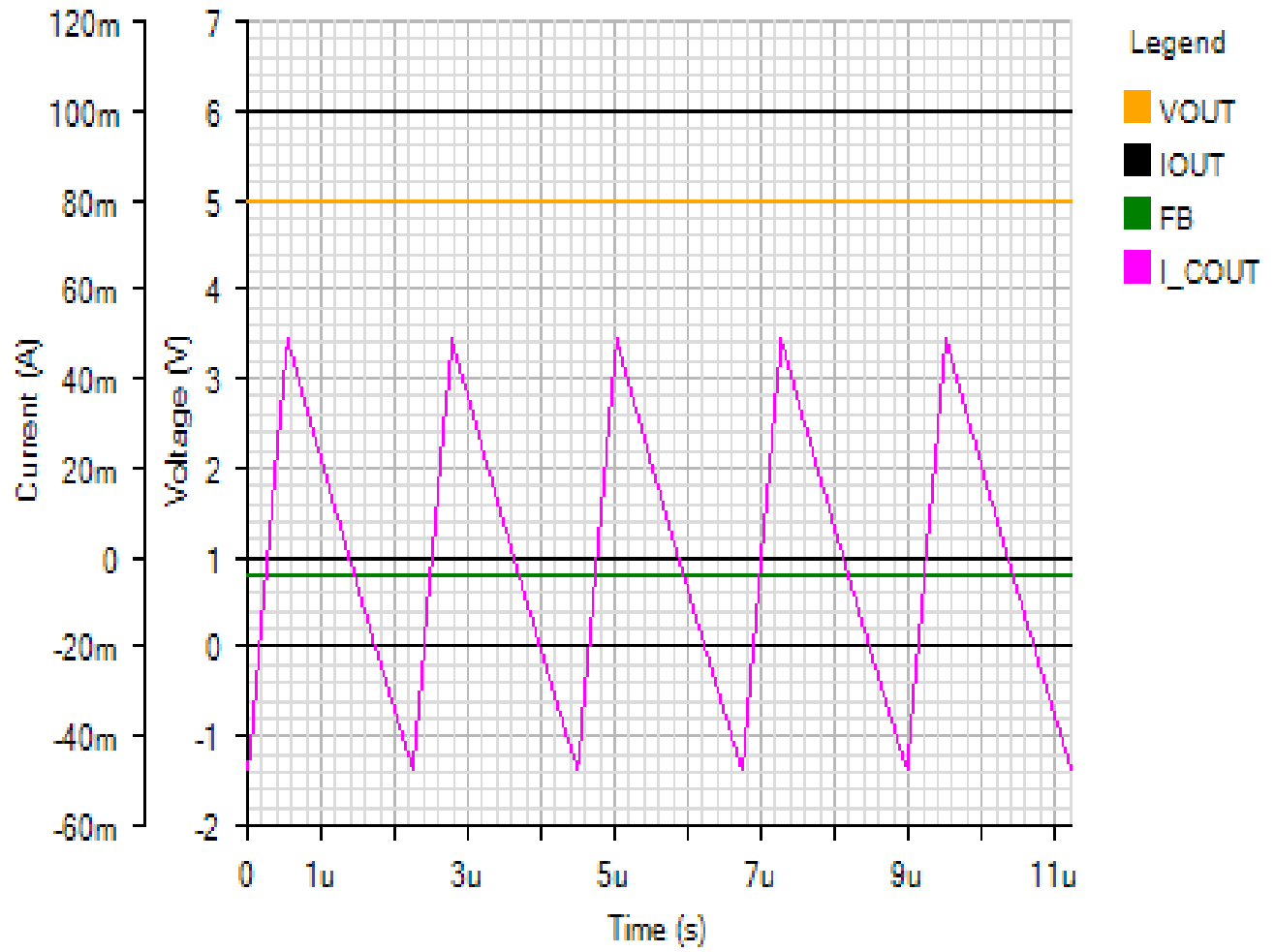


Steady State - Wed Dec 19 2018 16:38:01



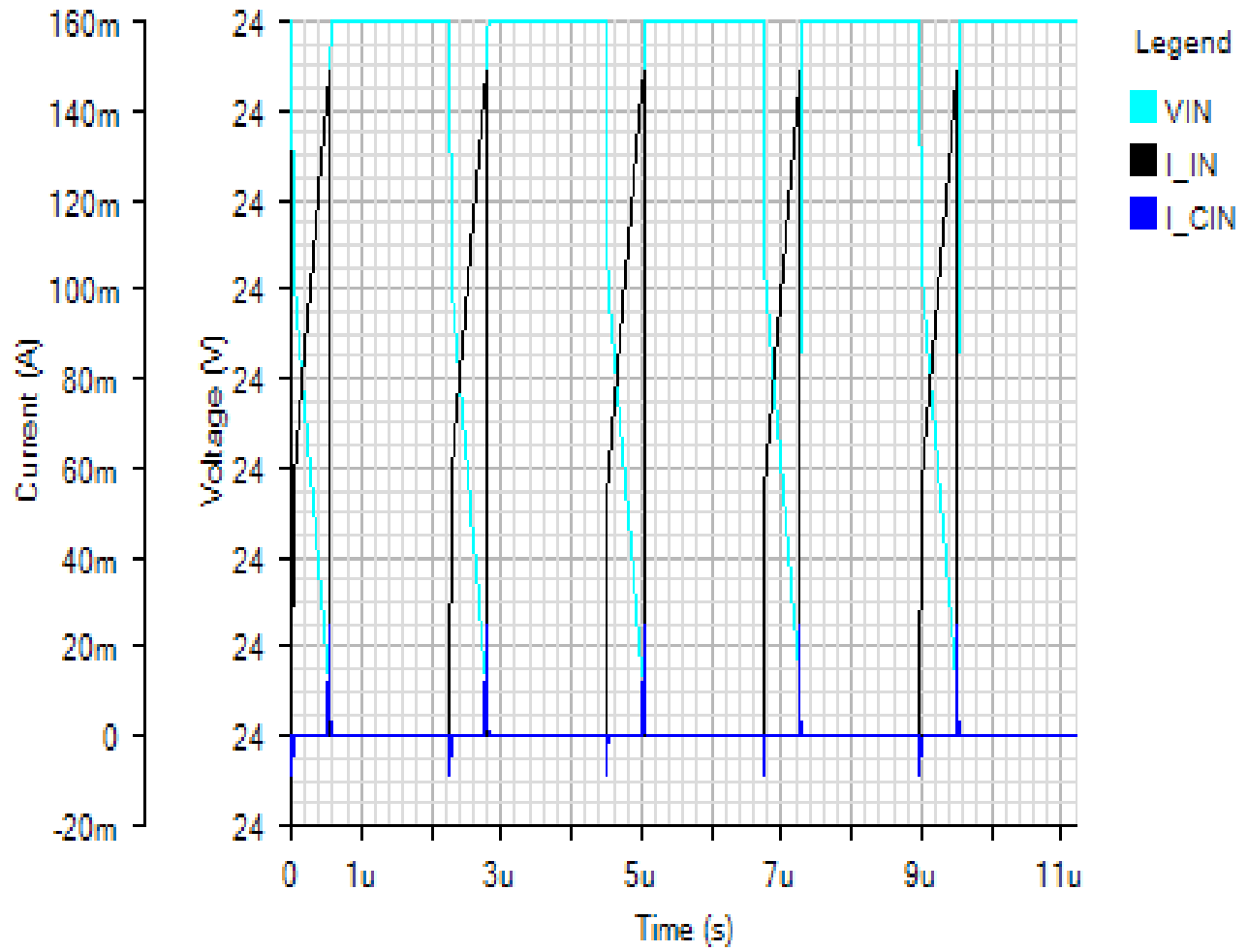
OUTPUT

Default



INPUT

Default



SWITCHING

Default

